Ulysses

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

Targeted Analysis 2013/2/10

Annex III – Case Study 1: Trinational Metropolitan Area Upper Rhine

Report on Task 2.2 - Multi-scale performance analysis

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Nomenclature

CBR: Abbreviation for the Cross Border Region representing the Trinational Metropolitan Area Upper Rhine

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 (peripheries for Greece and planning regions for Bulgaria).

NUTS 3: Third level definition of the EU space, corresponding to districts (prefectures for Greece and oblasts for Bulgaria).

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

Population Growth: Represents the change of total population over a certain time period.

Population Density: Represents a key geographic parameter expressing the total population per unit area, usually per sq km.

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.

Executive Summary

The Trinational Metropolitan Area Upper Rhine is located centrally in Europe, in the northern part of Switzerland, eastern part of France and south-western part of Germany with the River Rhine as its natural border between these three countries and consists of five Swiss NUTS3 units, two French NUTS3 units, and 16 German NUTS3 units. With 6.076.678 inhabitants in the year 2009, the CBR is a very dense populated cross border region with a strong economy.

Demography

Although being a border region, the indicators used show a high attractiveness of the CBR: besides positive natural growth on the Swiss and French side, the CBR could steadily gain population by migration and hence has an overall positive population growth. This indicates a strong labour market, especially in the Swiss NUTS3 units of the CBR, with a high share of incoming commuters from France and Germany.

The population by age as well as the dependency ratios show a successful policy of the French government regarding families, as the overall as well as local fertility are much higher compared to the national as well as local level of Switzerland and Germany.

Polycentric Development

Polycentricity is a core phenomenon in the analysis of the cross-border Upper Rhine Valley. The main Functional Urban Areas (FUAs) within the German-French-Swiss Oberrhein conference are Basel in the South, Strasbourg-Kehl in the middle and Karlsruhe in the North. They are embedded in several neighbouring and surrounding FUAs. These FUAs of different levels build the polycentric structure of the Upper Rhine Valley.

Urban-rural relationships

Trying to express the relationship of urban and rural areas in the CBR Trinational Metropolitan Area Upper Rhine, a typology for characterizing how urban or rural a region is was created. It characterizes predominantly rural, intermediate and predominantly urban areas. The spatial unit of the NUTS3 level was too rough to apprehend the details of the area, as a lot of urban cores lie within a bigger surrounding predominately rural area.

The economic situation of the rural areas concerning agriculture is in comparison to other European regions strong and has a relatively solid added value. This is due to concentration on winery and arable crops. The area used for agricultural use however is shrinking on an average level.

The available data does not allow getting an insight in conflicts of land use. Due to topographical circumstances agglomeration takes place in the plain Rhine valley. Urban development and agriculture have to share the most valuable soil, so there are conflicts which cannot be described with the data.

A closer look with more detailed data would allow a better understanding of the area and its characteristics. So far no evaluation of interaction between rural and urban areas can be performed.

Accessibility and connectivity

The Upper Rhine Valley is a very well connected cross-border region in the centre of Europe. Various important European destinations are readily accessible through motorways or high-speed rail. Three regional airports and the neighbourhood of important international air traffic hubs provide excellent accessibility of worldwide destinations. Numerous road crossings of the River Rhine and the national borders make commuting to the neighbouring countries on a daily bases a piece of cake. A fly in the ointment though are issues with intra-regional connectivity in public transportation, which hinder the effective cross-border usage of common infrastructure.

Gothenburg and Lisbon / Europe 2020 strategy

The CBR has a quite strong economy which can be seen by the GDP per capita; most of the NUTS3 units of the CBR are above the national and EU averages. Especially the urban centres have a high GDP per capita, which will also be true for the French NUTS3 units, though due to their size no further differentiation can be made. In the economic development the CBR could steadily increase GDP per capita and the number of employees, although it is falling behind the reference area of Greater London. The results of this analysis has to handled with care, as the "economic bubble" of the finance sector resulted in high growth rates in the financial sectors without a similar growth of the industry and further services.

Also unemployment rates are very low, especially in the Swiss and German NUTS3 units of the CBR. These low unemployment rates as well as high GDP rates may be due to a relative high share of high and medium tech enterprises in the CBR.

R&D potential

The CBR Upper Rhine Valley offers a great potential for cross-border research and educational activity. Regarding the cooperation potential by road accessibility, a well integrated and connected cross-border region appears. Depending on the sector of the research activity, the regional distribution of the clusters may vary a lot. The sector of life sciences gathers around Basel, while the social sciences are mainly situated in Freiburg. Other fields of research are more

evenly distributed over the CBR. Due to the excellent cross-border accessibility by road, the border plays only a minor role even though it's still visible. More important prove to be the differences between the densely populated and high developed plain in the centre of the region and the more rural low mountain ranges which flank this plain. Whereas the CBR offers great accessibility by road, the poor regional accessibility in cross-border public transportation might be an issue, since especially educational commuting is highly dependent on public transportation.

Factor analysis

The Factor Anaylsis validates the results of the previuos chapters, putting them into relation to the involved countries of the CBR and all NUTS3 units in Europe.

Again it is affirmed, that the CBR analysed belongs to the stronger regions in Europe regarding economy, unemployment, environmental conditions etc. In this analysis date from Switzerland is missing, but the proximity of the French and german NUTS3 units to Switzerland is important for their (economic) performance as a high share of emplyess chose to live in France or germany and work in Switzleand bevcause of higher wages and lowwer taxes there.

What had to be excluded form the analysis are non-quantatative factors, nevertheless playing a crucial role for the attractiviness of a region: the Upper Rhine is well known for culture, landscape, warm summers, atractive cities, wine etc. Chosing the place of domicile, these factors are important for a lot of people (as long as the working conditions are met).

Chapter 1 - Report Objectives and General Overview

1.1. ULYSSES Objectives in the context of this Report

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. Four are the overall objectives of ULYSSES:

- 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 Case Study region 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 recommendations: 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 Case Studies 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 Upper Rhine cross-border area along the land borders between France, Germany and Switzerland (CS 1), the Trinational Metropolitan Area Upper Rhine 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 the Greece – Bulgaria Cross-Border Area, with regards to six targeted themes under analysis and under different territorial scales.

Based on a series of data indicators developed by ESPON and other data sources, for each case study CBR, a territorial socioeconomic dynamic analysis will take place. This analysis will be done under different territorial scales, thus comparing each region to the cross border area as a whole, each region to the entire cross border area within the same country, each region to the whole cross border area in the neighbouring country and each region confining non-border regions within the same country.

The selected indicators to be used for the analysis of territorial socio-economic dynamics are:

- for the demographic analysis,
  - Population (absolute values)
  - Population by age structure
  - Net migration
  - Population density
  - Dependency rates
  - Ageing index
  - Fertility rate (or long range growth rate)
  - Population growth
- for the cross-border polycentric development analysis,
  - Share of population in cities below 50.000 inhabitants
  - Polycentricity index
  - Log linear rank-size distribution
  - Primacy population and/or GDP Rate
  - Potential interaction of urban centres

- for the urban-rural relationship analysis,
  - Land use (Artificial area, Agricultural area, Forest area, etc.)
  - Percent employed in agriculture forestry and fishing
  - Relative rurality based on national classifications
- for the accessibility & connectivity analysis,
  - Length of railway network, km (2001)
  - Length of highroad network (km)
  - Length of road network (km)
  - Number of commercial airports
  - Number of rail stations serving high speed rail lines
  - Households with broadband internet access (NUTS 2)
  - Firms access to fibre backbones (NUTS 2)
  - Time (minute) to the nearest motorway access, by car of the capital or centroid representative of the NUTS3
  - Connectivity to commercial airports by car of the capital or centroid representative of the NUTS3 (HOURS)
  - Connectivity to rail stations (minutes) weighted by surface
  - Traffic in commercial airports (in million passengers/year 2000)/inhabitants (1999)
  - Potential accessibility road, air, train & multimodal (NUTS 3, 2006)
  - Traffic in commercial airports (in million passengers/year 2000)/inhabitants

Based on a series of data indicators developed by ESPON and other data sources, for each case study CBR, a territorial performance analysis will take place. This analysis will be done under different territorial scales, thus comparing each region to the cross border area as a whole, each region to the entire cross border area within the same country, each region to the whole cross border area in the neighbouring country and each region confining non-border regions within the same country.

The selected indicators to be used for the analysis of territorial performance are:

- for the economy & employment analysis,
  - Employment by NACE
  - GDP in million euro
  - GDP in million euro per inhabitant
  - GDP in millions euro of Purchasing Power Parities
  - Employment rate by sex

- Economically active population

- for the innovation & research analysis,
  - Population by age groups and educational level
  - R&D as % of investment
  - Human resources in Science and Technology as % of total employment
  - % of population with tertiary education
  - % of 18 years old participating in education
  - Patent registration by million inhabitants
- for the social cohesion analysis,
  - Expenditure in euro per inhabitant on sickness and health
  - At risk of poverty after social transfers
  - Long-term unemployment rate
  - Youth unemployment rate
- for the environmental analysis,
  - CO_2 emissions
  - Greenhouse gases emissions
  - Emissions of acidifying substances
  - Number of observed forest fires
  - Occurrence of landslides
  - Occurrence of snow avalanches
  - Regional average number of flood events
  - Energy inland consumption renewable sources
  - CO_2 per capita
  - Number of observed forest fires/1000 sq km in NUTS3 region

1.2. General Overview of the Trinational Metropolitan Area Upper Rhine

The Swiss (CH) – German (DE) – French (FR) cross border region (CBR) is located in the northern part of Switzerland, eastern part of France and south-western part of Germany with the River Rhine as its natural border between these three countries (see Figure 1.1). It consists of parts of the NUTS2 administrative units:

- Switzerland: Espace Mittelland (CH02), Nordwestschweiz (CH03)
- Germany: Karlsruhe (DE12), Freiburg (DE13), and Rheinhessen-Pfalz (DEB3)
- France: Alsace (FR42)[1]

Each NUTS2-level is further divided into a number of NUTS3 level administrative districts (see Table 1.1) of uneven sizes (see Figure 1.1 and Figure 1.2).

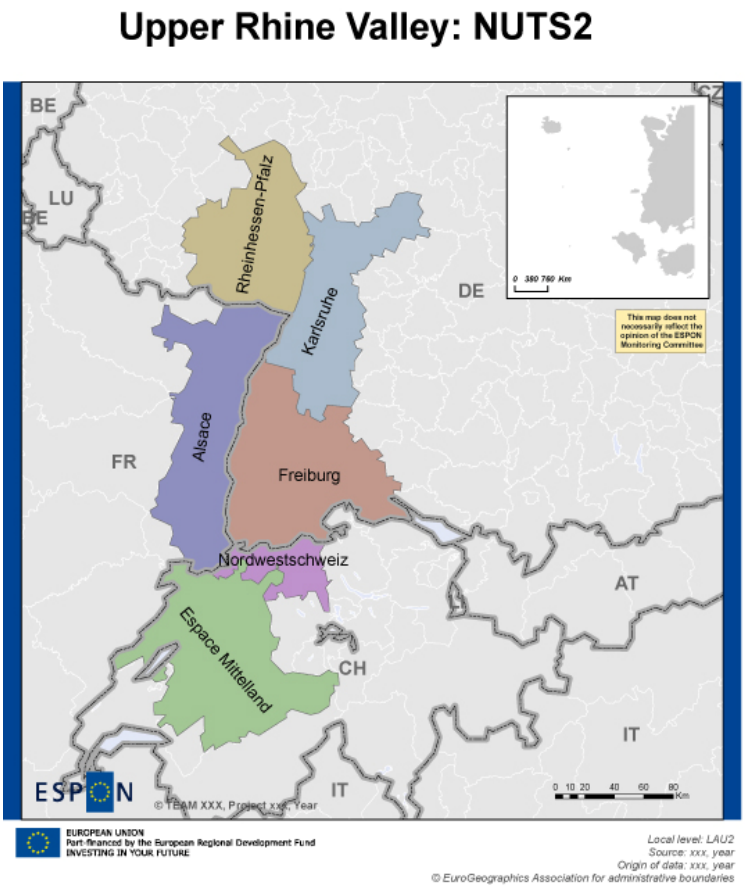


Figure 1.1: Map of NUTS2 level units of the CBR

[1] The NUTS2 units FR42 Alsace and CH02 Nordwestschweiz are as a total part of the CBR, while only parts of the other NUTS2 units belong to the CBR.

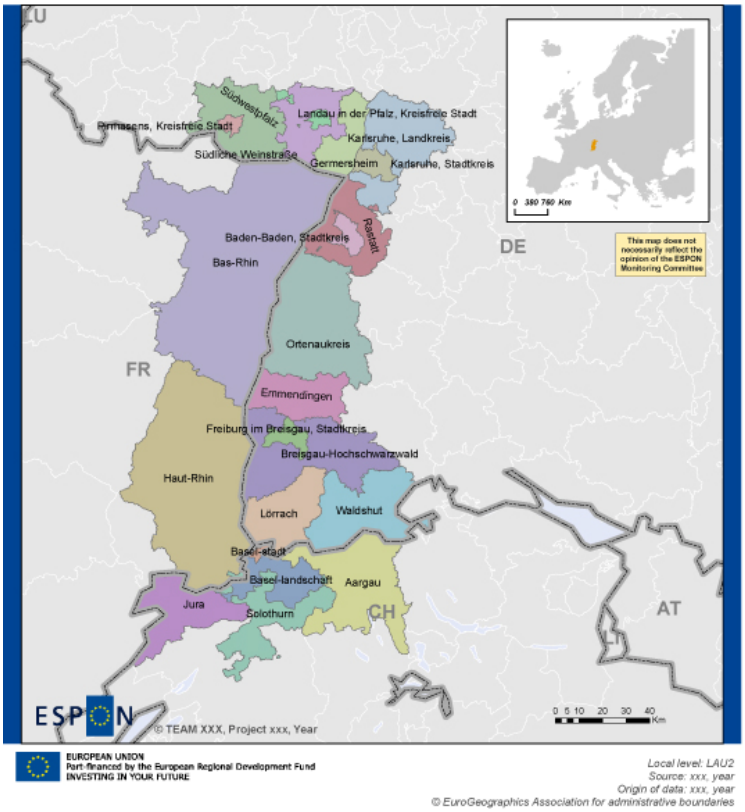


Figure 1.2: Map of NUTS3 level units of the CBR

	NUTS_ID	NUTS level
Switzerland	CH	NUTS1
Espace Mittelland	CH02	NUTS2
Solothurn	CH023	NUTS3
Jura	CH025	NUTS3
Nordwestschweiz	CH03	NUTS2
Basel-Stadt	CH031	NUTS3
Basel-Landschaft	CH032	NUTS3
Aargau	CH033	NUTS3
Germany	DE	NUTS1
Karlsruhe	DE12	NUTS2
Baden-Baden, Stadtkreis	DE121	NUTS3
Karlsruhe, Stadtkreis	DE122	NUTS3
Karlsruhe, Landkreis	DE123	NUTS3
Rastatt	DE124	NUTS3
Freiburg	DE13	NUTS2
Freiburg im Breisgau, Stadtkreis	DE131	NUTS3
Breisgau-Hochschwarzwald	DE132	NUTS3
Emmendingen	DE133	NUTS3
Ortenaukreis	DE134	NUTS3
Lörrach	DE139	NUTS3
Waldshut	DE13A	NUTS3
Rheinhessen-Pfalz	DEB3	NUTS2
Landau in der Pfalz, Kreisfreie Stadt	DEB33	NUTS3
Pirmasens, Kreisfreie Stadt	DEB37	NUTS3
Germersheim	DEB3E	NUTS3
Südliche Weinstraße	DEB3H	NUTS3
Südwestpfalz	DEB3K	NUTS3
France	FR	NUTS1
Alsace	FR42	NUTS2
Bas-Rhin	FR421	NUTS3
Haut-Rhin	FR422	NUTS3

Table 1.1: Administrative levels of CBR

1.3. Total Area of the CBR

The CBR occupies an area of 22.216,2 sq km. The Swiss part of the CBR covers 16,2% of the CBR (4.390,3 sq km), the German NUTS3 units 46,6% (10.465,7 sq km) and the France part 37,2% (8.280,2 sq km). According to the each national areas, the Swiss part of the CBR accounts for 8,7% of Switzerland, the German NUTS3 units of the CBR 2,9% of Germany and Alsace accounts only for 1,3% of France.

The sizes of the NUTS3 units of the CBR are very different due to different administrative settings: The smallest NUTS3 units are the urban centres CH031 Basel-Stadt (37 sq km), DEB37 Pirmasens (61,4 sq km), and DEB33 Landau (83 sq km), while the largest one are the two French NUTS3 units FR422 Haut-Rhin (4.755 sq km) and FR412 Bas-Rhin (3.525,2 sq km), followed by the German NUTS3 unit DE134 Ortenaukreis with 1.860,8 sq km)

	NUTS_ID	NUTS level	
Switzerland	CH	NUTS1	41.284,6
Espace Mittelland	CH02	NUTS2	10.062,1
Solothurn	CH023	NUTS3	790,5
Jura	CH025	NUTS3	838,6
Nordwestschweiz	CH03	NUTS2	1.958,3
Basel-Stadt	CH031	NUTS3	37,0
Basel-Landschaft	CH032	NUTS3	517,6
Aargau	CH033	NUTS3	1.403,7
Germany	DE	NUTS1	357.108,0
Karlsruhe	DE12	NUTS2	6.919,0
Baden-Baden, Stadtkreis	DE121	NUTS3	140,2
Karlsruhe, Stadtkreis	DE122	NUTS3	173,5
Karlsruhe, Landkreis	DE123	NUTS3	1.084,9
Rastatt	DE124	NUTS3	738,8
Freiburg	DE13	NUTS2	9.357,1
Freiburg im Breisgau, Stadtkreis	DE131	NUTS3	153,1
Breisgau-Hochschwarzwald	DE132	NUTS3	1.378,3
Emmendingen	DE133	NUTS3	679,9
Ortenaukreis	DE134	NUTS3	1.860,8
Lörrach	DE139	NUTS3	806,8
Waldshut	DE13A	NUTS3	1.131,2
Rheinhessen-Pfalz	DEB3	NUTS2	6.851,4
Landau in der Pfalz, Kreisfreie Stadt	DEB33	NUTS3	83,0
Pirmasens, Kreisfreie Stadt	DEB37	NUTS3	61,4
Germersheim	DEB3E	NUTS3	463,3
Südliche Weinstraße	DEB3H	NUTS3	639,8
Südwestpfalz	DEB3K	NUTS3	953,6
France	FR	NUTS1	632.833,6
Alsace	FR42	NUTS2	8.280,2
Bas-Rhin	FR421	NUTS3	4.755,0
Haut-Rhin	FR422	NUTS3	3.525,2

Table 1.2: Area of the CBR (2009)

Chapter 2 – Demographic Analysis

2.1. Aims, Indicators and Methods

Demographic Analysis of the CBR aims to identify the behaviour of the cross-border region in terms of population spatial distribution and temporal dynamics. The main objective is to understand the influence of the border on the settlement and population patterns of the CBR. The key questions to be answered are: Is the border attracting or repulsing local population? Is the population of the border region growing faster or slower than non-border regions? Is the population of the border region ageing more or less rapidly than in non-border regions?

To answer to the above questions, a set of indicators has been identified, as the CBR's total population; the population growth; the population density; the total and partial dependency rates; the ageing index; and the fertility rates.

More specifically, the parameters and indicators analysed for the Cross-Border Region, are shown in Table2.1.

Variable name	Geographical scale	Source	Time frame
Total fertility rates	NUTS 2 (NUTS 1 Russia)	EUROSTAT, Russian Statistical Institute	1997-2009
Commuters to other countries among by active population	NUTS 2	EUROSTAT	2009
Commuters to other regions among by active population	NUTS 2	EUROSTAT	2009
Old and young age dependency rates	NUTS 3	EUROSTAT	2009
Net migration, natural growth, total growth	NUTS 3	EUROSTAT, Demipher Project	2000-2009
Population	Several	EUROSTAT, National Statistical Institutes	2000-2009

Table 2.1: Demographic Parameters studied for the CBR.

2.2. Total Population

There were 6.076.678 inhabitants living in the CBR in 2009, hence about 1,22% of the EU27 population (499,705,496 inhabitants in 2009). The CBR's population of each national parts of the CBR represent 18,1% of the total population of Switzerland (7.593.494 in 2009), 3,48% of the total German population (82.217.837 in 2009), and 2,89% of the total population in France (64.007.290 in 2009).

The Swiss part of the CBR (CH02 Espace Mittelland, CH03 Nordwestschweiz) has a population share of 27,3% of the total CBR, the German Part (DE12 Karlsruhe, DE13 Freiburg, DEB3 Rheinhessen-Pfalz) 33,1%, and the French part (FR42 Alsace) 39,6% of the total CBR.

	NUTS_ID	NUTS level	2009
Switzerland	CH	NUTS1	7.593.494
Espace Mittelland	CH02	NUTS2	321.652
Solothurn	CH023	NUTS3	251.830
Jura	CH025	NUTS3	69.822
Nordwestschweiz	CH03	NUTS2	1.049.518
Basel-Stadt	CH031	NUTS3	186.672
Basel-Landschaft	CH032	NUTS3	271.214
Aargau	CH033	NUTS3	591.632
Total CBR CH			1.371.170
Germany	DE	NUTS1	82.217.837
Karlsruhe	DE12	NUTS2	1.004.005
Baden-Baden, Stadtkreis	DE121	NUTS3	54.777
Karlsruhe, Stadtkreis	DE122	NUTS3	290.736
Karlsruhe, Landkreis	DE123	NUTS3	431.381
Rastatt	DE124	NUTS3	227.111
Freiburg	DE13	NUTS2	1.434.536
Freiburg im Breisgau, Stadtkreis	DE131	NUTS3	219.665
Breisgau-Hochschwarzwald	DE132	NUTS3	250.132
Emmendingen	DE133	NUTS3	157.667
Ortenaukreis	DE134	NUTS3	417.613
Lörrach	DE139	NUTS3	222.596
Waldshut	DE13A	NUTS3	166.863
Rheinhessen-Pfalz	DEB3	NUTS2	42.002
Landau in der Pfalz, Kreisfreie Stadt	DEB33	NUTS3	43.008
Pirmasens, Kreisfreie Stadt	DEB37	NUTS3	41.358
Germersheim	DEB3E	NUTS3	125.603
Südliche Weinstraße	DEB3H	NUTS3	109.625
Südwestpfalz	DEB3K	NUTS3	100.508
Total CBR DE			2.858.643
France	FR	NUTS1	64.007.290
Alsace	FR42	NUTS2	1.846.865
Bas-Rhin	FR421	NUTS3	1.097.045
Haut-Rhin	FR422	NUTS3	749.820
Total CBR FR			1.846.865
Total CBR			6.076.678

Table 2.2: Total Population in 2009 for CBR

The two French NUTS3 units FR421 Bas-Rhin and FR422 Haut-Rhin have the highest contribution in the total population in the CBR due to their much bigger size compared to the Swiss and German NUTS3 units. The cities of Landau (DED33) and Pirmasens (DEB37) have the smallest amount of population of the whole CBR (see also Figure 2.1, Figure 2.2)

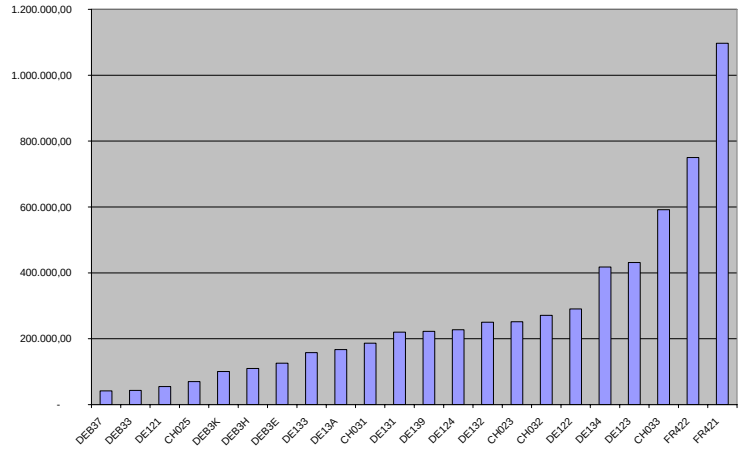


Figure 2.1: Population of each NUTS3 unit 2009 in the CBR

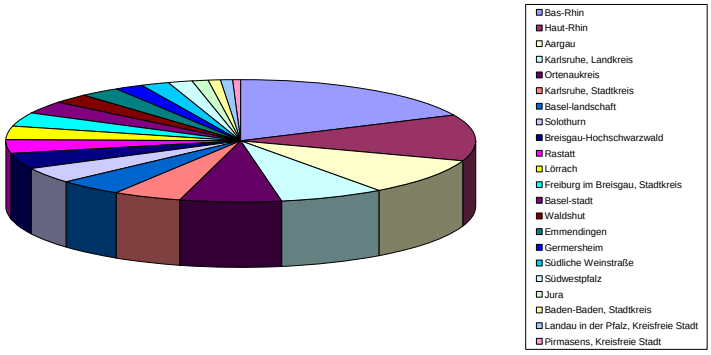


Figure 2.2: Percent of each NUTS3 level unit contribution in the Total Population of the CBR

2.3 Total Population by Age

Three age classes were considered in the analysis: a) total population aged between 0-14 years old; b) total population aged between 15-64 years old; and c) total population aged over 65 years old. Data for all NUTS3 units of the CBR are only available from 2006 – 2009.

The average proportions of total population of the CBR in the three above defined age classes are in 2009: 15,47% (between 0-14 years old), 66,74% (between 15-64 years old) and 17,79 (over 65 years old). Es to be expected, compared to Germany these proportions are higher for the class of the minor 15 (13,58%) and lower than the 65+-agers (20,40%). For France, these proportions are vice versa (minor 15: 18,51%, 65+: 16,50%), due to a much higher fertility rate in France compared to Germany. Switzerland shows about the same proportion of younger people (15,32%) but less elderly (15,41%) and hence a higher proportion of 15.54 years old (69,06%).

Also not surprisingly, the three "oldest" NUTS3 units of the CBR are all German ones, with DE121 Baden-Baden[2] (26,45%), DEB37 Pirmasens (25,26%), and DEB36 Neustadt (23,00%), while those three with lowest population of 65 years and older are CH033 Aargau (15,07%), FR421 Bas-Rhin (15,16%), and FR422 Haut-Rhin (16,07%).

The "youngest" NUTS3 units of the CBR are FR422 Haut-Rhin (18,32%), FR421 Bas-Rhin (17,64%) and CH025 Jura (16,80%), while those with the lowest proportion of 14 and younger are found in the urban parts of the CBR, with DE121 Baden-Baden (11,72%), CH031 Basel-Stadt (11,99%), and DE122 Karlsruhe (12,19%) (see also Figure 2.3)

[2] In Germany, the city of Baden-Baden is a typical place for retired people of high income

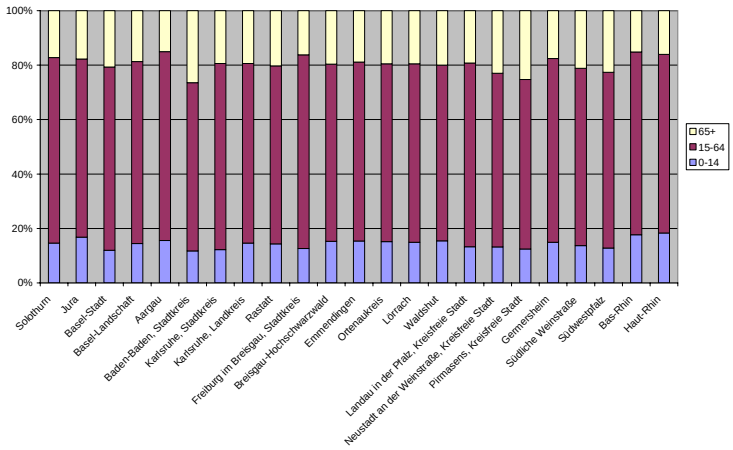


Figure 2.3: Relative proportions of the three age classes for each NUTS3 level unit of the CBR (year 2009)

2.4 Dependency Ratios

Another measure of the proportion of age classes is the expression of dependency ratios. The total demographic dependency ratio is the ratio of the combined youth population (0 to 14 years) and senior population (65 or older) to the working-age population (15 to 64 years). It is expressed as the number of "dependents" for every 100 "workers"[3]:

$$Total\ \ Dependency\ \ Ratio = \frac{(Number\ of\ \ people\ aged\ 0-14)+(Number\ of\ \ people\ aged\ over\ 65)}{(Number\ of\ \ people\ aged\ \ 15-64)}$$

The (total) dependency ratio can be decomposed into the child dependency ratio and the aged dependency ratio, as:

$$Child\ \ Dependency\ \ Ratio = \frac{(Number\ of\ \ people\ aged\ 0-14)}{(Number\ of\ \ people\ aged\ \ 15-64)}$$

$$Aged\ \ Dependency\ \ Ratio = \frac{(Number\ of\ \ people\ aged\ over\ 65)}{(Number\ of\ \ people\ aged\ \ 15-64)}$$

$$Ageing\ Index = \frac{(Number\ of\ \ people\ aged\ over\ 65)}{(Number\ of\ \ people\ aged\ \ 0-14)}$$

Changes in demographic dependency ratios highlight changes in the age composition of the population.

Table2.3 presents the NUTS 3 level units' total, child, and aged dependency rates of the CBR and the EU27 mean values.

[3] Just taking the working age population into account is of course insufficient. In fact, the employment rate plays an important role of how many "workers" pay for "dependents".

	NUTS_ID	NUTS level	Total dependency Ratio	Young age dependency Ratio	Old age dependency Ratio
Switzerland	CH	NUTS1	46,8	22,5	24,3
Solothurn	CH023	NUTS3	46,7	21,47	25,27
Jura	CH025	NUTS3	52,7	25,65	27,07
Basel-Stadt	CH031	NUTS3	48,7	17,84	30,84
Basel-Landschaft	CH032	NUTS3	49,6	21,57	28,01
Aargau	CH033	NUTS3	44,2	22,44	21,72
Germany	DE	NUTS1	51,5	20,6	30,9
Baden-Baden, Stadtkreis	DE121	NUTS3	61,8	18,97	42,82
Karlsruhe, Stadtkreis	DE122	NUTS3	46,3	17,83	28,45
Karlsruhe, Landkreis	DE123	NUTS3	51,6	22,14	29,49
Rastatt	DE124	NUTS3	52,8	21,84	30,94
Freiburg im Breisgau, Stadtkreis	DE131	NUTS3	40,5	17,68	22,80
Breisgau-Hochschwarzwald	DE132	NUTS3	53,6	23,45	30,20
Emmendingen	DE133	NUTS3	52,1	23,38	28,74
Ortenaukreis	DE134	NUTS3	53,2	23,26	29,92
Lörrach	DE139	NUTS3	52,4	22,68	29,76
Waldshut	DE13A	NUTS3	55,0	23,95	31,00
Landau in der Pfalz, Kreisfreie Stadt	DEB33	NUTS3	48,3	19,71	28,56
Pirmasens, Kreisfreie Stadt	DEB37	NUTS3	60,6	20,03	40,57
Germersheim	DEB3E	NUTS3	48,1	22,05	26,09
Südliche Weinstraße	DEB3H	NUTS3	53,6	21,05	32,51
Südwestpfalz	DEB3K	NUTS3	54,9	19,79	35,07
France	FR	NUTS1	53,9	28,5	25,4
Bas-Rhin	FR421	NUTS3	48,8	26,24	22,55
Haut-Rhin	FR422	NUTS3	52,4	27,92	24,49
Total CBR (average)			51,3		
EU27			48,9	23,3	25,6

Table 2.3: Total, child and aged dependency ratios and ageing indices for the NUTS3 level units of the CBR (2009)

Simultaneous to Chapter 2.3, the NUTS3 units having the highest aged dependency are the German ones of DE121 Baden-Baden (42,82) DEB37 Pirmasens (40,57), and DEB3K Südwestpfalz (35,07), all significant higher than the EU27 average of 25,6. Those NUTS3 units having high aged dependency ratios are at the same time the NUTS3 units with the highest total dependency ratios. I.e. the aged dependency determines the total dependency while the child dependency plays a minors role. Thos is due to the fact that the child dependency ratios are much lower (compared to the aged dependency), the highest ones to be found in FR422 Haut-Rhin (27,92), FR421 Bas-Rhin (26,24), and CH025 Jura (25,65).

In all but the both French NUTS3 units and CH033 Aargau, the child dependency ratios were found lower than the aged dependency ratios. This shows that the young population of the CBR represents a smaller portion of total population, as compared to the aged population of the CBR. The highest differences are again to be found in the German NUTS3 units mentioned above.

Figure 2.4 illustrates the scatter diagram of child vs. aged dependency ratios for year 2009 for the CBR at NUTS1 and 3 levels, showing that only the NUTS3 units mentioned above are having higher child dependency ratio than the corresponding aged dependency ratio.

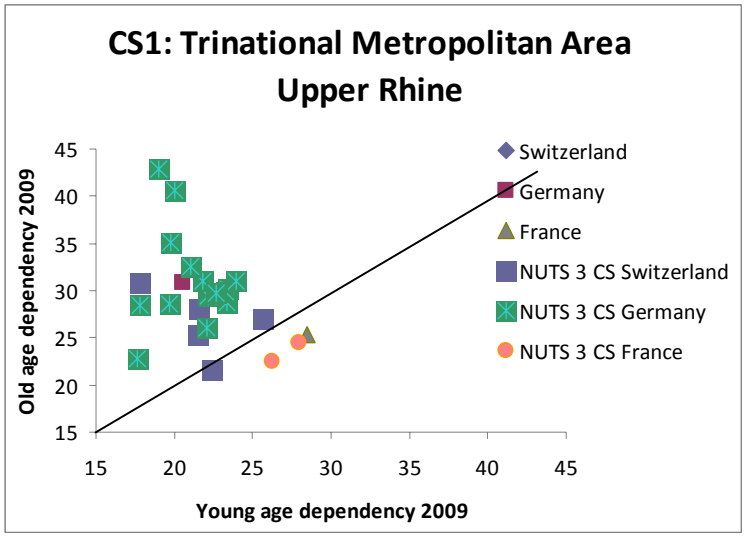


Figure 2.4: Scatter diagram of child vs. aged dependency ratios for year 2009 in CBR

2.5 Population Development

There were 6.076.678 inhabitants living in the CBR in 2009 which means an increase of about 260.000 persons from 2000 – 2009 (see Table 2.4). This increase accounts to 27% for the Swiss part of the CBR, a third to the German part of the CBR, and 40% for the French. In relation to the overall population in the CBR, France and Switzerland record the highest increases (5,6 % and 5,2%), while the German part only records an increase of 3,0%.

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
CH023	Solothurn	243.908	243.700	245.200	246.300	247.000	247.379	247.937	248.613	250.240	251.830
CH025	Jura	68.818	68.800	69.000	69.100	69.200	69.091	69.110	69.292	69.555	69.822
CH031	Basel-Stadt	188.458	187.300	186.700	186.700	187.300	186.753	185.601	184.822	185.227	186.672
CH032	Basel-Landschaft	258.602	260.000	261.200	262.900	264.500	265.305	266.089	267.166	269.145	271.214
CH033	Aargau	540.639	544.700	549.900	555.800	559.900	565.122	569.344	574.813	581.562	591.632
DE121	Baden-Baden, Stadtkreis	52.700	52.800	53.200	53.700	54.000	54.301	54.581	54.855	54.853	54.777
DE122	Karlsruhe, Stadtkreis	277.400	278.100	279.800	281.500	282.700	284.163	285.263	286.327	288.917	290.736
DE123	Karlsruhe, Landkreis	416.500	419.300	422.900	425.900	427.100	428.312	429.603	430.351	431.519	431.381
DE124	Rastatt	223.200	223.400	224.500	225.900	226.700	227.549	228.408	228.006	227.929	227.111
DE131	Freiburg im Breisgau	202.600	204.700	207.700	210.300	212.300	213.998	215.966	217.547	219.430	219.665
DE132	Breisgau-Hochschwarzwald	238.900	240.800	243.500	245.500	247.000	248.400	249.535	250.013	250.183	250.132
DE133	Emmendingen	150.300	151.400	153.000	154.300	155.200	156.069	156.728	157.265	157.629	157.667
DE134	Ortenaukreis	405.800	408.200	411.400	413.200	414.300	415.405	416.410	416.973	417.754	417.613
DE139	Lörrach	216.100	217.300	219.200	220.500	220.900	220.689	221.357	221.787	222.528	222.596
DE13A	Waldshut	164.900	165.200	166.200	166.900	167.100	167.266	167.274	167.168	167.200	166.863
DEB33	Landau in der Pfalz	40.900	40.900	41.100	41.300	41.500	41.821	42.028	43.048	43.063	43.008
DEB37	Pirmasens	45.800	45.200	44.800	44.400	44.000	43.637	43.137	42.427	41.875	41.358
DEB3E	Germersheim	122.800	123.300	124.200	124.700	124.900	125.348	125.268	125.425	125.822	125.603
DEB3H	Südliche Weinstraße	109.000	109.300	109.900	110.300	110.500	110.938	110.639	110.211	109.957	109.625
DEB3K	Südwestpfalz	105.700	105.300	105.300	105.100	104.600	104.018	103.309	102.512	101.596	100.508
FR421	Bas-Rhin	1.032.498	1.040.521	1.048.305	1.055.890	1.063.274	1.071.160	1.079.016	1.084.840	1.091.015	1.097.045
FR422	Haut-Rhin	711.457	715.557	719.749	723.685	727.871	732.242	736.477	742.408	746.072	749.820
Total CBR CH		1.300.425	1.304.500	1.312.000	1.320.800	1.327.900	1.333.650	1.338.081	1.344.706	1.355.729	1.371.170
Total CBR DE		2.772.600	2.785.200	2.806.700	2.823.500	2.832.800	2.841.914	2.849.506	2.853.915	2.860.255	2.858.643
Total CBR FR		1.743.955	1.756.078	1.768.054	1.779.575	1.791.145	1.803.402	1.815.493	1.827.248	1.837.087	1.846.865
Total CS		5.816.980	5.845.778	5.886.754	5.923.875	5.951.845	5.978.966	6.003.080	6.025.869	6.053.071	6.076.678

Table 2.4: Population Development in the CBR 2000 - 2009

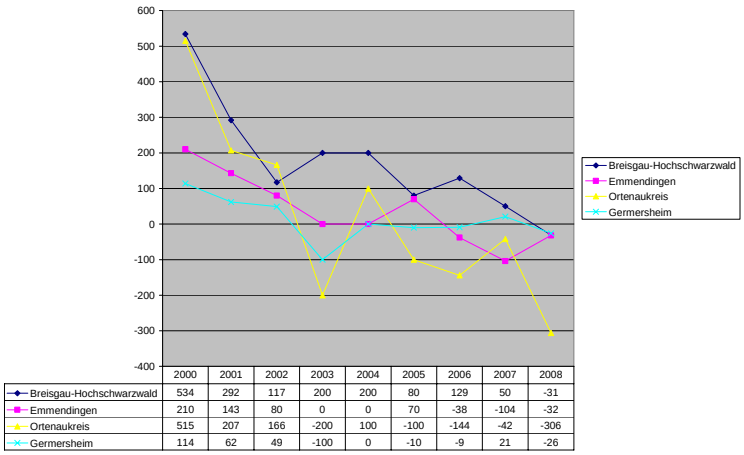
Besides the NUTS3 units DE131 Freiburg and DE 132 Breisgau-Hochschwarzwald (and to only a small extend DE133 Emmendingen, DE134 Ortenaukreis, and DEB3E Germersheim), all the German increase in population is due to positive migration, as the natural development is negative in all other German NUTS3 units of the CBR, respectively changed from positive to negative growth (see Table 2.6). This corresponds to the overall German development of negative growth rates over the whole period analysed. The Swiss and French NUTS3 units all have –besides the urban NUTS3 unit CH031 Basel-Stadt- positive natural growth rates and hence a positive natural population development from 2000 – 20009 (see Table 2.5).

		Natural increase Years 2000 - 2009
EU27	EU27*	3.048.671
CH	Switzerland	128821
DE	Germany	-1335145
FR	France	2715222
CH023	Solothurn	219
CH025	Jura	755
CH031	Basel-Stadt	-5579
CH032	Basel-Landschaft	2605
CH033	Aargau	13655
DE121	Baden-Baden	-2784
DE122	Karlsruhe, Stadtkreis	-2651
DE123	Karlsruhe, Landkreis	-581
DE124	Rastatt	-2299
DE131	Freiburg im Breisgau	1923
DE132	Breisgau-Hochschwarzwald	1571
DE133	Emmendingen	329
DE134	Ortenaukreis	196
DE139	Lörrach	-891
DE13A	Waldshut	-346
DEB33	Landau in der Pfalz	-553
DEB37	Pirmasens	-2994
DEB3E	Germersheim	101
DEB3H	Südliche Weinstraße	-2085
DEB3K	Südwestpfalz	-3403
FR421	Bas-Rhin	45798
FR422	Haut-Rhin	29253
Total CBR		**72239**

Table 2.5: Natural increase 2000 – 2009 in the CBR

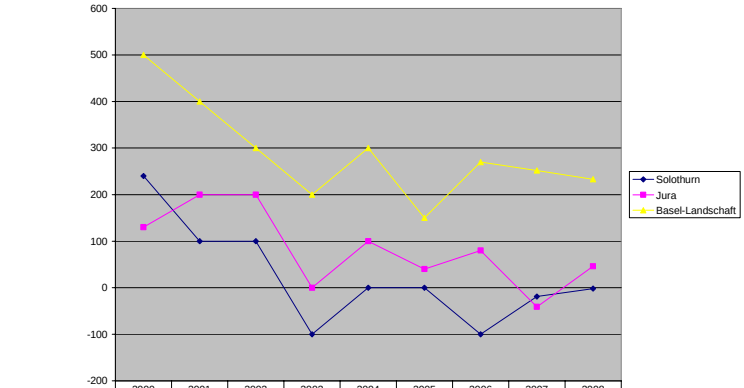
Although five German NUTS3 units of the CBR have a natural increase in population, they show negative trend over the period 2000-2009[4] (see Figure 2.5). The increase of the Swiss NUTS3 units of the CBR is in contrast to their fertility rates, which are slightly higher than the German rates (see Chapter 2.6). Here a negative trend can also bee seen (see Figure 2.6) –due to the mentioned low fertility rates, and it can be assumed that a negative natural growth will take place in the next years.

[4] Besides DE131 Freiburg im Breisgau, investing in high-density dwellings for young families in the last decades



	2000	2001	2002	2003	2004	2005	2006	2007	2008
Breisgau-Hochschwarzwald	534	292	117	200	200	80	129	50	-31
Emmendingen	210	143	80	0	0	70	-38	-104	-32
Ortenaukreis	515	207	166	-200	100	-100	-144	-42	-306
Germersheim	114	62	49	-100	0	-10	-9	21	-26

Figure 2.5: Trend of natural increase of growing German NUTS3 units in the CBR (besides DE131 Freiburg)



	2000	2001	2002	2003	2004	2005	2006	2007	2008
Solothurn	240	100	100	-100	0	0	-100	-19	-2
Jura	130	200	200	0	100	40	80	-41	46
Basel-Landschaft	500	400	300	200	300	150	270	252	233

Figure 2.6: Trend of natural increase of selected Swiss NUTS3 units in the CBR[5]

[5] CH031 Basel-Stadt has a steady natural decrease of population, while and CH033 Aargau a steady high increase.

NUTS name	Crude rate of natural increase								
	2000	2001	2002	2003	2004	2005	2006	2007	2008
EU27	0,6	0,5	0,3	0,2	0,8	0,6	1,0	1,0	1,3
Total CBR	1,9	1,6	1,3	1,0	1,5	1,2	1,3	1,3	1,1
Switzerland	2,2	1,5	1,5	1,2	1,8	1,6	1,7	1,8	2,0
Germany	-0,9	-1,1	-1,5	-1,8	-1,4	-1,8	-1,8	-1,7	-2,0
France	4,4	4,3	4,0	3,7	4,5	4,3	4,8	4,5	4,5
Solothurn	1,0	0,4	0,4	-0,4	0,0	0,0	-0,4	-0,1	0,0
Jura	1,9	2,9	2,9	0,0	1,4	0,6	1,2	-0,6	0,7
Basel-Stadt	-3,8	-3,7	-4,3	-4,3	-3,2	-2,9	-3,0	-2,0	-2,6
Basel-Landschaft	1,9	1,5	1,1	0,8	1,1	0,6	1,0	0,9	0,9
Aargau	3,1	2,4	2,3	2,5	3,0	2,6	2,6	2,5	3,2
Baden-Baden, Stadtkreis	-5,8	-6,7	-6,2	-5,6	-5,6	-5,6	-4,4	-5,5	-6,3
Karlsruhe, Stadtkreis	-1,7	-1,6	-1,9	-1,8	-0,7	-0,5	-0,7	-0,3	-0,3
Karlsruhe, Landkreis	0,9	0,6	0,1	-0,2	0,2	-0,4	-0,4	-1,0	-1,1
Rastatt	-0,4	-0,5	-1,1	-1,3	-0,9	-1,3	-1,4	-1,2	-1,9
Freiburg im Breisgau, Stadtkreis	0,8	0,3	1,0	0,5	0,9	1,6	1,1	1,5	1,3
Breisgau-Hochschwarzwald	2,2	1,2	0,5	0,8	0,8	0,3	0,5	0,2	-0,1
Emmendingen	1,4	0,9	0,5	0,0	0,0	0,4	-0,2	-0,7	-0,2
Ortenaukreis	1,3	0,5	0,4	-0,5	0,2	-0,2	-0,3	-0,1	-0,7
Lörrach	0,6	0,3	-0,4	-0,5	-0,9	-1,2	-0,9	-0,4	-0,7
Waldshut	0,6	0,7	0,3	-0,6	0,6	-0,9	-1,0	-0,5	-1,2
Landau in der Pfalz, Kreisfreie Stadt	-0,7	-1,2	-2,0	-2,4	0,0	-1,7	-2,0	-1,6	-1,5
Pirmasens, Kreisfreie Stadt	-7,0	-7,6	-8,5	-6,8	-6,8	-9,3	-7,3	-7,4	-7,9
Germersheim	0,9	0,5	0,4	-0,8	0,0	-0,1	-0,1	0,2	-0,2
Südliche Weinstraße	-1,2	-1,1	-0,9	-2,7	-1,8	-3,0	-2,8	-2,9	-2,5
Südwestpfalz	-2,7	-2,2	-3,3	-3,8	-3,8	-4,6	-3,5	-3,9	-5,0
Bas-Rhin	5,3	5,0	4,6	4,3	4,7	4,8	4,8	4,8	4,6
Haut-Rhin	4,3	4,5	4,1	4,4	4,6	4,4	5,0	4,5	4,3

Table 2.6: Crude rate natural increase 2000 - 2008

In contrast to this, most of the NUTS3 units of the CBR have a gain of population due to migration. This corresponds to the overall crude rates of net migration for Switzerland and France, only Germany had a slight loss in migration in 2008 (see Table 2.7). A steady negative crude rate of net migration within the CBR is only true for DEB37 Pirmasens and DEB3K Südwestpfalz, both peripheral to the Rhine Valley. Other NUTS3 units have about an even development or high rates of net migration, which is especially true for the Swiss units (i.e. CH032 Basel-Landschaft, CH033 Aargau). But also German NUTS3 units like DE121 Baden-Baden and DE123 Karlsruhe, Stadtkreis have a high migration gain of the period analysed, which is due to their economic potential (Karlsruhe) or attractiveness for retired people (Baden-Baden).

NUTS name	Crude rate of net migration								
	2000	2001	2002	2003	2004	2005	2006	2007	2008
EU27	1,5	1,3	3,8	4,2	4,0	3,6	3,2	3,9	3,3
Total CBR	3,1	5,4	5,0	3,8	3,1	2,8	2,5	3,2	2,7
Switzerland	3,3	5,6	6,5	5,7	5,2	4,3	4,9	9,4	12,1
Germany	2,0	3,3	2,7	1,7	1,0	1,0	0,3	0,5	-0,7
France	2,7	3,0	3,1	3,2	3,2	3,0	1,8	1,2	1,2
Solothurn	-1,8	5,7	4,1	3,2	3,2	2,3	3,1	6,6	6,3
Jura	-2,1	0,0	-1,4	1,4	-1,4	-0,3	1,5	4,4	3,2
Basel-Stadt	-2,3	0,5	4,3	7,5	2,1	-3,3	-1,2	4,2	10,4
Basel-Landschaft	3,5	3,1	5,7	5,3	3,0	2,4	3,0	6,4	6,8
Aargau	4,4	7,1	8,1	4,8	5,2	4,9	6,9	9,2	14,0
Baden-Baden, Stadtkreis	7,6	14,3	15,7	11,1	11,1	10,7	9,3	5,5	5,0
Karlsruhe, Stadtkreis	4,2	7,7	8,0	6,0	5,3	4,4	4,4	9,3	6,6
Karlsruhe, Landkreis	5,8	7,9	7,0	3,3	2,6	3,4	2,1	3,7	0,7
Rastatt	1,3	5,4	7,4	4,9	4,4	5,1	-0,4	0,9	-1,6
Freiburg im Breisgau, Stadtkreis	9,6	14,3	11,5	9,0	7,5	7,6	6,1	7,1	-0,2
Breisgau-Hochschwarzwald	5,7	10,0	7,7	5,3	4,8	4,2	1,4	0,5	-0,1
Emmendingen	5,9	9,6	7,9	5,8	5,1	3,8	3,7	3,0	0,4
Ortenaukreis	4,6	7,3	4,0	3,4	2,2	2,7	1,7	2,0	0,4
Lörrach	4,9	8,4	6,3	2,3	1,4	4,2	2,8	3,7	1,0
Waldshut	1,2	5,3	3,9	1,8	0,0	0,9	0,3	0,7	-0,8
Landau in der Pfalz, Kreisfreie Stadt	0,7	6,1	6,9	7,3	7,1	6,6	25,7	1,9	0,3
Pirmasens, Kreisfreie Stadt	-6,4	-1,3	-0,4	-2,3	-2,3	-2,3	-9,2	-5,8	-4,5
Germersheim	3,1	6,8	3,6	2,4	2,4	-0,6	1,3	3,0	-1,5
Südliche Weinstraße	4,0	6,6	4,5	5,5	3,6	0,3	-1,1	0,6	-0,5
Südwestpfalz	-1,1	2,2	1,4	-1,0	-1,9	-2,2	-4,2	-5,1	-5,8
Bas-Rhin	2,4	2,5	2,6	2,6	2,7	2,5	0,5	0,9	0,9
Haut-Rhin	1,4	1,4	1,4	1,4	1,4	1,4	3,0	0,4	0,7

Table 2.7: Crude rate net migration increase 2000 - 2008

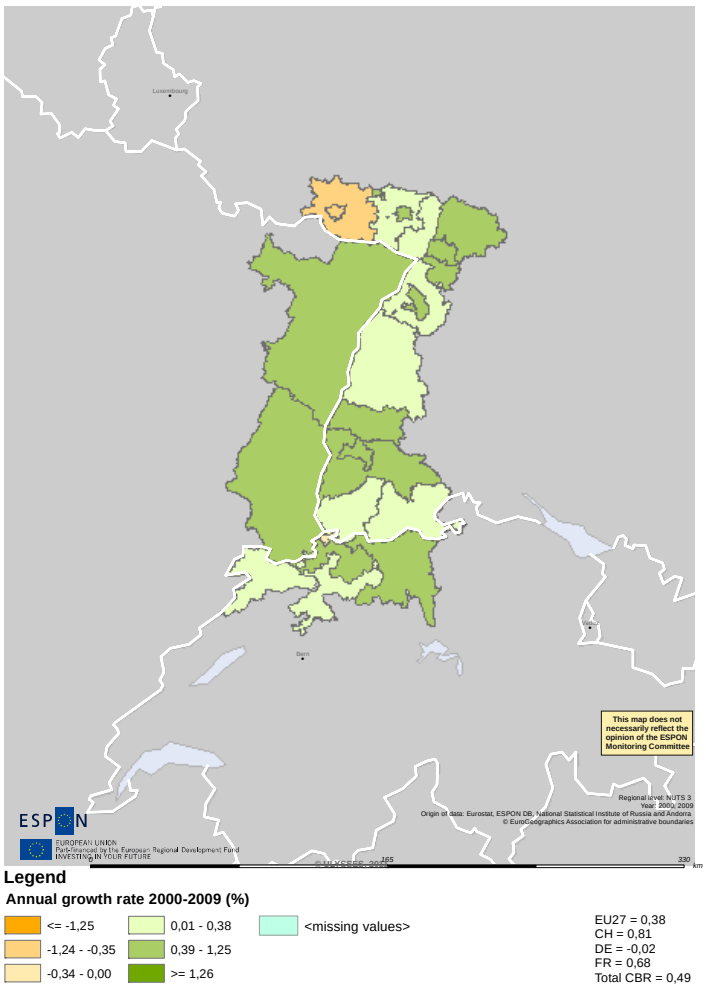


Figure 2.7: Category map of annual population growth of NUTS3 level units

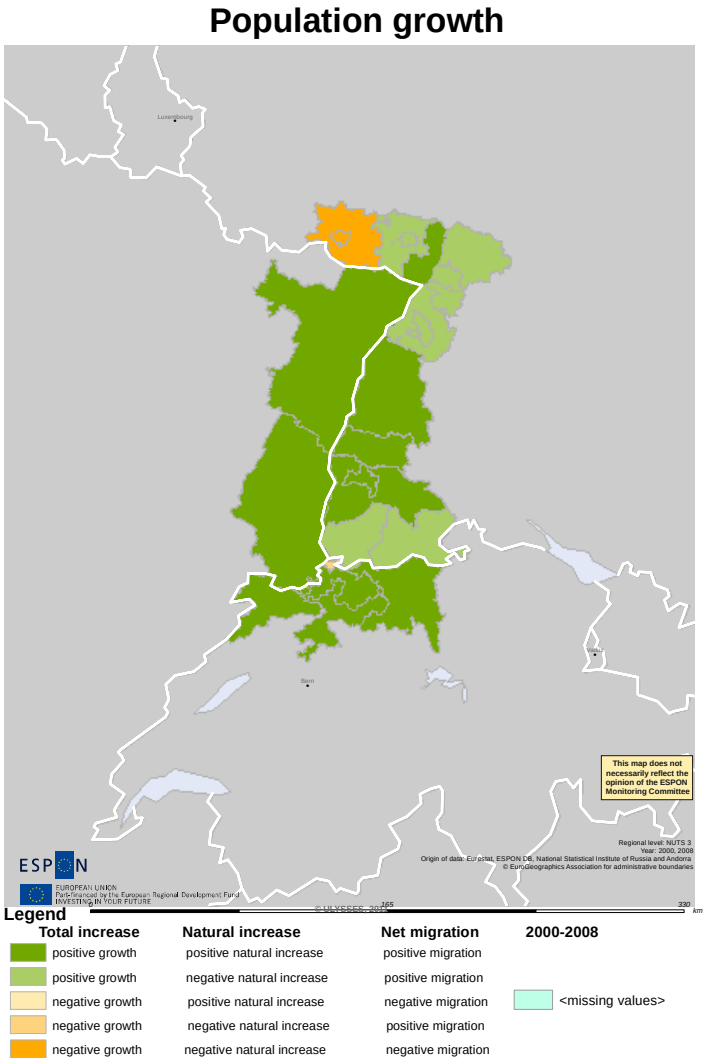


Figure 2.8: Category map of population growth of NUTS3 level units

Altogether, most of the CBR could gain population from 2000 – 2009 as positive migration outranged the negative natural development (see Table 2.8, Figure 2.7, and Figure 2.8). Exceptions are Basel-Landschaft, where the positive migration could not compensate the natural losses, as well as DEB37 and DEB3K Pirmasens and Südwestpfalz with either a negative natural increase as negative migration. As mentioned before, the latter two are not part of the Rhine Valley and mainly within the Palatine Forest (see Figure 2.8 and Figure 2.9).

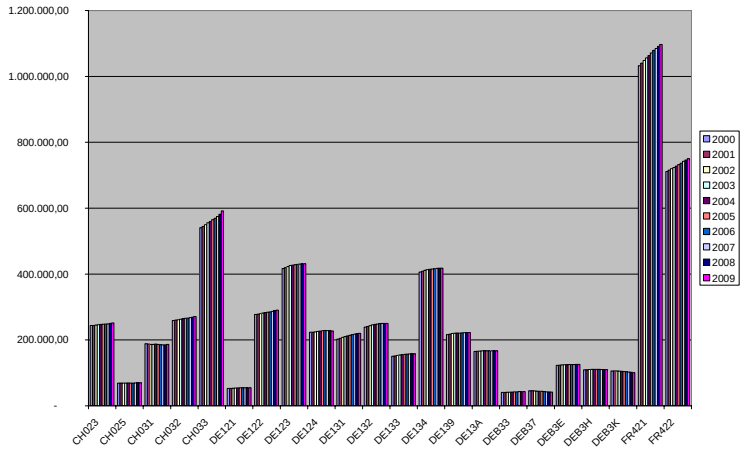


Figure 2.9: Development of the population in each NUTS3 unit of the CBR 2000 - 2009

		Years 2000 - 2009			Categor-ization	Change natural increase 00-08	Change net migration 00-08	Impact on total population change	Annual growth rate 2000-2009
		Natural increase	Net migration	Sum					
EU27	EU27*	3.048.671	13.896.020	16.944.691	+ +	positive natural increase	positive migration	positive growth	0,38
CH	Switzerland	128821	492541	621362	+ +	positive natural increase	positive migration	positive growth	0,81
DE	Germany	-1335145	973927	- 361.218	- +	negative natural increase	positive migration	negative growth	-0,02
FR	France	2715222	1456066	4171288	+ +	positive natural increase	positive migration	positive growth	0,68
CH023	Solothurn	219	8124	8343	+ +	positive natural increase	positive migration	positive growth	0,36
CH025	Jura	755	358	1113	+ +	positive natural increase	positive migration	positive growth	0,16
CH031	Basel-Stadt	-5579	4140	-1439	- +	negative natural increase	positive migration	negative growth	-0,11
CH032	Basel-Landschaft	2605	10402	13007	+ +	positive natural increase	positive migration	positive growth	0,53
CH033	Aargau	13655	36616	50271	+ +	positive natural increase	positive migration	positive growth	1,01
DE121	Baden-Baden	-2784	4860	2076	- +	negative natural increase	positive migration	positive growth	0,43
DE122	Karlsruhe, Stadtkreis	-2651	15824	13173	- +	negative natural increase	positive migration	positive growth	0,52
DE123	Karlsruhe, Landkreis	-581	15550	14969	- +	negative natural increase	positive migration	positive growth	0,39
DE124	Rastatt	-2299	6161	3862	- +	negative natural increase	positive migration	positive growth	0,19
DE131	Freiburg im Breisgau	1923	15244	17167	+ +	positive natural increase	positive migration	positive growth	0,90
DE132	Breisgau-Hochschwarzwald	1571	9661	11232	+ +	positive natural increase	positive migration	positive growth	0,51
DE133	Emmendingen	329	6969	7298	+ +	positive natural increase	positive migration	positive growth	0,53
DE134	Ortenaukreis	196	11612	11808	+ +	positive natural increase	positive migration	positive growth	0,32
DE139	Lörrach	-891	7698	6807	- +	negative natural increase	positive migration	positive growth	0,33
DE13A	Waldshut	-346	2243	1897	- +	negative natural increase	positive migration	positive growth	0,13
DEB33	Landau in der Pfalz	-553	2640	2087	- +	negative natural increase	positive migration	positive growth	0,56
DEB37	Pirmasens	-2994	-1485	-4479	- -	negative natural increase	negative migration	negative growth	-1,13
DEB3E	Germersheim	101	2554	2655	+ +	positive natural increase	positive migration	positive growth	0,25
DEB3H	Südliche Weinstraße	-2085	2572	487	- +	negative natural increase	positive migration	positive growth	0,06
DEB3K	Südwestpfalz	-3403	-1807	-5210	- -	negative natural increase	negative migration	negative growth	-0,56
FR421	Bas-Rhin	45798	18749	64547	+ +	positive natural increase	positive migration	positive growth	0,68
FR422	Haut-Rhin	29253	9110	38363	+ +	positive natural increase	positive migration	positive growth	0,59
Total CBR		72239	187795	260034	+ +	positive natural increase	positive migration	positive growth	0,49

Table 2.8: Summarized development of population and trends in the CBR

It can be summarized, that although the River Rhine is a natural border, dividing the CBR politically and also lingual, the population figures show a high attractiveness of the Rhine Valley, which can be seen by the NUTS3 units not belonging to the Rhine valley performing worse than those within. This outperformance can also be seen looking at the expected population development compared the actual. The expected behaviour of the regions' natural population growth and net migration is compared to the expected behaviour if they would have followed the patterns of the countries of which they are part of. For this the national averages where weighted according to the proportion of the regions' population belonging to the different countries in the Cross Border regions and afterwards compared to their actual data.

While the expected development states minor increase of population -mainly due to migration- the actual development outperforms this expected development by far – due to the strong crude rates of net migration but also natural increases in Switzerland and France (see Figure 2.10 and Figure 2.11).

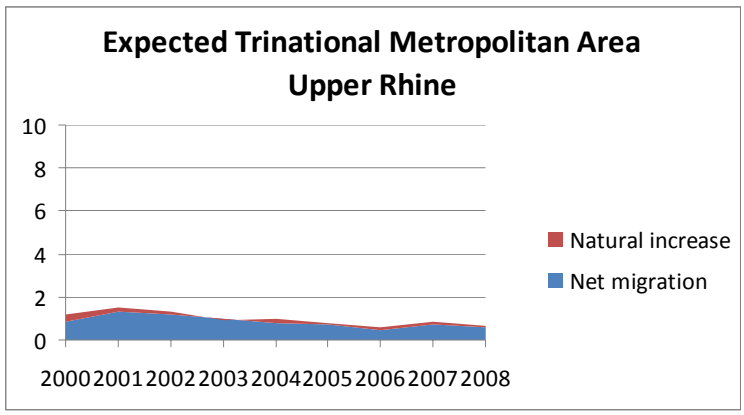


Figure 2.10: Expected population development in the CBR

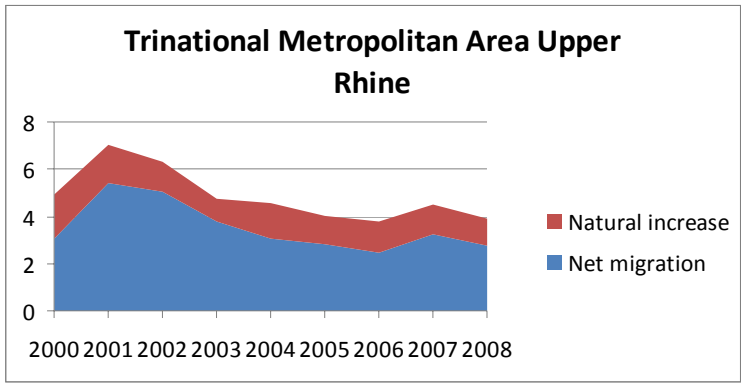


Figure 2.11: Actual population development in the CBR

This development would have been even higher, if the overall natural decrease in Germany would not also affect the German parts of the CBR. But this is mainly due to the political and social framework conditions in Germany, not favouring maternity in Germany.

Hence a closer look onto the fertility rates will be done in the following, on NUTS2 level only.

2.6 Total Fertility Rates

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.

For the CBR, fertility rates are reported only at NUTS2 level units. The fertility rates in the year 2008 range from 1,33 (DE12 Karlsruhe) to 1,82 (FR42 Alsace) and follow the mean fertility rates of the national country each and show a slightly increase on national and also CBR level from 2000 - 2009 (see Figure 2.12)

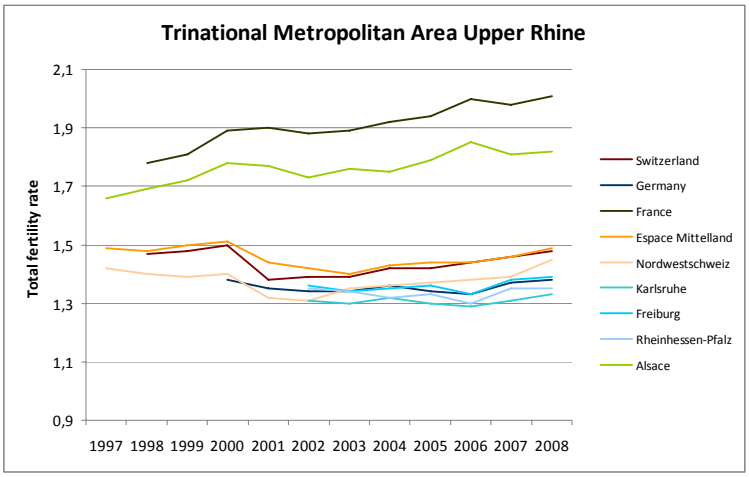


Figure 2.12: Fertility rate on NUTS2 level and national level 2008

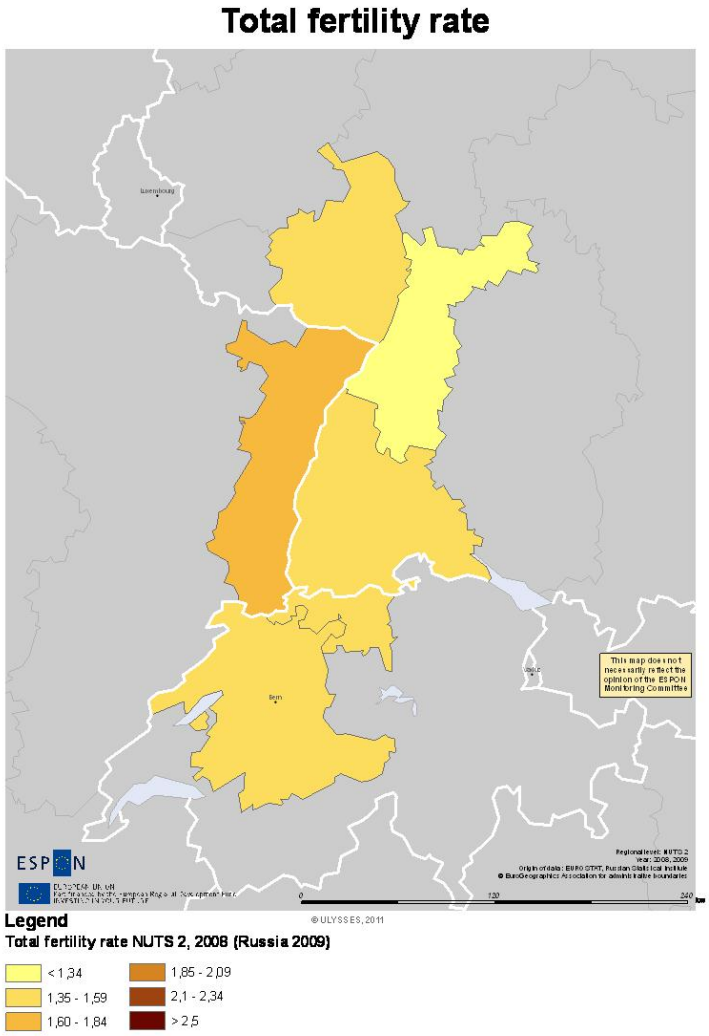


Figure 2.13: Map of total fertility rates of the NUTS2 level units (year 2008) of the CBR

2.7 Population Density

Population density is a key geographic parameter expressing the total population per unit area, usually per sq km.

For the CBR, population density is reported at NUTS1, 2 and 3 level units. The mean population density of the CBR shows steady increase, reaching is 273,52 inhabitants per sq km for the year 2009 (see Figure 2.14), compared to 101,4 inhabitants per sq km in France, 230 in Germany, and 191,2 in Switzerland, the latter both already significant higher than the EU27 average of 116 inhabitants per sq km (see Figure 2.15). The CBR is hence rather dense area, even compared to the national level of for instance Germany, which is one of the densest population countries in Europe. On NUTS4 level, on which no data is available, this figures would show an even more extreme tendency, as the edges of the CBR a significant less dense populated, especially along the Rhine valley, as it is flanked by the Vosges and Black Forest with rather small settlements.

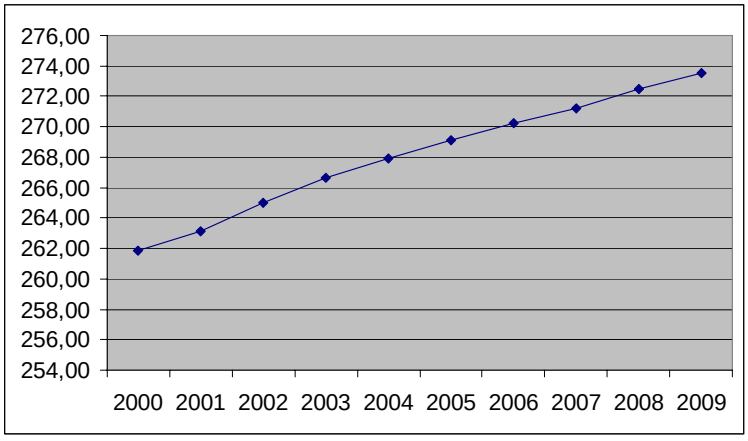


Figure 2.14: Mean population density evolution for the CBR

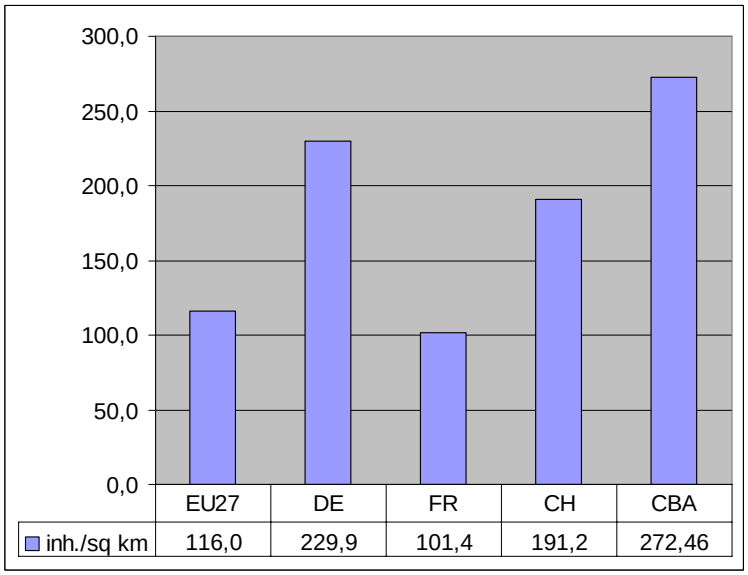


Figure 2.15: Mean density of CBR in comparison to EU27 and national levels (2008)

On the NUTS3 level units, the population density is mostly affected by the urban centres and the uneven size of the NUTS3 units in France compared to Switzerland and Germany.

Figure 2.16 shows the spatial distribution at NUTS3 level throughout the CBR, for the year 2008.

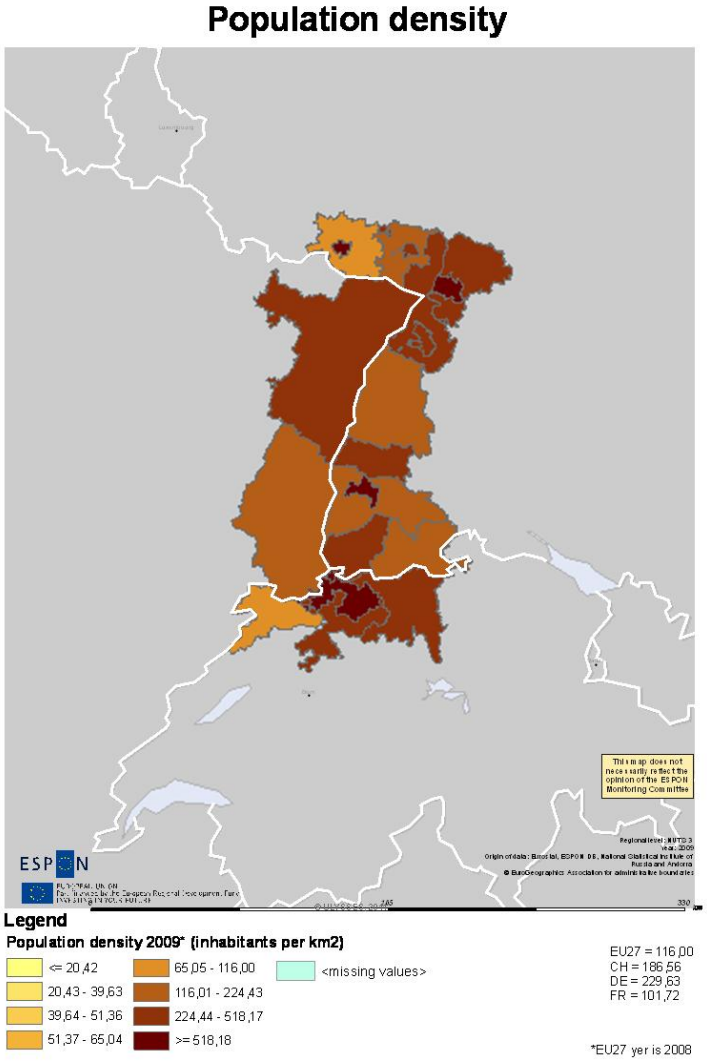


Figure 2.16: Category map of population density in the CBR 2009

2.8 Commuters

Commuter patterns are analysed on the NUTS2 level, with differentiations in commuters working in the same region, another region or foreign country. Data is not available for all years of the period 2000-2009, hence not all trends can be shown.

The commuter patterns can be interpreted showing different attractiveness of either the labour market of a region in the CBR (high number of incoming commuters) or location for settlement/housing, e.g. due to low real estate prices or attractiveness of the city or region (high number of outgoing commuters).

Regarding the commuters to foreign countries, and increase in all NUTS1 and 2 units can be seen, with a slight downturn during the mid-2000 years (see Table 2.9). France has the highest proportion of commuters working in a foreign country while Switzerland shows the lowest figures, which can be explained by the attractiveness of the working conditions (wages, taxes and unemployment rates) in the different countries (see also Chapter 6 – Gothenburg and Lisbon/Europe 2020 Strategy Analysis).

In relation to the active population, especially the NUTS2 unit FR42 Alsace shows a high proportion of commuters. This is due to the lower wages in France compared to Germany and especially Switzerland. Hence, a relatively high proportion of employees commute either to Germany and Switzerland. In Germany, it is the NUTS2 unit of DE13 Freiburg having the highest proportion of commuters to foreign countries, to be explained by the proximity to Switzerland, where higher wages can be earned (see Table 2.10 and Figure 2.17).

The Swiss NUTS2 units show diverging figures: CH02 Espace Mittelland has a much lower commuting proportion than the Swiss average (0,03 to 0,35 in 2009), while CH03 Nordwestschweiz has about the same commuting proportion. Especially with the trinational FUA of Basel, a relatively high proportion of employees living in Switzerland work in France or Germany, although wages are higher in Switzerland.

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
CH	Switzerland	:	:	:	:	:	:	:	11,8	13,9	15,2
DE	Germany	63,8	64,5	63,5	86,4	84,6	101,1	149,8	176	263,4	290,4
FR	France	258,1	275,6	328,4	358,4	276,6	266,8	254,8	273,5	282,2	331,3
CH02	Espace Mittelland	:	:	:	:	:	:	:	0,4	0,5	0,3
CH03	Nordwestschweiz	:	:	:	:	:	:	:	1,2	0,9	2,2
DE12	Karlsruhe	1,5	1,8	0,9	1,7	1,3	1,5	2,5	1,2	3	3,1
DE13	Freiburg	28,1	25,3	26,2	38,9	36,8	33,7	42,1	42,8	47,1	52
DEB3	Rheinhessen-Pfalz	1,1	:	:	0,9	0,3	:	1,0	1,1	2,1	3,4
FR42	Alsace	53,1	59,3	61,1	68,3	70,1	73,5	67,9	65,1	76,3	94,5

Table 2.9: Commuters to foreign countries in 1.000

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
CH	Switzerland								0,28	0,32	0,35
DE	Germany	0,16	0,16	0,16	0,22	0,21	0,25	0,36	0,44	0,63	0,69
FR	France	1,01	1,07	1,24	1,34	1,00	0,96	0,91	0,97	0,99	1,15
CH02	Espace Mittelland								0,04	0,05	0,03
CH03	Nordwestschweiz								0,21	0,15	0,37
DE12	Karlsruhe	0,12	0,14	0,07	0,13	0,10	0,11	0,18	0,09	0,21	0,22
DE13	Freiburg	2,77	2,50	2,56	3,69	3,43	3,12	3,73	3,77	4,04	4,46
DEB3	Rheinhessen-Pfalz	0,12			0,09	0,03		0,10	0,11	0,21	0,33
FR42	Alsace	6,62	7,32	7,42	8,31	8,39	8,65	7,78	7,56	8,81	10,50

Table 2.10: Commuters to foreign countries in relation to active population

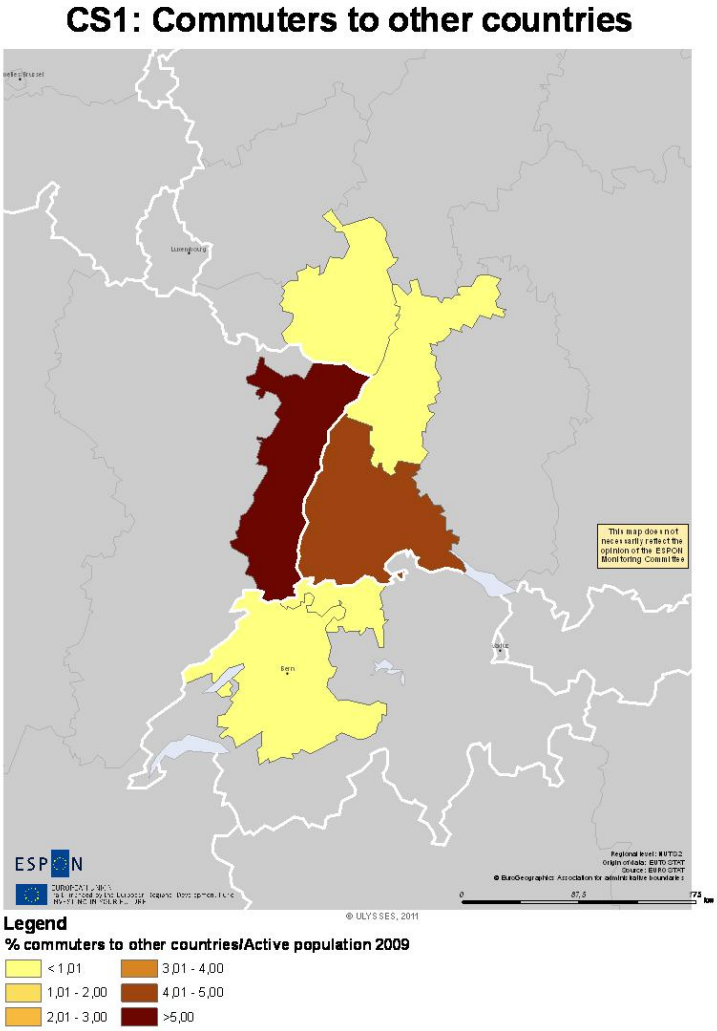


Figure 2.17: Category map of commuters from the NUTS2 units of the CBR to other countries (2009)

Besides the commuters to foreign countries, commuting to other regions was analysed. Again, data is not available for the whole period.

Simultaneous to the commuters to foreign countries, an overall increase in commuting can be in all NUTS1 and 2 units can be seen, with a downturn during the mid-2000 years. Here Germany has by far the highest proportion of people working in another region (about the double compared to France and more than 20 times compared to Switzerland in 2009 (see Table 2.12)). According to this, the German NUTS2 units of the CBR have also the highest proportions of commuters to other regions, especially the NUTS2 unit DEB3 Rheinhessen-Pfalz with 18,76 in 2009. This is due to the economic circumstances, as in this NUTS2 unit the economic rather weak NUTS3 units Südwestpfalz and Pirmasens are located and the other NUTS3 units (Landau, Südliche Weinstraße, Germersheim[6]) lack of an economic centre, attracting a high number of employees.

[6] DEB3E Germersheim is characterized by having a large production plant of Daimler, but is in itself no economic centre.

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
CH	Switzerland	:	:	:	:	:	:	11,8	13,9	:	:
DE	Germany	2678,8	2886,2	4381,4	3047,7	2646,1	3618	3729,4	3741	3598,3	2678,8
FR	France	917	957,3	1062,5	1135,5	1172,7	1169,8	1230,2	1309,1	1265	917
CH02	Espace Mittelland	:	:	:	:	:	:	0,4	0,5	:	:
CH03	Nordwest-schweiz	:	:	:	:	:	:	1,2	0,9	:	:
DE12	Karlsruhe	97,3	146,9	149,1	139,6	87,7	157,7	150,9	152,2	150,3	97,3
DE13	Freiburg	26,4	60	58,6	67,7	38,9	94,9	84,1	57	59,7	26,4
DEB3	Rheinhessen-Pfalz	:	:	884	182,7	134,1	202,8	223,5	225,1	192,2	:
FR42	Alsace	24,9	16,8	18,6	19,6	20,3	23,3	23,2	20,2	17,8	24,9

Table 2.11: Commuters to another region in 1.000

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
CH	Switzerland								0,28	0,32	
DE	Germany	7,82	6,79	7,29	11,05	7,65	6,66	8,78	9,25	8,95	8,56
FR	France	3,25	3,56	3,60	3,96	4,11	4,21	4,17	4,35	4,59	4,41
CH02	Espace Mittelland								0,04	0,05	
CH03	Nordwest-schweiz								0,21	0,15	
DE12	Karlsruhe	9,99	7,66	11,35	11,37	10,55	6,63	11,41	10,84	10,81	10,60
DE13	Freiburg	7,10	2,61	5,85	5,56	6,30	3,61	8,40	7,41	4,88	5,13
DEB3	Rheinhessen-Pfalz	15,89				19,05	14,39	20,65	22,04	22,11	18,76
FR42	Alsace	2,39	3,08	2,04	2,26	2,35	2,39	2,67	2,69	2,33	1,98

Table 2.12: Commuters to another region in relation to active population

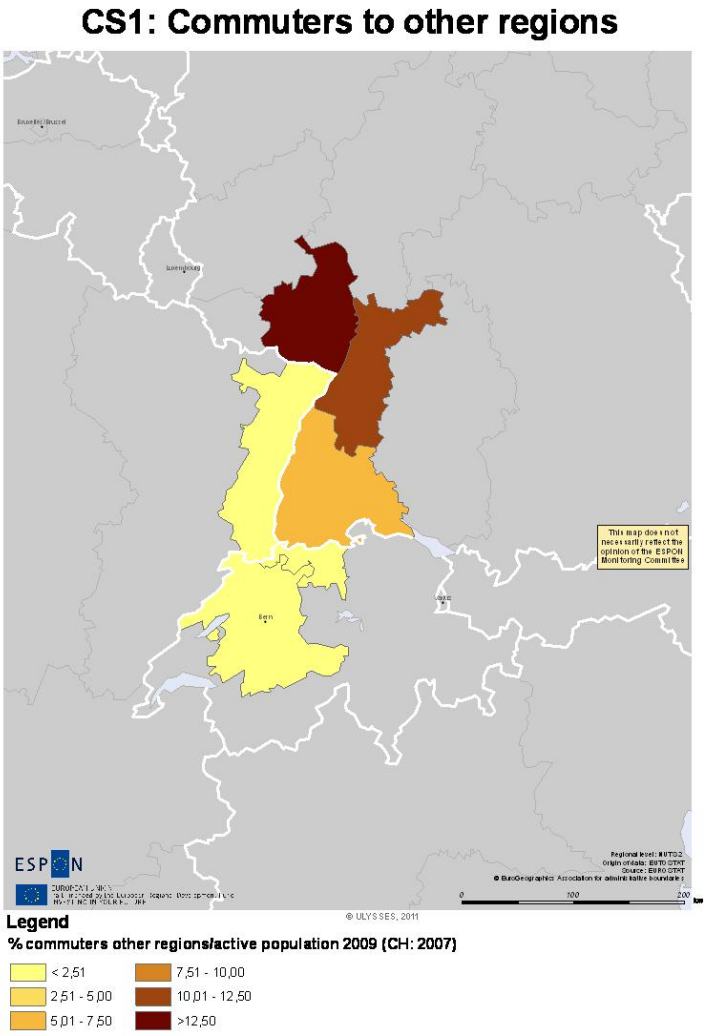


Figure 2.18: Category map of commuters from the NUTS2 units of the CBR to other regions (2009)

2.9 Conclusion

It can be summarized, that although the River Rhine is a natural border, dividing the CBR politically and also lingual, the population figures show a high attractiveness of the Rhine Valley, which can be seen by the NUTS3 units not belonging to the Rhine valley performing worse than those within. In all but the two mentioned NUTS3 units a positive migration has taken place during 2000 and 2009, resulting in a positive growth, although nearly all of the German NUTS3 units of the CBR are suffering by a negative natural increase. The development of the population of the CBR is hence significantly higher than the national averages and the expected development according to them.

As a matter of fact, the population density of the CBR is quite high, though missing a real metropolis, quite above the national and especially EU average.

Although the Swiss NUTS3 units still have an overall positive natural increase, low fertility rates will lead to a negative growth in the future, comparable to Germany. Only in France a still positive natural growth is taking place, which indicates a more effective policy regarding families and hence fertility rates. The uneven sizes of the NUTS3 units do not foster a comparison between the NUTS3 units in the CBR, as the Swiss and German units are much more smaller in size and hence also population.

Simple speaking, development takes place especially along the border in the Rhine valley, while at the edges of the CBR –in the Vosges and Black and Palatian Forest– stagnation or negative growth can be seen (partly which small growing centres in the rural area). To detail and verify this analysis, more detailed data on NUTS4 level is needed, as the NUTS3 units cannot reflect this dual development within the CBR.

Especially Switzerland proofs to be an attractive labour market, which can be seen by the high figures of commuters from the southern French and German NUTS3 units to another country – in this case especially to Switzerland. Just the two German north-western NUTS3 units of Pirmasens and Südwestpfalz could not take part at the overall positive development: commuter figures show a high level of outgoing commuters. This is also proofed by the economic figures in Chapter 6.

Chapter 3 – Polycentric Development

3.1 Approach and Data

The data used for polycentricity was developed by the ESPON 1.4.3 and is based on the concept of Functional Urban Area from the ESPON 1.1.1. This project's intention was to review the ESPON 1.1.1 and to develop a methodology for defining FUA that was independent from national classifications and based on data regarding population density at the LAU 2 level and total population on a LAU 1 level for 2006 (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. Nonetheless, the ESPON database maintains some FUA that have very small overall population in some countries, therefore leading to some confusion about what exactly is the criterion. 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.

Variable name	Geographical scale	Source	Time frame	Observations
Morphological and Functional Urban Areas		ESPON 1.4.3	2001; 2006	Some data has been gathered for the FUA mostly based on the values of the NUTS 3 which they overlap (GDP, unemployment, etc.)
Population	NUTS 0,2	EUROSTAT	2000-2006	

Table 3.1: Scale, source and time frame of key data for FUA analysis

3.2 Methods

FUA in the ESPON 1.4.3 are defined by aggregating LAU 2 in a way that they can cover several broader administrative boundaries (NUTS 2 or 3). 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 CBR (defined by NUTS2) if more than 60 % of their area is overlapping with that the CBR or if most of their Morphological Urban Area (MUA) is within the limits of the CBR (the MUA is essentially the cities' core that forms a FUA together with its commuter catchment area). Due to the fact that the analysis is based on NUTS 2 the analysis of the urban systems is made on the extended CBR of the Upper Rhine region.

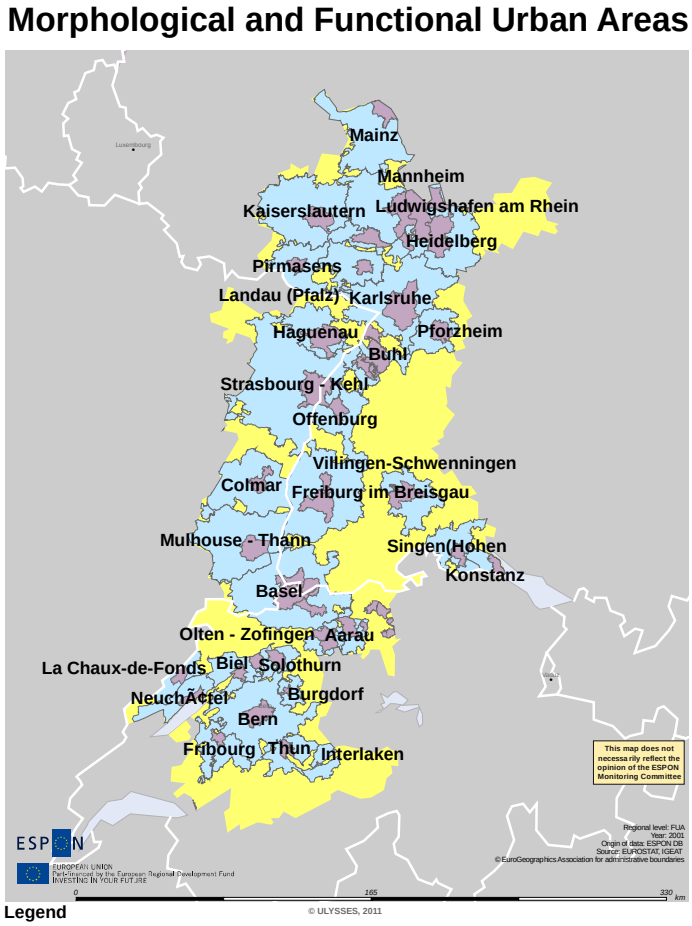


Figure 3.1: Category map of Morphological Urban Areas (MUAs) and Functional Urban areas (FUAs)

Figure 3.1 shows the polycentric settlement structure of the extended case study area of the Upper Rhine with its MUAs and FUAs. There is not a single FUA of significant higher importance than the other ones.

Following the definition of „polycentricity“ in the ESPON project 1.1.1 (ESPON 2005) polycentricity „first relates to morphology, i.e. the distribution of urban areas in a given territory (number of cities, hierarchy, distribution). The second concerns the relations between urban areas, i.e. the networks of flows and co- operation.” the MUAs and FUAs verify this polycentricity of the Upper Rhine.

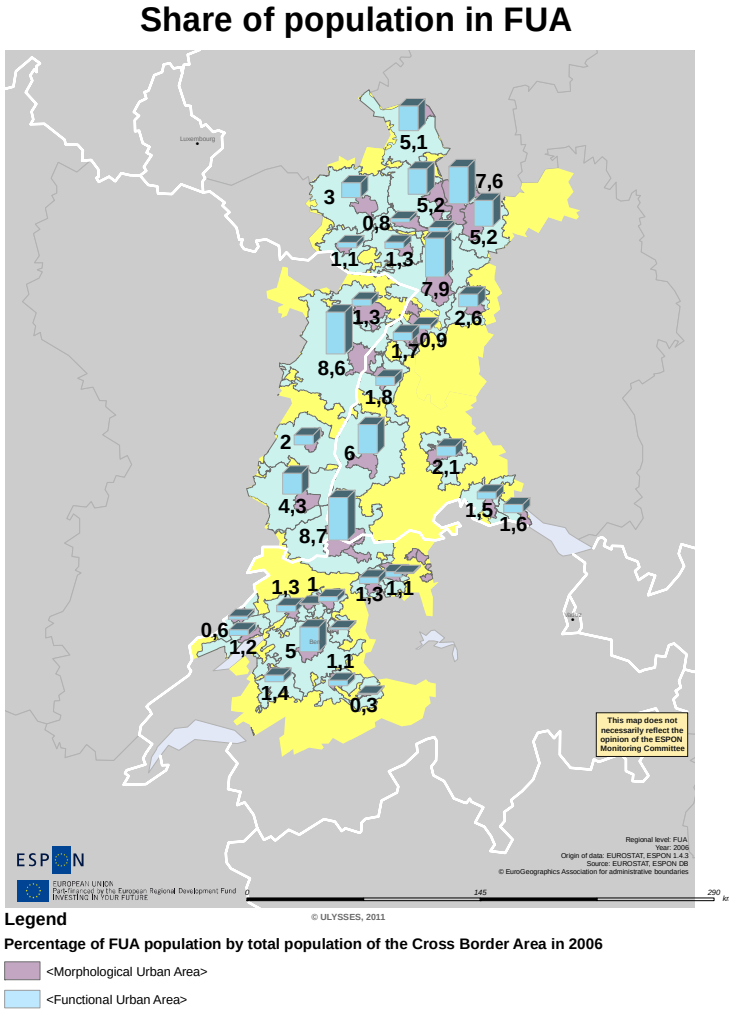


Figure 3.2: Category map of percentage of FUA population by total population of the extended case study area of the Upper Rhine in 2006

The indicator of population is one of the indicators to calculate the FUAs. The chart shows that the highest densities of population in the focused area are in the cities like Basel, Strasbourg, Karlsruhe or Mannheim and Ludwigshafen.

Detailed analysis of population and demography is made in according chapter of this report.

FUA_id	FUA	FUA area (km2)	FUA Population 2001	FUS Population 2006	Population increase 2001_2006	Compactn. 2001 (MUApop/FUA pop)
CH10076	Basel	2092,41	827251	846943	2,4	46
FR10569	Strasbourg - Kehl	2744,29	802150	839807	4,7	52
DE10207	Karlsruhe	1680,87	756729	773527	2,2	49
DE10229	Mannheim	949,72	736287	741807	0,7	69
DE10177	Freiburg im Breisgau	1806,64	558085	582648	4,4	46
DE10195	Heidelberg	923,07	500664	512963	2,5	53
DE10224	Ludwigshafen am Rhein	1092,72	502991	506919	0,8	53
DE10228	Mainz	1259,68	478115	497697	4,1	40
CH10077	Bern	1493,12	493638	493101	-0,1	46
FR10534	Mulhouse - Thann	1525,88	407715	421919	3,5	52
DE10206	Kaiserslautern	1486,53	299394	295534	-1,3	33
DE10252	Pforzheim	502,67	248974	253360	1,8	49
DE10282	Villingen-Schwenningen	709,96	199724	202290	1,3	41
FR10494	Colmar	1132,13	188063	195823	4,1	40
DE10246	Offenburg	601,46	171391	174813	2	34
DE11299	Buhl	261,84	159552	163668	2,6	18
DE10215	Konstanz	291,20	155578	161205	3,6	50
DE11307	Singen (Hohen)	546,01	139367	143292	2,8	32
CH10080	Fribourg	554,22	124479	133176	7	48
FR10508	Haguenau	659,05	122177	129464	6	41
CH10078	Biel	402,03	126201	128183	1,6	59
CH10089	Olten - Zofingen	308,17	123660	127405	3	35
DE10218	Landau (Pfalz)	638,77	122294	124064	1,4	34
CH10087	Neuchâtel	421,92	113490	114524	0,9	53
CH10075	Aarau	248,43	108242	111924	3,4	54
CH10094	Thun	376,95	108205	110875	2,5	61
DE10253	Pirmasens	659,67	112072	108576	-3,1	40
CH10093	Solothurn	270,59	98574	99897	1,3	62
DE10140	Baden-Baden	268,58	89469	91985	2,8	59
DE10271	Speyer	131,92	78946	80717	2,2	63
DE10241	Neustadt an der Weinstr.	305,62	81208	77470	-4,6	66
CH11268	La Chaux-de-Fonds	347,69	62359	62233	-0,2	59
CH11265	Burgdorf	182,52	41905	42726	2	35
CH11266	Grenchen	60,41	27792	27653	-0,5	90
CH11270	Lenzburg	47,22	25583	26073	1,9	45
CH11267	Interlaken	233,13	25228	25814	2,3	20

Table 3.2: Data for FUA and MUA for CS1

3.3 Indicators

Polycentric development within the concept of ULYSSES is expected to examine the diversity in the spatial structures, economic performance and social cohesion of each cross-border region at NUTS 3 level. 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. Therefore, 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.

Morphological indicators

CS1	CBR	CH	DE	FR	ESPON
Slope rank size distribution GDP	-1,03	-1,40	-1,10	-1,03	-1,36
Primacy rate GDP	1,37	0,57	0,20	2,34	0,05
Slope rank size distribution population	-1,02	-1,36	-0,98	-0,96	-1,06
Primacy rate population	0,20	0,44	0,29	1,64	0,14
Number FUA	36	34	172	168	1552
Average FUA	261946,5	8360,2	11463,6	8632,3	245298,6
Minimum FUA	25814	483	394	565	3216
Maximum FUA	846943	85454	136559	520533	12972492
% population in FUA	96,4	90,3	80,6	77,0	74,8
% effective FUA pop change 2001-06	2,3	3,5	1,0	5,2	3,0
Compactness 2001 (MUApop/FUA pop)	48,7	48,4	57,4	61,0	64,9
Gini coefficient thiessen polygons(%)	28,4	0,39	0,33	0,29	-

Table 3.3: Morphological indicators of the CS1

The slope of the rank size distribution is a measure of the hierarchy of a city system. For this indicator, the FUA of the regions are ranked according to their population and then the following equation is estimated:

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

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.

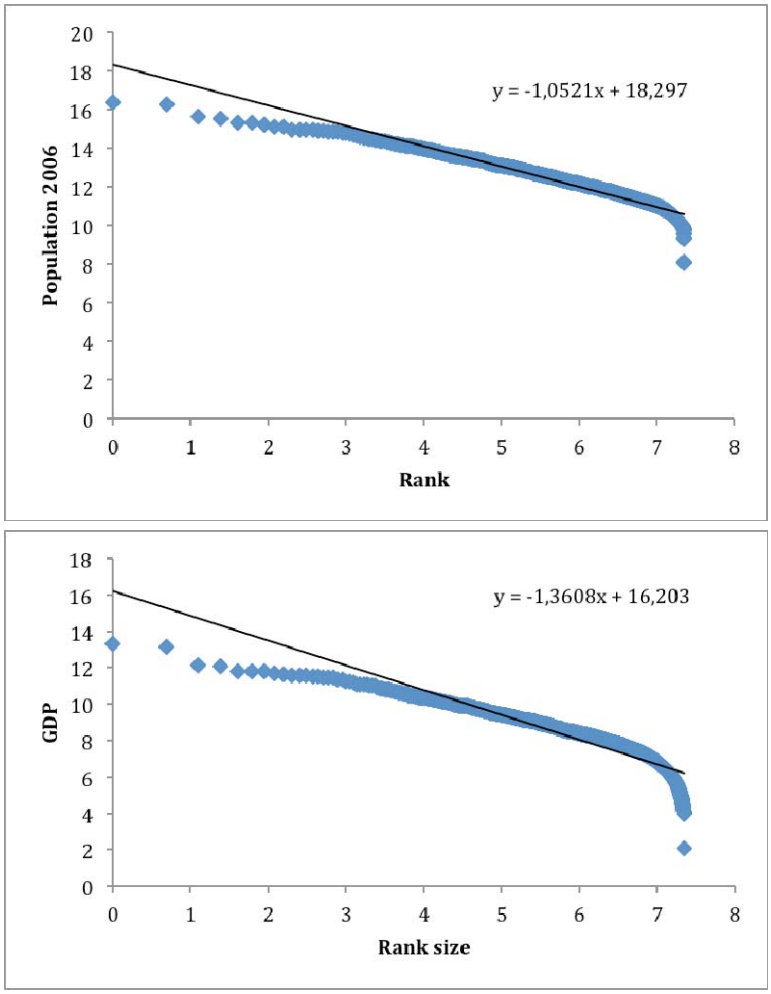


Figure 3.3: EU 27 + CH + NO

For the ESPON countries' population, β -1,0521, which is very close to -1, the value corresponding to the regularity known as Zipf's law? It is also 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 then the approximate 13million inhabitants of the London FUA (the biggest in the ESPON space).

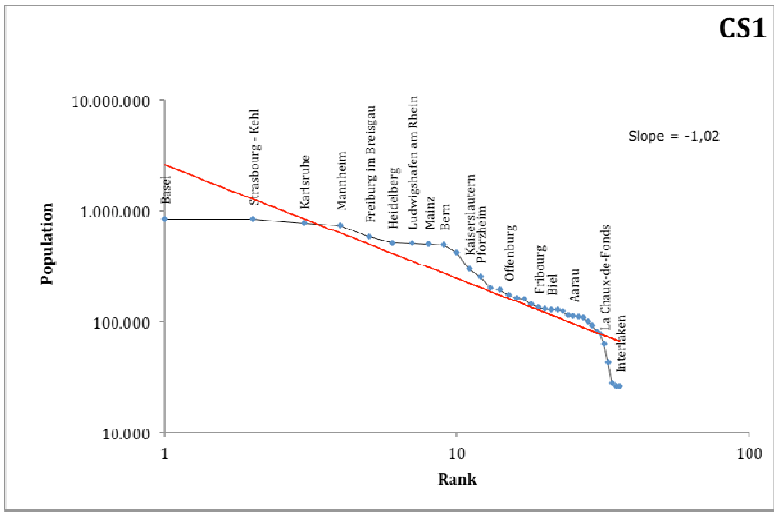


Figure 3.4: Rank of population of CS1

For the CS6 the rank-size distribution has a slope of – 1,02 which is essentially in line with the European value (see the following graph which presents the rank size distribution on a logarithmical scale with base 10. It is important to keep in mind that this slope is of the overall regression function including the largest cities, while for the primacy rates the function is obtained without the largest city. So a city being above or below the tendency line is not directly related to the primacy rate.

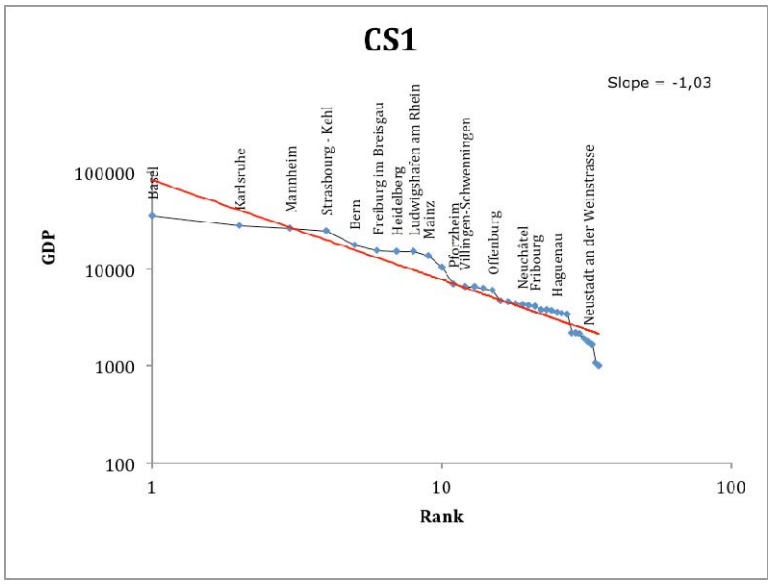


Figure 3.5: Rank of GDP of CS1

Primacy rates measure the degree to which the size of the largest city of the cross-border region deviates from the regression line of the rank-size distribution of the regions, considering all but the largest city. 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 compactness indicator measures the amount of the FUA population that resides in the MUA. It would have been a good idea do add some land cover data, namely the soil urbanization in comparison to the population growth and so forth (such as was done by FOCI), but the time and effort clearly exceeds the Ulysses project.

The Gini coefficient of the FUA Thiessen polygons 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 where 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 midways between two FUA. On a national level, the Gini coefficients were produced considering the border as a limit.

Thiessen polygons Germany Thiessen polygons Switzerland Thiessen polygons France

Figure 3.6: FUA Thiessen polygons of the different countries for CS1

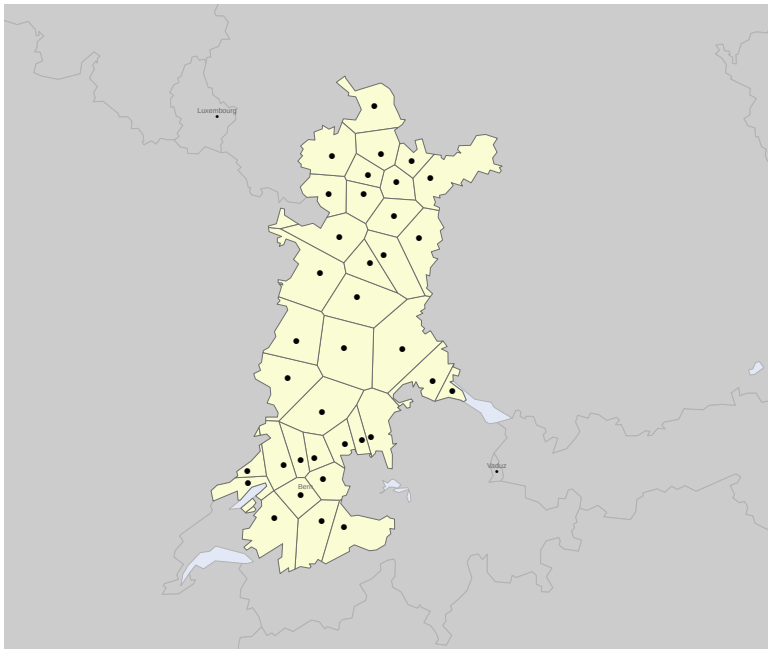


Figure 3.7: FUA Thiessen polygons for CS1

As stated by the Epson'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 is 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.

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 (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 (see annex for detailed description).

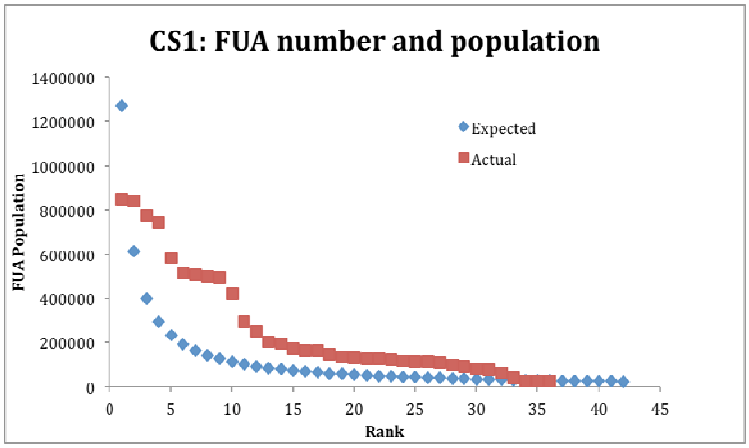


Figure 3.8: FUA number and population of CS1 and EU 27 + CH + NO

The analysis shows what would be the expected amount and size of the FUA in a region according to its total population. One can conclude that the region not only lacks hierarchy (meaning FUA with considerable size), but also lacks an overall amount of FUA.

Functional indicators

Although only a proxy of the actual functional specialization of the FUA, in the FUA layer from the ESPON 1.4.3 several socio-economic indicators were estimated according the values of the NUTS 3 of which the FUA are part: unemployment rates, GDP per inhabitant and value added by NACE. These indicators have to be interpreted with some care, but I presented them anyway. For the NACE it is the metadata didn't state the version used, but from time scale, but according to the categories and the date of release, it must be NACE 1.1.

FUA_id	FUA	Gross Value Added						GDP by Inhabitant (1.000)	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)		
CH10076	Basel	1,3	31,5	5,5	16,1	24,2	21,4	42	6,3
FR10569	Strasbourg - Kehl	1,6	20,9	5,9	19	30,2	22,4	29	6,1
DE10207	Karlsruhe	0,4	29,1	3,6	17,3	30,6	19,1	36	6,8
DE10229	Mannheim	0,3	30,7	3,8	17,8	31,3	16,1	35	8,4
DE10177	Freiburg im Breisgau	1	22,9	4,8	17,9	25,1	28,3	27	6
DE10195	Heidelberg	0,4	23,2	3,4	15,4	35,7	22	30	6,9
DE10224	Ludwigshafen am Rhein	1,3	48,4	2,7	12	19,8	15,9	30	10,1
DE10228	Mainz	1,8	18,7	3,3	18,9	30,3	27,1	28	7,7
CH10077	Bern	n/d	n/d	n/d	n/d	n/d	n/d	36	n/d
FR10534	Mulhouse - Thann	2,5	22,2	6,3	17,4	28	23,6	25	7,1
DE10206	Kaiserslautern	0,7	21,7	4,5	17,1	27,6	28,4	21	10,3
DE10252	Pforzheim	0,5	33,9	3,9	18,4	24,6	18,8	28	7,9
DE10282	Villingen-Schwenningen	0,7	38,1	4,5	14,5	23,3	19	33	5,4
FR10494	Colmar	2,5	22,2	6,3	17,4	28	23,6	24	7,1
DE10246	Offenburg	1,1	36,6	5	18,3	20,8	18,2	34	5,4
DE11299	Buhl	0,7	36,3	4,7	16,1	20,4	21,7	41	5,9
DE10215	Konstanz	1,1	30,5	3,6	17,3	25	22,4	22	5,9
DE11307	Singen (Hohen)	1,1	30,5	3,6	17,3	25	22,4	27	5,9
CH10080	Fribourg	n/d	n/d	n/d	n/d	n/d	n/d	31	n/d
FR10508	Haguenau	1,6	19,6	6	19	31	22,8	28	6,2
CH10078	Biel	n/d	n/d	n/d	n/d	n/d	n/d	35	n/d
CH10089	Olten - Zofingen	n/d	n/d	n/d	n/d	n/d	n/d	36	n/d
DE10218	Landau (Pfalz)	4,9	21	5,4	19,1	24,4	25,2	18	8,7
CH10087	Neuchâtel	n/d	n/d	n/d	n/d	n/d	n/d	37	n/d
CH10075	Aarau	n/d	n/d	n/d	n/d	n/d	n/d	38	n/d
CH10094	Thun	n/d	n/d	n/d	n/d	n/d	n/d	34	n/d
DE10253	Pirmasens	1,2	20,5	4,5	24,4	25,7	23,8	20	8,7
CH10093	Solothurn	n/d	n/d	n/d	n/d	n/d	n/d	35	n/d
DE10140	Baden-Baden	0,6	32,6	4,5	15,6	21,1	25,6	41	6,4
DE10271	Speyer	0,7	23,4	3,1	18,1	23,6	31,1	28	8,7
DE10241	Neustadt an der Weinstr.	2,3	11,8	5	20,3	30,7	29,9	23	8,7
CH11268	La Chaux-de-Fonds	n/d	n/d	n/d	n/d	n/d	n/d	32	n/d
CH11265	Burgdorf	n/d	n/d	n/d	n/d	n/d	n/d	39	n/d
CH11266	Grenchen	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d
CH11270	Lenzburg	n/d	n/d	n/d	n/d	n/d	n/d	41	n/d
CH11267	Interlaken	n/d	n/d	n/d	n/d	n/d	n/d	39	n/d

Table 3.4: Unemployment rates, GDP per inhabitant and value added by NACE

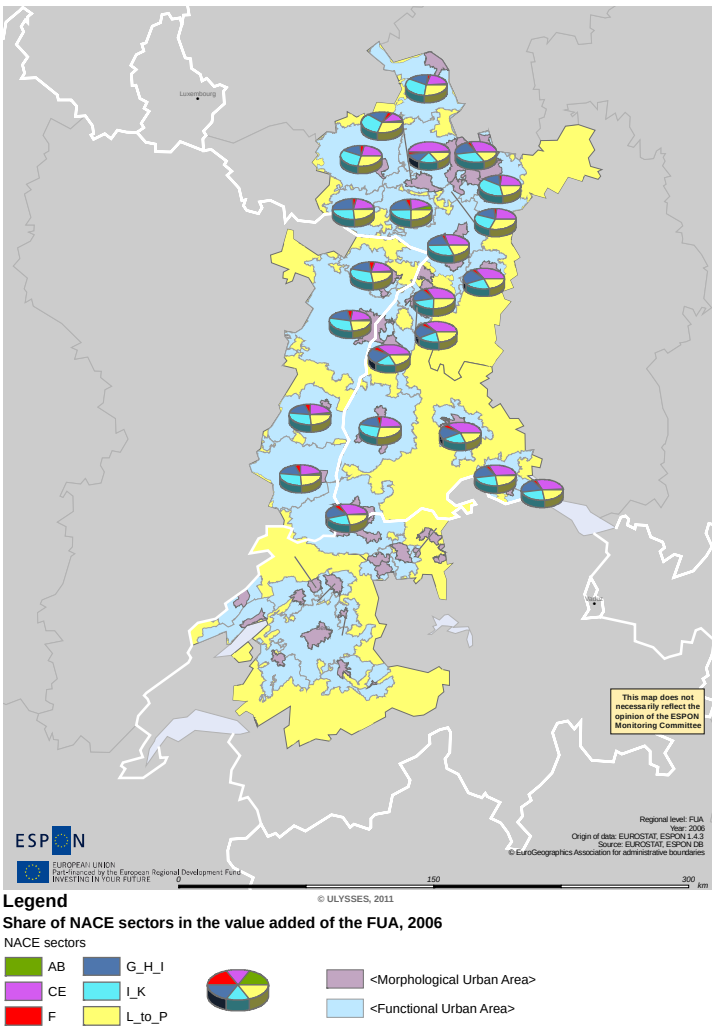


Figure 3.9: Share of NACE in the value added of the FUA for CS1

In terms of NACE sectors the Upper Rhine and the extended case study area are represented by the sectors Manufacturing (C), Electricity, gas, steam and air conditioning supply (D), Water supply; sewerage; waste management and remediation activities (E), Wholesale and retail trade; repair of motor vehicles and motorcycles (G), Transporting and storage (H), Accommodation and food service activities (I), Information and communication (J), Financial and insurance activities (K), Real estate activities (L), Professional, scientific and technical activities (M), Administrative and support service activities (N), Public administration and defence; compulsory social security (O), Education (P) and CE. In the chart the NACE sectors are grouped by A-B, C-E, F, G-I, J-K and L-P to represent the different sectors. The chart shows its diversification in this sector all over the focused area. In different shares they are represented in the whole focused area of the extended case study area of the Upper Rhine.

On the contrary the NACE sectors Agriculture, forestry and fishing (A), Mining and quarrying (B) and Construction (F) do play a subordinate or no role in the focused area (see also Chapter on urban-rural relations).

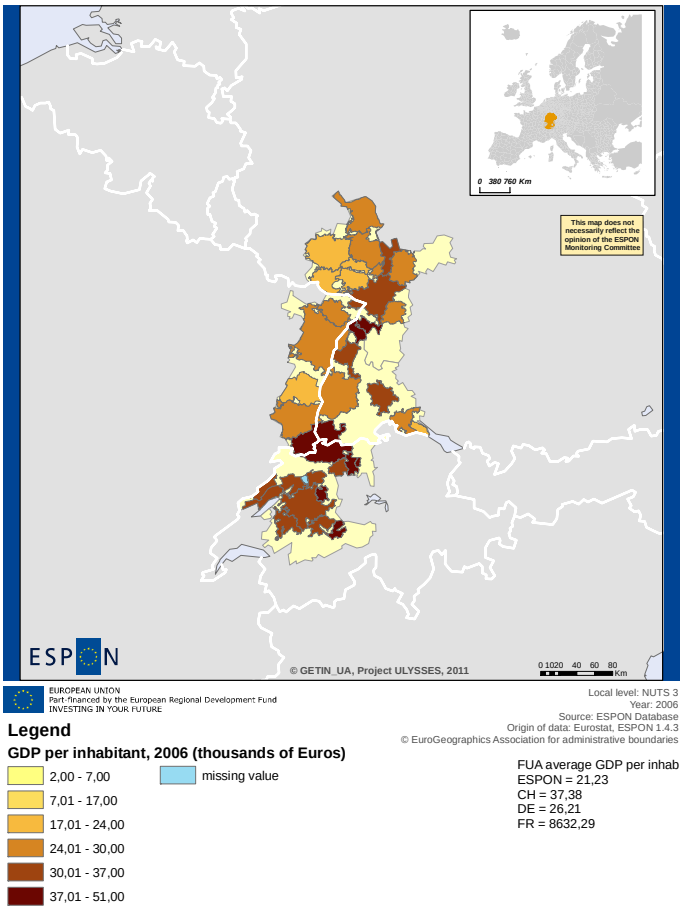


Figure 3.10: FUA GDP per inhabitant for CS1

The figure 3.10 shows that the distribution of GDP in the enlarged CBR. The GDP ranges form 18.000 to 42.000 EUR while the average in EU 27 + CH + NO is 21.2300 EUR. The highest values are in the Swiss FUAs as well as the German FUAs especially in the South next to Switzerland.

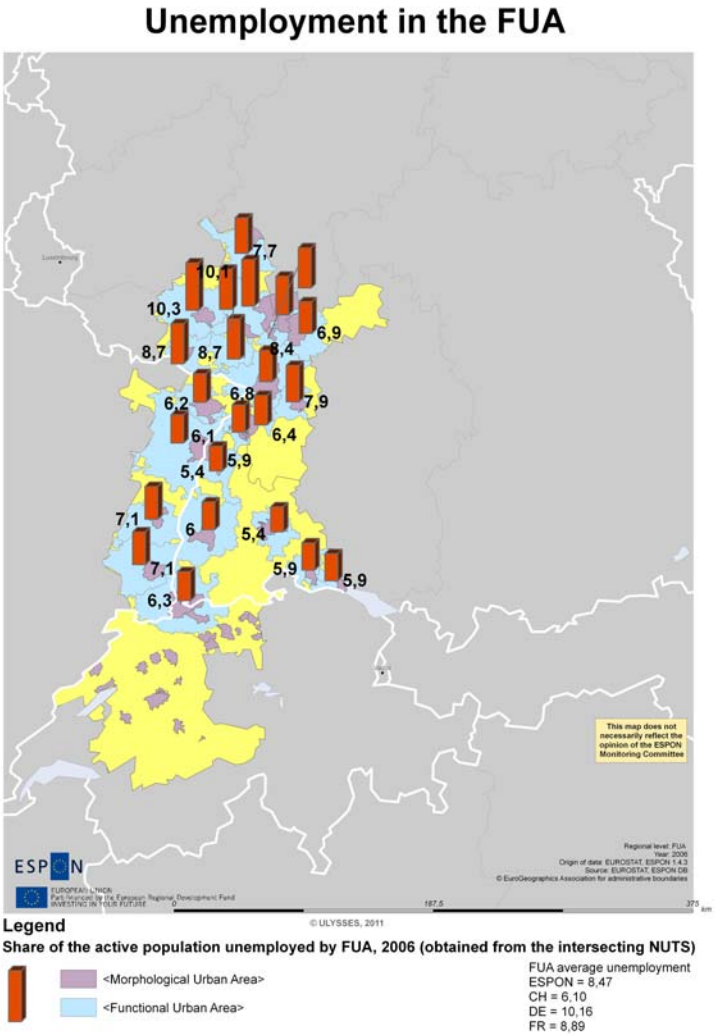


Figure 3.11: Unemployment in the FUA for CS1

Unemployment rate in the extended CBR is in the considered year between 5,4 (Villingen-Schwenningen) and 10,3 (Kaiserslautern) while the average of the ESPON area 27 is 8,47 in the same considered year. Both named FUAs are within the chosen boundaries of CR1 but not within the Upper Rhine as a political unit.

The unemployment rate is significantly lower in the south of the focused area than in the north.

3.4 Reflection on the chosen approach and limits of the FUA

The Upper Rhine this a polycentric metropolitan region embedded in the Rhine-Neckar region in the north, the Stuttgart region in the east and the Bern region in south-west and the Zurich region in south-east.

Being embedded and surrounded by different metropolitan regions the Upper Rhine region, delimit by the territory of the Upper Rhine Conference, the differentiation and the definition in contrast to the surrounding metropolitan regions is an important factor by the stakeholders of the Upper Rhine Valley.

Therefore early analysis took place to define borders and shape of the Upper Rhine Valley in order to get a cross-border unit being capable of acting. An early study showing the heterogeneity of the Upper Rhine Valley and defining the potential of a cross-border region being capable of acting was done by DATAR in 2003.

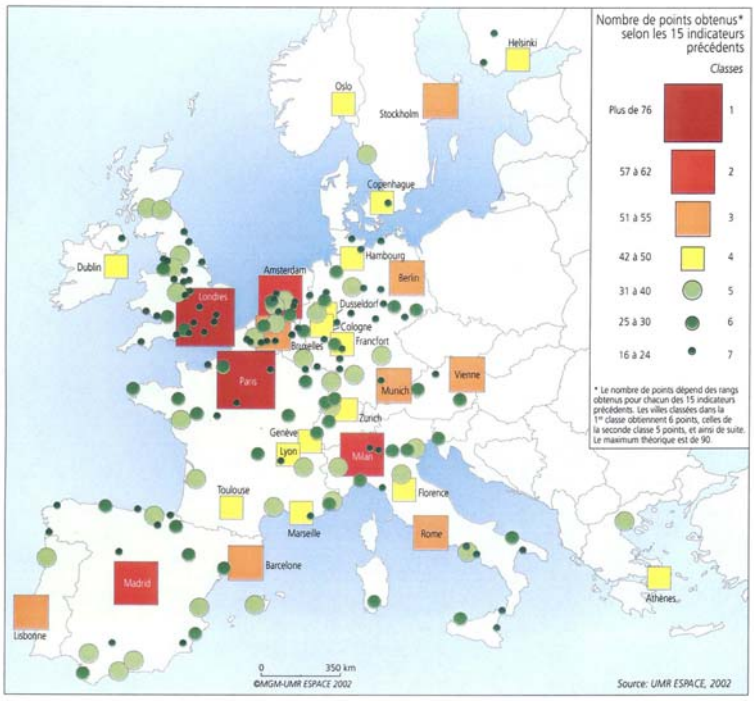


Figure 3.12: Early analysis of metropolitan phenomenon – Classification of cities

The analysis of the metropolitan rank by the Délégation à l'Aménagement du Territoire et à l'Action Régionale (DATAR) was based on:

- Population / Development - Capacity of Ports
- Airports / Passengers
- Accessibility
- Global Players / Banking
- Tourism
- Trade Fairs / Congresses
- Museums / Cultural Events - Students / R&D Facilities
- Scientific Journals

Because of the positioning of the Upper Rhine Valley in contrast to the neighbouring, and competing, urban areas the boundaries have to be drawn due to political decisions than due to statistical units which do not reflect this.

Therefore the statistical analysis of FUAs within the boundaries of the German-French-Swiss Oberrhein conference reflects better the political reality. Analysis in these boundaries was done in the ESPON project Metroborder.

Focussing on the boundaries of the German-French-Swiss Oberrhein conference one can consider three core FUAs of the Upper Rhine like Basel in the South, Strasbourg-Kehl in the middle and Karlsruhe in the North. The catchment area of the FUA of Karlsruhe is not only the catchment area of the Upper Rhine it also interferes with the catchment area of the neighbouring FUAs like the Mannheim-Ludwigshafen (in the North) and Stuttgart (in the East).

Beside the three core FUAs the Upper Rhine has also neighbouring FUAs of the core FUAs such as Mulhouse-Thann, Freiburg, Offenburg, Hagenau and Rastatt, Baden-Baden, Bühl as well as Olten-Zofingen, Aarau, Lenzburg.

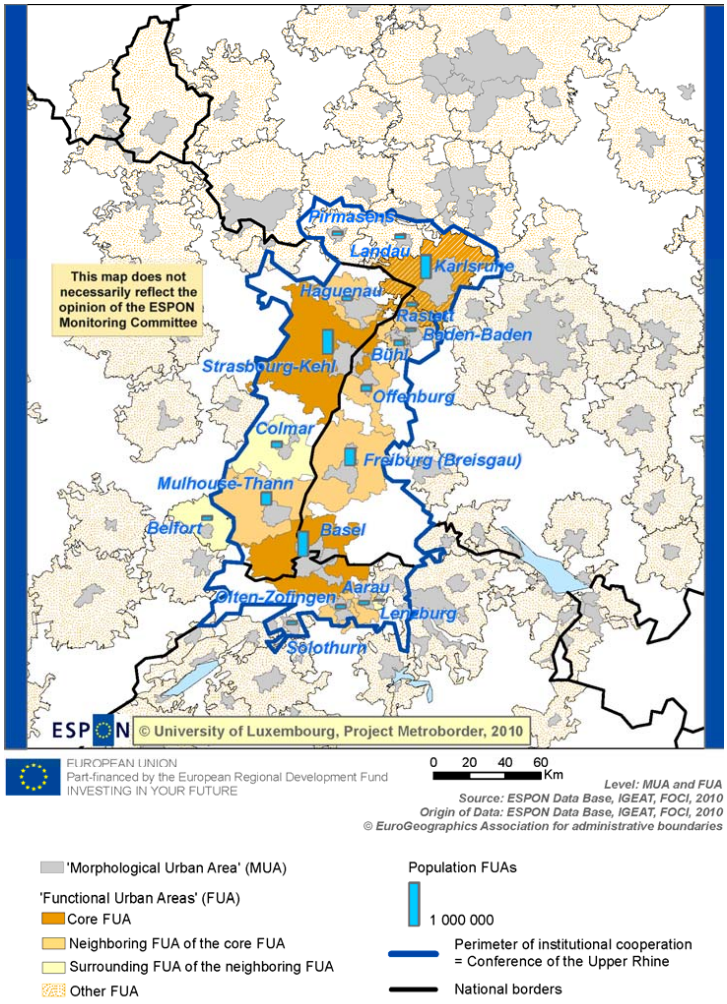


Figure 3.13: Functional and morphological urban areas (FUAs/MUAs) in the Upper Rhine region (Source: Report Metroborder 2010: 25)

3.5 Conclusions

The analysis of polycentricity in the CBR bears out its value in the interregional analysis in order to benchmark different CBRs. By this the different CBRs can be measured and compared with the other CBRs within ULYSSES.

Due to the statistical definition of scope and the lacking data its use for intraregional analysis is limited.

Chapter 4 – Urban Rural relationship

To evaluate the interaction between rural and urban areas (meaning flows of people, goods, and services) no data is available on EUROSTAT or ESPON. Regarding the structural indicators such as employment and economical patterns are only available at a NUTS3 level. The urban/rural typologies established by ESPON and EUROSTAT are also only available on a broad scale, limiting the ability to link the indicators with rural or urban areas at a significant dimension. Therefore the focus was on taking these typologies on a NUTS3 and highlighting some of the differences between them, regarding socioeconomic indicators as well as the land use patterns.

Besides the ESPON typology of urban and rural regions, data for land types has been included. Some of this data is available from the ESPON DB, although there are some inconsistencies between the ESPON DB and the data from the CLC country files Germany for artificial surfaces. As the data, e.g. for agricultural areas, varies only in an acceptable margin of error, the analysis was focused on the land use changes of the CLC 2000-2006 which was processed for all relevant NUTS3 regions and the ESPON countries.

Variable name	Geographical scale	Source	Time frame	Observations
Change urban fabric	NUTS 3	Corine Land Cover	2000-2006	
Agricultural areas	NUTS 3	ESPON DB	1990; 2000; 2006	
Urban-rural typology	NUTS 3	ESPON DB/ Eurostat		
Urbanization of natural areas	NUTS 3	Corine Land Cover	2000-2006	
Gross value added in forestry and fishing	NUTS 3	Eurostat	1997-2008	
Employment in forestry and fishing	NUTS 3	Eurostat, Russian Federal State Statistics Service	1997-2008	Years missing for some countries

Table 4.1: sources for data mining

2.1 Urban – Rural Typology

There are two alternative typologies available for the ULYSSES project. One is the ESPON 1.1.2 typology, which is based on the idea of two main dimensions, that is, degree of urban influence on the one hand, and degree of human intervention on the other hand.

In determining degree of urban influence, two factors were taken into account: population density and status of the leading urban centre of the region. High urban influence includes all NUTS3 areas with a population density more than the European average (107 persons per square km) and/or the areas where the leading urban centre of the NUTS3 area has been labelled “Metropolitan European Growth Area” (MEGA). The rest of the NUTS3 regions were classified as being under low urban influence.

The degree of human intervention is determined by the relative share of land cover according to the main land cover classes of the CLC data set. The main classes are artificial surfaces, agricultural areas, and residual land cover. High urban intervention corresponds to a situation where the share of artificial surfaces (and possibly one of the two other land cover categories) is above European average. Medium human intervention equals the cases where the share of agricultural land (and possibly the share of residual land cover) is above European average. Low human intervention concerns all cases where only the share of residual land cover is above European average.

The ESPON 1.1.2 typology has been included for illustrative purposes, but has not been used to cross with other data, as indicators have not been updated for NUTS3 changes and due to that are outdated.

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

- Clusters of urban grid cells with a minimum population density of 300 inhabitants per km² and a minimum population of 5.000 were created. All the cells outside these urban clusters are considered as rural.
- NUTS3 units of less than 500 km² are grouped with one or more of its neighbours solely for classification purposes, i.e. all the NUTS 3 regions in a grouping are classified in the same way.
- It classifies NUTS3 units based on the share of population in rural grid cells. More than 50 % of the total population in rural grid cells = predominantly rural, between 20 % and 50 % in rural grid cells = intermediate and less than 20 % = 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.

In the CBR Trinational Metropolitan Area Upper Rhine nearly all NUTS3 units are classified as intermediate regions. The only predominantly urban regions are DE122 Karlsruhe Stadtkreis and DE123 Karlsruhe Landkreis. That means less than 20% of the population in these two regions lives in rural grid cells and the population density is above 300 inhabitants per km² (DE 122 Karlsruhe Stadtkreis: 1.675, DE123 Karlsruhe Landkreis: 397). The only predominantly rural NUTS 3 unit found also on the German side is DE13A Waldshut (147 inhabitants per km²). The two French NUTS 3 units both are classified as intermediate, although the region FR421 Bas-Rhin includes Strasbourg with its nearly 280.000 inhabitants (DE122 Karlsruhe Stadtkreis 290.736). The classification here results from the great areal size of the NUTS3 region. Unfortunate is the missing of Swiss data. The city of Basel has about 170.000 inhabitants, the

Trinational Agglomeration Basel (TAB) about 830.000. Basel is the most densely populated area in Switzerland with 5.174 inhabitants per km² (3 times higher than Karlsruhe).

What becomes clearly visible in this context is the problematic of classification and formation of the spatial unit on which the classes are applied. Looking at figure 4.1, one could get the idea the only important urban centre in the CBR is the German city Karlsruhe, whereas there are other urban centres like Freiburg (DE), Baden-Baden (DE), Mulhouse (FR) or Strasbourg (FR), which is nearly the same size as Karlsruhe and even more dense populated within the city borders (3.500 inhabitants per km²).

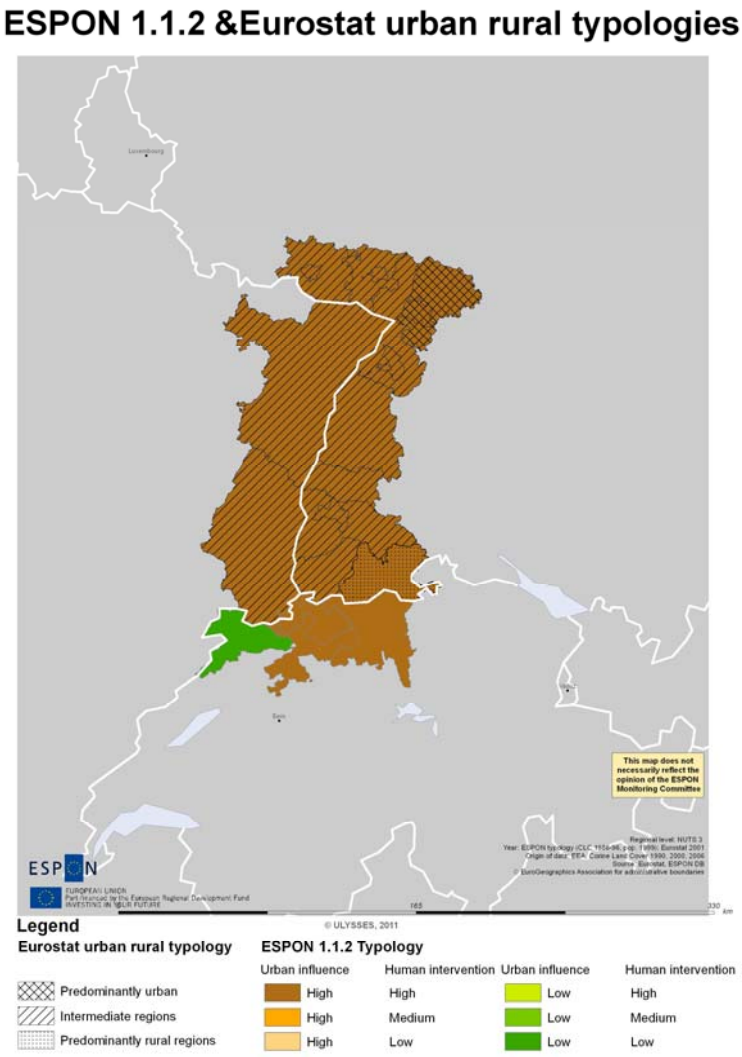


Figure 4.1: ESPON 1.1.2 & Eurostat urban rural typologies

Nor is it visible in the maps that the landscape's influence is a great deal higher than the borders one. Infrastructure has to be orientated along the axis from north to south using the Rhine valley, often being "back to back" in duplicate on the German an French side of the river (see also Chapter 5). Due to these topographical circumstances the border is an agglomeration area, rather than because of the border itself. Departing from the border the structures become less urban,

what is an important fact, but not visible to a non-local person looking at the maps. It is obvious using NUTS3 level is not detailed enough for the sufficient illustration of these matters of fact.

4.2 Economy

An indicator for a region being more urban or rural is the share of agriculture and fishing in regards of total employment and share of Gross Development Production (GDP) or Gross Added Value (GVA).[7] The assumption is: The higher the share of agriculture and fishing in a certain area, the more rural the area is, while in urban areas agriculture and fishing plays a minor role in the economy. In this case study the indicator of Gross Added Value (GVA) is used.[8] In general agriculture and fishing is only a small economic sector compared to other economic activities in the CBR Trinational Metropolitan Area Upper Rhine.[9] It can be assumed (although data is not available) fishing takes only a minor share of the whole sector of agriculture and fishing, as freshwater fishing is not very productive compared to sea fishing and the topography in connection with climate condition of the Upper Rhine promote winery and arable crops.

[7] Although the GVA of agriculture and fishing ha only a small share of the total added value, it will be used here as an indicator.
[8] GVA is related to GDP as follows: GVA + taxes – subsidies = GDP. I.e. in the GVA's share of case agriculture and fishing of the total GVA is higher than compared to the common used GDP's share as a high amount of subsidies is paid in this sector.
[9] Nevertheless the biggest amount in the EU financing is related to agriculture and fishing.

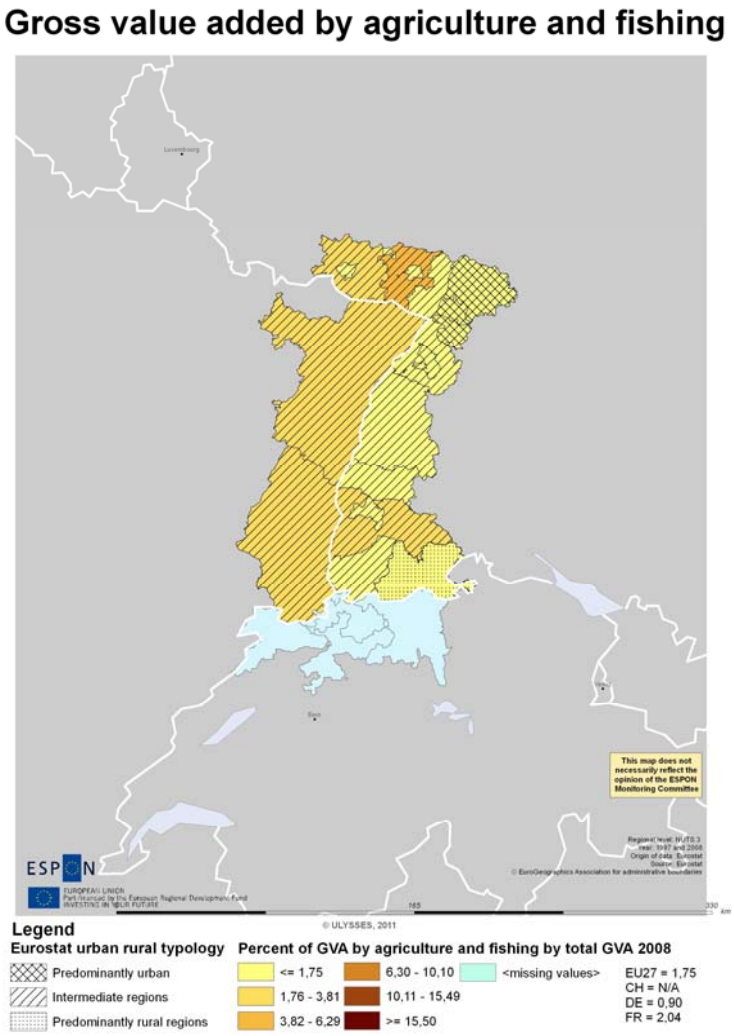


Figure 4.2: Gross value added by agriculture and fishing

The GVA's share of agriculture and fishing in France is about 2.3 times higher compared to Germany (2,04% (FR) to 0,90% (DE)). The average shares of the CBR´s French NUTS3 units meet the French average while most of the German rural regions within the CBR show higher percentages than the German average and also the total is higher (1,26%/0,90%). This is caused by arable (specialised) crops, especially winery and to some extend orcharding, which account a higher Added Value compared to agriculture based on i.e. wheat or corn. This can be seen exemplarily in the NUTS3 unit DEB3H "Südliche Weinstraße", belonging to the largest winery areas in Germany, with a GVA share of 5% of the total GVA.

Similar figures occur concerning the employment in this sector. The economy in France and Germany both shows a relatively small employment in agriculture and fishing (about half (FR) respectively a third (DE) of the EU27 average), dropping by between 1,0% (DE) and 1,7% (FR) per year. Employment in two German NIUTS3 units (DEB3E Germersheim, DEB3H Südliche Weinstraße), and one French NUTS3 unit (FR421 Bas-Rhin) grew slightly and four NUTS3 units staid the same (DEB33 Landau, DEB37 Pirmasens, DEB3K Südwestpfalz, FR422 Haut-Rhin), while the GVA of all CBS's NUTS3 units fell or remained constant from 2000-2008 –

except in DEB3H Südliche Weinstraße and FR421 Bas-Rhin with an increase of 1,51 and 2,42%. Nevertheless, in all CBR's NUTS3 units the share of GVA for agriculture and fishing fell related to the total GVA. That means the economic sector was not able to keep up with the overall economic development within the CBR.

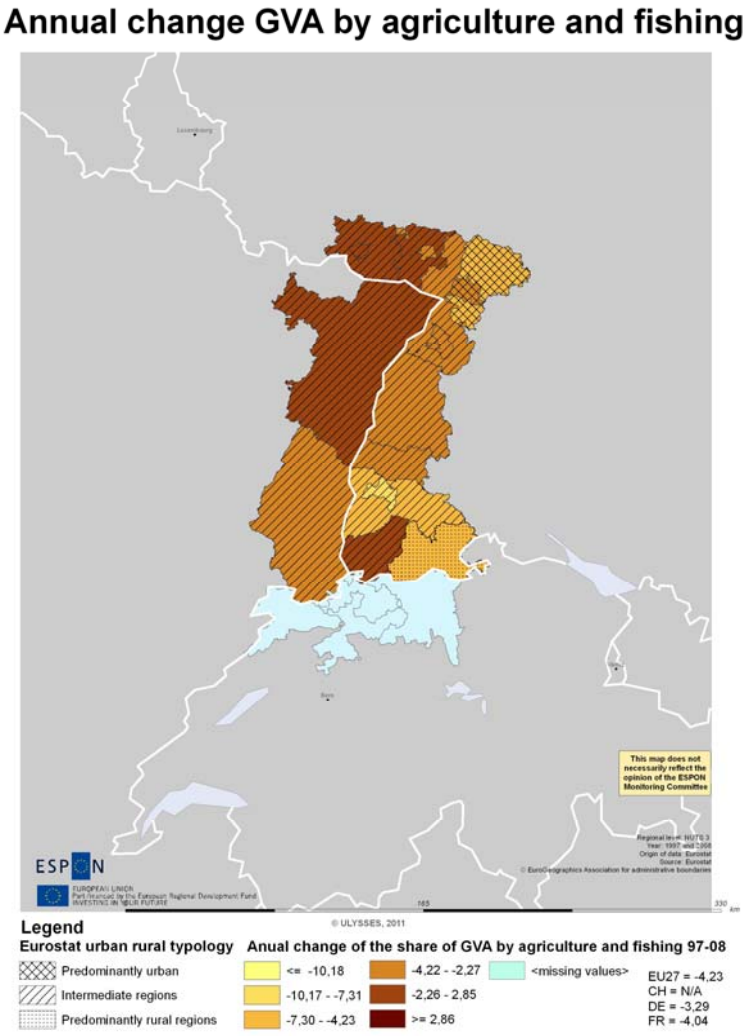


Figure 4.3: Annual change GVA by agriculture and fishing

4.3 Land Use

4.3.1 Agricultural areas

In Germany and France more than a half of the overall soil is in agricultural use (59,47% (DE), 51,42% (FR)). The data for CBR Trinational Metropolitan Area Upper Rhine differs slightly from the national average in France (47,45%) and more clearly in the German part (38,99%). The difference is more visible in Germany due to more agrarian used soil in the North of the country where there are regions with 70% to over 80% of agricultural used land. Not even one NUTS3 region in the CBR meets or exceeds the respective national average. The annual growth rate is in all NUTS3 regions negative, the average loss of agricultural used soil from 1990 to

2006 on the German side was 630 ha (2,2% (1,59% Germany)), on the French side 2.300 ha (1,15% (0,55% France)) per NUTS3 unit.

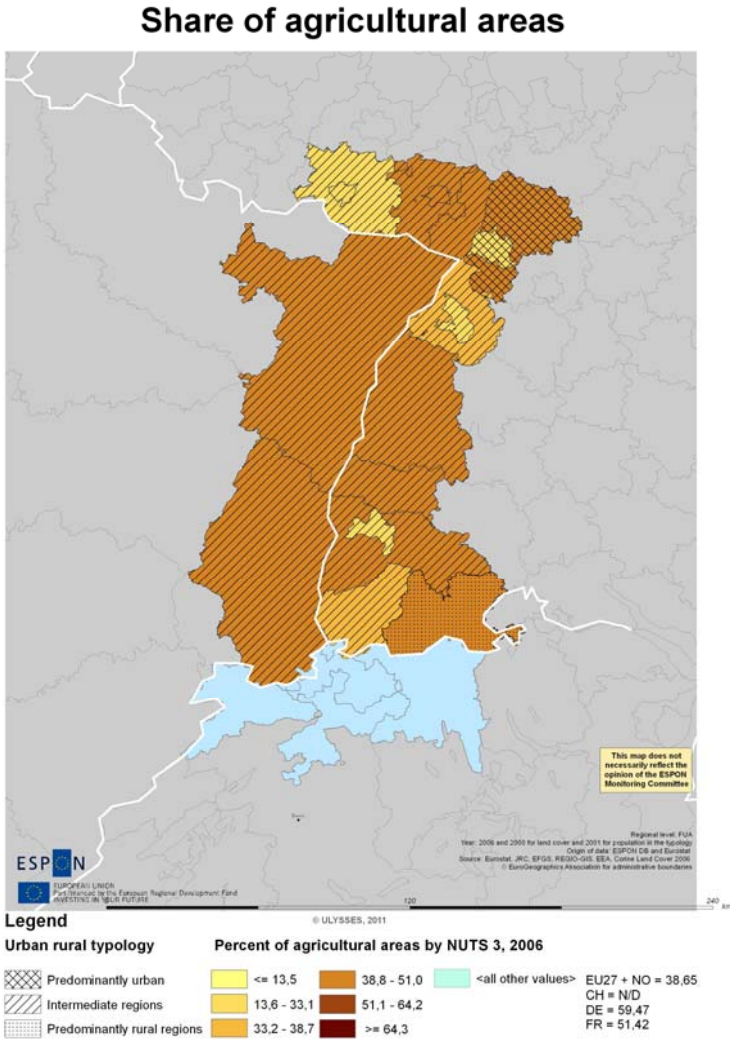


Figure 4.4: Share of agricultural areas

	NUTS name	Agricultural areas (ha)						
		Total 1990	Total 2000	Total 2006	Share of total area 06 (%)	Net formation of land cover 90-06	Net formation of land cover by total area 90-06 (per 10000)	Annual growth rate 90-06 (per 1000)
EU27 + CH + NO		182685050,0	205227723,0	184577384,0	38,65	1892334,0	39,621	6,44
CH	Switzerland	74906,0	74824,0	75658,0	N/D	752,0	1,82	6,25
DE	Germany	21604012,0	21397990,0	21263899,0	59,47	-340113,0	-95,12	-9,91
FR	France	33006580,0	32903514,0	32826621,0	51,42	-179959,0	-28,19	-3,42
CH023	Solothurn	1865,0	1857,0	1865,0	2,36	0,0	0,00	0,00
CH025	Jura	24291,0	24278,0	24350,0	29,04	59,0	7,04	1,52
CH031	Basel-Stadt	583,0	583,0	370,0	9,94	-213,0	-572,45	-280,18
CH032	Basel-Landschaft	3636,0	3628,0	3557,0	6,88	-79,0	-15,28	-13,72
CH033	Aargau	600,0	600,0	600,0	0,43	0,0	0,00	0,00
DE121	Baden-Baden, Stadtkreis	3283,0	3156,0	3116,0	21,99	-167,0	-117,85	-32,58
DE122	Karlsruhe, Stadtkreis	5301,0	5086,0	4963,0	28,41	-338,0	-193,47	-41,09
DE123	Karlsruhe, Landkreis	57222,0	55839,0	55278,0	51,01	-1944,0	-179,38	-21,58
DE124	Rastatt	26621,0	26265,0	25937,0	35,11	-684,0	-92,60	-16,26
DE131	Freiburg im Breisgau, Stadtkreis	4733,0	4493,0	4439,0	28,81	-294,0	-190,81	-40,00
DE132	Breisgau-Hochschwarzwald	61997,0	61491,0	61209,0	44,48	-788,0	-57,26	-7,99
DE133	Emmendingen	32308,0	31967,0	31850,0	46,83	-458,0	-67,34	-8,92
DE134	Ortenaukreis	81045,0	79993,0	79218,0	42,64	-1827,0	-98,33	-14,24
DE139	Lörrach	31071,0	30676,0	30488,0	37,77	-583,0	-72,23	-11,83
DE13A	Waldshut	49838,0	49433,0	49319,0	43,61	-519,0	-45,90	-6,54
DEB33	Landau in der Pfalz, Kreisfreie Stadt	4224,0	4147,0	4115,0	50,29	-109,0	-133,22	-16,33
DEB37	Pirmasens, Kreisfreie Stadt	1929,0	1860,0	1854,0	30,03	-75,0	-121,49	-24,75
DEB3E	Germersheim	22164,0	21711,0	21454,0	46,48	-710,0	-153,81	-20,33
DEB3H	Südliche Weinstraße	31270,0	30991,0	30691,0	47,71	-579,0	-90,01	-11,67
DEB3K	Südwestpfalz	28760,0	28643,0	28399,0	29,75	-361,0	-37,82	-7,89
FR421	Bas-Rhin	240862,0	239631,0	238985,0	49,84	-1877,0	-39,14	-4,89
FR422	Haut-Rhin	161922,0	160556,0	159196,0	45,06	-2726,0	-77,15	-10,61

Table 4.2: Agricultural areas

4.3.2 Artificial surfaces

The amount of artificial surfaces varies depending on how “urban” or “rural” a region really is. Again the limited possibility of sophistication on the NUTS3 level hinders the data to be as significant as it could be. As an example the cities of Karlsruhe (DE) and Strasbourg (FR) will be compared. Karlsruhe Stadtkreis, which is less dense populated than Strasbourg (see above) has the highest share of artificial surface on the total land cover (40,34 m² per ha). Strasbourg is here

considered only as part of the NUTS3 region FR421 Bas-Rhin, which exhibits only a share of less than one third of Karlsruhe Stadtkreis (FR421: 12,24 m² per ha).

Concerning land-use change there is data available for agricultural land which was transformed into artificial surfaces. Corresponding with the loss of agricultural used soil in all NUTS3 units (see above) it is a "one-way" land use change to artificial surfaces. The relative changes are higher the more urban a region is classified and the less agricultural used soil it had before. The land use change is with 58,5 m² per ha highest in DE122 Karlsruhe Stadtkreis and with 0,5 m² per ha lowest in DE13A Waldshut, which is the only predominantly rural NUTS3 unit in the CBR. The two French NUTS3 units are according to relative figures on the average, but absolute land use change in German and French NUTS3 regions is summed up nearly the same (1.077 ha (DE) to 1.177 ha (FR)).

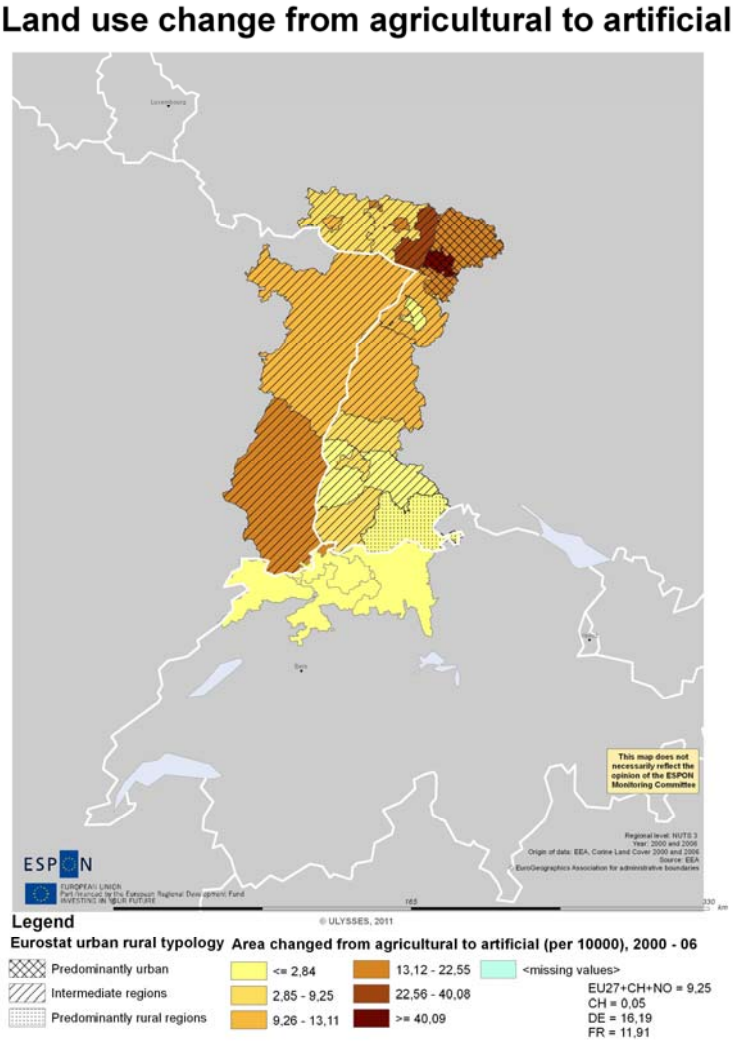


Figure 4.5: Land use change from agricultural to artificial

4.4 Conclusion

As stated in the introductory paragraph, data for evaluation of interaction between rural and urban areas is not available on EUROSTAT or ESPON. Also economical patterns are only available on NUTS3 level, which – altogether – made using NUTS3 as the basic spatial unit inevitable. The consequence is, neither the interaction between urban and rural area, nor cross-border activities and effects, could be described.

It became obvious in the discussion of urban rural indicators with the available data, the level of detail is not sufficient. There must be smaller and more detailed spatial units with more similar characteristics, such as covered area, for a better comparison within the CBR. A further important issue is data availability. Without data for the Swiss NUTS units, the comparison is incomplete and cannot reveal what it could, if data was available.

Chapter 5 – Accessibility and connectivity

5.1 Aims, Indicators and Methods

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 specially 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 (impendance function) with the population that can be reached (activity function).

Variable name	Geographical scale	Source	Time frame
Potential accessibility road, rail, air and multimodal indexed to ESPON average	NUTS 3	ESPON DB	2001;2006
Potential accessibility road, rail, air and multimodal indexed to CBR average	NUTS 3	ESPON DB	2001;2006
Potential accessibility road, rail, air and multimodal index change 2001-2006	NUTS 3	ESPON DB	2001;2006
Households with broadband connection, 2009	NUTS 2	European Commission 5th Cohesion Report, Regional Innovation Scoreboard	2009 (2004 NO, PL)

Table 5.1: Data applied

As for connectivity data, the ESPON database has only very few indicators on a NUTS 2 level and for 2003. Given the advancements in this area, data from the 5th Cohesion Report and from the European Innovation Scoreboard has been used regarding households' broadband internet access.

5.1.2 Indicators explained

The potential accessibility is a similar indicator as the demographic potential, meaning that is relates the activities to be reached with the travel time it takes to reach them. According to the ESPON 1.2.1 Final Report the potential accessibility is define as follows:

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

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." (pp: 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. The multimodal accessibility synthesizes all the other modes.

5.1.3 Index change

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 these indicators, "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), "Update of Selected Potential Accessibility Indicators Final Report", pp. 9)

5.1.4 Overview of values

NUTS code	NUTS name	Standardised potential accessibility (ESPON=100)				Standardised potential accessibility (CBR=100)			
		Multi modal	Rail	Road	Air	Multi modal	Rail	Road	Air
CH023	Solothurn	117,6	143,8	147,1	117,2	92,4	84,9	81,6	98,0
CH025	Jura	117,4	132,5	142,8	119,5	92,2	78,3	79,2	99,9
CH031	Basel-Stadt	156,5	180,1	181,8	159,7	122,9	106,4	100,9	133,5
CH032	Basel-Landschaft	140,7	168	166,2	142,3	110,5	99,2	92,2	118,9
CH033	Aargau	131,8	154,8	147,9	135,5	103,5	91,4	82,1	113,3
DE121	Baden-Baden, Stadtkreis	138,7	206,7	187,2	125,7	108,9	122,1	103,9	105,1
DE122	Karlsruhe, Stadtkreis	134,7	214,7	213,1	112,9	105,8	126,8	118,2	94,4
DE123	Karlsruhe, Landkreis	125,9	193,7	199,8	108,9	98,9	114,4	110,9	91,0
DE124	Rastatt	129,2	188,7	189,7	117	101,5	111,4	105,2	97,8
DE131	Freiburg im Breisgau, Stadtkreis	125,6	181,5	173,2	114,3	98,6	107,2	96,1	95,5
DE132	Breisgau-Hochschwarzwald	120,6	165,8	172	112,3	94,7	97,9	95,4	93,9
DE133	Emmendingen	121	162,8	174,2	113,8	95,0	96,1	96,6	95,1
DE134	Ortenaukreis	138,9	191,3	190,6	128,2	109,1	113,0	105,7	107,1
DE139	Lörrach	142,2	161,8	172,2	144,9	111,7	95,6	95,5	121,1
DE13A	Waldshut	134,4	128,3	160	142	105,6	75,8	88,8	118,7
DEB33	Landau in der Pfalz, Kreisfreie Stadt	116,8	173,4	213,5	98,1	91,7	102,4	118,5	82,0
DEB37	Pirmasens, Kreisfreie Stadt	117,7	142,9	197,9	109,9	92,4	84,4	109,8	91,9
DEB3E	Germersheim	116,4	190,5	188,2	95,2	91,4	112,5	104,4	79,6
DEB3H	Südliche Weinstraße	109,5	153,4	198,1	94,9	86,0	90,6	109,9	79,3
DEB3K	Südwestpfalz	113,2	153,5	190,1	102	88,9	90,7	105,5	85,3
FR421	Bas-Rhin	143,4	177,1	192,1	140,3	112,6	104,6	106,6	117,3
FR422	Haut-Rhin	109	159,9	167,6	97,6	85,6	94,4	93,0	81,6

Table 5.2: Overview of accessibility values

5.2 Road

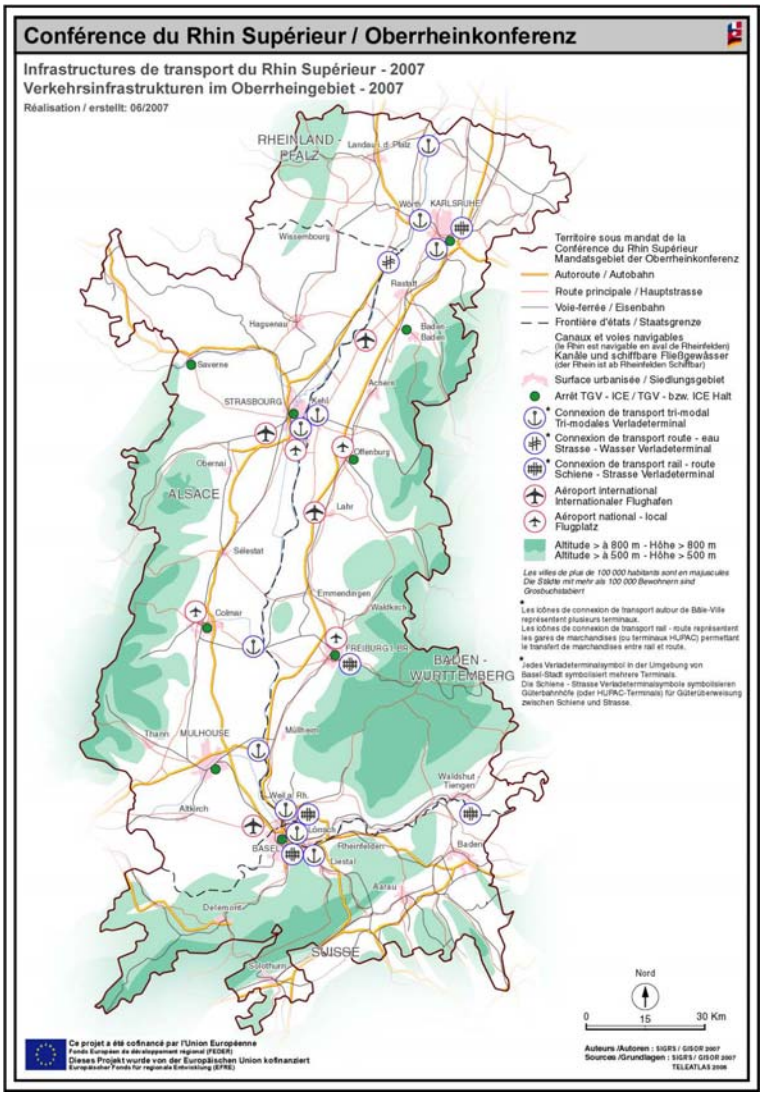


Figure 5.1: Infrastructure in the CBR

5.2.1 General situation

The road infrastructure of the CBR is characterised by redundant motorways on both sides of the River Rhine, which were constructed in the national French and German contexts independently one from another. As one can see in map 1, the French region Alsace shows a certain centralism, with motorways leading to and away from Strasbourg, the main centre of the Alsace. Strasbourg is westwards connected directly to Paris, while Mulhouse which lies more in the south has a direct motorway link-up to Lyon.

On the German side, the road infrastructure is strongly oriented to follow the direction of the Rhine Valley parallel to the Rhine in north-south direction, with horizontal axes which connect Black Forest and the frontier with France. In the northern part of the CBA the A8, a motorway connecting Mannheim, Karlsruhe and Munich can be seen, consequently avoiding French territory while it continues on its way north-westwards to Mannheim. To the north the A5, the

motorway crossing the CBR in north-south direction continues on to Frankfurt (Main), Hamburg and Berlin. Interestingly, there is only one direct motorway-connection between France and Germany, which is situated between Freiburg and Mulhouse. Any other connection is state roads which partially are extended with grade separation.

Switzerland has two motorway-connections with Germany and one with France within the borders of the CBR. The main centre of the Swiss part of the CBR, Basel, is southwards connected directly to Zurich, Lucerne and Bern as well as Geneva and Milan.

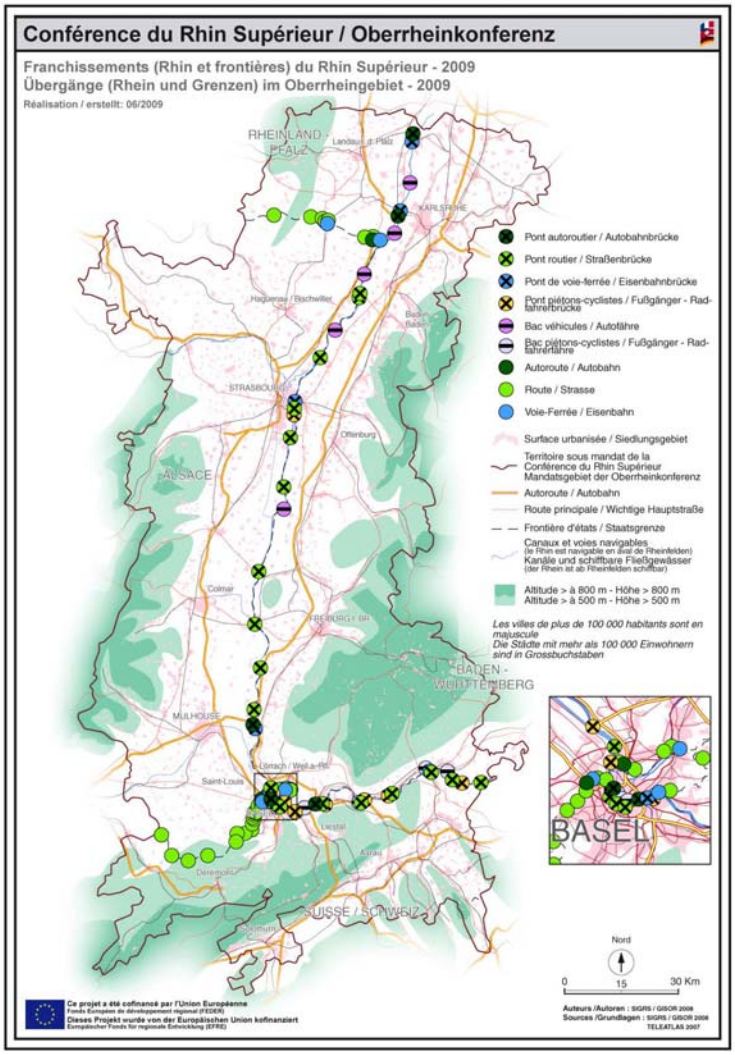


Figure 5.2: Crossings of the border and/or the river Rhine

The CBR profits from a large number of crossings over the Rhine as well as border crossings, where the state border doesn't match the Rhine as a natural border. Especially the high number of bridges which represent a highly expensive infrastructure, which needs a certain amount of foresighted planning and mutual interest on both sides of the river, provides the image of a very well integrated and connected cross-border-region when it comes to road infrastructure.

5.2.2 Potential accessibility

The potential accessibility in comparison to the CBR average reflects the situation of the geographical space. With the low mountains ranges Black Forest and Vosges east and west of the Rhine and the massive Alps in the South as natural barriers, the northern part has a significant relative accessibility advantage which is furthermore emphasized by the geographic closeness to the central European development cores.

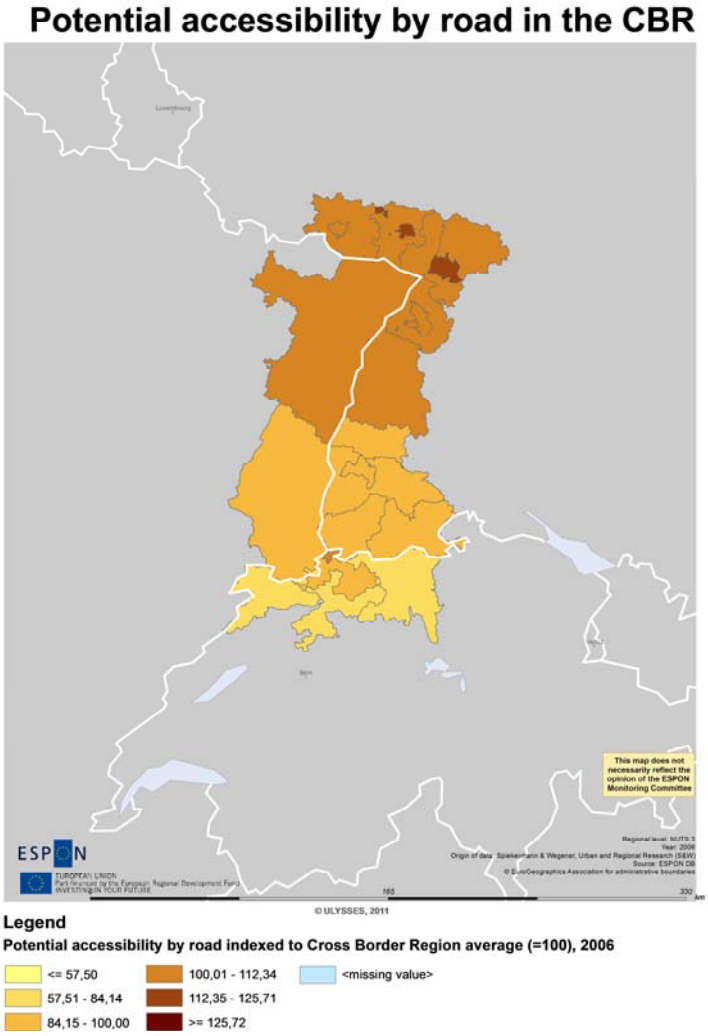


Figure 5.3: Potential accessibility by road relative to CBR average

In the European context though, these regional inequalities in accessibility don't seem to be too important as the CBR as a hole shows an excellent overall accessibility index widely over the ESPON average.

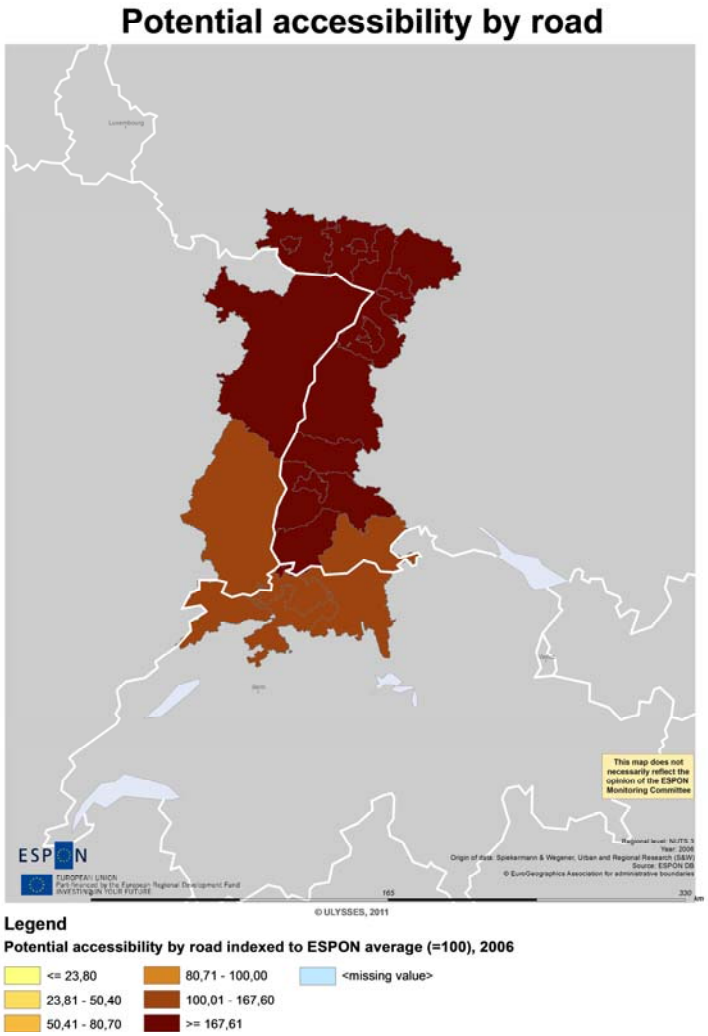


Figure 5.4: Potential accessibility by road relative to ESPON average

In the index change, the already well equipped parts of the CBR around Strasbourg and Karlsruhe have lost in comparison to the ESPON average, whereas especially the regions around the Swiss border could significantly improve their accessibility by road infrastructure between 2001 and 2006.

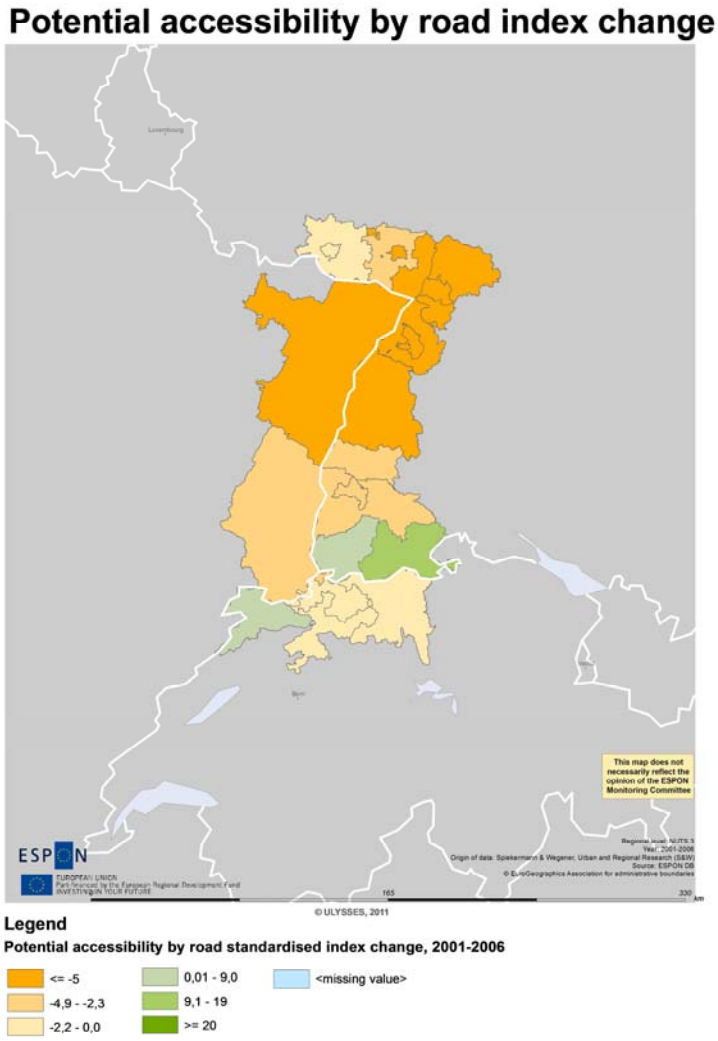


Figure 5.5: Index change of potential accessibility by road relative to ESPON average

5.3 Railroad

5.3.1 General situation

The “Rheintalbahn” (Rhine Valley Railway) – which is the name of the railroad line in north-south direction of the German side of the CBR – is one of the most important railroad corridors in Europe. Map 2 shows the freight volume in 1995. The numbers represent gross freight tonnes per year. As one can see in this map, there are no significant railroad freight movements between Germany and France whatsoever, whereas Basel and hence Switzerland seems to be well connected to as well Germany as France.

The intra-regional connectivity of the CBR is well represented by the fact, that there are three direct regional train connections between Germany and France (Offenburg-Strasbourg / Wissembourg-Landau / Müllheim-Mulhouse). Nonetheless do the links only enter as far as some

kilometres into French or rather German territory only closing the missing links between the two national rail networks. An integrated regional cross-border public transport network doesn't exist up till now. Still, the suburban lines of Basel penetrate deeply into German and French territory, being an achievement mainly driven by the development pressure of the global city of Basel into the territories on the other sides of the border.

The CBR is well equipped with high speed rail stations, as so are to be found in Karlsruhe, Baden-Baden, Offenburg, Freiburg and Basel Badischer Bahnhof in Germany; Strasbourg, Mulhouse and Colmar in France; and Basel in Switzerland. From the CBR, important European cities as Paris, Brussels, Luxembourg, Hamburg, Berlin, Munich, Milan, Zurich, Lyon are accessible within six hours and with one interchange or less. Again, intra-regional accessibility is an important issue.

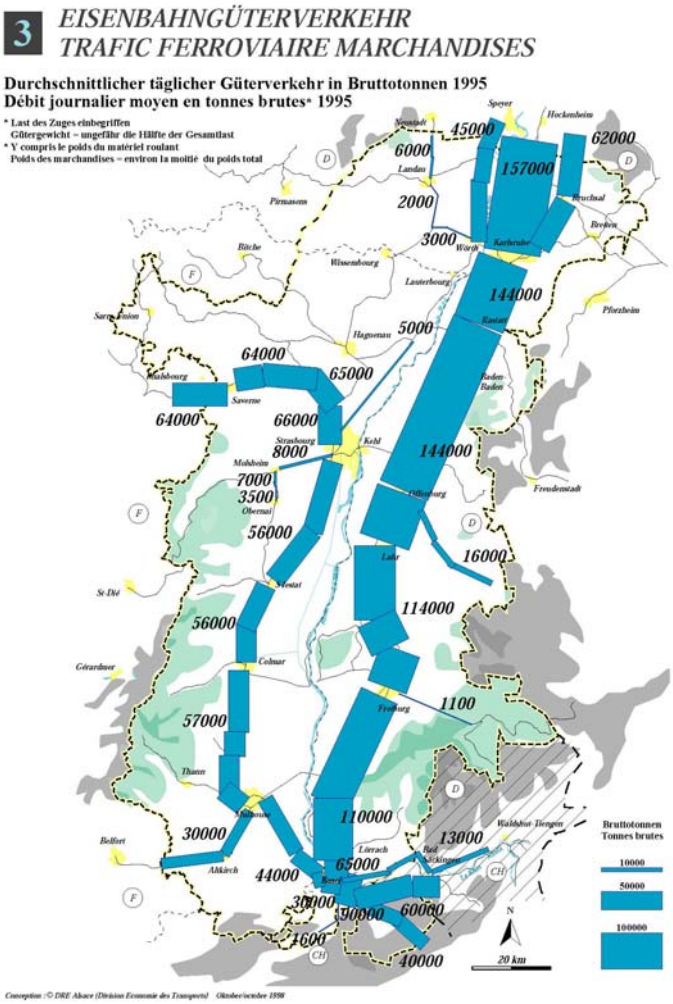


Figure 5.6: Railroad freight traffic in the CBR in 1995

Unfortunately, the mentioned issues with intra-regional accessibility can't be shown using accessibility indicators on NUTS3 level. This might lead to the false image of a well integrated border region concerning regional public transport, although the border still plays an important role in separating the national railroad networks. It is true, that the CBR has excellent

accessibility values, if one regards the CBR as a unity. Still, the CBR lacks the intra-regional links to be considered as an integrated hole.

This is especially important considering the four regional airports, which – all together – offer a great variety of destinations. Unfortunately, due to the poor intra-regional development in regional public cross-border transportation, this potential can practically not be unleashed.

5.3.2 Potential accessibility

Compared to the CBR's average, the German northern part of the CBR shows a clear advantage due to its integration in two transeuropean corridors (Paris-Vienna / Hamburg-Milan) as well as in the German high-speed-rail-network. Strasbourg still profits from the direct connections to Paris and Munich, whereas the southern part of the CBR lacks this good accessibility.

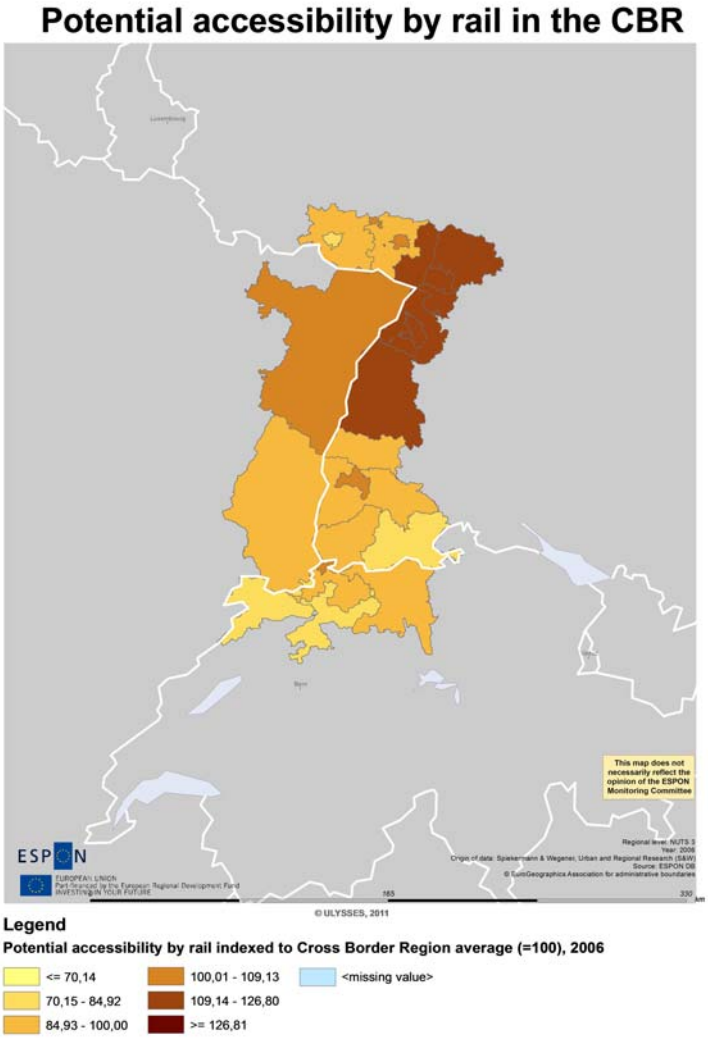


Figure 5.7: Potential accessibility by rail relative to CBR average

Compared to the ESPON average the CBR as a hole still has an accessibility index above average, which puts the intra-regional disparities into perspective.

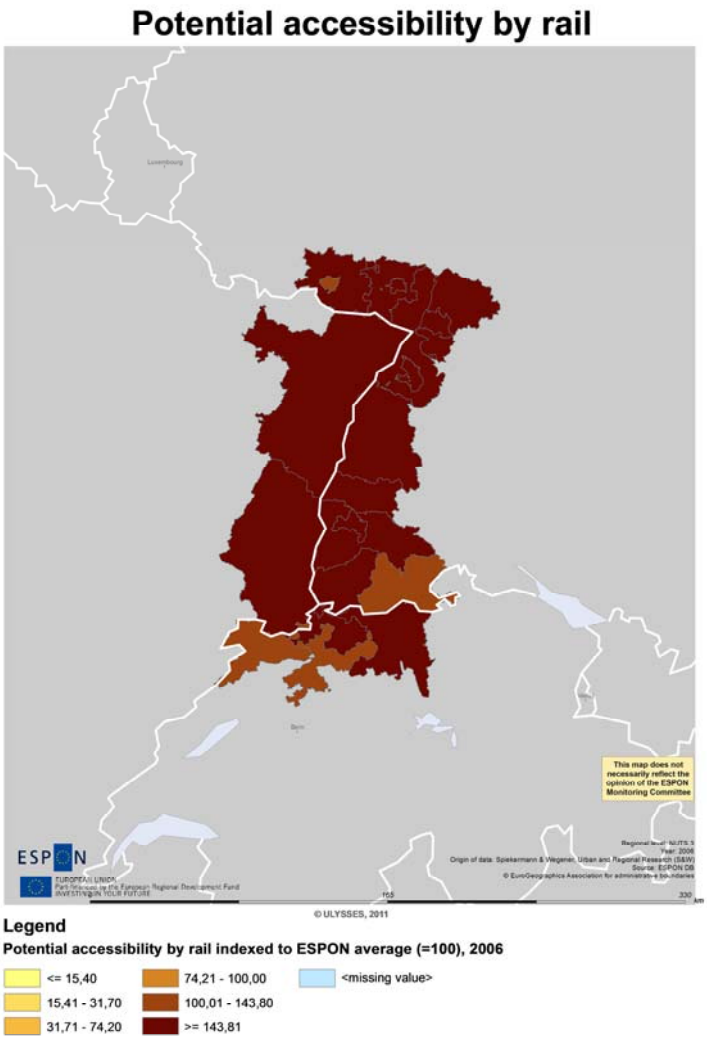


Figure 5.8: Potential accessibility by rail relative to ESPON average

Looking at the dynamics, the already high German values could still be improved, while the western and southern parts of the CBR have lost ground in the European context between 2001 and 2006.

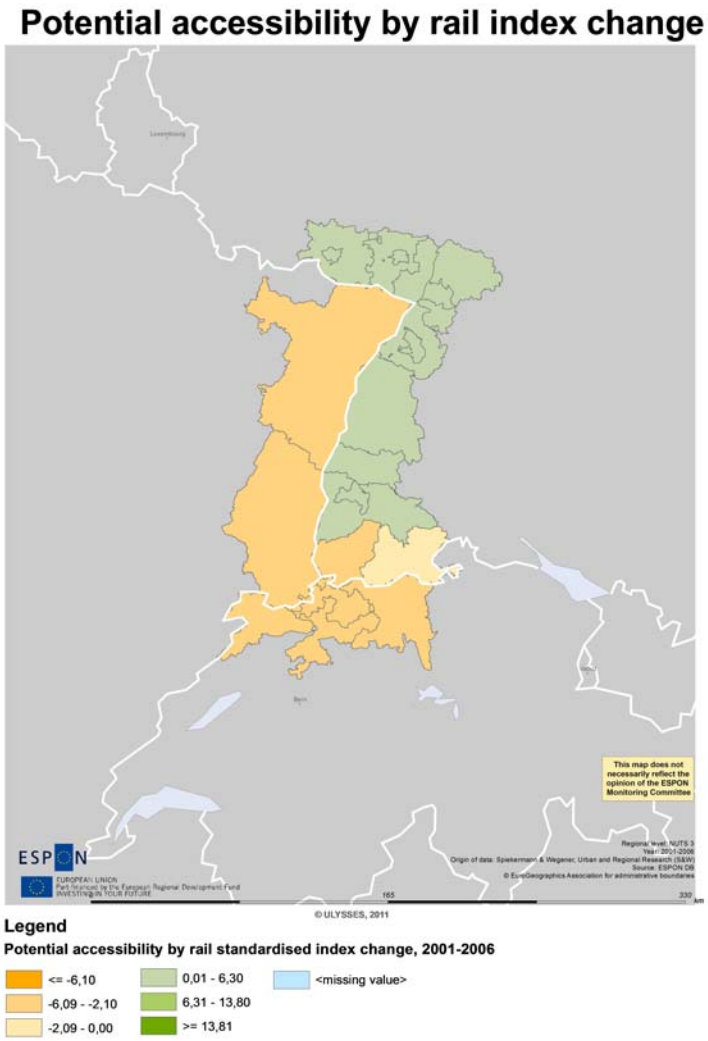


Figure 5.9: Index change of potential accessibility by rail relative to ESPON average

5.4 Air

5.4.1 General situation

The CBR lies in neighbourhood of the important international airports in Frankfurt (Main), Zurich, Munich and Paris, which are all readily accessible via rail. Also, the CBR is equipped with four airports on its own (Baden-Baden, Strasbourg, Lahr, Basel) of which one almost only serves for freight purposes (Lahr). Between the airports has itself established an unofficial partition of the destinations served. Whereas all airports together cover destinations in 360° in all directions, the poor intra-regional public transport network makes an effective combined usage of the three passenger airports almost impossible, since they aren't effectively accessible over the border. The linkage between the airports is provided by private bus companies which suffer reliability issues as they are dependent on motorways and thus affected by heavy traffic.

5.4.2 Potential accessibility

The high values in the southern east of the CBR – even though this part of the CBR doesn't have an airport on its own – clearly outnumber the air accessibility of the region around the Basel-Mulhouse airport due to its proximity to Zurich, which is situated in the direct neighbourhood. The high values of the Strasbourg region could be explained with the three airports Strasbourg, Baden-Baden and Lahr in direct neighbourhood. The numbers don't seem to reflect the regional reality too well, though.

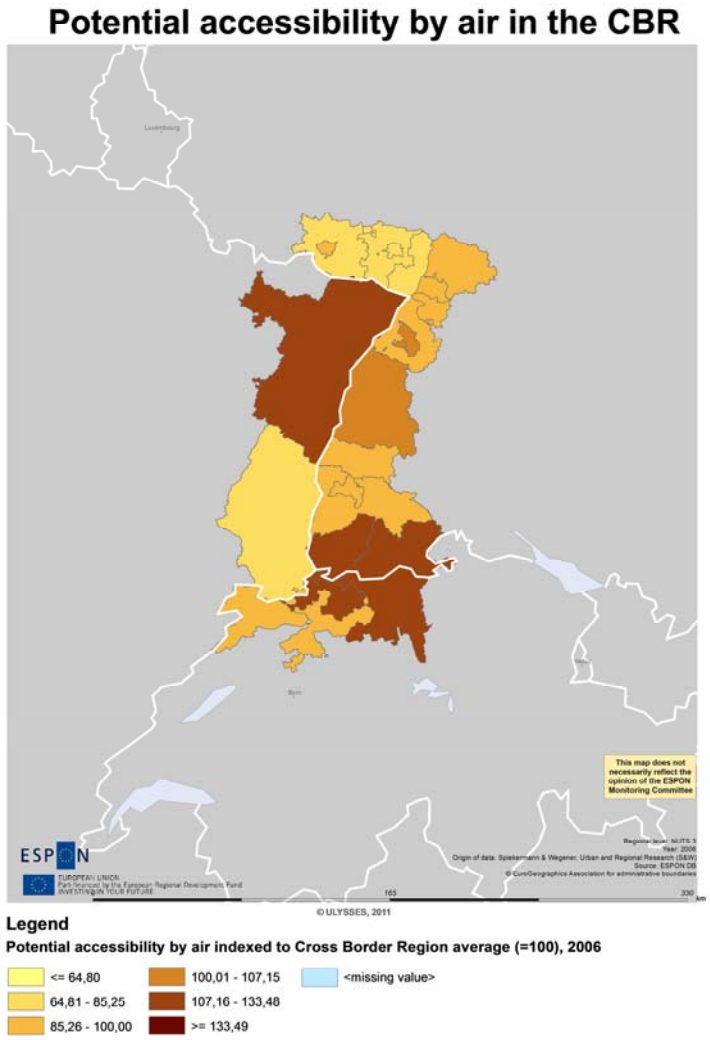


Figure 5.10: Potential accessibility by air relative to CBR average

Compared to the ESPON average most of the territories of the CBR offer air accessibility above average.

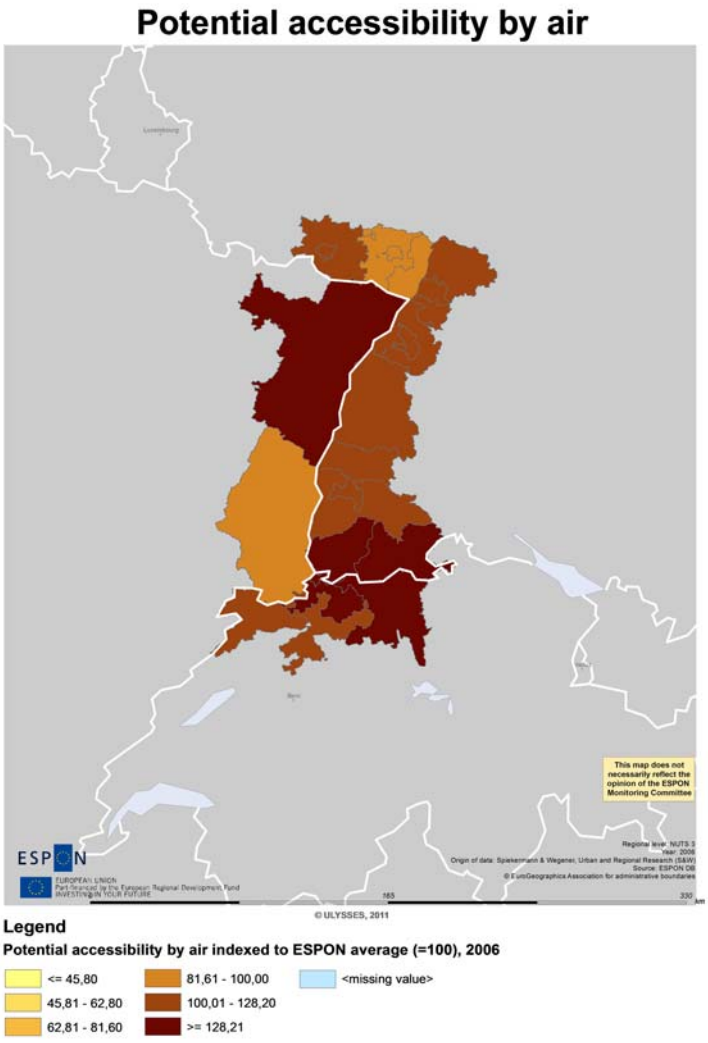


Figure 5.11: Potential accessibility by air relative to ESPON average

Between 2001 and 2006 the region has lost some of its relative accessibility advantage. Only the region around the Baden-Baden airport could improve its position.

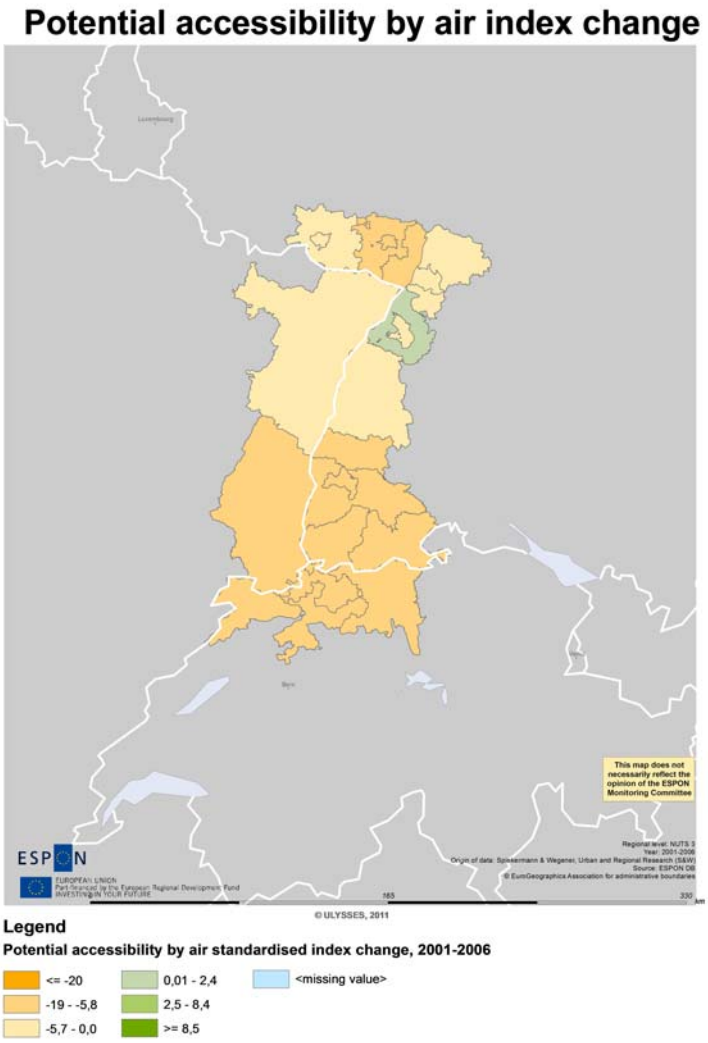


Figure 5.12: Index change of potential accessibility by air relative to ESPON average

5.5 Multi-modal

5.5.1 Potential accessibility

The NUTS3 that had high values for rail and air accessibility show also strong results in the multi-modal accessibility analysis.

Again, the accessibility values are above average, compared to the ESPON average.

Between 2001 and 2006 most parts of the CBR relatively lost ground in the EU context. Due to the very high values of the region, this is not a surprise since the new member states of the EU-25 are catching up steadily

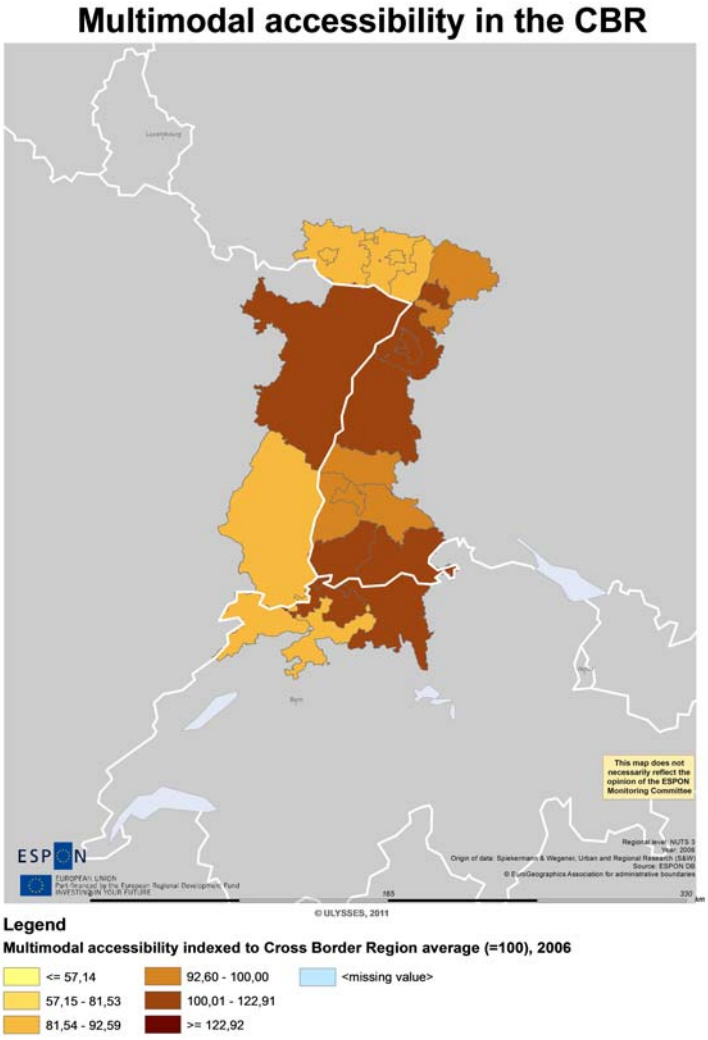


Figure 5.13: Potential multi-modal accessibility relative to CBR average

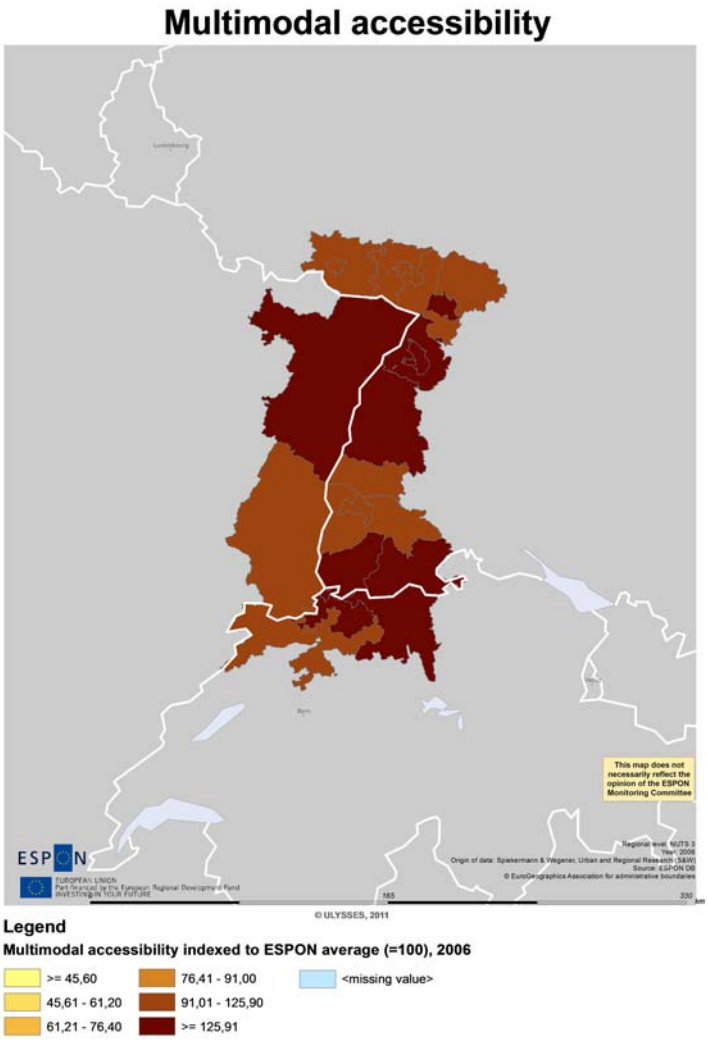


Figure 5.14: Potential multi-modal accessibility relative to ESPON average

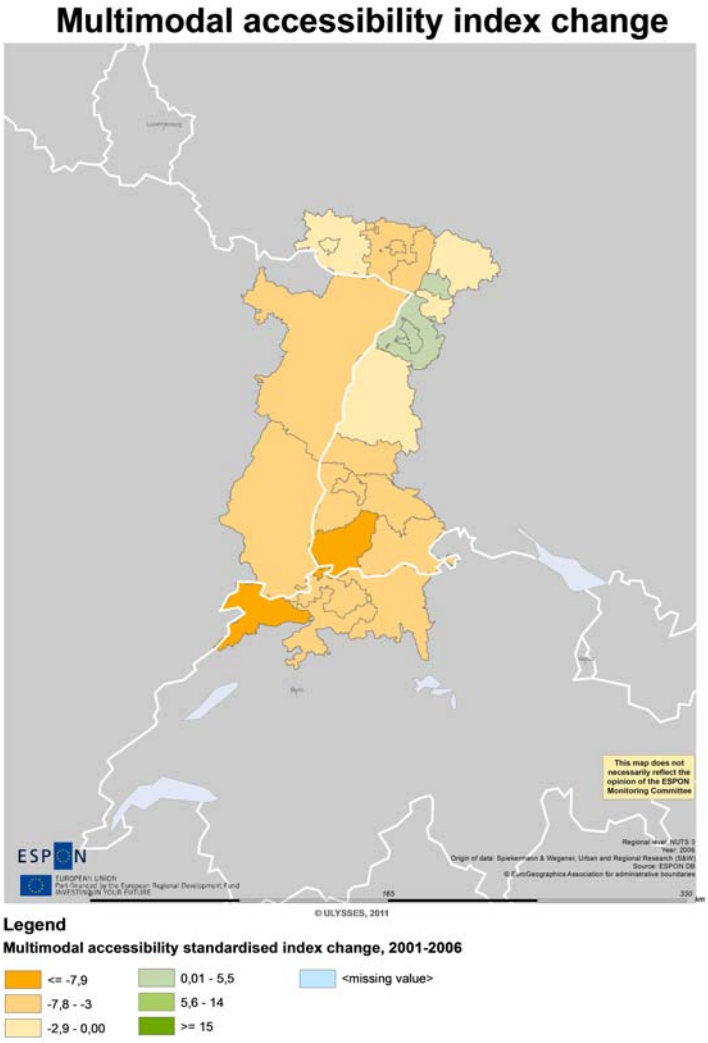


Figure 5.15: Index change of Potential multi-modal accessibility relative to ESPON average

5.6 Broadband internet access

For analysing the internet accessibility the level of NUTS2 was used. The figures show a 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 regional levels with a maximum of 100. The highest values in the EU are found in London with a factor of 89,54, but within the upper quartile, values range from this 89,54 to 3,09.

Within the CBR the values for internet structure range from 3,49 in CH02 Espace Mittelland to 0,50 in FR42 Alsace. All NUTS2 units had a decrease in the composite indicator of internet infrastructure from 2006 to 2008, which may derive from less internet traffic and s decreasing share of IP addresses in comparison to the European development.

NUTS_id	NUTS name	2006	2008	Growth rate
CH02	Espace Mittelland	4,6844	3,49238	-1,19202
CH03	Nordwestschweiz	1,96565	1,82047	-0,145171
DE12	Karlsruhe	3,58393	3,42844	-0,155493
DE13	Freiburg	0,838401	0,706529	-0,131872
DEB3	Rheinhessen-Pfalz	1,37481	1,28565	-0,0891678
FR42	Alsace	0,534365	0,507035	-0,0273307

Table 5.3: Composite indicator of internet infrastructure

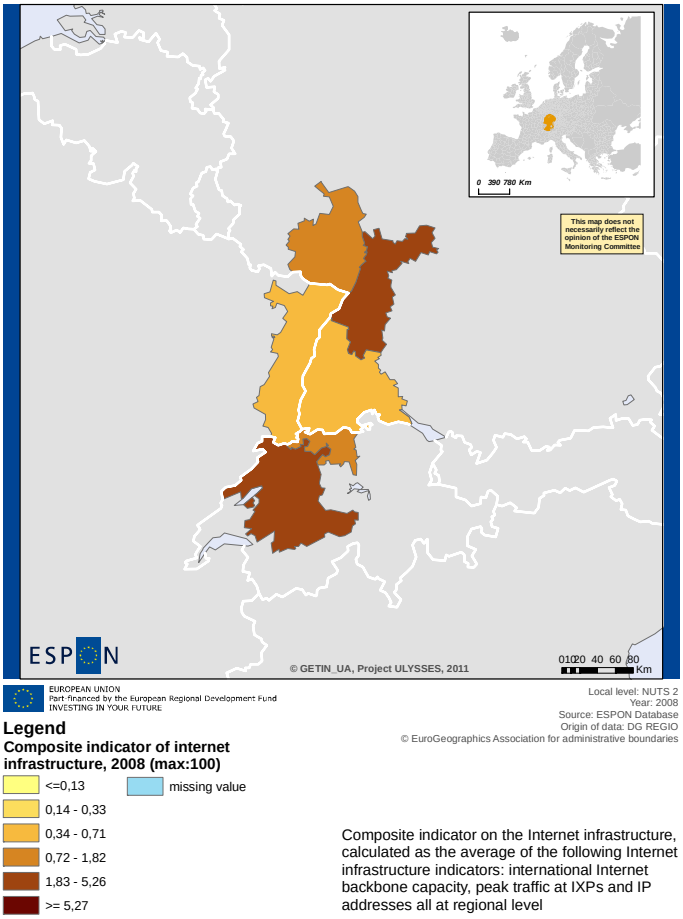


Figure 5.16: Category map of composite indicator of internet infrastructure

5.7 Border effect

The border still plays an important role in the CBR. Especially the division of the German and French regional public transport is an important issue, which hinders regional development.

While this is a known fact among players in the region, unfortunately the accessibility indicators gathered don't help much to come to this conclusion. Reasons for this are, that the sheer size of the NUTS3 units makes them cover the hole width between the state border and the border of the

CBR. This makes the assessment of the border effect impossible. Furthermore, the regions features differ very much between the densely populated and highly developed plain in the centre of the region and the low mountain ranges which flank this plain. As long as there isn't data available on NUTS4 or 5 level, these geographic characteristics that exert an important influence on the accessibility can't be assessed.

5.8 Chapter conclusion

Especially for the topic of accessibility, one has to be aware of the coarseness of the spatial units in which data is provided. This is true for intra-regional analyses like the effect of a border, but as well for the inter-regional comparison of regional performance indicators, as the accessibility performance of a region can only be estimated correctly through an integrated assessment of extra- and intra-regional connectivity features.

Chapter 6 – Gothenburg and Lisbon/Europe 2020 strategy Analysis

6.1 Aims, Indicators and Methods

The Lisbon Strategy, formulated in 2000, aimed to develop the EU as the most competitive and dynamic knowledge-based economy in the world, combined with the creation of growth and jobs embedded in a sustainable context. The Gothenburg strategy (2001), representing the environmental pillar of the Lisbon strategy, was more concerned with sustainable development and the environmental dimension of the topics employment, economic reform and social cohesion. To define and achieve specific objectives, different measures have been approved, like the improvement of transport systems, implementation of ESPON, and production of integrated development strategies for urban and environmentally-sensitive areas.

The methodology used in explained in each sub-chapter. Table 6.1 shows the indicators and sources used for the analysis in this Chapter.

Variable name	Geographical scale	Source	Time frame
GDP	MUTS 3	EUROSTAT, Russian Statistical Institute	1997-2009
Share of Natura 2000 areas	NUTS 3	European Commission's 5th Cohesion Report	2009
Solar energy resources	NUTS 3		1981-1990
Wind energy potential	NUTS 3		2000-2005
Ozone concentration exceedances	NUTS 3		2008
Urban waste water treatment	NUTS 2		2007
Soil sealed area	NUTS 3		2006
Long term unemployment	NUTS 2	Eurostat	2009
Unemployment rate	NUTS 3		2010
Youth unemployment rate	NUTS 3		2010
Population at risk of poverty after social transfer	NUTS 3		2008
Gross value added by NACE	NUTS 3	Eurostat	1997-2008
Employment by NACE	NUTS 3	Eurostat & National statistical institute Russia	2000-2008
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

Table 6.1: Scale, source and time frame of key data for the analysis

6.2 Economy & employment

For defining the regional disparities in the GDP per capita per NUTS, the coefficient of deviation was used. This indicator is obtained by calculating the ration 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 CBR 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 0, excluding Switzerland).

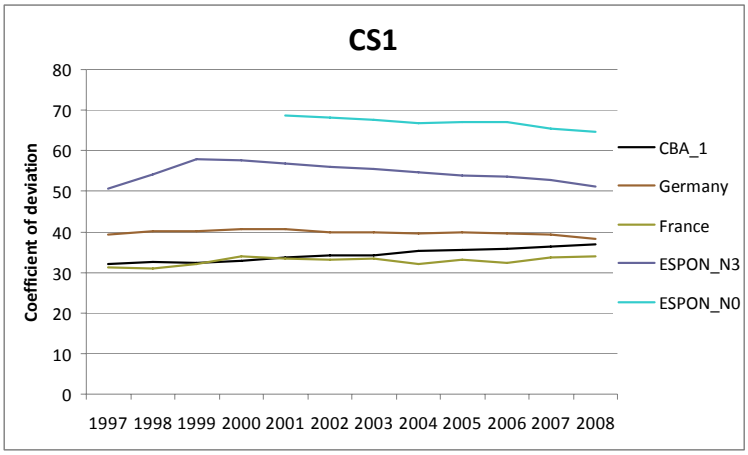


Figure 6.1: Coefficient of deviation of the CBR compared to France, Germany and EU

The higher the coefficient of deviation, the higher are the disparities within the geographical unit analysed. France and Germany show a much lower disparity compared to the ESPON area, with France and Germany having about the same coefficient and hence level of disparities over the period watched, while the disparities in CBR are increasing over ten years.

6.2.2 GDP indexed to the leading region

The analysis involves the indexation of GDP per capita in each NUTS III to the value of the leading region in 2008 (Greater London), which is by definition 100,0. The value of reference for GDP per capita is 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, 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. The concerned computation is represented in the following expression:

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

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

For the Swiss NUTS3 units being part of the CBR only date for 2003 could be integrated in the analysis. The figures shown can hence be only a rough comparison of the different national NUTS3 units.

ID		2008	index number	class
UKI	London	50.600	100	very rich region
EU27	European Union	25.100		
DE	Germany	30.200		
FR	France	30.400		
CH	Switzerland	44.800		
DE121	Baden-Baden, Stadtkreis	44.500	87,94	rich region
DE122	Karlsruhe, Stadtkreis	48.000	94,86	rich region
DE123	Karlsruhe, Landkreis	29.800	58,89	middle income region
DE124	Rastatt	33.100	65,42	middle income region
DE131	Freiburg im Breisgau, Stadtkreis	38.000	75,10	rich region
DE132	Breisgau-Hochschwarzwald	22.400	44,27	less developed region
DE133	Emmendingen	23.100	45,65	less developed region
DE134	Ortenaukreis	32.700	64,62	middle income region
DE139	Lörrach	27.600	54,55	middle income region
DE13A	Waldshut	25.300	50,00	middle income region
DEB33	Landau in der Pfalz, Kreisfreie Stadt	34.000	67,19	middle income region
DEB37	Pirmasens, Kreisfreie Stadt	31.900	63,04	middle income region
DEB3E	Germersheim	27.800	54,94	middle income region
DEB3H	Südliche Weinstraße	18.700	36,96	less developed region
DEB3K	Südwestpfalz	13.400	26,48	laggard region
FR421	Bas-Rhin	30.000	59,29	middle income region
FR422	Haut-Rhin	26.000	51,38	middle income region
CH023	Solothurn	33.438	66,08	middle income region
CH025	Jura	28.835	56,99	middle income region
CH031	Basel-Stadt	70.227	138,79	very rich region
CH032	Basel-Landschaft	38.662	76,41	rich region
CH033	Aargau	36.227	71,60	rich region

Table 6.2: GDP of the NUTS3 units of the CBR and their index compared to the reference unit of Greater London (2008; 2003 for Swiss NUTS3 units)

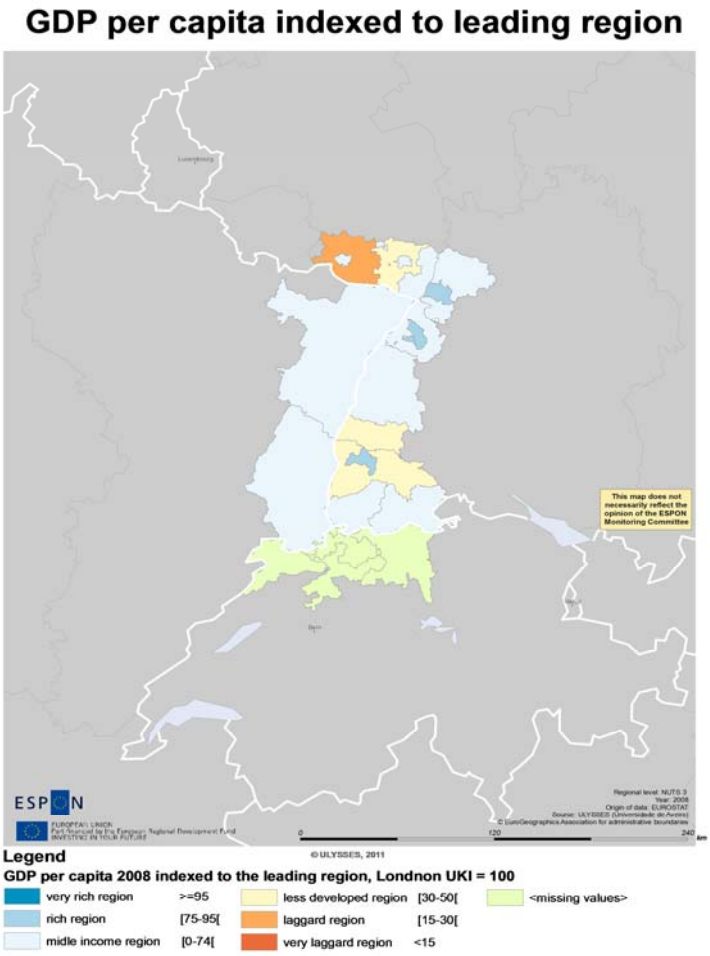


Figure 6.2: Category map of GDP per capita indexed to the leading region

The wealthiest units in the CBR are the bigger urban NUTS3 units of CH031 Basel-Stadt with an index approximately 57% higher than the reference unit of Greater London (in 2003) and DE122 Karlsruhe-Stadt 5% lower than the reference unit. Even taking not only the urbanised area of Basel-Stadt but the agglomeration together with Basel-Landschaft into account, the GDP per capita in 2003 is 16% higher than of Grater London (EUR 51.770 per capita in 2003 for Basel-Stadt and Basel-Landschaft, EUR 44.800 per capita for Greater London)

Less developed regions with an index lower than 50% of the reference unit are all found in Germany with DE133 Emmendingen (45,65), DE132 Breisgau-Hochschwarzwald (44,27), DEB3H Südliche Weinstraße (36,96), and a laggard region DEB3K Südwestpfalz of only 26,48 compared to the reference unit.

6.2.2 Catching up analysis

This analysis intends to evaluate the speed of catching-up with the leading region Greater London, through a standard logistic process. In the present example 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:

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

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 a 250 years. Non converging region 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.

Except for the already 'leading region' CH031 Basel-Stadt (in fact even higher than the leading region of Greater London) all NUTS3 units of the CBR have to be indexed as diverging region, i.e. their growth rate in GDP per capita is less than the leading region of Greater London, hence they will not catch up[10] (see Table 6.3). This is partly due to the effect that London as *the* place of the financial markets in Europe had an extreme growth in GDP during the period analysed, from EUR/capita 32.000.- in 1997 to EUR/capita 50.600 in 2008 (+57%). So most of the regions having a higher annual growth can be found in the former socialist countries now joining the EU.

The NUTS3 units of CBR are amongst the wealthiest NUTS3 units of all ULYSSES Case Study Areas and share a high GDP per capita compared to other European NUTS3 units. Working on a high basis, increases in GDP are steady but lower compared to the leading region of Greater London, hence the gap between the Greater London area and the CBR is widening over time.

[10] Note that the figures used are for the period of 1997 to 2008. London as the European most important location for financial sector had a tremendous increase in GDP due to the disproportionate growth of the financial sector. Comparing the growth rates of other NUTS3 units in Europe it can be seen, that those having the highest annual growth rates are to be found in the new member states of Bulgaria, Romania, and Latvia.
With the real estate and financial crisis in the US affecting European markets -in particular the financial centres like London- the leading position might still be true, but overall has to be handled with care for statistic analysis.

ID		GDP/capita[11]		Annual growth rate	class
		1997	2008		
UKI	London	32.200	50.600	0,0419	leading region
CH023	Solothurn	32.491	33.438	0,0096	slow catching-up region
CH025	Jura	28.448	28.835	0,0045	non converging region
CH031	Basel-Stadt	56.602	70.227	0,0745	leading region
CH032	Basel-Landschaft	38.457	38.662	0,0018	diverging region
CH033	Aargau	36.131	36.227	0,0008	diverging region
DE121	Baden-Baden, Stadtkreis	33.100	44.500	0,0273	diverging region
DE122	Karlsruhe, Stadtkreis	42.800	48.000	0,0105	diverging region
DE123	Karlsruhe, Landkreis	21.000	29.800	0,0323	diverging region
DE124	Rastatt	25.300	33.100	0,0247	diverging region
DE131	Freiburg im Breisgau, Stadtkreis	30900	38.000	0,0190	diverging region
DE132	Breisgau-Hochschwarzwald	17.700	22.400	0,0216	diverging region
DE133	Emmendingen	18.000	23.100	0,0229	diverging region
DE134	Ortenaukreis	24.400	32.700	0,0270	diverging region
DE139	Lörrach	21.900	27.600	0,0213	diverging region
DE13A	Waldshut	19.800	25.300	0,0225	diverging region
DEB33	Landau in der Pfalz, Kreisfreie Stadt	26.800	34.000	0,0219	diverging region
DEB37	Pirmasens, Kreisfreie Stadt	27.300	31.900	0,0143	diverging region
DEB3E	Germersheim	20.500	27.800	0,0281	diverging region
DEB3H	Südliche Weinstraße	14.600	18.700	0,0228	diverging region
DEB3K	Südwestpfalz	10.700	13.400	0,0207	diverging region
FR421	Bas-Rhin	22.300	30.000	0,0273	diverging region
FR422	Haut-Rhin	20.200	26.000	0,0232	diverging region

Table 6.3: GDP per capita, annual growth rates and performance in relation to leading region of Greater London of the NUTS3 units in the CBR

[11] Switzerland: years 2000 and 2003

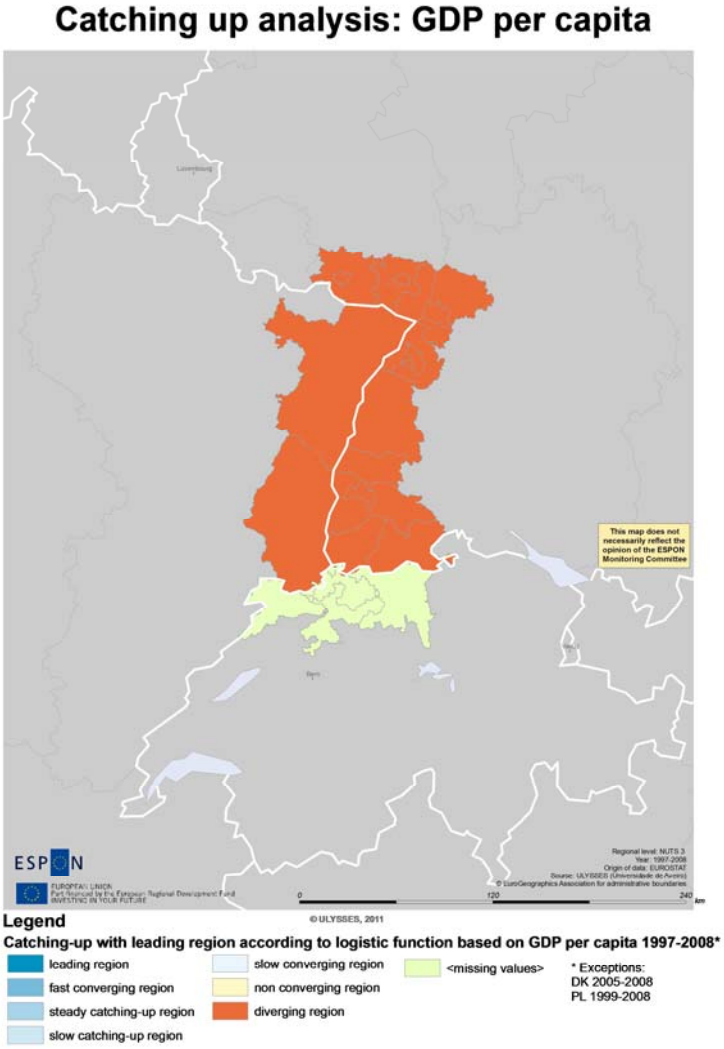


Figure 6.3: Category map of catching-up analysis

6.2.3 Employment by NACE

Employment figures were analysed for the years 2000 and 2008. For the Swiss NUTS3 units no data was available so the analysis is based on the French and German NUTS3 units only.

While most of the NUTS3 units of the CBR have about similar shares of employment by NACE, some NUTS3 units show some peculiarities: DE124 Rastatt and DEB3E Germersheim show a significant higher proportion of employees in industry (more than double to the German average of 1994% of this sector), due to the two production plants of Daimler, dominating the labour market. Same to the high share of agriculture and fishing in the NUTS3 units DE132 Breisgau-Hochschwarzwald (5,32%), DE133 Emmendingen (4,54%), and DEB3H Südliche Weinstraße (8,54%) compared to 2,14% in Germany due to the winery and orchading (see Table 6.4 and also Chapter 4).

From 2000 to 2008 an overall increase of 0,57% of employment can be watched in the CBR. The number of employees rose from 2.087.700 to 2.186.600 in the French and German NUTS3 units. This increase is mainly covered by the tertiary sector of 'Wholesale and retail; hotels & restaurants; transport` (+0,61%), 'Financial intermediation; real estate' (+1,58%), and 'Public administration and community services; activities of households' (+1,60%), while the first ('Agriculture; fishing' -0,61%[12]) and second ('Industry' -0,90%, 'Construction' -0,71%) sector lost employees 2000-2009.

Besides the –as already mentioned- economic not very attractive NUTS3 units of DEB37 Pirmasens (-0,19%) and DEB3K Südwestpfalz (-0,69%) only FR421 Bas-Rhin (-0,20%) lost employees from 2000-2009 (see Table 6.5).

[12] See also Chapter 4 for this.

Share of employment by NACE 2008 (%)							
		Agriculture; fishing	Industry (except construction)	Construction	Wholesale and retail trade; hotels and restaurants; transport	Wholesale and retail; hotels & restaurants; transport	Public administration and community services; activities of households
EU27		1,75	19,61	6,48	21,08	28,27	22,80
CH		#NV	#NV	#NV	#NV	#NV	#NV
DE		2,14	19,94	5,44	24,94	17,40	30,14
FR		3,05	14,67	6,93	23,92	16,09	35,35
CH023	Solothurn	#NV	#NV	#NV	#NV	#NV	#NV
CH025	Jura	#NV	#NV	#NV	#NV	#NV	#NV
CH031	Basel-Stadt	#NV	#NV	#NV	#NV	#NV	#NV
CH032	Basel-Landschaft	#NV	#NV	#NV	#NV	#NV	#NV
CH033	Aargau	#NV	#NV	#NV	#NV	#NV	#NV
DE121	Baden-Baden, Stadtkreis	1,40	15,62	4,20	23,31	14,22	41,26
DE122	Karlsruhe, Stadtkreis	0,23	12,25	3,22	25,93	24,69	33,67
DE123	Karlsruhe, Landkreis	1,36	26,15	5,48	22,49	22,39	22,08
DE124	Rastatt	1,60	41,94	5,25	20,21	11,13	19,86
DE131	Freiburg im Breisgau, Stadtkreis	0,41	10,52	2,72	25,05	16,70	44,67
DE132	Breisgau-Hochschwarzwald	5,32	21,86	7,45	27,56	11,12	26,69
DE133	Emmendingen	4,54	28,95	7,04	21,75	10,80	26,92
DE134	Ortenaukreis	3,22	28,22	5,98	26,00	11,59	25,05
DE139	Lörrach	2,27	28,43	5,33	24,48	12,34	27,15
DE13A	Waldshut	3,07	27,79	6,70	24,58	10,61	27,09
DEB33	Landau in der Pfalz, Kreisfreie Stadt	1,38	10,38	3,11	26,99	16,96	41,18
DEB37	Pirmasens, Kreisfreie Stadt	0,38	22,69	4,62	25,38	14,62	32,31
DEB3E	Germersheim	2,66	40,78	4,96	18,62	9,93	23,05
DEB3H	Südliche Weinstraße	8,54	16,58	7,79	26,88	8,29	31,66
DEB3K	Südwestpfalz	4,05	19,84	9,72	29,96	7,69	28,34
FR421	Bas-Rhin	1,64	18,61	6,64	24,50	15,24	33,37
FR422	Haut-Rhin	2,19	21,74	7,07	23,65	10,91	34,41

Table 6.4: Share of employment by NACE 2008 (%)

		Annual growth rate of employment by NACE 2000-2008 (%)						
		All NACE	Agriculture; fishing	Industry (except construction)	Construction	Wholesale and retail trade; hotels and restaurants; transport	Wholesale and retail; hotels & restaurants; transport	Public administration and community services; activities of households
EU27		3,12	1,26	-1,48	-4,33	-2,96	4,36	3,37
CH		#NV	#NV	#NV	#NV	#NV	#NV	#NV
DE		0,36	-1,03	-0,76	-2,87	0,28	2,39	0,92
FR		0,63	-1,73	-1,74	2,50	0,70	1,73	1,11
CH023	Solothurn	#NV	#NV	#NV	#NV	#NV	#NV	#NV
CH025	Jura	#NV	#NV	#NV	#NV	#NV	#NV	#NV
CH031	Basel-Stadt	#NV	#NV	#NV	#NV	#NV	#NV	#NV
CH032	Basel-Landschaft	#NV	#NV	#NV	#NV	#NV	#NV	#NV
CH033	Aargau	#NV	#NV	#NV	#NV	#NV	#NV	#NV
DE121	Baden-Baden, Stadtkreis	1,43	0,00	-1,40	-2,48	2,51	3,59	1,92
DE122	Karlsruhe, Stadtkreis	0,46	-2,25	-1,33	-2,54	0,04	1,28	1,30
DE123	Karlsruhe, Landkreis	1,28	-0,92	-0,27	-1,76	1,55	3,49	1,97
DE124	Rastatt	0,58	-1,31	0,43	-3,43	0,86	2,96	0,94
DE131	Freiburg im Breisgau, Stadtkreis	1,19	-1,91	-1,00	-2,25	0,63	1,64	2,27
DE132	Breisgau-Hochschwarzwald	0,56	-1,29	0,00	-2,07	1,50	1,02	1,14
DE133	Emmendingen	0,36	-1,60	0,14	-1,55	0,46	1,55	1,07
DE134	Ortenaukreis	0,53	-1,01	-0,30	-0,46	0,40	2,57	1,27
DE139	Lörrach	0,56	-0,53	-0,55	-1,91	1,00	1,96	1,45
DE13A	Waldshut	0,46	-2,97	-0,25	-1,46	0,96	2,17	1,08
DEB33	Landau in der Pfalz, Kreisfreie Stadt	1,28	0,00	-1,18	-1,31	-0,47	3,93	2,46
DEB37	Pirmasens, Kreisfreie Stadt	-0,19	0,00	-3,12	0,00	-1,25	3,44	1,95
DEB3E	Germersheim	1,62	1,80	2,62	-1,66	1,00	1,95	1,22
DEB3H	Südliche Weinstraße	0,92	1,16	-0,37	-1,15	0,98	0,78	2,06
DEB3K	Südwestpfalz	-0,69	0,00	-4,19	-2,34	0,52	2,17	0,93
FR421	Bas-Rhin	0,53	0,17	-1,87	1,40	0,56	0,99	1,71
FR422	Haut-Rhin	-0,20	0,00	-2,76	0,65	0,10	-1,02	1,64

Table 6.5: Annual growth rate of employment by NACE 2000-2008 (%)

6.2.4 Gross value added

The gross value added, serves to evaluate the overall contribution of the different sectors to the total output of the regions.

Nuts name		Share of GVA by NACE 2008 (%)					
		Agriculture; fishing (A_B)	Industry (except construction) (C-E)	Construction (F)	Wholesale and retail trade; hotels and 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	22,80
CH		#NV	#NV	#NV	#NV	#NV	#NV
DE		0,90	25,58	4,25	17,75	29,44	22,08
FR		2,04	13,63	6,66	18,85	33,38	25,44
CH023	Solothurn	#NV	#NV	#NV	#NV	#NV	#NV
CH025	Jura	#NV	#NV	#NV	#NV	#NV	#NV
CH031	Basel-Stadt	#NV	#NV	#NV	#NV	#NV	#NV
CH032	Basel-Landschaft	#NV	#NV	#NV	#NV	#NV	#NV
CH033	Aargau	#NV	#NV	#NV	#NV	#NV	#NV
DE121	Baden-Baden, Stadtkreis	0,82	20,36	4,73	16,91	23,68	33,49
DE122	Karlsruhe, Stadtkreis	0,11	20,32	3,17	19,53	32,91	23,95
DE123	Karlsruhe, Landkreis	0,56	33,20	4,67	16,16	30,23	15,18
DE124	Rastatt	0,66	48,27	4,95	13,89	18,71	13,51
DE131	Freiburg im Breisgau, Stadtkreis	0,21	18,57	2,75	18,37	25,16	34,94
DE132	Breisgau-Hochschwarzwald	1,93	25,01	7,78	18,40	25,24	21,64
DE133	Emmendingen	1,44	31,81	6,80	15,26	22,71	21,97
DE134	Ortenaukreis	1,12	35,18	5,43	18,40	21,49	18,38
DE139	Lörrach	0,85	35,81	5,59	14,91	22,54	20,31
DE13A	Waldshut	0,91	33,11	6,69	15,92	22,48	20,89
DEB33	Landau in der Pfalz, Kreisfreie Stadt	0,95	13,88	3,10	18,42	30,75	32,91
DEB37	Pirmasens, Kreisfreie Stadt	0,15	18,82	3,95	26,59	23,85	26,64
DEB3E	Germersheim	1,37	50,23	3,43	11,08	19,36	14,52
DEB3H	Südliche Weinstraße	5,00	20,36	6,60	18,70	23,83	25,51
DEB3K	Südwestpfalz	2,78	17,34	7,58	20,13	29,61	22,55
FR421	Bas-Rhin	1,89	19,03	6,61	18,11	30,57	23,80
FR422	Haut-Rhin	2,20	20,44	6,99	17,85	28,35	24,18

Table 6.6: Share of GVA by NACE in the CBR, 2008

Simultaneous to chapter 6.1.2 catching-up analysis all NUTS3 units of the CBR had an increase of Gross Value added from 1997 to 2008. The highest are in the already relatively strong German NUTS3 units DE123 Karlsruhe, Landkreis and DEB3E Germersheim, the lowest in DEB37 Pirmasens and the two French NUTS3 units.

	Annual growth rate of the GVA by NACE 1997-2008 (%)							
		All NACE	Agriculture; fishing (A_B)	Industry (except construction) (C-E)	Construction (F)	Wholesale and retail trade; hotels and 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
CH		#NV	#NV	#NV	#NV	#NV	#NV	#NV
DE		2,39	-0,98	2,58	-0,69	2,37	3,08	2,19
FR		4,13	-0,08	1,28	6,67	4,04	5,5	4,19
CH023	Solothurn	#NV	#NV	#NV	#NV	#NV	#NV	#NV
CH025	Jura	#NV	#NV	#NV	#NV	#NV	#NV	#NV
CH031	Basel-Stadt	#NV	#NV	#NV	#NV	#NV	#NV	#NV
CH032	Basel-Landschaft	#NV	#NV	#NV	#NV	#NV	#NV	#NV
CH033	Aargau	#NV	#NV	#NV	#NV	#NV	#NV	#NV
DE121	Baden-Baden, Stadtkreis	3,04	0,68	4,28	0,82	4,22	1,93	3,05
DE122	Karlsruhe, Stadtkreis	1,42	-1,96	-0,41	-0,02	1,75	2,08	2,29
DE123	Karlsruhe, Landkreis	3,66	-2,24	4,42	2,19	4,89	3,06	2,93
DE124	Rastatt	2,74	-0,73	2,98	1,41	4,45	1,76	2,53
DE131	Freiburg im Breisgau, Stadtkreis	2,7	-5,09	4,08	0,2	2,05	2,28	3,01
DE132	Breisgau-Hochschwarzwald	2,76	-1,87	2,47	2,39	4,25	2,68	2,72
DE133	Emmendingen	2,89	-0,96	3,13	2,2	4,09	2,28	2,98
DE134	Ortenaukreis	3,04	0,06	3,71	1,75	3,01	2,66	2,93
DE139	Lörrach	2,48	2	1,76	3,29	3,24	2,96	2,57
DE13A	Waldshut	2,39	-2,82	1,86	2,29	4,01	2,35	2,56
DEB33	Landau in der Pfalz, Kreisfreie Stadt	2,83	-0,96	1,86	1,48	1,37	5,24	2,47
DEB37	Pirmasens, Kreisfreie Stadt	0,16	-0,95	-3,16	1,66	-0,53	2,07	2,29
DEB3E	Germersheim	3,14	0,36	3,29	1,46	2,94	4,24	2,23
DEB3H	Südliche Weinstraße	2,45	1,51	4,38	2,28	1,54	2,2	2,21
DEB3K	Südwestpfalz	1,55	0,03	-0,62	1,74	2,42	2,51	1,7
FR421	Bas-Rhin	1,24	2,43	0,59	3,19	0,8	1,33	1,47
FR422	Haut-Rhin	1,17	-0,53	-0,73	2,43	1,12	1,61	2,57

Table 6.7: Annual growth rate of the GVA by NACE in the CBR 1997-2008

6.3 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. Population at risk of poverty is defined as "having equivalised disposable income (i.e. adjusted for household size and composition) of less than 60% of national median" (European Commission's 5th Cohesion Report database).

NUTS 2 name	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
Switzerland	4,5	1,1	7,9	16,2*	4,0	35,3
Germany	7,1	3,5	9,9	15,2*	3,5	26,6
France	9,7	3,5	23,4	12,7*	3,8	29,0
Espace Mittelland	4,2	0,8	7,7	#N/A	4,6	32,6
Nordwestschweiz	4,5	1,3	8,1	#N/A	3,4	35,6
Karlsruhe	5,3	2,1	8,9	11,1	3,0	29,1
Freiburg	4	1,3	5,4	10,3	3,2	26,7
Rheinhessen-Pfalz	6,1	2,5	12,6	13,7	2,5	26,1
Alsace	8,3	2,7	18,3	10,7	4,2	30,7

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

Compared to the EU and national averages, social cohesion is quite strong in the CBR: France as a total shows higher figures according unemployment, long-term unemployment and youth unemployment, but the NUTS2 unit Alsace is significant lower than the EU and national average. Same is true to the Swiss and German NUTS2 units of the CBR, having a quite low unemployment rate, belonging to the lowest rates within Europe. Not having the data for 'population at risk of poverty' for the Swiss NUTS2 areas, the high figure of Switzerland as total, only slightly lower than the EU average is astonishing and might be explained by the overall high expenses for daily life in Switzerland and a wide gap between income of skilled and/or academic workers to the unskilled.

6.4 Innovation & research

The analysis of the potential Innovation and Research is meant to measure the competitiveness f the CBR for future economic wealth and growth. An in-depth analysis will be done in Chapter 7.

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) and as a percentage of GDP)
- EPO patents
- Employed persons in high and medium tech manufacturing activities

NUTS-ID(N2)	NUTS 2 name	Total intramural R&D expenditure 2007				EPO patents per million of inhabitants 2007	Employed persons in high and medium tech manufacturing activities (% total workforce) 2004 *
		Total	Business enterprise sector	Government sector	Higher education sector		
EU27	EU27	2,01	1,18	0,24	0,42	#NV	#NV
CH	Switzerland	2,9	2,14	0,03	0,66	#NV	#NV
DE	Germany	2,53	1,77	0,35	0,41	186,35	16,22
FR	France	2,07	1,31	0,34	0,4	79,68	9,26
CH02	Espace Mittelland	:	:	:	:	:	:
CH03	Nordwestschweiz	:	:	:	:	:	:
DE12	Karlsruhe	3,75	2,32	0,9	0,53	322,92	18,17
DE13	Freiburg	2,49	1,73	0,3	0,46	323,47	22,11
DEB3	Rheinhessen-Pfalz	2,85	2,09	0,25	0,52	223,84	24,95
FR42	Alsace	1,54	0,85	0,06	0,63	119,63	22,17

Table 6.8: Indicators for innovation and research: R&D expenditure in percentage of GDP, patents and employed persons in the CBR 2004

The total intramural R&D expenditures of the involved national countries are all higher than the EU average, only Switzerland spends less on the governmental sector. Compared to national averages, the NUTS2 unit FR42 Alsace is –besides the higher education sector- relatively weak on R&D expenditure, while the German NUTS2 units spend about the same or more than the national averages, especially in the NUTS2 unit DE12 Karlsruhe with about 50% more expenditure on R&D in total (for Innovation and Research see also Chapter 7).

Regarding EPO patents, a common German prejudice comes true of the people of the state of Baden-Wuerttemberg being “Tüftler” (tinkerers – like Walt Disney’s Gyro Gearloose) and hence having the highest amount of patents per inhabitants. This can be seen even within the German NUTS2 areas with the two belonging to the State of Baden-Wuerttemberg having about 50% more than the NUTS2 unit of Rheinhessen-Pfalz, nearly the double compared to the German average and more than three times compared to France.

Also the employed persons in high and medium tech manufacturing activities are quite a lot: the average for France is at 9,26% of the total workforce in 2004, in Germany 75% higher at 16,22% of the total workforce. Within the CBR, the highest share got DEB3 Rheinhessen-Pfalz with nearly a quarter of high and medium tech employed, which may be related to the chemical trust of BASF, residing in Ludwigshafen, the by largest employer in the region. The other NUTS2 units DE12 Karlsruhe, DE13 Freiburg and FR42 Alsace also show higher shares compared to the national averages, especially in Alsace, where high and medium tech employed share is more than two times higher than the French average.

6.5 Environment

For the environmental analysis, two sets of indicators are available. On one hand, the indicators from the European Commission's 5th Cohesion Report, and on the other hand, indicators from the ESPON Climate Project regarding the region's sensitivity for climate change.

Six indicators from the 5th Cohesion Report were considered: soil sealed area, ozone exceedances, waste water treatment, Natura 2000 areas, solar energy, and wind potential. While the first four show some concrete elements on environmental issues in the region, the last two are a 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.

The data for environmental issues are available for the French and German NUTS units only.

6.5.1 Soil sealed area

Not only soil sealed areas but also land claims in general are a concern in spatial planning and a lot of efforts of how to reduce land claims had been down in recent years, especially in Germany with high funding within the REFINA Programme (the Germany abbreviation for Research for the reduction of land claims and sustainable development) by the German Ministry for Education and Research.

It is not the much the soil sealed area per inhabitant per se, but the daily or annual new claims which are important for the performance of a country or region. This data is unfortunately not available for the ESPON countries and NUTS units, so the soil sealed area per total area and per inhabitant has to serve here.

		Soil sealed area, 2006 (% total area)	Soil sealing per inhabitant (m2 per inhabitant), 2006
EU27		6,72	214
CH		NV	NV
DE		9,11	231,93
FR		4,85	249,45
CH023	Solothurn	NV	NV
CH025	Jura	NV	NV
CH031	Basel-Stadt	NV	NV
CH032	Basel-Landschaft	NV	NV
CH033	Aargau	NV	NV
DE121	Baden-Baden, Stadtkreis	6	164
DE122	Karlsruhe, Stadtkreis	23	149
DE123	Karlsruhe, Landkreis	8	184
DE124	Rastatt	6	209
DE131	Freiburg im Breisgau, Stadtkreis	18	127
DE132	Breisgau-Hochschwarzwald	3	195
DE133	Emmendingen	4	163
DE134	Ortenaukreis	5	204
DE139	Lörrach	5	193
DE13A	Waldshut	3	229
DEB33	Landau in der Pfalz, Kreisfreie Stadt	12	200
DEB37	Pirmasens, Kreisfreie Stadt	10	173
DEB3E	Germersheim	7	244
DEB3H	Südliche Weinstraße	3	196
DEB3K	Südwestpfalz	2	173
FR421	Bas-Rhin	5	211
FR422	Haut-Rhin	6	281

Table 6.9: Soil sealed area in relation to total area and soil sealing per capita in the CBR in 2006

The CBR's NUTS3 units are nearly all below the national averages of 231,93 sqm per inhabitant (DE) and 249,45 sqm per inhabitant (FR), only DEB3E Germersheim and FR422 Haut-Rhin show higher figures.

Most of the urbanised areas of the CBR (like DE131 Freiburg im Breisgau, Stadtkreis, DE122 Karlsruhe, DE121 Baden-Baden, DEB37 Pirmasens) have the lowest figures of soil sealing per inhabitant (and a high proportion of soil sealed of the total area), while the more rural areas are above them (see Table 6.9 and Figure 6.1). This can be explained by the higher densities if settlement realised in these areas, while the area for settlement and traffic purposes per capita is higher in rural areas.

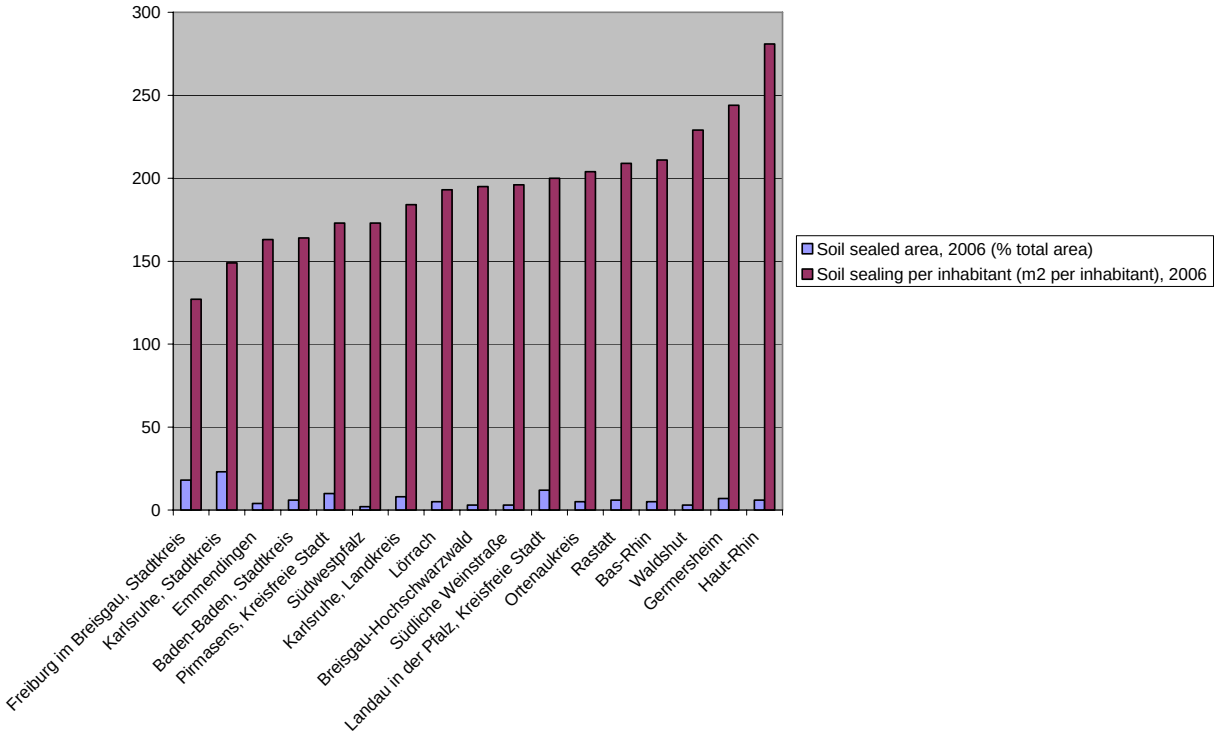


Figure 6.4: Soil sealed area in relation to total area and soil sealing per capita, ranked by size

The soil sealed area in relation to the total area of course show higher values for the urbanised areas (see Figure 6.5), but on NUTS3 level cannot reflect the uneven distribution of population and settlement in the CBR with an concentration along the Rhine Valley and lower densities in the Vosges and Black Forest.

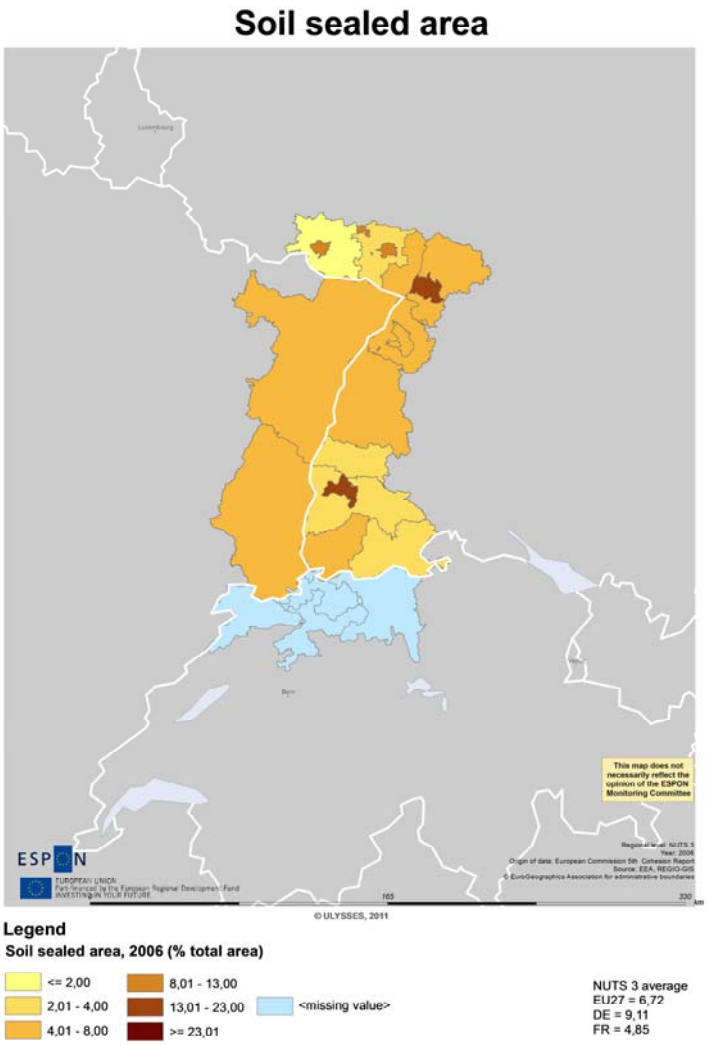


Figure 6.5: Category map of soil sealed area in the CBR

6.5.2 Ozone

The amounts of days with ground-level ozone concentration above 120 µg/m³ reflect emissions of fossil fuels, especially from the transport sector as NO_X-emissions from vehicles react with oxygen (O_2) to ozone (O_3). This reaction does not only take place in the areas of high NO_X-emissions (for instance city centres) buts also in the surrounding suburbs and areas. Due to catalysts for vehicles, the overall stress by ground-level ozone fell in the last decade, while particular matter (fine dust particles) PM10 remains a problem in agglomerations.

Germany (7,77 days/year) and France (7,82 days/year) have about the same amount of days with ground-level ozone concentration above 120 µg/m³, both below the EU average of 9,99 days/year. The ozone concentration exceedances in the CBR have a small range from 6 to 9 days/year with an average of 7,30 days/year in 2008. As described above, the NUTS3 units having the highest values are not those being highly urbanised but on the contrary DE139 Lörrach and DE13A Waldshut (see Table 6.10).

NUTS CODE	NUTS NAME	Ozone concentration exceedances in NUTS3 regions (days), 2008
EU27 NUTS 2 average		9,99
CH		NV
DE		7,77
FR		7,82
DE121	Baden-Baden, Stadtkreis	8
DE122	Karlsruhe, Stadtkreis	6
DE123	Karlsruhe, Landkreis	6
DE124	Rastatt	7
DE131	Freiburg im Breisgau, Stadtkreis	8
DE132	Breisgau-Hochschwarzwald	8
DE133	Emmendingen	8
DE134	Ortenaukreis	6
DE139	Lörrach	9
DE13A	Waldshut	9
DEB37	Pirmasens, Kreisfreie Stadt	7
DEB3E	Germersheim	6
DEB3H	Südliche Weinstraße	7
DEB3K	Südwestpfalz	7
FR421	Bas-Rhin	6
FR422	Haut-Rhin	8
CBR Total		7,30

Table 6.10: Days with ground-level ozone concentration above 120 µg/m³

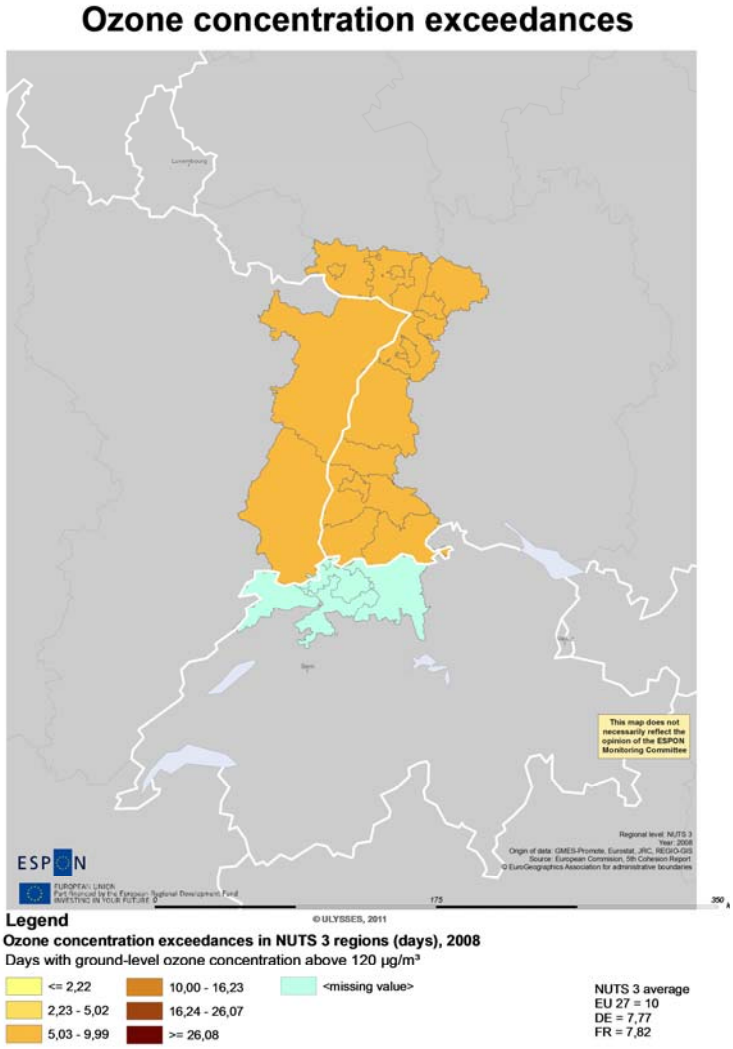


Figure 6.6: Ozone concentration exceedances in the CBR, 2008

6.5.3 Urban waste water treatment capacity

The urban waste water treatment capacity indicates how effective waste water can be treated before it is reverted into the natural circle, usually receiving streams like the River Rhine.

Both, France and Germany have averages higher than the EU average, especially in the NUTS2 units of the CBR, reaching nearly 100% of urban waste water treatment capacity.

NUTS CODE	NUTS NAME	Urban waste water treatment capacity, 2007
EU27 NUTS 2 average		92,53
CH		NV
DE		98,48
FR		96,24
DE12	Karlsruhe	99
DE13	Freiburg	99
DE14	Tübingen	99
FR42	Alsace	100

Table 6.11: Urban waste water treatment capacity in the CBR 2007

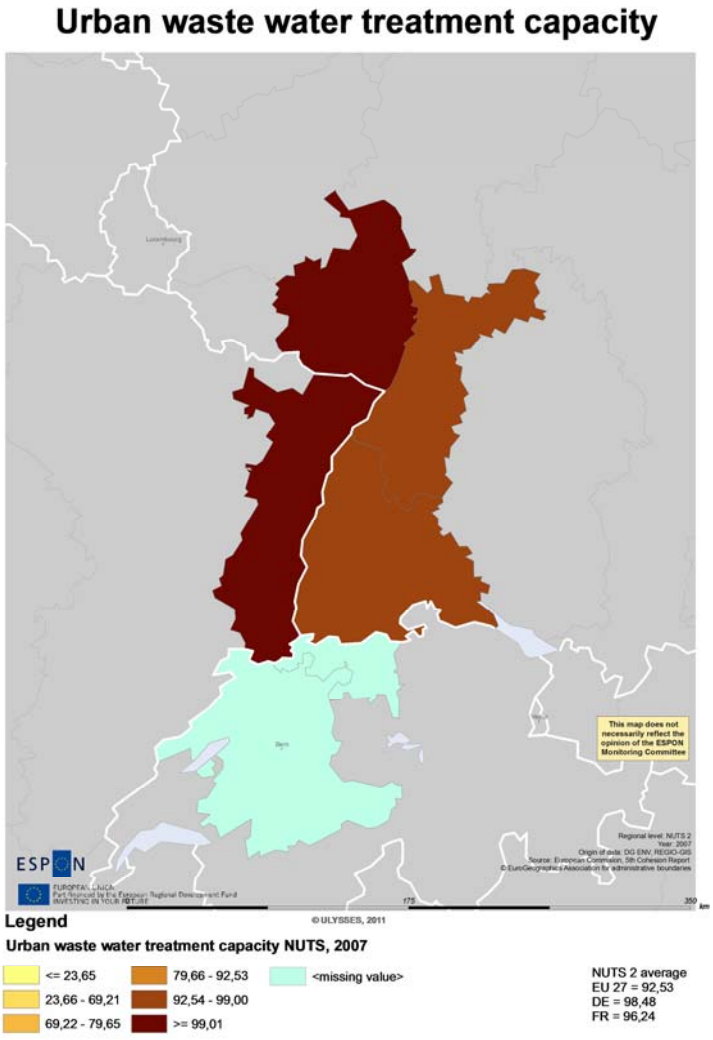


Figure 6.7: Category map of urban waste water treatment capacity in the CBR 2007

6.5.4 Natura 2000

Natura 2000 is „an EU wide network of nature protection areas established under the 1992 Habitats Directive. The aim of the network is to assure the long-term survival of Europe's most valuable and threatened species and habitats. It is comprised of Special Areas of Conservation (SAC) designated by Member States under the Habitats Directive, and also incorporates Special Protection Areas (SPAs) which they designate under the 1979 Birds Directive. Natura 2000 is not a system of strict nature reserves where all human activities are excluded. Whereas the network will certainly include nature reserves most of the land is likely to continue to be privately owned and the emphasis will be on ensuring that future management is sustainable, both ecologically and economically. The establishment of this network of protected areas also fulfils a Community obligation under the UN Convention on Biological Diversity. “ (European Commission’s DG Environment 2011)

The existence of Natura 200 areas does not reflect, whether a region is more or less urbanised, as landscapes economically used for forestry are usually not part of the Natura 200 network, although potentially a habitat for a lot of species. This is a reason why for instance the NUTS3 unit FR421 Bas-Rhin has a relatively small share of Natura 2000 areas, though having the large woods of the Vosges du Nord in its borders.

Overall the CBR has vast Natura 2000 areas, besides DE121 Baden-Baden, DEB37 Pirmasens, and FR421 Bas-Rhine all NUTS3 units of the CBR are above the EU and national averages of France and Germany, more than double of the respective national averages (and DEB3E Germersheim belonging to theTop20 of all European NUTS3 units regarding the share of Natura 2000 areas).

NUTS CODE	NUTS NAME	NATURA 2000 areas, 2009 (% of total)
EU27 NUTS 2 average		14,24
CH		NV
DE		13,16
FR		11,81
DE121	Baden-Baden, Stadtkreis	11
DE122	Karlsruhe, Stadtkreis	24
DE123	Karlsruhe, Landkreis	26
DE124	Rastatt	28
DE131	Freiburg im Breisgau, Stadtkreis	23
DE132	Breisgau-Hochschwarzwald	25
DE133	Emmendingen	25
DE134	Ortenaukreis	18
DE139	Lörrach	24
DE13A	Waldshut	26
DEB37	Pirmasens, Kreisfreie Stadt	8
DEB3E	Germersheim	52
DEB3H	Südliche Weinstraße	21
DEB3K	Südwestpfalz	34
FR421	Bas-Rhin	14
FR422	Haut-Rhin	20

Table 6.12: Natura 2000 areas in relation to total area in the CBR, 2009

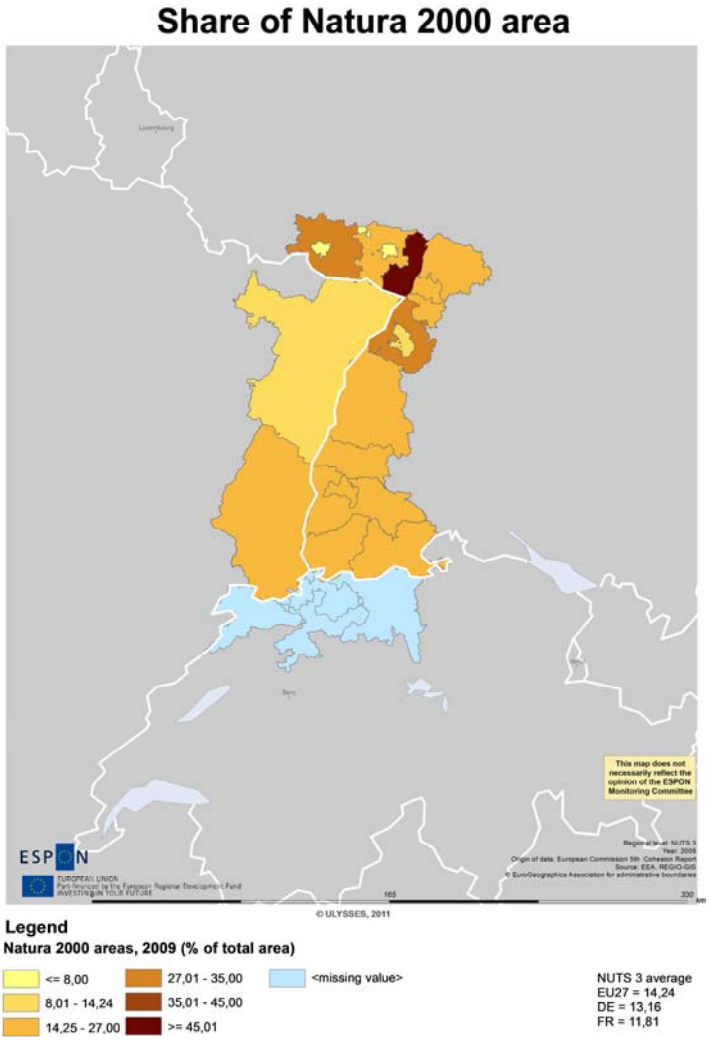


Figure 6.8: Category map of Natura 2000 areas in relation to total area in the CBR, 2009

6.5.5 Solar energy potential

The solar energy potential of the CBR is even distributed and no major differences can be seen. For the German NUTS3 units they are slightly above the national average, for the French NUTS3 units they are about 10% lower than the national average. The solar energy potential itself however does not reflect on how environmental friendly a region is regarding its energy production. National legislation, like the German Renewable Energy Sources Act (Erneuerbare Energien Gesetz – EEG) is an important factor of how much renewable energy can be or is produced.

NUTS CODE	NUTS NAME	Solar energy resources per NUTS 3 regions (kWh per year, 1981-1990)
EU27 NUTS 2 average		1304,46
CH		NV
DE		1159,01
FR		1431,18
DE121	Baden-Baden, Stadtkreis	1.211
DE122	Karlsruhe, Stadtkreis	1.206
DE123	Karlsruhe, Landkreis	1.204
DE124	Rastatt	1.211
DE131	Freiburg im Breisgau, Stadtkreis	1.256
DE132	Breisgau-Hochschwarzwald	1.237
DE133	Emmendingen	1.218
DE134	Ortenaukreis	1.206
DE139	Lörrach	1.251
DE13A	Waldshut	1.232
DEB37	Pirmasens, Kreisfreie Stadt	1.205
DEB3E	Germersheim	1.200
DEB3H	Südliche Weinstraße	1.199
DEB3K	Südwestpfalz	1.202
FR421	Bas-Rhin	1.215
FR422	Haut-Rhin	1.239

Table 6.13: Solar energy potential in the CBR; Average is calculated on the yearly sum of global irradiation on optimally-inclined surface (kWh/m^2)

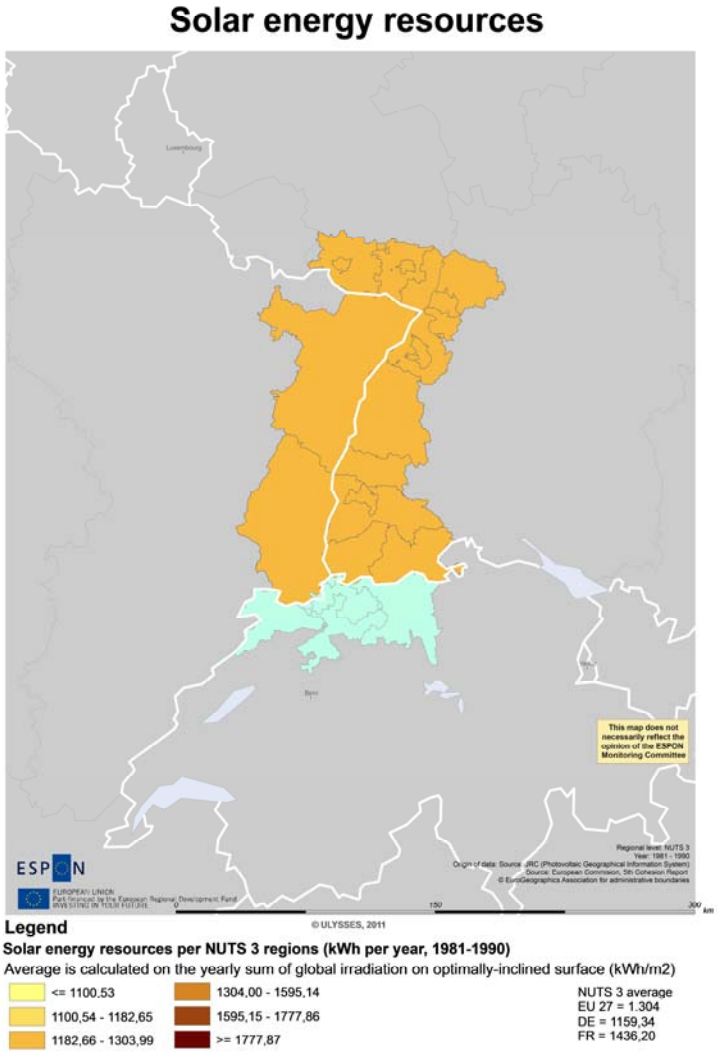


Figure 6.9: Category map of solar energy potential in the CBR; Average is calculated on the yearly sum of global irradiation on optimally-inclined surface (kWh/m^2)

6.5.6 Wind energy potential

Simultaneous to the solar energy potential it is in particular the national legislation, energy policy and he structure of the energy market determining the factual wind energy production.

The German national average correlates with the EU average, while France –despite its relatively long cost line– has about 10% less wind energy potential than the EU average.

All NUTS3 units of the CBR are below the national averages, the highest values are to be identified in the Palatine Forest of the NUTS3 units DEB3K Südwestpfalz and DEB37 Pirmasens, while those in the Rhine Valley have a much lower wind energy potential than the national averages, due to the topography of this region.

NUTS CODE	NUTS NAME	Wind energy potential: onshore full load hours, 2000-2005 (number hours /ear) at 80 m hub height.
EU27 NUTS 2 average		1378,98
CH		#DIV/0!
DE		1382,16
FR		1213,93
DE121	Baden-Baden, Stadtkreis	711
DE122	Karlsruhe, Stadtkreis	960
DE123	Karlsruhe, Landkreis	909
DE124	Rastatt	726
DE131	Freiburg im Breisgau, Stadtkreis	90
DE132	Breisgau-Hochschwarzwald	377
DE133	Emmendingen	276
DE134	Ortenaukreis	402
DE139	Lörrach	409
DE13A	Waldshut	513
DEB37	Pirmasens, Kreisfreie Stadt	1.336
DEB3E	Germersheim	938
DEB3H	Südliche Weinstraße	1.152
DEB3K	Südwestpfalz	1.370
FR421	Bas-Rhin	713
FR422	Haut-Rhin	358

Table 6.14: Wind energy potential in the CBR

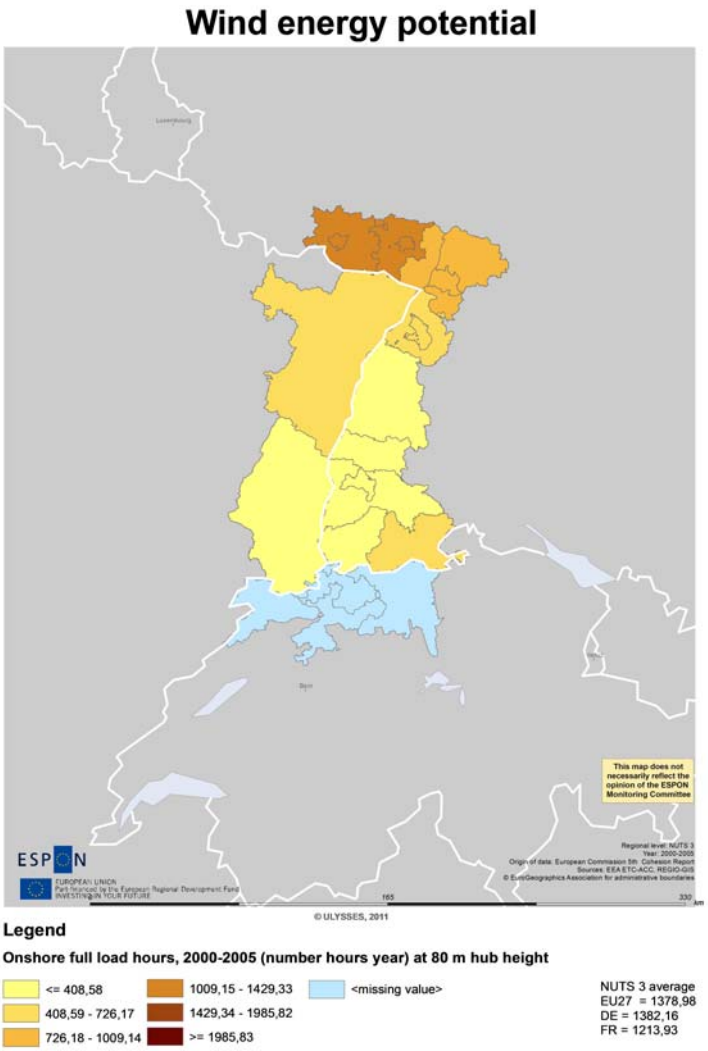


Figure 6.10: Category map of wind energy potential in the CBR

6.5.7 Renewable Energy

Detailed data for the production of solar and wind energy are not available, just broad hints for the comparison between France and Germany. In France the production of primary energy deriving from renewable energy sources (biomass, geothermal energy, wind, solar, water) rose from 16.013 crude oil units in 1998 to 19.567 crude oil units in 2009 (+22,19%), while in the same time the production of primary energy deriving from renewable energy sources in Germany rose from 7.795 crude oil units to 27.692 crude oil units (+255,25%) (Eurostat 2011). This can be explained by the German Renewable Energy Sources Act (Erneuerbare Energien Gesetz – EEG), fostering renewable energy by providing fix recompenses for renewable energy.

6.6 Climate

The climate analysis is based on the ESPON Climate, Scientific Report (ESPON Climate – Climate Change and territorial Effects on regions and Local Economies, 2013/1/4). Here the

findings of the combined physical sensitivity, combined social sensitivity, and combined economic sensitivity were taken into account.

6.6.1 Combined physical sensitivity

"Physical sensitivity relates to all human artefacts that are important for territorial development and are potentially affected by climate change. This includes settlements (homes, public buildings, industrial facilities) and infrastructure (e.g. transport and energy infrastructure). These physical assets of a region are typically adapted to normal regional weather conditions and can thus withstand smaller climatic changes. However, buildings and infrastructure are sensitive to more extreme weather events like flash floods, large-scale river floods and coastal storm surges." (ESPON Climate, p. 47)

Sensitivity indicators used are: settlements sensitive to flash floods, roads and railways sensitive to flash flood, settlements sensitive to river flooding, roads and railways sensitive to river flooding, airports and harbours sensitive to coastal flooding, settlements sensitive to coastal flooding, roads and railways sensitive to coastal flooding, and airports and harbours sensitive to coastal flooding.

Exposure indicators used are changes in number of days of heavy rainfall, changes in occurrence of river flooding, change of mean sea level.

Within the CBR only minor physical sensitivity was calculated, though the Rhine Valley is supposed to undergo major changes due to climate change, especially in the mean of river flooding. The NUTS3 unit DE122 Karlsruhe, Stadtkreis is the most sensitive NUTS3 unit of the CBR as it is located near the River Rhine, and having a major port and mineral oil refinery in its city limit.

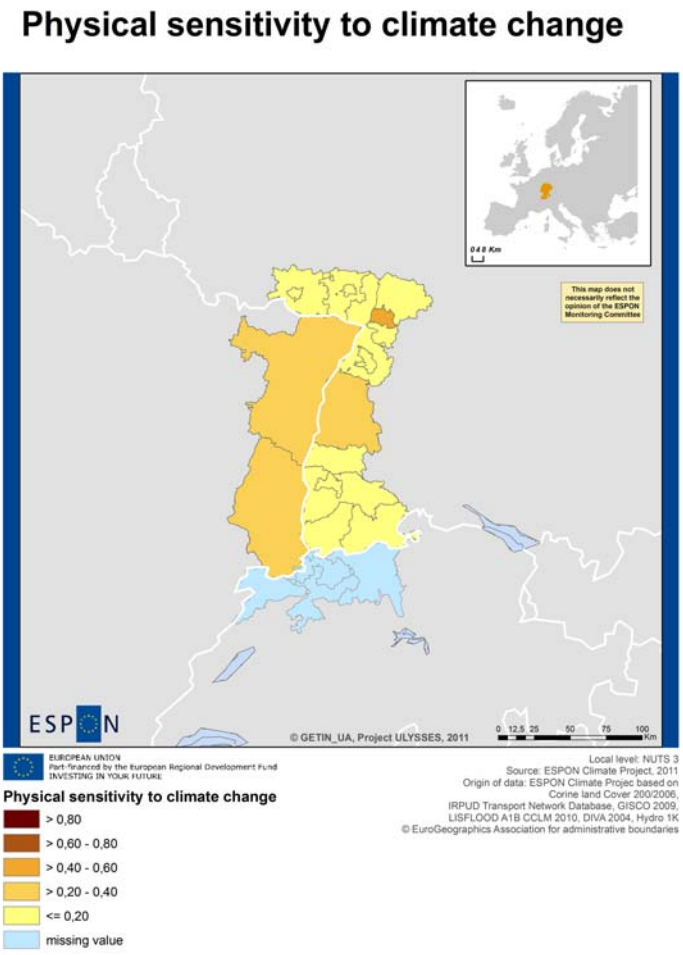


Figure 6.11: Category map of physical sensitivity to climate change in the CBR

6.6.1 Combined social sensitivity

"Social sensitivity relates to human populations that may be adversely or positively affected by climate change. In particular, this encompasses climate-related sensitivities in regard to public health and personal mobility. Many of these sensitivities relate only to certain social groups, e.g. senior citizens, or spatially defined communities, e.g. urban population." (ESPON Climate, p. 60)

Sensitivity indicators are population sensitive to summer heat, population sensitive to coastal flooding, population sensitive to river flooding, population sensitive to flash floods.

Exposure indicators taken into account are changes in number of heavy rainfall days, changes of number of summer days, changes in occurrence of river flooding, and change of mean sea level.

Again, the CBR shows a rather low to middle social sensitivity to climate change.

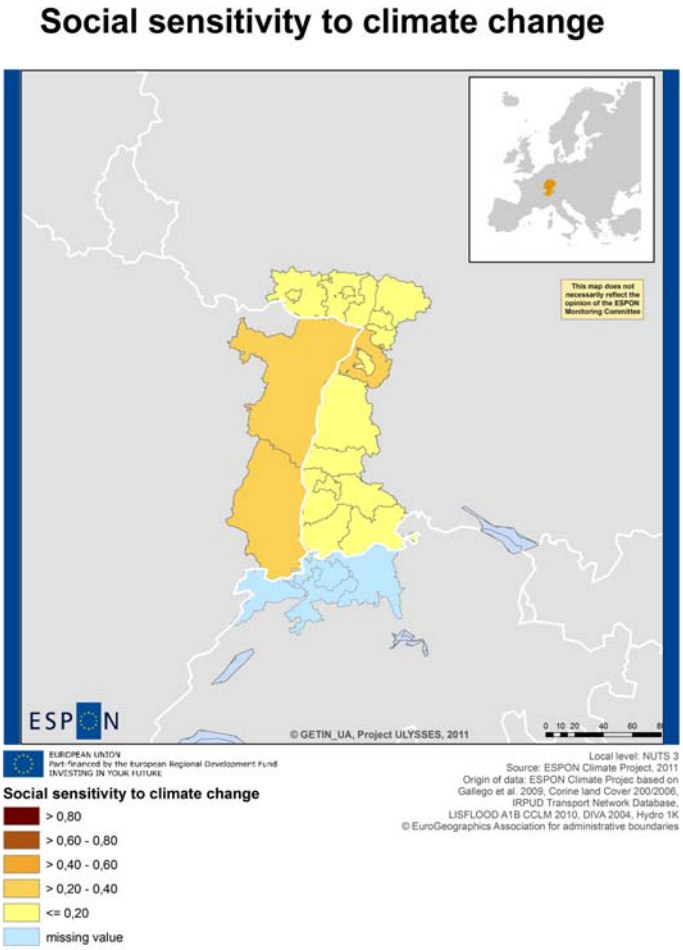


Figure 6.12: Category map of social sensitivity to climate change in the CBR

6.6.1 Combined economic sensitivity

“Climate change can potentially impact on a wide range of economic activities and sectors, and economic sensitivity relates to all economic activities that are potentially affected. This can for example be changes in profitability in agriculture or forestry, changes in tourist demand or supply, loss of production due to flooding, costs of rebuilding infrastructure after extreme weather events…. Our analysis, therefore, will be limited to the economic sensitivity of the sectors which will be directly affected by climate change, and includes agriculture and forestry, tourism and energy” (ESPON Climate, pp 67f)

The sensitivity indicators analysed are agriculture sensitive to water availability, forestry sensitive to water availability, summer tourism sensitive to summer temperatures, winter tourism sensitive to snow cover changes, energy demand sensitive to summer heat, energy demand sensitive to winter frost, energy supply sensitive to changing river water levels.

The exposure indicators are changes in number of heavy rainfall days, change of mean winter evaporation, change of number of days with snow cover, change of number of summer days, decrease of number of frost days, change of mean summer perception.

Here, the same results like in the social sensitivity occur. Most of the NUTS3 units of the CBR have a low class of economic sensitivity, only FR 421 Bas-Rhin, FR422 haut-Rhin, and DE123 Karlsruhe, Landkreis have a lower medium class of sensitivity related to economy.

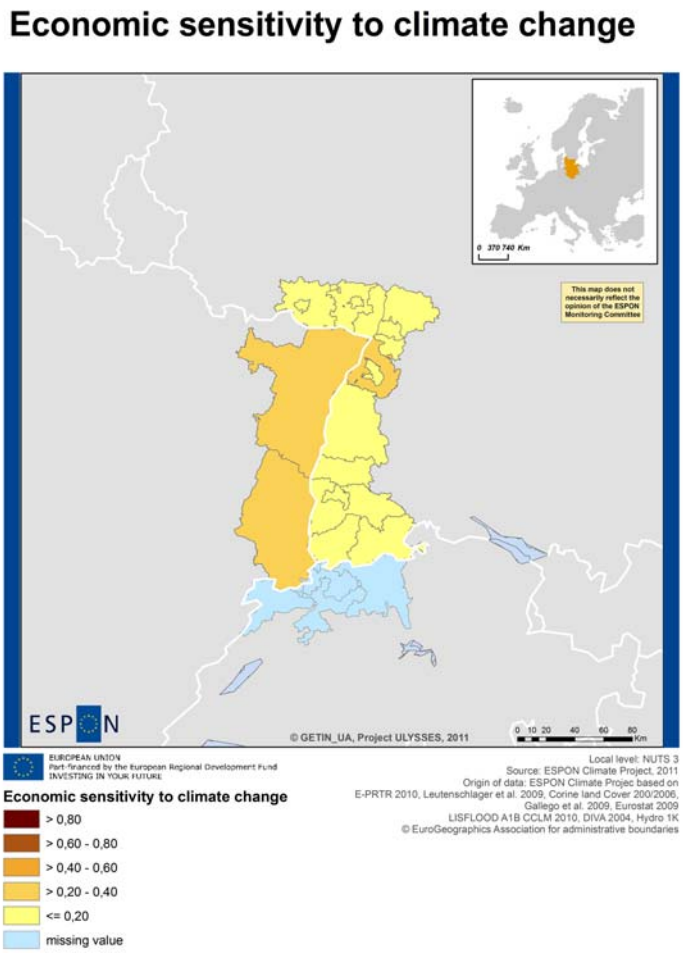


Figure 6.13: Category map of economic sensitivity to climate change in the CBR

6.7 Conclusion

The CBR has a quite strong economy which can be seen by the GDP per capita; most of the NUTS3 units of the CBR are above the national and EU averages. Especially the urban centres have a high GDP per capita, which will also be true for the French NUTS3 units, though due to their size no further differentiation can be made. In the economic development the CBR could steadily increase GDP per capita and the number of employees, although it is falling behind the reference area of Greater London. The results of this analysis has to handled with care, as the "economic bubble" of the finance sector resulted in high growth rates in the financial sectors without a similar growth of the industry and further services. The strong economy can also be seen by the low unemployment rates of the CBR, besides the French NUTS2 unit Alsace significant below the EU average.

This might be partly due to the relatively high amount of innovation and research related jobs in the CBR combined with a high rate of patents per inhabitants.

Chapter 7 – R&D potential

7.1 Aims, indicators and methods

7.1.1 R&D in the Upper Rhine Valley

The subject of the tailor-made analysis lies in the field of science and research in the Trinational Metropolitan Region Upper Rhine Valley, as was defined with the local stakeholders of Ulysses already at an early stage of the project. In the strategy paper from the 9th of June 2010 the Metropolitan Region Upper Rhine Valley set itself the ambitious goal to become the most competitive knowledge based economy under the cross-border regions in the EU until 2020. The region already possesses well integrated and highly competitive automotive, chemical industry and life science clusters. Still it is a great challenge to effectively combine the resources of the research institutions of an entire region, especially in the cross-border context. As long as two spots aren't accessible one from another, their potentials can't be combined to create an integrated hole, which is possibly even more than just the sum of its elements. To achieve this kind of "emergence" is one of the most critical goals in building a knowledge driven cross-border economy.

7.1.2 Method

To assess the performance of the cross-border R&D landscape we chose an approach to analyse the cooperation potential of the regional research institutions with regard to the accessibility by road infrastructure. As input data served a shape-file of the regional road infrastructure as well as a list of the relevant regional research institutions provided by one of the local stakeholders. The roads were subdivided in the different classes according to their extension and applied reasonable average travelling speeds in function to the speed limit. Through this we were able to calculate the movement cost in seconds for every stretch of road in the CBR.

In the next step we performed a calculation of the cooperation potential for every research institution. To this end, using the time of travel from the institution trough the road network, we discounted the R&D potential of this certain institution from 100 % at its site down to 0% in more than one hour travel distance in a cosine curve function. These values afterwards were interpolated into the area using the "r.surf.idw" command in GRASS GIS with used an interpolation method by E. H. Isaaks and R. M. Srivastava (in: Applied Geostatistics, Oxford University Press, 1989). Finally these raster values were summed up to five different sectors which were defined in the list of institutions by our stakeholder.

7.1.3 Interpretation

The values ranging from 0 to 100 for every institution represent the potential for effective cooperation with another research institution of the same sector at any point in the CBR, assuming that it is necessary to have face-to-face contact for effective cooperation. Due to a lack of times of travel by rail, we used the road network to provide for travel times. The time of travel from the institution is assumed to reduce the potential for cooperation until it reaches zero at one hour travel time, which we considered the limit for reasonable commuting.

The overlay of the layers of cooperation potential of all the institutions of similar orientation to different sectors, thus gives us the cooperation potential inside of entire sectors which is actually achievable as it is accessible. With this tool, the maximum “critical mass” of combined research activities, which is actual achievable at the most can be assessed for every point of the CBR.

This makes it possible to (1) estimate the inner cooperation potentials of different CBR's and to compare these for different sectors amongst the regions. And (2) to perform neighbourhood studies, to examine if a regional research potential of a certain sector might be dwarfed or withdrawn due to gravity effects of a much more competitive neighbouring region, which is still within commuting distance. The negative effects of infrastructure development that promote regional brain become thus able to be simulated.

7.1.4 Data, formulas and values applied

The map shows the road network and the different research institutions the were considered by sector.

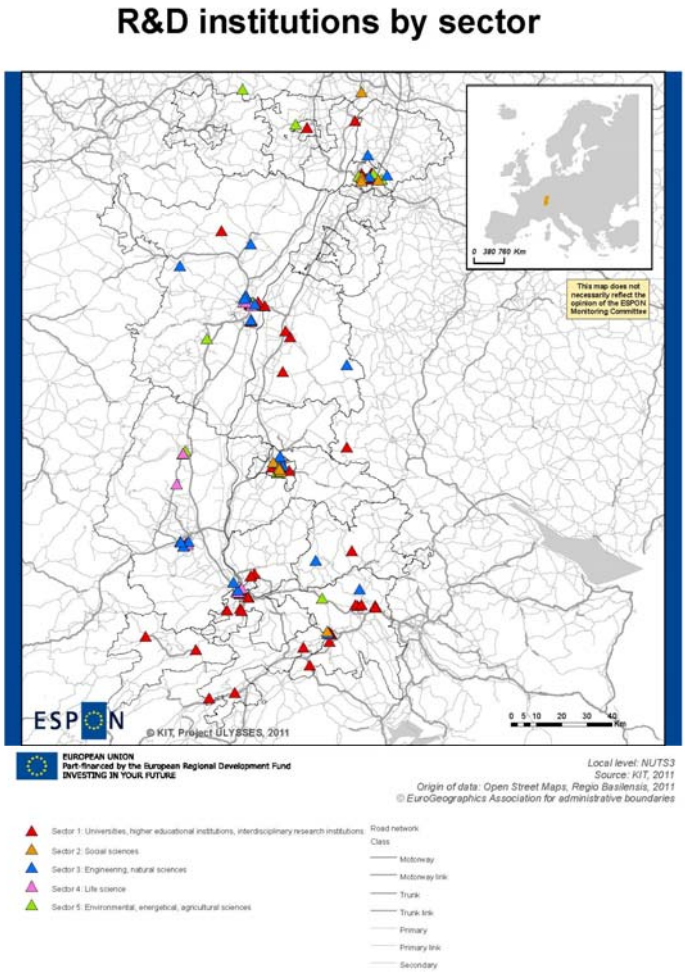


Figure 7.1: R&D institutions by sector

Research sector	Fields of science
Sector 1	Universities, higher educational institutions, interdisciplinary research institutions
Sector 2	Social sciences
Sector 3	Engineering, natural sciences
Sector 4	Life science
Sector 5	Environmental, energetical, agricultural sciences

Tab 7.1: Fields of science by research sectors

The road network data distinguishes several different types of roads, which were applied hypothetical average speeds to match real accessibility better.

Road class	Average speed assumed in km/h
Motorway link	60
Motorway	130
Trunk link	40
Trunk	110
Primary link	20
Primary	70
Secondary	50

Tab 7.2: Average speeds by road classes

In dependency to these speeds the following formula was applied to calculate the corresponding values for the research potential: (cos(0,05*t)+1)*50

The table shows the time classes and corresponding values that were used in the model.

Time from institution	Value for potential applied
< 5	100
5 – 10	96
10 – 15	90
15 – 20	80
20 – 25	69
25 – 30	56
30 – 35	43
35 – 40	31
40 – 45	20
45 – 50	10
50 – 55	4
> 55	1

Tab 7.3: Values for R&D potential by travel time from institution

7.2 Results

7.2.1 General results

As was to be expected, the potential spreads out along the higher infrastructure. This creates two parallel branches of very high potential for combined R&D activities along the two motorways in France as rather Germany in north-south direction. Only where well developed bridges connect the two networks on both sides of the Rhine, the potential of each institution is able to spread out onto the other side of the river. The model makes the effect and the importance of crossings of institutional and natural borders visible. Where accessibility is poor, regions are liable to fall apart.

This effect is also visible in the southern part of the region, where the potentials created in Basel spread out easily along the well developed Swiss road network. Due to missing links in high

infrastructure to the German side of the border – with its natural barrier of the Black Forest – as well as to the French side – which is in this part of region is scarcely populated – the potential remains only a Swiss asset, which doesn't contribute to a increasing cross-border integration of the region. Exception is here of course the two already mentioned motorways parallel the Rhine.

As well easily perceptible are the effects of the low mountain ranges Black Forest and Vosges which narrow up the outspreading of the potentials in the central part of the valley whereas in the northern and southern parts the effects penetrate deeper into the areas surrounding the research institutions.

7.2.2 Sector 1 – Universities, higher educational institutions, interdisciplinary research institutions

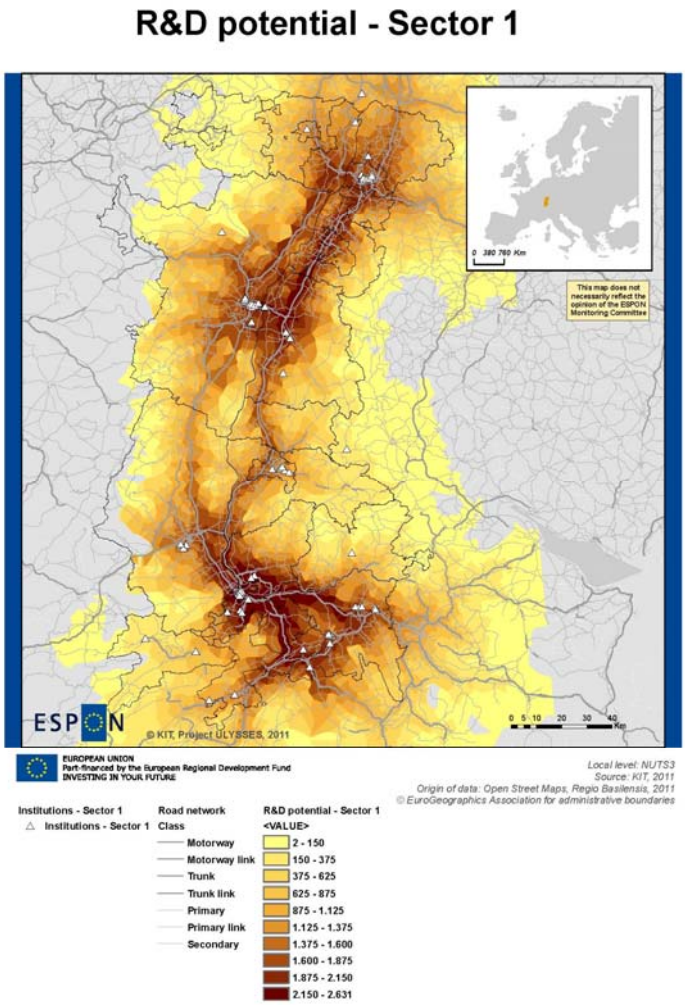


Figure 7.2: R&D potential in sector 1 – universities, higher educational institutions and interdisciplinary research institutions

The sector of universities, higher educational institutions and interdisciplinary research institutions is the largest of all five sectors. It compromises 83 of the total 157 institutions.

Leading region with a very high potential is the zone around Basel. But also Strasbourg and Karlsruhe appear the have a high potential for combined research activity within the one hour travel threshold. Since indicators of size aren't part of the calculations the number of institutions provides for a high potential, which might be misleading. See the chapter's critics and outlook for further details.

7.2.3 Sector 2 – Social sciences

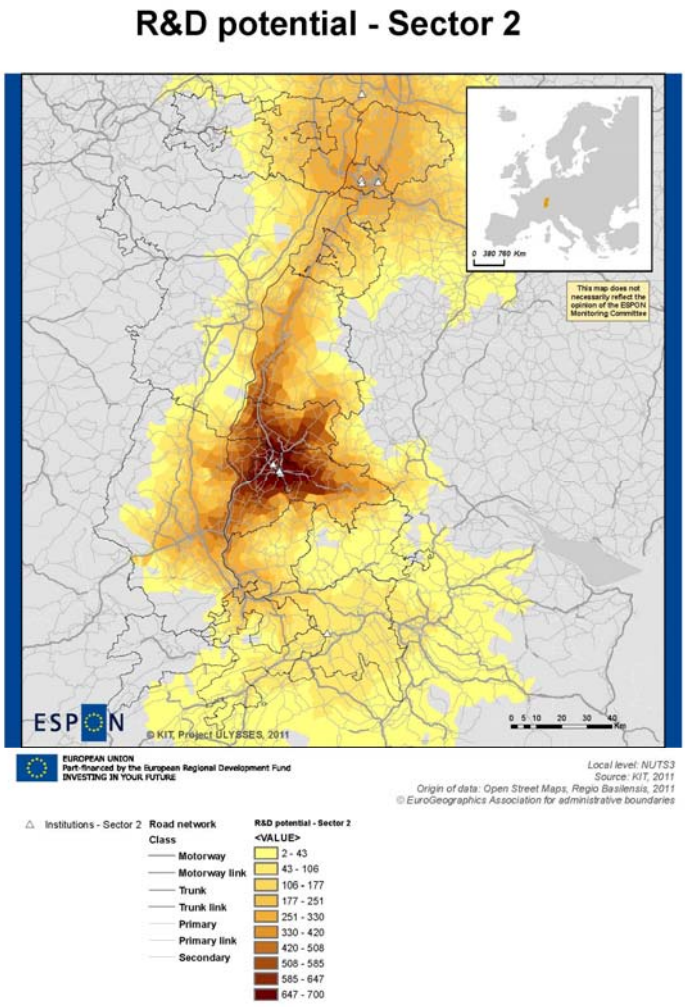


Figure 7.3: R&D potential in sector 2 – social sciences

The next sector consists of thirteen institutions in the field of social sciences, the smallest sector in the Upper Rhine Valley. Freiburg offers by far the strongest potential for combined research in this field, but also Karlsruhe appears on the map. Since the faculties of social sciences of the universities are only considered in conjunction with their universities, their potentials only appear in the first sector. Thus these values don't reflect the whole truth, as also Strasbourg and Basel have important capacities in social sciences. This problem might be helped in splitting the universities into the corresponding faculties considering each one independently.

7.2.4 Sector 3 – Engineering and natural sciences

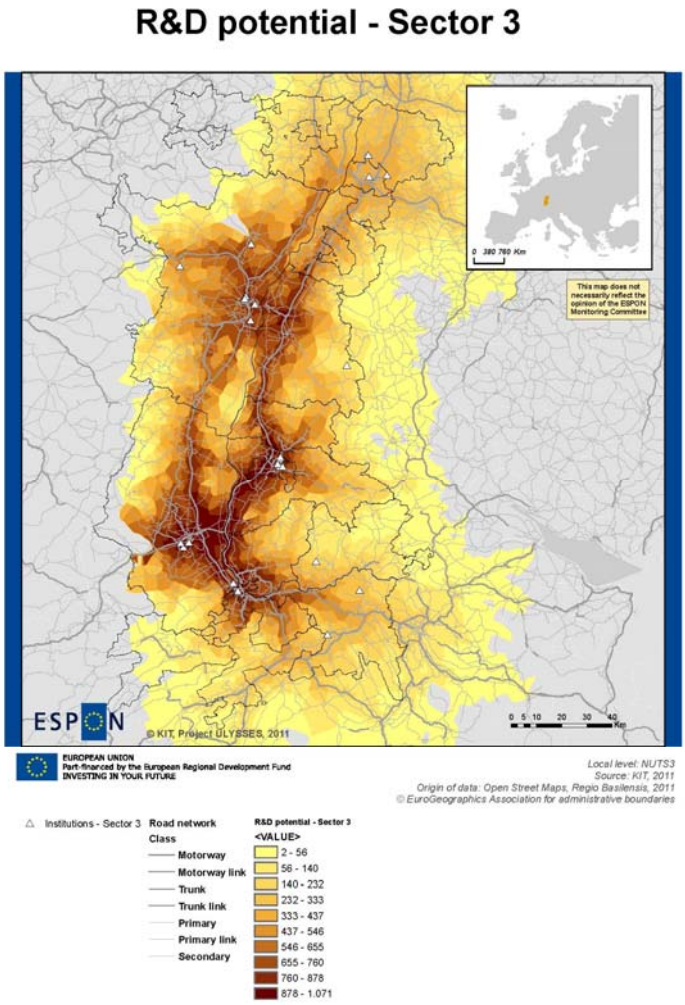


Figure 7.4: R&D potential in sector 3 – engineering and natural sciences

In the field of natural sciences and engineering Basel, Mulhouse and Freiburg appear as a important cluster. Strasbourg seems to be on his own with a couple of institutions in the surroundings, whereas Karlsruhe almost doesn't appear on the map. Again this doesn't perfectly reflect the regional realities. As already mentioned, since there weren't any indicators of size included in the calculation, Karlsruhe as an important location of natural sciences and engineering in the Upper Rhine Valley suffers from its integration of the majority of the important research institutions into the University of Karlsruhe. Due to the lack of size indicators, only a high number of different institutions provide for a high research potential. See the chapter's critics and outlook for further details.

7.2.5 Sector 4 – Life science

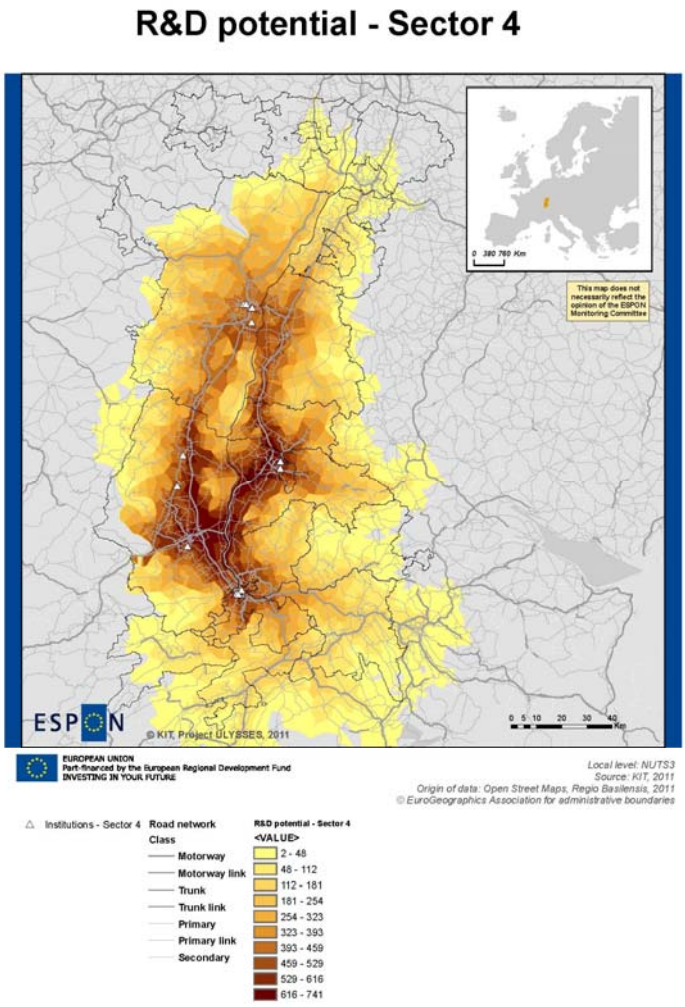


Figure 7.5: R&D potential in sector 4 – life science

The fourth sector, Life Sciences, although reflects very well the regional situation around Basel, Mulhouse and Freiburg where several international enterprises of this sector are based and organised in clusters like BioValley.

7.2.6 Sector 5 - Agricultural, energetical and environmental sciences

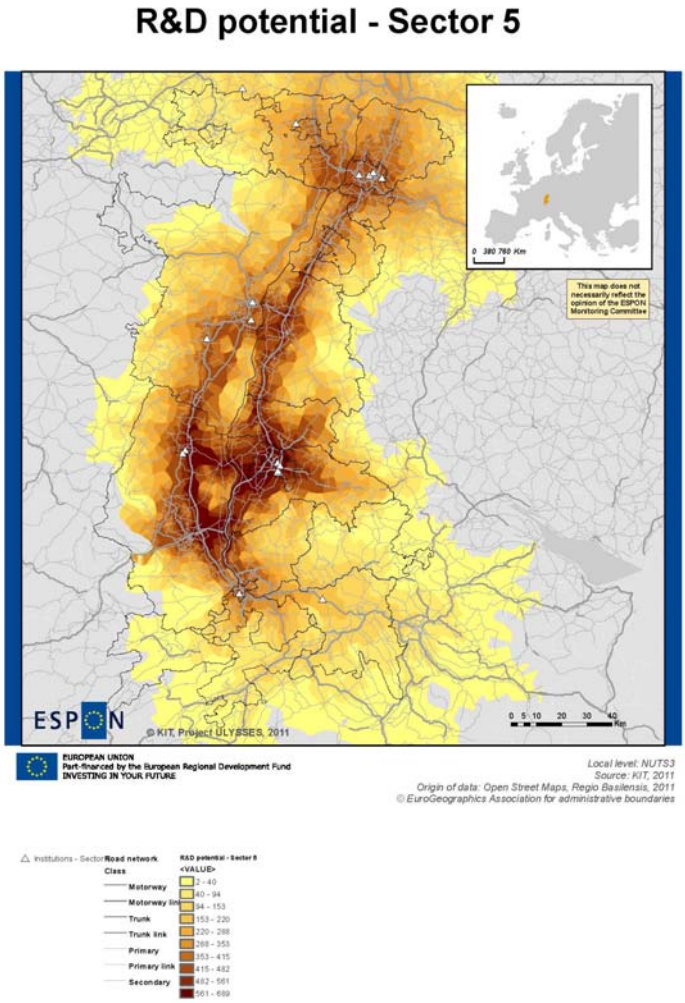


Figure 7.6: R&D potential in sector 5 – Agricultural, energetical and environmental sciences

The sector of agricultural, energetical and environmental research seems quite evenly distributed over the CBR. Freiburg and as well Mulhouse seem to build a special entity though, which in the case of Freiburg isn't surprising, since it was the first city in Germany governed by a green party mayor.

7.3 Conclusion

7.3.1 Accomplishments of the approach

By means of this approach we were able to sidestep the weak spots resulting from the coarseness of the NUTS3 units in the Upper Rhine Valley and the lack of more detailed data. Using the exact location of research institutions and the actual road (bike lane/footway) network, the precision of the results is only limited by the chosen resolution of the raster output layers. The border effect and the importance of border crossings as well as the effect of natural barriers become clearly visible as they have direct influence on the spread of the road network, without the limitations of spatial entities that may or may not reflect the realities of the space. Later on it is easily possible at any time to integrate the values obtained into the NUTS system for further analyses, or to calculate an accessibility or research potential ratio for the entire region to enable inter-regional rankings.

7.3.2 Criticism

The analysis carried out has several weaknesses which were partly already mentioned. Under that fall the following issues:

- Due to no indicator of size available for the institutions every one of them represents the same impact on the regional R&D potential which of course isn't very realistic. Regions with many but very small research institutions appear in this way to have a much higher potential than a region with small and large research organisms. Possible indicators of size could be employed persons in R&D or expenditure for R&D. This way, also enterprises could be taken into account that have a significant activity in R&D without being an exclusive research institution.
- The costs of movement as travelling time were calculated out of the road network by means of hypothetically assumed average speeds. To obtain realistic results the use of measured real world accessibility is indispensable.
- Since data for regional accessibility by public transport is first of all simply not available and second of all much more complex than travelling time by car, we didn't make any attempt to make use of regional rail accessibility. Nonetheless, to build a sustainable European knowledge based cross-border region one has necessarily take into account connectivity by a regional rail network.
- Commuting on a daily bases is not only a question of the time to spend on the way, but also a question of the financial cost. This is especially important when comparing car and rail accessibility.

- Even if all the above mentioned weaknesses are eliminated, the result of such an analysis can only be a hypothetical potential. The actual performance of the existing regional innovation system can approximately determined only through an assessment of the existing cooperation and coordination networks. A social network analysis of the relations of the regional players can offer considerable insight into these matters. Even though such an analysis can be performed without the need of a particular data foundation, it goes beyond the scope of the Ulysses project.

7.3.3 Adaption of the analysis

As a response to these weaknesses we have planned to perform an adapted partial repetition of the calculation, with the following adjustments:

- Since the numbers of students registered to the universities and higher educational institutions are easily available we will create a sixth sector named educational institutions which includes only universities and higher educational institutions, which were before part of the first sector.
- We will use the numbers of students registered to each institution to estimate their actual relative contribution in the region.
- We will apply a different function for the way the potential spreads out along the road network depend on the time of travel. The objective is to emphasize the positive effects of accessibility in walking distance or by bike.

Unfortunately the new calculations won't be finished until the interim report, so that the results will only appear in the final report.

Chapter 8 - Factor Analysis

8.1 Aims, Indicators and Methods

For the factor analysis two sets of indicators were established: one for territorial profile variables and one for performance variables.

The first set considered variables linked to overall characteristics of the different regions on the themes that where considered (accessibility, rural-urban relationship and demography). 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.

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
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

Table 8.1: Indicator set of factor analysis linked to overall characteristics

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.

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	nominal	1997-2008	NUTS 3
Natura 2000 area	%	2006	NUTS 3
Ozone concentration exceedance, per year	%	2008	NUTS 3
Waste water treatment capacity	%	2007	NUTS 2
Soil sealed area	%	2006	NUTS 3

Table 8.2: Indicator set of factor analysis linked to Lisbon/Gothenburg and Europe 2020

The scores of the factors was also 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 CBR 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 bellow which it falls (5%, 20%, 50%, 80%, and 95%).

8.2 Centrality (FAC1_1)

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. The CBR can be seen as part of the Blue Banana with slightly less centrality indices than the highest scores of Rhine-Ruhr or Belgium. This could also derive from excluding Switzerland as the data is missing here, which could in the analysis lower the centrality index for South-West and Germany and North-West Italy.

All Nuts3 units of the CBR fall into the two highest percentiles of all European NUTS3 units, expressing the high centrality of this region.

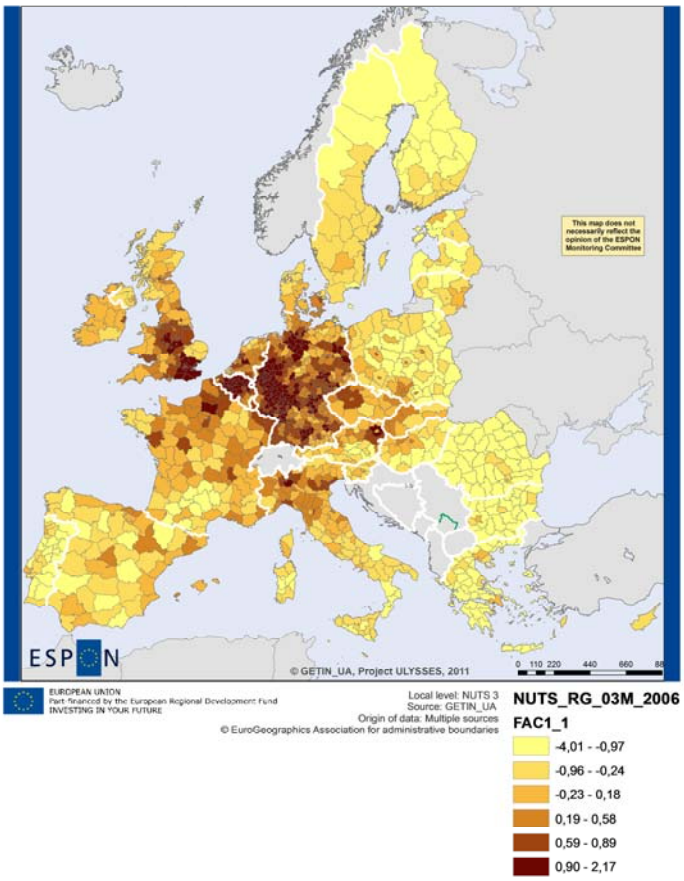


Figure 8.1: Category map of the factor centrality for Europe

NUTS code	NUTS name	FAC1						
		Scores	Country comparison (weighted NUTS 3 average)				Country /CBR country level (+ -)	Percentile all NUTS 3
CS1			Ch	DE	FR	All CBR countries		
All	Weighted average of CBR countries	0,53						80
CH	Switzerland							
DE	Germany	0,80				0,27		80
FR	France	0,18				-0,35		50
CH023	Solothurn							
CH025	Jura							
CH031	Basel-Stadt							
CH032	Basel-Landschaft							
CH033	Aargau							
DE121	Baden-Baden, Stadtkreis	0,58		-0,23		0,04	+ -	80
DE122	Karlsruhe, Stadtkreis	0,85		0,05		0,32	+ +	95
DE123	Karlsruhe, Landkreis	0,92		0,12		0,39	+ +	95
DE124	Rastatt	0,66		-0,14		0,13	+ -	80
DE131	Freiburg im Breisgau, Stadtkreis	0,59		-0,21		0,06	+ -	80
DE132	Breisgau-Hochschwarzwald	0,63		-0,17		0,10	+ -	80
DE133	Emmendingen	0,60		-0,20		0,07	+ -	80
DE134	Ortenaukreis	0,81		0,01		0,28	+ +	80
DE139	Lörrach	0,89		0,09		0,36	+ +	95
DE13A	Waldshut	0,70		-0,10		0,17	+ -	80
DEB33	Landau in der Pfalz, Kreisfreie Stadt	1,00		0,20		0,46	+ +	95
DEB37	Pirmasens, Kreisfreie Stadt	0,92		0,12		0,39	+ +	95
DEB3E	Germersheim	1,01		0,21		0,48	+ +	95
DEB3H	Südliche Weinstraße	0,57		-0,23		0,03	+ -	80
DEB3K	Südwestpfalz	0,90		0,10		0,37	+ +	95
FR421	Bas-Rhin	0,62			0,45	0,09	+ +	80
FR422	Haut-Rhin	0,40			0,23	-0,13	- +	80

Table 8.3: Centrality indices of the NUTS3 units of the CBR

8.3 Research and Development (FAC2_1)

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. 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.

The CBR shows high values of the R&D indices, all but the two French NUTS3 units above the national averages and within the highest percentiles in Europe (see also Chapter 6 for that) showing the high capacity of R&D of this region within Europe and in comparison to the German average (see also Chapter 7).

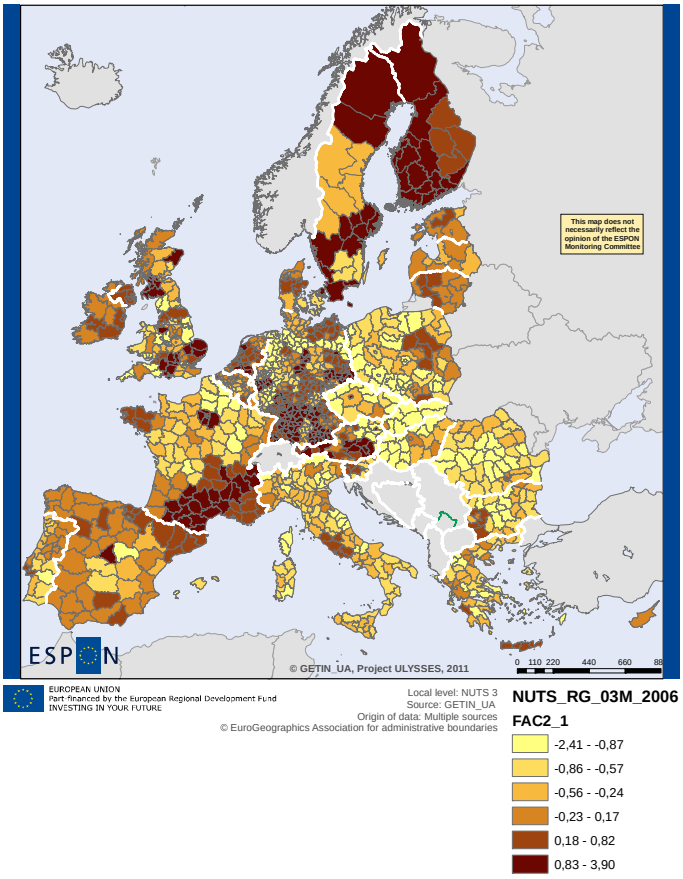


Figure 8.2: Category map of the factor research and development for Europe

NUTS code	NUTS name	FAC2						
		Scores	Country comparison (weighted NUTS 3 average)				Country /CBR country level	Percentile all NUTS 3
CS1			Ch	DE	FR	All CBR countries		
All	Weighted average of CBR countries	0,37						80
CH	Switzerland							
DE	Germany	0,45				0,09		80
FR	France	0,25				-0,12		80
CH023	Solothurn							
CH025	Jura							
CH031	Basel-Stadt							
CH032	Basel-Landschaft							
CH033	Aargau							
DE121	Baden-Baden, Stadtkreis	1,70		1,24		1,33	+ +	95
DE122	Karlsruhe, Stadtkreis	1,76		1,31		1,40	+ +	95
DE123	Karlsruhe, Landkreis	1,89		1,43		1,52	+ +	95
DE124	Rastatt	1,82		1,37		1,46	+ +	95
DE131	Freiburg im Breisgau, Stadtkreis	0,63		0,18		0,27	+ +	80
DE132	Breisgau-Hochschwarzwald	0,89		0,44		0,52	+ +	95
DE133	Emmendingen	0,76		0,31		0,40	+ +	95
DE134	Ortenaukreis	0,72		0,26		0,35	+ +	95
DE139	Lörrach	0,67		0,22		0,31	+ +	80
DE13A	Waldshut	0,89		0,44		0,53	+ +	95
DEB33	Landau in der Pfalz, Kreisfreie Stadt	0,46		0,00		0,09	+ +	80
DEB37	Pirmasens, Kreisfreie Stadt	0,48		0,02		0,11	+ +	80
DEB3E	Germersheim	0,49		0,03		0,12	+ +	80
DEB3H	Südliche Weinstraße	0,73		0,28		0,37	+ +	95
DEB3K	Südwestpfalz	0,79		0,33		0,42	+ +	95
FR421	Bas-Rhin	0,13			-0,12	-0,23	- -	80
FR422	Haut-Rhin	0,14			-0,11	-0,23	- -	80

Table 8.4: Research and development indices of the NUTS3 units of the CBR

8.4: Administrative centres (FAC3_1)

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. Most of the border NUTS 3 units in Spain and Portugal have very high scores in this factor, as well as Karelia. The other cross-border regions 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.

Within the CBR only the urban centres show high scores, like DE121 Baden-Baden and DE131 Freiburg, while the two French NUTS3 units are on an intermediate scale, partly due to the size of these units: especially Strasbourg with the European Parliament should have very high scores but is only part of a big NUTS3 unit.

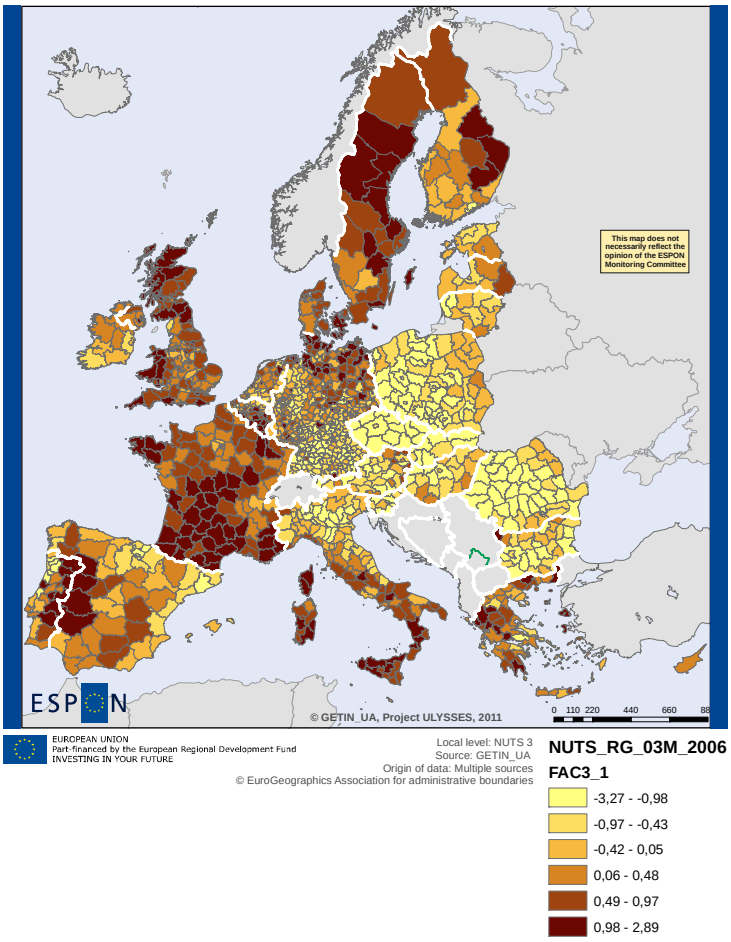


Figure 8.3: Category map of the factor administrative centres for Europe

NUTS code	NUTS name	FAC3						
		Scores	Country comparison (weighted NUTS 3 average)				Country /CBR country level	Percentile all NUTS 3
CS1			Ch	DE	FR	All CBR countries		
All	Weighted average of CBR countries	0,20						80
CH	Switzerland							
DE	Germany	-0,17				-0,37		50
FR	France	0,68				0,49		80
CH023	Solothurn							
CH025	Jura							
CH031	Basel-Stadt							
CH032	Basel-Landschaft							
CH033	Aargau							
DE121	Baden-Baden, Stadtkreis	1,15		1,32		0,95	+ +	95
DE122	Karlsruhe, Stadtkreis	0,05		0,22		-0,15	- +	80
DE123	Karlsruhe, Landkreis	-1,26		-1,09		-1,46	- -	20
DE124	Rastatt	-2,19		-2,02		-2,39	- -	5
DE131	Freiburg im Breisgau, Stadtkreis	0,94		1,11		0,74	+ +	95
DE132	Breisgau-Hochschwarzwald	-0,53		-0,36		-0,72	- -	50
DE133	Emmendingen	-0,82		-0,65		-1,02	- -	50
DE134	Ortenaukreis	-1,19		-1,02		-1,39	- -	20
DE139	Lörrach	-0,88		-0,71		-1,08	- -	20
DE13A	Waldshut	-0,68		-0,51		-0,88	- -	50
DEB33	Landau in der Pfalz, Kreisfreie Stadt	1,25		1,42		1,05	+ +	95
DEB37	Pirmasens, Kreisfreie Stadt	0,50		0,67		0,30	+ +	80
DEB3E	Germersheim	-1,87		-1,70		-2,07	- -	5
DEB3H	Südliche Weinstraße	0,29		0,46		0,09	+ +	80
DEB3K	Südwestpfalz	0,06		0,23		-0,14	- +	80
FR421	Bas-Rhin	0,10			-0,59	-0,10	- -	80
FR422	Haut-Rhin	0,22			-0,47	0,02	+ -	80

Table 8.5: Administrative centres indices of the NUTS3 units of the CBR

8.5 Demographic dynamism (FAC4_1)

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 regions with the lowest scores of this factor are in the Mediterranean countries, such as Portugal, Spain and Greece as well as Germany. As described in Chapter 2, the factor analysis reflects the different natural population development especially in comparison between France and Germany with a big difference in fertility rates and hence dependency rates.

While the German parts of the CBR still grow due to migration, the natural development of the population is negative, while The French NUTS3 units still have a slight natural increase.

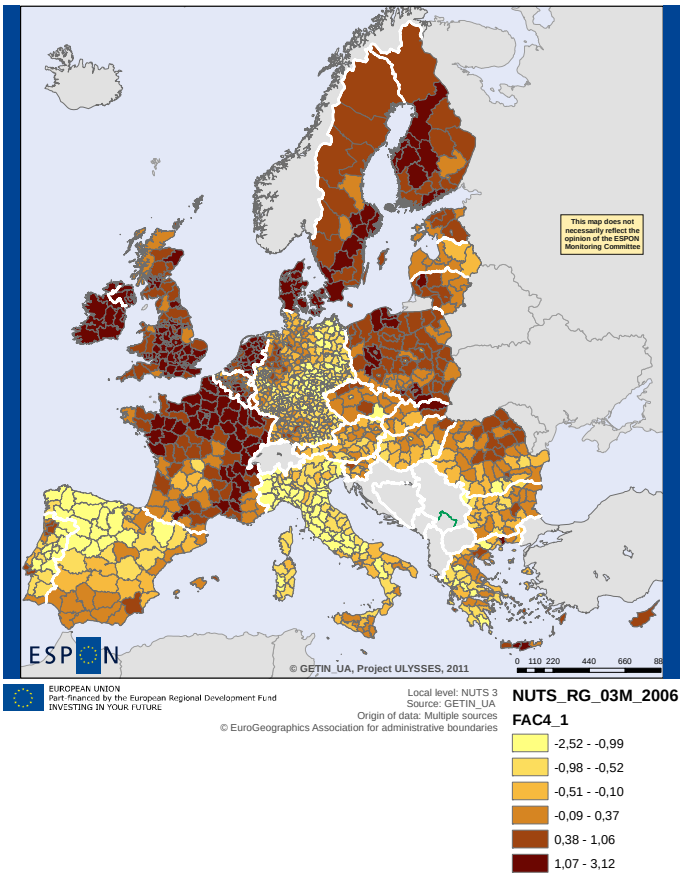


Figure 8.4: Category map of the factor demographic dynamism for Europe

NUTS code	NUTS name	FAC4						
		Scores	Country comparison (weighted NUTS 3 average)				Country /CBR country level	Percentile all NUTS 3
CS1			Ch	DE	FR	All CBR countries		
All	Weighted average of CBR countries	0,11						80
CH	Switzerland							
DE	Germany	-0,65				-0,77		50
FR	France	1,12				1,01		95
CH023	Solothurn							
CH025	Jura							
CH031	Basel-Stadt							
CH032	Basel-Landschaft							
CH033	Aargau							
DE121	Baden-Baden, Stadtkreis	-1,64		-0,99		-1,76	- -	5
DE122	Karlsruhe, Stadtkreis	-1,27		-0,62		-1,38	- -	20
DE123	Karlsruhe, Landkreis	-0,44		0,21		-0,56	- +	50
DE124	Rastatt	-0,25		0,41		-0,36	- +	50
DE131	Freiburg im Breisgau, Stadtkreis	-0,61		0,04		-0,73	- +	50
DE132	Breisgau-Hochschwarzwald	-0,31		0,34		-0,42	- +	50
DE133	Emmendingen	-0,16		0,49		-0,28	- +	50
DE134	Ortenaukreis	-0,29		0,36		-0,40	- +	50
DE139	Lörrach	-0,08		0,57		-0,20	- +	80
DE13A	Waldshut	-0,24		0,41		-0,35	- +	50
DEB33	Landau in der Pfalz, Kreisfreie Stadt	-0,66		-0,01		-0,77	- -	50
DEB37	Pirmasens, Kreisfreie Stadt	-1,04		-0,39		-1,15	- -	20
DEB3E	Germersheim	0,26		0,91		0,14	+ +	80
DEB3H	Südliche Weinstraße	-0,56		0,09		-0,68	- +	50
DEB3K	Südwestpfalz	-0,90		-0,25		-1,01	- -	20
FR421	Bas-Rhin	0,99			-0,13	0,88	+ -	95
FR422	Haut-Rhin	1,20			0,08	1,09	+ +	95

Table 8.6: Demographic dynamism indices of the NUTS3 units of the CBR

8.6 Environmental risk (FAC5_1)

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.

By the factor analysis no major concerns are to be expected, although climate change will hit the Rhine Valley especially with more stress caused to heat. For agricultural uses in the CBR (i.e. winery and orchading) the impacts are disputed, whether this could lead to advantageous or disadvantageous conditions.

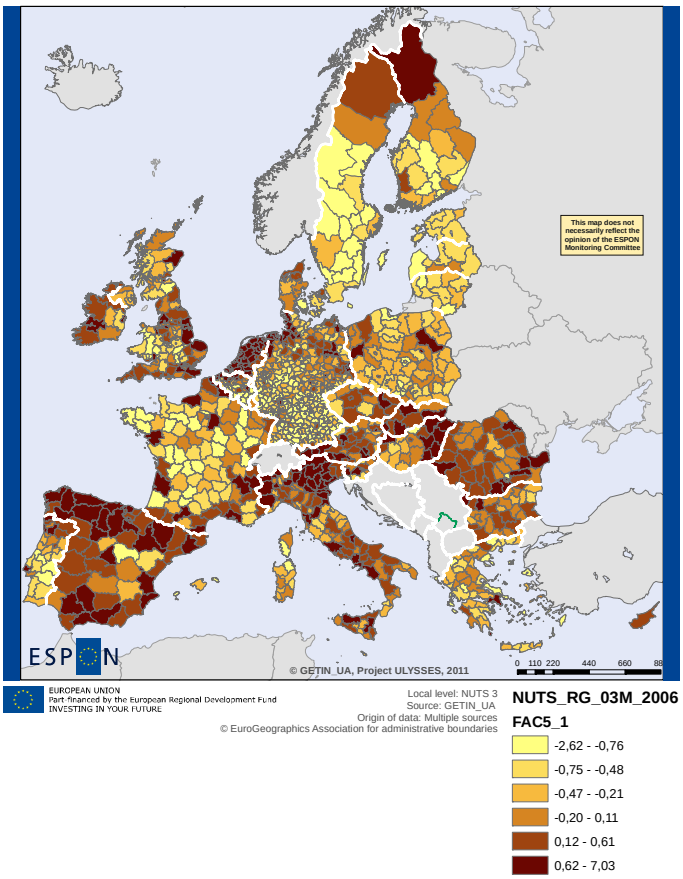


Figure 8.5: Category map of the factor environmental risks in Europe

NUTS code	NUTS name	FAC5						
		Scores	Country comparison (weighted NUTS 3 average)				Country /CBR country level	Percentile all NUTS 3
CS1			Ch	DE	FR	All CBR countries		
All	Weighted average of CBR countries	0,07						80
CH	Switzerland							
DE	Germany	0,01				-0,06		80
FR	France	0,15				0,08		80
CH023	Solothurn							
CH025	Jura							
CH031	Basel-Stadt							
CH032	Basel-Landschaft							
CH033	Aargau							
DE121	Baden-Baden, Stadtkreis	-0,87		-0,89		-0,95	- -	20
DE122	Karlsruhe, Stadtkreis	0,84		0,83		0,77	+ +	95
DE123	Karlsruhe, Landkreis	-0,11		-0,12		-0,18	- -	80
DE124	Rastatt	-0,03		-0,04		-0,10	- -	80
DE131	Freiburg im Breisgau, Stadtkreis	-0,07		-0,09		-0,15	- -	80
DE132	Breisgau-Hochschwarzwald	-0,58		-0,59		-0,65	- -	50
DE133	Emmendingen	-0,26		-0,27		-0,33	- -	50
DE134	Ortenaukreis	-0,31		-0,32		-0,38	- -	50
DE139	Lörrach	-0,43		-0,44		-0,50	- -	50
DE13A	Waldshut	-0,80		-0,81		-0,87	- -	20
DEB33	Landau in der Pfalz, Kreisfreie Stadt	-0,87		-0,89		-0,94	- -	20
DEB37	Pirmasens, Kreisfreie Stadt	-1,13		-1,14		-1,20	- -	5
DEB3E	Germersheim	0,29		0,27		0,21	+ +	80
DEB3H	Südliche Weinstraße	-0,81		-0,82		-0,88	- -	20
DEB3K	Südwestpfalz	-0,89		-0,90		-0,96	- -	20
FR421	Bas-Rhin	0,52			0,37	0,45	+ +	95
FR422	Haut-Rhin	-0,05			-0,20	-0,13	- -	80

Table 8.7: Environmental risk indices of the NUTS3 units of the CBR

8.7 Services and transport (FAC6_1)

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). 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.).

In the CBR it is DEB3K Südwestpfalz and DE132 Breisgau-Hochschwarzwald showing the highest scores of this factor, both deriving mainly from tourism, too.

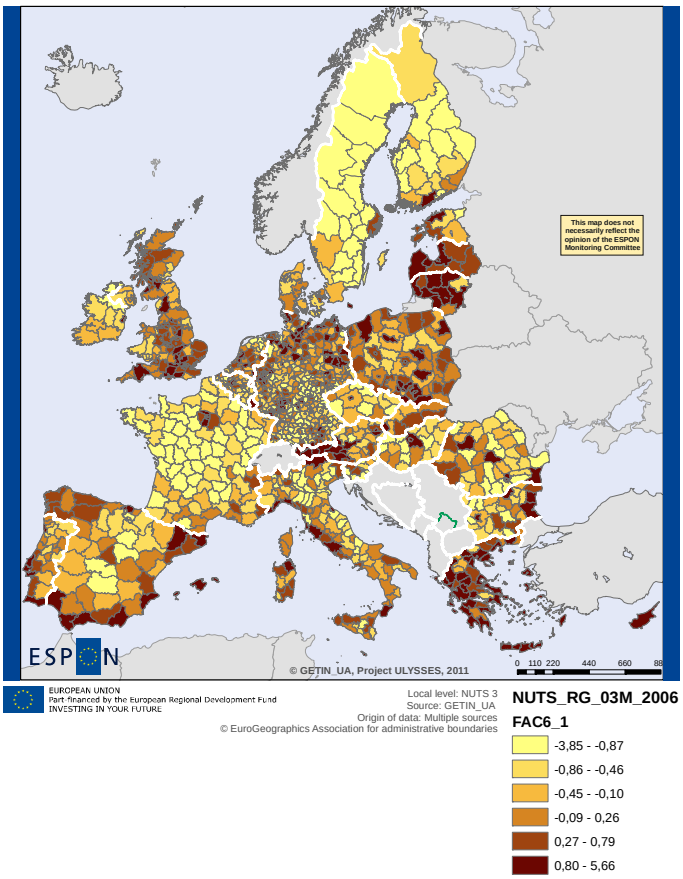


Figure 8.6: Category map of the factor services and transport in Europe

NUTS code	NUTS name	FAC6						
		Scores	Country comparison (weighted NUTS 3 average)				Country /CBR country level	Percentile all NUTS 3
CS1			Ch	DE	FR	All CBR countries		
All	Weighted average of CBR countries	-0,18						50
CH	Switzerland							
DE	Germany	0,00				0,18		80
FR	France	-0,41				-0,24		50
CH023	Solothurn							
CH025	Jura							
CH031	Basel-Stadt							
CH032	Basel-Landschaft							
CH033	Aargau							
DE121	Baden-Baden, Stadtkreis	-0,26		-0,26		-0,08	- -	50
DE122	Karlsruhe, Stadtkreis	0,56		0,56		0,74	+ +	80
DE123	Karlsruhe, Landkreis	0,06		0,06		0,24	+ +	80
DE124	Rastatt	-0,75		-0,76		-0,58	- -	50
DE131	Freiburg im Breisgau, Stadtkreis	0,09		0,08		0,26	+ +	80
DE132	Breisgau-Hochschwarzwald	0,27		0,27		0,45	+ +	80
DE133	Emmendingen	-0,71		-0,72		-0,54	- -	50
DE134	Ortenaukreis	-0,04		-0,04		0,14	+ -	80
DE139	Lörrach	-0,52		-0,52		-0,34	- -	50
DE13A	Waldshut	-0,79		-0,80		-0,62	- -	20
DEB33	Landau in der Pfalz, Kreisfreie Stadt	0,31		0,30		0,48	+ +	80
DEB37	Pirmasens, Kreisfreie Stadt	0,67		0,67		0,85	+ +	95
DEB3E	Germersheim	-1,34		-1,34		-1,16	- -	5
DEB3H	Südliche Weinstraße	0,22		0,22		0,40	+ +	80
DEB3K	Südwestpfalz	0,91		0,90		1,08	+ +	95
FR421	Bas-Rhin	-0,24			0,18	-0,06	- +	50
FR422	Haut-Rhin	-0,55			-0,13	-0,37	- -	50

Table 8.8: Services and transport indices of the NUTS3 units of the CBR

8.8 Immigration (FAC7_1)

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.

Although the CBR has continuous immigration (see Chapter 2), scores compared to the national averages are relatively low, i.e. in the EU average of all NUTS units has higher migration rates than the CBR.

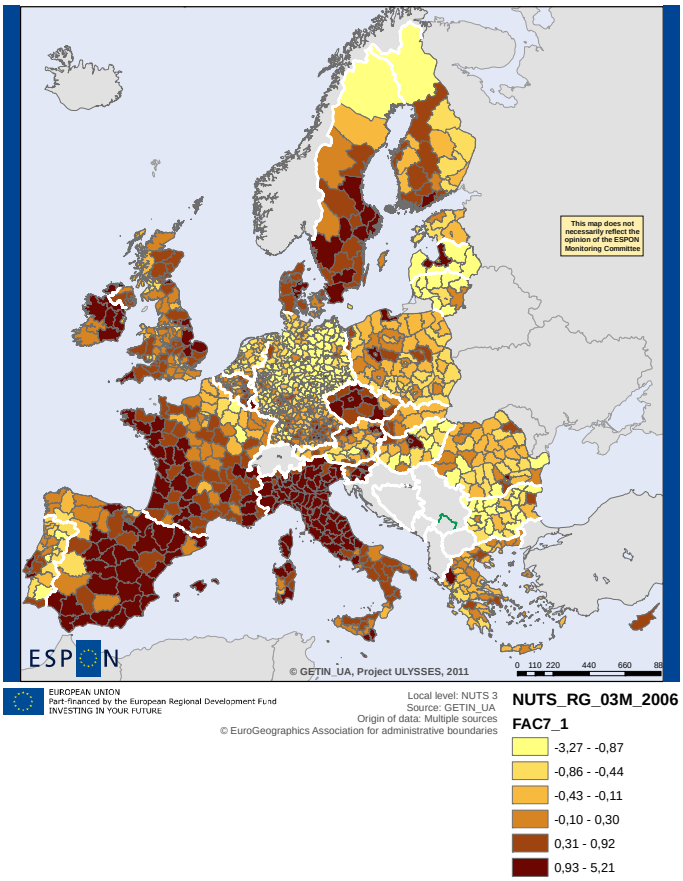


Figure 8.7: Category map of the factor immigration in Europe

NUTS code	NUTS name	FAC7						
		Scores	Country comparison (weighted NUTS 3 average)				Country /CBR country level	Percentile all NUTS 3
CS1			Ch	DE	FR	All CBR countries		
All	Weighted average of CBR countries	0,00						80
CH	Switzerland							
DE	Germany	-0,27				-0,27		50
FR	France	0,36				0,36		80
CH023	Solothurn							
CH025	Jura							
CH031	Basel-Stadt							
CH032	Basel-Landschaft							
CH033	Aargau							
DE121	Baden-Baden, Stadtkreis	-0,11		0,16		-0,11	- +	50
DE122	Karlsruhe, Stadtkreis	0,72		0,99		0,71	+ +	80
DE123	Karlsruhe, Landkreis	-0,27		0,00		-0,27	- +	50
DE124	Rastatt	-0,96		-0,68		-0,96	- -	20
DE131	Freiburg im Breisgau, Stadtkreis	0,03		0,30		0,03	+ +	80
DE132	Breisgau-Hochschwarzwald	-0,33		-0,06		-0,34	- -	50
DE133	Emmendingen	-0,25		0,02		-0,25	- +	50
DE134	Ortenaukreis	-0,34		-0,07		-0,34	- -	50
DE139	Lörrach	0,06		0,34		0,06	+ +	80
DE13A	Waldshut	-0,12		0,15		-0,12	- +	50
DEB33	Landau in der Pfalz, Kreisfreie Stadt	-0,15		0,12		-0,15	- +	50
DEB37	Pirmasens, Kreisfreie Stadt	-1,55		-1,28		-1,55	- -	5
DEB3E	Germersheim	-0,65		-0,37		-0,65	- -	50
DEB3H	Südliche Weinstraße	-0,77		-0,50		-0,77	- -	50
DEB3K	Südwestpfalz	-1,72		-1,45		-1,72	- -	5
FR421	Bas-Rhin	0,14			-0,23	0,13	+ -	80
FR422	Haut-Rhin	0,17			-0,19	0,17	+ -	80

Table 8.9: Immigration indices of the NUTS3 units of the CBR

8.9 Construction (FAC8_1)

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 (both maybe due to the "Real Estate Bubble"), the Baltic States and Eastern Germany.

The CBR has intermediate to low scores in the factor construction, i.e. construction only plays a minor role in the economy. On the other hand, a low share in construction can be interpreted as an indicator for a stable and matured economy.

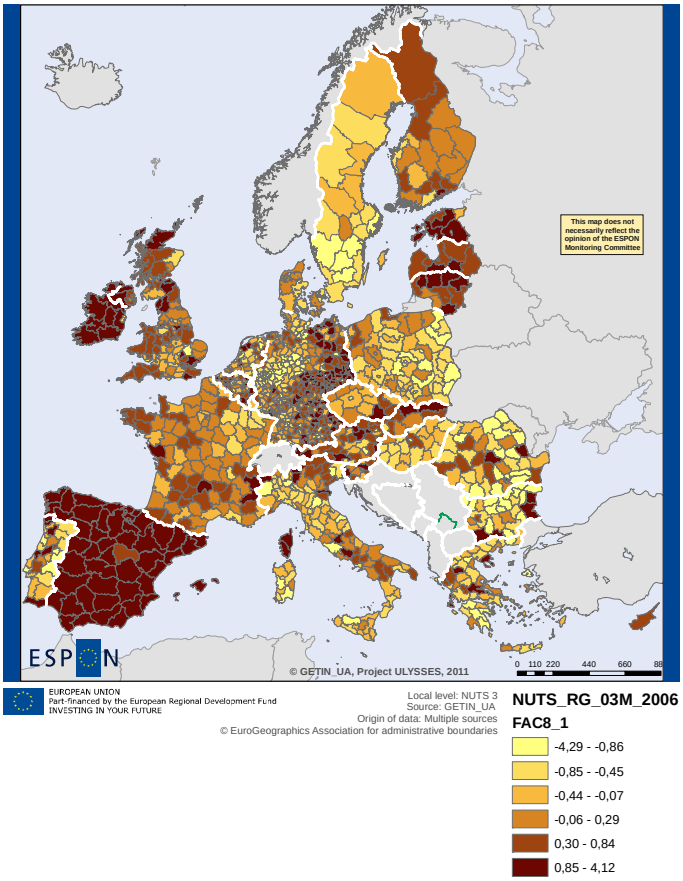


Figure 8.8: Category map of the factor construction in Europe

NUTS code	NUTS name	FAC8						
		Scores	Country comparison (weighted NUTS 3 average)				Country /CBR country level	Percentile all NUTS 3
CS1			Ch	DE	FR	All CBR countries		
All	Weighted average of CBR countries	-0,31						50
CH	Switzerland							
DE	Germany	-0,52				-0,22		50
FR	France	-0,02				0,29		80
CH023	Solothurn							
CH025	Jura							
CH031	Basel-Stadt							
CH032	Basel-Landschaft							
CH033	Aargau							
DE121	Baden-Baden, Stadtkreis	-0,72		-0,20		-0,42	- -	50
DE122	Karlsruhe, Stadtkreis	-1,45		-0,93		-1,15	- -	20
DE123	Karlsruhe, Landkreis	-0,54		-0,02		-0,24	- -	50
DE124	Rastatt	-0,14		0,39		0,17	+ +	50
DE131	Freiburg im Breisgau, Stadtkreis	-1,44		-0,92		-1,13	- -	20
DE132	Breisgau-Hochschwarzwald	0,45		0,97		0,76	+ +	80
DE133	Emmendingen	0,25		0,77		0,56	+ +	80
DE134	Ortenaukreis	-0,11		0,42		0,20	+ +	50
DE139	Lörrach	-0,56		-0,04		-0,26	- -	50
DE13A	Waldshut	0,24		0,76		0,54	+ +	80
DEB33	Landau in der Pfalz, Kreisfreie Stadt	-1,18		-0,65		-0,87	- -	20
DEB37	Pirmasens, Kreisfreie Stadt	-0,79		-0,27		-0,48	- -	20
DEB3E	Germersheim	-0,43		0,09		-0,13	- +	50
DEB3H	Südliche Weinstraße	0,34		0,86		0,64	+ +	80
DEB3K	Südwestpfalz	1,04		1,56		1,34	+ +	95
FR421	Bas-Rhin	-0,07			-0,05	0,24	+ -	80
FR422	Haut-Rhin	-0,01			0,01	0,30	+ +	80

Table 8.10: Construction indices of the NUTS3 units of the CBR

8.10 Unemployment (FAC1_2)

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.

The CBR has quite low scores regarding this factor (see Chapter 6), as unemployment rates are significant lower than the national and EU averages. Exceptions are DEB37 Pirmasens and FR422 Haut-Rhin. Including data from Switzerland would have highlighted to good conditions for workers and employees in the CBR.

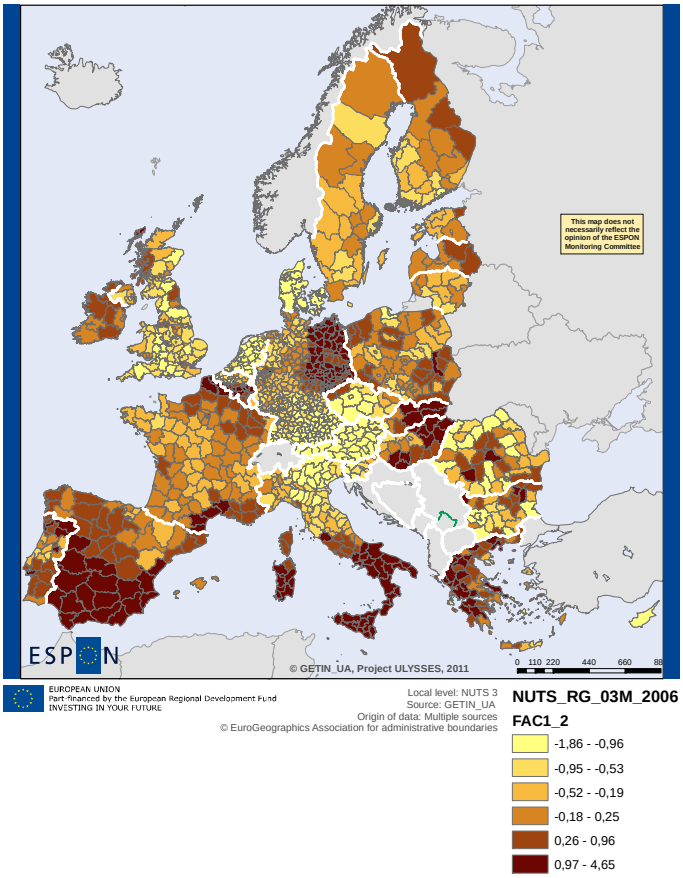


Figure 8.9: Category map of the factor unemployment in Europe

NUTS code	NUTS name	FAC1_2						
		Scores	Country comparison (weighted NUTS 3 average)				Country /CBR country level	Percentile all NUTS 3
CS1			Ch	DE	FR	All CBR countries		
All	Weighted average of CBR countries	0,14						80
CH	Switzerland							
DE	Germany	0,06				-0,08		80
FR	France	0,25				0,11		80
CH023	Solothurn							
CH025	Jura							
CH031	Basel-Stadt							
CH032	Basel-Landschaft							
CH033	Aargau							
DE121	Baden-Baden, Stadtkreis	-0,39		-0,45		-0,53	- -	50
DE122	Karlsruhe, Stadtkreis	-0,27		-0,33		-0,41	- -	50
DE123	Karlsruhe, Landkreis	-0,84		-0,90		-0,98	- -	50
DE124	Rastatt	-0,91		-0,97		-1,05	- -	20
DE131	Freiburg im Breisgau, Stadtkreis	-0,50		-0,56		-0,64	- -	50
DE132	Breisgau-Hochschwarzwald	-1,08		-1,14		-1,22	- -	20
DE133	Emmendingen	-1,11		-1,17		-1,25	- -	20
DE134	Ortenaukreis	-1,09		-1,15		-1,23	- -	20
DE139	Lörrach	-1,00		-1,06		-1,14	- -	20
DE13A	Waldshut	-1,13		-1,19		-1,28	- -	20
DEB33	Landau in der Pfalz, Kreisfreie Stadt	-0,48		-0,54		-0,62	- -	50
DEB37	Pirmasens, Kreisfreie Stadt	0,87		0,81		0,73	+ +	95
DEB3E	Germersheim	-0,60		-0,66		-0,74	- -	50
DEB3H	Südliche Weinstraße	-0,75		-0,81		-0,90	- -	50
DEB3K	Südwestpfalz	-0,52		-0,58		-0,67	- -	50
FR421	Bas-Rhin	-0,27			-0,52	-0,41	- -	50
FR422	Haut-Rhin	-0,17			-0,42	-0,31	- -	80

Table 8.11: Unemployment indices of the NUTS3 units of the CBR

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 and unemployment.

Regression Statistics	
Multiple R	0,59374
R Square	0,35252
Adjusted R Square	0,34699
Standard Error	0,80809
Observations	1298

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower*	*Upper*
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

Table 8.12: Unemployment regression

8.11 Catching-up regions (FAC2_2)

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 in the map, 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 throughout the late 1990 and early 2000 (some countries even had occasional double digit growth rates), while the central European countries, although starting from a high initial position, witnessed relatively small growth rates. The overall pattern of the border regions seem to essentially follow the national tendency, which is rue also fort he CBR.

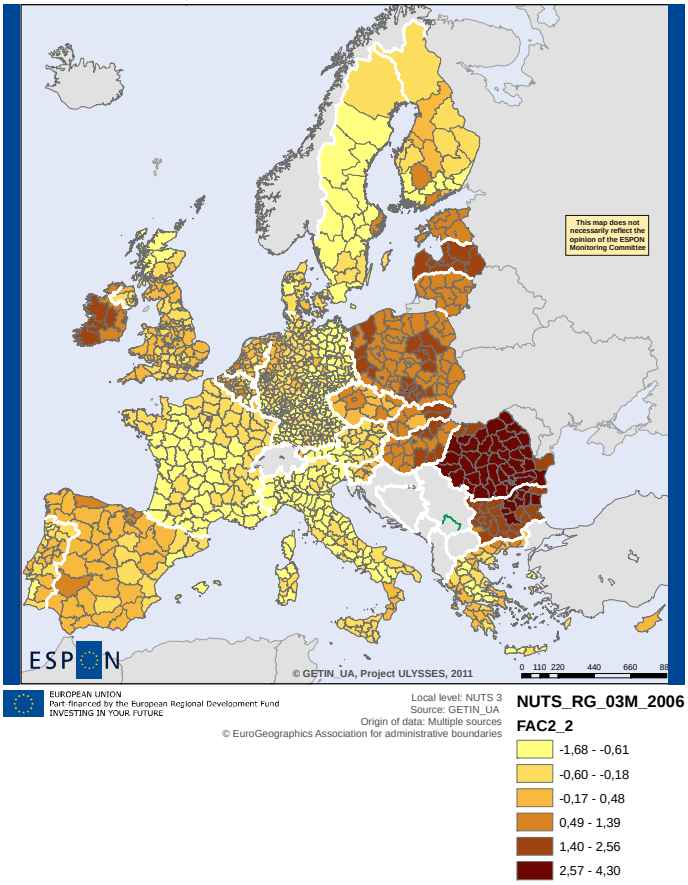


Figure 8.10: Category map of the factor catching-up in Europe

NUTS code	NUTS name	FAC2_2						
		Scores	Country comparison (weighted NUTS 3 average)				Country /CBR country level	Percentile all NUTS 3
CS1			Ch	DE	FR	All CBR countries		
All	Weighted average of CBR countries	-0,39						50
CH	Switzerland							
DE	Germany	-0,34				0,05		80
FR	France	-0,46				-0,07		50
CH023	Solothurn							
CH025	Jura							
CH031	Basel-Stadt							
CH032	Basel-Landschaft							
CH033	Aargau							
DE121	Baden-Baden, Stadtkreis	-0,82		-0,48		-0,43	- -	20
DE122	Karlsruhe, Stadtkreis	-0,67		-0,33		-0,28	- -	50
DE123	Karlsruhe, Landkreis	-0,71		-0,37		-0,32	- -	20
DE124	Rastatt	-0,79		-0,45		-0,40	- -	20
DE131	Freiburg im Breisgau, Stadtkreis	-0,58		-0,24		-0,19	- -	50
DE132	Breisgau-Hochschwarzwald	-0,65		-0,30		-0,25	- -	50
DE133	Emmendingen	-0,63		-0,29		-0,24	- -	50
DE134	Ortenaukreis	-0,65		-0,31		-0,26	- -	50
DE139	Lörrach	-0,67		-0,33		-0,28	- -	50
DE13A	Waldshut	-0,69		-0,35		-0,30	- -	20
DEB33	Landau in der Pfalz, Kreisfreie Stadt	-0,74		-0,40		-0,35	- -	20
DEB37	Pirmasens, Kreisfreie Stadt	-0,78		-0,44		-0,39	- -	20
DEB3E	Germersheim	-1,04		-0,69		-0,64	- -	5
DEB3H	Südliche Weinstraße	-0,81		-0,47		-0,42	- -	20
DEB3K	Südwestpfalz	-0,86		-0,52		-0,47	- -	20
FR421	Bas-Rhin	-0,43			0,03	-0,03	- +	50
FR422	Haut-Rhin	-0,43			0,03	-0,04	- +	50

Table 8.13: Catching-up indices of the NUTS3 units of the CBR

The negative correlation of the catching-up indicator with other performance indicators in this factor is essentially linked to the high growth rates of the eastern countries in the initial decades of their transition to a market economy. 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 indictor, which has a slightly higher R square then 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).

Regression Statistics	
Multiple R	0,6261119
R Square	0,3920161
Adjusted R Square	0,3868156
Standard Error	0,7830609
Observations	1298

	Coefficients	*Standard*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower*	*Upper*
Intercept	-6,26829E-08	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

Table 8.14: Catching-up regression

8.12: Economic development (FAC3_2)

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 urbanization. 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.

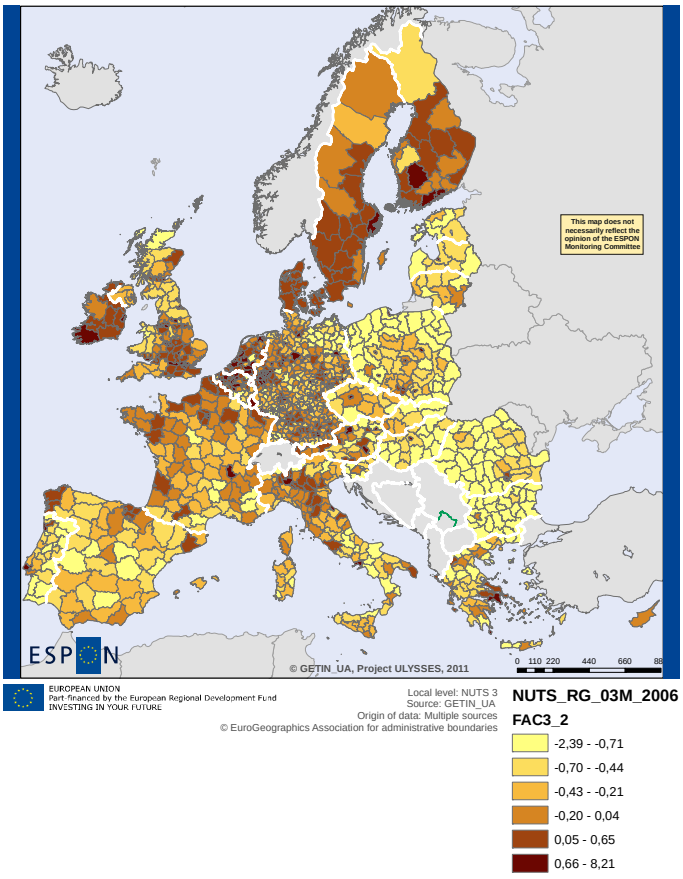


Figure 8.11: Category map of the factor economic development in Europe

NUTS code	NUTS name	FAC3_2						
		Scores	Country comparison (weighted NUTS 3 average)				Country /CBR country level	Percentile all NUTS 3
CS1			Ch	DE	FR	All CBR countries		
All	Weighted average of CBR countries	0,54						95
CH	Switzerland							
DE	Germany	0,61				0,06		95
FR	France	0,46				-0,08		95
CH023	Solothurn							
CH025	Jura							
CH031	Basel-Stadt							
CH032	Basel-Landschaft							
CH033	Aargau							
DE121	Baden-Baden, Stadtkreis	0,66		0,05		0,11	+ +	95
DE122	Karlsruhe, Stadtkreis	1,39		0,78		0,84	+ +	95
DE123	Karlsruhe, Landkreis	-0,22		-0,83		-0,77	- -	50
DE124	Rastatt	-0,28		-0,88		-0,82	- -	50
DE131	Freiburg im Breisgau, Stadtkreis	0,79		0,19		0,25	+ +	95
DE132	Breisgau-Hochschwarzwald	-0,73		-1,34		-1,28	- -	20
DE133	Emmendingen	-0,66		-1,27		-1,21	- -	20
DE134	Ortenaukreis	-0,10		-0,70		-0,64	- -	80
DE139	Lörrach	-0,40		-1,01		-0,94	- -	50
DE13A	Waldshut	-0,66		-1,27		-1,20	- -	20
DEB33	Landau in der Pfalz, Kreisfreie Stadt	0,66		0,06		0,12	+ +	95
DEB37	Pirmasens, Kreisfreie Stadt	0,71		0,10		0,17	+ +	95
DEB3E	Germersheim	-0,98		-1,59		-1,53	- -	20
DEB3H	Südliche Weinstraße	-0,74		-1,34		-1,28	- -	20
DEB3K	Südwestpfalz	-1,27		-1,88		-1,82	- -	5
FR421	Bas-Rhin	-0,03			-0,49	-0,57	- -	80
FR422	Haut-Rhin	-0,24			-0,70	-0,78	- -	50

Table 8.15: Economic development indices of the NUTS3 units of the CBR

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.

Regression Statistics	
Multiple R	0,824258
R Square	0,679401
Adjusted R Square	0,676659
Standard Error	0,568631
Observations	1298

	Coefficients	*Standard*	*t Stat*	*P-value*	*Lower*	*Upper*	*Lower*	*Upper*
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

Table 8.16: Economic development regression

8.13 Pollution (FAC4_2)

The significant variable of this factor is ozone concentration exceedance. 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, and 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. Although the map shows as some overall tendencies, the regression analysis shouldn't be 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, such as can be seen in Ireland.

The CBR shows relatively high scores regarding pollution. This can derive from the high density of this region as well as being a major European corridor for passenger and freight, increasing emissions from transport.

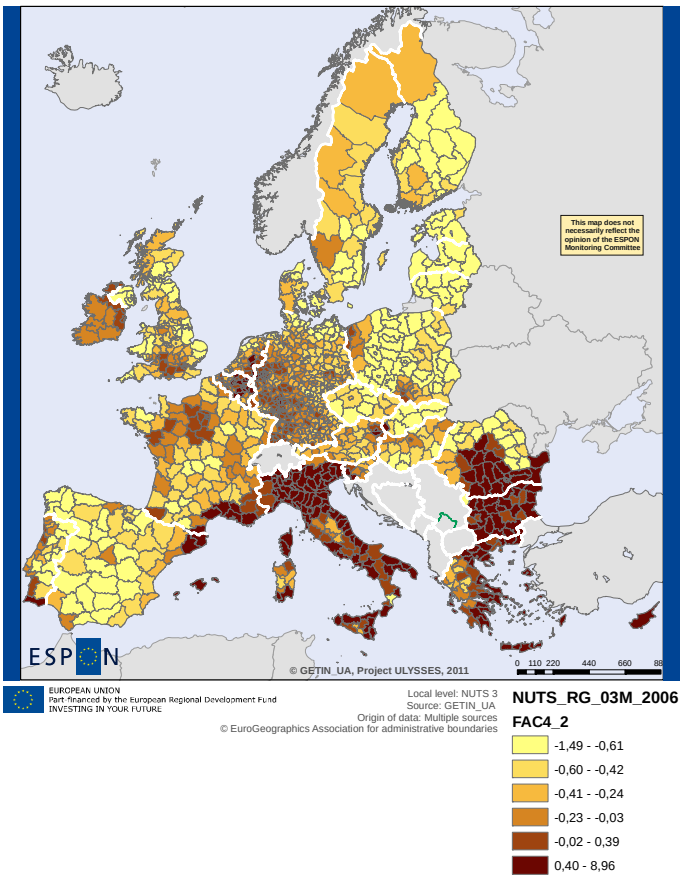


Figure 8.12: Category map of the factor pollution in Europe

NUTS code	NUTS name	FAC4_2						
		Scores	Country comparison (weighted NUTS 3 average)				Country /CBR country level	Percentile all NUTS 3
CS1			Ch	DE	FR	All CBR countries		
All	Weighted average of CBR countries	-0,08						80
CH	Switzerland							
DE	Germany	-0,12				-0,03		80
FR	France	-0,04				0,04		80
CH023	Solothurn							
CH025	Jura							
CH031	Basel-Stadt							
CH032	Basel-Landschaft							
CH033	Aargau							
DE121	Baden-Baden, Stadtkreis	0,01		0,12		0,09	+ +	80
DE122	Karlsruhe, Stadtkreis	0,23		0,34		0,31	+ +	80
DE123	Karlsruhe, Landkreis	0,00		0,11		0,08	+ +	80
DE124	Rastatt	0,11		0,23		0,19	+ +	80
DE131	Freiburg im Breisgau, Stadtkreis	0,21		0,33		0,29	+ +	80
DE132	Breisgau-Hochschwarzwald	0,02		0,14		0,11	+ +	80
DE133	Emmendingen	0,04		0,16		0,12	+ +	80
DE134	Ortenaukreis	-0,06		0,05		0,02	+ +	80
DE139	Lörrach	0,15		0,27		0,23	+ +	80
DE13A	Waldshut	0,13		0,25		0,21	+ +	80
DEB33	Landau in der Pfalz, Kreisfreie Stadt	-0,08		0,03		0,00	- +	80
DEB37	Pirmasens, Kreisfreie Stadt	-0,23		-0,11		-0,14	- -	80
DEB3E	Germersheim	0,35		0,47		0,43	+ +	95
DEB3H	Südliche Weinstraße	-0,13		-0,01		-0,05	- -	80
DEB3K	Südwestpfalz	0,00		0,11		0,08	+ +	80
FR421	Bas-Rhin	-0,31			-0,27	-0,23	- -	50
FR422	Haut-Rhin	-0,14			-0,11	-0,06	- -	80

Table 8.17: Pollution indices of the NUTS3 units of the CBR

8.14 Conclusion

The Factor Analysis validates the results of the previous chapters, putting them into relation to the involved countries of the CBR and all NUTS3 units in Europe.

Again it is affirmed, that the CBR analysed belongs to the stronger regions in Europe regarding economy, unemployment, environmental conditions etc. In this analysis date from Switzerland is missing, but the proximity of the French and German NUTS3 units to Switzerland is important for their (economic) performance as a high share of employees chose to live in France or Germany and work in Switzerland because of higher wages and lower taxes there.

What had to be excluded form the analysis are non-quantitative factors, nevertheless playing a crucial role for the attractiveness of a region: the Upper Rhine is well known for culture, landscape, warm summers, attractive cities, wine etc. Choosing the place of domicile, these factors are important for a lot of people (as long as the working conditions are met).

Chapter 9 – Conclusion

The Trinational Metropolitan Area Upper Rhine is a peripheral and at the same time central region in Europe: it is peripheral as it is located in the northern part of Switzerland, eastern part of France and south-western part of Germany with the River Rhine as its natural border between these three countries. And it is at the same time centrally located within Europe, being part of the "Blue Banana". With this central position in Europe and the existence of a variety of small, medium und larger cities and conurbations (see Chapter 3), the CBR hosts a quite strong economy, administrative centres (e.g. the European Parliament), and research centres, resulting in rather low unemployment rates and high GDP respectively GVA.

What had to be excluded form the analysis are non-quantitative factors, nevertheless playing a crucial role for the attractiveness of a region: the Upper Rhine is well known for culture, landscape, warm summers, attractive cities, wine etc. Choosing the place of domicile, these factors are important for a lot of people (as long as the working conditions are met). From the quantitative statistical analysis some challenges of the future for the CBR come not in sight:

The Rhine Valley is one of the European main corridors for passenger and freight transport. There are excessive networks of road and rail, but the interconnection between those are still insufficient. The expected increases in traffic all over Europe - especially in freight – and new connections through the Alps like the Gotthard will put pressure on the transport networks in this important part of the North-South connection within Europe (see also Chapter 5).

Also the public transport of the CBR is quite comprehensive in all national parts. The interconnection and quality of service in-between is still an important issue of cross-border cooperation, as a real cross-border network does not exist. The existing transport network is focused on national needs and institutions and a shared use is seldom aspired.

Besides the quantities figures of the change in land use patterns, it is the conflict of different uses of land, e.g. for settlement or for agriculture, often competing for the same strips of land (see also Chapter 4). The trend towards renewable energy produced from biomass may sharpen this conflict, as flat, fertile machinery capable arable land is needed for the large-scale cultivation of energy crops.

Although there is a high potential of research and development in the CBR (see Chapter 6 and 7), the interconnection between the research institutions is still lacking behind.

It became obvious in the discussion of the indicators, that the level of detail is not sufficient. The NUTS3 units involved are not only of uneven sizes (e.g. French NUST3 units compared to Swiss ones) but are to large to measure effects within the CBR, for instance when it comes to places of domicile of the incoming migrates, shrinkage and coexistent growth processes and so on. A further important issue is data availability. Without data for the Swiss NUTS units, the comparison is incomplete and cannot reveal what it could, if data was available.

For a more detailed analysis, in particular measuring the border effect and the disparities between the Rhine valley and the edges of the CBR, more detailed and updated data on NUTS4 level, including the Switzerland, is needed.

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