Ulysses

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

Targeted Analysis 2013/2/10

Annex VII – Case Study 5: Poland -Germany - Sweden Cross-Border Area (Euregion Pomerania)

Report on Task 2.2 - Multi-scale performance analysis

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Nomenclature

NUTS: Abbreviation for the Nomenclature of territorial units for statistics. The NUTS classification is a hierarchical system for dividing up the economic territory of the EU for the purpose of collection, development and harmonisation of EU regional statistics.

NUTS 1: major socio-economic regions

NUTS 2: basic regions for the application of regional policies

NUTS 3: small regions for specific diagnoses

LAU: Abbreviation for the Local Administrative Units (LAUs) compatible with NUTS classification.

LAU 1: The upper LAU level (formerly NUTS level 4) is defined for most, but not all of the countries.

LAU 2: The lower LAU level (formerly NUTS level 5) consists of municipalities or equivalent units in the 27 EU Member States.

CBA: Abbreviation for cross-border area.

Executive summary

This report represents results of the Ulysses-study task 2.2 concerning Case Study 5; the Poland – Germany – Sweden cross-border area (Euregion Pomerania). In the given task multi-thematic analyses were performed on statistical data with the aim of analysing territorial development in the case study area.

Euregion Pomerania is a cross-border region situated on the border between Poland, Germany and Sweden. The border between Poland and Germany is a land border, while Sweden is separated from the Polish and German regions of Euregion Pomerania by a maritime border. From a covernance point of view Euregion Pomerania is an association formed by three associations of local authorities in Poland, Germany and Sweden. The Euregion was originally established in 1995 in Szczecin, where the parties officially agreed upon a common goal to be achieved with the collaboration; that of promoting equal and balanced development in the regions of Euregio Pomerania.

Euregion Pomerania has a total area of 49 663,97 km² and a total population of 3 915 493 inhabitants. Demographic analyses performed in this study reveal that Polish regions have the largest share of inhabitants in Euregion Pomerania (43,24 %), Swedish region of Skåne län the second largest (31,02 %) and German regions the smallest share (25,74 %). From the perspective of sex structure, Euregion Pomerania has a female majority with 1 993 574 females that make up 50,92 % of the total population of the CBA. Age structure of the CBA is following: the share of 0-14 year old population in Euregion Pomerania in 2009 was 14 %, the share of 15-64 year old population 69 % and the share of population over 65 years of age 17 %. Dependency ratios for Euregion Pomerania indicate that, in comparison with the European Union averages, there is less pressure for the working age to take care of children less than 15 years of age, but more pressure on the working age population to take care of elderly people. Considering the small share of children under 15 years of age, there will also be less people to take care of the working age population in the future.

Population density in Euregion Pomerania was 278,7 inhabitants per km² in 2008. While the population density has been declining in the German and Polish regions of Euregion Pomerania, the population density in Skåne län has been increasing between years 2000 and 2008. Besides Skåne län there were only two other regions in Euregion Pomerania that have experienced positive growth in population density between the given period. These were Barnim in Germany and Szczezinski in Poland. Population change has accordingly been negative in all the regions of Euregion Pomerania, except for Barnim, Szczecinski and Skåne län in Sweden.

Natural increase has been a more significant factor for population change than net migration in the regions of Euregion Pomerania. Between 2000 and 2008 there were 10 163 deaths over births in Pomerania and 8 890 emigrants over immigrants. None of the regions of Euregion Pomerania has a total fertility rate above the replacement level. Sydsverige has the highest TFR, and the rate has experienced a considerable growth between 1997 (1,51) and 2008 (1,9), as has the TFR for Sweden. Sydsverige is the only region in the Poland – Germany – Sweden CBA with a total fertility rate above the EU average (1,6 in 2008).

Polycentric development of the Poland – Germany – Sweden CBA has been studied here on NUTS 2 level, and therefore Functional Urban Areas outside the actual territory of Euregion Pomerania have been included in the study. FUAs located in Euregion Pomerania are Neubrandenburg, Greifswald, Stralsund and

Eberswalde-Finow (Barnim) in Germany, Szczecin, Koszalin (Koszalinski), Kolobrzeg (Koszalinski) and Stargard Szczecinski (Stargardski) in Poland and Malmö (Skåne län) in Sweden. The largest FUA of the Poland – Germany – Sweden CBA in 2006 was Malmö with 636 157 inhabitants. When we take a look at population change in the FUAs of Euregion Pomerania, it is possible to observe that population growth between 2001 and 2006 has been positive in Malmö (4,4 %), Koszalin (0,3 %) and Greifswald (0,7 %), while all the other FUAs have been loosing population.

The slope of rank size distribution of FUA population in the Poland – Germany – Sweden CBA was -0,96 in 2006. This indicates of a relatively polycentric urban structure in the CBA, more polycentric than the urban structure in ESPON space. When considering the GDP of the FUAs the CBA is more monocentric. GDP in the leading city Malmö was 19 688 M€ in 2006 and the difference in GDP was significant compared to other FUAs in the CBA. Primacy rate for the Poland – Germany – Sweden CBA was 0,57 in 2006. This again suggests that urban structure of the region is not dominated by one big city, but that the size of the biggest FUA (Malmö) is actually smaller than anticipated by the rank-size distribution of the FUAs. Avarage FUA size in the Poland – Germany – Sweden CBA was 189 228,9 inhabitants in 2006. Only 51,5 % of the Poland – Germany – Sweden CBA's total population lives in FUAs. The dominating economic activity in the FUAs of the CBA was Service sector (L-P). However, the share of Trade and transport (GHI) and Finance and business services (J-K) was almost as large in the GVA added of the FUAs.

Considering urban-rural relationship in the CBA, ESPON 1.1.2 typology classifies following regions of Euregion Pomerania as regions with low urban influence and low human intervention: Uckermark, Demmin, Mecklenburg-Strelitz, Nordvorpommern, Ostvorpommern, Rügen, Uecker-Randow and Koszaliński. Regions with high urban influence and high human intervention are, according to the classification Barnim, Greifswald, Neubrandenburg, Stralsund and Skåne län. The Eurostat typology considers following regions of the CBA as predominantly rural regions: Uckermark, Demmin, Rügen, Uecker-Randow and Stargardski. The rest of the regions of Euregion Pomerania are classified as intermediate regions.

Agricultural areas occupy relatively large areas in all the regions of Euregio Pomerania. Demmin has the largest share of agricultural areas (79,73 %) and even in Neubrandenburg (where the share of agricultural areas is the smallest in the CBA) 25,08 % of the total area is occupied by agricultural land. In general, total area of agricultural land has been decreasing in all the regions of Euregion Pomerania between 1990 and 2006.

Urbanisation of agricultural areas in the regions of Euregion Pomerania has been relatively similar to the European Union average (2,67 ha per 10000 ha), but two regions have experienced urbanisation of far larger agricultural areas. In Stralsund 38,93 ha per 10000 ha and in Greifswald 24,89 ha per 10000 ha of agricultural land was urbanised between 2000 and 2006. The average share of artificial areas in Euregion Pomerania was also very similar to the ESPON average (11,35 ha per 10000 ha of land). Biggest changes in the amount of artificial land cover between 2000 and 20006 in the regions of Euregion Pomerania have taken place in the city districts of Greifswald, Stralsund and Neubrandenburg.

The share of GVA by agriculture and fishing in total GVA has decreased in all the regions of Euregion Pomerania between 1997 and 2008. Employment statistics for agriculture and fishing show a gradual decrease in the regions of Euregion Pomerania and the changes have been especially severe in the Polish regions of the CBA. Decrease in employment in agriculture and fishing has naturally reduced the share of employment in general employment statistics.

In the context of ESPON space potential accessibility of the regions of Euregion Pomerania by road vary from 129,3 (Barnim) to 48,7 (Skåne län). German regions of Euregion Pomerania are potentially more easy to access by road than ESPON regions in general. Potential accessibility of the Polish regions is below the ESPON average. German regions of Euregion Pomerania have the highest potential accessibility by road also in the context of the cross-border area.

Potential accessibility by rail in the regions of Euregion Pomerania is relatively similar to the road accessibility values. The German region of Barnim has the highest potential accessibility both in the context of ESPON regions (135,8) and the CBA (140,1). Index change in the potential accessibility by rail has been positive in all the German regions of Euregion Pomerania, but negative in all the other regions.

Accessibility of Euregion Pomerania appears very different, when considering accessibility by air. In the context of ESPON space Skåne län was the most difficult region to access by road and rail, but it is has the highest accessibility by air among the NUTS 3 regions of Euregion Pomerania (136,8). It is also the most potential region to be accessed by air within the CBA (158,3). Good air accessibility clearly affects the multimodal accessibility of Skåne län, which has according to the analysis the highest potential multimodal accessibility of the regions of Euregion Pomerania (120,6). "Virtual accessibility" of Skåne län is also good considering that Södra Sverige had the largest share of households with broadband internet access in 2009 (78,6 %).

Analyses on Lisbon / Europe 2020 and Gothenburg objectives included four subcategories: economy and employment, research and innovation, social cohesion and environment. The coefficient of deviation, which measures regional disparities in the GDP per capita has been increasing between 1997 and 2008 in the Poland – Germany – Sweden CBA. This signifies that disparietes in GDP per capita have been growing in Euregion Pomerania during the given time period. When compared to the NUTS 3 average of ESPON countries, the coefficient of deviation (and accordingly disparities in GDP per capita) has been higher in ESPON countries, but has now settled on the same level with the CBA.

We compared NUTS 3 regions of the CBA with the leading region (Inner London West region) in terms of GDP per capita, trough index number analysis. The best performing region among the regions of Euregion Pomerania in terms of GDP per capita is Neubrandenburg (32900 in 2008), while the lowest GDP per capita is to be found in Stargardski (6100 per capita). Compared to the leading European region in GDP per capita (London), Greifswald, Neubrandeburg, Stralsund and Skåne län are considered middle income regions. Stargardski is classified as a very laggard region, while other regions of the CBA area have according to the index number analysis been classified as less developed regions or laggard regions.

In the catching up analysis we evaluated the speed of catching-up with the leading region (Inner London West region). Most of the regions in Euregion Pomerania have been classified as diverging regions. This indicates that these regions are not catching up the leader, but growing less and thus diverging from the leading region. Polish regions of Euregio Pomerania have been classified as slow catching-up regions (Koszalinski, Miasto Szczecin and Szczecinski) or slow converging regions (Stargardzki). With a similar growth rate these regions could in theory catch up the leader in 75 to 102 years.

The leading economic sector in Euregion Pomerania in 2008 was Public administration and community services (L-P), which produced 30 % of the total GVA in the CBA. Highest share of employment in Euregion Pomerania was in 2008 recorded in Public administration and community services (L-P). Share of employment in this sector was in average 36,20 % of total employment in Euregion Pomerania.

Total intramural R&D expenditure in Euregion Pomerania was 1,66 in 2007, which is lower than the EU average (2,01). In Sydsverige (4,75) R&D expenditure was well above the EU and Swedish average (3,4). Zachoniopomorskie had the lowest R&D expenditure (0,24). Unemployment in Euregion Pomerania (11,13) was well above the European and national (Germany, Poland, Sweden) averages in 2010.

We studied environmental performance of the Northern Finland – Russia CBA based on indicators from the European Commission's 5th Cohesion Report and ESPON Climate Project. From the 5th Cohesion Report we selected six indicators; soil sealed area, ozone exceedance, waste water treatment, Natura 2000 areas, solar energy and wind power potential.

Soil sealing was particularly high in the city regions of Euregion Pomerania. In Stralsund soil sealed area covered as much as 37 % of the total land area. Ozone concentration exceedances were below national and EU averages in Euregion Pomerania. Urban waste water treatment capacity in Euregion Pomerania was above national and EU averages in all other regions but Zachodniopomorskie, where the capacity was only 57 %. The share of NATURA 2000 areas values higher than national or European averages. Solar energy potential in the CBA is below European averages, but in line with national averages. Wind energy potential, on the other hand, is well above European average in Euregion Pomerania. Sensitivities to climate change were relatively low in all the regions of Euregion Pomerania.

Factor analyses that complete this study on the territorial development of Poland – Germany - Sweden CBA validate results of the previous sections.

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Chapter 1. Introduction

1.1. Research objectives

ULYSSES is a case study oriented project, the main aim of which is to use ESPON applied results as a yardstick for decentralized cross-border spatial development planning. There are four overall objectives in the ULYSSES-project:

1) To promote ESPON research results by raising awareness among involved stakeholders on the practical utility of decentralised cross-border spatial development.

2) To 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.

3) To promote experience and best practices exchange in the field of cross border spatial development by applying coherent cross-border strategies.

4) To promote a further application of targeted research results in the selected cross-border areas and review general usefulness of applied research results in the context of cross border spatial development.

More specific objectives of ULYSSES are following:

a) To perform multi-scale and multi-thematic territorial analysis. To analyse territorial socioeconomic dynamics and performance of each case study region with regard to six targeted themes under analysis at different territorial scales. The objective is to identify territorial drivers and dynamics of each region.

b) To perform institutional performance analysis. To identify key institutional drivers that could allow building better baseline strategies in order to answer main challenges identified.

c) To conduct integrated analysis, where territorial dynamics and performance of the regions will be compared to their institutional performance. To relate performance analysis with policy structures and actions.

d) To produce policy recommendations. To formulate 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.

Case studies to be examined within the framework of ULYSSES are:

CS 1: Upper Rhine cross-border area along the land borders between France, Germany and Switzerland,

CS 2: Cross-border area along the entire Spanish-French land border (Pyrenees),

CS 3: Cross-border area along the land border between Greece and Bulgaria,

CS 4: Cross-border area covering parts of Northern Finland-Russian land border (Euregion Pomerania),

CS 5: Cross-border area along the borders between Poland, Germany (land border) and Sweden (maritime border), and

CS 6: Extremadura/Alentejo on the border between Spain and Portugal.

Analyses in the framework of ULYSSES-project are based on data and indicators developed by previous ESPON projects. Complementary data has been collected also from Eurostat and national statistical databases. Analyses are done on different territorial scales, 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 to confining non-border regions within the same country.

Analyses of territorial dynamics include following four themes: demography, polycentric development, urban-rural relationship and accessibility and connectivity. Territorial performance of the cross-border regions is studied from the perspective of Gothenburg and Lisbon/Europe 2020 strategies, and thus following four themes have been included in the analyses: economy and employment, research and innovation, social cohesion and environment. Finally, factor analyses are performed in order to study the relationship between territorial dynamics and territorial performance.

This report presents research results concerning ULYSSES case study number five, namely the study of Poland – Germany – Sweden cross-border area (CBA). First we give a general overview of the case study region, and then deliver the results of the analyses theme by theme. In the end of each chapter we draw conclusions on the theme in question, and in the end of this report we summarize the most relevant findings of the study as a whole.

1.2. General overview of the Poland – Germany – Sweden CBA (Euregion Pomerania)

Euregion Pomerania is a cross-border region situated on the border between Poland, Germany and Sweden. Polish regions of Euregion Pomerania are located in Northeastern Poland, German regions in Northwestern Germany and Swedish regions cover the southernmost part of Sweden. The border between Poland and Germany is a land border, while Sweden is separated from the Polish and German regions of Euregion Pomerania by a maritime border. The distance across the Baltic Sea from the Swedish coast to the German coast is approximately 80 km (in it's narrow-most part) and to the Polish coast approximately 180 km.

From a covernance point of view Euregion Pomerania is an association formed by three associations of local authorities in Poland, Germany and Sweden. The Euregion was originally established in 1995 in Szczecin between the Association of Polish Local Authorities of the Euregion Pomerania and Association of Local Authorities Europaregion Pomerania e.V. In 1998 the Scania Association of Local Authorities from Sweden joined the Euregion and the parties officially agreed upon a common goal to be achieved with the collaboration; that of promoting equal and balanced development in the regions of Euregio Pomerania.[1]

Figure 1. Map of Euregion Pomerania

In the Ulysses project quantitative statistical analysis were made on Euregion Pomerania utilizing the NUTS classification (Nomenclature of territorial units for statistics) established by Eurostat. From the perspective of NUTS division Euregion Pomerania appears as follows. In Poland it includes four NUTS 3 level regions; Koszaliński, Stargardzki, Miasto Szczecin and Szczecinski. These regions form the NUTS 2 level region of Zahodnio-Pomorskie, which belongs to the NUTS 1 level region of Pólnocno-Zachodni. On the German side Euregion Pomerania includes eleven NUTS 3 level regions. Two of these, Barnim and Uckermark belong to the NUTS 2 region of Brandenburg-Nordost and, thus, to the NUTS 1 region of Brandenburg. The other nine regions (Greifswald, Neubrandenburg, Stralsund, Demmin, Mecklenburg-Strelitz, Nordvorpommern, Ostvorpommern, Rügen and Uecker-Randow) are part of the NUTS 2 / 1 region of Mecklenburg-Vorpommern.[2] In Sweden only one NUTS 3 region, that of Skåne län belongs to Euregion Pomerania. Skåne län is part of the NUTS 2 region of Sydssverige, which belongs to the NUTS 1 region of Södra Sverige (Southern Sweden). Since part of the analysis on the case study areas were made on NUTS 2 level, it is necessary to notice that the German NUTS 2 regions of Mecklenburg-Vorpommern and Brandenburg-Nordost, and the Swedish NUTS 2 region of Sydsverige include NUTS 3 regions that are not members of Euregion Pomerania.

[1] Avtal angående kommunförbundet Skånes inträde i Euregion Pomerania.

[2] The NUTS division of the German regions applied in this report is the division preceeding the September 2011 local government reform in the Federal State of Mecklenburg-Vorpommern. In this reform, the state was divided into six rural districts (Kreise). The German NUTS 3 regions of Euregion Pomerania were accordingly reorganized and merged into three new rural districts; Vorpommern-Greifswald, Vorpommern-Rügen and Mecklenburgische Seenplatte. Vorpommern-Greifswald now includes the former districts of Ostvorpommern, Uecker-Randow, the Ämter Jarmen-Tutow and Peenetal/Loitz from the former Demmin district and the former district-free town Greifswald. The former districts of Nordvorpommern and Rügen and the former district-free town Stralsund were merged into Vorpommern-Rügen. Mecklenburgische Seenplatte was established by merging the former districts of Müritz, Mecklenburg-Strelitz and Demmin (except the Ämter Jarmen-Tutow and Peenetal/Loitz) and the former district-free town Neubrandenburg.

Table 1. NUTS division of Poland – Germany – Sweden CBA (Euregion Pomerania)

NUTS ID	NUTS 0	NUTS 1	NUTS 2	NUTS 3
DE	Germany (Deutschland)			
DE4		Brandenburg		
DE41			Brandenburg-Nordost	
DE412				Barnim
DE418				Uckermark
DE8		Mecklenburg-Vorpommern		
DE80			Mecklenburg-Vorpommern	
DE801				Greifswald
DE802				Neubrandenburg
DE805				Stralsund
DE808				Demmin
DE80B				Mecklenburg-Strelitz
DE80D				Nordvorpommern
DE80F				Ostvorpommern
DE80H				Rügen
DE80I				Uecker-Randow
PL	Poland (Polska)			
PL4		Region Północno-Zachodni		
PL42			Zahodnio-Pomorskie	
PL422				Koszaliński
PL423				Stargardzki
PL424				Miasto Szczecin
PL425				Szczecinski
SE	Sweden (Sverige)			
SE2		Södra Sverige		
SE22			Sydsverige	
SE224				Skåne län

Figure 2. Map of NUTS 2 and NUTS 3 level units of the Poland – Germany – Sweden CBA.

Following table and map present administrative centres of the NUTS 3 level regions of Euregion Pomerania. In Poland NUTS 3 level corresponds to counties, powiats, which do not have cities as administrative centres. On the contrary, they are coverned by Seats of County Authorities that are located in central cities of the counties. For Polish NUTS 3 regions the list therefore includes name of the city where the Seat of County Authorities is located. Cities are also considered NUTS 3 level units and they have their own administration. Counties and cities are grouped into voivodships (województwo), administrative regions that represent level 2 in the NUTS division. The six existing NUTS 1 level regions, the so called macroregions serve only for statistical purposes.

In Germany NUTS division follows the administrative division of the country, and the states (Länder or Bundesländer) form the first, government regions (Regierungsbezirke) the second and districts (Kreise) the third NUTS level. NUTS 3 level rural and urban districs are headed by District Councils that are located in the administrative cities of the districts. Swedish NUTS division corresponds to the administrative regions on NUTS 3 level (NUTS 1 and 2 levels have been created for statistical purposes), following the division into counties, 'län'. Counties are headed by 'länstyrelse', County Administrative Boards, and the board for Skåne län is located in the city of Malmö.

Table 2. Administrative centres of the NUTS 3 level regions of Euregion Pomerania.

NUTS ID	NUTS	NUTS level	Administrative Centre
DE412	Barnim	NUTS 3	Eberswalde
DE418	Uckermark	NUTS 3	Prenzlau
DE801	Greifswald	NUTS 3	Greifswald
DE802	Neubrandenburg	NUTS 3	Neubrandenburg
DE805	Stralsund	NUTS 3	Stralsund
DE808	Demmin	NUTS 3	Demmin
DE80B	Mecklenburg-Strelitz	NUTS 3	Neustrelitz
DE80D	Nordvorpommern	NUTS 3	Grimmen
DE80F	Ostvorpommern	NUTS 3	Anklam
DE80H	Rügen	NUTS 3	Bergen
DE80I	Uecker-Randow	NUTS 3	Pasewalk
PL422	Koszaliński	NUTS 3	Koszalin
PL423	Stargardzki	NUTS 3	Stargard Szczeciński
PL424	Miasto Szczecin	NUTS 3	Szczecin
PL425	Szczecinski	NUTS 3	Szczecin
SE224	Skåne län	NUTS 3	Malmö

Figure 3. Map of Germany, Poland and Sweden presenting the Poland – Germany – Sweden CBA and the NUTS 3 level administrative centres.

Euregion Pomerania has a total area of 49 663,97 km². The largest NUTS 3 unit of the CBA is Skåne län in Sweden. It has a total area of 11 368,5 km² that forms 22,89 % of the total area of Euregion Pomerania. The smallest NUTS 3 unit of the CBA is Stralsund in Germany with a total area of 39,1 km² (0,08 % of the total area of the CBA). German NUTS 3 regions cover 31,02 % and Polish regions 46,09 % of the total area of Euregion Pomerania. In their nation states the regions of Euregion Pomerania cover relatively small shares of total country areas. Polish regions of the CBA form 7,32 % of the total area of Poland, German regions cover 4,31 % of the total area of Germany, and the share of Skåne län in the total area of Sweden is only 2,6 %.

Table 3. Total area of NUTS 0-3 level units of the Poland – Germany- Sweden CBA.

NUTS ID	NUTS	NUTS level	Total Area (km²) 2010	% of CBA
DE	Germany (Deutschland)	NUTS 0	357 123,50	
DE4	Brandenburg	NUTS 1	29 481,95	
DE41	Brandenburg-Nordost	NUTS 2	15 499,7*	
DE412	Barnim	NUTS 3	1471,64	2,96 %
DE418	Uckermark	NUTS 3	3058,28	6,16 %
DE8	Mecklenburg-Vorpommern	NUTS 1	23 188,98	
DE80	Mecklenburg-Vorpommern	NUTS 2	23 188,98	
DE801	Greifswald	NUTS 3	50,5	0,10 %
DE802	Neubrandenburg	NUTS 3	85,7	0,17 %
DE805	Stralsund	NUTS 3	39,1	0,08 %
DE808	Demmin	NUTS 3	1 922,0	3,87 %
DE80B	Mecklenburg-Strelitz	NUTS 3	2 089,9	4,21 %
DE80D	Nordvorpommern	NUTS 3	2 172,9	4,38 %
DE80F	Ostvorpommern	NUTS 3	1 911,2	3,85 %
DE80H	Rügen	NUTS 3	977,7	1,97 %
DE80I	Uecker-Randow	NUTS 3	1 624,6	3,27 %
PL	Poland (Polska)	NUTS 0	312 679,0	
PL4	Region Północno-Zachodni	NUTS 1	66 706,0	
PL42	Zahodnio-Pomorskie	NUTS 2	22 892,0	
PL422	Koszaliński	NUTS 3	10 402,0	20,94 %
PL423	Stargardzki	NUTS 3	6 838,0	13,77 %

PL424	Miasto Szczecin	NUTS 3	301,0	0,61 %
PL425	Szczecinski	NUTS 3	5 351,0	10,77 %
SE	Sweden (Sverige)	NUTS 0	441 369,5	
SE2	Södra Sverige	NUTS 1	81 092,5	
SE22	Sydsverige	NUTS 2	14 423,9	
SE224	Skåne län	NUTS 3	11 368,5	22,89 %
	Euregion Pomerania		49 663,97	100 %

*Data for 2008
Source Eurostat and Federal Statistical Office Germany

Chapter 2. Demographic analysis of the Poland – Germany – Sweden CBA

Demographic decline and the ageing of population is one of the main challenges in the European Union. Even if the population in EU (27) has been growing without a break since 1960, climbing up to 502.5 million in January 2011, net migration instead of natural change has been the main determinant of population growth since the beginning of 1990s. Europeans have generally been having fewer children, and the total fertility rate that describes the average number of children that would be born to a woman over her lifetime has declined from well above the replacement ratio (2.1 live births per woman) to 1.56 in 2008.[3] Population decline is especially problematic for peripheral regions, including border regions that are often situated on the fringe of nation states, since young people tend to migrate to large urban areas, and the peripheral regions are left with the skewed age structure and the responsibility to provide services for the ageing population.[4]

The aim of this chapter is to analyse the demographic dynamics and trends in the Poland – Germany – Sweden CBA (Euregion Pomerania). We start by describing the demographic dynamics in the area. How densely populated is the CBA? What does the age and sex structure of the CBA look like? What seem to be the temporal dynamics of the population growth? The main objective of the chapter, however, is to understand whether the border is influencing settlement patterns. Key questions to be answered are following: Is the border attracting or repulsing population? Are the border regions growing faster or slower than non-border regions? Is the population in the Poland – Germany – Sweden CBA ageing more rapidly than the population in non-border regions? In the conclusive chapter we will discuss spatial effects of the demographic dynamics and trends.

In order to study the demographic situation and future trends in the case study area, we have identified a set of indicators. These include CBA's total population, population density, natural and total population growth, total fertility rate, old and young dependency ratios and net migration. We will also study the inter-regional and international commuting in and out of the CBA. Methods of analysing the chosen parameters are explained in each subchapter separately.

[3] There has been a slight recovery in the TFR rates since 2003, when the ratio was as low as 1.47.
[4] Population and population change statistics 2011; Fertility statistics 2011.

Table 4. Demographic parameters studied for the Poland – Germany – Sweden CBA (Euregion Pomerania).

Parameter – Indicator	Period covered	Data source	NUTS level
Total population			
Total population by sex			
Total population by age			
Population density	2000-2010	Eurostat, Rosstat	NUTS 2, 3; LAU 1
Natural population growth			
Total population growth			
Total fertility rate			
Old and young dependency ratios			
Net migration			
Commuters to other countries among/by active population			
Commuters to other regions among/by active population			

2.1. Demographic dynamics

2.1.1. Total population

Euregion Pomerania has a total population of 3 915 493 inhabitants. The largest NUTS 3 region of the CBA is Skåne län in Sweden with 1 214 758 inhabitants and the smallest Greifswald in Germany with 54 131 inhabitants. Polish regions have the largest share of inhabitants in Euregion Pomerania (43,24 %), Swedish region of Skåne län the second largest (31,02 %) and German regions the smallest share (25,74 %). Considering national populations, Skåne län has the largest share of national population (13,12 %), while German NUTS 3 regions of Euregion Pomerania constitute (with the total of 1 007 778 inhabitants) only 1,23 % of the total population of Germany. The Polish regions of Euregion Pomerania have the total of 1 692 957 inhabitants that makes 4,44 % of the total population of Poland. When compared to the total population of the European Union, which in 2009 was 499 705 496 citizens, the population of Euregion Pomerania makes up 0,78 % of the EU27 population.

Table 5. Total population in the Poland – Germany – Sweden CBA (Euregion Pomerania).

NUTS ID	NUTS	NUTS level	Population 2009	% of CBA population
DE	Germany (Deutschland)	NUTS 0	82002356	
DE4	Brandenburg	NUTS 1	2522493	
DE41	Brandenburg-Nordost	NUTS 2	1140851	
DE412	Barnim	NUTS 3	177644	4,54 %
DE418	Uckermark	NUTS 3	132837	3,39 %
DE8	Mecklenburg-Vorpommern	NUTS 1	1664356	
DE80	Mecklenburg-Vorpommern	NUTS 2	1664356	
DE801	Greifswald	NUTS 3	54131	1,38 %
DE802	Neubrandenburg	NUTS 3	65879	1,68 %
DE805	Stralsund	NUTS 3	57866	1,48 %
DE808	Demmin	NUTS 3	81788	2,09 %
DE80B	Mecklenburg-Strelitz	NUTS 3	79729	2,04 %
DE80D	Nordvorpommern	NUTS 3	107963	2,76 %
DE80F	Ostvorpommern	NUTS 3	106875	2,73 %
DE80H	Rügen	NUTS 3	68872	1,76 %
DE80I	Uecker-Randow	NUTS 3	74194	1,89 %
PL	Poland (Polska)	NUTS 0	38135876	
PL4	Region Północno-Zachodni	NUTS 1	6099536	
PL42	Zahodnio-Pomorskie	NUTS 2	1692957	
PL422	Koszaliński	NUTS 3	591693	15,11 %
PL423	Stargardzki	NUTS 3	375056	9,58 %

PL424	Miasto Szczecin	NUTS 3	406941	10,39 %
PL425	Szczecinski	NUTS 3	319267	8,15 %
SE	Sweden (Sverige)	NUTS 0	9256347	
SE2	Södra Sverige	NUTS 1	4026590	
SE22	Sydsverige	NUTS 2	1367017	
SE224	Skåne län	NUTS 3	1214758	31,02 %
	Euregion Pomerania		3915493	100 %

From the perspective of sex structure, Euregion Pomerania has a female majority with 1 993 574 females that make up 50,92 % of the total population of the CBA. In general the sex structure in the regions of Euregion Pomerania is very even and there are no significant deviations in any of the regions. The City of Szczecin (Miesto Szczezin) in Poland has the largest share of female population (52,56 %) in the CBA, while Uecker-Randow In Germany has the largest share of male population (50,14 %). The sex structure of Euregion Pomerania thus resembles the distribution between male and female citizens in Poland, Germany and Sweden. All these countries have a slight female majority. In Poland the share of female inhabitants is 51,71 %, in Germany 51 % and in Sweden 50,26 %. In the European Union (EU27) 48,82 % of the citizens are male and 51,18 % female.

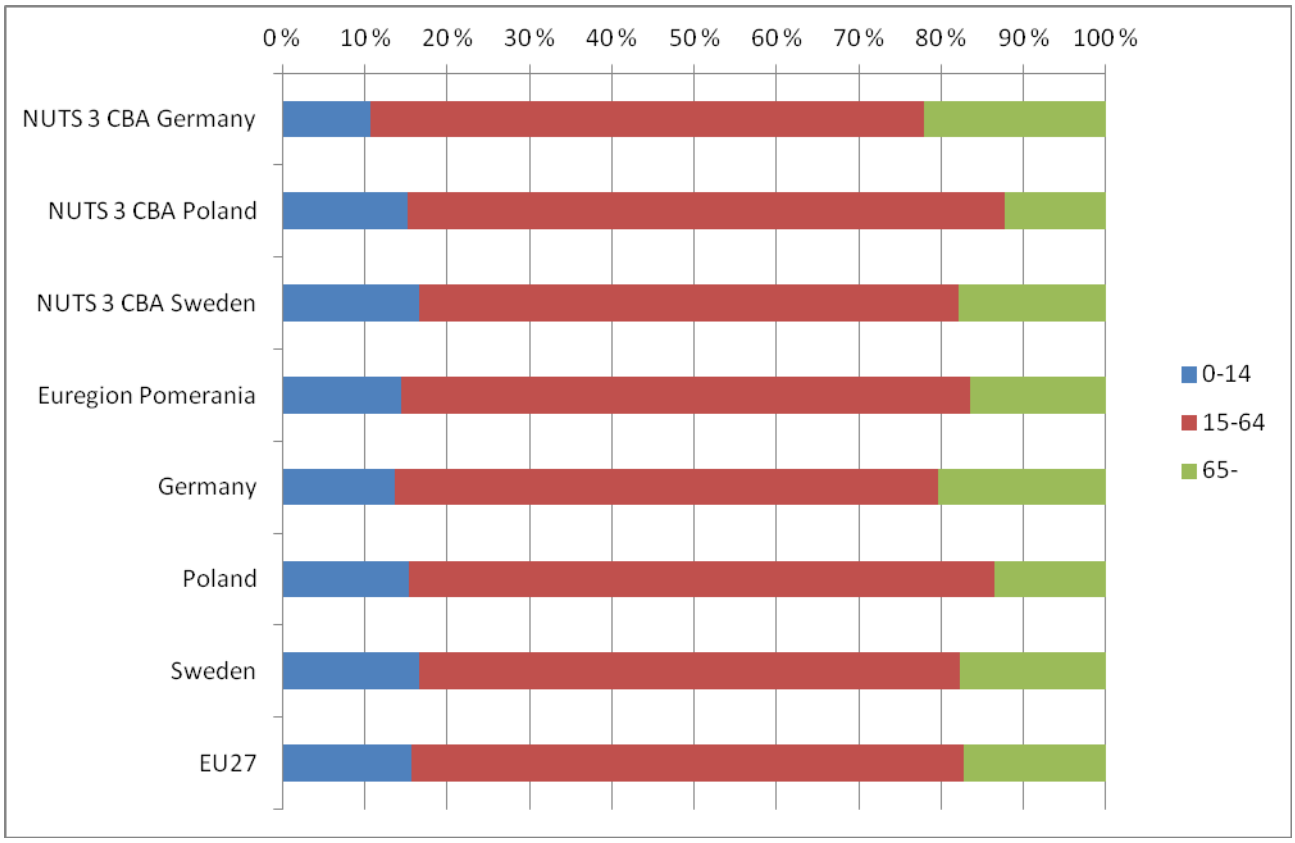
Table 6. Amount of male and female population in the Poland – Germany – Sweden CBA (Euregion Pomerania).

NUTS ID	NUTS	Male population 2009	Male population % of total population	Female population 2009	Female population % of total population
DE	Germany (Deutschland)	40 184 283	49,00	41 818 073	51,00
DE4	Brandenburg	1 249 312	49,53	1 273 181	50,47
DE41	Brandenburg-Nordost	566 396	49,65	574 455	50,35
DE412	Barnim	88 371	49,75	89 273	50,25
DE418	Uckermark	66 186	49,82	66 651	50,18
DE8	Mecklenburg-Vorpommern	825 124	49,58	839 232	50,42
DE80	Mecklenburg-Vorpommern	825 124	49,58	839 232	50,42
DE801	Greifswald	25 895	47,84	28 236	52,16
DE802	Neubrandenburg	32 118	48,75	33 761	51,25
DE805	Stralsund	28 071	48,51	29 795	51,49
DE808	Demmin	40 764	49,84	41 024	50,16
DE80B	Mecklenburg-Strelitz	39 877	50,02	39 852	49,98
DE80D	Nordvorpommern	53 772	49,81	54 191	50,19
DE80F	Ostvorpommern	53 186	49,76	53 689	50,24
DE80H	Rügen	34 007	49,38	34 865	50,62
DE80I	Uecker-Randow	37 201	50,14	36 993	49,86
PL	Poland (Polska)	18 414 926	48,29	19 720 950	51,71
PL4	Region Północno-Zachodni	2 958 148	48,50	3 141 388	51,50
PL42	Zahodnio-Pomorskie	821 437	48,52	871 520	51,48
PL422	Koszaliński	287 160	48,53	304 533	51,47
PL423	Stargardzki	184 461	49,18	190 595	50,82
PL424	Miasto Szczecin	193 055	47,44	213 886	52,56
PL425	Szczecinski	156 761	49,10	162 506	50,90
SE	Sweden (Sverige)	4 603 710	49,74	4 652 637	50,26
SE2	Södra Sverige	2 004 064	49,77	2 022 526	50,23
SE22	Sydsverige	678 063	49,60	688 954	50,40
SE224	Skåne län	601 034	49,48	613 724	50,52
	Euregion Pomerania	1 921 919	49,08	1 993 574	50,92

In order to study the age structure in Euregion Pomerania, three age groups were considered in the analysis: 1) population between 0-14 years, 2) population between 15-64 years (working age population)

and 3) population over 65 years of age. The share of 0-14 year old population in Euregion Pomerania in 2009 was 14 %, the share of 15-64 year old population 69 % and the share of population over 65 years of age 17 %. German NUTS 3 regions of Euregio Pomerania have the smallest share of population under 15 years of age (11 %) that is significantly lower than the German (14 %) or the European Union average (16 %). The Polish NUTS 3 regions, on the other hand, have the largest share of working age population (73 %) and the smallest share of population over 65 years of age (12 %). Age structure of the Polish regions resembles the general age structure in Poland, where the share of 15-64 year old population is larger and the share of elderly population significantly lower than the EU average. If 71 % of the population in Poland belongs to the working age population, the average share of 15-64 year old population in the EU27 countries is 67 %. Further, while 13 % of the population in Poland is 65 years or more, in the EU the average share of elderly people is 17 %. The age structure of Skåne län resembles very closely the general age structure in Sweden and in the European Union.

Figure 4. Age structure in the Poland – Germany – Sweden CBA in 2009.



2.1.2. Population density

Population density that expresses the amount of population per unit of measurement (here square kilometre) was 278,7 inhabitants per km² in Euregion Pomerania in 2008. In general population densities in the CBA vary widely. The most densely populated region of the Poland – Germany – Sweden CBA in 2008 was Stralsund with 1486,6 inhabitants per km², while the population density in the most sparsely populated

region of Mecklenburg-Strelitz was 38,4 inhabitants per km². The most densily populated region of the Polish regions of Euregion Pomerania was the city of Szczecin with 1354 inhabitants per km², while the region of Stargardski had the lowest population density of 55 inhabitants per km².

When compared to national averages, Euregion Pomerania has a higher population density than Germany (229,9), Poland (121,9) or Sweden (22,5 inhabitants per km²). Sweden has the biggest diffence in population densities between Skåne län and the national average. Population density in Skåne län was 109,4 inhabitants per km² in 2008, while the national average was only 22,5 inhabitants per km². European Union average population density valued at 116 inhabitants per km² in 2008.

While the population density has been declining in the German and Polish regions of Euregion Pomerania, the population density in Skåne län has been increasing between years 2000 and 2008. If the population density in Skåne län was 102,1 inhabitants per km² in 2000, there were 109,4 inhabitants per km² in Skåne in 2008. Besides Skåne län there were only two other regions in Euregion Pomerania that have experienced positive growth in population density between the given period. These were Barnim in Germany, where density has increased from 112,9 to 118,9 inhabitants per km² and Szczezinski in Poland, where density has increased from 58 (in 2002) to 60 inhabitants per km² (in 2008).

The following figures illustrate the temporal evolution of the population density in the Poland – Germany – Sweden CBA (Figure 5) and the population density in the regions of Euregion Pomerania (Figure 6).

Figure 5. Population density in the Poland – Germany – Sweden CBA between years 2000 and 2008.

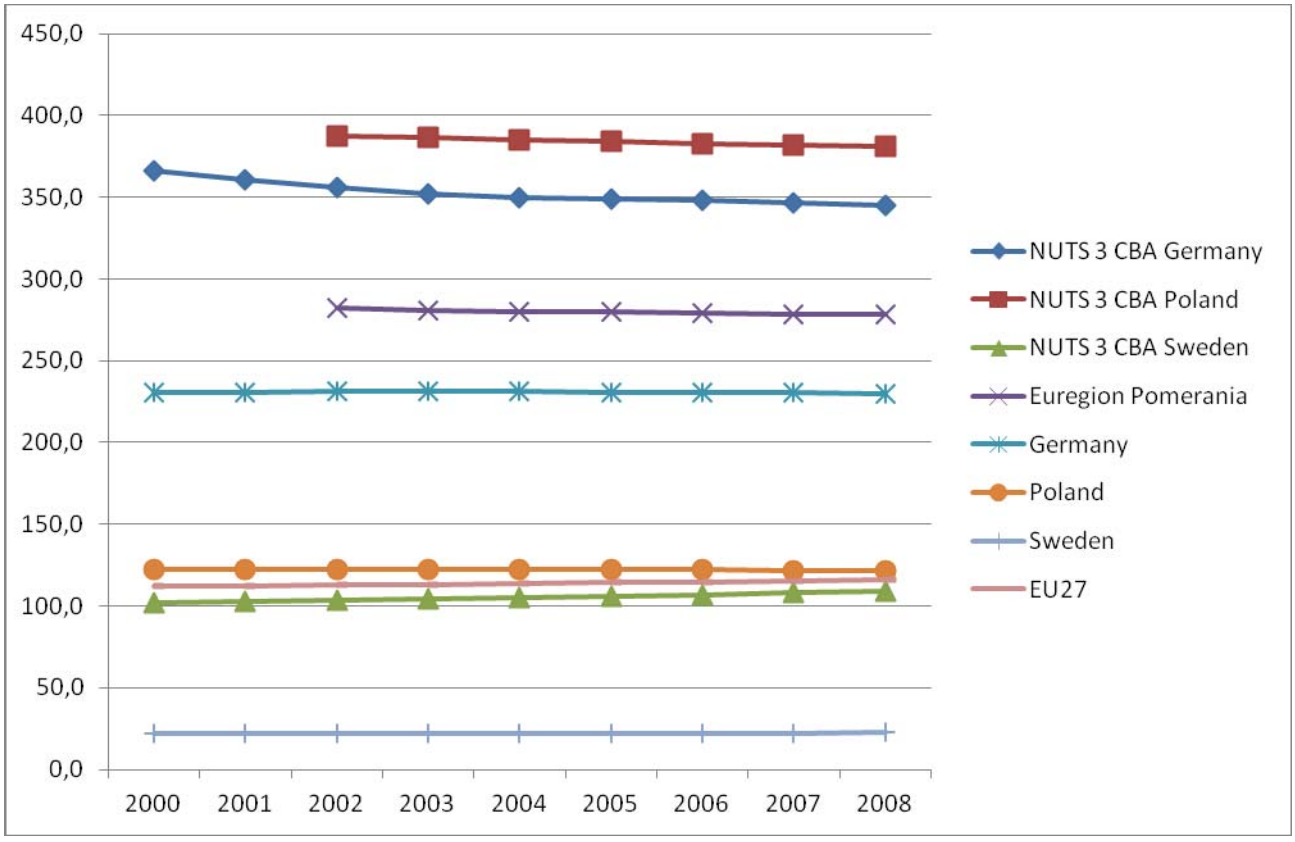
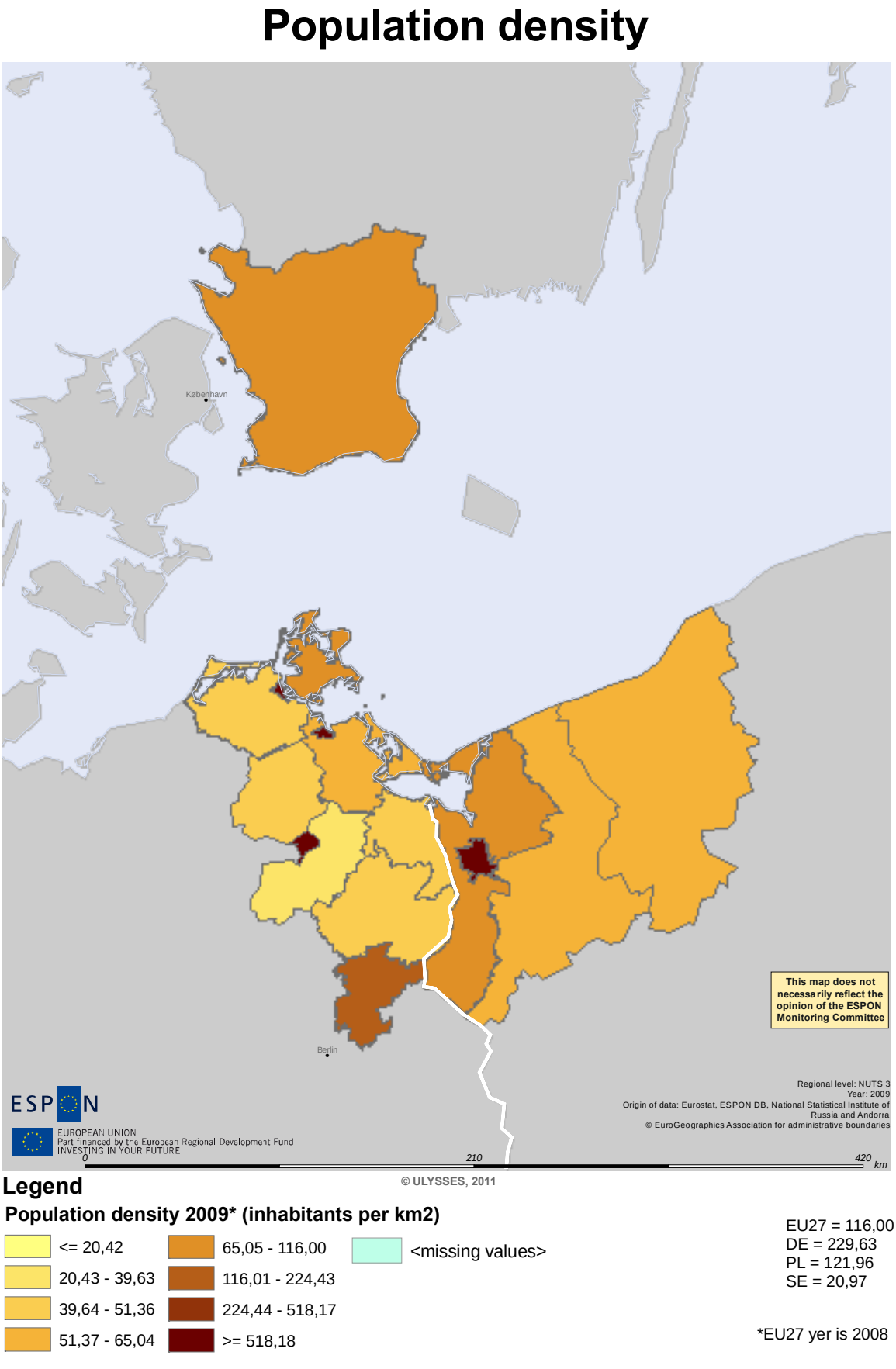


Figure 6. Population density in Euregion Pomerania in 2009.



2.1.3. Population change

Population growth illustrates the change in an area's population over time and it is determined by four factors; births, deaths, immigrants and emigrants. Natural population change is the difference between the number of live births and deaths during a given time period. Total population change, unlike natural population change, takes into account migration. The following table presents total population change in the Poland – Germany – Sweden CBA between years 2000 and 2009. Population change has been negative in all the regions of Euregion Pomerania, except for Barnim in Germany, Szczecinski in Poland and Skåne län in Sweden.

Table 7. Population change in the Poland – Germany – Sweden CBA 2000-2009.

NUTS ID	NUTS	Population 2000	% of CBA population	Population 2009	% of CBA population	Total population change 2000–2009
DE	Germany (Deutschland)	82163475		82002356		-161119
DE4	Brandenburg	2601200		2522493		-78707
DE41	Brandenburg-Nordost	1177600		1140851		-36749
DE412	Barnim	167300	4,26 %	177644	4,54 %	10344
DE418	Uckermark	154000	3,92 %	132837	3,39 %	-21163
DE8	Mecklenburg-Vorpommern	1789300		1664356		-124944
DE80	Mecklenburg-Vorpommern	1789300		1664356		-124944
DE801	Greifswald	55300	1,41 %	54131	1,38 %	-1169
DE802	Neubrandenburg	74600	1,90 %	65879	1,68 %	-8721
DE805	Stralsund	61300	1,56 %	57866	1,48 %	-3434
DE808	Demmin	95800	2,44 %	81788	2,09 %	-14012
DE80B	Mecklenburg-Strelitz	88400	2,25 %	79729	2,04 %	-8671
DE80D	Nordvorpommern	119400	3,04 %	107963	2,76 %	-11437
DE80F	Ostvorpommern	115100	2,93 %	106875	2,73 %	-8225
DE80H	Rügen	76200	1,94 %	68872	1,76 %	-7328
DE80I	Uecker-Randow	86400	2,20 %	74194	1,89 %	-12206
PL	Poland (Polska)	38653559		38135876		-517683
PL4	Region Północno-Zachodni	6111700		6099536		-12164
PL42	Zahodnio-Pomorskie	1732800		1692957		-39843
PL422	Koszaliński	605100	15,41 %	591693	15,11 %	-13407
PL423	Stargardzki	378330*	9,64 %*	375056	9,58 %	-3274**
PL424	Miasto Szczecin	416657*	10,61 %*	406941	10,39 %	-9716**
PL425	Szczecinski	308694*	7,86 %*	319267	8,15 %	10573**
SE	Sweden (Sverige)	8861426		9256347		394921
SE2	Södra Sverige	3835001		4026590		191589
SE22	Sydsverige	1274411		1367017		92606
SE224	Skåne län	1123786	28,62 %	1214758	31,02 %	90972
	Euregion Pomerania	3926367	100 %	3915493	100 %	-10874

* Data for 2001

** Total population change 2001-2009

Source Eurostat

In order to have a closer look at total population change in the Poland – Germany – Sweden CBA we have compared the population growth during two four-year periods, the first one including years 2000 to 2004 and the second one years 2005 to 2009. For both periods, we have calculated a growth rate according to the following formula:

$$Growth\ rate = \frac{population\ at\ the\ end\ of\ period - population\ at\ the\ beginning\ of\ period}{population\ at\ the\ beginning\ of\ period}$$

A positive growth rate indicates that the population has been increasing and a negative rate that the population has been decreasing. Euregion Pomerania shows negative population change during the first period, but positive population growth during the second period; a -0,59 % decrease between 2000 and 2004, but a 0,35 % increase between 2005 and 2009. During the first period Euregion Pomerania lost 22997 inhabitants, and during the second period total population increased by 13730 persons. Again, the only regions with positive population growth during both periods were Barnim, Szczecinski and Skåne län. In Barnim the growth has been slowing down during the second period (from 4,06 % in 2000-2004 to 1,01 % in 2005-2009), but the population of Szczecinski and Skåne län has been growing more rapidly during the second period. Skåne has had the strongest population growth rate, valuing at 4,64 % between 2005 and 2009. Uckermark and Demmin, on the other hand, have suffered from around 6 % population lost during both the first and the second period, and the greatest population lost of -7,35 % faced Demmin during the second period.

When we compare the two periods it is possible to detect a general tendency in the population growth. Regions where population has been increasing between 2000 and 2004 have continued to grow between 2005 and 2009, and regions with negative population change during the first period have continued to loose population during the second time period. Greifswald in Germany makes the only exception, since it has shifted from being a region with negative population growth (-4,34 %) to a region with positive population growth (2,78 %). Greifswald has also had the greatest difference in population growth between the first and the second period. The population of European Union (EU27) has been increasing both between 2000 and 2004 (1,25 %) and between 2005 and 2009 (1,75 %).

If we look at the whole period from 2000 to 2009, Euregion Pomerania has had a -0,03 % annual population decline. Annual population growth rate is an indicator that illustrates an average annual percent change in the total population during a given time period and it is calculated according to the following formula:

$$Annual\ growth\ rate = \left(\frac{population\ at\ the\ end\ of\ period}{population\ at\ the\ beginning\ of\ period}\right)^{\frac{1}{years\ in-between}} - 1$$

In the Poland – Germany – Sweden CBA, Demmin has had the greatest annual change of -1,74 % and smallest annual changes in the population during the given time period have taken place in Stargardzki, where the population has been declining at an -0,11 % annual rate. In general annual population growth has been negative in Germany (-0,02 %) and Poland (-0,15 %), while the Swedish population has been increasing between 2000 and 2009 at an 0,49 % annual rate. Population growth in Sweden has been greater than annual population growth in the European Union (0,38 %).

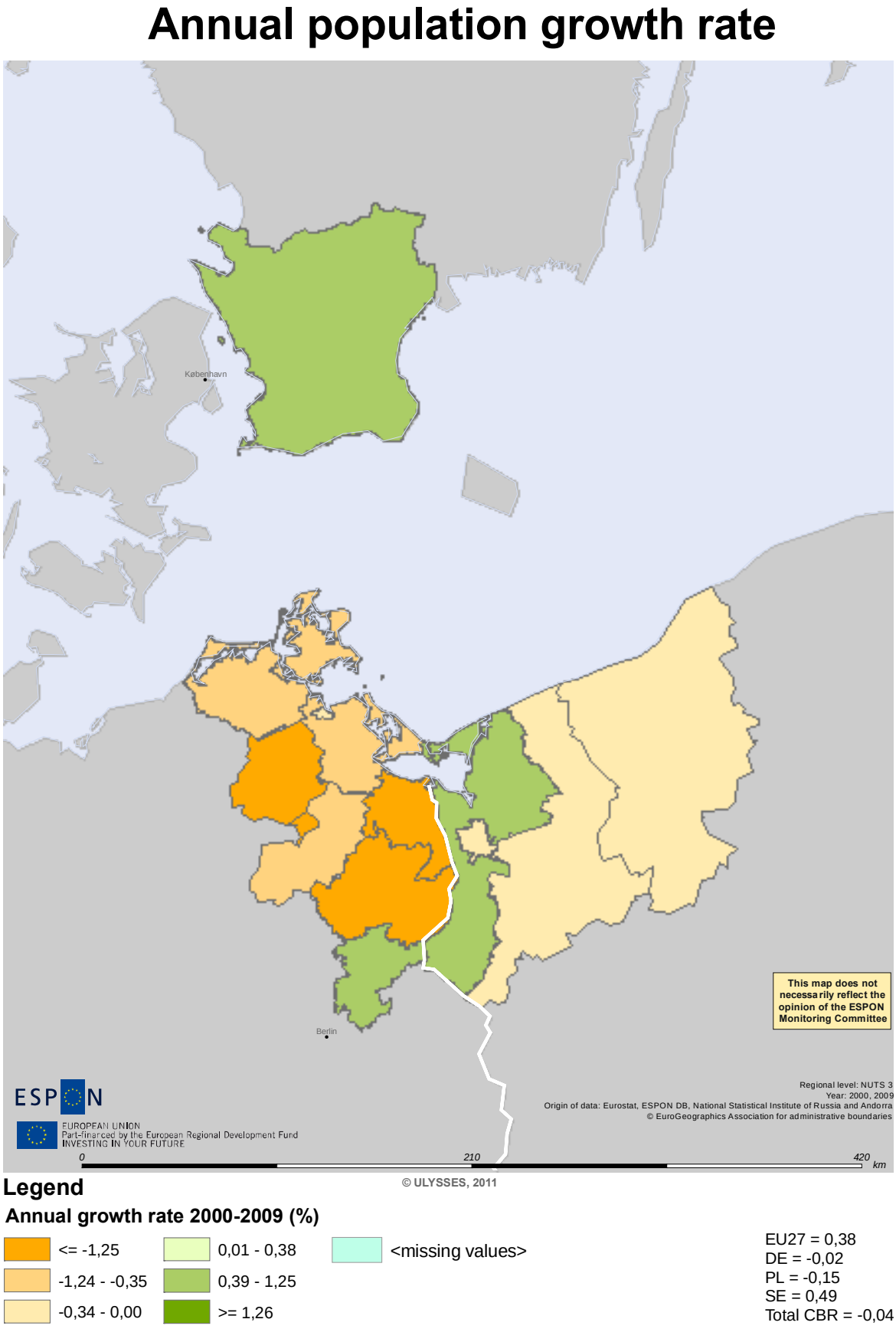
Table 8. Population growth rates in the Poland – Germany – Sweden CBA.

NUTS ID	NUTS	Growth rate 2000–2004 %	Growth rate 2005–2009 %	Annual population growth rate 2000–2009
DE	Germany (Deutschland)	0,45	-0,60	-0,02
DE4	Brandenburg	-1,03	-1,76	-0,34
DE41	Brandenburg-Nordost	-0,86	-1,98	-0,35
DE412	Barnim	4,06	1,01	0,67
DE418	Uckermark	-6,82	-6,09	-1,63
DE8	Mecklenburg-Vorpommern	-3,19	-3,22	-0,80
DE80	Mecklenburg-Vorpommern	-3,19	-3,22	-0,80
DE801	Greifswald	-4,34	2,78	-0,24
DE802	Neubrandenburg	-7,10	-3,76	-1,37
DE805	Stralsund	-3,59	-1,67	-0,64
DE808	Demmin	-6,16	-7,35	-1,74
DE80B	Mecklenburg-Strelitz	-3,28	-5,71	-1,14
DE80D	Nordvorpommern	-3,52	-5,16	-1,11
DE80F	Ostvorpommern	-2,78	-3,76	-0,82
DE80H	Rügen	-4,33	-4,57	-1,12
DE80I	Uecker-Randow	-7,06	-5,84	-1,68
PL	Poland (Polska)	-1,20	-0,10	-0,15
PL4	Region Północno-Zachodni	-0,77	0,50	-0,02
PL42	Zahodnio-Pomorskie	-2,12	-0,11	-0,26
PL422	Koszaliński	-1,91	-0,31	-0,25
PL423	Stargardzki	-0,22*	-0,50	-0,11**
PL424	Miasto Szczecin	-0,63*	-1,20	-0,29**
PL425	Szczecinski	0,74*	2,17	0,42**
SE	Sweden (Sverige)	1,29	2,72	0,49
SE2	Södra Sverige	1,63	2,81	0,54
SE22	Sydsverige	2,21	4,25	0,78
SE224	Skåne län	2,57	4,64	0,87
	Euregion Pomerania	-0,59	0,35	-0,03

* Growth rate 2001-2004

** Annual growth rate 2001-2009

Figure 7. Annual population growth rate in Euregion Pomerania between 2000 and 2009.



2.1.4. Natural population change and net migration

What then has been the dominating factor for population change in the Poland – Germany – Sweden CBA? In order to better understand the mechanisms of population change we have analysed natural increase (births – deaths) and net migration (immigrants – emigrants)[5] in the CBA between years 2000 and 2008. It occurs that natural increase has been a more significant factor for population change in the regions of Euregion Pomerania. Between 2000 and 2008 there were 10 163 deaths over births in Pomerania and 8 890 emigrants over immigrants.

German regions of the Euregion have been suffering from strong outmigration and the only region with positive net migration between 2000 and 2008 was Barnim (14397 immigrants over emigrants). The general tendency in Germany has been the opposite; net migration has been positive, but natural increase negative. Between 2000 and 2008 there were 984 698 immigrants over emigrants in Germany, and 1 145 727 deaths over births.

Poland has also had a strong outmigration during the given time period. Out of the Polish regions of Euregion Pomerania Szczecinski has been the only region with positive net migration (6 798). Outmigration has been especially strong in the regions of Koszaliński (-19 206) and Stargardzki (-17 480), while natural increase and net migration have had a relatively similar influence on population change in Szczecinski and the City of Szczecin. Both natural increase and net migration have been positive for Szczecinski, but negative for the City of Szczecin. While natural increase valued at 5 163 and net migration at 6 798 for Szczecinski, there were 5 612 deaths over births and 4 790 emigrants over emigrants in the City of Szczecin between 2000 and 2008.

Population in Skåne län has been growing both due to positive natural increase and net migration. Natural increase valued at 9 333 and net migration at 81 639 in Skåne during the studied time period. Skåne has followed the general positive population trend in Sweden both from the perspective of natural growth, but also due to significant migration into the country and its regions.

Table 9. Natural population increase and net migration in the Poland – Germany – Sweden CBA between 2000 and 2008.

NUTS ID	NUTS	Natural increase 2000–2008	Net migration 2000–2008
DE	Germany (Deutschland)	-1 145 727	984608
DE4	Brandenburg	-73 986	
DE41	Brandenburg-Nordost	-35 033	
DE412	Barnim	-4 214	14397
DE418	Uckermark	-5 153	-16064
DE8	Mecklenburg-Vorpommern	-41 377	
DE80	Mecklenburg-Vorpommern	-41 377	
DE801	Greifswald	-295	-643
DE802	Neubrandenburg	39	-8611
DE805	Stralsund	-2 066	-1315
DE808	Demmin	-3 475	-10614
DE80B	Mecklenburg-Strelitz	-2 545	-6185

[5] For a national population, net migration refers to external migration (movements between countries), and is the difference between external arrivals and external departures. For a subnational population, net migration includes both external migration and internal migration (movement within a country), and is the difference between external arrivals and external departures, plus the difference between internal arrivals and internal departures.

DE80D	Nordvorpommern	-3 721	-7858
DE80F	Ostvorpommern	-3 477	-4704
DE80H	Rügen	-2 271	-5226
DE80I	Uecker-Randow	-3 172	-9028
PL	Poland (Polska)	34 439	-552122
PL4	Region Północno-Zachodni	63 028	
PL42	Zahodnio-Pomorskie	10 854	
PL422	Koszaliński	6 437	-19 206
PL423	Stargardzki	4 866	-17 480
PL424	Miasto Szczecin	-5 612	-4790
PL425	Szczecinski	5 163	6798
SE	Sweden (Sverige)	70 008	324 913
SE2	Södra Sverige	16 364	175 225
SE22	Sydsverige	7 576	85 030
SE224	Skåne län	9 333	81 639
	Euregion Pomerania	-10 163	-8890

To be able to compare natural increase and net migration figures of the regions, we have calculated crude rates for these indicators. Crude rate of natural increase illustrates the difference between births and deaths during a year to the average population and it is expressed per 1 000 inhabitants. It is calculated according to the following formula:

$$\textit{Crude rate of natural increase} = \frac{\textit{natural increase in a given year}}{\textit{average population in that year}}\ 1000$$

Crude rate for natural population increase has changed from negative (-0,4) to positive (0,4) in Euregion Pomerania during 2007 and 2008. When we compare Euregion Pomerania to national and EU averages it is possible to detect a similar trend in Sweden and Poland, and in EU27 countries. German regions of Euregion Pomerania have not followed the German trend of steadily decreasing natural increase of population, but natural increase has been varying from year to year withour a clear pattern.

Table 10. Crude rate of natural increase in Euregion Pomerania between 2000 and 2008.

NUTS ID	NUTS	Crude rate of natural increase								
		2000	2001	2002	2003	2004	2005	2006	2007	2008
EU27	EU27*	0,6	0,5	0,3	0,2	0,8	0,6	1,0	1,0	1,3
Total CBA	Euregion Pomerania	-0,4	-0,5	-0,7	-0,5	-0,4	-0,4	-0,1	0,0	0,4
DE	Germany	-0,9	-1,1	-1,5	-1,8	-1,4	-1,8	-1,8	-1,7	-2,0
PL	Poland	0,3	0,1	-0,1	-0,4	-0,2	-0,1	0,1	0,3	0,9
SE	Sweden	-0,3	-0,3	0,1	0,7	1,2	1,1	1,6	1,7	1,9
DE412	Barnim	-2,6	-3,1	-2,3	-3,5	-2,9	-2,8	-2,4	-2,8	-1,9
DE418	Uckermark	-3,1	-3,3	-4,2	-4,8	-3,5	-4,1	-4,4	-4,8	-4,1
DE801	Greifswald	-0,3	0,1	-0,3	0,0	-1,9	-0,9	-0,8	0,0	-1,4
DE802	Neubrandenburg	1,1	0,3	0,5	0,0	0,0	-0,4	-0,8	0,1	-0,4
DE805	Stralsund	-3,0	-2,9	-5,0	-5,1	-1,7	-4,1	-5,2	-4,5	-3,6
DE808	Demmin	-3,7	-3,1	-4,7	-5,5	-4,5	-3,9	-3,9	-5,3	-4,5
DE80B	Mecklenburg-Strelitz	-2,6	-2,9	-3,0	-3,5	-3,5	-4,5	-3,4	-3,6	-3,1
DE80D	Nordvorpommern	-3,4	-3,6	-4,4	-2,6	-3,5	-4,3	-3,6	-3,7	-3,5
DE80F	Ostvorpommern	-3,1	-3,8	-4,0	-2,7	-2,7	-3,0	-4,5	-3,9	-3,5
DE80H	Rügen	-3,0	-2,9	-3,9	-4,1	-2,8	-3,9	-3,0	-3,6	-4,3
DE80I	Uecker-Randow	-3,9	-3,3	-4,8	-3,7	-5,0	-5,0	-4,1	-4,9	-5,1
PL422	Koszaliński	1,8	2,0	1,4	1,1	0,9	0,6	0,8	1,1	1,0
PL423	Stargardzki	2,1	1,8	1,1	1,3	1,1	1,5	1,2	1,1	1,7
PL424	Miasto Szczecin	-1,6	-1,7	-2,2	-1,6	-1,7	-1,3	-1,7	-1,4	-0,5
PL425	Szczecinski	2,1	2,3	1,7	1,1	1,4	1,4	1,7	2,4	2,6
SE224	Skåne län	-0,6	-0,6	-0,1	0,6	0,9	1,1	2,0	2,0	2,5

Crude rate of net migration, on the other hand, is the difference between immigrants and emigrants during a year (including statistical adjustments) to the average population and it is also expressed per 1 000 inhabitants. The rate is calculated according to the following formula:

$$\text{Crude rate of net migration} = \frac{\text{net migration in a given year}}{\text{average population in that year}} 1000$$

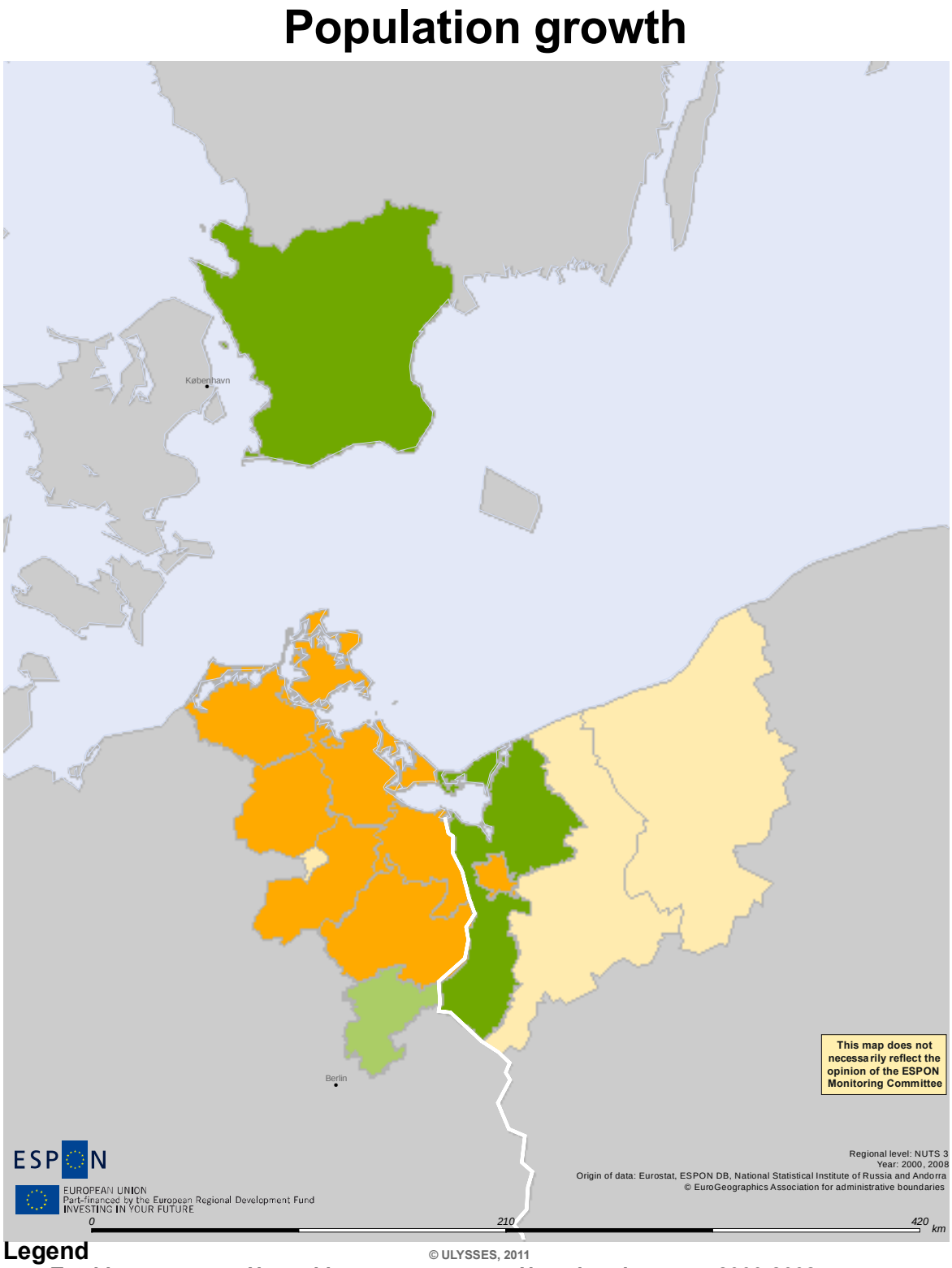
Crude rate of net migration in Euregion Pomerania has been increasing between 2000 and 2008, and it has improved from -4,9 in 2000 to 1,0 in 2008, mainly due to the positive net migration trend in Skåne län. In Skåne län there were 5,6 immigrants over emigrants (per 1000 inhabitants) in 2000, and already 10,2 immigrants over emigrants (per 1000 inhabitants) in 2008.

Table 11. Crude rate of net migration in Euregion Pomerania between 2000 and 2008.

NUTS ID	NUTS	Crude rate of net migration								
		2000	2001	2002	2003	2004	2005	2006	2007	2008
EU27	EU27*	1,5	1,3	3,8	4,2	4,0	3,6	3,2	3,9	3,3
Total CBR	Euregion Pomerania	-4,9	-0,6	-0,2	-0,2	0,0	0,2	1,3	1,1	1,0
DE	Germany	2,0	3,3	2,7	1,7	1,0	1,0	0,3	0,5	-0,7
PL	Poland	-10,7	-0,4	-0,5	-0,4	-0,2	-0,3	-0,9	-0,5	-0,4
SE	Sweden	2,7	3,2	3,5	3,2	2,8	3,0	5,6	5,9	6,0
DE412	Barnim	18,0	11,3	8,7	13,3	12,0	7,5	6,4	3,9	2,2
DE418	Uckermark	-10,7	-16,7	-16,2	-11,7	-11,3	-11,1	-10,9	-11,8	-11,8
DE801	Greifswald	-16,1	-14,9	-9,1	-3,8	1,9	12,5	3,7	7,6	6,7
DE802	Neubrandenburg	-18,6	-20,8	-20,2	-15,7	-10,1	-3,4	-9,1	-11,8	-12,6
DE805	Stralsund	-5,2	-12,1	-5,1	1,7	-1,7	1,7	-2,1	0,0	0,9
DE808	Demmin	-11,0	-12,9	-12,7	-11,0	-13,5	-13,4	-13,7	-15,4	-16,1
DE80B	Mecklenburg-Strelitz	-3,1	-6,2	-6,2	-5,8	-8,2	-8,1	-10,3	-14,0	-11,9
DE80D	Nordvorpommern	-2,5	-5,7	-5,8	-8,6	-8,7	-10,4	-7,8	-9,6	-10,2
DE80F	Ostvorpommern	-2,1	-4,9	-4,0	-3,6	-4,5	-3,9	-5,2	-6,0	-8,1
DE80H	Rügen	-7,6	-9,1	-8,3	-6,8	-8,3	-8,3	-8,7	-7,0	-8,0
DE80I	Uecker-Randow	-11,2	-16,9	-14,5	-14,8	-13,8	-16,1	-7,4	-6,5	-10,9
PL422	Koszaliński	-19,0	-1,7	-2,0	-2,0	-1,0	-1,1	-1,5	-2,6	-1,5
PL423	Stargardzki	-26,8	-1,4	-1,7	-3,3	-2,5	-3,2	-2,6	-2,9	-1,9
PL424	Miasto Szczecin	-0,1	-0,5	0,6	-1,0	-3,5	-0,6	-3,3	-1,7	-1,6
PL425	Szczecinski	2,4	1,1	0,0	1,3	3,4	1,8	3,7	4,6	3,4
SE224	Skåne län	5,6	6,9	7,6	6,0	6,2	6,3	10,8	10,5	10,2

In the following map we have categorized the regions of Euregion Pomerania according to their demographic performance between years 2000 and 2008. As illustrated, Skåne län and Szczecinski are the only regions in Euregion Pomerania that have during the given time period had positive natural and total population growth and positive net migration. Barnim has had a positive total population growth and net migration, but a negative natural increase. Neubrandenburg, Koszaliński and Stargardzki, on the other hand, have suffered from negative population growth and negative migration, but have had a positive natural growth of population. All the other regions of Euregion Pomerania have had negative natural and total population growth and negative net migration

Figure 8. Category map of population change in Euregion Pomerania between years 2000 and 2008



2.1.5. Population projections

Following two figures represent the expected and actual natural population change and net migration in Euregion Pomerania between 2001 and 2008. Expected natural population change and net migration are synthetic figures that illustrate regions' behaviour assuming that regions would follow the patterns of their respective countries. Accordingly we have calculated Euregion Pomerania's expected natural population change and net migration assuming that, first, the German regions of Euregion Pomerania would have followed the German national natural population change and net migration figures, and that, second, the Polish regions would have followed the Polish national averages, and finally that Skåne län would have behaved according to the Swedish national avarages. In order to calculate the rates, national natural population change and net migration averages were weighted according to the regions' population.

In the figures we can observe that would the natural population growth in Euregion Pomerania have followed the German, Polish and Swedish national averages, it would have been positive during the whole period between 2001 and 2008. During the last studied year (2007-2008) natural population change in Euregion Pomerania has been positive to such an extent that it has almost reached the national averages. Net migration, on the other hand, has since 2004 been well above the expected values.

Figure 9. Expected behaviour of Euregion Pomerania's natural population change and net migration between years 2001 and 2008.

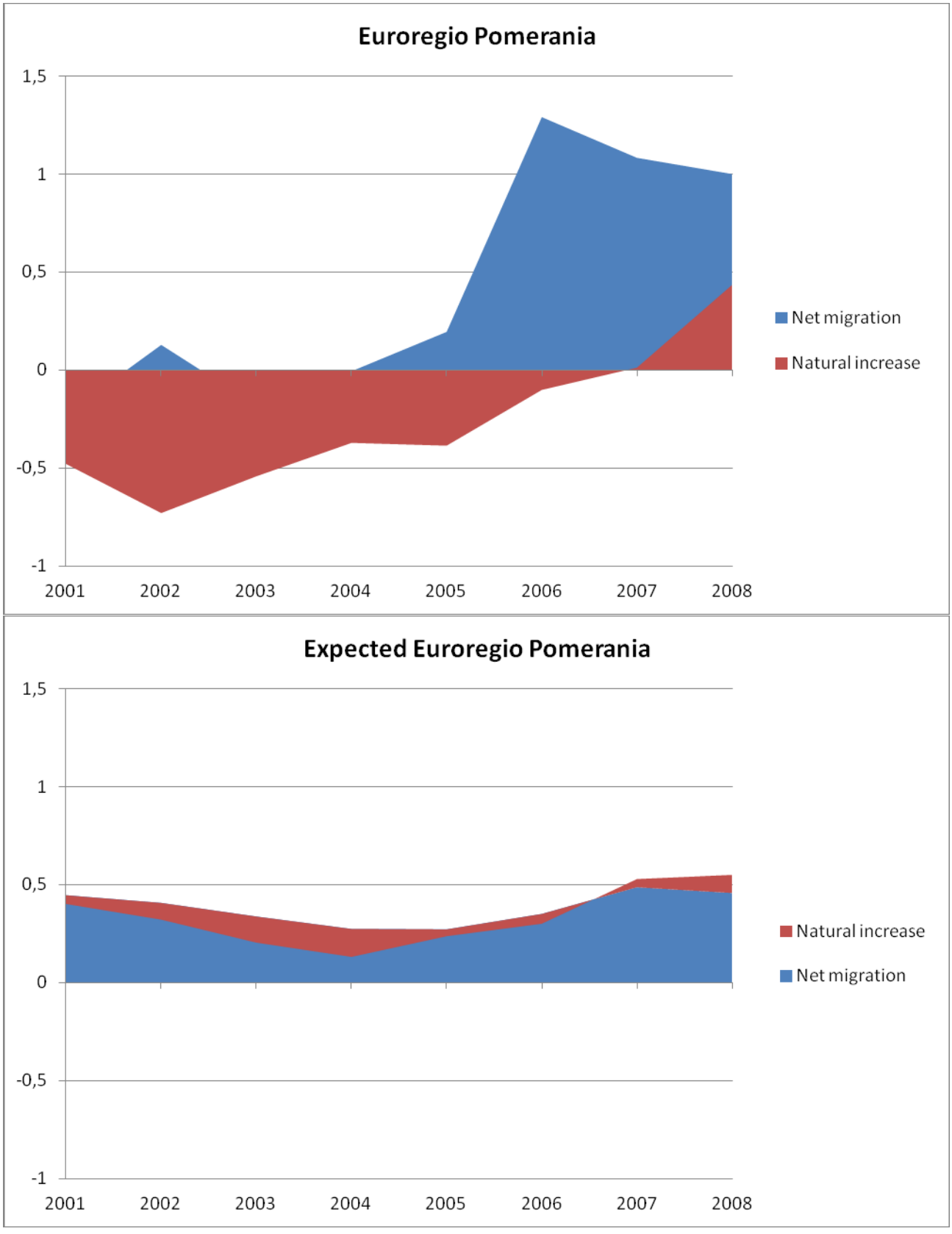


Figure 10. Total population change in the Poland – Germany – Sweden CBA between 2000 and 2009 and linear regression for population projection.

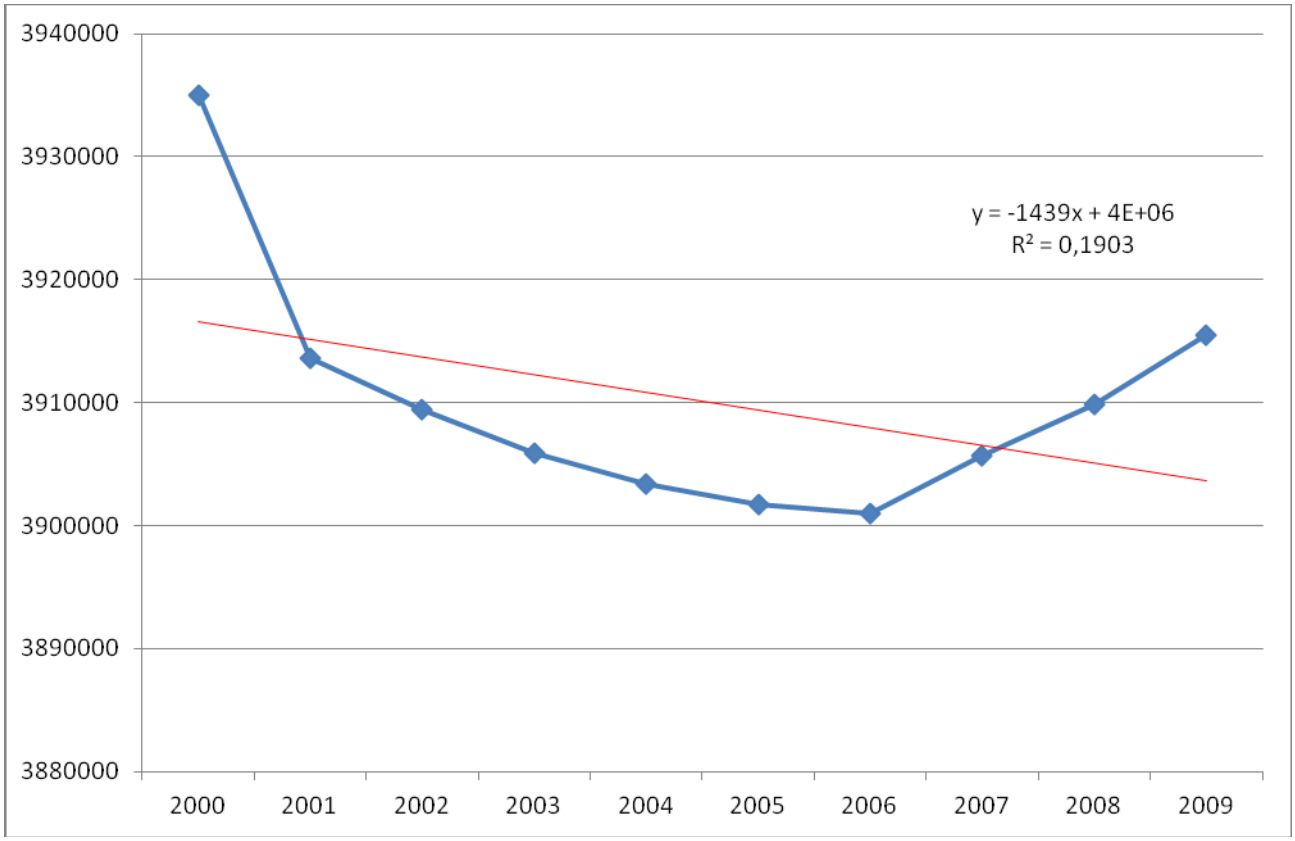


Table 8. Linear regression models and 2020 population projection for the Poland – Germany – Sweden CBA.

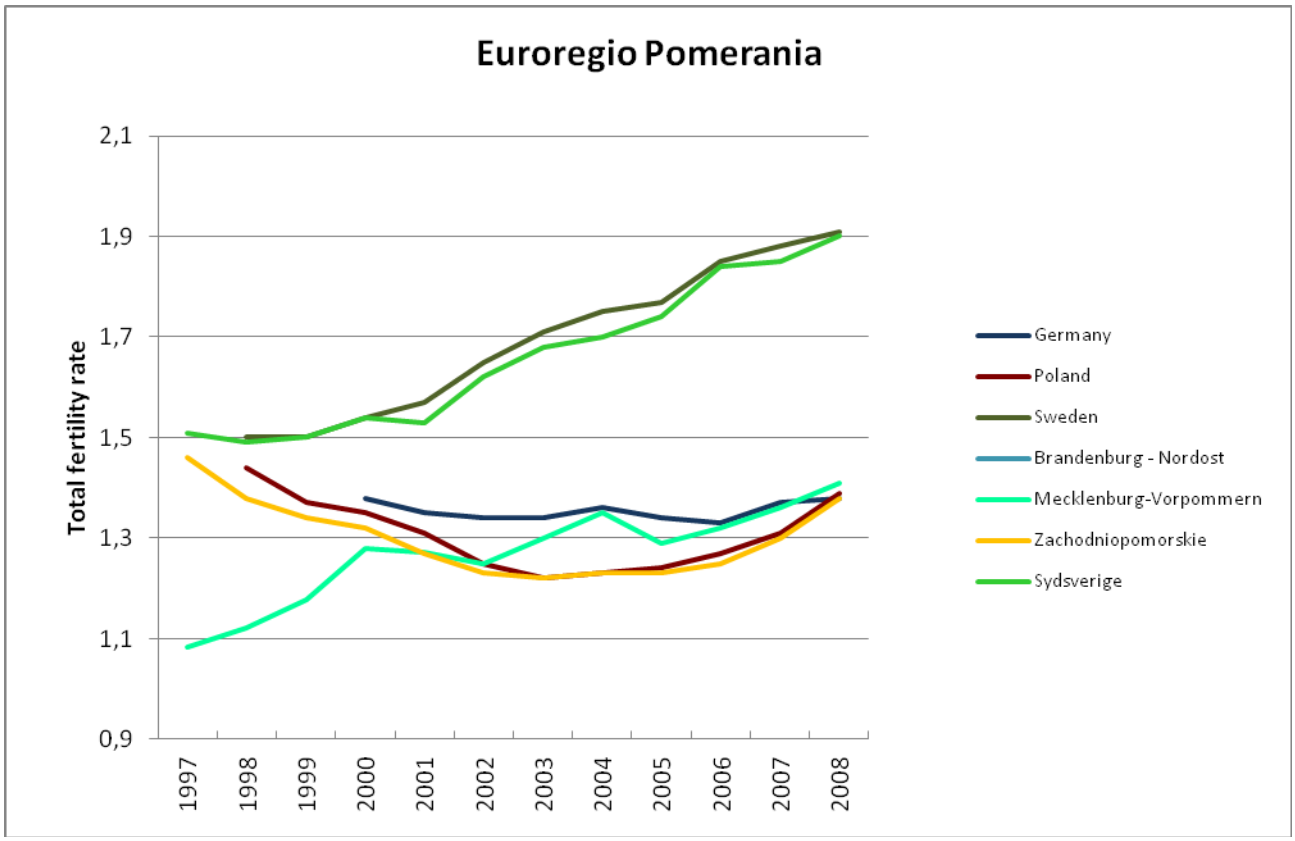
2.1.6. Total fertility rates

Total fertility rate (TFR) is an indicator that describes the average number of children that would be born to a woman over her lifetime if she were to live to the end of her child-bearing years (15-49 years) and bear children in accordance with current age-specific fertility rates. The TFR is a synthetic rate and it is not based on the fertility of any real group of women. A total fertility rate of around 2.1 live births per woman represents the so-called replacement level, which is the average number of live births per woman required to keep the population size constant if there were no inward or outward migration.

Total fertility rate has been studied here on NUTS 2 level. No data was available on Brandenburg – Nordost and therefore no average total fertility rate could be calculated for Euregion Pomerania. We have thus looked at the NUTS 2 regions of the Euregion separately. None of the regions of Euregion Pomerania has a total fertility rate above the replacement level. Sydsverige has the highest TFR, and the rate has experienced a considerable growth between 1997 (1,51) and 2008 (1,9), as has the TFR for Sweden. Sydsverige is the only region in the Poland – Germany – Sweden CBA with a total fertility rate above the EU average (1,6 in 2008).

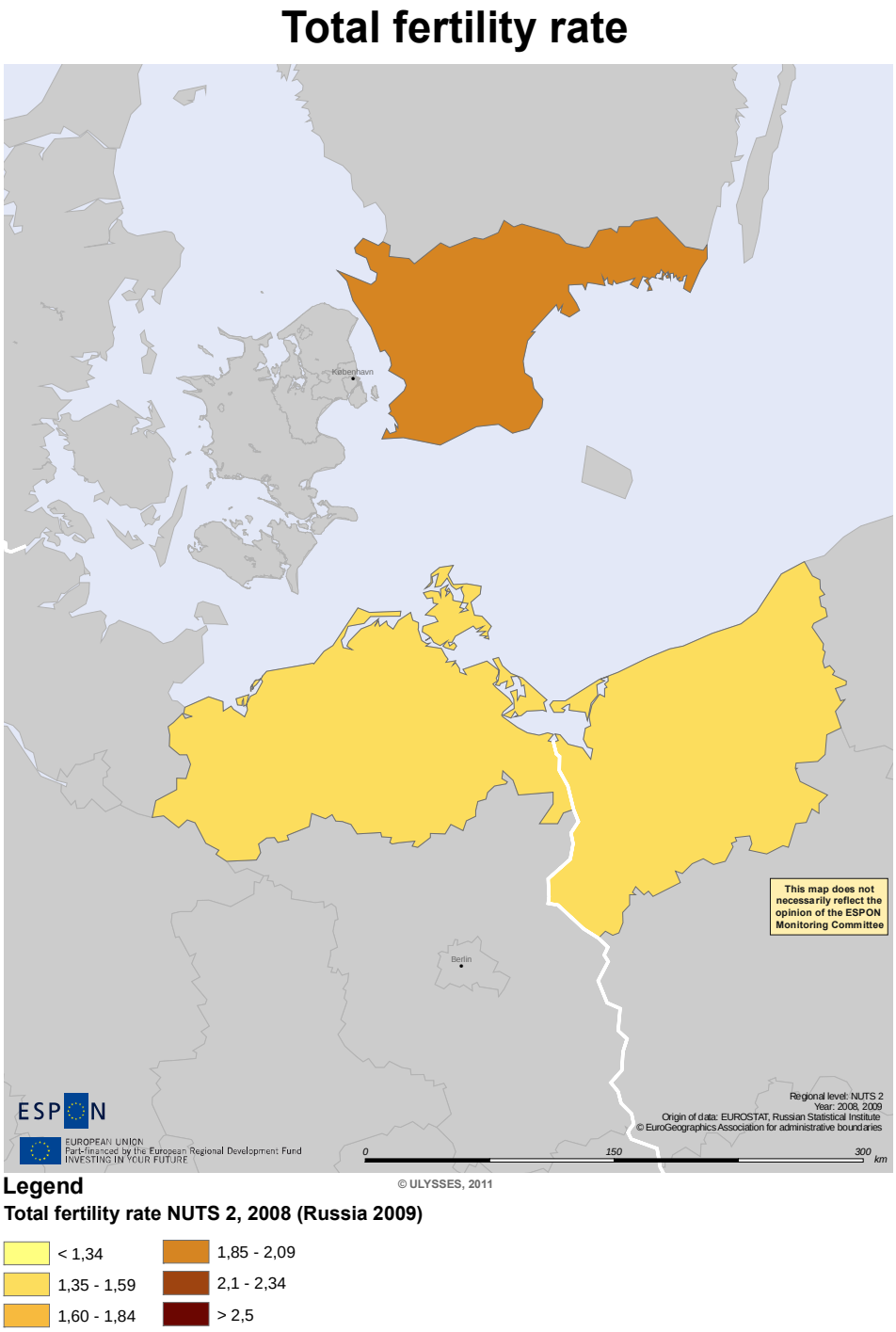
Total fertility rate in Mecklenburg-Vorpommern has also been increasing significantly between 1997 and 2008. In the beginning of the period TFR of the region was as low as 1,08, but in 2008 TFR of Mecklenburg-Vorpommern was 1,41, which was already above the German average rate (1,38). Fertily in Zachodniopomorskie was, as fertily in Poland in general, experiencing a decrease in the end of the 1990s and the first half of the 2010s, but has since that shown a new recovery. TFR for Zachodniopomorskie valued at 1,46 in 1997 and was as low as 1,22 in 2003. In 2008, however, the rate was already 1,38.

Figure 11. Evolution of total fertility rates in the Poland – Germany – Sweden CBA between 2000 and 2009.



* No data for Brandenburg - Nordost

Figure 12. Map of total fertility rates in the Poland – Germany – Sweden CBA in 2008.



2.1.7. Dependency ratios

Dependency ratios are indicators that are used to study the level of pressure on productive population supporting the young and/or old population. These ratios are expressed as the number of dependents to the working age population. Accordingly, young age dependency ratio is the amount of 0-14 olds for every 100 person in the working age population, and old age dependency ratio is the number of people over 64 years of age for every 100 person in the working age population. Total dependency ratio is the combination of young and old age dependency ratios. Dependency ratios can be calculated according to the following formulas:

$$Young\ age\ dependency\ ratio = \frac{Number\ of\ people\ aged\ 0-14}{Number\ of\ people\ aged\ 15-64}\ 100$$

$$Old\ age\ dependency\ ratio = \frac{Number\ of\ people\ over\ 64\ years\ of\ age}{Number\ of\ people\ aged\ 15-64}\ 100$$

$$Total\ dependency\ ratio = \frac{Number\ of\ people\ aged\ 0-14 + Number\ of\ people\ over\ 64\ years}{Number\ of\ people\ aged\ 15-64}\ 100$$

In 2009 total dependency ratio for Euregion Pomerania was 46,2. It signifies that there were 46,2 persons aged 0-14 and over 64 years of age for every 100 person in the working age population. This ratio is slightly lower than EU average (48,9) and significantly lower than the German (51,5) and Swedish (52,5) avarages, but greater than total dependency ratio for Poland (40,4). When examining the young age dependency ratio it becomes obvious that there are far less “dependents” under 15 years of age for the working population in Euregion Pomerania (17,6 in 2009) than in the European Union or the respective nation states. The old age dependency ratio in Euregion Pomerania, on the other hand, values higher than the EU average. In 2009 the old age dependency ratio in Euregion Pomerania was 28,6 and in EU27 it was 25,6. Compared to the national averages, old dependency ratio of Euregion Pomerania was lower than the German (30,9) average, but higher that the Swedish (27,1) or Polish (18,9) averages.

Dependency ratios for Euregion Pomerania thus indicate that, in comparison with the European Union averages, there is less pressure for the working age to take care of children less than 15 years of age, but more pressure on the working age population to take care of elderly people. Considering the small share of children under 15 years of age, there will also be less people to take care of the working age population in the future.

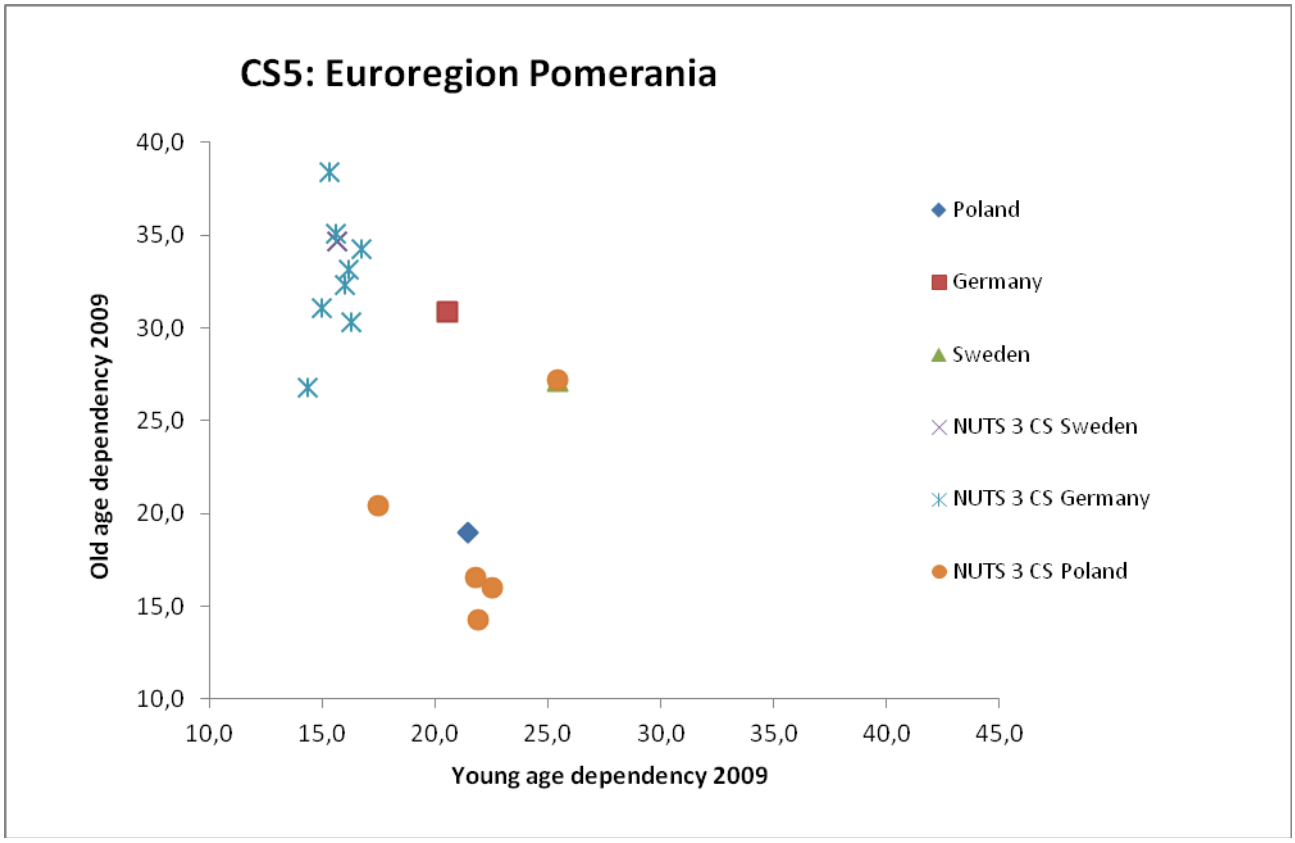
When looking at NUTS 3 regions of Euregion Pomerania, Stralsund in Germany has the highest total dependency ratio (53,7) and old age dependency ratio (38,4). Young age dependency in the region is very low (15,3). These values indicate that Stralsund has a large amount of elderly people and a small share of children under 15 years of age. Accordingly there is a pressure on the working age population in Stralsund to take care of people over 65 years of age, while there is a small amount of children who will be the caretakers of the working age population in the future. Szczecinski in Poland has the lowest total dependency ratio(36,2) and old age dependency ratio (14,3) in Euregion Pomerania. The share of elderly people is small in all the Polish regions of Euregion Pomerania, and in Poland in general, which results from

low life expectancy in the country. Skåne län in Sweden has the highest young age dependency ratio (25,4) in the CBA due to high fertility and large share of population under 15 years of age.

Table 12. Dependency ratios in the Poland – Germany – Sweden CBA in 2009.

NUTS ID	NUTS	Old age dependency 2009	Young age dependency 2009	Total dependency 2009	Ageing index 2009
EU27	EU27	25,6	23,3	48,9	1,1
DE	Germany	30,9	20,6	51,5	1,5
PL	Poland	18,9	21,5	40,4	0,9
SE	Sweden	27,1	25,4	52,5	1,1
DE412	Barnim	30,3	16,3	46,6	1,9
DE418	Uckermark	35,1	15,6	50,7	2,2
DE801	Greifswald	26,8	14,4	41,2	1,9
DE802	Neubrandenburg	31,0	15,0	46,0	2,1
DE805	Stralsund	38,4	15,3	53,7	2,5
DE808	Demmin	34,2	16,7	51,0	2,0
DE80B	Mecklenburg-Strelitz	32,3	16,0	48,3	2,0
DE80D	Nordvorpommern	33,1	16,2	49,3	2,0
DE80F	Ostvorpommern	33,8	16,2	50,0	2,1
DE80H	Rügen	33,5	15,1	48,7	2,2
DE80I	Uecker-Randow	34,7	15,7	50,3	2,2
PL422	Koszaliński	16,6	21,8	38,3	0,8
PL423	Stargardzki	16,0	22,5	38,6	0,7
PL424	Miasto Szczecin	20,4	17,5	37,9	1,2
PL425	Szczecinski	14,3	21,9	36,2	0,7
SE224	Skåne län	27,2	25,4	52,6	1,1
	Euregion Pomerania	28,6	17,6	46,2	1,73

Figure 13. Scatter chart of young and old age dependency ratios in the Poland – Germany – Sweden CBA in 2009.



2.2. Chapter conclusions

Euregion Pomerania has a total population of 3 915 493 inhabitants. Polish regions have the largest share of inhabitants in Euregion Pomerania (43,24 %), Swedish region of Skåne län the second largest (31,02 %) and German regions the smallest share (25,74 %). From the perspective of sex structure, Euregion Pomerania has a female majority with 1 993 574 females that make up 50,92 % of the total population of the CBA. Age structure of the CBA is following: the share of 0-14 year old population in Euregion Pomerania in 2009 was 14 %, the share of 15-64 year old population 69 % and the share of population over 65 years of age 17 %. Dependency ratios for Euregion Pomerania indicate that, in comparison with the European Union averages, there is less pressure for the working age to take care of children less than 15 years of age, but more pressure on the working age population to take care of elderly people. Considering the small share of children under 15 years of age, there will also be less people to take care of the working age population in the future.

Population density in Euregion Pomerania was 278,7 inhabitants per km² in 2008. While the population density has been declining in the German and Polish regions of Euregion Pomerania, the population density in Skåne län has been increasing between years 2000 and 2008. Besides Skåne län there were only two other regions in Euregion Pomerania that have experienced positive growth in population density between the given period. These were Barnim in Germany and Szczezinski in Poland. Population change has

accordingly been negative in all the regions of Euregion Pomerania, except for Barnim, Szczecinski and Skåne län in Sweden.

Natural increase has been a more significant factor for population change than net migration in the regions of Euregion Pomerania. Between 2000 and 2008 there were 10 163 deaths over births in Pomerania and 8 890 emigrants over immigrants. None of the regions of Euregion Pomerania has a total fertility rate above the replacement level. Sydsverige has the highest TFR, and the rate has experienced a considerable growth between 1997 (1,51) and 2008 (1,9), as has the TFR for Sweden. Sydsverige is the only region in the Poland – Germany – Sweden CBA with a total fertility rate above the EU average (1,6 in 2008).

Chapter 3. Polycentric development in the Poland – Germany – Sweden CBA

The concept of polycentric development has gained widespread currency in planning and territorial development strategies, and today it plays a fundamental role in European regional policy and European Spatial Development Perspective (ESDP). According to ESDP pursuit of polycentricity helps to avoid further economic and demographic concentration in the core area of the EU. Balanced and sustainable development of local entities and regions creates real locational advantage of the EU vis-à-vis other large economic regions in the world.[6] The newly published Territorial Agenda of the European Union 2020 promotes polycentric development also at regional, macro-regional and cross-border levels. The report states that small and medium-sized towns can play a crucial role at regional development.[7]

The aim of this chapter is to study polycentric development, in other words, structure of city network in the Poland – Germany – Sweden CBA. First, we present functional urban areas (FUAs) of the CBA and provide information of their area (km²), population, population change and compactness. Second, we perform several analyses in order to detect whether the urban structure of the Poland – Germany – Sweden CBA is polycentric. We also examine whether the amount and size of urban centres in the region deviates from the rank-size distribution of urban centres in the European Union (EU27). Finally we have a look at functional specialization of the urban areas.

Indicators selected for the analysis are following:

[6] ESDP 1999.
[7] Territorial agenda 2020.

Table 13. Indicators included in the study of polycentric development in the Poland – Germany – Sweden CBA.

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	
Slope rank size distribution GDP				
Primacy rate GDP				
Slope rank size distribution population				
Primacy rate population				
% population in FUA				
% effective FUA pop change 01-06				
Compactness 2001 (MUApop/FUA pop)				
Gini coefficient thiessen polygons (%)				

Methodology that we applied for studying polycentricity originates from ESPON 1.1.1 -project.[8] The given project considers two different aspects of polycentric development. The first one is morphological (the distribution of urban areas in a given territory) and the second one relational (networks of flows and cooperation between urban areas at different scales). Both of these aspects are closely linked, since relations between cities are crucial for polycentricity; nodes without connections between each other would not form a polycentric system. We have, however, limited our study to the morphological aspect of polycentricity. Analysis on how different urban agglomerations interact with their surroundings and each other could not, due to the lack of data, have been performed soundly on a broad scale.

Data applied in this study has been developed by ESPON 1.4.3 -project and all the analyses are based on the concept of Functional Urban Area (FUA), generated in ESPON 1.1.1 -project. Functional Urban Areas consist of a core municipality and municipalities surrounding the core. The concept is an important prerequisite for studying urban trends, because it reflects the actual role played by cities in regional development. It also has the ability to exceed administrative boundaries, since smaller administrative regions are combined according to their functional orientation and not following the traditional hierarchical classification of regions. [9] In ESPON 1.4.3 FUAs were defined by aggregating LAU 2 level regions from different NUTS 3 or 2 level regions.

In our study we have included FUAs that have at least 60 % of their area overlapping with the area of the cross-border region, and FUAs, whose Morphological Urban Area (MUA), that is the core municipality, is located within the limits of the cross-border area. The analyses on polycentricity have been made on the scale of the whole CBA, because the study of urban structure is not meaningful on low geographical scales based on the possible small amount of FUAs. In the selection of the FUAs we have followed requirements set up by ESPON 1.4.3. According to the project MUAs should have a core with more than 650 inhabitants per km² (NUTS 5 level unit) or with more than 20 000 inhabitants if they have a clear concentrated morphological core. In total FUAs should have a minimum population of 50 000 inhabitants.[10]

[8] ESPON 1.1.1.
[9] Antikainen 2005.
[10] ESPON 1.4.3.

3.1. Functional Urban Areas

Functional Urban Areas of the Poland – Germany – Sweden CBA are presented in the following table and map. The table provides information on the area (km²), population, population change and compactness of the FUAs. The map pictures the location of FUAs and their MUAs (core regions presented in violet colour). The Poland – Germany – Sweden CBA has been studied here on NUTS 2 level, and therefore cities outside the actual territory of Euregion Pomerania have been included in the study. FUAs located in Euregion Pomerania are Neubrandenburg, Greifswald, Stralsund and Eberswalde-Finow (Barnim) in Germany, Szczecin, Koszalin (Koszalinski), Kolobrzeg (Koszalinski) and Stargard Szczecinski (Stargardski) in Poland and Malmö (Skåne län) in Sweden.

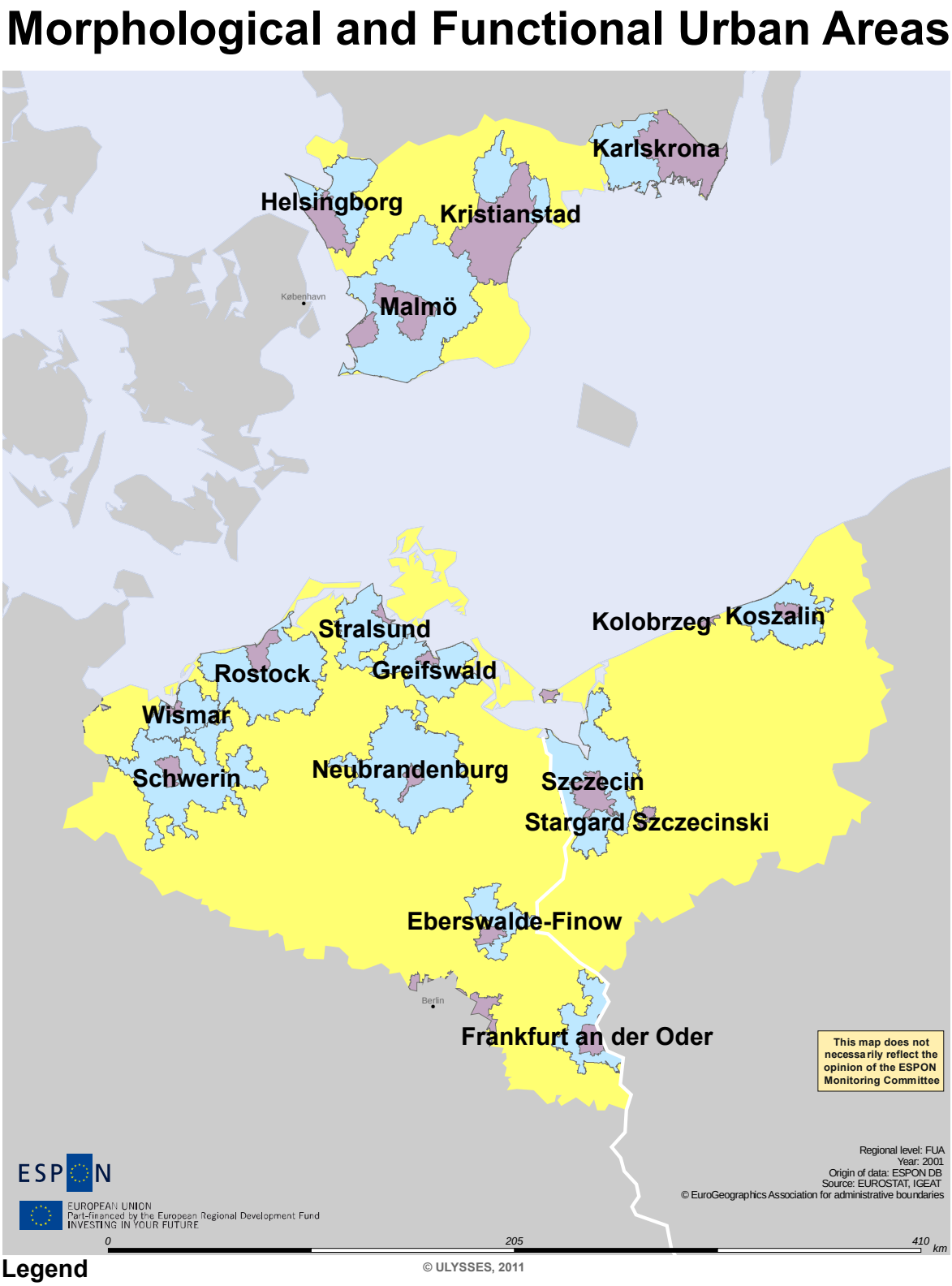
The largest FUA of the Poland – Germany – Sweden CBA was in 2006 Malmö with 636 157 inhabitants. The largest FUA on the Polish side of the CBA was Szczecin with 610 403 inhabitants and the smallest Kolobrzeg with 44 737 inhabitants. On the German side of the CBA the largest FUA in 2006 was Rostock with 331 588 inhabitants and the smallest FUA Eberswalde-Finow with 59 631 inhabitants. If we only consider cities on the territory of Euregion Pomerania, the largest FUA on the German side was Neubrandenburg with 145 322 inhabitants.

When we take a look at population change in the FUAs of Euregion Pomerania, it is possible to observe that population growth between 2001 and 2006 has been positive in Malmö (4,4 %), Koszalin (0,3 %) and Greifswald (0,7 %), while all the other FUAs have been loosing population. Neubrandenburg has suffered from the greatest population decrease (-5 %), and Stralsund (-4,9 %) and Eberswalde-Finow (-4,2 %) have also been loosing a significant share of population.

Table 14. FUAs of the Poland – Germany – Sweden CBA.

FUA ID	FUA	Fua area (km²)	FUA Population 2001	FUA Population 2006	Population increase 2001–2006	Compactness 2001 (MUA population / FUA population)
SE11111	Malmö	3542,62	609424	636157	4,4	45
PL11016	Szczecin	2140,49	610878	610403	-0,1	68
DE10261	Rostock	2020,58	325702	331588	1,8	62
SE11599	Helsingborg	1133,06	204266	211439	3,5	58
DE10267	Schwerin	2197,05	198435	191785	-3,4	51
PL10972	Koszalin	990,79	152315	152717	0,3	71
DE10238	Neubrandenburg	2355,15	152992	145322	-5	48
DE10176	Frankfurt an der Oder	961,27	122755	115576	-5,8	59
SE11107	Kristianstad	1985,63	100461	102004	1,5	74
DE10273	Stralsund	872,98	100274	95357	-4,9	60
DE10185	Greifswald	957,82	92131	92762	0,7	59
SE11105	Karlskrona	1858,25	89198	89741	0,6	68
DE10287	Wismar	634,79	77915	77990	0,1	60
PL11012	Stargard Szczecinski	48,08	71367	70453	-1,3	100
DE10169	Eberswalde-Finow	608,22	62222	59631	-4,2	72
PL10970	Kolobrzeg	25,67	44947	44737	-0,5	100

Figure 14. FUAs and MUAs of the Poland – Germany – Sweden CBA.



Morphological Urban Areas and Functional Urban Areas, according to the ESPON 1.4.3 (established from data from 2001)

3.2. Morphological analysis of FUAs

It is characteristic for a polycentric urban system that no city dominates over other cities in demographic or economic sense. In other words, a polycentric urban system lacks hierarchy, and cities are relatively similar of size. We have analysed the hierarchy of city systems in the countries participating in ESPON programme by calculating the slope of rank size distribution of the FUAs, and later we will perform the same analysis for the Poland – Germany – Sweden CBA. In order to calculate slope of rank size distribution, FUAs of a given territory are ranked from largest to smallest according to the amount of population. After that following equation is computed:

$$LN(population) = a + b\,LN(rank)$$

*LN is a function that returns the natural logarithm of a value.

This function is a so called rank-size equation in the Lotka form. If estimated relation holds, the size distribution of FUAs follows a statistical log-linear distribution. The slope of equation (β) indicates the level of hierarchy and thus the level of polycentricity in a region; the lower the absolute value of β, the higher the level of polycentricity.

Figure 15 presents rank size distribution of population in the Functional Urban Areas of ESPON countries. All the FUAs of ESPON countries have been ranked from largest to smallest, and related to each other according to their size (blue marks). The black line in the chart is the statistical log-linear line that presents a hypothetical homogeneous distribution of FUAs. A relatively flat line (low absolute value of β) implicates of a polycentric urban system, whereas a steep line stands for a more monocentric system, where a one city dominates over others.[11] The slope of equation for ESPON countries (β) for year 2006 was -1,0521, which signifies that urban system in the European Union (+ Norway and Switzerland) is in fact relatively polycentric. (ESPON β-value is very close to -1, which corresponds to regularity known as Zipf's law.) When we have a look at the hypothetical log-linear line, it is possible to observe that urban system of ESPON countries lacks hierarchy even at the upper end of the rank size distribution. The largest city should, according to the log-linear line, have a population much higher than the approximate 13 million that the largest FUA in the ESPON space, London, actually has.

Rank size distribution can be calculated also for gross domestic product in the FUAs. Figure 16 presents how the ESPON FUAs have ranked according to GDP. Here the slope of the log-linear line is steeper (-1,3608) than in the population chart because of greater differences in GDP between the leading FUAs (London and Paris) and the FUAs with the lowest GDP. The steep drop in the lower end of the distribution line is caused by a group of approximately two hundred FUAs with GDP less than 400 M€. GDP for London FUA was 589028 M€ in 2006 and for Paris 520533 M€.

[11] ESPON 1.1.1.

Figure 15. Rank size distribution of the population in Functional Urban Areas of ESPON countries (2006).

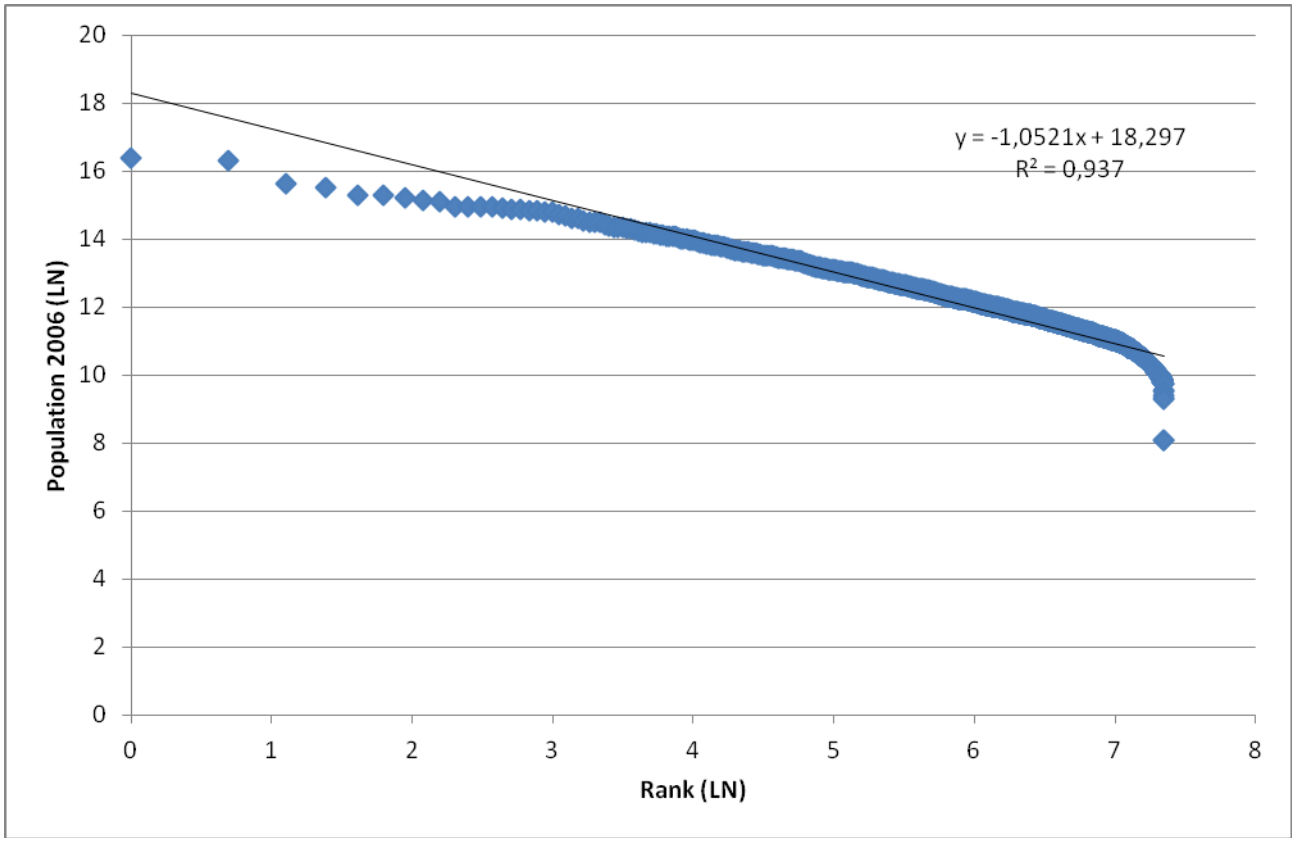
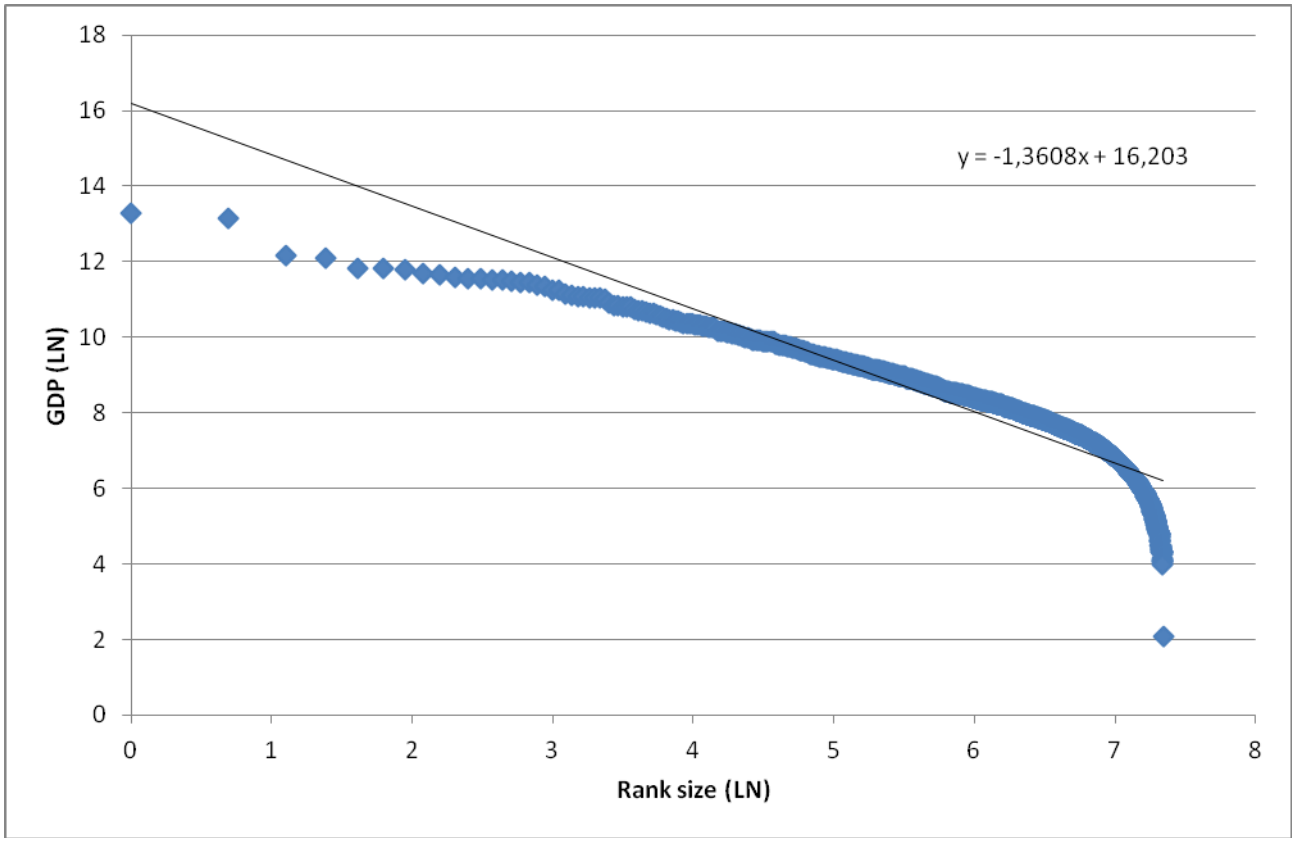


Figure 16. Rank size distribution of GDP in Functional Urban Areas in ESPON countries (2006).



The slope of rank size distribution of FUA population in the Poland – Germany – Sweden CBA was -0,96 in 2006. This indicates of a relatively polycentric urban structure in the CBA, more polycentric than the urban structure in ESPON space. The slope of rank size distribution of FUA GDP was -1,3 in 2006. Thus, the city structure of the CBA might be polycentric, but the CBA is more monocentric when considering the GDP of the FUAs. GDP in the leading city Malmö was 19 688 M€ in 2006, which was well above the GDP of Rostock, the second city in the ranking, (7284 M€) or Kolobrzeg (282 M€) that came in the last place in the FUA GDP ranking. The slope of rank size distribution of FUA GDP in the Poland – Germany – Sweden CBA is very close to the distribution of FUA GDP in ESPON space (-1,36).

Figure 17. Rank size distribution of the population of Functional Urban Areas in the Poland – Germany – Sweden CBA (2006).

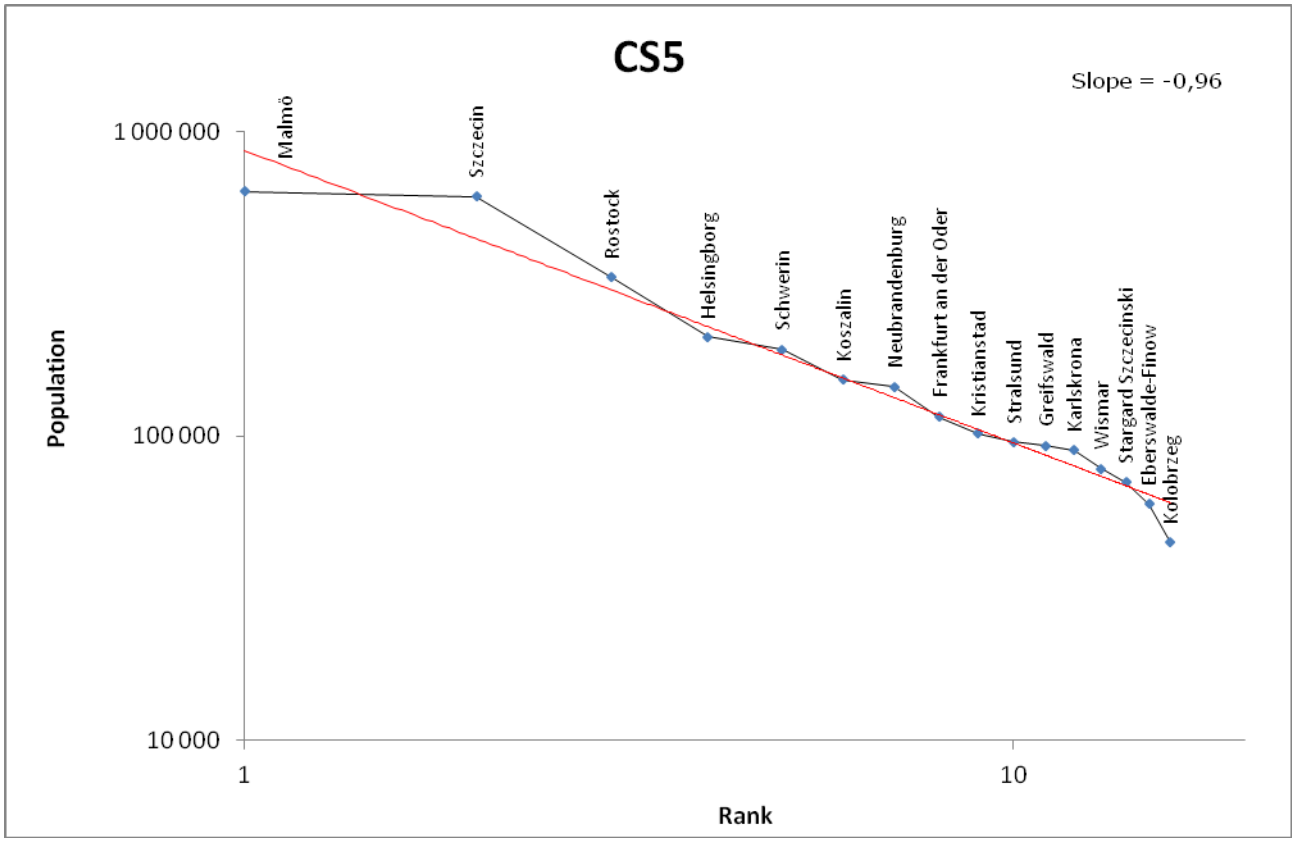
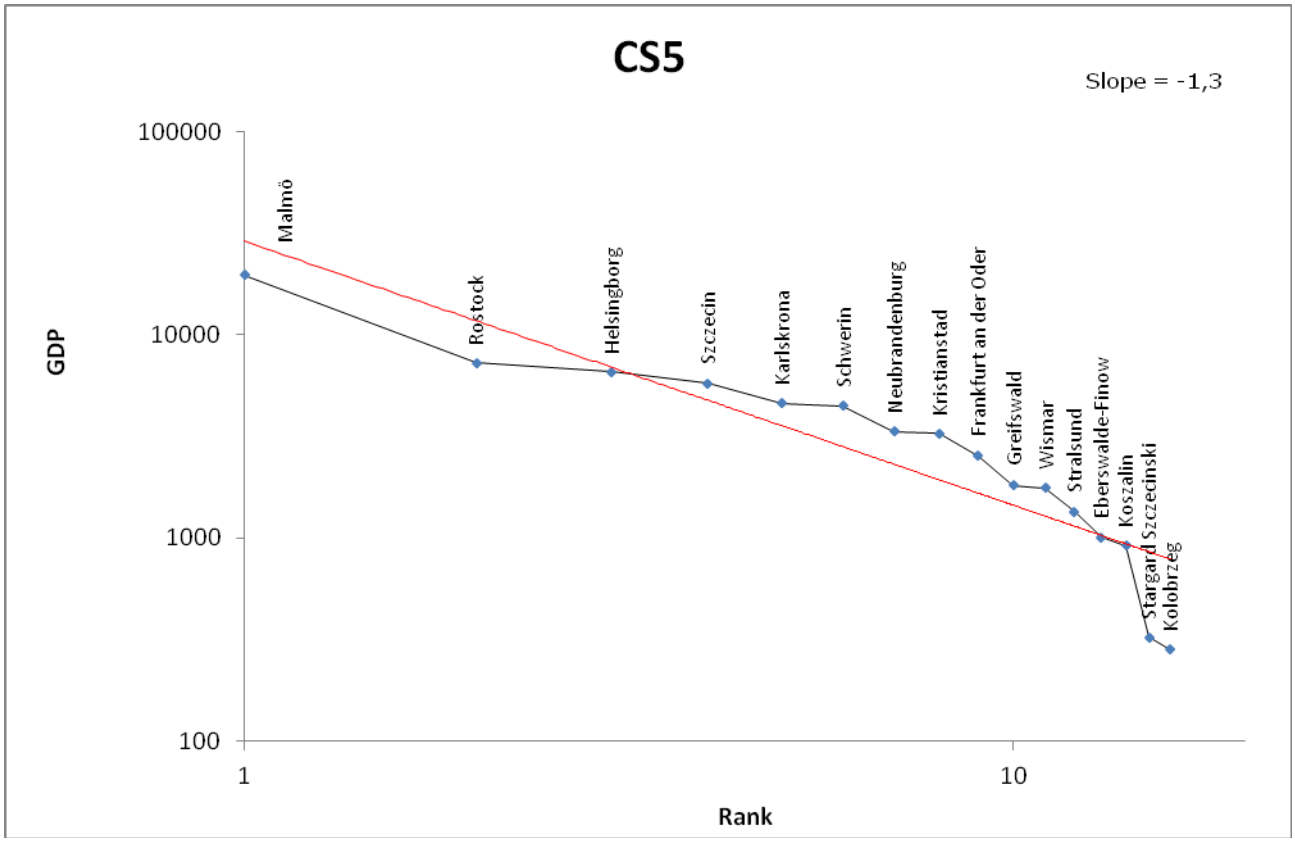


Figure 18. Rank size distribution of GDP in Functional Urban Areas in the Poland – Germany – Sweden CBA (2006).

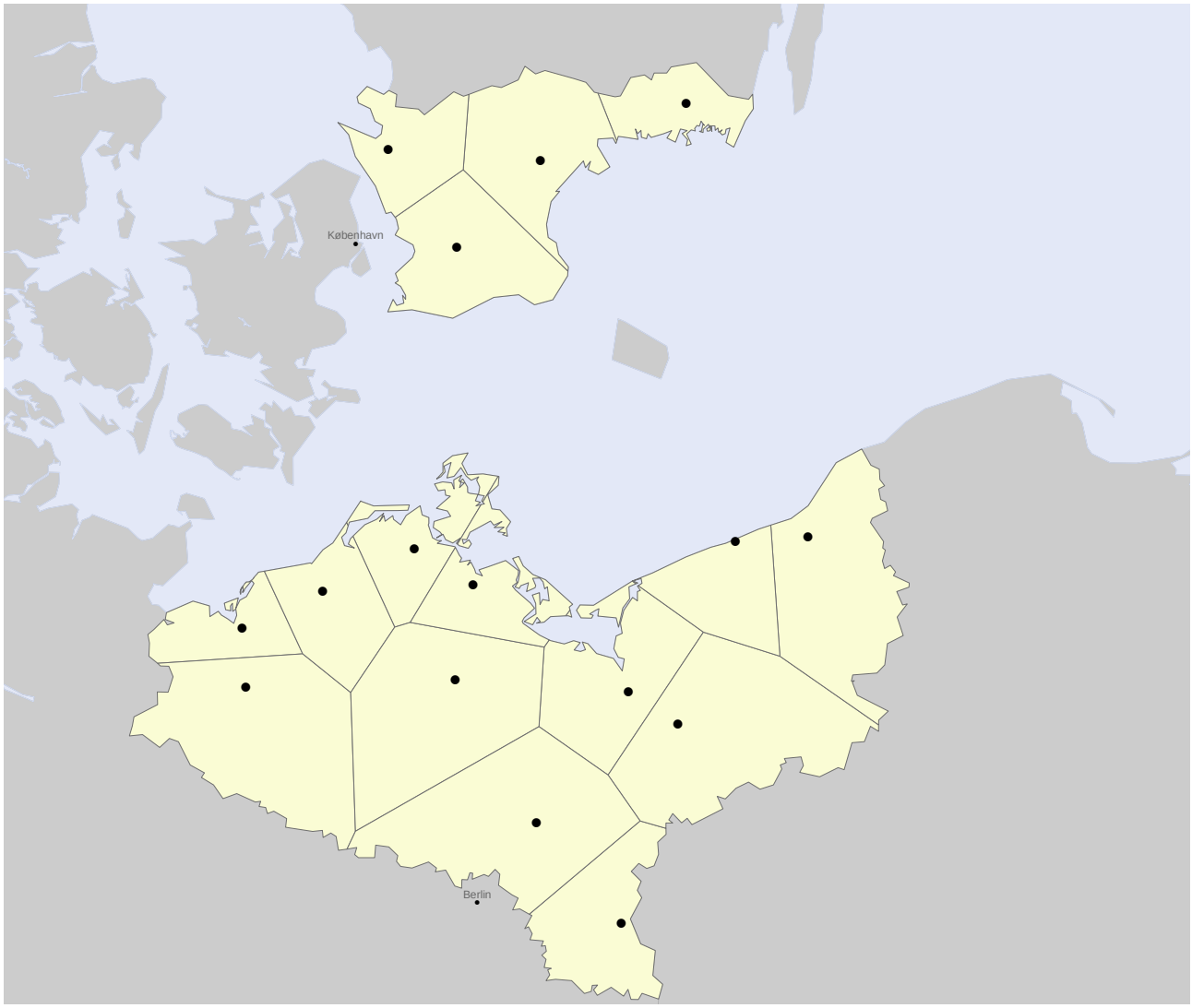


While the slope of rank size distribution considers all FUAs in a region, primacy rate excludes the largest FUA from the analysis. It is an indicator that measures how much the size of the largest FUA deviates from the regression line of the rank-size distribution of the FUAs in a given region. If the primacy rate values above 1, the population of the main FUA is above the expected value, and, on the contrary, if the primacy rate is below 1, the largest FUA is smaller than what would be expected by the regression line of the rank-size distribution of FUAs. High primacy rate thus indicates of a monocentric urban structure with one dominating FUA, and low primacy rate of a polycentric urban structure.

Primacy rate for the Poland – Germany – Sweden CBA was 0,57 in 2006. This again suggests that urban structure of the region is not dominated by one big city, but that the size of the biggest FUA (Malmö) is actually smaller than anticipated by the rank-size distribution of the FUAs. Primacy rate for Germany was 0,29, for Poland 0,44 and for Sweden 2,03 in 2006. The ESPON average was 0,14 in 2006. The value for Sweden is caused by the large size of Stockholm FUA compared to the size of other FUAs in the country. The Swedish GDP primacy rate was also high and valued at 2,61 in 2006, indicating of accumulation of production in the capital region of the country. The distribution of GDP among the FUAs in the Poland – Germany – Sweden CBA was more balanced and valued at 0,49.

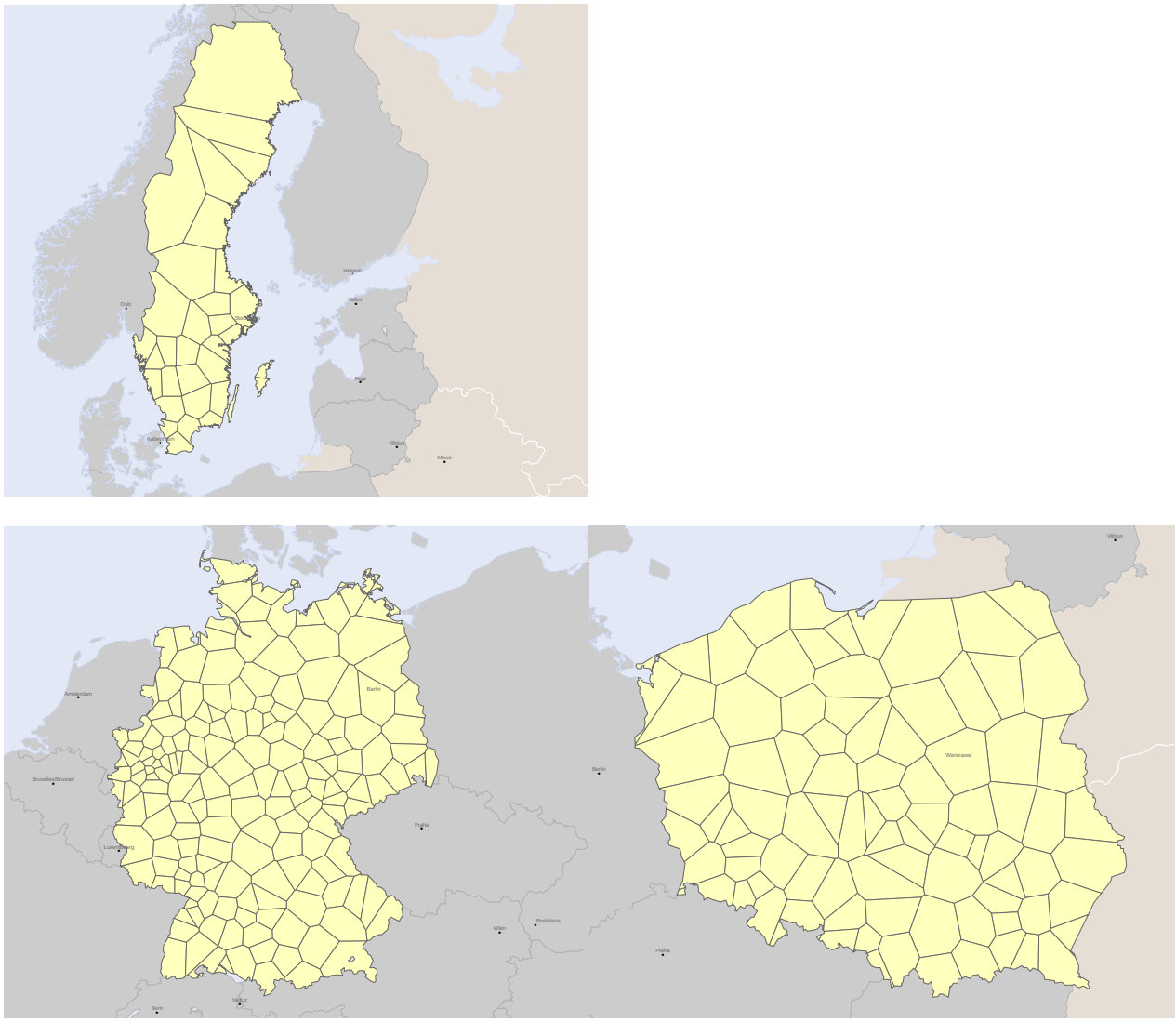
The gini coefficient of the FUA Thiessen polygons is an indicator that measures how the FUAs are spaced throughout a given region. Values close to 100 % indicate of great inequalities in the FUA distribution while values below 100 % imply that FUAs are more evenly spaced.[12] The gini coefficient for thiessen polygons in Poland – Germany – Sweden CBA valued at 25,3 %, which again indicates of a polycentric urban structure. As stated in ESPON 1.4.3 Final Report this measure implicitly evaluates overall distribution of the population. However, it has a problem of attributing same weight to all different FUAs and it 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.

Figure 19. FUA Thiessen polygons for the Poland – Germany – Sweden CBA (2006).



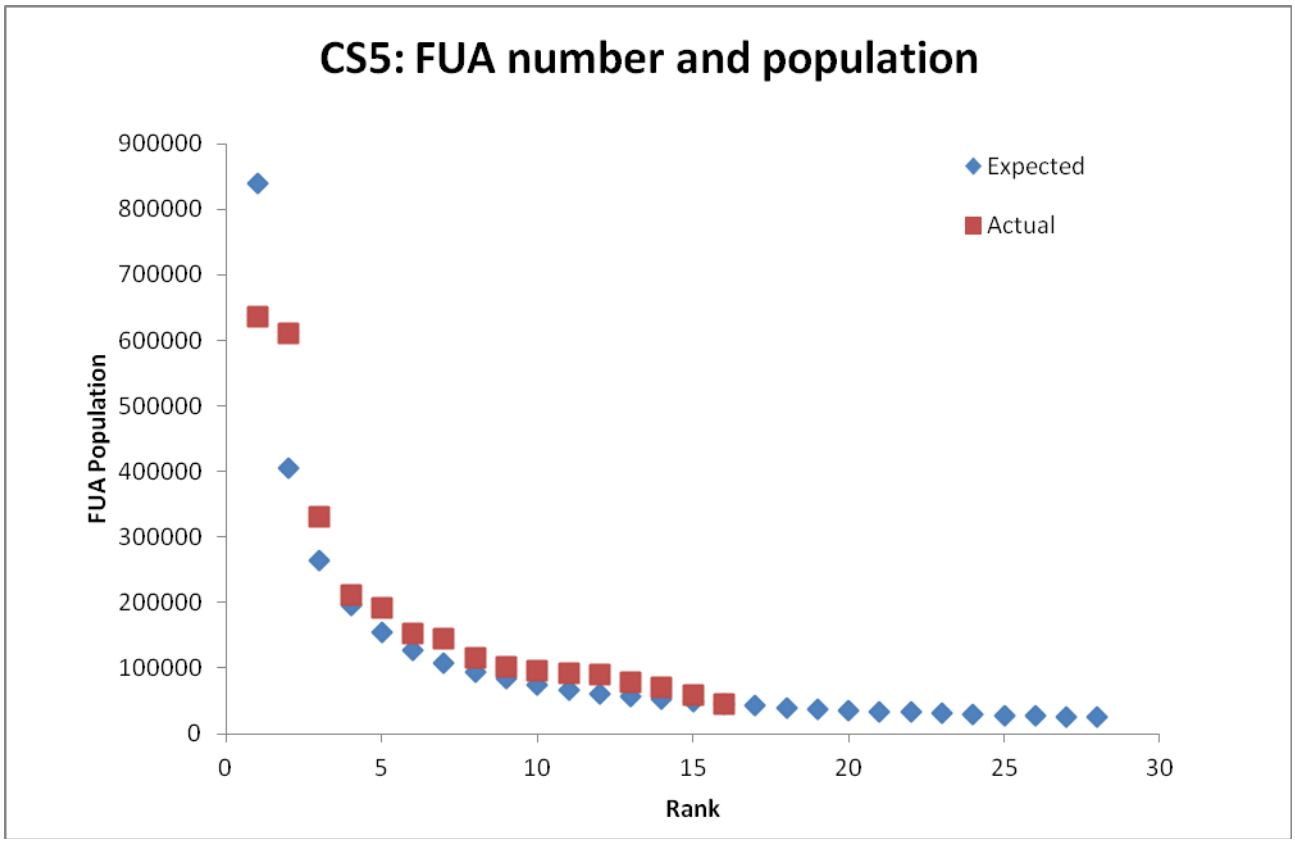
[12] For this indicator, polygons were produced based on ESPON 1.4.3 FUA layer (made available by the ESPON DB 2013) so that the limits of the polygons were established exactly midways between two FUAs. On national level, gini coefficients were produced considering the border as a limit.

Figure 20. Thiessen polygons for Sweden, Germany and Poland (2006).



Finally, we have compared rank size distribution of FUAs in the Poland – Germany – Sweden CBA to the overall distribution of FUAs in ESPON countries (EU27 + CH + NO). For this exercise, rank-size coefficients were estimated considering all FUAs in ESPON countries. The actual rank-size distribution of the FUAs was thereafter compared with what would be expected if the regions would follow the European distribution. This analysis demonstrates the expected amount and size of a FUA in a region according to its total population. As the following figure illustrates, rank-size distribution of FUAs in the Poland – Germany – Sweden CBA lacks hierarchy (leading FUA with a considerable size) and the amount of FUAs is not as big as expected. However, the slope of FUA distribution is very similar to the expected distribution.

Figure 21. Rank size distribution of the Functional Urban Areas of the Poland – Germany – Sweden CBA to the overall distribution of FUAs in ESPON countries (2006).



Following table summarizes morphological analyses of FUAs and presents the Poland – Germany – Sweden CBA in the context of German, Polish and Swedish FUAs and FUAs of the ESPON countries. If we compare the average size of FUAs in the CBA, it is approximately two thirds of the average size of FUAs in ESPON countries. In the context of German, Polish and Sweding FUAs, however, FUAs of the CBA are large. Avarage FUA size in the Poland – Germany – Sweden CBA was 189 228,9 inhabitants in 2006, while the average size of FUAs in Germany was 11 463,6, in Poland 2 088 and in Sweden 8 718,6 inhabitans. What is also worth mentioning, is the fact that only 51,5 % of the CBA's total population lives in FUAs, while 80,6 % of the German and 77,5 % of the Swedish population inhabits FUAs. The share of population living in FUAs in Poland is very similar to that of the Poland – Germany – Sweden CBA (56,7 %). In ESPON countries the average share of FUA population is 74,8 %.

Table 15. Morpholocigal indicators for the Poland – Germany – Sweden CBA (2006).

CS5	CBR	DE	PL	SE	ESPON
Slope rank size distribution GDP	-1,30	-1,10	-1,30	-0,98	-1,36
Primacy rate GDP	0,49	0,20	0,60	2,61	0,05
Slope rank size distribution population	-0,96	-0,98	-1,12	-0,93	-1,06
Primacy rate population	0,57	0,29	0,44	2,03	0,14
Number FUA	16	172	88	30	1552
Average FUA population	189228,9	11463,6	2088,0	8718,6	245298,6
Minimum FUA population	44737	394	136	1742	3216
Maximum FUA population	636157	136559	44482	101783	12972492
% population in FUA	51,5	80,6	56,7	77,5	74,8
% effective FUA pop change 01-06	0,4	1,0	0,1	2,8	3,0
Compactness 2001 (MUApop/FUA pop)	60,4	57,4	73,0	66,9	64,9
Gini coefficient thiessen polygons (%)	25,3	33,26	30,27	51,92	-

3.3. Functional analyses of FUAs

We have selected a group of socio-economic indicators in order to study functional specialization of FUAs in the Poland – Germany – Sweden CBA. Since data is not available for these indicators on FUA level, we have made estimations according to the values of NUTS 3 regions that given FUAs are part of. [13] Selected indicators include unemployment rates, GDP per inhabitant and value added by NACE that are presented in table 16. [14]

The dominating economic activity in the FUAs of Poland – Germany – Sweden CBA was Service sector (L-P). However, the share of Trade and transport (GHI) and Finance and business services (J-K) was almost as large in the GVA added of the FUAs in the CBA. Figure 22 presents the share of different NACE sectors in the cross value added of the FUAs, and figure 23 GDP per inhabitant in the FUAs of the CBA. The map well illustrates the higher GDP per inhabitant in FUAs located in Sydsverige compared to FUAs located in the NUTS 2 regions of Mecklenburg-Vorpommern, Brandenburg-Nordost or Zachodnio-Pomorskie.

[13] As the values are estimates they have to be interpreted with some care.

[14] NACE (Statistical classification of economic activities) version applied here is 1.1.
A = Agriculture, hunting and forestry, B = Fishing
C = Mining and quarrying, D = Manufacturing, E = Electricity, gas and water supply
F = Construction
G = Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods, H = Hotels and restaurants, I = Transport, storage and communications
J = Financial intermediation, K = Real estate, renting and business activities
L = Public administration and defence; compulsory social security, M = Education, N = Health and social work, O = Other community, social and personal services activities, P = Activities of private households as employers and undifferentiated production activities of private households
Q = Extraterritorial organisations and bodies

Table 16. Functional indicators for the Poland – Germany – Sweden CBA (2006).

FUA ID	FUA	Gross Value Added						GDP by Inhabitant	Unemployment rate 2006
		Agriculture, forestry and fishing (AB)	Mining, manufacturing and energy (CDE)	Construction (F)	Trade and tansport (GHI)	Finance and business services (J-K)	Other services (L-P)		
SE11111	Malmö	1,5	21,6	5,4	21,1	25,3	25,1	31	7
PL11016	Szczecin	1,9	18,5	6,6	32	20,2	20,8	9	21
DE10261	Rostock	0,9	10,3	4,6	23,8	29,2	31,2	22	16,9
SE11599	Helsingborg	1,5	21,6	5,4	21,1	25,3	25,1	31	7
DE10267	Schwerin	1,5	12	5,2	19,8	25	36,6	23	16,5
PL10972	Koszalin	6	16,8	6,7	30,4	17,1	23	6	14,7
DE10238	Neubrandenburg	1,6	14,5	4,5	16,4	27,3	35,7	23	21,5
DE10176	Frankfurt an der Oder	0,9	11,1	4,1	18,8	22,7	42,5	22	17
SE11107	Kristianstad	1,5	21,6	5,4	21,1	25,3	25,1	32	7
DE10273	Stralsund	4,5	7,6	7,6	18,3	26,9	35,1	14	22,1
DE10185	Greifswald	1,2	12,1	3,4	16,8	28,8	37,7	20	20,1
SE11105	Karlskrona	2,6	26,6	4,5	15,7	20,5	30,1	51	7,5
DE10287	Wismar	1,3	34,6	6,9	12	20,6	24,6	23	17,5
PL11012	Stargard Szczecinski	10,1	17,9	6,8	26,1	16	23,1	5	14
DE10169	Eberswalde-Finow	1,2	11,1	5,3	22,6	27,6	32,2	17	15,4
PL10970	Kolobrzeg	6	16,8	6,7	30,4	17,1	23	6	14,7

Figure 22. Share of different NACE sectors in the value added of FUAs in the Poland – Germany – Sweden CBA (2006).

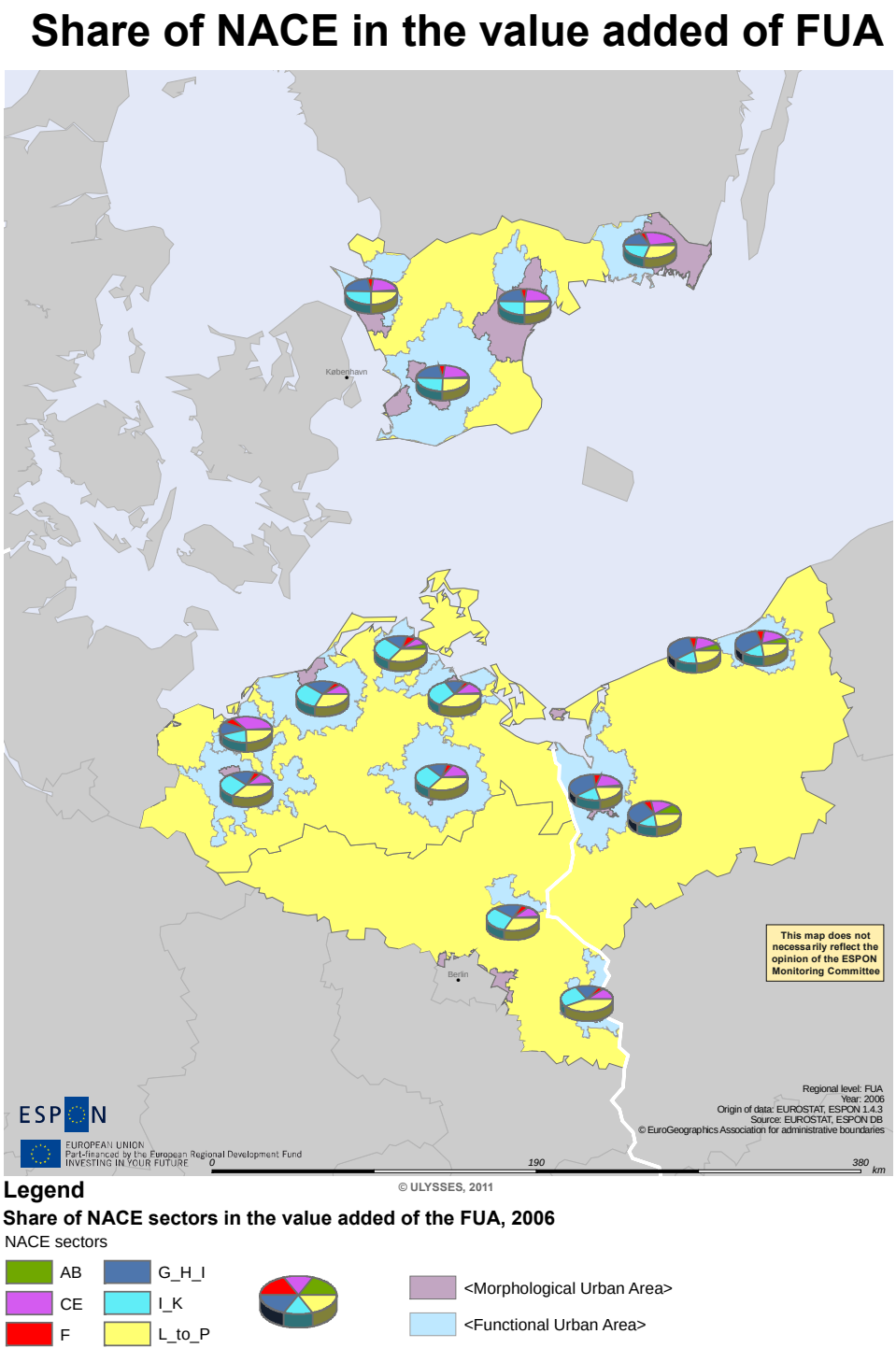
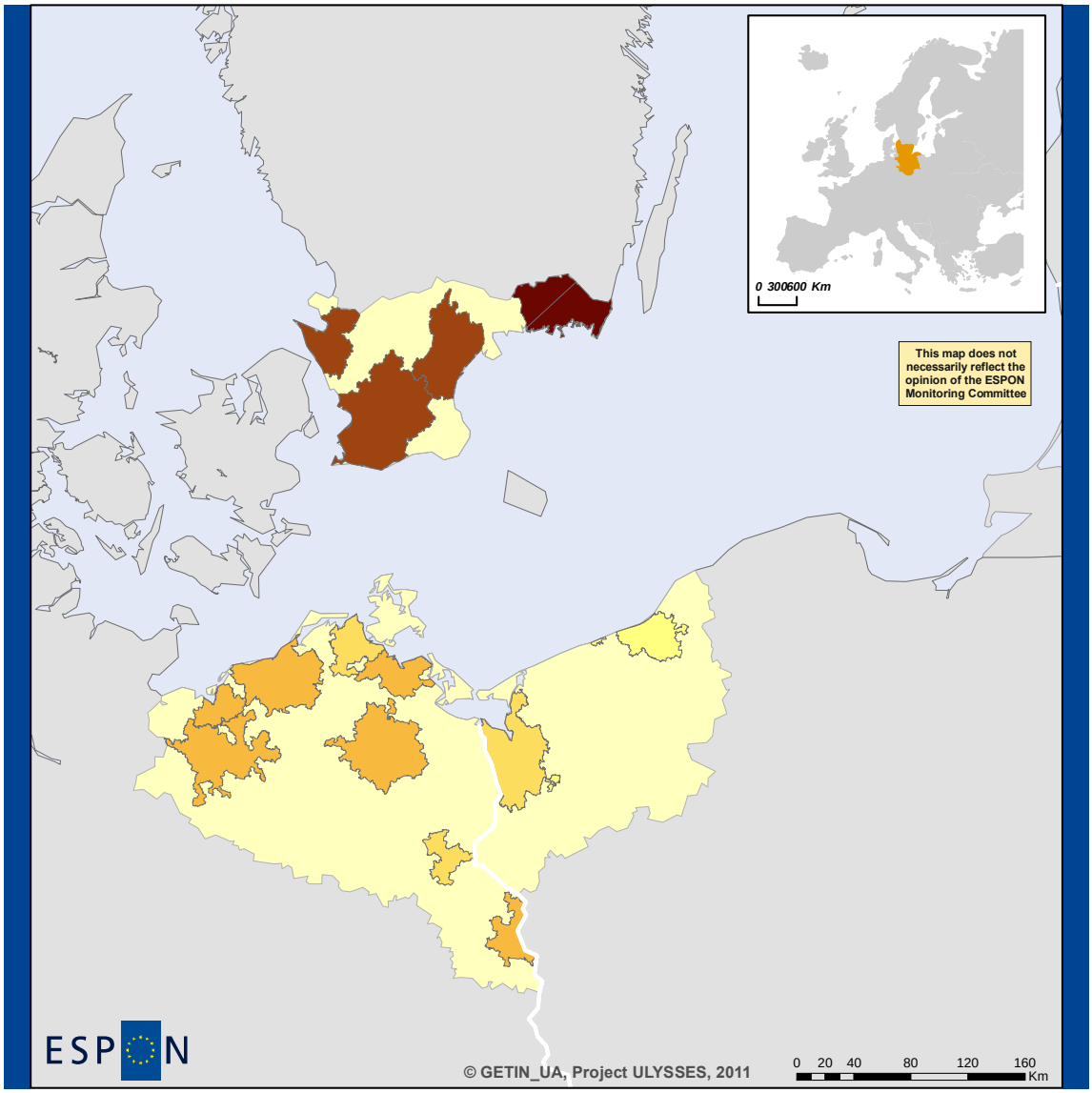


Figure 23. GDP per inhabitant in the FUAs of Poland – Germany – Sweden CBA (2006).



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

Local level: NUTS 3
Year: 2006
Source: ESPON Database
Origin of data: Eurostat, ESPON 1.4.3
© EuroGeographics Association for administrative boundaries

Legend

GDP per inhabitant, 2006 (thousands of Euros)

- 2,00 - 7,00
- 7,01 - 17,00
- 17,01 - 24,00
- 24,01 - 30,00
- 30,01 - 37,00
- 37,01 - 51,00
- missing value

FUA average GDP per inhab
ESPON = 21,23
PL = 6,36
SE = 34,30
PT = 13,14

3.4. Chapter conclusions

Polycentric development of the Poland – Germany – Sweden CBA has been studied here on NUTS 2 level, and therefore Functional Urban Areas outside the actual territory of Euregion Pomerania have been included in the study. FUAs located in Euregion Pomerania are Neubrandenburg, Greifswald, Stralsund and Eberswalde-Finow (Barnim) in Germany, Szczecin, Koszalin (Koszalinski), Kolobrzeg (Koszalinski) and Stargard Szczecinski (Stargardski) in Poland and Malmö (Skåne län) in Sweden. The largest FUA of the Poland – Germany – Sweden CBA in 2006 was Malmö with 636 157 inhabitants. When we take a look at population change in the FUAs of Euregion Pomerania, it is possible to observe that population growth between 2001 and 2006 has been positive in Malmö (4,4 %), Koszalin (0,3 %) and Greifswald (0,7 %), while all the other FUAs have been loosing population.

The slope of rank size distribution of FUA population in the Poland – Germany – Sweden CBA was -0,96 in 2006. This indicates of a relatively polycentric urban structure in the CBA, more polycentric than the urban structure in ESPON space. When considering the GDP of the FUAs the CBA is more monocentric. GDP in the leading city Malmö was 19 688 M€ in 2006 and the difference in GDP was significant compared to other FUAs in the CBA. Primacy rate for the Poland – Germany – Sweden CBA was 0,57 in 2006. This again suggests that urban structure of the region is not dominated by one big city, but that the size of the biggest FUA (Malmö) is actually smaller than anticipated by the rank-size distribution of the FUAs. Avarage FUA size in the Poland – Germany – Sweden CBA was 189 228,9 inhabitants in 2006. Only 51,5 % of the Poland – Germany – Sweden CBA's total population lives in FUAs. The dominating economic activity in the FUAs of the CBA was Service sector (L-P). However, the share of Trade and transport (GHI) and Finance and business services (J-K) was almost as large in the GVA added of the FUAs.

Chapter 4. Urban-rural relationship in the Poland – Germany – Sweden CBA

Urban-rural relationship is another key concept of European spatial policy. Active relations between urban areas and surrounding rural regions are considered a means to achieve sustainable development and territorial cohesion. Recent studies (including ESPON 1.1.2 "Urban-rural relations in Europe") have shown that urban-rural linkages are now moving beyond single one-way exchanges towards a dynamic web of interdependencies, which shape the development of both cities and countryside. New technologies are a good example of new elements that influence the pattern and character of flows between rural and urban areas.[15] Hence there are visible and invisible flows of people, capital, goods, information and technology between urban and rural areas. It is the recognition of the complexity of urban-rural relationships that has gained political attention both at national and European levels. European Spatial Development Perspective (ESDP) speaks about going beyond traditional co-operation and building successful long-term partnerships

[15] Küle 2010.

between urban and rural areas.[16] According to the Territorial Agenda 2020 urban-rural partnerships should include integrated governance and planning aspects.[17]

To be able to study urban and rural areas, ESPON 1.1.2 project makes a distinction between structural and functional properties of a region. Structural properties include established land-use patterns, settlement structure and the distribution of population, while functional properties refer to the factual use of the physical environment (various forms of production, consumption and communication). Following this distinction the project defines urban-rural relations as follows: structural relations of urban and rural areas are determined by the way the physical environment is constituted and shaped, while functional relations between urban and rural areas are determined by the way the physical environment is utilised.[18]

In our analyses we have examined both dimensions of urban-rural relations, however, with a limited selection of parameters. First we take a look at land use patterns in the Poland – Germany – Sweden CBA, and then analyse how the traditional rural fields of economic activity; agriculture, forestry and fishing have developed in the CBA.

We have faced some limitations regarding the data. Although it is possible to get land cover data on a very low geographical scale from the Corine Land Cover, indicators such as employment and economical patterns are only available at NUTS 3 level. Typologies established by ESPON and Eurostat are also available only at broad scale, and it is not possible to link the indicators with rural or urban areas at any significant scale. We have therefore focused on these typologies on NUTS 3 level and highlighted differences between them regarding land use patterns as well as socioeconomic indicators. Besides the ESPON typology on urban and rural regions, data for land types has been included in the analysis. What comes to evaluating interaction (flows of people and goods or computer mediated communication) between urban and rural areas, there is no data available on EUROSTAT or ESPON.

Table 17. Urban-rural relationship parameters studied for the Poland – Germany – Sweden CBA.

Variable name	Geographical scale	Source	Time frame	Observations
Change of 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	1997–2008	Years missing for some countries

[16] ESDP 1999.
[17] Territorial agenda 2020.
[18] ESPON 1.1.2.

4.1. Land use patterns

Different typologies have been established in order to classify regions to urban and rural territories. The typology that was developed in ESPON 1.1.2 project is based on tree indicators; land cover, population density and the presence/absence of a FUA. Based on different combinations of these indicators, NUTS 3 regions are classified in the project as having high or low human influence (population densities) and urban intervention (land cover).

Eurostat uses an urban-rural typology that is a revision of OECD typology and classifies regions according to the three following steps:

1. Clusters of urban grid cells are created with a minimum population density of 300 inhabitants per km² and a minimum population of 5 000 inhabitants. All the cells outside these urban clusters are considered rural.

2. NUTS 3 regions of less than 500 km2 are grouped with one or more neighbours solely for classification purposes. All NUTS 3 regions in a grouping are classified in the same way.

3. NUTS 3 regions are classified 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.

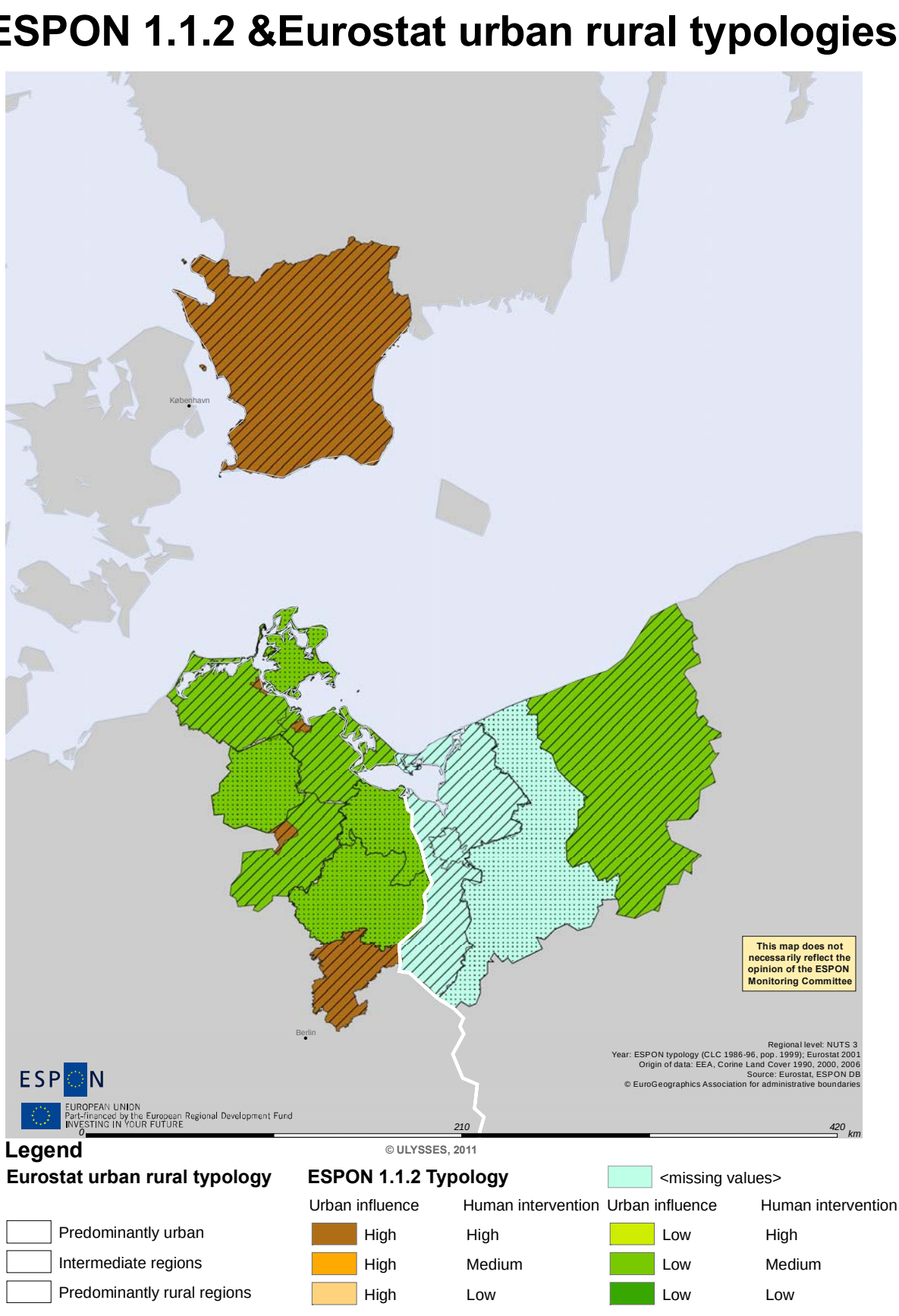
Further, some regions that are predominantly rural are considered intermediate in the presence of a city with more than 200 000 inhabitants, and intermediate regions located next to cities of over 500 000 inhabitants are considered urban.[19]

Following map presents the regions of Euregion Pomerania based on these two typologies. ESPON 1.1.2 typology classifies following regions as regions with low urban influence and low human intervention: Uckermark, Demmin, Mecklenburg-Strelitz, Nordvorpommern, Ostvorpommern, Rügen, Uecker-Randow and Koszaliński. Regions with high urban influence and high human intervention are, according to the classification Barnim, Greifswald, Neubrandenburg, Stralsund and Skåne län.

The Eurostat typology considers following regions of the CBA as predominantly rural regions: Uckermark, Demmin, Rügen, Uecker-Randow and Stargardski. The rest of the regions of Euregion Pomerania are classified as intermediate regions. According to the classification there are no predominantly urban region in Euregion Pomerania.

[19] A revised urban-rural typology 2010.

Figure 24. Poland – Germany – Sweden CBA according to ESPON 1.1.2. and Eurostat urban rural typologies.



Agricultural areas occupy relatively large areas in all the regions of Euregio Pomerania. Demmin has the largest share of agricultural areas (79,73 %) and even in Neubrandenburg (where the share of agricultural areas is the smallest in the CBA) 25,08 % of the total area is occupied by agricultural land. Share of agricultural areas in the ESPON countries was 38,65 % in 2006. In general, total area of agricultural land has been decreasing in all the regions of Euregion Pomerania between 1990 and 2006.

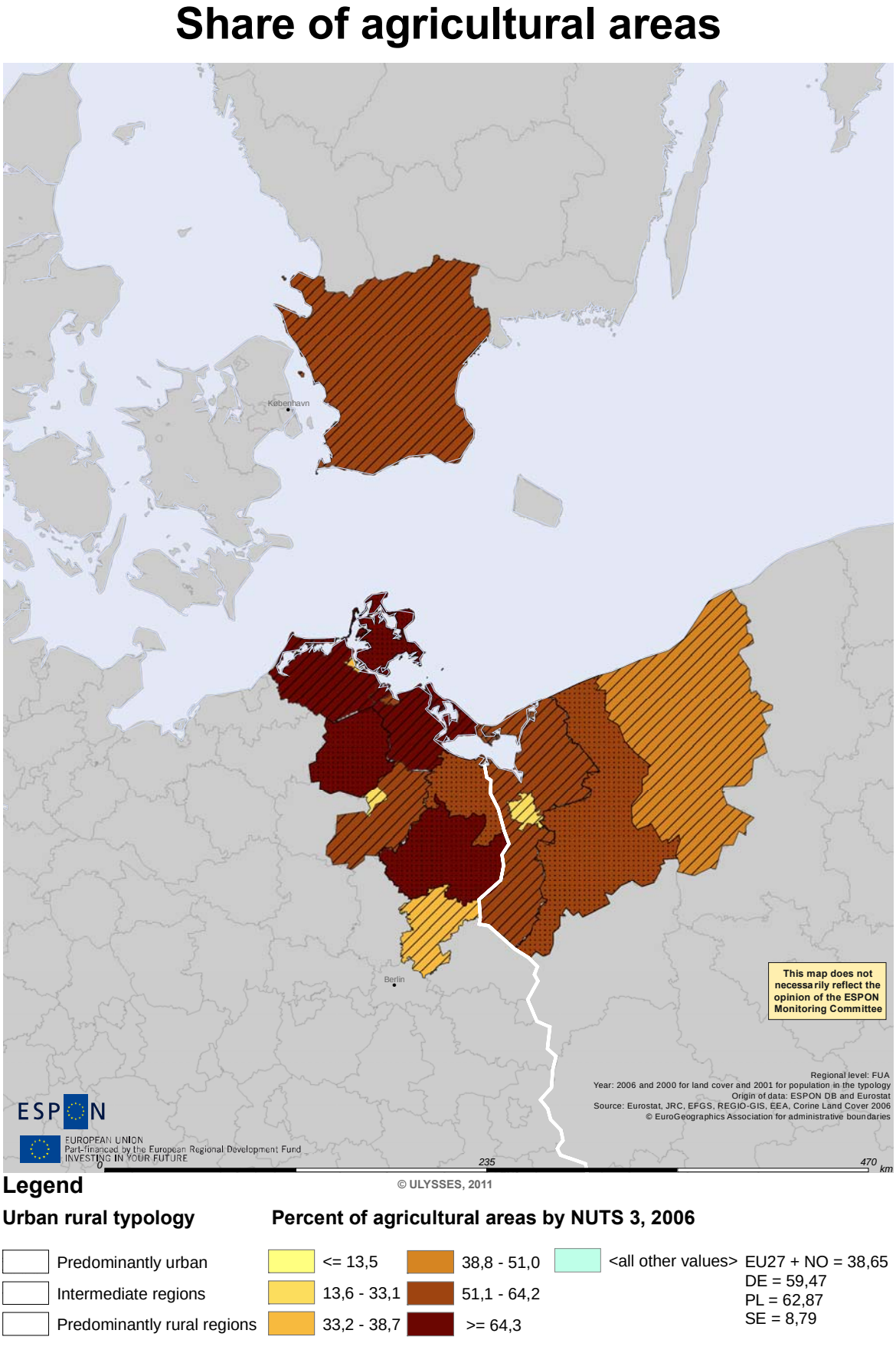
The following table presents agricultural areas in the regions of Euregion Pomerania, Germany, Poland, Sweden and ESPON countries. Land cover data that is used here and in the following analyses has been categorized according to the Corine Land Cover (CLC). CLC has five main categories of land use; (1) artificial, (2) agricultural, (3) forests and semi-natural areas, (4) wetlands and (5) water bodies. Agricultural areas include arable land, permanent crops, pastures and heterogeneous agricultural land.

Table 18. Agricultural areas (category 2 of the Corine Land Cover) in the Poland – Germany – Sweden CBA.

NUTS ID	NUTS	Agricultural areas (ha)						
		Total 1990	Total 2000	Total 2006	Share of total area 2006 (%)	Net formation of land cover 1990-2006	Net formation of land cover by total area 1990-2006 (per 10000)	Annual growth rate 1990–2006 (per 1000)
EU27 + CH + NO		182685050,0	205227723,0	184577384,0	38,65	1892334,0	39,621	6,44
DE	Germany	21604012,0	21397990,0	21263899,0	59,47	-340113,0	-95,12	-9,91
PL	Poland	20114390,0	20082359,0	19612645,0	62,87	-501745,0	-160,84	-15,78
SE	Sweden	0,0	3943824,0	3946861,0	8,79	3037,0*	0,68*	1,28*
DE412	Barnim	58912,0	57560,0	57846,0	38,48	-1066,0	-70,92	-11,41
DE418	Uckermark	211061,0	210031,0	209601,0	68,16	-1460,0	-47,48	-4,34
DE801	Greifswald	2880,0	2718,0	2741,0	56,45	-139,0	-286,27	-30,87
DE802	Neubrandenburg	2906,0	2377,0	2145,0	25,08	-761,0	-889,65	-187,98
DE805	Stralsund	1549,0	1477,0	1431,0	36,82	-118,0	-303,63	-49,40
DE808	Demmin	155691,0	155131,0	154308,0	79,73	-1383,0	-71,46	-5,58
DE80B	Mecklenburg-Strelitz	125491,0	124450,0	123742,0	58,87	-1749,0	-83,21	-8,77
DE80D	Nordvorpommern	160943,0	160149,0	157298,0	73,66	-3645,0	-170,70	-14,31
DE80F	Ostvorpommern	142876,0	141326,0	139322,0	73,36	-3554,0	-187,13	-15,73
DE80H	Rügen	73795,0	73321,0	72384,0	74,56	-1411,0	-145,35	-12,06
DE80I	Uecker-Randow	90409,0	89068,0	88852,0	59,40	-1557,0	-104,09	-10,85
PL422	Koszaliński	534326,0	532360,0	518911,0	49,86	-15415,0	-148,13	-18,28
PL423	Stargardzki	443055,0	442252,0	439044,0	64,21	-4011,0	-58,66	-5,68
PL424	Miasto Szczecin	6900,0	6760,0	6641,0	22,12	-259,0	-86,25	-23,88
PL425	Szczecinski	271854,0	270965,0	269432,0	55,01	-2422,0	-49,45	-5,59
SE224	Skåne län	0,0	605497,0	604231,0	53,19	-1266,0*	-11,14*	-3,49*

*Data for 2000–2006
Source: ESPON Database
Methodology: Tabulate area between CLC2000 level 3 and NUTS 2006 (levels 1,2,3) and aggregation at CLC2000 level 1.

Figure 25. Share of agricultural areas in the Poland – Germany – Sweden CBA in 2006.



Urbanisation of agricultural areas in the regions of Euregion Pomerania has been relatively similar to the European Union average (2,67 ha per 10000 ha), but two regions have experienced urbanisation of far larger agricultural areas. In Stralsund 38,93 ha per 10000 ha and in Greifswald 24,89 ha per 10000 ha of agricultural land was urbanised between 2000 and 2006. During the same time period urbanisation of natural and semi-natural areas has been almost non-existent in the regions of Euregion Pomerania.

The following table presents changes in the urban fabric of the regions of Euregion Pomerania, Germany, Poland, Sweden and ESPON countries between 2000 and 2006. [20] As for the following two maps, they illustrate urbanisation of agricultural, and natural and semi-natural areas in the Poland – Germany – Sweden CBA between 2000 and 2006.

Table 19. Urban fabric (categories 111 and 112 of the Corine Land Cover) in the Poland – Germany – Sweden CBA.

NUTS ID	NUTS	Urban fabric (ha) (2000–2006)							
		Formation of new land cover	Consumption of land cover	Net formation of land cover	Net formation of land cover by total area (per 10000)	Urbanisation of agricultural areas (2000-2006)	Urbanisation of agricultural areas by total area (per 10000)	Urbanisation of natural and semi-natural areas	Urbanisation of natural and semi-natural areas by total area (per 10000)
EU27 + CH + NO		191290,05	1447,96	189842,09	3,97	127745,51	2,67	16003,73	0,34
DE	Germany	34168,79	387,39	33781,40	9,45	25695,18	7,19	519,18	0,15
PL	Poland	5732,91	84,06	5648,85	1,81	3212,30	1,03	34,15	0,01
SE	Sweden	3062,35	32,29	3030,06	0,67	1445,97	0,32	1082,84	0,24
DE412	Barnim	52,51	0,00	52,51	3,49	17,19	1,14	0,00	0,00
DE418	Uckermark	21,57	14,35	7,23	0,24	21,57	0,70	0,00	0,00
DE801	Greifswald	12,08	0,00	12,08	24,89	12,08	24,89	0,00	0,00
DE802	Neubrandenburg	13,77	0,00	13,77	16,10	5,31	6,21	0,00	0,00
DE805	Stralsund	20,38	0,00	20,38	52,45	15,13	38,93	0,00	0,00
DE808	Demmin	7,08	0,00	7,08	0,37	7,08	0,37	0,00	0,00
DE80B	Mecklenburg-Strelitz	25,26	0,00	25,26	1,20	9,88	0,47	5,23	0,25
DE80D	Nordvorpommern	53,34	0,00	53,34	2,50	53,34	2,50	0,00	0,00
DE80F	Ostvorpommern	72,61	0,00	72,61	3,82	67,34	3,55	5,27	0,28
DE80H	Rügen	29,36	0,00	29,36	3,02	29,36	3,02	0,00	0,00
DE80I	Uecker-Randow	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
PL422	Koszaliński	96,94	5,13	91,81	0,88	96,94	0,93	0,00	0,00
PL423	Stargardzki	35,36	0,00	35,36	0,52	35,36	0,52	0,00	0,00
PL424	Miasto Szczecin	38,75	0,00	38,75	12,91	14,50	4,83	0,00	0,00
PL425	Szczecinski	27,74	0,00	27,74	0,57	27,74	0,57	0,00	0,00
SE224	Skåne län	838,64	10,82	827,82	7,29	685,18	6,03	33,55	0,30

Source: EEA Corine Land Cover
Methodology: Intersection of CLC land cover changes with level 3 and NUTS 2006 (levels 1,2,3) and aggregation at CLC2000-2006 level 2.

[20] Urban fabric belongs to the 1st CLC category of artificial surfaces. Two subcategories of urban fabric have been included in the table. These are 1.1.1 that corresponds to continuous urban fabric and 1.1.2 that corresponds to discontinuous urban fabric.

Figure 26. Urbanisation of agricultural areas in Poland – Germany – Sweden CBA between 2000 and 2006.

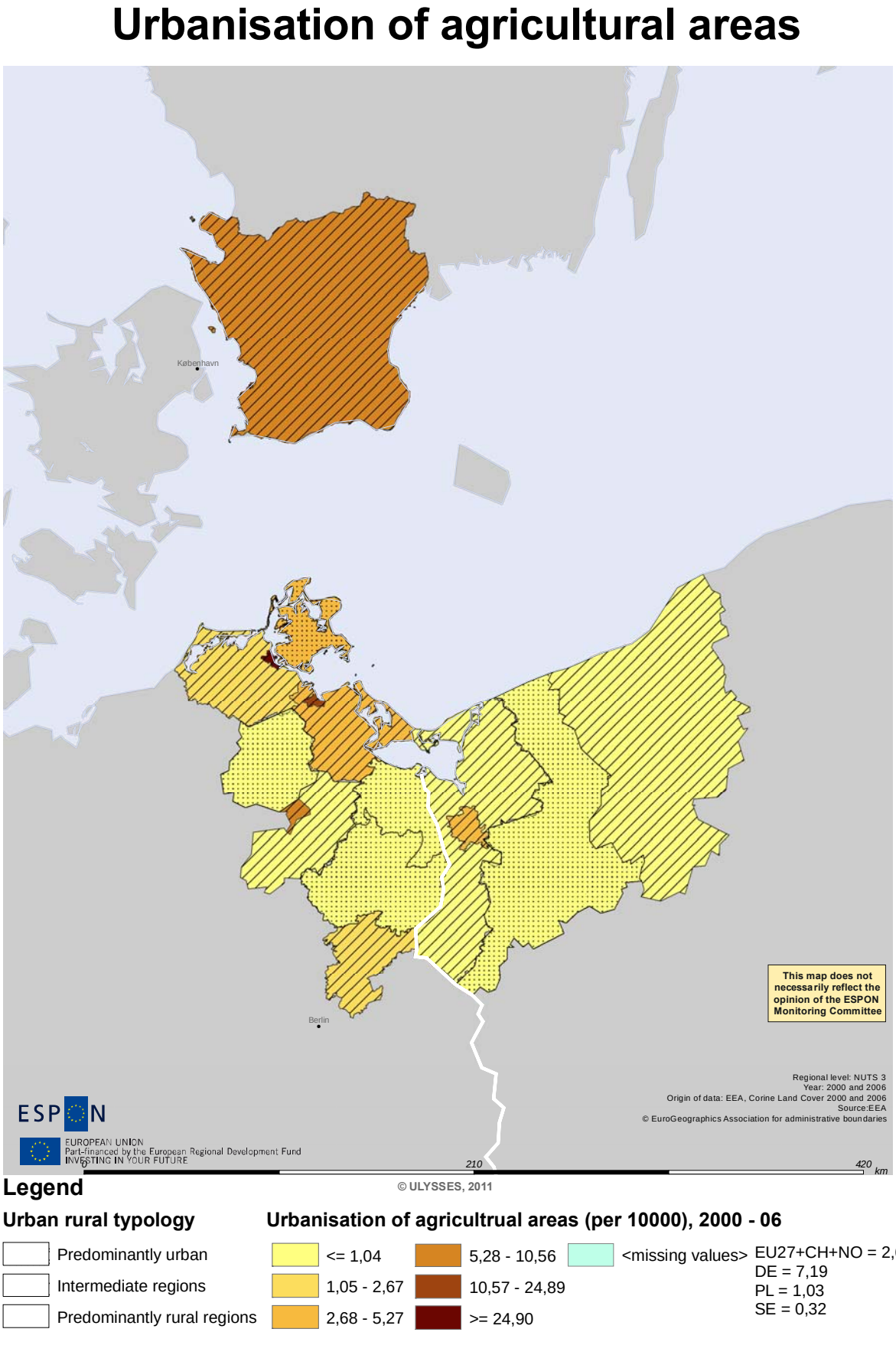
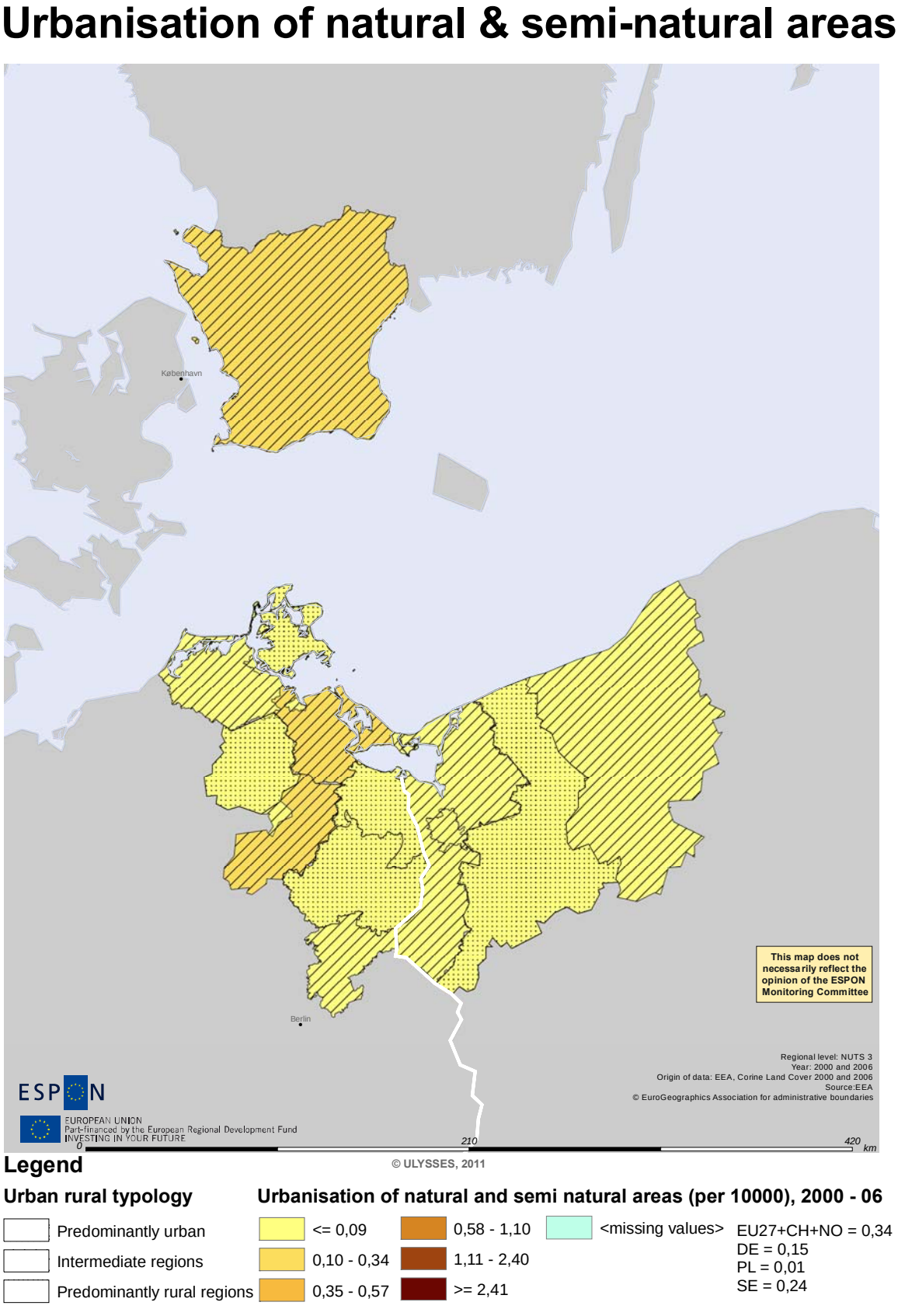


Figure 27. Urbanisation of natural and semi-natural areas in the Poland – Germany – Sweden CBA between 2000 and 2006.



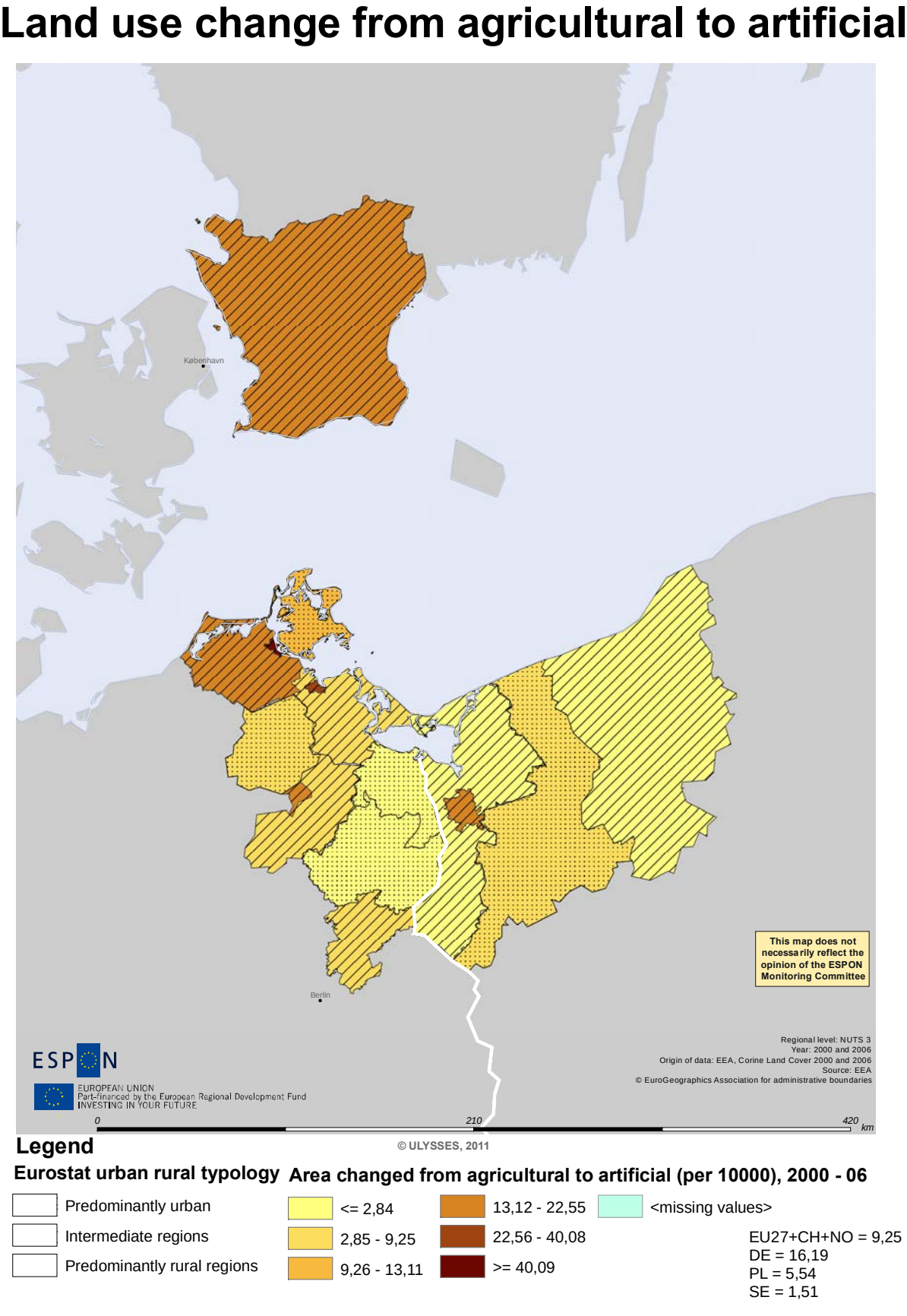
Artificial areas include in the CLC classification (1.1) urban fabric, (1.2) industrial, commercial and transport units, (1.3) mine, dump and constructions sites and (1.4) artificial non-agricultural vegetated areas (green urban areas and sports and leisure facilities). Between 2000 and 2006 the share of artificial areas in the ESPON countries was 10,63 ha per 10000 ha of land. The average share of artificial areas in Euregion Pomerania was very similar to the ESPON average (11,35 ha per 10000 ha of land). In Germany the share of artificial areas was slightly higher (13,24), while in Poland and Sweden the share of artificial areas was significantly lower (3,59 and 3,89). The largest share of artificial areas was in Neubrandenburg (46,91) and the smallest in Uckermark (0,28). Biggest changes in the amount of artificial land cover between 2000 and 20006 in the regions of Euregion Pomerania have taken place in the city districts of Greifswald, Stralsund and Neubrandenburg.

Table 20. Artificial surfaces (category 1 of the Corine Land Cover) in the Poland – Germany – Sweden CBA.

NUTS ID	NUTS	Artificial Surfaces (ha) (2000–2006)							
		Formation of new land cover	Consumption of land cover	Net formation of land cover	Share of net formation of land cover (per 10000)	Agricultural to artificial areas (2000–2006)	Agricultural to artificial areas by total area (per 10000)	Natural and semi-natural to artificial areas	Natural and semi-natural to artificial areas by total area (per 10000)
EU27 + CH + NO	EU27 + CH + NO	667087,81	159607,44	507480,37	10,63	441994,68	9,25	118710,43	2,49
DE	Germany	83478,18	36120,25	47357,93	13,24	57901,44	16,19	9292,95	2,60
PL	Poland	25499,77	14292,90	11206,88	3,59	17289,70	5,54	2901,45	0,93
SE	Sweden	20063,68	2584,07	17479,61	3,89	6781,50	1,51	10826,20	2,41
DE412	Barnim	179,40	103,50	75,90	5,05	62,92	4,19	33,18	2,21
DE418	Uckermark	113,61	105,12	8,49	0,28	43,52	1,42	18,85	0,61
DE801	Greifswald	19,46	33,61	-14,15	-29,14	19,46	40,08	0,00	0,00
DE802	Neubrandenburg	48,59	8,46	40,13	46,91	12,69	14,84	27,44	32,07
DE805	Stralsund	33,55	5,25	28,30	72,82	28,30	72,82	0,00	0,00
DE808	Demmin	96,87	0,00	96,87	5,01	96,87	5,01	0,00	0,00
DE80B	Mecklenburg-Strelitz	152,18	52,69	99,49	4,73	88,28	4,20	11,21	0,53
DE80D	Nordvorpommern	304,81	14,19	290,62	13,61	302,03	14,14	2,78	0,13
DE80F	Ostvorpommern	143,06	0,71	142,34	7,49	137,78	7,25	5,27	0,28
DE80H	Rügen	95,13	0,00	95,13	9,80	93,29	9,61	1,84	0,19
DE80I	Uecker-Randow	37,56	20,65	16,90	1,13	16,90	1,13	0,00	0,00
PL422	Koszaliński	266,63	116,78	149,85	1,44	183,80	1,77	77,70	0,75
PL423	Stargardzki	230,57	17,76	212,82	3,11	215,39	3,15	15,18	0,22
PL424	Miasto Szczecin	98,42	64,24	34,19	11,38	63,67	21,20	0,00	0,00
PL425	Szczecinski	119,52	0,00	119,52	2,44	102,98	2,10	16,54	0,34
SE224	Skåne län	3452,57	555,10	2897,47	25,50	2253,17	19,83	744,07	6,55

Source: EEA Corine Land Cover
Methodology: Intersection of CLC land cover changes with level 3 and NUTS 2006 (levels 1,2,3) and aggregation at CLC2000-2006 level 2.

Figure 28. Land use change from agricultural to artificial areas in the Poland – Germany – Sweden CBA between 2000 and 2006.



4.2. Gross value added and employment in agriculture and fishing

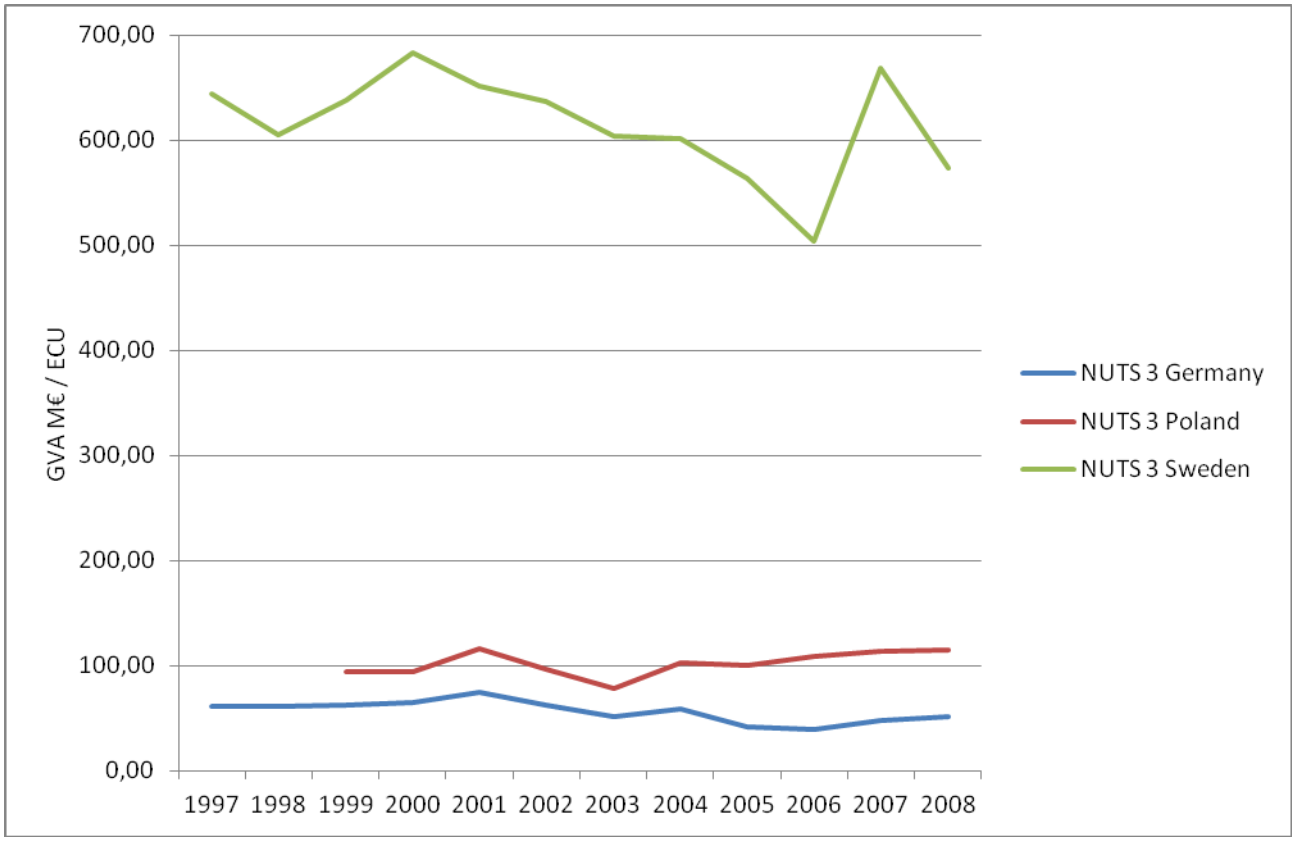
Gross Value Added (GVA) is a measure in economics of the value of goods and services produced in an area. The value of goods and services consumed as intermediate consumption is reduced from CVA. Table 21 presents GVA produced by agriculture, hunting, forestry and fishing (NACE classes A-B, hereafter referred to as agriculture and fishing) in the regions of Euregion Pomerania, Germany, Poland, Sweden and European Union (EU27) between 1997 and 2008. Figure 29 illustrates the temporal change in the GVA by agriculture and fishing in the German, Polish and Swedish NUTS 3 regions of the CBA.

Table 21. Gross value added by agriculture and fishing in the Poland – Germany – Sweden CBA between 1997 and 2008.

NUTS ID	NUTS	GVA by agriculture and fishing (millions of euro/ECU)										
		1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
EU27	EU27	196578,60	194025,70	190538,70	195587,10	205609,80	198864,60	194881,10	204970,50	185614,10	185243,60	200954,7
DE	Germany	22571,40	21891,20	22230,00	23460,00	25940,00	22160,00	19080,00	21900,00	17520,00	17900,00	20670,0
PL	Poland	8399,20	8412,40	7514,10	8205,70	9681,40	8368,10	7338,20	9151,30	9606,50	10162,00	11645,7
SE	Sweden	5106,90	4862,90	4835,90	4862,80	4608,80	4668,50	4820,70	4978,80	3226,40	4066,70	5078,5
DE412	Barnim	43,80	43,70	44,00	39,00	49,00	44,00	34,50	45,40	37,20	30,00	45,60
DE418	Uckermark	111,50	120,20	121,00	115,00	142,00	121,00	93,30	121,50	92,30	81,30	92,10
DE801	Greifswald	1,00	1,00	1,00	1,00	5,00	6,00	4,60	3,70	4,30	4,40	4,70
DE802	Neubrandenburg	1,00	1,00	1,00	1,00	3,00	3,00	3,40	2,30	2,50	2,80	3,60
DE805	Stralsund	4,00	4,00	4,00	4,00	5,00	4,00	4,70	3,60	3,30	3,40	3,50
DE808	Demmin	115,50	112,20	106,00	114,00	133,00	110,00	99,00	106,60	68,30	67,90	74,00
DE80B	Mecklenburg-Strelitz	72,70	71,50	81,00	88,00	98,00	83,00	65,80	71,30	42,50	40,40	48,40
DE80D	Nordvorpommern	113,50	114,20	112,00	120,00	130,00	110,00	93,10	106,70	68,10	65,30	79,10
DE80F	Ostvorpommern	92,60	90,40	95,00	102,00	111,00	93,00	71,40	80,40	51,80	49,40	60,10
DE80H	Rügen	57,70	58,60	59,00	63,00	66,00	54,00	47,20	50,40	56,00	53,90	71,20
DE80I	Uecker-Randow	58,70	57,60	66,00	69,00	74,00	61,00	47,90	55,10	34,80	33,30	40,80
PL422	Koszaliński	187,90	183,30	155,70	154,90	192,30	162,80	133,60	175,60	170,30	186,10	194,80
PL423	Stargardzki	N/A	N/A	128,90	127,70	156,30	136,10	108,20	144,90	139,90	152,20	160,70
PL424	Miasto Szczecin	N/A	N/A	1,90	1,70	2,20	2,10	1,80	2,20	2,00	2,30	2,40
PL425	Szczecinski	N/A	N/A	89,70	93,30	110,60	86,30	69,80	88,80	85,80	93,40	97,80
SE224	Skåne län	644,50	604,80	638,00	683,10	651,90	637,30	603,80	601,40	563,80	503,80	668,20

Source: Eurostat

Figure 29. Gross value added by agriculture and fishing in Euregion Pomerania between 1997 and 2008.



The share of GVA by agriculture and fishing in total GVA has decreased in all the regions of Euregion Pomerania between 1997 and 2008. Table 22 well demonstrates the fact that even if the regions would have experienced growth in the GVA by agriculture and fishing, the share of those fields of economy in the total GVA has decreased between 1997 and 2008 in all the regions of Euregion Pomerania (if not considering Neubrandenburg, where GVA in agriculture and fishing has been very low both in 1997 (0,05 %) and in 2008 (0,19 %)).

Table 22. GVA by agriculture and fishing, and share of GVA by agriculture and fishing in total GVA in the Poland – Germany – Sweden CBA.

NUTS ID	NUTS	GVA by agriculture and fishing (millions of euro/ECU)		GVA by agriculture and fishing by total GVA (%)		Annual growth rate GVA by agriculture and fishing 1997-2008	Annual growth rate of share of GVA by agriculture and fishing 1997-2008
		1997	2008	1997	2008		
EU27	EU27	196578,6	171307,5	2,82	1,75	1,26	-4,23
DE	Germany	22571,4	20250	1,31	0,90	-0,98	-3,29
PL	Poland	8399,2	11735,1	6,86	3,69	3,09	-5,48
SE	Sweden	5106,9	5182,5	2,61	1,77	0,13	-3,45
DE412	Barnim	43,8	50,7	2,19	1,87	1,34	-1,41
DE418	Uckermark	111,5	89,6	5,33	3,57	-1,97	-3,58
DE801	Greifswald	1	3,8	0,11	0,30	12,90	9,92
DE802	Neubrandenburg	1	3,7	0,05	0,19	12,63	12,03
DE805	Stralsund	4	3,4	0,35	0,22	-1,47	-3,99
DE808	Demmin	115,5	84,9	10,21	6,25	-2,76	-4,37
DE80B	Mecklenburg-Strelitz	72,7	53,1	7,06	5,04	-2,82	-3,03
DE80D	Nordvorpommern	113,5	87,4	8,97	5,57	-2,35	-4,25
DE80F	Ostvorpommern	92,6	65,4	7,54	4,13	-3,11	-5,32
DE80H	Rügen	57,7	72,2	6,23	5,87	2,06	-0,54
DE80I	Uecker-Randow	58,7	44,4	5,22	3,81	-2,51	-2,83
PL422	Koszaliński	155,7	196,2	11,65	4,88	2,60	-6,14
PL423	Stargardzki	128,9	161,4	13,40*	8,06	2,53*	-5,49*
PL424	Miasto Szczecin	1,9	2,3	0,08*	0,05	2,15*	-4,71*
PL425	Szczecinski	89,7	97,9	8,10*	4,06	0,98*	-7,38*
SE224	Skåne län	644,5	572,8	2,81	1,71	-1,07	-4,40

*Data for 1999-2008
Source: Eurostat

Figure 30. Share of GVA by agriculture and fishing in total GVA in the Poland – Germany – Sweden CBA (2008).

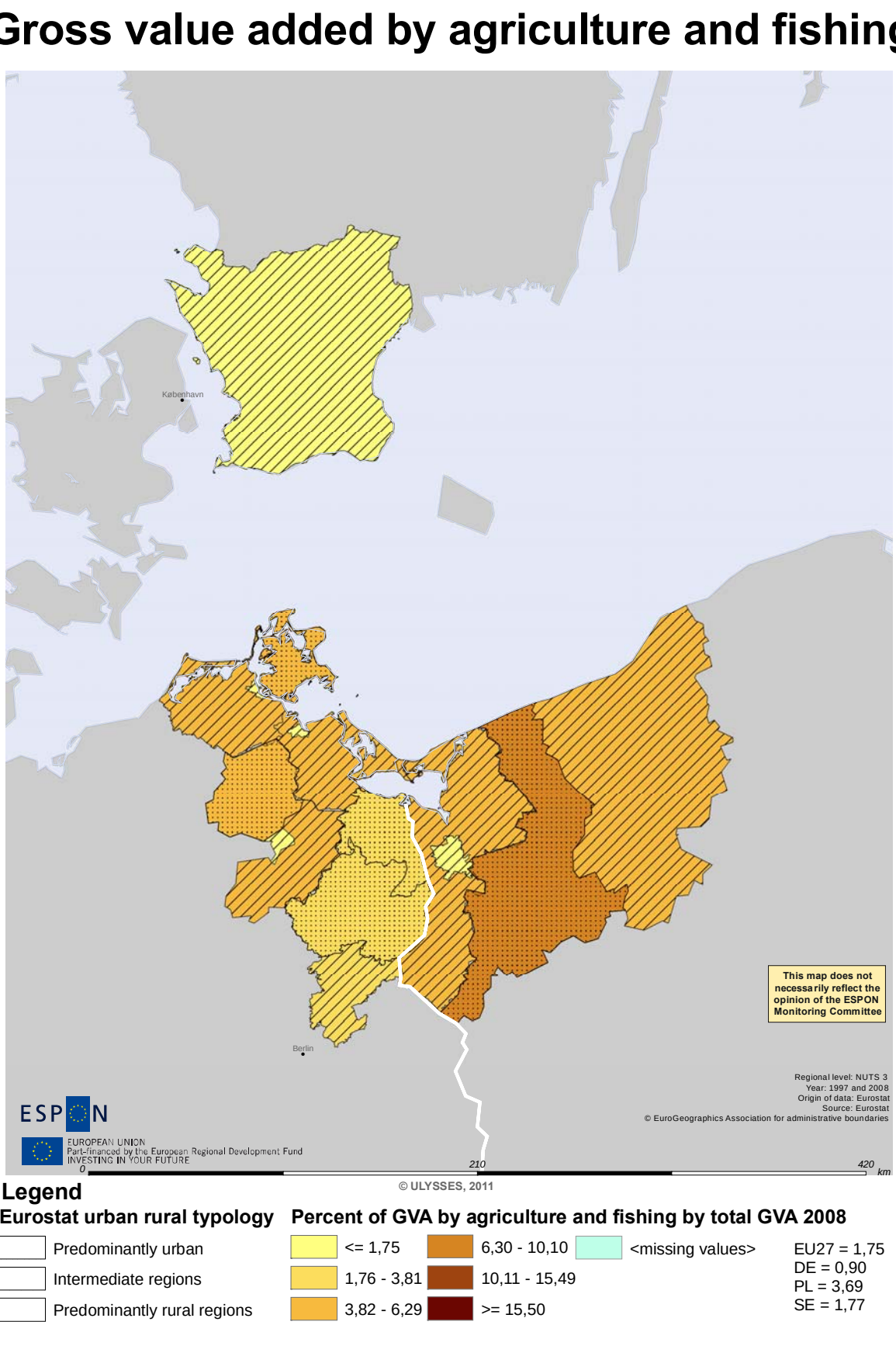
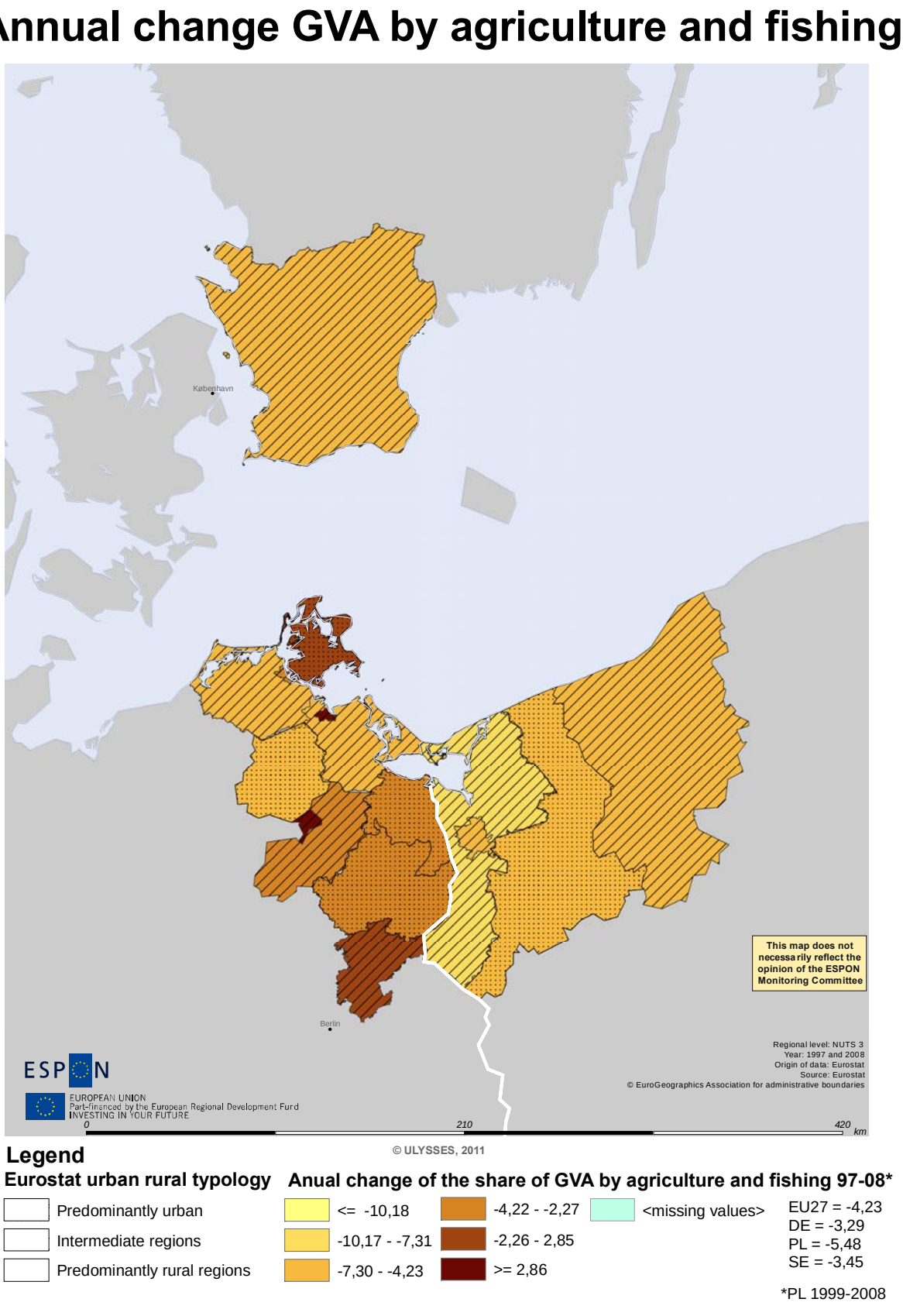


Figure 31. Annual growth rate of the share of GVA by agriculture and fishing in total GVA in the Poland – Germany – Sweden CBA between 1997 and 2008.



Employment statistics for agriculture and fishing show a gradual decrease in the European Union, Germany, Poland and Sweden between 2000 and 2008. The trend has prevailed also in the regions of Euregion Pomerania and the changes have been especially severe in the Polish regions of the CBA. Table 23 presents employment statistics for the given period, and figure 32 temporal evolution of employment in agriculture and fishing in the regions of Euregion Pomerania between 2000 and 2008.

Table 23. Employment in agriculture and fishing in the Poland – Germany – Sweden CBA between 2000 and 2008.

NUTS ID	NUTS	Employment in agriculture and fishing (thousands of persons)								
		2000	2001	2002	2003	2004	2005	2006	2007	2008
EU27	EU27*	17112,90	15846,30	14540,40	14368,70	13880,20	13686,60	13111,90	12875,70	11706,90
DE	Germany	934,60	925,00	904,20	880,00	873,00	853,00	837,00	850,00	860,00
PL	Poland	3955,90	2717,60	2661,10	2505,60	2480,40	2445,40	2290,20	2236,30	2208,10
SE	Sweden	127,40	118,80	115,20	107,80	103,80	99,00	96,80	95,30	97,00
DE412	Barnim	1,80	1,70	1,90	2,00	2,00	1,80	1,70	1,90	1,80
DE418	Uckermark	3,90	3,70	3,90	4,20	4,20	3,70	3,40	3,30	3,20
DE801	Greifswald	0,10	0,40	0,50	0,30	0,50	0,50	0,40	0,40	0,40
DE802	Neubrandenburg	0,30	0,30	0,20	0,20	0,20	0,20	0,20	0,20	0,20
DE805	Stralsund	0,20	0,20	0,20	0,20	0,20	0,20	0,20	0,20	0,20
DE808	Demmin	3,90	3,40	3,20	3,10	3,00	2,80	2,70	2,70	2,60
DE80B	Mecklenburg-Strelitz	4,00	3,40	3,00	2,80	2,70	2,10	1,90	1,80	1,90
DE80D	Nordvorpommern	2,80	2,70	2,80	2,70	2,70	2,60	2,50	2,60	2,60
DE80F	Ostvorpommern	2,50	2,00	2,00	1,90	1,90	1,90	1,80	1,90	1,90
DE80H	Rügen	1,30	1,20	1,20	1,20	1,30	1,30	1,30	1,30	1,30
DE80I	Uecker-Randow	1,60	1,50	1,60	1,50	1,50	1,50	1,50	1,50	1,50
PL422	Koszaliński	36,80	18,30	19,70	24,40	25,10	24,60	20,00	17,00	15,30
PL423	Stargardzki	28,90	14,00	14,90	18,80	18,00	17,60	15,20	12,10	11,50
PL424	Miasto Szczecin	2,10	0,90	1,10	1,50	1,70	1,30	1,00	1,00	0,90
PL425	Szczecinski	20,30	10,60	10,10	12,10	12,10	11,80	9,70	8,10	7,10
SE224	Skåne län	19,80	19,30	18,80	16,90	16,40	15,50	16,30	16,20	13,40

*NL not included in 2000; UK not included in 2000 and 2001
Source: Eurostat

Figure 32. Employment in agriculture and fishing in the regions of Euregion Pomerania between 2000 and 2008.

Decrease in employment in agriculture and fishing has naturally reduced the share of employment in general employment statistics. In Euregion Pomerania the greatest decrease has taken place in Szczecinski, where the share of employment in agriculture and fishing has decreased at an annual rate of -11,77 %. Stralsund on the other hand has shown smallest changes in the employment in agriculture and fishing (0,11 % annual growth rate) between 2 Uckermark share of artificial areas Neubrandenburg 000-2008.

Table 24. Employment in agriculture and fishing, and share of employment in agriculture and fishing in total employment in the Poland – Germany – Sweden CBA.

NUTS ID	NUTS	Employment in agriculture and fishing (thousands of persons)		Share of employment in agriculture and fishing by total employed (%)		Annual growth rate of employment in agriculture and fishing 2000-2008	Annual growth rate of employment in agriculture and fishing 2000-2008
		2000	2008	2000	2008		
EU27	EU27*	17701,10	11706,90	8,41	5,87	-5,04	-4,39
DE	Germany	934,6	860	2,39	2,14	-1,03	-1,39
PL	Poland	3955,9	2208,1	26,34	14,02	-7,03	-7,58
SE	Sweden	127,4	97	2,96	2,12	-3,35	-4,07
DE412	Barnim	1,8	1,8	2,86	2,89	0,00	0,12
DE418	Uckermark	3,9	3,2	6,90	6,30	-2,44	-1,14
DE801	Greifswald	0,1	0,4	0,35	1,32	18,92	18,17
DE802	Neubrandenburg	0,3	0,2	0,61	0,44	-4,94	-4,11
DE805	Stralsund	0,2	0,2	0,60	0,60	0,00	0,11
DE808	Demmin	3,9	2,6	12,11	9,15	-4,94	-3,44
DE80B	Mecklenburg-Strelitz	4	1,9	12,90	6,96	-8,89	-7,43
DE80D	Nordvorpommern	2,8	2,6	7,18	6,84	-0,92	-0,60
DE80F	Ostvorpommern	2,5	1,9	6,10	4,57	-3,37	-3,55
DE80H	Rügen	1,3	1,3	4,29	4,22	0,00	-0,20
DE80I	Uecker-Randow	1,6	1,5	4,72	4,98	-0,80	0,68
PL422	Koszaliński	36,8	15,3	19,03	8,04	-10,39	-10,21
PL423	Stargardzki	28,9	11,5	26,59	11,64	-10,88	-9,81
PL424	Miasto Szczecin	2,1	0,9	1,14	0,51	-10,05	-9,46
PL425	Szczecinski	20,3	7,1	20,55	7,55	-12,31	-11,77
SE224	Skåne län	19,8	13,4	3,84	2,40	-4,76	-5,70

*For NL and UK no data was available for 2000 and therefore data from 2001 (NL) and 2002 (UK) was used.
Source: Eurostat

Figure 33. Share of employment in agriculture and fishing in total employment in the Poland – Germany – Sweden CBA (2008).

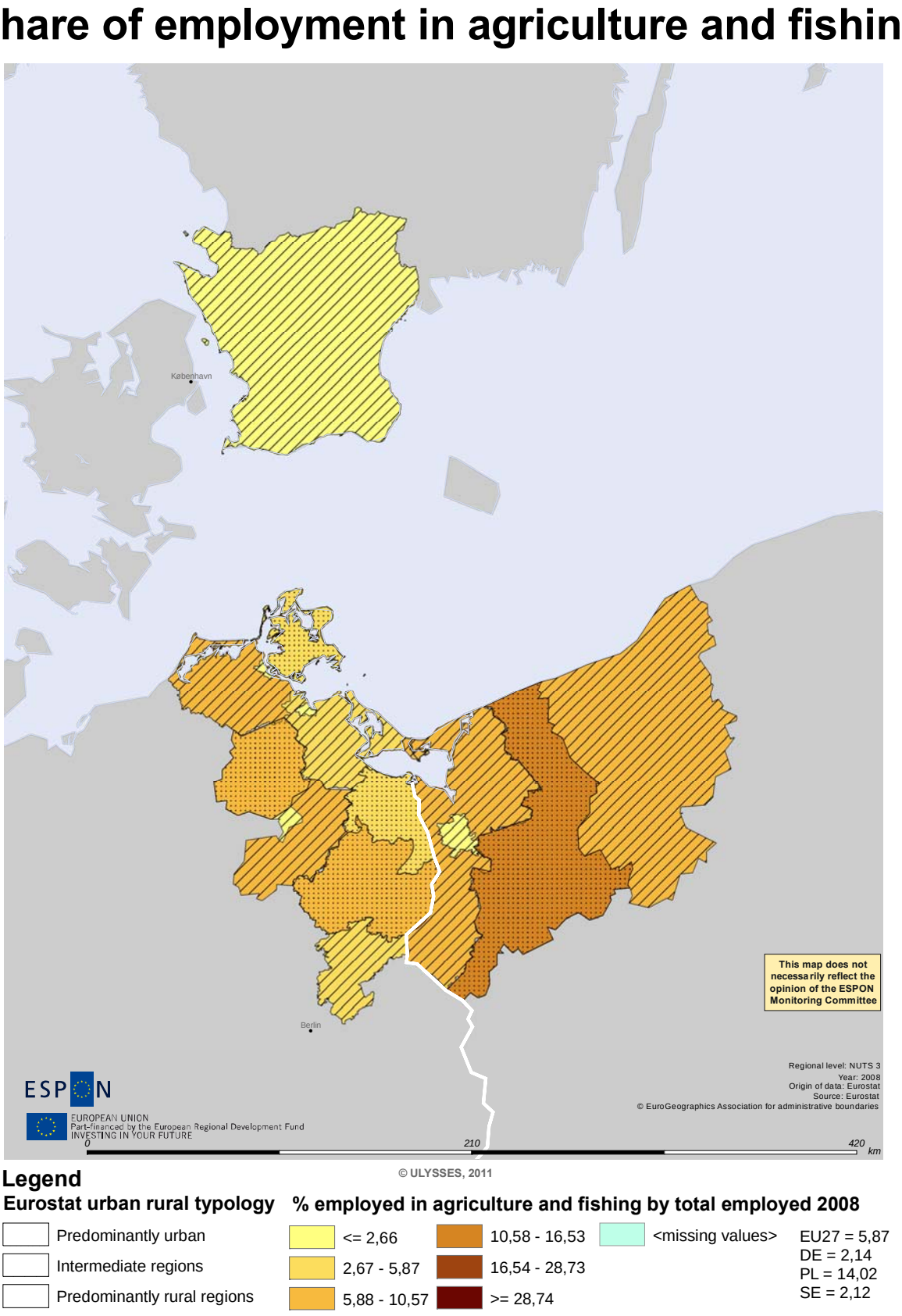
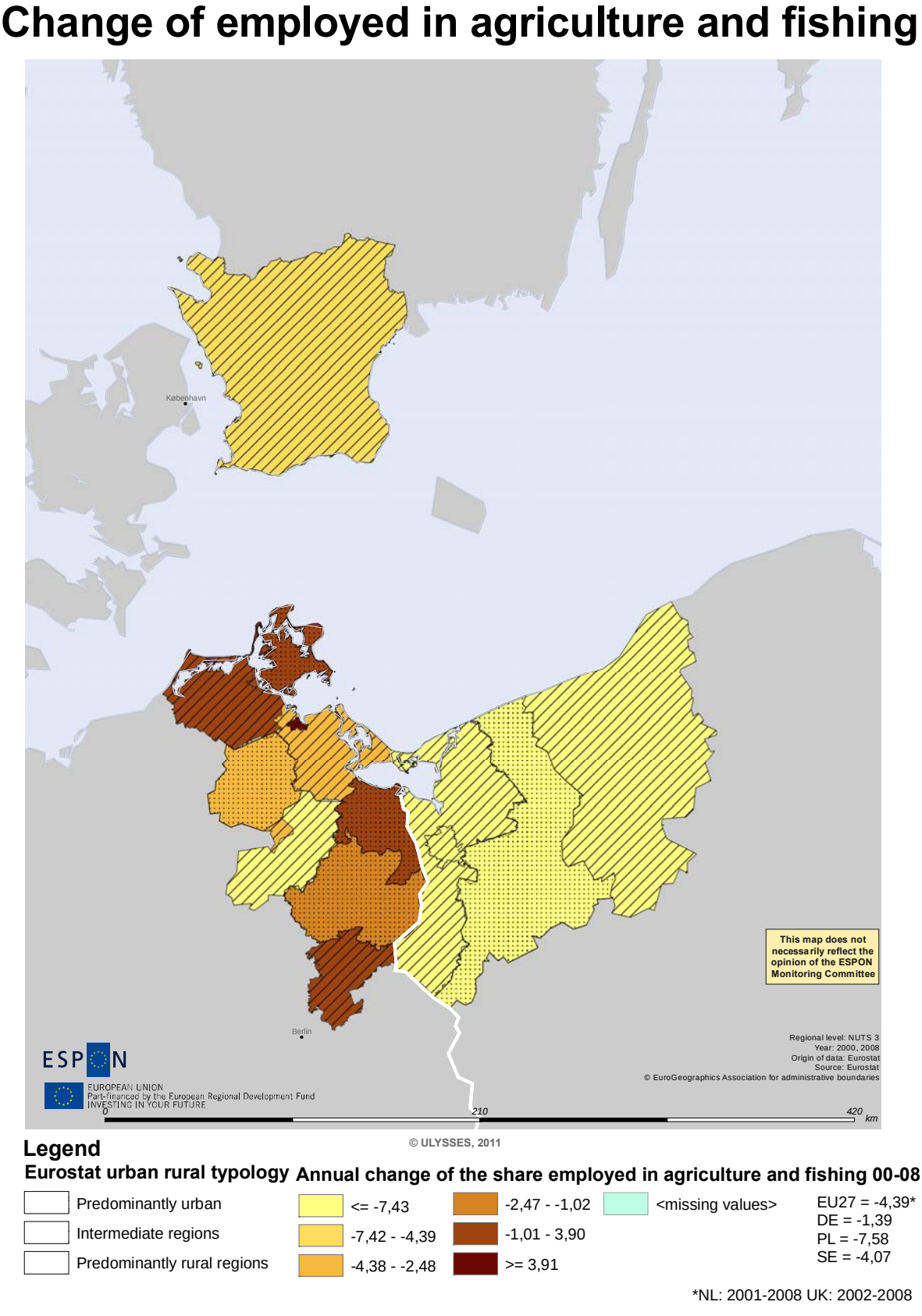


Figure 34. Annual growth rate of the share of employment in agriculture and fishing in the Poland – Germany – Sweden CBA between 2000 and 2008.



4.3. Chapter conclusions

ESPON 1.1.2 typology classifies following regions of Euregion Pomerania as regions with low urban influence and low human intervention: Uckermark, Demmin, Mecklenburg-Strelitz, Nordvorpommern, Ostvorpommern, Rügen, Uecker-Randow and Koszaliński. Regions with high urban influence and high human intervention are, according to the classification Barnim, Greifswald, Neubrandenburg, Stralsund and Skåne län. The Eurostat typology considers following regions of the CBA as predominantly rural regions: Uckermark, Demmin, Rügen, Uecker-Randow and Stargardski. The rest of the regions of Euregion Pomerania are classified as intermediate regions.

Agricultural areas occupy relatively large areas in all the regions of Euregio Pomerania. Demmin has the largest share of agricultural areas (79,73 %) and even in Neubrandenburg (where the share of agricultural areas is the smallest in the CBA) 25,08 % of the total area is occupied by agricultural land. In general, total area of agricultural land has been decreasing in all the regions of Euregion Pomerania between 1990 and 2006.

Urbanisation of agricultural areas in the regions of Euregion Pomerania has been relatively similar to the European Union average (2,67 ha per 10000 ha), but two regions have experienced urbanisation of far larger agricultural areas. In Stralsund 38,93 ha per 10000 ha and in Greifswald 24,89 ha per 10000 ha of agricultural land was urbanised between 2000 and 2006. The average share of artificial areas in Euregion Pomerania was also very similar to the ESPON average (11,35 ha per 10000 ha of land). Biggest changes in the amount of artificial land cover between 2000 and 20006 in the regions of Euregion Pomerania have taken place in the city districts of Greifswald, Stralsund and Neubrandenburg.

The share of GVA by agriculture and fishing in total GVA has decreased in all the regions of Euregion Pomerania between 1997 and 2008. Employment statistics for agriculture and fishing show a gradual decrease in the regions of Euregion Pomerania and the changes have been especially severe in the Polish regions of the CBA. Decrease in employment in agriculture and fishing has naturally reduced the share of employment in general employment statistics.

Chapter 5. Accessibility and connectivity in the Poland – Germany – Sweden CBA

Accessibility of a region is determined by two factors, its geographical location and infrastructure. While the geographical location cannot be changed, improving connectivity can. European Spatial Development Perspective (ESDP) states that good accessibility of European regions improves not only their competitive position but also the competitiveness of Europe as a whole. Accessibility is accordingly a key policy aim of the European Union, since accessibility of a region determines the extent to which it can participate in economic growth. According to ESDP accessibility in certain parts of Europe is poor, which can make these

areas less attractive for many types of investment. Islands and border regions often belong to this type of territories and they have to find specific solutions in order to succeed.[21]

Territorial Agenda 2020, on the other hand, states that fair and affordable accessibility to services of general interest, information, knowledge and mobility are essential for territorial cohesion. Providing services and minimising infrastructure barriers can improve sustainable and harmonious territorial development of the European Union. According to the agenda it is of major importance to secure access to road, rail, water-based and air transport, and to other infrastructure facilities such as broadband and Trans-European energy networks.[22]

The aim of this chapter is to evaluate accessibility and connectivity levels of the Poland – Germany – Sweden CBA. What is the accessibility level of the CBA in comparison with European countries? What is the general accessibility of the CBA regarding different modes of transport? What is the level of broadband internet access in the Poland – Germany – Sweden CBA?

Data for the accessibility analyses comes from ESPON database. Most of the data for accessibility available at the ESPON database is 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 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 in 2006 been updated and re-calculated for fitting the then ruling NUTS 3 delimitation retroactively for 2001, and it is therefore available for two different comparable years. For us this was particularly useful as this indicator does not limit itself to measuring the transport network, but synthesizes overall accessibility of the regions by relating the travel time (impedance function) with the population that can be reached (activity function).

As for connectivity data, the ESPON database has only very few indicators, which are on NUTS 2 level and only for year 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.

Table 25. Parameters studied for the accessibility and connectivity in the Poland – Germany – Sweden CBA.

Variable name	Geographical scale	Source	Time frame	Observations
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)	

[21] ESDP 1999; SURE 2009.
[22] Territorial agenda 2020.

We have studied the Poland – Germany – Sweden CBA from the perspective rail, road air and multimodal (synthesizing all the modes of transportation) accessibility. We used an indicator named potential accessibility, which is a similar indicator to demographic potential. This means that it relates activities to be reached with travel time it takes to reach them. Potential accessibility is calculated according to the following formula:

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

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.

The method we applied here originates from ESPON 1.2.1 project. The project stated that the concept of potential accessibility is based on the assumption that the attraction of a destination increases with size, and declines with distance, travel time or cost. Destination size is usually represented by population or economic indicators such as GDP or income. The potential accessibility model uses centroids of NUTS 3 regions as origins and destinations. The accessibility model calculates minimum travel times between the centroids of the NUTS 3 regions. For each NUTS 3 region the value of the potential accessibility indicator is calculated by summing up the population in all other regions including those outside ESPON space weighted by the travel time to get there. [23]

We have summarized results of the potential accessibility analyses in the following table. It represents how accessible regions of Euregion Pomerania are, first, in the context of ESPON countries and, second, in the context of the cross-border region (CBR). We will interpret the results separately for each transport mode in the following subchapters.

[23] ESPON 1.2.1.

Table 26. Potential accessibility of the regions of Euregion Pomerania in the context of ESPON space and the cross-border region (2006).

Nuts code	Multimodal_ESPON	Rail_ESPON	Road_ESPON	Air_ESPON	Multimodal_CBR	Rail_CBR	Road_CBR	Air_CBR
DE412	116,2	135,8	129,3	113,2	148,65	140,06	132,90	158,32
DE418	83,6	111	111,6	74,8	106,95	114,48	114,70	104,62
DE801	70,6	100,6	109,3	58,1	90,32	103,76	112,34	81,26
DE802	80,8	110,9	110,2	71,7	103,37	114,38	113,27	100,28
DE805	71,2	101	103,9	60	91,08	104,17	106,79	83,92
DE808	71,7	89,2	103,6	64,5	91,72	92,00	106,48	90,21
DE80B	84,4	113,5	109,3	76,1	107,97	117,06	112,34	106,43
DE80D	69,3	85,2	107,7	60,6	88,65	87,87	110,70	84,76
DE80F	65,9	97,3	98,6	53,6	84,30	100,35	101,34	74,97
DE80H	60,3	86,4	86,5	50,4	77,14	89,11	88,91	70,49
DE80I	80,1	111,6	115,8	68,3	102,47	115,10	119,02	95,52
PL422	42,1	61,8	49,4	36,2	53,86	63,74	50,77	50,63
PL423	74,4	96,7	87,8	68,4	95,18	99,74	90,24	95,66
PL424	76	97,4	95,3	70	97,23	100,46	97,95	97,90
PL425	83,2	92,7	89,7	81,3	106,44	95,61	92,20	113,71
SE224	120,9	60,2	48,7	136,8	154,67	62,09	50,05	191,33

As the potential accessibility was in ESPON 1.2.1 project produced for two different years, it was possible for us to study the evolution of infrastructure development between 2001 and 2006. Here, the index change of accessibility was used. For this indicator the accessibility values of 2001 were standardised to the ESPON average of that year and those of 2006 to the average of that year. Each ESPON average was set to 100 and the regional values were transformed accordingly. The maps show the differences in the index values, i.e. the change in position of the regions relative to other regions. Positive values express an improvement in relative locational quality, while negative values express a loss in relative locational quality.[24]

[24] Potential Accessibility Indicators 2007.

Table 27. Standardised potential accessibility of the regions of Euregion Pomerania in the context of ESPON countries and the cross-border region (2006).

NUTS ID	NUTS	Standardised potential accessibility (ESPON=100)				Standardised potential accessibility (CBA=100)			
		Multimodal	Rail	Road	Air	Multimodal	Rail	Road	Air
DE412	Barnim	116,2	135,8	129,3	113,2	148,7	140,1	132,9	158,3
DE418	Uckermark	83,6	111	111,6	74,8	106,9	114,5	114,7	104,6
DE801	Greifswald	70,6	100,6	109,3	58,1	90,3	103,8	112,3	81,3
DE802	Neubrandenburg	80,8	110,9	110,2	71,7	103,4	114,4	113,3	100,3
DE805	Stralsund	71,2	101	103,9	60	91,1	104,2	106,8	83,9
DE808	Demmin	71,7	89,2	103,6	64,5	91,7	92,0	106,5	90,2
DE80B	Mecklenburg-Strelitz	84,4	113,5	109,3	76,1	108,0	117,1	112,3	106,4
DE80D	Nordvorpommern	69,3	85,2	107,7	60,6	88,7	87,9	110,7	84,8
DE80F	Ostvorpommern	65,9	97,3	98,6	53,6	84,3	100,4	101,3	75,0
DE80H	Rügen	60,3	86,4	86,5	50,4	77,1	89,1	88,9	70,5
DE80I	Uecker-Randow	80,1	111,6	115,8	68,3	102,5	115,1	119,0	95,5
PL422	Koszaliński	42,1	61,8	49,4	36,2	53,9	63,7	50,8	50,6
PL423	Stargardzki	74,4	96,7	87,8	68,4	95,2	99,7	90,2	95,7
PL424	Miasto Szczecin	76	97,4	95,3	70	97,2	100,5	98,0	97,9
PL425	Szczecinski	83,2	92,7	89,7	81,3	106,4	95,6	92,2	113,7
SE224	Skåne län	120,9	60,2	48,7	136,8	154,7	62,1	50,1	191,3

5.1. Accessibility by road

In the context of ESPON space potential accessibility of the regions of Euregion Pomerania by road vary from 129,3 (Barnim) to 48,7 (Skåne län). German regions of Euregion Pomerania are potentially more easy to access by road than ESPON regions in general. Accordingly, Barnim is more easily accessed by road than NUTS 3 regions of ESPON countries in general, while Skåne is more difficult to reach by road than NUTS 3 regions in ESPON countries in general. Potential accessibility of the Polish regions is below the ESPON average.

German regions of Euregion Pomerania have the highest potential accessibility by road also in the context of the cross-border area. Barnim is again the most easily accessed region (132,9), while Skåne län (50,1) and Koszaliński (50,8) are the most poorly accessed regions in Euregio Pomerania.

The index change in the potential accessibility between 2001 and 2006 has been positive in all the regions of Euregion Pomerania, except for Skåne län, for which the index change was slightly negative (-0,2). Most positive change in potential accessibility experienced the German regions of Greifswald (35,7), Nordvorpommern (33,9) and Stralsund (30,3).

Figure 35. Potential accessibility of the regions of Euregion Pomerania by road in the context of ESPON countries (2006).

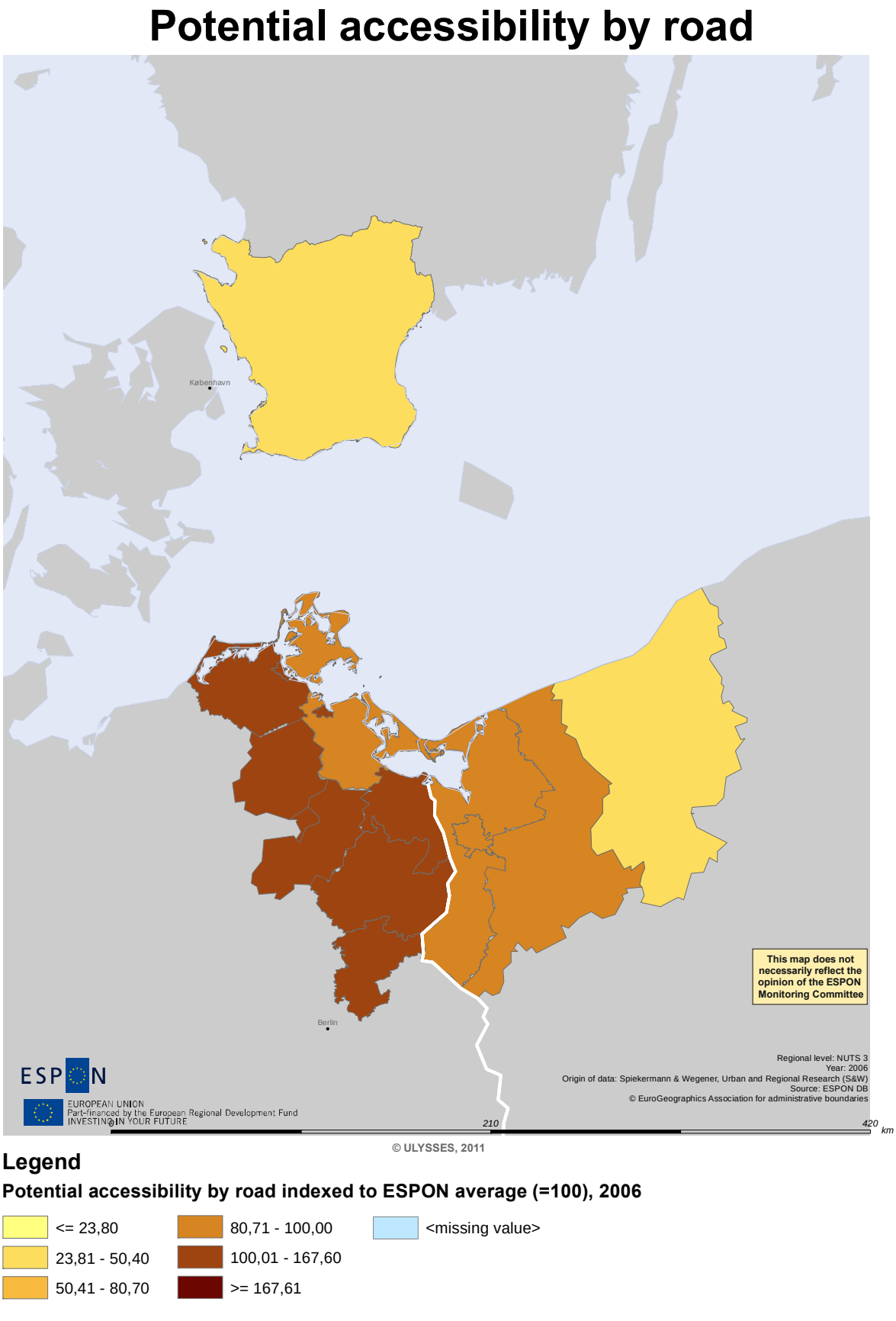


Figure 36. Potential accessibility of the regions of Euregion Pomerania by road in the context of the cross-border region (2006).

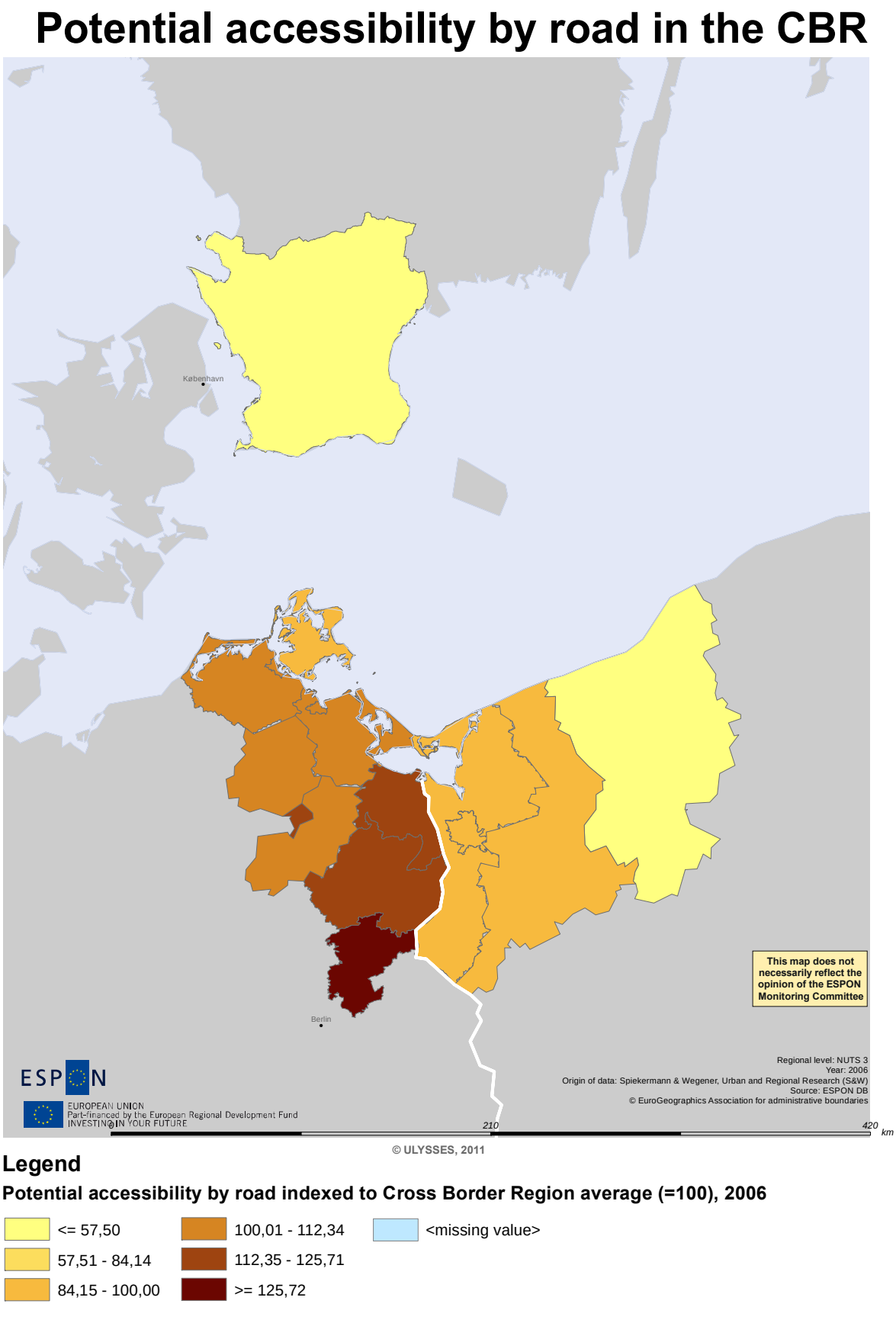
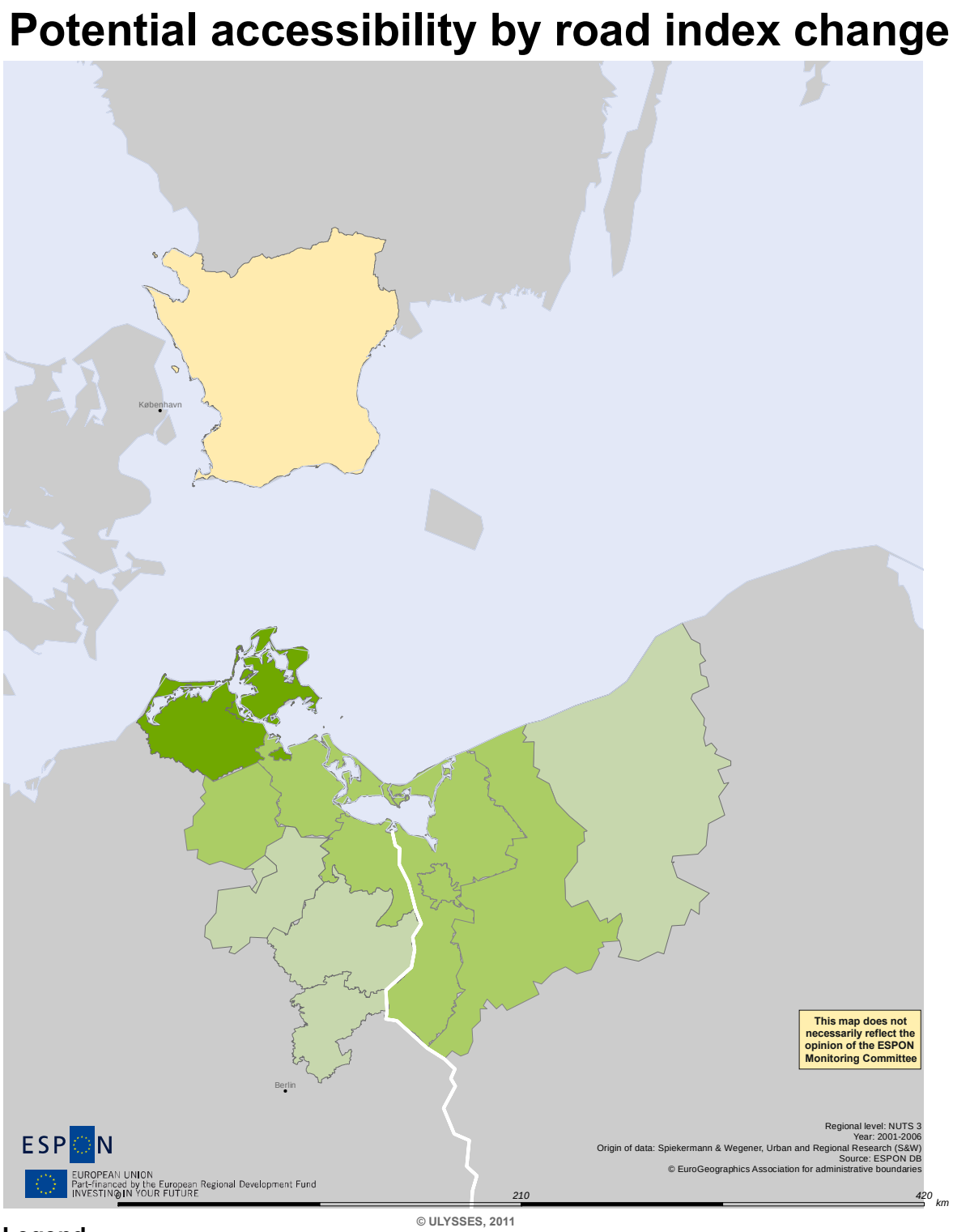


Figure 37. Index change of standardised potential accessibility by road in the regions of Euregion Pomerania between 2001 and 2006.



5.2. Accessibility by rail

Potential accessibility by rail in the regions of Euregion Pomerania is relatively similar to the road accessibility values. The German region of Barnim has the highest potential accessibility both in the context of ESPON regions (135,8) and the CBA (140,1). German regions of Euregion Pomerania are more easily accessed by rail than the Polish regions, or Skåne län in Sweden, which scores lowest in both the ESPON and CBA ratings. Considering geographical facts (the maritime border) low accessibility of Skåne län from the European road and rail infrastructures seems very natural.

Index change in the potential accessibility by rail has been positive in all the German regions of Euregion Pomerania, but negative in all the other regions. Demmin has experienced the most positive change (34), while the City of Szczecin has had the most negative change in potential accessibility by rail (-4,6).

Figure 38. Potential accessibility of the regions of Euregion Pomerania by rail in the context of ESPON countries (2006).

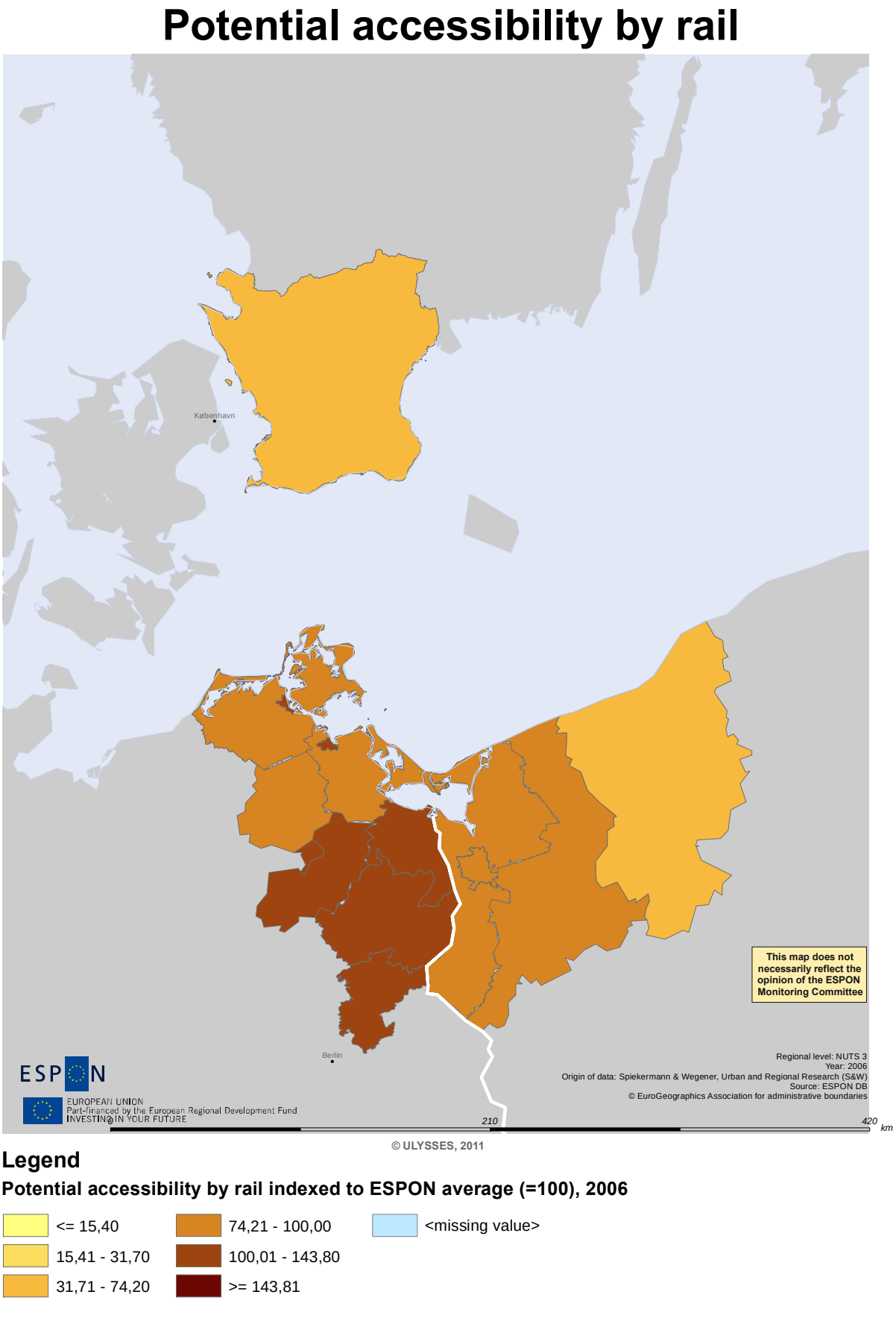


Figure 39. Potential accessibility of the regions of Euregion Pomerania by rail in the context of the cross-border region (2006).

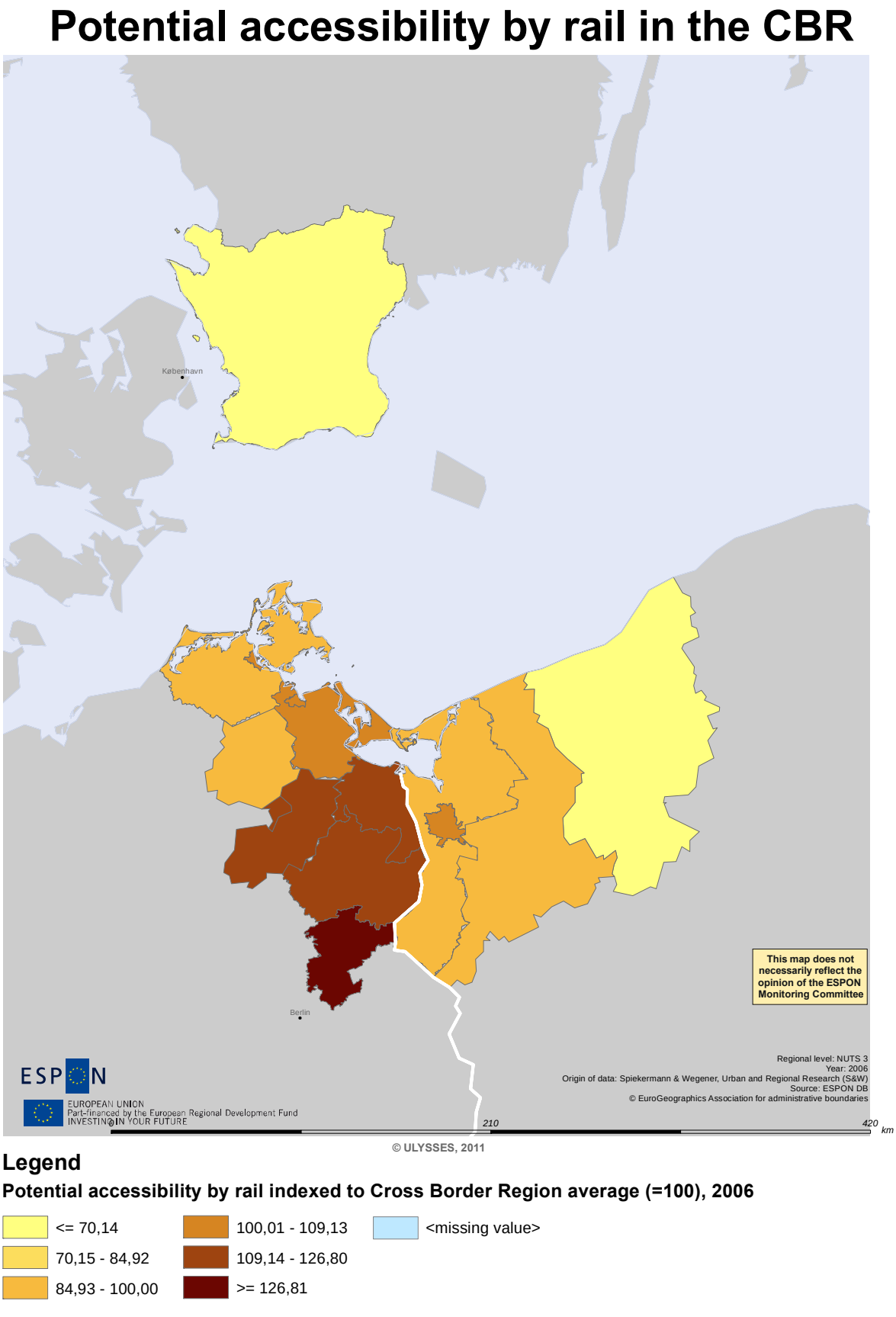
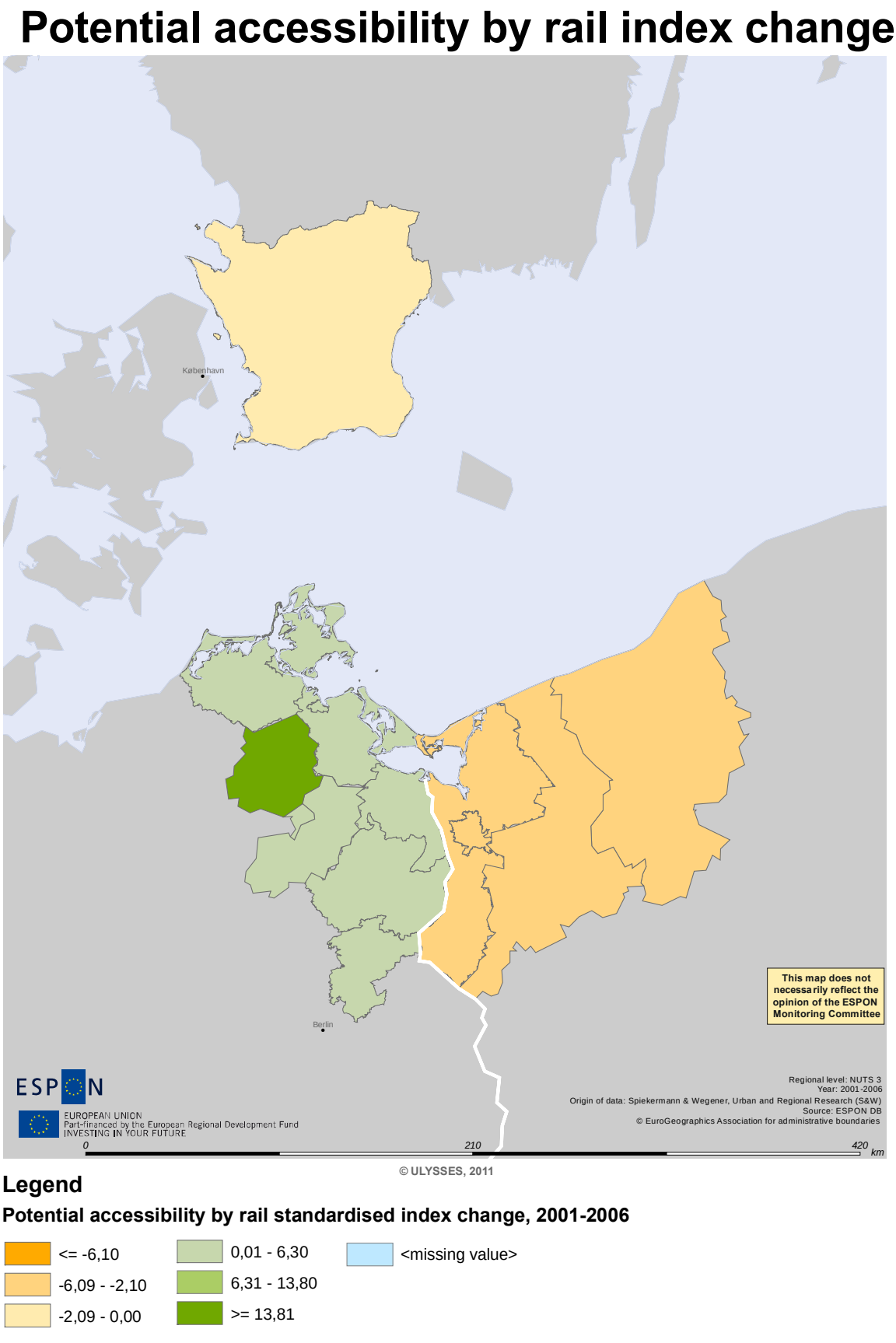


Figure 40. Index change of standardised potential accessibility by rail in the regions of Euregion Pomerania between 2001 and 2006.



5.3. Accessibility by air

Accessibility of Euregion Pomerania appears very different, when considering accessibility by air. In the context of ESPON space Skåne län was the most difficult region to access by road and rail, but it is has the highest accessibility by air among the NUTS 3 regions of Euregion Pomerania (136,8). It is also the most potential region to be accessed by air within the CBA (158,3). The City of Szczecinski has also a better accessibility by air than by road or rail; 81,3 in the context of ESPON countries and 113,7 in the Context of the CBA. Koszaliński in Poland has the lowest potential accessibility by air both in the context of ESPON countries (36,2) and the CBA (50,6).

Index change in potential accessibility by air has undergone less changes than accessibility by road and rail. Skåne län has experienced the biggest negative change (-5,8), while accessibility of Nordvorpommern by air has increased slightly (4,5) between 2001 and 2006.

Figure 41. Potential accessibility of the regions of Euregion Pomerania by air in the context of ESPON countries (2006).

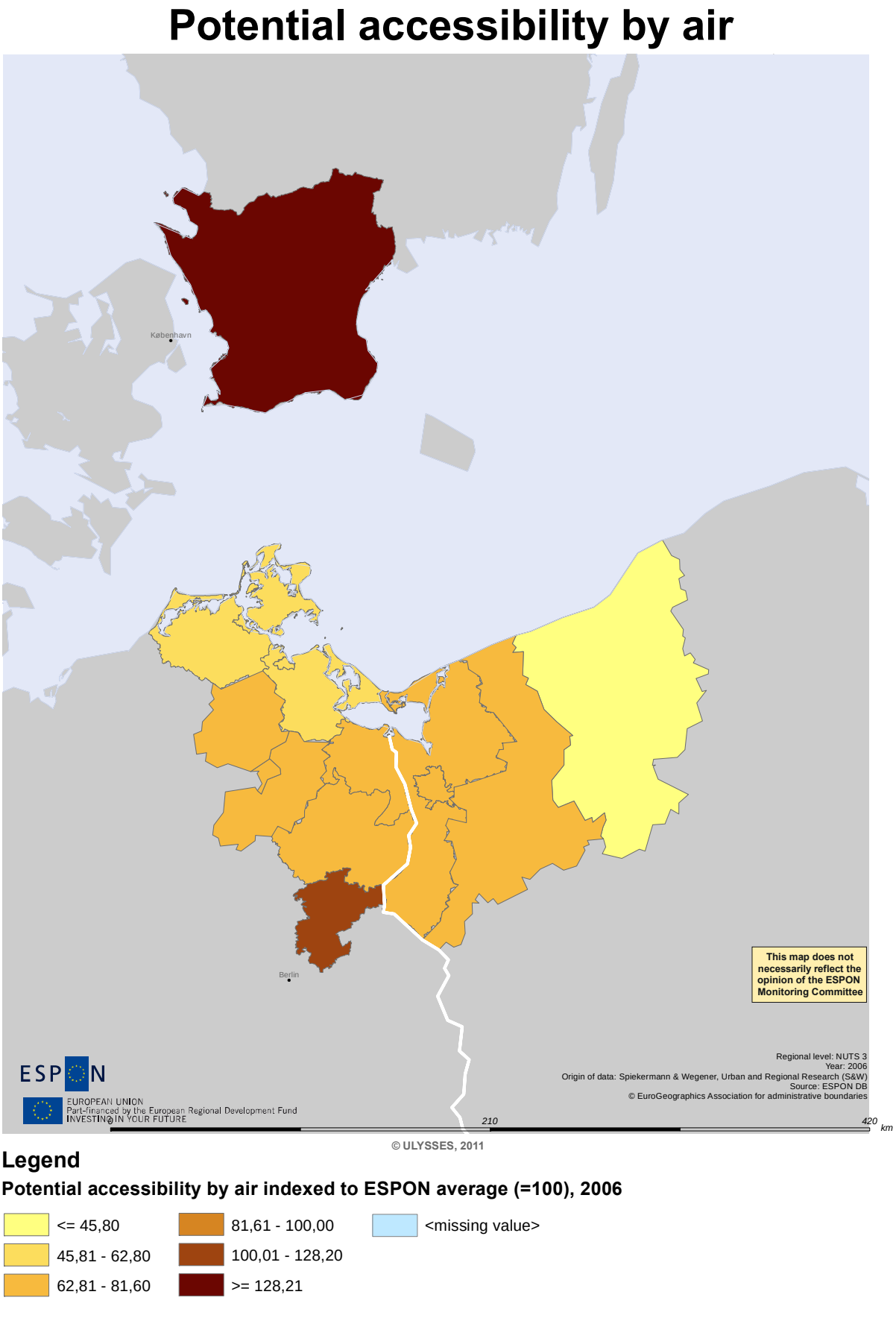


Figure 42. Potential accessibility of the regions of Euregion Pomerania by air in the context of the cross-border region (2006).

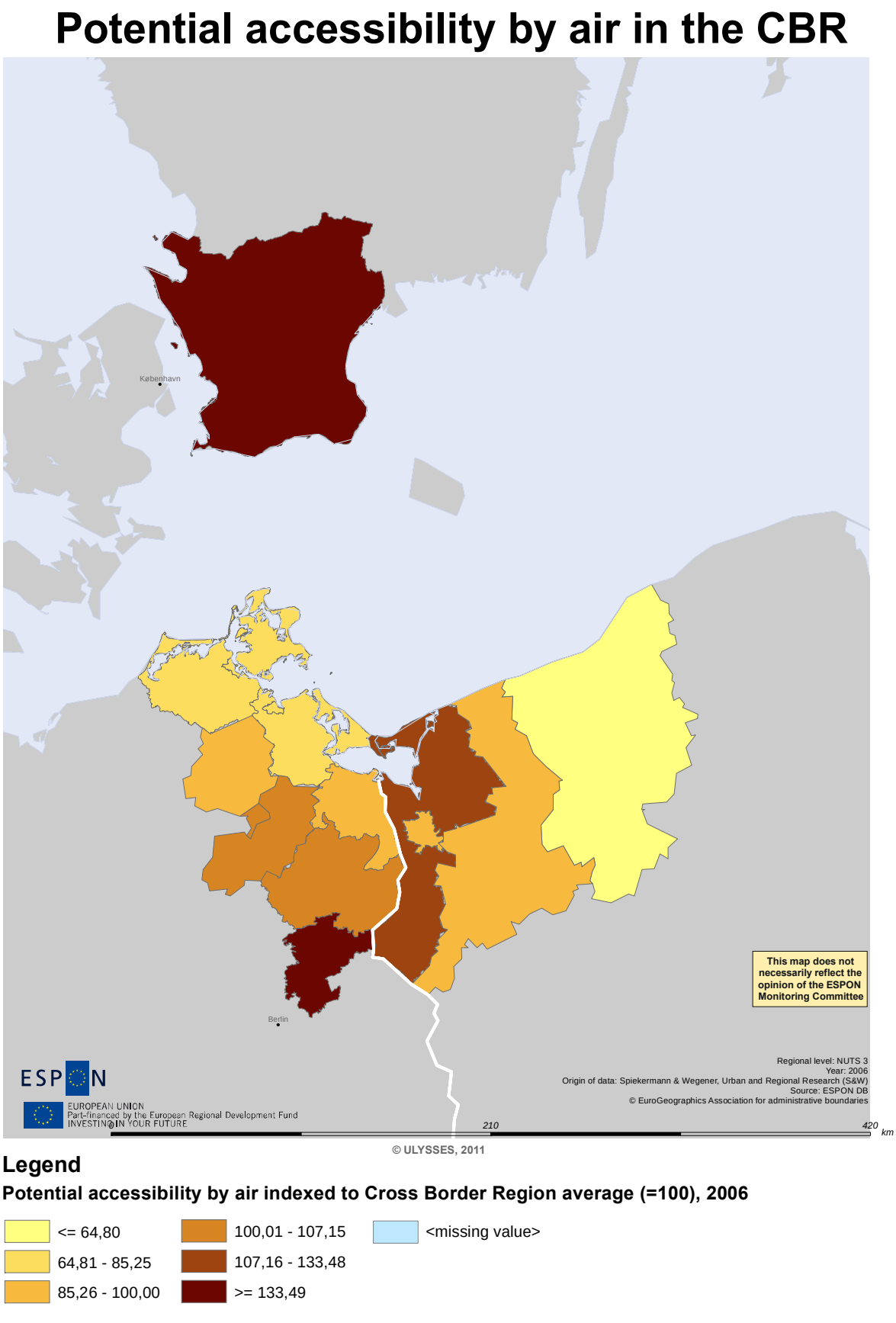
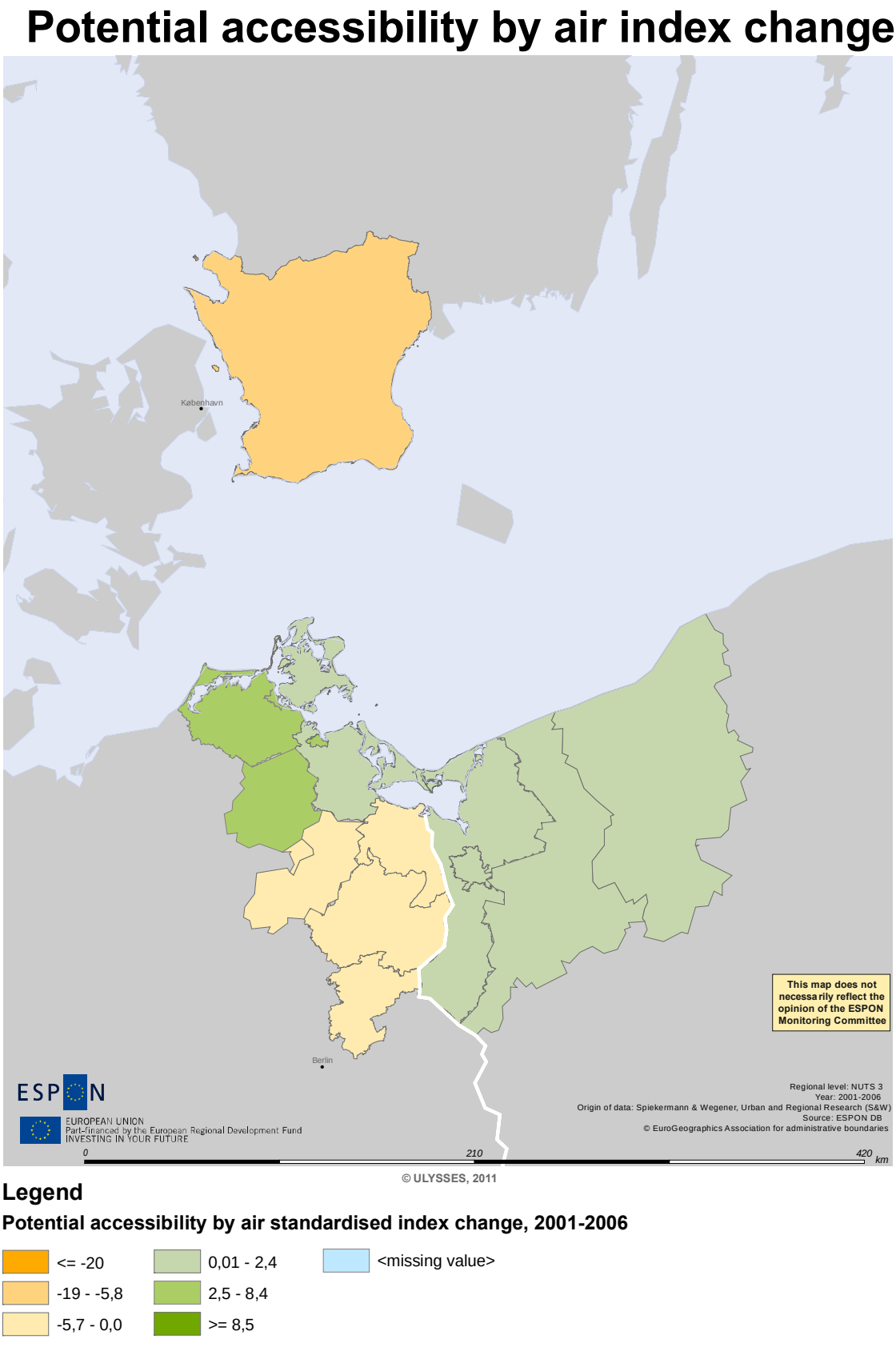


Figure 43. Index change of standardised potential accessibility by air in the regions of Euregion Pomerania between 2001 and 2006.



5.4. Multimodal accessibility

Multimodal accessibility combines all the above analysed forms of transport and demonstrates general accessibility levels. Good air accessibility clearly affects the multimodal accessibility of Skåne län, which has according to the analysis the highest potential multimodal accessibility of the regions of Euregion Pomerania (120,6). Barnin has the second highest multimodal potential accessibility both in the context of ESPON countries (116,2) and the CBA (148,7). In general multimodal potential accessibility of the regions of Euregion Pomerania is relatively similar. Only the region of Koszaliński has an accessibility value well below the average; in the context of ESPON countries it scored at 42,1 and in the context of the CBA at 53,9.

Koszaliński, however, has been the region to experience the strongest index change in multimodal accessibility between 2001 and 2006 (32). Only Uckermark has increased its accessibility to the same extend (32). Greatest decrease in multimodal accessibility has according to this analysis encountered Skåne län (-5,8).

Figure 44. Multimodal potential accessibility of the regions of Euregion Pomerania in the context of ESPON countries (2006).

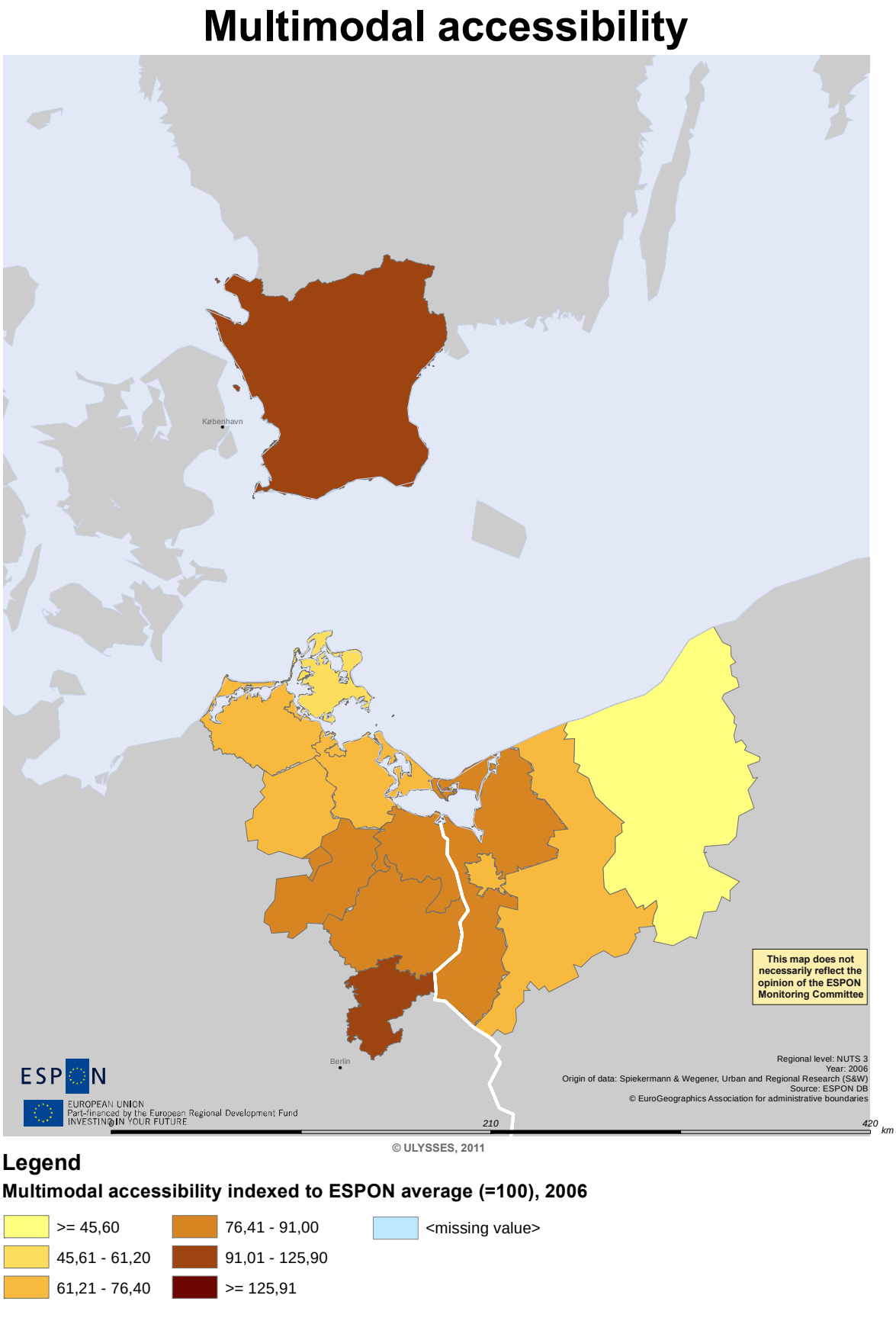


Figure 45. Multimodal potential accessibility of the regions of Euregion Pomerania in the context of the cross-border region (2006).

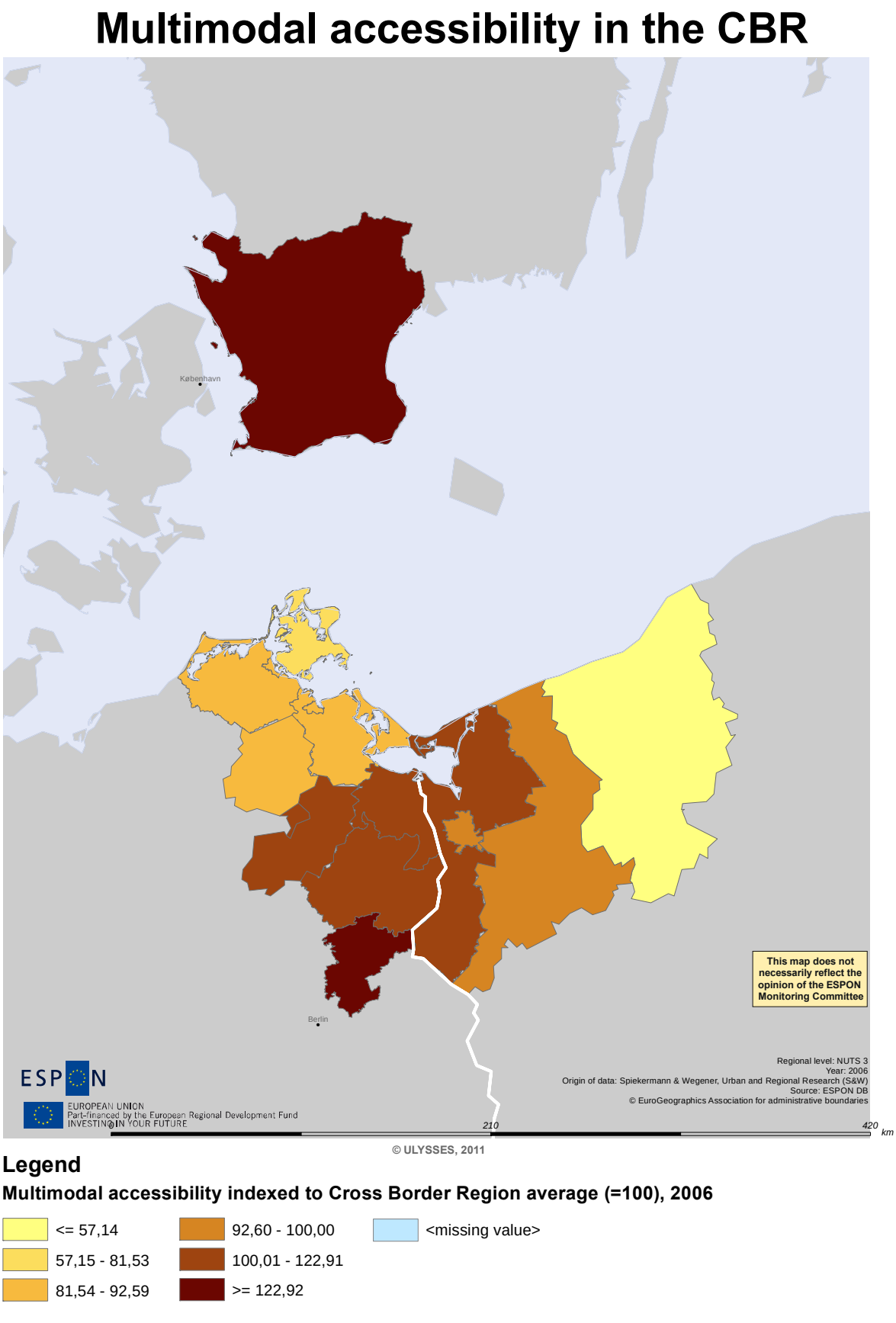
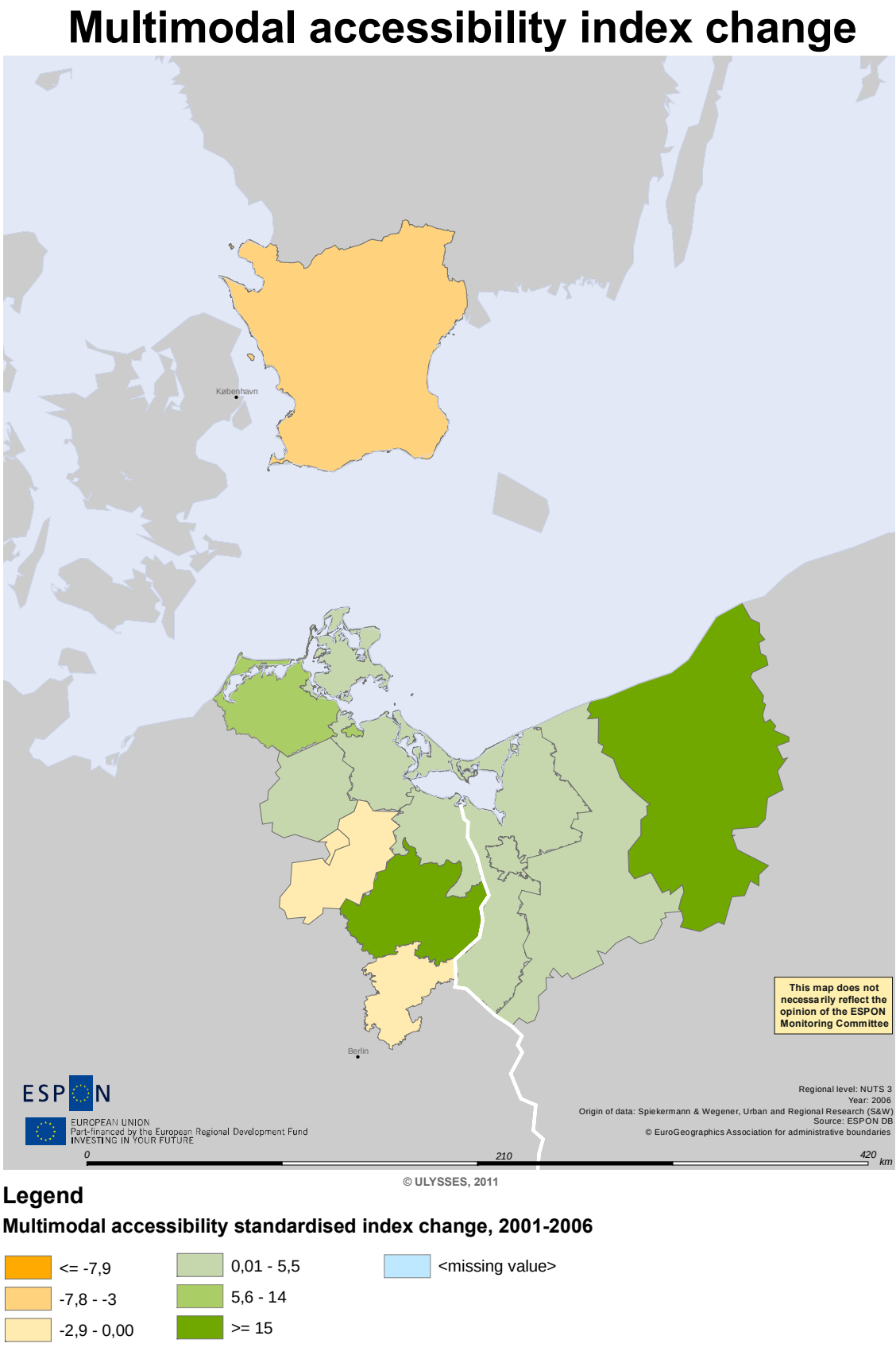


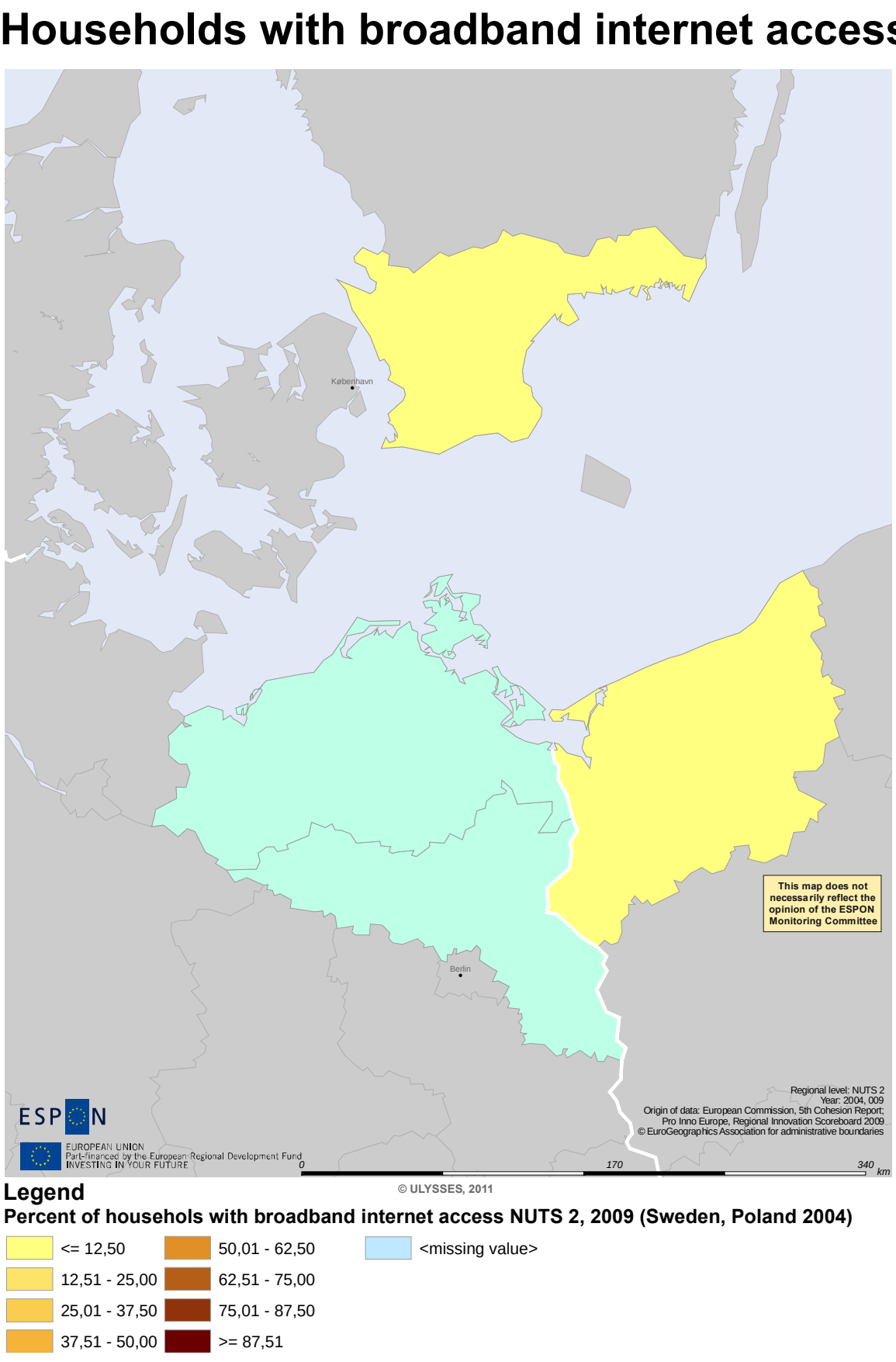
Figure 46. Index change of standardised multimodal potential accessibility in the regions of Euregion Pomerania between 2001 and 2006.



5.5. Broadband internet access

Access of population to information and services was examined on NUTS 1 level with one indicator; percent of households with broadband internet access. Södra Sverige in Sweden has the largest share of such households; 78,6 %. Brandenburg, on the contrary, has the smallest share of households with broadband internet access (39,7 %). In Mecklenburg-Vorpommern the share was 56 % and in Region Północno-Zachodni 55,1 %.

Figure 47. Households with broadband internet connection in the Poland – Germany – Sweden CBA in 2009.



5.6. Chapter conclusions

In the context of ESPON space potential accessibility of the regions of Euregion Pomerania by road vary from 129,3 (Barnim) to 48,7 (Skåne län). German regions of Euregion Pomerania are potentially more easy to access by road than ESPON regions in general. Potential accessibility of the Polish regions is below the ESPON average. German regions of Euregion Pomerania have the highest potential accessibility by road also in the context of the cross-border area.

Potential accessibility by rail in the regions of Euregion Pomerania is relatively similar to the road accessibility values. The German region of Barnim has the highest potential accessibility both in the context of ESPON regions (135,8) and the CBA (140,1). Index change in the potential accessibility by rail has been positive in all the German regions of Euregion Pomerania, but negative in all the other regions.

Accessibility of Euregion Pomerania appears very different, when considering accessibility by air. In the context of ESPON space Skåne län was the most difficult region to access by road and rail, but it is has the highest accessibility by air among the NUTS 3 regions of Euregion Pomerania (136,8). It is also the most potential region to be accessed by air within the CBA (158,3). Good air accessibility clearly affects the multimodal accessibility of Skåne län, which has according to the analysis the highest potential multimodal accessibility of the regions of Euregion Pomerania (120,6). “Virtual accessibility” of Skåne län is also good considering that Södra Sverige had the largest share of households with broadband internet access in 2009 (78,6 %).

Chapter 6. Performance of Poland – Germany – Sweden CBA from the perspective of Lisbon / Europe 2020 and Gothenburg objectives

Lisbon Strategy was launched in 2000 by the European Council as a response to the challenges of globalisation and ageing. The core idea of the strategy was for the European Union to become the most dynamic and competitive knowledge-based economy in the world by 2010. The Strategy underlined sustainable economic growth and promoted social cohesion and respect for the environment. Lisbon Strategy was re-launched in 2005 with more focused goals and clearer division of responsibilities between EU and national levels. The new revised Lisbon Strategy concentrated on two particular themes; growth and jobs.[25] European Union member states endorsed the strategy by formulating National Reform Programmes (NRPs).

Objectives of the Lisbon Strategy were achieved only partly in the Member States. Economic crisis was one the biggest obstacles that hindered the realization of National Reform Programmes. In June 2010 European Council adopted a new "Europe 2020 Strategy" that was adjusted to the current economical situation and challenges. The Europe 2020 Strategy identified three key drivers for growth that included smart growth (fostering knowledge, innovation, education and digital society), sustainable growth (making our

[25] Lisbon Strategy evaluation 2010.

production more resource efficient while boosting competitiveness of the EU) and inclusive growth (raising participation in the labour market, the acquisition of skills and the fight against poverty).

Europe 2020 Strategy also set five concrete targets to be reached by year 2020. These were following:

- 75 % of the population aged 20-64 should be employed
- 3% of the EU's GDP should be invested in research and development
- the "20/20/20" climate / energy targets should be met
- the share of early school leavers should be under 10 % and at least 40 % of the younger generation should have a tertiary degree or diploma
- 20 million less people should be at risk of poverty

Member States of the European Union prepared national targets for the Europe 2020 Strategy.

Gothenburg Strategy ('A Sustainable Europe for a Better World: A European Union Strategy for Sustainable Development') was launched by the European Commission in 2001 to complement the Lisbon Strategy by adding an environmental dimension to the Lisbon process for employment, economic reform and social cohesion. Gothenburg strategy identifies seven long-term objectives to meet unsustainable trends in the EU. These include:

- limiting climate change and its effects by meeting commitments under the Kyoto Protocol and under the framework of the European Strategy on Climate Change
- limiting the adverse effects of transport and reducing regional disparities
- promoting more sustainable modes of production and consumption
- encouraging sustainable management of natural resources
- limiting major threats to public health
- combating social exclusion and poverty and mitigating the effects of an ageing society
- strengthening the fight against global poverty, monitoring global sustainable development and compliance with international commitments[26]

The goal of our study was to measure the performance of the Poland – Germany – Sweden CBA regarding the socio-economic and environmental goals set up in the Lisbon / Europe 2020 and Gothenburg strategies. Analyses were divided into four subcategories: economy and employment, research and innovation, social cohesion and environment.

[26] Strategy for sustainable development 2009.

Table 28. Indicators applied for the study of Lisbon / Europe 2020 and Gothenburg Strategies.

Variable name	Geographical scale	Source	Time frame	Observations
GDP	NUTS 3	EUROSTAT, Russian Federal State Statistics Service	1997–2009	Regional level missing for CH and RU
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 transfers	NUTS 3		2008	
Gross value added by NACE	NUTS 3	Eurostat	1997–2008	
Employment by NACE	NUTS 3	Eurostat & Russian Federal State Statistics Service	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 million of inhabitants	NUTS 2	Eurostat	2007	

6.1. Economy and employment

6.1.1. GDP per capita

In order to define regional disparities in the GDP per capita we used coefficient of deviation in our analyses. This indicator is obtained by calculating the ratio of the standard deviation to the mean, and it is a good way to compare geographical units which differ greatly in their average values. The coefficient of deviation was calculated, besides the cross-border areas, for the countries of which the CBA is part of as well as for all the NUTS 3 and NUTS 0 level regions and countries of the ESPON space (on NUTS 0 level separately for EU27+CH+NO and EU27). The coefficient was calculated excluding the Swiss and Russian regional data because it was not available. Formula for producing coefficients of deviation is following:

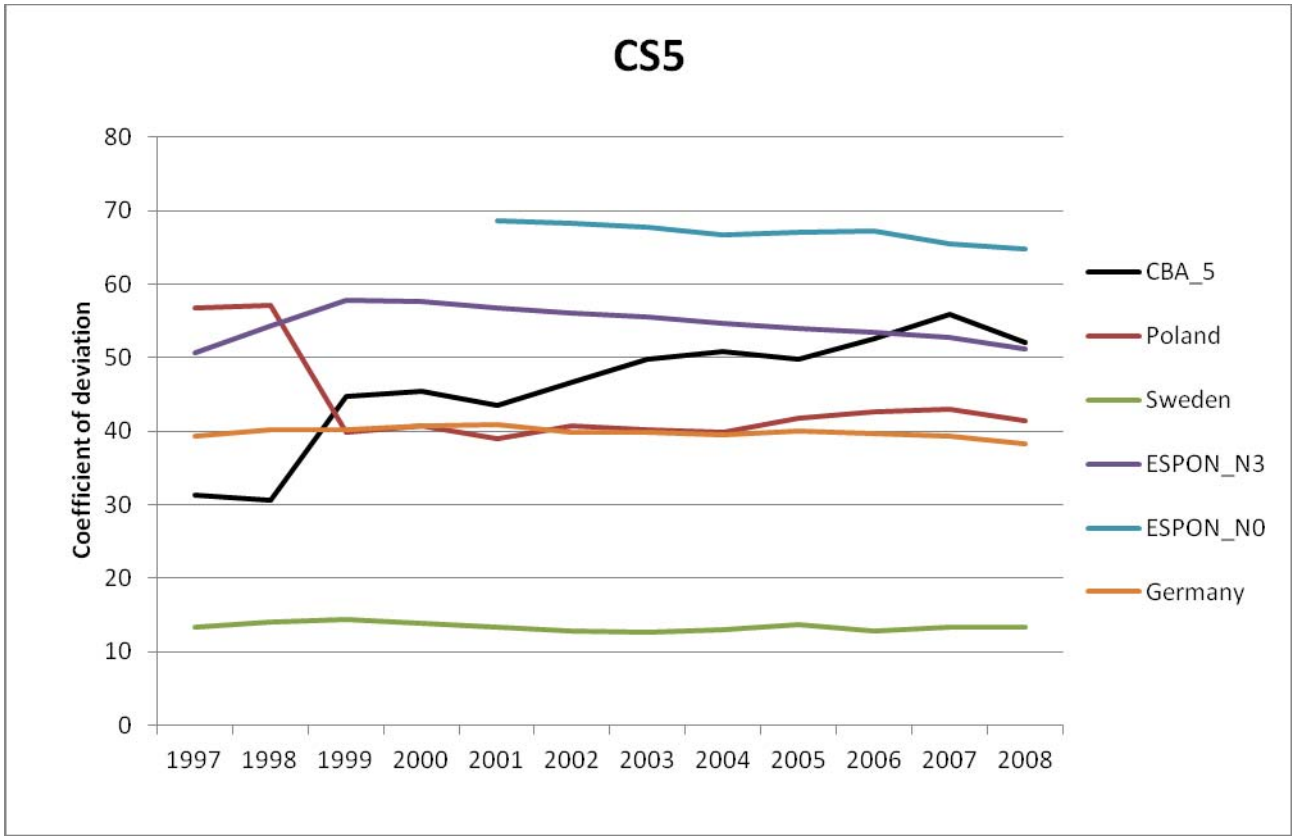
$$Coefficient\ of\ deviation = \frac{Standard\ deviation}{Average}$$

The higher the coefficient of deviation, the higher are the disparities within the analysed geographical unit. The following figure represents coefficient of deviation values regarding GDP in the Poland – Germany – Sweden CBA (CBA_5 in the figure).

Coefficient of deviation has been steadily increasing in Euregion Pomerania between 1997 and 2008. This signifies that disparietes in GDP per capita have been growing in Euregion Pomerania during the given time period. When compared to the NUTS 3 average of ESPON countries, the coefficient of deviation (and

accordingly disparities in GDP per capita) has been higher in ESPON countries, but has now settled on the same level with the CBA.

Figure 48. Coefficient of deviation of GDP per capita between 1997 and 2008.



Source: Eurostat

Next, we perform two different analyses on the data on GDP per capita at NUTS 3 level. In the first one we compare each NUTS 3 region with the leading region in terms of GDP per capita (Inner London West region), trough index number analysis. In the second one we apply a logistic function to establish the relative performance of each NUTS 3 to the leading region, exploring the notion of territorial catching-up.

In theory, for both analyses the value of reference for GDP per capita would be the highest value among all NUTS 3, that of 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 (of which London is a good example), there normally is a steady flow of migrant workers, as well as commuters from other NUTS 3 region, and 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 3, the whole Greater London NUTS 2 was used as a reference for this analysis.

As to the first analysis, GDP indexed to the leading region, it involves the indexation of GDP per capita in each NUTS 3 region to the value of the leading region in 2008 referred to above. The value of the leading region is by definition 100,0. Following formula is applied in the analysis:

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

where GDP_R is the GDP per capita of a given NUTS 3 region and GDP_L is the GDP per capita of the NUTS 2 region of London.

Table 29. GDP per capita (euro) in the leading NUTS 2 region (London) and the regions of Euregion Pomerania between 1997 and 2008.

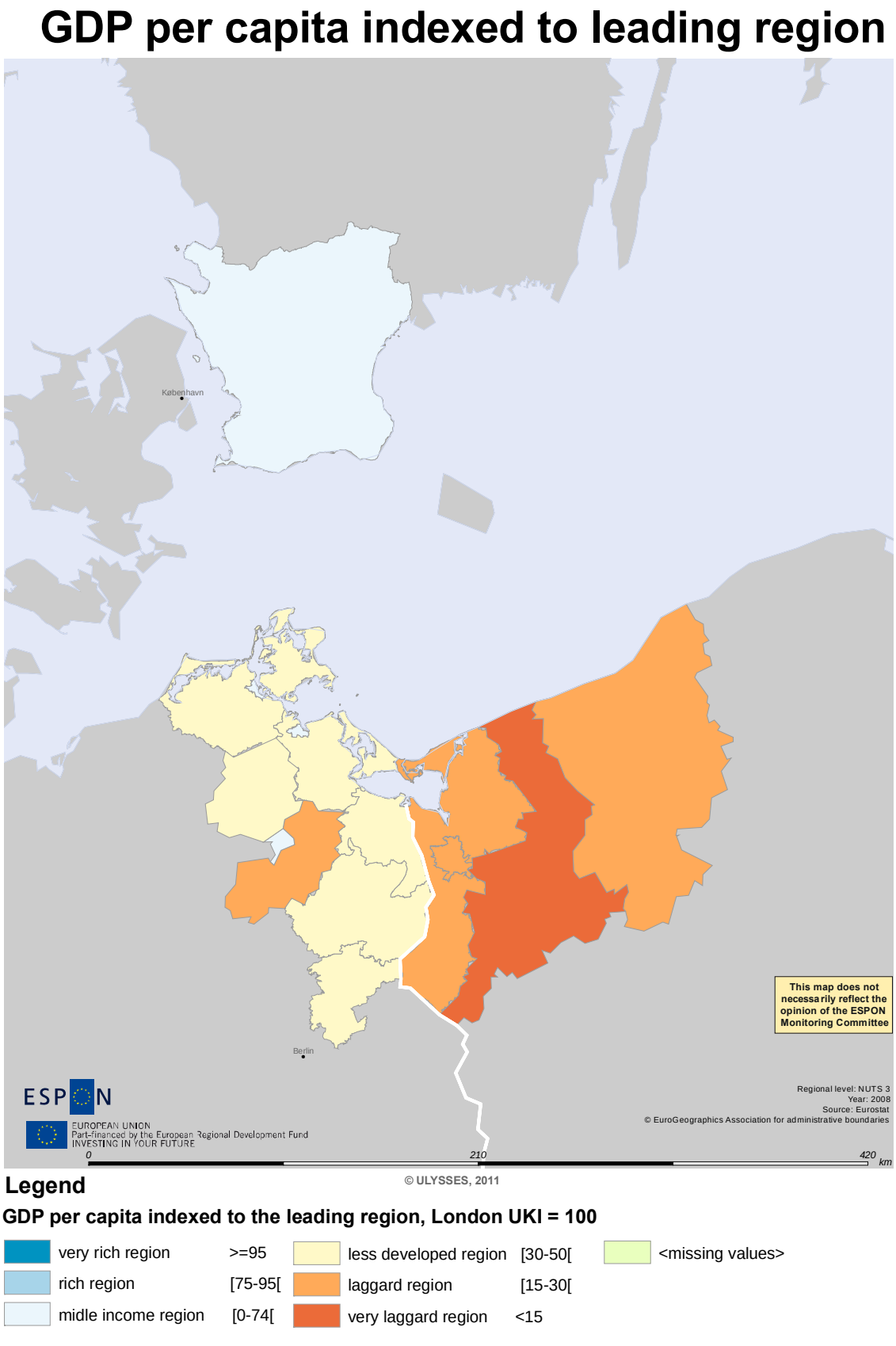
NUTS ID	NUTS	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
UKI	London	32200	35200	38600	43600	44300	46400	44800	48300	50000	53400	56700	50600
DE412	Barnim	14100	14300	14800	14900	15200	15100	15100	14800	15200	15500	16100	16900
DE418	Uckermark	14600	15100	15300	16900	18200	17400	17100	17900	18400	20600	20400	20800
DE801	Greifswald	17600	17700	18600	18600	19300	20200	21300	21500	22900	23900	25800	25800
DE802	Neubrandenburg	26100	26700	26200	26200	26400	27900	29300	29400	29400	31200	33500	32900
DE805	Stralsund	19900	19400	20000	20700	20800	21800	22200	23300	23500	24500	26800	29200
DE808	Demmin	12700	12800	12900	13500	14400	14100	15700	17500	16700	18600	18800	18100
DE80B	Mecklenburg-Strelitz	12900	12800	13200	13500	13500	13400	13600	14100	13700	13900	13600	14600
DE80D	Nordvorpommern	11600	12000	12000	12200	12300	12600	13000	13500	13600	14300	15600	16000
DE80F	Ostvorpommern	11700	12300	12600	12800	13500	13700	13700	13900	13700	14200	15300	16200
DE80H	Rügen	13100	13400	14100	14400	15700	16200	16600	17000	17600	17400	18900	19800
DE80I	Uecker-Randow	14100	14100	14800	14400	14400	14200	14100	14300	14600	15000	16600	17200
PL422	Koszaliński	10200	11100	3400	4100	4700	4500	4200	4500	5300	5900	6600	7800
PL423	Stargardzki	N/A	N/A	2900	3400	3800	3700	3400	3600	4300	4500	5200	6100
PL424	Miasto Szczecin	N/A	N/A	6400	7700	8300	8200	7000	6900	8600	9400	10500	12300
PL425	Szczecinski	N/A	N/A	4000	4700	5400	5200	4700	4900	5800	6100	7100	8700
SE224	Skåne län	23500	23500	25000	27500	25800	27300	27900	28800	29300	31000	33600	31500

The results of the analysis are presented in the following table. The best performing region among the regions of Euregion Pomerania in terms of GDP per capita is Neubrandenburg (32900 in 2008), while the lowest GDP per capita is to be found in Stargardski (6100 per capita). Compared to the leading European region in GDP per capita (London), Greifswald, Neubrandeburg, Stralsund and Skåne län are considered middle income regions. Stargardski is classified as a very laggard region, while other regions of the CBA area have according to the index number analysis been classified as less developed regions or laggard regions.

Table 30. GDP per capita of the regions of Euregion Pomerania indexed to the leading NUTS 2 region of London (2008).

NUTS ID	NUTS	2008	INDEX NUMBER	CLASS	CODE
UKI	London	50600	100	very rich region	1
DE412	Barnim	16900	33,40	less developed region	4
DE418	Uckermark	20800	41,11	less developed region	4
DE801	Greifswald, Kreisfreie Stadt	25800	50,99	middle income region	3
DE802	Neubrandenburg, Kreisfreie Stadt	32900	65,02	middle income region	3
DE805	Stralsund, Kreisfreie Stadt	29200	57,71	middle income region	3
DE808	Demmin	18100	35,77	less developed region	4
DE80B	Mecklenburg-Strelitz	14600	28,85	laggard region	5
DE80D	Nordvorpommern	16000	31,62	less developed region	4
DE80F	Ostvorpommern	16200	32,02	less developed region	4
DE80H	Rügen	19800	39,13	less developed region	4
DE80I	Uecker-Randow	17200	33,99	less developed region	4
PL422	Koszalinski	7800	15,42	laggard region	5
PL423	Stargardzki	6100	12,06	very laggard region	6
PL424	Miasto Szczecin	12300	24,31	laggard region	5
PL425	Szczecinski	8700	17,19	laggard region	5
SE224	Skåne län	31500	62,25	middle income region	3

Figure 49. GDP per capita of the regions of Euregion Pomerania indexed to the leading NUTS 2 region of London (2008).



The catching up analysis evaluates the speed of catching-up with the leading region, through a standard logistic process. The catching-up process analysis sets the relative position of each NUTS 3 region 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 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 data used for the catching up analysis was GDP per capita for the years 1997 and 2008.

All regions with a performance of 95% or higher compared to the leading region were considered leading regions. The analysis distinguishes converging regions 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 to 50 years, slow catching-up regions between 51 to 100 and slow converging regions between 101 to 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.

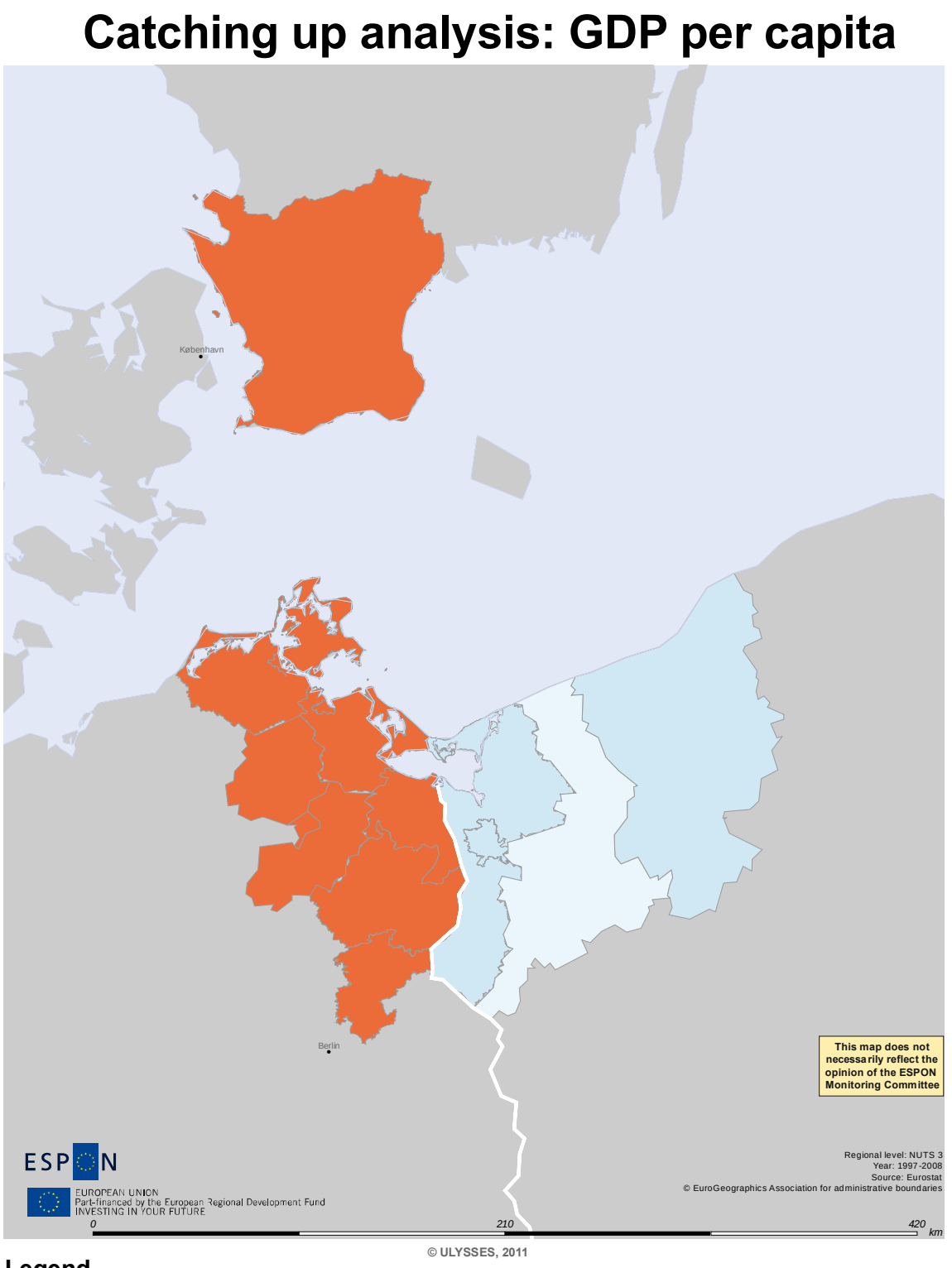
leading region	>=95% (GPD already close to the leader)
fast converging region	[0-20]
steady catching-up region	]20-50]
slow catching-up region	]50-100]
slow converging region	]100-250]
non converging region	>250
diverging region	growth (g) < growth London (g*)

The following table and map illustrate the results of the catching-up analysis for Euregion Pomerania. Most of the regions in Euregion Pomerania have been classified as diverging regions. This indicates that these regions are not catching up the leader, but growing less and thus diverging from the leading region. Polish regions of Euregio Pomerania have been classified as slow catching-up regions (Koszalinski, Miasto Szczecin and Szczecinski) or slow converging regions (Stargardzki). With a similar growth rate these regions could in theory catch up the leader in 75 to 102 years.

Table 31. Catching-up analysis of the regions of Euregion Pomerania (performance in GDP per capita between 1997 and 2008 compared to the leading NUTS 2 region of London).

NUTS ID	NUTS	Annual growth rate	G = relative growth	K = relative position (GDP)	A = constante for G e K	Years to the leader	CLASS	CODE
UKI	London	0,0419						
DE412	Barnim	0,0166	-0,0243	1,99	-0,037	-99,52776937	diverging region	7
DE418	Uckermark	0,0327	-0,0089	1,43	-0,015	-219,2643898	diverging region	7
DE801	Greifswald, Kreisfreie Stadt	0,0354	-0,0063	0,96	-0,013	-226,0233555	diverging region	7
DE802	Neubrandenburg, Kreisfreie Stadt	0,0213	-0,0198	0,54	-0,057	-40,98166096	diverging region	7
DE805	Stralsund, Kreisfreie Stadt	0,0355	-0,0062	0,73	-0,015	-179,3281267	diverging region	7
DE808	Demmin	0,0327	-0,0088	1,80	-0,014	-256,456738	diverging region	7
DE80B	Mecklenburg-Strelitz	0,0113	-0,0294	2,47	-0,041	-93,10987155	diverging region	7
DE80D	Nordvorpommern	0,0297	-0,0118	2,16	-0,017	-215,5998491	diverging region	7
DE80F	Ostvorpommern	0,0300	-0,0114	2,12	-0,017	-219,7339559	diverging region	7
DE80H	Rügen	0,0383	-0,0035	1,56	-0,006	-583,6614359	diverging region	7
DE80I	Uecker-Randow	0,0182	-0,0228	1,94	-0,034	-104,6417081	diverging region	7
PL422	Koszalinski	0,0967	0,0525	5,49	0,062	74,86280701	slow catching-up region	4
PL423	Stargardzki	0,0861	0,0424	7,30	0,048	102,2791573	slow converging region	5
PL424	Miasto Szczecin	0,0753	0,0320	3,11	0,042	96,5112573	slow catching-up region	4
PL425	Szczecinski	0,0902	0,0463	4,82	0,056	80,7986968	slow catching-up region	4
SE224	Skåne län	0,0270	-0,0144	0,61	-0,038	-64,29021211	diverging region	7

Figure 50. Performance of the regions of Euregion Pomerania in GDP per capita between 1997 and 2008 compared to the leading NUTS 2 region of London.



6.1.2. Economic sectors

Following tables differentiate the economic structure and evolution between 1997-2008 in the regions of Euregion Pomerania, and enables comparing the economical and employment structure of the region to the EU27 and the national averages. The economic performance of the regions is expressed in Gross Value Added, which presents the overall contribution of different economic sectors to the total output of the region. The employment by sectors, on the other hand, illustrates the importance of different economic sectors in the composition of the regions' workforce.

The leading economic sector in Euregion Pomerania in 2008 was Public administration and community services (L-P), which produced in average 30 % of the total GVA in the CBA. In some regions this sector produced almost half of the regions total GVA (including 46,56 % of the total GVA of Uecker-Randow).The second most important economic sector in Euregion Pomerania was Financial intermediation and real estate (J-K).

Table 32. Share of GVA by NACE (Rev. 1.1) in the regions of Euregion Pomerania in 2008.

NUTS ID	NUTS	Share of GVA by NACE 2008 (%)					
		Agriculture and 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	EU27	1,75	19,61	6,48	21,08	28,27	22,80
DE	Germany	0,90	25,58	4,25	17,75	29,44	22,08
PL	Poland	3,69	23,93	7,04	26,91	19,59	18,84
SE	Sweden	1,77	21,59	5,21	20,33	25,78	25,32
DE412	Barnim	1,87	11,73	5,40	21,64	28,19	31,16
DE418	Uckermark	3,57	33,29	4,63	15,86	18,11	24,54
DE801	Greifswald	0,30	15,93	2,49	15,41	28,25	37,63
DE802	Neubrandenburg	0,19	15,24	3,50	16,64	27,73	36,70
DE805	Stralsund	0,22	12,84	2,90	18,23	25,22	40,58
DE808	Demmin	6,25	21,18	6,38	15,29	26,23	24,68
DE80B	Mecklenburg-Strelitz	5,04	5,12	6,72	19,39	25,83	37,91
DE80D	Nordvorpommern	5,57	6,83	7,06	19,69	28,19	32,66
DE80F	Ostvorpommern	4,13	11,11	5,87	22,82	25,38	30,69
DE80H	Rügen	5,87	6,05	3,97	34,55	23,78	25,78
DE80I	Uecker-Randow	3,81	8,92	4,78	12,00	23,92	46,56
PL422	Koszaliński	4,88	17,98	8,50	28,89	16,55	23,19
PL423	Stargardzki	8,06	17,57	8,39	27,14	16,03	22,80
PL424	Miasto Szczecin	0,05	12,98	7,91	31,86	25,90	21,29
PL425	Szczecinski	4,06	29,35	6,85	28,11	13,28	18,33
SE224	Skåne län	1,71	20,69	5,80	21,96	24,52	25,32
	Euregion Pomerania	3,47	15,43	5,70	21,84	23,57	29,99

GVA has been increasing in Euregion Pomerania at an annual rate of 3,56 %. The growth has been greatest in the Polish regions of the CBA, where average annual growth rate of GVA between 1999 and 2008 was 8,51 %. Growth rate for the German regions of Euregion Pomerania valued at 1,77 % and for Skåne län at 3,49 % (between 1997 and 2008). Growth had been greatest in the sector for Financial intermediation and real estate (J-K). Avarage annual growth rate of the GVA for this sector was 6,67 %.

Table 33. Annual growth rate of GVA by NACE in Euregion Pomerania between 1997 and 2008 (% share of total GVA).

NUTS ID	NUTS	Annual growth rate of the GVA by NACE 1997-2008 (%)						
		All NACE	Agriculture and fishing (A-B)	Industry (except construction) (C-E)	Construction (F)	Wholesale and retail; hotels & restaurants; transport (G-I)	Financial intermediation; real estate (J-K)	Public administration and community services; activities of households (L-P)
EU27	EU27	3,12	1,26	-1,48	-4,33	-2,96	4,36	3,37
DE	Germany	2,39	-0,98	2,58	-0,69	2,37	3,08	2,19
PL	Poland	9,06	3,09	7,84	9,94	8,98	12,57	9,14
SE	Sweden	3,71	0,13	2,36	5,69	4,00	4,22	4,18
DE412	Barnim	2,79	1,34	3,79	-6,17	3,58	6,22	2,28
DE418	Uckermark	1,68	-1,97	3,54	-7,36	3,23	2,70	1,55
DE801	Greifswald	2,72	12,90	8,40	-10,98	1,19	5,96	1,95
DE802	Neubrandenburg	0,54	12,63	1,44	-8,82	-0,24	1,64	1,46
DE805	Stralsund	2,63	-1,47	4,24	-8,40	1,34	6,01	2,73
DE808	Demmin	1,69	-2,76	5,12	-6,89	1,77	6,19	0,91
DE80B	Mecklenburg-Strelitz	0,22	-2,82	-3,02	-6,93	1,58	3,37	0,92
DE80D	Nordvorpommern	1,98	-2,35	4,28	-7,55	3,81	6,30	2,51
DE80F	Ostvorpommern	2,33	-3,11	3,89	-4,84	3,75	5,24	2,01
DE80H	Rügen	2,61	2,06	1,58	-7,89	5,79	4,05	1,55
DE80I	Uecker-Randow	0,33	-2,51	4,56	-8,83	-1,77	3,59	0,98
PL422	Koszaliński	9,32*	2,60*	8,86*	13,14*	8,33*	13,04*	9,49*
PL423	Stargardzki	8,48*	2,53*	5,44*	9,80*	8,03*	13,36*	11,80*
PL424	Miasto Szczecin	7,19*	2,15*	2,06*	7,89*	5,86*	11,71*	8,73*
PL425	Szczecinski	9,03*	0,98*	8,84*	10,72*	7,75*	12,52*	11,61*
SE224	Skåne län	3,49	-1,07	1,07	5,92	4,36	4,77	3,81
	Euregion Pomerania	1,92	1,20	4,01	-2,32	3,65	6,67	4,02

*Data for 1999-2008

Highest share of employment in Euregion Pomerania was in 2008 recorded in Public administration and community services (L-P). Share of employment in this sector was 36,20 % of the total employment in Euregion Pomerania. The second largest share of employment (26,38 %) was in the sector for Wholesale and retail trade; hotels and restaurants (G-I). The share of employment in industry was high (21,89 %) in the Polish regions of the CBA.

Table 34. Share of employment in total employment by NACE sectors (Rev. 1.1) in Euregion Pomerania (2008).

NUTS ID	NUTS	Share of employment by NACE 2008 (%)					
		Agriculture and 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	EU27*	5,67	18,08	7,72	25,10	14,31	29,13
DE	Germany	2,14	19,94	5,44	24,94	17,40	30,14
PL	Poland	14,02	23,84	7,59	23,32	8,56	22,68
SE	Sweden	2,12	16,84	6,47	21,38	15,94	37,24
DE412	Barnim	2,89	11,24	10,27	26,48	12,68	36,28
DE418	Uckermark	6,30	16,73	8,46	24,02	10,43	34,06
DE801	Greifswald	1,32	8,94	3,64	19,87	23,84	42,38
DE802	Neubrandenburg	0,44	11,11	4,58	22,66	19,39	41,83
DE805	Stralsund	0,60	8,16	4,83	22,66	16,92	46,83
DE808	Demmin	9,15	13,03	9,86	25,00	8,45	34,51
DE80B	Mecklenburg-Strelitz	6,96	8,79	8,79	26,01	7,69	41,39
DE80D	Nordvorpommern	6,84	7,37	9,74	29,74	7,11	39,21
DE80F	Ostvorpommern	4,57	8,41	6,97	32,69	10,58	36,78
DE80H	Rügen	4,22	6,17	5,52	44,16	11,04	28,90
DE80I	Uecker-Randow	4,98	10,30	6,31	18,27	11,96	47,84
PL422	Koszaliński	8,04	21,22	9,35	26,84	6,25	28,31
PL423	Stargardzki	11,64	22,87	9,41	23,28	5,47	27,33
PL424	Miasto Szczecin	0,51	16,57	9,09	31,49	11,77	30,57
PL425	Szczecinski	7,55	26,89	8,50	26,04	5,10	25,93
SE224	Skåne län	2,40	15,19	6,91	22,82	15,60	37,08
	Euregion Pomerania	4,90	13,31	7,64	26,38	11,52	36,20

*EU27 data for 2008 includes data for 2007 for IT.
Source: Eurostat

Annual growth rate for employment was slightly negative (-0,5 %) in Euregion Pomerania between 2000 and 2008. The field of Construction (F) experienced the greatest decrease in the annual growth rate for employment (-3,55 %), despite for the fact that the share of construction in total employment increased at an 4,28 % annual rate in Skåne län. Besides construction, employment in agriculture and fishing decreased significantly (-3,49 %), and in Poland the share of employment in agriculture and fishing came down at an annual rate of -10,91 %.

Table 35. Annual growth rate of the share of employment by NACE sectors in total employment in Euregion Pomerania between 2000 and 2008.

NUTS ID	NUTS	Annual growth rate of employment by NACE 2000-2008 (%)						
		All NACE	Agriculture and fishing (A-B)	Industry (except construction) (C-E)	Construction (F)	Wholesale and retail; hotels & restaurants; transport (G-I)	Financial intermediation; real estate (J-K)	Public administration and community services; activities of households (L-P)
EU27	EU27*	0,82	-4,05	-0,48	2,00	1,18	2,59	1,47
DE	Germany	0,36	-1,03	-0,76	-2,87	0,28	2,39	0,92
PL	Poland	0,59	-7,03	2,14	4,23	2,35	1,89	2,97
SE	Sweden	0,75	-3,35	-0,90	3,81	0,48	2,68	0,77
DE412	Barnim	-0,12	0,00	-0,52	-3,34	-0,22	2,87	0,11
DE418	Uckermark	-1,32	-2,44	0,30	-7,17	-0,60	0,00	-0,77
DE801	Greifswald	0,64	18,92	0,00	-9,29	-0,21	6,05	0,00
DE802	Neubrandenburg	-0,86	-4,94	0,50	-8,30	-1,67	0,88	-0,26
DE805	Stralsund	-0,11	0,00	-2,84	-7,16	0,17	1,95	0,66
DE808	Demmin	-1,56	-4,94	-1,27	-5,76	-0,35	0,00	-0,25
DE80B	Mecklenburg-Strelitz	-1,58	-8,89	-2,34	-7,03	-0,35	-1,13	1,29
DE80D	Nordvorpommern	-0,32	-0,92	-2,03	-6,44	0,68	0,00	1,53
DE80F	Ostvorpommern	0,18	-3,37	-2,25	-5,60	1,47	3,28	1,03
DE80H	Rügen	0,20	0,00	-2,36	-7,60	1,79	2,46	0,00
DE80I	Uecker-Randow	-1,48	-0,80	0,84	-8,30	-2,44	4,15	-1,54
PL422	Koszaliński	-0,20	-10,39	0,22	5,27	0,60	-0,91	2,69
PL423	Stargardzki	-1,19	-10,88	-1,20	3,62	0,22	-1,31	4,29
PL424	Miasto Szczecin	-0,65	-10,05	-1,86	1,42	-1,56	-1,79	1,34
PL425	Szczecinski	-0,61	-12,31	-0,34	4,56	-0,05	-0,75	4,47
SE224	Skåne län	1,00	-4,76	-1,70	4,28	1,07	4,23	0,98
	Euregion Pomerania	-0,50	-3,49	-1,05	-3,55	-0,09	1,25	0,97

*EU27 data for 2000 includes data for 2001 for NL and 2002 for UK. EU27 data for 2008 includes data for 2007 for IT.
Source: Eurostat

6.2. Research and innovation

Tree types of indicators can be distinguished for studying research and innovation of regions. These include enablers, firm activities and outputs. Since a wide-ranging analysis on all of these topics could not have been possible in the context of this project and due to the lack of data (NUTS 2 coverage is very poor for most of the indicators) we have selected in our analysis a few indicators from all the above mentioned groups. These are:

- 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

Total intramural R&D expenditure in Euregion Pomerania was 1,66 in 2007, which is lower than the EU average (2,01). In Sydsverige (4,75) R&D expenditure was well above the EU and Swedish average (3,4), and

the expenditure had been directed especially to business and enterprice sector. Sydsverige also had a high amount of EPO patents (190,95 patents per million inhabitants) and a large share of persons employed in high and medium tech manufacturing (140, 03 % of total workforce indexed to EU25). The Polish region of Zachoniopomorskie, on the contrary, had a low total R&D expenditure (0,24), a small amount of EPO patents (2,72 per million of inhabitants) and and a relatively small share of persons employed in high and medium tech manufacturing (61,40 % of total workforce indexed to EU25).

Table 36. Indicators for research and innovation in the Poland – Germany – Sweden CBA

NUTS ID	NUTS	Total intramural R&D expenditure 2007				EPO patents per million of inhabitants 2007	Employed persons in high and medium tech manufacturing activities (% of total workforce EU25 = 100) 2004 *
		Total	Business enterprise sector	Government sector	Higher education sector		
EU27	EU27	2,01	1,18	0,24	0,42	N/A	N/A
PL	Poland	0,57	0,17	0,2	0,19	3,54	71,49
SE	Sweden	3,4	2,47	0,17	0,75	145,77	106,19
DE41	Brandenburg - Nordost	0,34	0,21	0,28	0,06	56,81	84,44
DE80	Mecklenburg-Vorpommern	1,3	0,38**	0,54	0,38	34,88	56,50
PL42	Zachodniopomorskie	0,24	0,01	N/A	0,22	2,72	61,40
SE22	Sydsverige	4,75	3,79	0,08	0,89	190,95	140,03
	Euregion Pomerania	1,66	1,34	0,30	0,39	71,34	85,59

*Source: ESPON DB (Regional Innovation Scoreboard).
**Data for 2005.
Source: Eurostat

6.3. Social cohesion

We have studied social cohesion of the Poland – Germany – Sweden CBA by analysing following indicators: youth unemployment rate, long term unemployment rate, infant mortality rate, and population at risk of poverty after social transfers. While all the other indicators are standard demographic variables, population at risk of poverty is defined as "persons having equalised disposable income (i.e. adjusted for household size and composition) of less than 60% of national median" (European Commission's 5th Cohesion Report database).

Unemployment and long-term unemployment in Poland – Germany – Sweden CBA was well above the European and national (Germany, Poland, Sweden) averages in 2010. Unemployment rate was 11,13 for the CBA, while the rate valued at 7,1 for Germany, 9,6 for Poland and 8,4 for Sweden. EU unemployment rate was 9,6 in 2010. Mecklenburg-Vorpommern and Zachodniopomorskie had the highest unemployment rates in the CBA, while long-term unemployment was highest in Mecklenburg-Vorpommern (7,3) and Brandenburg-Nordost (7,2). Youth unemployment was also high in Poland – Germany – Sweden CBA, and Zachodniopomorskie was the region with the highest youth unemployment rate ; 31 % of labour force aged 15-24.

Mecklenburg-Vorpommern had the largest share of population at risk of poverty after social transfers (24 % of total population), while the CBA average was 18,15 in 2008. This was very close to the European Union

average of 17 %. Infant mortality rated highest in Zachodniopomorskie in 2008 (5,1), while Skåne län had the lowest infant mortality rate (2,2). Population aged 25-64 with tertiary education was slighty above the European average in Poland – Germany – Sweden CBA (28,38).

Table 37. Social cohesion indicators for the Poland – Germany – Sweden CBA.

NUTS ID	NUTS	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 (% of total population)	Infant mortality rate 2008	Population aged 25–64 with tertiary education 2010
EU27	EU27	9,6	3,0	20,9	17,0*	4,3	25,9
DE	Germany	7,1	3,5	9,9	15,2	3,5	26,6
PL	Poland	9,6	2,5	23,7	16,9	5,6	22,9
SE	Sweden	8,4	1,1	25,2	12,2	2,5	34,2
DE41	Brandenburg - Nordost	11,2	7,2	16,8	18,7*	:	29,2
DE80	Mecklenburg-Vorpommern	12,4	7,3	13,4	24,0*	3,7	27,0
PL42	Zachodniopomorskie	12,3	3,5	31	16,3*	5,1	21,1
SE22	Sydsverige	8,6	0,9	27	13,6*	2,2	36,2
	Euregion Pomerania	11,13	4,73	22,05	18,15	3,67	28,38

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

6.4. Environmental analysis

We have applied two sets of indicators for environmental analysis of the Poland – Germany – Sweden CBA; indicators from the European Commission's 5th Cohesion Report and indicators from the ESPON Climate Project regarding the region's sensitivity for climate change. From the European Commission's 5th Cohesion Report we selected six indicators, namely, soil sealed area, ozone exceedance, waste water treatment, Natura 2000 areas, solar energy, wind potential. While the first four indicators show concrete environmental performance of the region, the last two indicate what could be the region's capacity in exploiting alternative energy sources in an energy source transition scenario.

6.4.1. Environmental performance

The first indicator of environmental performance that we have studied is soil sealing. Soil sealing means covering of soil for housing, roads or other land developments. When land is sealed, the area for soil to carry out its natural functions including the absorption of rainwater for infiltration and filtering is reduced. Sealed areas may have a great impact on surrounding soils by changing water flow patterns and by increasing the fragmentation of biodiversity.

According to the 5th Cohesion Report Soil sealing is particularly high in highly urbanised areas such as parts of the Netherlands, North Belgium, West and South Germany and central and southeastern parts of the UK.

In Mediterranean regions, soil sealing is relatively high along the coasts where rapid urbanisation is associated with the expansion of tourism.[27]

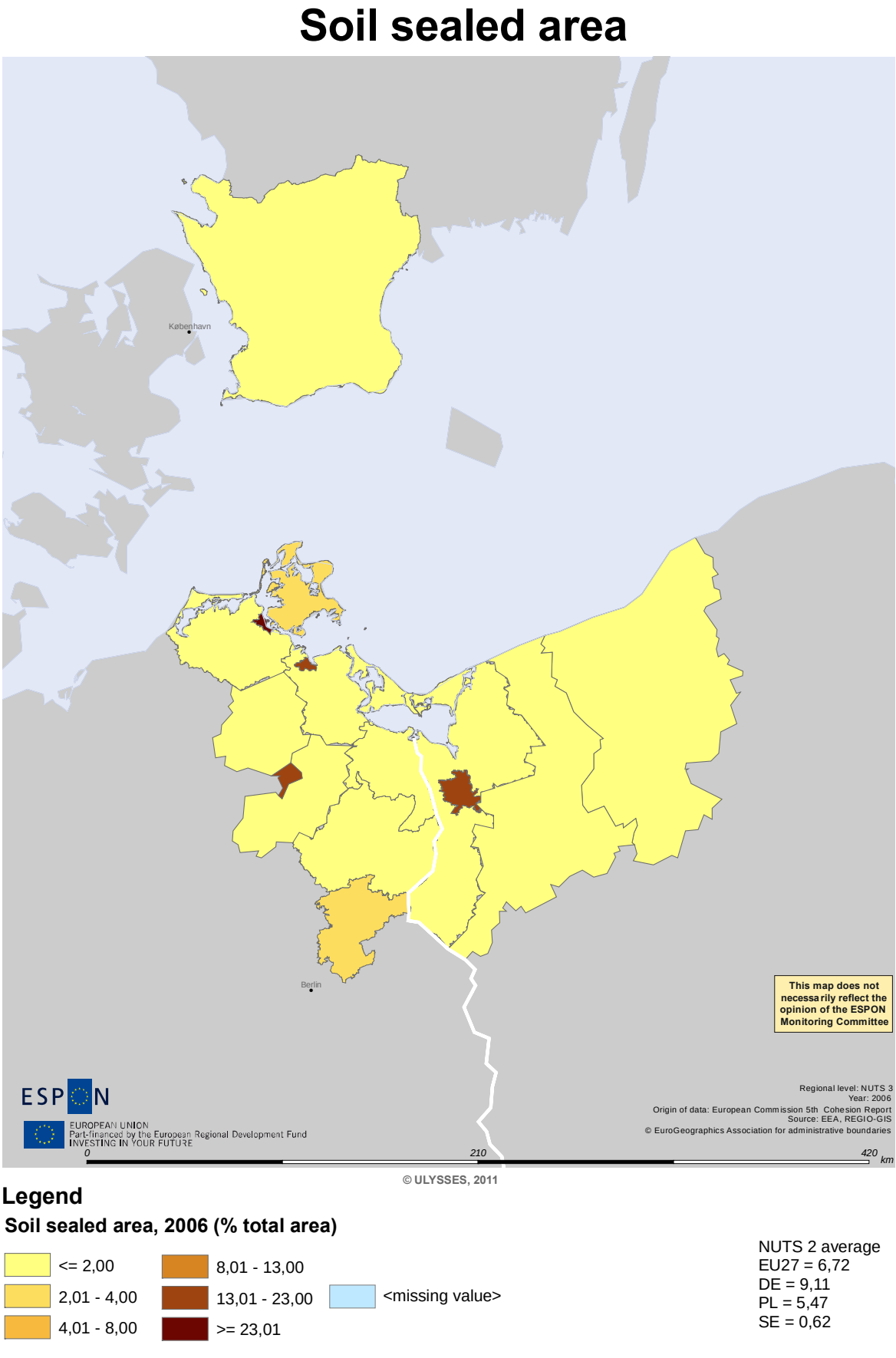
Soil sealing has been particularly high in the city regions of Euregion Pomerania. In Stralsund soil sealed area covered as much as 37 % of the total land area in 2006. Other regions with large shares of soil sealed area were Greifswald (20 %) and Neubrandenburg (19 %) in Germany and the City of Szczecin (18 %) in Poland. These shares are well above the EU27 average share that valued at 6,72 % in 2006.

Table 38. Soil sealing in the regions of Euregion Pomerania in 2006.

NUTS ID	NUTS	Soil sealed area 2006 (% of total area)	Soil sealing per inhabitant (m² per inhabitant) 2006
EU27	(NUTS 2 average)	6,72	214
DE	Germany	9,11	231,64
PL	Poland	5,47	182,39
SE	Sweden	0,62	205,00
DE412	Barnim	4	299
DE418	Uckermark	2	377
DE801	Greifswald, Kreisfreie Stadt	20	213
DE802	Neubrandenburg, Kreisfreie Stadt	19	249
DE805	Stralsund, Kreisfreie Stadt	37	241
DE808	Demmin	2	345
DE80B	Mecklenburg-Strelitz	1	347
DE80D	Nordvorpommern	2	329
DE80F	Ostvorpommern	2	375
DE80H	Rügen	3	368
DE80I	Uecker-Randow	2	365
PL422	Koszaliński	1	208
PL423	Stargardzki	1	192
PL424	Miasto Szczecin	18	140
PL425	Szczeciński	2	229
SE224	Skåne län	2	152
	Euregion Pomerania	7,38	276,81

[27] Fifth Report on Economic, Social and Territorial Cohesion 2010.

Figure 51. Soil sealed area in Euregion Pomerania in 2006.



The European Union aims at reducing ozone levels and particulate matter in the air. After all, good air quality helps to prevent respiratory diseases and premature death. The 5th Cohesion Report states that there is much evidence on high ground-level ozone concentrations harming lungs and irritating the respiratory system. Ozone concentrations often exceed EU thresholds in cities, especially in southern Europe.[28]

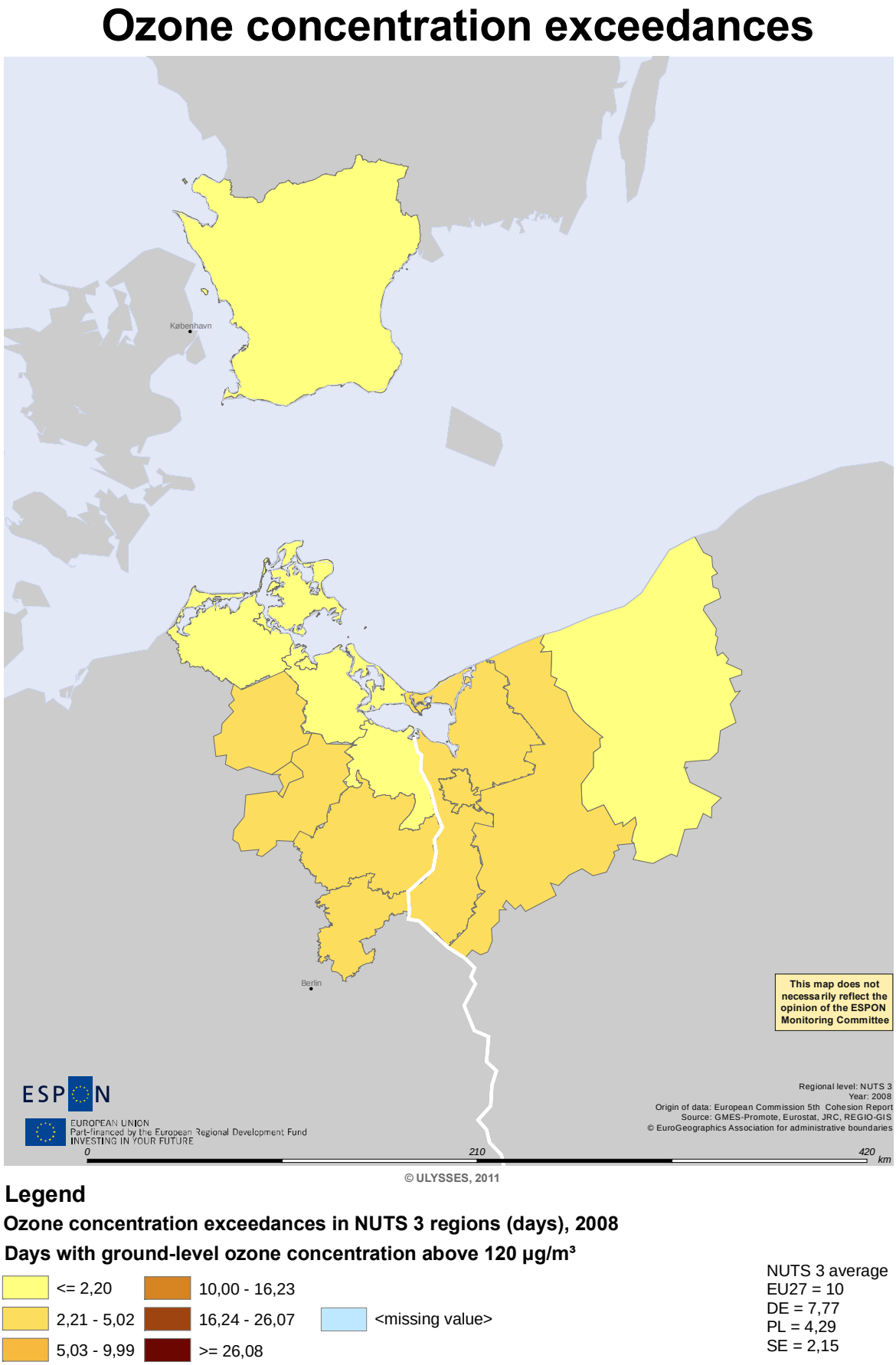
Ozone concentration exceedances in Euregio Pomerania were below national and EU averages in 2008. Greifswald, Stralsund, Nordvorpommern and Rügen had no days with exceedances , and regions with the most exceedances were Barnim and Mecklenburg-Strelitz (four days with ozone exceedances in 2008).

Table 39. Ozone concentration exceedances in the regions of Euregion Pomerania in 2008.

NUTS ID	NUTS	Ozone concentration exceedances in NUTS 3 regions (days), 2008
EU27	(NUTS 2 average)	9,99
DE	Germany	7,77
PL	Poland	4,29
SE	Sweden	2,15
DE412	Barnim	4
DE418	Uckermark	3
DE801	Greifswald, Kreisfreie Stadt	0
DE802	Neubrandenburg, Kreisfreie Stadt	3
DE805	Stralsund, Kreisfreie Stadt	0
DE808	Demmin	3
DE80B	Mecklenburg-Strelitz	4
DE80D	Nordvorpommern	0
DE80F	Ostvorpommern	1
DE80H	Rügen	0
DE80I	Uecker-Randow	2
PL422	Koszaliński	2
PL423	Stargardzki	3
PL424	Miasto Szczecin	3
PL425	Szczeciński	2
SE224	Skåne län	1
	Euregion Pomerania	1,94

[28] Fifth Report on Economic, Social and Territorial Cohesion 2010.

Figure 52. Ozone concentration exceedances (days) in Euregion Pomerania in 2008.



According to the 5th Cohesion Report, urban waste water is not yet treated adequately in all the Member State, especially in regions of EU12 countries, but also several of the EU‑15 countries. Treatment of waste water is, however, necessary to preserve the quality of water reserves, for drinking, use by industry, tourism and agriculture and for environmental reasons generally. For urban areas, treatment which removes most contaminants from sewage is mandatory.[29]

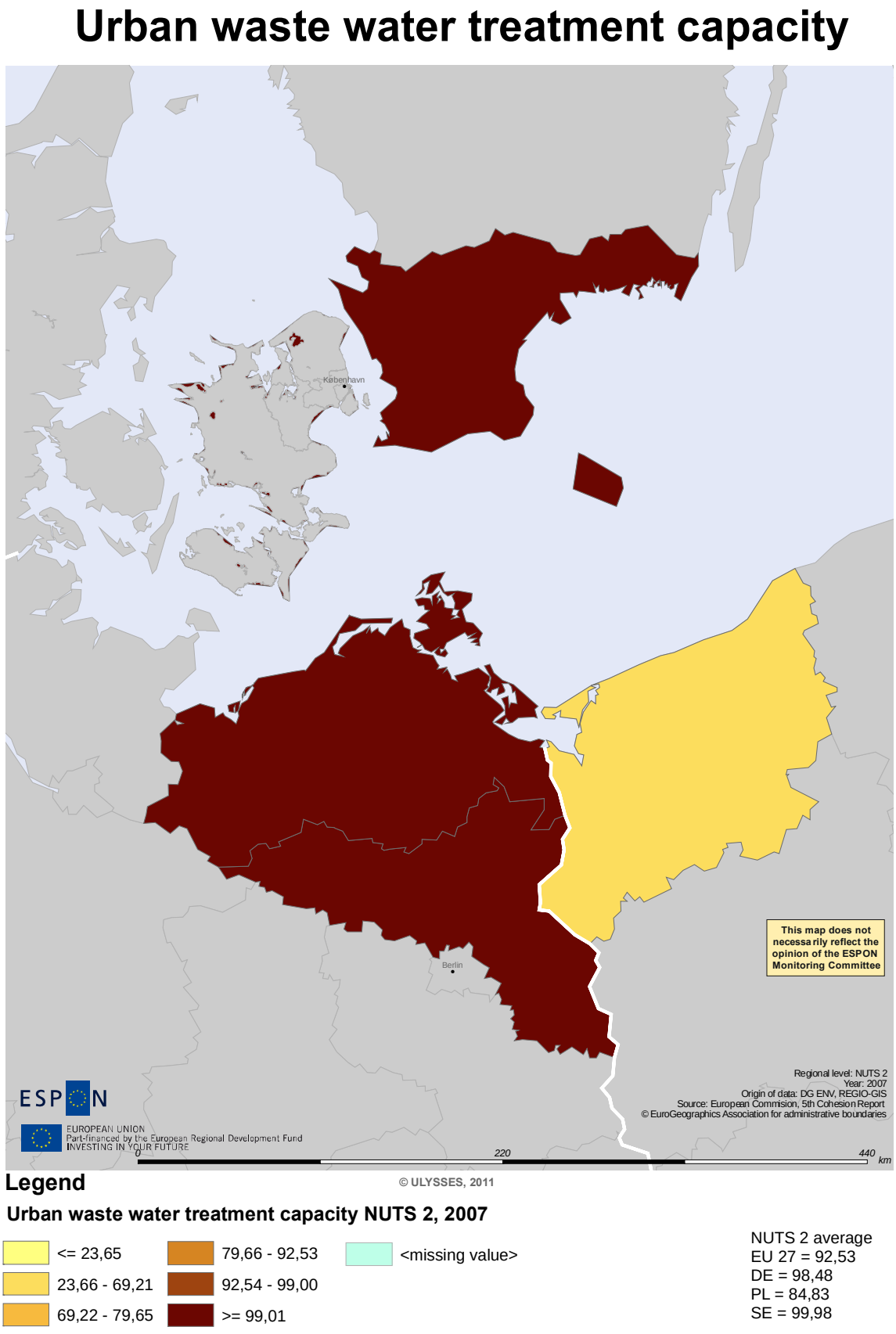
Urban waste water treatment capacity in Euregion Pomerania was above national and EU averages in all regions except for Zachodniopomorskie, where the capacity was only 57 %. Brandenburg-Nordost, Mecklenburg-Vorpommern and Sydsverige were able to treat all their urban waste waters in 2007, while the EU27 average for the given year was 92,53 %.

Table 40. Urban waste water treatment capacity in the Poland – Germany – Sweden CBA (2007).

NUTS ID	NUTS	Urban waste water treatment capacity, 2007
EU27	(NUTS 2 average)	92,53
DE	Germany	98,48
PL	Poland	84,83
SE	Sweden	99,98
DE41	Brandenburg – Nordost	100
DE80	Mecklenburg-Vorpommern	100
PL42	Zachodniopomorskie	57
SE22	Sydsverige	100
	Euregion Pomerania	89,25

[29] Fifth Report on Economic, Social and Territorial Cohesion 2010.

Figure 53. Urban waste water treatment capacity in the Poland – Germany – Sweden CBA (2007).



Natura 2000 is an EU wide network of nature preservation areas. The aim of NATURA is to ensure the long-term survival of threatened species and habitats. According to the EU Nature Directives, conservation should be achieved while taking account of economic, social, cultural, regional and recreational needs. Regions should consider the sites as important assets in development strategies: NATURA 2000 areas could be used to attract more visitors and to develop economic activities related to ecotourism, as well as enhancing the quality of life of the people living in the nearby regions.[30]

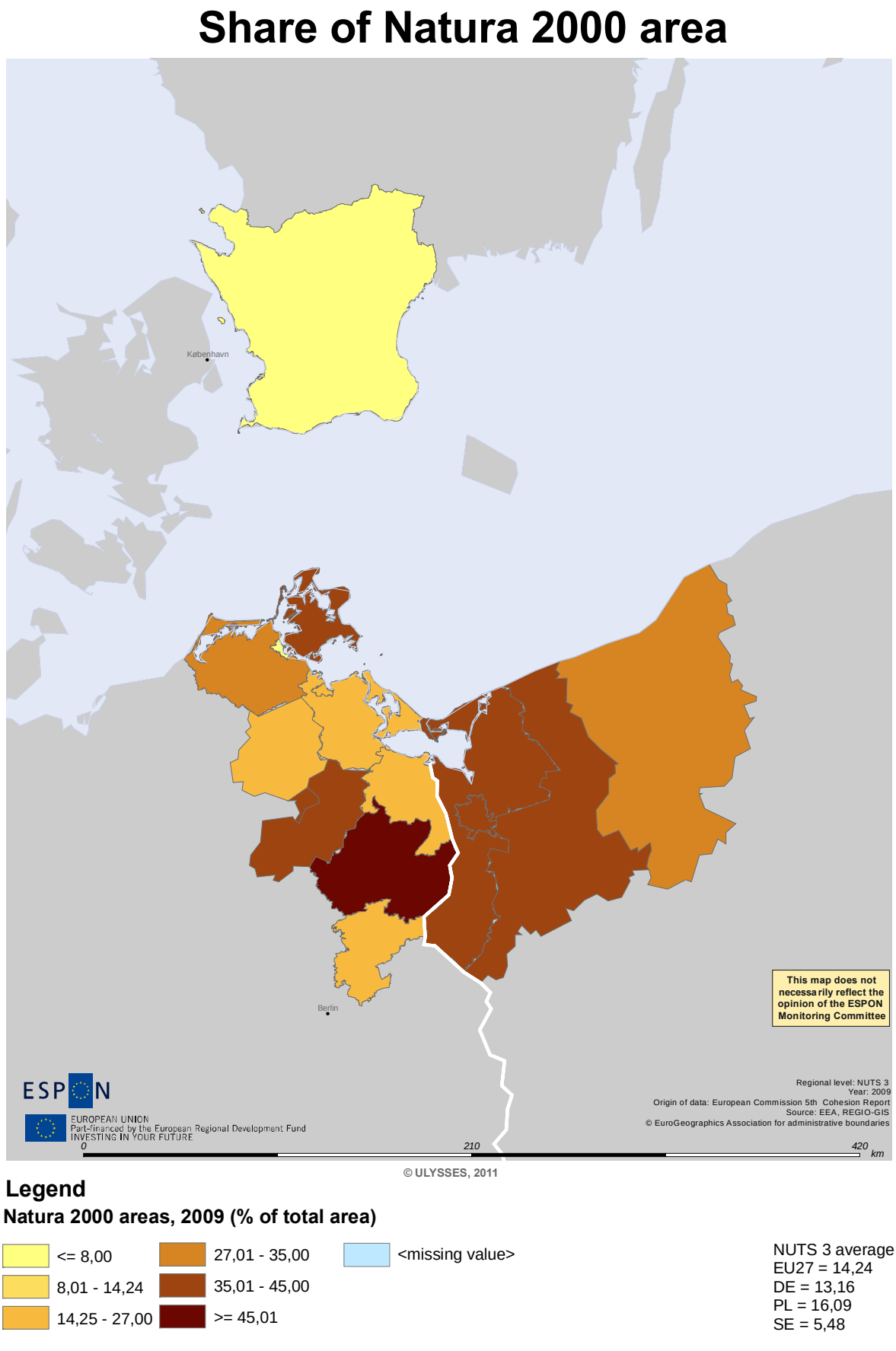
The share of NATURA 2000 areas in Euregio Pomerania in 2009 was 30,06 % of total land area. The share was significantly higher than German (13,16 %), Polish (16,09 %), Swedish (5,48 %) or the European Union average (14,24 %). Szczeciński had the largest share (45 %), while Stralsund had the smallest share (3 %) of NATURA 2000 areas.

Table 41. Share of Natura 2000 areas of total area (%) in the regions of Euregion Pomerania in 2009.

NUTS ID	NUTS	NATURA 2000 areas, 2009 (% of total area)
EU27	(NUTS 2 average)	14,24
DE	Germany	13,16
PL	Poland	16,09
SE	Sweden	5,48
DE412	Barnim	22
DE418	Uckermark	54
DE801	Greifswald, Kreisfreie Stadt	18
DE802	Neubrandenburg, Kreisfreie Stadt	43
DE805	Stralsund, Kreisfreie Stadt	3
DE808	Demmin	26
DE80B	Mecklenburg-Strelitz	38
DE80D	Nordvorpommern	32
DE80F	Ostvorpommern	23
DE80H	Rügen	40
DE80I	Uecker-Randow	27
PL422	Koszaliński	33
PL423	Stargardzki	36
PL424	Miasto Szczecin	37
PL425	Szczeciński	45
SE224	Skåne län	4
	Euregion Pomerania	30,06

[30] Fifth Report on Economic, Social and Territorial Cohesion 2010.

Figure 54. Share of Natura 2000 areas of total area (%) in Euregion Pomerania in 2009.



6.4.2. Environmental capacity

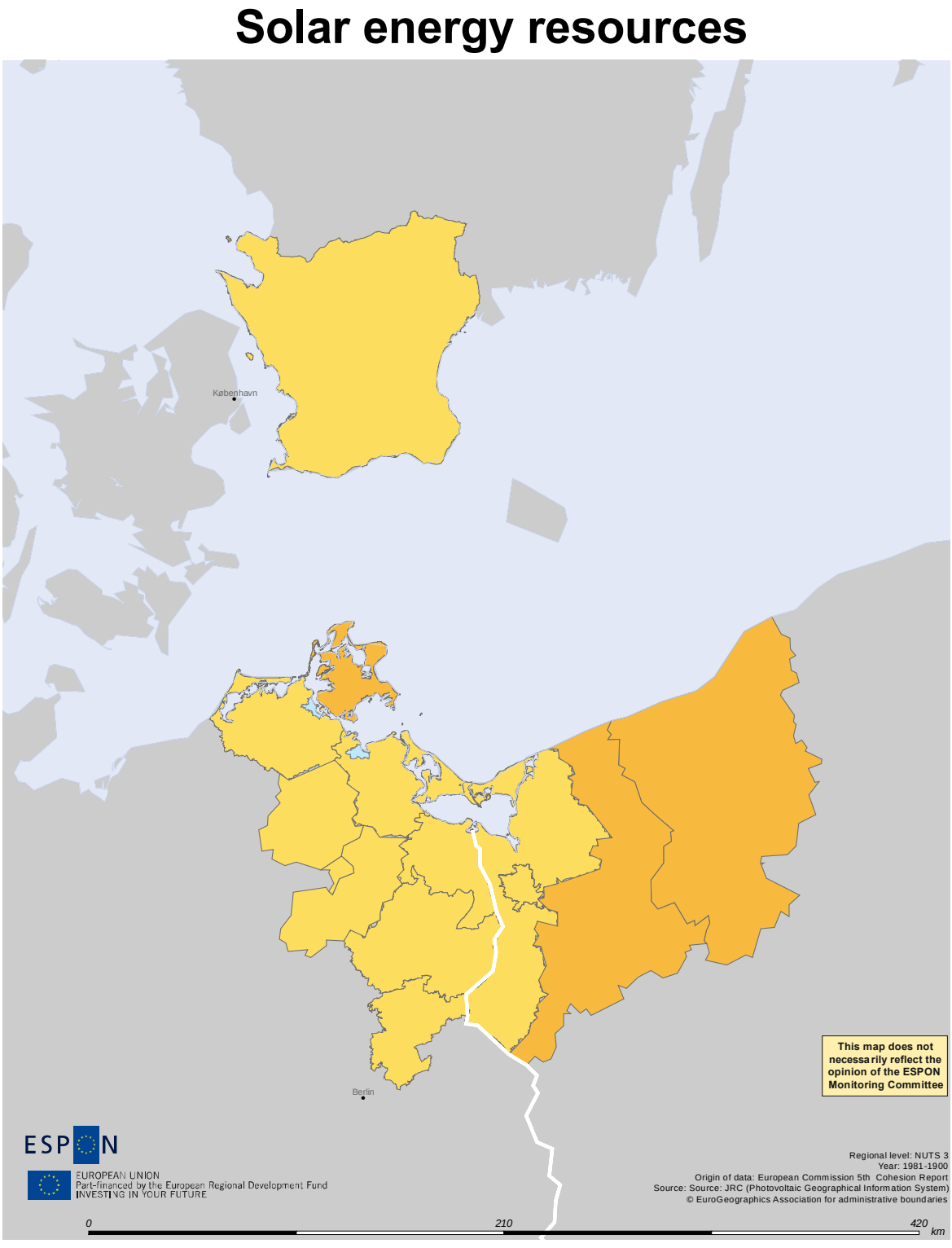
The 5th Cohesion report point out that production of renewable energy has a strong geographical dimension. Solar energy potential is far greater in the southern regions, while the potential of wind power is greatest in areas along the Atlantic and North Sea coasts. The report reminds that regions can play an important role in facilitating and encouraging renewable energy production.

Solar energy potential in Euregion Pomerania is below European average (1304,46 kWh per year), but in line with national averages. Solar energy recources were 1172 kWh per year for Euregion Pomerania, which is slightly above the Swedish (1119,03 kWh), German (1159,22 kWh) and Polish (1168, 80 kWh) averages. Most solar energy recources in the EU possessed Ragusa region in Italy with 2027 kWh and the least Shetland islands in the United Kingdom with 922 kWh per year.

Table 42. Solar energy resources in the regions of Euregion Pomerania between 1981 and 1990.

NUTS ID	NUTS	Solar energy resources per NUTS 3 regions (kWh per year, 1981-1990)
EU27	(NUTS 2 average)	1304,46
DE	Germany	1159,22
PL	Poland	1168,80
SE	Sweden	1119,03
DE412	Barnim	1 155
DE418	Uckermark	1 167
DE802	Neubrandenburg, Kreisfreie Stadt	1 169
DE808	Demmin	1 173
DE80B	Mecklenburg-Strelitz	1 167
DE80D	Nordvorpommern	1 182
DE80F	Ostvorpommern	1 183
DE80H	Rügen	1 191
DE80I	Uecker-Randow	1 177
PL422	Koszaliński	1 188
PL423	Stargardzki	1 183
PL424	Miasto Szczecin	1 179
PL425	Szczeciński	1 181
SE224	Skåne län	1 112
	Euregion Pomerania	1 172

Figure 55. Solar energy resources (kWh per year) in Euregion Pomerania between 1981 and 1990.

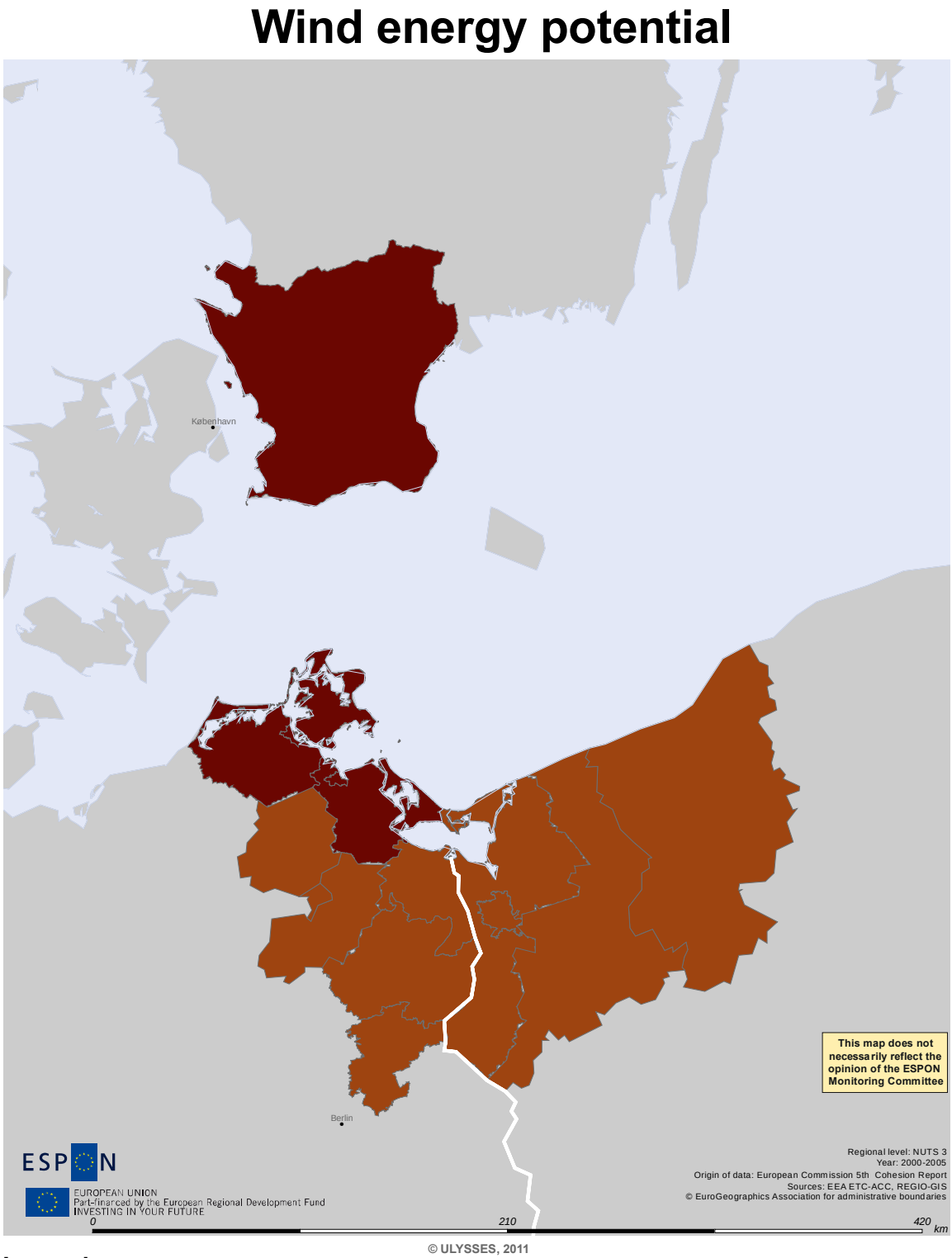


Wind energy potential, on the other hand, is well above national and European averages in Euregion Pomerania. This is very natural considering the geographical location of the Euregio. Wind energy potential in Euregio Pomerania was 2086,06 hours per year, while the EU average potential valued at 1378,98 hours. Regions located on the coast of the Baltic Sea possessed the greatest wind energy potential. Wind energy potential of the island of Rügen was 3 326 hours per year, and even the lowest wind energy potential in the CBA, 1545 hours per year in Uckermark, is above the EU average and German and Polish national averages.

Table 43. Wind energy potential (onshore full load hours) in Euregion Pomerania between 2000 and 2005.

NUTS ID	NUTS	Wind energy potential: onshore full load hours, 2000-2005 (number of hours per year) At 80 m hub height
EU27	(NUTS 2 average)	1378,98
DE	Germany	1382,16
PL	Poland	1450,43
SE	Sweden	1969,21
DE412	Barnim	1 720
DE418	Uckermark	1 545
DE801	Greifswald, Kreisfreie Stadt	2 576
DE802	Neubrandenburg, Kreisfreie Stadt	1 719
DE805	Stralsund, Kreisfreie Stadt	2 699
DE808	Demmin	1 664
DE80B	Mecklenburg-Strelitz	1 715
DE80D	Nordvorpommern	2 258
DE80F	Ostvorpommern	2 511
DE80H	Rügen	3 326
DE80I	Uecker-Randow	1 959
PL422	Koszaliński	1 986
PL423	Stargardzki	1 658
PL424	Miasto Szczecin	1 735
PL425	Szczeciński	1 933
SE224	Skåne län	2 373
	Euregion Pomerania	2086,06

Figure 56. Wind energy potential (onshore full load hours) in Euregion Pomerania between 2000 and 2005.



6.4.3. Climate change

We have studied the sensitivity of the Poland – Germany – Sweden CBA to climate change based on methods applied in ESPON Climate project (Climate Change and Territorial Effects on Regions and Local Economies in Europe) [31]. The methodology consisted of the main components: "The exposure analysis focused on the climatic changes as such. It made use of existing projections on climate change and climate variability from the CCLM climate model, whose results have been used, among others, by the 4th IPCC assessment report on climate change. Using the IPCC climate scenario A1B (Nakicenovic et al. 2000) the ESPON Climate project aggregated data for two time periods (1961-1990 and 2071-2100) for eight climate stimuli. River flooding and sea level rise were added as two immediate 'triggered effects' of these climate stimuli. Each region was then assessed in regard to its climate change sensitivity. For each sensitivity dimension (physical, environmental, social, economic and cultural) several sensitivity indicators were developed. Each indicator was calculated in absolute and relative terms and then combined." We have selected three following themes for analysis:

- Combined physical sensitivity, which relates to all human artefacts that are important for territorial development and potentially affected by climate change. This includes settlements, roads, railways, airports and harbours. These physical assets of a region are typically adapted to normal regional weather conditions and can withstand smaller climatic changes. However, buildings and infrastructure are sensitive to extreme weather events like flash floods, large scale river floods and coastal storm surges which's frequency and magnitude may change due to climate change.
- Combined social sensitivity, which 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. In particular this dimension includes populations sensitive to river flooding, coastal flooding, flash floods and heat (i.e. senior citizen in urban heat islands). These populations are mainly concentrated in Southern European agglomerations and along the coastline, and the most sensitive regions are coastal agglomerations in the Mediterranean.
- Combined economic sensitivity, which relates to economic activities or sectors that are especially sensitive to climatic changes. This includes agriculture and forestry whose economic goods are highly dependent on suitable climate. Tourism, both summer and winter tourism, capitalises on specific climatic conditions. The energy sector is also very sensitive: Power plants need water for cooling and are sensitive to flooding. Private households and the service sector require heating and/or cooling and thus demand more or less energy.

Sensitivities to climate change were relatively low in all the regions of Euregion Pomerania. Small differences were detected in the physical and social sensitivity of the regions, and these are illustrated in the following maps.

[31] ESPON Climate 2011.

Table 44. Climate sensitivity values for Euregion Pomerania.

NUTS ID	sens_phys	sens_soc	sens_env	sens_cult	sens_econ
DE412	0,101036	0,088902	0,39524	0,087494	0,705539
DE418	0,126187	0,139271	0,58843	0,027753	0,383888
DE801	0,307678	0,32207	0,456068	0,227422	0,313013
DE802	0,171821	0,152989	0,547802	0,112777	0,594004
DE805	0,399027	0,336064	0,63869	0,456478	0,322916
DE808	0,126172	0,141854	0,499403	0,077641	0,32246
DE80B	0,087643	0,089361	0,46139	0	0,392756
DE80D	0,154873	0,174186	0,724656	0,137122	0,321733
DE80F	0,24739	0,215084	0,583606	0,152411	0,438341
DE80H	0,223704	0,205314	0,69493	0,146959	0,369334
DE80I	0,115348	0,154816	0,585763	0,020386	0,411043
PL422	0,257533	0,191485	0,508974	0,052017	0,700545
PL423	0,132045	0,16773	0,541369	0,124422	0,391803
PL424	0,343078	0,245985	0,639277	0,216552	0,736895
PL425	0,183165	0,20007	0,574069	0,046822	0,658354
SE224	0,256696	0,158649	0,366486	0,006139	0,576347

Figure 57. Physical sensitivity to climate change of the regions of Euregion Pomerania.

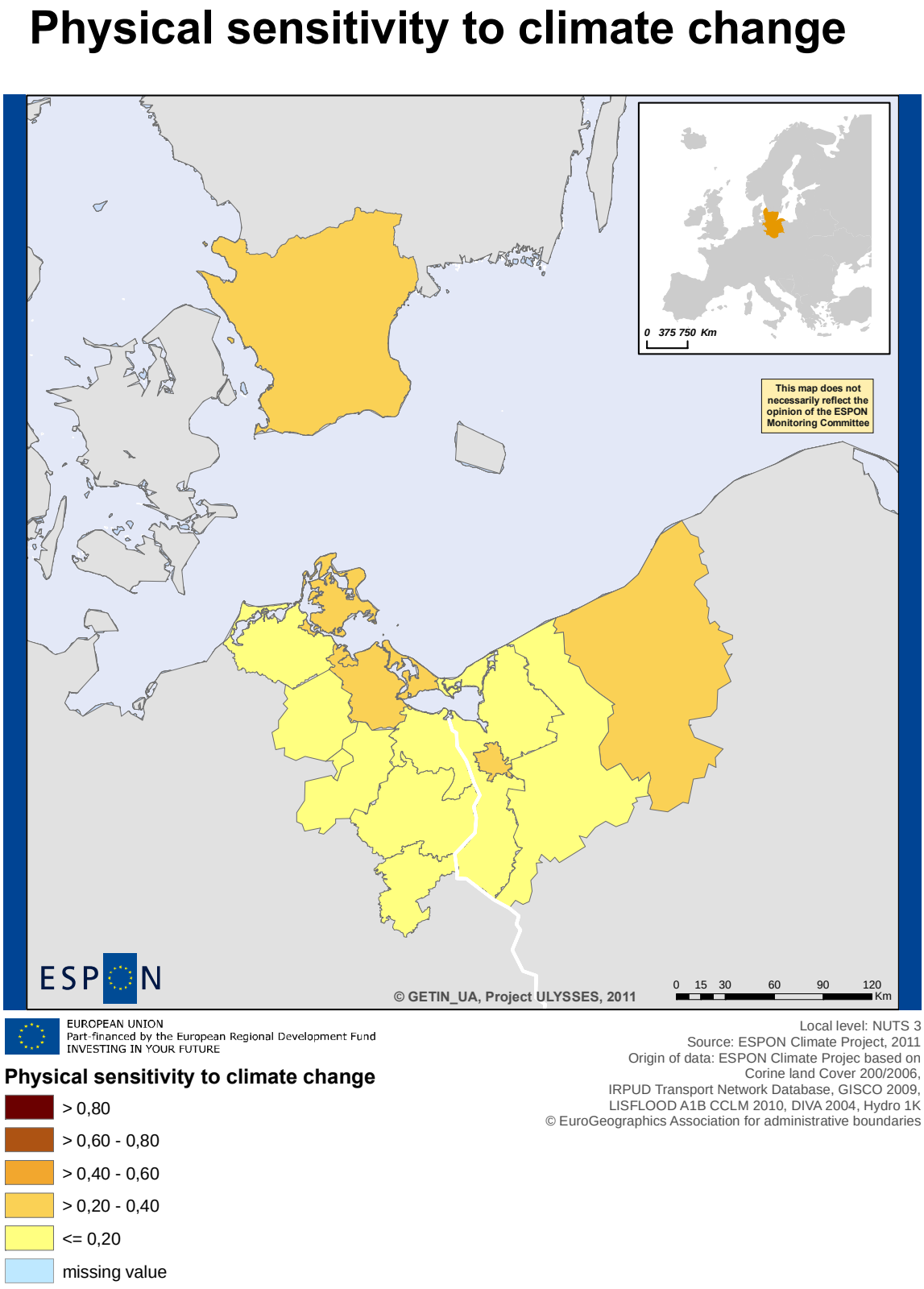


Figure 58. Social sensitivity to climate change in the regions of Euregion Pomerania.

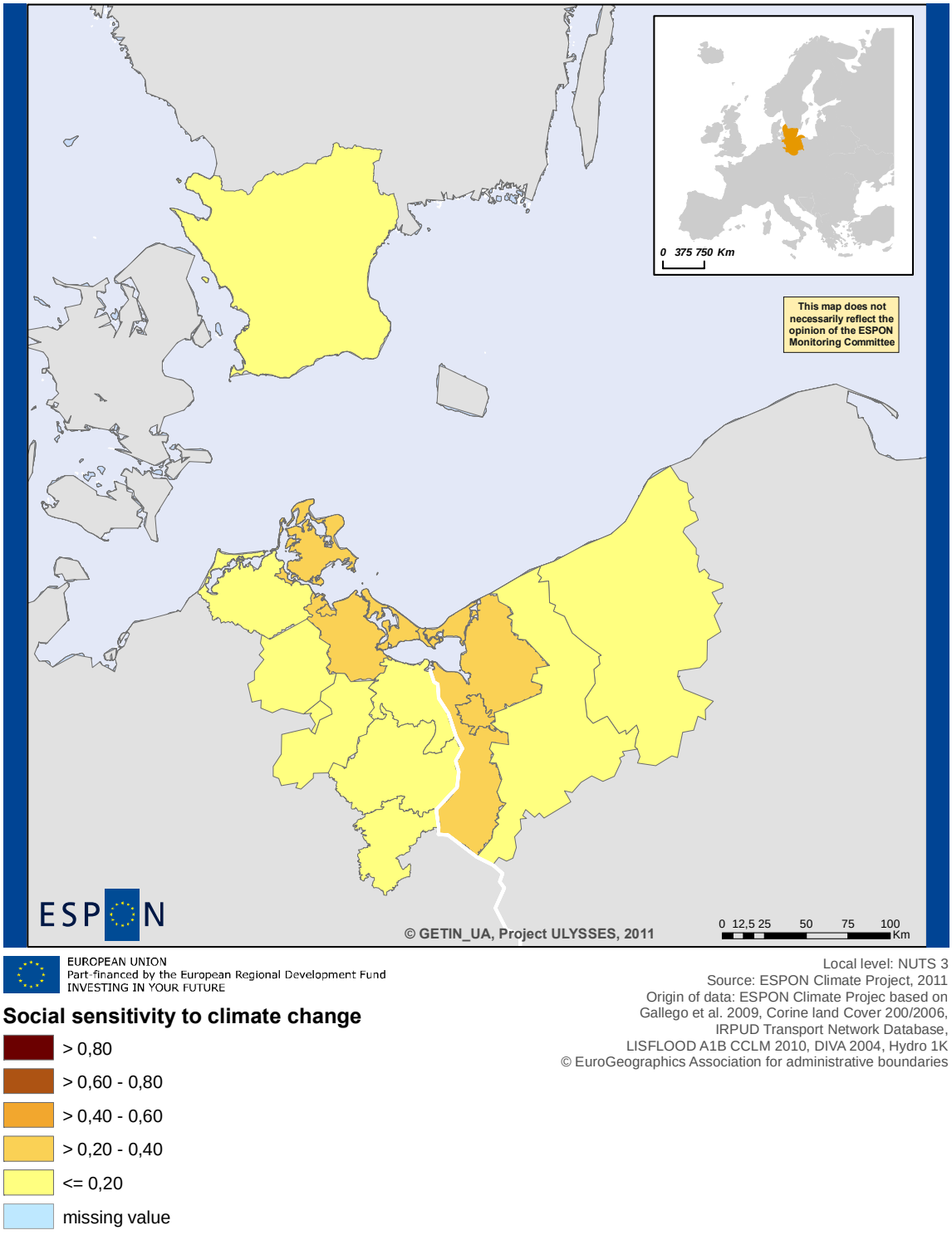


Figure 59. Economic sensitivity to climate change in the regions of Euregion Pomerania.

6.5. Chapter conclusions

Analyses on Lisbon / Europe 2020 and Gothenburg objectives included four subcategories: economy and employment, research and innovation, social cohesion and environment. The coefficient of deviation, which measures regional disparities in the GDP per capita has been increasing between 1997 and 2008 in the Poland – Germany – Sweden CBA. This signifies that disparietes in GDP per capita have been growing in Euregion Pomerania during the given time period. When compared to the NUTS 3 average of ESPON countries, the coefficient of deviation (and accordingly disparities in GDP per capita) has been higher in ESPON countries, but has now settled on the same level with the CBA.

We compared NUTS 3 regions of the CBA with the leading region (Inner London West region) in terms of GDP per capita, trough index number analysis. The best performing region among the regions of Euregion Pomerania in terms of GDP per capita is Neubrandenburg (32900 in 2008), while the lowest GDP per capita is to be found in Stargardski (6100 per capita). Compared to the leading European region in GDP per capita (London), Greifswald, Neubrandeburg, Stralsund and Skåne län are considered middle income regions. Stargardski is classified as a very laggard region, while other regions of the CBA area have according to the index number analysis been classified as less developed regions or laggard regions.

In the catching up analysis we evaluated the speed of catching-up with the leading region (Inner London West region). Most of the regions in Euregion Pomerania have been classified as diverging regions. This indicates that these regions are not catching up the leader, but growing less and thus diverging from the leading region. Polish regions of Euregio Pomerania have been classified as slow catching-up regions (Koszalinski, Miasto Szczecin and Szczecinski) or slow converging regions (Stargardzki). With a similar growth rate these regions could in theory catch up the leader in 75 to 102 years.

The leading economic sector in Euregion Pomerania in 2008 was Public administration and community services (L-P), which produced 30 % of the total GVA in the CBA. Highest share of employment in Euregion Pomerania was in 2008 recorded in Public administration and community services (L-P). Share of employment in this sector was in average 36,20 % of total employment in Euregion Pomerania.

Total intramural R&D expenditure in Euregion Pomerania was 1,66 in 2007, which is lower than the EU average (2,01). In Sydsverige (4,75) R&D expenditure was well above the EU and Swedish average (3,4). Zachoniopomorskie had the lowest R&D expenditure (0,24). Unemployment in Euregion Pomerania (11,13) was well above the European and national (Germany, Poland, Sweden) averages in 2010.

We studied environmental performance of the Northern Finland – Russia CBA based on indicators from the European Commission's 5th Cohesion Report and ESPON Climate Project. From the 5th Cohesion Report we selected six indicators; soil sealed area, ozone exceedance, waste water treatment, Natura 2000 areas, solar energy and wind power potential.

Soil sealing was particularly high in the city regions of Euregion Pomerania. In Stralsund soil sealed area covered as much as 37 % of the total land area. Ozone concentration exceedances were below national and EU averages in Euregion Pomerania. Urban waste water treatment capacity in Euregion Pomerania was

above national and EU averages in all other regions but Zachodniopomorskie, where the capacity was only 57 %. The share of NATURA 2000 areas values higher than national or European averages. Solar energy potential in the CBA is below European averages, but in line with national averages. Wind energy potential, on the other hand, is well above European average in Euregion Pomerania. Sensitivities to climate change were relatively low in all the regions of Euregion Pomerania.

Chapter 7. Factor analyses

The aim of the factor analyses was to compare the CBA's territorial profile to the performance of the CBA from the perspective of Lisbon / Europe 2020 Strategy and Gothenburg objectives. Two sets of indicators were established for the analyses: 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 in previous chapters (accessibility, rural-urban relationship and demography). Polycentricity was excluded at this point, because instead of using NUTS 3 level as a unit of analysis, it is based on the definition of FUAs and thus is not comparable. 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.

Table 45. Indicators for the study of territorial profile of the Poland – Germany – Sweden CBA.

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 1990-2006 agricultural areas	per 10000	1900-2006	NUTS 3
Net formation of urban fabric by total area 2000-2006	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

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.

Table 46. Indicators for the study of territorial performance of the Poland – Germany – Sweden CBA.

Indicator	UNITS	Year	Geographical unit
Unemployment rate	%	2008	NUTS 3
Long-term unemployment rate (>=12 months)	%	2009	NUTS 2
Youth unemployment rate, per labor 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

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

7.1. Centrality (FAC1_1)

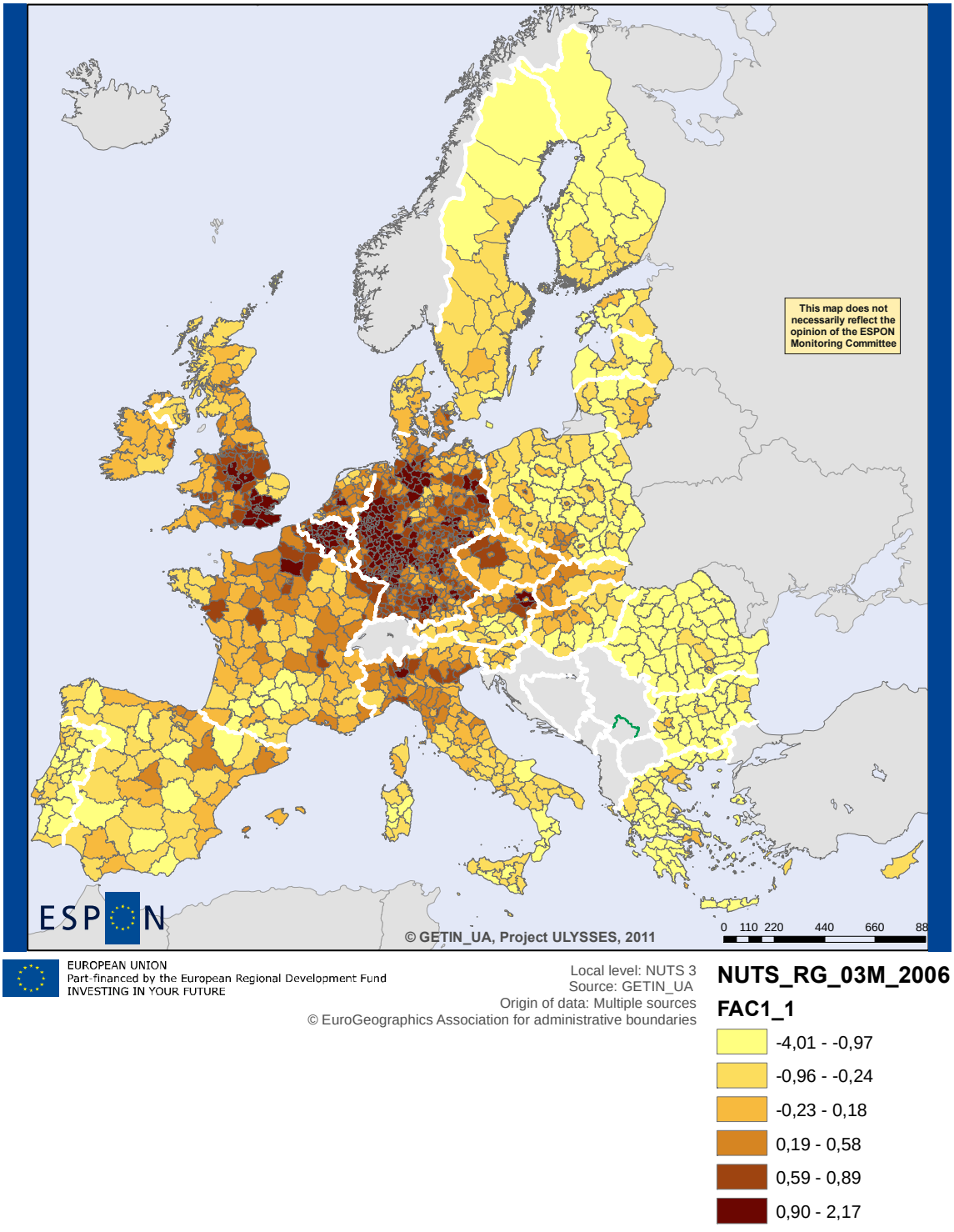
The first factor essentially expresses central location and has an explained variance of %14,83. It has high positive correlations with all the indicators regarding potential accessibility and, to a lesser extent, with the share of employment in financial intermediation and real estate, employment in 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. In Euregio Pomerania the region of Barnim received the highest centrality score.

Table 47. Results of analysis on Centrality FAC1_1 in Euregion Pomerania.

NUTS ID	NUTS	FAC1						
		Scores	Country comparison (weighted NUTS 3 average)				Country / CBA country level (+ -)	Percentile all NUTS 3
CS5			DE	PL	SE	All CBA countries		
All	All Countries	0,26	-0,54					80
DE	Germany	0,80	0,00			0,54		80
PL	Poland	-0,72	-1,52			-0,97		50
SE	Sweden	-0,56	-1,36			-0,82		50
DE412	Barnim	1,30	0,50			1,04	+ +	> 95
DE418	Uckermark	0,80	0,00			0,55	+ +	80
DE801	Greifswald	0,14	-0,66			-0,11	- -	50
DE802	Neubrandenburg	0,15	-0,65			-0,11	- -	50
DE805	Stralsund	0,08	-0,73			-0,18	- -	50
DE808	Demmin	-0,23	-1,03			-0,48	- -	50
DE80B	Mecklenburg-Strelitz	-0,15	-0,95			-0,41	- -	50
DE80D	Nordvorpommern	-0,10	-0,90			-0,36	- -	50
DE80F	Ostvorpommern	-0,01	-0,81			-0,26	- -	50
DE80H	Rügen	-0,25	-1,05			-0,50	- -	50
DE80I	Uecker-Randow	-0,26		0,46		-0,52	- +	50
PL422	Koszaliński	-0,53		0,19		-0,79	- +	50
PL423	Stargardzki	-0,67		0,05		-0,92	- +	50
PL424	Miasto Szczecin	0,34		1,05		0,08	+ +	80
PL425	Szczecinski	-0,12		0,60		-0,37	- +	50
SE224	Skåne län	-0,45			0,12	-0,70	- +	50

Figure 60. Results of analysis on Centrality FAC1_1 in Euregion Pomerania.



7.2. Research and development (FAC2_1)

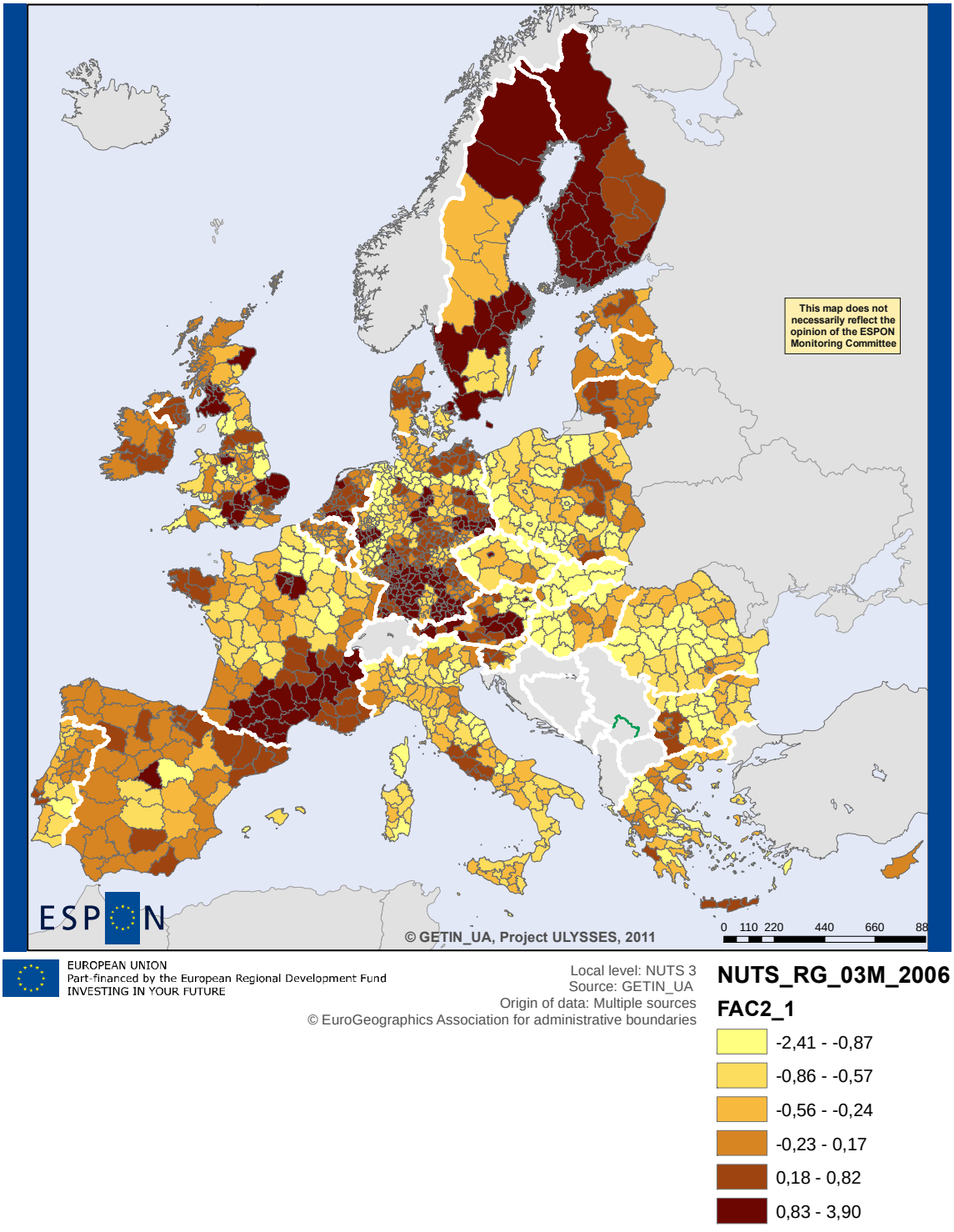
The explained variance of the research and development factor is % 8,04 and it mainly relates variables that are linked to innovation and scientific development such as R&D investment of different sectors and, to a lesser extent, EPO patent applications and tertiary educated active population. As said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

It is interesting to note that, besides the capital cities, it is possible to identify specific innovation strongholds such as important university towns or high tech industries (Airbus in the Toulouse area, Volkswagen around Wolfsburg, Cambridge or the Silicon Glen). The Scandinavian countries also have a very favourable position in this factor. This is valid also in the study of Euregion Pomerania, where Skåne län in Sweden received highest scores for the Research and development -factor analysis.

Table 48. Results of analysis on Research and development (FAC2_1) in Euregion Pomerania.

NUTS ID	NUTS	FAC2						
		Scores	Country comparison (weighted NUTS 3 average)				Country / CBA country level	Percentile all NUTS 3
CS5			DE	PL	SE	All CBA countries		
All	All Countries	0,20	-0,26					80
DE	Germany	0,45	0,00			0,26		80
PL	Poland	-0,65	-1,10			-0,85		50
SE	Sweden	1,42	0,96			1,22		95
DE412	Barnim	-1,15	-1,61			-1,35	- -	20
DE418	Uckermark	-0,99	-1,44			-1,19	- -	20
DE801	Greifswald	-0,04	-0,49			-0,24	- -	80
DE802	Neubrandenburg	0,02	-0,44			-0,18	- -	80
DE805	Stralsund	0,03	-0,42			-0,17	- -	80
DE808	Demmin	0,61	0,16			0,41	+ +	80
DE80B	Mecklenburg-Strelitz	0,20	-0,25			0,00	+ -	80
DE80D	Nordvorpommern	0,52	0,06			0,32	+ +	80
DE80F	Ostvorpommern	0,32	-0,14			0,12	+ -	80
DE80H	Rügen	0,55	0,10			0,35	+ +	80
DE80I	Uecker-Randow	0,13		0,77		-0,07	- +	80
PL422	Koszaliński	-0,81		-0,16		-1,01	- -	20
PL423	Stargardzki	-0,69		-0,05		-0,89	- -	50
PL424	Miasto Szczecin	-0,92		-0,27		-1,12	- -	20
PL425	Szczecinski	-0,96		-0,31		-1,15	- -	20
SE224	Skåne län	2,19			0,77	1,99	+ +	95

Figure 61. Results of analysis on Research and development (FAC2_1) in Euregion Pomerania.



7.3. 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.

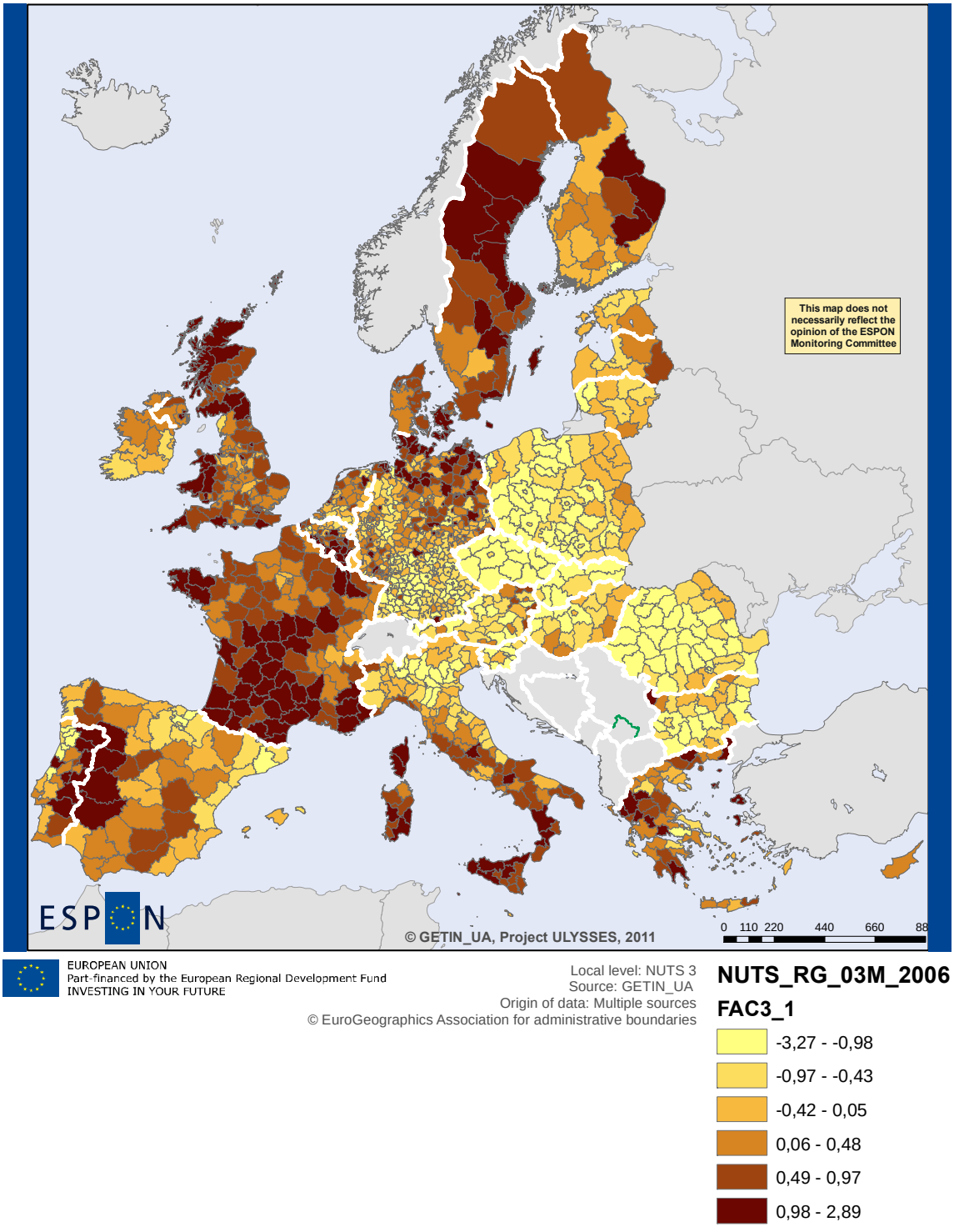
The regions with the highest scores of this factor are highly depressed regions in which, because of their poor economic performance, the public sector assumes an important position. It is interesting to see that most of the border NUTS 3 in Spain and Portugal have very high scores in this factor, as well as Karelia. The other cross-border 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. In Euregion Pomerania there were several regions that scored high in the Administrative centres -analysis. These are city regions on the German side of the CBA.

Table 49. Results of analysis on Administrative centres (FAC3_1) in Euregion Pomerania.

NUTS ID	NUTS	FAC3						
		Scores	Country comparison (weighted NUTS 3 average)				Country / CBA country level	Percentile all NUTS 3
CS5			DE	PL	SE	All CBA countries		
All	All Countries	-0,38	-0,21					50
DE	Germany	-0,17	0,00			0,21		50
PL	Poland	-1,07	-0,90			-0,69		20
SE	Sweden	0,66	0,83			1,04		80
DE412	Barnim	1,13	1,30			1,51	+ +	95
DE418	Uckermark	0,39	0,56			0,77	+ +	80
DE801	Greifswald	1,77	1,94			2,15	+ +	> 95
DE802	Neubrandenburg	1,53	1,70			1,91	+ +	95
DE805	Stralsund	2,30	2,47			2,68	+ +	> 95
DE808	Demmin	0,59	0,76			0,97	+ +	80
DE80B	Mecklenburg-Strelitz	1,79	1,96			2,17	+ +	> 95
DE80D	Nordvorpommern	1,48	1,65			1,85	+ +	95
DE80F	Ostvorpommern	1,23	1,40			1,60	+ +	95
DE80H	Rügen	0,90	1,08			1,28	+ +	95
DE80I	Uecker-Randow	2,60		3,67		2,98	+ +	> 95
PL422	Koszaliński	-0,47		0,61		-0,09	- +	50
PL423	Stargardzki	-0,41		0,66		-0,03	- +	50
PL424	Miasto Szczecin	-0,11		0,96		0,27	+ +	50
PL425	Szczecinski	-1,26		-0,19		-0,88	- -	20
SE224	Skåne län	0,53			-0,13	0,91	+ -	80

Figure 62. Results of analysis on Administrative centres (FAC3_1) in Euregion Pomerania.



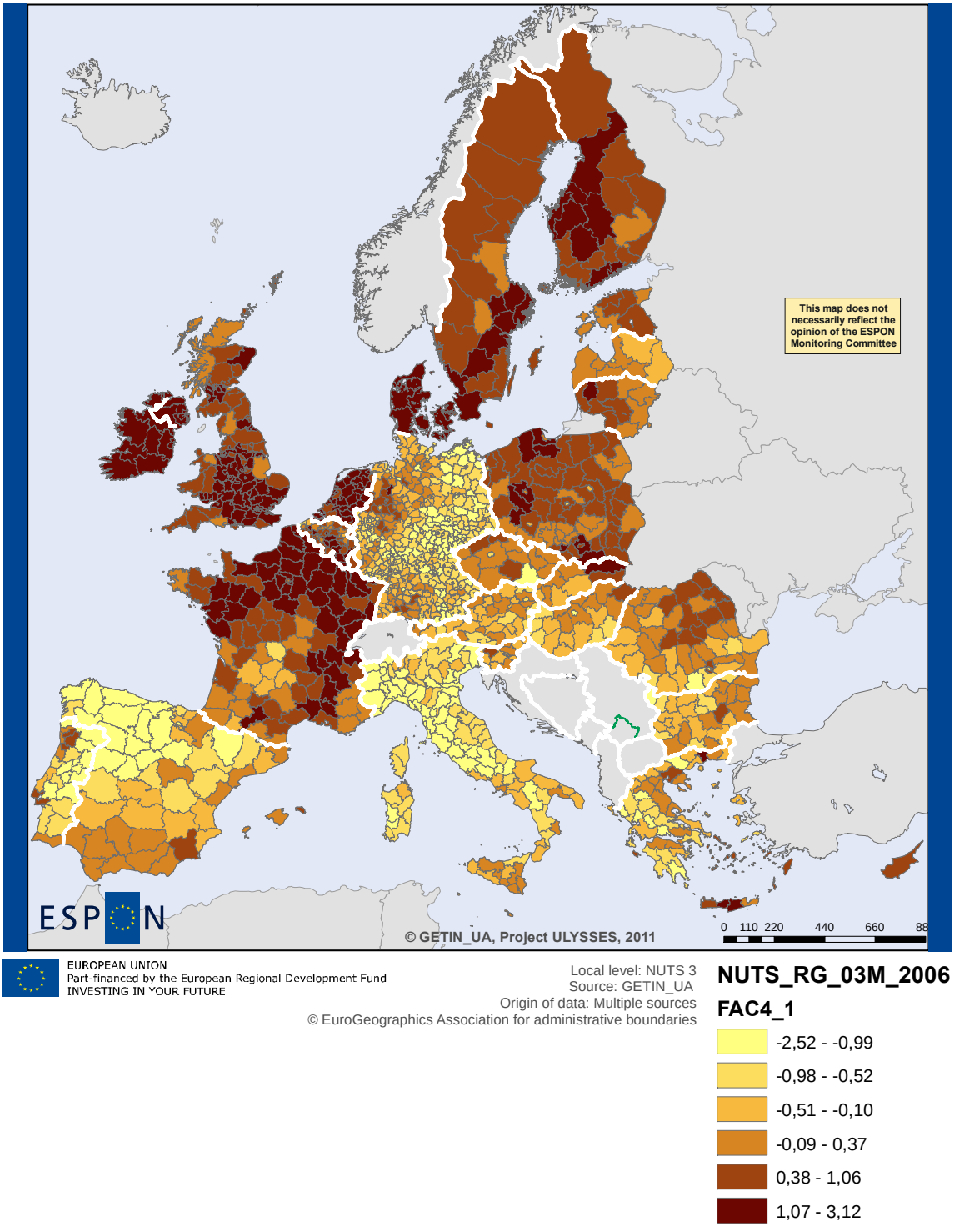
7.4. Demographic dynamism (FAC4_1)

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 region with the lowest scores of this factor are in the Mediterranean countries, such as Portugal, Spain and Greece as well as Germany. In Euregion Pomerania the best performance in demographic dynamism has Skåne län in Sweden, whereas Stralsund and Demmin have received high negative scores on demographic dynamism.

Table 50. Results of analysis on Demographic dynamism (FAC4_1) in Euregion Pomerania.

NUTS ID	NUTS	FAC4						
		Scores	Country comparison (weighted NUTS 3 average)				Country / CBA country level	Percentile all NUTS 3
CS5			DE	PL	SE	All CBA countries		
All	All Countries	-0,18	0,47					5
DE	Germany	-0,65	0,00			-0,47		5
PL	Poland	0,54	1,19			0,72		5
SE	Sweden	1,00	1,65			1,18		5
DE412	Barnim	-0,85	-0,20			-0,66	- -	5
DE418	Uckermark	-0,77	-0,12			-0,59	- -	5
DE801	Greifswald	-1,28	-0,63			-1,10	- -	5
DE802	Neubrandenburg	-0,81	-0,16			-0,63	- -	5
DE805	Stralsund	-1,76	-1,11			-1,58	- -	95
DE808	Demmin	-2,05	-1,40			-1,87	- -	95
DE80B	Mecklenburg-Strelitz	-0,84	-0,19			-0,66	- -	5
DE80D	Nordvorpommern	-1,20	-0,54			-1,01	- -	5
DE80F	Ostvorpommern	-1,20	-0,55			-1,02	- -	5
DE80H	Rügen	-1,34	-0,68			-1,15	- -	5
DE80I	Uecker-Randow	-1,42		-1,96		-1,24	- -	5
PL422	Koszaliński	0,48		-0,05		0,67	+ -	5
PL423	Stargardzki	0,61		0,07		0,79	+ +	5
PL424	Miasto Szczecin	-0,52		-1,05		-0,33	- -	5
PL425	Szczecinski	0,86		0,33		1,05	+ +	5
SE224	Skåne län	1,10			0,10	1,28	+ +	5

Figure 63. Results of analysis on Demographic dynamism (FAC4_1) in Euregion Pomerania.



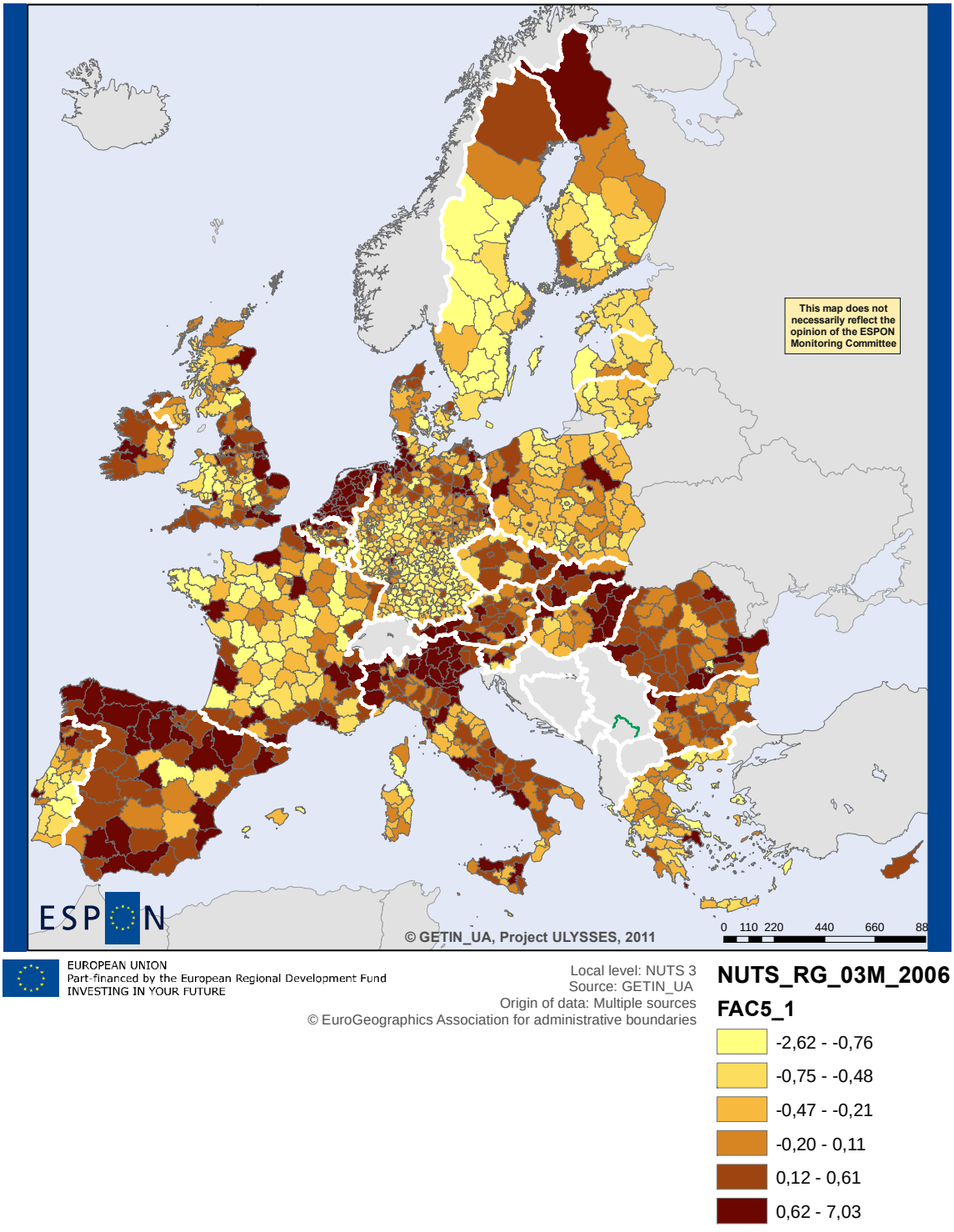
7.5. Environmental risks (FAC5_1)

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. Regions in coastal areas of Euregion Pomerania have scored high in this analysis, and are thus more sensitive to environmental risks related to climate change than other regions of the CBA.

Table 51. Results of analysis on Environmental risks (FAC5_1) in Euregion Pomerania.

NUTS ID	NUTS	FAC5						
		Scores	Country comparison (weighted NUTS 3 average)				Country / CBA country level	Percentile all NUTS 3
CS5			DE	PL	SE	All CBA countries		
All	All Countries	-0,13	-0,14					80
DE	Germany	0,01	0,00			0,14		80
PL	Poland	-0,31	-0,32			-0,18		50
SE	Sweden	-0,64	-0,65			-0,51		50
DE412	Barnim	-0,53	-0,55			-0,40	- -	50
DE418	Uckermark	-0,11	-0,12			0,02	+ -	80
DE801	Greifswald	1,24	1,23			1,37	+ +	95
DE802	Neubrandenburg	0,36	0,35			0,49	+ +	80
DE805	Stralsund	2,56	2,55			2,69	+ +	> 95
DE808	Demmin	0,00	-0,01			0,13	+ -	80
DE80B	Mecklenburg-Strelitz	-0,61	-0,63			-0,49	- -	50
DE80D	Nordvorpommern	0,50	0,49			0,63	+ +	95
DE80F	Ostvorpommern	0,79	0,77			0,92	+ +	95
DE80H	Rügen	0,53	0,52			0,66	+ +	95
DE80I	Uecker-Randow	-0,06		0,25		0,06	+ +	80
PL422	Koszaliński	0,18		0,49		0,31	+ +	80
PL423	Stargardzki	-0,03		0,28		0,10	+ +	80
PL424	Miasto Szczecin	1,34		1,65		1,47	+ +	95
PL425	Szczecinski	-0,04		0,27		0,09	+ +	80
SE224	Skåne län	-0,54			0,10	-0,41	- +	50

Figure 64. Results of analysis on Environmental risks (FAC5_1) in Euregion Pomerania.



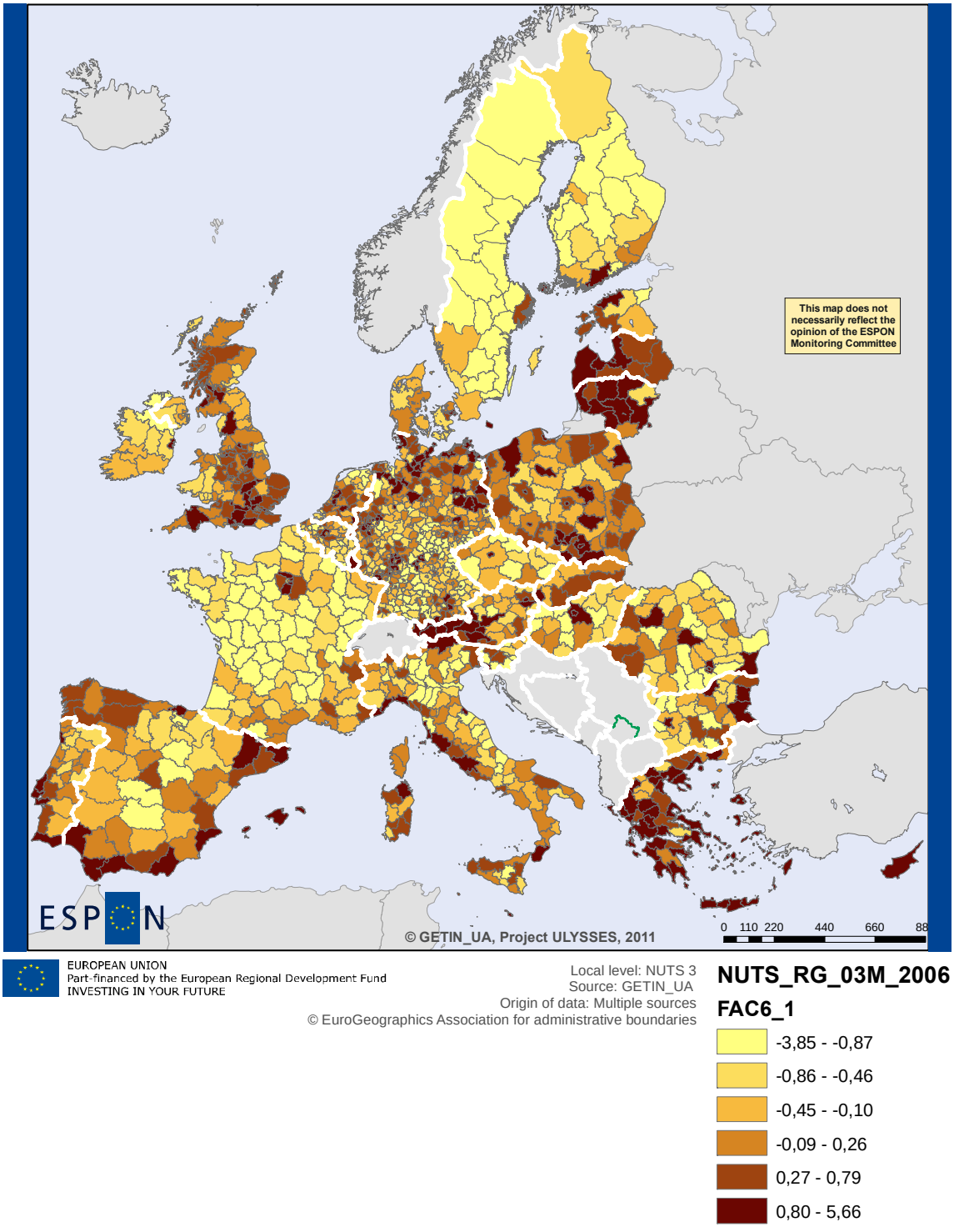
7.6. Services and transport (FAC6_1)

The 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.).

Table 52. Results of analysis on Services and transport (FAC6_1) in Euregion Pomerania.

NUTS ID	NUTS	FAC6						
		Scores	Country comparison (weighted NUTS 3 average)				Country / CBA country level	Percentile all NUTS 3
CS5			DE	PL	SE	All CBA countries		
All	All Countries	0,12	0,12					80
DE	Germany	0,00	0,00			-0,12		80
PL	Poland	0,56	0,55			0,43		80
SE	Sweden	-0,63	-0,63			-0,75		50
DE412	Barnim	0,54	0,54			0,42	+ +	80
DE418	Uckermark	-0,28	-0,29			-0,41	- -	50
DE801	Greifswald	-1,54	-1,54			-1,66	- -	5
DE802	Neubrandenburg	-0,02	-0,03			-0,15	- -	80
DE805	Stralsund	-1,21	-1,21			-1,33	- -	20
DE808	Demmin	-0,25	-0,25			-0,37	- -	50
DE80B	Mecklenburg-Strelitz	0,66	0,66			0,54	+ +	95
DE80D	Nordvorpommern	0,56	0,56			0,44	+ +	80
DE80F	Ostvorpommern	1,01	1,01			0,89	+ +	95
DE80H	Rügen	2,96	2,96			2,84	+ +	> 95
DE80I	Uecker-Randow	-1,23		-1,79		-1,35	- -	20
PL422	Koszaliński	0,90		0,35		0,78	+ +	95
PL423	Stargardzki	0,19		-0,37		0,07	+ -	80
PL424	Miasto Szczecin	1,49		0,93		1,36	+ +	95
PL425	Szczecinski	0,57		0,01		0,45	+ +	80
SE224	Skåne län	-0,25			0,37	-0,38	- +	50

Figure 65. Results of analysis on Services and transport (FAC6_1) in Euregion Pomerania.



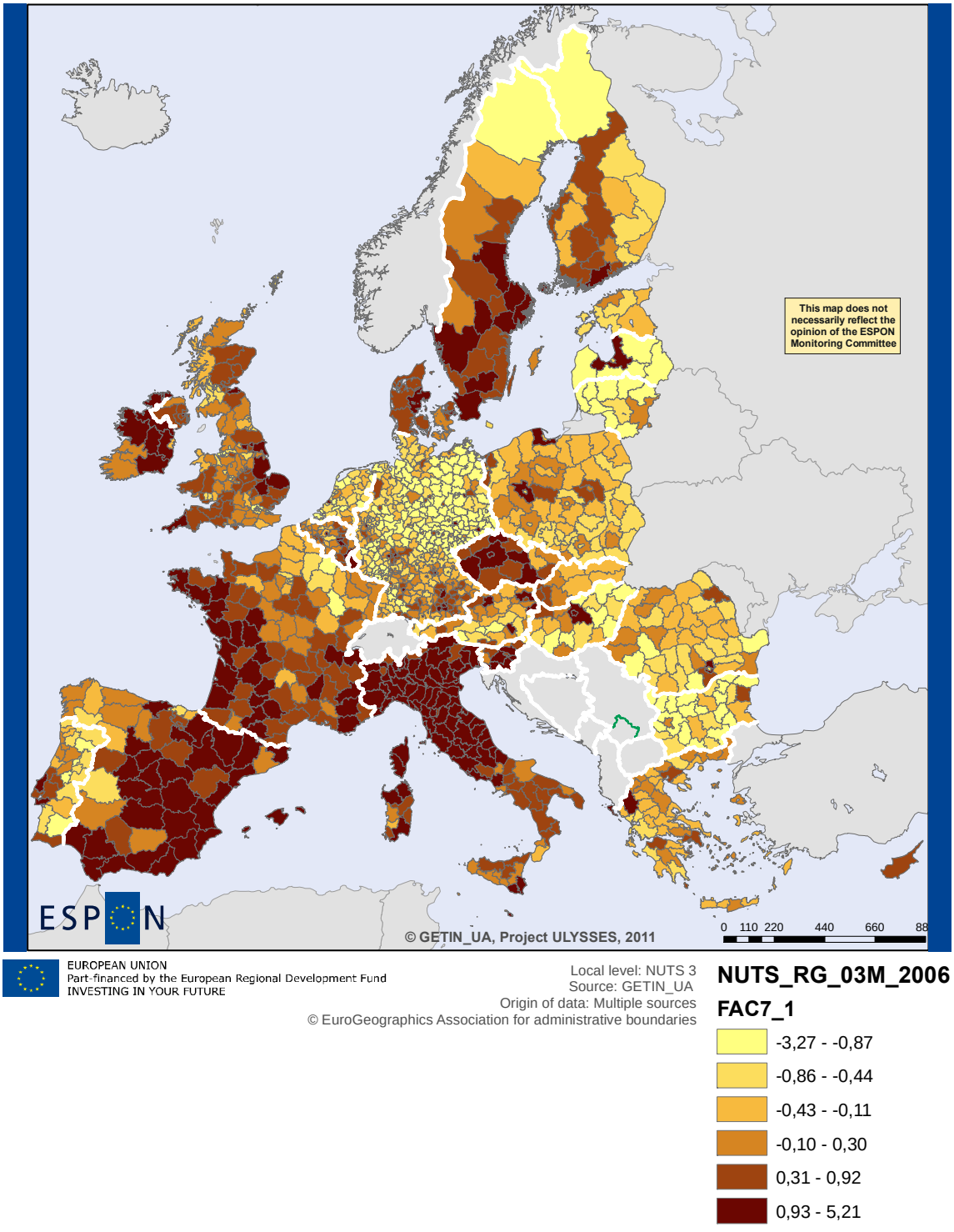
7.7. Immigration (FAC7_1)

The highly correlated variables of the factor 7 are population growth and 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. In Portugal border regions in general (and Alentejo in particular) have much lower values than the coastal regions, suggesting an internal migrations process towards the coast. Greifwald and Skåne län in Euregion Pomerania have had a positive net migration and thus have scored high in this analysis. It would be interesting to have a closer look at migration statistics and discover, where do the migrants come to these regions.

Table 53. Results of analysis on Immigration (FAC7_1) in Euregion Pomerania.

NUTS ID	NUTS	FAC7						
		Scores	Country comparison (weighted NUTS 3 average)				Country / CBA country level	Percentile all NUTS 3
CS5			DE	PL	SE	All CBA countries		
All	All Countries	-0,15	0,12					50
DE	Germany	-0,27	0,00			-0,12		50
PL	Poland	-0,20	0,07			-0,05		50
SE	Sweden	1,11	1,38			1,26		95
DE412	Barnim	-0,03	0,24			0,12	+ +	80
DE418	Uckermark	-2,29	-2,02			-2,14	- -	5
DE801	Greifswald	1,33	1,60			1,48	+ +	95
DE802	Neubrandenburg	-1,46	-1,19			-1,31	- -	20
DE805	Stralsund	-0,07	0,20			0,08	+ +	80
DE808	Demmin	-1,84	-1,57			-1,69	- -	5
DE80B	Mecklenburg-Strelitz	-1,88	-1,61			-1,73	- -	5
DE80D	Nordvorpommern	-1,76	-1,48			-1,60	- -	5
DE80F	Ostvorpommern	-1,45	-1,18			-1,29	- -	20
DE80H	Rügen	-1,80	-1,53			-1,64	- -	5
DE80I	Uecker-Randow	-1,38		-1,18		-1,23	- -	20
PL422	Koszaliński	-0,27		-0,07		-0,12	- -	50
PL423	Stargardzki	-0,47		-0,27		-0,32	- -	50
PL424	Miasto Szczecin	-0,42		-0,22		-0,27	- -	50
PL425	Szczecinski	0,31		0,51		0,46	+ +	80
SE224	Skåne län	1,77			0,67	1,93	+ +	95

Figure 66. Results of analysis on Immigration (FAC7_1) in Euregion Pomerania.



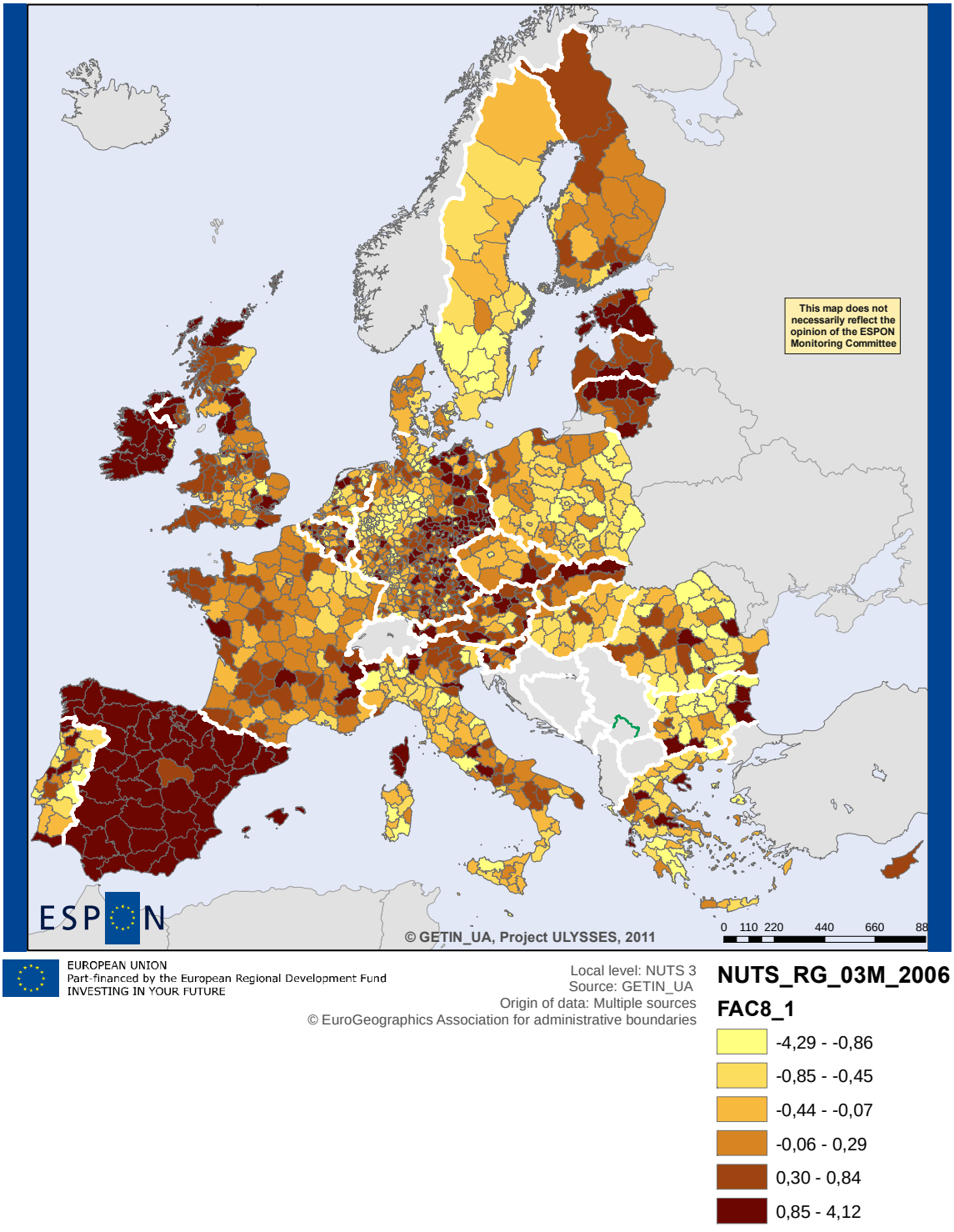
7.8. Construction (FAC8_1)

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, the Baltic States and Eastern Germany. In Euregio Pomerania the share of employment in construction has been decreasing, and diffences between regions concerning employment in construction vary relatively little between the regions.

Table 54. Results of analysis on Construction (FAC8_1) in Euregion Pomerania.

NUTS ID	NUTS	FAC8						
		Scores	Country comparison (weighted NUTS 3 average)				Country / CBA country level	Percentile all NUTS 3
CS5			DE	PL	SE	All CBA countries		
All	All Countries	-0,52	0,00					50
DE	Germany	-0,52	0,00			0,00		50
PL	Poland	-0,46	0,06			0,06		50
SE	Sweden	-0,76	-0,23			-0,24		20
DE412	Barnim	0,50	1,02			1,02	+ +	80
DE418	Uckermark	0,77	1,30			1,30	+ +	95
DE801	Greifswald	-1,43	-0,91			-0,91	- -	20
DE802	Neubrandenburg	-1,05	-0,52			-0,53	- -	20
DE805	Stralsund	-0,97	-0,45			-0,45	- -	20
DE808	Demmin	1,68	2,20			2,20	+ +	95
DE80B	Mecklenburg-Strelitz	0,26	0,78			0,78	+ +	80
DE80D	Nordvorpommern	1,03	1,55			1,55	+ +	95
DE80F	Ostvorpommern	0,16	0,68			0,68	+ +	80
DE80H	Rügen	-0,31	0,22			0,22	+ +	50
DE80I	Uecker-Randow	-0,16		0,31		0,37	+ +	50
PL422	Koszaliński	0,14		0,61		0,67	+ +	80
PL423	Stargardzki	0,37		0,83		0,89	+ +	80
PL424	Miasto Szczecin	0,18		0,64		0,70	+ +	80
PL425	Szczecinski	-0,19		0,28		0,34	+ +	50
SE224	Skåne län	-0,82			-0,06	-0,30	- -	20

Figure 67. Results of analysis on Construction (FAC8_1) in Euregion Pomerania.



7.9. 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 which 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 border-areas, 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. Unemployment is high in Euregion Pomerania as shown earlier in this study, and thus regions of the Euregion score high in this analysis.

Table 55. Results of analysis on Unemployment (FAC1_2) in Euregion Pomerania.

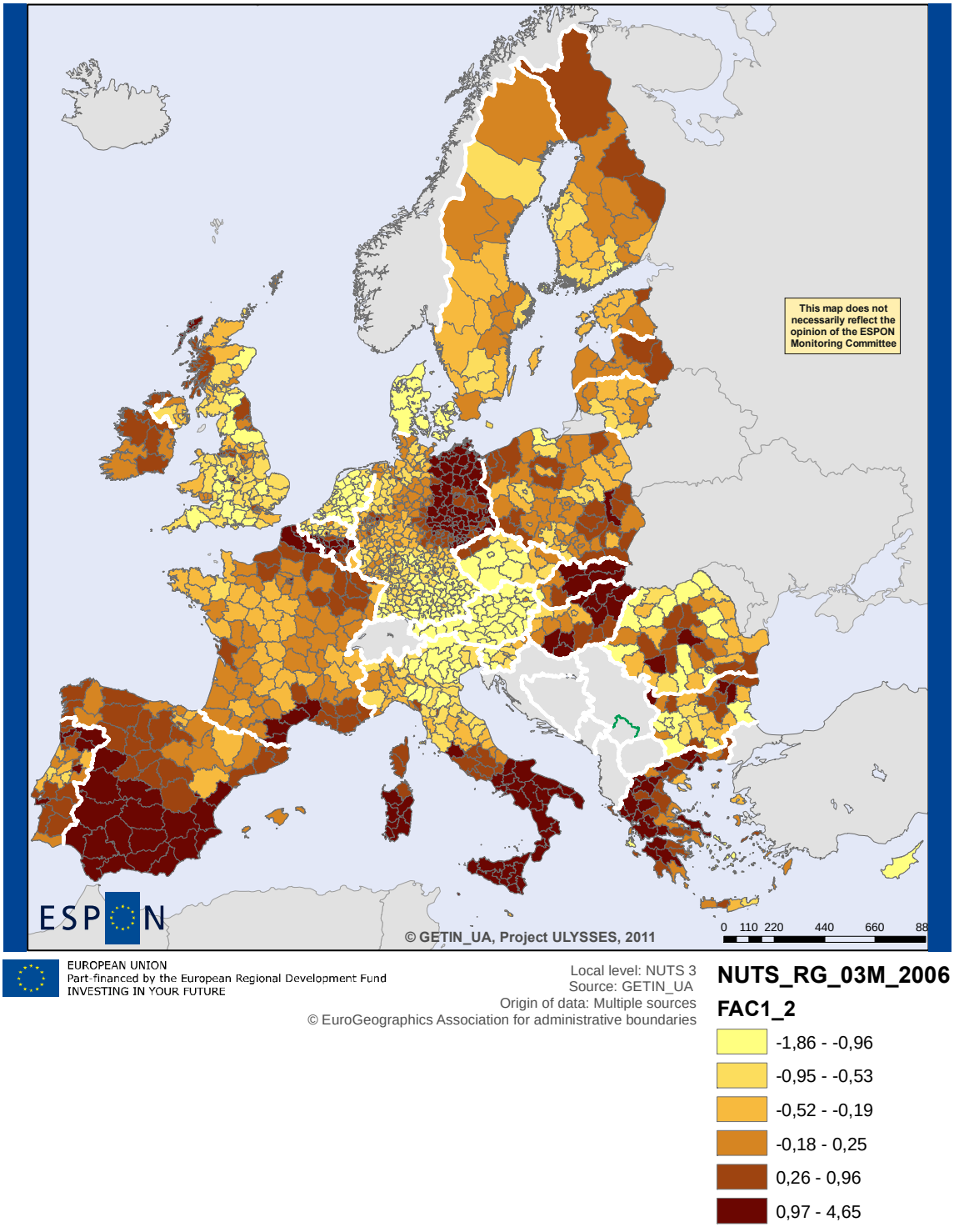
NUTS ID	NUTS	FAC1_2						
		Scores	Country comparison (weighted NUTS 3 average)				Country /CBA country level	Percentile all NUTS 3
CS5			DE	PL	SE	All CBA countries		
All	All Countries	0,00	-0,06					80
DE	Germany	0,06	0,00			0,06		80
PL	Poland	-0,04	-0,10			-0,04		80
SE	Sweden	-0,33	-0,39			-0,33		50
DE412	Barnim	1,44	1,38			1,44	+ +	95
DE418	Uckermark	2,41	2,35			2,41	+ +	> 95
DE801	Greifswald	2,00	1,94			2,00	+ +	95
DE802	Neubrandenburg	2,31	2,25			2,31	+ +	> 95
DE805	Stralsund	2,57	2,51			2,56	+ +	> 95
DE808	Demmin	2,51	2,45			2,51	+ +	> 95
DE80B	Mecklenburg-Strelitz	1,95	1,89			1,95	+ +	95
DE80D	Nordvorpommern	2,02	1,96			2,01	+ +	95
DE80F	Ostvorpommern	2,08	2,02			2,07	+ +	> 95
DE80H	Rügen	1,71	1,65			1,70	+ +	95
DE80I	Uecker-Randow	2,39		2,43		2,39	+ +	> 95
PL422	Koszaliński	0,89		0,93		0,88	+ +	95
PL423	Stargardzki	0,89		0,94		0,89	+ +	95
PL424	Miasto Szczecin	0,30		0,34		0,30	+ +	80
PL425	Szczecinski	0,54		0,58		0,54	+ +	80
SE224	Skåne län	-0,10			0,23	-0,10	- +	80

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 95,0%*	*Upper 95,0%*
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

Figure 68. Results of analysis on Unemployment (FAC1_2) in Euregion Pomerania.



7.10. 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 on the map that the correlation between high GDP growth and poor social conditions is essentially a consequence of a 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. Likewise in Euregion Pomerania, the growth of GDP in Poland has been rapid and therefore the Polish regions of the Euregio (following the national trend) score high in this analysis.

Table 56. Results of analysis on Catching-up regions (FAC2_2) in Euregion Pomerania.

NUTS ID	NUTS	FAC2_2						
		Scores	Country comparison (weighted NUTS 3 average)				Country / CBA country level	Percentile all NUTS 3
CS5			DE	PL	SE	All CBA countries		
All	All Countries	0,17	0,51					80
DE	Germany	-0,34	0,00			-0,51		80
PL	Poland	1,42	1,76			1,25		95
SE	Sweden	-0,43	-0,08			-0,59		50
DE412	Barnim	-0,96	-0,62			-1,13	- -	5
DE418	Uckermark	-1,23	-0,89			-1,40	- -	5
DE801	Greifswald	-0,49	-0,15			-0,66	- -	50
DE802	Neubrandenburg	-0,78	-0,43			-0,94	- -	20
DE805	Stralsund	-0,19	0,16			-0,36	- +	80
DE808	Demmin	-0,79	-0,45			-0,96	- -	20
DE80B	Mecklenburg-Strelitz	-0,84	-0,50			-1,01	- -	20
DE80D	Nordvorpommern	-0,76	-0,42			-0,93	- -	20
DE80F	Ostvorpommern	-0,71	-0,37			-0,88	- -	20
DE80H	Rügen	-0,82	-0,48			-0,99	- -	20
DE80I	Uecker-Randow	-0,77		-2,19		-0,94	- -	20
PL422	Koszaliński	1,52		0,11		1,35	+ +	95
PL423	Stargardzki	1,23		-0,18		1,06	+ -	95
PL424	Miasto Szczecin	1,72		0,30		1,55	+ +	95
PL425	Szczecinski	1,47		0,05		1,30	+ +	95
SE224	Skåne län	-0,80			-0,37	-0,97	- -	20

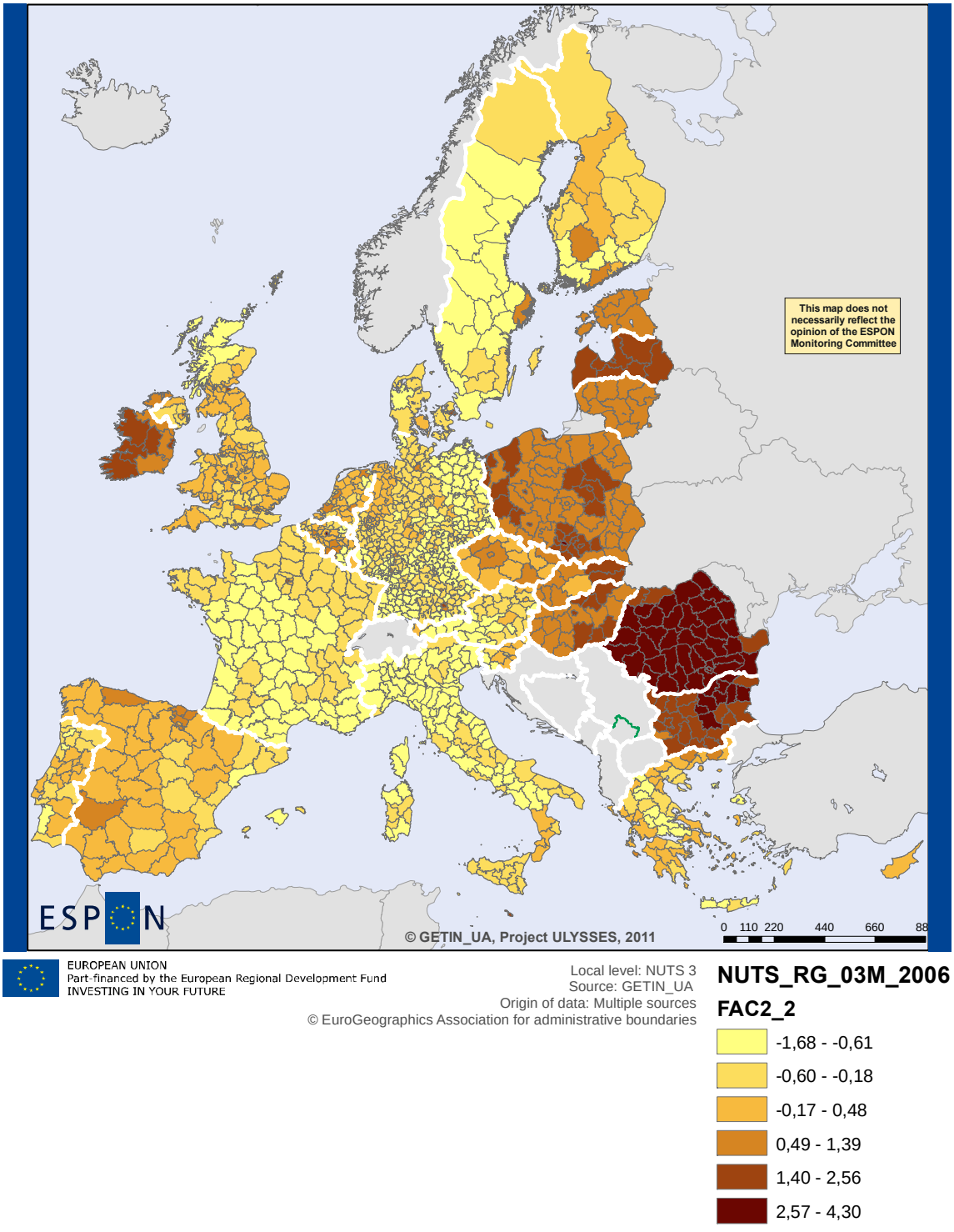
As stated above, the negative correlation of the catching-up indicator with other performance indicators in this factor is essentially linked to the high growth rates of the eastern countries in the initial decades of their transition to a market economy. As this is an historic contingency and does not 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 Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95,0%*	*Upper 95,0%*
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

Figure 69. Results of analysis on Catching-up regions (FAC2_2) in Euregion Pomerania.



7.11. 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. In Euregion Pomerania regions having high GDP per capita and high level of urbanisation of land areas are Greifswald and Stralsund, and they thus have scored high in this analysis.

Table 57 Results of analysis on Economic development (FAC3_2) in Euregion Pomerania.

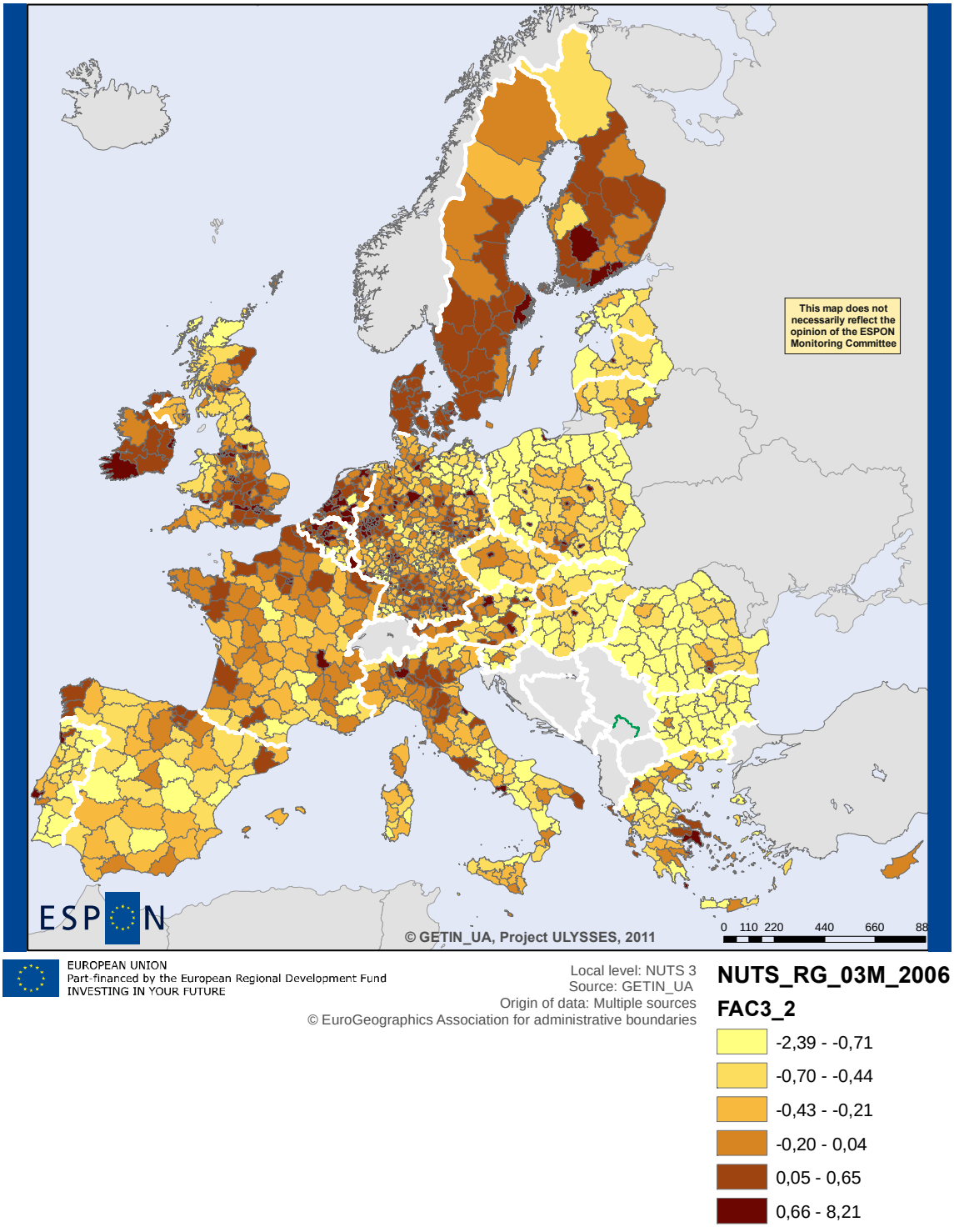
NUTS ID	NUTS	FAC3_2						
		Scores	Country comparison (weighted NUTS 3 average)				Country / CBA country level	Percentile all NUTS 3
CS5			DE	PL	SE	All CBA countries		
All	All Countries	0,32	-0,29					80
DE	Germany	0,61	0,00			0,29		95
PL	Poland	-0,32	-0,92			-0,64		50
SE	Sweden	0,41	-0,20			0,09		95
DE412	Barnim	-0,58	-1,19			-0,90	- -	50
DE418	Uckermark	-1,20	-1,81			-1,52	- -	5
DE801	Greifswald	0,79	0,19			0,47	+ +	95
DE802	Neubrandenburg	0,40	-0,20			0,08	+ -	80
DE805	Stralsund	2,33	1,72			2,01	+ +	> 95
DE808	Demmin	-0,54	-1,15			-0,86	- -	50
DE80B	Mecklenburg-Strelitz	-1,13	-1,74			-1,45	- -	5
DE80D	Nordvorpommern	-0,89	-1,49			-1,21	- -	20
DE80F	Ostvorpommern	-0,64	-1,24			-0,96	- -	50
DE80H	Rügen	-0,97	-1,57			-1,29	- -	20
DE80I	Uecker-Randow	-0,63		-0,32		-0,95	- -	50
PL422	Koszaliński	-1,13		-0,82		-1,45	- -	5
PL423	Stargardzki	-1,38		-1,07		-1,70	- -	5
PL424	Miasto Szczecin	-0,26		0,06		-0,58	- +	50
PL425	Szczecinski	-1,44		-1,12		-1,76	- -	5
SE224	Skåne län	0,19			-0,22	-0,13	- -	80

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 Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95,0%*	*Upper 95,0%*
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

Figure 70. Results of analysis on Economic development (FAC3_2) in Euregion Pomerania.



7.12. 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, 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.

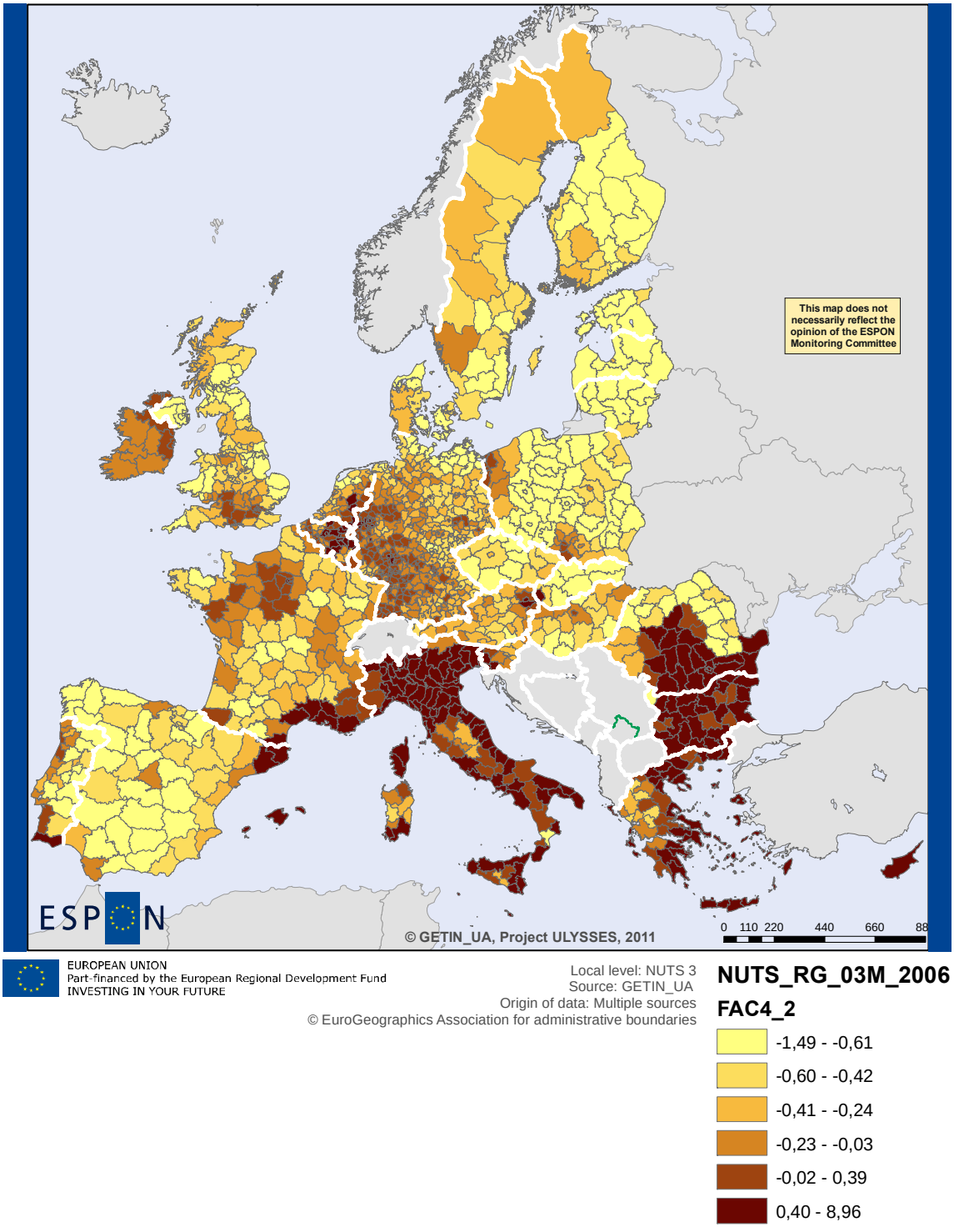
Table 58. Results of analysis on Pollution (FAC4_2) in Euregion Pomerania.

NUTS ID	NUTS	FAC4_2						
		Scores	Country comparison (weighted NUTS 3 average)				Country / CBA country level	Percentile all NUTS 3
CS5			DE	PL	SE	All CBA countries		
All	All Countries	-0,31	-0,19					50
DE	Germany	-0,12	0,00			0,19		80
PL	Poland	-0,68	-0,56			-0,37		20
SE	Sweden	-0,49	-0,37			-0,18		50
DE412	Barnim	-0,55	-0,44			-0,25	- -	50
DE418	Uckermark	-0,29	-0,17			0,02	+ -	50
DE801	Greifswald	-0,91	-0,80			-0,61	- -	20
DE802	Neubrandenburg	-0,28	-0,16			0,03	+ -	50
DE805	Stralsund	-0,98	-0,87			-0,68	- -	5
DE808	Demmin	-0,94	-0,82			-0,63	- -	5
DE80B	Mecklenburg-Strelitz	-0,62	-0,50			-0,31	- -	20
DE80D	Nordvorpommern	-0,99	-0,88			-0,68	- -	5
DE80F	Ostvorpommern	-1,02	-0,91			-0,72	- -	5
DE80H	Rügen	-0,79	-0,67			-0,48	- -	20
DE80I	Uecker-Randow	-0,99		-0,31		-0,68	- -	5
PL422	Koszaliński	-0,27		0,40		0,03	+ +	50
PL423	Stargardzki	-0,13		0,54		0,17	+ +	80
PL424	Miasto Szczecin	0,12		0,79		0,43	+ +	80
PL425	Szczecinski	0,00		0,68		0,31	+ +	80
SE224	Skåne län	-0,60			-0,11	-0,29	- -	20

Regression Statistics	
Multiple R	0,453723
R Square	0,205864
Adjusted R Square	0,199071
Standard Error	0,894946
Observations	1298

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95,0%*	*Upper 95,0%*
Intercept	1,07E-07	0,0248	4,3E-06	0,999996569	-0,04873	0,04873	-0,04873	0,04873
FAC1_1	-0,0666	0,0249	-2,67974	0,007461916	-0,11534	-0,01784	-0,11534	-0,01784
FAC2_1	-0,1221	0,0249	-4,91213	1,01672E-06	-0,17082	-0,07332	-0,17082	-0,07332
FAC3_1	-0,0901	0,0249	-3,62692	0,000298046	-0,13888	-0,04138	-0,13888	-0,04138
FAC4_1	-0,1422	0,0249	-5,72284	1,30207E-08	-0,19096	-0,09346	-0,19096	-0,09346
FAC5_1	0,0631	0,0249	2,537822	0,011271718	0,01431	0,11182	0,01431	0,11182
FAC6_1	0,2723	0,0249	10,95641	9,05477E-27	0,22352	0,32102	0,22352	0,32102
FAC7_1	0,2268	0,0249	9,12637	2,66302E-19	0,17804	0,27554	0,17804	0,27554
FAC8_1	-0,1153	0,0249	-4,63984	3,8429E-06	-0,16405	-0,06655	-0,16405	-0,06655
FAC9_1	-0,0461	0,0249	-1,85425	0,06393185	-0,09483	0,00267	-0,09483	0,00267
FAC10_1	0,1137	0,0249	4,573888	5,24943E-06	0,06491	0,16241	0,06491	0,16241
FAC11_1	-0,0175	0,0249	-0,70285	0,482273479	-0,06622	0,03129	-0,06622	0,03129

Figure 71. Results of analysis on Pollution (FAC4_2) in Euregion Pomerania (tendencies).



Chapter 8. Conclusions

To be completed.

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