ESPON

INTERCO
Indicators of territorial cohesion

Scientific Platform and Tools Project 2013/3/2

(Draft) Final Report

Part C | Scientific report

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C.1. Territorial cohesion

Territorial cohesion is a multi-dimensional and dynamic concept, prone to different interpretations. Taking its roots in spatial policy development, it has aroused the interest of several actors, from researcher to policy makers and planners. For a long time, debates on what was called European *space* or *territory*, *spatial* or *territorial* dimension, took place in informal meetings or under the auspices of Council of Europe. Important documents punctuate the emergence of territorial issue, such as Europe 2000 and 2000+, the Leipzig Charter, the European Spatial Development Perspectives (ESDP), the Territorial States and Perspectives of the European Union (TSP, 2005) and of course the Territorial Agenda (TA) of 2007 which started to spread the topic out of specialists' spheres. But the public debate was really launched by the Green Paper on Territorial Cohesion (EC, 2008a), which reminds the main issues related to territorial cohesion: harmonious development of all territories and of European territory, competitiveness, territorial diversity and potential, accessibility, cooperation, inclusion, sustainability and coordination of policies.

Although it took over previous insights on territorial cohesion, it did not propose any clear definition of it but had a wide and integrated approach, with balanced and sustainable development at its centre. Territorial cohesion is seen as a means of achieving it, by transforming diversity into an asset. The key challenge identified is "*to ensure a balanced and sustainable territorial development of the EU as whole, strengthening its economic competitiveness and capacity for growth while respecting the need to preserve its natural assets and ensuring social cohesion*". Thus, territorial cohesion has the difficult task to build "*bridges between economic effectiveness, social cohesion and ecological balance*". This threefold dimension is partly due to its close links with sustainable development. It also reflects the different not to say contradictory development paradigms it tries to harmonise, such as sustainability, convergence and regional competitiveness (TSP, 2011). One has to go back to territorial cohesion genealogy to understand how we came to this.

Officially territorial cohesion was first mentioned in European primary law in 1997, when new Treaty establishing the European Community (TEC) after the reform of Amsterdam discreetly introduced the terms. Article 16 (now article 14 TFEU) recognised "the place occupied by services of general economic interest in the shared values of the Union as well as their role in promoting social and territorial cohesion". This aspect of territorial cohesion is very specific in comparison to the broader sense it has gained later. The link between general economic interest services provision and territorial cohesion is the idea that every territory must be included in overall European development, having the same opportunities thanks to basic infrastructures tailored to its territorial context and without leaving aside specific territories (Husson, 2002). It can be seen as a need for "spatial justice" (Dabinett, 2011) in the context of a European model of society that should be preserve (Davoudi, 2007). One can recognise here the then French vision which advocates for provision of even non profitable services in all parts of territory (Peyrony, 2007). It is

not surprising, knowing that the Assembly of European Regions first claimed for introducing this third pillar of cohesion in 1995, after having observed that solidarity was strongly missing among European territories and that unbalanced development may lead to territorial deconstruction (AER, 1995). These “French roots” played a great role in understanding and promoting territorial cohesion as maintaining services and lifestyle in less favoured regions, to counter balance deregulation (Faludi, 2004). Besides, French institutions are still priding themselves on it (DATAR 2010) after the success of what has become a “not-so-new buzz word” (Eser, 2009).

Territorial cohesion as an objective of the EU is much more recent since it was added thanks to the Lisbon reform (article 3 TEU: the Union “shall promote economic, social and territorial cohesion, and solidarity among Member States”). As such it does not tell us much about how to achieve territorial cohesion nor about what it means. But the related part on economic, social and territorial cohesion (Title XVIII) has some important changes. According to what had been proposed in the Treaty establishing a Constitution for Europe (article III-220), the least favoured regions which deserve more attention are not anymore only islands or rural areas (ex article 158 TEC). Indeed, the new article on cohesion states that:

> *“In order to promote its overall harmonious development, the Union shall develop and pursue its actions leading to the strengthening of its economic, social and territorial cohesion.*
>
> *In particular, the Union shall aim at reducing disparities between the levels of development of the various regions and the backwardness of the least favoured regions.*
>
> *Among the regions concerned, particular attention shall be paid to rural areas, areas affected by industrial transition, and regions which suffer from severe and permanent natural or demographic handicaps such as the northernmost regions with very low population density and island, cross- border and mountain regions.”* (article 174 TFEU)

The new treaties recognise the role of territorial cohesion to achieve harmonious, balanced and sustainable development, translating it into a territorial setting (TSP, 2011). They take over the idea of reducing disparities, which is the main goal of Cohesion policy, and specify on which new areas public actions have to focus, leaving the door open for new types of regions. As such, territorial cohesion appears as a twofold concept (Schön, 2005). First, it aims at decreasing gaps of socio-economic development levels, to promote equity and balance. And not only between member states but also between regions, where disparities are increasing, and more generally between “territories”, were they cities, rural or functional areas. This has raised the question of efficiency of Cohesion policy (Ederveen, Gorter 2002) while studies have demonstrated that disparities tend to increase at regional scale (Geppert, Stephan, 2008 ; Jean, Baudelle, (dir.), 2009 ; EC, 2008a; Dubois et al. 2007). Nevertheless, this situation confirms the need of a “place-based” approach (Barca, 2009) in policy making and policy evaluation. Second, in order to reduce

negative effects of geographical and structural features that are considered as obstacles to good interaction between those specific territories and other regions, an efficient use of territorial capital is expected to transform handicaps into assets, or "diversity into a strength". The idea behind is that unused growth potential can reinforce persistent disparities (OECD, 2009) and that comparative advantages can result from specific features and act as development potentials. Unleashing the territorial capital (EC, 2009d) does not only concern local development, although it has become central in new Cohesion policy, but rather endogenous development.

As the focus is on territories and not on sectors, implementing territorial cohesion requires coordination of economic policies of member states as well as of sectoral policies and actions of the EU. This is expressed by article 175 TFEU, which tries to overcome the difficulty of overlapping powers and competence in the field of spatial development policies, because they are implemented by different actors. Thus, at European level, the challenge is to internalise spatial mindset among officials and to encourage responsible spatial policy authorities to play their role in implementing territorial cohesion (Bynens, Van der Lecq, 2005). The fact that territorial cohesion is now a shared competence does not really solve the problem already stresses by ESDP. As a policy framework, ESDP aimed at improving "cooperation between Community sectoral policies with significant spatial impacts and between Member States, their regions and cities" (ESDP, par. 22). Among its principles, it stated that spatial development can contribute in a decisive way to the achievement of the goal of economic and social cohesion, to the implementation of Community policies which have a territorial impact and that the central aim is to achieve sustainable and balanced development. In that context, territorial cohesion is becoming a more governance issue and takes over the role of spatial development policy in the post-ESDP-process (David, 2007). But this need for more coherence should not reduce territorial cohesion to the territorial dimension which must be taken into account in policy process, for example through territorial impact assessments and more generally through appropriate tools that helping defining territorial context, challenges and policy answers (McCann, 2011).

Because of its genealogy, territorial cohesion can be considered as a policy concept, rather than a theoretical concept (Gualini, 2008). This may be the reason why it encompasses such divergent goals, coming almost all from ESDP. Indeed, this first political document gathering knowledge and orientations for European space set up all important issues that are still at stake in new Territorial Agenda. The three spatial development guidelines are:

- Development of a polycentric and balanced urban system and strengthening of the partnership between urban and rural areas. This involves overcoming the outdated dualism between city and countryside.
- Promotion of integrated transport and communication concepts, which support the polycentric development of the EU territory and are an important pre-condition for enabling European cities and regions to pursue their integration into

EMU. Parity of access to infrastructure and knowledge should be realised gradually. Regionally adapted solutions must be found for this.

- Development and conservation of the natural and the cultural heritage through wise management. This contributes both to the preservation and deepening of regional identities and the maintenance of the natural and cultural diversity of the regions and cities of the EU in the age of globalisation.

Actually, polycentrism appears as an overarching principle which has free itself from urban studies and became a normative concept (Davoudi, 2003 ; Gualini, 2008). Far from being only about territorial structure, its decentralised centrality concerns at least four scales: European, national, regional and local (Baudelle, Castagnède, 2002). They are well taken into account in TA2020, but it may be preferable to make clear the objective for each level (Krätke, 2001), since it appears that for regions and cities it is more related to competitiveness issues, whereas for the EU it is discussed in terms of cohesion and in both competitiveness and cohesion at national scale (Meijers, Waterhout, Zonneveld 2006). This raises the broader question of compatibility between cohesion and competitiveness (Lennert, Robert 2010, Héraud, 2009; Vanolo 2010 ; Ache, 2008), especially with technological innovation and cluster being at the centre of development strategy (Héraud, 2009). In any case, the role of cities is crucial for a polycentric Europe, as they constitute nodes of concentration and connection. Urban dimension gains more and more importance in Cohesion policy (EC, 2011c) and in Europe's growth strategy (EC, 2011b). This is not surprising knowing that from small towns to large urban areas, cities contain the biggest contradictions and concentrate the highest disparities, which increase the challenges they have to face.

As we can see, there are different ways of understanding territorial cohesion, given its background and its multiple objectives. Following Camagni, we can summarise the three dimensions as below (Camagni et al., 2010- TIPTAP Final Report):

- Territorial Efficiency: resource-efficiency with respect to energy, land and natural resources; competitiveness and attractiveness; internal and external accessibility; capacity of resistance against de-structuring forces related to the globalisation process; territorial integration and cooperation between regions;
- Territorial Quality: the quality of the living and working environment; comparable living standards across territories; fair access to services of general interest and to knowledge;
- Territorial Identity: presence of "social capital"; landscape and cultural heritage; creativity; local know-how and specificities; productive "vocations" and "uniqueness" of each territory.

This vision deserves credit for integrating economic, social and environmental objectives, but in fact it reproduces the ambiguity of a "model that maximizes economic growth through competitiveness softened by references to ecological equilibrium" (Farrugia, Gallina, 2008). This can be explained by EU's current policy priorities to which it is linked. To take only the most important, we should refer to

Europe 2020 and Sustainable Development strategies. The first aims at smart, sustainable and inclusive growth : developing an economy based on knowledge and innovation, focusing on more resource efficient, greener and more competitive economy and fostering a high-employment economy delivering economic, social and territorial cohesion (EC, 2010a). Thus, the relationship between territorial policy and growth strategy has to be mutual (TSP, 2011). The second, as a long-term and global vision, includes territorial cohesion in the overarching questions of well-being and progress, i.e. an economic and social well-being that is sustainable.

Behind the territorial dimension, this is actually the overarching question of **well-being** of people that is at stake, even more the question of **progress**, i.e. an economic and social well-being that is sustainable (see the work of the Commission on the Measurement of Economic Performance and Social Progress Following (Stiglitz, Sen and Fitoussi 2009)).

There are indeed clear links between territorial cohesion, well-being (economic, social, environmental) and sustainability. Well-being must be sustainable in the long term and shared among people and territories; cohesion is a condition for sustainability; sustainability must be looked after while maintaining the highest possible level of well being (Figure 11).

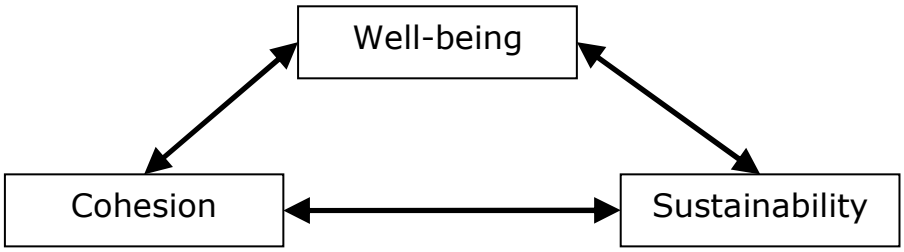


Figure 11. Cohesion, well-being and sustainability

Sustainability could be seen as the temporal component of well-being, cohesion being an horizontal component across the various dimensions of well-being (economy, society, environment). In reference to Da Cunha (Da Cunha, 2005) for his definition of sustainable development, cohesion can be seen as:

- a principle of action (something must be done)
- ethics (a set of values, such as economical, social and territorial equity)
- an integrative concept (multi-dimensional approach)

Linking territorial cohesion with well-being may appear well-intentioned, but in fact it is crucial when it comes to measure it, i.e. to choose indicators and ways of calculating them. To measure the dimension of well-being on which policy can reasonably claim to have an effect, we have to prefer outcomes indicators (Barca, McCann, 2011). This allows also getting out of the false debate on place-based *vs* people-centred policies.

Territorial cohesion, being an objective and an instrument, is a rather complex policy concept, evolving with the general policy context and much prone to debate. Even if

a clear definition is desirable, one has to admit that its flexibility allow many interpretations and thus adaptations to different contexts. This may not make the task to implement and measure it easier, but its different facets give also more possibilities for the choice of indicators.

C.2. Selection criteria

C.2.1. The selection of the "headline" and "core" indicators

C.2.1.1. The number of indicators

As we have underlined, **the number of these indicators should not be very big** in order the entire set could be easily handled by interested stakeholders. The project first identified roughly 60 headlines and core indicators (Annex 2) and, finally, 32 top indicators (Annex 3).

C.2.1.2. "Territorial" or "place- based" indicators

A primary important criterion of selection of indicators is **whether they are "territorial" or "place- based"**. This criterion has both conceptual and "technical" aspects.

The conceptual aspect

INTERCO has prioritised a "**place-based" or "territorial" approach of the ESPON space.** As a number of analyses has stressed (see, among others, in: Barca 2011 and Grasland – Hamez 2005), the setting and implementation of the EU Cohesion Policy were at a great extent based on a "a-spatial" (non spatial) approach of Cohesion. Thus the attempts of the Cohesion Policy to face the actual territorial challenges were much less efficient than expected.

The "territorial" scope of INTERCO should be reflected both in the choice of the indicators and the methods to use them.

From this point of view the literature on the "place based' approaches does not always define clearly the issues which are supposed to be "territorial". However, all the respective researches agree that issues related to the cities, the rural space and the specific regions are more "territorial' than the issues related to a simpler "regional classification" of the European and the national space.

The technical aspect

From the previously described scope, indicators which correspond to the NUTS3 level and, even lower levels –LAU levels – are more "territorial" than others. The "degree of urbanisation" also counts from this scope. We will come back to this issue in next.

C.2.1.3. The cover of all the TC dimensions

An important choice of INTERCO is to approach TC as a **multi-dimensional concept**, emphasising, more than the relevant previous attempts, on the well being and environment components of TC.

INTERCO has approached the TC dimensions in **two conceptual levels** (see also in chapter "B.2.1. Selecting the indicators"):

A more general level in which TC is analysed in three dimensions: economy (competitiveness), society (inclusion), environment or, in terms of the "Europe 2020": *smart growth, inclusive development, sustainable development* (environmental sustainability).

A second level in which TC is decomposed in eight dimensions: *competitiveness, innovation, inclusion, environment quality, energy, connection and cooperation/ governance.*

C.2.1.4. The data availability in relation to the scale / level and the context

Scales and contexts

The territorial approach is necessarily a **multi-level** approach in which drivers of force acting at each level are interrelated with drivers of force acting at the higher and lower levels. Thus, the **"context"** is of crucial importance for the territorial approach of cohesion. Therefore it was necessary to examine if the headline and core indicators enable to study this interaction among the "levels".

Specifically, the tests of indicators in INTERCO showed that the territorial patterns of inequalities per indicator differ considerably according to the level examined.

Therefore we have included by priority in the "headline and core" set indicators for which there are data at least for the NUTS2 level. This concerns finally the large majority of indicators of this set.

The existence of data at NUTS3 level is an advantage, but working for some "dimensions" at NUTS3 level necessitates the transformation of the NUTS2 data for other indicators to NUTS3, which could be done with caution.

The data availability per NUTS

From the scope of the present analysis, we have discerned four categories of indicators as for the data availability:

- **Indicators for which there are actually data only at NUTS0 level (**for example: Labour productivity.) It is not worthwhile to use these indicators in synthetic / composite indicators which aim explain territorial inequalities (adopting a place – based approach). INTERCO recommends to Eurostat and EU member countries to collect the respective data regularly at NUTS2 level.
- **Indicators for which there are actually data at NUTS2 level**. They could be used for the creation of TC synthetic / composite indicators. We should divide this group of indicators in two sub-categories:
    a. The first refers to indicators the data for which are already collected regularly by National Statistical Offices as for example labour force indicators based on data collected by the Labour Force surveys which are regularly implemented in all EU countries.
    b. Indicators based on data provided by specific surveys which are not implemented regularly by National Statistical Offices of the EU

countries as for example: GERD (Gross domestic expenditure on research and development). INTERCO recommends to Eurostat and EU member countries to collect the respective data regularly (at NUTS2 level).

- **Indicators for which there are data at NUTS3 level** as for example: employment rate. These indicators are the more appropriate to be used in TC analyses and for the creation of TC synthetic / composite indicators for all the TC issues except from the TC urban-rural and "local" issues.
- **Indicators for which there are data at LAU level** as for example: population density. They are more appropriate to study the TC urban – rural and local issues.

  Approaches of some dimensions of TC could only be implemented by analyses at LAU level: urban, urban-rural and "local" analyses (included in the "territorial structure" dimension) or by network analyses (included in the "connection" dimension).

*As we have pointed out the set of "headline" and "core" indicators (*Annex 2*) fulfills to a considerable degree but not fully the selection criteria.*

The indicators which fulfil fully these criteria are included in the list of "top" indicators" while the remaining indicators are put in a ***list of "wishful" indicators.***

C.2.2. The selection of top indicators

The number of indicators of this set is even more limited – it contains 32 indicators (Table 6, page 16) – in order that this set could be used by a very large audience of interested stakeholders, a number of which has a low technical capacity regarding TC concepts and techniques.

The top indicators should be fully "territorial", fully operational actually (the necessary data should be available now -see before) and very well related to territorial cohesion policy objectives.

Especially for this last criterion:

The majority of the **Territorial Agenda (TA) 2020** objectives (priorities – see below) which interests INTERCO more as they are by definition based in a space-based approach) correspond to the top indicators. The latter should also correspond to the EU 2020 priorities

TA 2020 priorities

- Promote polycentric and balanced territorial development
- Encouraging integrated development in cities, rural and specific regions
- Territorial integration in cross-border and transnational functional regions
- Ensuring global competitiveness of the regions based on strong local economies
- Improving territorial connectivity for individuals, communities and enterprises

- Managing and connecting ecological, landscape and cultural values of regions

EU 2020 priorities

- Smart growth – developing an economy based on knowledge and innovation.

Sustainable growth – promoting a more resource efficient, greener and more competitive economy.

Inclusive growth – fostering a high-employment economy delivering economic, social and territorial cohesion.

The TPG has assessed in more depth the degree of fulfillment of these criteria using the following more detailed **additional criteria** for the indicators examined[9]:

- They clearly target territorial cohesion and not economic or social cohesion, i.e. they focus on the added value of territorial cohesion
- They are normative, i.e. they move from less to more territorial cohesion.
- The direction of change should be clear.
- Exact thresholds could be used. These thresholds should be decided through a political process but should also be related at least to the thresholds mentioned by the EU 2020 targets[10].
- Necessary data for the indicators are available, updated regularly -ideally annually- and include a short time series
- They change over time
- They are sensitive to policy change
- They are available at the sub-national level and preferably NUTS 3 or degree of urbanisation + NUTS2 level
- As territorial cohesion mostly relates to differences between territories, not on the absolute values of an indicator within a single region. The direction of change should be to reduce differences between regions/territories and not a general increase everywhere

Almost all the “top” indicators (Table 6) fulfill these additional criteria.

[9] The majority of these criteria are included in the contribution of L. Disjkra (DG Regio) towards the 2nd INTERCO meeting with stakeholders

[10] The 5 targets for the EU 2020:
1. Employment: 75% of the 20-64 year-olds to be employed
2. R&D / innovation: 3% of the EU's GDP (public and private combined) to be invested in R&D/innovation
3. Climate change / energy: greenhouse gas emissions 20% (or even 30%, if the conditions are right)lower than 1990,

20% of energy from renewables, 20% increase in energy efficiency
4. Education: Reducing school drop-out rates below 10%, at least 40% of 30-34–year-olds completing third level education
5. Poverty / social exclusion: at least 20 million fewer people in or at risk of poverty and social exclusion

C.3. Indicators presentation

The territorial cohesion indicators as selected and defined in INTERCO project are presented in the following chapters. Basically, following chapter "B.2.2. Reasoning scheme for the final set of indicators" (p. 14), the indicators are presented by territorial objective. First, the territorial objectives and the rationale behind the indicator selection will be described. After that, each indicator will be presented in a standardised manner. First, basic information on the indicator will be provided, along with an indicator description, followed by a diagram illustrating the minima, mean and maxima values per country for the latest available year. The presentation will then be concluded with the indicator map, which also includes the sigma convergence graphs (if available).

Indicator presentation for each territorial objective concludes with a short summary highlighting the main findings and focusing on the indicator developments (trends towards cohesion or towards increasing disparities).

C.3.1. Strong local economies ensuring global competitiveness

A more balanced and sustainable competitiveness is needed within Europe and for its role in a globalised economy. This was already the objective of ESDP and continues to be of great importance in TA 2020 and Europe 2020. Regions should aim at a sustainable growth through a more competitive economy based on higher productivity. Strong local economies and communities are key players for that. Thus, one should look at local challenges to underline local disparities, especially on what can shadow long-term growth: demographic challenge (ageing) and quality of labour market.

Four indicators are proposed as territorial cohesion indicators under this objective:

- GDP per capita
- Overall unemployment rate
- Old age dependency ratio
- Labor productivity

These indicators are dedicated to measure the overall economic output of all activities (GDP per capita), the quality of the regional labour markets (unemployment rate), the labour market age structure (old age dependency ratio), and the competitiveness of a region compared to global market (labour productivity). As for the indicator on labour productivity, European statistics provide time series data for a period of 1995-2010 only at national level. Therefore, the related indicator called labour productivity in industry and services was also tested, which is available at least at NUTS-2 level, but only for one point in time and not as time series. So the reader will find two productivity maps here.

Consequently, in the indicator wishlist it is recommended to collect data on labour productivity per persons employed at regional level (NUTS-3).

As all four indicators are available for several years, sigma and beta conversion plots have been generated helping to analyse the temporal dimension of cohesion, i.e. to analyse trends towards cohesion (for labour productivity only at national level). For indicators at NUTS-3 level (GDP per capita, unemployment rate, old age dependency ratio), this analysis was furthermore conducted by differentiating five types of regions (predominantly urban regions, intermediate regions close to a city, intermediate regions remote, rural regions close to a city, rural regions remote) which may provide additional insights into the spatial development of cohesion trends in Europe.

GDP per capita

Theme:
ECONOMY, LABOUR FORCE
Business, all sectors

Policy relevance:
This indicator measures the overall economic output of all economic activities.
It provides insight into economic strength and regional growth.

Desired direction of change:
Increase of GDP per capita is desired generally for all regions; however, lagging regions and regions in rural or peripheral areas should catch up faster.

Description:
The map highlights two main spatial divides: first, there is a strong concentration of GDP per capita in capital city regions and in big agglomerations. Second, the map illustrates the still existing clear East-West divide between the old and the new EU Member States, with Eastern Europe experiences significant lower GDP levels compared to Western Europe.
The temporal development of disparities between European regions was quite distinct, as the sigma convergence graph shows: until 2001, disparities slightly increased for all types of regions; since then disparities decreased with highest decreases for intermediate, remote regions as well as predominantly rural regions (Figure 13); differences between predominantly urban regions, however, remained stable over time. Across all NUTS-3 regions, a slight trend towards cohesion could be observed for entire Europe.
This is generally confirmed by the beta conversion graphs (Figure 14), illustrating that for all region types those regions with lower levels of GDP per capita developed faster compared to those regions with higher GDP levels; however, because there are for all region types (except for remotely predominantly rural regions) regions with negative GDP developments, watering down the positive results, the overall sigma convergence trend is not as clear as it seems at a first glance.

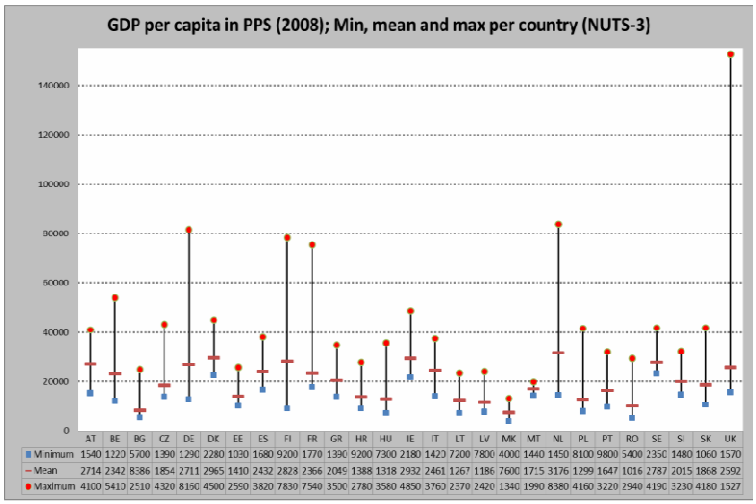


Figure 12. GDP per capita by country – Minima, maxima and averages

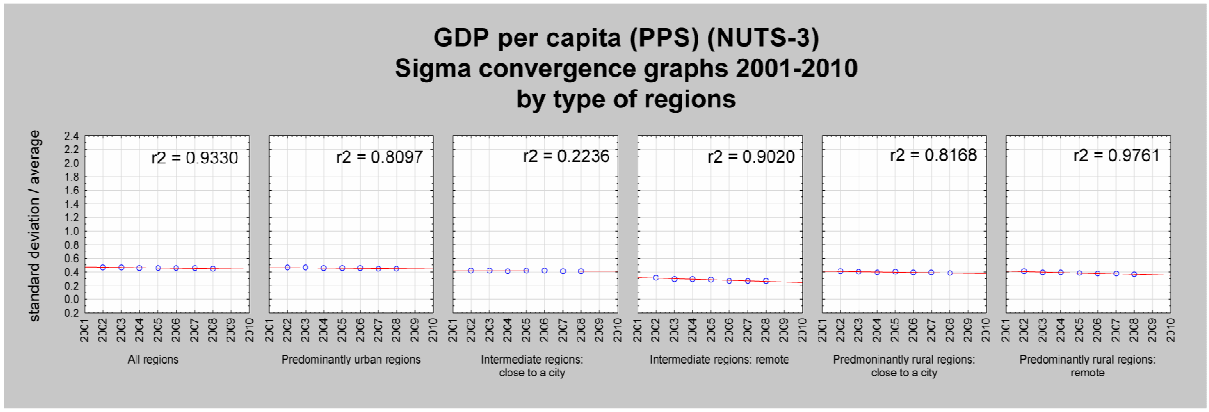


Figure 13. GDP per capita by type of region – development of disparities 2001-2010

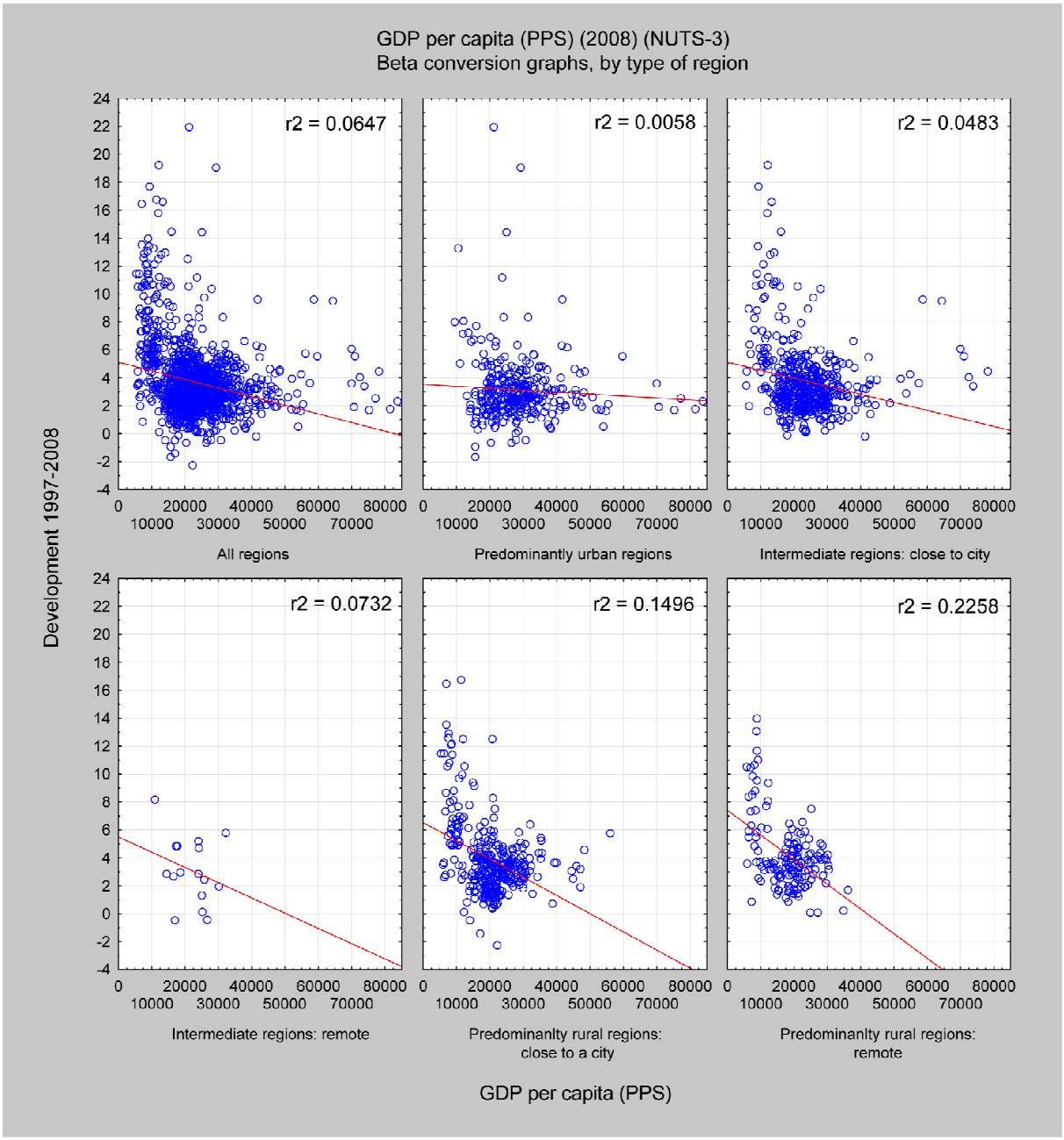
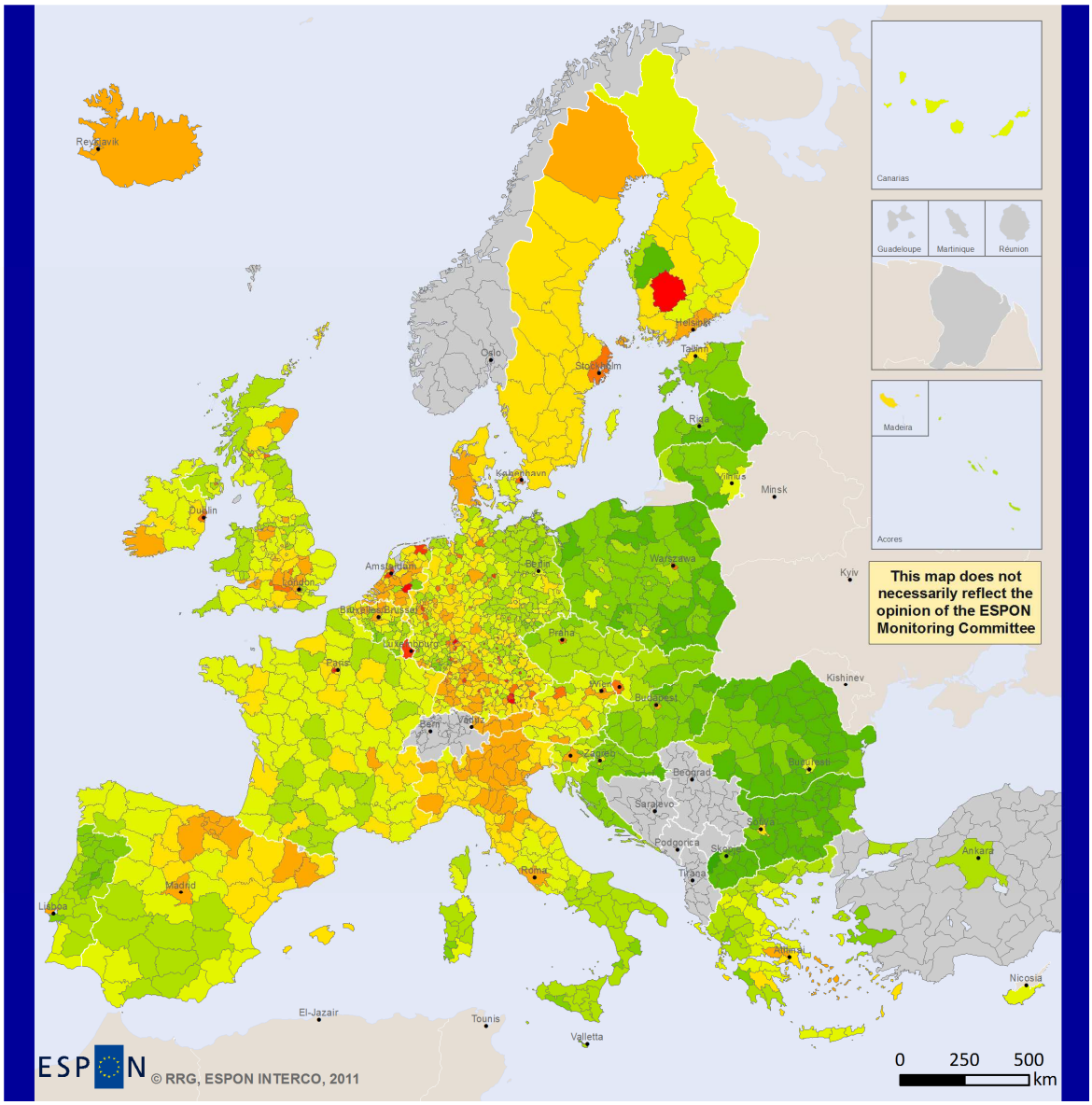


Figure 14. GDP per capita by type of region – beta convergence

GDP per capita (2008)

0 7 0 8 g d p p p s _ _ 2 0 0 8 n 3 r t d

Territorial objective	*Change direction*	*Gaps*	*Years available*
Strong load economies ensuring global competitiveness	Increase desired, while lagging regions should catch up faster	Missing data for CH, NO, TR and Western Balkans	1997-2008



Euros in Purchasing Power Standards

0 - 5,000	25,001 - 30,000
5,001 - 10,000	30,001 - 40,000
10,001 - 15,000	40,001 - 50,000
15,001 - 20,000	50,001 - 75,000
20,001 - 25,000	75,001 - 200,000
	Data missing

Indicator definition

GDP per capita in Purchasing Power Standards (PPS)

Sigma convergence

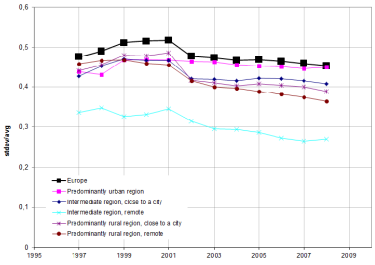


Figure 15. Indicator – GDP per capita 2008 (PPS).

Unemployment rate

Theme:
ECONOMY, LABOUR FORCE
Employment, Unemployment

Policy relevance:
This indicator measures the quality and performance of regional labour markets.
It constitutes a contextual indicator important to assess regional flexibility as well as sustainability of local economic activities.

Desired direction of change:
Generally a decrease of unemployment rates over total population is desired; particular attention needs to be paid to decrease unemployment in old industrialised areas and in rural areas or areas with specific geographical handicaps (such as islands, mountain regions or border regions).

Description:
Unemployment rate in Europe ranges from one percent (Norway, Alpine regions, Benelux, parts of Germany and the UK) up to almost 30 percent in Southern Spain. Some countries show only little variations (France, Portugal, Finland, and Sweden), other countries such as Germany, Spain, and Turkey or Romania reveal great differences among their regions (Figure 16). Development of unemployment rates differed to large extent across Europe. While regions in Poland, Finland and Southern Italy experienced a fall in unemployment, Sweden, Iceland, Ireland, England, parts of Spain, Italy and Hungary experienced significant increase in unemployment rates, partly as high as 20 percentage points. During 2006-2009, unemployment rates again increased in many countries due to the economic crisis. This increase, however, had quite different impacts on the development of disparities among different types of regions (Figure 17).
While disparities among predominantly urban regions remained unchanged, disparities increased among remote intermediate regions and also among remote rural regions; in contrast, disparities slightly decreased for intermediate

regions that are close to a city, and significantly decreased for rural regions close to a city. Altogether, at European level this lead to a slight decrease in unemployment across all regions.
When analyzing the development of regional unemployment rates over a longer period since 1999, the beta convergence confirms (Figure 18) these heterogeneous developments: even though generally in regions with higher unemployment rates unemployment even increased, the situation in regions with lower unemployment rates is not that clear: there are regions with increasing but also with decreasing unemployment. This observation holds true for all types of regions.

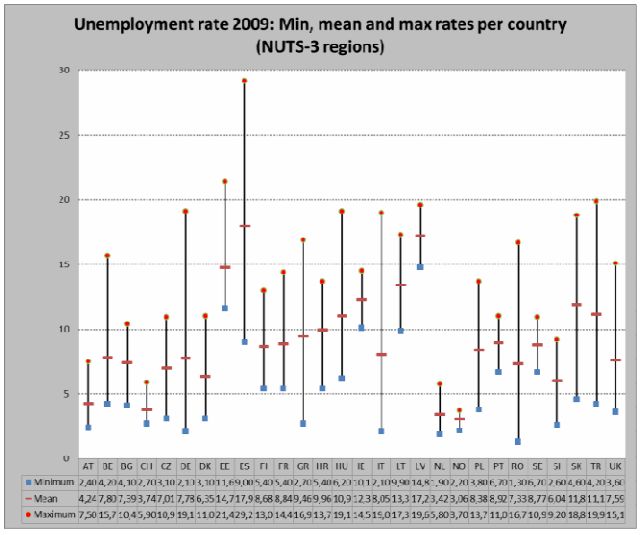


Figure 16. Unemployment rates by country – Minima, maxima and averages

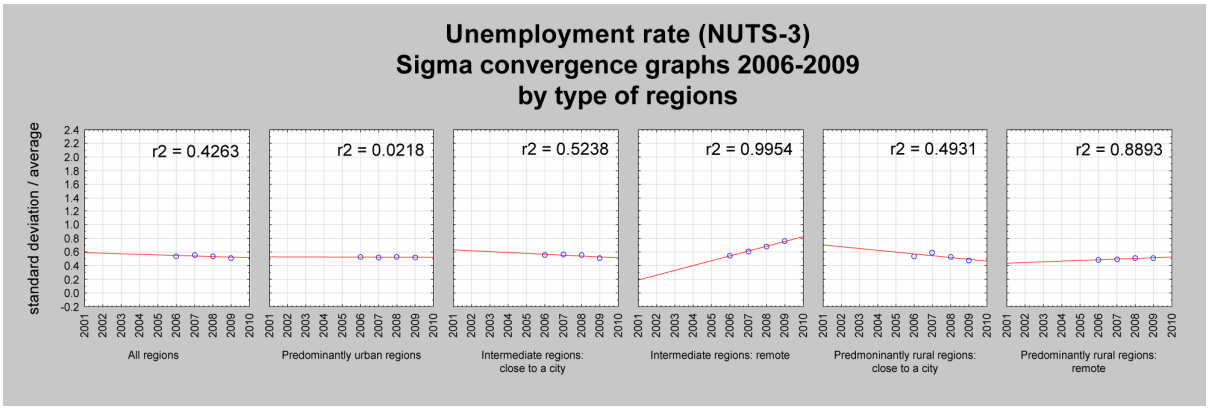


Figure 17. Unemployment rate by type of regions - development of disparities 2006-2009

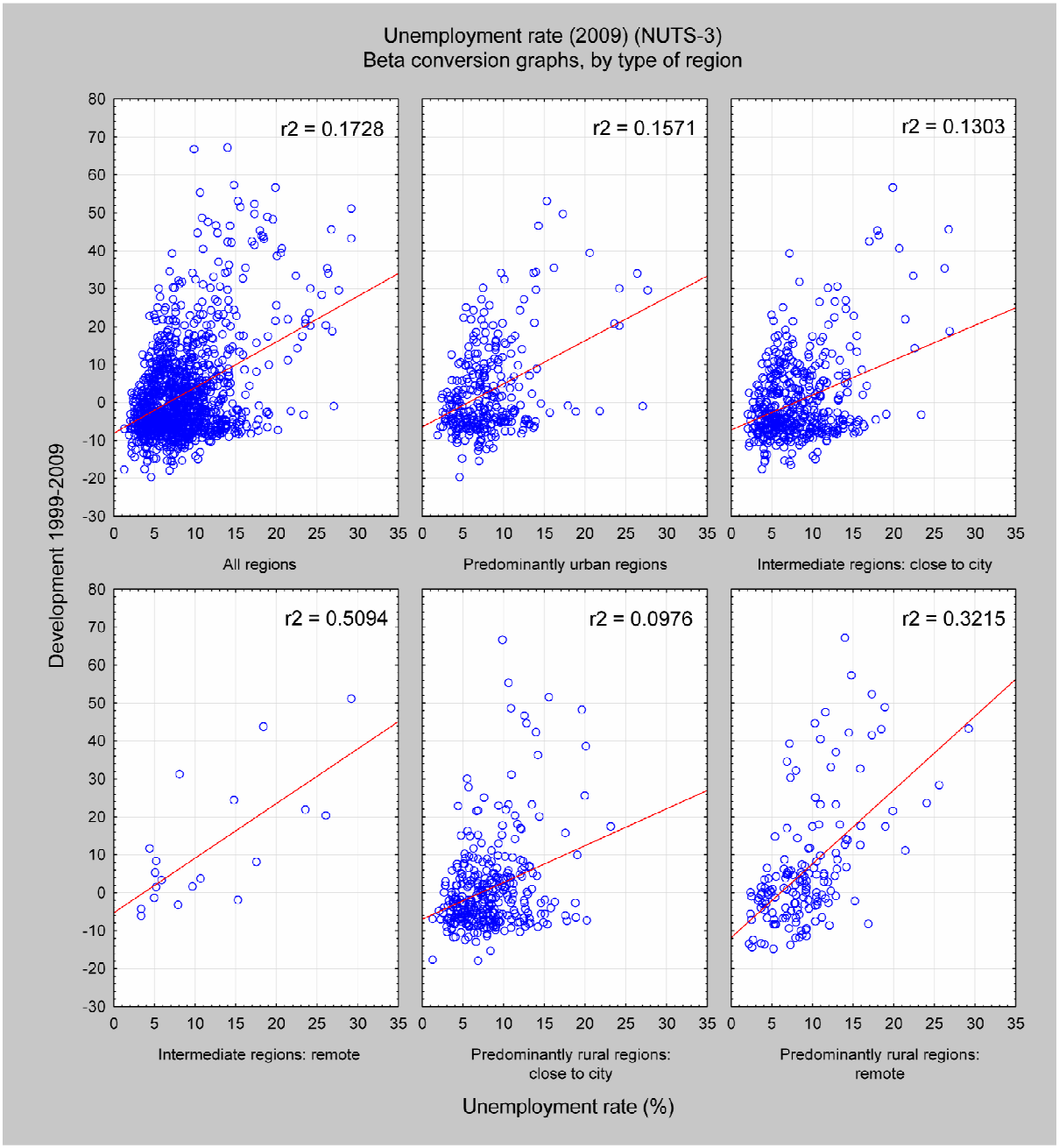
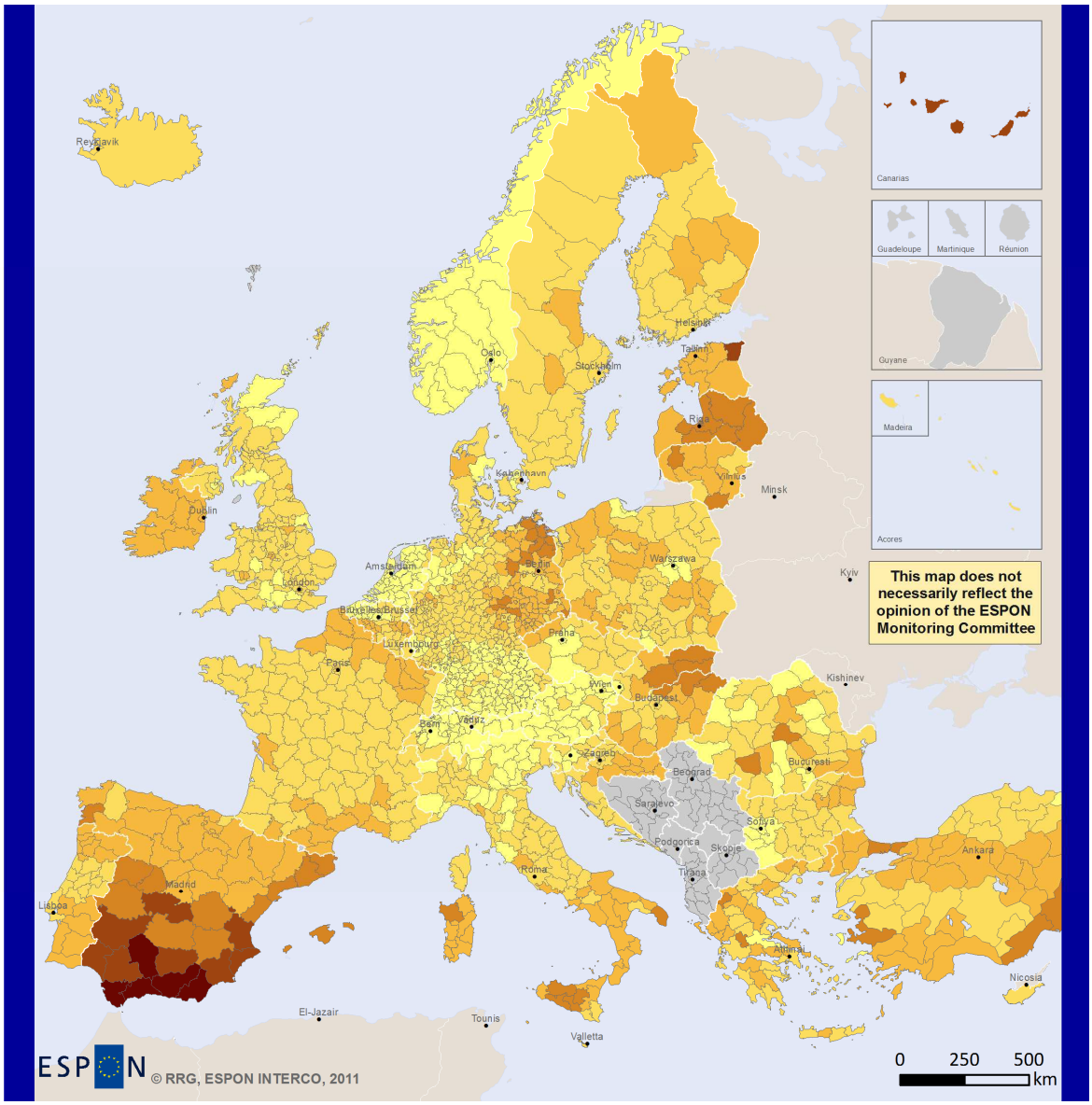


Figure 18. Unemployment rates – beta convergence

Unemployment rate (2009)

0 7 0 2 u n e m a l l _ 2 0 0 9 n 3 r t d

Territorial objective	*Change direction*	*Gaps*	*Years available*
Strong load economies ensuring global competitiveness	Decrease desired: old industrialized regions/ rural areas	Missing data: LI&MK. Data for BE, BG CH, HR, IS, PT, NO and TR NUTS-2	1999-2009



in %

1 - 5	16 - 20	Data missing
6 - 10	21 - 25	
11 - 15	26 - 29	

Indicator definition

Sigma and beta conv.

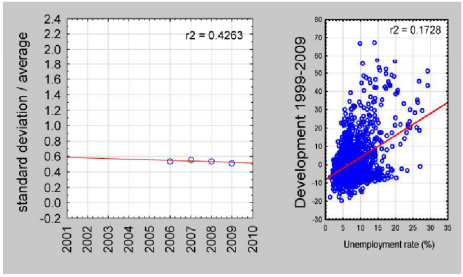


Figure 19. Indicator – Unemployment rate (%).

Old age dependency ratio

Theme:
DEMOGRAPHY
Population structure

Policy relevance:
This indicator measures the percentage of working class population in relation to elderly, retired people.
It warns about overaging of population that may lead to severe problems in pension systems and also to social disruptions, affecting sustainability of local economies.

Desired direction of change:
Generally a society should strive for a balanced population structure in terms of percentage of different cohorts. Thus, development over time should ensure a balanced age structure and to avoid overaging.

Description:
Generally the indicator illustrates that the size of the working-class population in East European countries is higher compared to West European or Scandinavian countries, as more people in working-age exist compared to elderly people. But even in Western Europe there are distinct areas with extremely high dependency ratios, such as in South of France, East Germany, the border area between Spain and Portugal or Greece, leading to high variations in indicator performance at NUTS-3 level within the countries (Figure 20). Even though variations for all countries are quite high with often 10-15 percentage points difference between the worst and best performing regions, Spain, Germany, Portugal, Greece and France are remarkable since they yield extremely big variations up to 30 percentage points (Figure 20).

Even though in remote rural regions disparities decreased between2007 and 2009 or remained stable for rural regions close to a city (Figure 21), slightly increasing disparities for intermediate regions and for predominantly urban regions led to a small increase in disparities over all NUTS-3 regions in Europe until 2009.

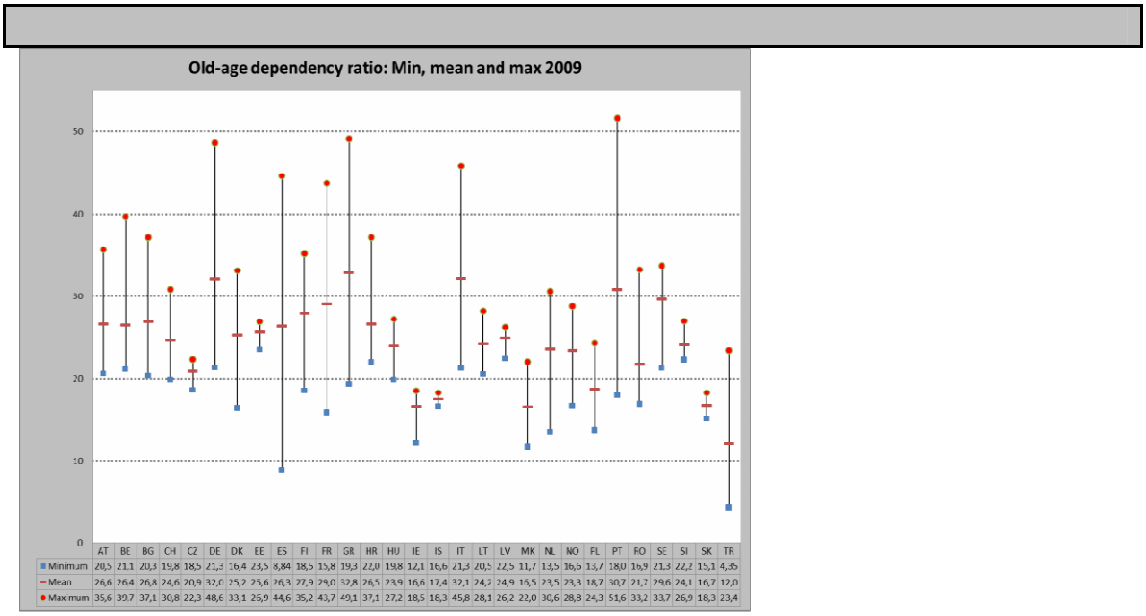


Figure 20. Old-age dependency by country – minima, maxima and averages

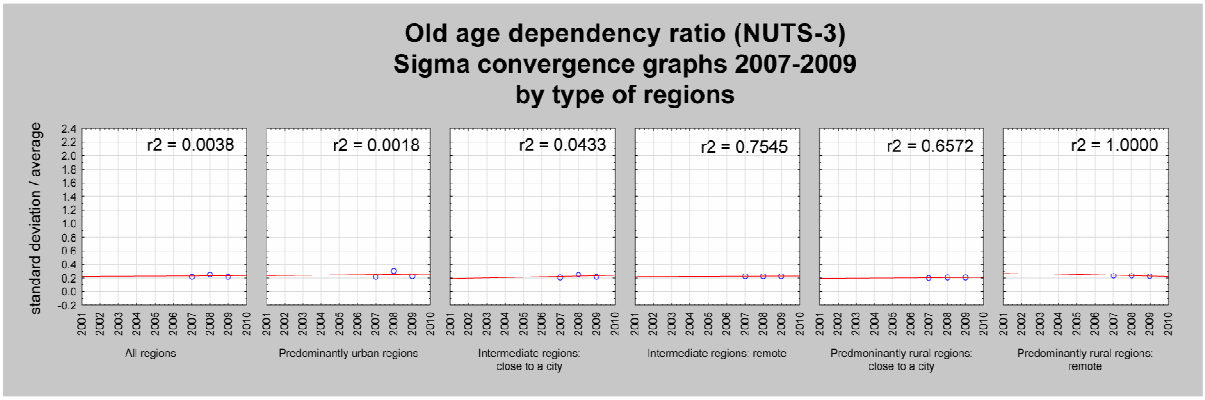


Figure 21. Old age dependency ratio – development of disparities 2007-2009

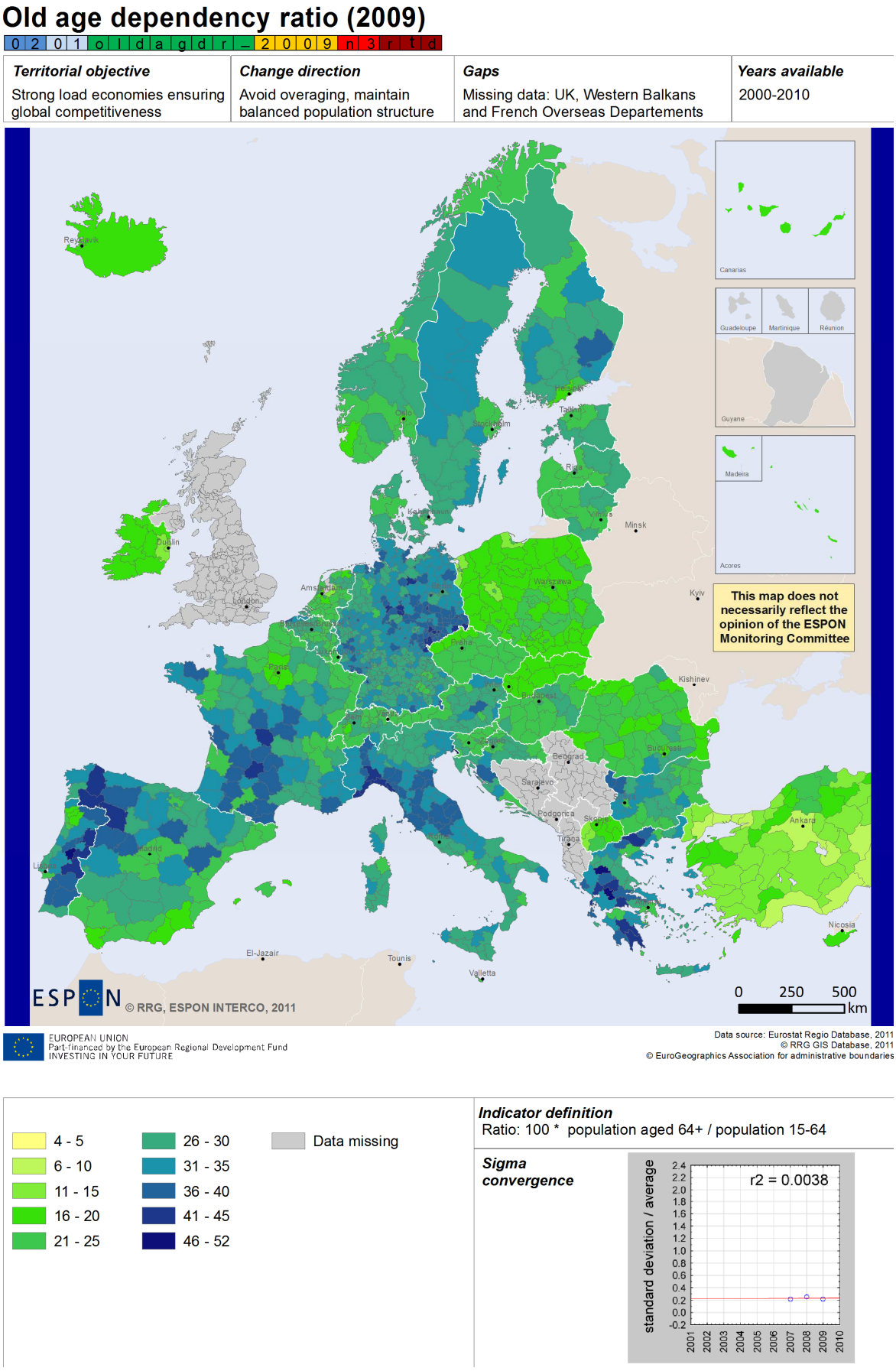


Figure 22. Indicator – Old age dependency ratio.

Labour productivity

Theme:
ECONOMY, LABOUR FORCE
Labour force

Policy relevance:
This indicator tells us the robustness of GDP produced and shows the competitiveness of a region in global economies.

Desired direction of change:
Generally increase is desired to prepare European regions for difficult global markets; however, regions with less than 50% of EU27 average should catch up faster.

Description:
There is a clear divide between the old EU member states and the new EU member states, with all of the latter ones experiencing productivity levels below the EU average (with Bulgaria and Romania experiencing the least productivities). From the old EU Member States only Greece and Portugal have levels slightly below EU average. At the contrary, Luxembourg, Belgium, Ireland and Norway gain the highest labour productivities with up to 178 of the EU27 average. When looking at the productivity in industry and service sector, the picture is even more distinct. In addition to the above patterns, there is also a clear North-South divide in several countries (Spain, Italy, Germany), and also a urban-rural divide (UK, Greece, France, Germany) with urban areas experiences higher productivities compared to their surrounding regions, leading to large intra-national disparities (see also min, mean, max graph in Figure 23).

At national level, disparities in labour productivity decreased in the period of 1998-2009 (Figure 24) remarkably as an effect both of improvements in productivity of least-performing regions and slight decreases of productivity of better performing regions (Figure 25).

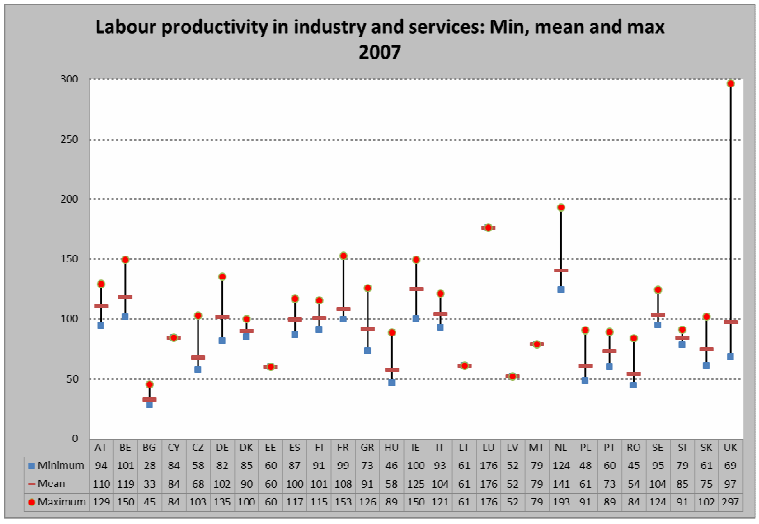


Figure 23. Labour productivity in industry and services by country – minima, maxima and averages

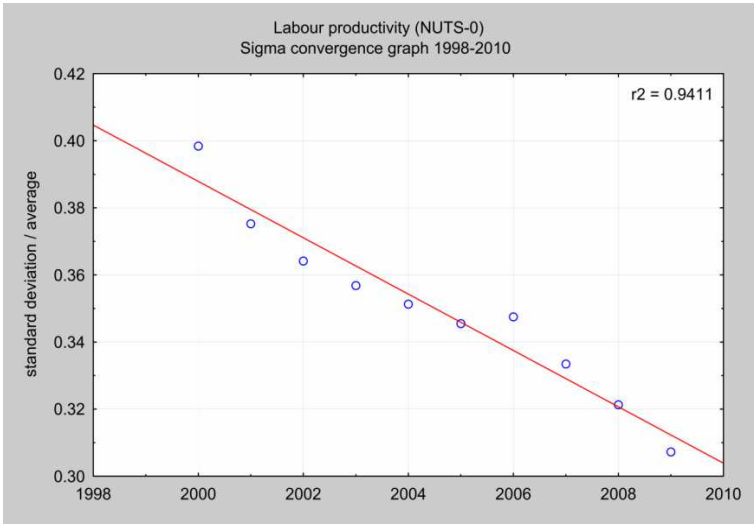


Figure 24. Labour productivity (NUTS-0) – development of disparities 1998-2010

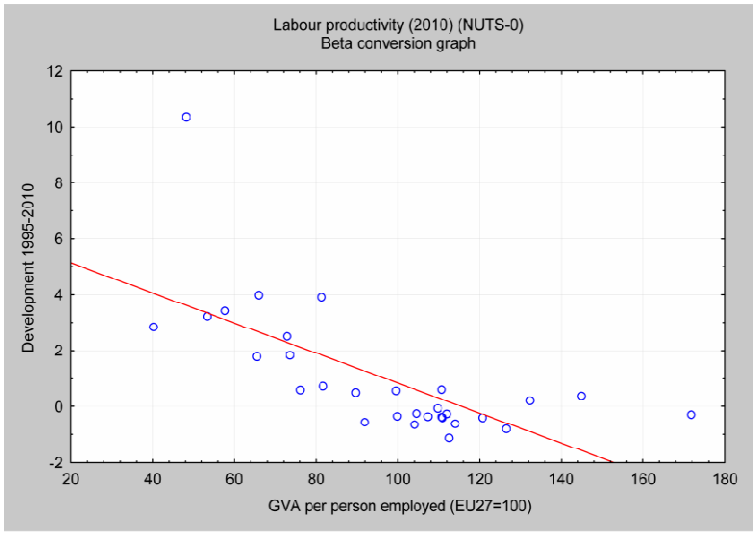


Figure 25. Labour productivity (NUTS-0) – beta convergence

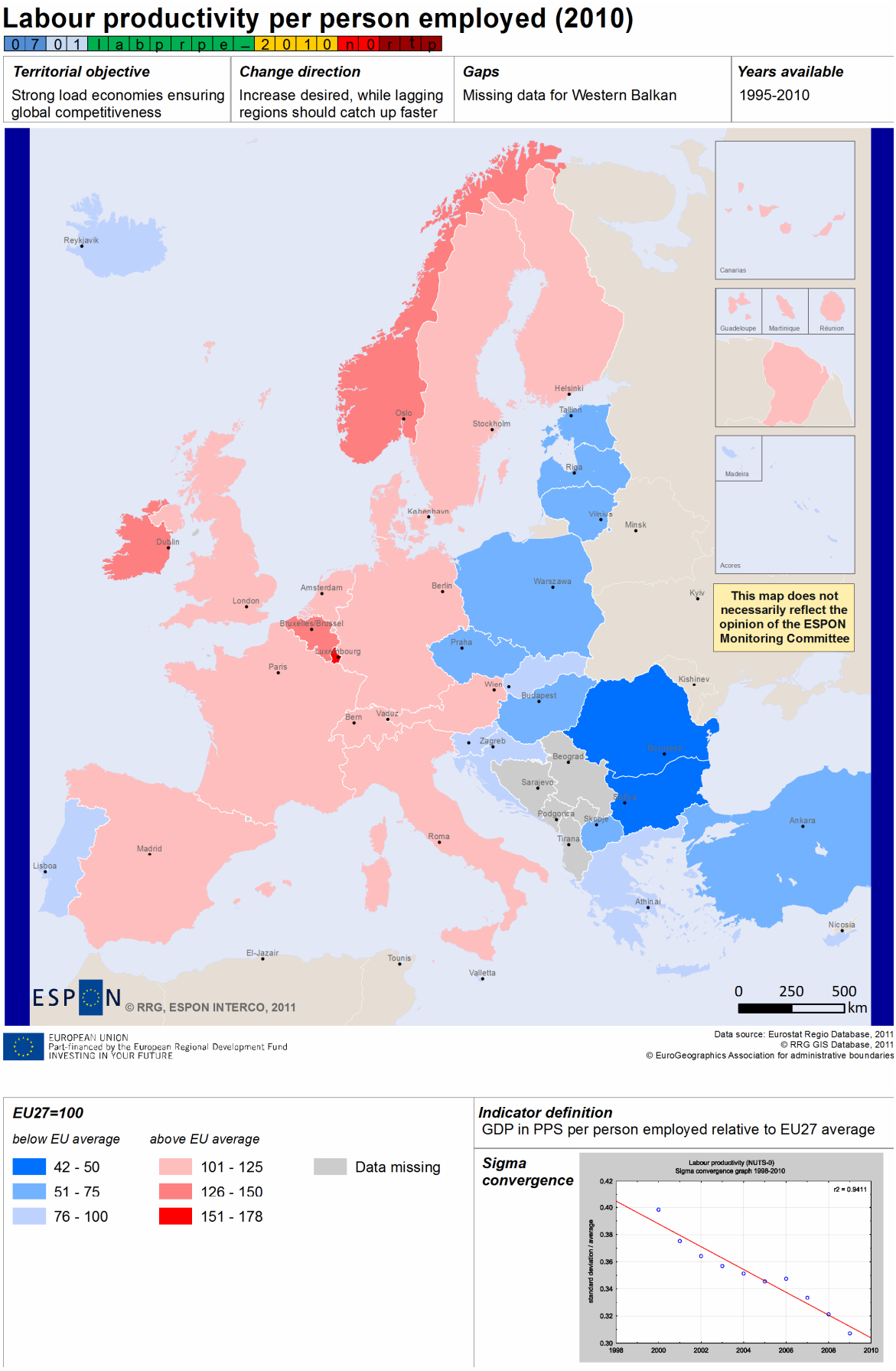


Figure 26. Indicator – Labor productivity per person employed (NUTS 0).

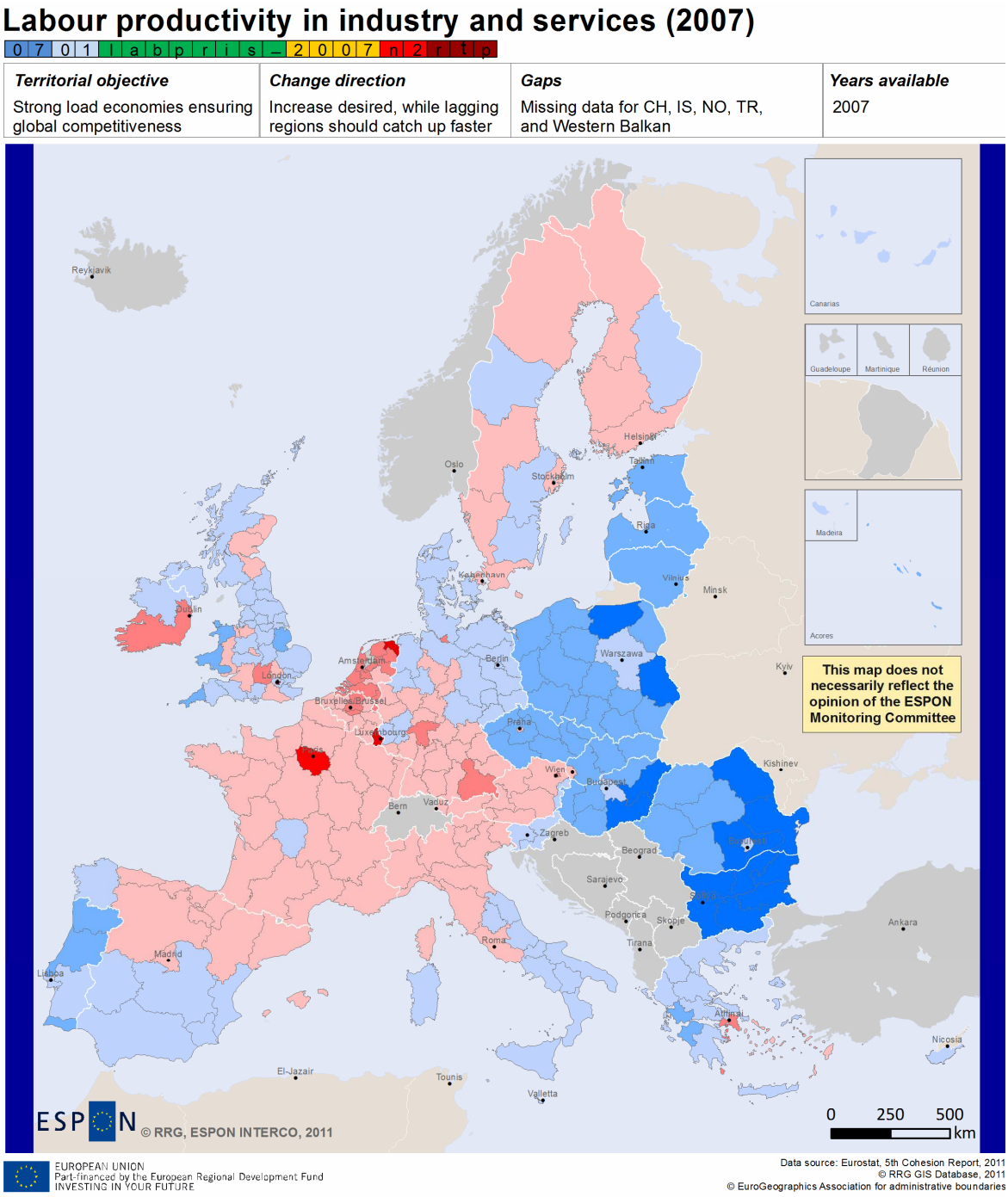


Figure 27. Indicator – Labor productivity in industry and services (NUTS 2)

Summary

What are the territorial disparities of the indicators selected for the territorial objective of strong local economies ensuring global competitiveness? And how have these indicators developed over the last decade?

The indicator ***GDP per capita*** revealed quite distinct developments of disparities, with slight increase until 2001 for all type of regions, and slight trend of convergence afterwards (however, for certain differences for different types of regions). As desired, results show that trend of convergence in remote regions (intermediate and rural) was highest, while disparities in urban regions or regions close to a city remained stable.

For all European regions, a slight trend towards convergence of ***unemployment rates*** could be observed over the recent past (2006-2009). Even though this overall trend of convergence is appreciated, there is no harmonious trend of convergence for all rural regions, as desired, since only those rural regions close to a city reduced disparities in unemployment, while the same disparities for remote rural areas increased in the same period. For urban regions, including the old industrialised ones, disparities remained.

Despite slight convergence trends in the ***old age dependency ratio*** for rural regions, slight increases in disparities for intermediate and urban regions led to an overall increase in disparities. Thus, the desired direction of change is not met, neither in terms of cohesion trends as a whole nor in terms of striving for a balanced age structure.

For ***labour productivity***, remarkable trends toward cohesion at national level could be observed with least performing regions catching up faster than good performing ones. Thus, the indicator moved into the desired direction of change.

Over all four indicators, there is no general trend towards convergence. While GDP per capita and unemployment rates only reveal slight positive effects, opposite negative development can be observed for the old age dependency ratio (Figure 28). Only labour productivity showed clear trends towards cohesion, albeit measured at national level.

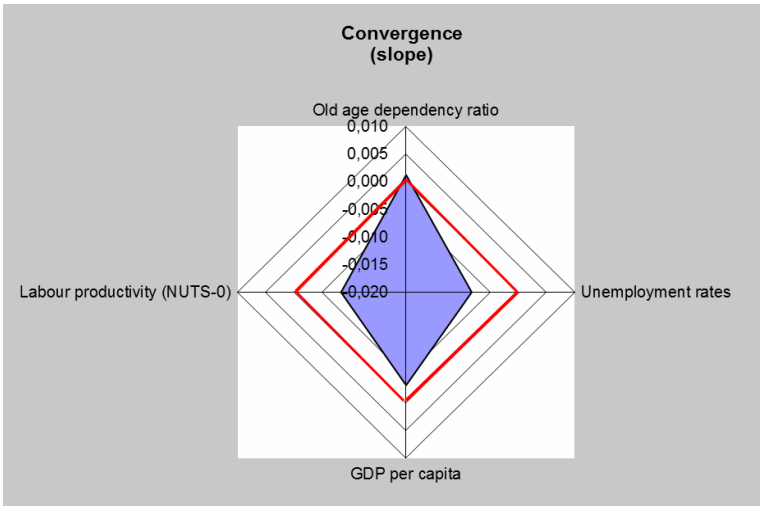


Figure 28. Degree of convergence for indicators under Territorial Objective "Strong local economies"

Notwithstanding the recent development trends, big disparities among NUTS regions in Europe for GDP per capita and unemployment rates still remained, as Figure 29 illustrates, while disparities for the old age dependency ration is lowest, followed by labour productivity (at NUTS-0).

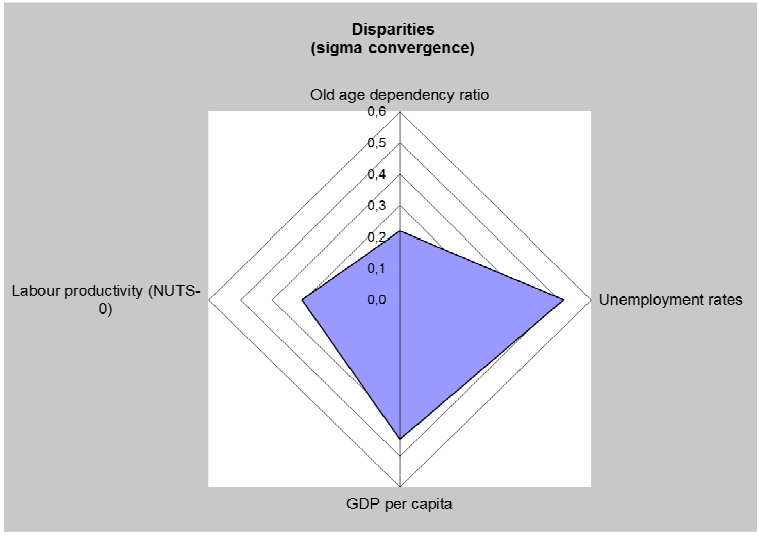


Figure 29. Degree of actual disparities for indicators under Territorial Objective "Strong local economies"

C.3.2. Innovative territories

Innovation is at the centre of EU strategies for recovery, growth and sustainable development. Because it can help creating and distributing wealth and facing current challenges, it is central for territories which can find their proper way to make good use of their assets. Especially, eco-innovation is expected to deliver appropriate response to the need of energy efficiency and low carbon economy, while innovation in the governance process will help rationalising and improving the institutional framework, for better territorial governance. Thus, research and development should not be only for top class territories and actors. But the key determinant of innovation capacity and regional growth is certainly human capital, which means not only educated population but also its effective participation to growth.

Three indicators are proposed as territorial cohesion indicators under this objective:

- Population aged 25-64 with tertiary education
- Intramural R&D expenditures
- Employment rate 20-64

These indicators are dedicated to measure the qualification level of regional labour forces (tertiary education), the degree of participation of population in working age in actual economic activities (employment rate), and the future orientation of the regional economies in terms of investments in R&D.

Sufficient time series data are only available for the indicators on tertiary education and employment rate, allowing generating sigma and beta convergence plots and thus allowing analyses of convergence trends over time. Since these two indicators are currently available only at NUTS-2 level, a further differentiated analysis by types of regions at NUTS-3 level could unfortunately not be performed.

Population aged 25-64 with tertiary education

Theme:
SOCIAL AND CULTURAL AFFAIRS, QUALITY OF LIFE
Education

Policy relevance:
This indicator measures the highly-qualified labour force as basis for future R&D activities. Human capital is an essential factor for innovation potential.

Desired direction of change:
Generally increase in skills and qualification levels of the entire labour force is desired; however, lagging regions, and regions in rural or peripheral areas should catch up faster than agglomerations.

Description:
The results are quite interesting. On the one hand they reveal great differences in the educational attainment at European level, ranging from mere 5 percent up to 52 percent at the top (capital cities, agglomerations). On the other hand the results also suggest that the intra-national differences are rather small, compared to the differences between the countries, so that one can assume that the differences are the outcome of the different national education systems.
The sigma convergence graph (Figure 31) illustrates convergence for the three analysed years (2008-2010), mainly driven by regions with relatively low levels of tertiary education who developed stronger compared to those regions who already had a rather high level of education (Figure 32).

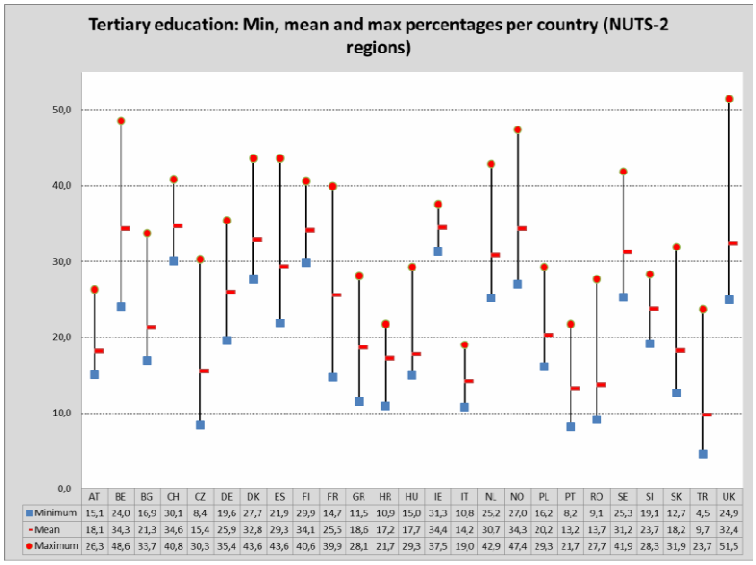


Figure 30. Tertiary education – minima, mean and maxima

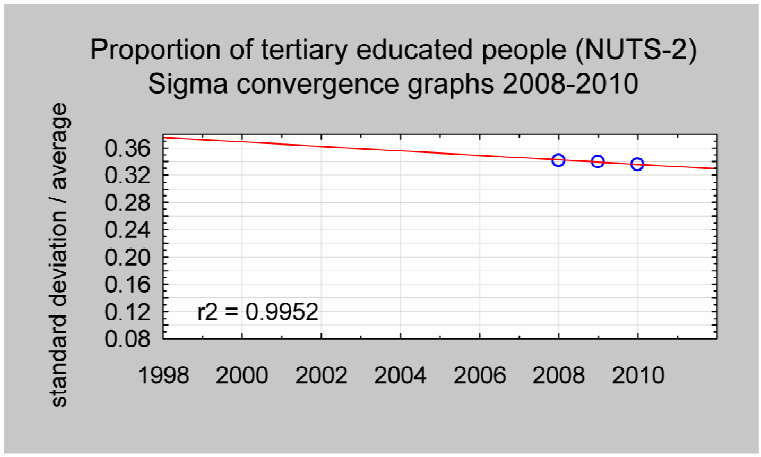


Figure 31. Tertiary education – development of disparities 2008-2010

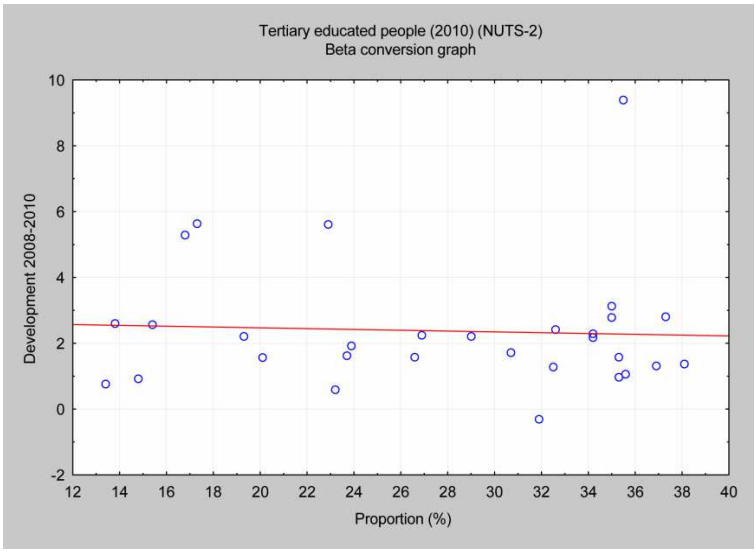
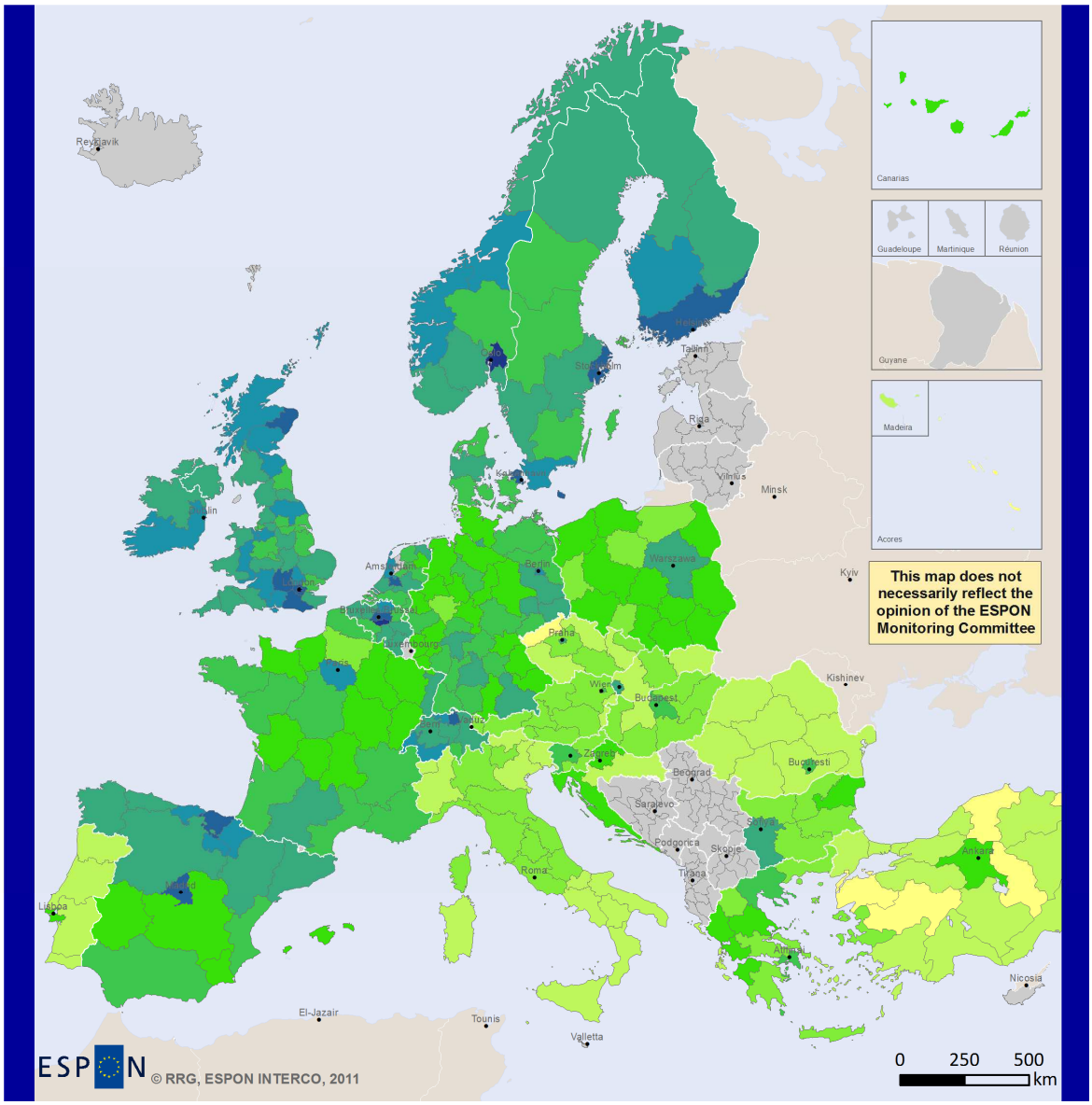


Figure 32. Tertiary education – beta convergence

Population aged 25-64 with tertiary education (2010)

0 6 0 2 t e r e d u _ _ 2 0 1 0 n 2 r t d

Territorial objective	*Change direction*	*Gaps*	*Years available*
Innovative territories	Increase desired; lagging/rural/ remote regions catch up faster	Missing data: IS, LU, Baltic States and Western Balkan	2008-2010



EUROPEAN UNION
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Data source: Eurostat Regio Database, 2011
© RRG GIS Database, 2011
© EuroGeographics Association for administrative boundaries

in %

6 - 10	31 - 35	Data missing
11 - 15	36 - 40	
16 - 20	41 - 45	
21 - 25	46 - 50	
26 - 30	51 - 53	

Indicator definition

Pop with teritary education as percentage of all pop 25-64

Sigma convergence

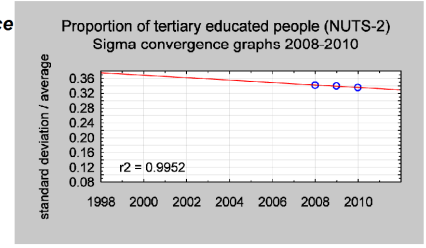


Figure 33. Indicator – Population aged 25-64 with tertiary education

Total intramural R&D expenditures

Theme:
ECONOMY, LABOUR FORCE
Innovation

Policy relevance:
This indicator measures the future orientation of the regional economy in terms of investments in R&D. This support to innovation capacity is considered as a key driver of regional growth.

Desired direction of change:
Generally each region should have a minimum level of R&D activities, either at public research institutes, or at private companies. Increase is desired until this minimum level is reached.

Description:
Regions considered as high-tech regions in Europe clearly appear (for instance, southern Germany, England, Scandinavia). Percentages are generally lower in new EU Member States compared to the old ones. The value ranges are great for Germany, UK, Finland and Sweden, only for Bulgaria, Hungary and Slovakia rather small regional variations within the countries can be detected (Figure 34 and Figure 35).

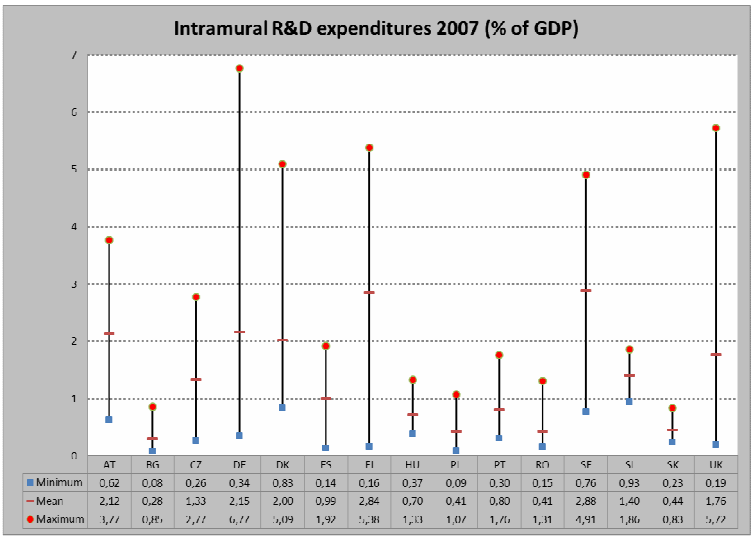


Figure 34. Intramural R&D expenditures – Minima, mean and maxima

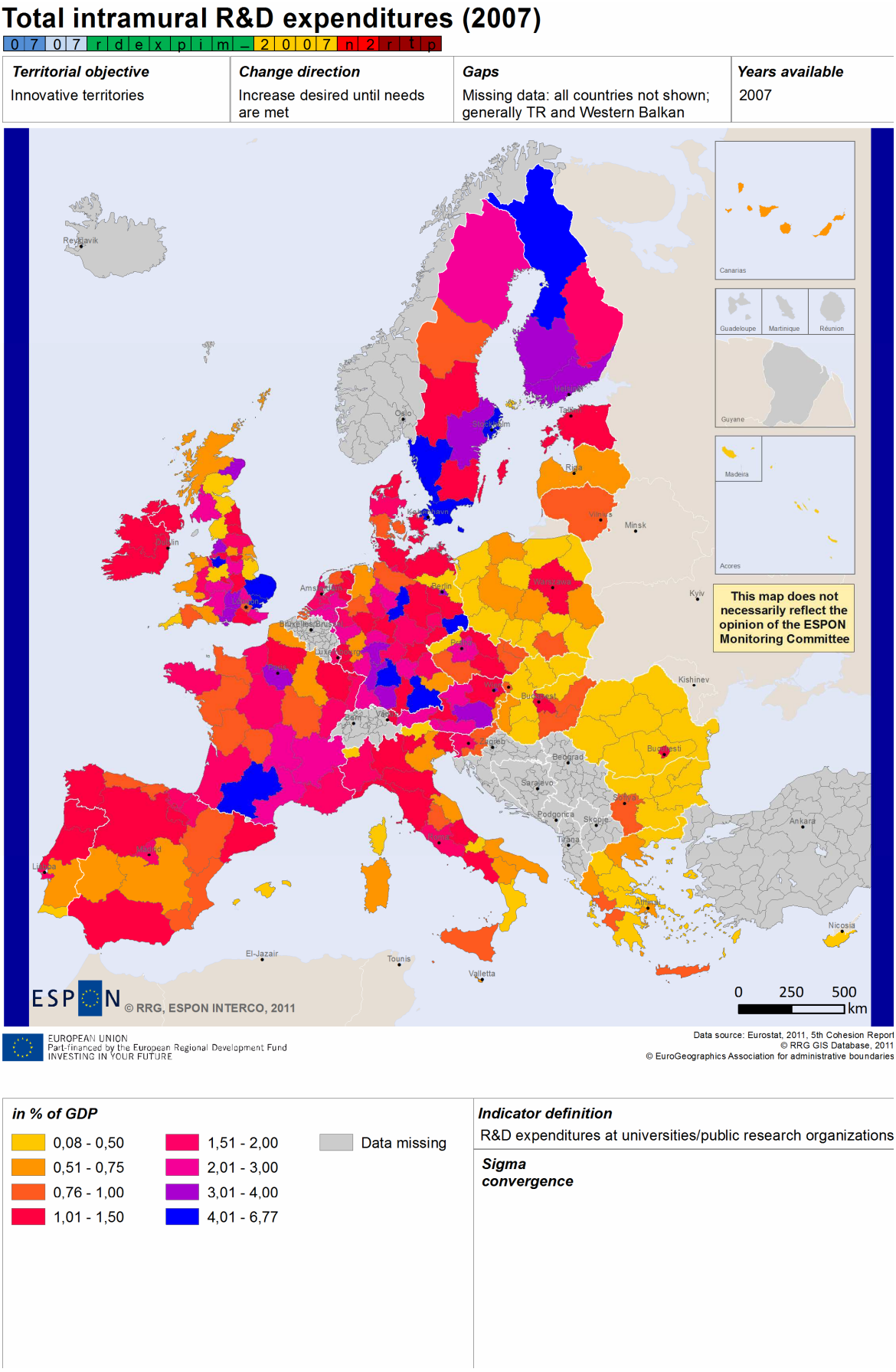


Figure 35. Indicator – Intramural R&D expenditures.

Employment rate

Theme:
ECONOMY, LABOUR FORCE
Employment, Unemployment

Policy relevance:
This indicator measures the actual participation of working age population in economic regional activities and in producing net added value. High employment rates reflect quality of labour market which constitutes a favourable context for innovative territories.

Desired direction of change:
Basically a full employment of population should be achieved (100% employment rate). Regions with lower employment rates should catch up faster than the other regions.

Description:
Employment rates significantly differ across Europe. As tendencies the rates are lower the farther south and the farther east a region is located, i.e. resulting in lowest employment rates in southern Spain, southern Italy and Turkey. In contrast, highest employment rates are found in Scandinavia, Benelux, UK, Germany and Switzerland. The map and the chart also suggest that there are great disparities within individual countries itself (for instance, Italy, Turkey, Spain) (Figure 36).
Since 2007, these disparities even increase over all European NUTS-2 regions (Figure 37), caused by two combined effects (Figure 37): First, regions with already high employment rates even managed to increase these rates even more. Second, many regions with low or intermediate employment rates experiences a drop in these rates (negative developments of employment). Taking these two trends together, regional disparities in Europe widened for employment in the period 2007-2010.

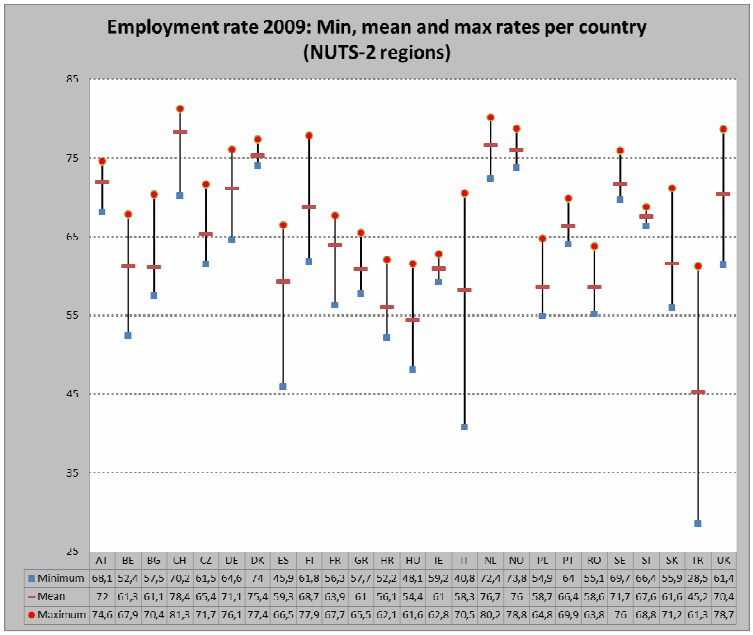


Figure 36. Employment rate – minima, mean and maximum by country

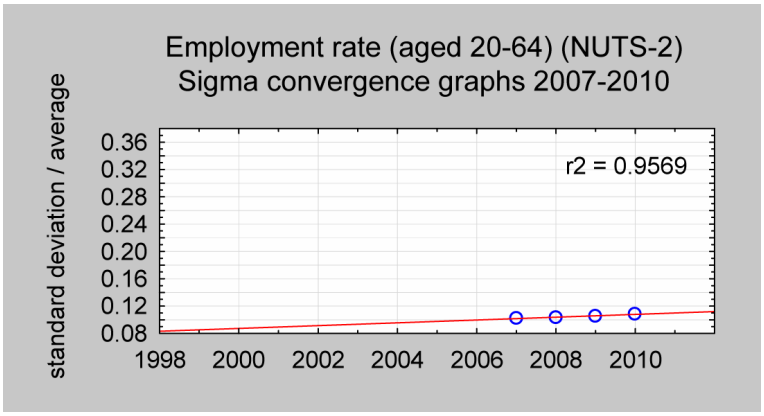


Figure 37. Employment rate – development of disparities 2007-2010

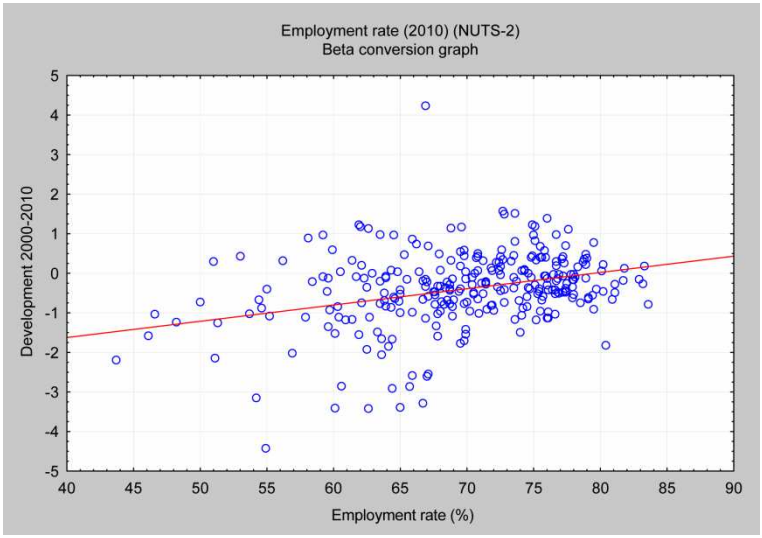


Figure 38. Employment rates – beta convergence

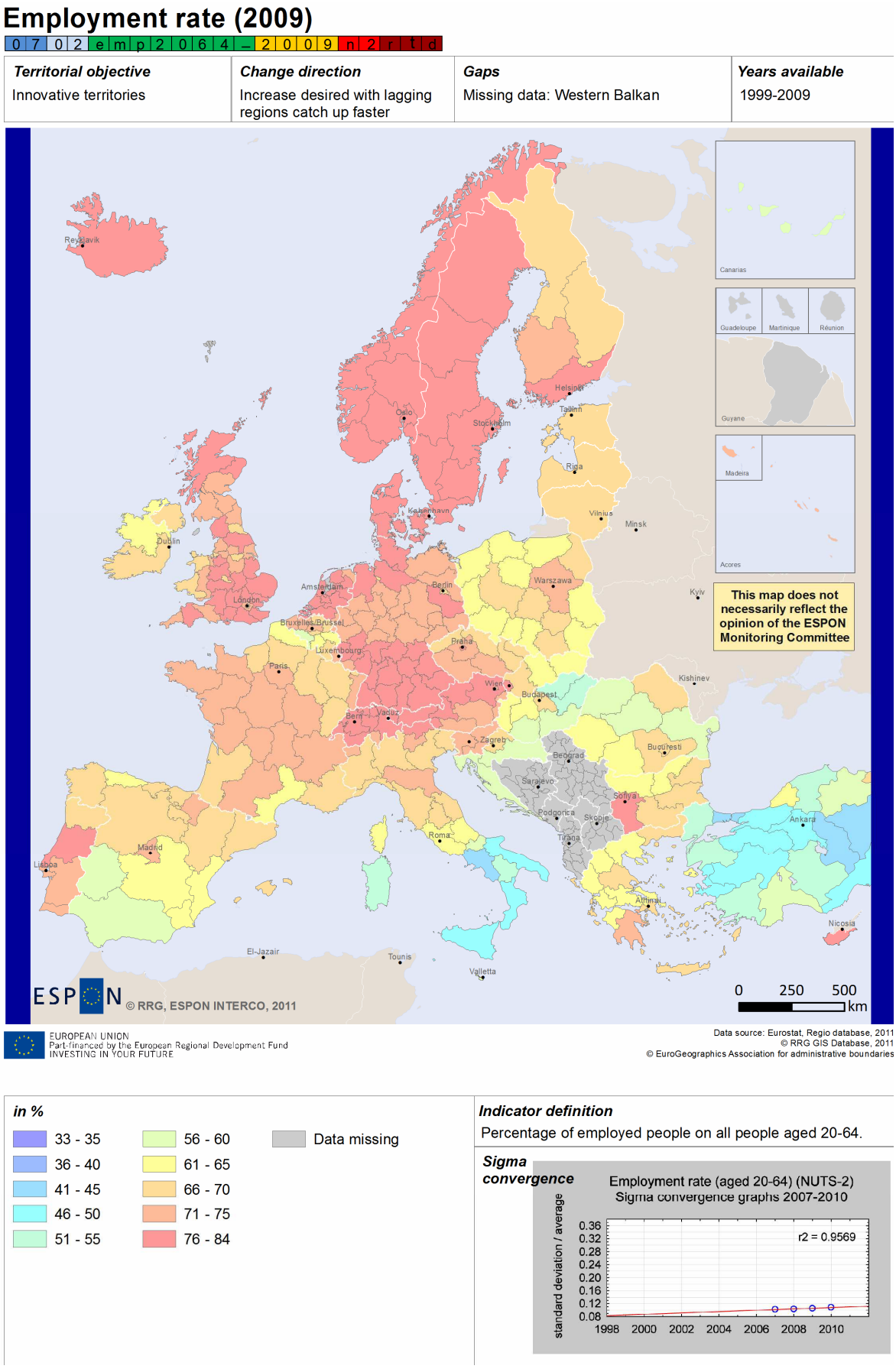


Figure 32. Indicator – employment rate 20-64 years

Summary

What are the territorial disparities of the indicators selected for the territorial objective of innovative territories? And how have these indicators developed over the last decade?

Concerning ***tertiary education***, convergence trends towards cohesion at regional level could be observed since lagging regions developed stronger than already good performing regions; differences within countries are rather small compared to difference between countries, revealing fundamental differences in the national education systems.

Due to poor data availability, no time series analysis was possible for ***intramural R&D expenditures***. Great disparities exist even within high-tech regions and rural regions within countries, but there are obvious big gaps still existing between the old and the new EU Member States.

Gaps in ***employment*** widened since 2007, because good performing regions improved their employment rates on the expense of lagging regions, which even experienced a further fall in employment, making existing disparities permanent between the East European and south European countries on the one hand, and the remaining parts of Europe on the other hand.

Overall results for the territorial objective on innovative territories show that there is no automatism of improving levels of tertiary education and employment rates. Quite the opposite, trends of convergence for one indicator does not necessarily imply same development trends for the other indicator. For entire Europe, this led to a convergence in tertiary education, but to widened gaps in employment rates.

C.3.3. Fair access to services, markets and jobs

"*Fair and affordable accessibility to services of general interest, information, knowledge and mobility are essential for territorial cohesion. Providing services and minimising infrastructure barriers can improve competitiveness and the sustainable and harmonious territorial development of the EU*". With this statement, TA 2020 gives a central role to service provision and accessibility in a broader sense, since they are considered as essential for territorial connectivity and integration. The objective to make sure that every territory benefit from well-being standards and from equal development potential, especially for remote, isolated or sparsely populated areas.

Seven indicators are proposed as territorial cohesion indicators under this objective:

- Access to compulsory schools
- Access to hospitals
- Access to grocery services
- Access to universities
- Accessibility potential by road
- Accessibility potential by rail
- Accessibility potential by air

These indicators are dedicated to measure fair access to basic (public) services (compulsory schools, hospitals, grocery services, universities), and represent context indicators for accessibility and market potential and locational advantages by different modes of transport (accessibility potential by road, rail and air).

Unfortunately, data on the first four indicators (access to …) are so far not available at regional level for entire ESPON space, but from SILC survey they are only available at country level with a subdivision by degree of urbanisation. At the time of drafting the INTERCO Final Report access to SILC data was requested by the INTERCO team, but actual access was not yet granted. Therefore, only for the first two indicators (access to compulsory schools and access to hospitals) related charts from the 5rh Cohesion Report are discussed so far. The ESPON TRACC project is currently being calculating such “access to …” indicators, but only for selected case study regions. Results of ESPON TRACC are not yet available, however, the potentials of such indicators are exemplified in the chapter on wishlist indicators (B.4.1. Wishlist).

The other three accessibility indicators are available at NUTS-3 level for entire ESPON space, but so far only for two points in time, i.e. 2001 and 2006. The ESPON TRACC project is currently working to update these indicators for 2011, but results of these calculations are not yet available at the time of writing up INTERCO Final

Report. In any case, even though only two points in time are available so far, time series analysis (sigma convergence) was performed to retrieve at least basic development trends of the accessibility indicators.

Access to compulsory schools

Theme:
TRANSPORT, ACESSIBILITY, COMMUNICATION
Accessibility

Policy relevance:
This indicator measures fair access to basic education as a basic public service. To benefit equally from well-being standards is essential for territorial cohesion.

Desired direction of change:
Generally the higher the access to such facilities is the better it is for families and the public; however, a minimum level should be maintained, even in remote or peripheral areas.

Description:
Figure 39 shows remarkable differences in the access to compulsory schools, both by country and by type of region. At country level, roughly there are three groups of countries with low proportion of concerned population (up to 10% of population facing difficulties, i.e. Cyprus, Finland, Sweden, Netherlands, France, UK), medium proportion (up to 20%, i.e. Belgium, Denmark, Ireland, Luxembourg, Greece, Czech Republic, Hungary, Slovenia, Estonia, Lithuania, Austria and Malta), and high proportion of population facing severe difficulties in access to compulsory schools (up to 30 %, remaining countries).
Second, there are also distinct differences by type of region. For most countries, access is least difficult for densely populated areas, followed by intermediate areas and is most difficult in sparsely populated rural areas. Exceptions from this rule are Malta and the UK, where access in urbanised areas is most problematic, as well as Belgium, Hungary and Portugal where interestingly access to schools in intermediate regions is most difficult. Figure CR1 furthermore shows that the differences by type of region are significant, reaching up to 15 percentage points (Germany, Poland, Bulgaria).

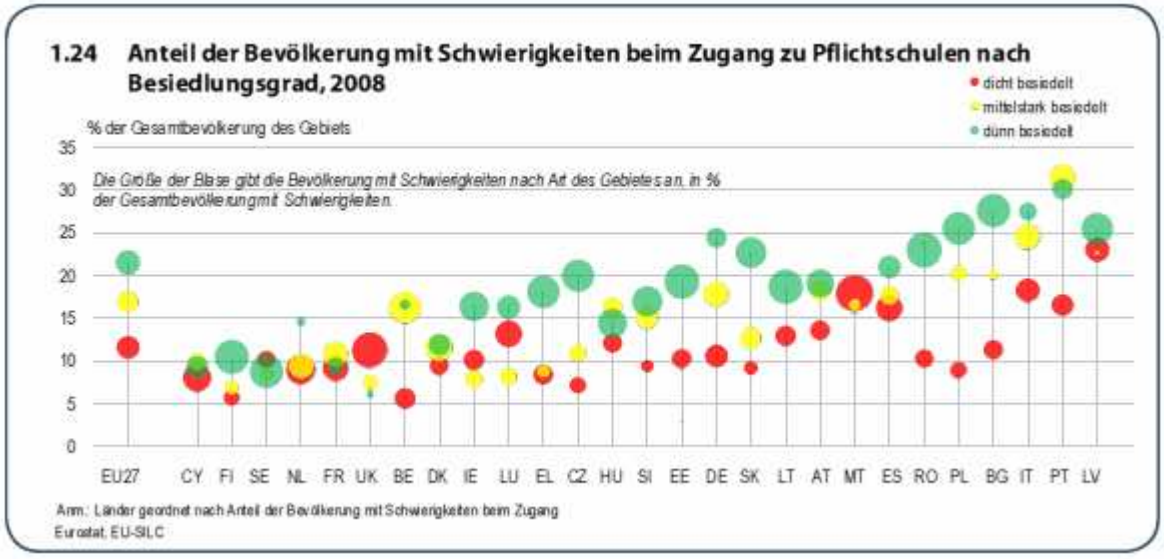


Figure 39. Access to compulsory schools in 2008 – proportion of population experiencing difficulties (5th Cohesion Report, 97)

Access to hospitals

Themes: **TRANSPORT, ACESSIBILITY, COMMUNICATION** **Accessibility**
Policy relevance: **This indicator measures fair access to health care as a basic public service. To benefit equally from well-being standards is essential for territorial cohesion.**
Desired direction of change: **Generally the higher the access to such facilities is the better it is for the public with the view to care best about health; however, a minimum level should be maintained, even in remote or peripheral areas.**
Description: **As Figure 40 illustrates, differences in access to primary health care services in Europe are differing significantly. In countries like France, UK, Netherlands, Luxembourg, Belgium or Germany, only a small proportion of up to 10% of the population face difficulties, with only small differences by type of region. In other countries such as Sweden, Hungary, Finland or Cyprus, the differences between the type of regions are also small, but the proportion of population facing difficulties is generally higher with up to 20%. For the other countries, 30% of the proportion or even up to 40% of population (Romania, Italy, Latvia) face severe problems in access primary health care services, mainly in sparsely populated rural areas.**

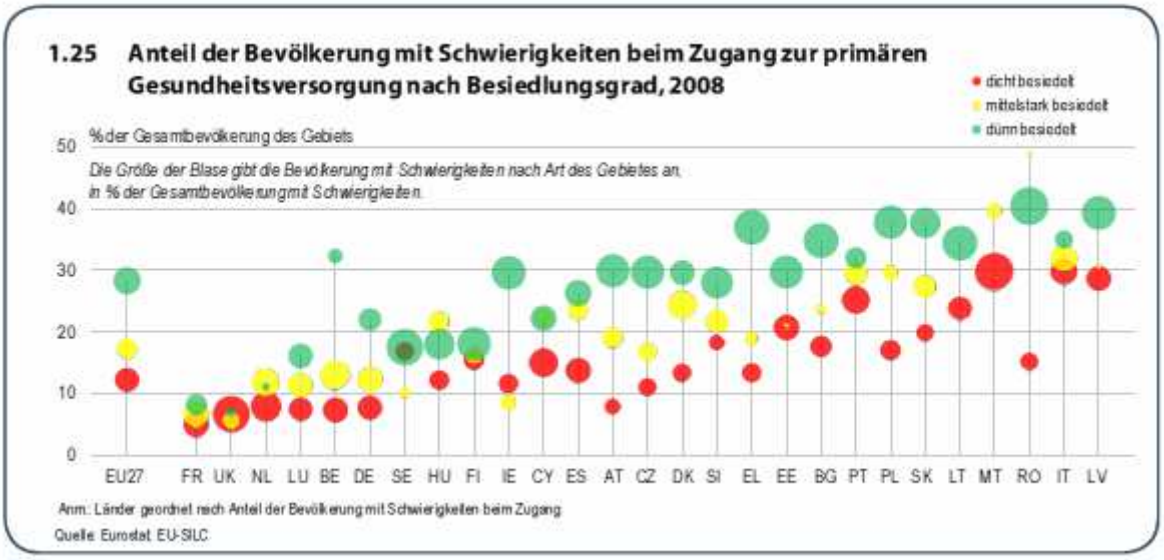


Figure 40. Access to primary health care services in 2008 – proportion of population experiencing difficulties (5th Cohesion Report, 97)

Accessibility potential by road

Themes:
TRANSPORT, ACESSIBILITY, COMMUNICATION
Accessibility

Policy relevance:
This indicator measures market potential and locational advantages of a region. To benefit equally from these development potential is essential for territorial cohesion.

Desired direction of change:
Minimum accessibility level desired. Regions with less than 50% of European average should catch up faster.

Description:
The regions in Belgium, the Netherlands and in the western parts of Germany have the highest accessibility values in Europe leading partly to a level more than twice the European average. But also regions in northern and eastern parts of France, in the south-east of England, in Switzerland, the western parts of Austria and the northern parts of Italy have very good accessibility by road. In all these regions the combination of good road infrastructure in form of dense motorways and high concentration of population leads to these favorite positions. Accessibility by road decreases towards regions located outside the core. Lowest accessibility by road is found in the northern regions of the Nordic countries. Also most regions of the Baltic States, Bulgaria, Romania and Greece have very low potential accessibility.
The disparities within countries are remarkable (Figure 41), and are highest in France, Germany, Italy and the UK. Even for those countries with generally high accessibility, there are regions with below-average (Austria, Czech Republic, Germany, Italy, Slovakia, and the UK).
In the period 2001-2006, disparities in potential accessibility by road slightly decreased for entire Europe (Figure 42); however, when differentiating by type of regions, the situation as not that clear: first, remote regions (intermediate regions and predominantly rural regions) have by far higher disparities compared to urban regions or regions located close to a city. Moreover, while disparities for urban regions stagnated between 2001 and 2006,

disparities even increased for remote rural regions, i.e. these regions gained real losses in the relative accessibility potential.

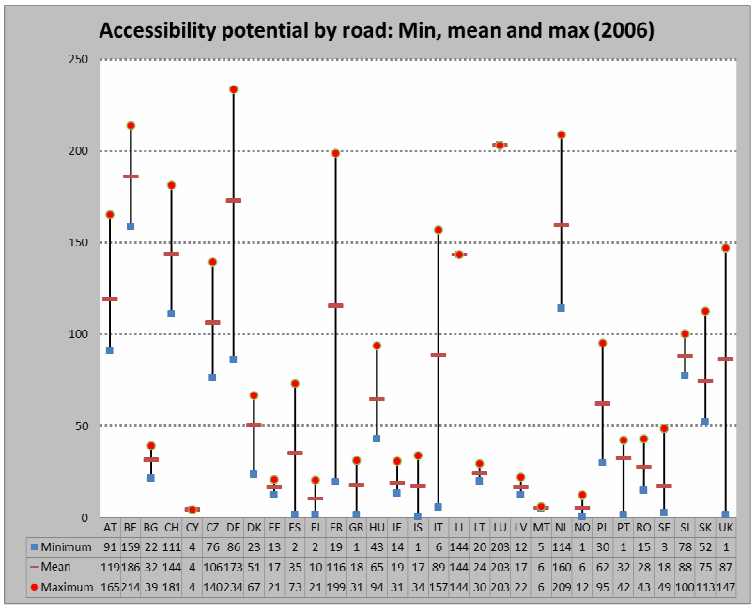


Figure 41. Accessibility potential by road – Min, mean and max

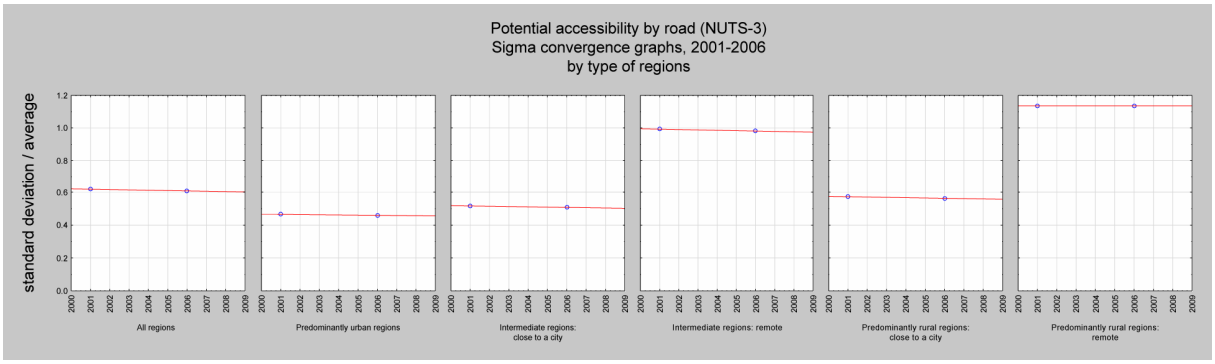
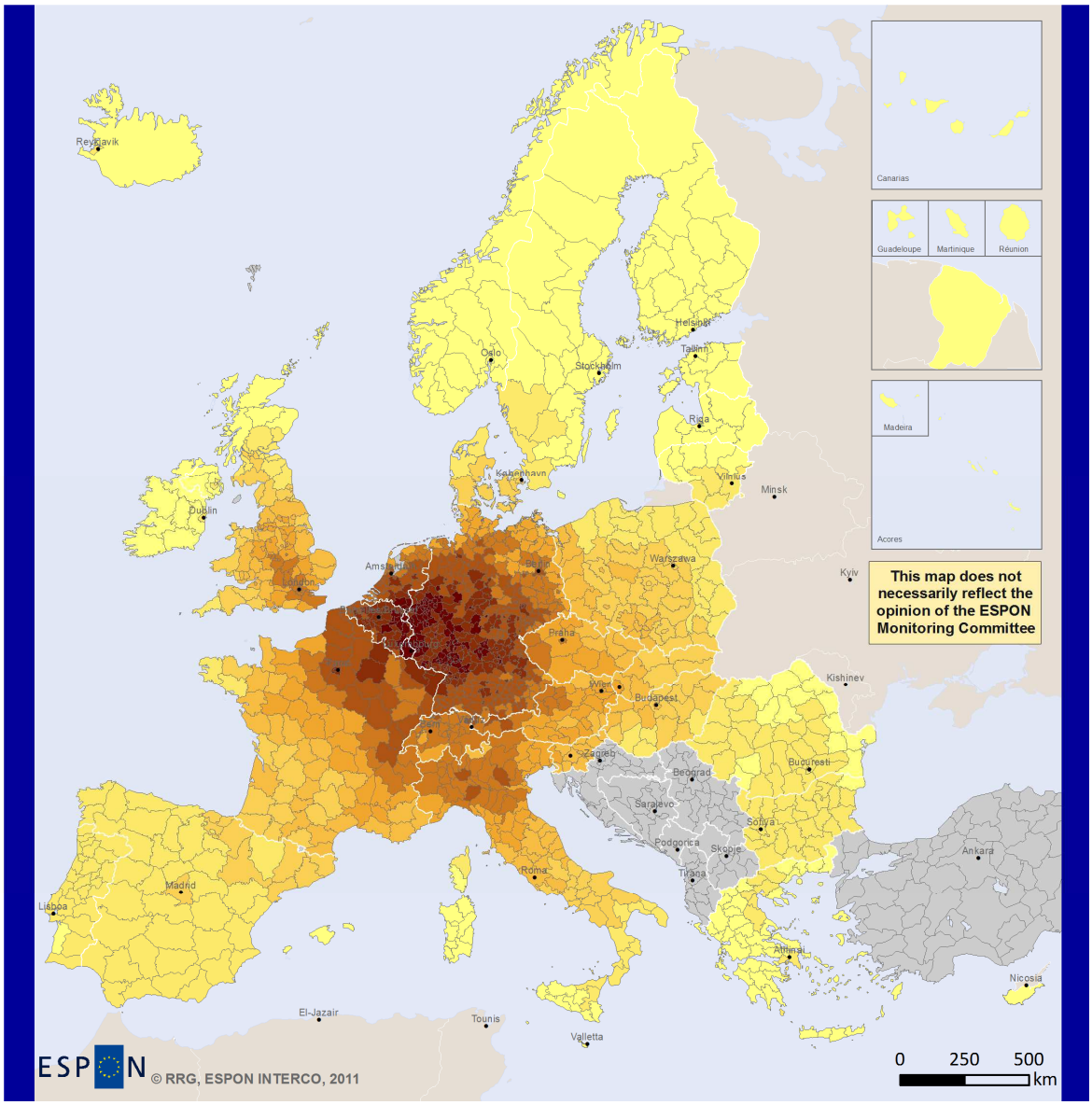


Figure 42. Accessibility potential by road – development of disparities 2001-2006

Accessibility potential by road (2006)

0 3 0 3 a c c p o t r o 2 0 0 6 n 3 r t d

Territorial objective	*Change direction*	*Gaps*	*Years available*
Fair access to services, markets and jobs	Minimum level desired; regions <50% Europ. ave. catch up faster	Missing data for TR and Western Balkans	2001, 2006



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EU27 = 100

- 1 - 25
- 26 - 50
- 51 - 75
- 76 - 100
- 101 - 125
- 126 - 150
- 151 - 175
- 176 - 200
- 201 - 234
- Data missing

Indicator definition
Reachable population weighted by distance

Sigma convergence

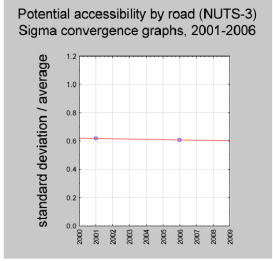


Figure 43. Indicator – Accessibility potential by road

Accessibility potential by rail

Reasoning: **TRANSPORT, ACESSIBILITY, COMMUNICATION** **Accessibility**
Policy relevance: **To measure market potential and locational advantages of a region (context indicator).**
Desired direction of change: **Minimum accessibility level desired. Regions with less than 50% of European average should catch up faster.**
Description: **Regions in the European core have the highest values. However, instead of forming a plateau of high accessibility like for roads, regions with top accessibility for rail are forming corridors along high-speed rail links. High-speed rail also brings very high accessibility to regions outside the European core, for instance in France to Tours and Lyon and Marseille or in Germany to Berlin. Below average accessibility by rail can be found in Ireland, Spain, Portugal, southern Italy and most regions of the new member states. Lowest accessibility by rail is located in the northern parts of the Nordic countries, the Baltic States and most regions of Romania, Bulgaria and Greece.** **Again there are significant disparities within countries (Figure 44), in particular for those countries which have high-speed train services (Germany, France, Belgium, and Italy). For many countries even the regions with highest accessibility are clearly below the European average, often even clearly below 50% of the European average (Bulgaria, Baltic States, Norway, Portugal, Greece, or Finland).** **For all regions in Europe, disparities remained stable between 2001 and 2006 (Figure 45). An analysis by type of region, however, revealed interesting details: while disparities for urban regions and for predominantly rural regions close to a city increased, there was a clear trend towards convergence for intermediate remote regions and for predominantly rural remote regions, but of course disparities for remote regions remained highest compared to the other types of regions. Increases in disparities for urban regions may be counter-intuitive at a first glance;**

however, recalling that not all urban regions were connected to the high-speed rail networks at the same time, the accessibility of urban regions without high-speed services falls behind those urban regions with high-speed services.

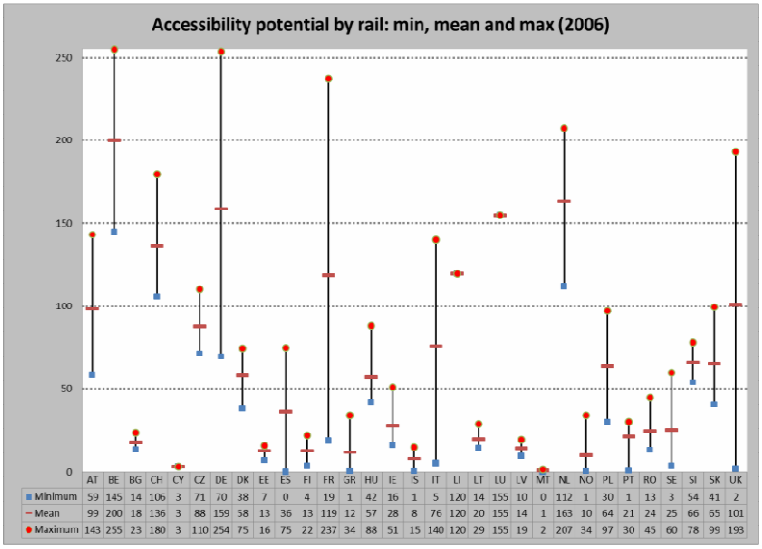


Figure 44. Accessibility potential by rail – min, mean and max

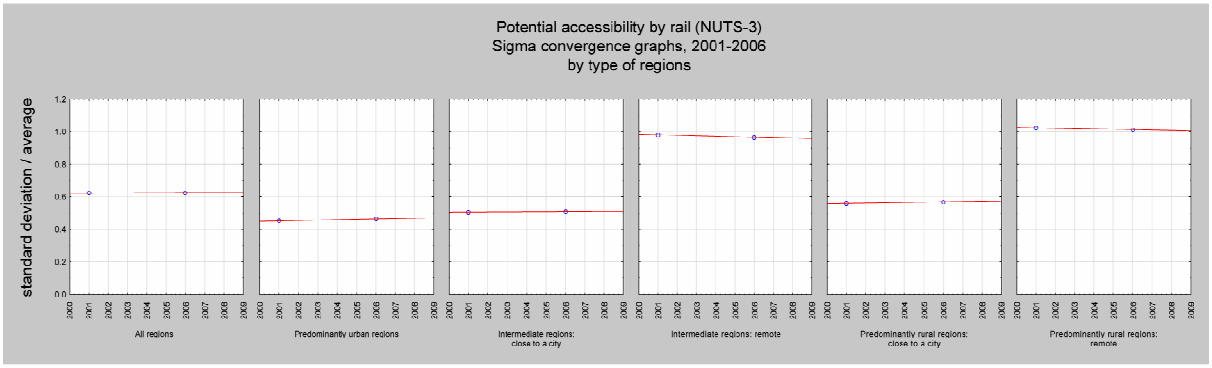
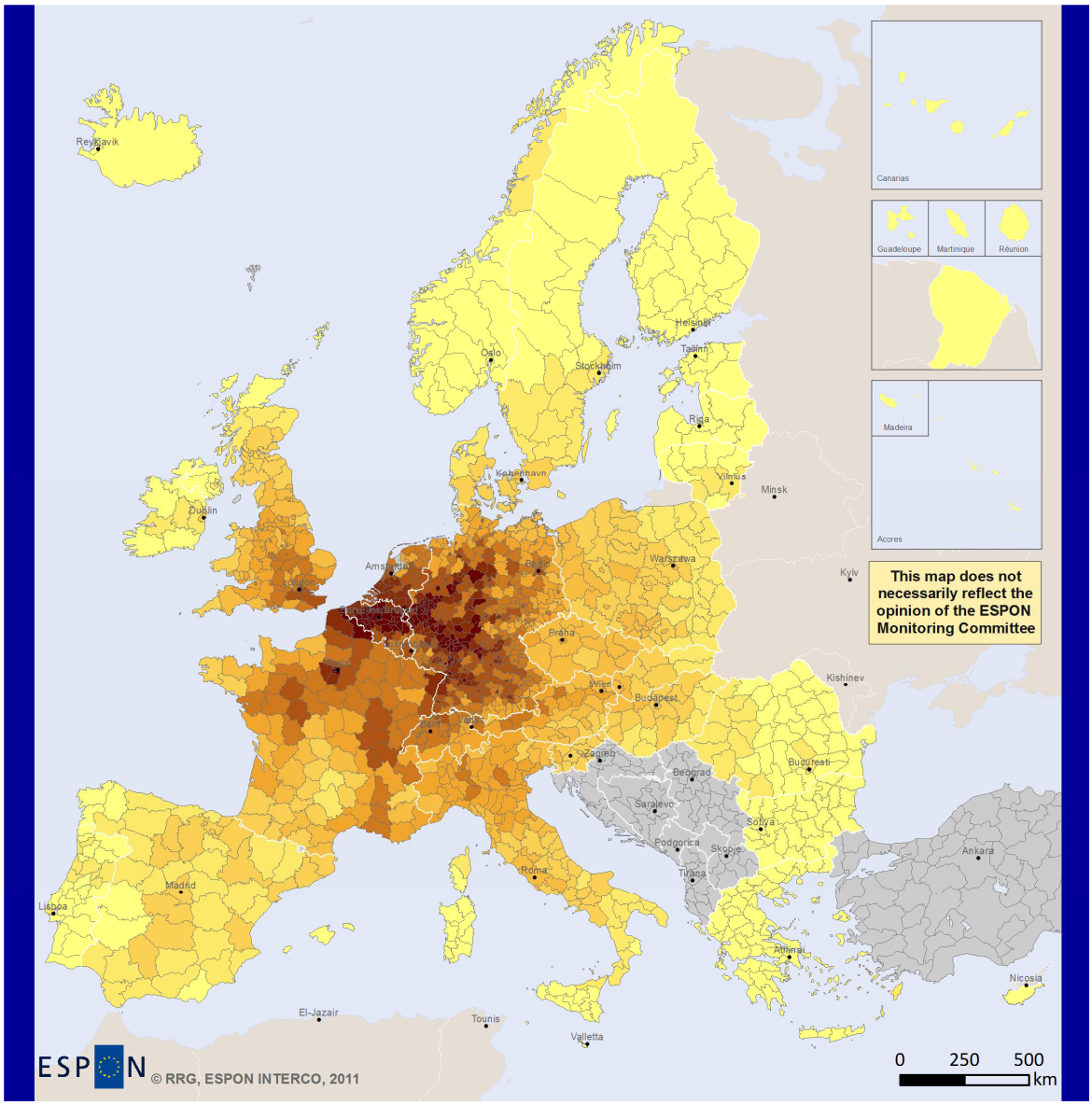


Figure 45. Accessibility potential by rail – development of disparities 2001-2006

Accessibility potential by rail (2006)

0 3 0 3 a c c p o t r a 2 0 0 6 n 3 r t d

Territorial objective	*Change direction*	*Gaps*	*Years available*
Fair access to services, markets and jobs	Minimum level desired; regions <50% Europ. ave. catch up faster	Missing data for TR and Western Balkans	2001, 2006



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EU27 = 100

- 0 - 25
- 26 - 50
- 51 - 75
- 76 - 100
- 101 - 125
- 126 - 150
- 151 - 175
- 176 - 200
- 201 - 255
- Data missing

Indicator definition
Reachable population weighted by distance

Sigma convergence

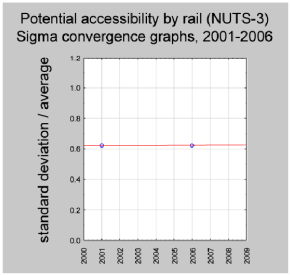


Figure 46. Indicator – Accessibility potential by rail

Accessibility potential by air

Theme:
TRANSPORT, ACESSIBILITY, COMMUNICATION
Accessibility

Policy relevance:
This indicator measures market potential and locational advantages of a region. To benefit equally from these development potential is essential for territorial cohesion.

Desired direction of change:
Minimum accessibility level desired. Regions with less than 50% of European average should catch up faster.

Description:
Regions with major airport hubs and their surroundings clearly appear as those regions with highest accessibilities. In most cases these are the capital city regions, plus selected other agglomerations. The fall in accessibility towards the other regions is remarkable in all countries, so that the biggest visible divide is between agglomerations and rural areas.
Consequently the variations within all countries are rather high (Figure 47), with regions clearly above EU27 average and also regions clearly below. The disparities between the countries are in any case smaller than those within the countries.
Between 2001 and 2006, disparities for all types of regions in Europe decreased for potential accessibility by air (Figure 48). While for urban regions disparities were already lowest, the dropped even more, but also for intermediate and rural regions, both close to a city and remotely, disparities decreased significantly.

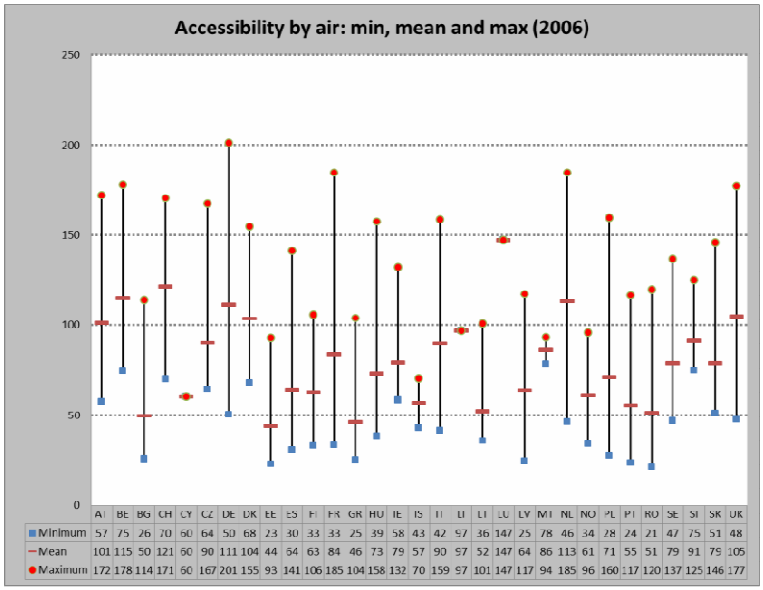


Figure 47. Accessibility by air – min, mean and max

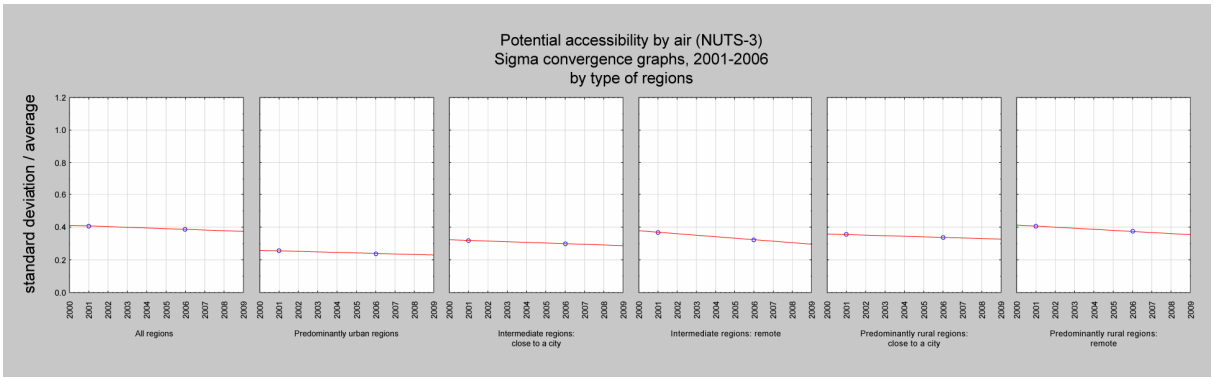
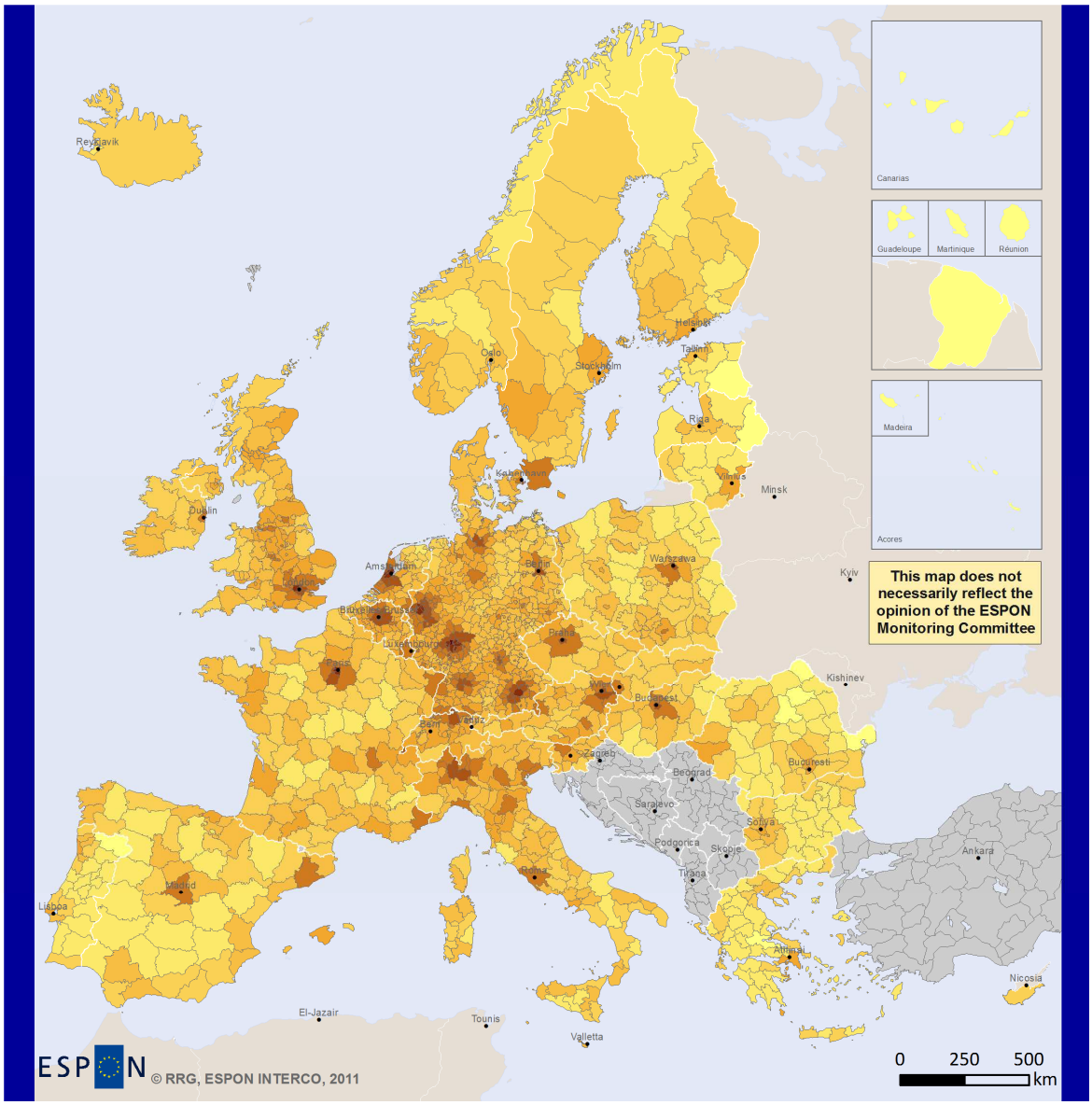


Figure 48. Accessibility by air – development of disparities 2001-2006

Accessibility potential by air (2006)

0 3 0 3 a c c p o t r a 2 0 0 6 n 3 r t d

Territorial objective	*Change direction*	*Gaps*	*Years available*
Fair access to services, markets and jobs	Minimum level desired; regions <50% Europ. ave. catch up faster	Missing data for TR and Western Balkans	2001, 2006



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EU27 = 100

- 21 - 25
- 26 - 50
- 51 - 75
- 76 - 100
- 101 - 125
- 126 - 150
- 151 - 175
- 176 - 200
- 201
- Data missing

Indicator definition

Reachable population weighted by distance

Sigma convergence

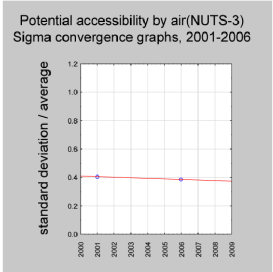


Figure 49. Indicator – Accessibility potential by air.

Summary

What are the territorial disparities of the indicators selected for the territorial objective of fair access to services, markets and jobs?

Access to services has become a clear challenge during the last decade. Given the current demographic and economic trends, ensuring a minimum access to services such as compulsory schools, primary health care, hospitals, universities etc. becomes a real challenge in rural and sparsely populated areas and in areas with other physical handicaps (mountains, islands etc.). Partly up to 40% of the population is facing severe access problems to such services, as the 5th Cohesion Report revealed. There are not only big disparities between countries, but also within countries between urbanised, intermediate and rural regions.

Large disparities of ***accessibility potential*** by road, rail and air exist, and continue to exist in the European Union (Spiekermann and Schürmann, 2007). New transport infrastructures built between 2001 and 2006 were not able to change the overall European spatial patterns with good, moderate and low accessibility (Spiekermann and Schürmann, 2007, 25), even though in the process of EU enlargement many new EU Member States significantly improved their road networks, and thus improved their relative position. When looking at rail, the improvements of road accessibility in the new Member States were counteracted by the implementation of high-speed rail networks, linking city centres with each other.

Insofar regional deficits in competitiveness based location still remain; in different types of regions, regional disparities even increased due to the construction of high-level transport infrastructures such as high-speed rail lines or motorways, connecting urban centres with each other and bypassing rural or remote areas. The design of the trans-European transport networks (TEN-Ts) outline plans obviously has a bias towards improving the competitiveness of European agglomerations on the expense of increasing disparities between rural and remote regions and highly-accessible urban centres.

A detailed look at the modes revealed that for the ***accessibility potential by road*** one can observe a slight trend towards cohesion across all regions between 2001 and 2006; however, the development was quite heterogeneous for different types of regions: while disparities for predominantly rural remote regions increased, and stagnated for urban regions, disparities decreased for all other types of regions. Disparities remained stable in this time period for the indicator accessibility potential by rail, again with quite distinct developments for different types of regions. While disparities for urban regions and for predominantly rural regions close to a city increased, there was a clear trend towards convergence for intermediate remote regions and for predominantly rural remote regions. Results for the ***accessibility potential by air***, in contrast, was quite clear with overall trends towards cohesion for all types of regions for entire Europe.

C.3.4. Inclusion and Quality of Life

This territorial objective is certainly the most closely related to well-being. Here the issue is social but also territorial: territorial cohesion is about reducing social disparities among European territories. As mentioned in TA 2020, focus should be on underdeveloped peripheral rural and sparsely populated areas as well as on territories facing severe depopulation, where inclusive growth is a key challenge. But "*high levels of employment, a balanced distribution of benefits of economic growth and full use of labour potential"* (Europe 2020) are also important for strong areas, especially cities where wealth and disparities are concentrated. Thus, reducing poverty, promoting gender equality, facing challenge of ageing population and decreasing early leavers from education is valid for all European territories at local level.

Six indicators are proposed as territorial cohesion indicators under this objective:

- Disposable household income
- Life expectancy at birth
- Proportion of early school leavers
- Gender imbalances
- Different female-male unemployment rates
- Ageing index

These indicators are dedicated to measure the welfare state of a region (household income), the quality of the regional health care system and healthiness of the living environment (life expectancy at birth), the level of education (proportion of early school leavers), balanced gender relations (gender imbalances and female-male unemployment rates), and the overall age structure of a society (ageing index).

Apart from the indicator on gender imbalances and ageing index, all other indicators are currently available only at NUTS-2 or even NUTs-1 level (early school leavers). Even though NUTS level 2 or 1 already provide some territorial insights, compared to the national level, it still need to be highlighted that from a territorial perspective data availability at NUTS-3 level should be aspired.

For the first four indicators, sigma and beta conversion plots are generated to analyse the temporal development of the indicators.

Disposable household income

Theme:
ECONOMY, LABOUR FORCE
Income and consumption

Policy relevance:
This indicator measures the welfare of residence population in a region and reflect the level of poverty. It is important for cohesion and inclusion that no high disparities and high level of poverty persist.

Desired direction of change:
General increases in disposable household income are desired. Regions with less than 10,000 EUR mean disposable household income should catch up faster.

Description:
Apart from the capital cities and the big agglomerations, the disposable household income is highest in Southern Germany, Austria, England (Greater London region), France (Paris) and Northern Italy. There is furthermore a clear divide between the old and new EU Member States, with Bulgaria and Romania yielding the lowest household incomes (< 5,000 EUR). Countries with the highest disposable household income are also those countries with the highest disparities among their regions: the UK; Germany, Italy, but also Greece experience extreme divide between their richest and poorest regions (Figure 50).
Notwithstanding the high income disparities still existing in 2007, there was a clear trend towards convergence in the time period of 2000-2007 across all European regions. (Figure 51). The beta convergence shows that regions with low household incomes catched up faster than those with already high income levels, since percentage income increases of regions with household incomes of less than 10,000 Euros was much higher compared to the other regions (Figure 52).

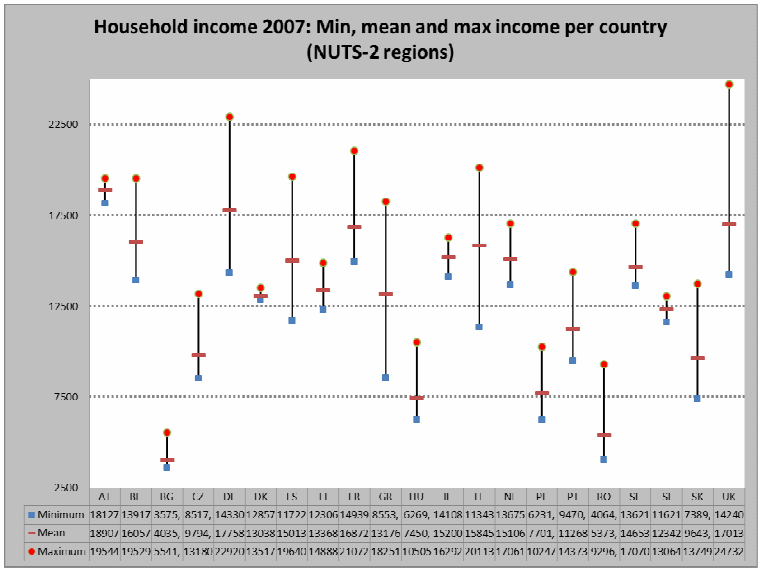


Figure 50. Disposable household income – Minima, maxima and averages

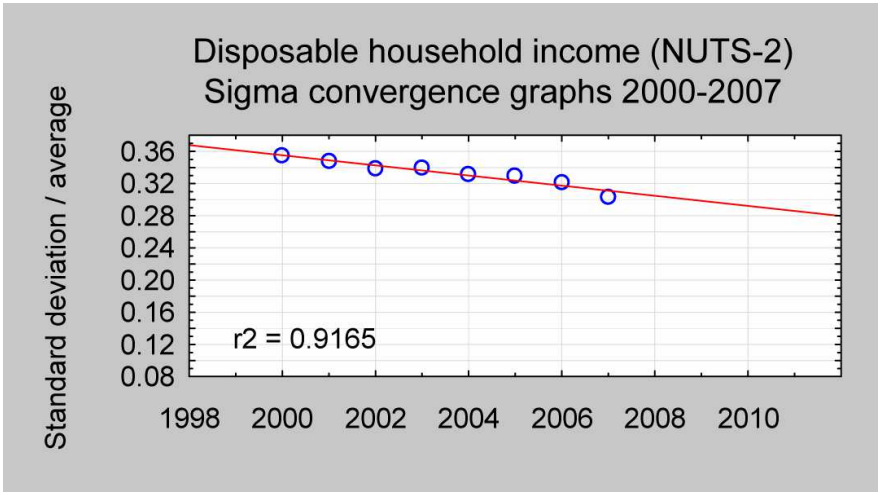


Figure 51. Disposable household income – development of disparities 2000-2007

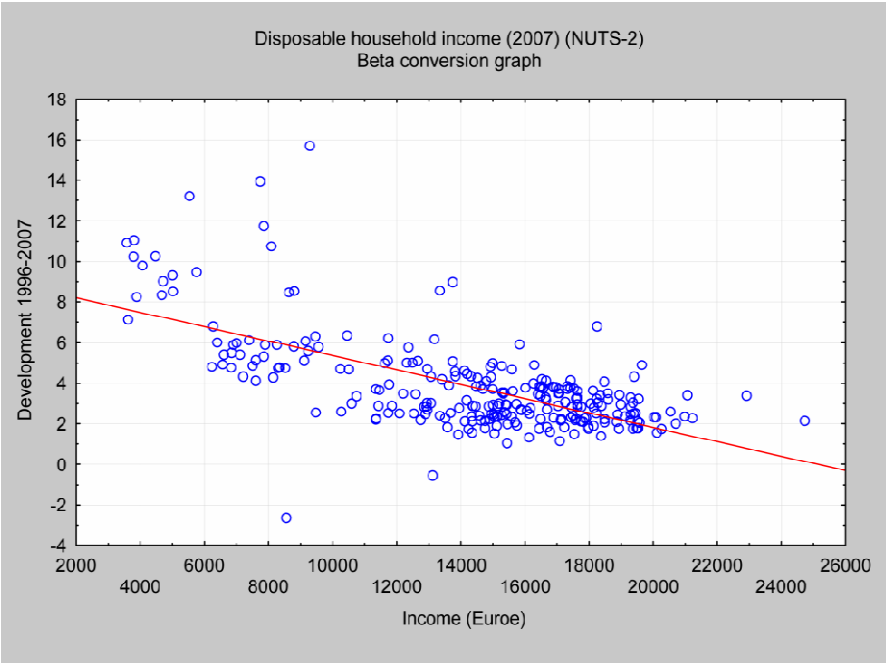


Figure 52. Disposable household income – beta conversion

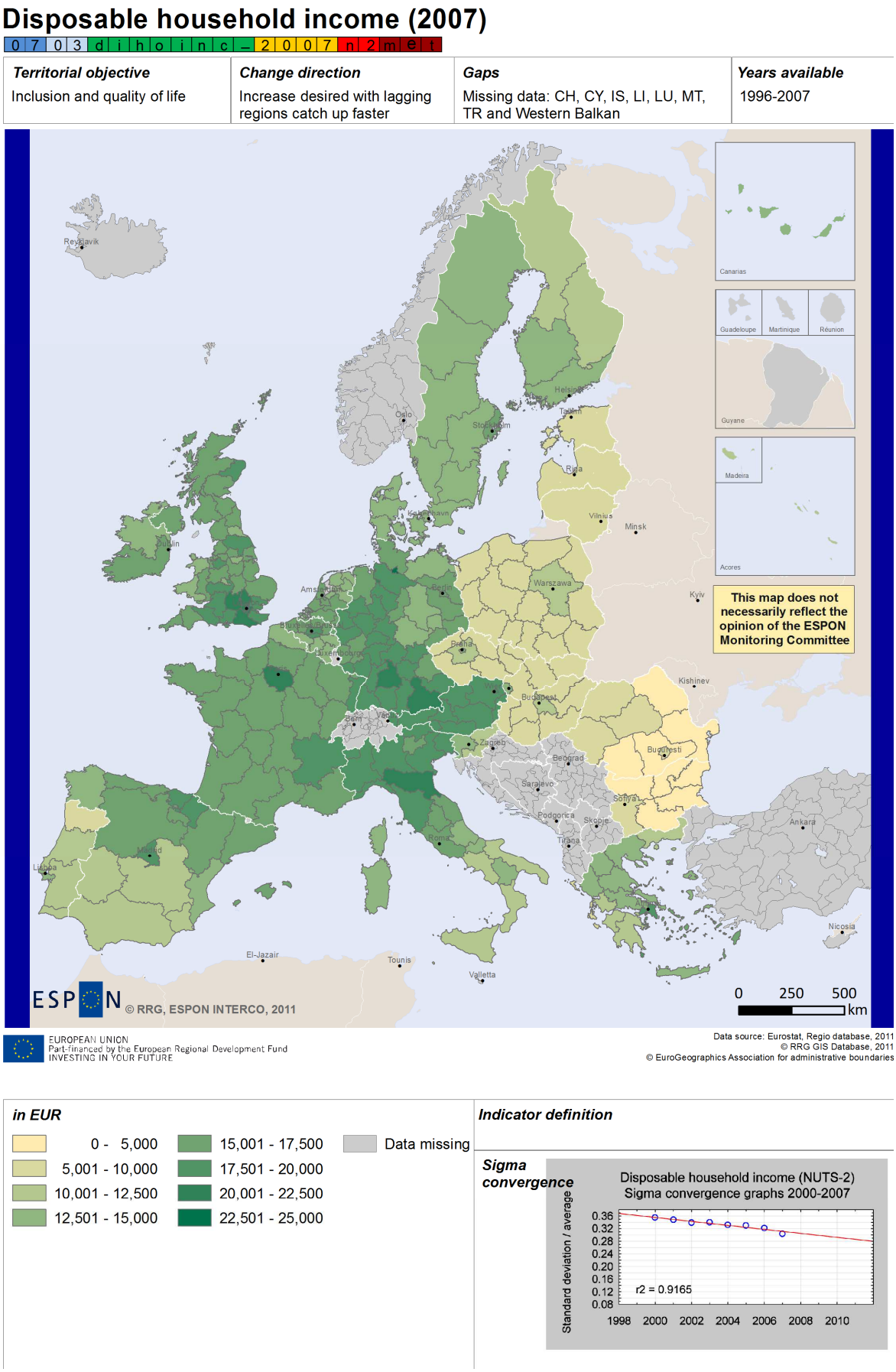


Figure 53. Indicator – disposable household income

Life expectancy at birth

Theme:
SOCIAL AND CULTURAL AFFAIRS, QUALITY OF LIFE
Health

Policy relevance:
This indicator represents a proxy for the overall quality of the health-care system in a region. It tells us about healthiness of living environment and together with ageing index it allows to assess social policies projections and risk of exclusion.

Desired direction of change:
Life expectancy should at least be stable; decreases should be avoided, regions with expectancies of less than 75 years should catch up faster

Description:
The map basically illustrates three findings: First, the general life expectancy in Europe lies between 72 and 84 years, i.e. within a time span of 12 years. Second, life expectancy is generally higher in EU15 compared to EU27, since all new EU Member States have significantly lower expectancies compared to Western Europe. Third, even in West European countries a distinction between Northern regions (lower expectancy) and southern regions (high expectancy) can be found, for instance in the UK and Germany and, to a lesser degree, in France or Greece.
Even though the general range of values between 72 and 84 years is rather small (Figure 54), the variations between the countries are completely different. There are countries with very small ranges, smaller than two or one years (Austria, Ireland, Netherlands, Norway), but there are also countries with great disparities of four or even more years (Hungary, Portugal, UK); in the latter case obviously it very much depends where people are living.
The disparities of this indicator remained almost stable in the period 2002-2008, although at a low level (Figure 55). As Figure 56 shows, the percentage development of the regions was close to zero, i.e. there was no significant development over time for almost all regions. However, the beta

convergence shows that regions with already high life expectancies increased these expectancies overproportionally, even though at a very, almost neglectable level.

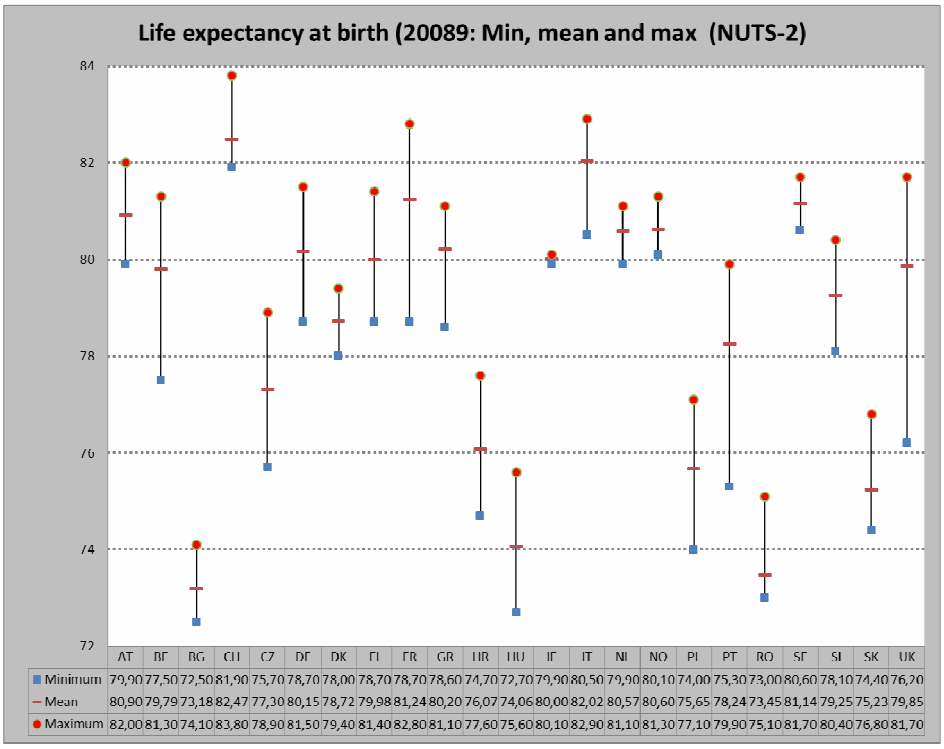


Figure 54. Life expectancy at birth by country – Minima, maxima and averages

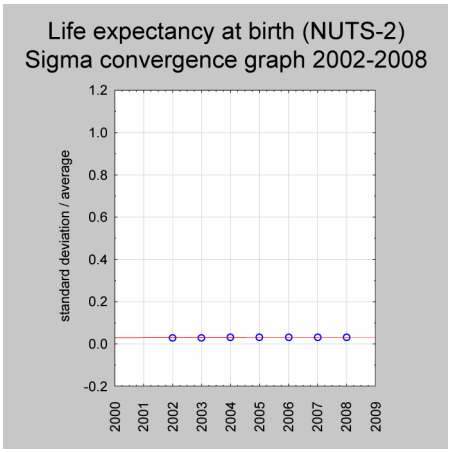


Figure 55. Life expectancy at birth – development of disparities 2002-2008

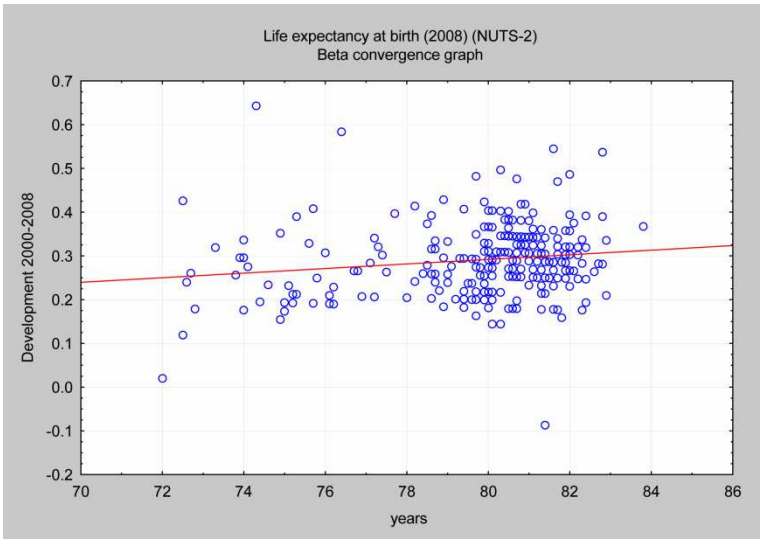
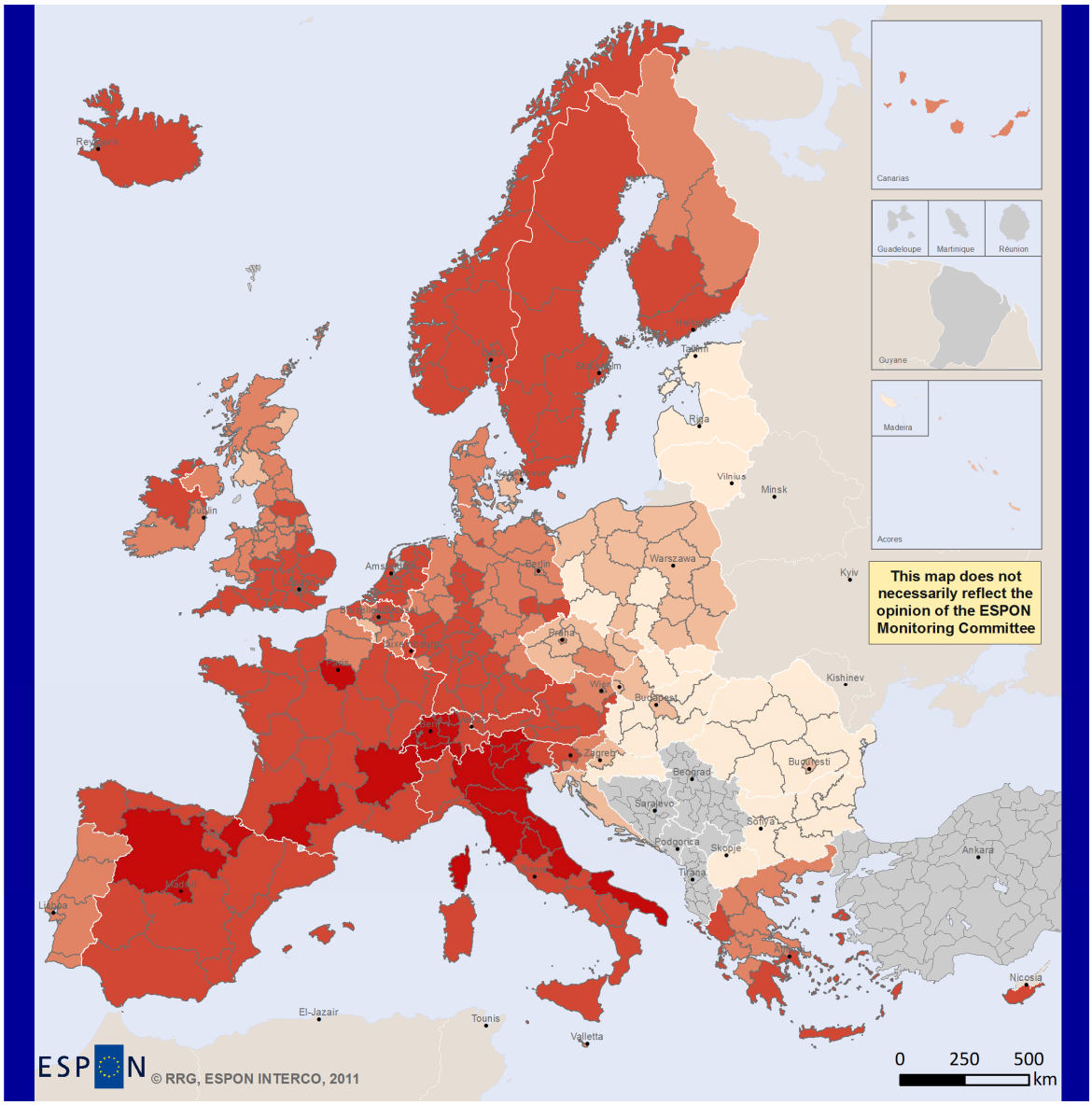


Figure 56. Life expectancy at birth – beta conversion

Life expectancy at birth (2008)

0 6 0 3 l e a b – – – – 2 0 0 8 n 2 m e t

Territorial objective	*Change direction*	*Gaps*	*Years available*
Inclusion and quality of life	Stable expectancy; avoid de-crease; lagging regions catch up	Missing data: TR, Western Balkan data BE, NO, UK for 2007	2000-2008



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in years

- 72 - 75
- 76 - 78
- 79 - 80
- 81 - 82
- 83 - 84
- Data missing

Indicator definition

Average expectancy for both women and men

Sigma convergence

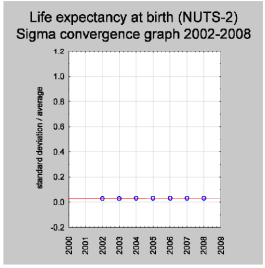


Figure 57. Indicator – Life expectancy at birth

Proportion of early school leavers

Theme:
SOCIAL AND CULTURAL AFFAIRS, QUALITY OF LIFE
Education

Policy relevance:
This indicator measures the quality of the school system and potential inclusion in labour market. Low level of education is more likely to expose to low income and low life expectancy.

Desired direction of change:
A decrease to zero is desired, since adequate and highest level of education is needed for Europe as a whole as assets in global markets.

Description:
In most regions in Europe, the proportion of school leavers in 2010 accounts for 11-20 percent; lower proportions can be found in Poland, Czech Republic, Slovenia and Croatia, higher proportions in Turkey, Romania, Spain, Portugal and Southern Italy (Figure 58). With the exception of Portugal, Spain and Turkey, disparities at regional level within countries are rather small; however, there are indeed variations of the general level between the countries (for instance, Swiss or Czech Republic compared to the other countries).
Notwithstanding these actual disparities, there has been a trend towards convergence since 2006 across all regions in Europe (Figure 59). This convergence trends was mainly caused by regions with high proportion of early school leavers who managed to reduce this proportion significantly (Figure 60). Regions with rather low proportion behaved differently: partly they managed to reduce this proportion even more since 2006, but for some of them the proportion increased.

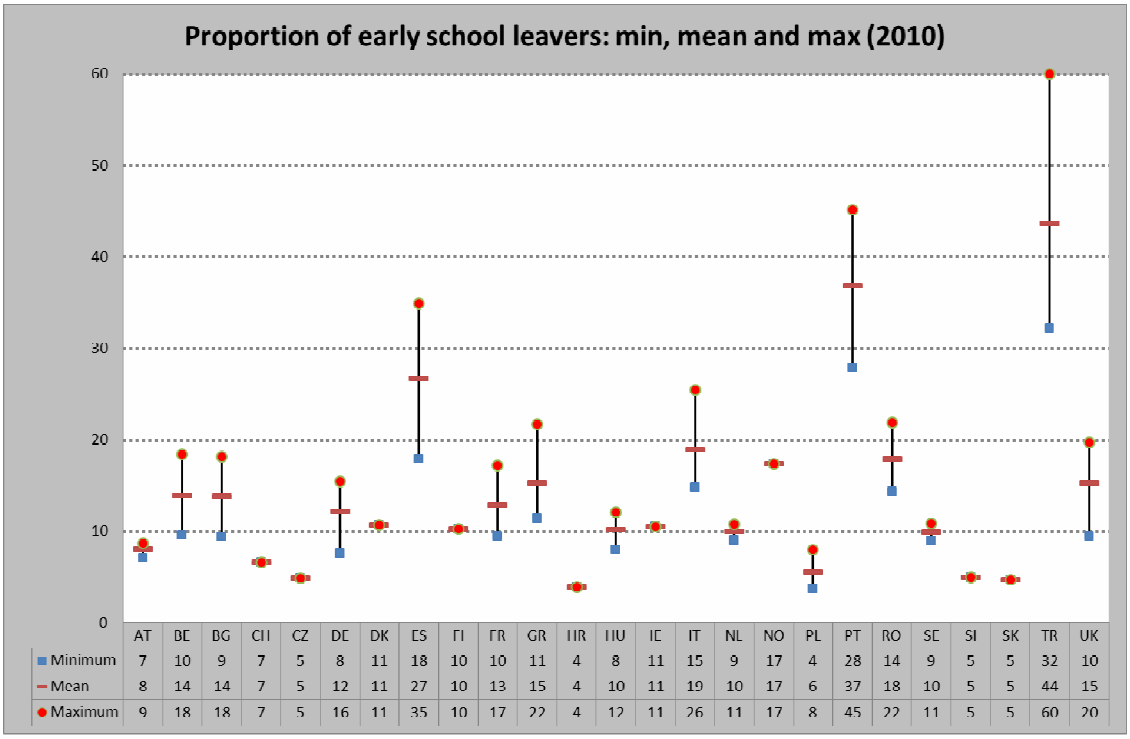


Figure 58. Early school leavers by country – minima, maxima and averages

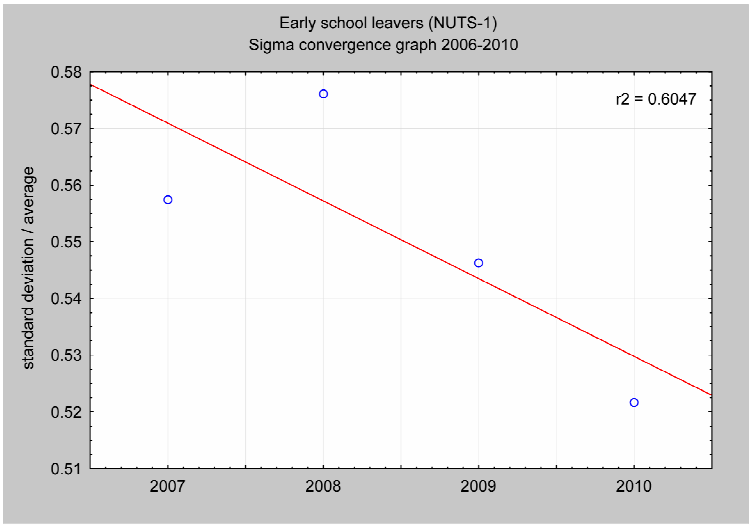


Figure 59. Early school leavers – development of disparities 2006-2010

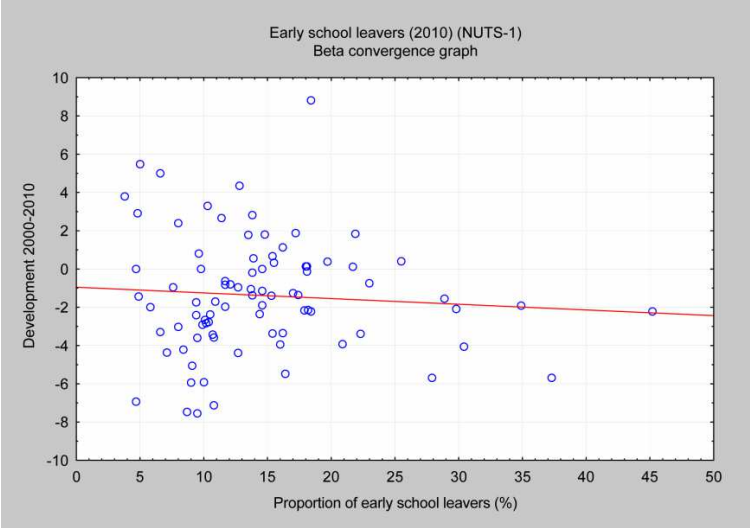
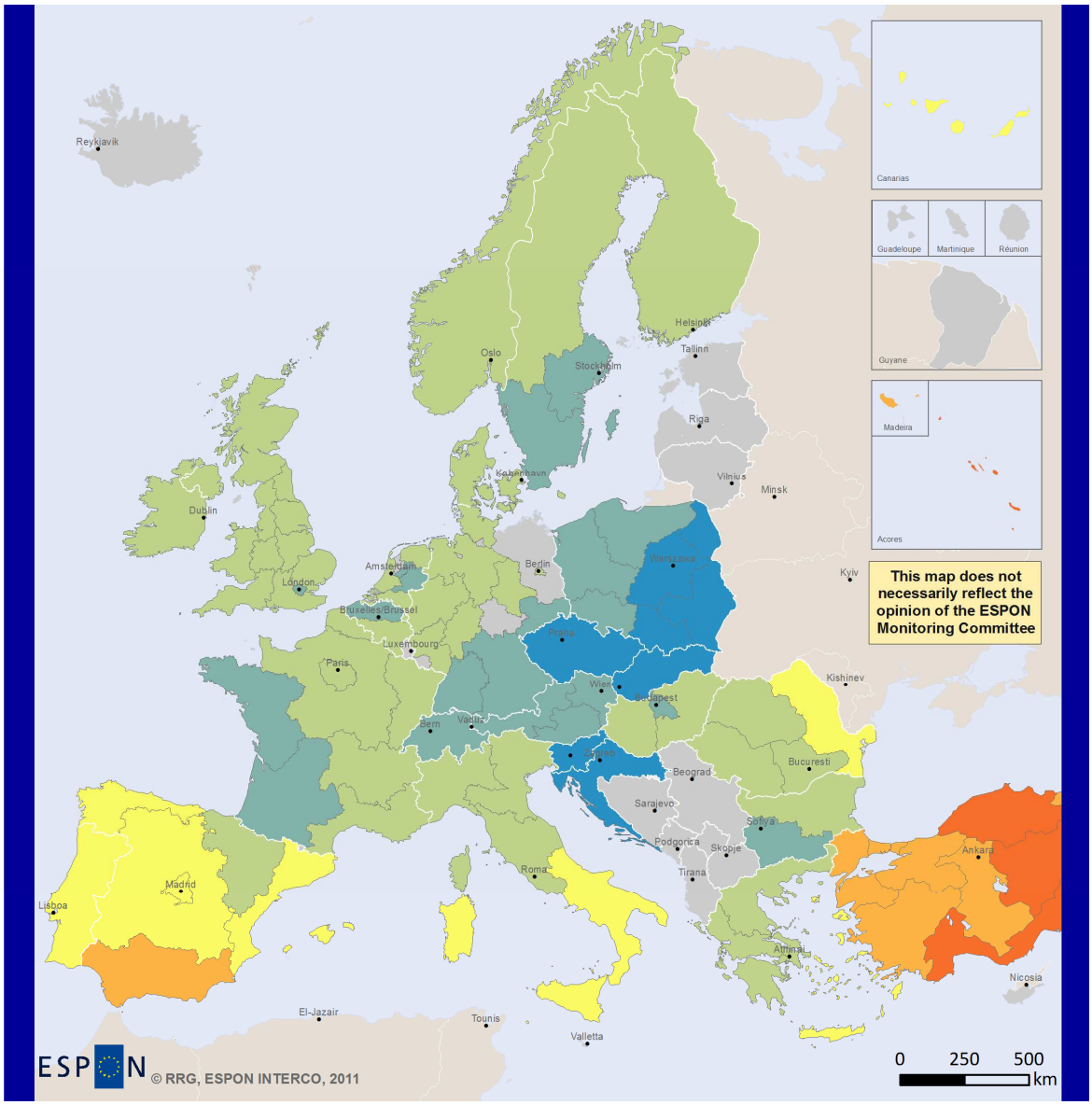


Figure 60. Early school leavers – beta conversion

Proportion of early school leavers (2010)

0 6 0 2 e a r s l l e a _ 2 0 1 0 n 1 r t d

Territorial objective	*Change direction*	*Gaps*	*Years available*
Inclusion and quality of life	Reduction to zero desired.	Missing data: IS, Baltic States, Eastern Germany, Western Balkan	2000-2010



in %

- 4 - 5
- 6 - 10
- 11 - 20
- 21 - 30
- 31 - 40
- 41 - 50
- 51 - 60
- Data missing

Indicator definition

Early leavers from education and training

Sigma convergence

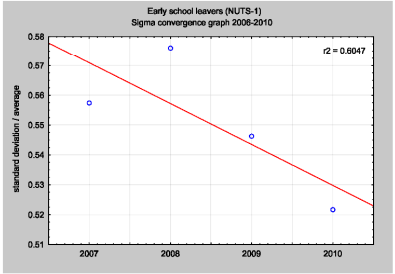


Figure 61. Indicator – early school leavers.

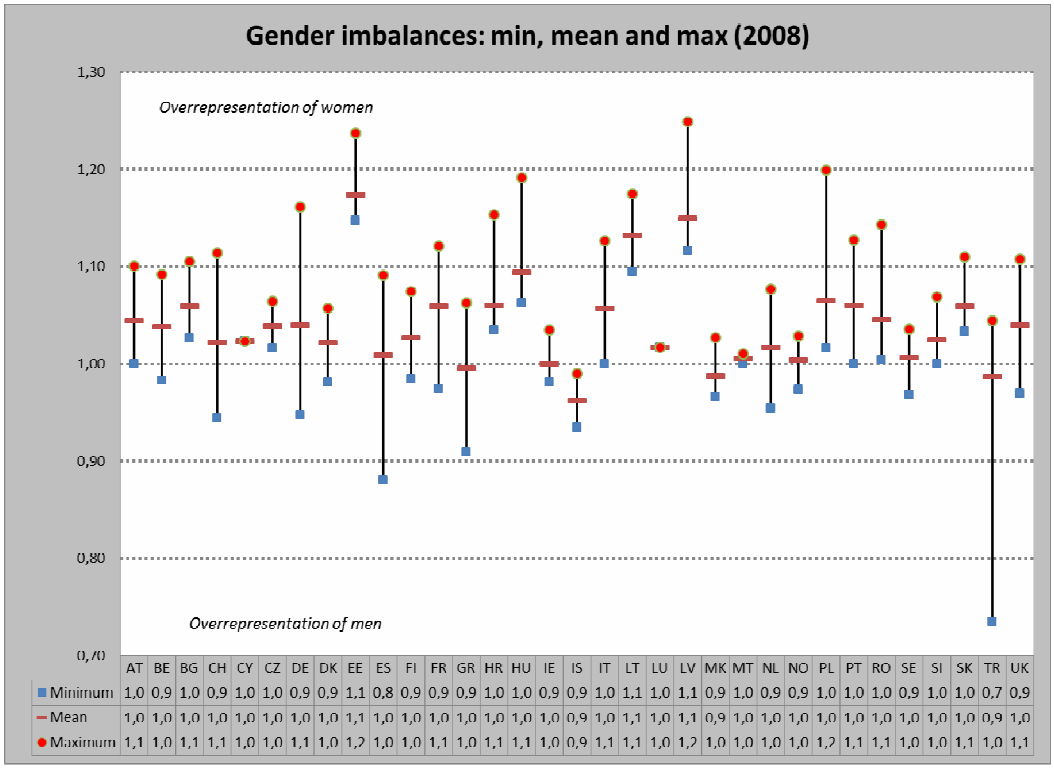
Gender imbalances

Theme:
DEMOGRAPHY
Population structure

Policy relevance:
This indicator measures differences in the gender composition of a society. A balanced participation of men and women in activities is determinant for an inclusive society.

Desired direction of change:
A balanced demographic structure between female and male population should be aspired.

Description:
The majority of regions in Europe experience a slight overrepresentation of women (Figure 62); only the Baltic States, as well as selected regions in Poland, Hungary, Southern France and Portugal have higher overrepresentation of women. In turn, regions in Northern Scandinavia, Ireland, East Germany, large parts of Spain, Greece and Turkey see a overrepresentation of men.
An almost balanced gender structure for the overall country can be observed for smaller countries like Cyprus, Ireland, Luxembourg, Macedonia, Malta or Norway.
This indicator experienced almost no development since 2003, neither for measuring across all regions, nor by differentiating the type of region. The sigma convergence remained stable, however, at a low level (Figure 63). As the beta convergence shows (Figure 64), the development since 2000 was for most regions in the range of +/- 0.5 percentage points only.



	AT	BE	BG	CH	CY	CZ	DE	DK	EE	ES	FI	FR	GR	HR	HU	IE	IS	IT	LT	LU	LV	MK	MT	NL	NO	PL	PT	RO	SE	SI	SK	TR	UK
Minimum	1,0	0,9	1,0	0,9	1,0	1,0	0,9	0,9	1,1	0,8	0,9	0,9	0,9	1,0	1,0	0,9	0,9	1,0	1,1	1,0	1,1	0,9	1,0	0,9	0,9	1,0	1,0	1,0	0,9	1,0	1,0	0,7	0,9
Mean	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,1	1,0	1,0	1,0	1,0	1,0	1,0	1,0	0,9	1,0	1,1	1,0	1,1	0,9	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	0,9	1,0
Maximum	1,1	1,0	1,1	1,1	1,0	1,0	1,1	1,0	1,2	1,0	1,0	1,1	1,0	1,1	1,1	1,0	0,9	1,1	1,1	1,0	1,2	1,0	1,0	1,0	1,0	1,2	1,1	1,1	1,0	1,0	1,1	1,0	1,1

Figure 62. Gender imbalances by country – minima, maxima and averages

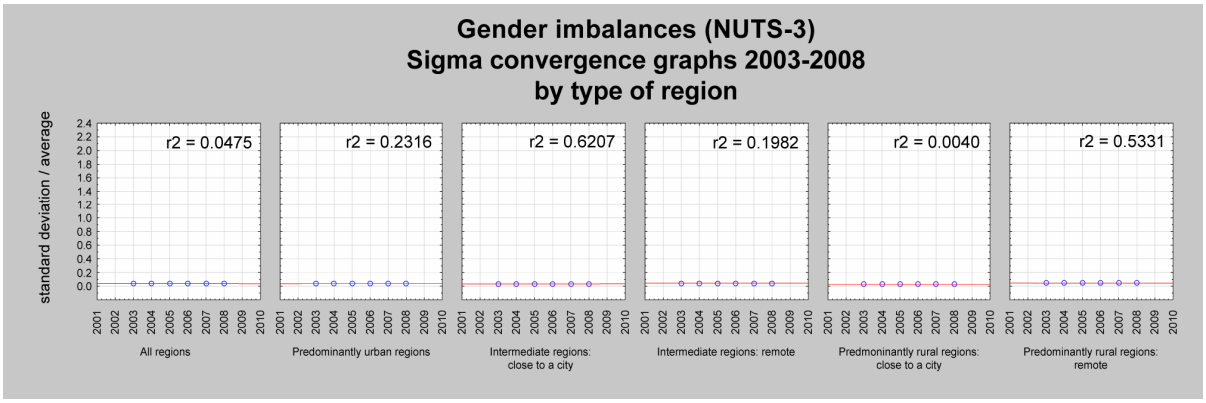


Figure 63. Gender imbalances – development of disparities 2003-2008

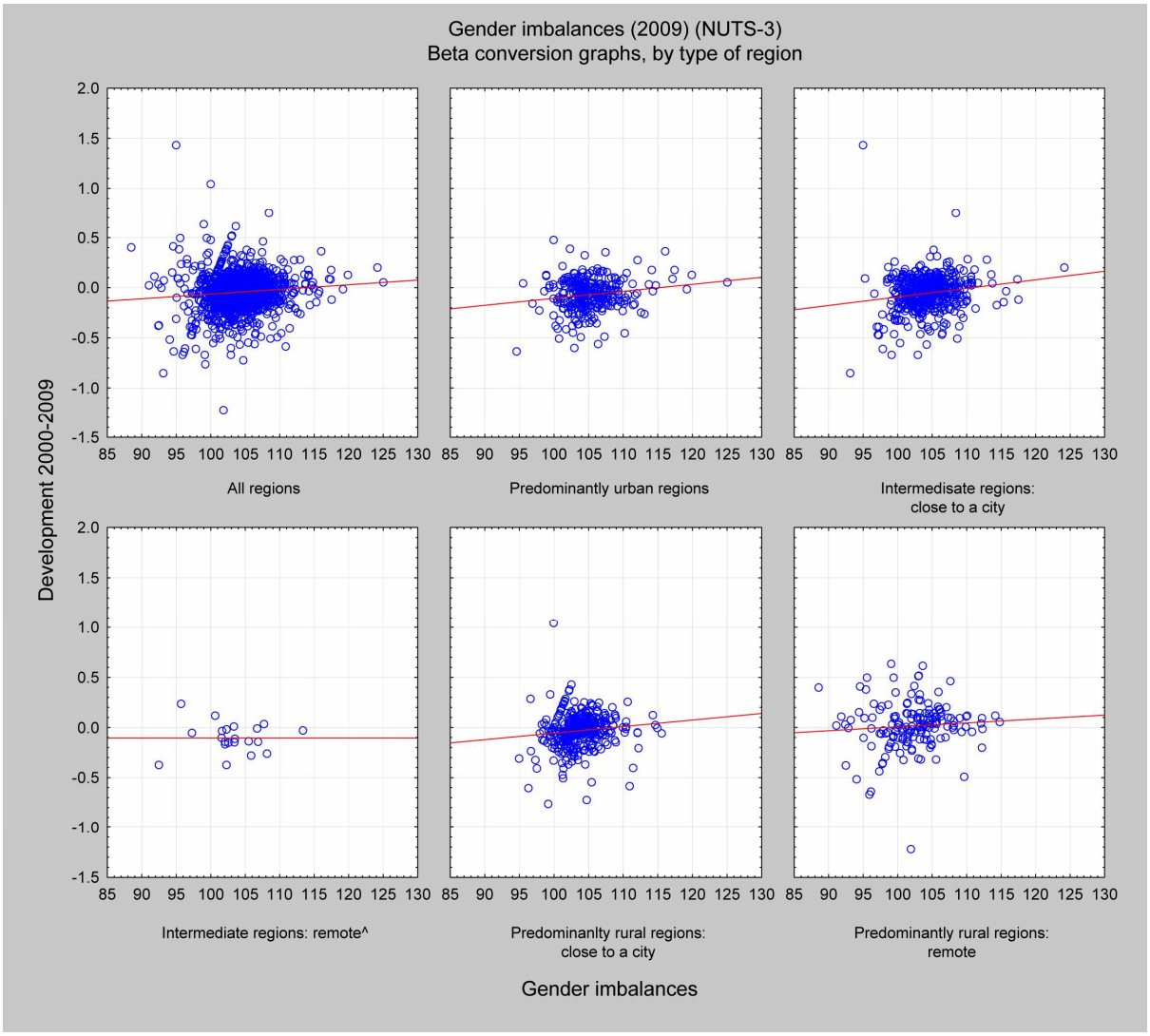
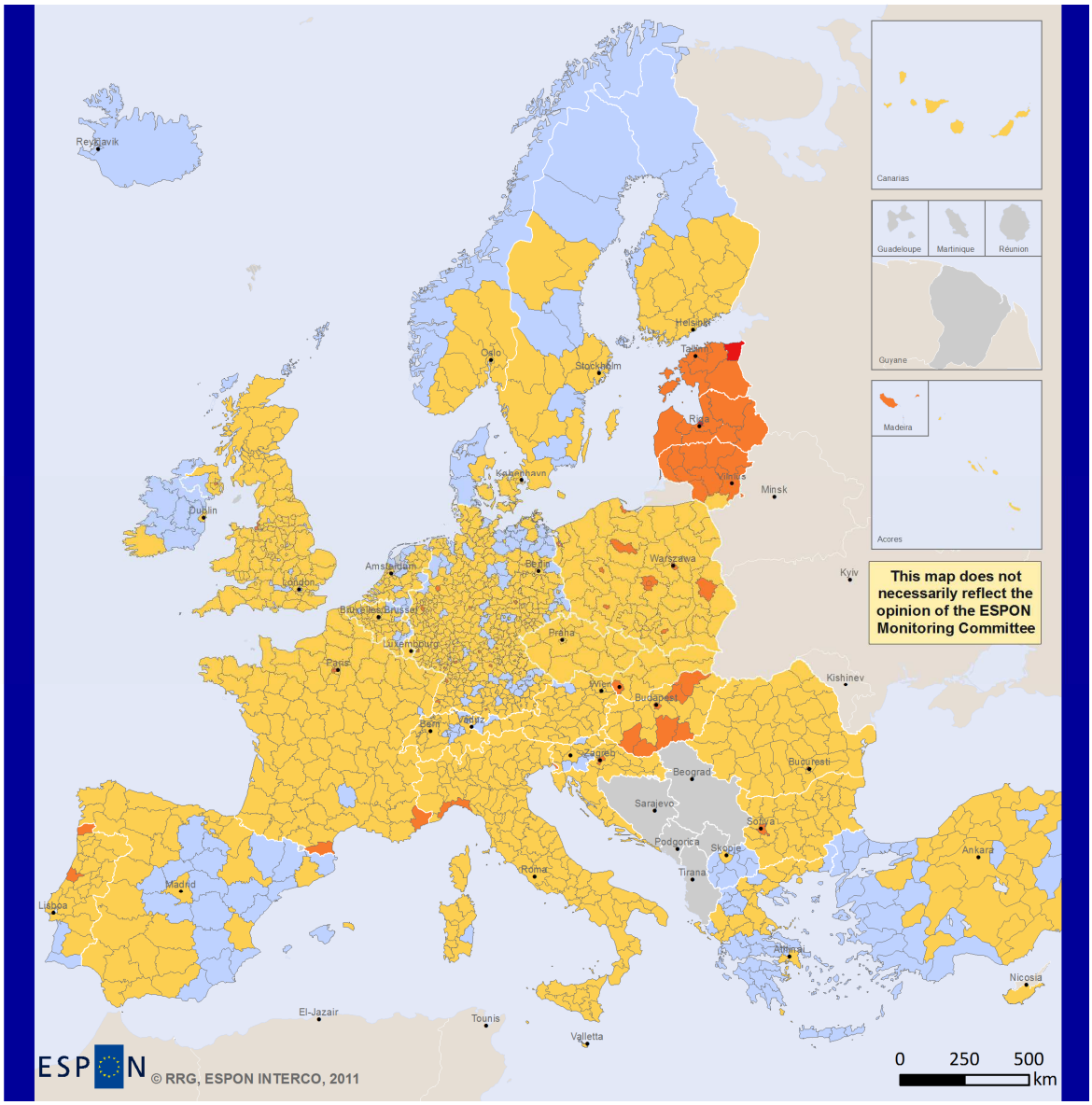


Figure 64. Gender imbalances – beta conversion.

Gender imbalances (2008)

0 2 0 1 g e n d i m b _ 2 0 0 8 n 3 r t d

Territorial objective	*Change direction*	*Gaps*	*Years available*
Inclusion and quality of life	Maintain balanced demographic structure	Missing data: IS, Baltic States, Eastern Germany, Western Balkan	2000-2009



Women

underrepresentation	*overrepresentation*	
0.7 - 0.8	1.0 - 1.1	Data missing
0.8 - 0.9	1.1 - 1.2	
0.9 - 1.0	1.2 - 1.3	

Indicator definition

Ratio female/male population

Sigma convergence

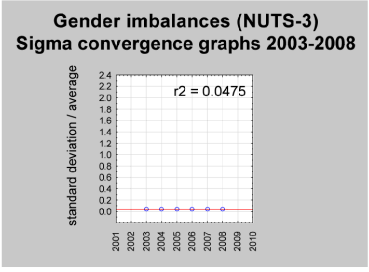


Figure 65. Indicator – Gender imbalances

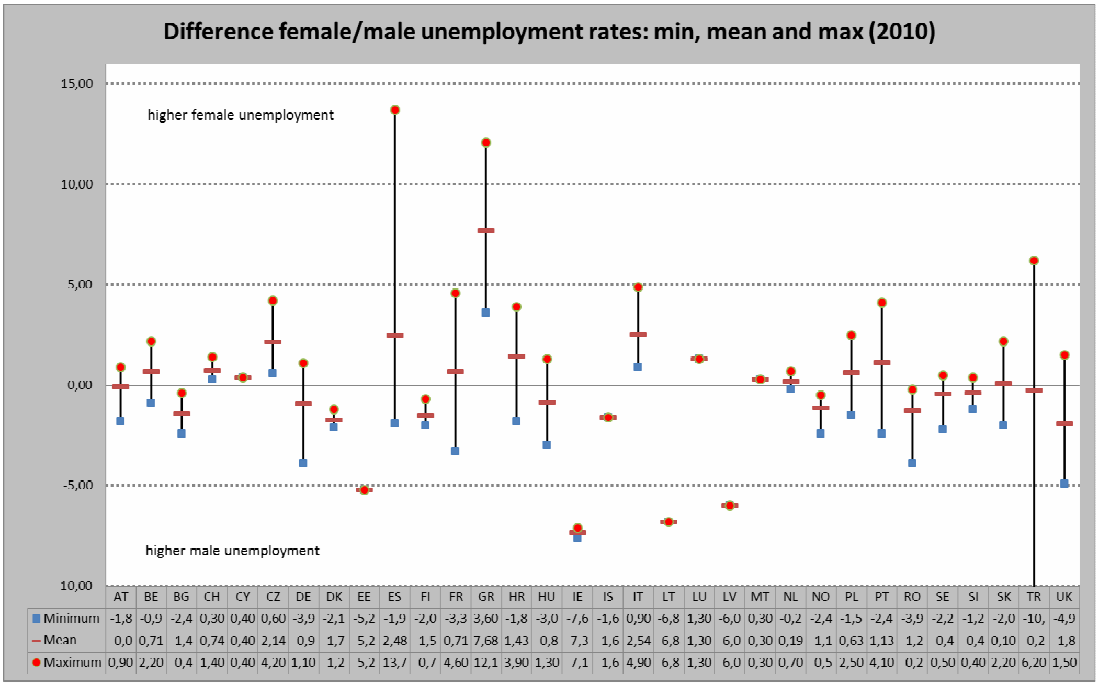
Differences in female-male unemployment rates

Theme:
ECONOMY, LABOUR FORCE
Employment, Unemployment

Policy relevance:
This indicator measures the female participation in economy, and thus the overall quality of labour markets of an inclusive society.

Desired direction of change:
The difference between the female and male unemployment rates should decreased, i.e. there should be no significant difference in unemployment for women or men. Furthermore, a general decrease in unemployment rates should be aspired.

Description:
The spatial patterns reveal interesting pictures: while in Scandinavia, the Baltic States, Germany, UK, Ireland, Bulgaria and Romania higher unemployment rates for men can be observed, the opposite is true for the Mediterranean countries, France, Poland, Czech Republic and Slovakia, where higher female unemployment rates can be detected. There are only few countries with balanced unemployment rates across sex, which are Switzerland, Denmark, Finland, Netherlands, Norway and Slovenia. For the other countries great disparities exist, with the highest ones in Spain, France. Greece and Turkey.



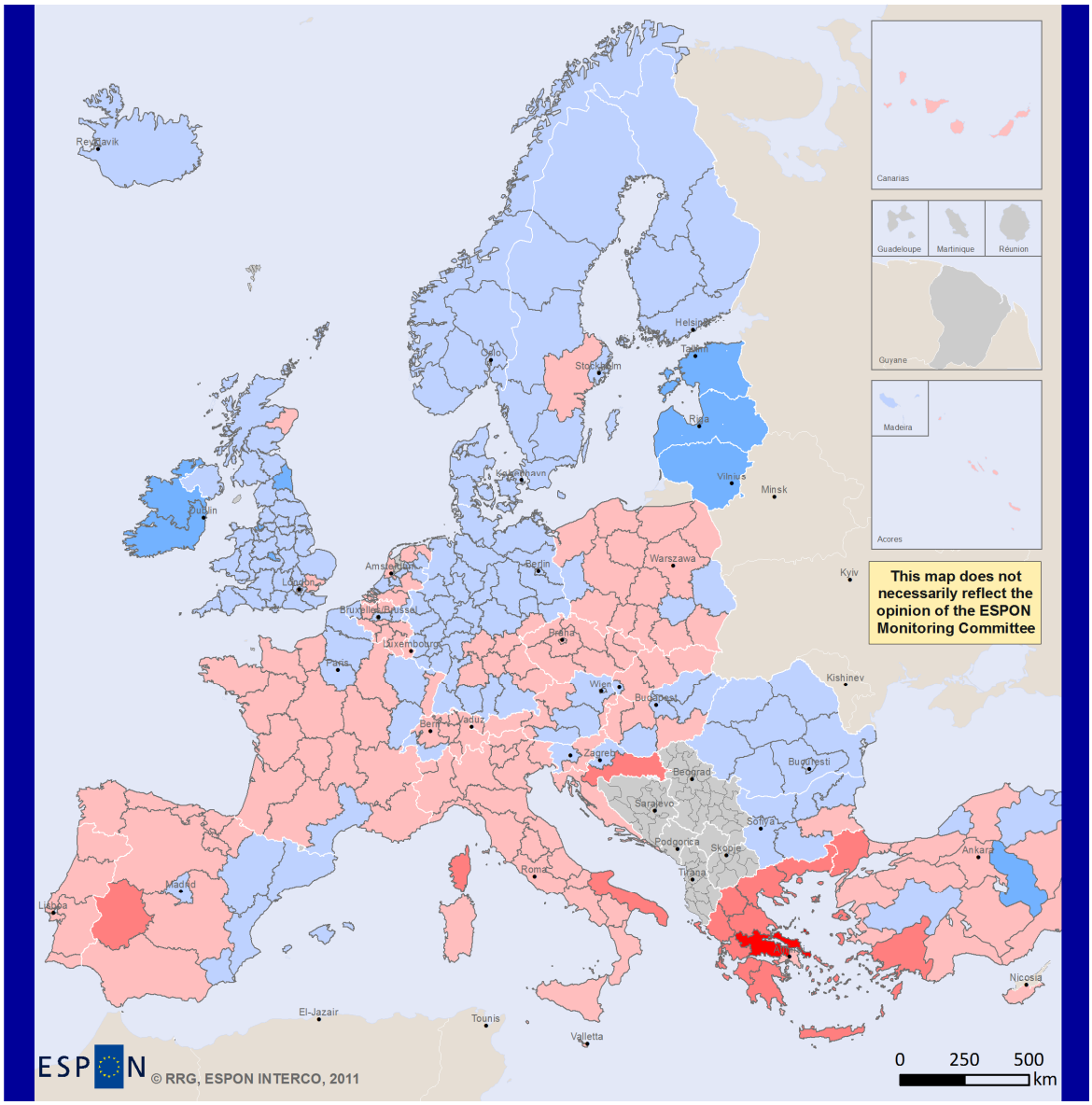
	AT	BE	BG	CH	CY	CZ	DE	DK	EE	ES	FI	FR	GR	HR	HU	IE	IS	IT	LT	LU	LV	MT	NL	NO	PL	PT	RO	SE	SI	SK	TR	UK
Minimum	-1,8	-0,9	-2,4	0,30	0,40	0,60	-3,9	-2,1	-5,2	-1,9	-2,0	-3,3	3,60	-1,8	-3,0	-7,6	-1,6	0,90	-6,8	1,30	-6,0	0,30	-0,2	-2,4	-1,5	-2,4	-3,9	-2,2	-1,2	-2,0	-10,	-4,9
Mean	0,0	0,71	1,4	0,74	0,40	2,14	0,9	1,7	5,2	2,48	1,5	0,71	7,68	1,43	0,8	7,3	1,6	2,54	6,8	1,30	6,0	0,30	0,19	1,1	0,63	1,13	1,2	0,4	0,4	0,10	0,2	1,8
Maximum	0,90	2,20	0,4	1,40	0,40	4,20	1,10	1,2	5,2	13,7	0,7	4,60	12,1	3,90	1,30	7,1	1,6	4,90	6,8	1,30	6,0	0,30	0,70	0,5	2,50	4,10	0,2	0,50	0,40	2,20	6,20	1,50

Figure 66. Female/male unemployment by country – minima, maxima and averages

Difference in female/male unemployment rates (2010)

0702unemdiff2010nr2met

Territorial objective	*Change direction*	*Gaps*	*Years available*
Inclusion and quality of life	Differences to be minimised; overall rate to decrease to zero	Missing data: TR, Western Balkan data BE, NO, UK for 2007	1999-2010



Higher unemployment rates for men

- -15 - -10
- -9 - -5
- -4 - 0

Higher unemployment rates for women

- 0 - 5
- 6 - 10
- 11 - 15
- 16 - 20

Data missing

Indicator definition

Female unemployment rate - male unemployment rate

Sigma convergence

Figure 67. Indicator – Female/male unemployment rate

Ageing index

Theme:
DEMOGRAPHY
Population structure

Policy relevance:
This indicator measures the balance of the age structure of the society. Unbalanced age structure may lead to overaging of society and to further difficulties in maintaining adequate levels of public services and infrastructure, endangering quality of life.

Desired direction of change:
To maintain a balanced age structure of the society and to avoid overaging.

Description:
The map clearly differentiate regions with a surplus of children (green colors) from those with a surplus of elderly people (purple colors). Societies like Denmark, Iceland, Ireland, Norway, Poland, Romania or Turkey have higher shares of children compared to elderly people. The opposite situation is true in particular for areas in Northwest Spain, in Italy, Greece, Bulgaria, and in East Germany, whith overaging societies.
Due to the specific situation in East Germany, Germany is at the same time the country with the highest disparities between NUTS-3 regions, followed by Spain, Portugal and Greece and Italy (Figure 68). The remaining countries have only small disparities.

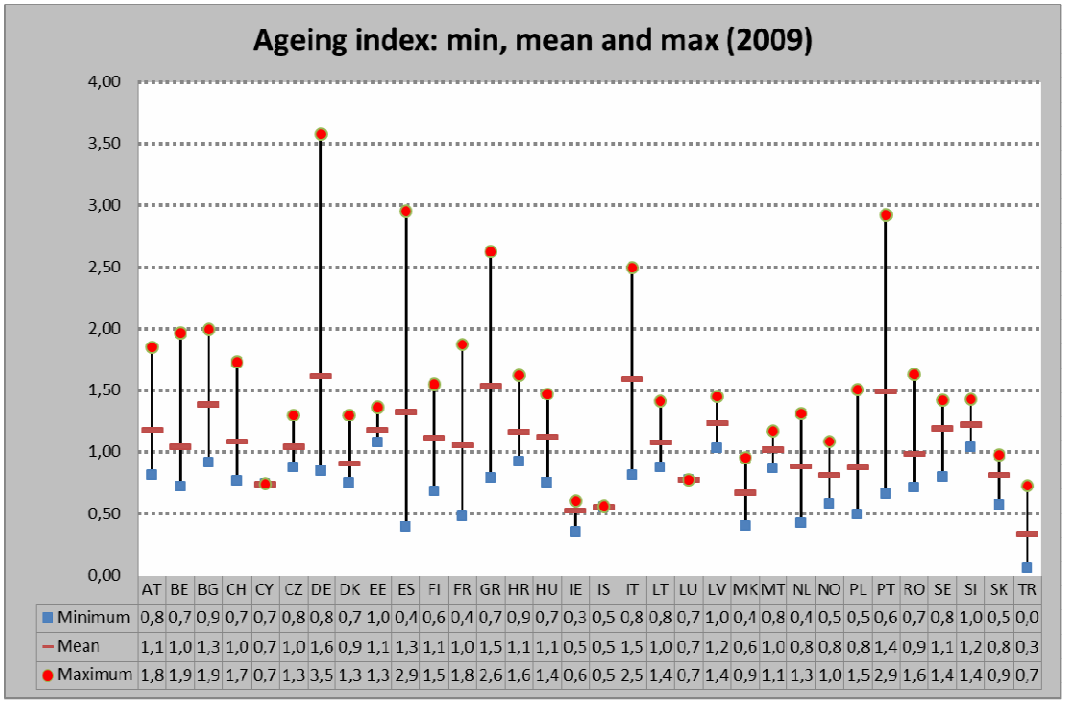


Figure 68. Ageing index by country – minima, maxima and averages.

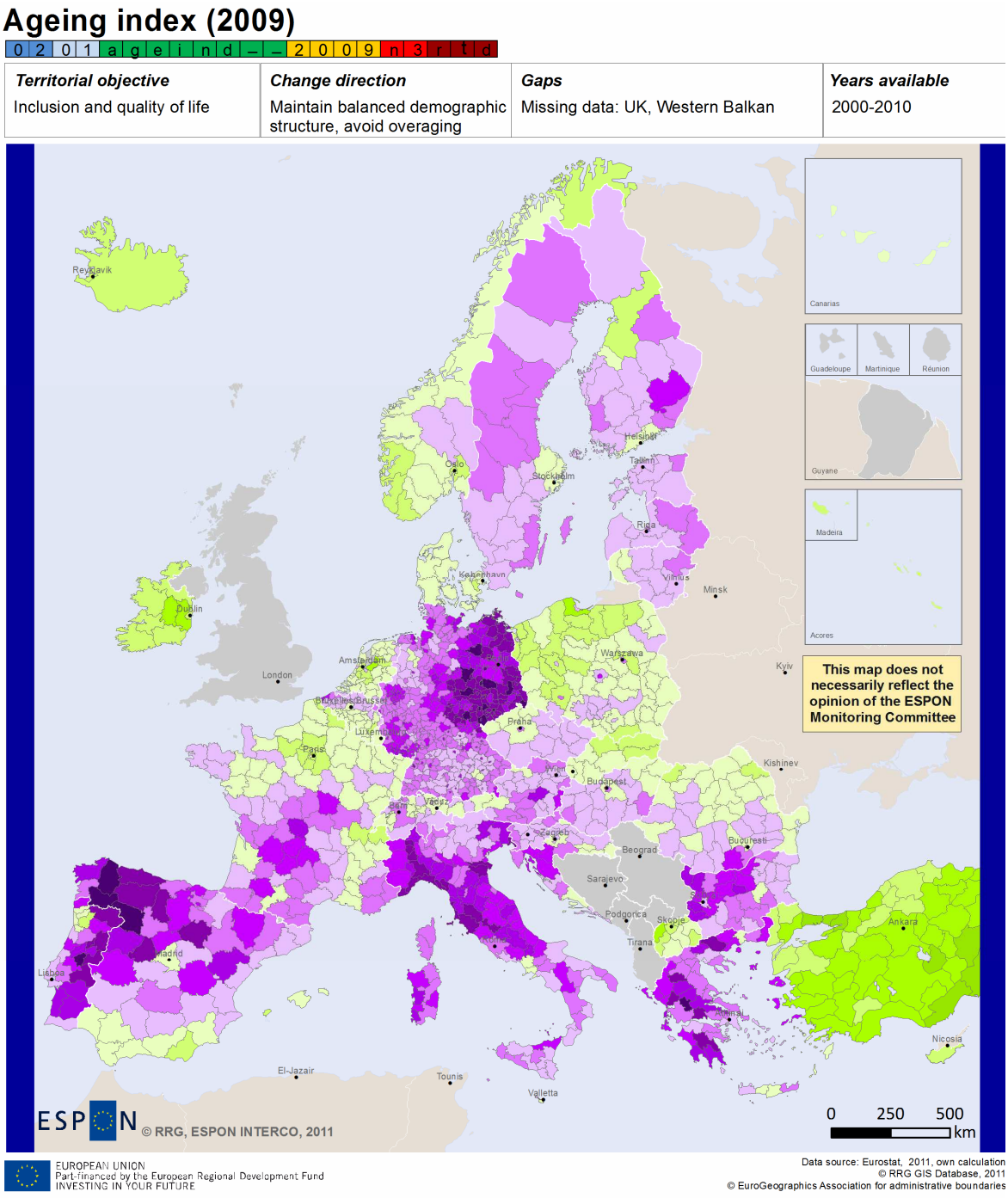


Figure 69. Indicator – Ageing index.

Summary

What are the territorial disparities of the indicators selected for the territorial objective of inclusion and quality of life? And how have these indicators developed over the last decade?

Disparities for the indicator ***life expectancy at birth*** remained almost stable, though at a low level. There has been almost no indicator development since 2002. So, differences within countries remain small, but differences between countries are quite high.

Though in 2010 some of the EU Member States still faced high rates of ***early school leavers***, a trend towards convergence could be observed since 2006 for the entire ESPON space. Many regions with high proportions of school leavers managed to reduce these rates significantly. But there were also some regions experiencing increases in the proportion of early school leavers.

There has been almost no indicator development for the ***gender imbalances*** since 2003. Gender imbalances remained stable, though generally at a low level.

Many countries only yield small differences in the ***unemployment rates for women and men***, however, some countries like Spain, France, Greece and Turkey show quite big differences.

While many countries reveal only small disparities in the ***ageing index***, there are remarkable exceptions like Germany, Spain, Portugal, Greece or Italy which show great disparities between their regions for this indicator.

Despite all the existing disparities in detail as described above, Figures Figure 70 and Figure 71 summaries that altogether disparities between European regions are rather low, and that disparities in the proportion of early school leavers decreased since 2006, furthermore resulting in a trend towards cohesion.

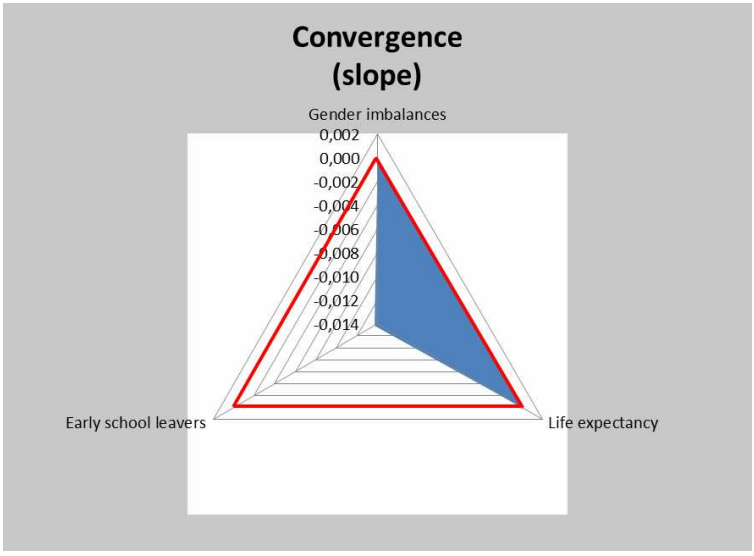


Figure 70. Degree of convergence for indicators under Territorial Objective "Inclusion and quality of life"

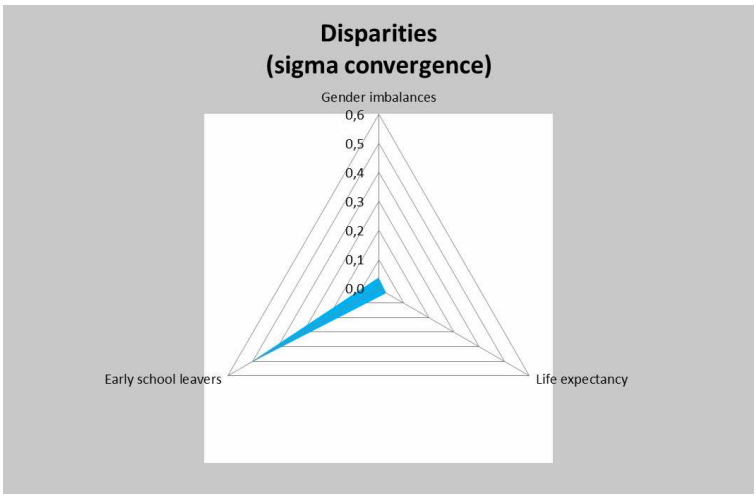


Figure 71. Degree of actual disparities for indicators under Territorial objective "Inclusion and quality of life"

C.3.5. Attractive regions of high ecological values and strong territorial capital

Sustainable growth is an essential pillar of Europe 2020 strategy. It aims decoupling growth from energy consumption, for a resource efficient and sustainable economy. Renewable and low-carbon energy are also underlined in TA 2020, which puts more emphasis on joint risk management and cooperation, especially to protect natural and cultural heritage. More than only conservation of European landscapes, there is a need to put quality forward and to make the best use of natural and cultural assets. This will in turn reinforce territorial capital and attractiveness of regions, for a long-term development based on well-functioning ecological systems (TA 2020).

Three indicators are proposed as territorial cohesion indicators under this objective:

- Air pollution: PM10
- Air pollution: Ozone concentration
- Soil sealing per capita

These indicators are dedicated to measure the emissions and soil sealing resulting from human behavior. Other wishlist indicators under this territorial objective include vulnerability to climate change, mortality, risk and hazards, biodiversity or renewable energy potential (see chapter B.4.1. Wishlist for more information).

Due to a lack of time series information, analyses of sigma and beta convergences could not be performed so far for this indicator set.

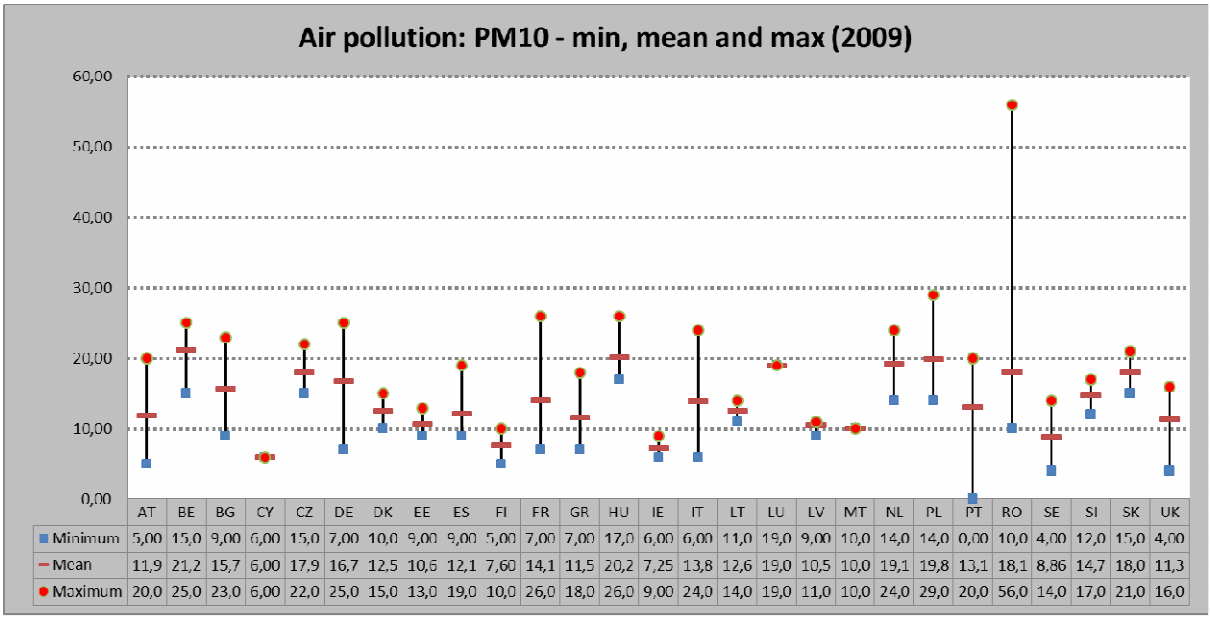
Air pollution: PM10

Theme:
ENVIRONMENT QUALITY, NATURAL ASSETS, HAZARDS
Environment quality

Policy relevance:
This indicator witnesses global warming and climate change processes. A reduction of greenhouse gas emissions, ozone concentrations, etc. is a political priority. The indicator tries measuring the degree of reductions in emissions for healthier natural living environments.

Desired direction of change:
Generally a reduction of the pollutions until zero is desired.

Description:
Northern Scandinavia, as well as some few regions in the Alpine arc, in Southern France, Northern Spain and Scotland show very low PM10 concentrations (Figure 72). All other regions still experience rather high concentrations, not only in the old EU Member States, but in particular also in the new ones, such as regions in Poland, Hungary or Romania. The highest spatial disparities can also be found in Romania, followed by Portugal, France, Italy and Germany. Particular low disparities within countries can be observed for Czech Republic, Denmark, the Baltic states, the Netherlands, Slovenia and Slovakia.



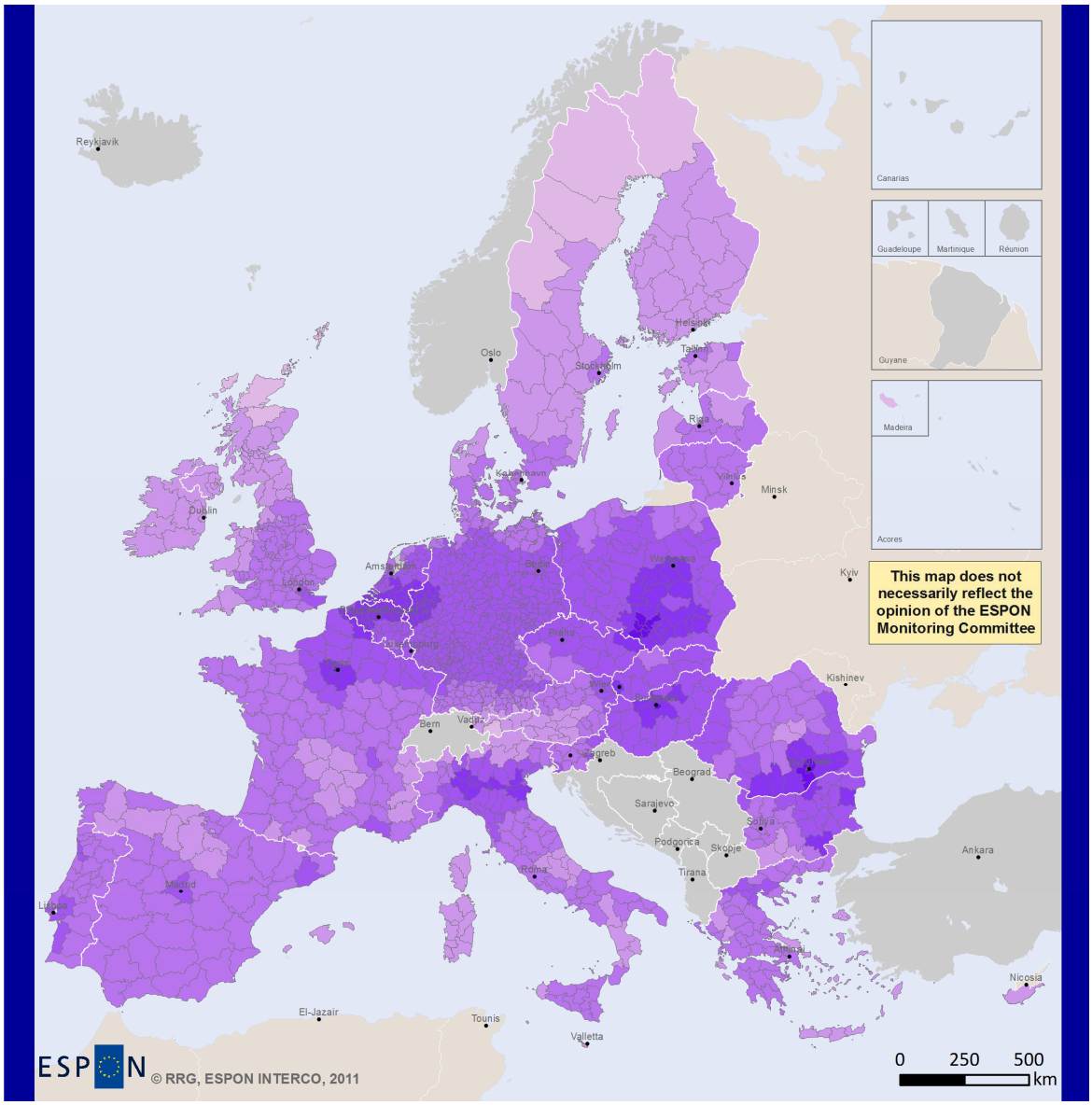
	AT	BE	BG	CY	CZ	DE	DK	EE	ES	FI	FR	GR	HU	IE	IT	LT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	UK
Minimum	5,00	15,0	9,00	6,00	15,0	7,00	10,0	9,00	9,00	5,00	7,00	7,00	17,0	6,00	6,00	11,0	19,0	9,00	10,0	14,0	14,0	0,00	10,0	4,00	12,0	15,0	4,00
Mean	11,9	21,2	15,7	6,00	17,9	16,7	12,5	10,6	12,1	7,60	14,1	11,5	20,2	7,25	13,8	12,6	19,0	10,5	10,0	19,1	19,8	13,1	18,1	8,86	14,7	18,0	11,3
Maximum	20,0	25,0	23,0	6,00	22,0	25,0	15,0	13,0	19,0	10,0	26,0	18,0	26,0	9,00	24,0	14,0	19,0	11,0	10,0	24,0	29,0	20,0	56,0	14,0	17,0	21,0	16,0

Figure 72. PM10 air pollution – minima, mean and maxima

Air pollution: PM10 (2009)

0 8 0 1 a p p m 1 0 _ _ 2 0 0 9 n 3 m e t

Territorial objective	*Change direction*	*Gaps*	*Years available*
Attractive regions of high ecological values & strong capital	Reduction of pollutions until zero desired	Missing data: CH, IS, NO, TR, UK, Western Balkan	2009



Yearly average (yg/m3)

0 - 5	16 - 20	Data missing
6 - 10	21 - 25	
11 - 15	26 - 56	

Indicator definition

PM10 concentration at surface level, weighted by population

Sigma convergence

Figure 73. Indicator – PM10 air pollution.

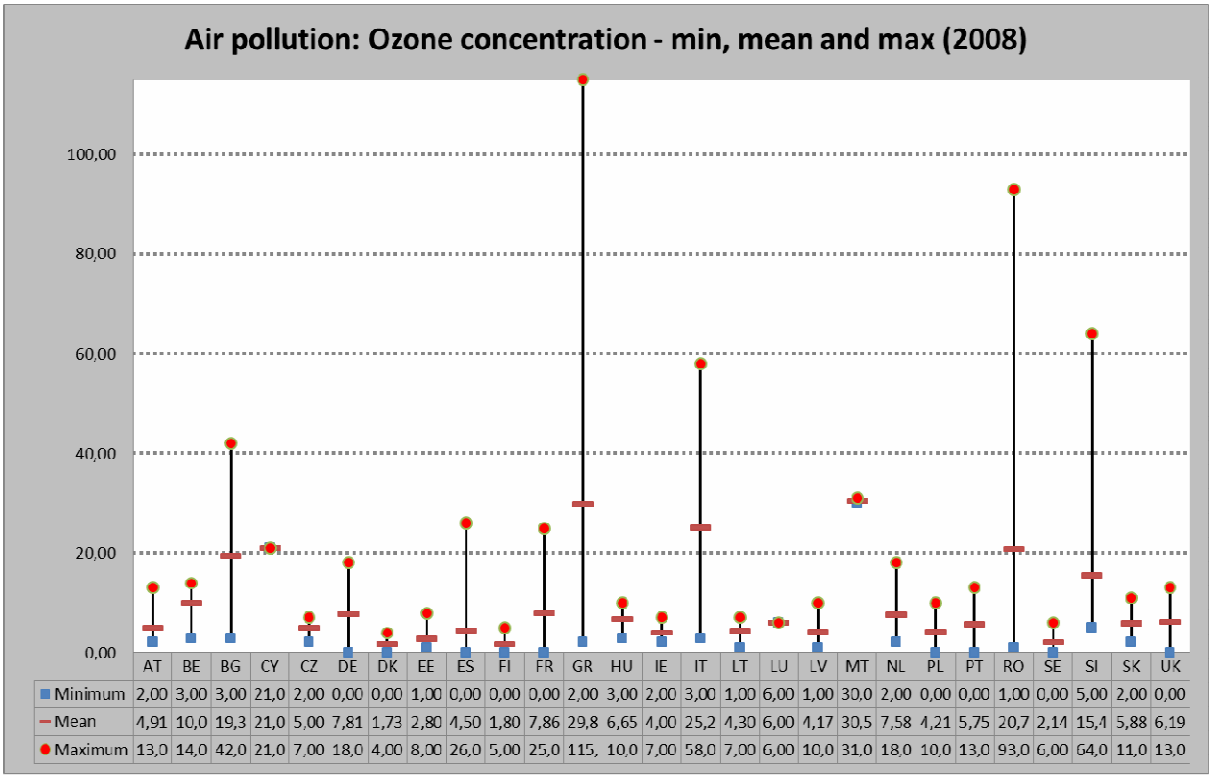
Air pollution: Ozone concentration

Theme:
ENVIRONMENT QUALITY, NATURAL ASSETS, HAZARDS
Environment quality

Policy relevance:
This indicator witnesses global warming and climate change processes. A reduction of greenhouse gas emissions, ozone concentrations, etc. is a political priority. The indicator tries measuring the degree of reductions in emissions for healthier natural living environments.

Desired direction of change:
Generally a reduction of air pollutions until zero is desired, so that the number of days with ozone concentration exceedances decrease.

Description:
For many countries the general number of days with Ozone concentration exceedances with less or equal 5 days is rather low (Scandinavia, Ireland, Spain, Baltic States, Poland); however, there are remarkable exceptions, such as Italy, Bulgaria and Romania and parts of Greece, experiencing highest number of days with concentrations above threshold levels with partly more than 100 days. The latter ones are also the countries with the highest disparities of exceedances within the countries, i.e. there are regions with rather good air quality (such as Western parts of Greece and Romania), but there are in contrary also regions with extremely bad air quality.



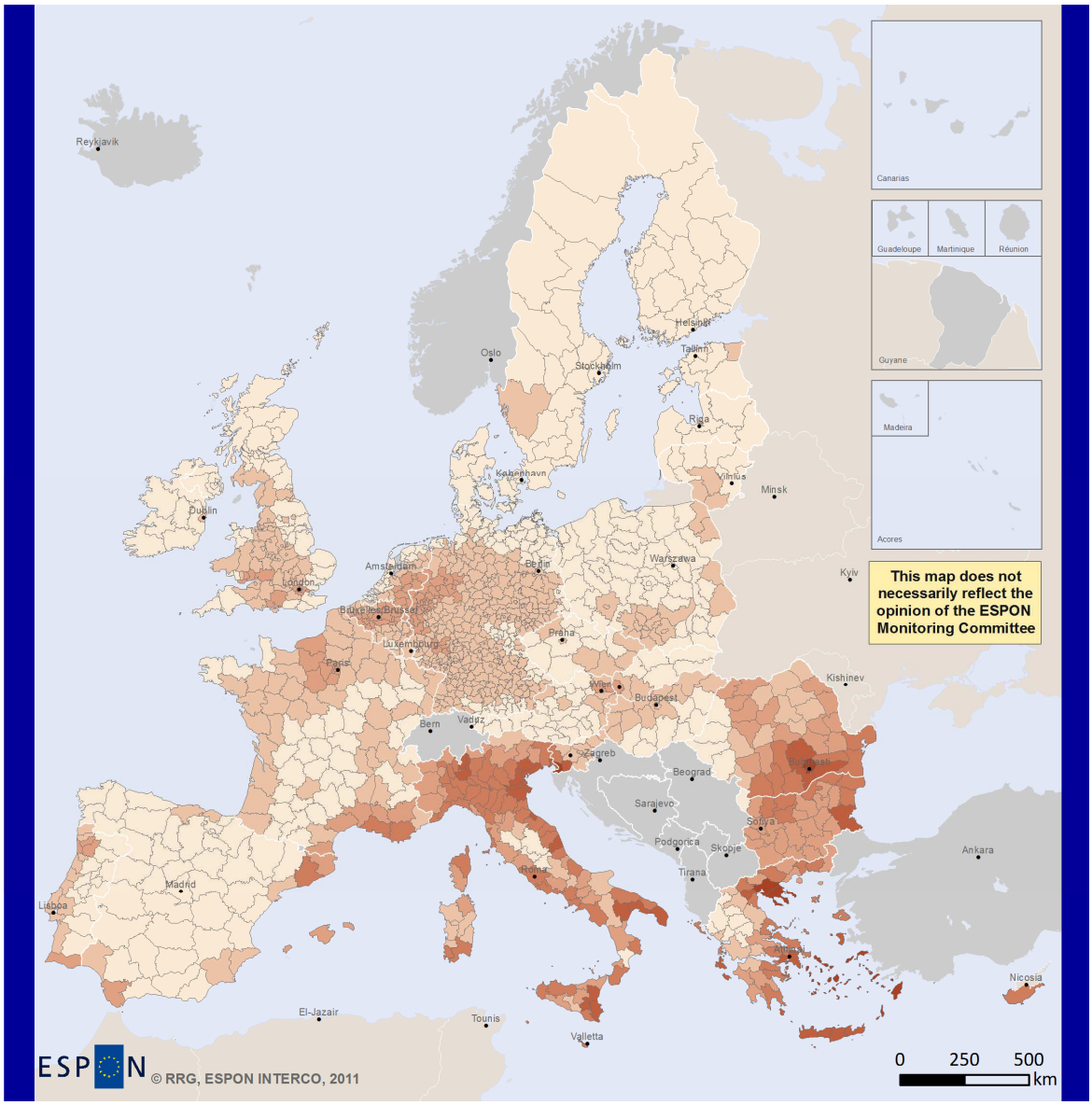
	AT	BE	BG	CY	CZ	DE	DK	EE	ES	FI	FR	GR	HU	IE	IT	LT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	UK
Minimum	2,00	3,00	3,00	21,0	2,00	0,00	0,00	1,00	0,00	0,00	0,00	2,00	3,00	2,00	3,00	1,00	6,00	1,00	30,0	2,00	0,00	0,00	1,00	0,00	5,00	2,00	0,00
Mean	1,91	10,0	19,3	21,0	5,00	7,81	1,73	2,80	1,50	1,80	7,86	29,8	6,65	1,00	25,2	1,30	6,00	1,17	30,5	7,58	1,21	5,75	20,7	2,14	15,1	5,88	6,19
Maximum	13,0	14,0	42,0	21,0	7,00	18,0	4,00	8,00	26,0	5,00	25,0	115,	10,0	7,00	58,0	7,00	6,00	10,0	31,0	18,0	10,0	13,0	93,0	6,00	64,0	11,0	13,0

Figure 74. Air pollution: Ozone concentration exceedances – Minima, mean and maxima

Air pollution: Ozone concentration (2008)

0 8 0 1 a p o z o n e _ 2 0 0 8 n 3 m e t

Territorial objective	*Change direction*	*Gaps*	*Years available*
Attractive regions of high ecological values & strong capital	Reduction of exceedances until zero desired	Missing data: CH, IS, NO, TR, UK, Western Balkan	2008



Days with Ozone concentration exceedances

0 - 5	21 - 40	Data missing
6 - 10	41 - 60	
11 - 20	61 - 115	

Indicator definition

Days with ground level concentration >120 yg/m3

Sigma convergence

Figure 75. Indicator – Ozone concentration exceedances

Soil sealing per capita

Theme:
ENVIRONMENT QUALITY, NATURAL ASSETS, HAZARDS
Climate change

Policy relevance:
This indicator measures the degree of de-coupling of economic / demographic development and land take. Concentration of constructions prevents from natural hazards and preserve ecological functions and values.

Desired direction of change:
Generally, decrease in soil sealing per capita is desired down to the absolute minimum level.

Description:
Differences in land take per capita are quite significant for all countries leading to a very diverse spatial pattern in Europe. Hot spots of soil sealing per capita are East Germany, Portugal, Western parts of Finland, Cyprus, parts of the Baltic States and some regions in France. On the contrary, soil take in Italy, UK, Romania, Poland, in large parts of Spain and in West Germany and East Finland is modest. This diverse picture leads to big value ranges between minimum and maximum for each country; while some countries like Italy or UK are on good track on average towards a reduction of annual soil sealings, other countries like Finland, Portugal, Belgium or Germany face two problems of (i) generally decrease overall soil sealing, and (ii) reduce the big gap between regions taking most land and those taking the least land.

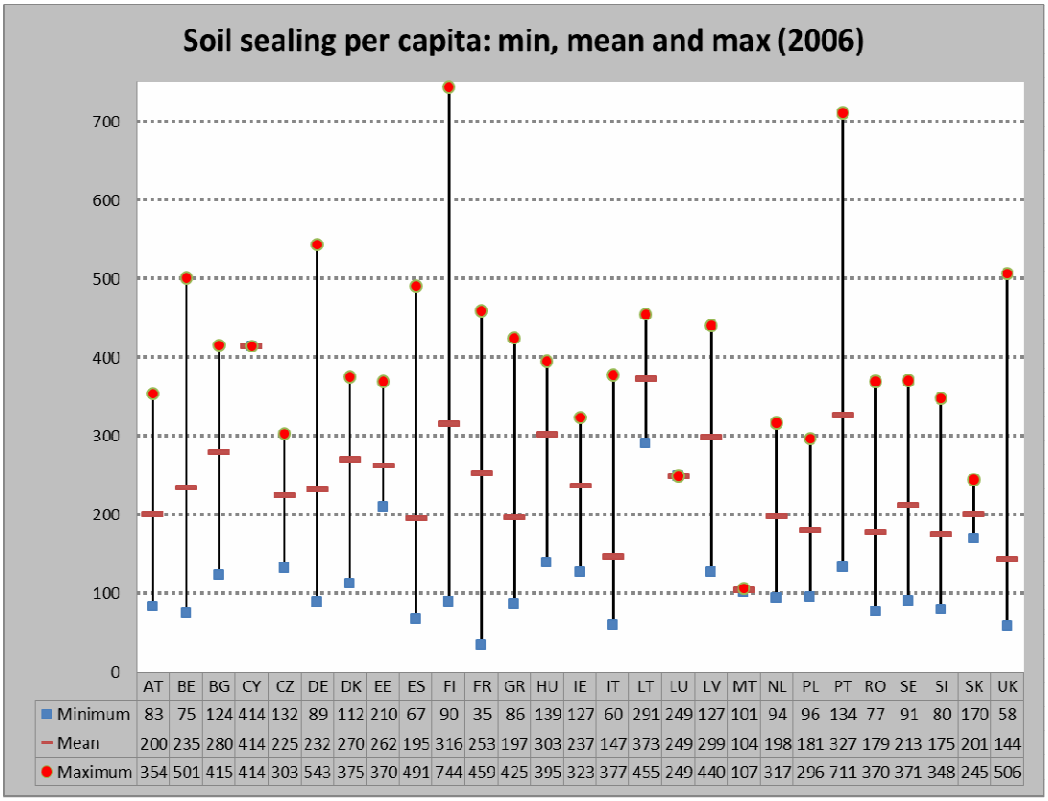
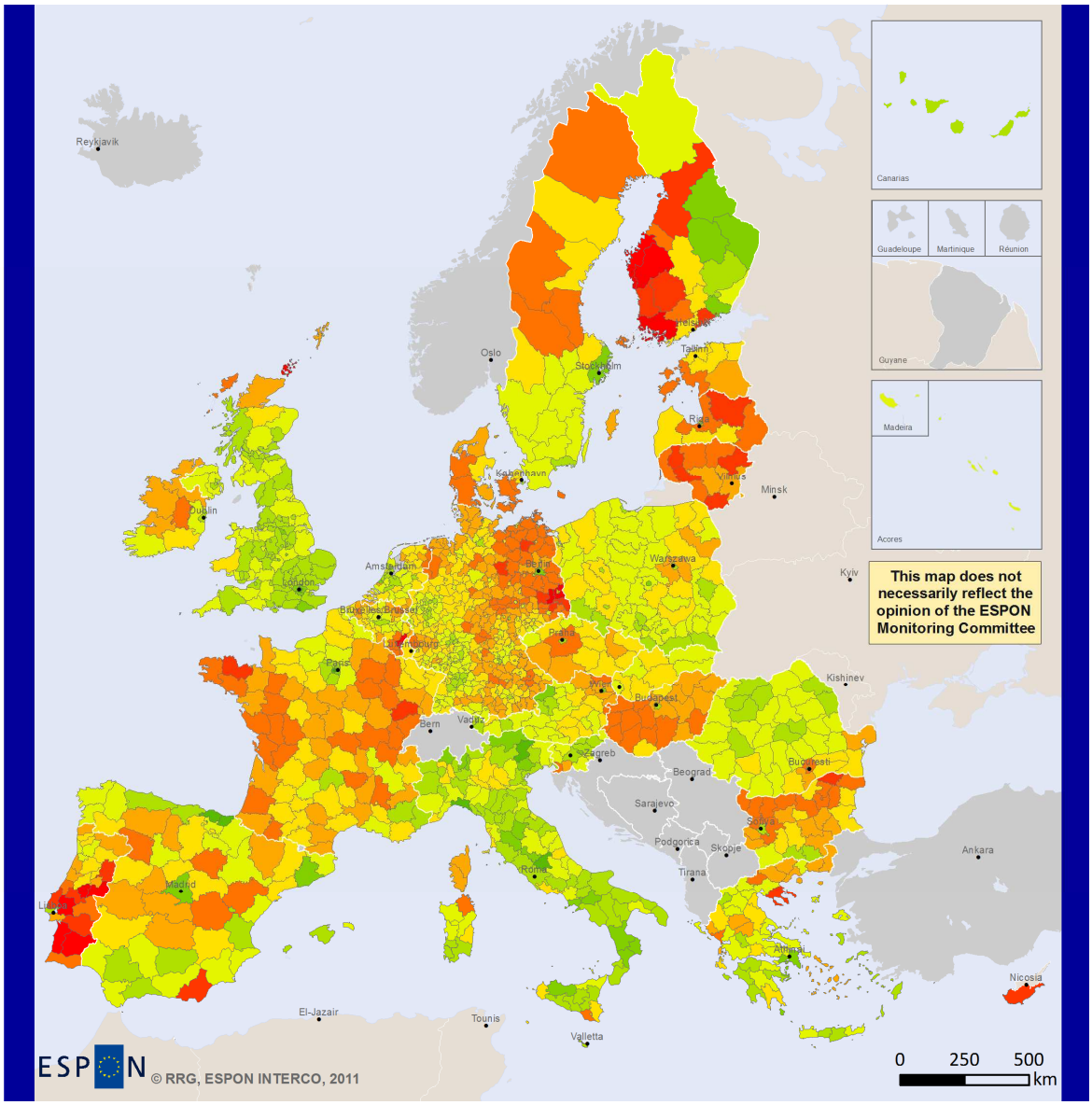


Figure 76. Soil sealing by country – minima, mean and maximum by country

Soil sealing per capita (2006)

0803soilsseall2006n3rtd

Territorial objective	*Change direction*	*Gaps*	*Years available*
Attractive regions of high ecological values & strong capital	Decrease desired until absolute minimum	Missing data: CH, IS, NO, TR, Western Balkan	2006



sqm per inhabitant

35 - 50	201 - 250	Data missing
51 - 75	251 - 300	
76 - 100	301 - 400	
101 - 150	401 - 500	
151 - 200	501 - 750	

Indicator definition

New annual soil sealing through land take

Sigma convergence

Figure 77. Indicator – Soil sealing per capita.

Summary

What are the territorial disparities of the indicators selected for the territorial objective of attractive regions of high ecological values and strong territorial capital? And how have these indicators developed over the last decade?

The desired thresholds (target values) for all three indicators can only be reached for a small number of regions; as for PM10 pollutions, many regions in Europe still have rather high concentrations, even though differences within a country are rather low. In case of Ozone concentration the analysis reveals that the number of days with concentration exceedances is quite low for most of European regions, with some remarkable exceptions, reflecting measures implemented over the last decade for improving the air quality; however, some countries like Italy, Romania or Bulgaria still have to improve their air quality levels. Soil sealing illustrates the most heterogeneous picture in Europe, with regions experiencing extremely high land take, and other regions with very modest land take rates per capita. Territorial disparities are extremely high within the countries, as well as between them.

So from a territorial cohesion perspective, the indicator on Ozone concentration already presents the smallest spatial disparities, followed by PM10, while soil sealing still yield very high disparities.

Unfortunately time series data are not available until today for none of the three indicators presented, so no assessment can be given on the development trends of these indicators over recent years. From an environmental point of view it would nonetheless be important to keep track of these indicators over time, so it is recommended in the wishlist (chapter B.4.1. Wishlist) to collect such datasets regularly over time periods allowing assessing the development trends.

C.3.6. Integrated polycentric territorial development

"*Polycentric and balanced territorial development of the EU is key element of achieving territorial cohesion*". Taking up the main priority of ESDP, TA 2020 promotes a polycentric pattern at macro-regional, cross-border, national and regional level that should reduce the strong territorial polarisation. The aim is to encourage competitiveness and attractiveness outside the Pentagon area thanks to extended networks between centers of different scales. Concentration and connection are the main challenges of polycentrism, as on one hand they help having a critic mass and allow surrounding areas to benefit from agglomeration effects, and on the other hand they may have negative externalities, especially in larges cities. As already underlined by the Green Paper, cooperation between territories is an important factor to tackle these issues and for having a real integrated territorial development. This implies not only well connected centers of different weights but also to have coordinated strategies and to overcome divisions due to borders, moreover in transnational functional areas.

Four indicators are proposed as territorial cohesion indicators under this objective:

- Population potential within 50 km
- Net migration rate
- Cooperation intensity
- Cooperation degree

These indicators are dedicated to measure basic territorial market potentials and territorial structures (population potential within 50 km), attractiveness of a region for in-migration (net migration rate), and the degree of collaborations with partner regions (cooperation intensity and cooperation degree).

The indicator "Population potential within 50 km" is defined as the number of people within reach of 50 km airline distance for a system of 2.5 x 2.5 km raster grid cells. For each cell the reachable population was calculated. This potential indicates the "daily life" type of service provision that requires certain minimum potential within reasonable distance or travel time, if the origin becomes a center for private or public service provision. This indicator, at grid level, furthermore illustrates territorial structures with city centres or agglomerations appearing as 'peaks' or 'plateaus', and rural or remote areas appearing as 'basins'. This indicator was first developed in the EU Parliament Cohesion Study (Dubois, 2007) at raster level. Within INTERCO, the results were aggregated to NUTS2-3 level. In order to highlight regions that are above or below the European average, the indicator has furthermore been standardised at the EU27 average.

The two indicators on cooperation intensity and cooperation degree have been developed by the ESPON TERCO project. Maps for these indicators were taken by courtesy of ESPON TERCO project.

Due to a lack of time series data, analyses of sigma and beta convergences could not be performed so far for none of the indicators under this objective.

Population potential within 50 km

Theme:
TERRITORIAL STRUCTURE
Regional / territorial structure

Policy relevance:
This indicator is a proxy for demand for provision of services, for market potential and for polycentricity. A polycentric pattern with balanced concentration is essential for territorial cohesion.

Desired direction of change:
A minimum level of potential should be secured. Regions with less than 50% of European average should catch up faster.

Description:
The indicator highlights the strong population potential that lies in the most urbanised parts of Europe: Benelux countries, Western Germany, Southern England and Northern Italy. But more importantly, the map also highlights that territories in the New Member States, but also in other 'peripheral' parts of the Iberian Peninsula and of Scandinavia, often enjoy high population potentials. By this the importance of regional centers in Poland, Czech Republic, Hungary, Rumania or Spain becomes apparent. On the other hand, the map also shows large areas with below-average potentials, not only in Norway, Cyprus and Greece, but also in geographically more central areas in France, Spain, Austria and other parts of Europe.
Disparities at grid level within the countries are significant, not only for usual subjects like Germany, France, Italy or UK, but also for countries like Netherlands, Spain, Belgium, or Poland.

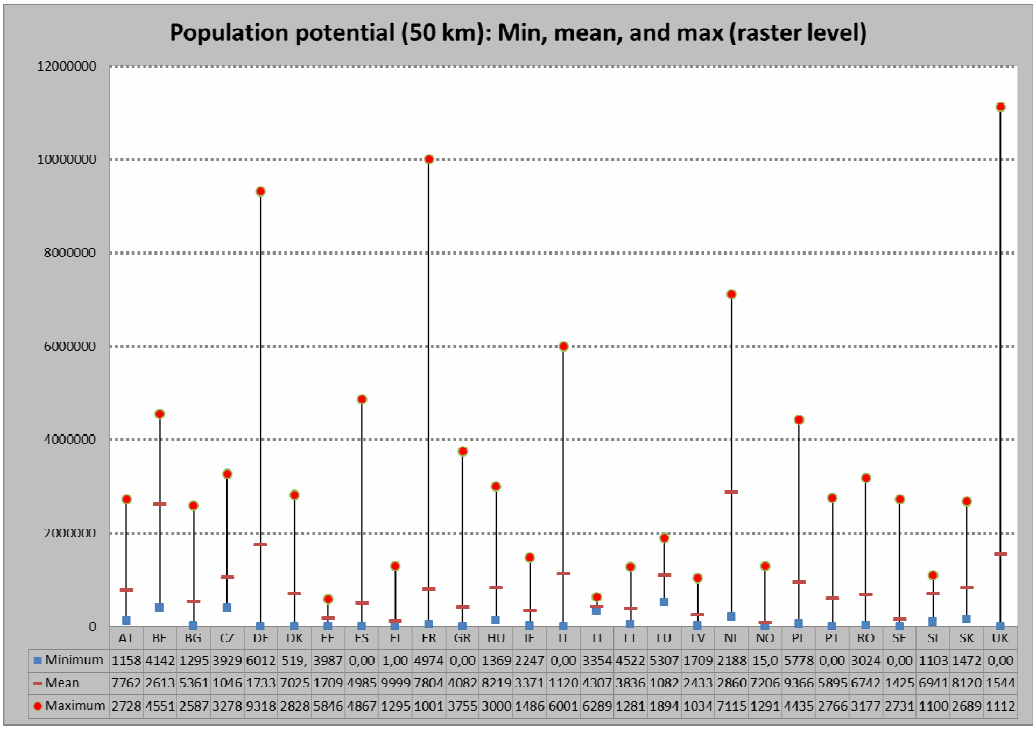
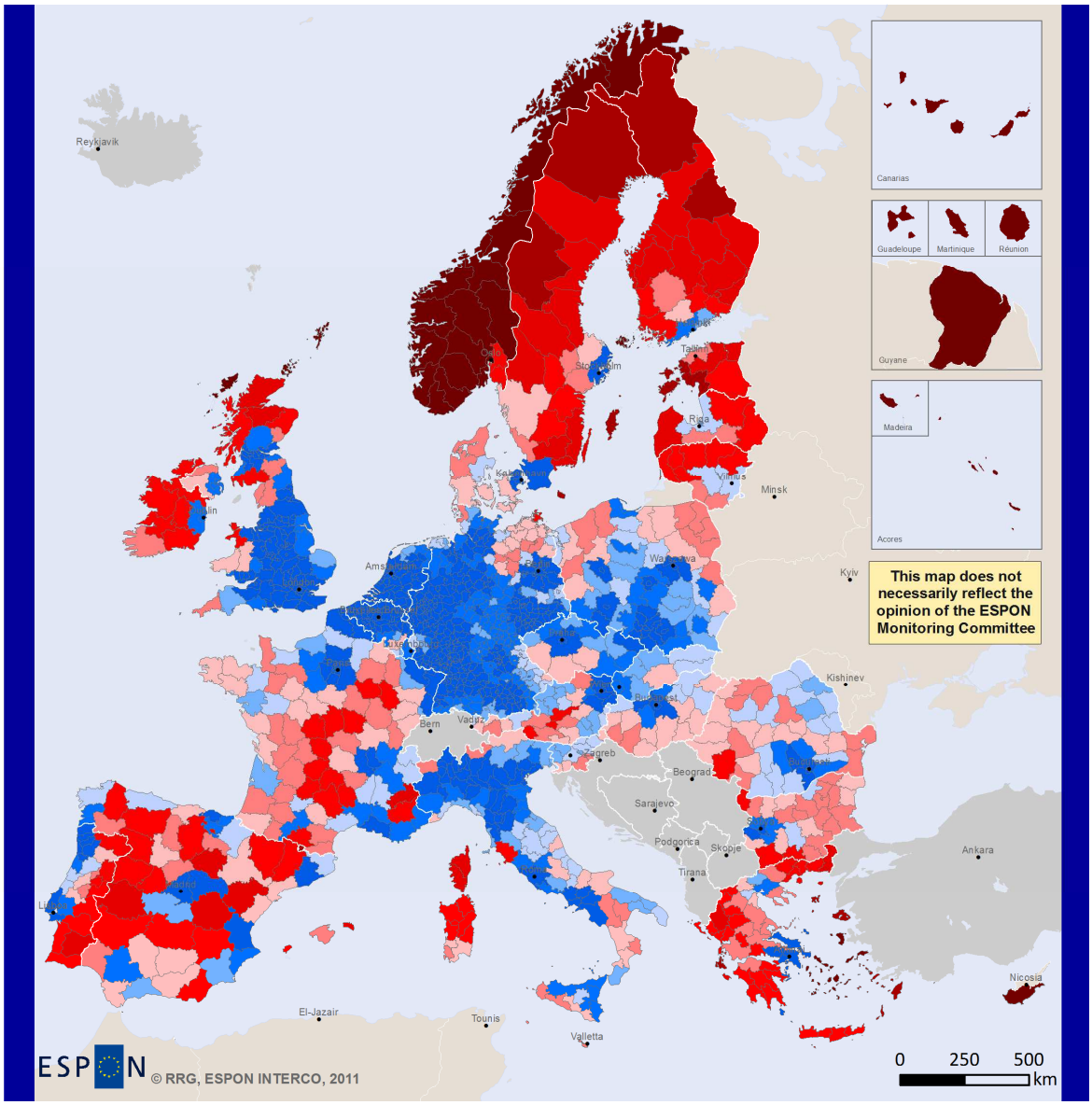


Figure 78. Population potential within 50 km – minimum, mean and maximum.

Population potential within 50 km (2008)

1 0 0 2 p o p p o t – – 2 0 0 8 n 3 m e t

Territorial objective	*Change direction*	*Gaps*	*Years available*
Integrated polycentric territorial development	Securing minimum potential; < 50% of EU average catch up	Missing data: CH, IS, TR, Western Balkan	2008



EU27 = 100

below average	*above average*	
0 - 5	101 - 125	Data missing
6 - 10	126 - 150	
11 - 25	151 - 200	
26 - 50	201 < ...	
51 - 75		
76 - 100		

Indicator definition

Population within 50 km distance; averaged over 2.5x2.5 grid

Sigma convergence

Figure 79. Indicator –Population potential within 50 km

Net migration rate

Theme:
DEMOGRAPHY
Migration

Policy relevance:
This indicator is considered as a proxy for the overall attractiveness of a region in terms of labour markets, education, quality of life, welfare, etc. It contributes to measure trends of concentration within European territory.

Desired direction of change:
Indicator should be positive, in particular in relation with negative population development and overaging.

Description:
Spatial patterns of net migration rates reveal that (i) in the new EU Member States most regions loose population except for the capital regions and other selected agglomerations, just as Northern Scandinavia, East Germany and Northern France do in losing population; in contrary, most regions along the Mediterranean Sea attract population.
Except for Belgium, there is no single country that has only positive or only negative migration rates, i.e. all countries have regions who lose population, as well as regions who gain. Greatest disparities can be found for Spain, Bulgaria, Netherlands and the UK. Otherwise disparities for most countries are in a range of 25 percentage points.

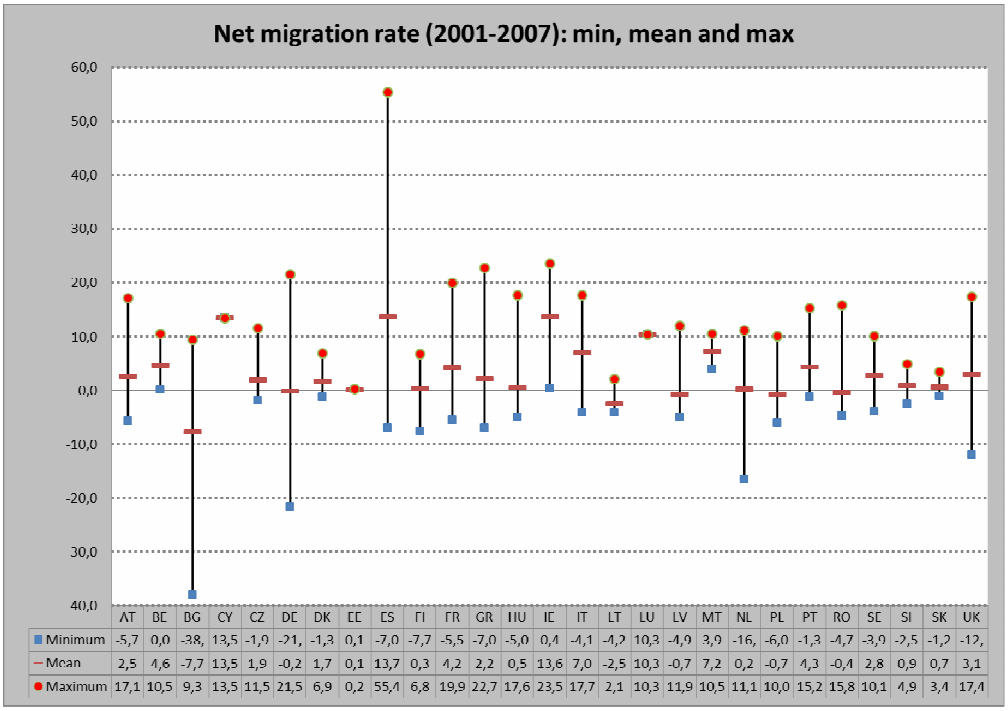


Figure 80. Net migration rates by country – minimum, mean and maximum

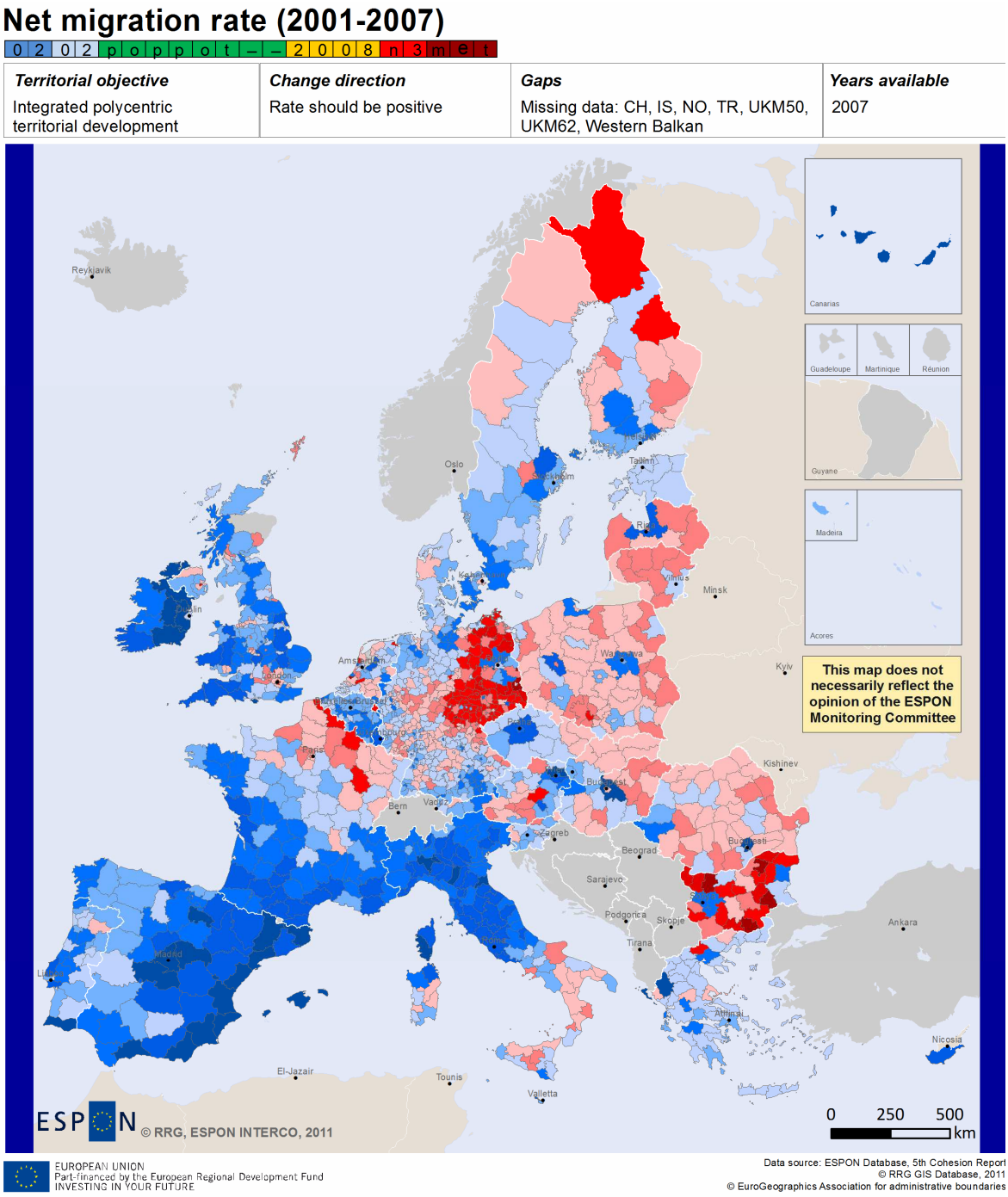


Figure 81. Indicator – Net migration rate

Cooperation intensity

Theme: **GOVERNANCE**
Policy relevance: **This indicator measures the intensity each region is cooperating in terms of number of INTERREG projects. Cooperation and coordination on the basis of such projects can reinforce territorial integration.**
Desired direction of change: **Each region should have a minimum level of cooperation; regions with no or with extremely low cooperation intensity should increase their efforts in such projects.**
Description: **Generally the number of INTERREG projects per inhabitants is higher the smaller the population number of a region is, i.e. regions in Sweden, Finland, the Baltic States, Austria, Slovenia, Greece, and Italy show the highest cooperation intensity, while regions in Western Germany, France, Poland, Romania or UK have only little intensities.**

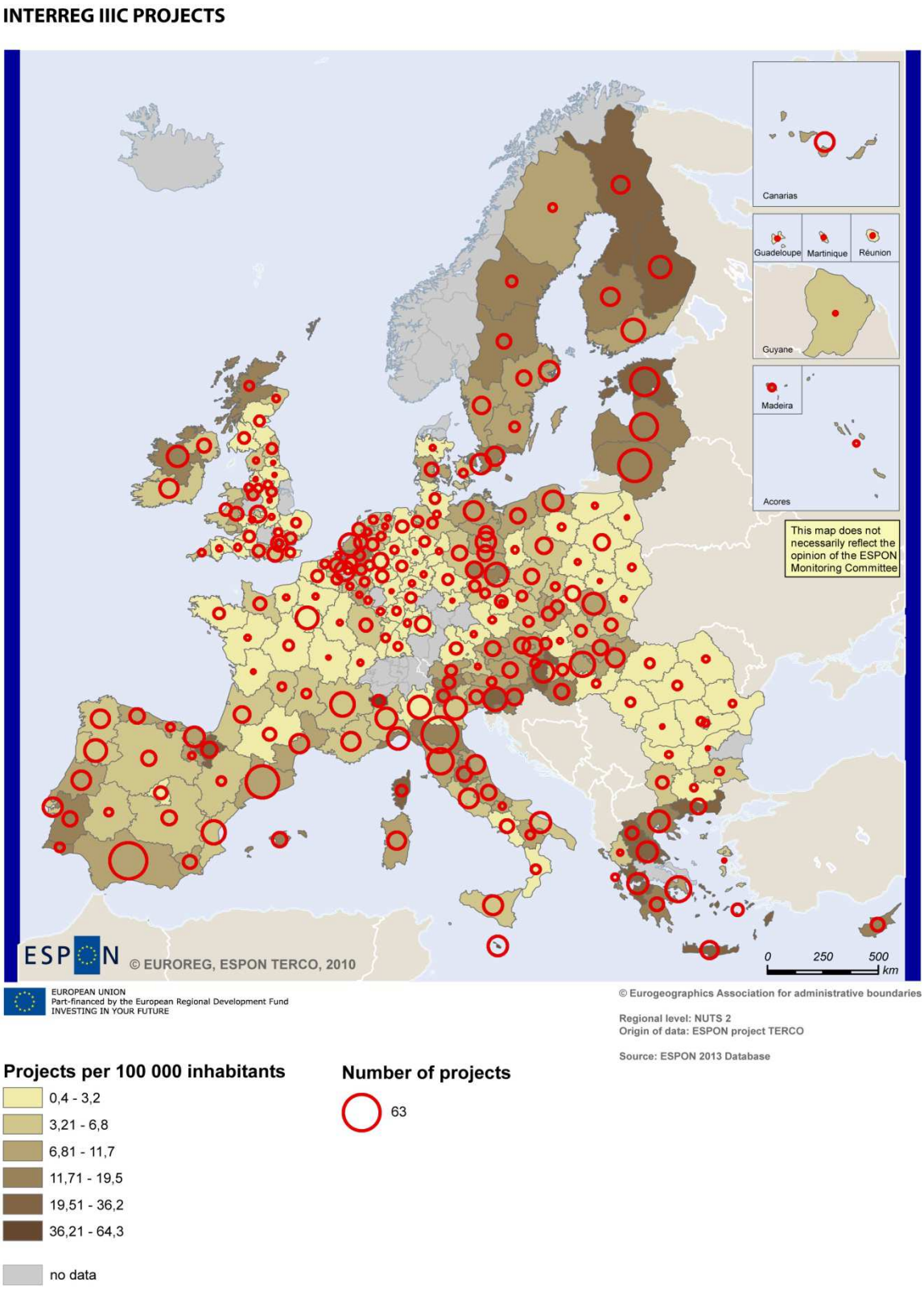


Figure 82. Indicator – Cooperation intensity (ESPON TERCO)

Cooperation degree

Theme: **GOVERNANCE**
Policy relevance: **This indicator measures the degree of cooperation between partner regions. Cooperation and coordination on the basis of such projects can reinforce territorial integration.**
Desired direction of change: **Each region should have a minimum level of cooperations; regions with no or with extremely low cooperation intensity should increase their efforts in such projects.**
Description: **The number of collaborating regions is quite different, ranging from mere 3 to 170 at maximum. While the general spatial patterns is quite heterogeneous, there is an arc of regions with highest cooperation degree ranging from Finland, the Baltic Stats, Poland/Slovakia/Hungary, Northern Italy, Southern France to Spain. Regions in France, Western Germany, the Benelux countries and the UK have only small numbers of collaborating regions.**

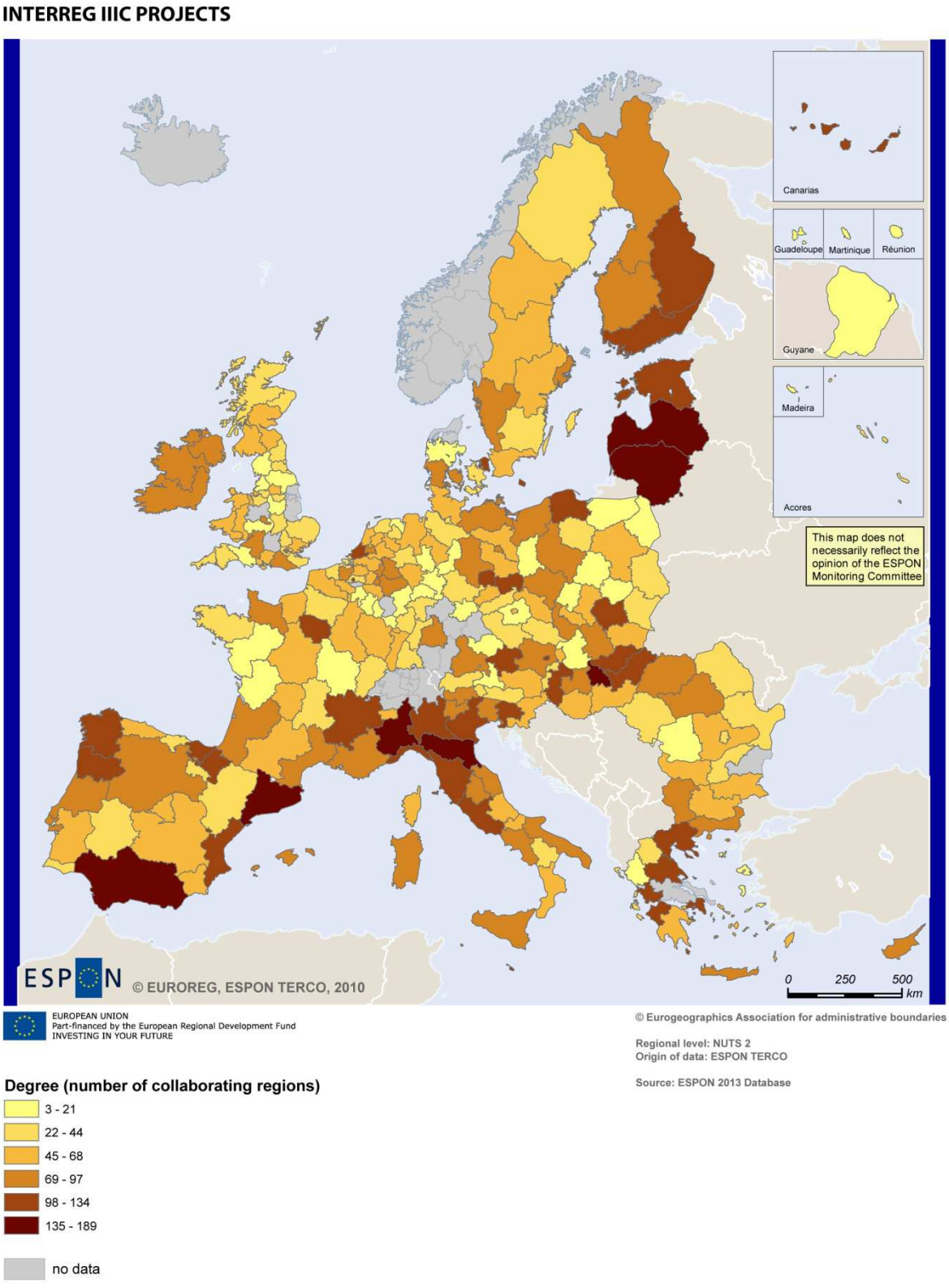


Figure 83. Indicator – cooperation degree (ESPON TERCO)

Summary

What are the territorial disparities of the indicators selected for the territorial objective of integrated polycentric territorial development?

The indicator population potential clearly highlights the main dichotomy between the European core area ('blue banana') and the peripheral ones. In areas outside the European core area only selected urban regions show above-average population potentials, while the other regions perform significantly below European average. A change in these patterns is unlikely to occur in the short run, even though some of the peripheral regions, such as regions in Spain, Greece or Ireland, experienced considerable population gains through migration processes. But since the main economic centers in Europe also experiences positive net migrations, it is rather unlikely that areas outside the blue banana significantly catch up. Nevertheless, the net migration patterns again highlight the tremendous negative population trends in the new Member States, in the Nordic countries, in Eastern Germany and Northern France, which need to be paid attention by policy makers.

Smaller countries like the Baltic States, Slovakia, or Slovenia already engaged over proportionally in international cooperation projects – by that trying to gain (or at least keep) knowledge in the countries as an instrument counteracting even further negative demographic trends.

C.3.7. Further ideas for analyses

The INTERCO TC indicators[11] allow us better approach actual weaknesses (and strengths) of European territories in relation to the TA 2020 policy priorities and Europe 2020 priorities and targets.

From this scope, we present in next some examples of potential exploitations of INTERCO TC indicators which are relatively easy to understand and to be used by regional and local level stakeholders[12].

[11] We refer here to the "final" indicators of the project

[12] In section C.3.7 are used some of the analyses presented in the NTUA team working paper: "Contribution on the selection and further exploitation of Territorial Cohesion indicators" submitted to the LP on. 19.10.2011

(1) Simple and more complex measures of territorial cohesion inequalities

The use of some classic, relatively simple statistical functions to measure territorial inequalities (on the basis of INTERCO indicators), such as: min/max, mean, standard deviation and coefficient of variation could give a first picture of territorial inequalities at different territorial levels, among NUTS or LAU units, for the EU space, the countries or the sub-national units. More complex statistical methods such as the use of b-convergence and sigma-convergence could allow a better evaluation of TC inequalities – see in previous sections of the report.

However, these methods cannot take into account either the type of territories or the "autocorrelation" (spatial interaction) of territories.

(2) Creating territorial typologies by indicators

These typologies could be produced by using **relatively simple clustering methods**. This could improve comparative analyses of TC among the different types of territories and, further on, the evaluation of the results of the policies implemented in the different types of territories.

(3) Comparison of the different dimensions (facets, aspects) of TC through indicators

For instance, among unemployment and tertiary education of people

(4) Comparison among the top indicators and "context" indicators.

The indicators for the different "types" of territories mentioned above could be used as "context" indicators for the analysis of each specific territory.

(5) Going from the GDP to the "well being" "territorial" indicators

As it is argued in INTERCO (on the basis of the most recent literature) well being is better placed to express cohesion than GDP. Further on, well being (and the respective indicators) is more "territorial" than GDP, as it is more embedded to the territories where the every-day life of citizens is deployed.

Therefore, **GDP could be used as a kind of "wild card" to be compared with indicators which better express well being.**

A second important reason is that GDP is very often used so far in Cohesion Policy[13].

For instance, we could compare the regional distribution of GDP with that of unemployment. We can thus see which territories have higher unemployment rate than expected taking into account the spatial distribution of GDP. Therefore we could have a first configuration of the territories to which a more active policy of decrease of unemployment (creation of jobs) should be implemented.

Here we could first create typologies of EU regions for specific INTERCO indicators with cluster analysis and then compare the spatial distribution of each of these indicators with GDP.

[13] See, among others, for this kind of reasoning in: Grasland – Hamez 2005

It is more appropriate to use for these statistical analyses data normalized by the population of the respective regions.

As an example of the use of this kind of analysis we present in next the case of the indicator of unemployment rate % 2007 (normalised by population) in comparison with the GDP 2007 (normalised by population) per NUTS2 regions.

We present, specifically, an analysis using three clusters of unemployment rate % (normalised by population): high, medium, low, in comparison with three clusters of GDP (normalised by population): high, medium, low.

The ***Figure 84*** presents a simple crossing of the 3 unemployment classes with the 3 GDP classes. It is evident that there is an important number of NUTS-2 regions which have high unemployment rate while their GDP is high or medium. Inversely, there are numerous regions which have low unemployment rate while their GDP is low.

These differences which are very important for the design of the territorial dimension of the cohesion policy are more clearly presented in the ***Figure 85*** showing the difference between the actual unemployment rate and the unemployment rate *"expected" from the GDP rate* (of the respective regions)[14]. The above three x three clusters have been used.

It appears that a considerable number of regions belong to a much higher unemployment class than “expected” from the GDP class (of the same regions).

[14] Both Unemployment rate and GDP are normalised by population 2007 and refer to the NUTS-2 regions of the ESPON space

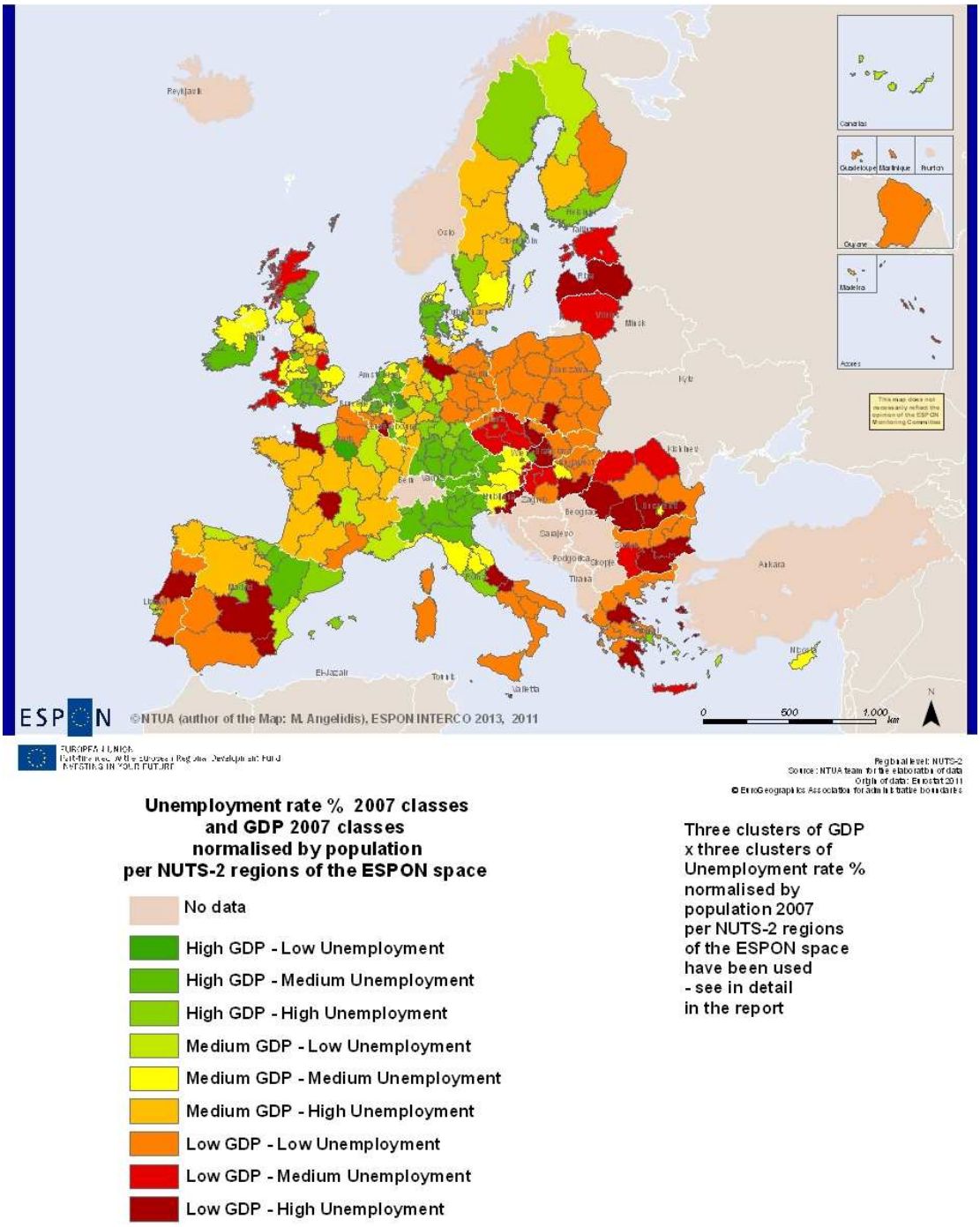


Figure 84. Unemployment rate % 2007 classes and GDP 2007 classes per NUTS-2 regions of the ESPON space

Source of the data: Eurostat 2011, Elaboration of the data: NTUA team

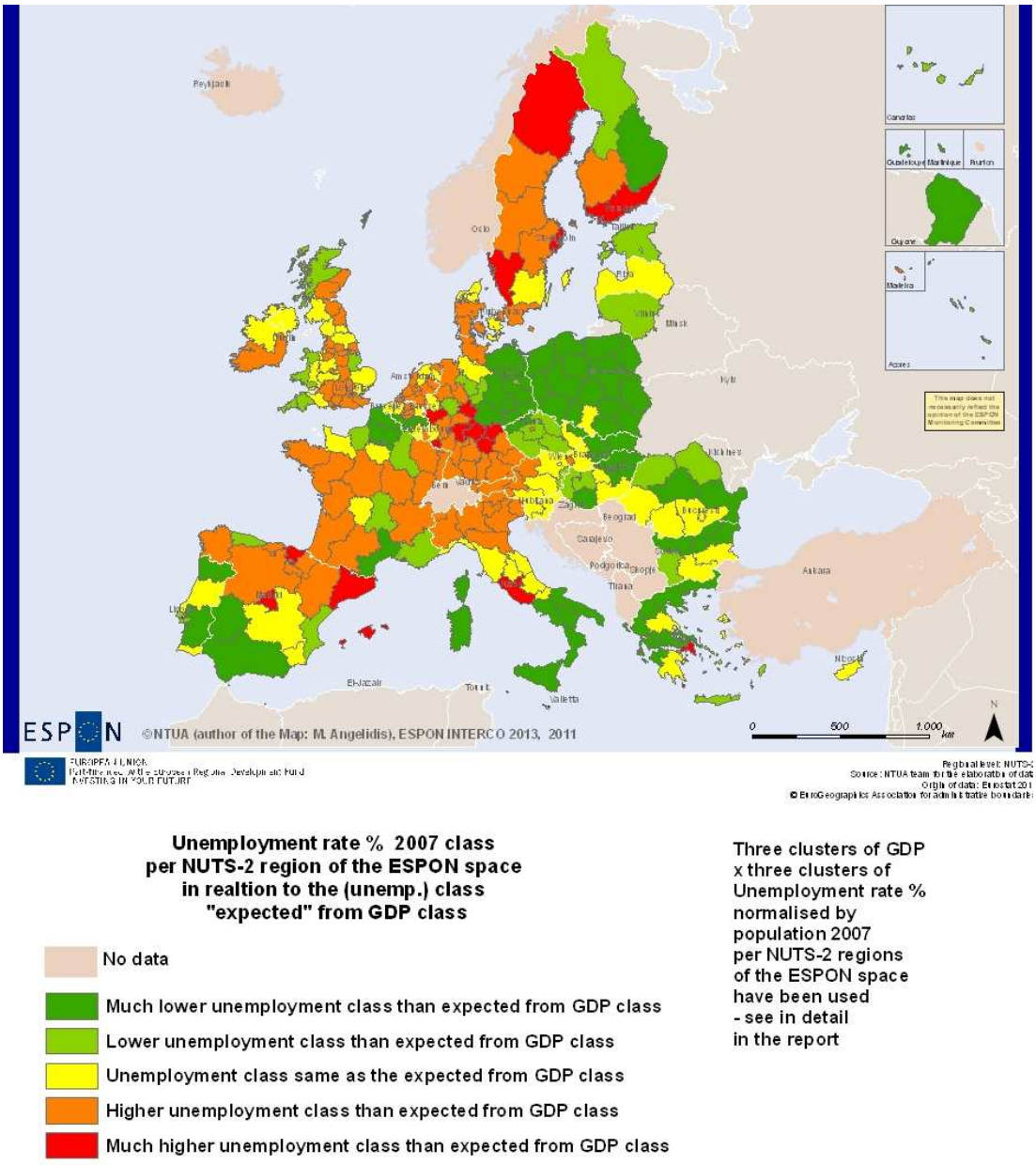


Figure 85. Unemployment rate (%) normalised by population 2007 per NUTS-2 regions of the ESPON space: relative difference to the unemployment rate "expected" from the GDP rate normalised by population

Source of the data: Eurostat 2011, Elaboration of the data: NTUA team

(6) Impacts of the territorial contiguity on territories' correlation (clustering) or dispersion

From this scope, the spatial autocorrelation method using the Moran's I index in association with z-scores could be used.

Moran's I is a measure of spatial autocorrelation developed by Patrick A.P. Moran. Spatial autocorrelation is characterized by a correlation in a signal among nearby locations in space. Spatial autocorrelation is more complex than one-dimensional autocorrelation because spatial correlation is multi-dimensional (i.e. 2 or 3 dimensions of space) and multi-directional.

Moran's I is defined as

$$I = \frac{\frac{\sum_{i=1}^{n}\sum_{j=1}^{n} c_{ij}(x_i-\bar{x})(x_j-\bar{x})}{\sum_{i=1}^{n}\sum_{j=1}^{n} c_{ij}}}{\sqrt{\sum_{i=1}^{n}\frac{(x_i-\bar{x})^2}{n}}\sqrt{\sum_{i=1}^{n}\frac{(x_i-\bar{x})^2}{n}}} = \frac{n}{\sum_{i=1}^{n}\sum_{j=1}^{n} c_{ij}}\frac{\sum_{i=1}^{n}\sum_{j=1}^{n} c_{ij}(x_1-\bar{x})(x_j-\bar{x})}{\sum_{1=1}^{n}(x_1-\bar{x})^2}$$

where n is the number of spatial units indexed by i and j; x is the variable of interest; is the mean of X; and c_{ij} is an element of a matrix of spatial weights.

The expected value of Moran's I under hypothesis of no spatial autocorrelation is

Its variance equals: E (I) = -1/(n-1)

Negative (positive) values indicate negative (positive) spatial autocorrelation. Values range from −1 (indicating perfect dispersion) to +1 (perfect correlation). A zero value indicates a random spatial pattern. For statistical hypothesis testing, Moran's I values can be transformed to Z-scores in which values greater than 1.96 or smaller than −1.96 indicate spatial autocorrelation that is significant at the 5% level.

As an example of the use of this method, we present the case of the indicator of unemployment rate % 2009 per NUTS2 regions[15] - ***see Figure 86***.

Moran's I index = 0,22 and Z-score = 12,12 standard deviations

This specific pattern is clustered (not dispersed). There is less than 1% likelihood that this clustered pattern could be the result of a random chance.

It is highly probable that in this case territorial contiguity impacts on territories' correlation (clustering) regarding unemployment rate.

In this case, it is more appropriate to use data normalized by the population of the respective regions. The result of the use of such data is presented in the ***Figure 87***.

The degree of the impact of the territorial contiguity has not changed.

In the above two test we have used for the parameter: "Conceptualisation of Spatial relationships"[16] the option: "Inverse distance" which takes into account for a specific NUTS2 region the influence of other regions which are contiguous or not contiguous to this region.

[15] We have used the Spatial Statistics Tools of ESRI ArcGIS

[16] In ESRI ArcGIS

We have then tested the option: “Polygons contiguity” in order the calculation takes into account only the contiguous (immediately neighbour) regions to each specific region. In this case the Moran’s I index = 0,60 and Z-score = 14,61 standard deviations, which means that this kind of territorial contiguity impacts much more on territories’ correlation (clustering) regarding unemployment rate.

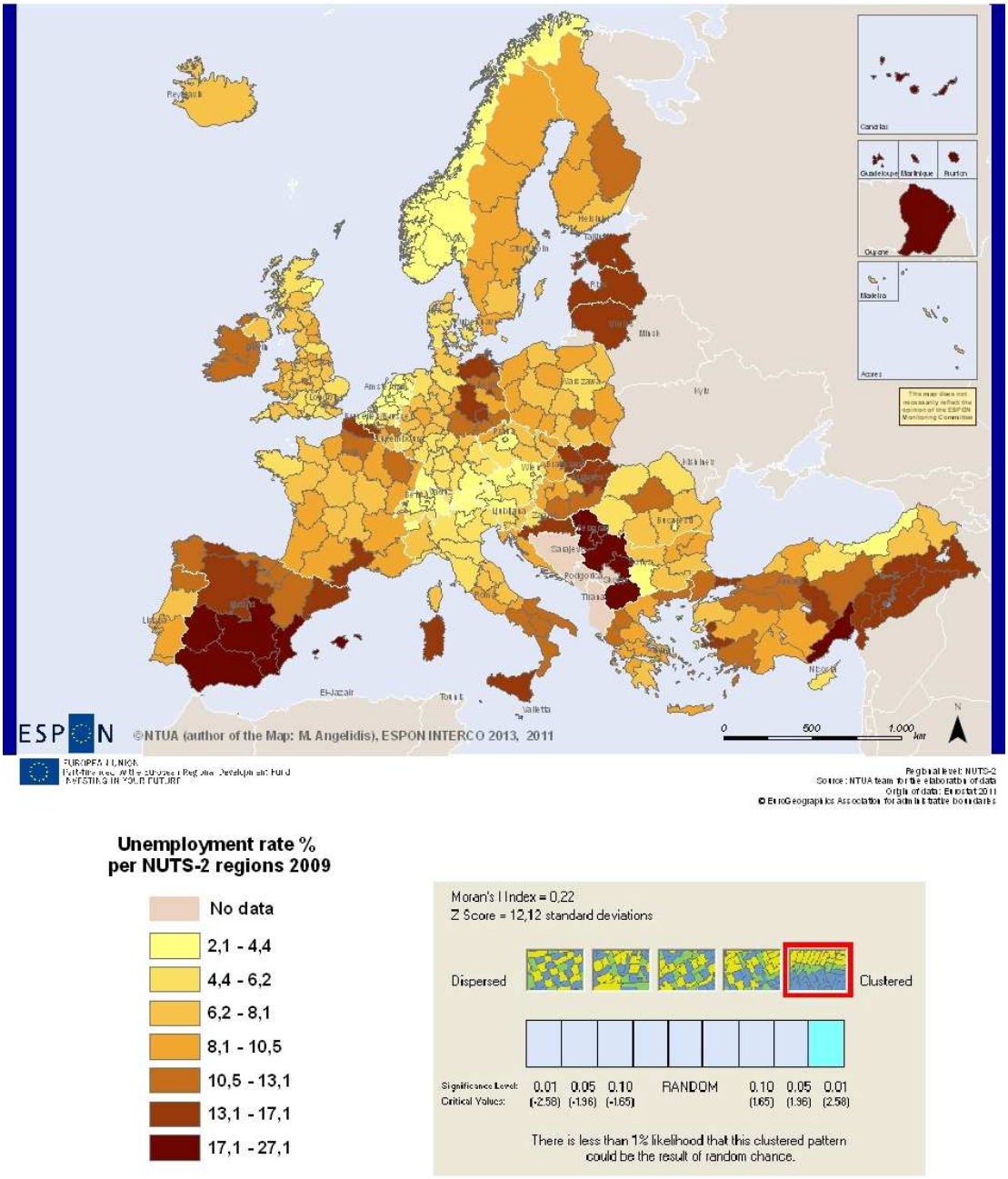


Figure 846: Unemployment rate (%) 2009 per NUTS-2 regions: Moran’s I index and Z-score

Source of the data: Eurostat 2011, Elaboration of the data: NTUA team

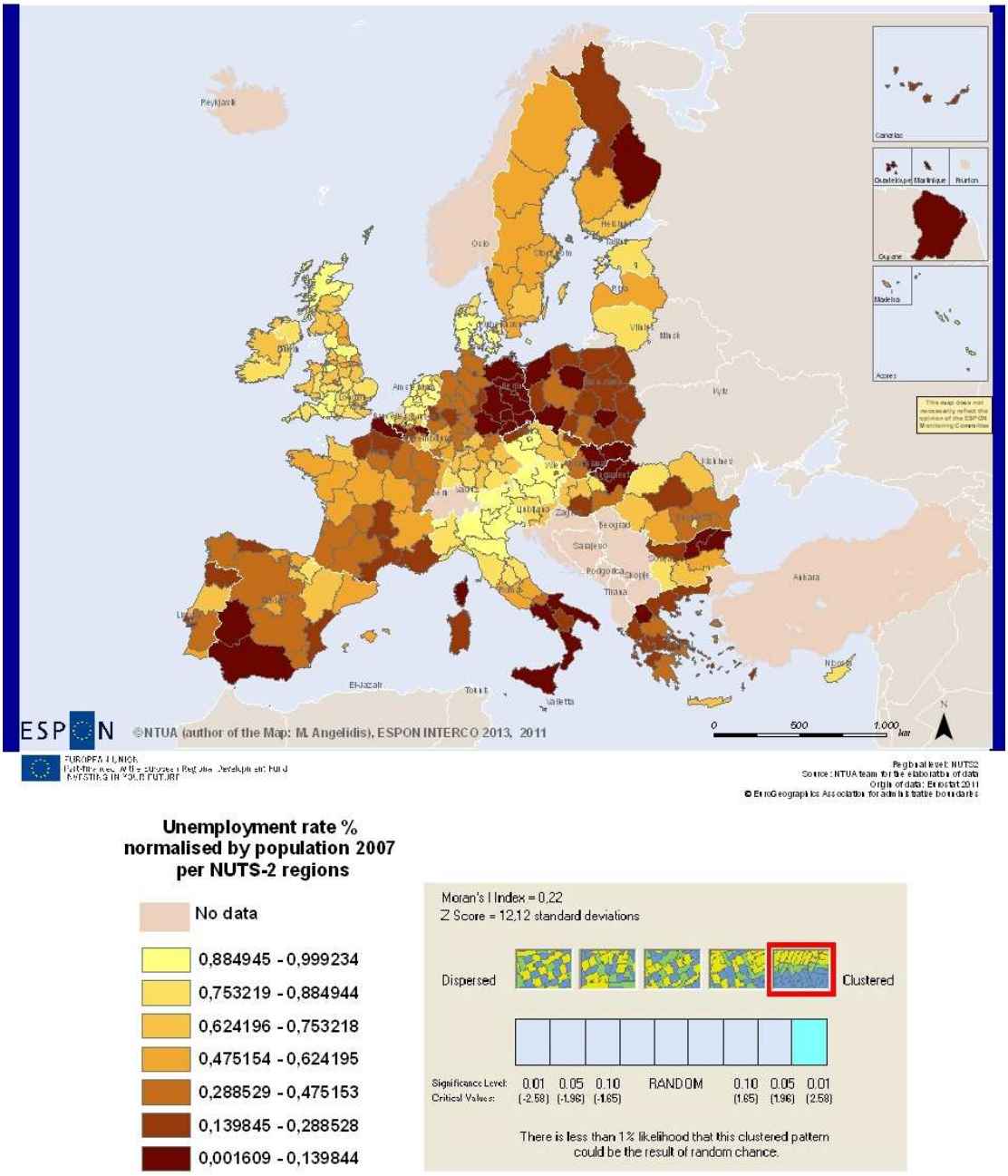


Figure 87. Unemployment rate (%) normalised by population 2007 per NUTS-2 regions: Moran's I index and Z-score

Source of the data: Eurostat 2011, Elaboration of the data: NTUA team

(7) Taking into account the urban – rural classification of Europe

We could cross check the values of the indicators (and the clusters that they will be divided) with the ESPON typologies: urban- rural, mountainous etc.

C.3.8. Further ideas for synthetic representations

As the next step for further research, we have also been exploring possible ways of presenting the main results, knowing we are not only looking at the states and trends

of each indicator, but even more at the performances in terms of convergence, i.e. of the evolution of disparities among European territories.

Results can be presented in many different ways (tables, maps, graphs) however, simple and comprehensive graphs are required for better communication in policy contexts.

We present below first few tries of such synthetic representations that could be developed, if sufficient spatial resolution and time series are available for the entire European territory.

Star diagram of disparities

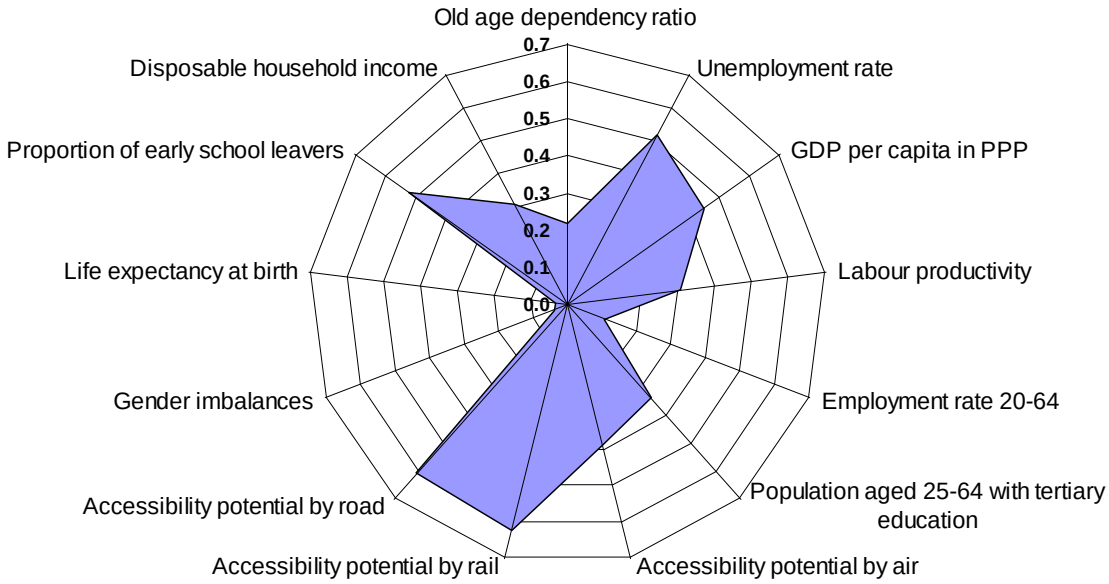


Figure 85. Disparities (standard deviation / average)

Figure 85 shows at one glance the disparities between territories for each indicator. If spatial (NUTS) levels and reference years were the same for all indicators, synthetic graphs could be produced as shown above, showing the objectives that are still challenging in terms of disparities. For instance, we can note that the most problematic issues are the accessibility by road and by rail, meaning that some place are still lagging behind in terms of access to jobs and markets. Proportion of early school leavers and unemployment rate are also important challenges to look at for political objectives. The star diagram has the advantage to represent in a simple way all indicators and how they behave one compared to each other. Examples of such diagrams are already presented in chapter "C.3. Indicators presentation".

Bar chart of sigma convergences

We could also present the results of the project with another kind of graph displaying sigma convergence values, in this case the correlation between the levels of disparities and time (Figure 86).

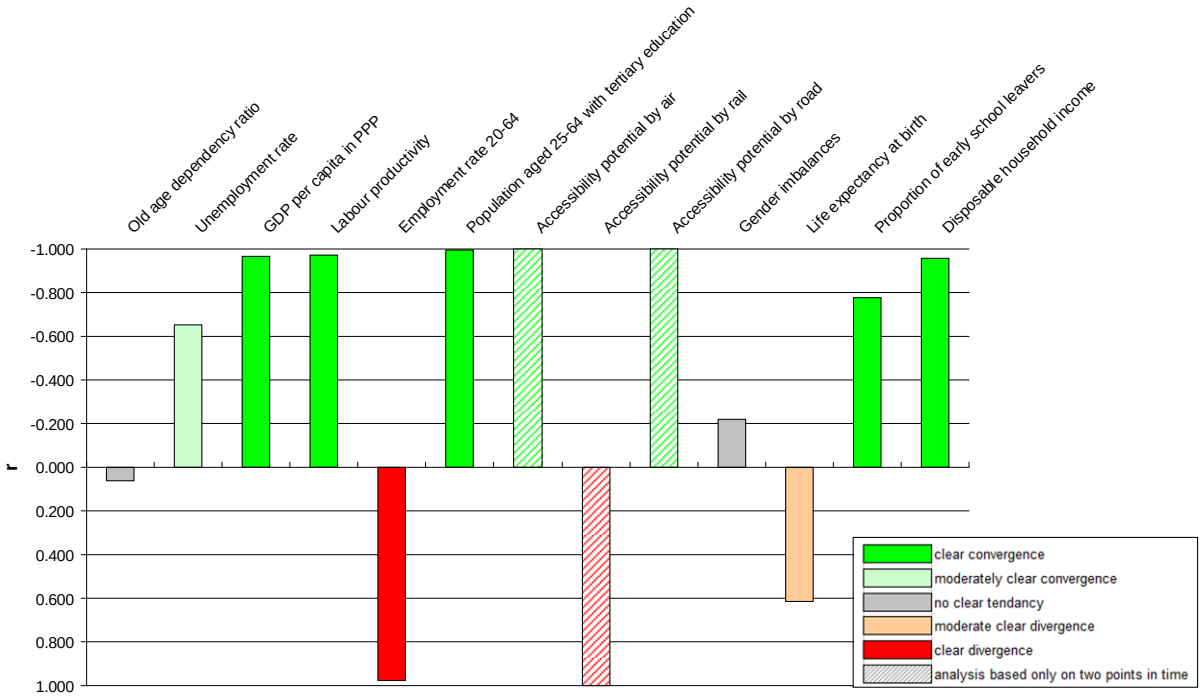


Figure 86. Bar chart of sigma convergences

A high negative correlation (e.g. below -0.75 or above +0.75) indicates that there is a clear tendency to the reduction or increase of disparities. A low correlation (e.g. between -0.25 and +0.25) indicates that disparities might diminish in one period and then increase again, in a random manner. It must be noted that correlation does not tell anything about the speed of reduction.

We can note that a few indicators presents clear convergence such as GDP/capita, labour productivity, population aged 25-64 with tertiary education, and disposable household income (again convergence can be clear but slow, such as for GDP/capita; information on the speed of convergence is not visible on this graph). Employment has a clear tendency of increasing divergence through time.

Indicators on accessibility potential by air, rail and road are shown with oblique patterns because data on only two points in time were available, hence correlations of -1 or +1 that are not significant. But nevertheless displaying this figures might help raising again the question of data availability.

The star diagrams by territorial objectives

The disparities among territories in Europe could also be exerted in comparison with the other elements that are building a given territorial objective. In the next diagram (Figure 87) are displayed the disparities for the indicators of the territorial objective "Inclusion and quality of life" :

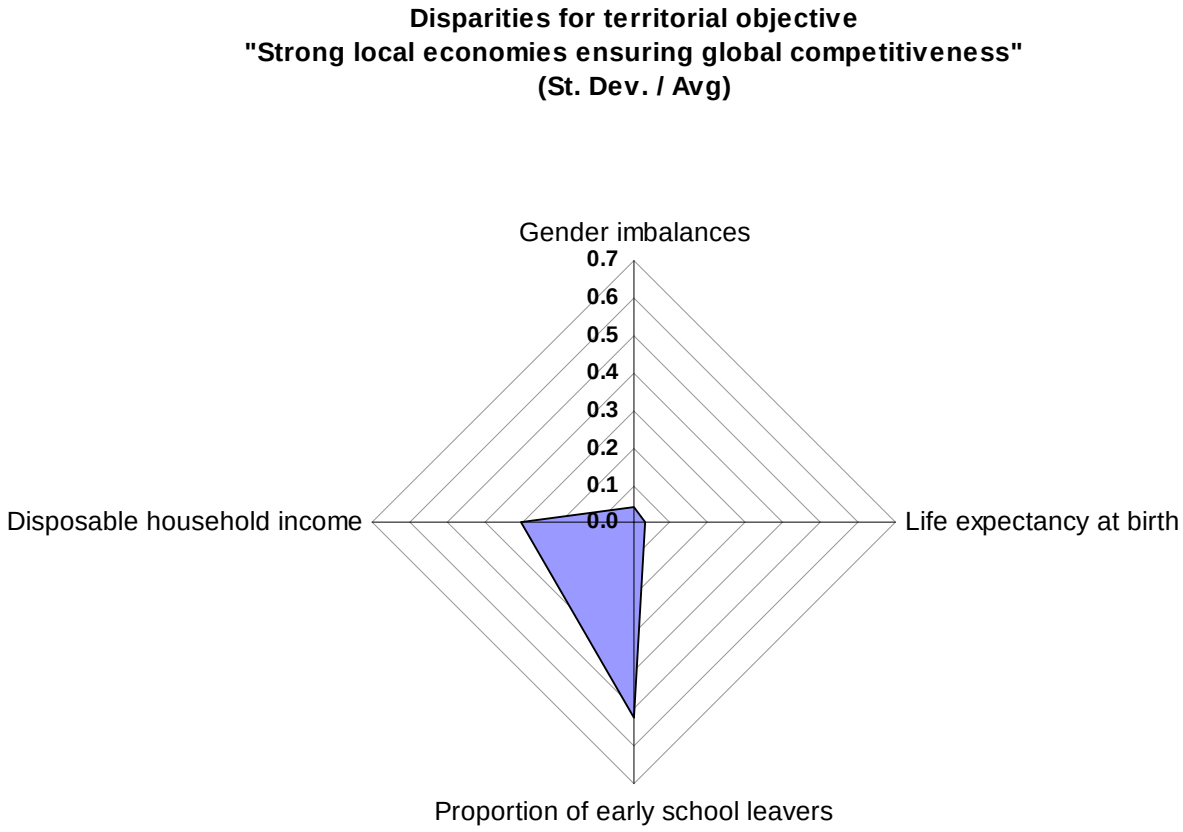


Figure 87. Disparities for territorial objective "Inclusion and quality of life" (St. Dev. / Avg)

In the above figure, we can certainly note the imbalances of disparities. Life expectancy at birth - representing health - and gender imbalances - representing demographic structure of population - show low levels of disparities between European territories. Disposable household income presents more disparities but, as stressed by the diagram, the proportion of early school leavers disparities is particularly worrying and should be of priority for policy action, though it is part of national policy and not always depending the local levels as measured by the indicators.

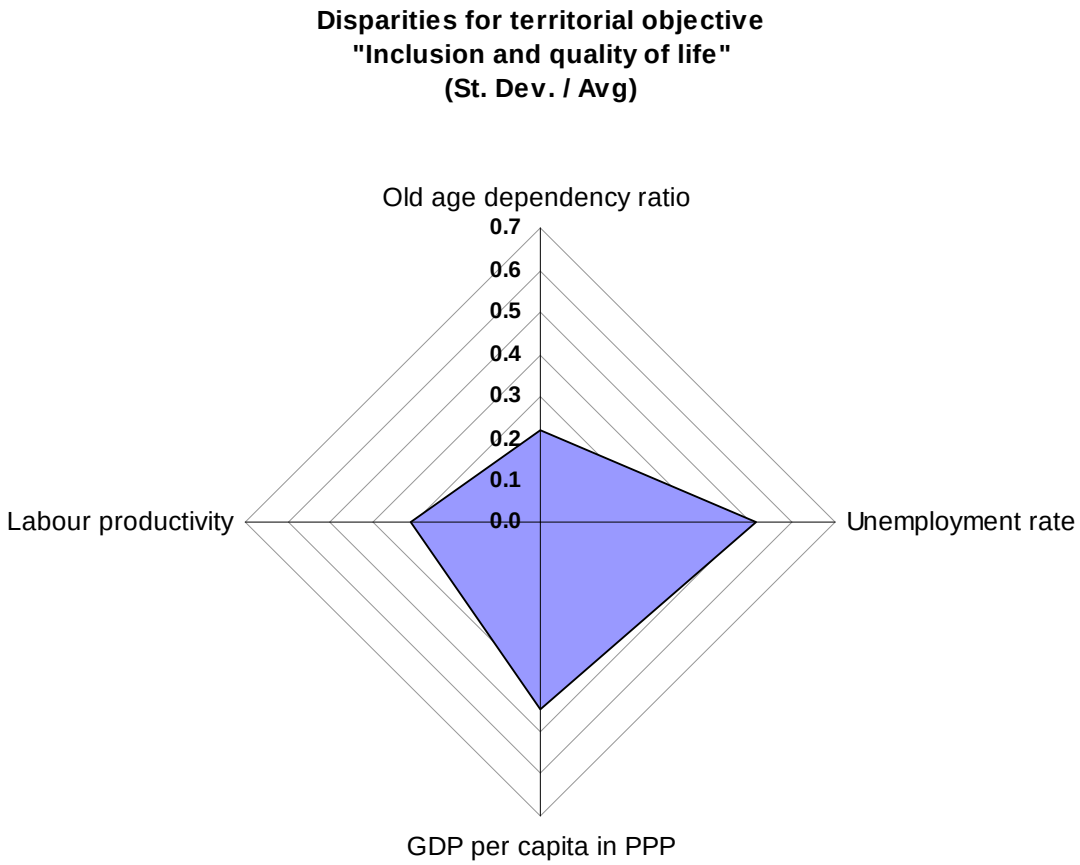


Figure 88. Disparities for territorial objective "Strong local economies ensuring global competitiveness" (St. Dev. / Avg)

In the above diagram, we can note a strong disparity in terms of unemployment rate, consistent with the level of disparities in GDP/capita in PPP. On the other hand, labour productivity is getting better in terms of disparities, the result of the catching up of regions that previously leg behind. The old age dependency ratio shows no strong disparities, when the result is certainly hiding some local disparities not seen in the general trend.

C.4. Other scales and territories

C.4.1. Territorial Cohesion: Extension to Global Level

The inclusion of the global scale is made to enhance our understanding of the processes occurring within Europe by framing them in broader, global perspective. The following discussion of the global level simply demonstrates first how global level indicators on (sustainable) development have implicitly informed some of the thinking on EU territorial cohesion indicators, and secondly the challenges of multiscalarity. Most of the global indicators are only available at NUTS0, and thus lack an important dimension of territoriality that the EU-level indicators have.

While discussions are not (yet) focused on achieving the policy goal of territorial cohesion at the global level, there are several attempts to measure development, sustainable development and quality of life on a world-wide scale. The most pertinent and vigorous examples include the Human Development Index (HDI) to measure wealth, health and education and the World Development Indicators by the World Bank[17] to help monitor the process towards the Millennium Development Goals which form a blueprint for achieving development world-wide, and in particular alleviating the situation of the most disadvantaged countries.

Globalisation, like territorial cohesion is a multifaceted notion but the principal underlying idea is the progressive integration of economies and societies according to the World Commission on the Social Dimension of Globalisation (WCSDG)[18]. The WCSDG report identifies a number of elements where the EU model has contributed to success in improving living and working conditions: a strong legal framework; openness to the world economy and an effective market economy; supportive national social protection systems and common minimum standards for employment; involvement of the stakeholders through the European social dialogue; gender equality; and, more widely, respect for human rights and the rule of law, democracy and the strengthening of democratic supervision through the European Parliament. It also mentions that the EU's economic and social model, and the Lisbon strategy even though they cannot simply be transposed to other parts of the world, contain a number of aspects which may be of interest for global development, especially in terms of the processes which are essential to the achievement of the balance between all the objectives at stake.

Comparing the INTERCO indicators for territorial cohesion in Europe clearly shows the added dimension that territoriality plays in territorial cohesion compared to social and economic cohesion, which are more easily understood at the non-European /global level. While Europe is surely a forerunner in advocating and developing

[17] http://data.worldbank.org/indicator

[18] Definition used by the World Commission on the Social Dimension of Globalization (WCSDG) prepared by ILO the International Labor Office: http://www.ilo.org/public/english/wcsdg/globali/index.htm

territorial cohesion indicators at sub-national scale, there may be opportunities to "export" the territorial cohesion concept and policy goal to other parts of the world.

Extension to the global scale

From the outset, it may seem odd to take a global outlook of territorial cohesion. First of all, territorial cohesion, as a policy goal, is explicitly expressed mainly by the European Community, although its primary targets of efficient, equitable, sustainable and balanced development are also important global development priorities (such as the Millennium Development goals). Second, there is a risk of sounding very Euro-centric in attempting to project the European territorial development paradigm outside its borders, but neither is this is not the specific aim of the project. In spite of this, we deem that it makes sense to use a global approach for investigating territorial cohesion on at least two accounts.

The first one relates to the acknowledgement that, even if 'territorial cohesion' is not mentioned explicitly, other international organisations have taken up similar stands on the future of territorial development policies[19]. Consequently, not only can the European experiment of territorial cohesion can be useful in feeding in that process, but it also emphasizes the need to see the territorial cohesion processes within Europe as a link with other processes that occur in its close vicinity (neighbourhood), but also further away. Moreover, it seems that there is a certain momentum regarding new deals for territorial development policies in many countries outside the EU, for instance in the OECD (Yamazaki-Honda, 2005).

The second one relates to the nature of globalisation itself. The increase in interdependencies between states and regions worldwide implies that achieving territorial cohesion in Europe is only possible if one brings into the picture the necessary ways of mitigating and adapting to global processes connected to trade, demography, migration, climate change or energy consumption/production. In addition the global positioning of Europe as a whole on a global scale is important in this regard.

Global Development Goals and Measurements

One of the most simple composite global development measurements is the Human Development Index (HDI), developed within the UNDP aegis[20]. The Human Development Index portents to measure basic quality of life through three parameters: wealth, health and education. In the latest HDI publication, all of the countries within the ESPON space ranked in the category "very high human development" with the exception of Romania, Bulgaria, Serbia and Turkey which ranked in the next highest category of the four categories. The Human Sustainable Development Index from 2010 re-ranked the traditional HDI by adding the indicator of

[19] See World Development Reports at http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/EXTWDRS/0,,contentMDK:20227703~pagePK:478093~piPK:477627~theSitePK:477624,00.html

[20] Human Development Index and the Human Development Reports can be found at: http://hdr.undp.org/en/statistics/hdi/

carbon emissions to measure sustainability, and showed a different picture of development, whereby several industrialised countries such as the USA ranked much lower on the scale[21].

Agreed to by all world governments and leading development institutions at the UN in 2000, the Millennium Development Goals form a blueprint for achieving development world-wide, and in particular alleviating the situation of the most disadvantaged countries and ending poverty. These goals are meant to halve extreme poverty by 2013 and include the a variety of indicators within eight main targets: 1) eradicating poverty and hunger, 2) achieving universal primary education, 3) promoting gender equality and empowering women, 4) reducing child mortality, 5) improving maternal health, 6) combating HIV/AIDS, malaria and other diseases, 7) ensuring environmental sustainability and 8) developing a global partnership for development.

The World Development Indicators, maintained by the World Bank and published yearly as a report[22] is a database based on reliable sources to help monitor the process towards the Millennium Development Goals including data from 209 countries. Indicators are analysed in a large number of themes: Agriculture and rural development, Economic policy and external debt, Education, Energy and Mining, Financial Sector, Gender, Health, Infrastructure, Labour & Social Protection, Poverty, Private Sector, Public Sector, Science and Technology, Social Development, and Urban Development.

Measuring Territorial Cohesion at European Level

One starting point for understanding territorial cohesion on a global and European level is by acknowledging that it is about identifying inequalities and looking for support of lagging-behind regions in order to narrow disparities between different territories by a) focussing in regional potentials and territorial capital; b) better positioning Europe and its regions (connectivity and integration) and c) promoting coherence of policies (TSP, 2005).

If territorial cohesion can be perceived as a multifaceted notion, globalisation is as well a term that is used in many ways, but the principal underlying idea is the progressive integration of economies and societies according to the WCSDG report[23]. It is driven by new technologies, new economic relationships and the national and international policies of a wide range of actors, including governments, international organisations, business, media, labour and civil society.

The report of the WCSDG identifies a number of elements of the EU model as having contributed particularly to its success in improving living and working conditions: a strong legal framework; openness to the world economy and an effective market economy; supportive national social protection systems and common minimum

[21] http://ourworld.unu.edu/en/the-2010-human-sustainable-development-index/

[22] http://data.worldbank.org/indicator

[23] Definition used by the World Commission on the Social Dimension of Globalization (WCSDG) prepared by ILO the International Labor Office: http://www.ilo.org/public/english/wcsdg/globali/index.htm

standards for employment; involvement of the stakeholders through the European social dialogue; gender equality; and, more widely, respect for human rights and the rule of law, democracy and the strengthening of democratic supervision through the European Parliament.

It also mentions that the EU's economic and social model, and the Lisbon strategy even though they cannot simply be transposed to other parts of the world, contain a number of aspects which may be of interest, especially in terms of the processes which are essential to the achievement of the balance between all the objectives at stake. A report of the European Commission issued in 2004 emphasised how the EU model places particular emphasis on solid institutional structures for the management of economic, social and environmental issues and the interplay between them, on effective public services and services of general interest, on strong social and civil dialogue, on investment in human capital and on the quality of employment (EC, 2004).

It is worth mentioning as well the key findings of the ESPON 2013 Programme gathered in the First Synthesis Report (2010) that underlines potentially positive contributions to economic recovery and the Europe 2020 strategy as well as to Territorial Cohesion and a balanced and polycentric Europe:

- Europe’s position in the world is changing (having challenges in ageing labour force, demographic change, energy supply and demand, and the possible impacts of climate Change)
- Europe’s competitiveness depends greatly on its global cities and metropolitan regions, where enterprises can benefit from agglomeration economies and networks linking global market places.
- Connectivity is important. Liveable and smart places have good connections and an attractive environment. Metropolitan regions need good accessibility to each other and to global markets. The number and quality of connections to hubs and urban centres are important preconditions for efficient functional integration of all parts of all parts of the EU.
- Europe has many smart rural regions that are well connected to the global economy, accessible to urban centres and have turned local assets into development opportunities.
- Accessibility of regions and cities is increasing through infrastructure investments which benefit the economic competitiveness of these places.
- Vulnerability to climate change impacts is a concern especially in regions where adaptation and mitigation strategies are not sufficiently in place or effectively enforced.
- Good governance and territorial co-operation are vital at every geographical scale, including partnerships at the level of city-regions and larger macro-regions, as well as across policy sectors.

The Problem of Multiscalarity

An important aspect to have in mind when approaching territorial cohesion at several scales is the element of 'multiscalarity' which refers to the fact that the degree of cohesion can fluctuate according to the scale it's applied. Territorial cohesion examined at different territorial levels presents main different pictures of what cohesion actually means. Looking at territorial cohesion through an EU-level lens, for instance, will give a panoramic view of processes such as polycentric development, cores and peripheries and macro-level disparities, but narrowing the focus with a local level lens will portray a greater detail disparities and development gaps (Van Well, 2011). Thus spatial disparities at, for example the national level may be masked if the analysis is up-scaled to the EU or global level or down-scaled to regional or local levels (Davoudi, 2007).

As an example Davoudi mentions how the pursuit of polycentricity at the EU level has led to monocentrism at national level, represented by concentration of population and economic activity in capital cities or major urban centres; another example is presented by Schön (Schön, 2005) when referring to socio-economic developments in which cohesion between the EU Member states increases while disparities between regions are constantly growing.

The multiscalar dimension of territorial cohesion is already present when looking at territorial development policies: the quest for territorial cohesion is framed between the inter-national (e.g. with policy initiatives taken by the EU or the World Bank) and the multi-national (e.g. with similar policy initiatives taken within many countries across the world).

One simple conclusion to the above is that the inclusion of the global scale in our work should feed a specific purpose, i.e. enhancing our understanding of the processes occurring within Europe by framing them in broader perspective.

An important standpoint from the outset is that "geographical scales are social constructs that should not be reified" (Taylor, 2008). Consequently, the global, understood as the territorial representation of the processes of "stretching and deepening of social relations and institutions across space and time" (Held, 2005), cannot be conceived as equivalent to worldwide, which is a static, both in space and time, territorial contour.

In his seminal work on globalisation, Taylor, which suggests adopting a three scale approach (urban, nation, global) to human geography, and takes the angle of the global as 'the scale of reality', which derives from a materialist position centred on the world economy. He also claims that the global is the 'ultimate scale, the one that 'really matters' (Taylor, 1982).

Limitations for global indicators

We have discussed the difficulty to define what the global entails, especially in terms of thematic focus, geographical coverage and territorial level of investigation. The

conceptual approach to the global (and the local) needs thus to be pragmatic and tailor-made. Yet, beyond the conceptual challenges, the empirical limitations may seem at least as overwhelming.

Indeed, the possibility to construct global indicators for territorial cohesion is strongly dependent on the availability of data for territories outside the Europe, which means that such data cannot be derived from the Eurostat office. Furthermore, there is no database that provides access to regional (i.e. NUTS 2 or 3) data on a worldwide basis, rather comparative analysis must be made at NUTS0 (country) level.

Key themes at the global level, including those in global indicator sets, often put more focus on measuring levels of 'development' or 'sustainable development'. Territorial cohesion indicators in Europe still consider the economic aspects of 'smart growth' to be the defining indicator, even if the social, environmental and governance factors are gaining in importance for achieving territorial cohesion, as we see from the broad storylines depicted in this report.

One of the reasons for this may be that social and environmental disparities are much greater at the global level than at the European level. In this vein, some of the global sustainability indicators include many where there is a degree of similarity among the countries at EU-level. For instance it is less meaningful to discuss indicators measuring infant mortality rates or literacy rates at only European scale, as the intra-European differences in terms of territorial cohesion are relatively small.

Relevance of European Territorial Cohesion Indicators and availability at Global Level:

In general many of the INTERCO indicators for territorial cohesion are also relevant for understanding patterns of development at global level, even if the global indicators are only available world-wide at NUTS0 level. (See Annex 4. INTERCO Indicators at Global Level). All of the INTERCO top indicators within the set of *strong local economies* are available globally, although there are some important substitutions and proxies used, ie both the World Development Index and the Human Development Index no longer define wealth in terms of GDP per capita in PPP; rather both of these indices have gone over to GNI per capita in PPP". The indicators for *innovative territories* are also highly relevant and mainly available in some form at the global level. However, most of the indicators that have more uniquely European territory characteristics, such the accessibility indicators in the category *fair access to services* concerning accessibility to services and potential accessibility by road, rail and car are not directly available at global level. Rather there are related indicators for travel time to major cities. This does not mean that they are not relevant outside of Europe, but rather that they are measured in different forms than accessibility by territory, such as per capita within a larger spatial setting such as the entire country. Likewise the indicators for *attractive ecological regions*, while highly relevant in a global setting, are generally systematically captured in in other ways outside of the industrialised countries. The indicators measuring number and density of cooperation projects under the category *integrated polycentric and territorial development* have

no direct equivalents at the global level. As well, the indicator “population potential within 50 km” has no real equivalent at global level, population density rather stands in for this.

Comparing the INTERCO indicators for territorial cohesion in Europe clearly shows the added dimension that territoriality plays in territorial cohesion compared to social and economic cohesion, which are more easily understood at the non-European /global level. While Europe is surely a forerunner in advocating and developing territorial cohesion indicators at sub-national scale, there may be opportunities to “export” the territorial cohesion concept and policy goal to other parts of the world

C.4.2. Territorial Cohesion: Extension to Local Level

General objectives

The objective of the case studies is to locally explore the indicators defined in the framework of the INTERCO Project as a way to characterise local situations.

The analysis of the feasible indicators is intended to show that higher spatial inequalities are revealed when going beyond the traditional NUTS 3 level of study. Territories which seem to have certain level of spatial disparities in the traditional NUTS-3 level of analysis might register other degrees of disparities/inequalities at a local level. The idea is to observe if the analyses at LAU level bring important new insights regarding TC patterns at NUTS 3 level as well as differences between them.

Additionally to this it is of interest to identify indicators available in the local case-studies that do not exist at the EU regional level but that might be of interest for the other levels in the framework of Territorial Cohesion. However examples as such were also difficult to find, confirming with this the complications when getting data at LAU level.

Summarising, the main objective is to create awareness of the existence of another spatial layer/level of study additional (and complementary) to the traditional NUTS 2-3 scales, where more complex spatial patterns exist but seem to be imperceptible in the traditional way of displaying indicators on the basis of these regional scales.

It is important to say that the local level is not intended to substitute or compete with other scales of analysis, but rather is intended to open a dialogue between different scales that increasingly overlap temporally and spatially (Conti, Giaccaria, 2001).

The selection of case studies

According to INTERCO Inception and Interim Reports, criteria to define local case studies includes the selection of relevant examples to the general theme of territorial coherence in countries where compilation of data is accessible and straightforward enough, like those countries covered by INTERCO TPG partners. This is due to the difficulties when finding data at LAU level. Later on during INTERCO's second TPG meeting it was proposed to take as reference case studies developed in the framework of the ESPON DEMIFER project (Demographic and Migratory Flows Affecting European Regions and Cities, 2010) in which two of the PPs (NTUA & Nordregio) have participated.

With this in mind, case studies selected to perform the analysis at the local level for ESPON INTERCO include Sydsverige-Eastern DK (Sweden-Denmark), Thessalia (Greece) and Piedmont (Italy).

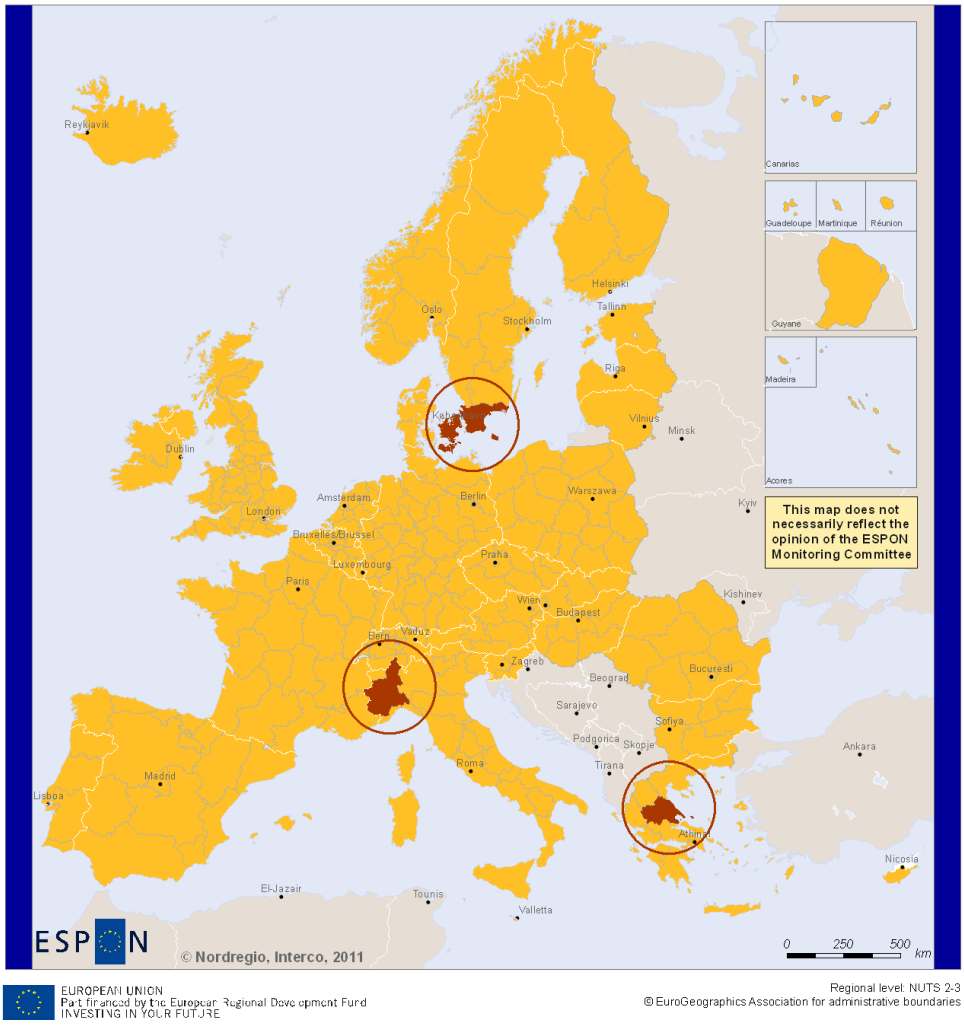


Figure 89. ESPON INTERCO Case studies

Sydsverige-Eastern Denmark (Sweden and Denmark) is a case study with regions in two different countries, which has a long tradition of cross border cooperation and a mixed urban structure that includes a national capital city (Copenhagen, Denmark), one of the 3 major national metropolitan areas in Sweden (Malmö), regional centres and remote sparsely populated areas and islands.

Thessalia (Greece) on the other hand contains both a number of small and medium sized cities outside the two national metropolitan regions of the country (Athens and Thessalonica) combined with rural and mountainous areas which represent a considerable extent of the case study.

Piedmont (Italy) is a border region with important contrasts between the east and west due to the existence of rural mountainous areas in contrast to one of Italy's largest business, industrial and economic centres.

The three case studies include NUTS-3 regions which cover satisfactorily the respective ranges of types for almost all the ESPON Territorial Typologies. Regarding the urban-rural typology by NUTS 3 region among the case studies it is

possible to find one predominantly urban region (in PI[24]), three intermediate regions close to a city (TH:1, SS:2), four predominantly rural regions close to a city (TH:1, PI:3) and four predominantly rural regions-remote (TH:2, SS:2).

Metropolitan regions are represented with three cases[25], while numerous coastal regions (6) are included in the three case study areas[26]. Five mountainous areas belong to the case studies[27] and, finally, the case studies include four regions with industrial branches loosing importance (SS:2, TH:1, PI:1).

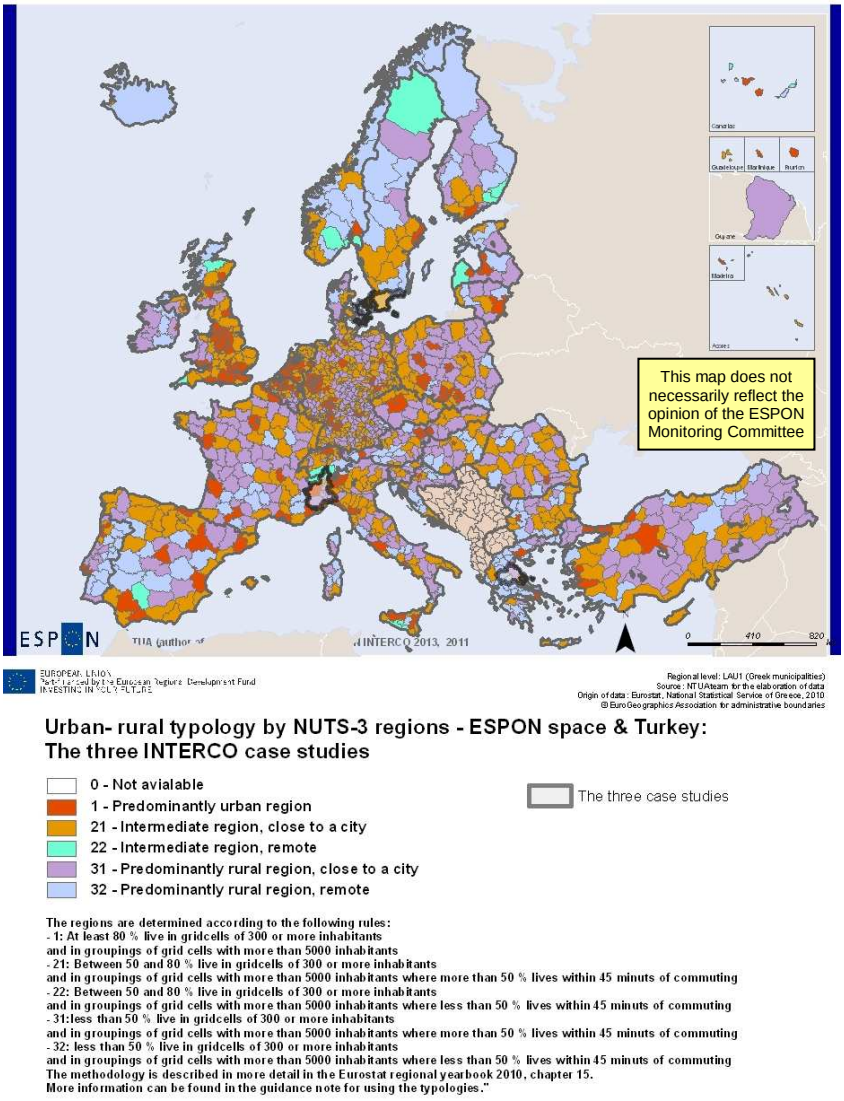


Figure 90. ESPON urban-rural typology by NUTS 3 regions and the 3 INTERCO case studies

[24] PI: Piedmont, TH: Thessalia, SS: Sydsverige-East Denmark

[25] 2 big metropolitan regions in PI and SS and 1 medium sized in SS

[26] From which, 4 (in SS) have a very high share of coastal population and 2 have a low share: 1 in PI and 1 in TH.

[27] Three areas are moderately mountainous remote (2 in TH and 1 in PI), one is predominantly mountainous under urban influence (TH), one is moderately mountainous under urban influence (TH) and one is predominantly mountainous remote (PI)

The selection of INTERCO indicators

When it comes to the local scale, the analytical dimension is implemented by conducting 'zoomed-in' analysis. In concrete terms it comprises an analysis of disparities within a selection of three mentioned case studies. This required the compilation of data at LAU1 or LAU2 levels.

As defined in the Inception Report, the analysis of Territorial Cohesion on the basis of the local level takes into consideration the indicators identified in the general framework of INTERCO. From this framework, indicators classified as headline are those with the highest explanatory power and highest relevance for the issues and policies at stake. Headline indicators are relevant as for their explanatory power also for the local scale but its feasibility at LAU levels is restricted and therefore its analysis depends pretty much on their availability at LAU level.

The lack of a standardised database like Eurostat for the LAU level makes difficult the process of collection and harmonisation of data at this level. Therefore the availability of the different headline indicators of the INTERCO project has been examined across several sources (National Statistical Institutions, National Employment Offices, Public National Health Institutions, local Statistical Offices, Ministries, etc, as well as the ESPON Database 2013 -FUAs database, GDP database, etc). This exemplifies another difficulty when locating and collecting data at LAU level since often it is necessary to track indicators among several sources in each individual country/case study.

However it can be said that INTERCO headline indicators on population, employment and education were feasible to be included in the analysis. Therefore a set of selected, available, relevant local indicators in these topics is calculated for the specific case studies. The rest of indicators (associated to thematic sub-categories on health, energy, poverty, environment, quality of life and governance categories) represent a challenge when trying to find data at LAU level and therefore could not be included in this analysis because of the lack of available or comprehensive data at LAU level. For the exact list of selected indicators per case study, please refer to each case study report (Annex 5, Annex 6 and Annex 7) where a summarising table indicates the set of selected and calculated local indicators respectively.

Sydsverige-Eastern Denmark

The case study area Sydsverige-Eastern Denmark is constituted by the cross border regions of Sydsverige in Sweden and Sjælland and Hovedstaden in Denmark. It covers both rural peripheral sparsely populated areas as well as important urban agglomerations such as Stor-Malmö (Greater Malmö) and Storkøbenhavn (Metropolitan Copenhagen) which together constitute one of the most densely populated areas in the Nordic Countries. It is a leader in promoting innovative research in several areas of technological development and is also home to the largest concentration of highly educated people in the Nordic countries. It hosts a well-developed working relationship between industry, higher education establishments and the authorities and is a major example of a region focused on

knowledge-base as one of the main pillars for regional development having additionally optimal accessibility conditions and a strong history of cross border cooperation. Some of the key findings resulting from the analysis of this case study are described next:

The analysis at LAU level is able to visualise larger gaps between LAU units than between NUTS regions as the ranges of results at LAU level in all of the indicators selected were larger than the ones registered by NUTS 2 or 3 figures. Consequently all figures at a local level show larger coefficients of variation implying therefore a broader level of complexity of the indicators at a local level.

The analysis at LAU level displays important local disparities among the different parts of the case study area, distinguishing local areas around urban centres with well-structured knowledge economies in contrast with local areas in need of economic restructuring and regeneration, and some sparsely populated rural local areas located at a relative distance from main urban centres.

Figures at local level were also able to illustrate strong disparities inside single NUTS 3 regions depending on its settlement structure. A clear example here is the region Skåne, where high local disparities at LAU level were identified in terms of ageing indexes, distribution of population, education levels or unemployment patterns, due to the diverse structure of the region where the majority of population and urban areas are located in the west (along the coastline) in contrast to the majority of rural and sparsely populated LAUs located inland in the north or east.

The analysis at a local level also allowed us to identify that weak performing local areas are not exclusively restricted to peripheral or rural sparsely populated areas but on the contrary low performing local examples are also found in central regions around major urban centres along the Öresund Strait in the hinterlands of Copenhagen, Malmö-Lund or Helsingborg. It was also found that average regional figures are unable to show exceptional local situations, for example remarkable LAUs with some of the highest shares of tertiary level educated population or critical LAU examples with some of the highest unemployment rates or ageing indexes. Other specific local situations as these ones can be found in the case study report which is included as an Annex.

Finally efforts developing indicators to measure crucial National and EU concepts at a local level (such as accessibility) were found in Skåne thanks to the Atlas on local accessibility. Also in Skåne and Blekinge an effort to measure business climate and entrepreneurship is found thanks to i.e. the Swedish Kommunranking which develops an index based on structural indicators at LAU level related to business and entrepreneurship as well as surveys to local entrepreneurs in every single municipality/LAU.

Piedmont

The case study area of Piedmont (NUTS-2 level) is situated in the north-western part of Italy. It includes four important cities and a wide number of urban LAUs (municipalities). Piedmont can be hardly defined as a “monocentric” region. Many of

the capital cities of its eight NUTS-3 regions (provinces), as well as some other towns, maintain their economic importance that is often based on specific industrial activities or agricultural production although Piedmont is undoubtedly a region in "industrial transition". In this study we have decided to include only the Piedmont's NUTS-3 regions of Torino, Cuneo, Asti and Alessandria because this area enables us to analyse the inequalities among a big metropolitan region (Torino) and its periphery, among the urban NUTS-3 region of Torino and the three predominately rural NUTS-3 regions (Cuneo, Asti and Alessandria), as well as those among mountainous and lowland areas. The NUTS-3 region of Torino maintains a strong neo-industrial identity and plays the role of international gateway for Piedmont. The coastal area of Alessandria has a location on the borders with the Genoa area and a harbour which makes it particularly appropriate for logistic activities. The agricultural area of Asti and the mountainous one of Cuneo are dominated by the agro-industrial industry and their spatial organisation is based on a highly cohesive network of medium-sized cities. Some of the key findings resulting from the analysis of this case study are described next:

From the examination of several types of statistics of variation at NUTS-3 and LAU-1 level, the conclusion is, that the values for all the indicators tested (unemployment rate, ageing index, population density, population growth and share of tertiary educated people), differ significantly at LAU level compared to NUTS-3 level. The coefficients of variation (which is the more appropriate statistic for this issue) are clearly higher at local level, implying therefore a broader level of complexity of the indicators at this level. Regarding unemployment rates, the mountainous LAUs of Cuneo perform better than the more urbanised ones of Torino and Alessandria. Complementary to that, population ageing is higher in the peripheral and mountainous LAUs revealing great disparities in comparison to the more urban and close to the metropolitan areas, LAUs. This pattern also applies to the share of tertiary educated people. Finally, the density of the population shows very large fluctuations among the mountainous LAUs-which present very low densities-and the LAUs near the big metropolitan city of Torino, which present much higher densities.

Figures at local level were also able to illustrate strong disparities inside single NUTS-3 regions. For instance, inside the big metropolitan region of Torino the peripheral areas show a totally different territorial pattern from the areas close to the city of Torino and perform differently in all the indicators tested (lower unemployment and share of tertiary educated people, higher ageing rates and negative population change)

The analysis at a local level also allowed us to identify that local areas which performs weaker as for some important dimensions of Territorial Cohesion are not exclusively restricted to peripheral or rural sparsely populated areas but on the contrary are also found around major urban centres: for instance LAUs with high shares of tertiary educated people are not only found in the LAUs which include FUAs, but are also presented in some of the most distant areas in the region of Torino and some areas in the mountainous region of Cuneo. It was also found that

average regional figures are unable to show exceptional local situations, as these ones can be found in the case study report which is included as an Annex.

Thessalia

The case study area of Thessalia (Greece) is a NUTS-2 region and corresponds to four NUTS-3 units. It includes two relatively large cities: Larissa and Volos, and two medium sized cities: Trikala and Karditsa. Volos is centre of an Intermediate region, close to a city while the three other cities are centres of predominantly rural areas, according to the ESPON urban-rural typology. While a large part of Thessalia is lowland, there are important in extent mountainous areas as well as coastal areas and islands. The primary sector of the region while declining continue to be important at national level; the formerly considerably developed industry of the two bigger urban centres has strongly declined during the last thirty years, while the development of services and construction has partly compensated the losses of jobs in the region. Tourism continues to develop in the coastal area and even more in the islands of the region. All these trends are typical for the Greek regions and to a considerable extent to the southern regions of the ESPON space. Some of the key findings resulting from the analysis of this case study are described next:

The analysis at LAU level (municipalities in this case) has shown larger gaps between LAU units than NUTS regions as all the ranges of results at LAU level for all of the feasible indicators used were larger than the ones registered by NUTS-3 figures. The coefficients of variation (which is the more appropriate statistic for this issue) are clearly higher at local level, implying therefore a broader level of complexity of the indicators at this level.

The analysis at LAU level displays important disparities in respect of all the ESPON territorial typologies (applying to the region) and all the indicators used: rate of the tertiary educated people, population growth and ageing, unemployment rate, employment rate and population density. Rural LAU population decreases strongly while the urban LAU one is stable or increase; the ageing and unemployment rates of the first are clearly higher and rise faster; its rate of tertiary educated people is clearly lower. Similar disparities are revealed when comparing the mountainous to the lowland population. It seems that the population of the coastal areas' and islands' LAUs –which are partly mountainous and rural- performs better than that of the respective comparable LAUs. Finally, the more intense industrial decline of the city of Volos explains to some extent its lower performance regarding population growth and structure.

Figures at local level were also able to illustrate strong disparities inside single NUTS-3 regions depending on its settlement structure. For instance, the economy of the western part of the NUTS-3 region of Trikala collapses because it is mountainous but also because it lacks small cities and the centre of the NUTS-3 region is relatively week.

The analysis at a local level also allowed us to identify that local areas which performs weaker as for some important dimensions of Territorial Cohesion are not

exclusively restricted to peripheral or rural sparsely populated areas but on the contrary are also found around major urban centres: for instance LAUs with very high unemployment rates are found in the immediate neighbouring areas of Larissa and Volos; the unemployment rate of these LAUs surpasses the respective rates for the mountainous and very sparsely populated LAUs of Thessalia. It was also found that average regional figures are unable to show exceptional local situations, as these ones can be found in the case study report included as an Annex.

It should also be stressed that datasets useful to measure crucial National and EU concepts at a local (LAU) level in Thessalia regarding for instance business development or tourism activities are provided and regularly updated by NUTS-3 level Chambers.

Finally, the study of not only Thessalia but also the other 2 case studies case has demonstrated that "really territorial" aspects of cohesion could not be appropriately analysed using indicators at NUTS-3 level. The use of local indicators at LAU level could be very useful by complementing the latter analyses.

C.4.3. Western Balkans and Turkey

This work refers to:

a) the **Candidate Countries (CC):** Croatia (HR), Former Yugoslav Republic of Macedonia - FYROM (MK), Montenegro (ME) and Turkey (TR) which have adopted the NUTS classification

b) the **Potential Candidate Countries** (PCC): Albania (AL), Bosnia & Herzegovina (BA), Serbia (RS) and Kosovo under UN Security Council Resolution 1244 (XK).

Objective of the research

A first objective of this research was to assess the availability and quality of data for the indicators which better reflect the territorial cohesion in the Western Balkans countries and Turkey. Thus, interested stakeholders could extend their territorial analyses in these countries, at least for the main facets of territorial cohesion. A second objective of the research was to analyse the territorial cohesion pattern in these countries

We have implemented the following methodological steps - see in extent in the respective report in Annex 8:

- we have examined *the NUTS / LAU classification in the CC/PCC;*
- next, we have commented the *feasibility of the indicators* of different kinds *as for the data availability* in the CC / PCC;
- then we have produced a *general overview of the development of the CC/ PCC in the European frame on the basis of existing literature* and we have analysed the different TC dimensions at country (NUTS0) and macro (overall CC/ PCC) levels;
- next, *we have used these indicators for the analysis of the territorial cohesion pattern in these countries at NUTS-2 level and NUTS-3 level, the latter being more "territorial".* This exercise enabled us to *test the explanatory power of these*

*indicators***.** Thus, finally, we have produced *conclusions* on the territorial cohesion in CC/PCC as well as on the effectiveness and the gaps of the methods of exploitation of TC indicators used. We have also proposed recommendations to interested stakeholders on the appropriate improvement of their work on territorial data on these countries.

NUTS / LAU classification in the CC / PCC

In the frame of the ESPON 2013 Database-1 project, in order to ensure a sound comparability of data of the PCC, which have not adopted the NUTS classification, the existing administrative units of these countries have been classified at different territorial levels in *"similar NUTS"* territorial units. For this purpose, the criterion of population potential of the EU NUTS classification has been used as well as the overall structure of government in these countries with focus on the power of the respective regional and local authorities and the main features of territorial development in each administrative level per country.

In the frame of INTERCO, we have checked the above classification and made necessary modifications and additions to the reasoning for the classification. To conclude, the "similar NUTS" divisions correspond almost fully with the respective divisions for the EU countries.

We present in the Figure 91 the overall division of the CC/PCC in NUTS-2, 3 and Similar NUTS-2, 3 units.

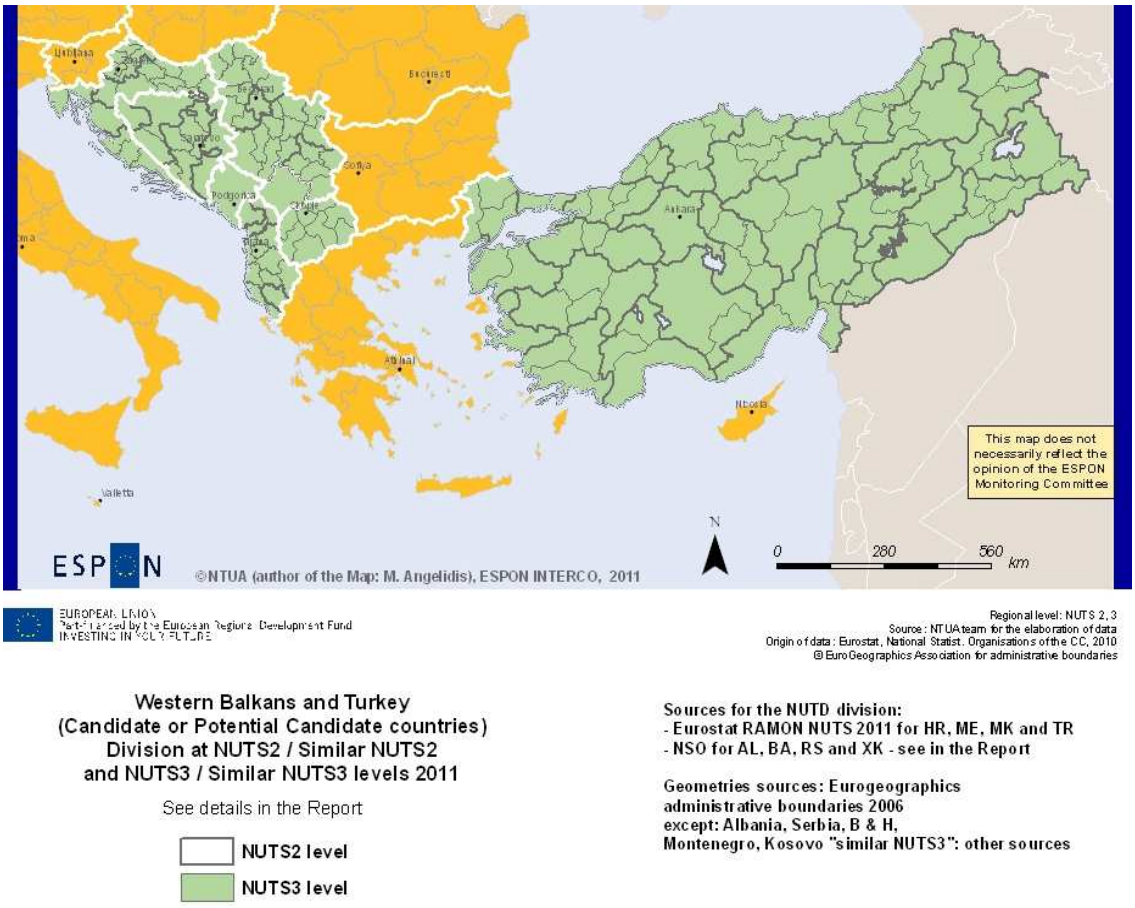


Figure 91. NUTS-2 and 3 units of the Western Balkans countries and Turkey (CC/PCC)

Feasibility of the INTERCO indicators as for the data availability in the CC/PCC

We should first remind that ESPON 2013 Database-1 project has, in general terms, referred only to a limited number of "basic" indicators for the CC/PCC. Following the scope of the entire INTERCO project, we have focused on a much larger range of indicators including at first the *final* ones which are defined by the "selection of indicators" task of INTERCO[28]. Specifically, we have assessed the feasibility of the above indicators as for the availability and quality of relevant data. This assessment showed that there are *available data at sub-national level* (NUTS2 or NUTS3 – which could be aggregated at national level) *for seven "final" indicators* and for two others there is *data only at national level***.**

Data sources: The data for *HR, MK and TR* are mostly from Eurostat, but data from NSO and other sources have also been added. For *ME and the PCC*, Eurostat provides data only at NUTS0 level – therefore, additional data should be used from the National Statistical Organisations (NSO) and other sources. In general terms, for a number of indicators there are for the PCC only data at NUTS0 (country) level.

[28] We have also examined the feasibility of the "headline" and "core" indicators, defined in a previous phase of the project – see in the respective report in Annex.

Cohesion trends at the macro level (overall CC/PCC) and the country level

The literature approach of the economic performance features of the CC/PCC provided us arguments on the existence of a TC pattern for the entire territory of CC/PCC (total of the countries) which is similar to the EU east one but clearly less performing compared to the latter. Further on, the specific analysis of the different TC dimensions on the basis of indicators at country level, have consolidated the above literature results, as for the majority of the TC dimensions. Inside the total area of the CC/PCC, TC inequalities per country are pronounced.

Regarding mainly competitiveness, HR and TR, which are candidates to join EU, are equally performing with the two "weaker" EU east countries: Romania and Bulgaria. ME and RS perform less in economy than HR and TR and present also similar values regarding indicators of several other TC dimensions. MK, BA, AL and XK are even less developed and present a relative homogeneity regarding several TC dimensions.

Territorial cohesion at country and sub-national level in the CC/PCC on the basis of feasible indicators as for the data availability – explanatory power of these indicators

As the necessary data at sub-national level for the PCC: AL, BA, RS and XK, are scarce, we have examined only six indicators: GDP rate, GDP dispersion and unemployment rate, ageing index, life expectancy and population density. Therefore, we have not made a complete analysis of TC at this level. Inversely, we have analysed in more depth these few TC indicators in order to see if the additional results bring important insights regarding the TC patterns at national and sub-national (NUTS2 / NUTS3) level as well as on the differences between these two last. This comparison complements the research of the project which refers to the entire ESPON space and to the "local" level.

We have specifically examined several types of indicators of variation (min / max, mean (average), standard deviation and coefficient of variation) at national (NUTS0) and sub-national level and examined how these statistics reflect the inequalities regarding TC. *We concluded that the TC pattern of inequalities by issue in the CC/PCC at national level differs considerably from that for the sub-national level.* Specifically, the coefficients of variation (which is the more appropriate statistic for this issue) are clearly higher at NUTS-3 level, implying therefore a broader level of complexity of the indicators at this level.

These results are very similar with those found for the local case studies, which enables us to consolidate the conclusion that analyses at a higher than the NUTS-3 level could not bring "really territorial" results regarding cohesion.

C.5. GIS Data & Tools

This chapter describes the GIS implementation of the INTERCO database and the developed scripts and tools supporting work with the indicators.

C.5.1. Structure of the INTERCO Geodatabase

As the initial step for all further GIS activities in INTERCO, the overall INTERCO geodatabase has been established.

The INTERCO geodatabase is implemented in ESRI´s Personal Geodatabase format (PGDB) of ArcGIS Version 10.x, and is named **INTERCO_DB**. The overall geodatabase is structured by so-called feature datasets, feature classes and tables.

A *feature dataset* is a collection of related feature classes that share a common coordinate system. Feature datasets within a geodatabase are used to spatially or thematically organize and integrate related feature classes.

Feature classes are homogeneous collections of common features, each having the same spatial representation, such as points, lines or polygons, and a common set of attribute columns. The four most commonly used feature classes in a geodatabase are points, lines, polygons and annotations.

The third building block of a geodatabase is tables. *Tables* store statistical data. The tables are not permanently linked to any feature class, but if a common field exist both a table and a feature class may be joined to each other. The join may be furthermore permanently saved in a so-called *relationship class*.

The **INTERCO_DB** PGDB comprises feature datasets, feature classes and standalone tables, as shown in Figure 92:

- the feature dataset called **ADMINISTRATIVE_BOUNDARIES** stores line and polygon layers representing administrative units. Most of these layers were imported from the overall ESPON Database, however, the layers called **ZONES_INTERCO*** represents the newly created INTERCO NUTS region layers.
- the feature dataset called **LANDCOVER** provides land cover and land use layers. Currently two layers are available, which are the **LAKES** layer, i.e. a layer representing water bodies derived from the seamless ESPON NUTS-5 municipality layer, and the **UMS_PROJECT** layer, which represents settlements / urban areas, taken from the overall ESPON Database.
- The feature dataset called **OTHER_LAYERS** comprises various other layers that are needed for drawing maps or for GIS processing. All layers subsumed under this feature datasets were taken from the ESPON Database.
- Apart from these feature datasets, the **INTERCO_DB** PDGB provides a number of different standalone tables, which can be combined into three groups: First, the template tables **ZONE_TEMPLATE_TABLE_NUTS3, ZONE_TEMPLATE_TABLE_NUTS2**, **ZONE_TEMPLATE_TABLE_NUTS1**, and

ZONE_TEMPLATE_TABLE_NUTS0 are template tables providing list of all NUTS-3, -2,. -1 and -0 regions that are used in INTERCO. These templates can be used to create new tables. Tables starting with **RD*** and followed by numeric numbers represent “raw data” tables, i.e. tables to provide raw data that are needed to calculate certain indicators but that are not the indicators itself. Finally all standalone tables starting with **IC_*** store the actual indicators, where one table is supposed to store all indicators belonging to a particular category (**IC**) for a specific spatial level. The actual spatial level is provided as suffix to the table name **(*_NUTS0, *_NUTS1, *_NUTS2**, or ***_NUTS3**). The following eleven indicator categories were identified:

- Agriculture and Fisheries
- Demography
- Transport, accessibility and communication
- Energy
- Land use
- Social and cultural affairs, quality of life
- Economy, labour force
- Environment quality, natural assets, hazards
- Governance
- Territorial structure
- Non & cross-thematic data

These categories correspond to the classification scheme (thesaurus) of the overall ESPON database, which later on allows a smooth integration of the INTERCO indicators into the ESPON database. Each category is further subdivided into sub-categories, which again are derived from the ESPON database categorisation. Table 9 illustrates the categories and sub-categories of the ESPON DB which are applied to set up the INTERCO GIS Database.

Cat. nr	Category name	Sub-cat. nr	Sub-category name
1	AGRICULTURE AND FISHERIES	1,01	Land Use
		1,02	Farms Structure
		1,03	Employment
		1,04	Livestock
		1,05	Production
2	DEMOGRAPHY	2,01	Population Structure
		2,02	Migration
		2,03	Total population
		2,04	Urban - rural population
3	TRANSPORT, ACCESSIBILITY, COMMUNICATION	3,01	Transport Infrastructure
		3,02	Passengers and Good Transport
		3,03	Accessibility
		3,04	Impacts of Transport Policies
		3,05	Information & Communication Technologies
4	ENERGY	4,01	Energy
5	LAND USE	5,01	Land Use
6	SOCIAL AND CULTURAL AFFAIRS, QUALITY OF LIFE	6,01	Households and dwellings
		6,02	Education
		6,03	Health
		6,04	Poverty
		6,05	Other social
		6,06	Culture
		6,07	Quality of life
7	ECONOMY, LABOUR FORCE	7,01	Labour force
		7,02	Employment, Unemployment
		7,03	Income and Consumption
		7,04	Investments, Finances, Expenditures
		7,05	Industry, Services
		7,06	Tourism
		7,07	Innovation
		7,08	Business, all sectors
8	ENVIRONMENT QUALITY, NATURAL ASSETS, HAZARDS	8,01	Environment quality
		8,02	Natural assets
		8,03	Climate change
		8,04	Risks, hazards
9	GOVERNANCE	9,01	Governance
10	TERRITORIAL STRUCTURE	10,01	Urban structure
		10,02	Regional/ Territorial structure
99	NON - CROSS-THEMATIC DATA	99,01	Integrative indices and typologies
		99,02	Geographical objects

Table 9. Categories and sub-categories of the ESPON DB

There will be one column per indicator in the **IC_*** tables. The column header corresponds to the unique INTERCO indicator code (see below).

- The metadata describing the **INTERCO_DB PGDB** will also be stored as part of the geodatabase (standard metadata functionalities of ArcGIS). From there they can be accessed or exported to **XML** file format, which itself can be read by Word or other word processors. The exported metadata in **XML** format can be accessed from outside ArcGIS via the **DOC** sub-directory (see folder description below). Metadata will be stored following ISO 19139 metadata implementation specification.

A full description of this geodatabase, including detailed descriptions of database structures, fields and formats, will be given in the metadata document that will be provided through the database CD-ROM/DVD.

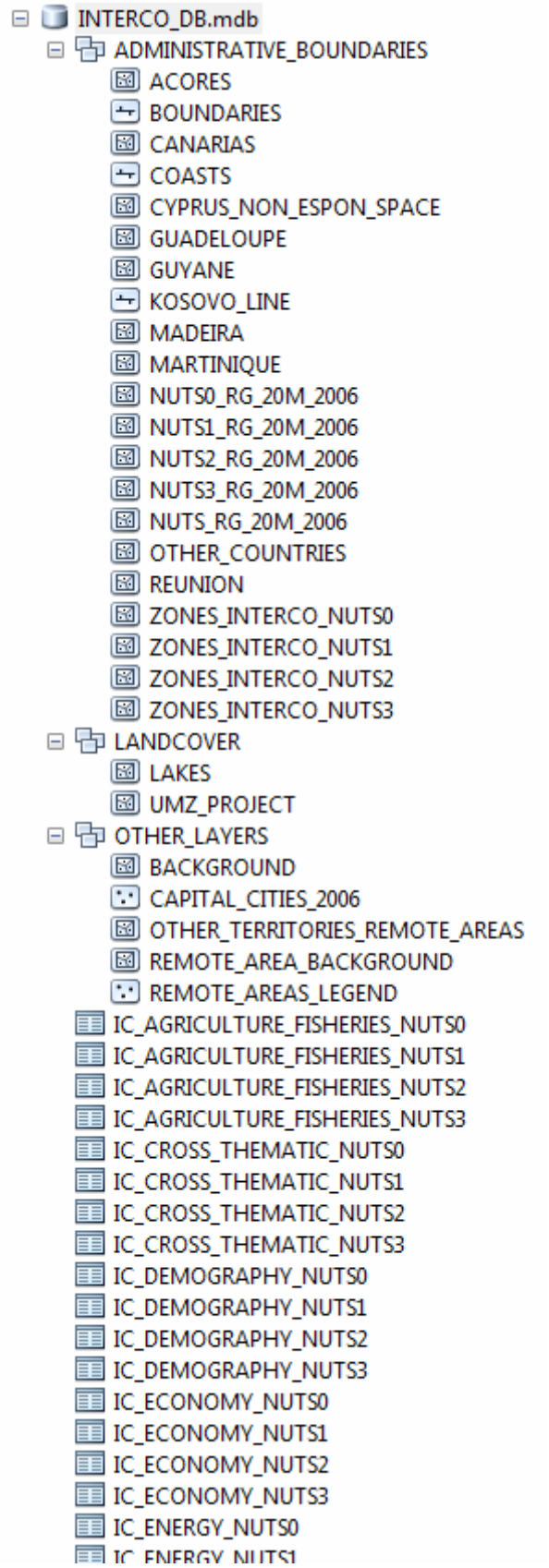


Figure 92. INTERCO_DB PGDB structure and contents (excerpts)

C.5.2. Scripts and Tools

If any indicator cannot directly be taken from statistics, it needs to be generated. Even though many indicators can directly be taken from the statistics, often input data need some sort of post-processing, sometimes even some form of complex calculations. The generation of such indicators usually requires a sequence of mathematical, statistical or GIS operations, or even the development of dedicated GIS models, depending on the indicator complexity and the required input data. All needed operations for the processing of input data to indicators in INTERCO will be implemented by scripts, with one script per indicator or per indicator group. The scripts will be subsumed in a new INTERCO toolbox for ArcGIS, called **INTERCOtools**. The tools can then be launched from ArcGIS to re-calculate any of the indicators easily without the need to redevelop the methodological basis again. Upon successful processing of a script, the script will update all relevant GIS layers and/or tables.

Figure 93 illustrates how a script can be accessed from ArcGIS Toolbox, as a collection of I**NTERCOtools**. The INTERCO toolbox is subdivided by toolsets. The names of the toolsets correspond to the six territorial objectives. (**LOCAL_ECONOMIES, INNOVATIVE_TERRITORIES, ACCESS_TO_SERVICES, QUALITY_OF_LIFE,HIGH_ECOLOGICAL_VALUES,POLYCENTRIC_DEVELOPMENT**) , so as the script names correspond to the indicator names.

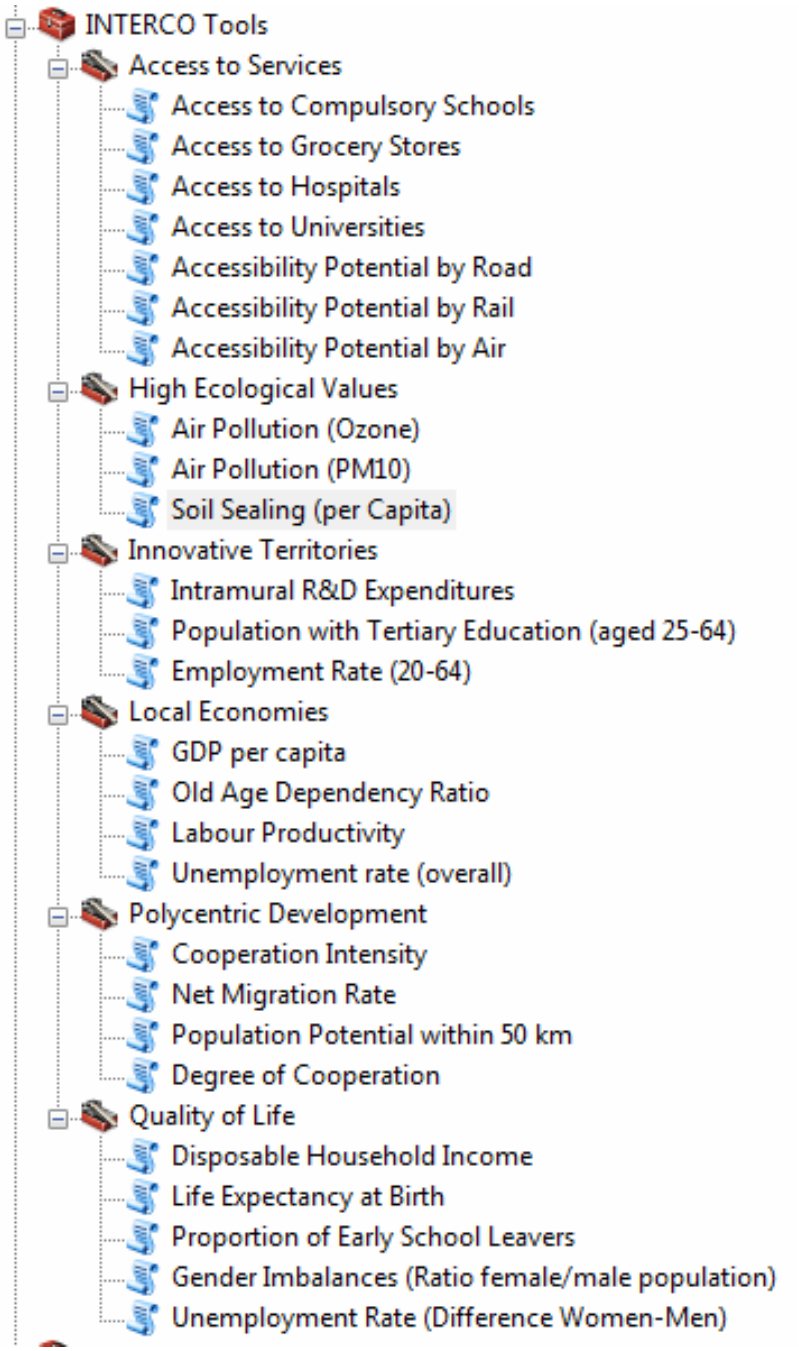


Figure 93. INTERCOtools in ArcGIS Toolbox

The scripts itself will be written in Python, VBA, or AML programming languages, or will be developed by using the Model Builder in ArcGIS. The following figure exemplifies a script developed with Model Builder in ArcGIS. The script subsequently launches five geoprocessing and statistics commands (orange boxes), processed onto two input layers (blue ellipses) and generating four interim and one final output layer/table (green ellipses). The presented script in Figure 94 uses the Corine Land use layer (EEA, 2011) to calculate the share of green space per NUTS-3 region.

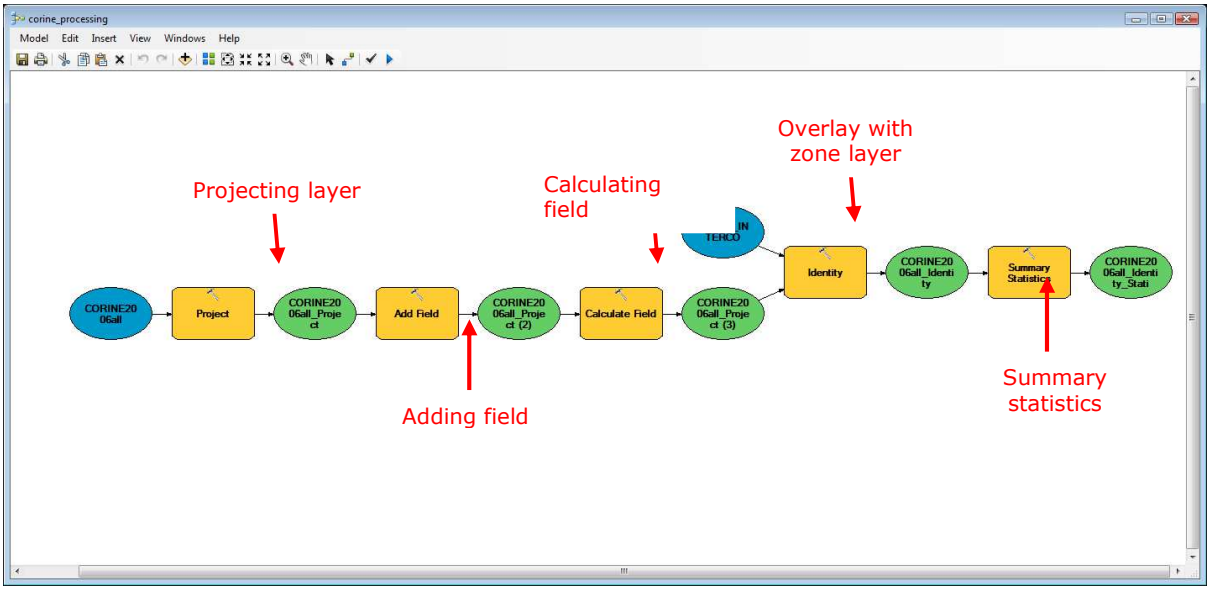


Figure 94. Custom script developed with Model Builder in ArcGIS

C.5.3. Mapping and cartography

The mapping of the indicators and the cartographic layout will be based upon the mapkits developed by the ESPON 2013 Database project (Zanin et al., 2010). Among the four available mapkits, the ESPON Space mapkit was selected as the most suitable one for INTERCO. Even though, unlike the ESPON Space and Candidate Countries mapkit, the territory of Turkey is not fully covered by it, it was selected since it provides the most detailed insight (=highest resolution) for Europe as a whole.

All European-wide maps will be produced by using this template. The template is stored as template file for ArcGIS (i.e. **MXT** and **MXD** files) in a specific folder (see below). The original **MXD** file of the ESPON 2013 Database project has been amended as follows to meet the INTERCO requirements (Figure 96):

(i) *Additional metadata*: Above and below the map field, metadata information for the indicator in question was added, providing the reader with all necessary metadata information about it. The added metadata information refer to the indicator code (see chapter "C.5.4. Indicator coding system" below), Territorial Objectives, desired direction of change (change direction), data gaps, and general years available (information above main map), as well as detailed indicator definition (added below the main map).

(ii) *Diagram*: While the main map area is used to show the territorial disparities at a given time, a diagram field was added below the map showing the sigma convergence or beta convergence graphs which analyse the spatio-temporal development of the indicator. By this, the map template shows both the territorial and temporal dimensions within one page.

(iii) *MXD file version*: All MXD files were created with ArcGIS Version 10. The MXD files cannot be opened in earlier versions of ArcGIS.

The enhanced map template ensures that all necessary information is provided to the reader at one page; in particular both dimensions of territorial cohesion, i.e. the territorial disparities and the evolution over time, are presented at a glance.

The layers used in the maps will also be provided as so-called **LYR** files, i.e. specific files that store the layer symbology (colors, symbols, line width, line and polygon patters, markers etc.) for later uses in other maps, without the need to re-establish the overall symbology again. Figure 95 illustrates the **LYR** files that constitute the basic map layout (as shown in Figure 96), which are stored in the **LYRS** subdirectory (see below).

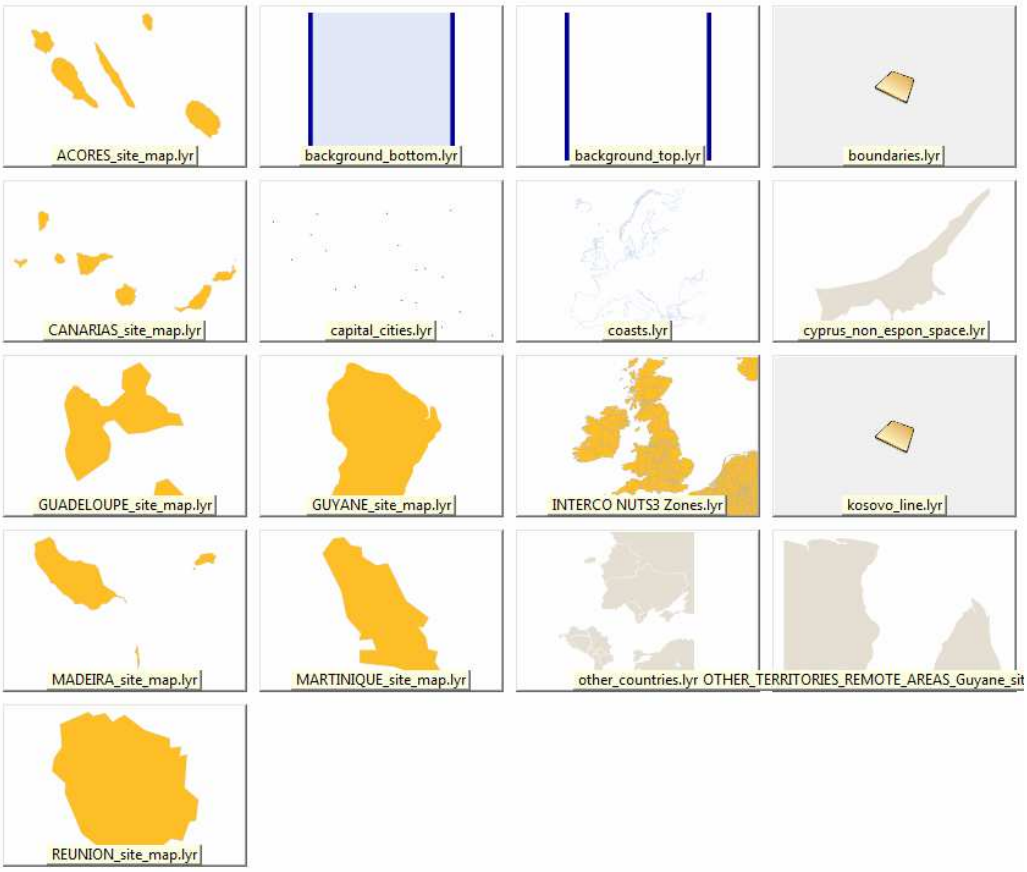


Figure 95. LYR files constituting the base map in thumbnails view (sample of all available layer files).

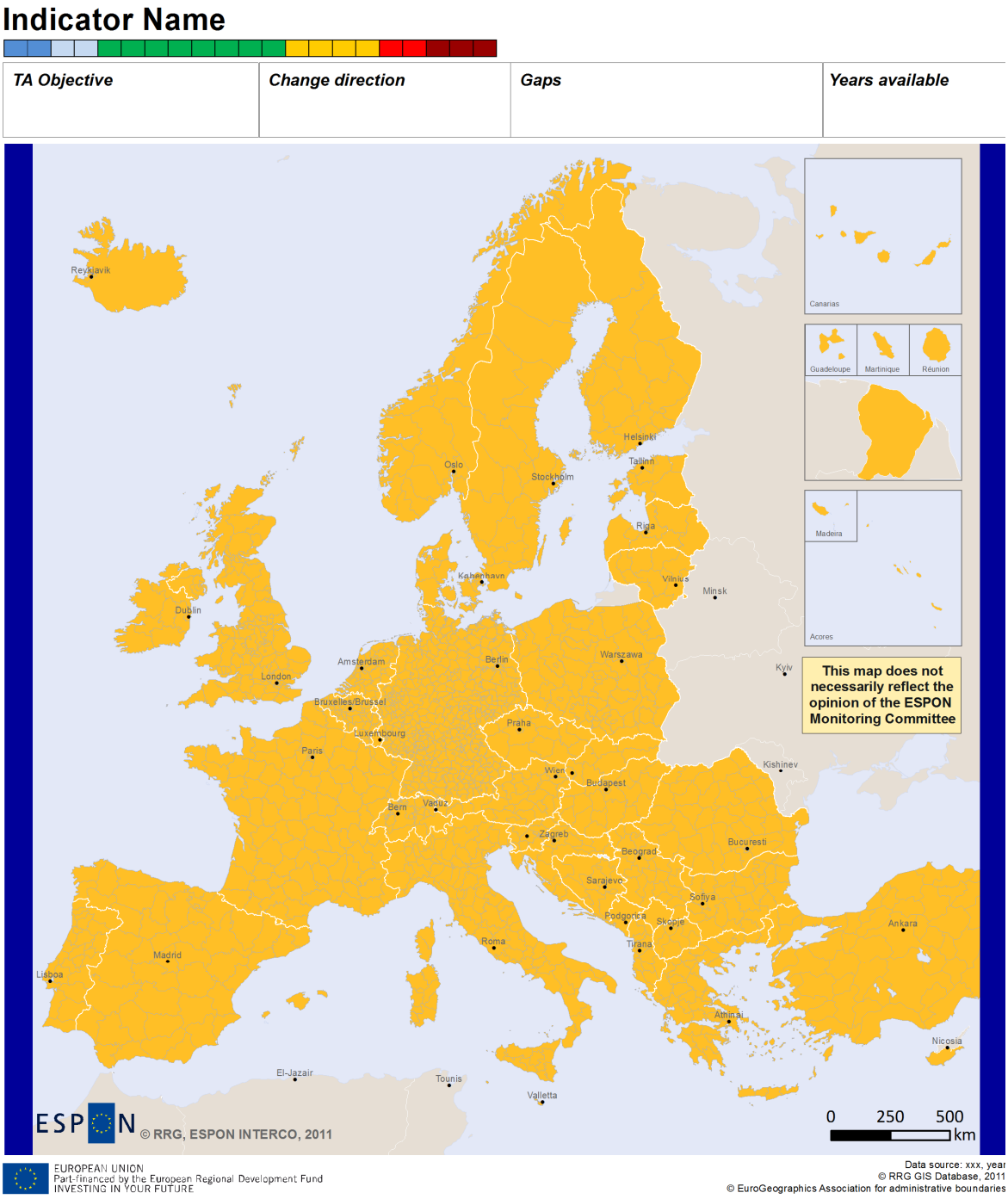


Figure 96. Enhanced INTERCO Map Template

C.5.4. Indicator coding system

Basic principles

In order to allow a smooth processing of the indicators in the GIS and across different databases (INTERCO GIS Database, ESPON DB 2013 etc.), a unique INTERCO indicator coding system has been developed, which itself is based upon the TtOYS indicator coding system used in ESPON DB 2013.

The enhanced coding scheme for each indicator consists of six fields, of which five fields follow the original TtOYS structure, plus one additional field dedicated to store the indicator data type. Altogether the full code consists of 21 letters (combination of characters and numbers). The six fields are **`Category`**, **`Sub-Category`**, **`Open field`**, **`Year`**, **`Space`** and **`Type`** (Figure 11).

Category		Sub-category		Open field							Year				Space		Type		
#	#	#	#	A	B	C	D	E	F	G	#	#	#	#	X	X	X	X	X

Figure 97. The INTERCO indicator coding scheme (TtOYS structure to code variables)

The fields **`Category`**, **`Sub-Category`** and **`Space`** are filled with two characters each, the **`Type`** field with three, while the other two fields are more flexible. The **`Open field`** can take six to maximum eight characters and the field **`Year`** can take two up to four characters. To improve harmonisation, the ESPON DB instructions further proposed that letters and numbers should be written in a specific order and text displayed as either upper or lower case. The two pairs of digits representing **`Category`** and **`sub-Category`** are indicated in the first four characters of the code. The codes for the categories and sub-categories have already be presented in Table 9.

Beyond the categorisation provided in **`Category`** and **`Sub-Category`**, it is necessary to give further details on the information that is being measured. This can be achieved by completing the **`Open field`**. In order to harmonise with other ESPON projects, the ESPON DB proposes three lists of abbreviations based on the current state of the database. The first two lists relate to subjects and to some adjectives and names widely used when labeling indicators (e.g. total, gender) and the third list should preferably remain fixed since it corresponds to measurement scales as recognised in the geographical/statistical literature.

In the **`Open field`**, upper case letters are used to identify the subject, up to three lower case characters are used to refine the subject and other lower case characters by the proposed lists of ESPON DB are used.

The **`Year`** field stores temporal information about the indicator. Two cases can be distinguished: if the indicator is available for only one year, the full year is provided (like 2009). If an indicator is available for a time interval of several years, the starting

and the ending year of the period are given, both with the latter two numbers (e.g. a period of 2001-2008 will be abbreviated by 0108).

The **Space** field indicates the spatial level for which the indicator is available, as a two-digit code. The following abbreviations are possible (Table 10):

Abbreviation spatial level (2 digits)	Meaning
N0	Country level
N1	NUTS-1 level
N2	NUTS-2 level
N3	NUTS-3 level
N5	NUTS-5 level
L1	LAU-1 level
L2	LAU-2 level
UZ	Urban (morphological zone)
GR	Grid / raster

Table 10. Abbreviations indicating the spatial level in the indicator code

The data **Type** field indicates the type of indicator in question. It is a 3-digit field that stores one of the following abbreviations (Table 11):

Abbreviation data type (3 digits)	Meaning
INT	Interval
MET	Metric
NOM	Nominal
NOU	Nominal unique
NOD	Nominal dichotomous
NOC	Nominal categorical
NOG	Nominal graded membership
ORD	Ordinal
ORU	Complete ordinal
ORC	Classed ordinal
RTO	Ratio
RTE	Extensive ratio
RTC	Count ratio
RTD	Derived ratio
RDE	Density ratio
RTY	Cyclic ratio
RTP	Constrained ratio

Table 11. Data type abbreviations used in the indicator code

The indicator codes need to be unique for each indicator. If there are two or more indicators with similar characteristics, the **`Open Field`** can be used to differentiate the indicator codes from each other.

Coding system implemented in INTERCO geodatabase

The indicator coding system described above is not only used in the fact sheets for indicator identification, but the codes are also used in the **INTERCO_DB** geodatabase as column header (i.e. field names) in the data tables (Figure 98). Since the indicator codes are unique, by that the column headers in the tables are also distinctive. The benefit of using these codes in the database over using other names is their compactness and uniqueness.

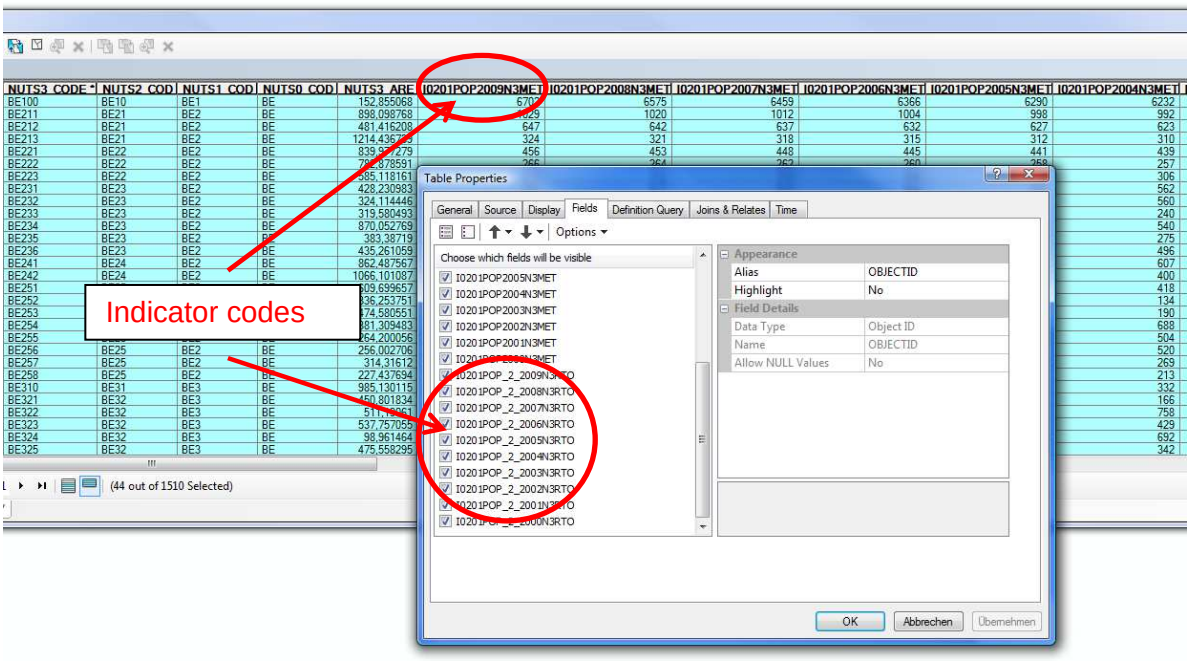


Figure 98. Indicator codes as field names in data tables of INTERCO_DB geodatabase

C.5.5. Files

Excel files

For those people who do not have ArcGIS available, or are non-GIS specialists, or for those who just want to work with the statistical data outside a GIS, the INTERCO projects offers all indicators in Excel file format.

The structure of the Excel files is easy to understand and straightforward. There will be one Excel file per indicator. Each file stores the indicator numbers (or input data) for all available years, where one column represents one year. The first column gives the NUTS region codes (either NUTS-3, NUTS-2 or NUTS-1) as defined by Eurostat, which can be used to link the table to GIS layers or to other statistical data.

The column headers, contents and units of the indicators are described in the metadata documentation and in the user manual.

PNG files

All indicator maps are exported from ArcGIS into **PNG** file format, i.e. raster format. The **PNG** maps are provided through a subdirectory on the CD-ROM/DVD. From there they can directly be viewed, retrieved and imported into reports, presentations or other documents; even for those users who do not have a GIS system at hand.

CD-ROM / DVD folder structure

The overall output of the GIS works in INTERCO will be stored and will be made available in a comprehensive folder structure, including the GIS database, the documentation, the cartography, Excel tables as well as layer files.

The following folder structure has already been implemented to store the results of all INTERCO works:

CARTO comprises all generated **MXD** files (ArcGIS version 10) for indicator mapping

DOC metadata documentation and user manual for the INTERCO database

EXCEL collection of Excel files (input and output of indicator calculation)

LYRS collection of layer files for mapping (referenced in **MXD** files)

MAPS collection of maps in **PNG** file format, exported from ArcGIS

TOOLS sub-directory storing the INTERCO toolbox and the developed scripts

The actual **INTERCO_DB PGDB** is stored in parallel to these sub-directories.

Each of the directories **CARTO**, **EXCEL**, **LYRS** and **MAPS** have several sub-directories which are named after the objectives of the Territorial Agenda (TA) (Table 12) to store the respective map templates (**CARTO**), indicator files (**EXCEL**), layer files (**LYRS**) or exported raster **PNG** map files (**MAPS**).

Name of subdirectory	Territorial Objective
LOCAL_ECONOMIES	Strong local economies ensuring global competitiveness
INNOVATIVE_TERRITORIES	Innovative territories
ACCESS_TO_SERVICES	Fair access to services, markets and jobs
QUALITY_OF_LIFE	Inclusion and quality of life
HIGH_ECOLOGICAL_VALUES	Attractive regions of high ecological values and strong territorial capital
POLYCENTRIC_DEVELOPMENT	Integrated polycentric territorial development

Table 12. Sub-directories under CARTO, EXCEL, LYRS and MAPS folders according to Territorial objectives

The file names itself are then composed of two parts. The first part represents the indicator code, and the second part is a short alias name for the indicator in question.