

Ulysses

Using applied research results from ESPON as a yardstick
for cross-border spatial development planning

Targeted Analysis 2013/2/10

Scientific Report for the Final Report

Multi-Thematic Territorial Analysis

of the

Extremadura-Alentejo Cross Border Area

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Nomenclature

CBA: Abbreviation for Cross Border Area, representing the Alentejo and the Extremadura

FUA: Abbreviation for Functional Urban Area, namely the municipality (or a cluster of municipalities forming an urban agglomeration) and its related labour basin.

LAU 1: Abbreviation of the Local Administrative Units. LAU 1 represents the lower administrative level (formerly NUTS level 4), corresponding to municipalities or equivalent units in the 27 EU Member States (Municipalities in Portugal and not defined in Spain).

LAU 2: Abbreviation of the Local Administrative Units. LAU 2 represents the lower administrative level (formerly NUTS level 5), corresponding to municipalities or equivalent units in the 27 EU Member States (Freguesias in Portugal and Municipalities in Spain).

NUTS: Abbreviation of the Nomenclature of Units for Territorial Statistics. It represents a 'geocode standard' for referencing the subdivisions of EU space for statistical purposes.

NUTS 1: First level definition of the EU space, corresponding to countries.

NUTS 2: Second level definition of the EU space, corresponding to regions (Regions in France and Autonomous Communities in Spain).

NUTS 3: Third level definition of the EU space, corresponding to districts (Departments in France and Provinces in Spain).

Total Dependency Ratio: Represents the ratio of the combined youth and senior population to the working-age population.

Total Fertility Rate: Represents the number of children that would be born to a woman if she were to live to the end of her childbearing years and bear children in accordance with current age-specific fertility rates.

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Chapter 1 - Executive Summary

1.1. ULYSSES project in brief

ULYSSES is an experimental and innovative project supported by 18 European border and cross-border areas (hereafter CBA) that aims at using applied research results from ESPON as a yardstick for decentralised cross-border spatial development planning. Within this overall framework, a targeted analysis including high-quality, comprehensive and multi-thematic territorial analyses (hereafter MTA), has been performed on six specific CBA across Europe. One of these areas is the Cross Border Area of the Extremadura and the Alentejo.

The MTA has focused on the main topics mentioned by Territorial Agenda of the European Union (EU 2006, 2011), namely: (i) cross-border polycentric development; (ii) patterns of urban/rural relationship; (iii) levels of accessibility and connectivity; (iv) effects of demographic change (territorial profile); and the level of attainment of (v) Lisbon/Europe 2020 and (vi) Gothenburg objectives by the CBA (territorial performance). In parallel, an in-depth statistical analysis focused on the six CBA was performed as well. This analysis included: (i) a catching-up analysis; (ii) a principal components analysis; and (iii) a multiple regression analysis.

Additionally, a comprehensive cross-border institutional performance analysis has been included as well in every MTA. This analysis captured the diversity of governance frameworks existing within each CBA by paying regard to both the structural dimension, i.e. the overall framework that can hardly be influenced by the partners of cross-border cooperation, as well as the activity dimension, i.e. the intensity and continuity of institutionalised cross-border cooperation on the regional level.

All the above mentioned activities crystallised in a comprehensive diagnosis for each MTA area that was delivered as an annex to the Interim Report of ULYSSES. On that basis, an integrated analysis taking account of previous inputs was performed at a later stage of the project. From a methodological perspective, this integrated analysis adopted the form of a two-phase SWOT analysis that included (i) a status-analysis phase in which the findings derived from previous research tasks were organised and prioritised as main challenges; and (ii) an action-decision phase in which a response to each one of the identified challenges was proposed as a potential strategy.

Both the challenges and strategies were discussed and eventually validated by stakeholders of the MTA areas. This SWOT analysis is also seen as the main contribution that ULYSSES may do to the Practical Guide that the Association of European Border Regions will develop in the near future. All in all, the final results of ULYSSES project are fully aligned with the expectations set by the project specifications.

1.2. Key analysis / diagnosis

1.2.1. Demography

According to the ESPON Demifer Project (ESPON 2010), the NUTS 2 of the Alentejo is considered an “ageing challenge region”, while the NUTS 2 of the Extremadura is considered a “challenge of labour force region”. This typology, which is based on age structure but also on growth rates, sheds some light on one of the major challenge these regions face on a demographic level: the difficulty to induce natural population growth or to attract population. But, although in the last decade the CBA as a whole has been witnessing a population growth rate that is close to stagnation, this general statement hides very different demographic realities.

A first aspect to consider are the uneven population dynamics. On the one hand, there are very different growth rates on each side of the border and, while the Portuguese part has been losing population, the Spanish has been growing slowly. On the other hand, there is also a tendency for the population growth to be very irregular at the local level: the LAU 1 /2 that concentrate around the major urban centres tend to grow, while many of the less densely populated municipalities face population stagnation or decrease. But the different demographic realities are not only related do the dynamics but area also expressed in the age structure. In fact, the ageing challenge is felt very differently at the local level and, once again, the more urban municipalities tend to concentrate a much larger share of young aged cohorts, while the remoter and more rural areas tend to have a large share of older cohorts.

A second aspect is that the border seems not to have a very significant impact on population growth. In fact, in the Spanish side of the border, many of the larger urban centres are located close to the border leading to a positive statistical relation between population growth and border distance. On the Portuguese side there is a negative relation, but it is not very significant.

A third aspect is that there seems to be a relatively high cross border commuting from the Alentejo to the Spanish side of the border. When considering the whole European Union, the commuting flow are still relatively small (in comparison to countries such as the USA or Japan), which further stressed this indicator as a sign of cross border integration.

1.2.2. Polycentric Development

The main conclusion from the urban hierarchies in this CBA is that, although being fairly polycentric from a European perspective, it not only lacks hierarchy (meaning Functional Urban Areas with a considerable size), but it also lacks an overall amount of FUA. Considering its area as well as its total population, the share of people that live in urban agglomerations that fall under the category of Functional Urban Areas is very small and there are only seven FUA – Badajoz, Cáceres, Mérida, Plasencia, Don Benito and Villanueva de la Serena on the Spanish side and Évora on the Portuguese one.

When looking at national classifications of urban areas, there is also a fairly large amount of small urban agglomeration. So essentially it is possible to conclude that this region is characterized by a low amount of large urban areas that are evenly spaced throughout the territory that is complemented by a large network of small urban areas. And none of the large none of the large urban centres exerts demographic or economic primacy.

From a dynamic point of view, there is an observable tendency is for the FUA population to grow, not only above the ESPON average, but also above the regional average. This essentially means that we could be witnessing a trend where a growing share of the population is concentrating itself in the larger urban areas of the territory, threatening the rural areas' and small towns' viability.

1.2.3. Urban-rural relationships

The urban-rural relationships of this region are marked by a spatial layout that consists of a network of small urban areas that spreads out over a large, predominantly rural, territory. This predominantly rural character of this CBA can be considered a structuring element and is well expressed in a set of indicators. Two major aspects can be highlighted on this subject.

First, the region is market by a well preserved landscape in which there a many natural and semi-natural areas. The share of agricultural areas is also high, and these areas are often explored in extensive type of agricultural units, such as the dehesa-montado system. The significance of primary sector activities becomes also evident by its contribution to the employment and Gross Value Added of the region, and by the high levels of productivity of this sector. The construction of the Alqueva damn might further contribute to the significance of the agriculture in this region by increasing the share or irrigated crops. But, generally speaking, this high productivity tends to be linked to a mechanised and standardised production process which contrasts with the traditional rural lifestyles and rhythms.

Second, there seems to be a significant threat to the more rural lifestyles, as population out of the zone of influence of the larger urban areas has been witnessing a steady decline in the last decade. But, in contrast, the artificial land-uptake has been occurring at a low pace, meaning that the increase of the overall human intervention on the territories and the loss of rural traits that tend to characterise it, are not a very significant tendency.

1.2.4. Accessibility and connectivity

As stated above, this cross border region is marked by overall low densities, to which communication and transport infrastructures and services are no exception. The lack of critical mass in these kind of territories poses a major challenge for developing mobility patterns that do not depend on private and motorized means of transportation, as the reduced economic viability of public transport tends to lead to the suppression of courses and the increase in fares. The low densities also mean that services and goods might often only make sense at a higher regional scale than the one at which they are needed by small population pockets. This, together with the ongoing demographic decline in many parts of the region, further accentuates the need to find intelligent ways of connecting the users with the services and goods they depend upon.

On a broader scale, the (eventual) development of the high-speed railway could be a major asset for the region, as it would increase the connection between regional polls (such as Sines and Badajoz), increase the connection of these poles with other regions and put the region in a strategic position, halfway between Lisbon and Madrid.

1.2.5. Gothenburg and Lisbon / Europe 2020 strategy

Regarding the Lisbon/Europe 2020 strategy objectives, the region is also in a vulnerable position. The first aspect to consider is that the economic situation of these regions is fragile, especially on the Portuguese side of the border. On one hand, all of the NUTS 3 are well below the leading region in terms of GDP per capita on the European level. On the other hand many of them have been diverging, or converging very slowly, from the leading region over the last decade and there are high economic disparities, especially between the two sides of the border. The second aspect is that most of the regions' social cohesion indicators are much worse than the respective national averages. This is especially worrying for the Extremadura, given that Spain already tends to have high values in these kind of indicators (youth unemployment, at risk of poverty after social transfers, etc.). The third is that the public sector plays a greater role in the CBA than in the rest of the countries. The fifth is that the regions' capacity to invest in research, development and innovation is very limited and is reflecting itself on the outputs (e.g. low amount of patent applications).

Regarding the Gothenburg strategy the region performs well. On one hand general indicators, such as ozone concentration, soil sealed areas, pollutant emission or share of Natura 2000 areas all show favourable values. On the other hand, the economic and urban growth patterns seem to be able to keep a certain balance between economic goals, biodiversity and resource usage.

1.2.6. Factor analysis

A major conclusion from the factor analysis is that the NUTS 3 of this CBA perform badly in the main factors that explain good economic performance in Europe. For example, all the NUTS 3 fall below the 20% percentile in the factor that is related to central location and a strong service sector, which has the biggest weight when explaining a region's GDP per capita. In the factor that related to R&D&I, most of the Portuguese regions fall below the 50% percentile, while the Spanish ones fall below the 80%. The regions also keep a relatively large weight of the public sector. And, as can be seen in the factor analysis, a large weight of the public sector is often related to depressed territories, as the public services are more evenly distributed among the territory therefore leading to their overrepresentation in a scenario of a dwindling private sector.

1.2.7. Territorial cooperation: governance framework and institutional mapping

In general terms the cross-border cooperation in this region is high, which is facilitated by structural aspects. In structural terms, the overall political and the planning systems of the two countries show some similarities, and the languages allow semi-communication (reciprocal understanding without being fluent in the respective language). From a morphological point of view, the border does also not represent a major barrier. In terms of the activities that have been developed, there is a large experience in cross border cooperation. There have been several EU programme based projects, currently in particular the INTERREG platform POCTEP, as well as EGTCs and a high amount of city-networks and interregional cooperation initiatives. From an informational point of view, there is an interactive cartography (www.ideotalex.eu) that is accessible online and a joint Atlas (OTALEX). Concerning a common strategic framework, the recent strategic document Euroace 2020 not only gives a comprehensive territorial analysis of the cross-border setting but also defines strategic guidelines and objectives that are ambitious. But one has to admit that this document is the outcome of an outsourced study and has to be concretised and implemented in a political way.

Given this institutional context, the next logic step would be towards a joint transport and territorial development strategy. One could also aim at internalizing some of the knowledge and network capital that is being built by the successive cross-border cooperation projects by giving it more durable institutional arrangements, namely in the context of the already existing bodies with legal personality, such as the Euroace.

1.3. Identified challenges

Portugal and, to a lesser extent, Spain are normally understood as part of the periphery of the European Union, in a geographical as well as a political and economic sense. The border between these two countries is, on its turn, a peripheral region in each of the countries, given that is it relatively far from capital cities as well as the more densely populated coasts. In the European context, the cross border region of the Alentejo-Extremadura can therefore be understood as a "periphery of a periphery".

This peripheral location is a crucial element which shapes this regions' behaviour in many of the analysed dimensions manifesting itself in an overall low density in human settlements, infrastructures and economic activities and a poor capacity in achieving the Lisbon/Europe 2020. This difficulty becomes evident when looking, for example, at the evolution of standard well-being indicators, which show a low GDP per capita,

poor potential accessibility, poor social cohesion, and a tendency for further diverging from the leading region in the GDP growth.

The demographic challenge that affects this region is also a strong menace, especially given its already very low densities. Some of the predictable challenges of this situation include: the satisfaction of an increasing demand of services from an ageing population that is scattered on a large area; the maintenance of general public infrastructures (roads, water, schools, etc.) for a population that would no longer justify them from an efficiency point of view; the viability of ecosystems that rely on human activities; the struggle of economic sectors that could suffer from factors related to an increasing remoteness, such as growing distances to markets, decreasing economies of scale or scarcity of labour force.

But, on a different note, the low densities in population and human activities have also led to a well preserved set of resources whose potential might be explored in the future. For example, the low artificial land uptake means that there is a large share of natural and semi-natural areas, that urban sprawl is not a major issue and that the conflict between different land uses has been kept to a minimum (e.g. agricultural vs. urban land use, economic activities vs. environmental protection areas, etc.). The region also keeps a very good record in the Gothenburg strategy indicators, by having low ozone concentration, low pollutant emission or preserving sustainable ways of exploring resources. The strategic position of Elvas – Badajoz halfway between Madrid and some major poles in Portugal, such as Lisbon or the Silves Seaport, is also an important point to consider, given the potential it arises from a logistical and developmental point of view.

Finally the dehesa/montado agro-silvo-pastoral system can also be considered a significant asset of this region. This system, which strongly shapes the region's landscape in many parts, guarantees high levels of biodiversity and a sustainable use of resources therefore playing a key role in combining economic and environmental concerns.

1.4. Proposed strategies

Although individual strategic guidelines have been developed for each theme under analysis, here only the some of the most important aspects of these strategies have been focused.

The first major strategy tries to deal with the difficulty in dealing with an ageing and stationary population and its consequences. To deal with this situation an intervention on several levels should be envisaged. First, **mitigation strategies** could be adopted to counter this tendency. These strategies could, for example, include the adaptation of immigrant friendly policies or the promotion of pro-fecundity measures in the areas where the share of women in fertile age is still significant. Second, **adaptation strategies could be adopted** to try to deal as best as possible with this situation. This could include planning for the adaptive reuse of many of the childcare facilities and services that will become unnecessary, namely for the elderly. But also, and since infrastructures and services for the elderly will have to be expanded to some degree, it could be interesting to develop them even further and linking them to leisure, wellbeing and tourism in order to attract retirees of other regions or countries.

The second strategy for the region, which is related to the previous one but exceeds its domain, is to try to **establish functional complementarities in services and infrastructures** of the small towns and urban centres and establish **intelligent ways to make them available for the population in the low density areas**. Essentially, mid-sized towns could function as centres of provision of services of general interest, which are thereafter extended to the surrounding low density territories through mobile means and by further adoption of computer mediated communication. In this context cross border complementarities could play an important role (as is already the case in health-care services in this CBA). This strategy could also be of great use if tourism and/or residential functions in rural areas are to be pursued, since this would be a way to allow the provision of amenities that are normally associated with an urban lifestyle.

The third strategy is to **take advantage of the dehesa/montado** as a strategic asset in the promotion of regional products and in creating value added by taking advantage of the increasing search for quality and sustainable products, namely in tourism and agriculture. A cornerstone of this strategy could be the integration of shared products across de border and the establishment of the dehesa/montado as in internationally recognised brand standing for quality, sustainability and authenticity. Regarding tourism, this region has excellent conditions for the tourist flows that occur beyond the mainstream 'see and sun' destinations in search for more authentic experiences. In this context, the integration of shared tourism products into larger networks and/or tour packages should be considered as a way to gain scale. Regarding products from the primary sector, this CBA seems to be able to make products that are produced according to the traditional practices in the dehesa/montado system and there already is a considerable amount of PDOs and PGIs that are linked to this kind of production. But, in parallel to what has been stated on tourism,

it would be nonetheless useful to further increase the visibility of these products. Both, agriculture and tourism, could also benefit from further exploiting the potential of the Alqueva dam.

A fourth strategy could be to **take advantage of the strategic position of the CBA halfway on Lisbon and Sines – Madrid axis**, preparing for the eventual construction of the high speed train connections. This could namely be done by focussing on the joint planning of logistical activities, the attraction of external investment, but also on the eventual increase in meeting and other event related activities. In this context the integration of the two major urban agglomerations that are located close to each other in the border could be an important element: Elvas and Badajoz. The promotion of joint strategies to take full advantage of this strategic position could namely be done using as a framework such as the concept of a **Elvas – Badajoz Eurocity**, with some degree of integration regarding spatial planning, transportation and service and facility provision. This strategy could also be important considering the urban structure of the more remote border regions, which would benefit from the creation of a stronger development pole.

A fifth strategy could be to focus on a **cross-border regional knowledge management**. A strategy in this area could be based on three pillars. The first one would be to strengthen the joint knowledge pool in the fields that are considered strategic for these regions, such as tourism, agriculture or renewable energy sources. The second one would be the establishment of a network approach in order to obtain cross-border cluster effects. This could mean exploring the complementarities in the scientific offer of the higher education organizations, promote joint programs or master degrees and/or facilitate student exchange, namely in subjects most relevant for the regional economy. The third would be related to knowledge dissemination and management. As the relevant knowledge for a particular sector or action tends to be widely distributed, what becomes crucial is to know what is available and how to adapt it to the specific needs of the territory. This means that a competence screening instrument could be promoted, namely by establishing an internet platform (e.g. portal) in order to facilitate the supply of goods, services, competences or workers whenever needed.

Finally, a greater effort to **coordinate environmental sustainability** in the CBA could be made. This does namely be done by integrating policies on the establishment and management of environmental protected areas (often the environmental protection areas still follow administrative boundaries in the border region) and by joint natural resource management, such as water.

1.5. Further steps

Although there is a growing amount of information available, there still are major shortcomings in understanding the cross-border realities in this region. First, there is not much data available on cross-border flows of goods, people and information. It would therefore be interesting to go deeper in this aspect, by understanding the integration of regional markets or the significance, direction and motivation of cross-border commuting, namely to see if it plays an important role in mitigating international labour market asymmetries and, if so, whether the further integration of the transport systems would be justified. The urban-rural relationship at a cross border level could also be object of further study, specifically to understand if the urban areas on one side of the border are being used for service provision or as regional markets for rural areas on the other side of the border.

Second, a more localized and spatial approach to cross-border realities would also be desirable. An approach based on large territorial units, such as the NUTS 3, might contribute for perceiving the relative position of the CBA in the national and European contexts but it says little about the concrete border realities and limits the development of joint spatial development strategies.

Third, and linked to a more localized and spatial approach, there could also be deeper study on how to facilitate cross-border joint service and infrastructure provision to limit redundancies. This could namely be done by analysing the extent, reach and nature of existing protocols (such as the ones that exist for the use of the maternity in Badajoz by users in the border region of the Alentejo) and developing a benchmarking strategy.

Chapter 2 – General overview of the area

2.1. ULYSSES project in brief

ULYSSES is an experimental and innovative project supported by 18 European border and cross-border areas (hereafter CBA) that aims at using applied research results from ESPON as a yardstick for decentralised cross-border spatial development planning. Within this overall framework, a targeted analysis including high-quality, comprehensive and multi-thematic territorial analyses (hereafter MTA), has been performed on six specific CBA across Europe. One of these areas is the WCP.

The MTA has focused on the main topics mentioned by Territorial Agenda of the European Union (EU 2006, 2011), namely (i) cross-border polycentric development, (ii) patterns of urban/rural relationship, (iii) levels of accessibility and connectivity, (iv) effects of demographic change (territorial profile), and (v-vi) level of attainment of Lisbon/Europe 2020 and Gothenburg objectives by the CBA (territorial performance). In parallel, an in-depth statistical analysis focused on the six CBA was performed as well. This analysis included (i) a catching-up analysis; (ii) a principal components analysis, and; (iii) a multiple regression analysis. These analyses have been performed on different scales, so that the indicators of each CBA have been compared on different spatial levels (NUTS III, cross-border, national and EU27/ESPON levels). The data used in the analyses basically included ESPON datasets (e.g. morphological urban areas) and EUROSTAT indicators (e.g. demography indicators), together with additional information provided by local stakeholders.

Additionally, a comprehensive cross-border institutional performance analysis has been included as well in every MTA. This analysis captured the diversity of governance frameworks existing within each CBA by paying regard to both the structural dimension, i.e. the overall framework that can hardly be influenced by the partners of cross-border cooperation, as well as the activity dimension, i.e. the intensity and continuity of institutionalised cross-border cooperation on the regional level.

For the sake of simplicity and applicability, the structural dimension included factors like (i) the political status of the border (e.g. EU membership / historicity, Schengen status); (ii) the planning system (i.e. the planning culture family); (iii) the physical status (e.g. geomorphology), and; (iv) the language barrier (i.e. number of languages existing in the area). These domains have been combined in a synthesis score that allows saying if the borders function as separation, interface or link. In contrast, the activity dimension has taken account of: (i) the historicity of cross-border cooperation in general (i.e. earliest founding date of cross-border cooperation); (ii) the maturity of cross-border cooperation (i.e. INTERREG III participation); (iii) the institutional thickness in cross-border cooperation (i.e. number of permanent institutionalisations); (iv) the current activity (in terms of operative EGTC); (v) the cross-border spatial development on regional level (e.g. joint GIS tools), and; (vi) the existing cross-border transport projects (e.g. TEN-T corridors crossing the border). These domains have been combined in a synthesis score that classified the borders function as integration, cooperation or separation.

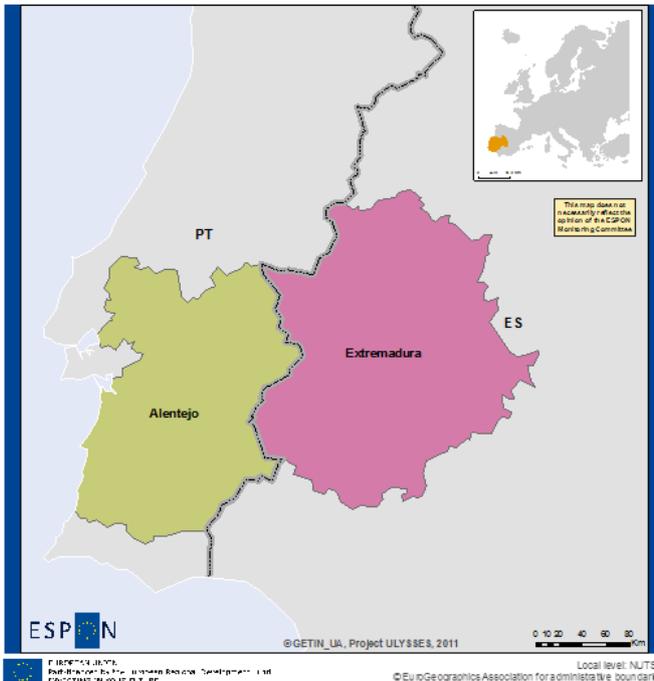
All the above mentioned activities crystallised in a comprehensive diagnosis for each MTA area that was delivered as an annex to the Interim Report of ULYSSES. On that basis, an integrated analysis taking account of previous inputs was performed at a later stage of the project. From a methodological perspective, this integrated analysis adopted the form of a two-phase SWOT analysis that included (i) a status-analysis phase in which the findings derived from previous research tasks were organised and prioritised as main challenges, and; (ii) an action-decision phase in which a response to each one of the identified challenges was proposed as a potential strategy.

Previous ESPON scenarios developed by ESPON 3.2 (ESPON n.d.) were taken into account as well while defining the opportunities and threats linked to any given CBA. In fact, the opportunities and threats identified in the aforementioned research work were contrasted with the scenarios developed by ESPON 3.2. Concretely, (i) the Baseline / trend scenario; (ii) the Danubian Europe / cohesion-oriented scenario, and; (iii) the Rhine-Rhone Europe / competitiveness-oriented scenario and their implications for the CBA under analysis were taken into account while designing the final opportunities and threats.

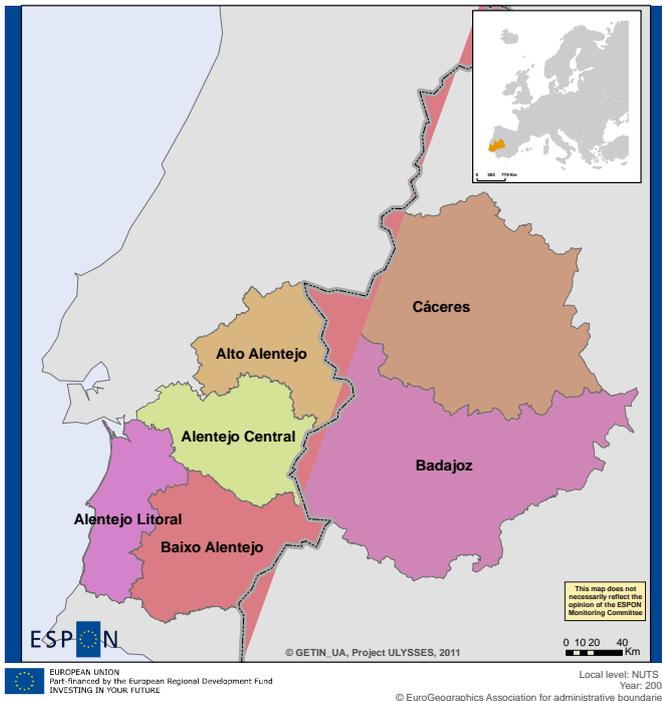
Both the challenges and strategies were discussed and eventually validated by stakeholders of the MTA areas. This SWOT analysis is also seen as the main contribution that ULYSSES may do to the Practical Guide that the Association of European Border Regions will develop in the near future. All in all, the final results of ULYSSES project are fully aligned with the expectations set by the project specifications.

2.2. Area

The Cross Border Area (CBA) of the Extremadura-Alentejo comprises the NUTS 2 of the Alentejo on the Portuguese side and the Extremadura on the Spanish side with their respective NUTS 3. An exception to this is the case of the Lezíria do Tejo, which has been excluded from the analysis on a NUTS 3 level. This is because from a historical point of view this region has never been considered part of the Alentejo and actually has had a completely different territorial development (it has only recently been included in the Alentejo NUTS 2).



NUTS	NUTS name	Area (km ²)
ES43	Extremadura	41634,5
PT18	Alentejo	31551,1



NUTS	NUTS name	Area (km ²)
ES431	Badajoz	21766,3
ES432	Cáceres	19868,2
PT181	Alentejo Litoral	5255,7
PT182	Alto Alentejo	6248,9
PT183	Alentejo Central	7228,8
PT184	Baixo Alentejo	8542,7

In terms of total area this CBA covers a large territory. This is true for the Alentejo, but even more so for the Extremadura, where the NUTS 3 are much larger.

Although there are major differences between the two regions, they come close in a large set of characteristics, which makes the overall challenges they face similar. Both regions are marked, for example, by a peripheral location in the national and European context, by very low population densities, by a city system that lacks weight and hierarchy or by a predominantly rural setting.

Chapter 3 – Demographic analysis

3.1. Concept and definition

It is a common tendency to evaluate the demography of a given population on two levels: a macro and a micro level. The macro level normally considers variables such as the overall size, distribution or age structure. The micro level is more concerned with the dynamic aspects, therefore considering variables such as fecundity and migrations.

Besides the straightforward demographic indicators that are linked to each of these major levels, several other types of analysis have also been performed. The first one was the expected behaviour of the regions' natural population growth and net migration in comparison to the expected behaviour if they would have followed the patterns of the countries of which they are part. For this the national averages were weighted according to the proportion of the regions' population belonging to the different countries in the CBA and afterwards compared to their actual data. The second one was the mobility of the labour force. For this, the share of commuters to other countries and other regions in relation to the total labour force was analysed. Unfortunately the available data is very outdated and only available for NUTS 2, but can nonetheless give some hints on the general trend. The third one was the demographic potential of the different LAU 1/2. This indicator can be used to detect the positioning of the different geographical units of the regions and how the border relates to overall patterns of settlement. The fourth one was the actual effect of the border distance on the demographic growth of the LAU 1/2, while controlling for population density.

All these different analysis have been grouped into two major themes in order to facilitate their interpretation, that do not follow the before mentioned levels. The first one deals with the general demographic trends, such as the overall population of the different regions, its distribution and growth as well as different mobility. The second one is the ageing challenge that the region is witnessing.

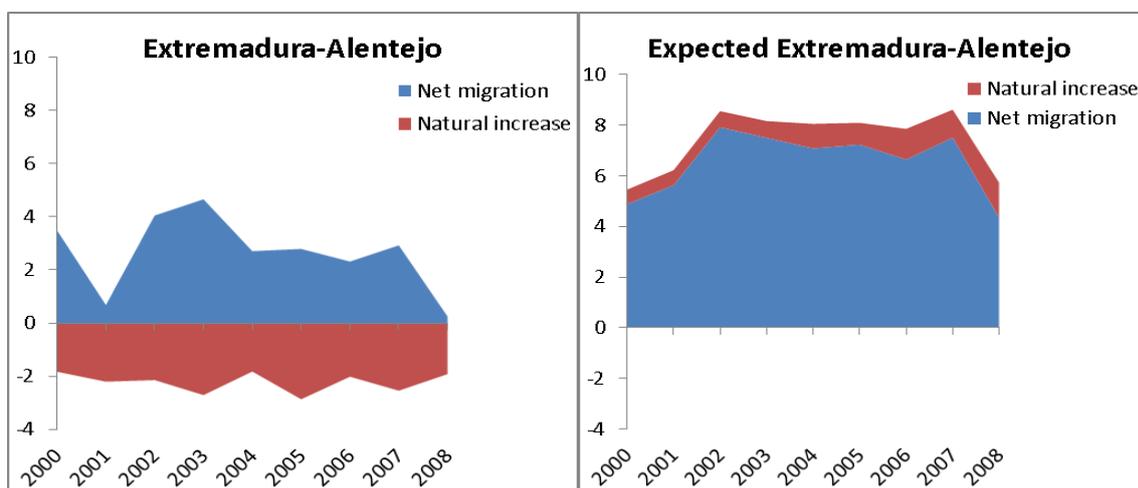
3.2. General trends

3.2.1. Population, distribution and change

In general terms this CBA can be considered a low density territory. With an area of 47144,3 square kilometre (considered on a NUTS 3 level), its total population was only 1837508 in 2009. This leads to an average density of only 25,11 inhabitants per square kilometre, while the Portuguese national average was 115,4, the Spanish one 90,57 and the EU 27 close to 116. The distribution of the population is also fairly irregular, with major densities concentrated around few poles, indicating that a well consolidated settlement structure that contrasts with very sparsely populated rural areas.

In general terms, the population growth from 2000 and 2008 is close to zero in the CBA which is due to low, but positive, immigration rates and especially negative natural growth rates. It is, for instance, interesting to see that in comparison to the expected behaviour if the CBA would have followed the patterns of the countries of which they are part, not only would the natural increase rate be slightly positive, but the net migration rate would be twice as high in most of the years

Figure 3.1. Actual and expected population growth in the CBA



Source: Own elaboration based on Eurostat and Demipher data

But there are major differences on the two sides of the border and, while the Extremadura keeps on growing due to net migration as well as natural increase, the Alentejo is already starting to lose population, even with positive net migration rates. Essentially, one can conclude that the increase in the average life expectancy as well as the recent positive migration rates (at least between 2000 and 2008) are no longer enough to guarantee a stable population in most of the CBA.

On a lower geographical level, the LAU 1/2 of the CBA also show rather different patterns. While the Portuguese side of the border is essentially devoid of any significant demographic dynamism, some of the municipalities on the Spanish side show signs of natural growth and the capacity to attract population. The

different growth rates, as would be expectable, are also related to higher densities meaning that the LAU 1/2 around the major urban centres tend to grow, while many of the less densely populated municipalities face population stagnation or decrease.

It is also interesting to see that many of the growing municipalities on the Spanish side are close to the border, concentrating in the Badajoz, Merida, and Cáceres triangle. This observable trend is also corroborated from a statistical point of view, where there no significant relation between population growth and the border distance of the different LAU 1/2 has been detected. On the Spanish side these two indicators are even positively correlated, while on the Portuguese this correlation is negative, but not statistically significant. This means that while the remote position of this area on the European and national levels might be relevant for explaining its low demographic dynamism, on the local level no border effects are identifiable.

Considering the distribution of the demographic potential in this region two conclusions can be drawn. The first one, is that the demographic potential is slightly higher around the arteries that link the major urban agglomerations of the CBA to big cities in neighbouring regions, specially on the Spanish side (such as the A66 and specially the N430), showing a tendency for the population to concentrate itself around an overly well consolidated urban system. The second conclusion is that the major variations in the demographic potential seem to be structured according to a wave pattern from the countries' capital cities throughout the regions. This wave pattern leads to poorer results in the more remote areas, which includes the border regions, but is by no means limited to them.

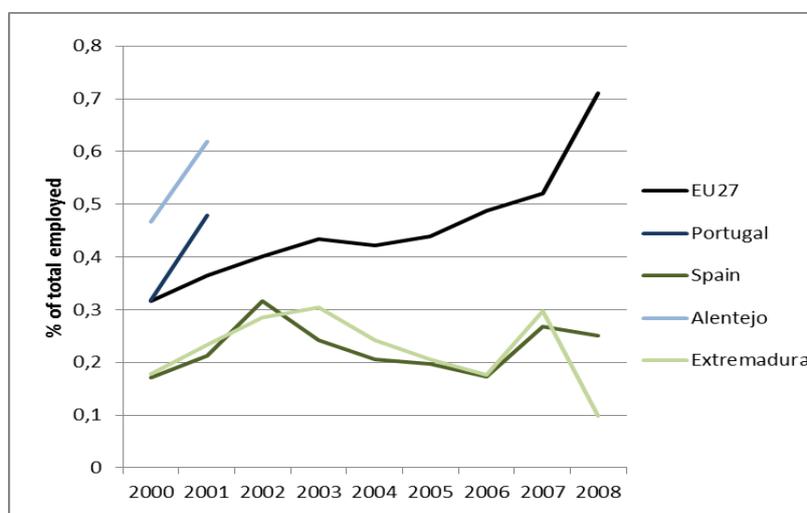
3.2.1. Labour force mobility

Another relevant aspect for the demography of these regions is the labour force mobility. In fact, according to Marvakov and Mathä (2007), as the general policy options for dealing with national and regional disparities are being reduced (such as currency devaluation), there is a growing concern that other adjustment mechanisms function well. In this context, labour force mobility might be an efficient way to deal with labour market inequalities through migration on one hand and commuting on the other.

Concerning migration, the data that is available indicates a generally high level in the Extremadura and a low one in the Alentejo. Concerning the immigrants that seek residence permit by LAU 1/2, there are many municipalities in the Extremadura where they amount to more than 2,15% of the total residents, while most of the Portuguese Municipalities are well below that limit. There also appears to be tendency for these requests to be relatively high on the bordering regions, suggesting that either these regions have an influx of Portuguese migrants, or that their high dynamisms attracts other foreigners.

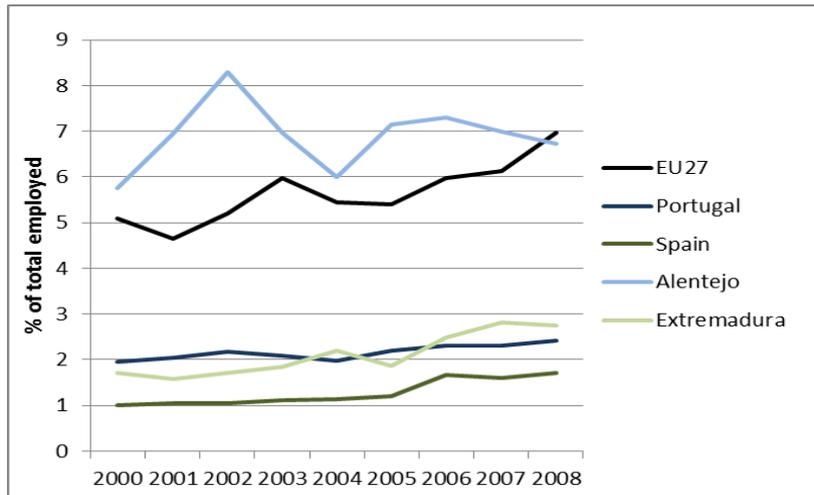
Concerning commuting, the overall levels tend to be high for the Alentejo and low for the Extremadura. Probably, the high values of the Alentejo can, on one hand, be explained by its proximity to Lisbon, whose metropolitan area extends arteries that reach some of the NUTS 3 of the CBA. On the other hand, the Alentejo region also has greater share of its total employed persons that seek work on the other side of the border (although, unfortunately, this data is only available for 2000 and 2001 for the Alentejo). The Extremadura, on its turn, seems to be more attracted by other, more developed, Spanish regions.

Figure 3.2. Commuters to foreign countries by total employed 2000-2009 by NUTS 2



Source: Own elaboration based on Eurostat data

Figure 1.3. Commuters to another region by total employed 2000-2009 by NUTS 2



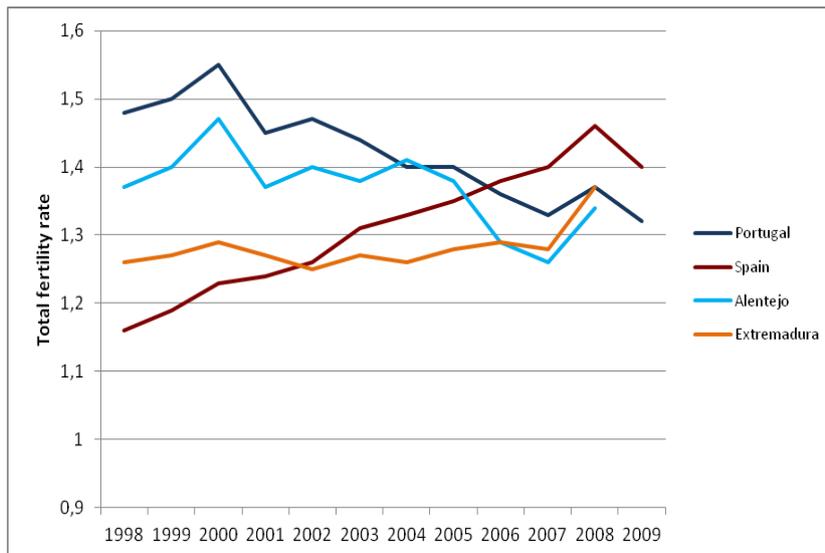
Source: Own elaboration based on Eurostat data

3.3. Ageing challenge

According to the ESPON Demipher Project, the NUTS 2 of the Alentejo is classified as a challenge of ageing region, while the NUTS 2 of the Extremadura is a challenge of labour force region (ESPON & NIDI, 2010: 10). This typology, which is based on age structure but also on growth rates, sheds some light on one of the major challenge these regions face on a demographic level: the difficulty to induce natural population growth or to attract population.

In fact, when analysing the age structure, it sticks out that this CBA has been facing a significant ageing process. Considering, for example, the dispersion between the old age dependency and the young age dependency, most of the NUTS 3 are significantly above the national averages in the old age dependency and significantly below in the young age dependency. This is especially true for the Alentejo, since in the Extremadura the old age dependency rates are significantly lower and, in the case of the Badajoz NUTS 3 the young age dependency rates are higher.

Figure 2.4. Total fertility rate 1998-2009 by NUTS 2



Source: Own elaboration based on Eurostat data

As would be expectable, the total fertility rate of the CBA is also very low, but with very different tendencies on each side of the border. The Extremadura, following a similar pattern as all of Spain, started from very low rate in the late nineties, and from then on witnessed a steady increase. The Alentejo, on its turn, started from a much higher position, but has recently witnesses a major decrease. Some of the decrease in the

Portuguese region is probably a consequence of postponement of child birth and therefore a slight rebound is expected to occur in the next few years.

Nonetheless, there are clear signs of a negative momentum of population growth, especially in the Alentejo. In fact, most of the municipalities of this CBA have a very low share of women in fertile age. And, as pointed out by Lutz et al (2006), very low fertility, death or migration rates in past periods of time, might lead to a reduced amount of women in reproductive ages, which will in turn lead to a shrinking population even if the fertility rate would rapidly rebound to replacement levels. This dynamic, means that even if pro-fecundity policies were to be adopted, their capacity to invert the population decline would be very limited. And, considering the institutional context of the two countries (characterized, for example, by difficulties in balancing work and household activities), the high youth unemployment rates and the age pyramids, there are limiting factors for a hypothetical increase in the total fertility rate. The low economic development of these regions might further constitute an obstacle as, according to Luci and Thévenon (2010), total fertility rates tend to decrease with increases in the GDP until a certain level, where they experience a rebound given favourable institutional contexts.

But the way in which the ageing challenge is felt in the CBA is by no means homogeneous. When looking at the share of women in fertile age, as well as natural population growths, there is a major divide not only between the different sides of the border, but also between the more and less densely populated municipalities in each side of the border.

Chapter 4 - Polycentric Development

4.1. Concept and definition

Polycentric development is a long stated goal in many of the European as well as country level strategies for urban development. Recently, the Agenda of the European Union 2020, once again reiterated the importance of this concept by stating that a “polycentric and balanced territorial development of the EU is key element of achieving territorial cohesion”. Further this document stated that “where the most developed cities and regions within Europe cooperate as parts of a polycentric pattern they add value and act as centres contributing to the development of their wider regions” (EC, 2011). It is therefore only natural that several large scale projects have been developed at the European level to understand this issue.

In the ESPON programme a core concept of the projects concerned with this theme is the Functional Urban Area (FUA). The data used here was developed by the ESPON 1.4.3 and is a review from the ESPON 1.1.1., in order to develop a methodology that was independent from national classifications. This classification is done by identifying a Morphological Urban Area (MUA), which is essentially a cities' core, to which a commuter catchment area is attached.

Regarding the methodology, it is important to keep in mind that polycentric development is a fairly elusive concept that poses several challenges. The first one is that it is not possible to grasp it if not in relative terms. Therefore, and according to the ESPON 1.1.1 (ESPON, 2005), the distinction between monocentric or polycentric areas cannot be made in a dichotomous manner, and polycentricity should be measured by scoring an area with a value ranging from more monocentric to more polycentric. The second one is that polycentricity is very scale dependent; meaning that on different levels the same region can fit into different categories. This problem has also been approached by the ESPON 1.1.1, by adopting different measures for different scales (rank-size distribution for the national or ESPON space levels or mono and multi-nuclearity for the FUA level). But there keep on being unquestionable difficulties in evaluating polycentricity at lower geographical scales. A third aspect is that polycentricity has a twofold nature: morphological, laying out the distribution of urban areas in a given territory; relational, based on the networks of flows and cooperation between urban areas at different scales/levels (Ibid.). While there is some data available regarding morphology, there is not much information available to understand the dynamic aspects of the city systems. Although some attempts to differentiate FUA according to their functional specialization have been made, the analysis of how the different urban agglomerations articulate themselves and interact with their surroundings cannot be soundly made on a broad scale.

4.2. Functional Urban Areas

4.2.1. General characterization

The FUA of ESPON 1.4.3 that can be considered to be part of this CBA are: Badajoz, Cáceres, Mérida, Plasencia, Don Benito and Villanueva de la Serena for the Spanish side of the border and Évora for the Portuguese one. The overall size of the FUA ranks from Badajoz, which in 2006 had 177.279 inhabitants and

Villanueva de la Serena which had only 24.932. Generally speaking, the population living in FUA is extremely low, as it reaches only 31,2 % of the total population of the region, while at the national levels Portugal has about 75% and Spain as much as 83,7%. This is especially true for the Portuguese side of the CBA which, while having similar population densities than the Spanish side, has a much inferior amount and size of FUA.

Although the city system shows some difficulties in achieving scale and hierarchy (meaning a high amount and large sized urban areas) the existing cities appear to be well consolidated. On one hand, the FUA are quite compact, with high shares of population that live in the urban core (MUA) in proportion of the total FUA population (e.g. the compactness is well above the average of the total FUA of Portugal or the ESPON space but still below Spain). On other hand, between 2001 and 2006 the FUA of this CBA have been experiencing considerable growth rates (close to 10,2%), that are not only above the ESPON average, but also above the total regional population growth. This means that this region seems to be witnessing an ongoing urbanization process, implying that a growing share of the population is concentrating itself in a small number of large urban areas.

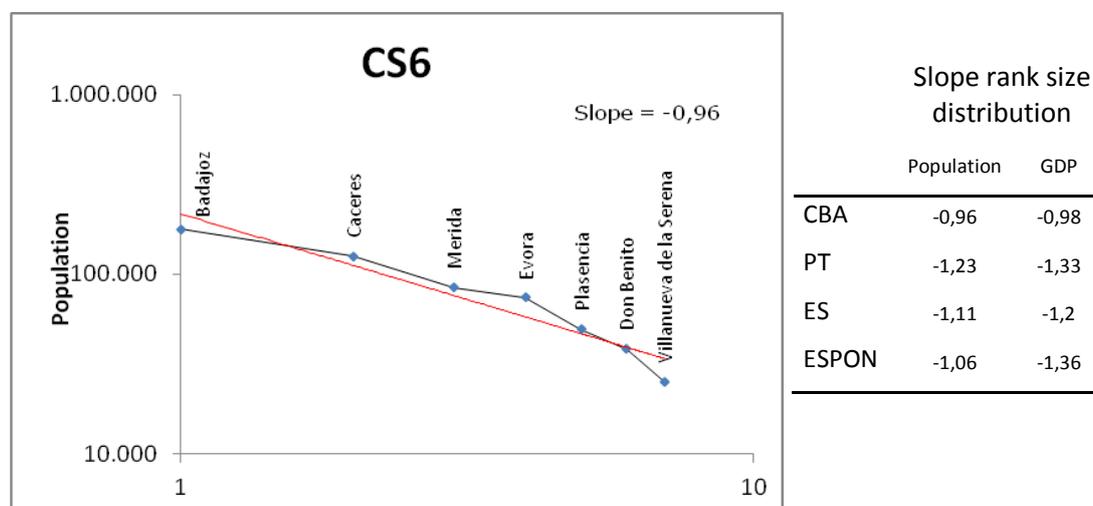
The spatial layout of the FUA also allows for the identification of two major urban axes that follow, or are being followed, by the major transport arteries. The first one is a vertical axis along the A66 that links the FUA between Plasencia and Mérida/Badajoz, and that runs almost parallel to the border. The second one is the horizontal axis that links Évora and Villanueva de la Serena along the N430/A6, which is more interesting from a cross-border perspective.

4.2.2. Rank size distribution

A way to understand the mono/polycentricity of a given region is by measuring the relation between the rank the city occupies in a given region and its population or GDP. Several indicators can be drawn from this kind of relation. The first one to be considered here is the so-called rank-size equation. If the estimated relation holds, the size distribution of cities follows a statistical log-linear distribution. The slope of equation, given by the estimated β , indicates the level of hierarchy, and thus the level of polycentricity within a region: the lower the absolute value of estimated β , the higher the level of polycentricity. For the total ESPON countries' population, the FUA slope of the regression line is $\beta = -1,0521$, which is very close to -1, the value corresponding to the regularity known as Zipf's law. Although following an expectable distribution, it is interesting to see that the city system of the ESPON countries lacks hierarchy at the upper end of the rank size distribution.

In the CBA, the slope of the rank-size distribution for population is -0,96, and therefore very similar to the ESPON average, but below the Portuguese as well as the Spanish values. This means that, while on a national level both countries are lacking medium sized cities, and move very fast from small ones to the big metropolises such as Barcelona, Madrid or Lisbon, in the CBA there is a more balanced hierarchy. The rank size distribution of the FUA's GDP, is also more balanced in the CBA than the countries as a whole or the ESPON space. While the CBA essentially maintains the same slope as for the population, the slope of the national and ESPON levels are significantly above.

Figure 4.1. Rank-size distribution of the FUA population, 2006

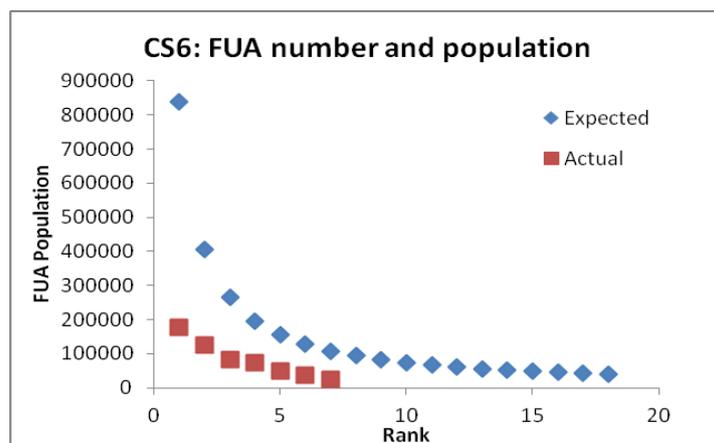


Source: Own elaboration based on ESPON FUA database.

We can therefore conclude that at the European tendency for wealth to concentrate itself above what would be expected by the concentration of population is not followed in the CBA. In fact, on the ESPON level, there is a clear tendency for large metropolises in the pentagon to excel economically, while there is a lack of medium sized poles to counter-balance. Portugal also shows a very steep line, which reflects the economic dominance of its few large metropolises, such as Porto and Lisbon, over the rest of the territory. Spain, on the other hand, has a less steep slope, indicating a more polinuclear economic development in its city system.

Another interesting perspective is given by comparing the rank size distribution of the region's FUA to the overall distribution. For this exercise, rank-size coefficients were estimated considering the FUA at the whole ESPON countries. The actual rank-size distribution of the relevant NUTS II is thereafter compared with what would be expected if the regions would follow the ESPON distribution, showing us what would be the expected amount and size of the FUA in a region according to its total population.

Figure 4.2. Rank-size distribution of the FUA population, 2006



Source: Own elaboration based on ESPON FUA database

As can be seen by this distribution, this CBA not only lacks hierarchy (meaning FUA with considerable size), but also lacks an overall amount of FUA. Regarding hierarchy, its largest FUA, which has below 180.000 inhabitants, is much smaller than the 850.000 it is expected to have. Its population actually comes closer to what would be expected for the fourth FUA in the ranking. Regarding the amount of FUA, this CBA actually only has about one fifth of the FUA it is supposed to have (7 instead of 33). Since the expected FUA rank-size distribution of the FUA is based on population, and not territory, this essentially means that this region's population is much less urban and even the urban population is distributed over a large amount of small urban agglomerations leading to overall high levels of polycentricity, but at a very low level.

This polycentric layout also becomes clear when taking into consideration the primacy rate, which measures the degree to which the largest city dominates a given city system. The primacy rates for population and GDP are very low in this CBA, when compared the national primacy rates of Spain and, particularly Portugal. This situation might be related to the absence of regional administrative unity, which means that there is no capital city that could concentrate much of its political, social and economic activities

4.2.3. Location Index

Another indicator to evaluate the polycentricity of a city system is the spatial distribution of the FUA. For this, the Gini coefficient of the thiesen polygons were used, in order to measure how the FUA are spaced throughout the region: a number closer to 100% means greater inequalities in the FUA distribution while lower percentages means the FUA are more evenly spaced. For this indicator, the polygons were produced based on the ESPON 1.4.3 FUA layer (made available by the ESPON DB 2013) so that the limits of the polygons are established exactly midway between two FUA. As stated by the ESPON's 1.4.3 Final Report (March 2007, pp. 230) this measure implicitly evaluates the overall distribution of the population, and has also the problem that it attributes the same weight to all the different FUA and does not reflect the actual influence of a city. It should, therefore, be essentially understood as a way to evaluate whether the minimum amount of services that an urban agglomeration can provide is accessible throughout the region.

When compared to the national averages, the Gini coefficient of this CBA is fairly low. Although the polygon associated to the Évora FUA is much greater than all the others, the fairly equal distribution on the Spanish

side of the border is enough to counterbalance this. It is particularly interesting to see that the region does not follow the overall tendency in Portugal and Spain to develop a dense urban network in the coastal areas, while in the interior this network becomes very loose. On the contrary, the CBA even concentrates the major urban areas in the interior.

Chapter 5 - Urban-rural relationship

5.1. Concept and definition

It is a commonplace to say that rural and urban areas are more and more indistinguishable. In fact, we have been witnessing to changes in the structural dimensions of social life that were at the base of urban and rural lifestyles. These changes are related to growing mobility, the dematerialization of interactions or the spread of urban areas as well as urban patterns of consumption, production and social reproduction. It has also been pointed out that these concepts have a necessarily dichotomous and circumstantial definition, meaning that in a given context rural is what is not urban and vice-versa. Nonetheless, and even admitting a large and essentially blurred intermediate zone, these two concepts are still at the base of an archetypical categorization that engenders abstract social references as well as concrete spatial realities. The growing concern with the ecological footprint of human activities, and the large amount of EU funding that goes into typically rural areas, further highlight the need for conceptual frameworks that contribute in understanding the relation between different institutional and territorial layouts. Thus, the study of the urban-rural relationship is an important aspect in structuring the way in which we occupy, manage or plan the territory.

Although the urban-rural relationship has been subjected to some study, namely in the ESPON program, there still is no data available on the EUROSTAT or the ESPON to actually evaluate the interaction between rural and urban areas (meaning the flow of people and goods as well as computer mediated communications). The focus in this project was therefore on structural indicators, such as land use patterns and economic sectors. Although it is possible to get land cover data on a very low geographical scale from the Corine Land Cover, indicators such as employment and economical patterns are only available at a NUTS 3 level. The typologies established by the ESPON and by the Eurostat, are also only available at this broad scale, limiting the ability to link the indicators with rural or urban areas in any significant way. A short analysis of the network of small urban areas that cover the territory was also included as, according to the Territorial Agenda of the European Union 2020, small and medium sized urban areas play a crucial role in rural areas for providing services and infrastructures at a local level.

5.2. Urban and rural areas

The ESPON 1.1.2 typology regarding urban and rural regions is based on three indicators: land cover, population density and the presence/absence of a FUA. According to different combinations of these indicators, NUTS 3 have been classified as having high or low human influence (population densities) and urban intervention (land cover). According to this typology, most of the NUTS 3 of this CBA are considered to have low urban influence and medium urban intervention. Only the NUTS 3 of the Alentejo Litoral and Cáceres have low human influence and low human intervention. Another typology has been developed by the Eurostat, revising an OECD typology, in which the major criterion was density. According to this typology, all of the NUTS 3 are considered to be predominantly rural.

Regarding the urban areas, and from what has become explicit in the polycentricity analysis, the region lacks a significant amount of large urban areas. But, and since the ESPON Database has only considered urban areas of a significant size, national studies on each side of the border show that both regions have a large amount of small cities. One can therefore conclude that the spatial layout of this CBA is essentially marked by a network of small urban areas that spreads out over a large, predominantly rural, territory, where they can function as anchors for population, services and infrastructures.

5.3. Land use

One of the central aspects (or arguable *the* central aspect) of the urban-rural typology is the difference in land use and land cover patterns. An intrinsic feature to urban areas is the high amount of artificial land cover, which includes residential and tertiary areas as well as transport corridors or industrial areas. The rural areas, on their turn hand, are characterized by a significant presence of agricultural areas as well as natural and semi-natural land cover. An interesting tool for analysing this issue is the Corine Land Cover survey, which has been applied extensively throughout Europe and for different years (CLC 1990, CLC 2000 and CLC 2006). It therefore is a good way to understand, not only the overall land use patterns, but also the major trends that are occurring.

5.3.1. Agricultural areas

The agricultural areas of the CLC include: arable land, permanent crops, pastures and heterogeneous agricultural areas. The share of these types of areas in the CBA is relatively high. Most of them are clearly above the ESPON as well as the national average. In 2006, the NUTS 3 which has the highest value is the Baixo Alentejo (74,4%), followed by the Alentejo Central (69,59%). The regions which have the lowest share of agricultural areas are the Alentejo Litoral (38,87%) and Cáceres (43,28%).

From a diachronically point of view, the amount of agricultural areas tend to diminish in this CBA between the CLC 1990 and the CLC 2006. The same phenomenon is also observable at the national levels, although at a very different pace: Portugal is losing much more agricultural areas every year than Spain while the ESPON space as a whole has been slowly increasing the share of agricultural areas.

Of the several uses to which the agricultural land is lost, one of the most important is the artificial land use¹. This is because it increases the overall human intervention on the territories, and goes hand in hand with a loss or rural traits of the territories. But, generally speaking, the share of agricultural land that is lost to this kind of land cover is very low throughout the CBA and even the region in the artificial uptake of agricultural areas is the greatest (the Alto Alentejo), the figures are well below the national averages as well as that of the total ESPON countries. Therefore, the agricultural land loss in this CBA seems to be only slightly related to the growth of artificial surfaces, and more to their abandonment or the uptake of forests or semi-natural areas.

Another important aspect of the land use in the Alentejo and the Extremadura is the widespread adoption of the *dehesa/montado alentejano* type of explorations to deal with the relatively poor soils and tough climate condition. The areas that fall under this category are normally associated with a strong complementarity of pastures, forestry and crops (normally cereals), and have revealed some resilience over the decade as a large share of land is still covered by this *agrosilvopastoril* system.

5.3.2. Urban areas

From the CLC point of view, the urban areas are divided into two categories: continuous urban fabric and discontinuous urban fabric. They comprise areas that are mostly covered by buildings, roads and artificial surfaces, although some vegetated areas and bare soil are admitted.

The urbanisation of other type of land uses has been subject to a broad discussion on the European level, namely in what constitutes the sustainable growth paradigm. In the NUTS 3 of this CBA this seems not to be a major issue. Noticeably, all of them have witnessed increases in the formation of new urban fabric between the CLC 1990 and the CLC 2006 which are well below the national averages of their respective countries. The region in which the urbanisation has moved fastest is the Alentejo Litoral. This region is also the one which has witnessed the greatest urbanisation of natural and semi-natural areas, which could be linked to the tourist attractiveness of its coastal areas.

5.4. Weight of the primary sector

Another aspect that is typically related to rural areas is the employment and Gross Value Added (GVA) in primary sector activities, namely agriculture and fishing. In this CBA which is considered to be predominantly rural, this association seem to be justified as most of the NUTS 3 of this region have a share of employment and GVA in these sub-sectors that is well above the national averages.

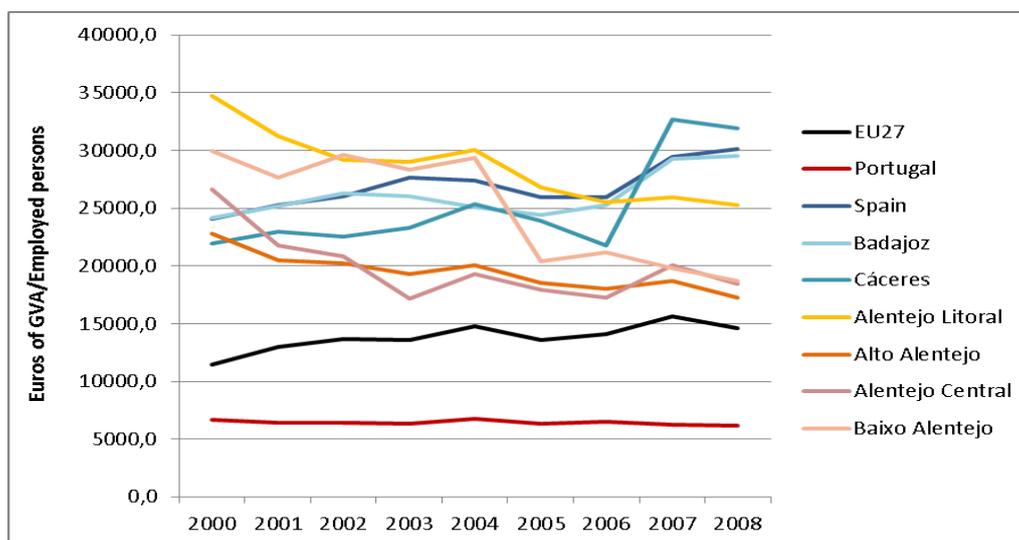
In 2008, on the Spanish side of the border, Badajoz had a share of persons employed in agriculture and fishing that is three time that of the national average, while Cáceres has almost double. But both of these regions have witnessed a major decline in this share from 2000 to 2008.

In the Portuguese side, only 3 of the regions are well above the national averages (Baixo Alentejo, Alentejo Litoral and Alto Alentejo), while the Alentejo central is in line with the national figures. But, contrary to the Spanish regions, there is an overall tendency for an increase of the share of employment in these subsectors, which is particularly strong in the Alentejo Central and the Baixo Alentejo. This tendency could be related to the construction of the Alqueva Dam, which has increased the capacities for irrigating many of the agricultural areas that surround it.

¹ The artificial land use includes urban fabric, industrial, commercial and transport areas, mine, dump and construction sites and non-agricultural vegetated areas.

Considering the GVA, the relative importance of these economic subsectors is even more visible. Although they have been experiencing a major decline from 1997 to 2008, they still manage to be well above the national averages and even the regions with the lowest share (C aceres) still doubles the national values.

Figure 5.1. Labour productivity in agriculture and fishing, 2006



Source: Own elaboration based on ESPON FUA database.

Considering the labour productivity in the agriculture and fishing, all of the NUTS 3 perform considerably well. Despite their low densities (or maybe precisely because of them), the large size of the agricultural enterprises and a growing mechanization of the production processes, have led to a competitive primary sector in both of sides of the border.

This is particularly interesting for the Portuguese regions, since this country's overall values are much lower than the European ones. Still, when compared with the Spanish side of the border, the NUTS 3 in the Portuguese side have lower values and are witnessing major decline from 2000-2008, while the Spanish regions have been increasing their productivity in this sector.

Chapter 6 - Accessibility and connectivity

6.1. Concept and definition

Accessibility and connectivity are a central aspect in the way human activities are laid out in the territories. In fact, the steady increase of the mobility and the transport infrastructure in the last decades, led to a situation where the structuring nature of different accessibilities becomes very evident. Essentially, and according to Hansen (1959:73), the more accessible a given area is to central functions, the more likely it is to be subject to urban growth. But accessibility is a forcefully relative concept: a region's accessibility is not an inherent trait, but a consequence of its position in the broader territory. As the mentioned author puts it, "accessibility is a measurement of the spatial distribution of activities about a point, adjusted for the ability and the desire of people or firms to overcome spatial separation" (Hansen,1959:73).

Connectivity, on its turn, functions according to a very different logic. While accessibility is an essentially spatial matter, connectivity refers precisely to the capacity to overcome the spatial nature of interactions. Although still dependent on the strength with which a region is linked to communication networks, once this connection is established the traditional time and space constraints are fundamentally challenged.

For measuring accessibility the most important indicator that was used was the potential accessibility by different modes of transportation that has been developed by the ESPON 1.2.1. This indicator has further been updated in 2006 and re-calculated for fitting the then ruling NUTS 3 delimitation retroactively for 2001 and is therefore available for two different and comparable years. This is particularly useful as this indicator does not limit itself to measuring the transport network, but synthesizes the overall accessibility of the regions by relating the travel time (impedence function) with the population that can be reached (activity function). Another perspective can be gained by looking at the transport infrastructure and systems in themselves. But data for this is not readily available at the ESPON database, as much of it is very outdated and available mostly for the 1999 NUTS version.

As for connectivity, there is normally a great lack of information. Even straightforward indicators, such as internet connections by household, are often difficult to come by, as the Internet Service Providers are reluctant to share this type of strategic information. Another issue is that the data is often not disaggregated at the regional level, therefore allowing international comparisons. Therefore, only two indicators on connectivity were included in this report: a composite indicator on the internet infrastructure was collected from the ESPON database and the percentage of households with broadband internet connection from the 5th Cohesion Report.

6.2. Accessibility

6.2.1. Infrastructure

The general railway development in this region is very limited, with a predominantly one line and non-electrified infrastructure and poor daily connections. There are two railway border crossing between both sides of the border in this CBA: one in the north, linking Marvão-Beirã to Valência de Alcântara and the second one linking Elvas to Badajoz. The first one is served by the Lusitânia Comboio Hotel, which is a night train going once a day from Lisbon to Madrid. The second has also one daily connection, but by a daytime regional train.

As for the road infrastructures, the network of the major roads is relatively loose, but this is only natural given the low densities. If we look at the Extremadura, for which more detailed data is available, one can even conclude that it is fairly well served with high speed road networks. In this region, the kilometres of high speed roads per square kilometres have been increasing steadily in the last two decades, and now the region has a ratio which is more than half of the national average, while its population density is less than one fourth.

In Portugal the high speed road length was only available from official sources for the district level. Although there is no exact match with the NUTS 3 areas, it is still possible to get an approximate idea on the density of the network. The main point that to retain from this data is that all the 3 border districts (Évora, Beja and Portalegre) are below the national averages, which, once again, is in line with the low population densities.

The Extremadura and the Alentejo share 3 main road border crossings: Marvão-Valencia de Alcantara, Campo Maior-Badajoz and Caia-Badajoz (located at the main axis around the A6/A5 that crosses almost the whole CBA). In terms of daily traffic, the most important of the 3 main border crossing of the CBA is Caia-Badajoz, which is estimated to have about 8105 cars crossing each day and about 1797 trucks. This means that this border is one of the busiest borders in all of Portugal, only surpassed by the Vilar Formoso - Fuentes de Oñoro and the Monte Francisco-Ayamonte border crossings².

6.2.2. Potential accessibility

According to the ESPON 1.2.1, the potential accessibility is an indicator that relates the activities to be reached with the travel time it takes to reach them. For each NUTS 3 of the ESPON space the potential accessibility was obtained by relating the travel time between the centroids through different modes of transportation with the population (road, train and air).

Given that the potential accessibility relates travel time with population that can be reached, the low density and remoteness of this territory does in itself set a strong limit to the score they could have. It therefore comes as no surprise that the regions potential accessibility by the different modes of transportation is well below the ESPON space average.

The mode of transportation in which the CBA performs worse is the rail. Both Spanish NUTS 3, as well as the Alto Alentejo have around 20% of the average of the ESPON space and the lower Alentejo regions have values that are even lower. If one considers that the central European countries tend to have much better developed railway networks, this result is not surprising.

The changes of the potential accessibility for this mode of transportation diverge between the different NUTS 3: the regions with the highest values are also the ones which have witnessed a positive change in their relative position, while the regions with lower values decreased their relative position. If it were to be performed in more recent years, this indicator would probably have a negative evolution in the interior Alentejo regions, which have witnessed the closure of many the regional train connections and the complete

² The main infrastructure used in the passenger traffic between Portugal and Spain is the road, which is used by about 94,6% of all the passenger flow. The road is also used by about 85% of all the freight flow between these two countries (the remaining is essentially transported by sea).

abandonment of some of its railway lines. An interesting perspective is also given by the high speed train development in this region, which has been progressing on the Spanish side, although in Portugal the political discussion of the project is on-going.

In the potential accessibility by road, this CBA performs much better. But even the best performing region (Badajoz) has little more than one third of the ESPON space average. Internally, once again the northern regions are the ones with the highest values. From an evolutionary perspective, all the NUTS 3 have been able to improve their relative position.

6.3. Connectivity

As stated in the methodology, there are not many indicators available to evaluate the connectivity at the regional level. Nonetheless, the two analysed indicators show that the connectivity levels of this CBA are low. In 2009, in the NUTS 2 of the Alentejo only 37,14% of the households have a broadband internet connection. In the Extremadura, these values are slightly higher (39,39%) although it still is the lowest ranking NUTS 2 in all of Spain. For the composite internet infrastructures³ the values of this CBA are also very low. In 2008, the Alentejo has a value of 0,13 and the Extremadura of 0,01, while the Portuguese average is 1,28 the Spanish one 1,91 and the ESPON space 2,65.

Chapter 7 - Gothenburg and Lisbon/Europe 2020 strategy

7.1. Concept and definition

The common framework set for the future development of the European Union is essentially based on three pillars: an economic one, a social one and an environmental one (added to the original goals of the Lisbon Strategy by the Gothenburg Council in 2001). In the centre of this three pillars is the often cited goal of making the European Union “the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion” (Lisbon European Council conclusions, March 2000). The pursuit of this goal is envisaged through a broad set of reform which range from the labour market, to the Green House Gas emissions.

In order to monitor how the different countries are adapting themselves to the goals of this strategy, a battery of indicators has been agreed to by the member states for each of these main pillars. This battery of indicators has been used as a reference in this analysis, although changes were made for two reasons. The first one was that not all the indicators that have been selected at the national level are available at the regional one (e.g. energy intensity of the economy). The second, was that some other indicators are available that are helpful in shedding a light on the regions capacity for developing itself in a sustainable way. For analytical purposes, these indicators were divided into four different categories: economy and employment, innovation and research, social cohesion and environment. While most of the used indicators are straightforward, some deserve further explanation.

The analysis of the regions' wealth was made from a threefold perspective: to evaluate the regional inequalities in wealth distribution; to point out the regions' actual position in the European context; and to understand their relative performance over the last decade. The data used for this analysis was the GDP per capita for the years 1997 and 2008.

The regions' position and performance was evaluated by two procedures:

- To compare each NUTS III with the leader, in terms of GDP per capita, through index numbers;
- To establish the relative performance of each NUTS III to the leading region, exploring the notion of territorial catching-up through a standard logistic process.

The regional disparities were evaluated by the coefficient of deviation of the GDP per capita. This indicator is obtained by calculating the ratio of the standard deviation to the mean, and therefore a good way to compare the distribution of geographical units which differ greatly on their average. As a reference the coefficient of deviation was included for the countries of which the CBA is part as well as for the whole NUTS 3 and NUTS 0 of the ESPON space (EU7+CH+NO for the N0 and only EU7 for NUTS 3).

³ Composite indicator on the Internet infrastructure, calculated as the average of the following Internet infrastructure indicators: international Internet backbone capacity, peak traffic at IXPs and IP addresses all at the regional level

For the environmental analysis, data from the ESPON climate project, from the European Commission's 5th Cohesion Report and from the European Pollutant Release and Transfer Register was used. This data was afterwards complemented with data from other local sources, namely the OTALEX Atlas.

While the environmental data from the 5th Cohesion Report and the other sources is easily understood the data of the ESPON Climate project is obtained through a fairly complex methodology. The indicators that were used refer to the regions' sensitivity to climate change. The sensitivity is defined by the project as being the "degree to which a system is affected, either adversely or beneficially, by climate related stimuli" (ESPON climate project, 2011: 4). The climate change data was obtained from the CCLM climate model, which compare the future period 2071-2100 to the reference period 1961-1990 for the scenario A1B.

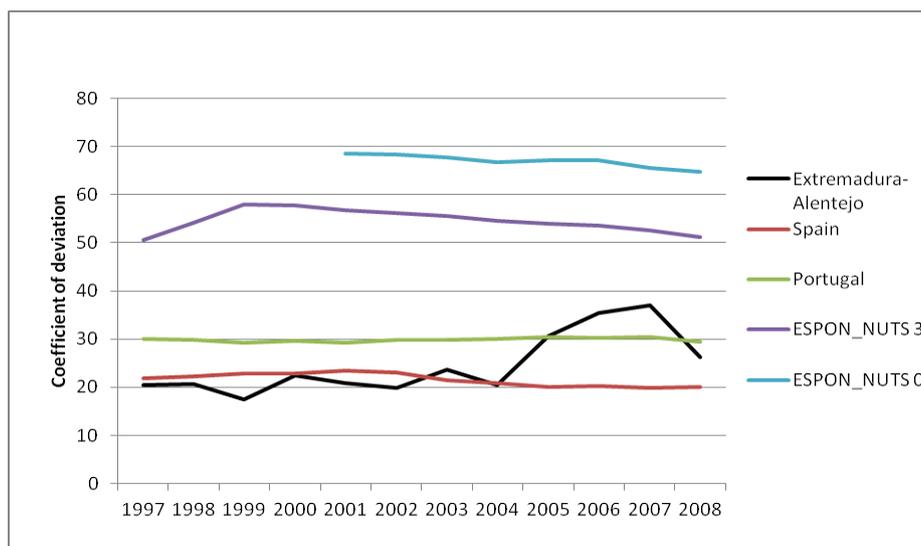
The combination of the different impacts the climate change has on a regional level, comes from relating the impacts on characteristics of the affected areas. For physical sensitivity, the amount of buildings and infrastructures that are susceptible to extreme weather events (such as to river floods and coastal storm surges) were considered. Social sensitivity relates the positive or negative effects on human populations. The economic sensitivity considers the impact on economic activities that are strongly dependent on climate conditions (especially tourism and energy). Environmental sensitivity focuses on entities that are highly sensitive to climate changes, such as sensitive soils or protected areas. And cultural sensitivity considers the impact on assets like museums and internationally recognised historic sites.

7.2. Economy and employment

In the European context, this CBA does not perform very well in the indicators related to this dimension, and all of the NUTS 3 have a GDP per capita that is very far from the leading region. Of all the regions, the ones that are performing worst are the Alentejo Litoral, the Alto Alentejo and the Alentejo Central, which is interesting given their greater proximity to Portugal's capital. Most of the regions have also had growth rates in the last decade that are equal or below that of the leading region, meaning that they have kept their relative position to the leading region or even been diverging. The noteworthy exceptions are the Spanish NUTS 3 as well as the Baixo Alentejo which have slowly been converging.

As would be expectable from the former analysis, the regional disparities in the ESPON space keep on being very high on the regional and national levels. This means that, although it is slightly decreasing, the tendency for major economic activities to concentrate themselves in central locations persists, despite of all the mechanisms the European Union has set up to increase regional cohesion. The CBA, on its turn, has regional disparities that are below the Portuguese national disparities, but above the Spanish ones and that have been increasing as the more developed regions have also been the ones to witness greater growth rates.

Figure 7.1. Coefficient of deviation



Source: Own elaboration based on ESPON FUA database.

As for the relative size of different economic sector, the composition of the GVA by sectors in the NUTS 3 is significantly different between the two sides of the border. Both share strong weights in the agriculture and fishing sector and low weights in the financial and real estate sectors. But on the Spanish side of the border construction and public administrations and community services assume a greater role (even greater than the Spanish average), while in the Portuguese regions the industry and the non-financial and real-estate related services contribute to a greater extent to the total GVA of the regions.

7.3. Innovation and research

The overall situation of this region in terms of innovation and research is not very favourable either. In the Alentejo the intramural R&D expenditure is significantly below the Portuguese average in all the sectors, although the share of employment in high and medium tech manufacturing is not far from the national average. In the Extremadura, these indicators have significantly higher scores, although it is very dependent on the public sector (government as well as higher education, which is essentially public in both countries). The low investment in R&D, of course has an impact in the amount of EPO patents, which is very small proportion of the national averages in both sides of the border.

As for the causes, the low percentage of the R&D investment of the higher education sector as percentage of the GDP is partly explained by the amount and size of the public higher education institutions in this region. As can be seen in the annex, only the University of the Extremadura (which is headquartered at Badajoz) has a considerable amount of students, while in the Alentejo there are several, but very small sized, higher education institutions.

But, according to Rodrigues 2011 the universities can play a role in regional development that goes far beyond the mere technology transfer or supply of qualified human resources. Particularly, the universities be a key player when it comes to translating the knowledge they produce, as well as knowledge produced in other regions, into concrete actions by the regions' main stakeholders. Especially when speaking of regions with relatively weak institutional contexts, the actual development of R&D might not be a central part in the fostering of an innovative environment. The higher education institutions might play a more relevant role in a process of creative adaptation of external knowledge and innovations, by responding to specific needs of the territories. It is therefore interesting to analyze the ways in which the Universities and Polytechnic Institutions have been positioning themselves in the areas that are considered to be strategic for this region, namely tourism, agriculture and renewable energy sources.

In fact, there seems to be some specialization of the regional higher education institutions in these areas. Regarding agriculture, the University of Évora, offers courses in many areas directly or indirectly related to agriculture and animal production, such as animal science and technology, biochemistry, biotechnology or veterinarian medicine. The Polytechnic Schools of Beja and of Portalegre also have a considerable offer in this area, such as agronomy, agronomic engineering, veterinarian nursery or horsey. The University of the Extremadura, on its turn, also offers courses related to the primary sector, such as food, agricultural industry and livestock engineering or enology. Regarding areas that are directly or indirectly related to tourism, there

is also some offer from the University of Évora (tourism, history and archaeology), from the Polytechnic Schools of Beja (tourism, sociocultural animation) and, especially, from the University of the Extremadura (history of art and historic and artistic heritage, history, tourism, administration and organization of touristic resources). It is also interesting to see that the University of Évora is currently offering an engineering course in renewable energy.

Further, indication for a tendency for specializing in areas that are relevant for the region's development, is also reflected in fact that, in 2001, 13% of the students in the Alentejo were enrolled in agricultural courses, compared to only 2,9% at the national level (Plano Regional de Inovação do Alentejo, 2005).

7.4. Social cohesion

The social indicators, once again, show the underdevelopment of this CBA. The Extremadura, only performs better than the Spanish average on the infant mortality rate, and does much worse in the population that is at risk of poverty and also the share of active aged population with tertiary education. The Alentejo, although it follows the Portuguese tendency to perform much better on most social indicators than Spain, still perform much worse than the national average.

Another interesting aspect of the social cohesion of this region is its performance in social capital. According to many authors (Coleman 1988, Halman 2003, Narayan and Cassidy 2001), social capital can essentially be understood as a characteristic in the social structure that enables or facilitates social action, and is expressed in issues like the trust people have in the institutions, political participation or the degree to which they are organized for collective action, namely by participating in associations.

The indicators for measuring social capital that are used here are from the Special Eurobarometer 223, available at <http://www.gesis.org/>. This study analyzed social capital at the NUTS 2 level in most European countries, although some countries were excluded here because the geographical level did not follow the common administrative boundaries (Germany, Denmark, Ireland, Italy and the United Kingdom). It is also important to keep in mind that the NUTS classification is from 2003, meaning that in the Alentejo the Lezíria do Tejo was not considered, and that the sample size for each region is not very large, and therefore the data is more of general indication than a sound scientific analysis.

The indicators that were used refer to five different dimensions of social capital: trust, socialization, participation in associations, informal social capital and political participation. The overall picture for this region is that the social capital levels are low:

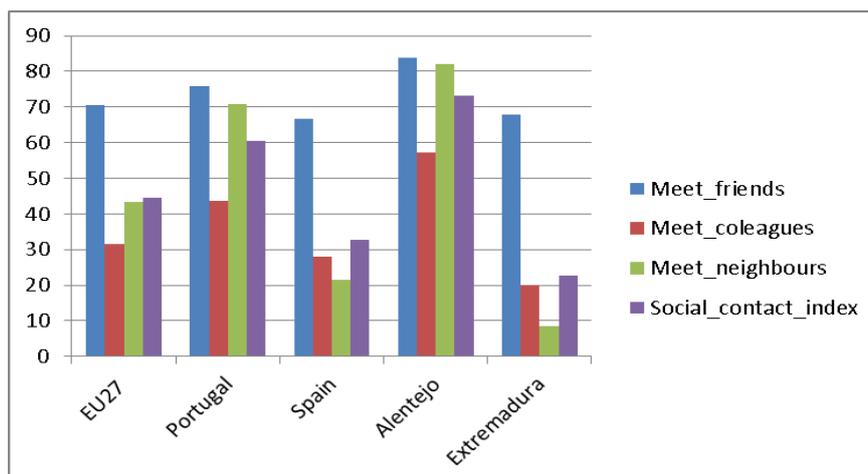
Trust

This dimension refers to interpersonal trust as well as general satisfaction with the way the countries' democracy works. The results for these indicators in the region show a strong difference on each side of the border. In the Alentejo, only few people believe that most people can be trusted and the general satisfaction with the way the democracy works is very low, although still higher than the average of the Portuguese NUTS 2. In the Extremadura interpersonal trust is much higher (but still below the national average) while more than 70% are satisfied with the way democracy works.

Socialization

This dimension refers to the intensity with which people contact with members from their networks, such as friends, neighbours and colleagues. As can be seen in the following graph, the Alentejo has a very high score in this dimension, while the Extremadura has an extremely low score, especially in what regards the meeting of colleagues and neighbours.

Figure 7.2. Frequency of social contact, NUTS 2 average



Source: Own elaboration based on ESPON FUA database.

Membership in associations

This dimension reflects the degree to which people are part of any association. The general levels of participation are low in both NUTS 2.

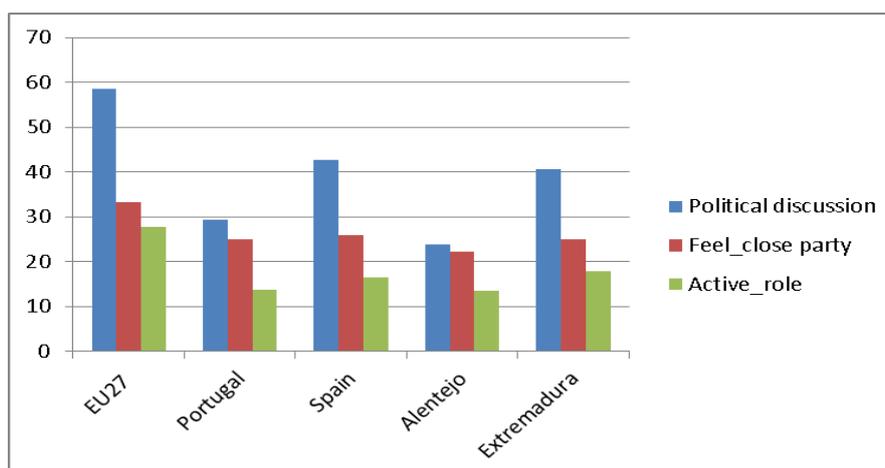
Informal social capital

On one hand, this dimension measures whether people feel that they could rely on their network in case of need and on the other hand whether people have helped other in the case of need in the last 12 months. The levels for this dimension indicate an average level for both NUTS 2.

Political participation

This dimension reflects the tendency to participate in political issues in the country. The amount of political participation in both NUTS 2 is essentially in line with the average of the NUTS 2 at the national level, but still considerably below the average of the NUTS 2 at the European level.

Figure 7.3. Frequency of social contact, NUTS 2 average



Source: Own elaboration based on ESPON FUA database.

7.5. Environment

As was already stated, four sets of indicators were used for the environmental analysis. First, indicators that were produced locally by a varied set sources, namely the OTALEX Atlas. Second, indicators from the European Commission's 5th Cohesion Report. Third, indicators from the ESPON Climate Project regarding the region's sensitivity for climate change. Fourth, indicators from the European Pollutant Release and Transfer Register.

Local sources

The local sources were instrumental in pointing out some of the major environmental issues in these territories that would have been difficult to grasp from a more macro oriented approach. The first one is that a major environmental challenge in this region is the risk of desertification (although not comparable to some of the more southern areas of Spain). Major national programs, such as the National Action Program against Desertification in Spain (Ministério de Medio Ambiente y Medio Natural e Marino, 2008), or the Regional Plan for Landplanning of the Alentejo (Plano Regional de Ordenamento do Território, August 2010), have identified the importance of this issue in the region, considering its geomorphologic, lithological and climatological characteristics. But, despite the general awareness of the desertification risk in this region the aridity index, which is the ratio of the rainfall by potential evapotranspiration, shows that much of this region is part of a humid or sub-humid climate zone. The risk of desertification is also to some extent mitigated by the considerable amount of subterranean and surface waters, and by the recent construction of the Alqueva Dam, that might also help to reduce the water shortage, at least in some parts of the region.

A second issue is the widespread *dehesa/montado* type of explorations, which are an often cited example of an extensive agro-silvo-pastoral system that guarantees high levels of biodiversity and a sustainable use of resources, leading to its inclusion in the Natura 2000 network. Namely, this system is instrumental in the preservation of many of the endangered species in the Iberian Peninsula, such as the Iberian Lynx, the Iberian Imperial Eagle or the Black Vulture, but also in erosion or nutrient and water cycles (Olea and San Miguel-Ayanz, 2006). These aspects, while important in themselves, are even enhanced given its relation to a relatively sensitive environment, which means that the delicate balance between human activities, dry and hot climate and generally poor soils can be easily disrupted leading to different sets of ecologic problems. But besides its importance, this system has come under some pressure in the last decades. According to Gaspar Garcia et al (2009), there are two major menaces to this type of explorations. The first one is an increase in the intensity of the land use, especially cattle breeding, which has been made possible by subsidies of the Common Agricultural Policy. The second one is the competition of more intensive exploitations which makes some of the more traditional forms unprofitable.

A third issue is the identification of the strategic areas from a biodiversity point of view. A project that dealt with this theme from a cross-border perspective was the Ecomap project, which ended in 2008 and was financed by the INTEREG III and developed by the University of the Extremadura and the University of Évora. This project's goals were to identify major strategic areas that are relevant for environmental protection and major shortcomings in the actual environmental protection networks. The area under analysis was the same as in the OTALEX, excluding the Alentejo Litoral. One of the major outcomes of this project was the attribution of different values to the socioeconomic patches of the region based on species richness as a proxy of biodiversity. The most critical areas identified by this project are on its fringes. Around the border, most of the areas are not critical regarding biodiversity.

Another aspect of the Ecomap project was the analysis of the wholes that were identified by crossing the coverage of the Natura 2000 areas with the areas which were considered to be hotspots according to the biodiversity. Although there is some coverage of the strategic habitats by the protected areas, there are also some clearly identifiable wholes, which suggest a more thorough analysis of the ecosystems and the European environmental protection mechanisms. The most significant land use of these strategic habitats is dry land farming (24%) and *dehesa/monte alentejano* type of land use (23%), which once again stresses this kind of land use in keeping this regions environmental sustainability.

A fourth issue is the low levels of photopollution. This phenomenon is not very significant in much of the region, and beyond the major structuring axes, there are many dark areas that indicate the absence of major light sources. Given the low emission of air pollutants and the low share of clouded nights, this region has excellent characteristics for night sky contemplation, which led to the constitution of the internationally certified "Alqueva Dark Sky Reserve", in order to promote astro-tourism.

European Commission's 5th Cohesion Report and ESPON Climate Data

The major indicators of the 5th Cohesion Report and the ESPON Climate Project, on its turn, show a more optimistic image of this region. From the 5th Cohesion Report, four indicators were considered: soil sealed area, ozone exceedances, waste water treatment and Natura 2000 areas. The NUTS 3 of this CBA perform well on many these indicators, although this might partly be related to its low densities, which minimizes the impact of human settlements on the environment (e.g. low shares of soil sealed).

The ESPON climate project, as was already stated, measured the regions' sensitivity to climate change regarding different issues (social, cultural, environmental, economic and physical). The overall performance of these indicators shows a low sensitivity to climate change in this region. According to this project, there

appear to be no very significant flood risks from the sea, where the coastline is very steep in most parts. And, although there are some aspects that could raise concerns, such as draught, fire risk or the flooding from the region's major rivers, the low densities mean that the amount of population and infrastructures that could be affected by climate change is not very high.

European Pollutant Release and Transfer Register

The E-PRTR is the result of a European wide protocol that harmonizes data collection and replaces the European Pollutant Emission Register (EPER). Besides data collection from the different industrial facilities, this register also includes data from different models that estimate road, agricultural or residence emissions. Here, only some of the main pollutants were analysed. In order to give a picture of the relative position of the region, the scale of the data is presented in quantiles from EU27 values.

The overall picture from this data is that this region does not have a problem with pollutant emissions. The industrial emissions are restricted to very few and scarcely scattered facilities, most of which do not rank high in the European context. An obvious exception to this situation is the refinery in Sines which ranks in highest quartile of the EU7 regarding emissions in PM10 as well as CO2. Residential and road emissions are generally low, which once again, can be related to overall low population densities.

The ammonia emissions related to agriculture, on its turn, are more ambiguous. On the Portuguese side of the border, the emissions are generally in the lower quantiles of the EU27, while on the Spanish side they tend to be on the higher ones. It is therefore possible to assume that the Extremadura has a much more intensive agriculture which uses a greater amount of fertilizers and, consequently, has a much higher environmental impact.

The tendency for a positive performance in pollutant emissions is also reflected in the air quality. In fact, the different measuring stations that are distributed throughout the territory show levels of air quality that are considered 'very good' in most of them and 'good' in only two of the stations that are close to the Sines Refinery (see OTALEX Atlas for more details).

Chapter 8 - Factor analysis

8.1. Concept and definition

The objective for the factor analysis was to aid the understanding of how the different regional realities affect the performance of the regions. For this several different steps were necessary. First the indicators were divided into two sets: regional profile indicators and territorial performance indicators. The first set considered variables linked to overall characteristics of the different regions on the themes that were considered (accessibility, rural-urban relationship and demography). Polycentricity was excluded at this point, because it is a concept that makes no sense on a NUTS 3 level at which the analysis was performed. On the other hand, indicators that are normally associated with the Lisbon/Europe 2020 and Gothenburg objectives at the input level (such as R&D investment, active population with tertiary education and so forth) have also been included, since the differentiation was made between dependent and independent variables and not merely based on thematic categories. Unlike most studies on innovation, the EPO patent applications have also been included at this level. This is because, although they can be understood as an output of innovation, innovation in itself is an input of economic performance.

The second set considered variables linked to the performance of the regions concerning indicators related to the Lisbon/Europe 2020 and Gothenburg indicators at the output level.

In order to analyse the relations between the territorial profile and the regions performance, two different analysis were performed. First, a factor analysis for each set of indicators. Second, several multiple linear regressions having as independent variables each factor of the performance indicators and as dependent variables all the factors of the territorial profile.

8.2. Findings

Two major aspects can be highlighted from relating these two different dimensions. The first one is that economic development is far less dependent on R&D investment than what would be expected. In fact, although there is a positive effect from factors related to location and R&D, the factor related to central location explains much more of different economic development levels. Similar conclusions can be drawn from the highly negative coefficient of the indicator related to rurality meaning that, on themselves, density and central location seem to be more important than research and innovation. The weight of the construction sector is also considerably negative, probably meaning that, at a certain stage, high economic development is more linked to a strong service sector than infrastructural development.

A second interesting finding is that high levels of unemployment have a strong negative relation to a high investment in R&D, demographic dynamism, central locations and high levels of immigration. As expected, the factor referring to administrative centres has a significant and positive impact and unemployment.

Regarding the performance of the CBA the factor analysis essentially corroborates the image that emerged from analysing the indicators individually. The region has, for example, bad performances in the factors related to economic performance, to R&D investment, services and transportation sector or demographic dynamism. Further the NUTS 3 of this CBA perform badly in the main factors that explain good economic performance in Europe. For example, all the NUTS 3 fall below the 20% percentile in the factor that is related to central location and a strong service sector, which has the biggest weight when explaining a region's GDP per capita. In the factor that expresses R&D&I, most of the Portuguese regions fall below the 50% percentile, while the Spanish ones fall below the 80%. The regions also keep a relatively large weight of the public sector. And, as can be seen in the factor analysis, a large weight of the public sector is often related to depressed territories, as the public services are more evenly distributed among the territory therefore leading to their overrepresentation in a scenario of a dwindling private sector.

But the region also shows positive scores in some factors. For example in the factors linked to environmental indicators the region shows a good performance. The same is also true for the catching up, where the regions, although converging slowly, are still performing reasonably well when considering the other European NUTS 3.

Chapter 9 - Cross-border governance framework

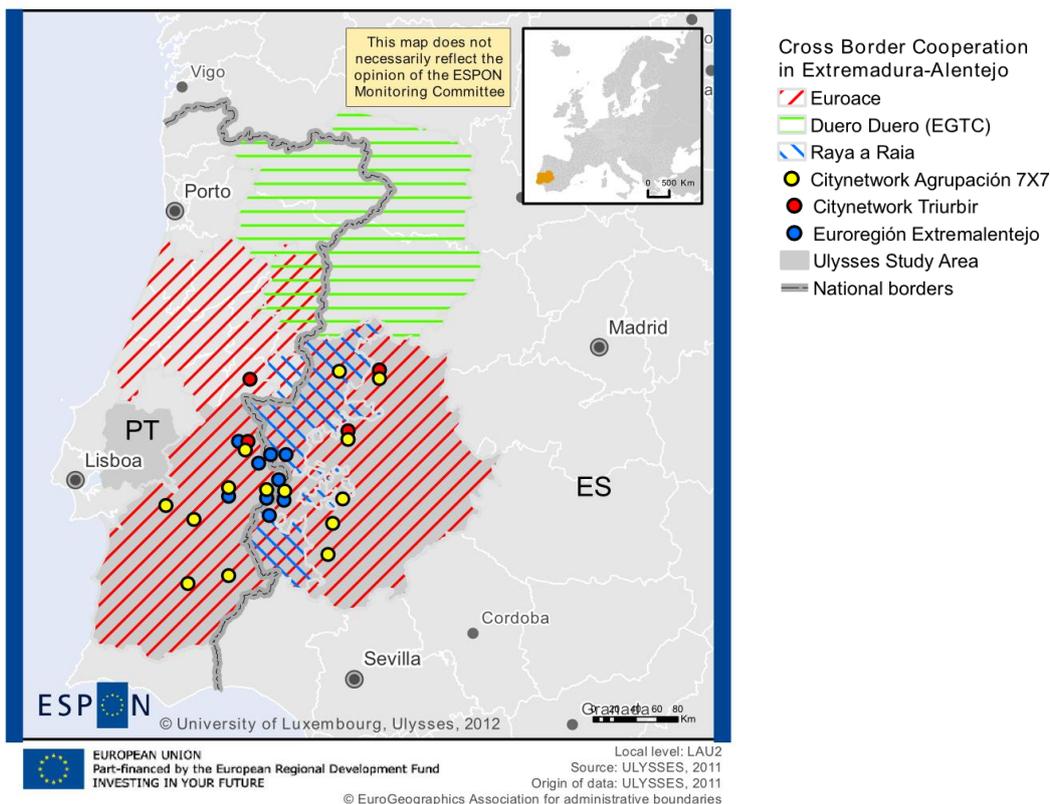
9.1. Concept and definition

Cross-border governance in contemporary Europe mostly means cooperation on the regional level (in particular Euregios), in many cases complemented by partners on the local level (city networks etc.).

The interregional cooperation is embedded within the multi-level governance of the European political system where nation states and the EU are major players. Against this background, the analysis of cross-border governance has to take two dimensions into account:

- Firstly, the regional partners are not completely free to develop political activities within cross-border cooperation, but they have to cope with national regulations and frameworks that are hardly to be modified: the overall political architecture of the nation state (e.g. federal vs. central) or the planning system (e.g. land use regulation vs. comprehensive integrated approaches) do play an important role in cross-border governance, too. In some cases, the systems from either side of the border fit quite well, in other cases the differences are large and can hamper efficient cross-border cooperation. – Within Ulysses Task 2.3 we call this the structural dimension which means the overall framework that can hardly be influenced by the partners of inter-regional cross-border cooperation.
- Second, inter-regional cross-border cooperation in Europe is established and developed for more than four decades now, and the countless examples are differing largely in terms of activity, continuity, historicity, forms of institutionalization, efficiency etc. These differences are not only to be explained by structural frameworks but also by the success of the regional actors. – Within Ulysses Task 2.3 we call this the activity dimension which means the intensity and continuity of cross-border cooperation on the regional level.

9.2. Findings



9.2.1. Structural Dimension

The Extremadura/Alentejo border separates two Iberian countries that share some important characteristics. The overall political and the planning systems show some similarities, and the languages allow to a certain extent semi-communication (reciprocal understanding without being fluent in the respective language). Also from a morphological point of view, the border does not represent a major barrier.

9.2.2. Activity dimension

The cross-border cooperation in the region can look back to a large experience of EU programme based projects, currently in particular as the INTERREG platform POCTEP. Only recently, in 2009, the involved regions have founded the joint institution of “Euroace” that is comparable to the ‘classical’ Euroregion we know from other parts in Europe. Nevertheless, the concentration of cross-border cooperation on different levels is high as the map reveals (city-networks and interregional cooperation). Currently, the dynamic is high as not only the foundation of Euroace but also the presence of new EGTCs show.

9.2.3. Spatial development and transport

An interactive cartographic tool does exist and is accessible online and a joint Atlas (OTALEX). The recent strategic document Euroace 2020 not only gives a comprehensive territorial analysis of the cross-border setting but also defines strategic guidelines and objectives that are ambitious. One has to admit that this document is the outcome of an outsourced study and has to be concretised and implemented in a political way. The step towards a joint transport and territorial development strategy would be the next logic step.

Chapter 10 - Integrated territorial analysis and scenarios

10.1. Objectives and methodology

Besides the institutional analysis and the quantitative, multi-scale analysis, one of the goals of the Ulysses project was to integrate these two types of approaches and contrast the verified tendencies with hypothetical trends. This integrated approach was obtained through a SWOT analysis. One way to do a SWOT analysis is to divide it between a status-analysis phase and an action-decision phase. The first phase serves to

identify the major traits of the unit under analysis as well as two identify the opportunities and challenges. The second phase consists of a set of strategies that mitigate the negative aspects and take advantage of the positive ones. Here, these two phases are treated separately and, while the first phase will be done in this chapter, the second phase will be done in the next one.

For the status-analysis phase, first a systematization of the major strengths and weaknesses of the CBA was done, for all of the different themes under analysis. Second, major challenges and opportunities were identified. These were obtained by analysing trends that are endogenous to the relation of the CBA with its surroundings, but also by taking into account the scenarios of the ESPON 3.2. Spatial scenarios and orientations in relation to the ESDP and Cohesion Policy. These scenarios were not linearly applied to the region, but single aspects of these scenarios were picked out according to their relevance to the region's characteristic as well as their likelihood to occur.

The ESPON 3.2 has developed three different scenarios: the Baseline/trend scenario, Danubian Europe or the cohesion-oriented scenario and Rhine-Rhone Europe or the competitiveness-oriented scenario.

10.2. Scenarios

10.2.1. Integrated baseline (trend) scenario

The baseline scenario is essentially a forecast of how the different trends that have been identified up until here will affect the different region up until 2030. On a policy level, no clear break with the actual major orientation is expected.

Demographic decline is on-going, although some immigration has occurred but mainly to urban areas. There is a continued metropolization process, meaning that a growing share of the population is concentrated in a few large metropolises, but the relative position of these metropolises to the pentagon areas is not improved and they therefore do not function as major counterweights or development poles. The polycentric layout of the region's city system is slowly reducing, as the major TEN-T network has mainly focussed on the connection between the larger urban areas. As a consequence, some of the weaker urban areas are declining and population is increasingly concentrated in the larger urban areas. Many of the rural territories are witnessing a strong marginalization process, with disruptive effects on the actual land use patterns. Namely, many of the agricultural and semi-natural areas are being abandoned and there is an increase of draughts and fires.

The relative position of the regions GPD is also not improving considerably, as the Lisbon Europe 2020 strategy has had limited effect in the southern areas, apart from a few poles. The loss of competitiveness is also linked to increasing energy prices, which has a stronger effect on southern economies (energy intensity is higher in Portugal and Spain than in most of the northern and central European countries). The continued economic disparities have led to the dissemination of second homes in the less developed but sunnier areas, therefore increasing their tourism potential but also urban sprawl.

10.2.2. Danubian Europe: Integrated cohesion-oriented scenario

This is a prospective, policy-oriented scenario. In this scenario, the main priorities of public policies at EU level, in a context of growing globalisation, are focused on economic, social and territorial cohesion and not on global competitiveness.

The demographic pressure on the region is reduced, as pro-fecundity measures have been able to raise the low fertility rates and the integration of first and second generation immigrants. The arrival of new waves of immigration from outside of Europe has been restricted, as Europe is more focussed on internal cohesion than openness to the world. The increase in accessibility has further reinforced the polycentric layout of the city system, leading the sustained growth in many of the small towns. Many European wide policies have been aimed at the less favoured regions, namely the CAP, the TEN-T and R&D and I programmes, leading the an increase in relative competitiveness of many of the rural areas in the CBA. Many services and infrastructures are maintained, as the marginalization of the peripheral regions is considered to be more damaging than the steady flow of subsidies that maintains their viability.

Although the GDP is similar to the baseline scenario, it is more evenly distributed, therefore benefiting less developed regions, such as this CBA. The priority given to environmental and animal health criteria as well as the promotion of quality products in the CAP is beneficial for the agriculture of the dehesa/montado system. The rising energy prices are also beneficial to a much subsidized renewable energy sector. Generally, there is a low pressure on the use of natural resources, which maintains the attractiveness of the region for quality tourism and sets favourable condition environmental sustainability.

10.2.3. Rhine-Rhone Europe: competitiveness-oriented scenario

This is a prospective, policy-oriented scenario. It is based on the assumption of a significant reshaping of EU policies originating in the disappointing results of the implementation of the Lisbon Strategy during the period 2002-2005 (ESPON 3.2, final report, vol. 2).

The main goal is to strengthen the international competitiveness of Europe, if necessary at the expense of the less developed regions. Transport policies are focussing on the major trunk connection and the necessity to gain scale by further increasing the metropolization process, leads to a strong polarization between the more developed urban areas and the other regions. The rural areas of the CBA are also affected by a very intense population ageing and a reduced public service provision. There is some pressure on the coast, given a growth in international trade (expansion of seaports) and an increased settlement in these areas, namely due to thriving tourism and second residences search from more developed countries and regions.

A heavy liberalization of the agricultural sector has also occurred. Namely, there has been an opening to international competition and major cuts in the CAP budget which is further focussing on the more productive areas. This situation poses a strong menace to the agricultural sector in the region, and the abandonment of dry land farming and of the *dehesa/montado* system is progressing even faster than in the baseline scenario. Allied to reduced amount of funding in environmental adaptation strategies, the environmental situation of the CBA is becoming critical, with recurrent fires, draughts and a general degradation of the ecosystems that depend on human action. In economic terms the regional disparities are increasing in the CBA, as well as in comparison to the more developed regions in the countries.

10.3. Most relevant challenges and opportunities

10.3.1. Most relevant challenges

As can be deduced by the different scenarios that have been presented, the relevant challenges that this region will face in the future are by no means predetermined. They are rather dependent on a different set of external evolutions and policy options on the European as well as the national levels. The method adopted here for identifying the challenges was therefore to cross a forecasted trend that is already identifiable in the region with aspects of the scenarios that are most relevant for this trend.

The underlying issue that shapes much of the challenges that this region faces is its peripheral position in the Iberian as well as the European context, which is understood in a geographical, political and economic sense. This peripheral location is a crucial element which shapes this regions' behaviour in many of the analysed dimensions manifesting itself in an overall low density in human settlements, infrastructures and economic activities and a poor capacity in achieving the Lisbon/Europe 2020.

In demographic terms, the most significant challenge the region is related to the population ageing, especially considering the already low population densities. Essentially, the low fertility rates and/or emigration in previous years led to a low amount of women in fertile age, meaning that the region could be facing a negative momentum of demographic growth. Further, countering this tendency can be difficult given necessarily limited reach of pro-fertility measures as well as the reduced stimulus for the inflow of migrants given the threat of economic stagnation. The territorial differentiation of the demographic structure in which younger generations are concentrated in the urban areas and the in retirees in the rural areas can also lead to a further marginalization and progressive abandonment of the rural areas, as well as the weaker urban areas, and a disruption of the actual urban/rural balance.

A second major challenge of this region is the development of the pattern of growth that accentuates the contrast between metropolitan and non-metropolitan areas, benefiting capital regions and large city regions and reducing the level of polycentricity in the national urban systems at the intermediate scale. Since this region's urban areas are essentially positioned in the intermediate level, this tendency can be a major threat to their development prospects. This could further be deepened by an infrastructure and transport service development that, in the context of an economic crisis, could focus on trunk connections between the main metropolitan areas at the expense of more local connections. The continued increase in energy prices (in particular of oil) is a major constraint in the transport sector, both for goods and people's transport, and could therefore make the access from and to the region more difficult (particularly considering its fringe position in the European context, and that the economy of peripheral countries is more dependent on transport).

A third major challenge is the combined effect of the (eventual) liberalisation in the agricultural policy (reduction of tariffs, of budget and of export subsidies) and the increasing energy prices. This could lead to the intensification of the agricultural production in the more fertile and centrally located areas and also an

increase in the competition of farm products from outside of the EU, which are a menace to the important agricultural sector of this region.

A fourth major challenge is the difficulty of this region in reaching high levels of well-being. This difficulty manifest itself in the poor performance in the social cohesion indicators, but also in the tendency for converging very slowly, or even diverging, from the leading region in the GDP per capita growth in the last decade. The already fragile position of this region is further menaced by two factors. On one hand, the retraction of state investment and services in the actual scenario can have a very disruptive effect, given its high relative importance in the regional economy. On the other hand, an increase in the regions relative remoteness can lead to the struggle of economic sectors that are affected by decreasing economies of scale, growing distance to markets or labour force scarcity.

A fifth major challenge is related to the pressure on the dehesa/montado systems, which could lead to more intense land use in the existing dehesas and an abandonment of many not so profitable properties. The decreased human intervention through this model, allied to the continued rise of average temperature and aridity could trigger problems such as an increase in draughts and fires or reduced agriculture production. Since the dehesa/montado system is an essential part in the region's environmental sustainability, this evolution poses a major threat.

10.3.2. Most relevant opportunities

Despite the already mentioned tendency for this region not to achieve high values in performance related indicators, there are several aspects in its spatial, economic and social layout that can be understood as an asset in its future development.

First, and while the region's ageing population and urban consolidation pose a major threat on some levels, it can also be perceived as an opportunity on other levels. Namely, the continued urbanization process in the region could lead to the growth in regional poles of attraction. For example, the population of major cities, such as Badajoz, has shown a considerable growth while the more rural areas have been losing population. Second, the ageing population and decreasing tendencies means that there is a reduced pressure on some services and facilities, especially the ones dedicated to young people such as schools, school transportation, kindergarten, etc.

Second, the strategic position of the Badajoz-Elvas-Campo Maior triangle could be reinforced by several tendencies. On one hand, the further integration of the border could lead to the development of an urban core-labour pool dynamic on a cross- border level. On the other hand, the development of the trans-European transport network (TEN-T), namely the high speed connection which could lead to a more direct link between this region and Central Europe could strengthen the logistical importance of the border areas (especially in the freight transport from and to the Sines and Lisbon ports). The strategic position of the Badajoz-Elvas on the Lisboa-Madrid Axis could further make it a privileged meeting point (congresses, seminaries, business meetings, etc.).

Third, the region's agriculture has also some strong point that could be explored in the future. There is, for example, a large margin for progress in the use of the Alqueva dam for increasing the irrigated agricultural areas. There has also been a growing demand for quality products (as opposed to highly mechanized and standardized products), which is an area in which this region appears to have some comparative advantages.

Fourth, the good performance in the Gothenburg Strategy indicators, the low densities and the abundance of natural and, especially, semi-natural areas leave an untapped resource for economic diversification in the rural areas. This could, for example, be relevant for exploiting residential functions for retired people from other regions/countries, for developing tourism sectors that are not part of the sea and sun destinations or for exploring renewable energy sources. But the low densities and relatively stable population growth also puts low pressure on land use, creating favourable conditions for environmental protection.

Chapter 11 – Suggested strategies

11.1. Objectives and methodology

This chapter highlights the main strategies of different natures identified for each topic included on Phase 2 of the SWOT analysis. These strategies are based on the status analysis performed in previous steps, which are explained in previous chapters.

As said before, SWOT (Strengths, Weaknesses, Opportunities, and Threats) has been the general framework to reach the Action-Decision Phase. The analysis of Opportunity and Threats on one hand and

Strength and Weakness on the other, as well as the analysis of the combination of these factors, has been the basis to suggest some possible actions. These actions result also from the discussion of the previous phase with the stake-holders and their perspectives on what should be the strategic orientation for this exercise.

11.2. Possible actions for each theme

11.2.1 Demographic Change

There are two main strategies that can be followed for countering the major threat this region faces in demographic terms. On the one hand, it is possible to develop a **mitigation strategy**, focussed on countering demographic decline. Several measures could be adopted in this sense. The first one is to create pro-fecundity measures, such as programs that facilitate the conciliation of family and work or offering childcares services. From an efficiency point of view, these measures should be focussed on urban areas, as the rural areas tend to have very low shares of women in fertile age, therefore limiting their impact. The second one is to promote immigration, especially for young couples. This could be done by facilitating job search (e.g. by creating, or maintaining, structures such as offices for professional integration of immigrants), promoting temporary accommodation for recent arrivals or facilitating access to social services and equipments such as healthcare or kindergartens. A third one is to promote and market affordable housing as a way to attract and fix existing population.

But, if one admits that countering demographic decline is too costly, out of reach of the policies that can be influenced or simply impossible, it is also a good idea to develop **adaptation strategies**. There are several types of actions that could help to limit the impact of an ageing and shrinking population. The first one is to plan for the adaptive reuse of many of the equipments and services for children that will become unnecessary, namely by adapting them for the elderly. It is, for example, possible to make demographic predictions and so identify with some certainty which equipments will become obsolete and plan for their adaptation for a different function. The second one, and since infrastructures and services for the elderly will have to be expanded to some degree, it could be useful to consider developing them even further and linking them to leisure, wellbeing and tourism in order to attract retirees of other regions or countries. A third one is to adapt working conditions to help the ageing population in keeping economically active. A fourth one is to try to adapt to eventual and localized labour force shortages by further stimulating cross-border commuting, therefore dealing with labour market imbalances by establishing a joint labour market.

11.2.2. Polycentric development

For polycentric development, a regional strategy should work on two levels. On the one hand, and given the spatial layout marked by small and medium urban areas, strengthen the principle of **decentralized concentration**. This could namely be done by concentrating services and facilities in large and mid-sized towns, guaranteeing a minimum level of access throughout the territory, and strengthening their position at the national level. The complementarities in these services and facilities between different urban areas should be considered, namely on a cross-border level.

On the other hand, it is also important to counter the absence of urban agglomerations on the higher end of the hierarchy by **consolidating the larger urban centres**. This could be done by promoting the cross border integration of the Badajoz/Elvas axis in a framework such as the Eurocity. This could namely occur through issues such as: the integration of public transport in order to facilitate commuting, especially from the Elvas to Badajoz (e.g. shared timetables and fares); the joint management or establishment of protocols for joint use of public infrastructures in order to gain scale and avoid redundancies (e.g. shared sport or leisure facilities); the harmonization of spatial planning in the two cities, favouring a global strategy. The creation of this kind of joint development pole on the border could play an essential role not only for the cities, but also in structuring the whole urban-rural relationship in the region.

11.2.3. Urban/rural relationship

As was already mentioned the spatial layout of this region is marked by a network of very small urban areas that stretch over a large predominantly rural territory. As the rural areas, as well as some of the smaller urban areas, are witnessing a population decline, one of the major challenges of this region will be the service provision for a dwindling population.

In this context, the major strategy for this CBA should be twofold. On one hand, it is important to establish **functional complementarities in services and infrastructures** of the small towns and urban centres. On the other hand, it is important to establish **intelligent ways to make them available in the low density areas**. Essentially, mid-sized towns could function as centres of provision of services of general interest,

which are thereafter extended to the surrounding low density territories through mobile means and by further adopting computer mediated communication. This strategy could also be of great use if tourism and/or residential function in rural areas are to be pursued, since this would be a way to allow the provision of amenities that are normally associated with an urban lifestyle. The cross-border complementarities could also play an important role in this context. The protocols established between Portugal and Spain regarding the use of the Badajoz maternity by the Portuguese border population could, for example, function as a benchmark for further extending the joint use, as well as highlighting some of the obstacles (namely symbolic ones) that have to be overcome.

Another important strategy should focus on **countering the decline of the rural areas**. One way to act on this is by increasing the viability of the agricultural sector as well as diversifying the economical tissue. For this, several actions could be envisaged. The first one is strengthen the position of the Alqueva dam as a development anchor in the cross border area, namely by further promoting the shared irrigation and tourist projects that can be framed through institutions like the Trans-border Association of Municipalities of the Land of the Great Lake (ATMTGLA). In this context it would also be interesting to study joint management of water resources, which is an essential aspect of this regions development (given the high aridity and the importance of the primary sector), in order to raise the cultivation of irrigated crops. The second, given the increasing market for products that give a sense of authenticity or are linked to regional specificities, it would be useful to jointly promote quality products as opposed to highly mechanized and standardized production, such as the Iberian pig and other products from the dehesa/montado systems. This strategy could go hand in hand with a lobbying activity for the consideration of the specificities of the dehesa/montado system in the way in which the CAP funding is made available. Third, given the favourable natural conditions, high quality rural tourism could also be stimulated. For this it is important to develop policies to maintain the characteristic landscape of the region, namely by minimizing urban sprawl and artificial land uptake.

11.2.4. Accessibility and connectivity

For accessibility and connectivity there are two kind of major challenges that have to be dealt with on a strategic level. The first one is the remote position of the region in the broader context, referring basically to the external accessibility. For the first issue, **the development of its external links** is essential. Namely, the conclusion of a high speed rail connection in the TEN-T that not only includes passenger service from Lisbon-Madrid but also freight services from the Sines seaport to Madrid passing through the CBA, is of crucial interest for this region's development. In fact, the logistical importance of the Elvas-Badajoz axis, which is already considerable, could benefit from a considerable increase in this scenario.

The second one is the low density of the territory which tends to leave some of its part rather inaccessible in terms of infrastructures and services. This essentially refers to its internal accessibility. For this issue, one could consider the development of an **integrated low density accessibility program** that is based on the following assumptions: a multimodal intelligent and flexible transportation network, alternative forms of service provision that combine ICT use with itinerant services; take advantage of capacities that are already there, namely of third sector organizations, therefore minimizing new infrastructural and equipment investments.

11.2.5. Lisbon Strategy

As has been already stated, this region faces difficulties in leading a knowledge intensive, inclusive and sustainable economic and social development.

While the lack of critical mass might set restraints for the development of very significant technological clusters on a large scale, what becomes crucial for this region is the **creative adaptation of external knowledge and innovations and to gain scale by strengthen the knowledge in the fields that are considered strategic**. The first strategic guideline is therefore to focus on: the promotion of a joint knowledge pool; the development of a network approach to obtain cross-border cluster effects; the implementation of instruments for competence screening on a broader scale. Several aspects become important for this strategy. The higher education institutions could, for example, focus on programs and curricula with regional relevance in order to provide qualified human resource and to allow for spill-over effects. This strategy could be coordinated in both sides of the border leading to areas such as: agriculture, tourism and renewable energy sources. Complementarities in the scientific offer of the higher education organizations, could also be explored by promoting the joint programs or master degrees and/or facilitate student exchange, namely in subjects most relevant for the regional economy. Finally, a competence screening instrument could be promoted, namely by establishing an internet platform (e.g. portal) in order to facilitate the demand and supply of goods, services, competences or workers whenever needed (announcing work-offers, subcontract, etc.).

A second strategic guideline, that has already been mentioned, is the **use of the dehesa/montado system as a joint umbrella 'brand' to promote regional products**. For this several aspects could be explored. The first one is the very characteristic landscape associated with the dehesa/montado, which is an easily recognized icon. The second one is the sustainability of these kinds of exploration, in what concerns ecosystem preservation or natural resource usage. A third one is the Unesco candidacy of the montado alentejano that could function as a major boost in publicity.

A third strategic guideline, this time for dealing with the poor performance in the social cohesion indicators (e.g. high unemployment, high share of population at risk of poverty after social transfers) could be the growing **integration of public policy with the third sector** in order to guarantee service provision. This policy should be developed in the light of **social innovation**, namely related to the provision of support services for the elderly, which implies the development of strong institutional gathering of private and public agents of both regions.

A fourth strategy could be **to take advantage of tourism products from a cross-border perspective**. This could namely be done by the joint promotion and other forms of integrating shared products in order to gain scale. But also by identifying complementarities such as, for example, the synergies that could be established between the Alqueva Dark Sky reserve and the Observatory of the University of the Extremadura for astronomical observations in the region.

A fifth strategy, that has already been mentioned concerning accessibility and connectivity, could be to consider the **strategic position of the CBA** that will come from the eventual construction of the high speed train connections between Lisbon/Sines and Madrid. Namely these strategies should focus on logistics, but also on the eventual increase in meeting and other event related activities. As has already been stated, in this context the integration of the two major urban agglomerations that are located close to each other in the border could be an important element: Elvas and Badajoz. The promotion of joint strategies to take full advantage of this strategic position could namely be **using as a framework such as the concept of a Eurocity**.

11.2.6. Gothenburg strategy

The strategies for guaranteeing environmental sustainability in these regions should be based on two types of actions. On one hand, a further **cross-border integration of the policies on the establishment and management of environmental protected areas**, namely by establishing joint programs for habitat preservation of endangered species and by implementing policies to keep the high share of natural and semi-natural areas.

On the other hand, **promote the sustainability of the dehesa/montado** kind of agro-silvo-pastoral system namely by: marketing its outputs to create added value from its sustainability; develop lobbying activities in order to guarantee that the CAP funding actually benefits this kind of model. From an energetic point of view the strategic assets of the region could also be exploited, by taking advantage of the high solar exposure as well as the abundance of land.

11.2.7. Cross-border governance

From a governance perspective, the major strategic guideline is to further continue the already considerable experiences in cross border cooperation. Further steps could namely be done in what concerns **joint transport and territorial development strategies**. But there are also some potential advantages that could be drawn from internalizing some of the knowledge and network capital that is being built by the successive cross-border cooperation projects by giving it more durable **institutional arrangements**, namely in the context of the already existing bodies with legal personality, such as the Euroace. The consolidation of these institutional arrangements, supportive of cross-border cooperation, is heavily dependent on two major policy agents acting in both regions, i.e, the Junta de Extremadura and the CCDRA. This can be optimized by means of a common body dedicated exclusively to cross-border cooperation.

11.3. Integrated strategic guidelines

Besides the strategic guideline for each topic, some themes were further developed by presenting a more detailed scheme. These strategic guidelines are presented below.

Promoting authenticity: Dehesa/Montado system

The Alentejo and the Extremadura have excellent conditions for creating value added by taking advantage of the increasing search for quality products. This is particularly true in two areas: tourism and agriculture.

Regarding tourism, this region has excellent conditions for the tourist flows that occur beyond the mainstream 'see and sun' destinations in search for more authentic experiences. In this context, the joint promotion of tourist products in order to gain scale should be considered for the Extremadura and the Alentejo. A cornerstone of this strategy could be the development of joint marketing strategies that create umbrella terms and the integration of shared tourism products into larger networks and/or tour packages. An example of this kind of initiative could be the constitution of a "roman tour", which draws on the vast roman heritage in both sides of the border, such as Mérida or Évora. Another example could be by taking advantage of the significant pre-historic sites such as the Almendres mehir and cromlech, the Maltravieso cave or Los Barruecos, to establish a "tour of the druids". The "new age" theme could further be explored and enhanced by linking this prehistoric heritage to the already existing dark sky reserve by the Alqueva dam. It is also interesting to note that the University of the Extremadura has been developing some capacity in astronomy and, besides an observatory, there are some related courses available in their physics program, which could be used to establish some synergies.

Regarding products from the primary sector, this CBA seems to be able to make products that are produced according to more traditional practices, namely in the dehesa/montado system. There already is a considerable amount of Protected Designation of Origin (PDO) and Protected Geographical Indication (PGI) that are linked to this kind of production: "Dehesa de Extremadura" PDO; "Presunto de Barrancos" PDO; "Presunto e Paleta de Campo Maior e Elvas" PDO; "Ternera de Extremadura" PGI; "Carnealentejana" PDO; "CORDEREX" PGI; "Queijo de Nisa" PDO; etc. In parallel to what has been stated on tourism, it would be nonetheless useful to further increase the visibility of these products in order to exploit the identifiable trend to look for higher quality and sustainable primary sector products.

In this context, the **dehesa/montado system could be used as a frame for promoting common regional products**. This could namely be done by establishing the dehesa/montado as an umbrella marketing term for tourism as well as agricultural products, highlighting the environmental sustainability of this kind of land use. The National Wildlife Federation has, for example, issued an article in 2006 ("Put a cork in it", <http://www.nwf.org/>) advocating the consumer preference for cork wine stoppers based on its importance for maintaining the Iberian cork forests and its type of resource usage. The current candidacy of the Montado Alentejano as a Unesco World Heritage could also play a major role for this strategy, by increasing its international visibility and helping to establish the brand. It would, nonetheless, be essential for this strategy to be framed by a more cross-border perspective, in which the shared characteristics of both sides of the border are explored to gain critical mass.

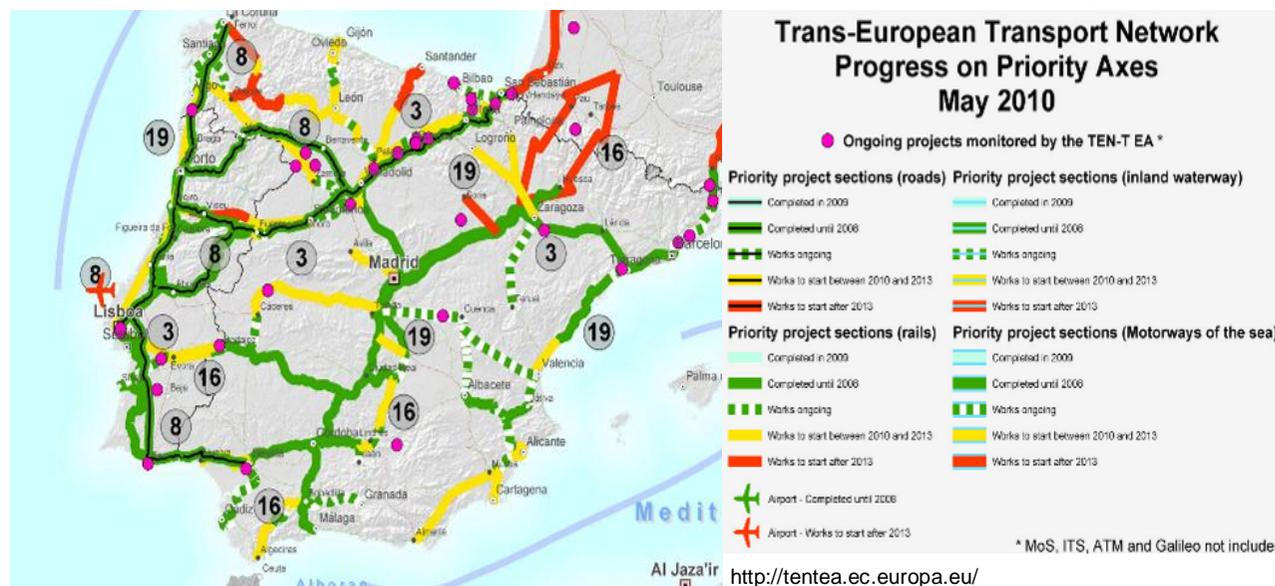
Sines – Lisbon – Madrid axis

The construction of a direct high-speed connection between Madrid and Lisbon for passenger and goods transportation, with the inclusion of a connection to the Sines Seaport, has long been under discussion. Although its construction is currently under debate on the Portuguese side due to financial constraints, it is sooner or later bound to be established. This scenario yields very interesting opportunities for this Cross Border Area (CBA), as it would allow for a direct train connection on international standard gauge to central Europe, which is especially relevant for freight transport from the Lisbon and the Sines Seaport (as for passengers there is a geographical limit to the competitiveness of high speed train connection in comparison to flights).

But, besides opening the doors to Europe, this connection would also be relevant for increasing the accessibility between the major poles of the region. For example, and if the connection would be established according to the original plan, this would reduce the traveling time from the Sines seaport to Badajoz from the actual 8h to 4h30.

For the border region, the establishment of a station just on top of the border and almost halfway between Lisbon and Madrid would also open up significant opportunities. On the one hand, the strategic position of the Badajoz-Elvas-Campo Maior triangle in this scenario could lead to an increase of its importance as a meeting point (congresses, seminars, business meetings, etc.).

On the other hand, it would make sense to exploit this strategic position for establishing major logistical activities in this area (especially in the freight transport from and to the Sines and Lisbon ports). Given the already high importance of the logistical sector in this area, that is specially focused on road transport, a more multimodal approach could in fact trigger an increase in scale that could justify a more joint management, as proposed by the “Strategy and Spatial Development Scheme for the Elvas/Badajoz transition area” (CESUR, 2007). Of course, this strategy would imply a thorough study of the logistical possibilities that come from the Sines Seaport, as well as a joint strategy for attracting foreign investment taking advantage of the new accessibility conditions and by creating favorable legal, institutional and infrastructural frameworks.



Badajoz-Elvas Eurocity

As stated in the polycentricity analysis, a major aspect of this region is the lack of Functional Urban Areas (FUA) at the higher end of the hierarchy. It is also true that, particularly in the Alentejo, the city system is dominated by a network of small cities that lack the capacity to fulfill the role of medium sized cities in fostering higher end services, providing regional markets or otherwise conferring hierarchy to the territories. The integration of cities from a network perspective could therefore be a way to promote the mentioned principle of decentralized concentration. From a cross-border perspective, this integration is especially relevant for the Elvas and Badajoz, as these are the two only considerably sized urban areas that are close to the border. The strengthening of this pole is also important given its, already mentioned, strategic position halfway between Sines-Lisbon and Madrid.

There are several issues that are important when considering a deeper integration of these two cities. The first one is that the, already mentioned, strategic position could be further strengthened by a joint approach. In fact, as has been shown by the “Strategy and Spatial Development Scheme for the Elvas/Badajoz transition area” (CESUR, 2007), there is actually a tendency for industrial and logistical activities to implement themselves in the area between these two cities. The second one is that the population of Elvas has been diminishing in the last decade, leading to a growing challenge in the provision of service and facilities on the Portuguese side of the border as well as to diminishing economic opportunities (e.g. decreasing economies of scale and market for regional products). The third one is that the regional complementarities and asymmetries can lead to a growing integration of the two cities in what regards economic exchange, commuting or even migration.

Therefore, a joint approach could focus on several issues:

- The first one is that some joint spatial planning could mean a more harmonic development of the two cities, namely in what regards logistical components or environmentally protected areas.
- The second one is that the shared use of some services and facilities could be promoted through protocols, taking as an example the use of Spanish health care services by Portuguese population (maternity of Badahoz).
- The third one is the dynamics of the labour market, which could be analyzed in order to see whether there are major commuting flows and, if so, in what direction and what is their role in the regional economy.
- The fourth one is a joint approach in transportation could be considered. In fact, there is a tendency for public agents to structure the public transportation network according to administrative boundaries. The mobility patterns of the region could therefore be analyzed to understand if it would be beneficial to advance in some degree of harmonization (at the limit, this could mean for example mean joint fares or timetables).

Low density integrated mobility program

In low density territories the reduced amount and regularity in the use of public transportations tends to lead to the suppression of courses and the increase in fares (as has been happening significantly in the Alentejo). There is also the need for a functional complementarity in services and infrastructures of the small towns and urban centres that, as they serve a small and decreasing amount of users, need to be structured as a network to reach a larger public and so justify their existence.

Given this context, the mobility of services as well as the users becomes a cornerstone in the efficient service provision in regions with the characteristics of this Cross Border Area (CBA). A strategy to pursue this goal should essentially impact three main levels. First, it is important to dematerialize interactions and services as much as possible. This is particularly viable for the public sector and is already advancing in many of the municipalities in the CBA. Second, it is important to establish mobile services. This can be obtained by establishing services and facilities in large and mid-sized towns which are afterwards extended to the rest of the low density territories by mobile means. Third, a more flexible mobility paradigm could be established by promoting Demand Responsive Transport (DRT). This kind of strategy could, on one hand, be used for taking greater advantage of the already existing public transportation and, on the other hand, to put to greater use the investment that was made by other agents, namely the third sector, cultural or sport associations as well as private transport enterprises and taxis. These kind of organizations often possess their own means of transportation that are significantly underused in large parts of the day and/or week.

The main strategy for a low density integrated mobility program would therefore be:

- A multimodal intelligent and flexible transportation network;
- Alternative forms of service provision that combine ICT use with itinerant services;
- Take advantage of capacities that are already there, namely of third sector organizations, therefore minimizing new infrastructural investments.

For implementing this strategy several steps have to be adopted. The first one is assessing the needs of transportation regarding school attendance, healthcare services, labour pools, commerce and leisure as well as the main fluxes that are already occurring. The second step is assessing the available resources, that include public transport, vehicles of enterprises and third sector organizations as well as studying options for increasing the use of soft modes of transportation, especially bicycles (which have a great potential in this CBA, given the relatively flat terrain in many parts). The third step is identifying the critical zones and periods and thereafter defining the highest priorities for intervening. The main components of the DRT should be based on two types of responses:

- Traditional model of transportation on the major axis based on pre-established timetables;
- Flexible solutions that respond to casuistic need of the public.

The systems should contemplate communication mechanism between the users and an operational center, mechanism to localize the transport units and the users and communications between and operational center and the transport units, therefore relying heavily on ICT and optimization programs. It should also be taken into consideration that the establishment of this kind of initiative on a cross-border level is particularly challenging, given the different institutional and legal framework, in a field where these already constitute a major issue. Therefore, and instead of immediately establishing a major fully operation system, an incremental approach might be the best response. To start, and after clarifying the legal implications, a first step could simply be to try to bring the third sector entities to put their means of transportation to a broader use in cases in which there are large gaps in the time they are used or if they capacity is not being totally used in the trips that they make. It should also be noted that the service provision between borders is of course limited and therefore this connection is very likely to be dependent on public transportation. And, at least the train connections on a cross-border level have been witnessing a continuous decline.

Cross-border regional knowledge management

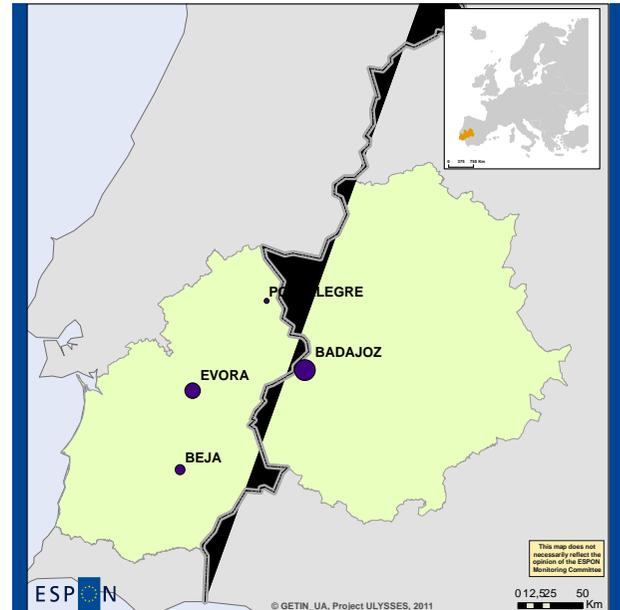
The importance of knowledge creation and diffusion in regional competitiveness and sustainability is widely recognized. In this context the higher education organizations can play a major role, not only in the promotion of innovation of technology transfers, but also in establishing institutional frameworks that facilitate the use of this knowledge for meaningful action and innovation.

But, and unlike some implicit assumptions from the Lisbon Strategy, it is not expectable that all regions have strong and native R&D impelled innovation, as these kind of activities tend to cluster in geographically concentrated areas. And territories such as the Extremadura-Alentejo, with its low institutional density, lack critical mass to create a very significant regional innovation system in more knowledge or technology intensive areas. For this kind of region, three main aspects become crucial: the creative adaptation of external knowledge and innovations; the creation of critical mass in the fields considered to be strategic; and the development of institutional capacity.

From a cross-border perspective, these goals could be obtained by several complementary initiatives. First, it is important to **strengthen the joint knowledge pool in the fields that are considered strategic** for these regions, such as tourism, agriculture or renewable energy sources. And, in fact, there already seem to be some indications of a specialization of the regional higher education institutions that is reflected in the large offer of study programs that are related to agriculture and tourism in the CBA. The University of the Extremadura, for example, offers programs such as agricultural industry and livestock engineering, enology, tourism or administration and organization of touristic resources. The University of Évora also has programs such as animal science and technology, biochemistry, biotechnology or veterinarian medicine as well as tourism. The Polytechnic schools of Beja and of Portalegre also have a considerable offer in this area, such as agronomy, veterinarian nursery or horsey. Generally, in 2001, 13% of the students in the Alentejo were enrolled in agricultural courses, compared to only 2,9% at the national level.

Second, initiatives aimed at **competence screening** in order to promote technological transfers, spillovers and the integration of the labour market. As the relevant knowledge for a particular sector or action tends to be widely distributed, what becomes crucial is to know what is available and how to adapt it to the specific needs of the territory. This means that a competence screening instrument could be promoted, namely by establishing an internet platform (e.g. portal) in order facilitate the supply of goods, services, competences or workers whenever needed.

Third, and as a cornerstone for the two issues mentioned before, the major higher education organizations of the CBA could promote a **network approach**, in order to obtain cross-border cluster effects. This could mean exploring the complementarities in the scientific offer of the higher education organizations, promote joint programs or master degrees and/or facilitate student exchange, namely in subjects most relevant for the regional economy.

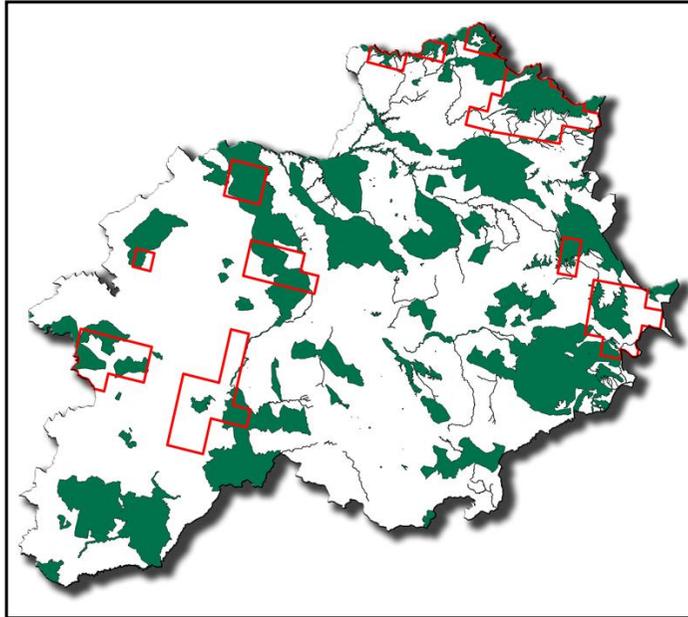


Legend

Higher education institution by number of students



Environmental sustainability



Source: http://www1.unex.es/eweb/gic_eccomap/

- Natura 2000 areas
- Biodiversity hotspots according to butterfly and bird population

When analysing the coverage of the Natura 2000 areas and their overlap with the areas which were considered to be hotspots according to the biodiversity, several conclusions can be drawn.

The first one is that, and although there is some coverage of the strategic habitats by the protected areas, there are also some mismatches, which suggest a more thorough analysis of the way in which the European environmental protection mechanisms can be used for species preservation.

A second interesting conclusion is that in several cases the Natura 2000 area limits are set by the border, indicating that it is following administrative and not natural boundaries set by ecosystem or habitat considerations.

The third and final conclusion is that a significant part of the strategic habitats are covered by dry land farming (24%) and dehesa/montado type of land use (23%), which further stresses the importance of this kind of agro-silvo-pastoral system in guaranteeing high levels of biodiversity and a sustainable use of resources.

An environmental protection strategy for this region could therefore focus on two main levels. On one hand, it is important to further consider deepening the cross-border coordination in delimitating and managing of the environmental protection areas and further progress in joint programs. On the other hand, the economic viability of the dehesa/montado systems should be guaranteed, namely by jointly promoting its outputs on the basis of its sustainability.

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Annex I – SWOT analysis

	<p style="text-align: center;">Strength</p> <ul style="list-style-type: none"> - Positive net migration rates in the last decade - Relatively high labour force mobility from the Alentejo to the Extremadura - No significant border effect limiting population growth 	
<p style="text-align: center;">Opportunity</p> <ul style="list-style-type: none"> - Some capacity to attract immigrants to balance the labour-force and the total population - Eventual adoption of more flexible retirement ages that reduce the labour-force challenge of the region - Consolidation of urban areas that are witnessing very stable growth patterns and a large share of women in fertile age (probably meaning that there is a tendency for young people to migrate from rural to urban areas) - Reduced pressure on some services and facilities given a stable population, especially the ones dedicated to young people such as schools, school transportation, kindergarten, etc. 	<p style="text-align: center;">Overall comprehensive strategy for DEMOGRAPHIC CHANGE</p> <ol style="list-style-type: none"> 1. Concentrate pro-fertility policies on the urban areas, as the rural areas tend to have very low shares of women in fertile age, therefore limiting their impact. 2. In urban and rural areas, adopt immigrant friendly policies, specially aimed at the young: <ul style="list-style-type: none"> • Facilitating job search (e.g. by creating structures such as offices for professional integration of immigrants); • Promoting temporary accommodation for recent arrivals; • Facilitating access to social services and equipments such as healthcare or kindergartens. 3. Promote and market affordable housing as a way to attract and fix existing population. 4. Plan for the adaptive reuse of many of the equipments and services for children that will become unnecessary, namely by adapting them for the elderly. 5. Since infrastructures and services for the elderly will have to be expanded to some degree, it could be useful to consider developing them even further and linking them to leisure, wellbeing and tourism in order to attract retirees of other regions or countries. 6. Adapt working conditions to help the ageing population in keeping economically active. 7. Try to adapt to eventual and localized labour force shortages by further stimulating cross-border commuting, therefore balancing labour market imbalances. 	<p style="text-align: center;">Threat</p> <ul style="list-style-type: none"> - Risk of a negative momentum of demographic growth (low fertility rates and/or emigration in previous years led to low amount of women in fertile age...) - Limited reach of pro-fertility measures in countering population decline - Reduced stimulus for the inflow of migrants given the threat of economic stagnation - Eventual scarcity of labour force for economic activities in the more remote parts of the area
	<p style="text-align: center;">Weakness</p> <ul style="list-style-type: none"> - High total dependency rates (high old age dependency rate not compensated enough) 	

	by low young age dependency rate) - Very low population densities (less than one fourth of the EU27 average) - Overall population growth close to stagnation in the last decade	
	<p style="text-align: center;">Strength</p> - Fairly polycentric hierarchy of the Functional Urban Areas (FUA) in the region (low primacy rate of the largest FUA in the region's urban system) - Low asymmetries in the distribution of the FUA throughout the territory (opposing the tendency of Portugal and Spain to concentrate major urban agglomerations on the coast) - The GDP of the FUA follows a similar distribution to that of the population meaning that no FUA exerts a strong economic dominance in the region	
<p style="text-align: center;">Opportunity</p> - Tendency of an in situ urbanization of the rural population leading to a growth in regional poles of attraction (for example, the population of major cities, such as Badajoz, has shown a considerable growth while the more rural areas have been losing population) - Further integration of the border could lead to the development of a urban core-labour pool dynamic, namely along the Badajoz/Elvas-Campo Maior axis	<p style="text-align: center;">Overall comprehensive strategy for POLYCENTRICITY</p> <ol style="list-style-type: none"> 1. Further promote the already in place principle of decentralized concentration: <ul style="list-style-type: none"> • Concentrate services and facilities in large and mid-sized towns, guaranteeing a minimum level of access throughout the territory, and strengthening their position at the national level. 2. Make use of the cross-border separation of functions, namely by studying the complementarities that can be established between different urban areas (e.g. on a basic level, it is possible to assume a core/labour pool relation between Badajoz and the Portuguese side of the border; more complex relation would imply different, but complementary functional specialization in the city system, which are of course challenging) 3. Counter the absence of urban agglomeration at the higher end of the hierarchy by consolidating the largest urban centres, namely through the cross border integration of the Badajoz/Elvas axis: <ul style="list-style-type: none"> • Consider the integration of public transport in order to facilitate commuting, specially from the Elvas to Badajoz (e.g. shared timetables and fares); • Consider the joint management of public infrastructures in order to gain scale and avoid redundancies (e.g. shared sport or leisure equipments). 	<p style="text-align: center;">Threat</p> - Further development of the pattern of growth that accentuates the contrast between metropolitan and non-metropolitan areas, benefiting capital regions and large city regions and reducing the level of polycentricity in the national urban systems at the intermediate scale - Increasing transport costs can lead to further concentration of population near the major working opportunities

	Weakness	
	<ul style="list-style-type: none"> - Low amount and small size of FUA in relation to the region's population (difficulties in generating urban agglomeration with critical mass) - Very small share of people living in FUA given the population of the region (only 31,2% of the total population lives in FUA, compared to the 74,8% in the total ESPON countries) 	

	Strength	
	<ul style="list-style-type: none"> - Well consolidated network of small and medium sized cities that can provide services that are associated with an urban environment in most of the region (health and education facilities, intermediate services for enterprises – accounting, consultancy, etc.) - Low loss of agricultural land to other type of uses - Low shares of urban land use and low urban land uptake in the last decade - Strong agricultural sector with productivities that are well above the European averages 	

Opportunity	Overall comprehensive strategy for URBAN-RURAL RELATIONSHIP	Threat
<ul style="list-style-type: none"> - Potential increase in irrigated agricultural areas by the Alqueva Dam - Significant production of goods in traditional manners, that might become increasingly valued (following the already established trend that led to the surge in biological products) - Low densities and abundance of natural and, especially, semi-natural areas that leave an untapped 	<ol style="list-style-type: none"> 1. Strengthen the position of the Alqueva dam as a development anchor in the cross border area, namely by further promoting the shared irrigation and tourist projects that can be framed through institutions like the Trans-border Association of Municipalities of the Land of the Great Lake (ATMTGLA). 2. In this context it would also be interesting to study joint management of water resources, which is an essential aspect of this regions development (given the high aridity and the importance of primary sector), in order to rise the cultivation of irrigated crops. 3. Given the increasing market for products that give a sense of authenticity or are linked to regional specificities, it would be useful to jointly promote quality products as opposed to highly mechanized and standardized production, such as the Iberian pig and other products from the dehesa/montado systems. 4. Lobby for the consideration of the specificities of the dehesa/montado system in 	<ul style="list-style-type: none"> - Rapid liberalisation of the Common Agricultural Policy (reduction of tariffs, of budget and of export subsidies) and increasing energy prices could lead to the intensification of the agricultural production in the more fertile and centrally located areas and also an increase in the competition of farm products from outside of the EU - Eventual reduction of the support to rural development policy from the European

<p>resource for economic diversification in the rural areas (e.g. new forms of tourism or residential functions for retired people)</p>	<p>the way in which the CAP funding is made available.</p> <p>5. In order to make service provision affordable in the more rural areas, a strategy could be adopted in which mid-sized towns function as centres of provision of services of general interest, which are thereafter extended to the surrounding low density territories through mobile means. This strategy could also be of great use if tourism and/or residential function in rural areas are to be pursued, since this would be a way to allow the provision of amenities that are normally associated with an urban lifestyle.</p> <p>6. Keep policies to minimize urban sprawl and generally low artificial land uptake that are characteristic of the region.</p>	<p>Union.</p> <p>- Further territorial differentiation of the demographic structure (younger generations in metropolitan areas and more retirees in rural areas) is accompanied by a corresponding marginalization and progressive abandonment of the rural areas</p> <p>- Difficulties in satisfying an increasing demand of services from an ageing population in the rapidly declining rural areas (especially considering the very low population densities)</p>
	<p>Weakness</p> <ul style="list-style-type: none"> - Very few urban centres of considerable size - Decreasing productivity in the agricultural sector on the Portuguese side of the border 	

	<p>Strength</p> <ul style="list-style-type: none"> - Strong development in road infrastructure in the last decades - One of the busiest border crossings between Portugal and Spain (Caia-Badajoz) - Large amount of commuters from the Portuguese to the Spanish side of the border 	
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<p style="text-align: center;">Opportunity</p> <ul style="list-style-type: none"> - The development of the trans-European transport network (TEN-T), namely the high speed connection which could lead to a more direct link between this region and Central Europe - Fairly well developed road infrastructure that can connect the many medium-sized and small towns to the major trunk networks that are being planned 	<p style="text-align: center;">Overall comprehensive strategy for ACCESSIBILITY & CONNECTIVITY</p> <ol style="list-style-type: none"> 1. Development of an integrated low density accessibility program that is based on the following assumptions: <ul style="list-style-type: none"> • A multimodal intelligent and flexible transportation network; • Alternative forms of service provision that combine ICT use with itinerant services; • Take advantage of capacities that are already there, namely of third sector organizations, therefore minimizing new infrastructural and equipment investments. 2. Analyse cross-border commuting flows in order to see if the Badajoz urban area does extend its labour pool beyond the border, as is expected, and try to understand the type and intensity of commuter flows and the justification (or not) of increasing the cross-border public transport connections. 3. Lobby for the conclusion of a high speed rail connection from the Sines seaport to Madrid passing through the CBA, which is of a crucial interest for this region's development. 	<p style="text-align: center;">Threat</p> <ul style="list-style-type: none"> - The continued increase in energy prices (in particular of oil) is a major constraint in the transport sector, both for goods and people's transport, and could therefore make the access from and to the region more difficult (particularly considering its fringe position in the European context, and that the economy of peripheral countries is more dependent on transport) - Infrastructure development and transport services in the context of an economic crisis could focus on trunk connections between the main metropolitan areas at the expense of more local connections
	<p style="text-align: center;">Weakness</p> <ul style="list-style-type: none"> - Low potential accessibility by air and rail - Low potential accessibility by road, although much better than the previous two and with a tendency to increase - Very weak values in the connectivity indicators, indicating that the ICT uptake is not necessarily contradicting the region's physical remoteness 	

	<p style="text-align: center;">Strength</p> <ul style="list-style-type: none"> - Maintenance of a productive agricultural sector which excels by highly mechanized production as well as production of iconic goods through traditional methods (e.g. iberian big in the montado/dehesa system) - Well preserved natural and semi-natural areas that form an harmonious landscape - Presence of a major urban seaport linked to a major refinery (Sines) - The region has good conditions for generating a diversified mix of high quality tourism products namely: <ul style="list-style-type: none"> - Good environmental indicators (clean air, low artificial land uptake, etc.) - Very important cultural heritage from pre-historic (Almendres menhir and cromlech, Maltravieso cave or Los Barruecos), as well as historic periods (Trujillo, Guadalupe, Cáceres, Mérida, Évora, Vila Viçosa) - Good conditions for astronomical observations (low photopollution and large share of clear nights) - The higher education institutions of the region have a considerable offer in programs in areas that are relevant for the regional development, such as agriculture, tourism and renewable energy sources. 	
<p style="text-align: center;">Opportunity</p> <ul style="list-style-type: none"> - Increasing energy prices can lead to an increase in maritime transportation which, allied to a relative saturation of the seaports in Central Europe (due to less land that is available for their continuous expansion), can strengthen the position of the seaport in Sines - Further growth of tourism sectors that are not part of the “Sun and See” destinations - Strategic position of the Badajoz-Elvas on the Lisboa-Madrid Axis making it a focal point in the high-speed line that (sooner or later) will be established between the two metropolises opens opportunities for: <ul style="list-style-type: none"> - Increase of the logistical 	<p style="text-align: center;">Overall comprehensive strategy for LISBON/EUROPE 2020 OBJECTIVES</p> <ol style="list-style-type: none"> 1. Promote a strategy that focuses on the creative adaptation of external knowledge and innovations. This means fostering the capacity to know what technology and procedures are available and how to adapt them to the specific needs of the territory. 2. Promote programs and curricula in the higher education institutions with regional relevance in order to provide qualified human resource and to allow for spill-over effects. This strategy could be coordinated in both sides of the border leading to cross-border cluster effects in areas such as: agriculture, tourism and renewable energy sources. 3. The mix of low density, low economic development and poor social cohesion, may be countered by the growing integration of public policy with the third sector in order to guarantee service provision and other ways to foster social innovation. Although the (apparently) low levels of social capital might pose a further 	<p style="text-align: center;">Threat</p> <ul style="list-style-type: none"> - Most parts of the CBA keep the diverging /very slow conversion tendency demonstrated in the GDP per capita growth in the last decade - The increase of energy prices threatens the economic development of the peripheral regions of Southern Europe which are more dependent on transportation (energy intensity in Spain as well as Portugal is high when compared to most Central European countries) - Retraction of state investment and services in the actual scenario can have a very disruptive effect given its high relative importance in the regional economy

<p>importance of Badajoz-Elvas (especially in the freight transport from and to the Sines and Lisbon ports)</p> <ul style="list-style-type: none"> - Increase of its importance as a meeting point (congresses, seminaries, business meetings, etc.) 	<p>challenge for this strategy.</p> <ol style="list-style-type: none"> 4. Develop initiatives in the tourist sector that can take advantage of the similar products on each side of the border, for example: <ul style="list-style-type: none"> • Create synergies between the Alqueva Dark Sky reserve and the Observatory of the University of the Extremadura for astronomical observations in the region; • Consider the joint promotion and other forms of integrating shared products in order to gain scale. 5. Prepare to take advantage of the new accessibility condition that will come from the eventual construction of the high speed train connections between Lisbon/Sines and Madrid. Namely these strategies should focus on logistics, but also on the eventual increase in meeting and other event related activities. 	<ul style="list-style-type: none"> - Changes in the CAP funding could threaten the economic output of the agricultural sector of the region - Struggle of economic sectors that could suffer from factors related to an increasing remoteness, such as decreasing economies of scale, growing distance to markets or labour force scarcity
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	<p style="text-align: center;">Weakness</p> <ul style="list-style-type: none"> - Great distance of the GDP per capita from the leading region in the EU27 - Weak technological and innovation capabilities, reflected in low R&D investment from the public as well as the private sector and a low amount of patent applications - Poor social cohesion indicators: <ul style="list-style-type: none"> - High unemployment (general as well as long term and youth unemployment) - High risk of poverty after social transfers - Relatively high economic disparities between the two sides of the border that have been deepening - Strong weight of the public administration in the of the economy of the region (in terms of employment as well as GVA) - Strong weight of the construction sector in the Extremadura (even above the Spanish average, which is in itself well above the European figures) - The area shows signs of low social capital 	
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	<p style="text-align: center;">Strength</p> <ul style="list-style-type: none"> - Widespread agro-silvo-pastoral system that keeps a balance between economic goals, biodiversity and resource usage - Good performance in many climate related indicators: <ul style="list-style-type: none"> - Low ozone concentration 	
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	<ul style="list-style-type: none"> - Good air quality regarding pollutants (even in the air quality measuring stations close to the Sines refinery) - Low industrial, residential and transport related PM10 and CO² emissions - High percent of Natura 2000 areas - Well preserved natural and semi-natural areas that form an harmonious landscape - Abundance of non-artificial land use 		
<p style="text-align: center;">Opportunity</p> <ul style="list-style-type: none"> - Low densities and relatively stable population growth put low pressure on land use allowing for the eventual development of environmental protection zones - Increasing energy prices can make room for the exploitation of renewable energy sources for which the region has good conditions: <ul style="list-style-type: none"> - One of the highest solar exposures in Europe - Abundance of soil - Take advantage of the well preserved environment for promoting nature tourism 	<p style="text-align: center;">Overall comprehensive strategy for GOTHENBURG STRATEGY OBJECTIVES</p> <ol style="list-style-type: none"> 1. Develop the renewable energy source sector, namely the photovoltaic, by taking advantage of the high solar exposure as well as the abundance of land. 2. Consider further cross-border integration of the policies on the establishment and management of environmental protected areas, namely by establishing joint programs for habitat preservation of endangered species, such as the great bustard and, if it eventually recovers some of its lost habitat, the Iberian lynx. 3. Guarantee the sustainability of the dehesa/montado kind of agro-silvo-pastoral system namely by: <ul style="list-style-type: none"> • Marketing its outputs to create added value from its sustainability; • Develop lobbying activities in order to guarantee that the CAP funding actually benefits this kind of model. 4. Implement policies to keep the high share of natural and semi-natural areas, as well as areas under environmental protection. 	<p style="text-align: center;">Threat</p> <ul style="list-style-type: none"> - Reduction of the CAP funding and restrictions on international competition put pressure on the Dehesa/Montado systems that could trigger: <ul style="list-style-type: none"> - More intense land use that could tip of the actual balance in the medium run; - The abandonment of many of farms and an overall decline of the region's ecosystem. - Continuous rise of average temperature combined with the aridity and the decreasing human intervention can lead to: <ul style="list-style-type: none"> - Increase in draughts and fires; - Reduced agriculture production. - The two previous threats combined, besides their impact in the social and economic sustainability in the region, are also major threats to the biodiversity as dryland farming and dehesa/montado type of land use constitute 24% and 23% of the areas considered strategic to this aspect by the Ecomap project 	
	<p style="text-align: center;">Weakness</p> <ul style="list-style-type: none"> - High aridity in large parts of the CBA - High average temperature and low/medium rainfall in much of the CBA - Relatively high pollutant emissions from agricultural sources (especially in the 		

	<p style="text-align: center;">Strength</p> <ul style="list-style-type: none"> - The overall political and the planning systems show some similarities, and the languages allow to a certain extent semi-communication (reciprocal understanding without being fluent in the respective language). - From a morphological point of view, the border does not represent a major barrier. - Large experience in cross-border cooperation in EU programme based projects, currently in particular as the INTERREG platform POCTEP - High amount of city-networks and interregional cooperation - An interactive cartographic tool does exist and is accessible online. 	
<p style="text-align: center;">Opportunity</p> <ul style="list-style-type: none"> - Only recently, in 2009, the involved regions have founded the joint institution of “Euroace” that is comparable to the ‘classical’ Euroregion we know from other parts in Europe. - The recent strategic document Eurace 2020 not only gives a comprehensive territorial analysis of the cross-border setting but also defines strategic guidelines and objectives that are ambitious 	<p style="text-align: center;">Overall comprehensive strategy for CROSS BORDER COOPERATION AND GOVERNANCE</p> <ol style="list-style-type: none"> 1. Further deepen the cross border cooperation, namely in what regards joint transport and territorial development strategy. 2. Aim at internalizing some of the knowledge and network capital that is being built by the successive cross-border cooperation projects by giving it more durable institutional arrangements, namely in the context of the already existing bodies with legal personality, such as the Euroace. 3. Promote intercultural exchange. 4. Highlight informal networks as a major asset in strengthening territorial cooperation. 	<p style="text-align: center;">Threat</p> <ul style="list-style-type: none"> - A clear joint agenda and methods to achieve it is still not expressed in any concrete governance scheme - Although there have been recent efforts to harmonize data on both side for the border in the OTALEX atlas, these initiatives are punctual, increasing the risk of very asymmetrical information on which joint initiatives could be based on
	<p style="text-align: center;">Weakness</p> <ul style="list-style-type: none"> - Relatively recent development in the constitution of more institutionalized forms of cooperation - Very low population densities (less than one fourth of the EU27 average) - Overall population growth close to stagnation in the last decade 	

Annex II – Full version of the Multi-thematic territorial analysis

Ulysses

Using applied research results from ESPON as a
yardstick for cross-border spatial development
planning

Multi-thematic territorial analysis 6: Extremadura-Alentejo cross border area

Final version/07/2012



This report presents a more detailed overview of the analytical approach to be applied by the project. This Targeted Analysis is conducted within the framework of the ESPON 2013 Programme, partly financed by the European Regional Development Fund.

The partnership behind the ESPON Programme consists of the EU Commission and the Member States of the EU27, plus Iceland, Liechtenstein, Norway and Switzerland. Each partner is represented in the ESPON Monitoring Committee.

This report does not necessarily reflect the opinion of the members of the Monitoring Committee.

Information on the ESPON Programme and projects can be found on www.espon.eu

The web site provides the possibility to download and examine the most recent documents produced by finalised and on-going ESPON projects.

This basic report exists only in an electronic version.

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Nomenclature

CBA: Abbreviation for the Extremadura-Alentejo cross border area

NUTS: Abbreviation of the Nomenclature of Units for Territorial Statistics. It represents a 'geocode standard' for referencing the subdivisions of EU space for statistical purposes.

NUTS 1: First level definition of the EU space, corresponding to countries.

NUTS 2: Second level definition of the EU space, corresponding to regions

NUTS 3: Third level definition of the EU space, corresponding to

NUTS 4: Fourth level definition of the EU space, corresponding to municipalities.

Chapter 0 – Executive summary

Portugal and, to a lesser extent, Spain are normally understood as part of the periphery of the European Union, in a geographical as well as an economic sense. The border between these two countries is, on its turn, a periphery for each one of them. In the European context, the cross border area of the Alentejo-Extremadura can therefore be understood as a “periphery of a periphery”.

This peripheral location is a crucial element which shapes this regions’ behaviour in many of the analysed dimensions manifesting itself in an overall low density in human settlements, infrastructures and economic activities and a poor capacity in achieving the Lisbon/Europe 2020 and Gothenburg Strategy objectives in all except the climate indicators.

Accessibility and connectivity

As stated above, this cross border area is marked by overall low densities, to which communication and transport infrastructures and services are no exception.

Regarding the few connectivity indicators that were analysed, this CBA has one of the poorest performances of the whole countries it belongs to.

Regarding accessibility, the long term choice for transport modes of this CBA seems to be the road, for which the regions’ potential accessibility scores were the highest when compared to other modes of transportation (rail and air). In fact, and although the potential accessibility by road is still well below the ESPON average, the road infrastructure has been witnessing major improvements in the last two decades, especially on the Spanish side of the border. This CBA also has one of the most important road border crossings in terms of daily car and truck intensity of all Portuguese-Spanish border (the Caia-Badajoz border crossing).

The potential accessibility for rail, on the other hand, is very low and its evolution between 2001 and 2006 shows a negative tendency in the NUTS 3 where the scores were the lowest.

But although accessibility and connectivity levels are very low, this region’s transport infrastructure is essentially in line with its remote position. Considering the very low densities, the regions can even be understood as having a fairly good infrastructure.

Demography

This CBA is struggling with a major ageing challenge in the Alentejo and labour force replacement challenge in the Extremadura. Several aspects are worth being analysed on this topic.

The first one is that, as these regions have been witnessing a decline in the young cohorts over extended periods, the ratio of persons aged over 65 is very high, not only in comparison to the cohorts of people under 15, but also in comparison to the working aged population.

The second, which is closely related to the previous one, is that most of the CBA seems to be experiencing a negative momentum of population growth. It is therefore very likely that most of these territories will witness an accelerating natural population decline in the next decades, even if the life-expectancy continues to grow and if effective measures to boost fertility would be put into place.

The third one is that, given the negative outlooks for natural population growth, the demographic sustainability of many of the settlement of these regions will depend on their capacity to attract population. This has been occurring to some extent in most of the regions, but it is not clear how this will progress, as the migration rates depend a lot on different variables such as the political context, accessibility levels or economic performance.

The fifth is that the major demographic challenges, although common to all of the regions, are not experienced at the same magnitude by all of them and cannot easily be linked to the border condition on a local level. For instance, a positive effect of the border distance on population growth has only been observed on the Portuguese side, which also suffers from decreasing densities as we move towards more remote areas. On the Spanish side there are consolidated

settlements very close to the border and the regions' population growth is also positively impacted by smaller border distances, even if this impact is not very significant.

The sixth is that the before mentioned growing urban agglomerations on the Spanish side of the frontier have a significant effect on the demographic potential on the neighbouring areas. This implies that a further integration, especially around the Badajoz-Elvas axis might attenuate the remote position of the whole border regions. Deeper ties between these two sides of the border might also benefit the already relatively high amount of workers that commute from the Alentejo to the Extremadura.

Policentricity

As stated by the Territorial Agenda of the European Union 2020, polycentric territorial development is a major factor for cohesion, since a network of cooperating cities act as centres for development in the larger territories. Concerning the polycentric development of this CBA, six major conclusions have been drawn.

The first one is that the share of people living in Functional Urban Centres is very low in. Only 31,2% of the total population lives in FUA, compared to the 74,8% in the total ESPON countries, 73,5% in Portugal or 83,7% in Spain.

The second one, which is a consequence of the former, is that the amount and size of these FUA is very small. Essentially, besides the already low densities, this region is also characterized by the difficulty of agglutinating its population in urban areas of a significant any size.

The third one is that the FUA network lacks hierarchy in the upper end of the rank size distribution. When considering that the share of the prime city in the total FUA is also relatively low, this means that city system does have a polycentric layout, even if at a very low scale.

The fourth is that the FUA are, sparsely, but evenly spaced throughout the CBA. This region therefore does not follow the overall tendency of Portugal and Spain to concentrate the biggest cities at the coast, leaving much of the interior deprived of major urban agglomerations.

The fifth is that the hierarchy of the GDP per capita distribution among the FUA is very similar to the one of the population. So the CBA does not follow the pattern of the ESPON space, where wealth is distributed in a more hierarchical way among the FUA than population.

Urban-rural relationships

As stated before, the amount of urban population is very low in this region. The urban-rural relationships are therefore marked by a spatial layout that consists of a network of small urban areas that spreads out over a large, predominantly rural, territory.

These rural areas have a large share of agricultural areas, although they have the overall tendency to diminish. But the changes in the share of agricultural areas seem to be only slightly related to the growth of artificial surfaces, and more to their abandonment or the uptake of forests or semi-natural areas.

As would be expectable, the low progress in the artificialization of the land use also extends itself to the urbanisation process. There is only one NUTS 3 in this CBA in which the urban land consumption is faster than at the national levels. But even this makes sense, as it is the region of the CBA with the largest population growth in the last decade.

Besides having large shares of land dedicated to agriculture, the economic structure of this CBA is also characterized by the weight of this sector. Its share in the regions' total values is well above the national average in employment but especially in Gross Value Added. But the agricultural sector in this CBA stands out not only for its weight, but also for its high labour productivity. This high productivity is linked to a highly mechanized and standardized production process which contrasts with the traditional rural lifestyles and rhythms.

Lisbon/Europe 2020

As for the Lisbon/Europe 2020, six major aspects were highlighted.

The first one is that the economic situation of these regions is fragile, especially on the Portuguese side of the border. On one hand, all of the NUTS 3 are well below the leading

region in terms of GDP per capita. On the other hand many of them have been diverging, or converging very slowly, from the leading region over the last decade.

The second one is that the region has relatively high economic disparities, especially between the two sides of the border, despite sharing so many overall characteristics. This seems to imply that belonging to one country or another has in itself a much greater impact on the regions' economic performance than the more remote or central position it occupies within a country.

The third one is that most of the regions' social cohesion indicators are much worse in this CBA than the respective national averages. This is especially worrying for the Extremadura, given that Spain already tends to have high values in these kind of indicators (youth unemployment, at risk of poverty after social transfers, etc.).

The fourth is that the public sector plays a greater role in the CBA than in the rest of the countries. As can be seen in the factor analysis, a large weight of the public sector is often related to depressed territories, as the public services are more evenly distributed among the territory and therefore leads to their overrepresentation in a scenario of a dwindling private sector.

The fifth is that the regions' capacity to invest in research, development and innovation is very limited and is reflecting itself on the outputs (e.g. low amount of patent applications).

The sixth is that the regions have a relatively good performance on climate related indicators, such as soil sealed areas, ozone concentration or protected areas. The threat of the long term climate change is also limited in its potential impacts due to the low densities in population and infrastructures of this region.

Overall conclusion

The overall conclusion that can be reached from this analysis is that this CBA's will face major challenges in the future. On one hand, this region's situation in many of the indicators is already poor when compared to the EU27. Not only does it have low accessibilities, small urban areas, low GDP per capita and poor social cohesion, but many of the NUTS 3 are also diverging from the leading region in the GDP growth. On the other hand, as has been revealed by the factor and regression analyses, the NUTS 3 of this CBA perform badly in the main factors that explain good economic performance in Europe. For example, all the NUTS 3 fall below the 20% percentile in the factor that is related to central location and a strong service sector, which has the biggest weight when explaining a region's GDP per capita. In the factor that expresses R&D&I, most of the Portuguese regions fall below the 50% percentile, while the Spanish ones fall below the 80%.

The demographic challenge that affects this region is also a strong menace, given its already very low densities. Some of the predictable challenges of this situation include: the satisfaction of an increasing demand of services from an ageing population that is scattered on a large area; the maintenance of general public infrastructures (roads, water, schools, etc.) for a population that would no longer justify them from an efficiency point of view; the viability of ecosystems that rely on human activities; the struggle of economic sectors that could suffer from factors related to an increasing remoteness, such as growing distances to markets, decreasing economies of scale or scarcity of labour force.

Chapter 1 – Report objectives and general overview

1.1. ULYSSES objectives

ULYSSES is a case study oriented project which has as main aim to use ESPON applied results as a yardstick for decentralized cross-border spatial development planning. It has four overall objectives:

- Promote ESPON research results by raising the awareness among involved stakeholders on the practical utility of decentralised cross-border spatial development;
- Produce multi-thematic territorial analysis for the cross-border areas by making use of available ESPON applied research results and other local analyses / data, taking into consideration future territorial challenges;
- Promote experience and best practices exchange in the field of cross border spatial development, by applying coherent cross-border strategies, and;
- Promote a further application of targeted research results in the selected Cross Border Cooperation (CBC) areas and review the general usefulness of applied research results in the context of cross border spatial development.

More specific objectives of ULYSSES are:

- Multi-scale and multi-thematic territorial analysis: To analyse the territorial socioeconomic dynamics and performances of each territorial unit with regards to six targeted themes under analysis and different territorial scales. The objective is to identify the territorial drivers and dynamics.
- Institutional performance analysis: To identify key institutional drivers that could allow building better baseline strategies in order to answer main challenges identified.
- Integrated analysis: To make an integrated analysis of the territorial performance and dynamics and the institutional performance, relating the performance analysis with the policy structures and actions.
- Policy alternatives: To formulated strategic guidelines to cope with identified challenges in each cross-border areas, methodological guidelines for future cross-border analysis and policy recommendations at national and EU level that encourage cross-border area territorial cooperation.

The territorial units to be examined within the framework of ULYSSES are:

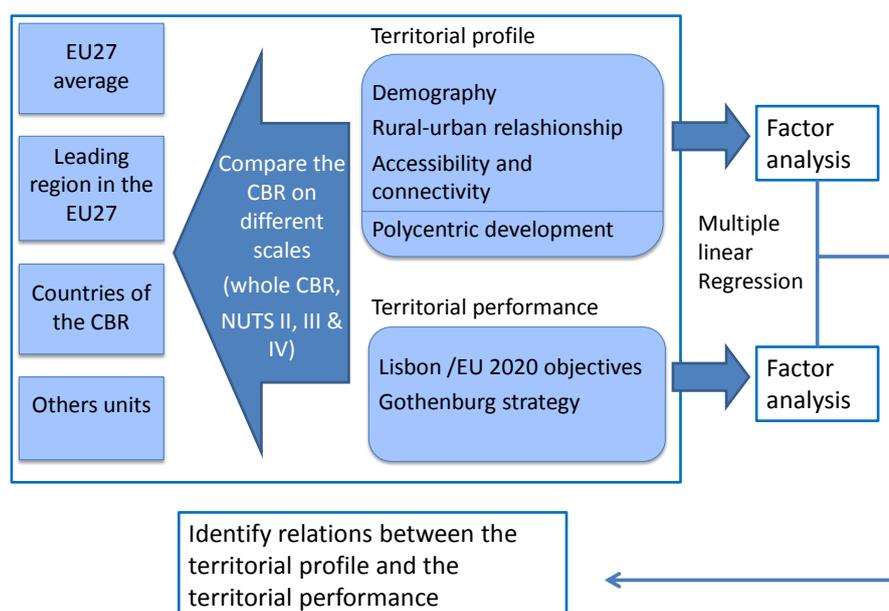
- CS 1: The Upper Rhine cross-border area along the land borders between France, Germany and Switzerland,
- CS 2: The cross-border area along the entire Spanish-French land border (Pyrenees),
- CS 3: The cross-border area along the land border between Greece and Bulgaria,
- CS 4: A cross-border area covering parts of the Northern Finland-Russian land border (Karelia),
- CS 5: A cross-border area along the borders between Poland, Germany (land border) and Sweden (maritime border), and
- CS 6: Extremadura/Alentejo (ES/PT).

This Report is referring to the Extremadura-Alentejo cross border areas along the land borders between Portugal and Spain and is part of Task 2.2 entitled “Multi-scale Performance Analysis”. The main aim of this task is the identification of territorial socioeconomic dynamics and performances for this CBA concerning six targeted themes under analysis.

1.2. Methodology

The general aim of Task 2.2 is to do a multi-thematic and multi-scale analysis of the different Cross border areas.

For this, the regions' behaviour regarding two major dimensions was analysed: territorial profile and territorial performance. The territorial profile refers to indicators of the four major ESPON themes (polycentric development, urban-rural relationship, accessibility & connectivity and demography). The territorial performance refers to their capacity in achieving the Lisbon/EU 2020 and Gothenburg strategy goals. Besides the individual analyses of each topic, these two dimensions were also subjected to a more detailed analysis in order to identify causal relations between them.



Multi-scale analysis

For analysing both dimensions, the indicators of each of the CBA were compared on **different scales**: (1) between different NUTS III (and in some cases NUTS II or IV) of the CBA; (2) between the CBA and the countries to which they belong to; (3) between different NUTS III (and in some cases NUTS II or IV) of the CBA regions belonging to a different country; (4) between different NUTS III (and in some cases NUTS II or IV) of the CBA and a reference index that can be established by the EU27 average, the leading region in the EU27, the individual countries of which the CRB are part or any other reference that might be useful to understanding the regions' performance for a specific indicator (for example, regarding total fertility rates, it is useful to evaluate the regions according to the renewal of their population: total fertility rate of 2,1).

The comparison between different scales had two main purposes. The first one was to understand the regions' behaviour in context, as many indicators are not easy to interpret in absolute terms. The second one was to contribute in understanding the effect of the border on the regions' behaviour. For example, a comparison of one side of the border of a CBA to the national average as well as the other side of the border might help to evaluate whether a region's performance is more influenced by its border position or by the realities of the countries it belongs to.

Factor analysis

The different themes were also be subjected to different statistical analysis in order to identify causal relations between the relative performances of each CBA and the territorial profile, as well as the main drivers behind the different performances.

For this, two different factor analyses were made: one for the territorial profile and one for the performance indicators. These factor analyses were made using data on a NUTS 3 scale for all the EU 27 countries. The polycentricity indicators were excluded, because they are not suited for the NUTS 3 level at which the analysis was performed. Also, and since the intention was to establish a causal relation between general aspects that characterize the regions and their performance, some of the indicators that are typically related to the Lisbon/Europe or the Gothenburg Strategy were included in the first set of indicators. This was the case, for example, for the ESPON climate indicators. These indicators relate the regions' sensitivity to potential climate change (e.g. the amount of flood prone areas) with elements of their spatial layout (e.g. population density, presence/absence of susceptible economic infrastructures). In this sense these indicators do not really reflect a regions capacity in reaching the Gothenburg goals, but are more related to their general exposure which is, to a high extent, a consequence of their geographical position or historic evolution.

Regression analysis

After the factor analysis, several multiple regressions were made, having as independent variables each factor of the performance indicators and as dependent variables all the factors of the territorial profile. Essentially, this analysis distinguished the influence of the regions' characteristics on its capacity to develop itself in a sustainable and cohesive way. But this does not mean that the territorial profile and the territorial performance are not relevant *per se*: the relations between different indicators are not necessarily marked by unique and clear-cut causal relations and relevant indicators of the territorial profile may have no significance to the territorial performance.

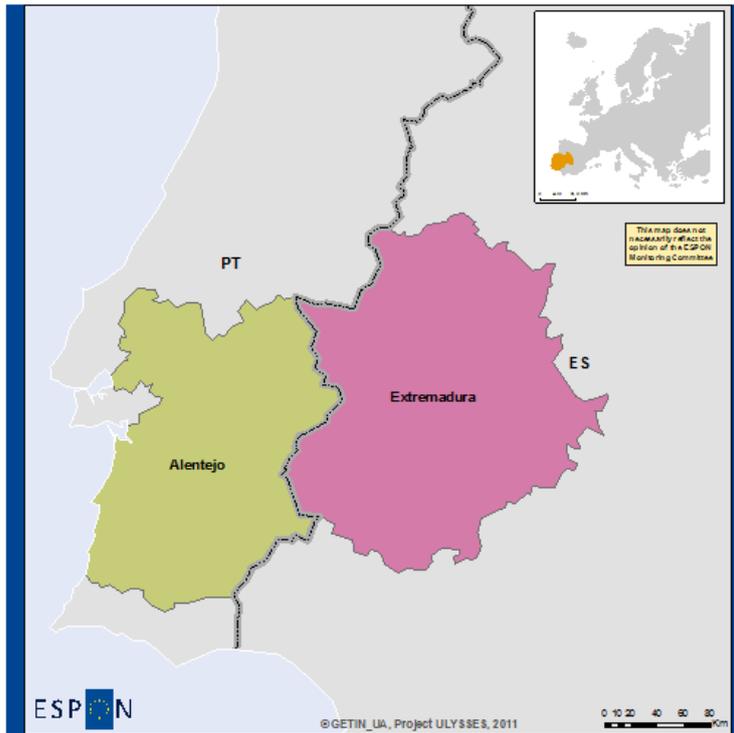
Main outputs

- A territorial profile of each CBA, based on the different themes under analysis;
- An evaluation of the territorial performance based on Lisbon/EU 2020 and Gothenburg objective indicators;
- Analysis of the relations between the territorial performance and the territorial profile;
- Analysis of the most relevant drivers that influence the regions behaviour regarding the different themes.

1.3. General overview of the Extremadura-Alentejo CBA

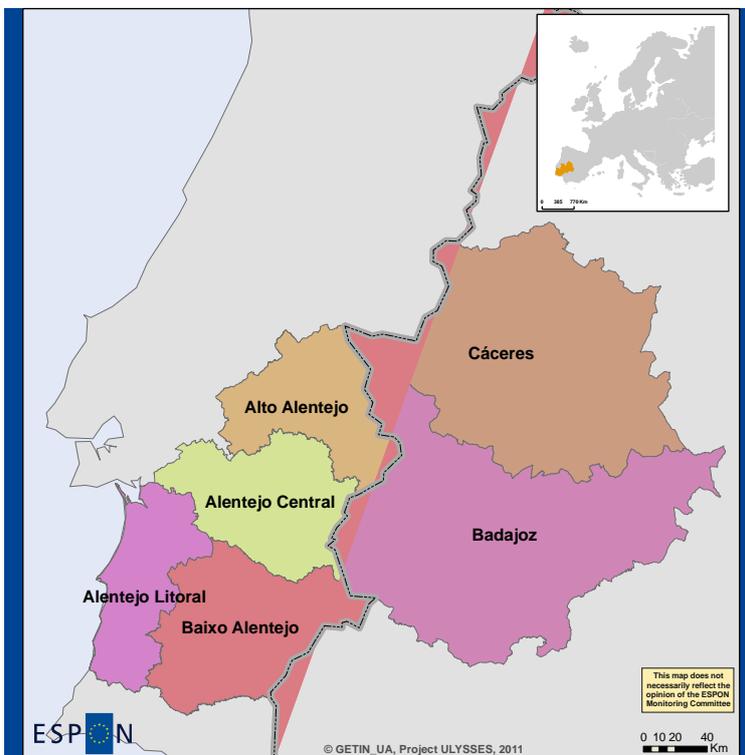
The Cross Border Area (CBA) of the Extremadura-Alentejo comprises the NUTS 2 of the Alentejo on the Portuguese side and the Extremadura on the Spanish side with their respective NUTS 3.

Map 1 & 2: Administrative units NUTS 2



NUTS	NUTS name	Area (km ²)
ES43	Extremadura	41634,5
PT18	Alentejo	31551,1

Local level: NUTS 2
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NUTS	NUTS name	Area (km ²)
ES431	Badajoz	21766,3
ES432	Cáceres	19868,2
PT181	Alentejo Litoral	5255,7
PT182	Alentejo Alto Alentejo	6248,9
PT183	Alentejo Central	7228,8
PT184	Alentejo Baixo Alentejo	8542,7

Local level: NUTS 3
 Year: 2006
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Chapter 2 – Demographic Analysis

2.1. Aims, Indicators and Methods

The main objective of this chapter is to identify the CBA's behaviour regarding demography. Namely, we will try to answer the questions: how is the border affecting settlement patterns? are the border regions growing faster or slower than non-border regions? is their population ageing more or less rapidly?

2.1.1. Data

The indicators that were used for this analysis were the following:

Indicator	Geographical scale	Source	Time frame
Population density	NUTS 3, Lau 1/2	EUROSTAT, National Statistical Institutes	2000-2009
Net migration, natural growth, total growth	NUTS 3	EUROSTAT, Demipher Project	2000-2009
Demographic potential	Lau 1/2	Own calculation	2008
Actual and expected net migration and natural growth rates	CBA	Own calculation and EUROSTAT	2000-2009
Commuters to other countries by active population	NUTS 2	EUROSTAT	2009
Commuters to other regions by active population	NUTS 2	EUROSTAT	2009
Total fertility rate	NUTS 2	EUROSTAT	1997-2009
Total fertility rate	NUTS 3	National Statistical Institutes	2003-2007
Young age dependency rate	NUTS 3	EUROSTAT	2009
Old age dependency rate	NUTS 3	EUROSTAT	2009
Ageing index	NUTS 3	EUROSTAT	2009
Foreigners requesting residents permit	Lau 1/2	National Statistical Institutes	2008
Women in fertile age	Lau 1/2	National Statistical Institutes	2010

Given the regularity at which demographic indicators are updated (even if through estimations) and that the ESPON demographic indicators are essentially built on EUROSTAT data, the data for demography comes majorly from this source. Data from the Demipher (ESPON) project was also used in order to fill occasional data gaps.

2.1.2. Methods

Most of the demographic analysis is based on standard indicators. These indicators essentially refer to the evolution of the population, the cause of this evolution (natural growth, migration rates), the age structure and commuting data.

Besides the more straightforward demographic indicators, two additional analyses were performed for the CBA: population growth and demographic potential. Both of these indicators relate population with distance. Although the distance should ideally be the actual travel time by road, here a simplified version was used based on air distance.

Demographic potential

The capacity of a region to develop itself does not only depend on its intrinsic characteristics but is also a function of its accessibility to other regions (Dentinho 2007). It is therefore important to understand how a region is positioned in the whole network of other regions, namely how far it is from other major poles or densely populated areas. For this analysis the demographic potential was calculated for all the LAU 1 in Portugal and Lau 2 in Spain.

The demographic potential of a given point i relative to j can be obtained through the following formula:

$$V_j = \sum_j \frac{P_j}{d_{ij}}$$

V_j = potential in j, P_j = population in j and d_{ij} = distance between j e i

The regions' own potential is included by dividing its population by one fourth of its perimeter (calculated through the area of the region and not its actual perimeter). In this case the population and distances between the centroids of the all the Lau 1 of the Portuguese part of CBA and Lau 2 for the Spanish part, as well as the NUTS 3 in the rest of the countries were considered.

Border effect on population growth

There is a common tendency to relate border regions with geographical, demographical and economic remoteness. At a first glance this seems certainly true for the Extremadura – Alentejo CBA. But what exactly is the border effect on the actual evolution in the settlement patterns? To answer this question a simply relation between demographic growth and border distance is not enough, as population growth it is very dependent on population density. In fact, as can be seen in the maps to follow, the highest effective growth rates tend to concentrate around the more densely populated regions.

This means that, in order to actually be able to evaluate whether the population growth is related to the border effect, a function that considers population density as well as the distance to the border was applied. This function can be described by the following formula:

$$\text{Growth Rate} = A + a_{db}db + a_d d + \varepsilon$$

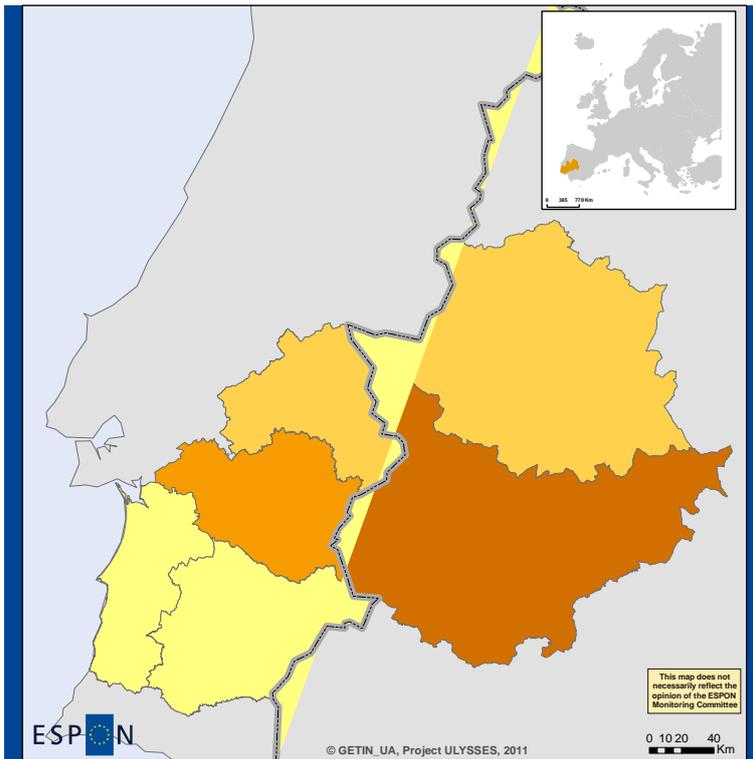
Where db is the distance to the border of the region's centroid and d is the density of a given region.

For this case-study the standardized value for the annual population growth between the years 2000 and 2010 and the population density for the year 2000 were used, as well as the shortest distance to the border from the LAU 1/2 centroids.

2.2. Total population

As said before, the Alentejo and the Extremadura are low density regions. In demographic terms, this applies to all of its territories. The biggest total population, on the other hand, belongs to Badajoz, which is easily justified by its area.

Map 3: Population density 2009 by NUTS 3



NUTS	Population 2009	% CBA	Inhab. km2
Portugal	10617575	-	115,4
Spain	45283259	-	90,57
Total PT CBA	757069	-	24
Total CBA ES	1080439	-	25,95
Total CBA	1837508	-	25,11
Badajoz	674649	36,72	31
Cáceres	405790	22,08	20,42
Al.Litoral	95524	5,20	18,18
Alto Alentejo	116744	6,35	18,68
Al. Central	168979	9,20	23,38
Baixo Al.	126234	6,87	14,78

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Legend

Inhabitants by square kilometer

14,78 - 18,17	20,43 - 23,38
18,18 - 20,42	23,39 - 31,00

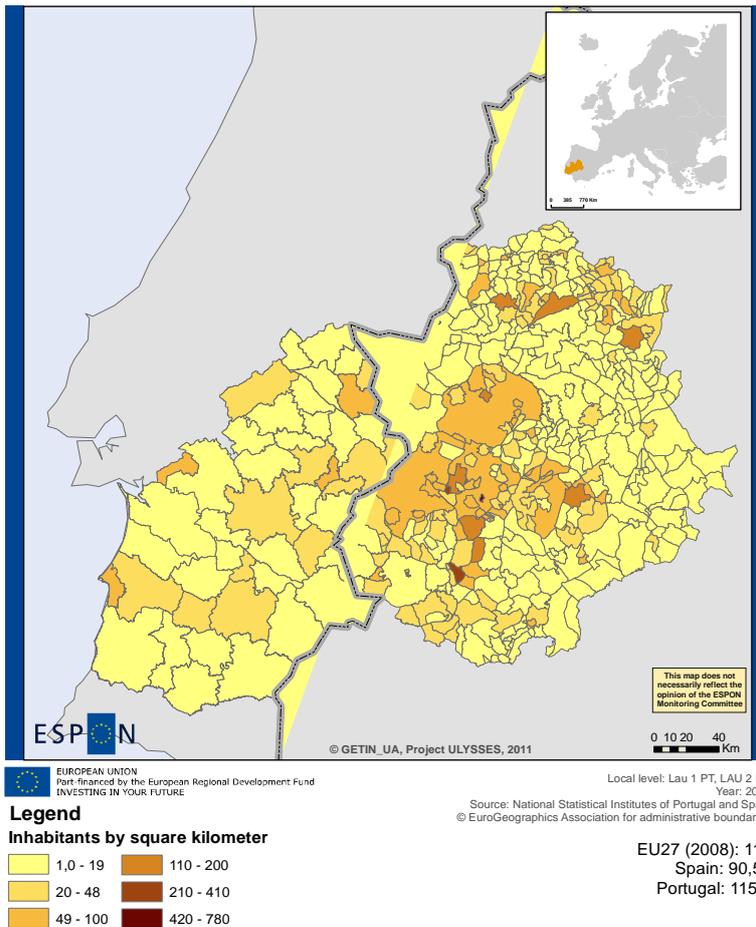
Local level: NUTS 3
Year: 2009

Source: Eurostat

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EU27 (2008): 116
Spain: 90,57
Portugal: 115,4

Map 4: Population density 2009 by LAU 1/2

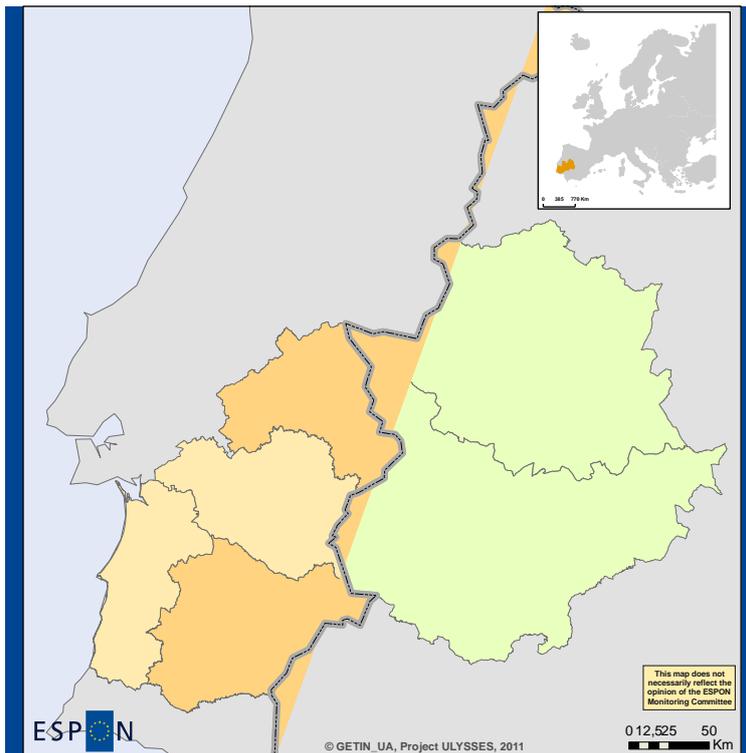


2.3. Population growth and mobility

According to the ESPON Demipher Project, the NUTS 2 of the Alentejo is classified as a challenge of ageing region, while the NUTS 2 of the Extremadura is a challenge of labour force region (ESPON & NIDI, 2010: 10). This typology, which is based on age structure but also on growth rates, sheds some light on one of the major challenge these regions face on a demographic level: the difficulty to induce natural population growth or to attract population.

Beside the already low densities, this CBA also shows very low population growth rates. The Portuguese side of the border shows an outright recessive tendency, which is compensated by the relatively high growth rates of the Badajoz region leading to an overall growth rate around zero in the last 9 years.

Map 5: Annual population growth rate 2000-2009 by NUTS 3



NUTS	2000-2009	
	Total growth	Annual rate (%)
Portugal	468692	0,50
Spain	548043	1,44
Total CBA PT	-7584	-0,11
Total CBA ES	23139	0,24
Total CBA	15555	0,09
Badajoz	21649	0,36
Cáceres	1490	0,04
Alentejo Litoral	-1832	-0,21
Alto Alentejo	-8332	-0,76
Alentejo Central	-543	-0,04
Baixo Alentejo	-6536	-0,56

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Local level: NUTS 3
Year: 2000-2009
Source: Eurostat

Legend

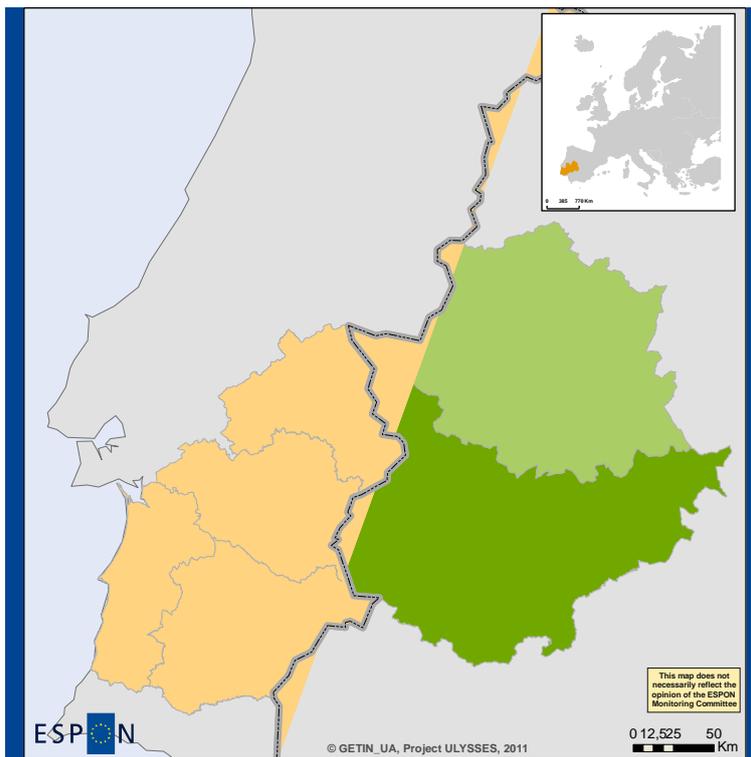
Annual population growth rates 2000-2009

	<= -1,25		0,01 - 0,38
	-1,24 - -0,35		0,39 - 1,25
	-0,34 - 0,00		>= 1,26

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The reasons for these low growth rates can be found in the low net migration rates, but especially in the negative natural increase rates. As can be seen when analysing the total growth, net migration and natural growth of these regions individually, the NUTS 3 on the spanish side have positive growth rates, although only the Badajoz regions manages to have positive values in all 3 indicators. The portuguese regions, although still being able to attract population, do not attract enough to compensate for their negative natural increase rates. Essentially, one can conclude that the increase in the average life expectancy as well as the recent positive migration rates (at least between 2000 and 2008) are no longer enough to guarantee a stable population in most of regions of the CBA.

Map 6: Natural and overall population growth 2000-2008 by NUTS 3



NUTS	Crude rates 2000 - 2008	
	Natural increase	Net migration
Portugal	-0,1	4,10
Spain	0,3	13,18
Total CBA	-2,04	0,77
Badajoz	0,2	3,44
Cáceres	-1,4	1,87
Alentejo Litoral	-4,8	2,72
Alto Alentejo	-8,0	0,43
Alentejo Central	-4,0	3,69
Baixo Alentejo	-7,3	1,72

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Local level: NUTS 3
Year: 2000-2008
Source: Eurostat

Legend

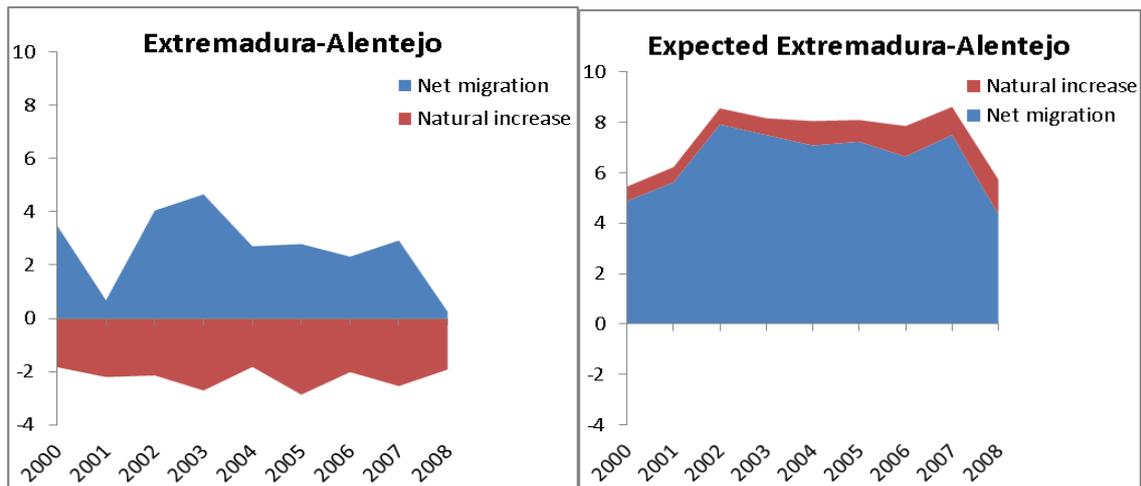
Total increase	Natural increase	Net migration	2000 - 2008
■ positive growth	positive natural increase	positive migration	
■ positive growth	negative natural increase	positive migration	
■ negative growth	positive natural increase	negative migration	
■ negative growth	negative natural increase	positive migration	
■ negative growth	negative natural increase	negative migration	

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Although this behaviour is a general tendency in Europe and, specifically in Spain and Portugal, in this CBA it is well above the national averages. In comparison to the expected behaviour if the CBA would have followed the patterns of the countries of which they are part, not only would the natural increase rate be slightly positive, but the net migration rate would be twice as high in most of the years⁴.

⁴ For this comparison the national averages were weighted according to the proportion of the regions' population belonging to each country to reach the expected values. The actual values are of course an aggregation of the absolute values of the regions.

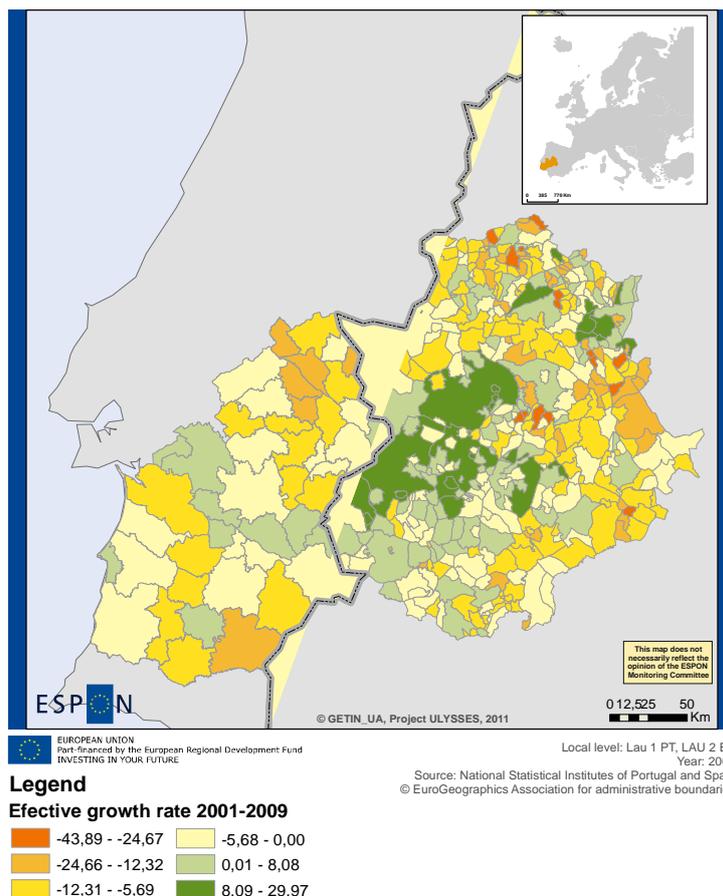
Figure 3: Actual and expected population growth in the CBA



2.3.1. The border effect on population growth

The overall impression from looking at the demographic data is that, although there are some similarities, there are also major differences in the trends evidenced on each side of the border.

Map 7: Annual growth rates 2001-2009 by LAU 1/2



While the Portuguese side of the border is essentially devoid of any significant demographic dynamism, some of the border municipalities on the Spanish side show signs of natural growth and the capacity to attract population. Not only are there many municipalities with considerable densities but there are also many which have been growing steadily in the last decade. It is

therefore important to answer the question of what exactly the effect of the border on population growth is.

For this analysis, a regression was performed between population growth rates, as well as densities and border distance.

Table 1: Regression for the total CBA

<i>Regression Statistics</i>									
Multiple R	0,24049								
R Square	0,05783								
Adjusted R Square	0,05353								
Standard Error	0,97287								
Observations	441								
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95,0%</i>	<i>Upper 95,0%</i>	
Intercept	2,25E-16	0,046327	4,85E-15	1	-0,09105	0,091051	-0,09105	0,091051	
Dist km	-0,08051	0,04662	-1,72689	0,084893	-0,17214	0,011119	-0,17214	0,011119	
Density 2001 (POP/km)	0,218585	0,04662	4,68861	3,68E-06	0,126957	0,310212	0,126957	0,310212	

As can be seen by the output, the explanatory capacity of the model is very low. We can therefore conclude that, at least at the local scale, there is no clearly identifiable impact of the border on the actual demographic development of this region. Nonetheless, in the small variation of the population growth that is explained by the model, there is a statistically significant positive effect of the density and a (not very significant) negative effect of the border distance. This means that, with a confidence interval of 90%, the regions which are closer to the border are likely to have slightly higher population growths.

Table 2: Regression for the Spanish CBA

<i>Regression Statistics</i>									
Multiple R	0,2470								
R Square	0,0610								
Adjusted R Square	0,0561								
Standard Error	0,9990								
Observations	383								
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95,0%</i>	<i>Upper 95,0%</i>	
Intercept	-0,00200	0,05111	-0,03905	0,96887	-0,10250	0,09850	0,10250	0,09850	
Dist km	-0,13613	0,05195	-2,62043	0,00913	-0,23828	-0,03399	0,23828	-0,03399	
Density 2001 (POP/km)	0,18595	0,04935	3,76827	0,00019	0,08892	0,28297	0,08892	0,28297	

The results for the Spanish Municipalities are essentially in line with the total CBA. There is no significant correlation between the population growth and the border distance or population densities and, while the densities are positively related, there is a not very significant negative effect from the border distance.

Table 3: Regression for the Portuguese CBA

<i>Regression Statistics</i>									
Multiple R	0,53358								
R Square	0,28471								
Adjusted R Square	0,25870								
Standard Error	0,68245								
Observations	58								
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95,0%</i>	<i>Upper 95,0%</i>	

		Error			95%	95%		95,0%	
Intercept		0,11280	0,09861	1,14388	0,25763	-0,08482	0,31042	-0,08482	0,31042
Dist km		0,20042	0,11006	1,82096	0,07405	-0,02015	0,42100	-0,02015	0,42100
Density	2001								
	(POP/km)	0,48090	0,18027	2,66776	0,01001	0,11964	0,84216	0,11964	0,84216

If the regression is performed only for the Portuguese side, the explanatory capacity of the model increases considerably: almost 29% of the variations of the population growth is explained by the dependent variables. Besides the expectable positive effect of the population density, the border distance also shows to have positive impact on population growth, even if only at a confidence interval of 90% and with a much smaller weight.

2.3.2. Labour force mobility

According to Castells (1997), while the capital and the power functions have been organising themselves in a progressively networked and globalised way, labour (as well as other major human activities) keeps on being tied to more concrete territorial references. This is certainly the case for the European Union, where labour migration has been kept to minimum not only between member states, but also within the regions of the different member states – when compared to countries such as the USA, Japan or Australia (Marvakov and Mathä, 2007). This also illustrates that the administrative, legal and cultural barriers between countries keep on functioning as a deterrent, even in the case of large regional asymmetries in unemployment and economic development and relative ease of mobility.

But, while the role of migration in diminishing regional labour market imbalances appears not to be very significant, commuting between regions has been on the rise throughout the EU, although starting from a very low level. Commuting to foreign countries, on one hand, represented less than 0,4% of the total amount of employed persons in 2000 and in 2008 had already risen to more than 0,7%. Commuting within different NUTS 2 of the same country, on the other hand, increased from just above 5% to 7% in the same period.

Figure 4: Commuters to foreign countries by total employed 2000-2009 by NUTS 2

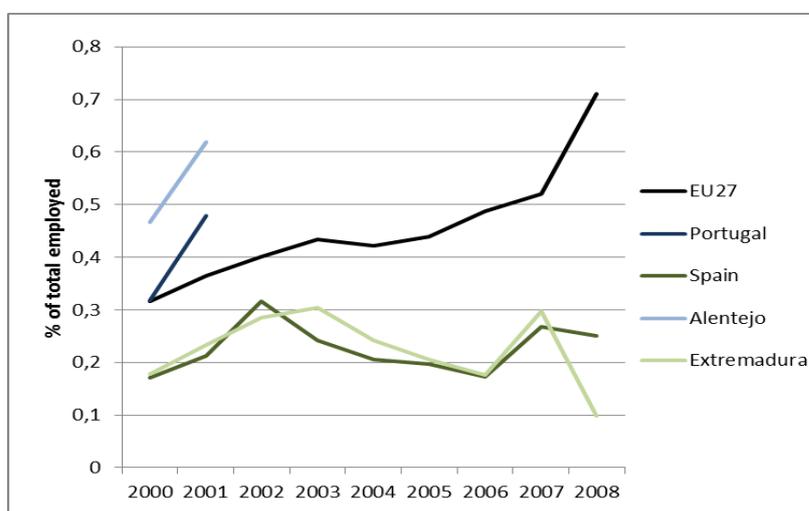
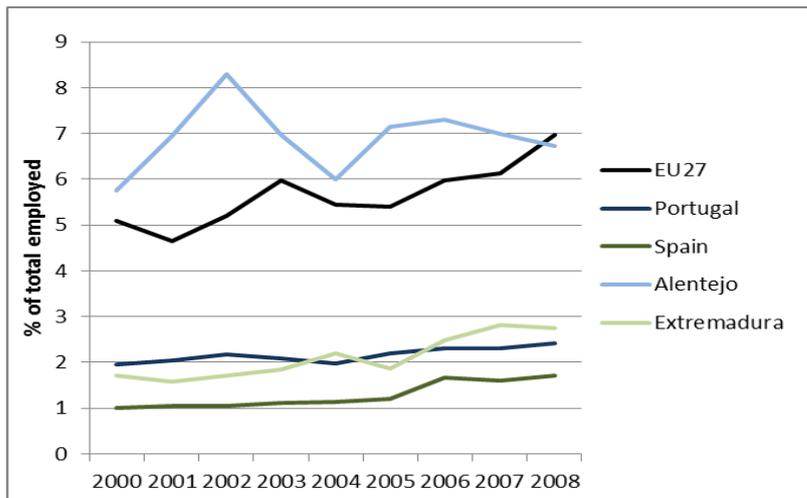


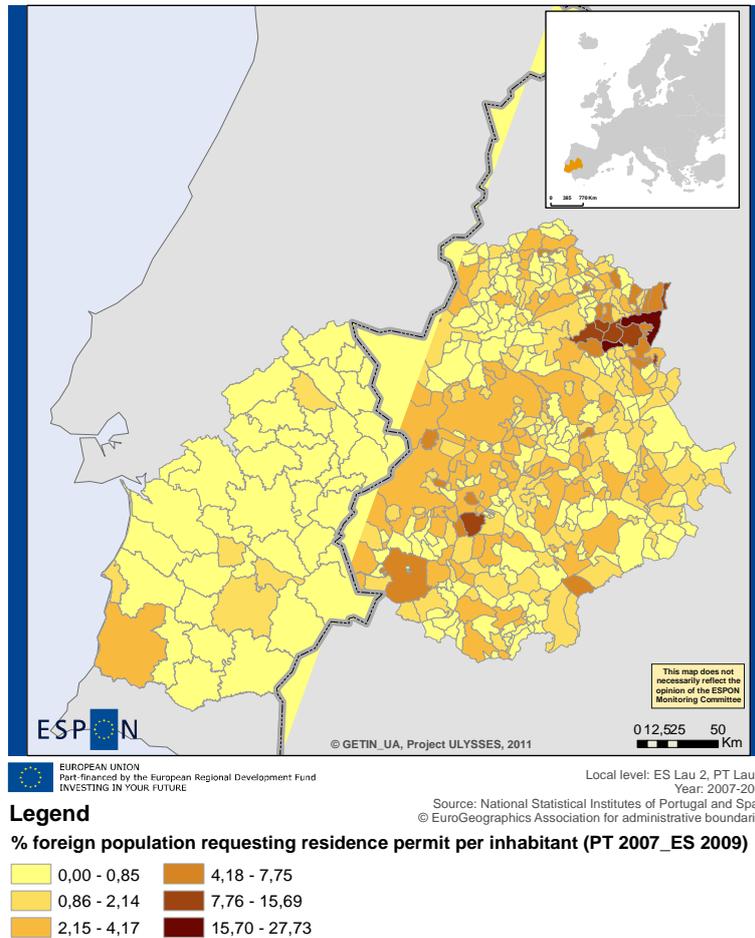
Figure 5: Commuters to another region by total employed 2000-2009 by NUTS 2



In this CBA, the overall commuting levels tend to be high for the Alentejo and low for the Extremadura. The high values of the Alentejo can, on one hand, be explained by its proximity to Lisbon, whose metropolitan area extends arteries that reach some of the NUTS 3 of the CBA. On the other hand, the Alentejo region also has greater share of its total employed persons that seek work on the other side of the border (although, unfortunately, this data is only available for 2000 and 2001 for the Alentejo). The Extremadura, on its turn, seems to be more attracted by other, more developed, Spanish regions.

Immigration, on the other hand, seems to play a greater role on the Spanish side of the border. Considering the amount of immigrants that seek residence permit, many of the municipalities on the Spanish side of the border have more than 2,15% of the total residents. These requests are relatively high on the bordering regions, suggesting that either these regions have an influx of Portuguese migrants, or that their high dynamisms attracts other foreigners. Although this data should be read with some precautions (as the immigrants that seek residence permits are only a small proportion of the total immigrants), it highlights the role of immigration even in the more depressed regions of Europe.

Map 8: Foreigners requesting residence permit by total residents 2007 (PT) and 2009 (ES) by LAU 1/2



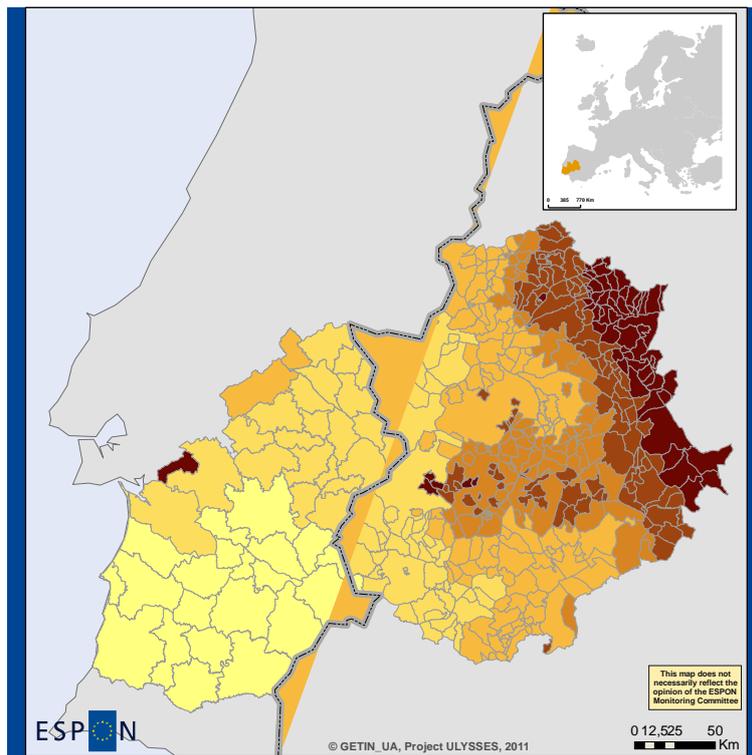
2.3.3. Demographic potential

Considering the distribution of the demographic potential in this region two conclusions can be drawn.

The first one, is that the demographic potential is slightly higher around the arteries that link the major urban agglomerations of the CBA to big cities in neighboring regions, specially on the Spanish side (such as the A66 and specially the N430). Considering that the distance was not measured by the actual travel time, the population on the Spanish side of the CBA seems to show a tendency to concentrate itself around a small but overly well consolidated urban system.

The second conclusion is that the major variations in the demographic potential seem to be structured according to a wave pattern from the countries' capital cities throughout the regions. This wave pattern leads to poorer results in the more remote areas, which includes the border regions, but is by no means limited to them. The Cáceres, Mérida, Badajoz triangle even seems to be able to exert some counterweight on the meeting point of two major axes of the CBA.

Map 9: Demographic potential 2009 by LAU 1/2



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Local level: ES Lau 2, PT Lau 1
Year: 2009

Source: National Statistical Institutes of Portugal and Spain
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Legend

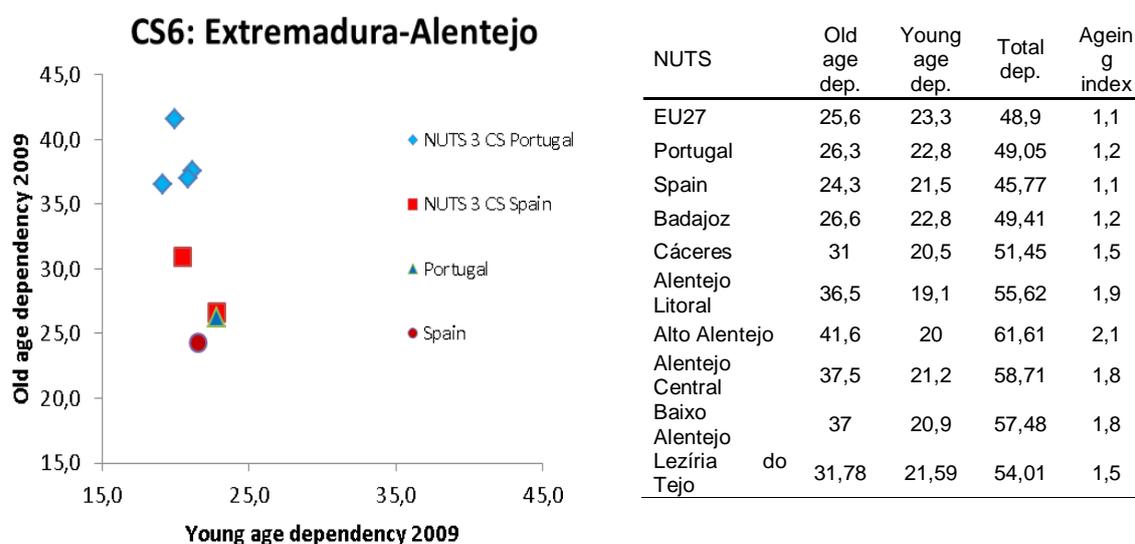
Demographic potential 2009 indexed to highest score (Esparragalejo = 100)

69,14 - 83,85	91,54 - 92,32
83,86 - 89,42	92,33 - 94,43
89,43 - 91,53	94,44 - 100,00

2.4. Ageing challenge

As said before, this CBA has been facing a significant ageing process. When analysing the dispersion between the old age dependency and the young age dependency, it immediately sticks out that most of the NUTS are significantly above the national averages in the old age dependency and significantly below in the young age dependency. This is especially true for the Alto Alentejo NUTS 3 which has an old age dependency rate of 40,6% and a young age dependency rate of only 20%. The Badajoz NUTS 3, on the other hand, while having an old age dependency rate above the national average, does also have a young age dependency which is above the average.

Figure 6: Young and old age dependency rates 2009 by NUTS 3



As would be expectable, the total fertility rate of the CBA is also very low, but with very different tendencies on each side of the border. The Extremadura, following a similar pattern as the all of Spain, started from very low rate in the late nineties, and from then on witnessed a steady increase.

The Alentejo, on its turn, started from a much higher position, but has recently witnesses a major decrease. Some of the decrease in the Portuguese region is probably a consequence of postponement of child birth and therefore a slight rebound is expected to occur in the next few years.

Figure 7: Total fertility rate 1998-2009 by NUTS 2

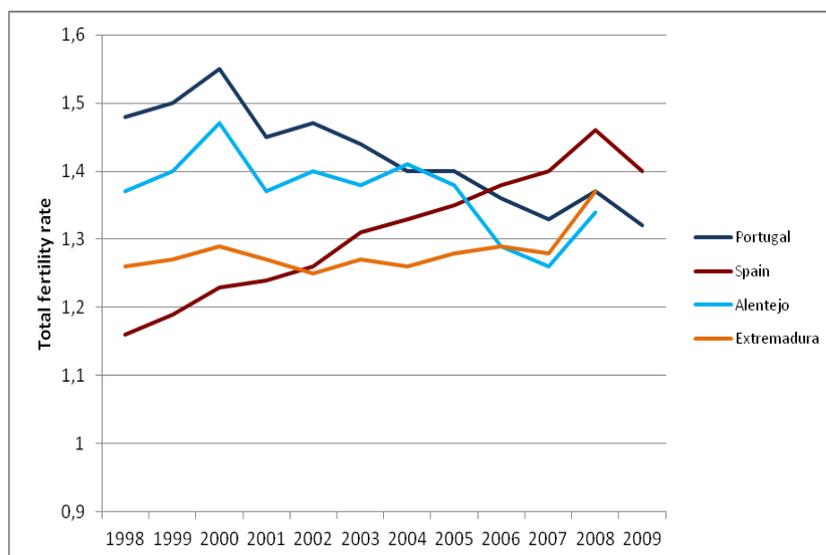


Table 4: Total fertility rate 2003-2007 by NUTS 3

	2003	2004	2005	2006	2007
Portugal	1,4	1,4	1,4	1,4	1,4
Spain	1,3	1,3	1,4	1,4	1,4
Alentejo	1,4	1,4	1,4	1,4	1,4
Extremadura	1,3	1,3	1,3	1,3	1,3
Badajoz	1,3	1,3	1,3	1,4	1,3
Cáceres	1,2	1,2	1,2	1,2	1,2
Alentejo Litoral	1,4	1,4	1,4	1,2	1,2
Alto Alentejo	1,3	1,3	1,3	1,1	1,1
Alentejo Central	1,4	1,4	1,3	1,3	1,2
Baixo Alentejo	1,4	1,4	1,5	1,3	1,4

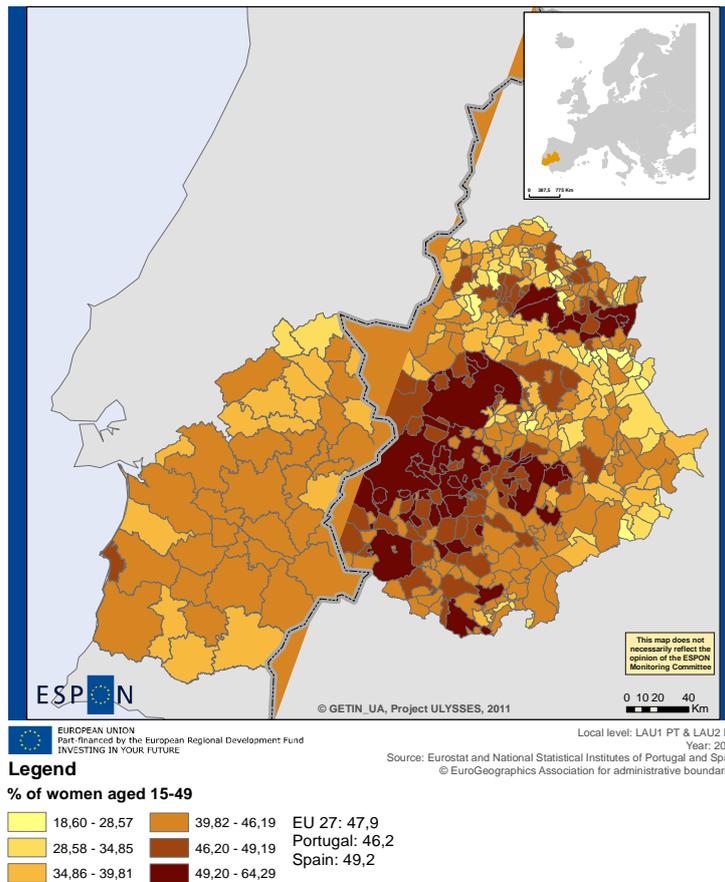
Source: National statistical institutes of Portugal and Spain

When considering the NUTS 3 of this CBA individually, it is observable that the regions on the Spanish side have a very similar behaviour, while the ones on the Portuguese side differ considerably. Especially the Baixo Alentejo has relatively high fertility rates (although still well below the replacement level) while the Alto Alentejo has very low fertility rates.

Nonetheless, and considering the whole CBA, the institutional context of the two countries (characterized, for example, by difficulties in combining work and family), the high youth unemployment rates and the age pyramids set a strong limit for a hypothetical increase in the total fertility rate. The low economic development of these regions might further constitute an obstacle. This is because, according to Luci and Thévenon (2010), total fertility rates tend to decrease with increases in the GDP until a certain level, where they experience a rebound given favourable institutional contexts.

But the low fertility rate is only one aspect in the ageing challenge of these regions. In fact, as pointed out by Lutz *et al* (2006), very low fertility, death or migration rates in a past periods of time, might lead to a reduced amount of women in reproductive ages, which will in turn lead to a shrinking population even if the fertility rate would rapidly rebound to replacement levels. This dynamic, which is known as a negative momentum of population growth, means that even if pro-fecundity policies were to be adopted, their capacity to invert the population decline would be very limited.

Map 10: Share of women in fertile age by LAU 1/2



2.5. Chapter conclusions

Six major conclusions can be drawn from the demographic variables for this CBA.

The first one is that there is significant ageing process in most of the NUTS 3, which is likely to accentuate itself in the near future. As the young cohorts have witnessed a decline over several years, at this point the ratio of the cohorts with persons aged over 65 is very high, not only in comparison to the cohorts of people under 15, but also in comparison to the working aged population.

The second, which is closely related to the previous one, is that most of the CBA risks a negative momentum of population growth (if it is not already occurring). It is therefore very likely that most of these territories will witness an accelerating population decline in the next decades, even if the life-expectancy continues to grow and if effective measures to boost fertility would be put into place.

The third one is that, given the negative outlooks for natural population growth, the demographic sustainability of many of the settlement of these regions will depend on their capacity to attract population. This has been occurring to some extent in most of the regions, but it is not clear how this will progress, as the migration rates depend a lot on different variables such as the political context, accessibility levels or economic performance.

The fourth one refers to the potential problems that come from relating the former aspects to one of the major trait of these regions – very low population density. Some of the predictable challenges of this situation include: the satisfaction of an increasing demand of services from an ageing population that is scattered on a large area; the maintenance of general public infrastructures (roads, water, schools, etc.) for a population that would no longer justify them from an efficiency point of view; the viability of ecosystems that rely on human activities; the

struggle of economic sectors that could suffer from factors related to an increasing remoteness, such as decreasing economies of scale, growing distance to markets or labour force scarcity.

The fifth is that the major demographic challenges, although common to all of the regions, are not experienced at the same magnitude by all of them and cannot easily be linked to the border conditions on a local level. For instance, a positive effect of the border distance on population growth has only been observed on the Portuguese side, which also suffers from decreasing densities as we move towards more remote areas. On the Spanish side there are consolidated settlements very close to the border and the regions' population growth is also positively impacted by smaller border distances, even if this impact is not very significant. There is also a big divide between the more rural and the more urban municipalities and, while the former have an ageing population, many of the more urban areas have a share of women in fertile age that is above the national averages.

The sixth is that the before mentioned growing urban agglomerations on the Spanish side of the frontier have a significant effect on the demographic potential on the neighbouring areas. This implies that a further integration might attenuate the remote position of the whole border regions, including on the Portuguese side.

The seventh is that there seem to be strong commuter flows from the Alentejo to the Extremadura as well as other Portuguese regions, while the Extremadura has very low commuter flows which occur primary to other Spanish NUTS 2.

General low density

Low demographic growth:

- Positive net migration
- Negative natural growth

No significant border effect on settlement patterns

Consolidated settlements on the Spanish side

Ageing population

Low fertility rates

High commuting flows from the Alentejo to the Extremadura but low commuting flows in the opposite direction

Chapter 3 – Polycentric development

3.1. Aims, indicators and methods

The main objectives of this chapter are to identify tendencies in the structure of the city network in the CRB: is the urban network more or less dense than in non-border regions? do the amount and size of the urban centres deviate from the rank-size distribution of the ESPON space? if so, in what sense (more polycentric, less polycentric)?

Naturally, the distinction between monocentric or polycentric areas cannot be made area in a dichotomous manner, and polycentricity should be measured by scoring an area with a value ranging from more monocentric to more polycentric.

According to the ESPON 1.1.1, polycentricity has a twofold feature:

- Morphological, laying out the distribution of urban areas in a given territory;
- Relational, based on the networks of flows and cooperation between urban areas at different scales/levels.

While there is some data available regarding morphology, the dynamic aspects of the city systems are very poorly covered. Although some attempts to differentiate FUA according to their functional specialization have been made, the analysis of how the different urban agglomerations articulate themselves and interact with their surroundings cannot be soundly made on a broad scale. Most of the ESPON data therefore focuses on the morphological aspects.

3.1.1. Data

Indicator	Geographical scale	Source	Time frame
Morphological and Functional Urban Areas	CBA	ESPON DB	2006
Slope rank size distribution GDP	CBA, ES, PT ESPON	Own production, based on ESPON DB	2006
Primacy rate GDP	CBA, ES, PT ESPON	Own production, based on ESPON DB	2006
Slope rank size distribution population	CBA, ES, PT ESPON	Own production, based on ESPON DB	2006
Primacy rate population	CBA, ES, PT ESPON	Own production, based on ESPON DB	2006
% population in FUA	CBA, ES, PT ESPON	ESPON DB	2006
% effective FUA pop change	CBA, ES, PT ESPON	ESPON DB	01-06
Compactness (MUApop/FUA pop)	CBA, ES, PT ESPON	ESPON DB	2001
Gini coefficient thiesen polygons (%)	CBA	Own production, based on ESPON DB	2006

The data used here was developed by the ESPON 1.4.3 and is based on the concept of Functional Urban Area (FUA) from the ESPON 1.1.1. The ESPON 1.4.3's intention was to review the ESPON 1.1.1 and to develop a methodology for defining FUA that was independent from national classifications. Their classification is done by identifying a Morphological Urban Area (MUA), which is essentially a cities' core, to which a commuter catchment area is attached. The commuter catchment area is made up by adding further LAU 2 if they form a high density continuum. The final definition of whether to consider an agglomeration a FUA also takes into account its total size (please see the final report of the project for a more detailed description). This method has straighten out some inconsistencies in the former FUA definition, by eliminating many small FUA considered by the ESPON 1.1.1 not through a size criterion but by

the importance that national experts gave to the FUA in question. Further characterization of the FUA has also been done considering the data available for the NUTS of which the FUA are part or which they cover entirely.

While this approach guarantees data comparability throughout the ESPON the countries, it has the inconvenience that it only considers urban centres on a broad scale. Small urban centres, such as the one that characterize the Alentejo region, are simply not taken into account, which makes it difficult to evaluate the urban systems on a national or regional level. The ESPON 1.4.3 also maintains some FUA that have very small overall population in some countries, leading to confusion about the exact criterion (according to the methodology, only FUA with a population of over 50.000 inhabitants were supposed to be included, but this rule was not always followed).

3.1.2. Methods

Besides more general aspects, such as the FUA's compactness, growth or number, several more specific aspects of the city system were analysed. The first analysis was on the rank-size distribution of the FUA (1). The second one was the Gini coefficient of the FUA's Thiessen polygons (2). And the third was the analysis of socio-economic characteristics (3) of the FUA.

For the **rank-size distribution (1)**, three different procedures were performed. The first one analyses the slope of the rank size distribution, which measures the overall level of hierarchy. For this indicator, the FUA of the regions are ranked according to their population and then the following equation is estimated:

$$\ln(\text{pop or GDP}) = a + b \ln(\text{rank})$$

The latter is the so-called rank-size equation in the Lotka form (Parr, 1985). If the estimated relation holds, the size distribution of cities follows a statistical log-linear distribution. The slope of equation, given by the estimated β , indicates the level of hierarchy, and thus the level of polycentricity within a region: the lower the absolute value of estimated β , the higher the level of polycentricity.

The second is in is the comparison of the regions actual and expected FUA. For this exercise, rank-size coefficients are estimated considering the FUA at the whole ESPON countries (EU27 + CH + NO). The actual rank-size distribution of the relevant NUTS II is thereafter compared with what would be expected if the regions would follow the European distribution.

Taking the Zipf law:

$$P_n = \frac{k}{n^A}$$

$\ln P_n = \ln A + k \ln n$, where A is the population of the biggest city

it is possible to adjust a regression curve to the population living in FUA in the EU-27 regions plus Switzerland and Norway:

$$\ln P_n = A + k \ln n + \epsilon$$

The calculation for all the FUA produced the following parameters for the curve:

$k = -1,0521$, which is very close to -1, the value corresponding to the regularity known as Zipf's law.

This equation will be the pattern to which the actual FUA distribution of a given region will be compared. To perform this comparison for a given region i , first the total population of its FUA has to be estimated (PF_i). For this we assume that the weight of the region's FUA population in relation to its total population is equal to the ESPON countries average:

$$PF_i = P_i \frac{PF(UE)}{P(UE)}$$

Second, the PF_i is distributed by n FUA according to the EU pattern:

$$PF_n = k n^{1,0514}$$

Where F_n is the FUA of ranking n and k is the population of the biggest FUA. Since k is unknown, it is calculated as the exact value which fits the equation $\sum PF_n = PF_i$.

It is thereafter possible to estimate the amount and size of FUA a CBA should have if it would follow the overall distribution to the actual amount and size of its FUA.

The third one is the primacy rate. Primacy rates measure the degree to which the size of the largest city of the cross border area deviates from the regression line of the rank-size distribution of the regions. If this indicator is above 1, the main city's population is above the value that would be expected according the rank-size distribution of the FUA of the region. If the primacy rate is below 1, the main FUA is smaller than the expected value. This means that, while regions in which one big city dominates the city system tend to have high primacy rates, the opposite holds true for more polycentric regions.

The largest city is excluded in this exercise in order to avoid that its effect on the equation could influence the results. If, for example, we would have a very large prime city in a small region/country, its weight could lead to a very high coefficient in the rank-size equation and therefore the primacy rate would be small (even though there is a clear dominance of one city over the region/country).

The **Gini coefficient of the Thiessen polygons (2)** is a measure of how the FUA are spaced throughout the region: number closer to 100% mean greater inequalities in the FUA distribution while lower percentages means the FUA are more evenly spaced. For this indicator, the polygons were produced based on the ESPON 1.4.3 FUA layer (made available by the ESPON DB 2013) so that the limits of the polygons are established exactly midway between two FUA. On a national level, the Gini coefficients were produced considering the border as a limit.

The **socio-economic situation (3)** is based on the ESPON 1.4.3 indicators. These indicators were obtained by crossing the NUTS 3 values which that of the FUA that do partly or totally cover them. They are therefore broad approximations that should be read with some care. The indicators to be included where: unemployment rates, GDP per inhabitant and value added by NACE 1.1.

3.1.3. Geographical scale

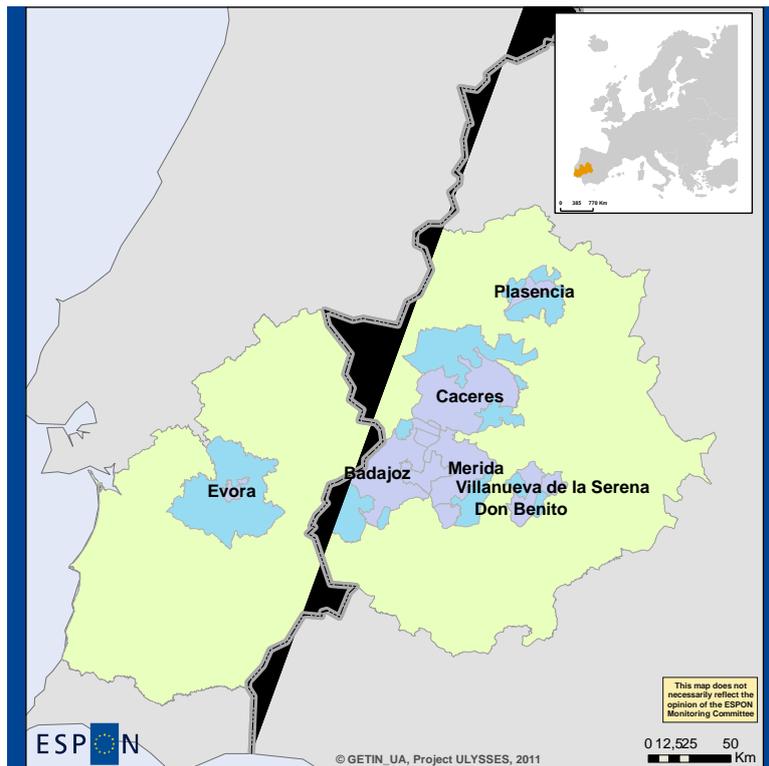
FUA in the ESPON 1.4.3 are defined by aggregating LAU 2 in a way that they can cover several broader administrative boundaries. Thus, their inclusion in one region or another poses some difficulties when the intention is to evaluate urban systems in confined regions. In this analysis, the FUA were considered to be part of the CBA if more than 60 % of their area is overlapping with that the CBA or if most of their Morphological Urban Area (MUA) is within the limits of the CBA. The analysis of the urban systems is made on the whole CBA, which for this case was defined at the defined at the NUTS2, as the concept of polycentricity is not meaningful on very low geographical scales.

3.2. Functional urban areas in the CBA

The FUA identified in the ESPON 1.4.3 are Badajoz, Cáceres, Mérida, Plasencia, Don Benito and Villanueva de la Serena for the Spanish side of the CBA and Évora for the Portuguese one. This means that, although the total densities in to two regions do not differ much, the Spanish side was able to establish much larger urban areas than the Portuguese one.

The spatial layout of the FUA also allow for the identification of two major urban axis that follow, or are being followed, by the major transport arteries. The first one is a vertical axis along the A66 that links the FUA between Plasencia and Mérida/Badajoz, and that runs close to parallel to the border. The second one is the horizontal axis that links Évora and Villanueva de la Serena along the N430/A6, which has more interesting from a cross-border perspective.

Map 11: Morphological and Functional Urban Areas




 EUROPEAN UNION
 Part-financed by the European Regional Development Fund
 INVESTING IN YOUR FUTURE

Local level: Does not apply
 Year: 2001
 Origin of data: ESPON DB
 Source: ESPON 1.4.3
 © EuroGeographics Association for administrative boundaries

Legend

Morphological and Functional Urban Areas, from the ESPON 1.4.3

-  Morphological Urban Area
-  Functional Urban Area

Taken as a whole, the FUA of this CBA have been experiencing growth rates that are well above the Portuguese and the ESPON averages, but much below the Spanish ones. As states in the Atlas of the Spanish Cities (Ministério del Fomento, 2006) Spain has had a long standing urbanisation process, which is currently being substituted by a metropolization process, implying that growing share of the population is concentrating itself in a small number of large metropolises. Between 2001 and 2006 this urbanisation process is very visible in the high growth rates of the FUA population (10,2%) which is much higher than the overall population growth. In Portugal, the urbanisation process is moving at a much slower rate, which is more in line with the other ESPON countries.

The total FUA population in the CBA, on the other hand, is extremely low. It reaches only 31,2 % of the population, while Portugal and the ESPON countries have about 75% and Spain as much as 83,7%. Spain also sticks out for having the most concentrate urban areas, with 80% of the urban population living in the MUA. In the CBA the FUA are less compact, but still above the Portuguese or the ESPON averages.

Table 5: Overall FUA of the CBA

	CBA FUA	PT	ES	ESPON
Number FUA	7	22	186	1552
Average FUA population	81929,0	353104,0	193848,1	245298,6
Minimum FUA population	24932	47138	17497	3216
Maximum FUA population	177279	3167673	6185544	12972492
% population in FUA	31,2	73,5	83,7	74,8
% effective FUA pop change 01-06	5,1	3,5	10,2	3,0

Compactness 2001 (MUApop/FUA pop)	75,1	64,6	80,0	64,9
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Individually, the largest of these FUA is Badajoz, with a total population of 177279. This FUA has also witnessed the second highest population increase between 2001 and 2006 (6,6%), after the Don Benito FUA.

Table 6: Individual FUA

FUA	FUA area (km2)	FUA Population 2001	FUA Population 2006	Population increase 2001_2006	Compactness 2001 (MUApop/FUApop)
Badajoz	2614,31	166324	177279	6,6	80
Caceres	3633,56	118593	125738	6	70
Merida	1503,21	80273	84067	4,7	70
Évora	2612,5	74121	74121	0	60
Plasencia	925,23	46209	49125	6,3	79
Don Benito	626,06	35847	38241	6,7	88
Villanueva de la Serena	152,56	24092	24932	3,5	100

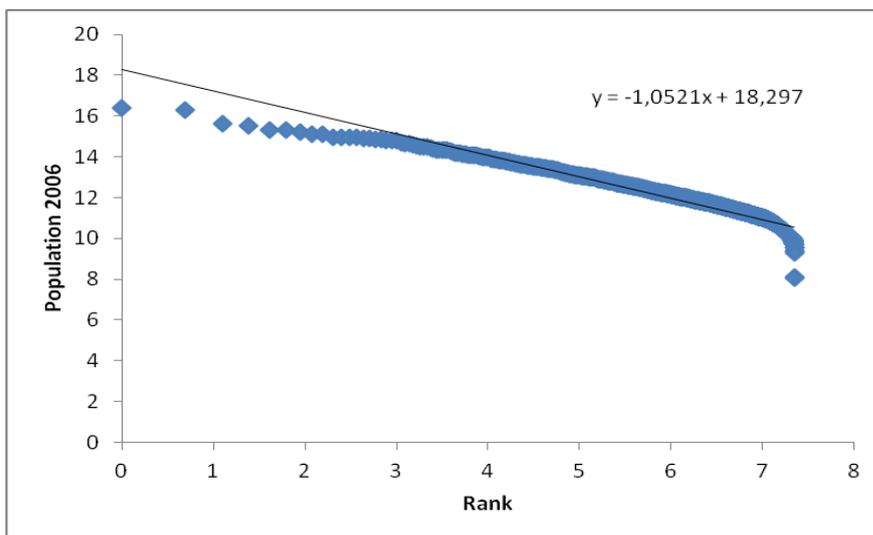
3.3. Rank size distribution

The rank size distribution is a way of understanding a city system according to the relation between size and the relative position of the cities. There are several types of indicator that can be obtained from the rank size.

3.3.1. Slope of the rank size distribution

As already stated in the methodology, for the ESPON countries' population, the slope of the regression line is $\beta = -1,0521$, which is very close to -1, the value corresponding to the regularity known as Zipf's law. Although following an expectable distribution, it is interesting to see that the city system of the ESPON countries lacks hierarchy at the upper end of the rank size distribution. The biggest city according to the regression should have $A = e^{18,297} = 88.366.191$ a much higher value than the approximate 13 million inhabitants of the London FUA (the biggest in the ESPON space).

Figure 8: ESPON country rank-size distribution of the population



The slope of the regression line for GDP is much steeper. Although there are some FUA missing at the higher end of the line, the GDP increases much faster if we move up the rank.

Figure 9: ESPON country rank-size distribution of the GDP

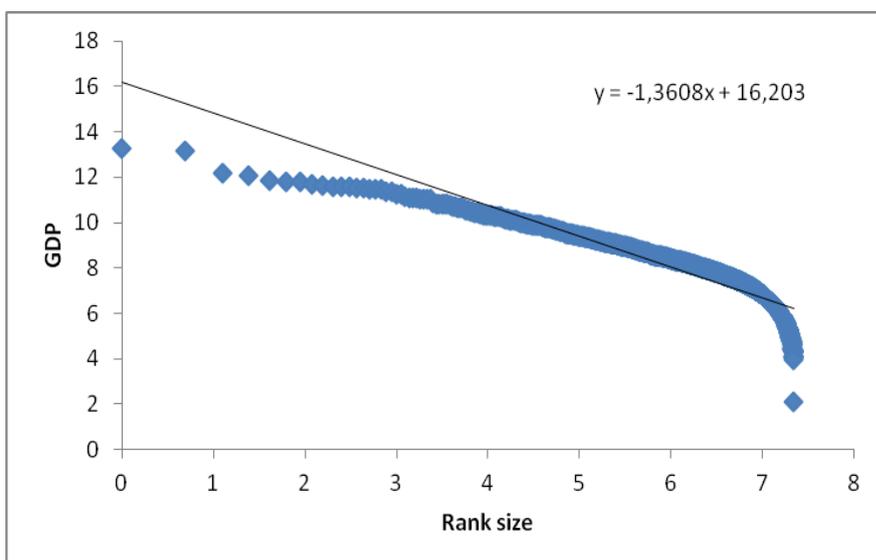
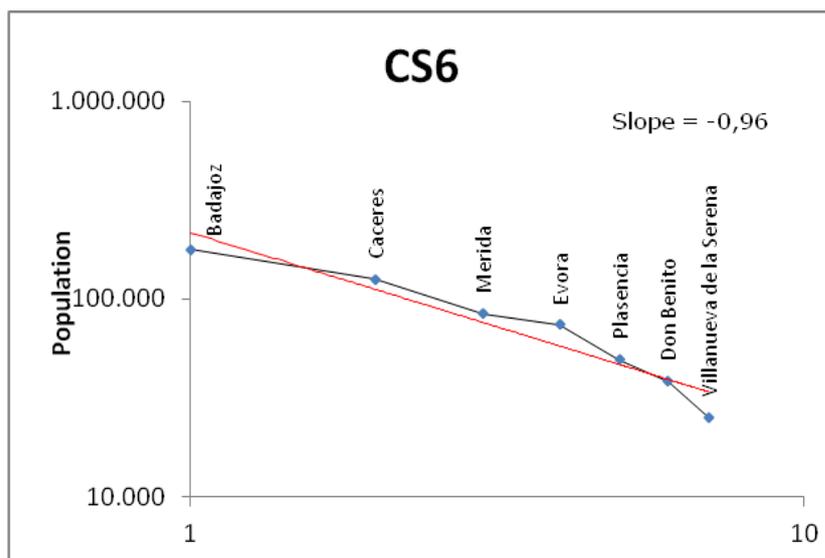


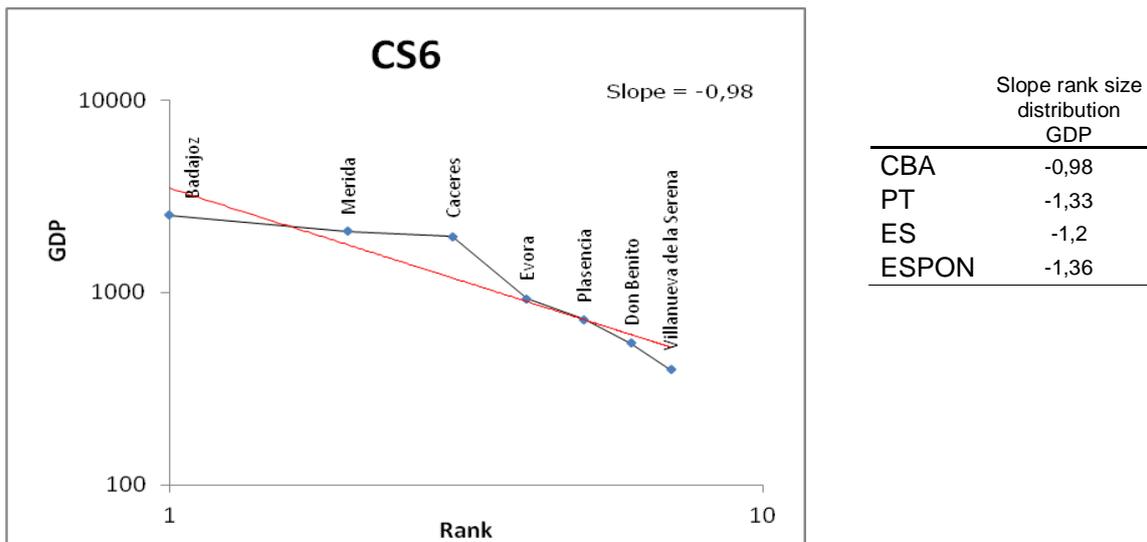
Figure 10: CBA rank-size distribution of the population



	Slope rank size distribution population
CBA	-0,96
PT	-1,23
ES	-1,11
ESPO	-1,06

For the CBA, the rank-size distribution for population has a slope of 0,96 which is essentially in line with the European value. As can be seen in the graph X, which presents the rank size distribution on a logarithmical scale with base 10, the trend line is very similar to that of the total ESPON space. Comparing to the national values, the CBA has a lower slope than Portugal and Spain. This means that, while on a national level both countries are lacking medium sized cities, and move very fast from small ones to the big metropolises such as Barcelona, Madrid or Lisbon, in the CBA there is a more balanced hierarchy.

Figure 11: CBA rank-size distribution of the GDP



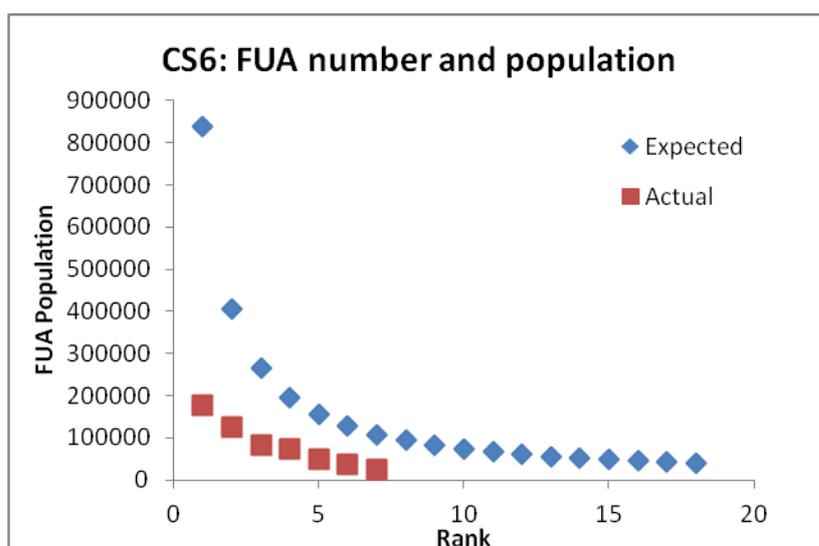
In rank size distribution of the GDP, the CBA is also more balanced than the countries as a whole or the ESPON space. While the CBA essentially maintains the same slope as for the population, the slope of the national and ESPON levels are significantly above.

We can therefore conclude that there is a strong tendency for wealth to concentrate itself above what would be expected by the concentration of population. On the ESPON level, there is a clear tendency for large metropolises in the pentagon to excel economically, while there is a lack of medium sized poles to counter-balance. Portugal also shows a very steep line, which reflects the economic dominance of its few large metropolises, such as Porto and Lisbon, over the rest of the territory. Spain, on the other hand, has a less steep slope, indicating a more polinuclear economic development in its city system.

3.3.2. Actual and expected FUA

Another interesting perspective is given by comparing the rank size distribution of the region's FUA to the overall distribution. For this exercise, rank-size coefficients are estimated considering the FUA at the whole ESPON countries. The actual rank-size distribution of the relevant NUTS II is thereafter compared with what would be expected if the regions would follow the European distribution, showing us what would be the expected amount and size of the FUA in a region according to its total population.

Figure 12: Actual and expected FUA



As can be seen by this distribution, this CBA not only lacks hierarchy (meaning FUA with considerable size), but also lacks an overall amount of FUA. Regarding hierarchy, its largest FUA, which has below 180.000 inhabitants, is much smaller than the 850.000 it is expected to have. Its population actually comes closer to what would be expected for the fourth FUA in the ranking. Regarding the amount of FUA, this CBA actually only has about one fifth of the FUA it is supposed to have (8 instead of 33). Since the expected FUA rank-size distribution of the FUA is based on population, and not territory, this essentially means that this region's population is either, much less urban or distributed over a large amount of small urban agglomerations that do not count as FUA.

3.3.3. Primacy rates

The primacy rates for population and GDP are very low in this CBA. As the region does not function as an administrative unity, there is of course no capital that could concentrate much of its political, social and economic activities. The strong position of the capital city is clear in Portugal where Lisbon occupies a very dominant position terms of population, but specially GDP. Spain, on the other hand, has low primacy rates given the already mentioned polinuclear organization of its large metropolises. The greater distances and the many thriving regional capitals might also help to attenuate the global position of the biggest city.

Table 7: Primacy rate of GDP per capita and population

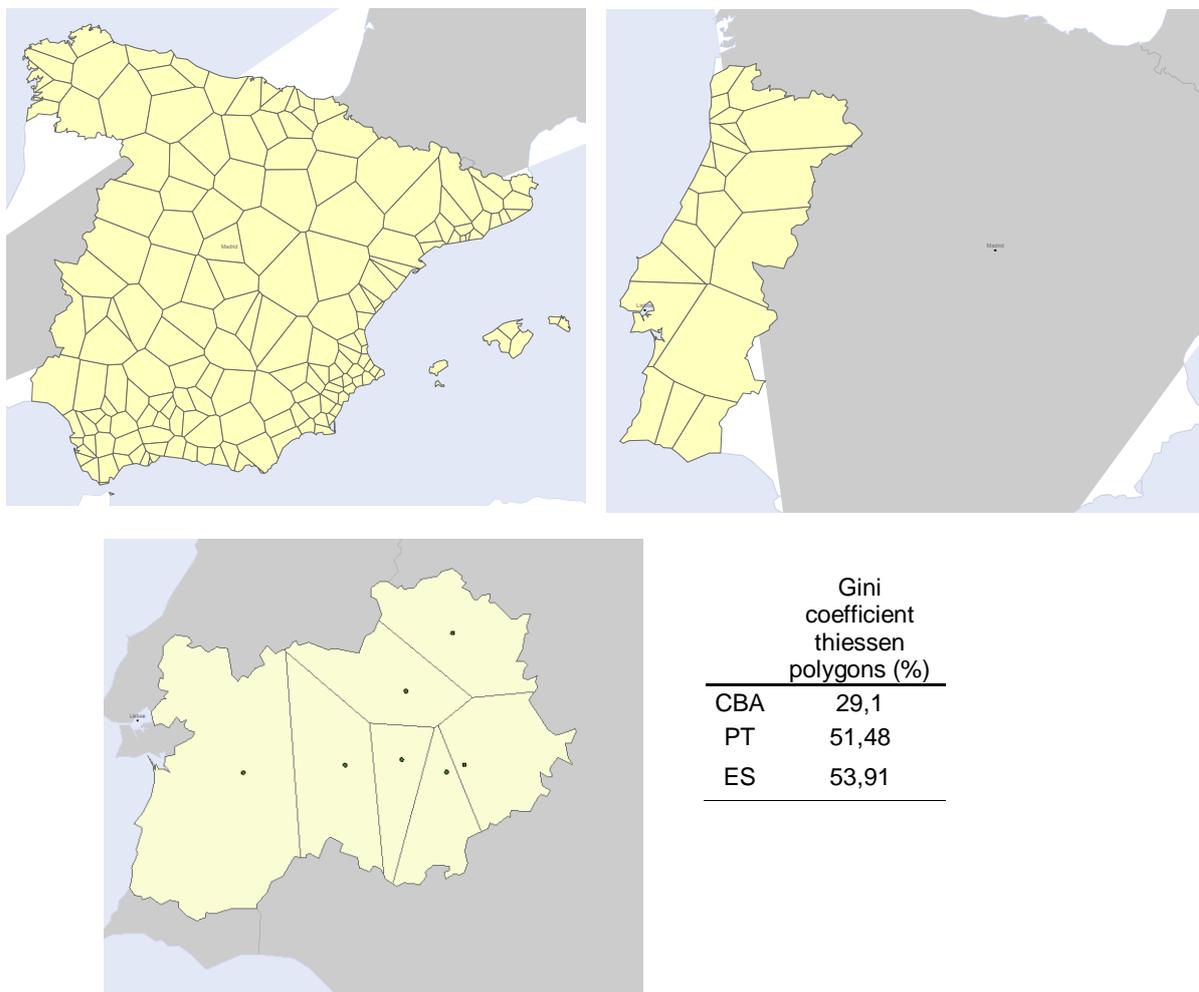
CS6	CBA FUA	PT	ES	ESPON
Primacy rate GDP per capita	0,38	2,23	0,60	0,05
Primacy rate population	0,54	1,54	0,63	0,14

3.4. Gini coefficient of the thiesen polygons

As state above, the Gini coefficient of the FUA thiesen polygons measures the spatial distribution of the FUA. According to the ESPON's 1.4.3 Final Report (March 2007, pp. 230) this measure implicitly evaluates the overall distribution of the population and, as the same weight is given to all the different FUA, does not reflect the actual influence of a city in the territory. Concerning density, this is of course true to some extent, as the definition of urban areas is itself based on densities. But similar densities can produce different amounts of urban areas, as is the case in the Alentejo and the Extremadura. As for the cities' influence, while a large urban centre is expected to have a greater influence on its hinterland, the distribution of a region's FUA can considered to be in itself and important aspect of city system. This of course does not mean that a fair distribution is necessarily desirable, although some negative aspects do occur if

a certain level of concentration is exceeded (infrastructure congestion, difficulty in providing remote populations with the type of services that are inherent to cities, etc.).

Figure 13: FUA thiesen polygons



The Gini coefficient of this CBA is fairly low, when compared to the national averages. Although the polygon associated to the Évora FUA is much greater than all the others, the fairly equal distribution on the Spanish side of the border is enough to counterbalance this.

On a national level, both countries have high inequalities. As can be seen in the map, this is mainly a consequence of the very dense urban network in the coastal areas, while in the interior this network becomes very loose. In Spain, this pattern is specially developed along the southern coast, Galicia and the Bask country and in Portugal in the north of the Cabo Mondego.

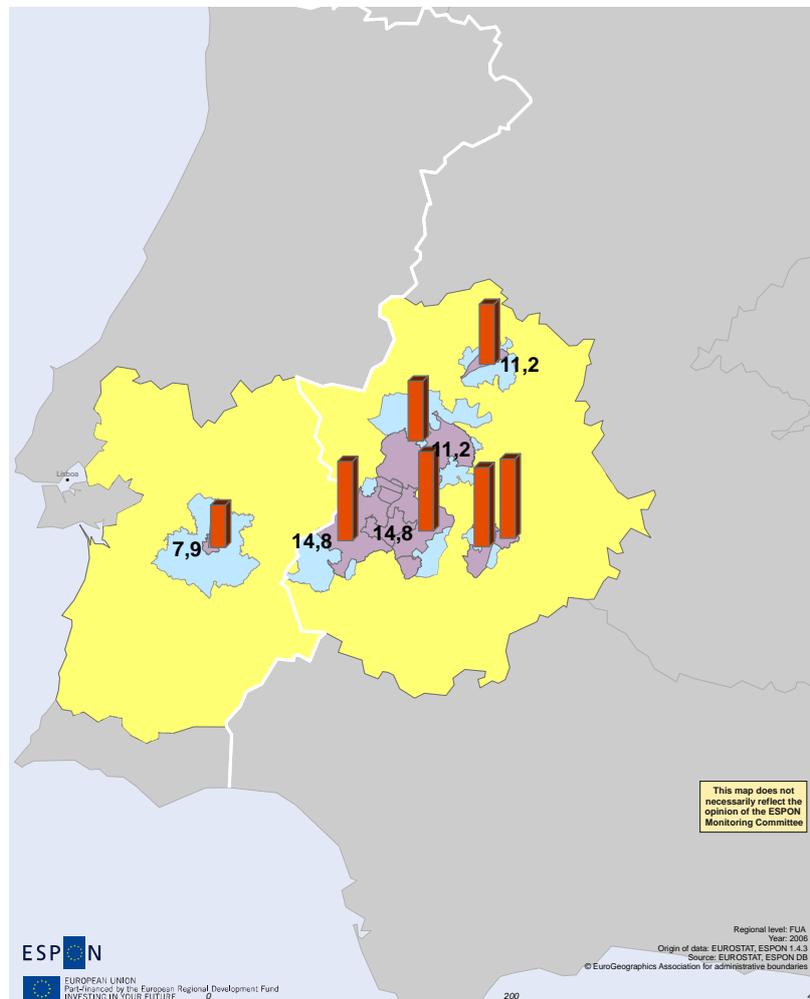
3.5. Socio economic situation

The socio economic indicators for this region's FUA are very similar. In terms of unemployment, all the FUA on the Spanish side have very high values, while the only FUA on the Portuguese side has much lower values, which follows the overall tendencies of these two countries.

Table 8: Gross Value Added by NACE 2006 by FUA of the CBA

FUA	Gross Value Added						GDP by Inhabitant	Unemployment rate 2006
	Agriculture, forestry and fishing (AB)	Mining, manufacturing and energy (CDE)	Construction (F)	Trade and transport (GHI)	Finance and business services (J-K)	Other services (L-P)		
Badajoz	11	9,4	15,2	18,9	14,9	30,7	14	14,8
Caceres	5,2	10,6	18,7	20,1	15,6	29,8	16	11,2
Merida	11	9,4	15,2	18,9	14,9	30,7	25	14,8
Évora	8,2	13,2	4,8	21,2	15,3	37,3	13	7,9
Plasencia	5,2	10,6	18,7	20,1	15,6	29,8	15	11,2
Don Benito	11	9,4	15,2	18,9	14,9	30,7	14	14,8
Villanueva de la Serena	11	9,4	15,2	18,9	14,9	30,7	16	14,8

Map 12: Share unemployment of the FUA 2006



Legend
 Share of the active population unemployed by FUA, 2006 (obtained from the intersecting NUTS)

<Morphological Urban Area>
 <Functional Urban Area>

FUA average unemployment
 ESPON = 8,47
 ES = 9,59
 PT = 6,64

On the GDP per capita most of the FUA are around 14 to 16 thousand euros, except for Merida which has much higher values than the other FUA (€25.000) and Plasencia, which has a much lower value.

As for the distribution of the GVA the patterns is also very similar between the FUA (which of course is also related to the fact that these values are estimations based on NUTS 3 values). Most of them show a strong service sector and have low values in the primary sector, especially Cáceres and Plasencia. The construction sector also plays an important part in the Spanish FUA, but not so in the Portuguese one.

3.6. Chapter conclusions

Six major conclusions have been drawn from the analysis of the policentricity indicators.

The first one is that the share of people living in Functional Urban Centres is very low in this CBA. Only 31,2% of the total population lives in FUA, compared to the 74,8% in the total ESPON countries, 73,5% in Portugal or 83,7% in Spain.

The second one, which is a consequence of the former, is that the amount and size of these FUA is very small. Essentially, besides the already low densities, this region is also characterized by the difficulty of agglutinating its population in urban areas of a significant any size.

The third one is that the FUA network lacks hierarchy in the upper end of the rank size distribution. When considering that the share of the prime city in the total FUA is also relatively low, this means that city system does have a polycentric layout, even if at a very low scale.

The fourth is that the FUA are, sparsely, but evenly spaced throughout the CBA. This region therefore does not follow the overall tendency of Portugal and Spain to concentrate the biggest cities at the coast leaving the inland fairly deprived of major urban centres.

The fifth is that the hierarchy of the GDP per capita distribution among the FUA is very similar to the one of the population. So the CBA does not follow pattern of Portugal, Spain and the total ESPON countries, where wealth is normally distributed in a more hierarchical way among the FUA than population.

The sixth is that the FUA tend to be very compact (morphological core occupies much of the total FUA) and have a tendency for growing well above the regional average.

- Low amount of FUA
- Higher end of the hierarchy missing
- Low percentage of people living in the FUA
- Evenly spaced urban system
- FUA are compact and are growing fast

Chapter 4 – Urban-rural relationships

4.1. Aims, indicators and methods

The main objective of this chapter is to identify relations between urban centres and their rural hinterlands: how are different population densities related to land use patterns? is the urban-rural typology capable of explaining different evolutions in land consumption? how are these categories linked to the economic structures? what is the urban network like at the local level?

4.1.1. Data

Although the urban-rural relationship has been subjected to some study, namely in the ESPON program, there still is no data available on the EUROSTAT or the ESPON to actually evaluate the interaction between rural and urban areas (meaning the flow of people and goods as well as computer mediated communications).

The focus in this chapter was therefore on structural indicators, such as land use patterns and economic sectors. Although it is possible to get land cover data on a very low geographical scale from the Corine Land Cover, indicators such as employment and economical patterns are only available at a NUTS 3. The typologies established by the ESPON and by the Eurostat, are also only available at a broad scale, limiting the ability to link the indicators with rural or urban areas at any significant dimension. The focus in this chapter was therefore on the urban-rural typologies on a NUTS 3 level, highlighting some of the differences between the regions concerning the structural indicators.

A short analysis of the urban areas was also included. As was verified by the policentricity analysis, the CBA has shown a small concentration of its population in Functional Urban Areas. But according to the Territorial Agenda of the European Union 2020, small and medium sized urban areas play a crucial role in rural areas imposing questions such as: are there many minor urban agglomerations that can provide a minimum set of services and infrastructures at a local level? have they been functioning as anchors in these low density territories?

Given the high threshold for considering a settlement as a FUA in the ESPON projects, the urban network in this chapter has been analysed according to the national classifications. As the criteria for considering an urban area differ widely, this data lacks comparability between each side of the border, and it essentially functions as a way to understand some elements of the settlements in these regions.

The used indicators were the following.

Variable name	Geographical scale	Source	Time frame
Change urban fabric	NUTS 3	Own production, based on the CLC	2000-2006
Agricultural areas	NUTS 3	ESPON DB	1990; 2000; 2006
Urban-rural typology	NUTS 3	ESPON DB/ Eurostat	
Urbanisation of natural areas	NUTS 3	Own production, based on the CLC	2000-2006
Gross value added in forestry and fishing	NUTS 3	Eurostat	1997-2008
Employment in forestry and fishing	NUTS 3	Eurostat	1997-2008
Urban areas	N/A	National Statistical Institute of Portugal, Ministerio del Fomento	

4.1.2. Methods

The ESPON 1.1.2 typology regarding urban and rural regions is based on three indicators: land cover, population density and the presence/absence of a FUA. According to different combinations of these indicators, NUTS 3 have been classified as having high or low human influence (population densities) and urban intervention (land cover). Although it has been

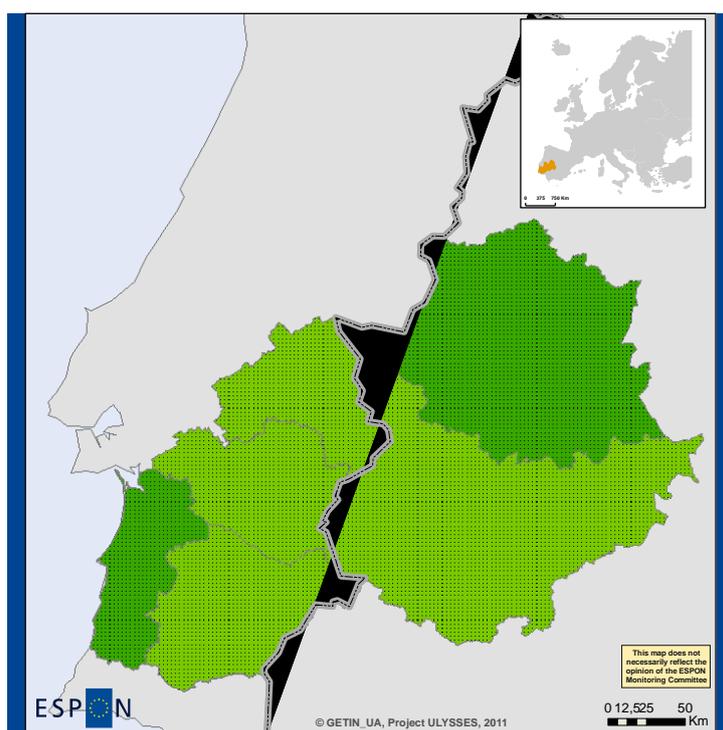
included for illustrative purposes, this typology has not been used to cross with other data. The reason for this is twofold: 1) the indicator has not been updated for NUTS 3 changes; 2) the inclusion of indicators on land cover to establish the typology, would lead to confusion when trying to cross these indicators with the typology.

The urban rural typology that was mainly used was a revision by the EUROSTAT of the OECD typology. This typology is established in three steps:

1. The first one is to cluster urban grid cells with a minimum population density of 300 inhabitants per km² and a minimum population of 5 000. All others are considered rural.
2. The second one is to group NUTS 3 regions with less than 500 km² with some of its neighbours solely for classification purposes, i.e. all the NUTS 3 regions in a grouping are classified in the same way.
3. The third one is to classify the NUTS 3 regions based on the share of population in rural grid cells. All that have more than 50 % of the total population in rural grid cells are considered predominantly rural. All between 20 % and 50 % in rural grid cells are considered to be intermediate. And all with less than 20 % in rural cells are considered to be predominantly urban (Eurostat 2010: 249).

Further, some regions that are predominantly rural are considered intermediate in the presence of a city with more than 200 000 inhabitants and intermediate regions with cities of over 500 000 inhabitants are considered as urban.

Map 13: ESPON 1.2.3 and Eurostat urban rural typologies by NUTS 3



Local level: NUTS 3
 Year: 2006 and 2000
 Source: EEA, Corine Land Cover 2000 and 2006
 © EuroGeographics Association for administrative boundaries

Legend

Eurostat urban rural typology		ESPON 1.1.2 typology			
		Human influence	Human intervention	Human influence	Human intervention
White	Predominantly urban	High	High	Low	High
Black	Intermediate regions	High	Medium	Low	Medium
Dark Grey	Predominantly rural	High	Low	Low	Low

As can be seen by overlapping the two typologies for this CBA, all of the NUTS 3 are considered to be predominantly rural according to the Eurostat and most of them are considered to have low urban influence and medium urban intervention according to the ESPON. Only the NUTS 3 of the Alentejo Litoral and Cáceres have low human influence and low human intervention.

Regarding the land use, the data has partly been drawn from the ESPON DB. Nonetheless, there were some inconsistencies between the ESPON DB and the data from the CLC country files for artificial surfaces. Because there was no plausible explanation for this, as data for agricultural areas for example varies only in an acceptable margin of error, the artificial surfaces were obtained from the shape file of the land use changes of the CLC 2000-2006 which was intersected with the NUTS 3 of the region.

4.2. The urban networks

Both, Portugal and Spain, have been developing official studies on their urban systems. In Portugal, an Atlas of the Portuguese Cities was made in 2002 by the National Statistical Institute, which is still cited regularly when analysing the urban systems of different regions. This atlas based itself on an administrative classification (cities were considered to be so according to their legal status) and census 2001 data. Whenever possible, the cities' perimeter was defined by the statistical subsections and sometimes by the LAU 2. Since the political status of a city is defined rather arbitrarily and since the inclusion/exclusion of neighbouring LAU 2 and subsections in the cities' perimeter did not occur according to a uniform method, this classification has some limitations. Nonetheless, the associated indicators give a small hint on the situation of these cities.

Table 9: Portuguese cities in the CBA by national classification 2001

City name	Population	Main mode of transportation	% foreign citizens	% building build after 1990	% dwellings inhabited by the owner
Évora	41159	Personal car	<= 2	]12-24]	]50-60]
Beja	21658	Personal car	<= 2	]12-24]	]50-60]
Portalegre	15238	Personal car	<= 2	]12-24]	]40-50]
Elvas	15115	Personal car	<= 2	<= 12	]40-50]
Sines	11303	Personal car	]2-4]	]12-24]	]50-60]
Vendas Novas	9485	Personal car	<= 2	]12-24]	]50-60]
Vila Nova de S. André	8745	Personal car	]2-4]	]12-24]	]60-70]
Moura	8459	By food/bycicle	<= 2	]12-24]	]50-60]
Montemor-o-novo	8298	Personal car	<= 2	]12-24]	]50-60]
Estremoz	7682	Personal car	<= 2	]12-24]	]40-50]
Ponte de Sôr	7331	Personal car	<= 2	]24-31]	]50-60]
Alcácer do Sal	6602	Personal car	<= 2	]12-24]	]50-60]
Reguengos de Monsaraz	5900	-	-	-	-
Santiago do Cacém	5240	By food/bycicle	<= 2	]12-24]	]50-60]
Serpa	5201	By food/bycicle	<= 2	]12-24]	]60-70]

Source: Instituto Nacional De Estatística (2002), "Atlas das cidades de Portugal", Instituto Nacional de Estatística, Lisboa.

The Alentejo region has a loose network of very small urban centres, most of which do not even count as much as 10000 inhabitants and the share of the total population that lives in these urban agglomerations is only 30,5%.

The main mode of transportation for most of these cities is the personal car, except for Serpa, Santiago do Cacém and Moura where people move predominantly by foot or by bicycle⁵. Home ownership is high throughout these cities, most of which are above the national city average of 53,5%. The share of foreigners and of new buildings is essentially in line with the national patterns.

In Spain, an important study of the urban areas was made at a similar time then the Portuguese: the Statistical Atlas of the Urban Areas of Spain, from 2000. This Atlas based its classification on the size and density of the municipalities, existing urban dynamics, infrastructures, demographic and real estate dynamics between 1960-1991 (Fidalgo and Nicolás, 2001).

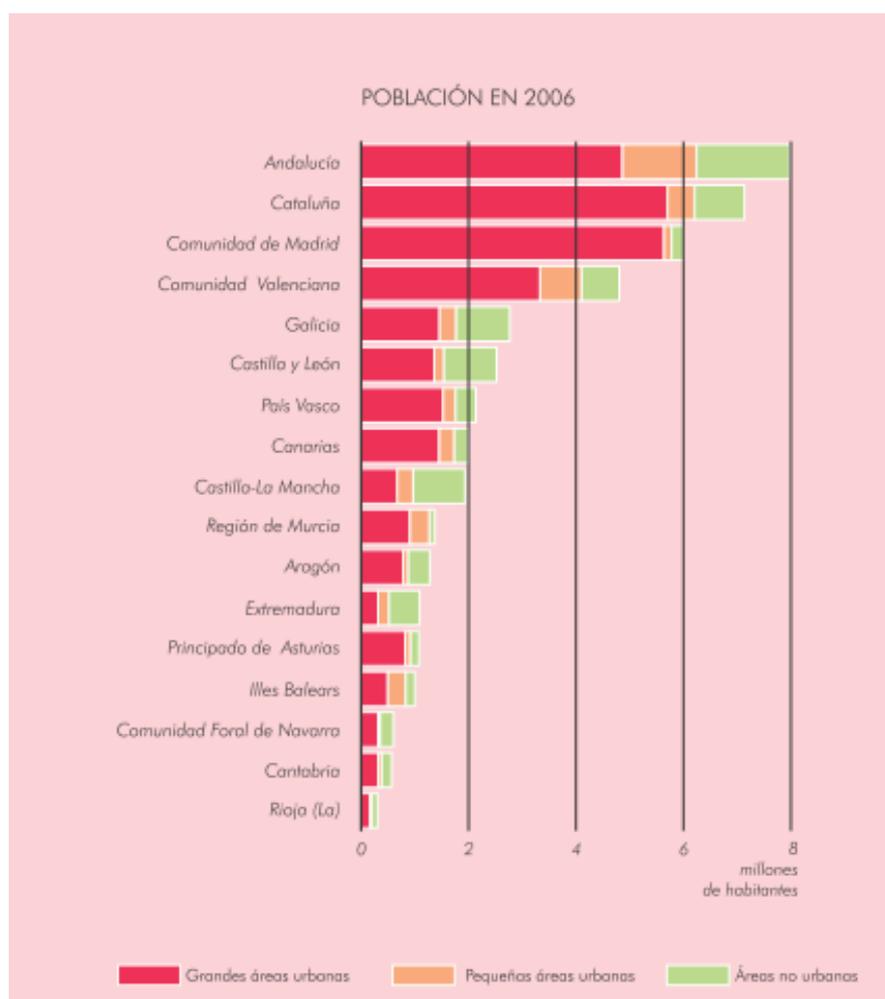
This atlas has since been updated and a revised version is available for 2006. In this version, 2 types of urban areas were identified:

- Large urban areas (> 50000 inhabitants)
- Small urban areas (10000-50000 inhabitants)

The criteria were mostly based on population of the Municipalities, although population dynamics or employment by sectors were also included in some cases.

⁵ This is a tendency in throughout the Portugal, and the only city where public transportation is the major mode of transportation is Lisbon.

Figure 14: Population the Autonomous Regions of Spain by type of urban area, 2006



Source: Ministerio del Fomento (2006), “Atlas Estadístico de las Áreas Urbanas 2006”

As can be seen in the graph, in the Extremadura the amount of people living in non-urban areas is the highest of all of Spain (about half of the total population). And, despite the considerable size of this region, there are only 3 large urban areas: Badajoz, Cáceres and Mérida. The largest of these 3 is Badajoz, which has also been witnessing the highest annual growth rate and the highest amount of foreign citizens (although still much bellow other Spanish cities Dénia-Javea - 46,84% or Torrevieja - 51,01%). As for cities' land consumption, Badajoz was in 2001 the city which had the best ratio of inhabitants per ha of urban soil (71,1%) followed by Cáceres (57,4%), with Mérida coming last (46,2%). The percent of building build after 2000 is very close to the national average of 28,6% in all three of the cities.

Table 10: Large Spanish urban areas in the CBA by national classification

	Badajoz	Mérida	Cáceres
Inhabitants 1991	130944	62792	93636
Inhabitants 2010	155855	70283	105534
Annual growth rate	0,92	0,59	0,63
Surface (km ²)	1532	986	1937
Density	102	71	54
Number of dwelling	60882	29366	47453
Number of households 2001	44331	20416	31206
Urban soil 2001 (ha)	1841,9	1359,22	1630,51
Artificial soil 2006 (ha)	4985,16	1845,58	2745,01
% Foreigners 2010	4,6	2,7	2,8

% building build after 2000 (2010) 26,6 26,0 27,8

Besides the few large urban areas, there is also a considerable network of small urban areas. These range from a minimum population of almost 13000 inhabitants in Coria, to almost 40.000 in Plasencia. Their density is mostly higher than that of the large urban areas.

Table 11: Small Spanish urban areas in the CBA by national classification

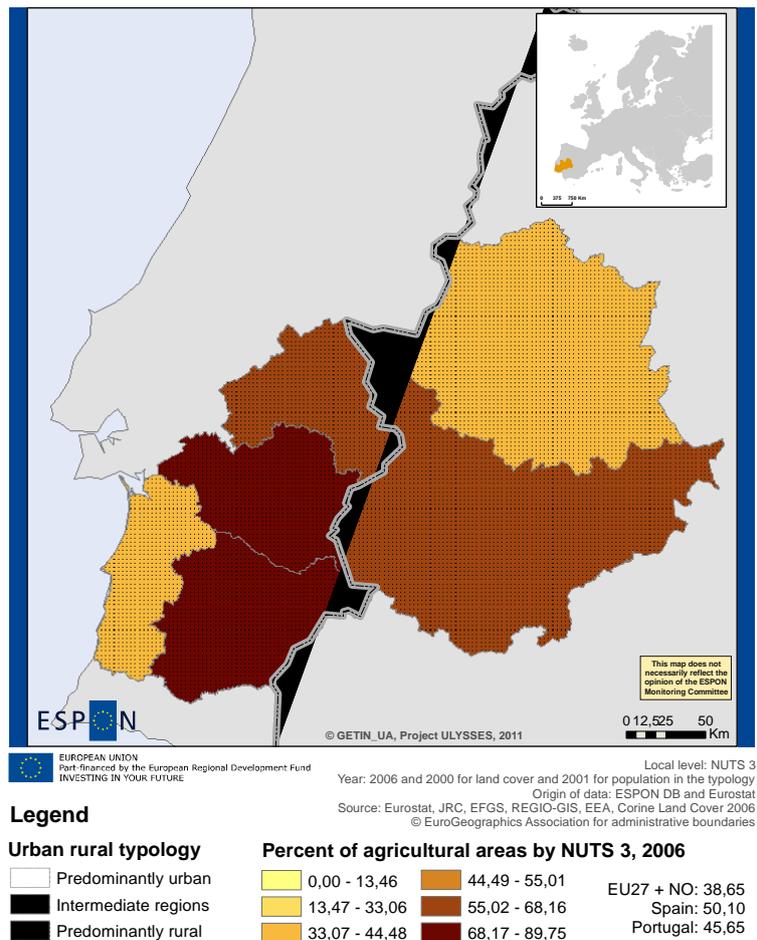
	Plasencia	Don Benito	Almendralejo	Villanueva de la Serena	Navalmoral de la Mata	Zafra	Montijo	Villafranca de los Barros	Coria
Inhabitants 2006	39785	34051	30741	24932	17099	15706	15648	13056	12901
Surface (km ²)	218	562	164	153	156	63	120	104	103
Density	183	61	187	163	110	251	131	125	125

4.3. Land use

4.3.1. Agricultural areas

The agricultural areas of the CLC include: arable land, permanent crops, pastures and heterogeneous agricultural areas. For evaluating the agricultural land in this CBA, values for the three different CLC surveys were used in order to show their evolution over the last decade.

Map 14: Share of agricultural areas 2006, by NUTS 3



The share of agricultural areas in this region is relatively high. Most of them are clearly above the ESPON as well as the national average. In 2006, the NUTS 3 which has the highest value is the Baixo Alentejo (74,4%), followed by the Alentejo Central (69,59%). The regions which have the lowest share of agricultural areas are the Alentejo Litoral (38,87%) and Cáceres (43,28%).

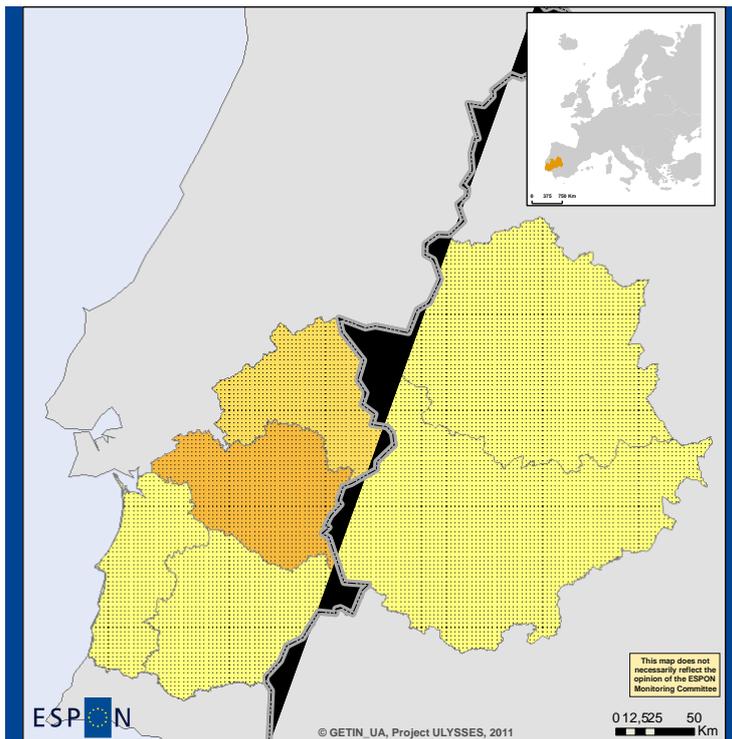
Table 12: Agricultural areas 1990-2006 by NUTS 3

	Total 1990	Total 2000	Total 2006	Agricultural areas (ha)			
				Share of total area 06 (%)	Net formation of land cover 90-06	Net formation by total area 90-06 (per 10000)	Annual growth rate 90-06 (per 10000)
EU27 + CH + NO	182685050	205227723	184577384	38,65	1892334	39,621	6,44
Portugal	4346643	4265900	4199200	45,65	-147443	-160,3	-21,55
Spain	25396779	25428657	25349184	50,1	-47595	-9,41	-1,17
Badajoz	1453810	1462240	1446240	66,45	-7570	-34,78	-3,26
Cáceres	834577	853332	859899	43,28	25322	127,44	18,7
Alentejo Litoral	228019	216787	203332	38,87	-24687	-471,98	-71,36
Alto Alentejo	384013	378944	379352	60,71	-4661	-74,59	-7,63
Alentejo Central	483986	479288	503231	69,59	19245	266,13	24,4
Baixo Alentejo	665403	649669	635487	74,4	-29916	-350,24	-28,71

Source: ESPON DB Methodology: Tabulate area between CLC2000 level 3 and Nuts 2006 (levels 1,2,3) and aggregation at clc2000 level1

From a diachronically point of view, the amount of agricultural areas tend to diminish in this CBA between the CLC 1990 and the CLC 2006 (the only two exceptions are the NUTS 3 of the Alentejo Central and Cáceres). The same phenomenon is also observable at the national level, although at a very different pace: Portugal is losing much more agricultural areas every year than Spain. The ESPON space as a whole, on the other hand, has been slowly increasing the share of agricultural areas.

Map 15: Land use change from agricultural to artificial 2000-2006 by NUTS 3



	Agric to artificial by total area (per 10000)
ESPON	9,25
Portugal	11,84
Spain	20,20
Badajoz	6,09
Cáceres	2,54
Alentejo Litoral	3,33
Alto Alentejo	4,52
Alentejo Central	6,10
Baixo Alentejo	4,01

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Local level: NUTS 3

Year: 2006 and 2000

Source: EEA, Corine Land Cover 2000 and 2006

© EuroGeographics Association for administrative boundaries

Legend

Urban rural typology

- Predominantly urban
- Intermediate regions
- Predominantly rural

Change agricultural to artificial areas (per 10000), 00-06

- 0,00 - 1,04
- 1,05 - 2,60
- 2,61 - 5,27
- 5,28 - 10,56
- 10,57 - 24,89
- 24,90 - 38,93

EU27+CH+NO: 9,2

Spain: 20,20

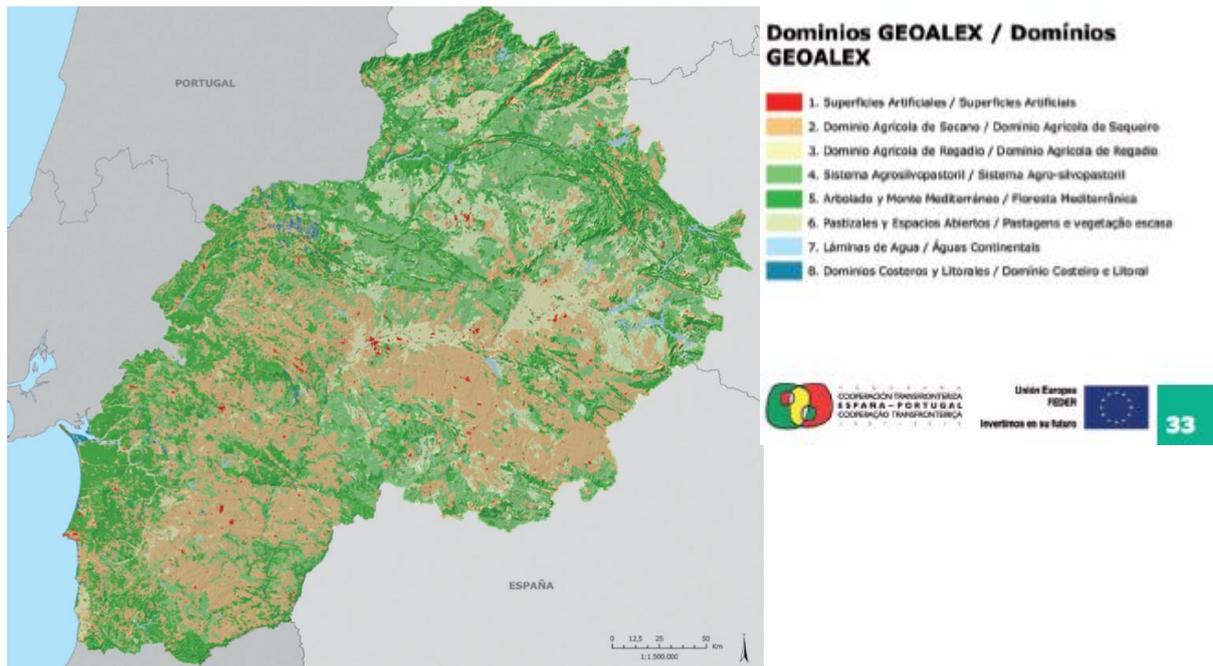
Portugal: 11,84

Of the several uses to which the agricultural land is lost, the one that is most telling is the artificial land use⁶. This is because it increases the overall human intervention on the territories, and goes hand in hand with a loss or rural traits of the territories.

From the NUTS 3 of this CBA, the one in which the artificial uptake of agricultural areas is the greatest is the Alto Alentejo (6,1 per 10000). But, even this region, is well below the national averages as well as that of the total ESPON countries.

⁶ The artificial land use includes urban fabric, industrial, commercial and transport areas, mine, dump and construction sites and non-agricultural vegetated areas.

Map 16: Land use by GEOALEX in 2000



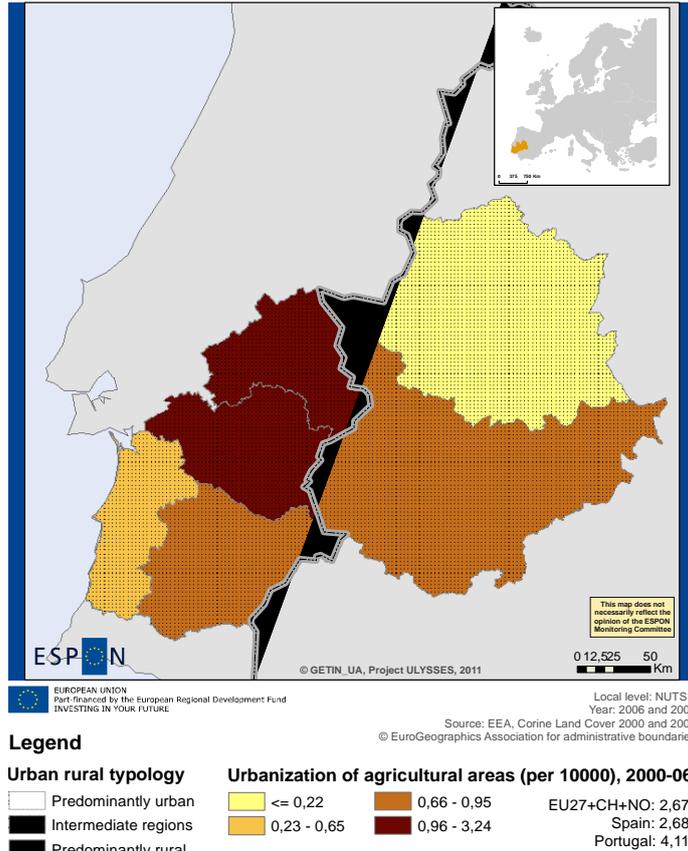
Source: OTALEX Atlas

Another important aspect of the Alentejo and the Extremadura is the widespread adoption of the dehesa/montado alentejano type of explorations to deal with the relatively poor soils and tough climate condition. The areas that fall under this category are normally associated with a strong complementarity of pastures, forestry and crops (normally cereals), and have revealed some resilience over the decades. As can be seen by in the previous maps, a large share of land is still covered by this agrosilvopastoril system.

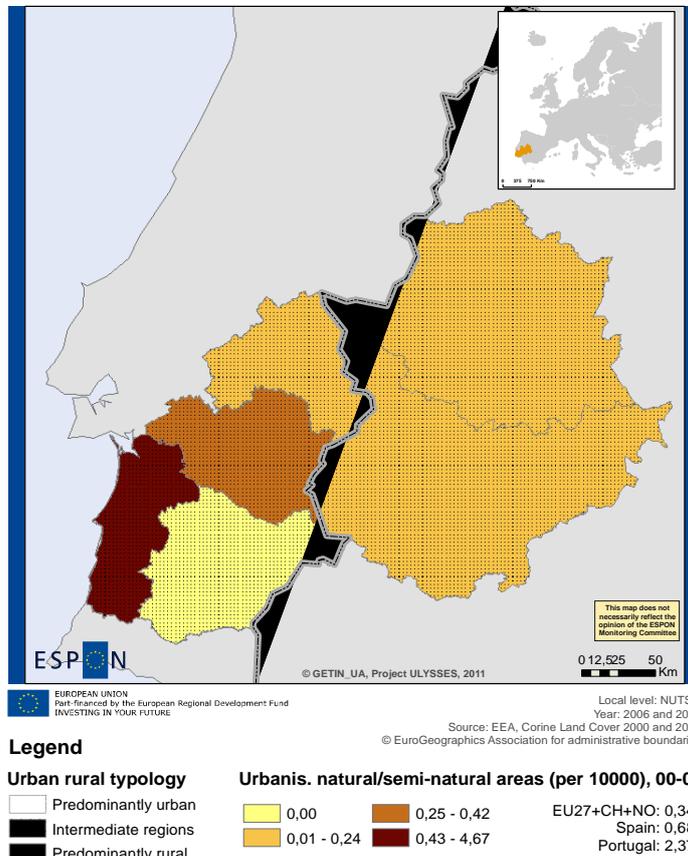
4.3.2. Urban areas

From the CLC point of view, the urban areas are divided into two categories: continuous urban fabric and discontinuous urban fabric. They comprise areas that are mostly covered by buildings, roads and artificial surfaces, although some vegetated areas and bare soil are admitted.

Map 17: Urbanisation of agricultural areas 2000-2006 by NUTS 3



Map 18: Urbanisation of natural and semi-natural areas, 2000-2006 by NUTS 3



The urbanisation of other type of land uses has been subject to a broad discussion on the European level, namely in what constitutes the sustainable growth paradigm. In the NUTS 3 of this CBA this seems not to be a major issue. Noticeably, all of them have witnessed increases in the formation of new urban fabric which are well below the national averages of their respective countries. The regions in which the urbanisation has moved fastest is the Alentejo Litoral (with a land uptake of 7,48 per 10000). This regions is also the one which have witnessed the greatest urbanisation of natural and semi-natural areas, which is especially strange given the low the population growth over the last decade which could justify a continuous urbanisation process.

Table 13: Urban fabric areas 2000-2006 by NUTS 3

	Urban fabric (ha) (2000-2006)					
	Net formation of land cover	Net formation of land cover by total area (per 10000)	Urbanisation of agricultural areas (00-06)	Urbanisation of agricultural areas by total area (per 10000)	Urbanisation of natural and semi-natural areas	Urbanisation of natural and semi-natural areas by total area(per 10000)
ESPON space	189842	3,97	127746	2,67	16003,73	0,34
Portugal	9097	9,89	3784	4,11	2179,84	2,37
Spain	31278	6,18	13557	2,68	3429,76	0,68
Badajoz	284	1,31	207	0,95	51,25	0,24
Cáceres	77	0,39	44	0,22	33,43	0,17
Alentejo Litoral	391	7,48	34	0,65	244,38	4,67
Alto Alentejo	181	2,90	140	2,24	8,31	0,13
Alentejo Central	272	3,76	234	3,24	30,30	0,42
Baixo Alentejo	99	1,15	72	0,84	0,00	0,00

4.4. Weight of agriculture and fishing

Another aspect that is typically related to rural areas is the employment and GVA in primary sector activities, namely agriculture and fishing. In this CBA, which is considered to be predominantly rural, this association seem to be justified as most of the NUTS 3 of this region have a share of employment and GVA in these sub-sectors that is well above the national averages.

Table 14: Share & annual growth rate of employment in agriculture and fishing 2000-2008 by NUTS 3

NUTS Name	Employment in agriculture and fishing (thousands of persons)		Share of employment in agriculture and fishing by total employed (%)		Annual growth rate of employment in agriculture and fishing 2000-2008	Annual growth rate of the share of employment in agriculture and fishing 2000-2008
	2000	2008	2000	2008		
Portugal	613,2	569,3	12,19	11,06	-0,92	-1,21
Spain	1037,4	879,6	6,32	4,28	-2,04	-4,75
Badajoz	45,2	35,5	20,86	13,56	-2,97	-5,24
Cáceres	13,2	11,2	10,95	7,64	-2,03	-4,39
Alentejo Litoral	6,7	7,7	19,14	19,44	1,75	0,20
Alto Alentejo	8,7	8,2	17,94	16,53	-0,74	-1,02
Alentejo Central	7,4	8,2	10,15	11,33	1,29	1,38
Baixo Alentejo	8,4	10,3	18,71	21,06	2,58	1,49

In 2008, on the Spanish side of the border, Badajoz had a share of persons employed in agriculture and fishing that is three time that of the national average, while Cáceres has almost double. But both of these regions have witnessed a major decline in this share from 2000 to 2008.

In the Portuguese side, only 3 of the regions are well above the national averages (Baixo Alentejo, Alentejo Litoral and Alto Alentejo), while the Alentejo central is in line with the national

figures. But, contrary to the Spanish regions, there is an overall tendency for an increase of the share of employment in these subsectors, which is particularly strong in the Alentejo Central and the Baixo Alentejo. This tendency could be related to the construction of the Alqueva Dam, which has increased the capacities for irrigating many of the agricultural areas that surround it.

Considering the GVA, the relative importance of these economic subsectors is even more visible. Although they have been experiencing a major decline from 1997 to 2008, they still manage to be well above the national averages and even the regions with the lowest share (C aceres) still doubles the national values.

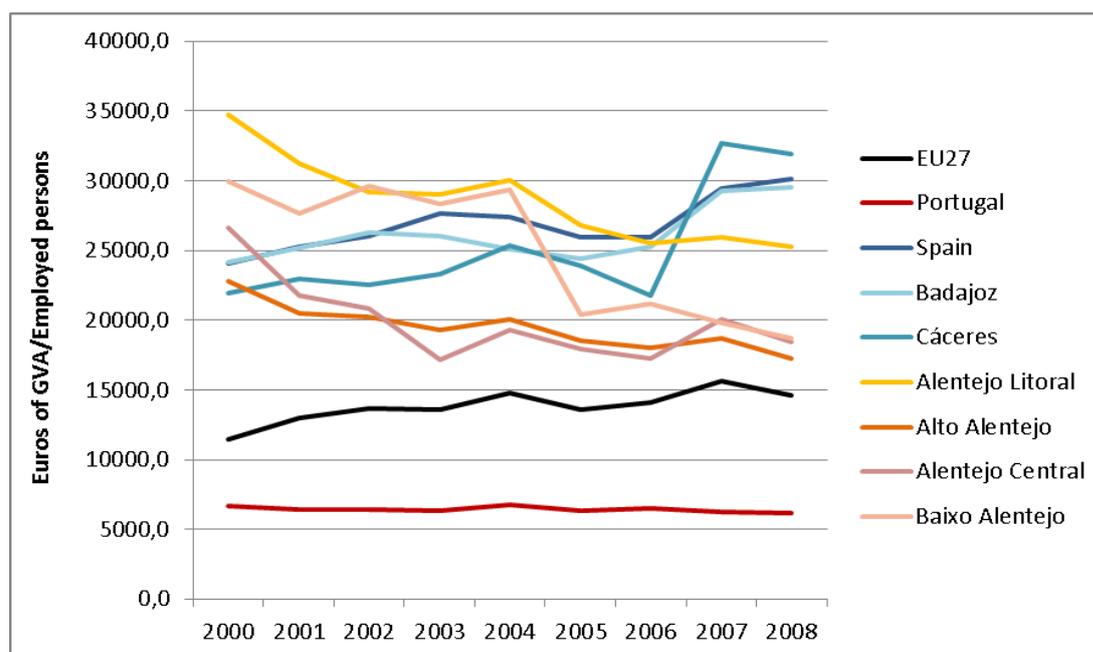
Table 15: Share & annual growth rate of GVA in agriculture and fishing 1997-2008 by NUTS3

NUTS Name	GVA by Agriculture; fishing (millions of euro/ECU)		GVA by Agriculture; fishing by total GVA (%)		Annual growth rate GVA by agriculture and fishing 1997-2008	Annual growth rate of share of GVA by agriculture and fishing 1997-2008
	1997	2008	1997	2008		
EU27	196578,6	171307,5	2,82	1,75	1,26	-4,23
Portugal	4021,1	3508,2	4,49	2,35	-1,23	-5,72
Spain	23222,7	26494	5,01	2,66	1,21	-5,60
Badajoz	820,4	1048,6	17,03	10,10	2,26	-4,64
C�aceres	204,6	357,2	6,81	5,71	5,20	-1,59
Alentejo Litoral	203,3	194,8	18,02	11,54	-0,39	-3,97
Alto Alentejo	183,7	141,5	20,08	10,55	-2,34	-5,68
Alentejo Central	180,5	151,2	14,04	7,49	-1,60	-5,55
Baixo Alentejo	262,4	192,5	25,95	11,26	-2,78	-7,31

Considering the labour productivity in the agriculture and fishing, all of the NUTS 3 perform considerably well. Despite their low densities (or maybe precisely because of them), the large size of the agricultural enterprises and a growing mechanization of the production processes, have led to a competitive primary sector in both of sides of the border.

This is particularly interesting for the Portuguese regions, since this country's overall values are much lower than the European ones. Still, when compared with the Spanish side of the border, the NUTS 3 in the Portuguese side have lower values and are witnessing major decline from 2000-2008, while the Spanish regions have been increasing their productivity in this sector.

Figure 15: Labour productivity in agriculture and fishing



4.5. Chapter conclusions

Five major conclusions have been identified from the analysis of the urban-rural relationship in this chapter.

The first one is that the region's spatial layout is marked by a network of small urban areas that spreads out over a large, predominantly rural, territory. According to the national classifications, these urban areas account for only about half the population in the Spanish side of the CBA and one third in the Portuguese one.

The second one is that there is a large share of agricultural areas, although they have the overall tendency to diminish. The changes in the share of agricultural areas seem to be only slightly related to the growth of artificial surfaces, and more to their abandonment or the uptake of forests or semi-natural areas.

The third is that these regions have been witnessing a slow growth in the urban land use.

The fourth is that the economic structure of this CBA is very characterized by the weight of the agricultural sector. Its share in the regions' total values is well above the national average in employment but especially in Gross Value Added. From this, it is possible to deduce that in this region the agricultural sector excels not only by its weight, but also by its high labour productivity. In this context it is particularly relevant to evaluate the contributions of the Alqueva dam in increasing the irrigated agricultural areas in the Alentejo.

The fifth is the importance of the dehesa/montado agrosilvopastoral system that continues to play an important part in that region and that is essential in maintaining the region's ecosystem.

Large share of agricultural areas
Low urbanisation process
Large share of employment and GVA in agriculture
High productivity in agriculture
Importance of the dehesa/montado type of land use

Chapter 5 – Accessibility and connectivity

5.1. Aims, indicators and methods

The main goal of this chapter is to evaluate the accessibility and connectivity levels of the CBA. The more specific questions to be answered are how are general accessibility levels of the CBA regarding different modes of transportation? what is their communication infrastructure like?

5.1.1. Data

Most of the data for accessibility available at the ESPON database is very outdated and available mostly for the 1999 NUTS version. The use of NUTS 1999 delimitations is especially limiting since changes in the coding systems and the actual boundaries of the regions have occurred in almost all of the countries in Europe. Nonetheless, the potential accessibility by different modes of transportation has been updated in 2006 and re-calculated for fitting the then ruling NUTS 3 delimitation retroactively for 2001 and is therefore available for two different and comparable years. This is particularly useful as this indicator does not limit itself to measuring the transport network, but synthesizes the overall accessibility of the regions by relating the travel time (impedence function) with the population that can be reached (activity function).

As for connectivity, there is normally a great lack of information. Even straightforward indicators, such as internet connections by household, are often difficult to come by, as the Internet Service Providers are reluctant to share this type of strategic information. Another issue is that the data is often not disaggregated at the regional level, therefore allowing international comparisons. Therefore, only two indicators on connectivity were included in this report: a composite indicator on the internet infrastructure was collected from the ESPON database and the percentage of households with broadband internet connection from the 5th Cohesion Report.

Variable name	Geographical scale	Source	Time frame
Potential accessibility road, rail indexed to ESPON average	NUTS 3	ESPON DB	2001;2006
Potential accessibility road, rail indexed to CBA average	NUTS 3	ESPON DB	2001;2006
Potential accessibility road, rail index change 2001-2006	NUTS 3	ESPON DB	2001;2006
Households with broadband connection	NUTS 2	European Commission 5th Cohesion	2009
Composite indicator on the Internet infrastructure	NUTS 2	ESPON DB	2008
Daily intensity of cars and trucks at the main border crossings	N/A	Observatorio transfronterizo España-Portugal	2008

5.2.1. Methods

Accessibility is forcefully a relative concept: a region's accessibility is not an inherent trait, but a consequence of its relative position in the broader territory. As Walter Hansen puts it, "accessibility is a measurement of the spatial distribution of activities about a point, adjusted for the ability and the desire of people or firms to overcome spatial separation" (Hansen,1959:73).

In the ESPON 1.2.1 Final Report, the potential accessibility is an indicator that relates the activities to be reached with the travel time it takes to reach them. Its function is as follows:

$$A_i = \sum_j W_j^a \exp(-\beta c_{ij})$$

where A_i is the accessibility of area i , W_j is the activity W to be reached in area j , and c_{ij} is the generalised cost of reaching area j from area i . A_i is the total of the activities reachable at j

weighted by the ease of getting from i to j. The interpretation is that the greater the number of attractive destinations in areas j is and the more accessible areas j are from area i, the greater is the accessibility of area i." (ESPON 2006: 276)

For each NUTS 3 of the ESPON space the potential accessibility was obtained by relating the travel time between the centroids through different modes of transportation with the population (road, train and air). Regarding the travel time by air, the exact methodology wasn't available at the metadata of the ESPON DB or the ESPON project's final report, but other modes of transportation are forcefully included.

The multimodal accessibility has also been calculates as an overall indicator that synthesizes all the different modes. According to the ESPON project, multimodal accessibility is "a log sum accessibility potential aggregating over road, rail and air" Ibid: 131. This essentially means that the individual accessibilities are aggregated in a way that balanced regions will have greater multimodal accessibilities than regions with very high results in some modes and very low results in others.

As the potential accessibility was produced for two different years, it is possible to see the evolution of the infrastructure in this period. Here, the index change of accessibility was used. For this indicator, "the accessibility values of 2001 are standardised to the ESPON average of that year and those of 2006 to the average of that year, each ESPON average is set to 100 and the regional values are transformed accordingly. The map then shows the differences of the index values, i.e. the change of the position of the regions relative to other regions. Positive values express an improvement of the relative locational quality, while negative values express a loss in relative locational quality" (Spiekermann & Wegener 2007: 9).

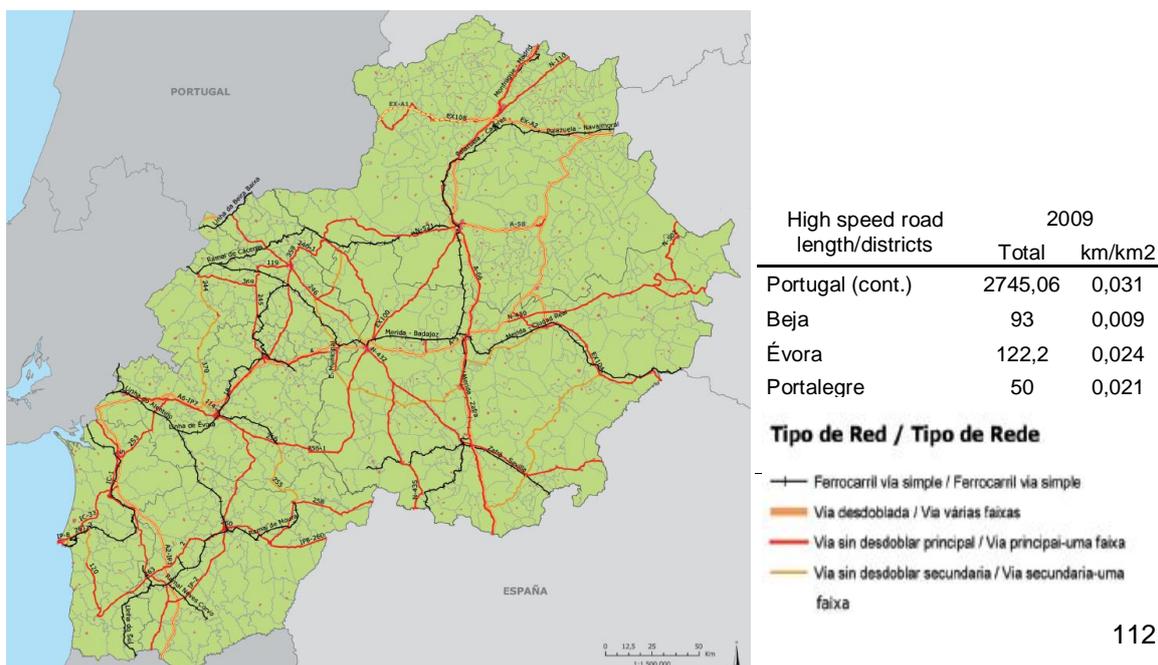
5.2. Accessibility

5.2.1. Infrastructure

The general railway development in this region is very limited, with a predominantly one line and non-electrified infrastructure and poor daily connections. There are two railway border crossing between both sides of the border in this CBA: one in the north, linking Marvão-Beirã to Valência de Alcântara and the second one linking Elvas to Badajoz. The first one is served by the Lusitânia Comboio Hotel, which is a night train going once a day from Lisbon to Madrid. The second has also one daily connection, but by a daytime regional train.

	1990		2009	
	km	km/km ²	km	km/km ²
Spain	5126	0,01	1562	0,0309
Extremadura	17	0,0004	724	0,0174

Map 19: Road and rail network in the CBA

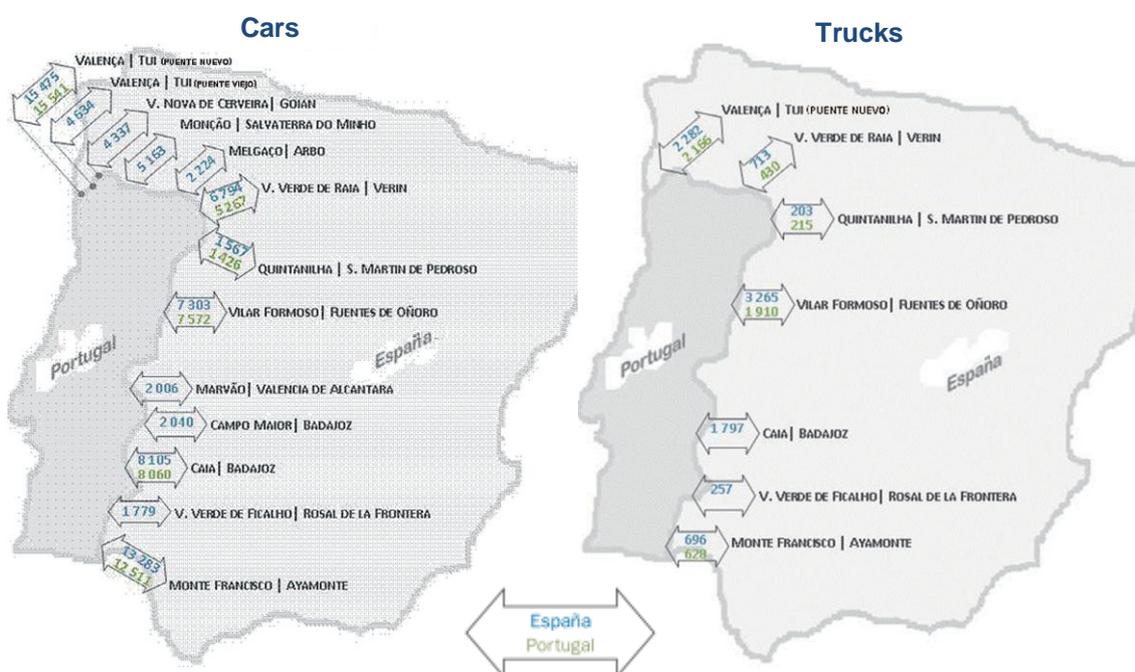


As for the road infrastructures, the network of the major roads is relatively loose, but this is only natural given the low densities. If we look at the Extremadura, for which more detailed data is available, one can even conclude that it is fairly well served with high speed road networks. In this region, the kilometres of high speed roads per square kilometres have been increasing steadily in the last two decades, and now the region has a ratio which is more than half of the national average, while its population density is less than one forth.

In Portugal the high speed road length was only available from official sources for the district level. Although there is no exact match with the NUTS 3 areas, it is still possible to get an approximate idea on the density of the network. The main point that to retain from this data is that all the 3 border districts (Évora, Beja and Portalegre) are below the national averages, which, once again, is in line with the low population densities.

The Extremadura and the Alentejo share 3 main road border crossings: Marvão-Valencia de Alcantara, Campo Maior-Badajoz and Caia-Badajoz (located at the main axis around the A6/A5 that crosses almost the whole CBA).

Figure 16: Daily intensity of cars and trucks in the main border crossings in 2008



Source: Observatorio transfronterizo España-Portugal **Origin of data:** DG Carretera, EP Estradas de Portugal.

In terms of daily traffic, the most important of the 3 main border crossing of the CBA is Caia-Badajoz, which is estimated to have about 8105 cars crossing each day and about 1797 trucks. This means that this border is one of the busiest borders in all of Portugal, only surpassed by the Vilar Formoso - Fuentes de Oñoro and the Monte Francisco-Ayamonte border crossings⁷.

5.2.1. Potential accessibility

Given that the potential accessibility relates travel time with population that can be reached, the low density and remoteness of this territory does in itself set a strong limit to the score they

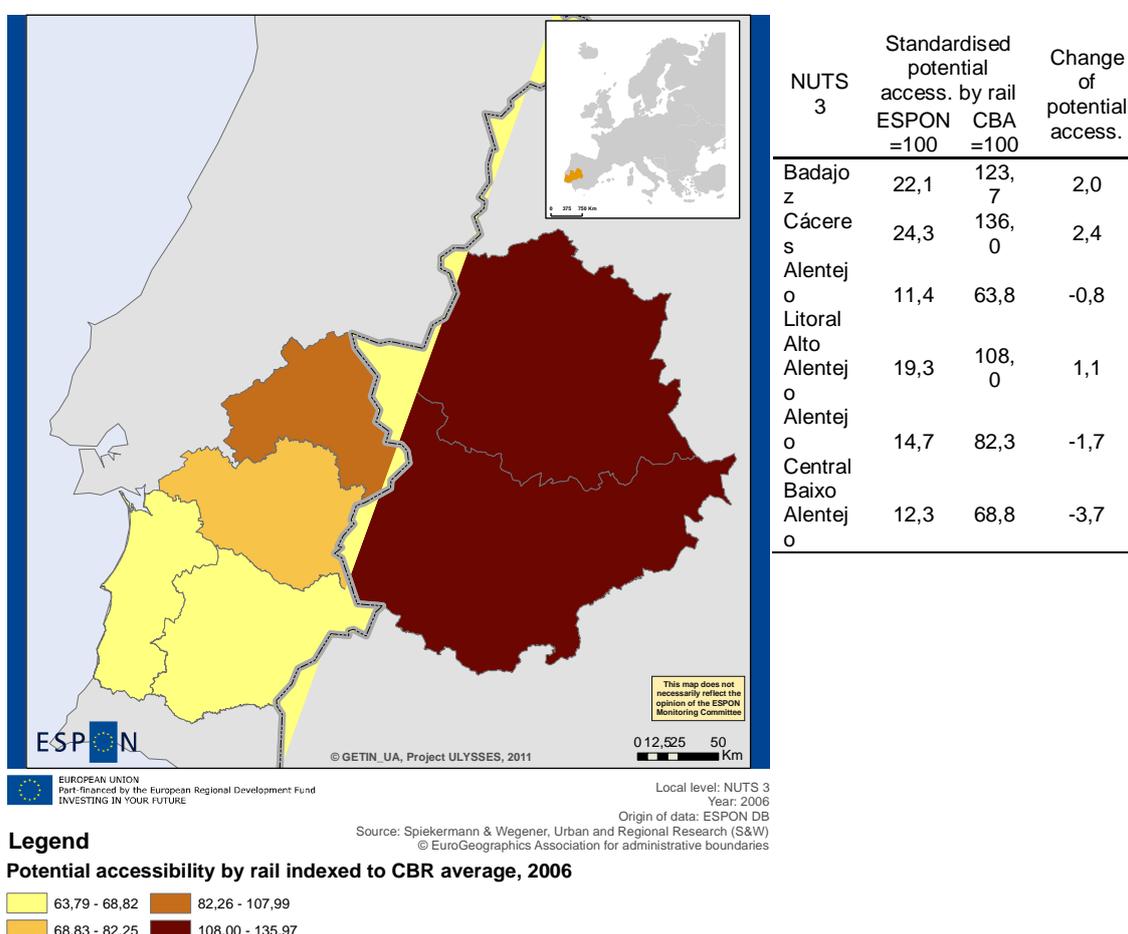
⁷ The main infrastructure used in the passenger traffic between Portugal and Spain is the road, which is used by about 94,6% of all the passenger flow. The road is also used by about 85% of all the freight flow between these two countries (the remaining is essentially transported by sea).

could have. It therefore comes as no surprise that the regions potential accessibility by the different modes of transportation is well below the ESPON space average.

The mode of transportation in which the CBA performs worse is the rail. Both Spanish NUTS 3, as well as the Alto Alentejo have around 20% of the average of the ESPON space and the lower Alentejo regions have values that are even lower. If one considers that the central European countries tend to have much better developed railway networks, this result is not surprising.

The changes of the potential accessibility for this mode of transportation diverge between the different NUTS 3: the regions with the highest values are also the ones which have witnessed a positive change in their relative position, while the regions with lower values decreased their relative position. If it were to be performed in more recent years, this indicator would probably have a negative evolution in the interior Alentejo regions, which have witnessed the closure of many of the regional train connections and the complete abandonment of some of its railway lines. An interesting perspective is also given by the high speed train development in this region, which has been progressing on the Spanish side, although in Portugal the political discussion of the project is on-going.

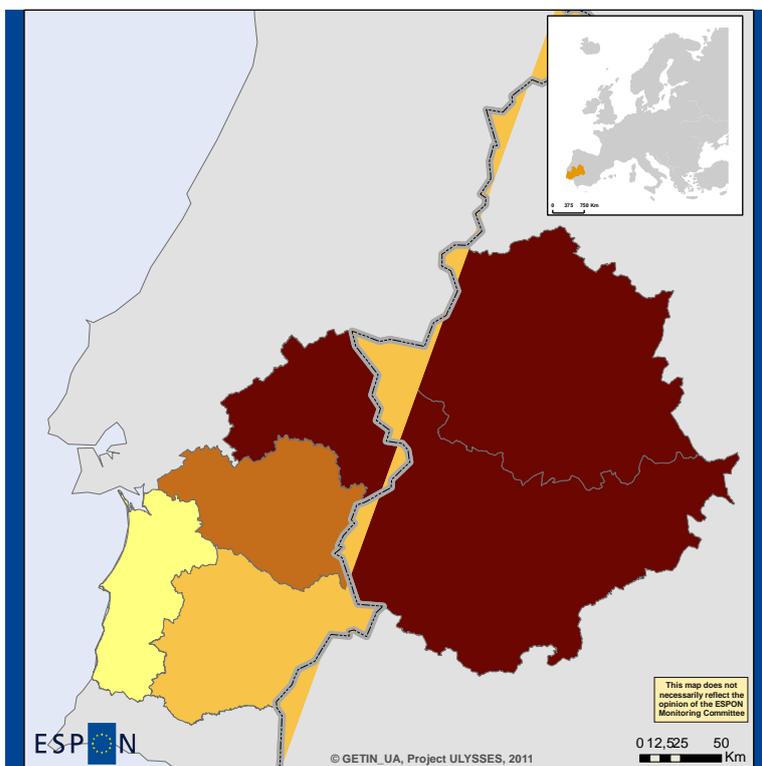
Map 20: Potential accessibility by rail 2006 by NUTS 3



In the potential accessibility by road, this CBA performs much better. But even the best performing region (Badajoz) has little more than one third of the ESPON space average. Internally, once again the northern regions are the ones with the highest values.

From an evolutionary perspective, all the NUTS 3 have been able to improve their relative position.

Map 21: Potential accessibility by road 2006 by NUTS 3



NUTS 3	Standardised potential access. by road ESPON =100	CBA= 100	Change of potential access.
Badajoz	35,3	111,9	2,0
Cáceres	34,3	108,7	1,5
Alentejo Litoral Alto	23,8	75,4	2,3
Alentejo Central	33,8	107,1	1,9
Alentejo Baixo	31,9	101,1	1,6
Alentejo	26,5	84,0	1,7

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0 12.5 25 50
Km

Local level: NUTS 3
Year: 2006

Source: Spiekermann & Wegener, Urban and Regional Research (S&W)
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Legend

Potential accessibility by road indexed to CBR average, 2006

75,42	83,98 - 101,09
75,43 - 83,97	101,10 - 111,86

5.3. Connectivity

As stated in the methodology, there are not many indicators available to evaluate the connectivity at the regional level. Nonetheless, the two analysed indicators show that the connectivity levels of this CBA are low.

In 2009, in the NUTS 2 of the Alentejo only 37,14% of the households have a broadband internet connection. In the Extremadura, these values are slightly higher (39,39%) although it still is the lowest ranking NUTS 2 in all of Spain.

For the composite internet infrastructures⁸ the values of this CBA are also very low. In 2008, the Alentejo has a value of 0,13 and the Extremadura of 0,01, while the Portuguese average is 1,28 the Spanish one 1,91 and the ESPON space 2,65.

⁸ Composite indicator on the Internet infrastructure, calculated as the average of the following Internet infrastructure indicators: international Internet backbone capacity, peak traffic at IXPs and IP addresses all at the regional level

5.4. Chapter conclusions

The first conclusion is that the regions transport infrastructure is essentially in line with its remote position. Indicators such as the kilometres of high speed road per area, for examples, are much smaller than the national averages. But considering the low densities of these territories they have a fairly good coverage.

The second one is that the region has one of the most important border crossings in terms of daily car and truck intensity of all the country (Caia-Badajoz).

The third one is that the potential accessibility of these regions is very low, especially if one considers the rail as the mode of transportation. The evolution between 2001 and 2006 also show a negative tendency for this indicator in regions were the scores were already low, while the other regions had a positive evolution.

The fourth is that the long term choice for transport modes of this CBA seems to be essentially the road. When compared to the ESPON average this mode of transportation is where the regions potential accessibility is the highest.

The fifth is that this region has very poor connectivity.

Remoteness well reflected on the potential accessibility indicators as well as the actual infrastructure

One of the most important border crossings between the two countries

Focus on road as the major infrastructure

Low scores in connectivity indicators

Chapter 6 – Gothenburg and Lisbon/Europe 2020 strategy

6.1. Aims, Indicators and Methods

The main objective of this chapter is to measure the regions' performance regarding the Gothenburg and Lisbon/Europe 2020 Strategy goals.

The common framework set for the future development of the European Union is essentially based on three pillars: an economic one, a social one and an environmental one (added to the original goals of the Lisbon Strategy by the Gothenburg Council in 2001). In the centre of this three pillar is the often cited goal of making the European Union “the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion” (Lisbon European Council conclusions, March 2000). The pursuit of this goal is envisaged through a broad set of reform which range from the labour market, to the Green House Gas emissions.

6.1.1. Data

In order to monitor how the different countries are adapting themselves to the goals of this strategy, a battery of indicators has been agreed to by the member states for each of these main pillars. This battery of indicators has been used as a reference in this chapter, although changes were made for two reasons. The first one was that not all the indicators that have been selected at the national level are available at the regional one (e.g. energy intensity of the economy, greenhouse gas emissions). The second, was that some other indicators are available that are helpful in shedding a light on the regions capacity for developing itself in a sustainable way.

Variable name	Geographical scale	Source	Time frame
GDP	MUTS 3	EUROSTAT, Russian Statistical Institute	1997-2009
Gross value added by NACE	NUTS 3	Eurostat	1997-2008
Employment by NACE	NUTS 3	Eurostat	2000-2008
Long term unemployment	NUTS 2	Eurostat	2009
Unemployment rate	NUTS 3	Eurostat	2010
Youth unemployment rate	NUTS 3	Eurostat	2010
Population at risk of poverty after social transfer	NUTS 3	Eurostat	2008
Social capital indicators	Nuts 2	Eurobarometer 6.2.2	2006
GERD, HERD, BERD	NUTS 2	Eurostat	2007
Employment in medium and high tech manufacturing	NUTS 2	ESPON DB (Regional Innovation Scoreboard)	2004
EPO Patents by per million of inhabitants	NUTS 2	Eurostat	2007
Share of Natura 2000 areas	NUTS 3	European Commission's 5 th Cohesion Report	2009
Solar energy resources	NUTS 3	EC 5 th Cohesion Report	1981-1990
Wind energy potential	NUTS 3	EC 5 th Cohesion Report	2000-2005
Ozone concentration exceedances	NUTS 3	EC 5th Cohesion Report	2008
Urban waste water treatment	NUTS 2	EC 5th Cohesion Report	2007
Soil sealed area	NUTS 3	EC 5th Cohesion Report	2006
Regional sensitivity to climate change (cultural, economic, environmental, cultural)	NUTS 3	ESPON DB	1961-1990; 2071-2100
NH3 emissions from agricultural source	Grid	E-PRTR	2008
CO2 from road, residential	Grid	E-PRTR	2008
Land use	Polygon	OTALEX Atlas	2000asd
Aridity Index	Polygon	OTALEX Atlas	1961-1990
Biological values of socioeconomic patches	Polygon	Eccomap Project	2008

Land use in the strategic areas for biodiversity	Polygon	Eccomap Project	2008
Coverage of Natura 2000 areas in the strategic areas	Polygon	Eccomap Project	2008

For analytical purposes, these indicators were divided into four different categories: economy and employment, innovation and research, social cohesion and environment.

6.1.2. Methods

Besides the direct interpretation of the indicators, some calculations were performed to give further insights regarding economic performance and inequalities. The environmental data of the ESPON Climate project also needs some methodological clarification, as it is obtained in a rather complex way.

Economic performance and inequalities

The analysis of the regions' wealth was made from a threefold perspective: to evaluate the regional inequalities in wealth distribution; to point out the regions' actual position in the European context; and to understand their relative performance over the last decade. The data used for this analysis was the GDP per capita for the years 1997 and 2008.

The regional disparities were evaluated by the coefficient of deviation of the GDP per capita. This indicator is obtained by calculating the ratio of the standard deviation to the mean, and therefore a good way to compare the distribution of geographical units which differ greatly on their average. As a reference the coefficient of deviation was included for the countries of which the CBA is part as well as for the whole NUTS 3 and NUTS 0 of the ESPON space (EU7+CH+NO for the N0 and only EU7 for NUTS 3).

$$\text{Coefficient of deviation} = \frac{\text{Standard deviation}}{\text{Average}}$$

The regions' position and performance was evaluated by two procedures:

- A1- To compare each NUTS III with the leader, in terms of GDP per capita, through index numbers;
- A2- to establish the relative performance of each NUTS III to the leading region, exploring the notion of territorial catching-up.

In theory, for both analyses, A1 and A2, the value of reference for GDP per capita would be the highest value among all NUTS III, pertaining to the Inner London West region. However, at this territorial level, GDP per capita can be affected by several factors, such as high population fluctuations and significant mismatches between jobs (and wealth production) and the place of residence. In fact, in economically central places (for which London is a good example), there normally is a steady flow of migrant workers, as well as commuters from other NUTS III, and so the GDP per capita of the economic centre is seriously overestimated. For that reason, instead of simply considering the GDP per capita of the Inner London West NUTS III, the whole Greater London NUTS II was used as a reference for this analysis.

A1 – GDP indexed to the leading region

This analysis involves the indexation of GDP per capita in each NUTS III to the value of the leading region in 2008 referred to above, which is by definition 100. The concerned computation is represented in the following expression:

$$\text{Index } GDP_a = \left(\frac{GDP_a}{GDP_L} \right) \times 100$$

where GDP_a is the GDP per capita of a given NUTS III and GDP_L is the GDP per capita of the London NUT II.

A2 - Catching up analysis

This analysis intends to evaluate the speed of catching-up with the leading region, through a standard logistic process. In the present exercise the catching-up process analysis sets the relative position of each NUTS III and its relative trajectory up to the level of 95% of the GDP of the leading region in 50 years. The difference of performance of each region in comparison to the leading region is, in the present analysis, measured in years needed to reach the level assumed above.

According to these assumptions, the logistic function which describes the problem is represented as follows:

$$X = 0,95 \bar{X} = \frac{\bar{X}}{1 + ke^{-at}} \quad (1)$$

As in the former case, all regions with a performance 95% or higher when compared to the leader region were considered leading regions. The analysis distinguishes converging from diverging regions, and the different levels of catching-up performance. Leading regions are the ones who already have a GDP close to that of the London NUTS 2. Fast converging regions have a growth rate which allows them to reach the leader in no more than 20 years, steady catching-up regions between 21 and 50 years, slow catching-up regions between 51 and 100 and slow converging between 101 and 250 years. Non converging regions have great distances in terms of GDP and are growing at a rate equal or slightly superior to the leader and diverging regions are growing less than the leader.

Environment

While the environmental data from the 5th Cohesion Report and the other sources is easily understood the data of the ESPON Climate project is obtained through a fairly complex methodology. The indicators that were used refer to the regions' sensitivity to climate change.

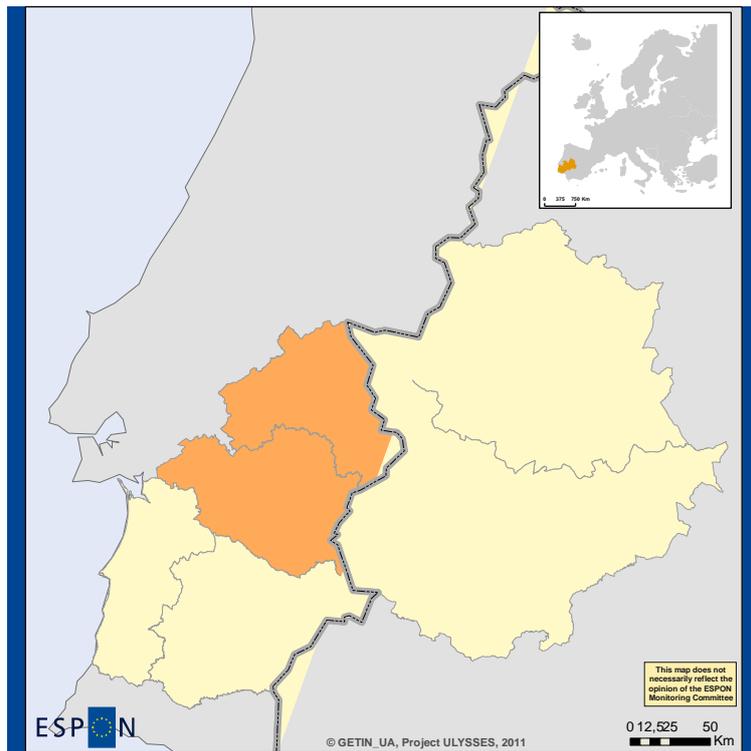
The sensitivity is defined by the project as being the "degree to which a system is affected, either adversely or beneficially, by climate related stimuli" (pp.4). The climate change data was obtained from the CCLM climate model, which compares the future period 2071-2100 to the reference period 1961-1990 for the scenario A1B.

The combination of the different impacts the climate change has on a regional level, comes from relating the impacts on characteristics of the affected areas. For physical sensitivity, the amount of buildings and infrastructures that are susceptible to extreme weather events (such as to river floods and coastal storm surges) were considered. Social sensitivity relates the positive or negative effects on human populations. The economic sensitivity considers the impact on economic activities that are strongly dependent on climate conditions (especially tourism and energy). Environmental sensitivity focuses on entities that are highly sensitive to climate changes, such as sensitive soils or protected areas. And cultural sensitivity considers the impact on assets like museums and internationally recognised historic sites.

6.2. Economy & employment

In the European context, this CBA does not perform very well. All of the NUTS 3 have a GDP per capita that is very far from the leading region. Of all the regions, the ones that are performing worst are the Alentejo Litoral, the Alto Alentejo and the Alentejo Central, which is interesting given their greater proximity to Portugal's capital.

Map 22: GDP per capita indexed to the leading region 2008 by NUTS 3



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Local level: NUTS 3
Year: 2008
Source: Eurostat

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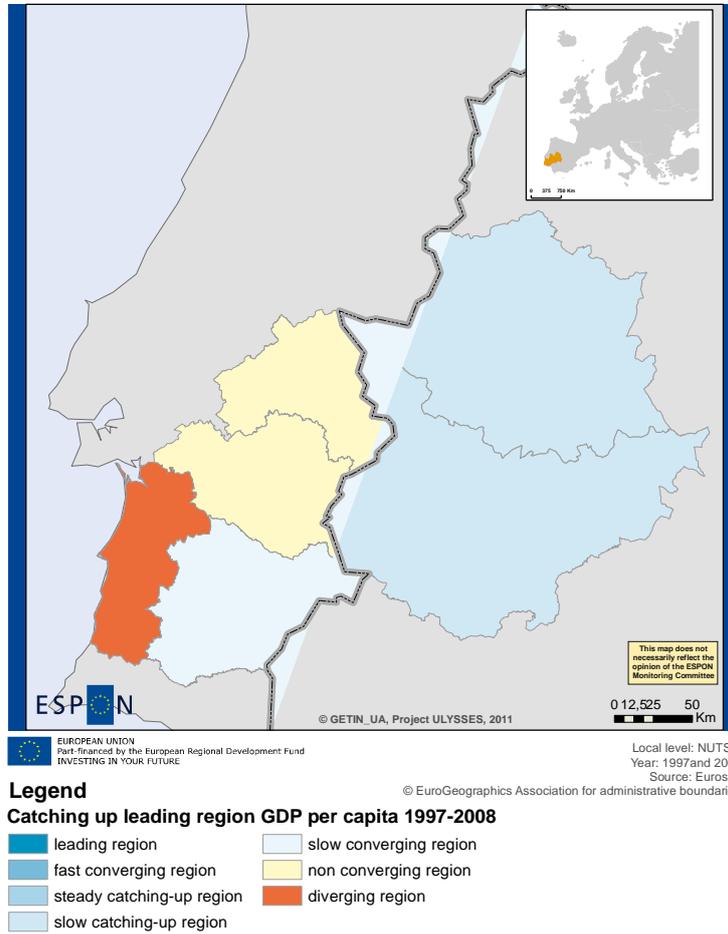
Legend

GDP per capita indexed to leading region 2008 (London UKI = 100)

	very rich region	>=95		less developed region	[30-50[
	rich region	[75-95[		laggard region	[15-30[
	middle income region	[0-74[		very laggard region	<15

Most of the regions have also had growth rates in the last decade that are equal or below that of the leading region. The noteworthy exceptions are the Spanish NUTS 3 as well as the Baixa Alentejo which have slowly been converging.

Map 23: Catching up in GDP per capita 1997-2008 by NUTS 3

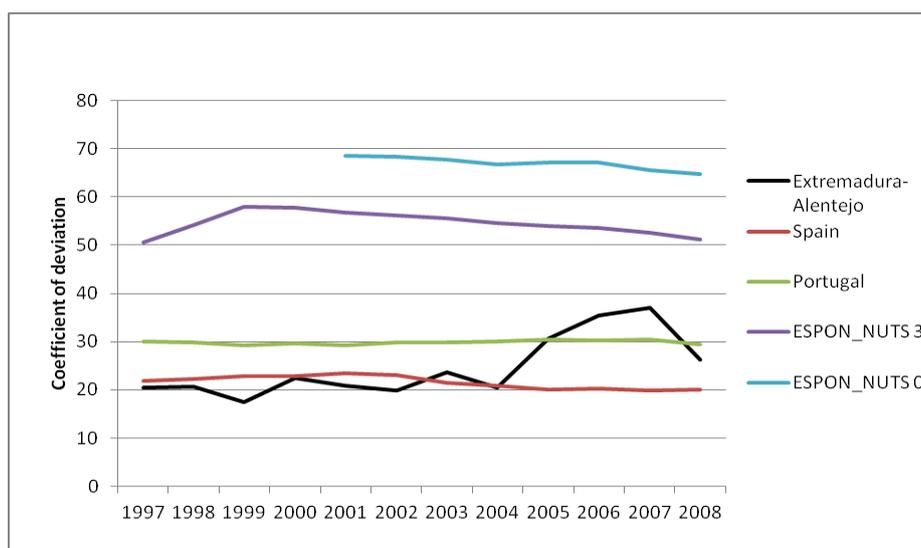


As would be expectable from the former analysis, the regional disparities in the ESPON space keep on being very high on the regional and national levels (see figure

Figure 17). This means that, although it is slightly decreasing the tendency for major economic activities to concentrate themselves in central locations persists, of all the mechanisms the European Union has set up to increase regional cohesion.

The CBA, on its turn, has regional disparities that are below the Portuguese national disparities, but above the Spanish ones and that have been increasing as the more developed regions have also been the ones to witness greater growth rates.

Figure 17: Coefficient of deviation



The composition of the GVA by sectors in the NUTS 3 is significantly different between the two sides of the border. Both share strong weights in the agriculture and fishing sector and low weights in the financial and real estate sectors. But on the Spanish side of the border construction and public administrations and community services sectors assume a greater role (even greater than the Spanish average), while in the Portuguese regions the industry and the non-financial and real-estate related services contribute to a greater extent to the total GVA of the regions.

Table 16: Share of GVA by NACE 2008 (%) (Rev.1.1)

	Agriculture; fishing (A_B)	Industry (except construction) (C-E)	Construction (F)	Wholesale retail trade; hotels restaurants; transport (G-I)	Financial intermediation; real estate (J_K)	Public administration and community services; activities of households (L-P)
EU27	1,75	19,61	6,48	21,08	28,27	22,8
Portugal	2,35	17,27	6,96	25,74	23,4	24,29
Spain	2,66	17,03	11,4	24,47	22,85	21,58
Badajoz	10,1	9,71	15,56	18,59	15,29	30,75
Cáceres	5,71	10,65	16,53	19,27	16,54	31,29
Alentejo Litoral	11,54	35,79	5,09	21,58	10,94	15,06
Alto Alentejo	10,55	15,55	4,95	22,35	13,76	32,85
Alentejo Central	7,49	15,12	6,09	23,13	14,34	33,84
Baixo Alentejo	11,26	26,6	6,01	19,05	12,4	24,69

Table 17: Annual growth rate of the GVA by NACE 1997-2008 (%)

	All NACE	Agriculture; fishing (A_B)	Industry (except construction) (C-E)	Construction (F)	Wholesale retail; hotels & restaurants; transport (G-I)	Financial intermediation; real estate (J_K)	Public administration and community services; activities of households (L-P)
EU27	3,12	1,26	-1,48	-4,33	-2,96	4,36	3,37
Portugal	4,76	-1,23	2,31	4,67	4,9	6,59	5,97
Spain	7,21	1,21	4,68	11,9	6,49	9,37	7,48
Badajoz	7,23	2,26	6,66	12,23	6,31	7,54	8,17
Cáceres	6,89	5,2	3,73	9,83	6,15	6,81	7,77
Alentejo Litoral	3,73	-0,39	2,99	4,08	6,14	5,32	5,64
Alto Alentejo	3,54	-2,34	1,92	2,41	5,38	4,72	6,03
Alentejo Central	4,19	-1,6	2,44	1	4,73	6,06	6,89
Baixo	4,89	-2,78	9,44	9,38	5,19	5,06	5,58

6.3. Innovation & research

For innovation and research the data sources were similar to the ones used in the Regional Innovation Scoreboard 2009 (Hollanders et al, 2009). These authors distinguish between three types of indicators: enablers, firm activities and outputs. Here, only some of the indicators for all of these three areas have been included, as the NUTS 2 coverage is very poor for most of the indicators:

- Total intramural R&D expenditures (R&D expenditures in the government sector (GOVERD) and the higher education sector (HERD) Business R&D expenditures (BERD) as a percentage of GDP)
- EPO patents
- Employed persons in high and medium tech manufacturing activities

The overall situation of this region in terms of research and innovation is not very favourable. In the Alentejo the intramural R&D expenditure is significantly below the Portuguese average in all the sectors, although the per cent of employment in high and medium tech manufacturing is not far from the national average. In the Extremadura, these indicators have significantly higher scores, although it is very much impelled by the public sector (government as well as higher education, which is essentially public in both countries).

The low investment in R&D, of course has an impact in the amount of EPO patents, which is very small proportion of the national averages in both sides of the border.

Table 18: Innovation indicators 2007

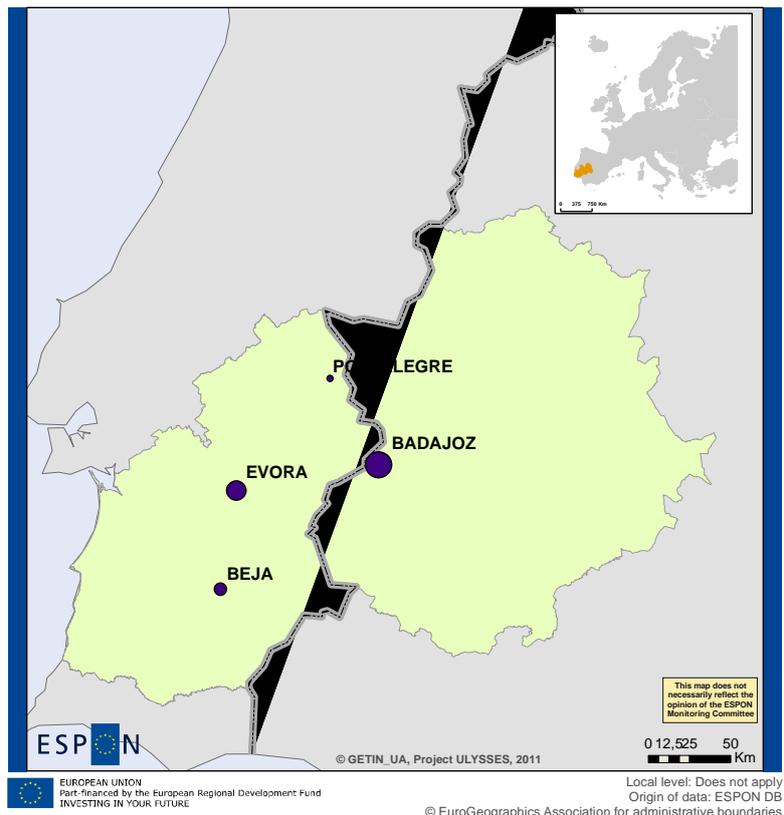
	Total intramural R&D expenditure 2007 (% GDP)				EPO patents per million of inhabitants 2007	Employed persons in high and medium tech manufacturing activities (% total workforce EU 25 = 100) 2004 *
	Total	Business enterprise sector	Government sector	Higher education sector		
EU27	2,01	1,18	0,24	0,42	-	-
Portugal	1,17	0,6	0,11	0,35	7,85	47,89
Spain	1,27	0,71	0,22	0,33	19,01	76,28
Alentejo	0,45	0,31	0,06	0,2	1,31	47,28
Extremadura	0,74	0,12	0,25	0,36	0,47	6,19

Source: Eurostat and ESPON DB (from the Regional Innovation Scoreboard)

2005

The low percentage of the R&D investment of the higher education sector as percentage of the GDP is partly explained by the amount and size of the public higher education institutions in this region. As can be seen, only the University of the Extremadura (which is headquartered at Badajoz) has a considerable amount of students, while in the Alentejo there are several, but very small sized, higher education institutions.

Map 24: Institutions of Higher Education



Legend

Higher education institution by number of students

- 3157
- 3779
- 8011
- 25912

But, according to Goddard, J. and Kempton, J. (2011), the universities play a role in regional development that goes far beyond the mere technology transfer or supply of qualified human resources.

Figure 18: Enhancing regional innovation through research activities

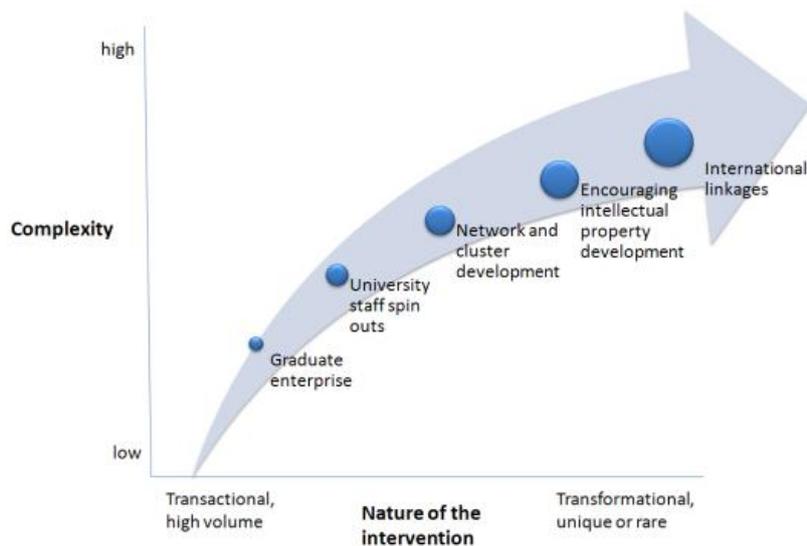
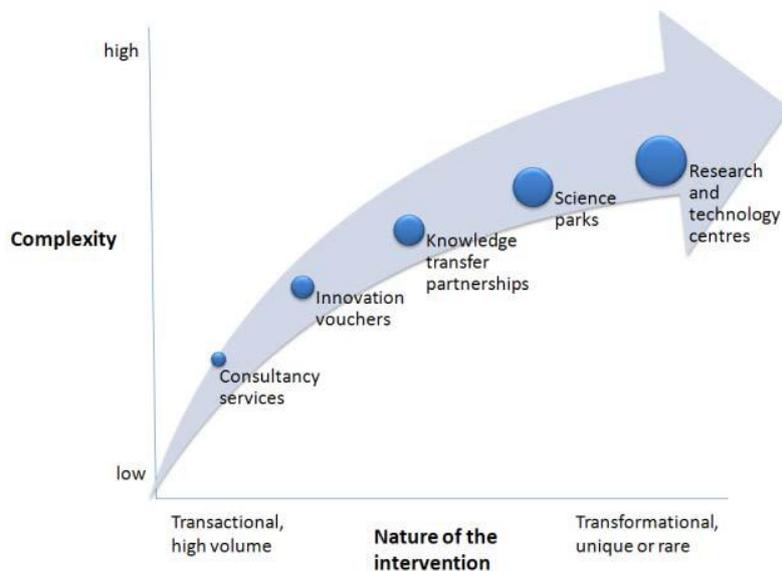


Figure 19: Promoting enterprise, business development and growth



Source: Goddard, J. and Kempton, J. (2011)

Particularly, the universities play a major role in translating the knowledge they produce, as well as knowledge produced in other regions, into concrete actions by the regions' main stakeholders. Especially when speaking of regions with relatively weak institutional contexts, the actual development of R&D might not be a central part in the fostering of an innovative environment. The higher education institutions might play a more relevant role in a process of creative adaptation of external knowledge and innovations, by responding to specific needs of the territories. It is therefore interesting to analyze the ways in which the Universities and Polytechnic Institutions have been positioning themselves in the areas that are considered to be strategic for this region, namely tourism, agriculture and renewable energy.

In fact, there seems to be some specialization of the regional higher education institutions in these areas. Regarding agriculture, the University of Évora, offers courses in many areas directly or indirectly related to agriculture and animal production, such as animal science and technology, biochemistry, biotechnology or veterinarian medicine. The Polytechnic Schools of Beja and of Portalegre also have a considerable offer in this area, such as agronomy, agronomic engineering, veterinarian nursery or horsey. The University of the Extremadura, on its turn, also offers courses related to the primary sector, such as food, agricultural industry and livestock engineering or enology. Regarding areas that are directly or indirectly related to tourism, there is also some offer from the University of Évora (tourism, history and archeology), from the Polytechnic Schools of Beja (tourism, sociocultural animation) and, especially, from the University of the Extremadura (history of art and historic and artistic heritage, history, tourism, administration and organization of touristic resources). It is also interesting to see that the University of Évora is currently offering an engineering course in renewable energy.

Further, indication for a tendency for specializing in areas that are relevant for the region's development, is also reflected in fact that, in 2001, 13% of the students in the Alentejo were enrolled in agricultural courses, compared to only 2,9% at the national level (Plano Regional de Inovação do Alentejo, 2005).

6.4. Social cohesion

The indicators for evaluating the social cohesion of the regions are: youth unemployment rate, long term unemployment rate, infant mortality rate and population at risk of poverty after social transfers. While all the other indicators are standard demographic variables and therefore need no explanation, population at risk of poverty is defined as "having equalised disposable income (i.e. adjusted for household size and composition) of less than 60% of national median" (European Commission's 5th Cohesion Report database).

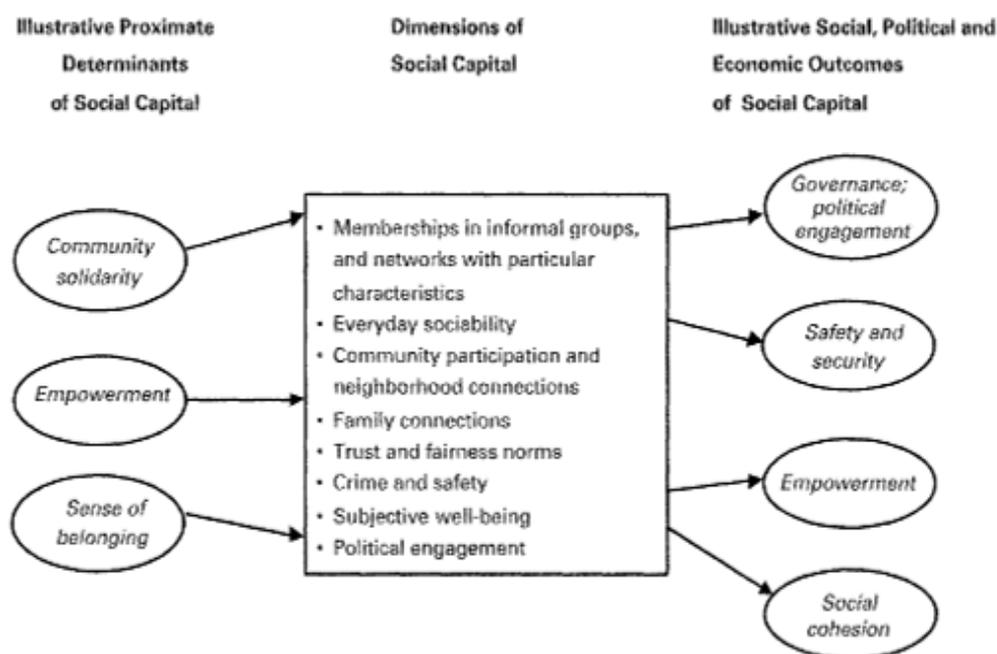
Table 19: Social cohesion indicators

	Unemployment rate, 2010	Long-term unemployment rate, 2009 (>=12 months)	Youth unemployment rate, 2010 (% of labour force aged 15-24)	Population at risk of poverty after social transfers, 2008 (% total pop)	Infant mortality rate 2008	Population aged 25-64 with tertiary education, 2010
EU27	9,6	3,0	20,9	17,0	4,3	25,9
Portugal	10,8	4,2	22,4	18,5	3,3	15,4
Spain	20,1	4,3	41,6	19,6	3,4	30,7
Alentejo	11,4	4,0	28,9	17,3	3,8	13,7
Extremadura	23,0	5,1	45,9	38,4	3,3	23,3

Source: Eurostat and European Commission's 5th Cohesion Report*

The social indicators, once again, show the underdevelopment of this CBA. The Extremadura, only performs better than the Spanish average on the infant mortality rate, and does much worse in the population that is at risk of poverty and also the share of active aged population with tertiary education. The Alentejo, although it follows the Portuguese tendency to perform much better on most social indicators than Spain, still performs much worse than the national average.

Another interesting aspect of the social cohesion of this region is its performance in social capital. According to many authors (Coleman 1988, Halman 2003, Narayan and Cassidy 2001), social capital can essentially be understood as a characteristic in the social structure that enables or facilitates social action, and is expressed in issues like the trust people have in the institutions, political participation or the degree to which they are organized for collective action, namely by participating in organizations.



Source: Narayan e Cassidy (2001:65).

The indicators for measuring social capital that are used here are from the Special Eurobarometer 223, available at <http://www.gesis.org/>. This study analyzed social capital at the NUTS 2 level in most European countries, although some countries were excluded here because the geographical level did not follow the common administrative boundaries (Germany, Denmark, Ireland, Italy and the United Kingdom). It is also important to keep in mind that the NUTS classification is from 2003, meaning that in the Alentejo the Lezíria do Tejo was not considered, and that the sample size for each region is not very large, and therefore the data is more of general indication than a sound scientific analysis.

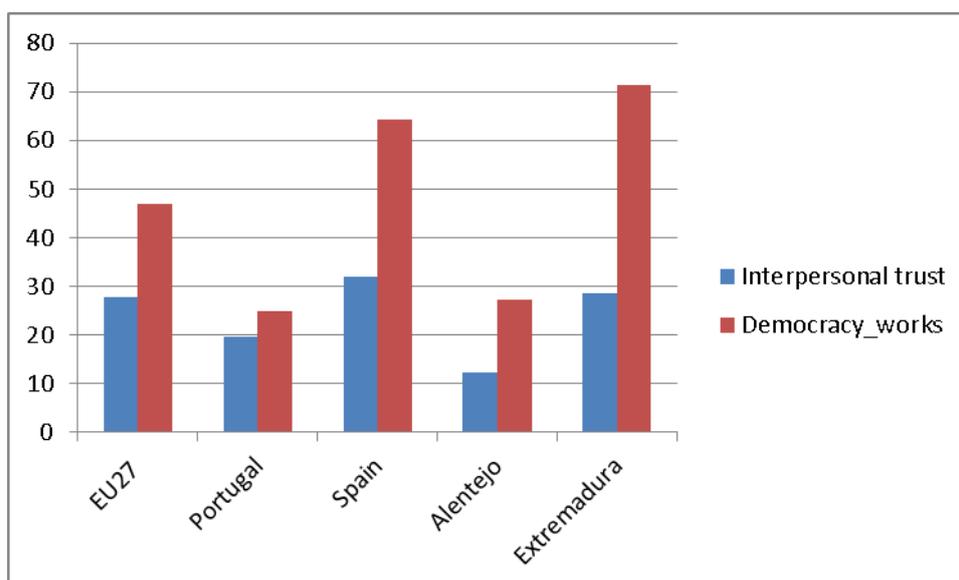
The indicators that were used refer to five different dimensions of social capital: trust, socialization, participation in associations, informal social capital and political participation.

Trust

This dimension refers to interpersonal trust as well as general satisfaction with the way the countries' democracy works. The results for these indicators in the region show a strong difference on each side of the border. In the Alentejo, only few people believe that most people can be trusted and the general satisfaction with the way the democracy works is very low, although still higher than the average of the Portuguese NUTS 2. In the Extremadura interpersonal trust is much higher (but still below the national average) while more than 70% are satisfied with the way democracy works.

Indicators	Units	Year
Interpersonal trust (most people can be trusted)	% responds positively	
Satisfied with the way democracy works	% responds positively	2006

Figure 20: Interpersonal trust and trust in institutions, NUTS 2 average

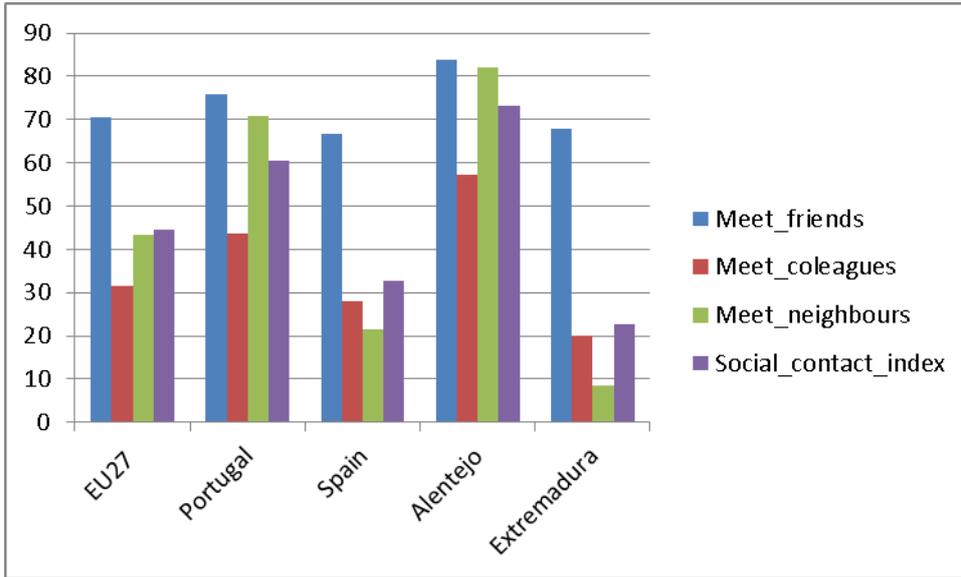


Socialization

This dimension refers to the intensity with which people contact with members from their networks, such as friends, neighbors and colleagues. As can be seen in the following graph, the Alentejo has a very high score in this dimension, while the Extremadura has an extremely low score, especially in what regards the meeting of colleagues and neighbors.

Indicators	Units	Year
Contact_friends		2006
Contact_colleagues	Index produced on the frequency of contacts	2006
Contact_neighbours		2006

Figure 21: Frequency of social contact, NUTS 2 average

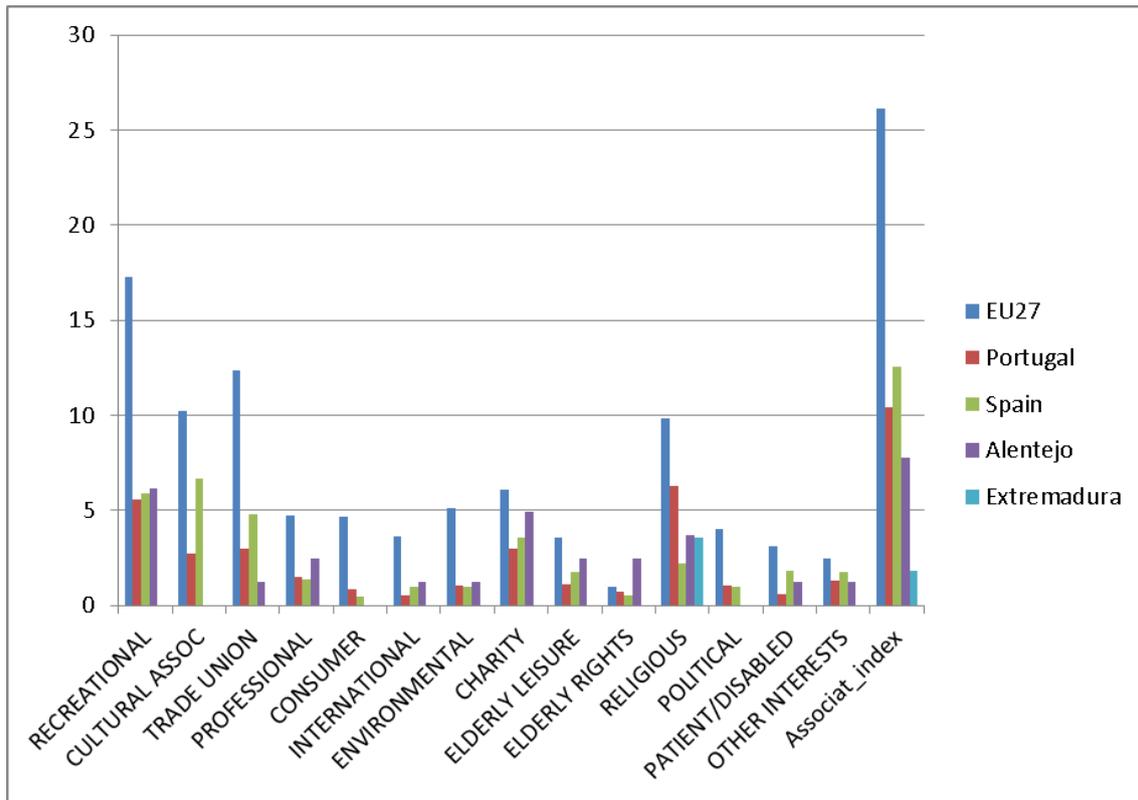


Membership in associations

This dimension reflects the degree to which people are part of any association. A synthetic index was also produced to get an overall picture on peoples' participation. The general levels of participation are low in both NUTS 2. It is interesting to see that the highest participation in Alentejo was in recreational as well as charity associations.

Indicators	Units	Year
Member of the following association		
RECREATIONAL		2006
CULTURAL ASSOC		2006
TRADE UNION		2006
PROFESSIONAL		2006
CONSUMER		2006
INTERNATIONAL		2006
ENVIRONMENTAL	% of person that are members	2006
CHARITY		2006
ELDERLY LEISURE		2006
ELDERLY RIGHTS		2006
RELIGIOUS		2006
POLITICAL		2006
PATIENT/DISABLED		2006
OTHER INTERESTS		2006
Index of membership	ISA = \sum (% members 1 association * 0,5 + % 2 association * 0,6 ... + % 6 or more associations)	2006

Figure 22: Membership in associations, NUTS 2 average



Informal social capital

On one hand, this dimension measures whether people feel that they could rely on their network in case of need and on the other hand whether people have helped other in the case of need in the last 12 months. The levels for this dimension indicate an average level for both NUTS 2.

Indicators	Units	Year	
Can rely on help for/has helped in			
Household TASKS		2006	
HELP Household MEMBERS		2006	
PERSONAL CARE		2006	
PAPERWORK HELP	% responds positively	2006	
DISCUSS PROBLMS		2006	
BORROW MONEY		2006	
BORROW GOODS		2006	
HELP THREATENED		2006	
Frequency help others		Index	2006

Figure 23: Feels that he can rely on help for different needs, NUTS 2 average

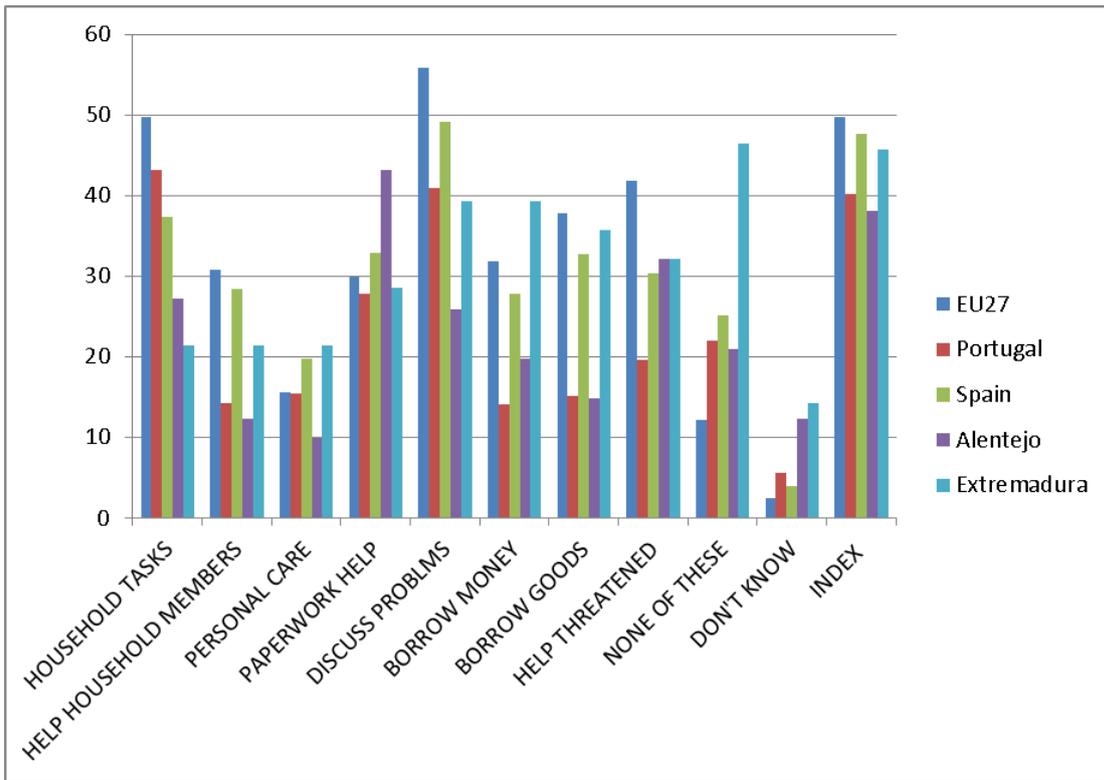
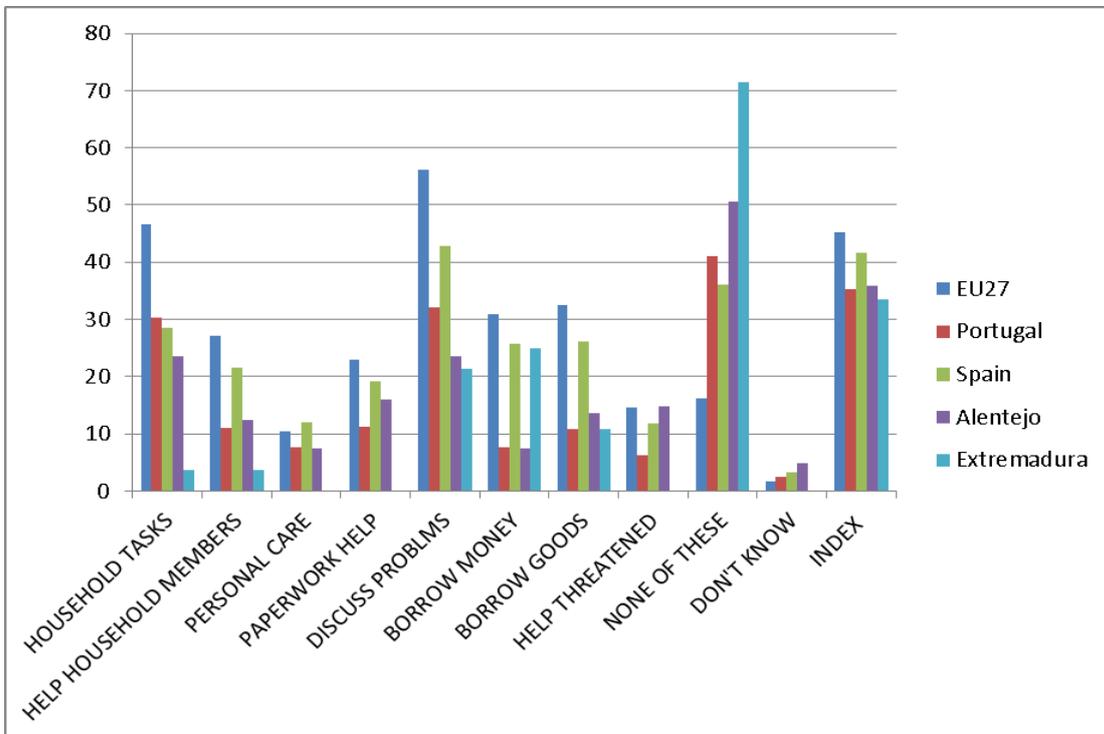


Figure 24: Help provided to others in the last 12 months, NUTS 2 average

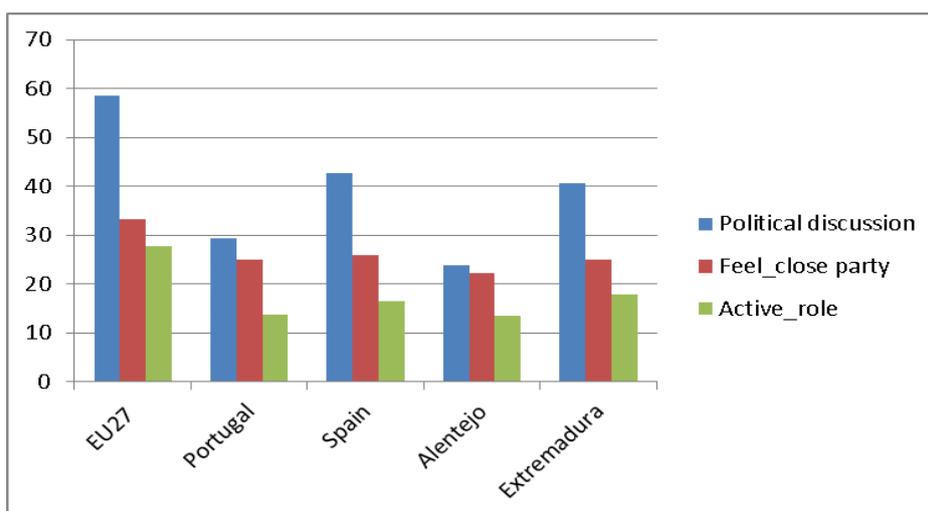


Political participation

This dimension reflects the tendency to participate in political issues in the country. The amount of political participation in both NUTS 2 is essentially in line with the average of the NUTS 2 at the national level, but still considerably below the average of the NUTS 2 at the European level.

Indicators	Units	Year
Frequency of political debate	index	2006
Possibility to be active politically	%	2006
Feel close to a party	%	2006

Figure 25: Political participation, NUTS 2 average



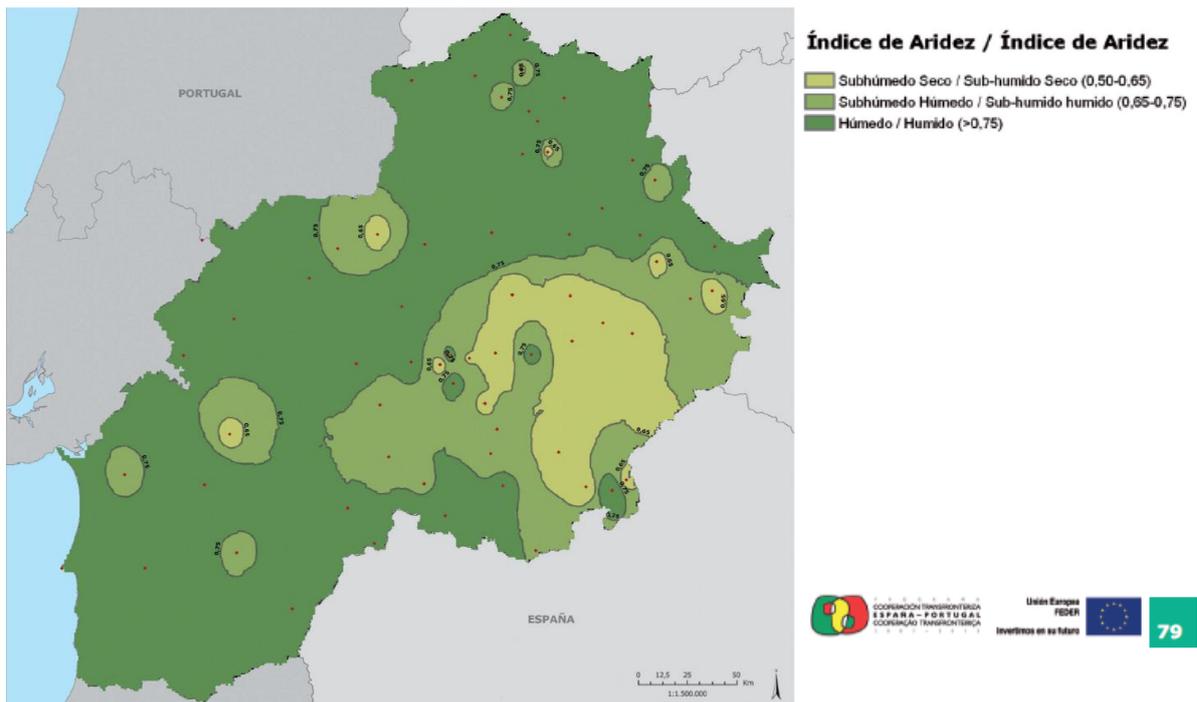
6.5. Environment

For the environmental analysis, four sets of indicators are available. First, indicators that were produced locally by a varied set sources, namely the OTALEX Atlas. Second, indicators from the European Commission's 5th Cohesion Report. Third, indicators from the ESPON Climate Project regarding the region's sensitivity for climate change. Fourth, indicators from the European Pollutant Release and Transfer Register.

Local sources

One of the major environmental challenges in this region is the risk of desertification (although not comparable to some of the more southern areas of Spain). Major national programs, such as the National Action Program against Desertification in Spain (Ministerio de Medio Ambiente y Medio Natural e Marino, 2008), or the Regional Plan for Landplanning of the Alentejo (Plano Regional de Ordenamento do Território, August 2010), have identified the importance of this issue in the region, considering its geomorphological, lithological and climatological characteristics. But, despite the general awareness of the desertification risk in this region the aridity index, which is the ratio of the rainfall by potential evapotranspiration, shows that much of this region is part of a humid or sub-humid climate zone.

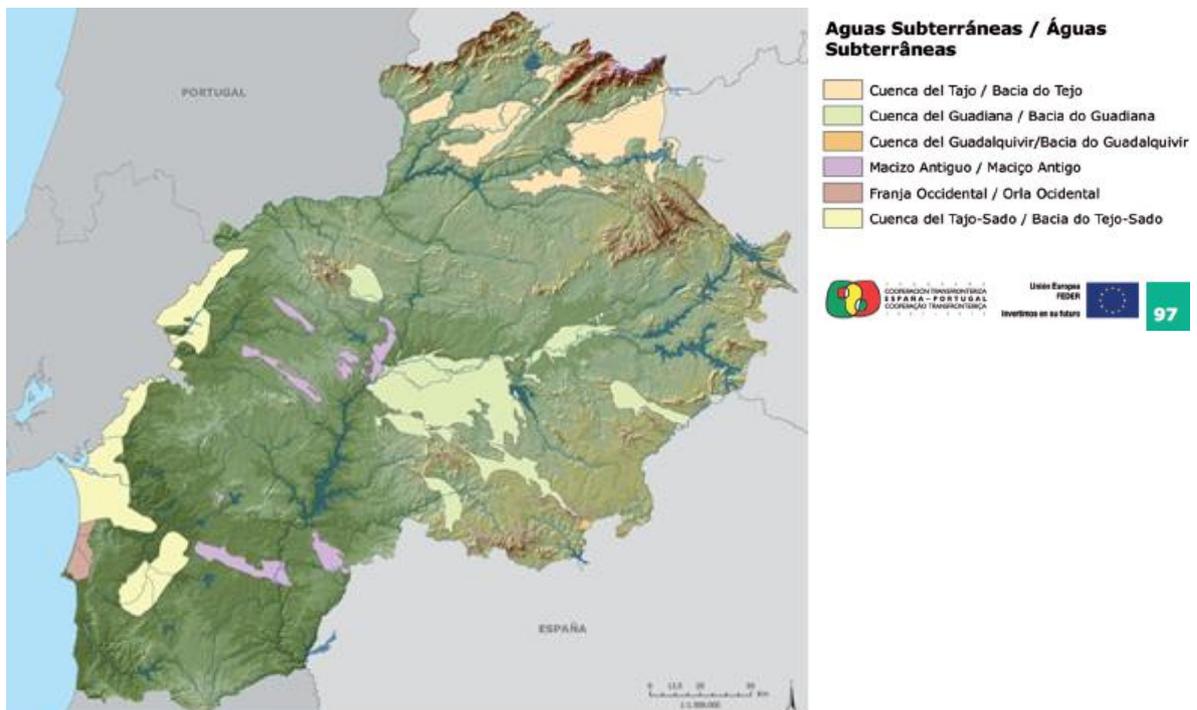
Map 25: Aridity Index



Source: OTALEX Atlas

The risk of desertification is also to some extent mitigated by the considerable amount of subterranean and surface waters, and by the recent construction of the Alqueva Dam, that might also help to reduce the water shortage, at least in some parts of the region.

Map 26: Land use by GEOALEX in 2000

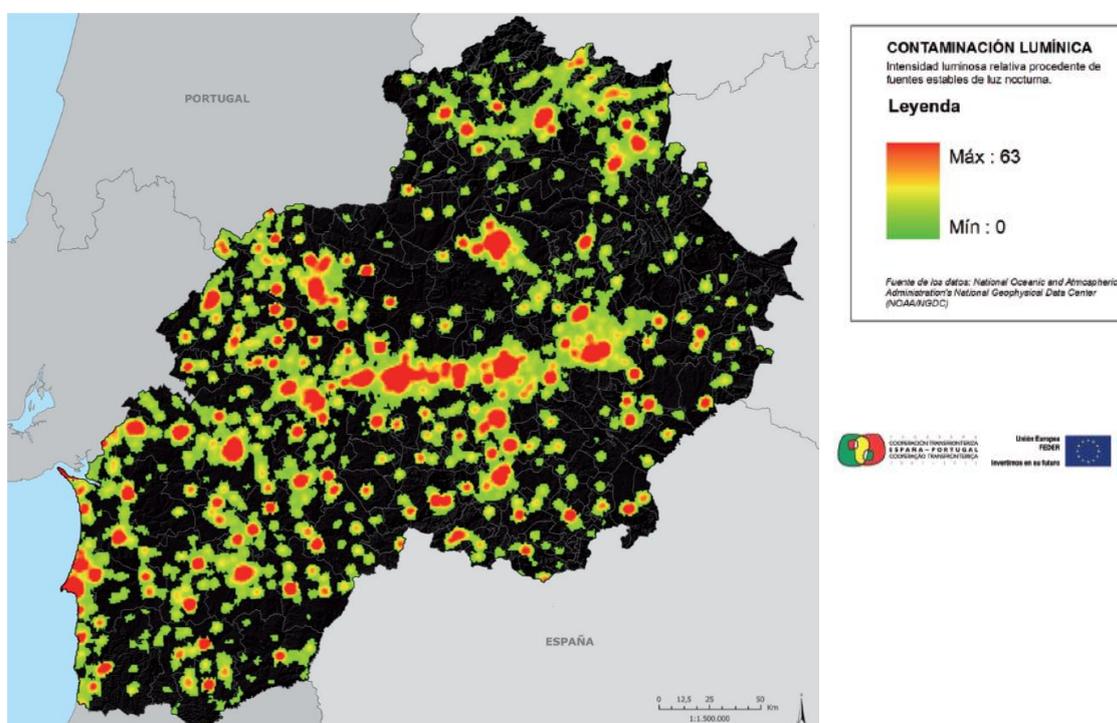


Source: OTALEX Atlas

As was already stated in chapter 4 another important aspect of the environment in the Alentejo and the Extremadura dehesa/montado alentejano type of explorations, which are an often cited example of an extensive agro-silvo-pastoral system that guarantees high levels of biodiversity and a sustainable use of resources, leading to its inclusion in the Natura 2000 network. Namely, this system is instrumental in the preservation of many of the endangered species in the Iberian peninsula, such as the Iberian Lynx, the Iberian Imperial Eagle or the Black Vulture, but also in erosion or nutrient an water cycles (Olea and San Miguel-Ayanz, 2006). These aspects, while important by themselves, are even enhanced given its relation to a relatively sensitive environment, which means that the delicate balance between human activities, dry and hot climate and generally poor soils can be easily disrupted leading to different sets of ecologic problems.

But besides its importance, this system has come under some pressure in the last decades. According to Gaspar Garcia *et al* (2009), there are two major menaces to this type of explorations. The first one is an increase in the intensity of the land use, especially cattle breeding, which has been made possible by subsidies of the Common Agricultural Policy. The second one is the competition of more intensive exploitations which makes some of the more traditional forms unprofitable.

Map 27: Levels of photopollution

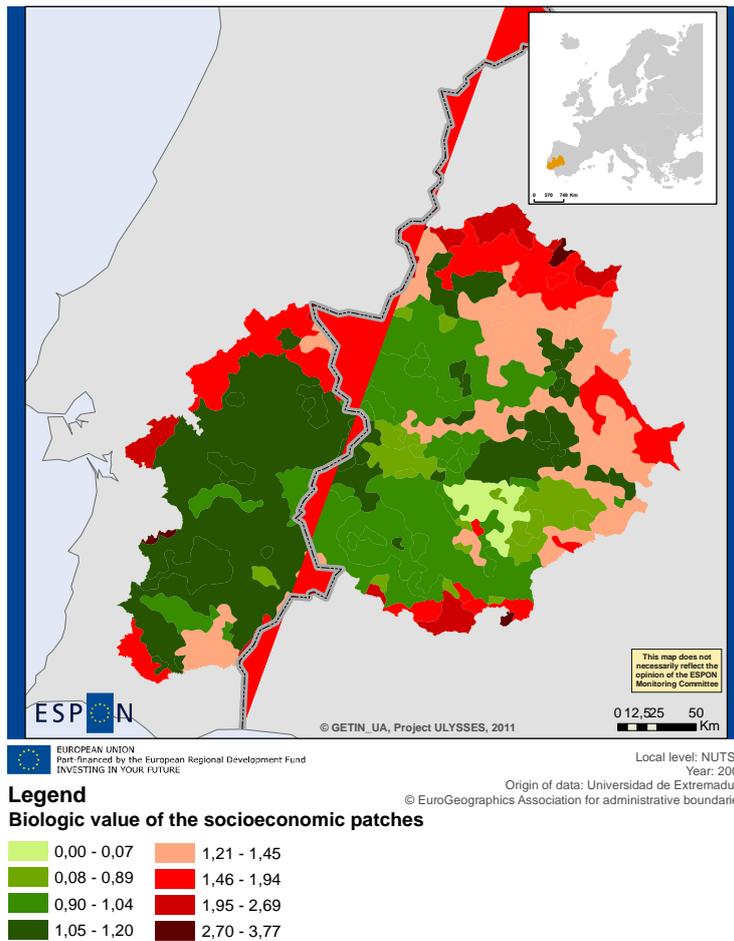


Source: OTALEX Atlas

Another interesting aspect in the environment of this region is the photopollution. As can be seen by the map produced by the OTALEX atlas, this phenomenon is not very significant in much of the region, and beyond the major structuring axes, there are many dark areas that indicate the absence of major light sources. Given the low emission of air pollutants and the low share of clouded nights, this region has excellent characteristics for night sky contemplation, which led to the constitution of the internationally certified “Alqueva Dark Sky Reserve”, in order to promote astro-tourism.

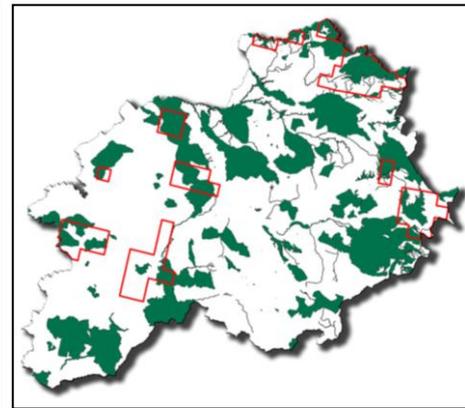
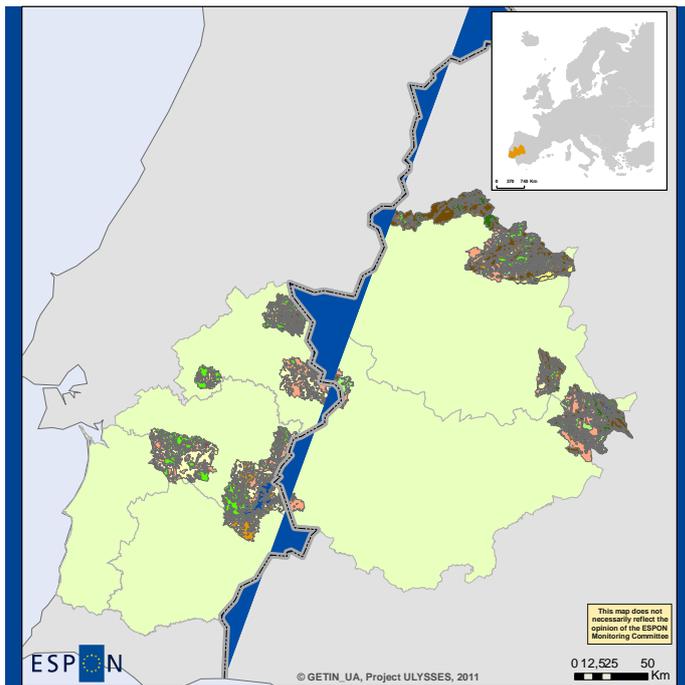
Besides the much cited OTALEX Atlas, a project that dealt with cross-border environmental issues in this geographical area was the Ecomap project, which ended in 2008 and was financed by the INTEREG III and developed by the University of the Extremadura and the University of Évora. This project’s goals were to identify major strategic areas that are relevant for the environmental protection and major shortcomings in the actual environmental protection networks, and the analysed area is the same as the OTALEX, but excluding the Alentejo Litoral.

Map 28: Biological values of socioeconomic patches



One of the major outcomes of this project was the attribution of different values to the socioeconomic patches of the region based on species richness as a proxy of biodiversity. The species richness was only assessed for butterflies and birds, as these were the only ones for which a comparable database was available for both sides of the border. As can be seen in this map the more critical areas in this CBA are the ones which are on its fringes. Around the border, most of the areas are not critical regarding biodiversity.

Map 29 & 30: Land use in the strategic areas and coverage of Natura 2000



Source: http://www1.unex.es/eweb/gic_eccomap/

- Natura 2000 areas
- Biodiversity hotspots according to butterfly and bird population

© GETIN, UA, Project ULYSSES, 2011
 Local level: NUTS 3
 Year: 2008
 Origin of data: Universidad de Extremadura
 © EuroGeographics Association for administrative boundaries

Legend

Land use in the strategic habitats (hotspots)

- | | |
|---|--|
| Urbano-Industrial | Bosques no Coníferas |
| Cultivos de Secano | Bosque de Coníferas |
| Cultivos de regadío | Bosque Mixto |
| Cultivos Permanentes | Matorral |
| Pastizales y Praderas | Roquedo |
| Cultivos Heterogéneos | Zonas Húmedas |
| Dehesas | |

Another aspect of the Ecomap project was the analysis of the wholes that were identified by crossing the coverage of the Natura 2000 areas with the areas which were considered to be hotspots according to the biodiversity. As can be seen in the previous maps, and although there is some coverage of the strategic habitats by the protected areas, there are also some clearly identifiable wholes, which suggest a more thorough analysis of the ecosystems and the European environmental protection mechanisms.

The most significant land use of these strategic habitats is dryland farming (24%) and dehesa/monte alentejano type of land use (23%).

European Commission's 5th Cohesion Report Data

The major indicators of the 5th Cohesion Report and the ESPON Climate Project, on the other hand, show a more optimistic image of this region. From the 5th Cohesion Report, four indicators were considered: soil sealed area, ozone exceedances, waste water treatment and Natura 2000 areas. Solar and wind energy potential were not included, as they only give a broad hint at what could be the region's capacity in exploiting alternative energy sources in an energy source transition scenario and not its actual production.

Table 20: Environmental indicators from the 5th Cohesion Report

	Ozone concentration exceedances in NUTS 3 regions (days), 2008	Soil sealed area, 2006 (% total area)	Soil sealing per inhab. (m ²), 2006	NATURA 2000 areas, 2009 (% of total)
EU 27 (NUTS 3 average)	9,99	6,72	213,94	14,24
Portugal (NUTS 3 average)	5,53	4,90	241,11	18,30
Spain (NUTS 3 average)	4,68	2,98	198,44	28,88
Badajoz	0,60	1	225	25,0
Cáceres	0,04	1	254	36,0
Alentejo Litoral	8,28	1	703	30,0
Alto Alentejo	1,64	1	350	35,0
Alentejo Central	3,49	1	422	13,0
Baixo Alentejo	3,77	1	566	31,0

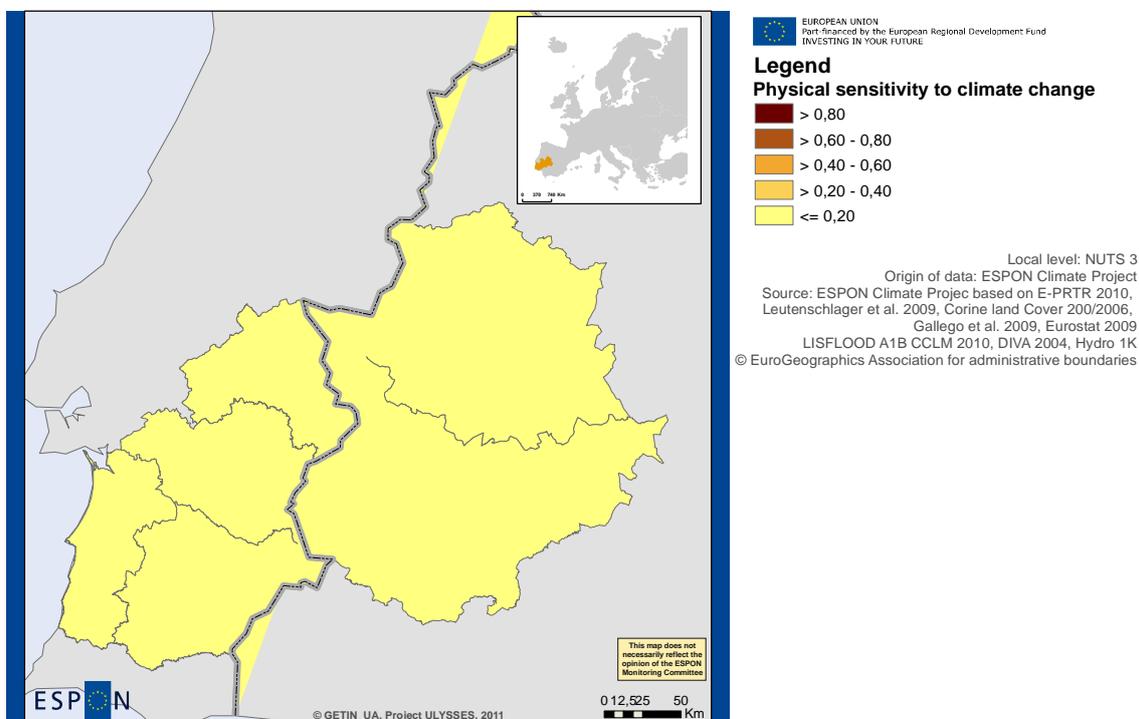
Source: 5th Cohesion Report

The NUTS 3 of this CBA perform well on many environmental indicators, although many of these are essentially a consequence of its low densities, such as the share of soil sealed and Natura 2000 areas. The urban waste water treatment capacity is also high and, in 2007, it was 80% in the Extremadura and 99% in the Alentejo, compared to a NUTS 2 average in the EU27 of 92,53%.

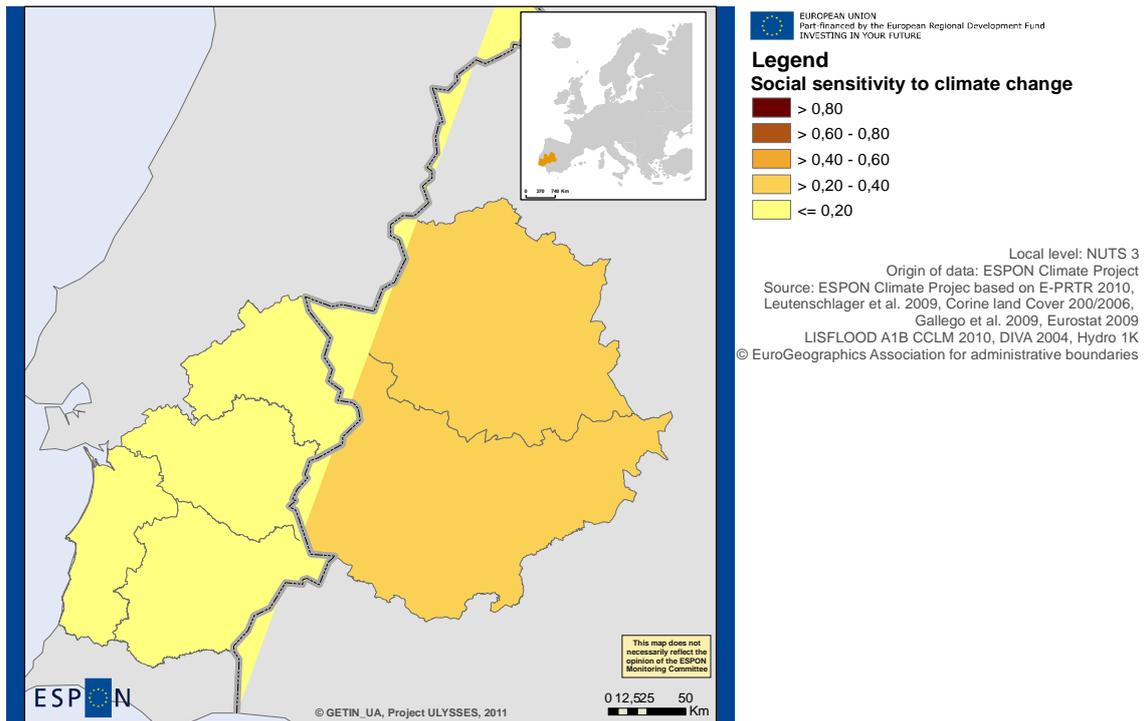
ESPON Climate

As already stated in the methodology, the ESPON climate's sensitivity, indicators measure the exposure of the different region to climate change regarding different type of infrastructures that are present.

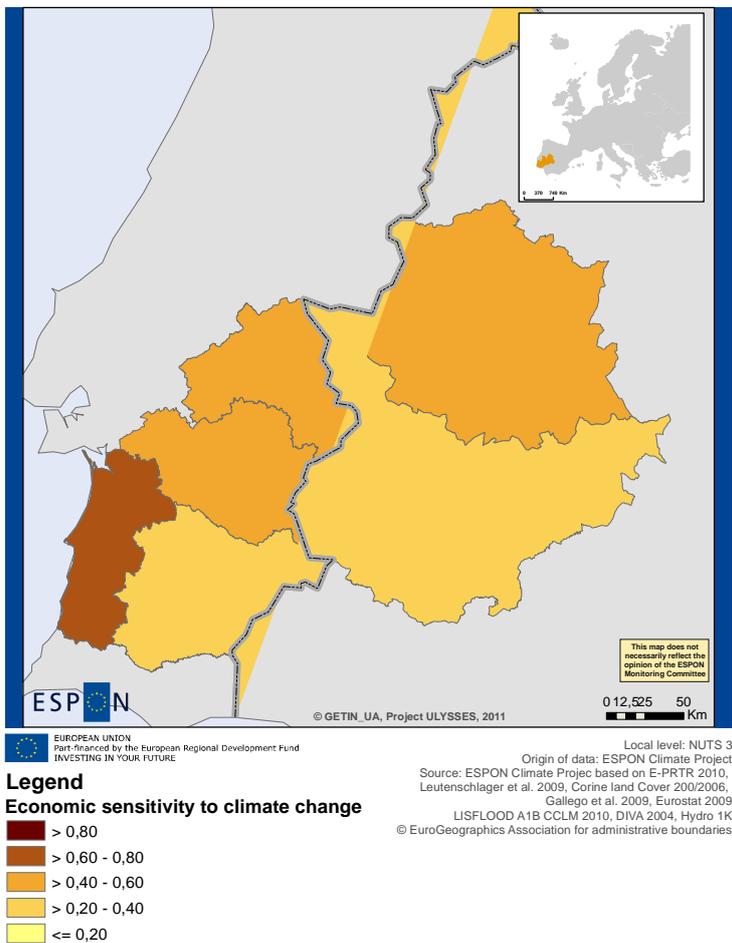
Map 31: Physical sensitivity to climate change by NUTS 3



Map 32: Social sensitivity to climate change by NUTS 3



Map 33: Economic sensitivity to climate change by NUTS 3

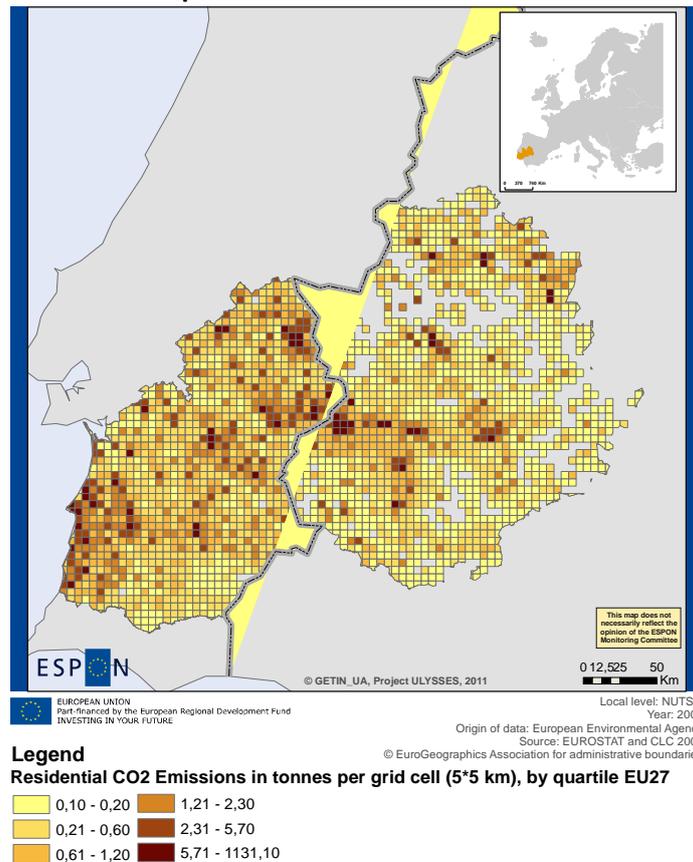


As can be seen in the maps this CBA is not particularly sensitive to climate changes. There are no major flood risks from rivers or from the sea, where the coastline is very steep in most parts. And, although there are some aspects that could raise concerns, such as draught, fire risk or the flooding from the region's major rivers, the low densities mean that the amount of population and infrastructures that could be affected by climate change is not very high.

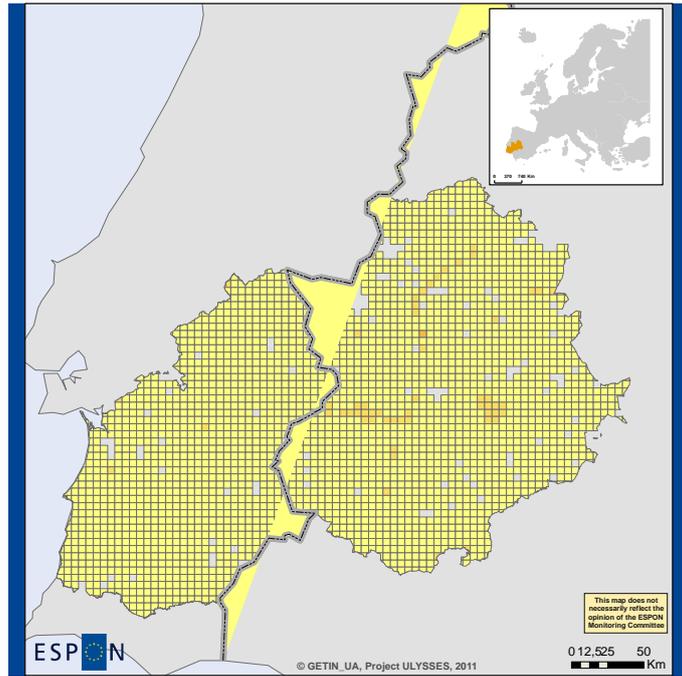
European Pollutant Release and Transfer Register

The E-PRTR is the result of a European wide protocol that harmonizes data collection and replaces the European Pollutant Emission Register (EPER). Besides data collection from the different industrial facilities, this register also includes data from different models that estimate road, agricultural or residence emissions. Here only some of the main pollutants were analysed. In order to give a picture of the relative position of the region, the scale of the data is presented in quantiles from the EU27.

Map 34: Residential CO2 emissions



Map 35: Road CO2 emissions




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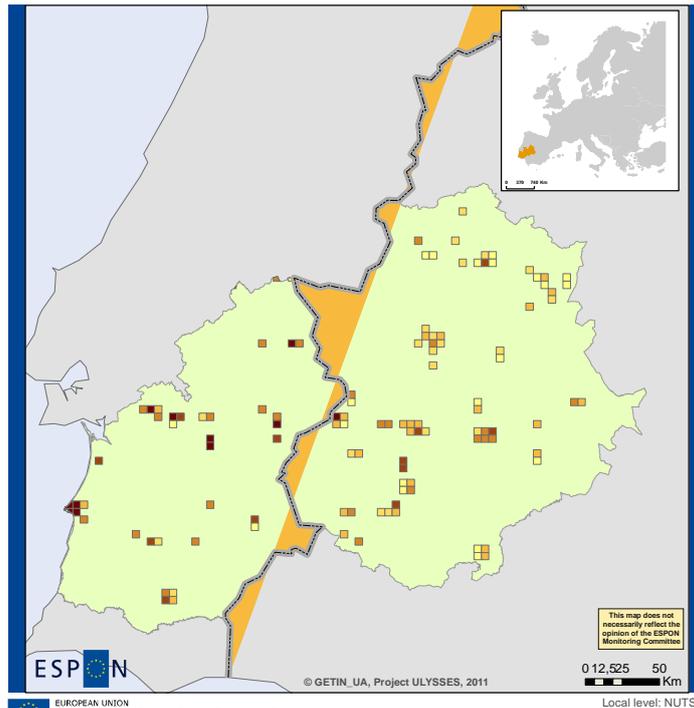
Local level: NUTS 3
 Year: 2008
 Origin of data: European Environmental Agency
 Source: EUROSTAT and CLC 2006
 © EuroGeographics Association for administrative boundaries

Legend

Road CO2 emissions in tonnes per grid cell (5*5 km), by quartile EU27

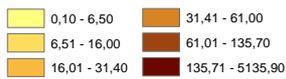
	0,10 - 9,00		85,11 - 213,00
	9,01 - 32,40		213,01 - 586,70
	32,41 - 85,10		586,71 - 1616,70

Map 36: Industry CO2 emissions

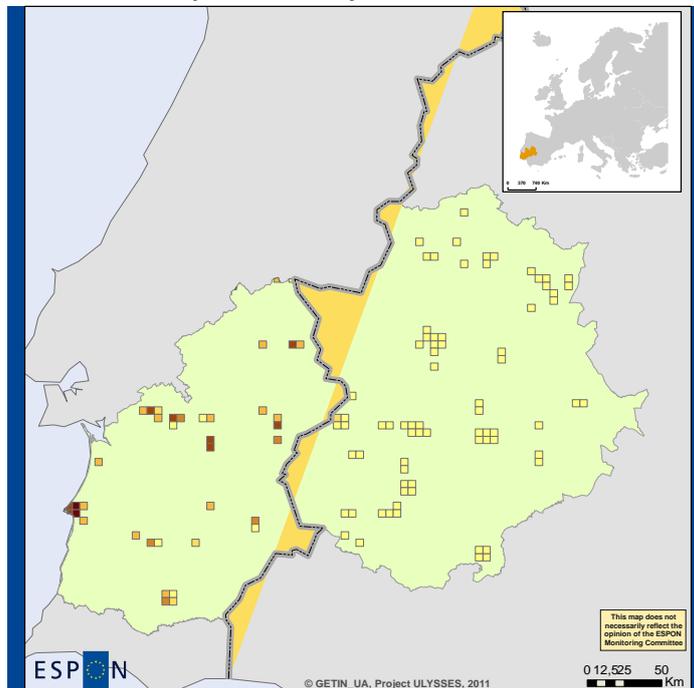


Legend

Industry CO2 emissions in tonnes per grid cell (5*5 km), by quartile EU27

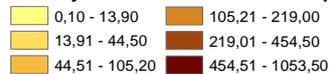


Map 37: Industry PM10 emissions

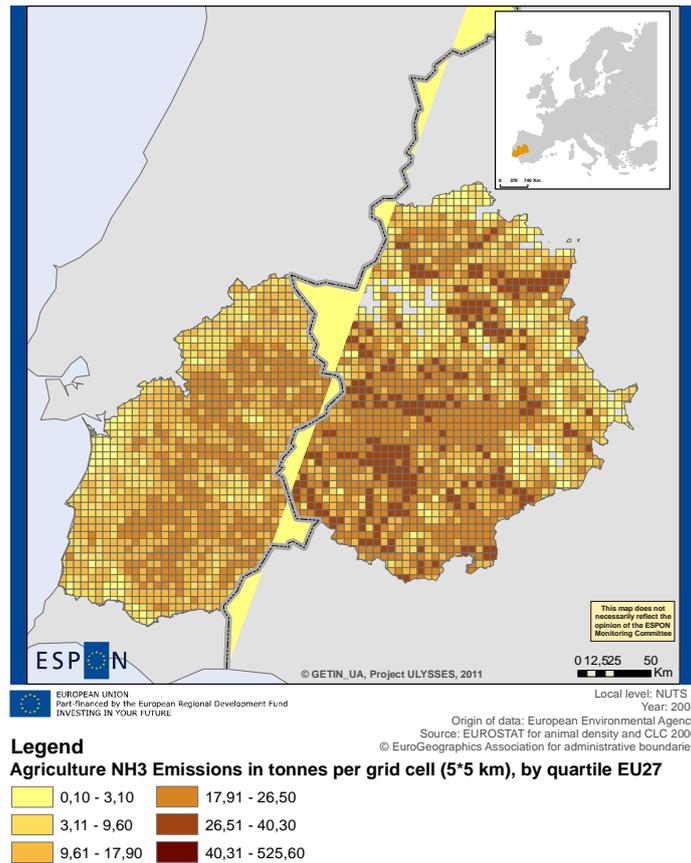


Legend

Industry PM10 emissions in tonnes per grid cell (5*5 km), by quartile EU27



Map 38: Agriculture NH3 emissions



The overall picture from this data is that this region does not have a problem with pollutant emissions. The industrial emissions are restricted to very few and scarcely scattered facilities, most of which do not rank high in the European context. An obvious exception to this situation is the refinery in Sines which ranks in highest quartile of the EU7 regarding emissions in PM10 as well as CO². Residential and road emissions are generally low, which once again, can be related to overall low population densities.

The ammonia emissions related to agriculture, on its turn, are more ambiguous. On the Portuguese side of the border, the emissions are generally in the lower quantiles of the EU27, while on the Spanish side they tend to be on the higher ones. It is therefore possible to assume that the Extremadura has a much more intensive agriculture which uses a greater amount of fertilizers and, consequently, has a much higher environmental impact.

The tendency for a positive performance in pollutant emissions is also reflected in the air quality. At least the different measuring stations that are distributed throughout the territory show air quality that is classified as very good in most of them in good only in two of the stations that are close to the Sines Refinery (see OTALEX Atlas for more details).

6.6. Chapter conclusions

Six major conclusions can be drawn from this analysis.

The first one is that the economic situation of these regions is fragile, especially on the Portuguese side of the border. On one hand, all of the NUTS 3 are well below the leading region in terms of GDP per capita. On the other hand many of them have been diverging, or converging very slowly, from the leading region over the last decade.

The second one is that the region has relatively high economic disparities, despite sharing so many overall characteristics. This seems to imply that the belonging to one country or another has in itself a major impact in the economic performance.

The third one is that most of the regions' social cohesion indicators are much worse in this CBA than the respective national averages. This is especially worrying for the Extremadura, given

that Spain already tends to have high values in this kind of indicators (youth unemployment, at risk of poverty after social transfers, etc.). It is also interesting to see that the region appears to have overly low performances in indicators that are associated with social capital, indicating a weak civil society.

The fourth is the regions capacity to invest in research, development and innovation is very limited and is reflecting itself on the outputs (low amount of patent applications). On a different note, the region appears to have some capacity in providing higher education in areas that are considered of strategic importance, namely agriculture and tourism.

The fifth is that the regions have a relatively good performance on some climate related indicators, such as soil sealed areas, ozone concentration or protected areas. Pollutant emission is also low from industrial or residential sources, but relatively high from agricultural sources, especially in the Extremadura, leading to a good air quality measured in the different stations throughout the territory.

The sixth is that keeping the Dehesa/Montado exploitation might be an important contribution in keeping the sensitive balance of human activities, a dry and hot climate and not very fertile soils whose disruption can trigger desertification processes.

The seventh is that, while many of the more critical areas for biodiversity preservation have a protected status, the Natura 2000 still does not cover some of them.

Poor economic performance

Relatively economic high disparities

Very poor indicators in R&D&I

Some capacity to offer higher education in areas that are strategic, such as agriculture and higher education

Low social cohesion

Low levels of social capital

Low emission of pollutants as well as photopollution

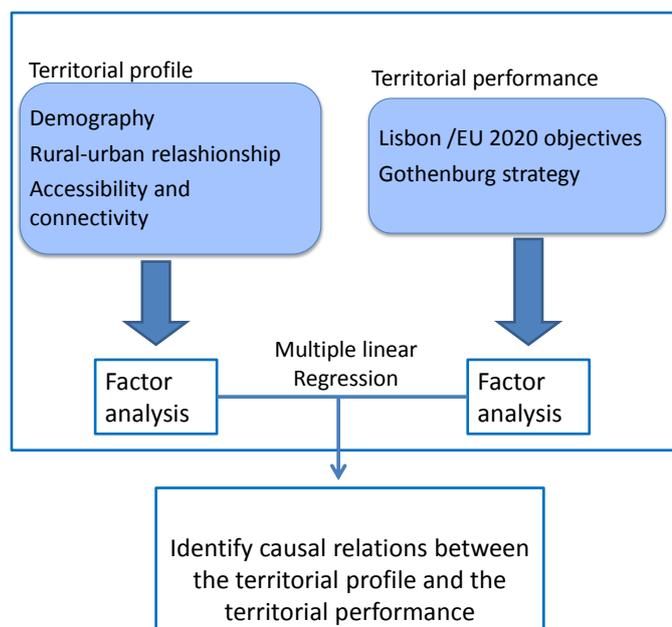
Environment that is threatened by desertification processes through a delicate balance between climate, soil quality and human activities

Importance of the Dehesa/Montato system in keeping this balance

Chapter 7 – Correlation analysis

7.1. Aims, indicators and methods

As state in the inception report, the indicators were divided into two sets: regional profile indicators and territorial performance indicators.



The first set considered variables linked to overall characteristics of the different regions on the themes that were considered (accessibility, rural-urban relationship and demography). Polycentricity was excluded at this point, because it is a concept that makes no sense on a NUTS 3 level at which the analysis was performed. On the other hand, indicators that are normally associated with the Lisbon/Europe 2020 and Gothenburg objectives at the input level (such as R&D investment, active population with tertiary education and so forth) have also been included, since the differentiation was made between dependent and independent variables and not merely based on thematic categories. Unlike most studies on innovation, the EPO patent applications have also been included at this level. This is because, although they can be understood as an output of innovation, innovation in itself is an input of economic performance.

The second set considered variables linked to the performance of the regions concerning indicators related to the Lisbon/Europe 2020 and Gothenburg indicators at the output level.

In order to analyse the relations between the territorial profile and the regions performance, two different analyses were performed. First, a factor analysis for each set of indicators. Second, several multiple linear regressions having as independent variables each factor of the performance indicators and as dependent variables all the factors of the territorial profile.

7.1.1. Data

Data was used on a NUTS 3 scale for all the EU 27 countries. Some of the overseas areas of Portugal, France and Spain were excluded since data was missing for many of the variables.

The year of reference for most data was 2008, since this is a year for which data is available for most countries. This means that the data does not reflect the impact of the financial crisis, which is especially meaningful for volatile indicators such as migration rates or unemployment rates or the per cent of the Gross Value Added by different economic sectors.

In case of missing values, several procedures were adopted:

- 1) Search for data in different sources - this method was forcibly used to a very limited extend, as it is very time-consuming;
- 2) Use of a different time reference;
- 3) Use of different geographical units - this is especially relevant for the performance indicators where data is often only available for NUTS 2, leading to clustered results;
- 4) Estimation through SPSS' EM procedure⁹.

Territorial profile

Indicator	UNITS	Year	Geographical unit
Population density	inhabitant/km2	2009	NUTS 3
Crude rate of pop increase	per 1000	2008	NUTS 3
Crude rate net migration	per 1000	2008	NUTS 3
Crude rate of natural increase	per 1000	2008	NUTS 3
Young age dependency	%	2008	NUTS 3
Old age dependency	%	2008	NUTS 3
Total fertility rate		2008	NUTS 2
Commuters to other region	per 1000	2009	NUTS 2
Rural typology	nominal	2008	NUTS 3
Percent_agric_area	%	2006	NUTS 3
Annual growth rate 90-06 agricultural areas	per 10000	1900-2006	NUTS 3
Net formation of urban fabric by total area 00-06	per 10000	1900-2006	NUTS 3
Potential accessibility by air index	%	2006	NUTS 3
Potential accessibility by rail index	%	2006	NUTS 3
Potential accessibility by road index	%	2006	NUTS 3
Change of the standardized rail index	%	2001-2006	NUTS 3
Change of the standardized road index	%	2001-2006	NUTS 3
Change of the standardized air index	%	2001-2006	NUTS 3
Share of employment in agriculture and fishing (A_B)	%	2008	NUTS 3
Share of employment in industry (except construction) (C-E)	%	2008	NUTS 3
% employment in construction (F)	%	2008	NUTS 3
% employment in wholesale and retail trade; hotels and restaurants; transport (G-I)	%	2008	NUTS 3
% employment financial intermediation; real estate (J_K)	%	2008	NUTS 3
% employment in public administration and community services; activities of households (L-P)	%	2008	NUTS 3
Agriculture; fishing (A_B)	%	2008	NUTS 3
Industry (except construction) (C-E)	%	2008	NUTS 3
Construction (F)	%	2008	NUTS 3

⁹ "For the EM procedure, a distribution is assumed for the partially missing data, and inferences are based on the likelihood under that distribution. Each iteration consists of an E step and an M step. The E step finds the conditional expectation of the "missing" data, given the observed values and current estimates of the parameters. These expectations are then substituted for the "missing" data. In the M step, maximum likelihood estimates of the parameters are computed as though the missing data had been filled in. "Missing" is enclosed in quotation marks because the missing values are not being directly filled, but, rather, functions of them are used in the log-likelihood." MaryAnn Hill / SPSS Inc (1997), "SPSS Missing Value Analysis™ 7.5", pp. 41

Wholesale and retail trade; hotels and restaurants; transport (G-I)	%	2008	NUTS 3
Financial intermediation; real estate (J_K)	%	2008	NUTS 3
Public administration and community services; activities of households (L-P)	%	2008	NUTS 2
Total intramural R&D expenditure by GDP	%	2007	NUTS 2
Intramural R&D expenditure of business enterprise sector by GDP	%	2007	NUTS 2
intramural R&D expenditure government sector by GDP	%	2007	NUTS 2
intramural R&D expenditure higher education sector by GDP	%	2007	NUTS 2
EPO patents per million of inhabitants by GDP	%	2007	NUTS 2
Employed persons in high and medium tech manufacturing activities by total workforce (EU 25 = 100)	%	2004	NUTS 2
Population aged 25-64 with tertiary education	%	2010	NUTS 2
Physical sensitivity to climate change	rate	n/a	NUTS 3
Social sensitivity to climate change	rate	n/a	NUTS 3
Environmental sensitivity to climate change	rate	n/a	NUTS 3
Cultural sensitivity to climate change	rate	n/a	NUTS 3
Economic sensitivity to climate change	rate	n/a	NUTS 3

Territorial performance

Indicator	UNITS	Year	Geographical unit
Unemployment rate	%	2008	NUTS 3
Long-term unemployment rate (>=12 months)	%	2009	NUTS 2
Youth unemployment rate, per labour force aged 15-24	%	2008	NUTS 3
Infant mortality rate	%	2008	NUTS 2
GDP per capita indexed EU average	%	2008	NUTS 3
Catching-up	ordinal	1997-2008	NUTS 3
Natura 2000 area	%	2006	NUTS 3
Ozone concentration exceedances, per year	%	2008	NUTS 3
Waste water treatment capacity	%	2007	NUTS 2
Soil sealed area	%	2006	NUTS 3

7.2. Territorial profile

Table 21: Factor analysis output for the territorial profile

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8,892	21,171	21,171	8,892	21,171	21,171	6,228	14,828	14,828
2	5,637	13,422	34,593	5,637	13,422	34,593	3,528	8,401	23,229
3	3,225	7,679	42,271	3,225	7,679	42,271	3,51	8,357	31,586
4	2,544	6,057	48,328	2,544	6,057	48,328	3,033	7,221	38,807
5	2,391	5,692	54,02	2,391	5,692	54,02	2,904	6,915	45,722
6	1,933	4,602	58,622	1,933	4,602	58,622	2,487	5,921	51,643

7	1,697	4,039	62,662	1,697	4,039	62,662	2,373	5,649	57,292
8	1,373	3,27	65,932	1,373	3,27	65,932	2,189	5,213	62,505
9	1,282	3,051	68,983	1,282	3,051	68,983	2,017	4,802	67,306
10	1,158	2,758	71,741	1,158	2,758	71,741	1,565	3,727	71,033
11	1,086	2,586	74,327	1,086	2,586	74,327	1,383	3,294	74,327

Extraction Method: Principal Component Analysis.

	Rotated Component Matrix										
	1	2	3	4	5	6	7	8	9	10	11
empl_agric_fish	-0,841										
Rail_index	0,806										
GVA_agric_fish	-0,801										
Road_index	0,783										
air_index	0,752										
employ_finan_r_estate	0,649										
Commuter_region	0,594										
High_tech_employ	0,57										
GVA_finan_r_estate	0,551										
Rural_typology	-0,511										
air_index_ch											
GERD		0,898									
BERD		0,798									
GOVERD		0,687									
HERD		0,633									
Tertiary_ed_act_pop		0,533									
EPO_patents		0,509									
GVA_adm_comm_serv			0,878								
employ_adm_comm_serv			0,825								
employ_industry			-								
GVA_industry			0,705								
Young_dep			-	0,814							
TFR			-	0,747							
Nat_increase			-	0,687							
Old_dep			-	-							
Rail_index_ch			0,524								
sens_phys					0,852						
sens_soc					0,843						
sens_cult					0,774						
sens_env											
GVA_trade_transp						0,837					
employ_trade_transp						0,836					
Net_migration							0,897				
Pop_increase							0,861				
sens_econ											
employ_construction								0,851			
GVA_construction								0,791			
Formation_urban_fabric											
Pop_density									-		
Growth_agric_area									0,673		
Road_index_ch										-0,672	
Percent_agric_area											0,669

FAC1_1: Central location

The first factor essentially expresses central location and has an explained variance of 14,83%. It has high positive correlations with all the indicators regarding potential accessibility and, to a lesser extent, with the share of employment in financial intermediation and real estate, employment in high and medium tech manufacturing activities and with commuting to other regions. It also has a strong negative correlation with the share of employment and GVA in agriculture and fishing.

This factor has its highest values in central European countries, especially in the Ruhr, Belgium and Southern England, in a pattern that clearly lines out the blue banana. In the less central region, the higher values tend to be concentrated around capitals and other major urban agglomerations.

FAC2_1: R&D&I

The explained variance of this factor is 8,04% and it mainly relates variables that are linked to innovation and scientific development such as R&D investment of different sectors and, to a lesser extent, EPO patent application and tertiary educated active population. As said in the introduction, the indicators in this factor are mostly available on a NUTS 2 level, meaning that a very high score in a specific NUTS 3 can lead to a whole cluster with high values.

It is interesting to note that, besides the capital cities, it is possible to identify specific innovation strongholds such as important university towns or high tech industries (Airbus in the Toulouse area, Volkswagen around Wolfsburg, Cambridge or the Silicon Glen). The Scandinavian countries also have a very favourable position in this factor.

Although in most countries one cannot really detect a border effect, it is interesting to see that Karelia lies clearly beneath the Finnish average, while the southern border of France and Germany counts with high values on both sides.

FAC3_1: Administrative centres

The indicators with the highest coefficients of correlation of this factor are the share employment and GVA in public administration, community services and activities of household and the share of employment and GVA in industry. Its explained variance is 8,36%.

The regions with the highest scores of this factor are majorly depressed regions in which, because of their poor economic performance, the public sector assumes an important position. It is interesting to see that most of the border NUTS 3 in Spain and Portugal have very high scores in this factor, as well as Karelia. The other cross border areas seem to be closer to the national patterns.

On a different note, this indicator also relates to the different levels of state interventionism, with the Scandinavian countries and France revealing overall high scores.

FAC4_1: Demographic dynamism

This factor has an explained variance of 7,22%. The variables with the highest coefficient of correlation are young age dependency rate, the crude rate of natural population increase, the total fertility rate and the old age dependency rate (this last one has a negative correlation). The region with the lowest scores of this factor are in the Mediterranean countries, such as Portugal, Spain and Greece as well as Germany.

FAC5_1: Environmental risk

This factor relates mainly to variables linked to the regions' sensitivity to climate change. As can be seen in the map, these regions are essentially located in coastal areas and other flood prone areas, such as areas close to the Danube or the Po.

FAC6_1: Services and transport

This significant indicators of this factor are the share of GVA and employment in wholesale and retail trade, hotels and restaurants and transport (NACE G-I). It is interesting to note that many

of the regions with the high scores in this factor seem to be linked to tourism (Southern Spain and Portugal, the alpine regions, Paris, Greece, Rome, etc.).

FAC7_1: Immigration

The highly correlated variables of the factor 7 are population growth and the net migration rate. While many regions in Central and Western Europe show high scores in this factor, in the eastern countries the high scores are generally restricted to the capital cities. Interestingly, in Portugal and Finland the border regions in general (and Karelia and the Alentejo in particular) have much lower values than the coastal regions, suggesting an internal migrations process towards the coast.

FAC8_1: Construction

The highly correlated variables of this factor are GVA and employment in construction. The regions with the highest score in this factor belong to Ireland, Spain, the Baltic States and eastern Germany.

FAC9_1; 10_1; 11_1

The last three factors have very small variances and will therefore not be subjected to a more detailed analysis. The factor 9 essentially refers to rurality, as its correlated variables are population density and growth of agricultural areas. The factor 10's only significantly correlated indicator is the road index change and the factor 11's the share of agricultural areas.

7.3. Territorial performance

Table 22: Factor analysis output for the territorial performance

Total Variance Explained

Comp.	Initial Eigenvalues			Extract Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2,898	28,983	28,983	2,898	28,983	28,983	2,419	24,194	24,194
2	1,847	18,471	47,454	1,847	18,471	47,454	1,871	18,708	42,902
3	1,434	14,344	61,798	1,434	14,344	61,798	1,757	17,568	60,470
4	1,049	10,486	72,284	1,049	10,486	72,284	1,181	11,814	72,284

Extraction Method: Principal Component Analysis.

Rotated Component Matrix^a

	Component			
	1	2	3	4
Unemployment	,947			
Long_unemploy	,884			
Youth_unemploy	,785			
Infant_m		,839		
GDP_pc_index			,755	
Catching_up		,733		
NATURA_2000_percent			-,546	
Ozone_conc_exceed				,961
Waste_water_treat_perc		-,697		

Soil_sealed_area_perc			,858	
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Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

FAC1_2: Unemployment

The first component explains 24,19% of the variance and its highly correlated variables are unemployment, long-term unemployment and youth unemployment. The geographical distribution of this factor's scores show a concentration of the highest values in the more depressed areas of Europe and countries with a structurally high unemployment such as (e.g. Southern Italy and Spain, Eastern Germany, Slovakia and Greece). Regions with used to have a strong industrial base also evidence relatively high scores in this factor, namely some regions in northern France and Portugal, Wallonia, the Setúbal Peninsula, Liverpool and Manchester.

In some borders, the regions seem to have higher scores in this indicator than the more centrally located regions. This is the case in Portugal, on the northern border of France and Bulgaria, Finnish Karelia or the Czech Republic where it borders eastern Germany

From the regression it is possible to see that, although the overall variation of the factor that is explained by the context factors is small, its relation to most of them is statistically significant. The coefficients indicate that high levels of unemployment have a strong negative relation to a high investment in R&D, demographic dynamism, central locations and high levels of immigration. As expected, the factor referring to administrative centres has a significant and positive impact on unemployment.

Table 23: Unemployment regression analysis

<i>Regression Statistics</i>								
Multiple R	0,59374							
R Square	0,35252							
Adjusted R Square	0,34699							
Standard Error	0,80809							
Observations	1298							
	<i>Coefficients</i>	<i>Standard</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower</i>	<i>Upper</i>	<i>Lower</i>	<i>Upper</i>
Intercept	-3,4E-09	0,022430	-1,5E-07	1	-0,0440	0,0440	-0,0440	0,0440
FAC1_1	-0,13913	0,022438	-6,20045	7,57172E-10	-0,1831	-0,0951	-0,1831	-0,0951
FAC2_1	-0,17056	0,022438	-7,60142	5,62205E-14	-0,2146	-0,1265	-0,2146	-0,1265
FAC3_1	0,35445	0,022438	15,79682	1,64522E-51	0,3104	0,3985	0,3104	0,3985
FAC4_1	-0,17954	0,022438	-8,00162	2,72054E-15	-0,2236	-0,1355	-0,2236	-0,1355
FAC5_1	-0,01938	0,022438	-0,86369	0,387920516	-0,0634	0,0246	-0,0634	0,0246
FAC6_1	0,04804	0,022438	2,140949	0,032465709	0,0040	0,0921	0,0040	0,0921
FAC7_1	-0,12934	0,022438	-5,76408	1,02676E-08	-0,1734	-0,0853	-0,1734	-0,0853
FAC8_1	0,07384	0,022438	3,29098	0,001025468	0,0298	0,1179	0,0298	0,1179
FAC9_1	-0,16827	0,022438	-7,49914	1,19255E-13	-0,2123	-0,1242	-0,2123	-0,1242
FAC10_1	-0,29276	0,022438	-13,0475	1,24326E-36	-0,3368	-0,2487	-0,3368	-0,2487
FAC11_1	-0,08551	0,022438	-3,81081	0,000145058	-0,1295	-0,0415	-0,1295	-0,0415

FAC2_2: Catching-up regions

The total explained variance of this factor is 18,71% and its most significant variable is catching-up. This indicator relates the GDP level and growth between 1997 and 2008 of a given region to the pattern evidenced by the leading region. Its correlated variables also include urban waste water treatment capacity and infant mortality.

As can be seen by the scores given to the different regions, the correlation between high GDP growth and poor social conditions is essentially a consequence of the very high growth rate witnessed by the eastern European countries in the initial decades of their transition to a market economy (some countries even had occasional double digit growth rates). The central European countries, although starting from a high initial position, witnessed relatively small growth rates. The overall pattern of the border regions seems to essentially follow the national tendency. As

this is an historic contingency and does not follow a deeper causal nexus, the regression analysis was made only for the catching-up indicators.

The regression of this indicator, which has a slightly higher R square than the previous one, shows that it is statistically related to many components of the territorial profile. Confirming what has previously been said about this indicator, the catching up process is especially strong in eastern countries and therefore the highest negative coefficients occur in factor 1 (central location) and factor 3 (administrative centres). On the other hand, in central Europe the regions which perform best in this indicator are the ones located in the blue banana and, even in Eastern Europe, the top performing regions tend to be the more central ones. This might explain why the catching up process is also negatively related to rurality (factor 9 - low density and growth of agricultural areas).

Table 24: Catching-up regression analysis

<i>Regression Statistics</i>								
Multiple R	0,6261119							
R Square	0,3920161							
Adjusted R Square	0,3868156							
Standard Error	0,7830609							
Observations	1298							
	<i>Coefficients</i>	<i>Standard</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower</i>	<i>Upper</i>	<i>Lower</i>	<i>Upper</i>
Intercept	-6,26829E-	0,0217	-2,884E-06	0,9999977	-0,043	0,043	-0,043	0,043
FAC1_1	-0,352	0,0217	-16,197241	7,7102E-54	-0,395	-0,310	-0,395	-0,310
FAC2_1	-0,102	0,0217	-4,7047433	2,8164E-06	-0,145	-0,060	-0,145	-0,060
FAC3_1	-0,326	0,0217	-14,995851	5,713E-47	-0,369	-0,283	-0,369	-0,283
FAC4_1	0,053	0,0217	2,4167366	0,01579882	0,010	0,095	0,010	0,095
FAC5_1	0,140	0,0217	6,44670648	1,6131E-10	0,098	0,183	0,098	0,183
FAC6_1	0,091	0,0217	4,18168723	3,0895E-05	0,048	0,134	0,048	0,134
FAC7_1	0,042	0,0217	1,9210766	0,05494291	-0,001	0,084	-0,001	0,084
FAC8_1	-0,049	0,0217	-2,2370838	0,02545166	-0,091	-0,006	-0,091	-0,006
FAC9_1	-0,297	0,0217	-13,645679	1,0773E-39	-0,339	-0,254	-0,339	-0,254
FAC10_1	-0,168	0,0217	-7,7085769	2,5325E-14	-0,210	-0,125	-0,210	-0,125
FAC11_1	0,017	0,0217	0,78598351	0,43202194	-0,026	0,060	-0,026	0,060

FAC3_2: Economic development

The variables with the highest coefficient of correlation in this factor are GDP per capita, % of Natura 2000 and soil sealed area and its explained variance is 17,57%. It can therefore be understood as a factor which expresses high degrees of development and urbanisation. As expected, the regions with the highest scores for this factor are concentrated in central Europe and Scandinavia and also include the capital cities of more marginal countries.

The explanatory capacity of this regression is significantly higher than that of the previous factors. The coefficients, once again, show a significant relation with most of the factors of the territorial profile. The overall picture from the coefficients is a positive effect from factors related to location and R&D (factor 1 and 2). It is also interesting to see that the central location explains much more of different economic development levels than the investment in R&D. Similar conclusions can be drawn from the highly negative coefficient of the indicator related to rurality (factor 9) meaning that, on themselves, density and central location seem to be more important than research and innovation. The weight of the construction sector is also considerably negative, probably meaning that, at a certain stage, high economic development is more linked to a strong service sector than infrastructural development.

Table 25: Economic development regression analysis

<i>Regression Statistics</i>								
Multiple R	0,824258							
R Square	0,679401							
Adjusted R	0,676659							
Standard Error	0,568631							
Observations	1298							
	<i>Coefficients</i>	<i>Standard</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower</i>	<i>Upper</i>	<i>Lower</i>	<i>Upper</i>
Intercept	-1E-07	0,01578	-7,1E-06	0,999994301	-0,0310	0,0310	-0,0310	0,0310
FAC1_1	0,4545	0,01579	28,78786	4,4844E-141	0,4236	0,4855	0,4236	0,4855
FAC2_1	0,1623	0,01579	10,27749	7,24251E-24	0,1313	0,1932	0,1313	0,1932
FAC3_1	0,0837	0,01579	5,303401	1,33687E-07	0,0528	0,1147	0,0528	0,1147
FAC4_1	0,0844	0,01579	5,348225	1,05025E-07	0,0535	0,1154	0,0535	0,1154
FAC5_1	0,1545	0,01579	9,785094	7,39012E-22	0,1235	0,1855	0,1235	0,1855
FAC6_1	0,0372	0,01579	2,356502	0,018597296	0,0062	0,0682	0,0062	0,0682
FAC7_1	0,1029	0,01579	6,518061	1,02027E-10	0,0719	0,1339	0,0719	0,1339
FAC8_1	-0,3541	0,01579	-22,4252	2,83549E-94	-0,3851	-0,3231	-0,3851	-0,3231
FAC9_1	-0,5195	0,01579	-32,9051	8,784E-173	-0,5505	-0,4886	-0,5505	-0,4886
FAC10_1	-0,0122	0,01579	-0,7752	0,438363708	-0,0432	0,0187	-0,0432	0,0187
FAC11_1	-0,0321	0,01579	-2,03075	0,042485717	-0,0630	-0,0011	-0,0630	-0,0011

FAC4_2: Pollution

The significant variable of this factor is ozone concentration exceedances. The ozone concentration is related to a photo chemical reaction of pollutants and depends on the presence/absence of heavy industries, traffic levels, sun exposure but also on wind conditions. This means that emissions in one place can affect neighbouring regions, that high emission in southern countries will lead to higher ozone levels than in northern countries and that favourable wind conditions can lead to low levels in regions with high emissions and vice-versa. Therefore, a regression analysis of this indicator with the context factors has necessarily a very limited explanatory capacity and can lead to relations that lack any evident logic if the atmospheric conditions are not taken into account. There also seem to be some discrepancies on the way it is measured in different countries, as it is not plausible that there are so clear cuts on some borders. Although the scores of the regions show us some overall tendencies, the regression analysis shouldn't be regarded for this component.

7.4. Extremadura Alentejo CBA

The scores of the factors should also be analysed for the NUTS 3 of the case-studies. For this analysis the countries' NUTS 3 average was obtained, weighted by the NUTS 3's proportion of population, and afterwards the difference between the individual NUTS 3 and the country it belongs to, as well as the weighted average of all the involved countries was calculated. The "+" and "-" signalize whether the regions' scores are above or inferior to the national and the CBA country levels. Basically, it provides a fast overview without the need to evaluate all the scores individually. The overall position of the NUTS 3 in the European context is expressed by the percentile below which it falls (5%, 20%, 50%, 80%, 95%).

NUTS name	Central Location					R&D&I					Administrative centres							
	Scores	Country comparison (weighted NUTS 3 average)			CBA country level/Country (+ -)	Percentile all NUTS 3	Scores	Country comparison (weighted NUTS 3 average)			CBA country level/Country (+ -)	Percentile all NUTS 3	Scores	Country comparison (weighted NUTS 3 average)			CBA country level/Country (+ -)	Percentile all NUTS 3
		PT	ES	All CBA countries				PT	ES	All CBA countries				PT	ES	All CBA countries		
All Countries	-0,27		-0,10			50	0,09		-0,06			80	-0,17		0,01			50
Portugal	-0,72		-0,54	-0,44		50	-0,17		-0,32	-0,26		80	-0,12		0,06	0,05		50
Spain	-0,18		0,00	0,10		50	0,15		0,00	0,06		80	-0,18		0,00	-0,01		50
Badajoz	-1,19		-1,02	-0,92	--	20	0,01		-0,14	-0,08	--	80	1,01		1,20	1,18	++	95
Cáceres	-0,79		-0,61	-0,51	--	20	-0,04		-0,19	-0,13	--	80	1,20		1,38	1,37	++	95
Alentejo Litoral	-1,36	-0,64		-1,09	--	20	-0,54	-0,37		-0,63	--	50	-0,27	-0,15		-0,10	--	50
Alto Alentejo	-1,45	-0,74		-1,18	--	20	-0,74	-0,57		-0,84	--	50	1,47	1,60		1,65	++	95
Alentejo Central	-1,05	-0,33		-0,77	--	20	-0,90	-0,73		-1,00	--	20	1,28	1,40		1,45	++	95
Baixo Alentejo	-1,55	-0,84		-1,28	--	20	-0,64	-0,47		-0,73	--	50	0,78	0,91		0,96	++	80

NUTS name	Demographic dynamism					Environmental risk					FAC6_1: Services and transport							
	Scores	Country comparison (weighted NUTS 3 average)			CBA country level/Country (+ -)	Percentile all NUTS 3	Scores	Country comparison (weighted NUTS 3 average)			CBA country level/Country (+ -)	Percentile all NUTS 3	Scores	Country comparison (weighted NUTS 3 average)			CBA country level/Country (+ -)	Percentile all NUTS 3
		PT	ES	All CBA countries				PT	ES	All CBA countries				PT	ES	All CBA countries		

All Countries	-0,39		0,06			5	1,13		-0,22			95	0,58		0,01			80
Portugal	-0,11		0,34	0,28		5	0,12		-1,23	-1,00		80	0,64		0,08	0,06		80
Spain	-0,45		0,00	-0,06		5	1,35		0,00	0,22		95	0,56		0,00	-0,01		80
Badajoz	-0,29		0,16	0,10	++	5	0,18		-1,17	-0,95	--	80	-0,16		-0,72	-0,74	--	50
Cáceres	-0,87		-0,42	-0,48	--	5	0,38		-0,97	-0,75	--	80	-0,15		-0,71	-0,73	--	50
Alentejo Litoral	-0,80	-0,69		-0,41	--	5	-0,51	-0,63		-1,64	--	50	0,49	-0,15		-0,09	--	80
Alto Alentejo	-1,19	-1,09		-0,81	--	5	-0,78	-0,90		-1,91	--	20	0,09	-0,55		-0,49	--	80
Alentejo Central	-0,61	-0,50		-0,22	--	5	-1,06	-1,18		-2,19	--	5	-0,14	-0,78		-0,72	--	50
Baixo Alentejo	-0,74	-0,63		-0,35	--	5	-0,49	-0,62		-1,62	--	50	-0,20	-0,83		-0,77	--	50

NUTS name	FAC7_1: Immigration						FAC8_1: Construction					
	Scores	Country comparison (weighted NUTS 3 average)			CBA country level/Country (+ -)	Percentile all NUTS 3	Scores	Country comparison (weighted NUTS 3 average)			Country /CBA country level	Percentile all NUTS 3
		PT	ES	All CBA countries				PT	ES	All CBA countries		
All Countries	1,13		-0,21			95	1,39		-0,35			95
Portugal	0,18		-1,15	-0,94		80	-0,17		-1,91	-1,56		50
Spain	1,34		0,00	0,21		95	1,74		0,00	0,35		95
Badajoz	0,22		-1,12	-0,91	--	80	2,48		0,74	1,09	++	> 95
Cáceres	-0,52		-1,86	-1,65	--	50	3,37		1,63	1,98	++	> 95
Alentejo Litoral	-0,52	-0,70		-1,64	--	50	-0,19	-0,03		-1,59	--	50
Alto Alentejo	-0,81	-0,99		-1,94	--	20	-0,89	-0,73		-2,29	--	20
Alentejo Central	-0,12	-0,30		-1,25	--	50	-0,60	-0,43		-1,99	--	50
Baixo Alentejo	-0,98	-1,16		-2,11	--	20	-0,37	-0,21		-1,77	--	50

NUTS name	FAC1_2: Unemployment				FAC2_2: Catching-up regions				FAC3_2: Economic development			
	Scores	Country comparison (weighted NUTS 3 average)	CBA country level/Country	Percentile all NUTS 3	Scores	Country comparison (weighted NUTS 3 average)	CBA country level/Country	Percentile all NUTS 3	Scores	Country comparison (weighted NUTS 3 average)	CBA country level/Country	Percentile all NUTS 3

		PT	ES	All CBA countries	(+ -)			PT	ES	All CBA countries	(+ -)			PT	ES	All CBA countries	(+ -)		
All Countries	0,99		-0,10			95	-0,09					80	-0,21						50
Portugal	0,55		-0,54	-0,44		80	-0,31		-0,26	-0,22		80	-0,04		0,21	0,17			80
Spain	1,09		0,00	0,10		95	-0,04		0,00	0,05		80	-0,25		0,00	-0,04			50
Badajoz	2,03		0,94	1,04	++	95	0,53		0,57	0,62	++	95	-0,41		-0,16	-0,20	--		50
Cáceres	1,59		0,50	0,60	++	95	0,46		0,50	0,55	++	80	-0,76		-0,51	-0,54	--		20
Alentejo Litoral	0,32	-0,24		-0,68	--	80	-0,64	-0,34		-0,55	--	50	-0,94	-0,90		-0,73	--		20
Alto Alentejo	0,74	0,18		-0,26	-+	80	-0,27	0,04		-0,18	-+	80	-1,15	-1,11		-0,94	--		5
Alentejo Central	0,44	-0,12		-0,56	--	80	-0,13	0,17		-0,04	-+	80	-0,62	-0,58		-0,41	--		50
Baixo Alentejo	0,92	0,37		-0,07	-+	95	0,00	0,31		0,09	++	80	-0,83	-0,78		-0,61	--		20

7.5. Chapter conclusions

The main conclusion from the factor and regression analysis is that the region has poor scores in most of the factors that have a significant impact on its development. In the factor 1, that expresses central location, all of the NUTS 3 of the CBA fall below the 20% percentile. In the factor 2, that expresses R&D&I, most of the Portuguese regions fall below the 50% percentile, while the Spanish ones fall below the 80%. Since these two factors are the ones that relate most strongly to the economic performance, the overall outlook of the regions is not very positive.

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Annex

Catching up analysis

According to these assumptions, the logistic function which describes the problem is represented as follows:

$$X = 0,95 \bar{X} = \frac{\bar{X}}{1 + ke^{-at}} \quad (1)$$

where, \bar{X} is the performance of the leading region, X is the relative position of the NUTS III in question and k is an abstract constant. k is a parameter which defines the value of X at the year of origin.

For $t=0 \rightarrow e^{-at} = 1$, and then

$$X = \frac{\bar{X}}{1 + k}$$

therefore

$$k = \frac{\bar{X} - X}{X}$$

which gives us the relative position of a NUTS III X to the leading NUTS III, \bar{X} .

Solving the equation (1) for t ,

$$0,95 = \frac{1}{1 + ke^{-at}}$$

$$\frac{1}{0,95} = 1 + ke^{at}$$

$$\frac{0,05}{0,95} = ke^{at}$$

$$19 k = e^{at}$$

$$\ln 19 k = at$$

$$t = \frac{\ln 19 k}{a}$$

Substituting k in this equation, the general expression to estimate the time needed to reach the 95% level of the leading region in 50 years is given by:

$$t = \frac{\ln \left(19 \times \frac{\bar{X} - X}{X} \right)}{a} \quad (2)$$

In order to solve this equation, the value of the parameter a must be obtained. That value corresponds both to the relative growth rate and to the relative position in terms of GDP per capita of each NUTS III, when compared to the leading region.

Given the definition of a logistic curve,

$$G = \frac{\frac{dx}{dt}}{X} = a \frac{\bar{X} - X}{\bar{X}}$$

$$a = G \frac{\bar{X}}{\bar{X} - X} \quad (3)$$

where G is the relative growth rate of the g NUTS III under analysis in comparison to the leading region, g^* , according to the following equation:

$$G = \frac{1 + g}{1 + g^*} - 1$$

In the analysis, the growth rates obtained refers to the evolution of GDP per capita between the years 1997 and 2008, in the form:

$$\left(\frac{\sqrt[11]{GDP_{2008}}}{\sqrt{GDP_{1997}}} \right) - 1$$

Substituting a (equation 3) in the equation (2),

$$t = \frac{\ln \left(19x \frac{X - X}{X} \right)}{G \frac{\bar{X}}{\bar{X} - X}}$$

and then

$$t = \frac{\ln \left(19x \frac{\bar{X} - X}{X} \right) \frac{\bar{X} - X}{\bar{X}}}{G}$$

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