ESPON

ESPON BSR-TeMo

Territorial Monitoring for the Baltic Sea Region

Scientific Platform and Tools Project 2013/3/9

Draft Final Report | Version 30/06/2013

Part C | Scientific Report

Volume C4 | Assessing territorial cohesion in the Baltic Sea Region

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Assessing territorial cohesion in the Baltic Sea Region

– Application and testing of the monitoring system through four case studies

ESPON BSR-TeMo

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Preamble

It is widely acknowledged that a picture says more than a thousand words.

According to this age-old formula, the fifty or so images in this report (not counting for the ones in the annex) would in the ESPON report template result in well over a hundred pages of mind-numbing text without a single image! We are certain that very few stakeholders would have the stamina needed to digest such amounts of written analysis.

We have consequently deliberately opted for a very graphical approach in this report, supplemented only by brief summarisations of the most relevant aspects and findings.

We hope that you may find useful information in this report and wish you a pleasant reading. The paper you are about to read is only a draft version, and we would be very thankful for any critical comments combined with suggestions for improvement that may arise along the way. We do appreciate any type of feedback in particular from the side of policy makers for whom this report is compiled.

The involvement of Baltic policy makers and in particular the VASAB CSPD has been valuable in the process of shaping the case studies and discussing their depth and scope. Owing to that, incorporation of data also from Russia and Belarus has been much easier and has allowed the project to sketch up one of the first spatial monitoring systems putting, so to speak, on equal footing EU member states and their neighbouring areas. The involvement of policy makers gives us hope that our monitoring system will be useful for day to day decision making processes and widely applied in the Baltic Sea region countries. These four case studies constitute examples of such application.

Dönsby, Karis, Finland

June 2013

1 Introduction

What are the key contents of this chapter?

We explain the context of this Work Package in the overall project, how the themes for the four specific test cases have emerged, how we have handled some internal dichotomies as to the stakeholder requirements, why the test cases appear so different in their outline and analytic depth, and we give details on some purely statistic-technical calculations that were required for producing the test cases. Finally we give details on how we have made the necessary extension of the official ESPON regional typologies to Belarus and NW Russia.

Hence, if such purely methodical issues are irrelevant for you at this stage, you may jump directly to the actual test cases (starting with the overall territorial cohesion case on page 13), which are fully comprehensible also without the information provided in this chapter.

1.1 The context and the objective of the testing of the monitoring system

WP 2.3 within this project consists of three consecutive sub tasks / research steps which are:

(i) Identification of test cases

(ii) Implementation and testing

(iii) Critical evaluation

The first step has been implemented through the two stakeholder meetings held in Potsdam and St Petersburg respectively as well as the communication from the ESPON CU ON the Inception and the Interim Report. This WP thus focuses on research step 2: Implementation and testing. The third and final subtask (Critical evaluation) will be finalised after the DFR has been submitted and when user feedback from this study has been assessed.

The objective of this testing is to establish the functionality of the monitoring system by pushing its analytical capacity to the maximum in a selection of “real life situations” where the ability to meet policy requirements constitutes the key parameter for assessment. According to the ToR of this project, we in the context of this monitoring system testing interpret policy requirement as being precisely that: functionality of the system in the form of an ability to extract relevant information for making balanced and as far as possible objective judgements about a tentative need to develop or close down policies or to evaluate the results of such already existing ones. The making of such a judgement is however handled over to the policy maker.

We thus wish to stress that you will not find any coherent lists of policy recommendations here, that lies far beyond the scope of this study. Nor will you encounter any targeted policy analysis. What you will find is a thematic

examination of certain aspects related to the concept of territorial cohesion within a not unequivocally stated general EU/BSR policy framework that is said to bear relevance for the region. Having said that, we have nonetheless occasionally contradicted this by including a limited amount of brief reflections with tentative relevance for wider policy making. These are however merely scattered reflections that have emerged during the course of the preparation of these case studies and are hence not in any way based on a coherent policy analysis.

The evolvement of the test issues and their selected focus are the result of a lengthy process starting with the requirements and suggestions put forth in a) the ToR of the project, b) the tender delivered by the TPG, c) Annex III to the project contract, d-e) the VASAB CSPD feedback from the two stakeholder meetings held so far (in Potsdam and St Petersburg), f) similar feedback received directly from individual countries, g) the CU response to the Inception Report, and finally ending with, h) the CU response to the Interim Report.

During this process four particular investigative areas have been agreed upon for testing the practical capacity of the monitoring system, namely testing its:

- ability to handle cross-cutting issues, where the overarching theme of territorial cohesion is able to utilise most of the information in the monitoring system
- functionality within a pronounced thematic focus, where BSR migration is highlighted;
- functionality to depict a particular geographic scope, where BSR border regions were deemed of specific interest; and finally
- overall benchmarking ability, where the BSR is benchmarked against the Alpine Space and the North Sea transnational regions.

Implicitly expressed, the requested results of the testing exercise are twofold. On the one hand the functionality of the monitoring system needs to be tested *per se.* This outcome could be deemed to be of a more technical nature. On the other hand, this testing is also expected to produce practical and user-friendly output that may be utilised in current BSR policy making.

These two separate requirements are not feasible to combine in one coherent package. As expressed already in the Interim report, we have solved this issue by separating most of the purely technical assessment into a separate third subtask (critical evaluation) to be performed after the delivery of the DFR. This also enables us to incorporate stakeholder observations/comments regarding the more descriptive part of the testing delivered in this report.

This paper is therefore more focussed on the second requirement of the testing phase, i.e. to produce usable output from the monitoring system that can be utilised in day-to-day policy development and assessment. However, also the chosen four practical test cases are unequal in terms of both depth and focus.

The last three test cases could be characterised as highly focussed whereas the first requires a much more holistic endeavour. This division is perceptible in the work that follows, where the last three test cases are more unidimensional in their approach and represent some sort of snapshots of the kind of thematic analysis that can be performed utilizing the information contained in the monitoring system.

In contrast to this, we regard the first test case (Territorial Cohesion) as a primary one, as it thematically addresses a wide array current policy issues. We have hence given this test case particular attention, experimenting with numerous analytic and visual techniques as well as a conscious utilisation of most

of the information contained in the monitoring system. In this case study we have also to some extent combined data across different domains.

However, most of the selected test cases are to some parts thematically overlapping. Although it can be discussed whether it is a sound choice or not, we have opted for making each of them a stand alone individual exercise rather than cross-referencing information across the cases. We believe this choice increases the usability of the material even if it inherently implies that some identical or nearly identical material will be presented in more than one test case simultaneously.

1.2 Technical considerations

Estimating comparative regional GDP levels for NW Russia and Belarus

Regional GDP data is available for both Russia and Belarus. This data is presented in national currency only (Russian and Belarusian roubles respectively). For the purpose of comparability we needed to convert this data into PPP that conforms to that utilised by Eurostat.

We transformed the national currency data into GDP in PPP conform to Eurostat's definitions by utilising the ratio of GDP/capita, PPP in current international $ from the World Bank for EU27 and respectively the Russian Federation and Republic of Belarus. We then applied this ratio to estimate GDP/capita levels in current prices PPP, index, EU27=100 based on Eurostat data at the national level for these countries, and finally adjusting these levels to the relative national stance of each regions in respective country.

Estimating the rate of economic growth

In Eurostat's New Cronos data base, at the regional level there is only available data for GDP in current prices or in current PPP. Such data cannot be compared over time. Due to inflation, one euro in 2005 is more than one euro in 2006. This also holds true for Russia and Belarus, where all GDP data is presented in current prices only. Wishing to provide a picture of real regional economic growth in the BSR, a standard measurement of economic attractivity and/or success, we were forced to overcome this lack of information.

We have acquired a deflator for GDP through calculating the intercept of total GDP in current and in fixed prices at the national level. For NW Russia and Belarus we used the GDP implicit deflator (ratio of GDP in current local currency to GDP in constant local currency) from the World Bank. In both cases we adjusted the scale so that the base year is 2005 throughout the data set. For converting roubles into euros we utilised Eurostat's indicator on average (annual) exchange rate for national currency/euros for Russia. Not finding this information for Belarus, we utilised the corresponding ditto from the World Bank instead. We finally adjusted all regional data with this acquired deflator, ending up with a time series on GDP in fixed 2005 prices.

We are well aware that utilising a *national* deflator on *regional* economies is not a straightforward issue. Particularly in large countries (such as the Russian Federation, or Germany), inflation is most likely very different in different parts of the country. This holds true for smaller but developmentally polarised countries as well. Furthermore, inflation particularly regarding GDP is also affected by the regional economic composition. In regions where a certain industry for example is prevailing (hence producing most of the GDP), changes in prices for input goods

to this industry may substantially affect the development of local GDP. We have however not been able to construct a method that could take account of such differences.

Thus, with all its limitations, this is the data we have utilised for depicting economic growth throughout this WP. We believe that doing so is better than omitting the entire issue of regional economic growth, or reducing it to a mere reflection of relative regional level changes to the EU average.

Transforming NUTS 3 –regions into NUTS 2 proxies

For the purpose of the benchmarking exercise (chapter 5 on page 100), we needed to spatially delimit the BSR, the North Sea and the Alpine space also at NUTS level 2. The spatial delimitations of the BSR and the Alpine Space Region are identical at both NUTS 3 and NUTS 2 levels and hence posed no challenges.

However, the spatial delimitation of the North Sea Region needs to be amended when transformed to NUTS level 2, because the definitions at NUTS level 3 in Sweden and in Scotland do not completely follow the borders of NUTS 2 regions. The classification principle used is that the entire NUTS 2 region is included, if a majority of its inhabitants live in the concerned NUTS 3 regions, otherwise not. More precisely, changes in transforming were:

In Sweden:

- SE221 not included at NUTS3-level, included at NUTS2-level
- SE212 included at NUTS3-level, not included at NUTS2-level
- SE311 included at NUTS3-level, not included at NUTS2-level

In Scotland:

- UKM63 and UKM64 not included at NUTS3-level, included at NUTS2-level

These differences are minuscule in a context of benchmarking the entire North Sea INTERREG region and do most likely affect the end results only extremely marginally.

Extending ESPON regional typologies to cover Belarus and northwest Russia

The ESPON 2013 Programme on the whole utilises ten specific regional typologies[1] that geographically span the entire ESPON space. The BSR parts of northwest Russia and Belarus are by definition not covered by these typologies. For comprehensive utilisation of these typologies in this project, there is hence a need to extend these typologies also for the non-ESPON parts of the BSR.

In this extension we have on the one hand focussed on those typologies that bear relevance for the greater BSR (thus excluding e.g. the typologies of outermost or mountainous regions, see below), and on the other hand on those typologies in general where existing data for Belarus and Russia actually allow for such an estimation.

The territorial level of the original ESPON typologies is NUTS 3, whereas we as a consequence of simple data availability have performed the estimation at the SNUTS 2 level for Belarus and northwest Russia. Particularly for those typologies

[1] These are: 1) Urban-rural regions; 2) Metropolitan regions; 3) Border regions; 4) Border regions - internal and external; 5) Island regions; 6) Sparsely populated regions; 7) Outermost regions; 8) Mountainous regions; 9) Coastal regions; and 10) Regions in industrial transition.

that have a clear urban dimension, as well as for the border typologies, this discrepancy in territorial levels poses substantial difficulties, with which we have been required to deal pragmatically.

The TPG wishes to emphasise that we have been forced to proxy much of the original methods simply due to lack of comparable information. The estimated typologies for Belarus and NW Russia should thus be viewed as *indicative alone*, and merely be *utilised for analytical rather than strict policy-oriented purposes*.

Hereunder follows a brief explanation on how we have performed the extension. In order to save space we have in this description focussed only on those points where the method (be it e.g. in terms of input data, temporal span, or other issues) differs from those utilised in the original ESPON typologies. Hence, for a comprehensive description of the full method utilised in the original typologies, please see e.g. European Commission (2011): Regional Typologies: a compilation, Regional Focus No 01/2011, DG Regio: Brussels.

Urban-rural regions

The original DG Regio typology is constructed in three steps: a) identification of rural areas; b) classification of regions; and c) adjustment of classification based on presence of cities. We have here followed a similar mode.

In the classification of rural areas (step "a") we have not been able to use data on land use in contiguous grid cells, but have utilised administratively based data on urban and rural population instead. The utilised thresholds are however nearly identical: for urban areas (in effect "non-rural") a density at least 300 inhabitants/km² (for Belarus similar threshold[2]) and also for Russia a minimum population of 10 000 inhabitants (dissimilar threshold, the original typology uses 5 000). The Russian data is taken from Nordregio Report 2005:1 and refers to the year 2001; the Belarusian data is supplemented by new figures on rurality from the 2009 census in order to accommodate the regional separation of Minsk city from its surrounding oblast.

The thresholds for step "b" are similar as in the original typology: "predominantly rural" if the share of population living in rural areas is higher than 50 %; "intermediate" if it is between 20 and 50 %; and "predominantly urban" if it is below 20 %.

In step "c" we have used similar thresholds as the original typology for the estimation of the presence of cities: a "predominantly rural" region which contains an urban centre of more than 200 000 inhabitants representing at least 25 % of the total regional population becomes "intermediate"; and an "intermediate" regions which contains an urban centre of more than 500 000 inhabitants representing at least 25 % of the total regional population becomes "predominantly urban". None such upgrading occurred based on the data utilised.

Finally, in the application of the typology's remoteness dimension on NW Russia and Belarus, lack of comparable data called for a proxy. In the original typology, an "intermediate" or a "predominantly rural" region is considered remote if less than half of its inhabitants can drive to a city of at least 50 000 inhabitants within 45 minutes.[3] All other regions in turn are considered "close to a city". As a proxy

[2] We have not been able to obtain information on population density in administrative urban units in Russia. However, bearing in mind that the Russian system of administrative division is very similar to that in Belarus (same historical development during the Soviet Union), and bearing in mind that the density in these Belarusian administratively defined cities ranges between 756 (lowest) and 14 358 (highest) inhabitants/km², we here *assume* that all administratively defined cities >10 000 inhabitants in NW Russia fall above the minimum threshold of 300 inhabitants/km².

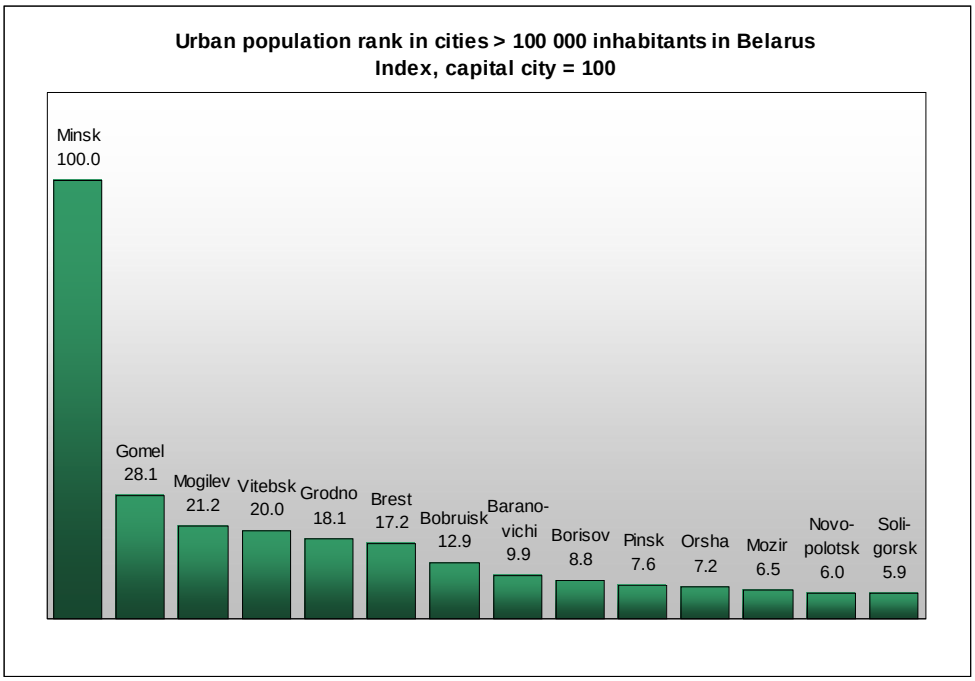
[3] In the original typology all "predominantly urban" regions are by default considered "close to a city". This is the case also in our extension of this typology.

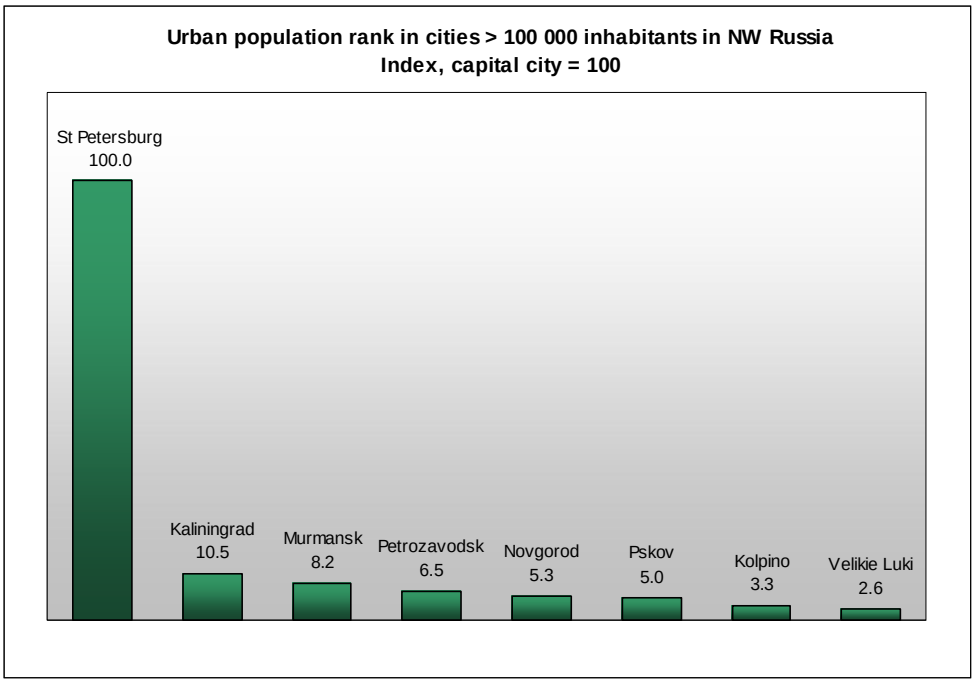
for this, we have here utilised data from: Schürmann & Spiekermann (2006): Accessibility Analysis of the Baltic Sea Region, Final Report, INTERREG III B Joint Secretariat. The data refers to the weighted regional average car travel time to a city with more than 50 000 inhabitants, where we put the threshold at a weighted regional average travel time of less than 90 minutes to such a centre.

Metropolitan regions

Once more, due to lack of comparable data, we have not been able to follow a similar rationale for classifying the metropolitan areas as is used in the original ESPON/DG Regio typology. We have not been able to use data on land use in contiguous grid cells, but have utilised administratively based data on urban population instead.

Figure 1: Urban rank in Belarus and northwest Russia





Data source: Hanell & Neubauer (2005): Cities of the Baltic Sea Region. Development Trends at the Turn of the Millennium, Nordregio Report 2005:1, Stockholm: Nordregio. Data refers approximately to the year 2001.

Primarily due to the discrepancy in the territorial levels used, we have also applied a more qualitative assessment in identifying the four specific categories of urban areas ("capital city region", "second tier metro region", "smaller metro region", and "other region").

In addition to Minsk, we have considered also St Petersburg as a "capital region" by virtue of its position as the capital of the Russian "Northwest Federal District".

Utilising - similarly to the original typology - a "natural break" threshold in identifying "second tier metro regions" for Belarus and NW Russia is not feasible

(Figure 1). In Belarus, all SNUTS2 regions outside the capital Minsk, apart from Minsk oblast, are in effect second tier city regions when examining the distribution of population in the largest cities. We have hence instead chosen not to classify all of Belarus into this category, but chose the second largest urban centre in Belarus, Gomel, as a "second tier metro region". In the oblasts containing the two next largest cities Mogilev and Vitebsk, the share of rural population in the regions is less than a third, whereupon we have labelled these "smaller metro regions". The three remaining regions in that country (Grodno, Brest and Minsk oblasts) have a rural population exceeding 30 % and are based on this consideration labelled as "other regions".

In NW Russia, the dominant position of St Petersburg implies that all other cities in the region are in comparison minuscule. The third largest city in the region Murmansk, in effect of its dominant position in the north and also due to its classification (in the previous typology) as a "predominantly urban region" implies that we have opted for here classifying the entire oblast as a "second tier metro region". Kaliningrad as an enclave and a major port to the region enjoys a special position in the urban hierarchy of NW Russia, whereupon we have also classified the entire oblast as a "second tier metro region". Disregarding the existence of major cities, the remaining regions in NW Russia are finally classified as "other regions" on account of the substantial rural population (roughly between 1/3 and 1/2).

Border regions

This typology considers all regions participating in cross-border cooperation programmes. For the BSR this implies that e.g. in addition to entire Denmark, Estonia and Latvia, most of Lithuania and Sweden as well as substantial parts of Finland and Norway would be considered a border region. This does not provide any analytical value-added for the BSR on the whole, whereupon we have not extended this typology to Belarus or NW Russia and have not utilised it in this study.

Border regions - internal and external

This typology considers all regions participating in the core areas of cross-border cooperation programmes in the programming period 2007-2013. In the EU/EFTA part of the BSR this would imply 37 NUTS 3 regions that participate in programmes involving countries outside both the EU and EFTA. We have extended this typology so that the R. of Karelia, and the oblasts of Murmansk, Leningrad, Novgorod, and Kaliningrad in NW Russia as well as Brest, Grodno and Vitebsk oblasts in Belarus are included as border regions. By doing this, we are able to capture the most significant border dimension between east and west BSR.

By focussing on external border regions only we have thus excluded all internal border regions between separate EU MS of the BSR. The rationale for this is basically twofold. On the one hand many EU and EFTA Member States, particularly the Nordic countries, are thoroughly integrated and the border status as such does not imply a substantially different relative socioeconomic stance vis-à-vis the non-border areas of these countries. On the other hand close to half of all BSR regions within EU/EFTA would be characterised as internal border regions, something which from an analytic point of view would not add value to the analysis, rather the contrary. This particularly since more than four fifths of thus identified non-border areas would be Polish or German interior regions. Furthermore, 26 NUTS 3 regions are both internal and external border regions at the same time, and an analysis of such mutually inclusive regions is conceptually very confusing.

We have finally, for sheer practical reasons, also opted not to single out external border regions in Poland (with CZ, SK and UA) and Belarus (with UA, and RU outside the BSR). An analysis of these would be severely hampered by lack of comparable regional data specifically on Ukrainian regions.

Island regions

No island regions are discernible in Belarus or NW Russia. We have hence coded all regions in this area to the category "Not an island region". Bearing in mind that in the EU/EFTA parts of the BSR, only three regions are classified as island ones (Åland, Gotland and Bornholm), we have utilised this typology very sparingly in the actual study.

Sparsely populated regions

The typology on sparsely populated regions is based on paragraph 30(b) of the Guidelines on national regional aid for 2007–13 (2006/C 54/08). In this, sparsely populated regions are regions with less than 12.5 inhabitants/km² at NUTS 3 level or less than 8 inhabitants/km² at NUTS level 2. As all our statistical regions in Belarus and NW Russia are SNUTS 2 ones, we have used the 8 inhabitants/km² threshold when extending this typology to these areas. Murmansk oblast and the R. of Karelia fall below this threshold.

Outermost regions

No comparable outermost regions are discernible in Belarus or NW Russia, as is the case in the EU/EFTA parts of the BSR. This typology hence bears little relevance to the BSR and we have not utilised it in this study.

Mountainous regions

Within the EU/EFTA part of the BSR, mountainous regions are only discernible in Norway (entire country save for two regions) and four regions in southern Poland. Even if the method of identifying these regions could be performed on Belarus and NW Russia, would no regions within these be classified as mountainous. For the BSR on the whole, this typology hence bears little relevance – neither policy nor analytic - and we have not utilised it in this study.

Coastal regions

The classification defines costal municipalities as municipalities with a coastline or no more than 10 km away from the coastline, which are then aggregated up to NUTS 3 regions. Based on the lower spatial level of analysis that allows for this, the original typology identifies four different classes of coastal regions, namely regions with a "low", a "medium", a "high" or a "very high" share of coastal population.

We have not been able to mimic this method and have simply chosen those five out of all fourteen regions in NW Russia and Belarus that lay by the coast (Murmansk, Karelia, Leningrad, St Petersburg and Kaliningrad) and classified these as coastal without any indication as to whether the share of population is low or high.

However, bearing in mind that in the EU/EFTA parts of the BSR, a total of 90 NUTS 3 regions (out of all 224 such) are classified as coastal, and that this group includes all BSR capitals apart from Berlin, Warsaw and Vilnius, and that the entire Denmark and a majority of the regions in Norway, Sweden, Finland, Estonia and Latvia also belong to this group, its analytical value-added to the BSR is rather limited. Hence we have in the forthcoming analysis interpreted the results of this typology very sparingly and with great caution.

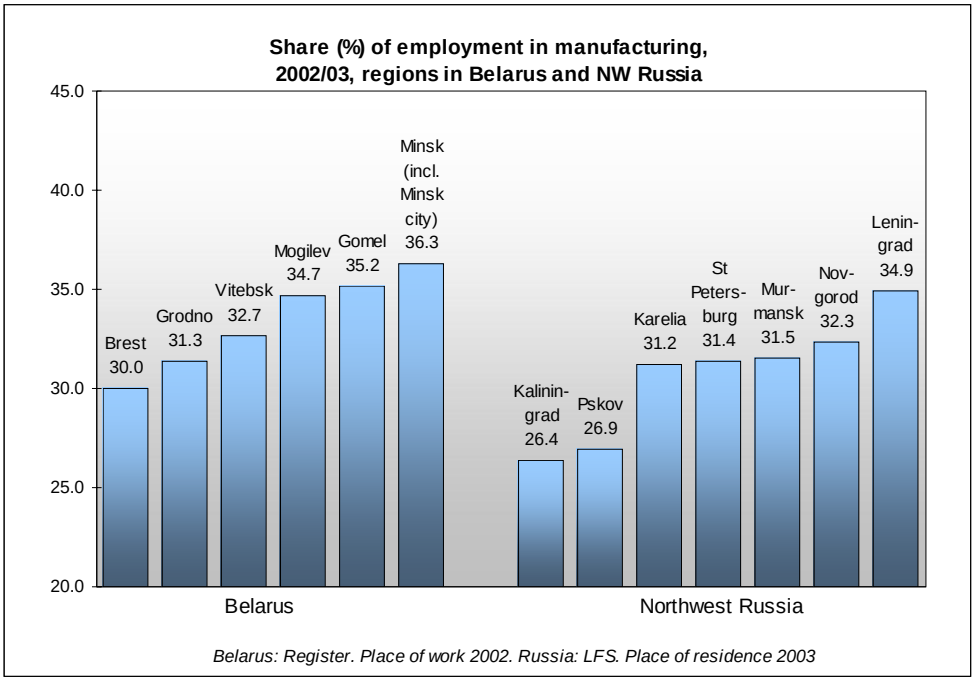
Regions in industrial transition

This typology stems from the ESPON Typology Compilation project. The original classification is constructed in two steps. In the first instance, industrial regions are identified as those, where the share of Gross Value Added and the share of employment in manufacturing at beginning of reference period (1995) are higher than 25% of total GVA and employment respectively that year. In the second instance, industrial regions are further subdivided based on whether the relative shares of GVA and employment have decreased between two points in time (1995 and 2005), whether both shares have increased or whether the two indicators have moved in opposite directions.

In northwest Russia and Belarus the share of employment in manufacturing is above the 25 % threshold in every region (Figure 2), with the probable, but not very likely, exception of Minsk city (which in this data is included in the surrounding oblast).

Comparable regional data on the share of manufacturing in the total GVA is not readily available for this area. However, national data from the World Bank (National accounts data base, www.worldbank.org) indicate that the share of the manufacturing industry in GDP was 44 % in Belarus in 2011 and correspondingly 37 % in the Russian Federation. In the prior ten year period to this, this share has been in a general increase in both countries.

Figure 2: Share of regional employment in manufacturing in Belarus and NW Russia 2002/2003



Data source: Hanell & Neubauer (2005): Cities of the Baltic Sea Region. Development Trends at the Turn of the Millennium, Nordregio Report 2005:1, Stockholm: Nordregio.

Although regional variations in the area are most likely substantial, based on the overall high shares in the national economy, it is probable that at least a considerable majority, if not all, of the regions in NW Russia as well as Belarus would be classified as industrial regions in case the typology criteria were applied on them. This assumption is reinforced by the documented high shares in employment. Taking into account the trend in both countries where manufacturing plays an increasingly important part in total value-added, it is also likely that most regions in the area would be classified as being in some sort of industrial transition.

Applying in this context the typology criteria on the regions in Belarus and northwest Russia – where all or nearly all of them would be classified as industrial transition regions – does not from an overall BSR point of view appear relevant in terms of analytic rationale. We have thus opted for not extending this typology to the area and consequently this typology will also not be utilised in the forthcoming analysis.

The ten indictors for territorial cohesion in the BSR

On pages 63-65 we introduce ten specific more or less complex macro level indicators for measuring overall territorial cohesion in the BSR. The methods for constructing these indicators are explained in detail in the related info box in chapter 2. The reason for not presenting this information in this technical section (where it arguably would be more natural) is that we wish that a tentative reader of the case study where the results of the ten measurements are presented also has the opportunity to grasp the rationale behind these ten indicators and thus assess the findings in light of this knowledge.

2 A holistic view on territorial cohesion in the BSR

The key messages of this test case are:

Regarding "A balanced territorial development"

- Recent trends in general territorial development in the BSR point towards increasing spatial polarisation further aggravating the already existing unbalanced regional structures.
- Certain trends however also point in the opposite direction leading to more balanced development and increasing convergence, not least the rapidly decreasing east-west divide economic divide.
- Employment growth in the BSR prior to the 2008 crisis acted cohesively, the subsequent reduction in jobs however had a sharply polarising effect, testifying of the periphery's weak resilience in face of external economic shocks.
- In terms of specific types of BSR territories, the statistical messages are, with certain distortions, fairly clear: these areas are with the exception of coastal areas generally lagging behind in most aspects of socioeconomic development.
- At the same time harnessing such territories pose considerable possibilities. The economic contribution for example of border regions in the total BSR value-added 2009-2010 was more than 13 %, that of sparse regions 11.4 %, remote regions for 11.4 %, and non-metropolitan regions close to 38 %.
- Bringing all BSR regions that lag behind the EU 2020 employment target up to target levels would imply more than two million new jobs created in the region.

Regarding "Diminishing territorial divides"

- Territorial divides in the BSR are pronounced in the light of the urban hierarchy. Regarding specific types of territories in the BSR, most appear to be moving in the wrong direction, border areas constituting the primary exception.
- The east-west border is no longer the most pronounced material welfare gap in the BSR as disparities across national borders have generally reduced
- In contrast, disparities in GDP/capita between adjacent regions inside countries have in the past 15 years exploded, particularly in eastern BSR, but most major metropolitan areas also in the west are being segregated from their surroundings. It is evident that the urban hierarchy is a decisive factor across the BSR in dictating the magnitude of on-the-ground territorial disparities.
- Corresponding disparities in unemployment rates show different patterns: country and economic structure are more important.

Regarding "Developing competitiveness through smart growth"

- In terms of higher education, the BSR shows cohesive development trends.
- R&D intensity still splits BSR in East and West, as is the case with employment rates.
- Projections show that out of all 44 NUTS 2 regions in the EU parts of the BSR, 13 already have or are projected to reach all EU employment rate targets by

the year 2020. 14 regions however are expected to reach neither their national target rates, nor the corresponding generic EU one.

- Of the 21 non-EU NUTS 2 regions in the BSR, most are beyond the 75 % target rate or projected to be so by 2020, whereas five regions are expected not to reach this level.

Regarding "Ensuring accessibility, connectivity and parity of access"

- Eastern BSR is still lagging behind in accessibility, but catch-up is rapid.
- Most disadvantaged types of territories are sparse and border regions.
- Capital regions and secondary city metropolitan areas have increased their accessibility most.
- Internet access in households follows the east-west gap.

Regarding "Ensuring sustainable growth"

- The high variations in soil sealing reflect the regions' diverse settlement structure.
- High per capita land use pressure is predominant in urban fringe regions.
- Air pollution in the BSR is largely a north-south affair.
- Eutrophication of the Baltic affects the entire sea except the open Bothnian Bay and certain coastal areas in the Gulf of Bothnia.

Regarding "Creating inclusive growth"

- The eastern BSR displays huge internal variations in life expectancy and the gap to western BSR is substantial. The development trends are cohesive, however.
- In terms of general health, the east-west divide is not clear-cut. Economic welfare explains only partly existing patterns in health.
- East-west differences in both relative and absolute poverty are fairly large in the BSR, but no straightforward territorial pattern is discernible.

The synthetic analysis displayed that

- The general trend of concentration of people, jobs and economic value-added is the norm in the BSR.
- The introduced ten indicators for measuring territorial cohesion in the BSR can be applied successfully in order to highlight general mega trends in territorial cohesion in the region. A multidimensional approach in applying these further ensures coherent interpretation of mixed trends stemming from different techniques.

The three principal BSR divides were in retrospect assessed so that

- Both the north-south as well as the urban rural gap of the BSR are growing further still.
- The east-west gap still exists, but it is changing form. From having been a primarily economic gap sharpest along the former iron curtain, it has now changed into a far more multifaceted divide, where social differences today are possibly the most pronounced ones.

In this test case we attempt to depict the monitoring system's ability to highlight the overarching issue of territorial cohesion in the BSR.

The traditional mode of doing such a testing would be to depart from an indicator- or a socioeconomic theme –based approach, where each indicator or domain would be assessed individually in terms of its contribution to cohesion.

The major difficulty in this sense would however be to provide a precise definition of territorial cohesion (c.f. Draft Finland Scientific Report, Volume 1), followed by a statistical operationalisation of this definition, and finally by a measurement of that same. We believe this is not possible. Even if it would be, we are of the opinion that this would make little sense, since that would only reflect our definition of territorial cohesion here, now, and in this particular context. Someone else, in a different time or context, would probably define territorial cohesion in a different manner.

Owing to the tentatively infinite possibilities to conceive territorial cohesion, there is also a clear necessity of maintaining a holistic view on the subject in order to capture as much of it that within a reasonable frame would be possible.

We have consequently addressed the theme from an altogether different angle. We have opted to highlight certain outspoken or at least relatively clearly understood BSR or EU wide strategic goals connected to a vast array of the territorial cohesion discourse and tried to fit in the information contained in the monitoring system into this loose framework. While this may not provide a full examination of each single component of the monitoring system, this approach nonetheless has the advantage of being able to connect to ongoing policy development better that a purely mechanical socio-economically thematic scrutiny.

As a starting point we have chosen a limited number of BSR-relevant generic macro level goals in core EU wide policies, notably the EU 2020 strategy including the EU strategy for the BSR as well as the Territorial Agenda for the European Union. Focus lies on such topics that have been identified as sharing common ground with current VASAB policy development and the selection is based on the analysis conducted in the interim report of this project (see also Draft Final Scientific Report, Volume 1). Not all topics identified have been included, though. After that we make an attempt to synthesize overall territorial cohesion trends and patterns in the BSR in the light of our introduction of ten specific macro level indicators for measuring territorial cohesion in the BSR. Finally we have addressed the three traditional BSR divides in light of the findings thus far by evaluating current patterns and trends specifically from the point of view of territorial cohesion across these divides.

It appears evident from the analysis to come that various targeted policies have a great need for further territorialisation, i.e. an adjustment to characteristics of different types of territories in order to harness the untapped potential identified in the analysis

In parallel, there also looks as if there is a growing importance of national and intraregional policies to address new types of divides within such a context.

Crises do in some cases brake a trend and in other cases reinforce unwanted such. Accordingly, the issue of territorial resilience has gained importance as a policy objective. As such, the key issue is to identify territorial factors contributing to such resilience

Crises do also generally jeopardise some of the long term spatial goals such as polycentricity and balanced development. There appears a need for a national level of arbitration between long term and short term goals, or at the minimum, recognition of these challenges.

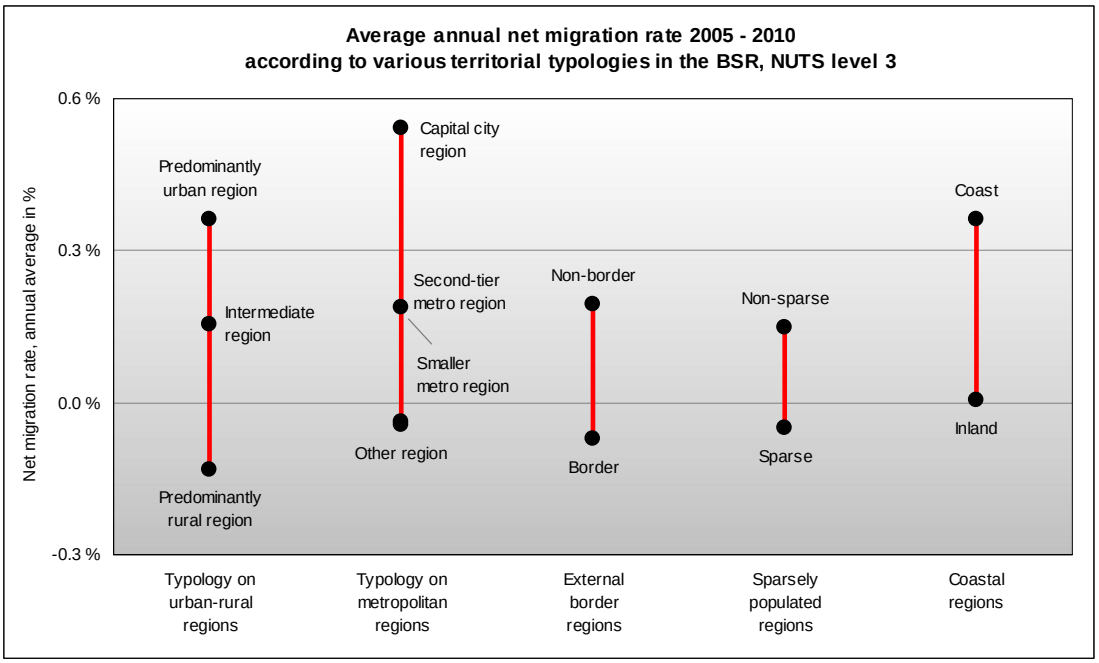
A balanced territorial development

Ongoing BSR polarisation across most socioeconomic realms

As has been the case for the past 20 years or, also recent trends in general territorial development in the BSR point towards increasing spatial polarisation. At a general level this polarisation looks surprisingly similar across all domains of the socioeconomic sphere encompassing among others demography, economic development, economic vulnerability, innovation, entrepreneurship, the knowledge economy, lack of polycentric urban structures, social development, and so forth. The BSR is nowhere unique in this respect and similar developments can be found across virtually entire Europe

The general pattern of this ongoing development in the BSR is illustrated for example by Figure 3, which depicts average net migration rates for various types of BSR territories 2005-2010. On the urban-rural axis, predominantly urban regions are in this respect taking a clear lead whereas predominantly rural regions on the other hand are at the bottom of the scale.

Figure 3: Net migration rate according to various typologies in the BSR 2005-2010



Data source: Eurostat, Belstat, Rosstat. NW Russia: 2005-2009; Finland & Denmark: 2007-2010.

When addressing the issue from the point of view of a more pronounced urban hierarchy, a very similar pecking order emerges, where capital city metropolitan areas exceed all other types of regions, and only ten urban regions (out of 238 regions in total) swallow 47 % of all migration surplus in the BSR.

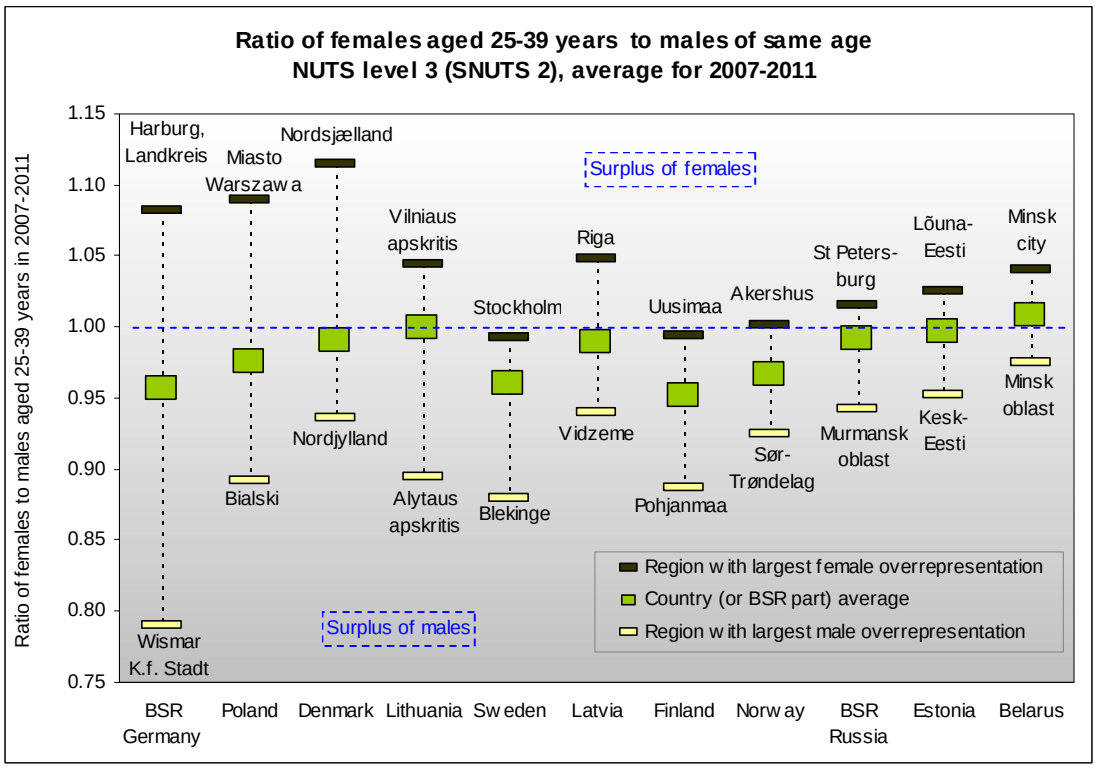
What is more, border regions, sparsely populated ones, as well as inland areas all appear hampered by negative, or in the case of inland areas at least in relative terms lower, levels of migration.

This trend of population concentration by and large also reflects most other strata of socioeconomic development.

Unsustainable demographic structures

In the BSR as throughout Europe, a predominant group among the migrants constitutes the young. Initially leaving for studies, after which normally locating close to the study site, this trend increases the already precarious territorial balance between core and periphery. Furthermore, as the gender balance of such rural-urban migration is biased via a comparatively large section of migrants being females, such selective migration results in increasingly unbalanced demographic structures.

Figure 4: Gender imbalances in age group 25-39 years across BSR countries 2007-2011



Data sources: Statistisches Bundesamt, GUS (Central Statistical Office), Statistics Denmark, Statistics Lithuania, Statistics Sweden, Latvijas Statistika, Statistics Finland, Statistics Norway, Rosstat, Statistics Estonia, and Belstat. Belarus: 2010-2011; BSR Germany: 2009-2011; Denmark: 2008-2011; BSR Russia: 2011.

The periphery is left with an increasingly ageing population, and among the dwindling classes of younger age groups, males predominate. International immigration (primarily males in working age) helps to alleviate the gender balance in larger metropolitan areas, which however is not the case in the peripheries.

In the long run such a dichotomous structure acts as a real barrier to family start-ups, resulting in lower nativity which in turn further aggravates the balance between periphery and core. Figure 4 depicts the gender imbalance in the prime

family start-up age group of 25-39 years. In the top regions in virtually each BSR country, males of this age may be overrepresented by as much as 10-20 %. Nearly all of these regions are rural and/or peripheral. At the other end of the scale then are primarily large urban regions, typically the country capital.

There are no profound differences between eastern and western BSR in this respect.

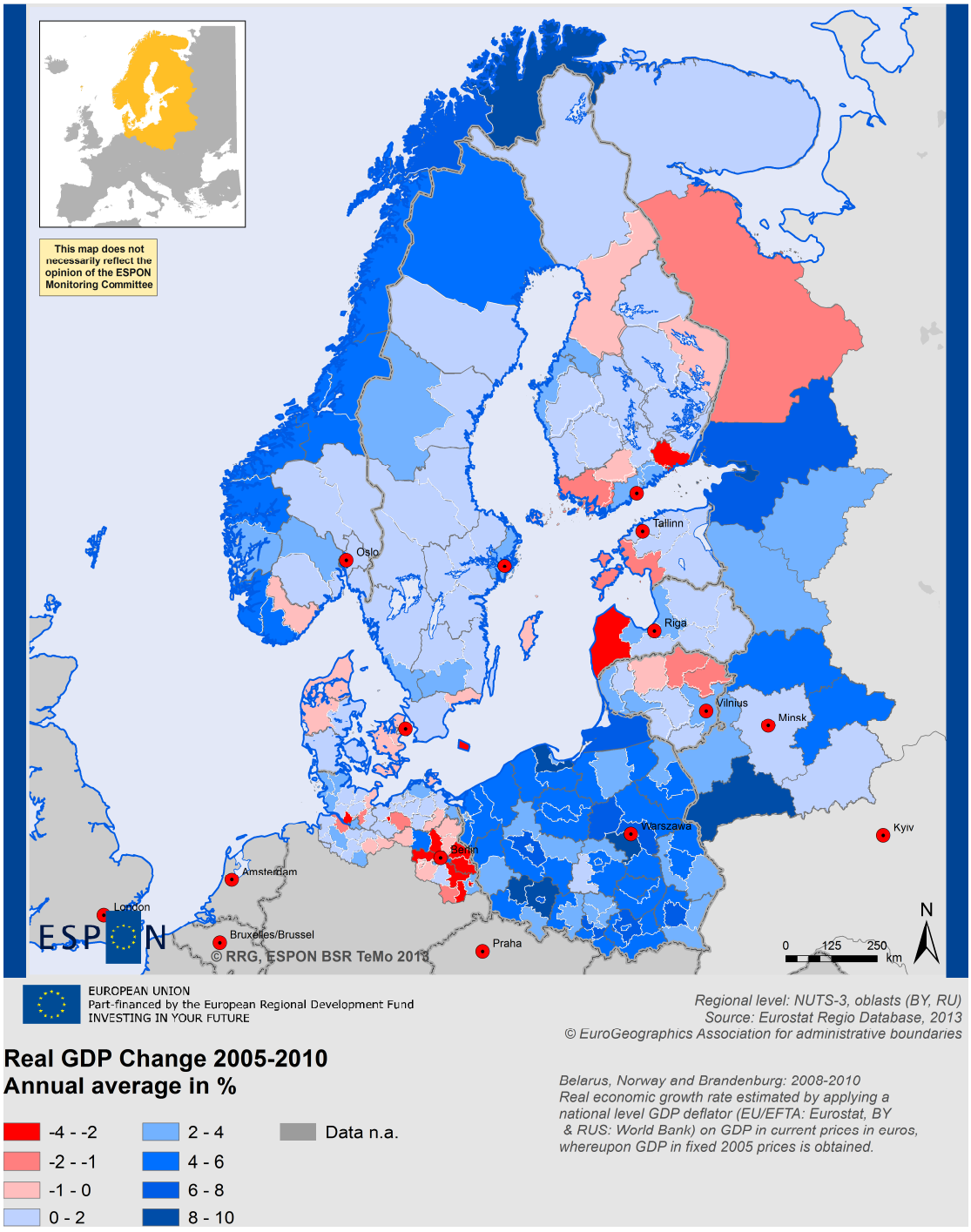
Growth in economic value-added alleviates the east-west divide

Despite the general trend of polarisation across the BSR, the concentration of economic value-added during the period 2005 to 2010 has not showed a clear core-periphery pattern, as is evident in Figure 5. The main general dividing factor is that of between east and west. The average annual macroeconomic growth rate in the entire BSR was 2.2 % during the period. Of this, 1.7 % was in the western BSR but as much as 3.7 % in eastern ditto. In the western BSR, most of Norway constitutes the exception to the general pattern, whereas parts of the Baltic States as well as Karelia do so in the east. The general east-west gap is hence in this respect being diminished.

The reduction in economic output was particularly severe in the western parts of the BSR, where production between 2008 and 2009 fell three times as much than was the case in the east.

Beyond this, certain common trends are discernible, however. The economies of predominantly urban areas have on average grown more than 3 percent per year, i.e. considerably exceeding the average rate for the BSR, further expanding the already existing gap.

Figure 5: Real GDP change in the BSR 2005-2010



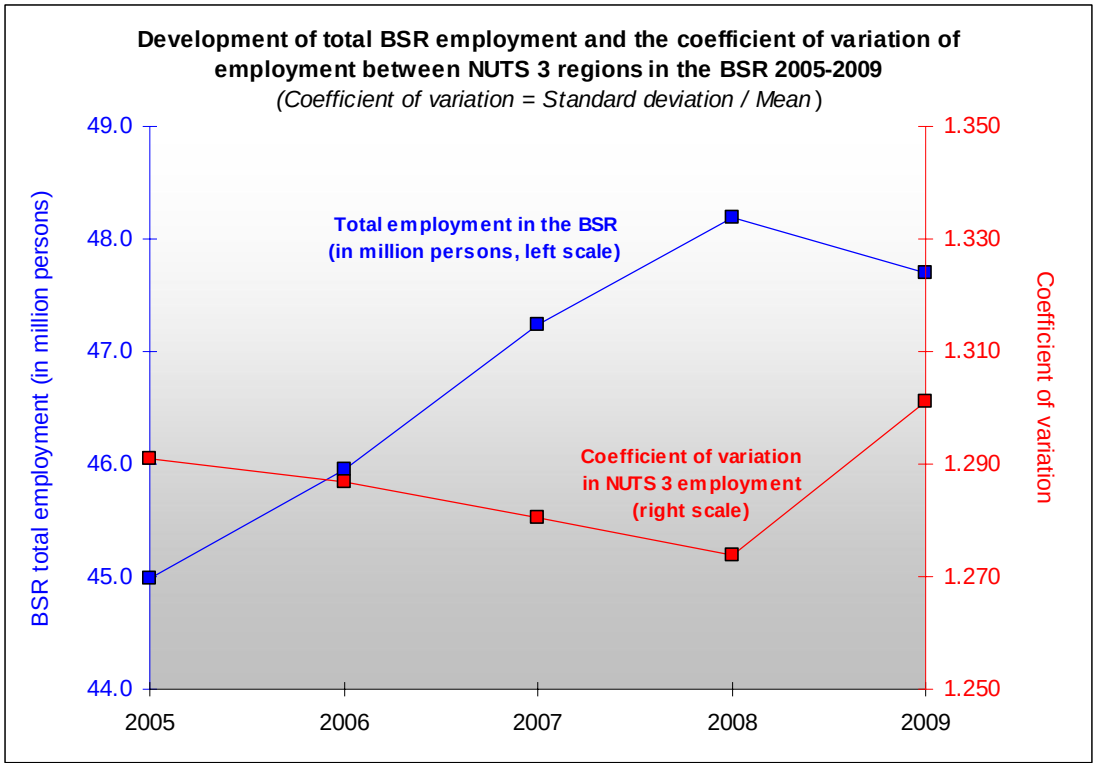
New jobs along the urban hierarchy ladder, subsequent losses in the periphery

During the three-year period 2005-2008, some three million new jobs were created in the BSR, two in the east, one in the west. In the subsequent crisis of 2008, the BSR lost approximately half a million jobs, equally distributed between east and west alike. The downturn in the eastern BSR was close to twice as high as that in the western parts of the region.

An alarming pattern however emerges when examining the spatial distribution of these jobs in the BSR, and at a macroregional level, a polarising development is

apparent. In Figure 6, the blue line depicts the development of total BSR employment, which grew continually up till 2008, after which it subsequently decreased. The change in the coefficient of variation of regional employment in the BSR depicts changes in intraregional (NUTS3/SNUTS 2) differences in this respect. This indicator (red line) decreased up till 2008, and only thereafter started to increase fairly rapidly.

Figure 6: Development of total employment and the coefficient of variation of employment at NUTS level 3 in the BSR 2005-2009

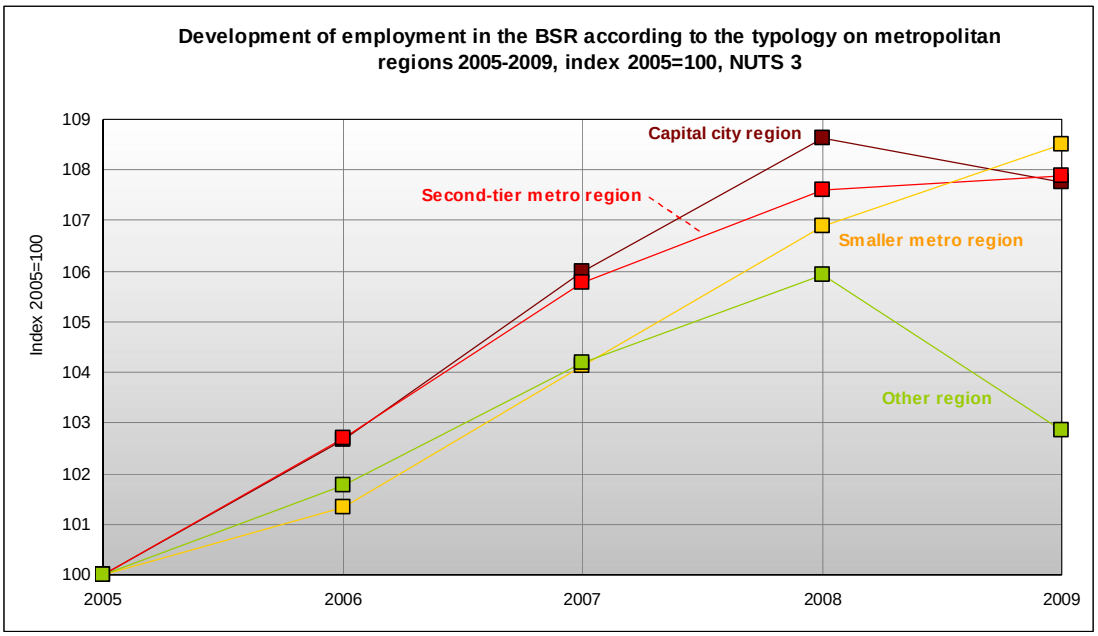


Data source: Eurostat, Belstat, Rosstat. SNUTS 2 for Belarus and NW Russia.

When analysing these two indicators jointly, we may conclude that when the number of jobs increased in the BSR, this increase was apparently beneficial to most smaller regions in the area as intraregional differences were reduced. However, when the number of jobs started to decrease as a result of the financial crisis of 2008, that decrease was not evenly distributed among the regions. Some of them lost relatively more than others, resulting in a concentration to larger regions, a testimony of the weak resilience of rural and/or peripheral areas in front of external economic shocks. To find out specifically which types of regions have been affected in which way, we need once more revert to regional typologies.

Looking specifically in what kind of locations these jobs were created (Figure 7), between 2005 and 2008, new employment has followed a rather strict hierarchical ranking of settlement types, where capital regions have gained most jobs, followed by second tier metropolitan areas. Smaller metro regions (i.e. typically SMESTOs), have also fared well, but new job creation has not been as fast in the remaining regions, which are primarily rural and/or peripheral. Differences in this growth phase between different types of regions were to a certain extent clear, however not enormous.

Figure 7: Development of employment by typology on metropolitan regions in the BSR 2005-2009



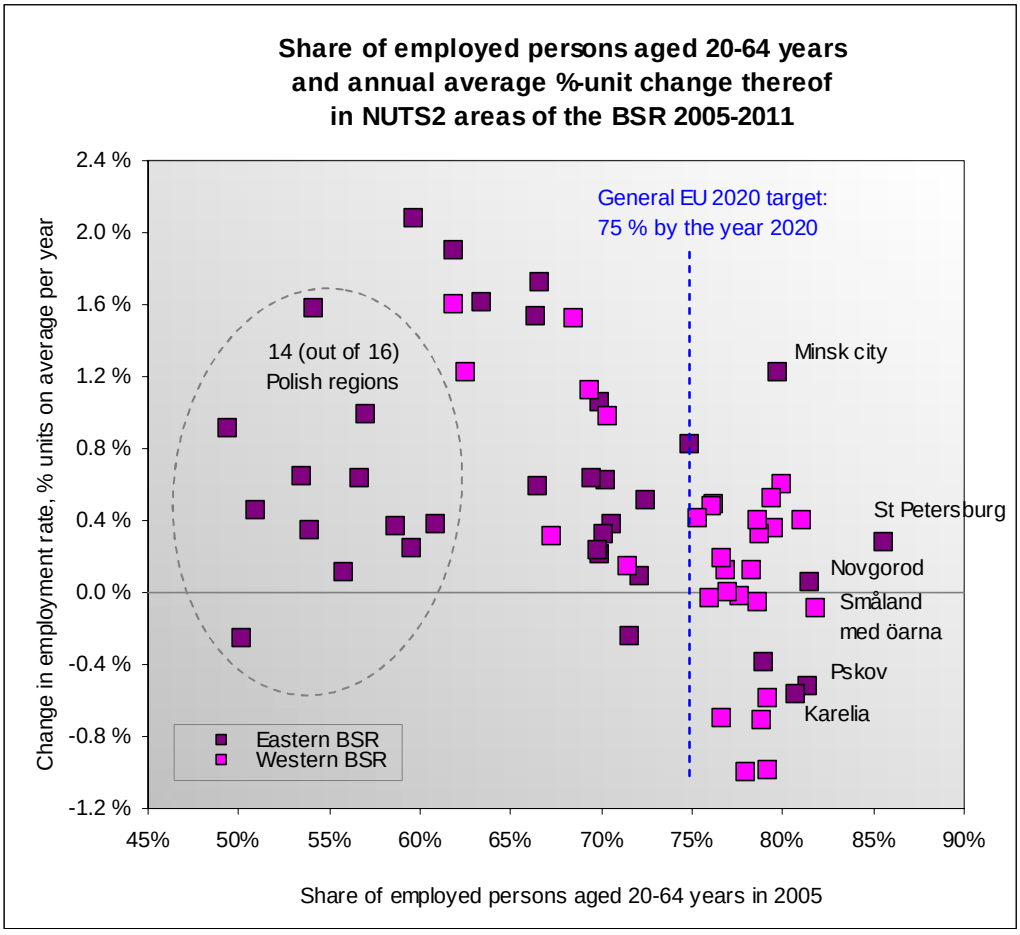
Data source: Eurostat, Belstat, Rosstat. SNUTS 2 for Belarus and NW Russia.

More alarmingly, the post-crisis loss of jobs had a considerable spatially segregating pattern, as the least urbanised areas were the ones to be hit hardest, an expression of the economic vulnerability of smaller settlements the BSR. Contrary to common trends smaller metro regions (i.e. urban regions such as Rostock or Cottbus in Germany, Szczecin in Poland or Stavanger in Norway) have fared comparatively well and have not been affected by the crisis to the same extent as the other types.

Convergence trends also discernible

New job creation is one aspect, but the main focus from an economically sustainable point of view lays on the employment rate, which indicates the share of persons in a region economically supporting all those that do not work. In the BSR during recent years, this development displays very cohesive patterns (Figure 8) despite the above indicated spatially segregated job creation.

Figure 8: Initial level and development of employment rate in NUTS 2 regions of the BSR 2005-2011



Data source: Eurostat, Rosstat, Belstat. Denmark: data for 2005-2006 intrapolated from trend 2007-2011. BSR Russia: 2011 extrapolated from trend 2005-2010. NW Russia: Employed persons aged 15-72 years; population denominator 16-59 years for males, 16-54 years for females. Belarus: Employed persons all age groups; same population denominator20-64 years throughout (from population census 2009)

In general, regions with the lowest employment rates have seen the (on average) fastest increases. This holds true foe east and west BSR alike. The only major exceptions to this general pattern are the vast majority of Polish regions, of which most have seen only modest increases far below those of their corresponding peer regions in the rest of the BSR.[4]

Specific territories in the BSR on the tightrope

Recognising territorial diversity has attended increased focus in the latter years and is bearing substantial relevance for the BSR, as the region is in this respect extremely heterogeneous by its character. Particularly since territorial development, where identifying potentials in relation to integrated development strategies in line with geographical specificities, and more generally acknowledging the territorial context as such, carries a promise of better

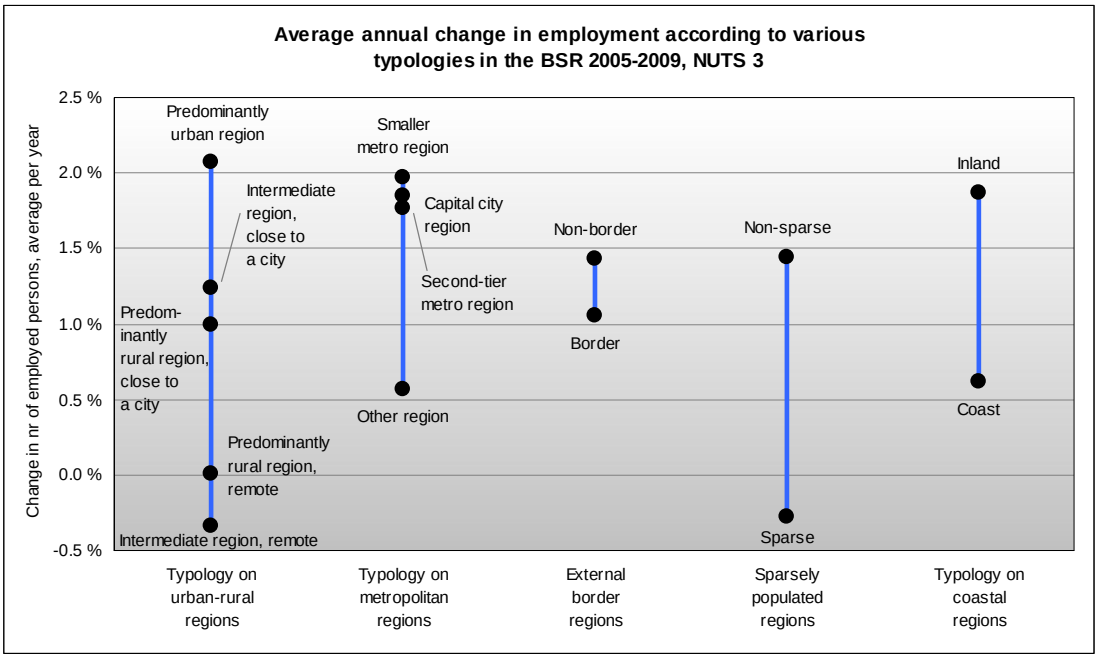
[4] The Russian and Belarusian figures are based on data where both in the numerator and the denominator differ, which biases their figures upwards.

utilisation of endogenous assets while at the same time alleviating the vulnerable position in which many of these areas sit in.

Above, we already had a brief glance at the population development in specific types of BSR territories. We saw that the movement of population by and large corroborated a general conception of increased spatial polarisation across virtually all axes of the BSR. At the same time we saw that real economic growth rates, i.e. the absolute growth of the regional economy, did only follow such divides to a lesser extent, albeit major urban nodes were clearly in an advantageous position in that respect.

Looking at employment change in a comparable manner (Figure 9), by and large similar patterns emerge. During the period 2005-2009, particularly sparse -, border- and rural regions have experience considerably worse development that their thematic counterparts. That coastal regions on average have fared worse than inland ditto, is to a large extent depending on the fast employment growth in Poland (of which a majority of regions are not by the coast).

Figure 9: Change in employment according to various typologies in the BSR 2005-2009



Data source: Eurostat, Belstat, Rosstat. SNUTS 2 for Belarus and NW Russia.

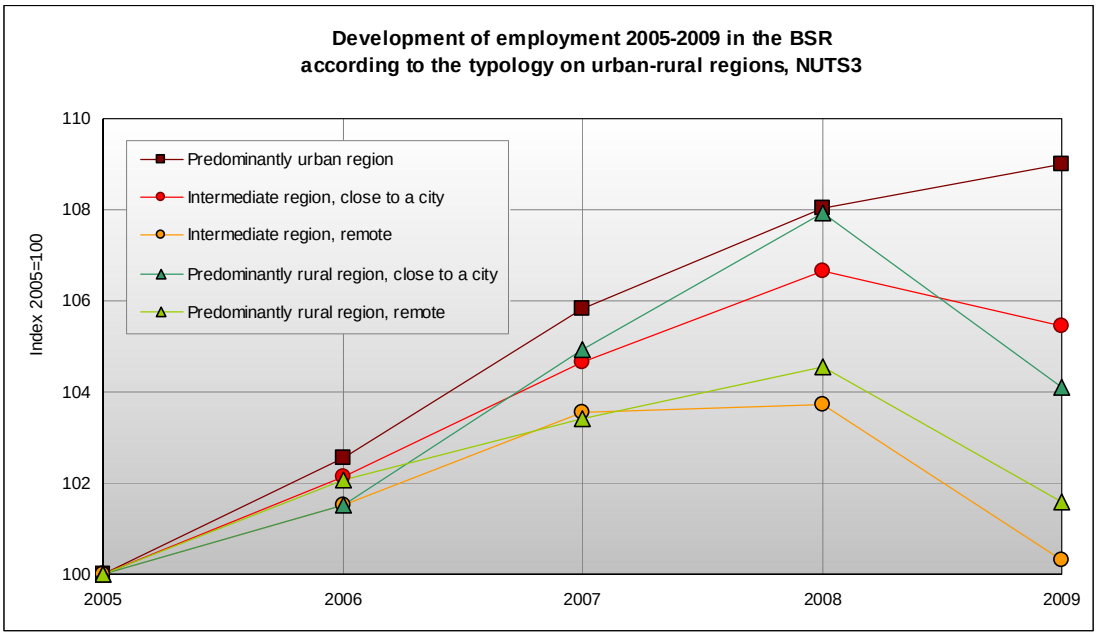
The outspoken urban-rural dimension of these typologies requires further examination. Regarding different forms of metropolitan regions, one may say that the dividing factor is between non-urban and urban, but regarding the latter not in a strictly hierarchical manner. The heterogeneousness of the BSR implies that the size of the metropolitan area as such appears of lesser importance, and other factors bear greater relevance.

However, at the same time interpreting the top notch of the urban-rural typology, we once more see the predominantly urban regions in the lead. What follows then is divided primarily along a remoteness scale rather than along the different "levels" of urbanity. Remote regions, be they intermediate or predominantly rural, have faired worse than their non-remote (i.e. "close to a city") respective counterparts.

Border regions in general still to-day perform worse than the rest of the BSR and they are particularly severely handicapped when examined in their national context. Net migration in external border areas is down to less than half that of their respective countries, employment change some 11 % worse, unemployment rate some 5 %-units higher, GDP/capita 12 % below, and accessibility some 18 % below.

By applying a spatio-temporal view on recent developments we may highlight the vulnerability of specific types of territories in the situation of external shocks.

Figure 10: Development of employment by typology on urban-rural regions in the BSR 2005-2009



Data source: Eurostat, Belstat, Rosstat. SNUTS 2 for Belarus and NW Russia.

Regarding employment fall in the aftermath of the 2008 credit crunch (Figure 10), predominantly urban regions appear to have walked largely untouched through the financial crisis, which is not the case for the other types. The drop was particularly steep for remote regions, be they rural or intermediate, a manifestation of the weak urban structures in parts of the region.

A similar notch is also discernible for sparsely populated regions. For example, sparse regions only accounted for some 2 % of the total employment increase during the years 2005 and 2008, but accounted for nearly 11 % of the total BSR decrease between the years 2008 and 2009.

Also border regions appear very vulnerable to external economic shocks. Following the economic crisis of 2008, these regions have experienced a much steeper fall in e.g. migration or a much larger relative decline in employment than have the non-border areas of the BSR.

Albeit we have here not specifically studied island or mountain regions (due to statistical challenges, see chapter (1.2 on “Extending ESPON regional typologies to cover Belarus and northwest Russia”), they nonetheless share very similar challenges with peripheral, sparse and rural regions, i.e. out-migration, weak demographic and economic structures, dependency on primary production or seasonal tourism, low levels of education, etc.

Coastal regions in the BSR on the other hand are by nature generally less peripheral, more urbanised and better connected than typical inland regions. Most BSR capitals are situated by the coast, as is the case with a vast majority of the other larger urban metropolitan regions, Poland, Belarus (axiomatic) and the larger inland cities in BSR Russia constituting the major exceptions. In coastal areas, the development challenges are rather different, related more to land use pressure, rapid urbanisation and other immediate or (causally constituted) mid- or long-term challenges. Integrated coastal zone management and maritime planning are some of the strategies to address such challenges

Contribution of specific territories

Specific territories represent not only a burden, but also an asset. For instance external border regions represent a large economic contribution potential that still to-day appears underutilised. Between 2009 and 2010, border regions accounted for more than 13 % of the total BSR economic growth, a value-added far beyond their relative share of the economy.

Similarly, sparse regions accounted for 11.4 % of the corresponding value added in the BSR, remote regions for 11.4, non-metropolitan regions (i.e. not capital, not secondary, not smaller metro region) for as much as 37.6 %, and so on, testifying the economic contribution potential of such areas.

Even if we do not have data at hand to verify it for the entire BSR, low levels of employment are a further challenge in most specific types of territories. If all those regions in the BSR, that lay below the EU 2020 target rate of 75 % employment in the age group 20-64 years, would reach this target, that would imply an addition of more than two million new jobs in the region. Similarly, if they would reach their specific national targets (with Belarus, Norway and BSR Russia aiming for the 75 % rate), that would imply an additional 1.6 million jobs. Managing to harness this underutilised potential would obviously bring forth great benefits for the entire region.

What to make of these mixed messages?

How to interpret all the mixed messages that the exemplifying data above bring forth? A first thing to consider is the heterogeneity of the BSR, where each region is placed first and foremost in a national context and only in the second instance (if even then) in a BSR ditto. Such heterogeneity by necessity implies that the perspective on a balanced territorial development can vary substantially depending on which from which shore of the Baltic Sea it is being assessed, albeit the region's countries share common ground in at east partial spatial segregation. Thus, the BSR as a macro region could be characterised as being not monocentric as such, but rather an arrangement of 11 separate monocentric spatial systems, in each of which trends and countertrends act in parallel.

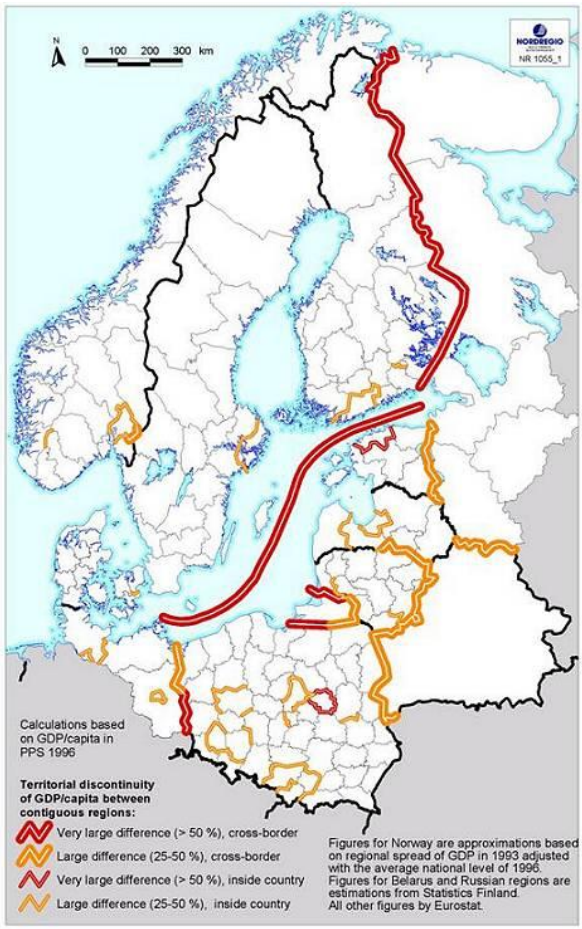
The subject of balanced territorial development will be further examined from a more macroregional perspective in the sub-chapter on "Territorial cohesion in the BSR: a synthetic multidimensional assessment" starting on page 59. Before doing this, however, we will have an alternative look on balanced development through the perspective of territorial divides in the BSR.

Diminishing territorial divides

Time to re-consider traditional territorial divides of the BSR

In the last years of the past century territorial cohesion – be that between or inside countries – in the sense of actual trans-border disparities in economic and social development attained increasing interest in the BSR. Figure 11 can be used to illustrate the prevailing mental image of the late 1990s. The (correctly) perceived main division in the BSR at that time was the east-west one, stretching from the White Sea to the Pomeranian bay. In addition to this only a few scattered material welfare pockets were discernible, primarily around capital regions such as Tallinn or Warsaw, as well as to a lesser extent around other ten or so major urban nodes.

Figure 11: Reflections of the past – territorial discontinuity of GDP/capita in the BSR 1996



Source: VASAB 2010+ Spatial Development Action Programme

In the past 15 years or so, this overarching pattern has changed. Arguably, the heavy east-west division across the Baltic Sea still exists, but already it has a few "cracks" in it, such as on certain stretches at the Finnish-Russo border, for example. Such levelling out of east-west material welfare differences is illustrated for instance through the massive cross-border trade as a consequence of the lower (!) price levels on the Finnish side.

Explosion of local disparities

When examining cross-border discrepancies in GDP/capita in 2010 in Figure 12, the largest difference to the situation 15-20 years ago is a virtual explosion of disparities among adjacent regions inside countries in particularly the eastern BSR.[5] Well aware that GDP as such is only able to measure material welfare to a limited extent, we nonetheless assume an analytic position where GDP/capita when adjusted for differences in purchasing power is able to reflect at least crude disparities in material welfare.

Hence a vast assortment of new "wealth islands" has emerged, typically surrounding major metropolitan areas.[6] What is more, also internal discrepancies are nowadays much sharper than was the case before, the most striking case in the eastern BSR being increased regional disparities in BSR Russia.

Increasing polarisation in the Nordic countries is evident and also manifested in growing intraregional disparities. In contrast to the past, all capital regions in the Nordic countries do nowadays show substantially larger barriers vis-à-vis their surrounding areas than was the case previously. A similar pattern also exists in BSR Germany.

Two decades ago, the main territorial disparities in the BSR were primarily a case between the very wealthy and the very poor, whereas the situation today appears to be much more multifaceted. Disparities are now frequent both across as well as within all layers of development, i.e. we also see a large polarisation between wealthy and ultra-wealthy, poor and ultra-poor, not forgetting the middle strata as well.

Territorial disparities in unemployment related to industrial transition

When instead examining local disparities in unemployment rates in a similar manner (c.f. Annex 1 on page 111), we see that in such a more pronounced social context, the patterns differs substantially from that of macroeconomic performance.

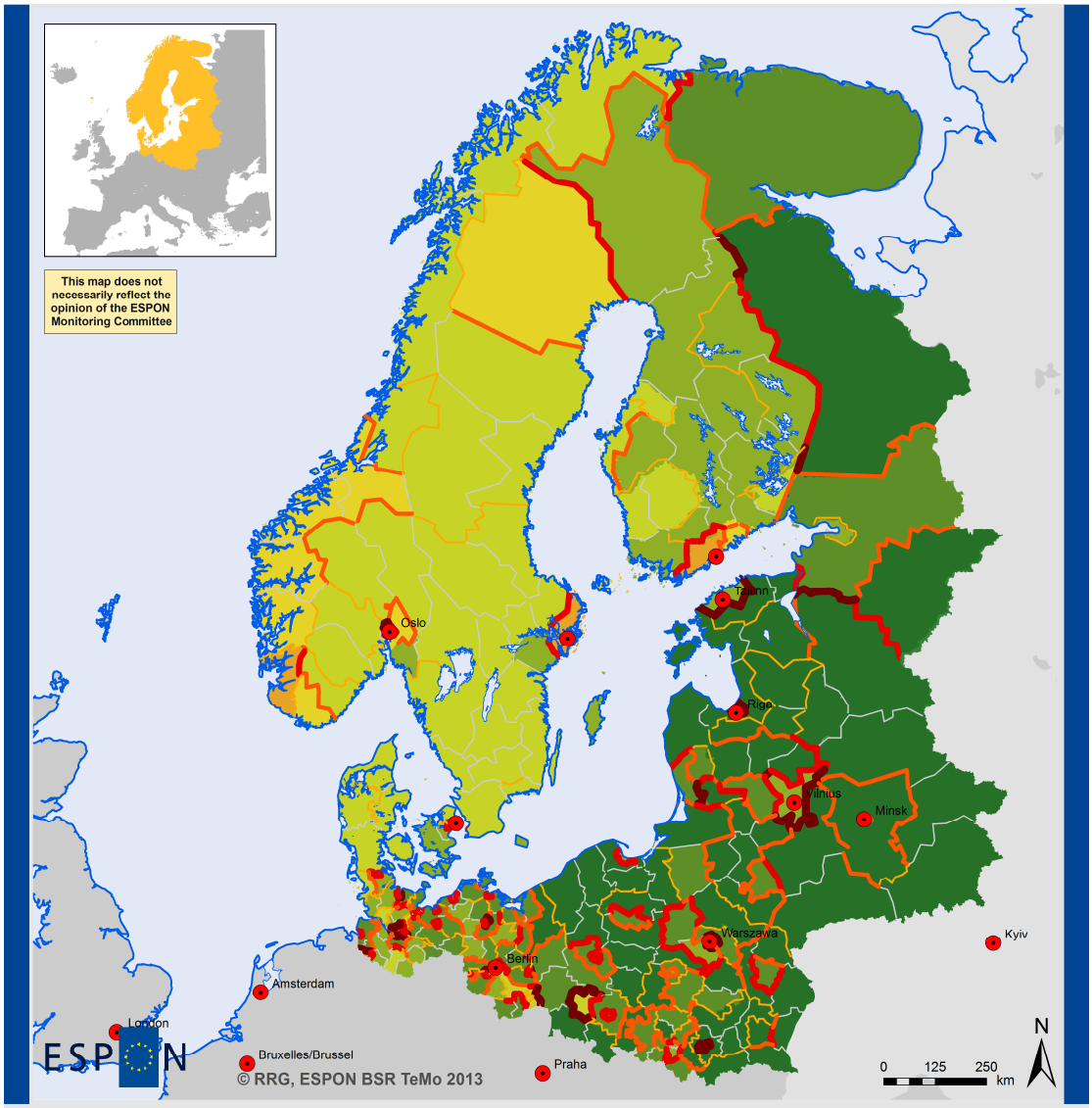
First, the primary divide appears to be between countries rather than within them, reflecting a situation where labour market policy in general is more a national than a regional affair. Regional differences in unemployment are also affected by the strong migratory flows from the most hard hit areas in the BSR, thus easing out differences between regions, but mostly not between countries (the Nordic labour migration perhaps constituting the only partial exception).

Second, as high unemployment (as well as other related social challenges) does not conform to the urban-rural dichotomy (i.e. the urban paradox) we for the most part see no particularly large discrepancies between major metropolitan areas and their surrounding territories. Rather, high transregional disparities in unemployment tend to be tied to regional industrial transition processes, as a result of which disparities can be substantial between on-the-surface -similar regions. The patterns in unemployment disparities do not conform themselves with any other specific types of BSR territories.

[5] N.b. that the disparity scales of the two maps differ, a reflection of the increasing on-the-ground-level polarisation in the region.

[6] The gradual increase in commuting explains one part of the increase in discrepancies, since commuting affects the GDP/capita values in favour of urban cores. The increase in commuting however is not the major explanatory factor.

Figure 12: Territorial discontinuity of GDP/capita in the BSR 2010



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Territorial discontinuity at NUTS-3 level in GDP per capita in PPS 2010

Regional level: NUTS-3, oblasts (BY, RU)
Source: Eurostat (EU/EFTA countries), Belstat / Rosstat (BY, RU)
© EuroGeographics Association for administrative boundaries
© Eurofutures Finland 2011

DK041, DK042, FI181, FI182: 2009
Data for NW Russia and Belarus estimated through ratio of national GDP of Russia and Belarus in international $ PPP compared to the corresponding value for EU27.

Cross-border disparities (%)	*GDP/capita in PPS Index EU27=100*
0 - 10	0 - 50
10 - 25	51 - 75
25 - 50	76 - 100
50 - 100	101 - 125
100 < ...	126 - 150
	151 - 175
	176 - 200
	200 < ...

General reduction of national border discrepancies

Trying to summarise the development in the past five years (2005-2010), the lower half of Table 1 brings forth the average national cross-border disparities in GDP/capita in PPS across land borders of the BSR in 2005 and in 2010, as well as

the changes in these disparities during this period. This data refers to unweighted average disparity across all land border stretches between any two BSR countries. The principal unit is the stretch of border tied to a particular NUTS 3 /SNUTS 2 region. The calculations are by necessity based on unweighted average disparities across each national stretch, regardless of the actual length of the NUTS 3 border stretch. The information has thus to be considered indicative only.

Looking first at the current status in 2010, we see that the highest welfare gap across any land border stretch within the BSR exists between Belarus and Lithuania, where differences in GDP/capita particularly between Vilniaus apskritis (w. GDP/capita 89 % of the EU average) on the one hand and Vitebsk (29 %) and Grodno (30 %) oblasts on the other imply a huge relative difference across this border stretch. The average disparity on the Lithuanian-Belarusian border of 117.4 % is however the result of substantially smaller differences between e.g. Utenos or Alytaus apskritises and Vitebsk and Grodno oblasts respectively.

In comparison to the Lithuanian-Belarusian border, disparities on the Finnish-Russian border actually appear quite modest. In contrast to the former (LT-BY border), the relative differences across the Finnish-Russo border have however decreased substantially in only five years owing to the relatively stable economic growth on the Russian side of the border. The same can be said about the Norwegian-Russian border between Norwegian Finnmark and Murmansk oblast.

Albeit the levels are quite different, a welfare gap of roughly similar proportions exist also between Denmark and Sweden, where the affluence of Copenhagen vis-à-vis the relatively average GDP/capita levels of southern Sweden (i.e. Skåne county incl. Malmö) imply a statistically large discrepancy.

Table 1: Territorial discontinuity of GDP/capita in PPS across land borders of the BSR at NUTS level 3 between and within countries 2005 and 2010

	Average disparity across NUTS 3 land borders in GDP/capita in PPS		
	Crossborder disparity on average in %		%-units change in disparity
	2005	2010	2005-2010
All regional land borders of the BSR	**32.8**	**32.5**	**-0.3**
Regional land borders inside BSR countries of which in:	*29.8*	*31.1*	*+1.3*
Belarus	27.6	20.8	-6.8
Denmark	18.0	20.2	+2.2
BSR Germany	39.2	40.2	+1.0
Estonia	44.4	42.9	-1.5
Finland	16.9	16.8	-0.1
Latvia	38.3	28.0	-10.2
Lithuania	51.4	48.1	-3.3
Norway	22.1	25.1	+3.0
Poland	28.0	31.3	+3.3
BSR Russia	47.8	58.6	+10.8
Sweden	9.6	9.5	-0.1
Regional land borders between BSR countries of which between:	*53.8*	*42.4*	*-11.4*
Estonia and BSR Russia	62.0	55.0	-7.0
Estonia and Latvia	39.6	16.1	-23.6
Latvia and BSR Russia	32.5	11.9	-20.6
Latvia and Belarus	12.5	7.1	-5.4
Latvia and Lithuania	50.2	43.4	-6.8
Lithuania and Poland	5.7	0.0	-5.7
Lithuania and BSR Russia	39.6	37.9	-1.7
Belarus and Lithuania	121.1	117.4	-3.8
Belarus and BSR Russia	35.0	0.0	-35.0
Belarus and Poland	30.4	35.5	+5.1
Poland and BSR Russia	25.6	14.6	-11.0
Poland and BSR Germany	68.1	50.8	-17.3
BSR Germany and Denmark	34.1	32.7	-1.4
Denmark and Sweden	62.0	69.4	+7.4
Norway and Sweden	9.0	11.5	+2.4
Norway and BSR Russia	90.7	67.6	-23.1
Sweden and Finland	29.4	51.1	+21.7
Finland and Norway	14.2	26.6	+12.5
Finland and BSR Russia	127.3	76.2	-51.1

Data refers to unweighted average cross border disparity. Data sources: EU/EFTA countries: Eurostat; Belarus and NW Russia: estimations of BELSTST/ROSSTAT data through the ratio of national GDP of Russia and Belarus in international $ PPP compared to the corresponding value for EU27. Belarus, Norway & Brandenburg: 2008-2010; DK041, DK042, FI181, FI182: 2005-2009

As mentioned above, the largest decreases in cross-border differences in this respect have occurred between Finland and Russia, where the discrepancy is nearly halved in merely five years. Also on the Norwegian-Russian border in the

north, disparities have decrease by nearly 25 percentage units. Apart from these two border stretches, most major decreases in cross-border differences in the BSR have occurred in eastern BSR.

The seemingly dramatic reduction in cross-border disparities between Belarus and BSR Russia is a statistical anomaly. Within the BSR area, the countries share only one stretch of border, namely that between Pskov oblast in Russia and Vitebsk ditto in Belarus. At the beginning of the period the ratio in GDP/capita between the two regions was 20/27. Largely owing to the dramatic population decline in Pskov combined with a stable economic growth rate, this ratio had by the year 2010 decreased to 30/30, i.e. a zero percent disparity.

Moving in the other direction in turn are primarily northern Nordic border stretches. The largest increases in relative disparities have occurred between Finland and Sweden and Finland and Norway. The high per capita economic growth rate in both Troms and Finnmark in Norway as well as Norrbotten in Sweden combined with the relatively stable situation in Finnish Lappi implies increasing statistically measured disparities. How much disparities in real material well-being have increased cannot however be judged based on this data.

Territorial disparities inside BSR countries converge and diverge in parallel

Looking at the current situation *within* countries, the upper half of Table 1 concerns itself with average territorial discontinuities in GDP/capita inside countries. Once more, the data refers to unweighted average disparity across all land border stretches between any two regions within a country.

The largest discrepancies in this sense in 2010 are within in the eastern BSR, i.e. in BSR Russia, Lithuania, Estonia and BSR Germany. The Nordic countries as well as Belarus show the corresponding smallest ones. In fact, on average border disparities in eastern BSR are some ten percentage units higher than those in the western parts of the region.

When looking at the recent (2005-2010) rate of change in such disparities, BSR Russia in particular displays increasing spatial segregation in this respect. During merely five years, disparities there have on average increased with some ten percentage units. The primary reason for this is the rapid economic growth taking place in St Petersburg and the surrounding Leningrad oblast, which implies a sharper break with the other NW Russian regions (c.f. map in Annex 2, which shows the rate of change in disparities across all borders of the BSR).

Albeit disparities in Finland have on average remained rather unchanged or even decreased, the Helsinki metropolitan area is at a rapid rate making an increased difference to all regions surrounding it.

The largest corresponding reductions in national local level disparities have occurred in Latvia and Belarus, but also Lithuania, which without this trend would be much worse off than is the actual case to day.

On average, urban hierarchy guides disparities

In Table 2 we make an attempt to analyse the data presented in terms of two typologies related to the urban hierarchy. Parts of this data must be interpreted with some care, though, as in some cases the sample sizes (i.e. the pair of type of regions opposite a border stretch) are small. For instance, we have only three land border stretches in the BSR where a capital region and a secondary city region are adjacent to each other (Vilnius-Kaunas, Helsinki-Turku, and Copenhagen-Malmö). Correspondingly, there are only seven instances of adjacent

capital and smaller metro regions. Regarding the remaining stretches, the sample sizes are sufficient, however.

Table 2: Territorial discontinuity of GDP/capita in PPS across land borders of the BSR at NUTS level 3 by regional typology 2005 and 2010

	Average disparity across NUTS 3 land borders in GDP/capita in PPS		
	Crossborder disparity on average in %		%-units change in disparity
	2005	2010	2005-2010
All regional land borders of the BSR	**32.8**	**32.5**	**-0.3**
of which:			
Regional land borders in western BSR incl. Berlin	24.3	25.6	+1.3
Regional land borders in eastern BSR	35.5	35.2	-0.3
Accordong to the typology of urban-rural regions			
Regional land borders between:			
Predominantly urban regions	61.4	61.9	+0.4
Intermediate regions	39.3	36.2	-3.1
Predominantly rural regions	16.8	16.3	-0.5
Predominantly urban and intermediate regions	62.3	70.4	+8.1
Predominantly urban and predominantly rural regions	34.5	36.9	+2.4
Intermediate and predominantly rural regions	29.2	28.4	-0.8
According to the typology of metropolitan regions			
Regional land borders between:			
Capital city regions	57.7	61.5	+3.8
Second tier metro regions	58.4	60.5	+2.1
Smaller metro regions	49.1	48.7	-0.5
Other regions	24.6	22.5	-2.1
Capital city and second tier metro regions	45.1	60.6	+15.5
Capital city and smaller metro regions	54.2	55.3	+1.1
Capital city and other regions	48.5	50.4	+1.8
Second tier and smaller metro regions	22.8	22.9	+0.1
Second tier metro regions and other regions	25.3	25.2	-0.1
Smaller metro regions and other regions	30.4	31.1	+0.7

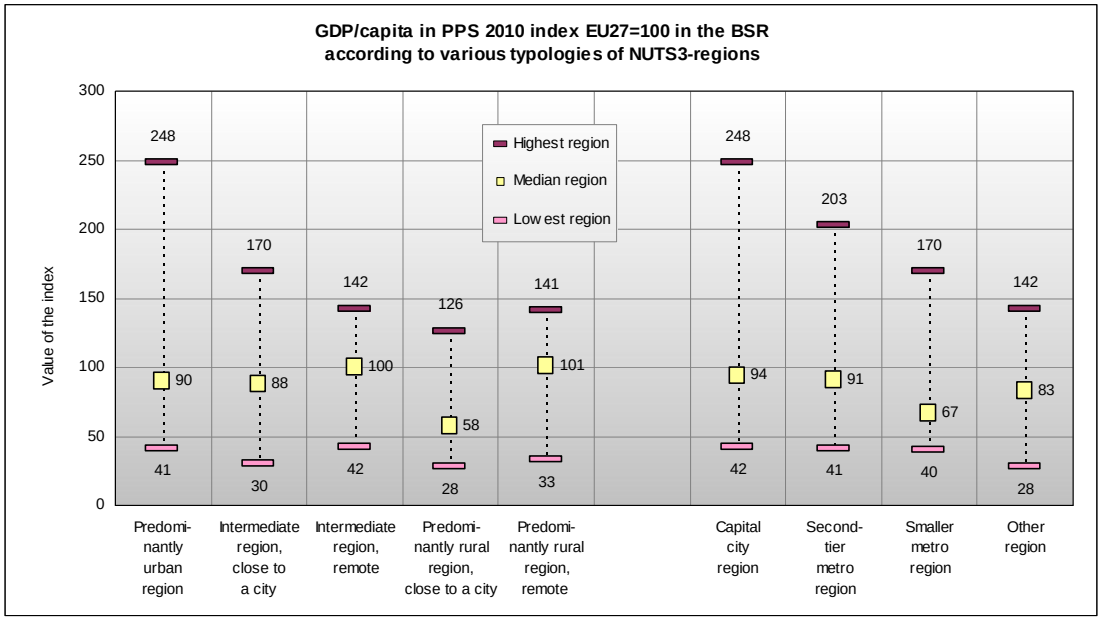
Data refers to unweighted average cross border disparity. Data sources: EU/EFTA countries: Eurostat; Belarus and NW Russia: estimations of BELSTST/ROSSTAT data through the ratio of national GDP of Russia and Belarus in international $ PPP compared to the corresponding value for EU27. Belarus, Norway & Brandenburg: 2008-2010; DK041, DK042, FI181, FI182: 2005-2009

It is both evident as well as expected that the urban hierarchy is a decisive factor across the BSR in dictating the magnitude of on-the-ground territorial disparities. Disparities between *same types* of regions in 2010 are by far largest within the groups, “capital city regions”, “second tier metro regions” as well as

"predominantly urban regions". At the other end of the scale we then find "predominantly rural regions" as well as its corresponding group "other regions" where disparities on average are rather low, with "smaller metro regions" and "intermediate regions" falling in between the two extremes.

Looking again at disparities between *different types* of regions, differences between "predominantly urban regions" and "intermediate regions" on the one hand, and "capital city regions" and "other regions" on the other, are rather high. This is once more rather expected. That such disparities are not substantially higher than the above-mentioned ones within these groups, is however rather surprising. One explanation tot his may be that particularly larger metropolitan areas share functional and morphological similarities that to a certain spill out across the borders of these areas to the surrounding regions, thus wiping out the sharpest discrepancies.

Figure 13: Spread of GDP/capita 2010 according to two urban-related typologies in the BSR 2010



Data sources: EU/EFTA countries: Eurostat; Belarus and NW Russia: estimations of BELSTST/ROSSTAT data through the ratio of national GDP of Russia and Belarus in international $ PPP compared to the corresponding value for EU27. DK041, DK042, FI181, FI182: 2009

Taken as a group, statistical differences between "capital city regions" and "second tier metro regions" as well as between "capital city regions" and "smaller metro regions" are also fairly high, but as mentioned above, such combinations in the BSR are too few in the sample to allow for any wide-ranging conclusions.

We also see a rather clear tendency for increasing disparities in the higher sphere of the urban hierarchy, as opposed to a decreasing tendency at the opposite end.

Nonetheless, such polarisation across and between the regional urban hierarchy is naturally a result of diminishing overall disparities when moving down the BSR urban ladder. If we once more revert back to overall disparities rather than cross-border ones (Figure 13), we can clearly see that in terms of both the urban-rural as well as the metropolitan axis, disparities in the BSR tend to decrease the smaller the settlement groups concerned are.

Disparities for specific types of territories

Looking more systematically at changes in disparities between different specific types of territories (Table 3) summarises GDP/capita (PPS) averages for different types of BSR territories and recent changes for these.

Table 3: GDP/capita according to different regional typologies 2005 and 2009

	GDP per capita in PPS, index: EU27=100		
	ca. 2005	ca. 2009	Development ca. 2005-2009: points change to EU27 average
The Baltic Sea Region (BSR)	**75**	**81**	**+6**
of which:			
- western BSR	124	122	-2
- eastern BSR	50	60	+10
Typology on urban-rural regions			
Predominantly urban regions	98	109	+11
Intermediate regions	66	71	+5
of which:			
- close to a city	*66*	*71*	+5
- remote	*71*	*74*	+2
Predominantly rural regions	62	65	+3
of which			
- close to a city	*53*	*57*	+4
- remote	*86*	*85*	-1
Typology on metropolitan regions			
Capital city regions	101	112	+11
Second-tier metro regions	84	89	+5
Smaller metro regions	58	64	+5
Other regions	61	65	+4
Typology on regions in external border programmes			
Border regions	46	53	+8
Non-border regions	82	88	+6
Typology on sparsely populated regions			
Sparsely populated regions	90	91	+1
Not sparsely populated regions	74	80	+7
Typology on coastal regions			
Coastal regions	95	101	+6
Non-coastal regions	62	68	+6

Data sources: EU/EFTA countries: Eurostat; Belarus and NW Russia: estimations of BELSTAT/ROSSTAT data through the ratio of national GDP of Russia and Belarus in international $ PPP compared to the corresponding value for EU27. Belarus, Norway & Brandenburg: 2008-2009.

The pronounced east-west divide is still clearly discernible, but diminishing at a rapid pace. A simple linear extrapolation of this (2005-2009) trend would imply the east-west difference being levelled out already by the year 2023. Such linear development is however seldom the reality.

In contrast to this, the already substantial gap between the largest urban regions and the rest of the BSR appears to change rapidly in the direction of more polarisation. Both “predominantly urban regions” as well as “capital regions” have increased their position (relative to the EU27 average) with some 11 percentage points in just a few years. In contrast, most types of more rural or non-urbanised regions have in a relative sense lost ground as their relative rate of increase lays below the BSR average. In terms of “intermediate” or “predominantly rural” regions, the remoteness factor appears to have an effect on the direction of change, where “remote” regions (as opposed to “close to a city” -ones) have fared worse.

As already mentioned previously, external border regions have displayed economic growth rates far exceeding their relative position thus closing in on the gap to non-border regions.

While a majority of all “sparsely populated regions” are in the Nordic countries, their relative level vis-à-vis GDP/head is naturally above the BSR average, but the direction of change does not work in favour of them.

Such development trends are not discernible for coastal regions, albeit their relative standing far exceeds the inland region’s corresponding average.

Developing competitiveness through smart growth

The EU 2020 smart growth initiative emphasises growth-enhancing policy action through more effective investments in education, research and innovation. The educational level should be lifted (encouraging people to learn, study and update their skills), the research and innovation intensity should be raised by creating new products and services that generate growth and the use of information and communication technologies should be developed further.

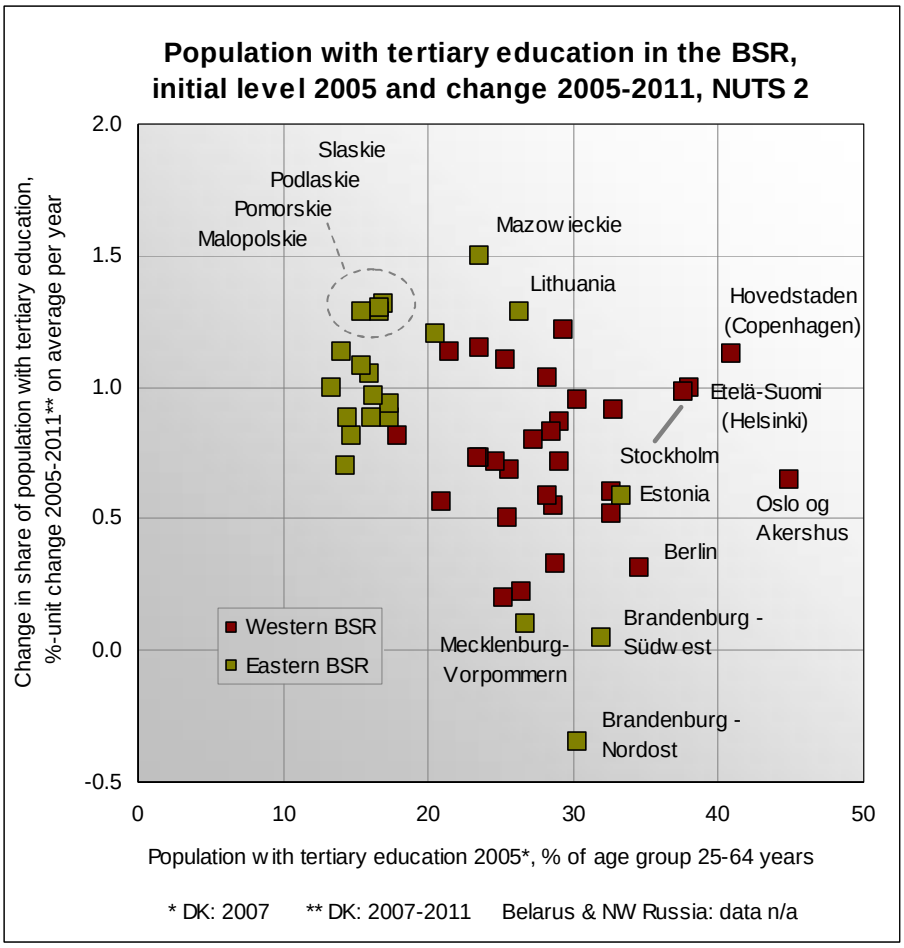
BSR higher educational levels converging

The educational level of the BSR population is generally well above that of the average EU citizen. When measured e.g. through the EU 2020 target of at least 40% of 30-34–year-olds having completed third level education, all EU/EFTA countries in the BSR are well above the EU average save for Germany. Most BSR countries have also reached their separate national targets in this respect, with Germany, Poland and (barely) Estonia constituting the only exceptions.

Regarding the entire age group 25-64 years, most regions in the BSR do not reach up to a 40 % limit, which is natural, since that target has been set only for the primarily young ones. Educational levels throughout Europe tend to fall the older the age group is concerned.

Nonetheless, there is a clear convergence process in the BSR regarding tertiary education (Figure 14), as those regions where levels are lowest tend to have the highest increase rates. This convergence process concerns eastern and western BSR alike.

Figure 14: Population 25-64 years with tertiary education in the BSR 2005-2011



Data source: Eurostat

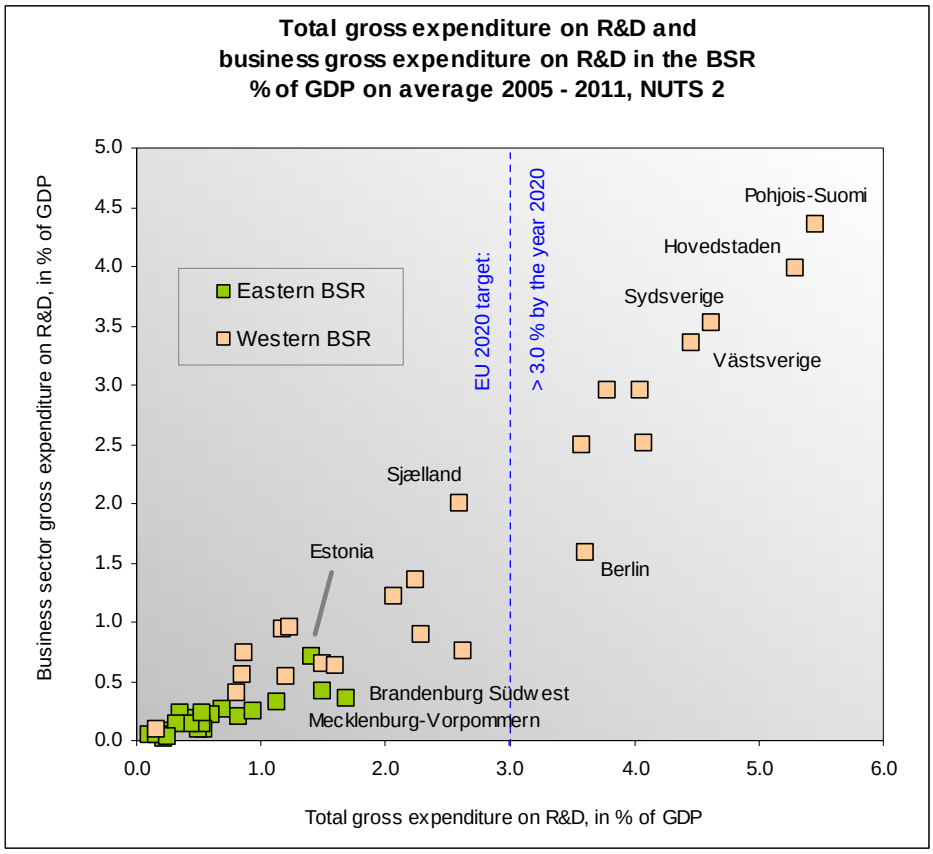
R&D intensity still splits BSR in East and West

A well-educated population may be regarded as an input factor to the knowledge economy. Another such input is investment in research and development, where the EU 2020 strategy has set a target rate, that 3 % of the Union's GDP should be allocated for R&D by the year 2020. Unlike in the previous Lisbon/Gothenburg strategy, the target makes no distinction between public, business or third sector R&D

In terms of total R&D investment shares, the BSR is thoroughly divided by an east-west gap. All regions having reached the magic 3 % target rate, or in fact all regions in general where this share is high, are western BSR regions (Figure 15, x-axis). Among those in the eastern BSR where this share is high are primarily former East German regions as well as e.g. Estonia (a NUTS 2 region in itself).

A similar pattern is visible regarding the business sector investment share (Figure 15, y-axis), which by and large tends to walk hand in hand with the total share. There are differences in this respect though. University cities or BSR capitals (such as Berlin) tend in general to have comparatively higher rates of public sector R&D investments whereas the opposite holds true for typical industrial regions.

Figure 15: Total and business sector gross expenditure on R&D in the BSR 2005-2011



Data source: Eurostat. Belarus, Norway & NW Russia: data n/a.

A completely other issue is of course that R&D as the only saviour is barely fitting each and every region, and also in the BSR there are evidence of prosperous regions despite low levels of education and/or low R&D input (Åland would be the prime example).

Steady-state in east-west convergence of employment rates

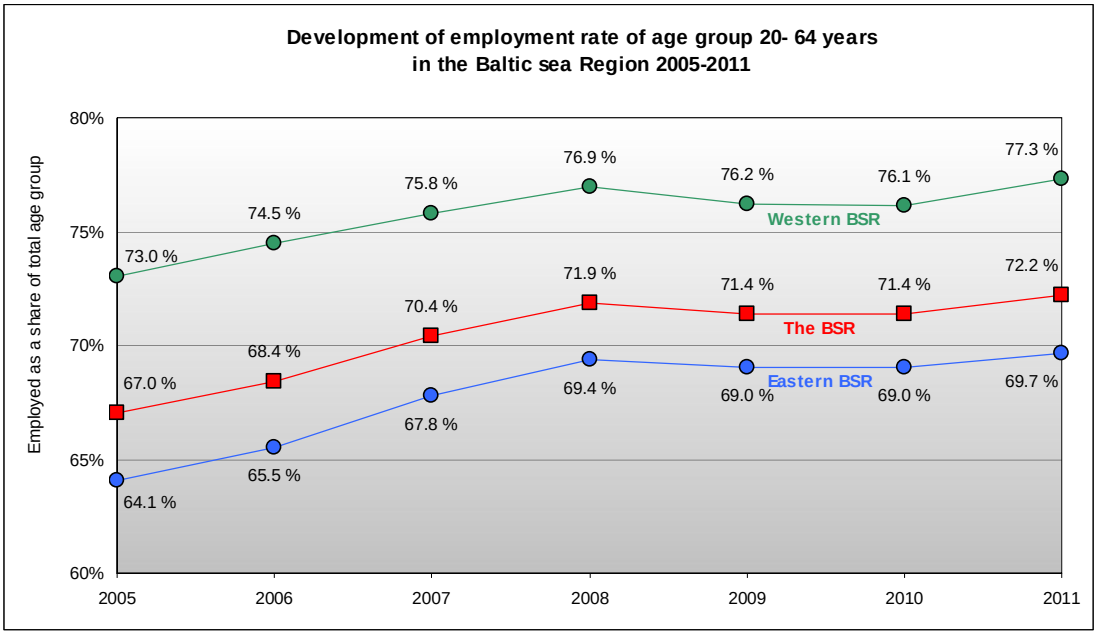
A third strategic target in the EU 2020 strategy concerns lifting up employment rates to higher levels. The general target set for the entire EU concerns the age group 20-64 years, of which at least 75 % should be employed by the year 2020.

Figure 16 shows the development of the overall employment rate of the entire BSR (red line), western BSR (green) as well as eastern BSR (blue) for the years 2005-2011.

Two observations can be made. Firstly, and rather obviously, employment rates for the eastern BSR taken as a group will not reach the 75 % limit by 2020, unless something truly dramatic would occur. The western BSR has already passed that rate, much thanks to substantially high employment rates in Sweden and Norway.

Secondly, the gap between eastern and western BSR appears rather consistent, implying that no macro level convergence is taking place between the two shores of the Baltic Sea.

Figure 16: Development of employment rate in eastern and western BSR 2005-2011



Data source: Eurostat, Rosstat, Belstat. Denmark: data for 2005-2006 intrapolated from trend 2007-2011. BSR Russia: 2011 extrapolated from trend 2005-2010.

Wide regional employment disparities in most BSR countries

Such macro level adjustment however less interesting from a territorial point of view. Figure 17 depicts the regional variations in terms of employment rates for the same age group 20-64 years. The data is at NUTS level 2, implying that in the Baltic States each country is considered as a single region.

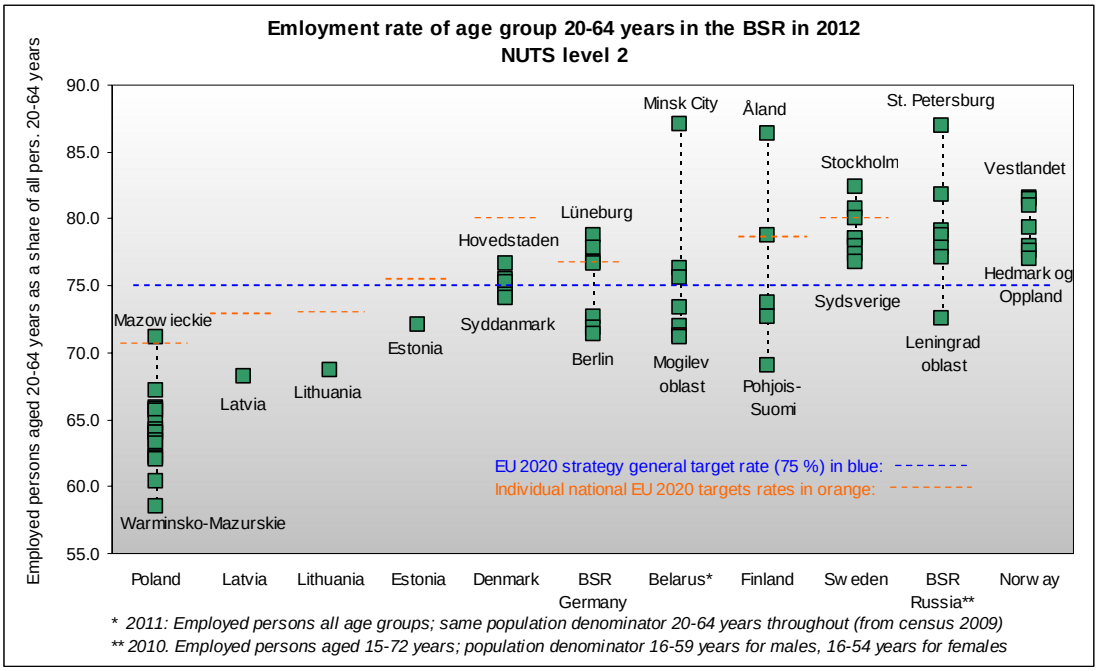
In most BSR countries regional differences in this respect are large, typically ranging between 10 and 15 % between top and bottom performer. Finland, Poland, Belarus as well as BSR Russia are most polarised in this respect (and at this territorial level) whereas particularly Denmark, but also Sweden and Norway, display a rather balanced pattern.

Only in Poland and the Baltic States (at this NUTS level) are there no regions that have already (by 2012) reached the generic EU target rate (blue line in the graph). All regions in Sweden as well as in Norway in contrast have done so. For comparison, all of BSR Russia save for Leningrad oblast also lay above the 75 % rate, albeit both Russian as well as Belarusian data is slightly biased (being based on data where both in the numerator and the denominator differ, which shifts their rates upwards) and not fully comparable.

Apart from the generic 75 % EU target, there are additional national target rates that have been adjusted to fit the on-the-ground reality of each Member State. In some cases this is above the 75 % line (Denmark, Sweden, Finland, Germany, and Estonia), in other cases below (Poland, Lithuania, and Latvia). The orange lines in Figure 17 denote these nationally individual target rates for the EU MS of the BSR.

Only three regions in Sweden, two in Finland, two in BSR Germany, and one in Poland have reached this national target rate, the rest of the regions in the EU parts of the BSR have not.

Figure 17: Regional employment rates in the BSR per country 2012 and distance to EU 2020 overall and national targets



Whether or not the remaining regions will be able to reach the generic EU targets and/or the corresponding national ones remains an open question. In Figure 18 we make an attempt to predict this. We have utilised the average year by year development between 2005 and 2012, and applied this rate of change on the years to come up till 2020.

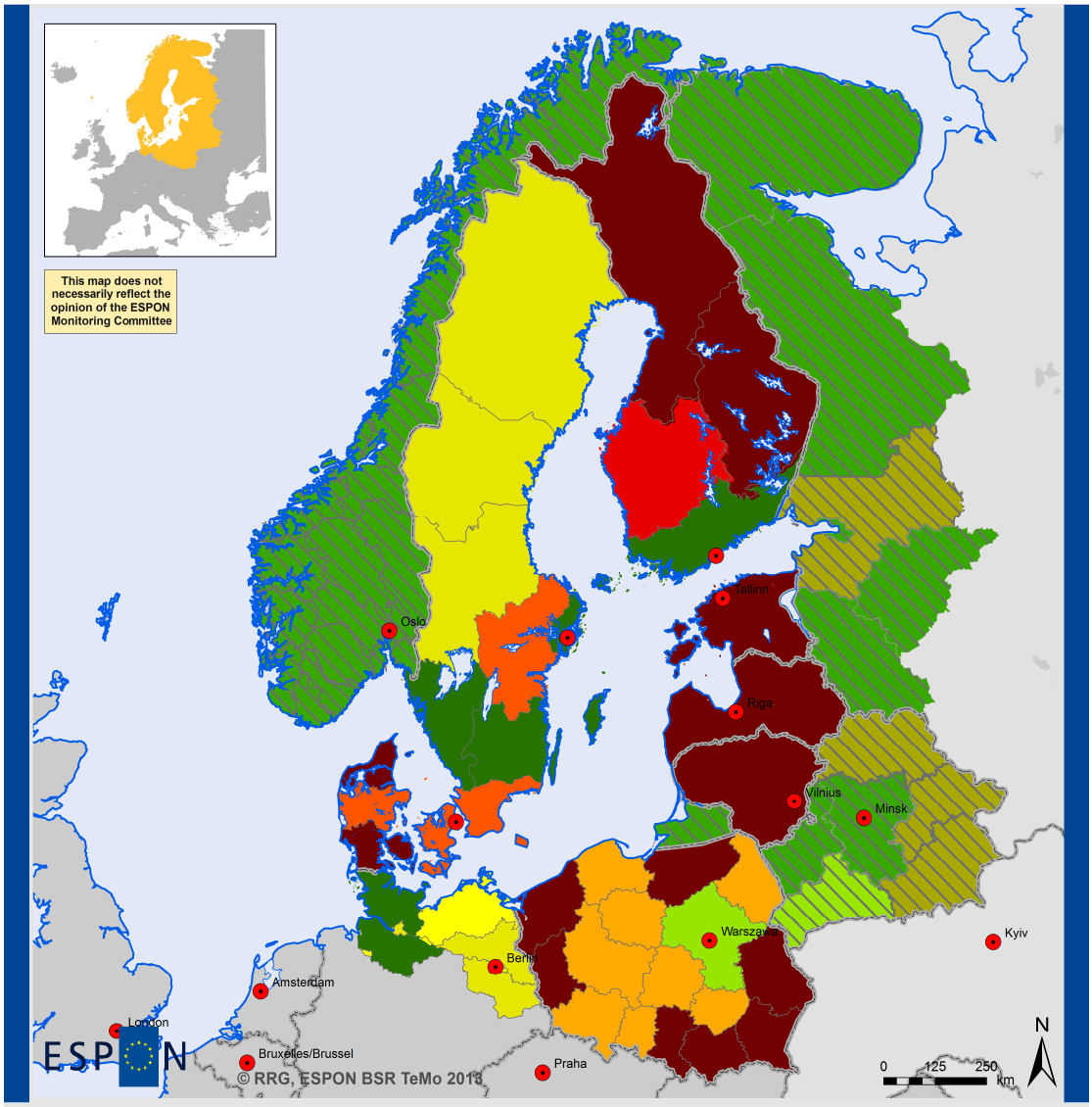
Arguably, within this time frame there have also been considerable decrease in employment rates throughout the BSR as a consequence of the credit crunch of 2008 (in particular the years 2009 and 2010). We have addressed this issue by calculating the annual growth rate for each year separately throughout the period, whereupon the average rate for a vast majority of the regions remains positive. Nonetheless, by including the years 2009 and 2010 we may say that this forecast is a cautious one, but realistic at that.

Another thing – which we have not been able to address – are the considerable (or expected) changes in the age group 20-64 years, as the baby boomers of the post war period are gradually passing the 65 year limit, which implies that the denominator of the employment rate will in many regions start to decline, resulting in comparatively higher rates despite no real change on the ground.

Nonetheless, the starting point is that among the EU MS, seven regions of which two in BSR Germany (Lüneburg, Schleswig-Holstein), two in Finland (Etelä-Suomi, Åland) and three in Sweden (Stockholm, Småland med öarna, Västsverige) have already reached both generic EU as well as their respective national target rates. A further six regions are expected to reach both these by 2020. Of these, three are Swedish, two German and one Polish (Mazowieckie).

14 NUTS 2 regions in the EU parts of the BSR are projected to reach neither their national target rates, nor the corresponding EU one. Apart from all three Baltic States, two Finnish and two Danish regions as well as seven Polish ones belong to this group.

Figure 18: Projected achievement of EU 2020 strategy employment rate targets for the BSR



In the non-EU parts of the BSR, we may compare the performance of regions in terms of the general EU target only. All Norwegian regions already to day lay above the 75 % line and all but one in BSR Russia (Leningrad oblast). Brest

oblast in Belarus would, if the present trend continues, also reach this level by the year 2020, whereas Gomel, Vitebsk and Mogilev oblasts in Belarus as well as Leningrad ditto in BSR Russia will not reach up to that

Such under-optimisation of productive resources is potentially as costly affair. As said previously, reaching EU targets would bring about between 1.6 and 2.0 million additional jobs to the BSR.

Ensuring accessibility, connectivity and parity of access

East-west/north-south divides in BSR accessibility

The strategic EU-BSR goals of access to services of general economic interest as well as access to knowledge and diffusion of innovation have long been on the BSR agenda. In term of the BSR, the physical parts of such accessibility is by and large connected to accessibility to larger cities, as these are the main economic, scientific, R&D, and service nodes in the region.

Multimodal accessibility may therefore serve as a general proxy for a large tract of all physical accessibility features. A point of reference is that the average accessibility in the EU/EFTA parts of the BSR[7] lays 20 % below that of the EU on average. For the eastern parts, this value is at 23 % below, for the western part 16 % below. Changes in this respect are rather rapid however, and the eastern parts are rapidly improving their position.

When examining the multimodal accessibility landscape in the BSR of 2006, the general picture is that there is a division between the Baltic States save for the capital regions, eastern Poland and the sparsely populated areas of Fennoscandia on the one hand, and the rest of the BSR on the other.

Between 2001 and 2006, the largest increases at a general level have taken place in Poland, Latvia and Lithuania, primarily due to considerable investments in updated road and rail infrastructure. The easternmost parts of Poland and all Baltic States have in relative terms lost ground during this period.

Sparse and border regions most disadvantaged

Looking more specifically into what kind of territories are accessible or inaccessible (Table 4), we see that in 2006, the main dividing factor was rather unexpectedly that of remoteness. Sparsely populated regions had a multimodal accessibility 53 % below the EU27 average, on average making them in this respect the most disadvantaged type of territory in the BSR. Also border regions on average had in 2006 an accessibility ratio close to half that of the general EU one.

Along the urban hierarchy, accessibility increases nearly linearly with status: capitals are most accessible, “other regions” least. A similar pecking order emerges when examining accessibility through the urban-rural typology. In this, also the remoteness factor is clearly discernible.

Capitals, second tier metro regions as well as “predominantly urban regions” are the only region types in the BSR where accessibility on average lays above the EU average.

[7] We have data for 2001 and 2006, but they do not contain Belarus or BSR Russia.

In contrast to most socioeconomic indicators, coastal regions in the EU/EFTA parts of the BSR have a slightly lower average accessibility than do non-coastal ones. Low accessibility along the Atlantic coast of Norway is the decisive factor for this discrepancy.

Table 4: Multimodal accessibility potential in the BSR by various territorial typologies 2001 and 2006

	Accessibility, index: EU27=100		
	2001	2006	Development 2001-2006: points change to EU27 average
The Baltic Sea Region (BSR)	**78**	**80**	**+2**
of which:			
- western BSR	87	84	-3
- eastern BSR	71	77	+5
Typology on urban-rural regions			
Predominantly urban regions	102	109	+7
Intermediate regions	87	88	+1
of which:			
- close to a city	*90*	*91*	+1
- remote	*56*	*58*	+2
Predominantly rural regions	63	63	+2
of which			
- close to a city	*68*	*70*	+2
- remote	*54*	*53*	-1
Typology on metropolitan regions			
Capital city regions	113	114	+1
Second-tier metro regions	95	100	+5
Smaller metro regions	87	89	+2
Other regions	65	66	+1
Typology on regions in external border programmes			
Border regions	49	51	+2
Non-border regions	84	86	+2
Typology on sparsely populated regions			
Sparsely populated regions	49	47	-2
Not sparsely populated regions	81	83	+2
Typology on coastal regions			
Coastal regions	76	76	0
Non-coastal regions	80	83	+3

Data source: Spiekermann & Wegener (2009): Multimodal and air accessibility Update, ESPON 2009. Belarus and NW Russia: data n/a.

Capitals improving accessibility fastest, sparse and remote regions loose

Examining changes between 2001 and 2006, we see that "predominantly urban regions" have increased their position most. Despite the overall lift-up of the entire BSR, "predominantly rural regions" on the other hand have actually deteriorated in their ranking. The same applies for sparsely populated areas.

Second-tier metro regions are the other group where changes in the positive direction have been rather fast. For the remaining types of territories, no major relative changes have occurred, i.e. they have moved approximately inline with the general BSR average increase.

E-accessibility divided between east and west

Examining the rather scarce regional data available for partaking in the information society, we see a general dividing line between eastern and western BSR when it comes to connectivity (Annex 3). In all regions in Norway, Sweden and Denmark, more than 4 out of five households had an internet access in 2011. Finland (data for one region only) lies slightly lower, but the Baltic States lag far behind their Nordic counterparts. However, with an access rate of 62-71 % of all households, also the Baltic States excel many other southerly EU countries such as Greece, Portugal or Italy.

Ensuring sustainable growth

Soil sealing

Soil sealing is the covering of the soil surface with artificial materials (concrete, stone, tarmac, etc.) resulting from buildings, roads, parking places and such. According to the EEA, "depending on its degree, soil sealing reduces or most likely completely prevents natural soil functions and ecosystem services on the area concerned".[8]

The EEA has produced a high resolution soil sealing layer for the whole of Europe for the year 2006 based on the same satellite pictures as used for CORINE land cover data. The monitoring system considers soil sealing per inhabitant (rather than as such), thus taking into account also this relational aspect. No data are available for Belarus, Norway or NW Russia.

High diversity in soil sealing/capita

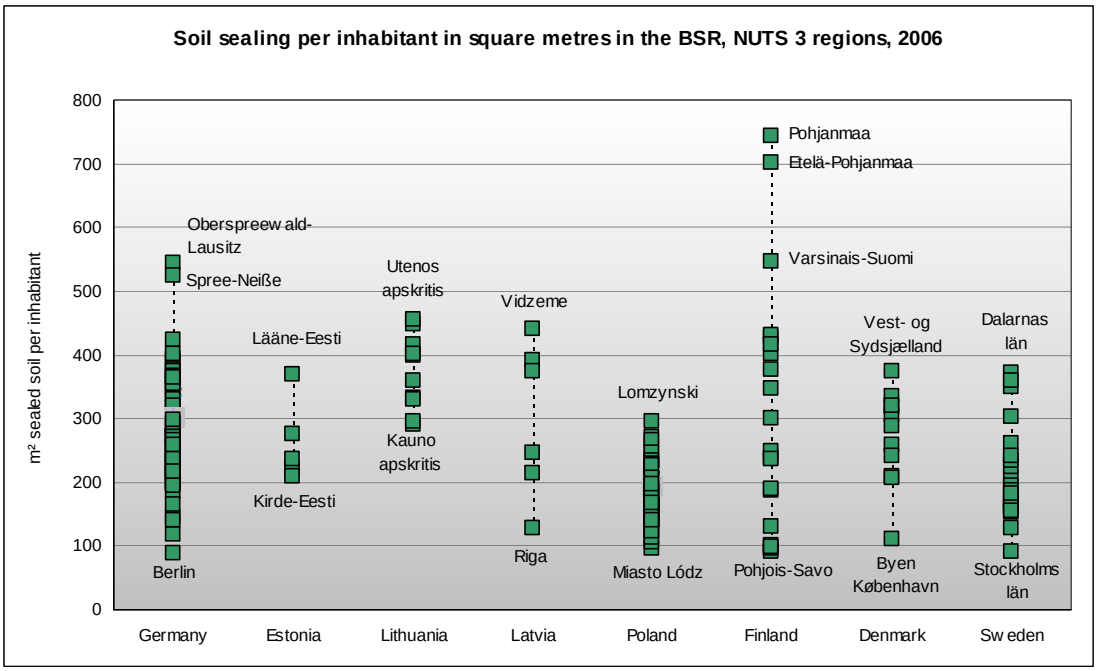
Each BSR country displays a wide variety in soil sealing per inhabitant (Figure 19, and map in Annex 4) reflecting its high territorial diversity. Even in relatively coherent Lithuania, values vary by nearly one hundred percent. Finland is in this respect most dispersed, with two NUTS 3 regions displaying rates of over seven times as high as the bottom ones.

Densely populated and narrowly delimited urban areas dominate the bottom positions in virtually each country. Despite such areas having generally higher absolute values of sealed surface, their large populations tend to lower the per capita rates.

[8] http://www.eea.europa.eu/articles/urban-soil-sealing-in-europe, on 23.6 2013

At the other end of the scale are then predominantly rural and/or sparsely populated regions. Half of the top ten regions in the BSR are Finnish.

Figure 19: Soil sealing per inhabitant in the BSR 2006 by country



Data source: EEA, Eurostat, REGIO-GIS

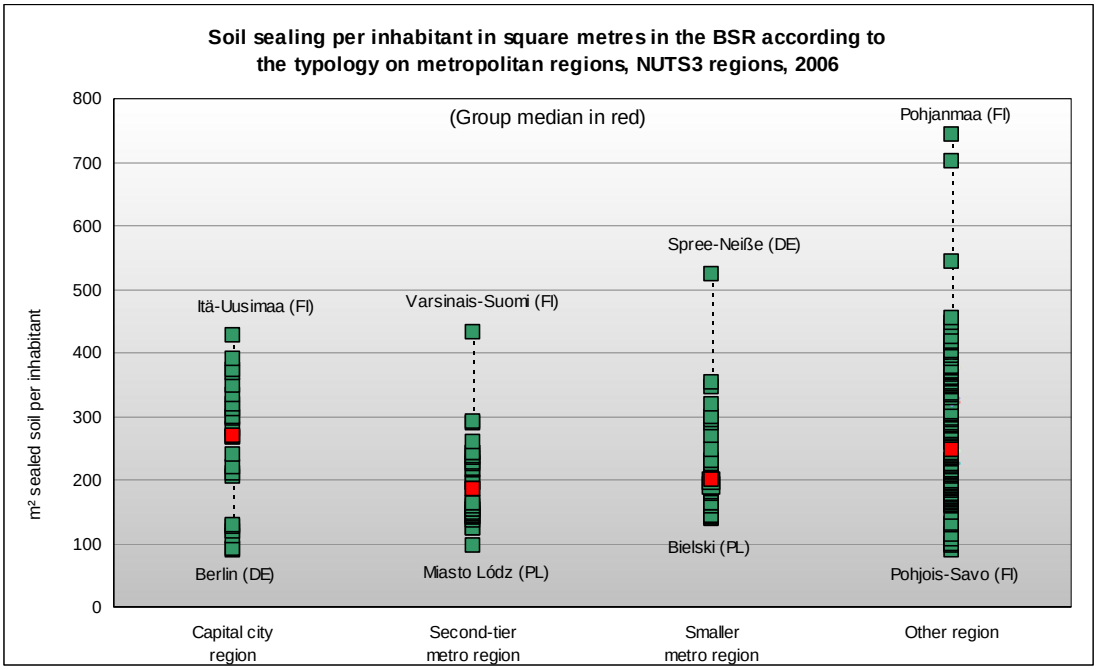
Metropolitan fringes high pressure, rural "pressure" a statistical anomaly

When examining soil sealing per inhabitant according to the typology on metropolitan regions (Figure 20), the regional values display something reminiscent of a U-shaped curve. In terms of land pressure, core city regions have in general rather low values per inhabitant whereas regions adjacent to these core cities (also classified as capitals) generally display comparatively high rates.

When moving to second tier metropolitan regions, the per capita values tend to get lower, only to start to increase again in the group of smaller metro regions, followed by even higher rates for the (in practice) rural areas.

The high rates for the most rural areas are a statistical anomaly that results from their small populations. Even one national road crossing the region, a larger harbour, an airport or a large industrial site for example, generates so much sealed soil, that the per capita rates rocket, despite that the actual land use pressure in such regions is negligible. Hence, an assessment of this information should also take into account the amount of available un-built surface per inhabitant, whereupon the figures would be largely inversed.

Figure 20: Soil sealing per inhabitant in the BSR 2006 by typology of metropolitan regions



Data source: EEA, Eurostat, REGIO-GIS

Soil sealing per inhabitant as an indicator is tentatively best suited for comparisons between similar types of regions rather than across the entire spectrum of BSR territories. Also in such comparison however the regional delimitation is a major factor to consider, as differently drawn boundaries resulting in differences in area and population can in a case of comparison affect the results to a large extent.

Air pollution follows north-south axis

A more familiar pattern emerges when studying air pollution, where data are available for all EU countries of the BSR for the year 2009. Two main factors appear to explain the amount of days per year when the density of small particles in the air exceed the provided norm value: density and industrial structure.

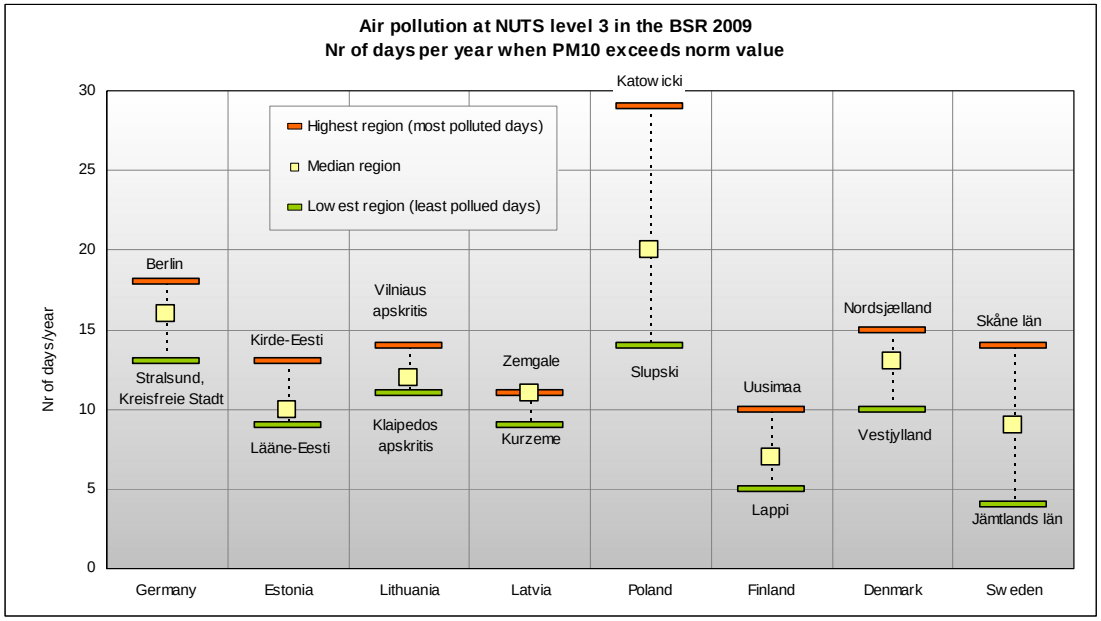
The large picture is that of north-south (Annex 5 on page 115), where the number of days per year when the norm value is exceeded are as little as 4-6 in the North. In these regions, particle concentrations those few days stem primarily from such natural phenomena as forest fires.

At the other end of the scale we have heavily industrialised areas in Upper Silesia in southern Poland, where the air quality is very poor, at worst for nearly an entire month per year.

Examining this data per country (Figure 21) we can note two main aspects. Firstly, air pollution tends to vary more between countries than inside them. For most countries air pollution levels vary very little, in general less than 10 units between the highest and the lowest region. Poland and Sweden constitute the major exceptions to this: Poland due to its large differences in industrial structure between the northernmost regions and the south; Sweden due to its long shape (arctic-to-near-continent) and southern Sweden's closeness to Copenhagen.

Secondly, in all countries the cleanest air tends to be in their sparsely populated regions (e.g. Lääne-Eesti, Lappi, Jämtland, etc.) or if in cities instead, then such situated by the sea shore (e.g. Klaipeda, Stralsund).

Figure 21: Air pollution in the BSR by country 2009



Data source: GMES Promote project, JRC, EFGS, REGIO-GIS. Belarus, Norway & NW Russia: data n/a.

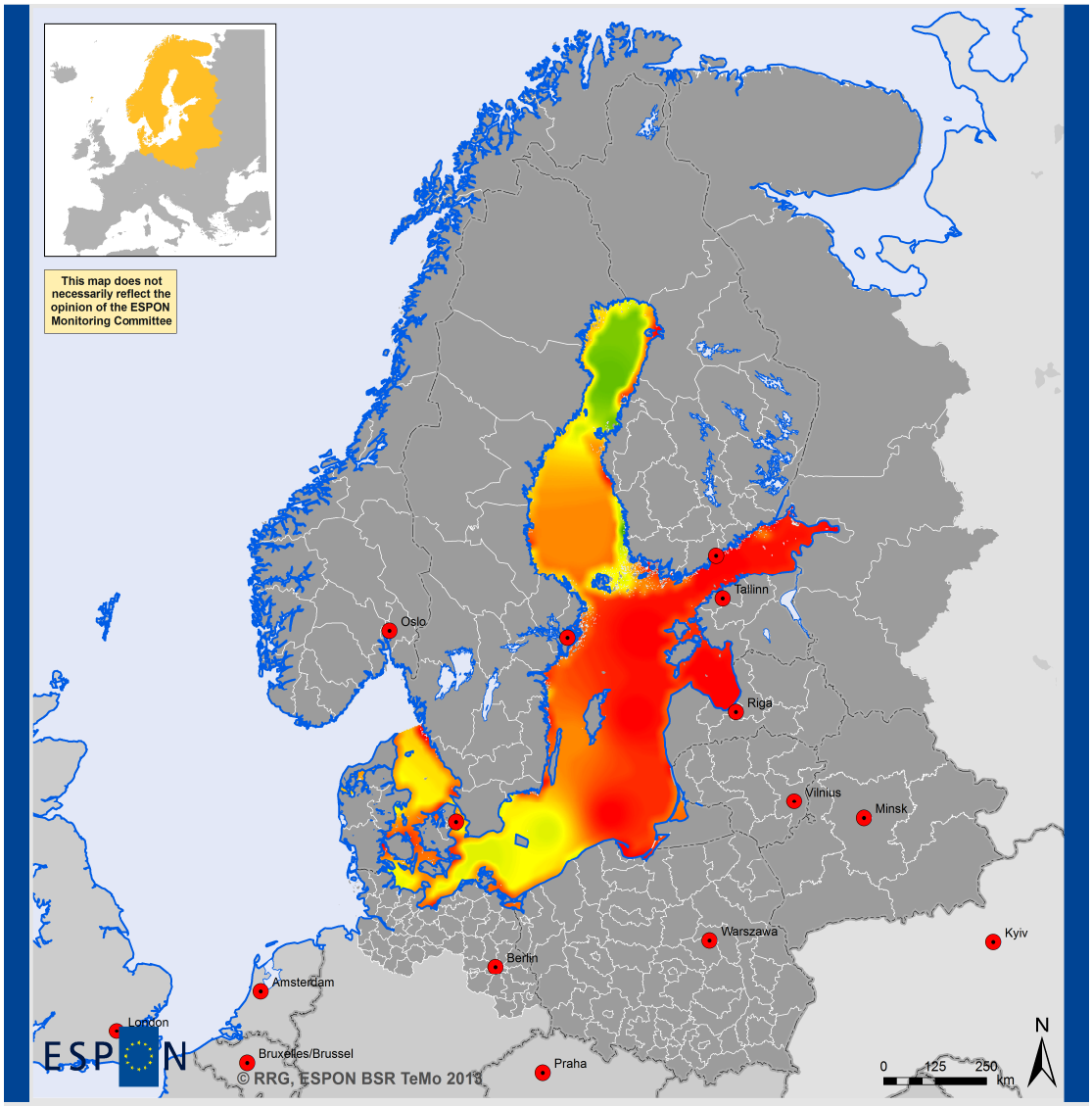
On the other hand, those regions with the worst air quality in each country are by and large either industrial regions or large metropolitan areas, or both.

Eutrophication of the Baltic Sea

The Baltic Sea is the only inland sea wholly in Europe and is one of the largest brackish-water basins in the world, and hence particularly sensitive to environmental stress. Eutrophication is addressed by one of the four thematic segments of the HELCOM Baltic Sea Action Plan. The strategic goal of HELCOM related to eutrophication is a Baltic Sea unaffected by eutrophication.

The whole Baltic Sea except the open Bothnian Bay and certain coastal areas in the Gulf of Bothnia were affected by eutrophication in 2010. Eutrophication of the Baltic Sea does not follow any traditional socioeconomic pattern of the BSR (Figure 22). Heavily industrialised or agricultural areas, large towns and water depth and interchange ability are among the affecting factors.

Figure 22: Eutrophication of the Baltic Sea 2010 – HEAT Integrated Classification



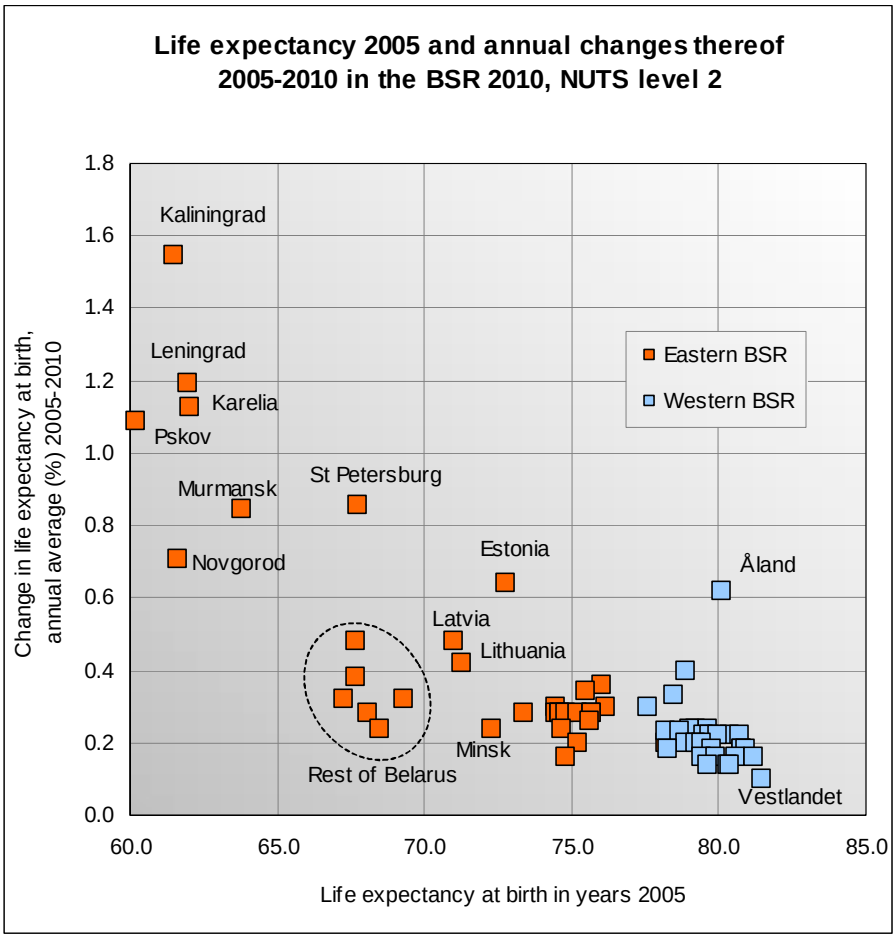
Creating inclusive growth

The EU 2020 strategy with its "inclusive growth" priority places considerably strong emphasis on inclusion; be that economic, social or territorial cohesion. In parallel to this, the EU has also the Sustainable Development Strategy where social sustainability is one of the corner stones. The GDP and Beyond initiative highlights the need for better taking into consideration aspects of well-being or quality of life (QoL) in policy making. Eurostat recently launched a monitoring framework[9] to measure the QoL of European citizens. At the regional level e.g. the Fifth Report on Economic and Social Cohesion devotes much attention to issues related to QoL.

Huge variations in life expectancy in eastern BSR

Life expectancy at birth (in years) is one of the principal global indicators for mortality. Included in the Laeken list of indicators, it reflects improvements in living standards and the establishment and improvement in health systems.

Figure 23: Changes in life expectancy 2005-2010 in the BSR

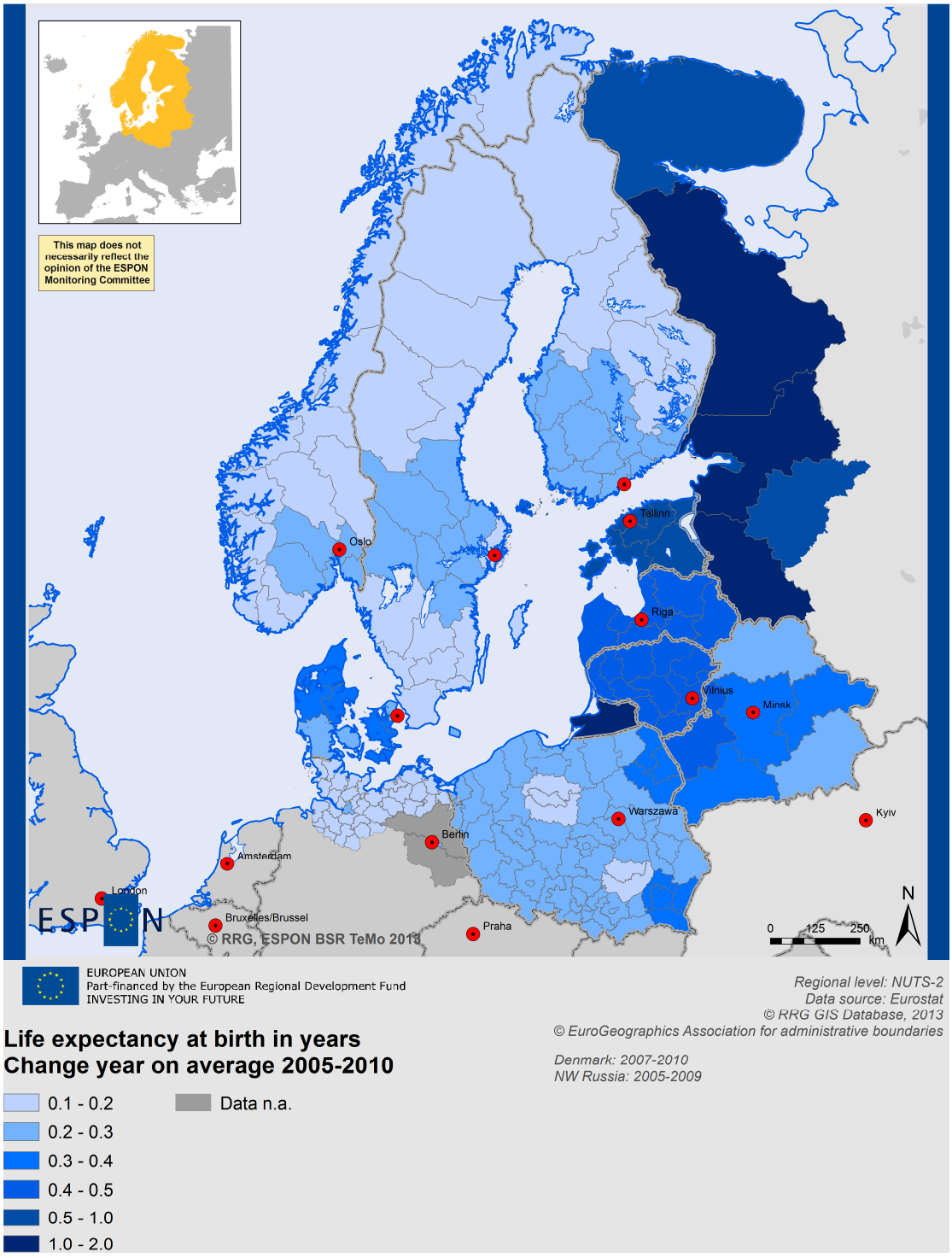


Data source: Eurostat, Rosstat, Belstat. NW Russia: 2005-2009. Brandenburg: data n/a.

[9] See e.g. http://epp.eurostat.ec.europa.eu/portal/page/portal/quality_life/introduction

Alongside low levels of fertility the gradual increase in life expectancy is however also one of the contributing factors to the ageing of the population. It can nonetheless be viewed as a partial output indicator of the quality of the health care system in general also incorporating aspects of public health awareness etc. Having said that, also the living environment, genetics, income, educational level, social relationships, etc. all have considerable impacts on health.

Figure 24: Changes life expectancy in the BSR 2005-2010



The BSR shows considerable variations in life expectancy reflecting the socioeconomic divide of the region. Differences between eastern and western BSR are substantial. Examining the x-axis in Figure 23, we see that the difference in life expectancy in 2005 between the best and the worst performers of the BSR was more than 20 life years. NW Russian regions as well as Belarus dominate the bottom positions, Norwegian and Swedish regions the top ones. This east-west gap has remained surprisingly wide and has not followed the general reduction of the economic ditto.

Slight cohesive trends in life expectancy discernible

Looking also at the y-axis in Figure 23, we see that there is a slow but detectable trend of cohesion in this respect, where the lowest performing regions have the relatively seen highest increase rates in life expectancy.

Some regions in Belarus however fall outside this general pattern and changes in these have been slower than for their peer regions.

Self-assessed general health as a proxy for objective indicators on health care personnel and expenditure

Life expectancy at birth is however a theoretical indicator where general trends of mortality are transposed on a new born child. A more current picture on the health status of a population can be obtained by asking them. Such a subjective indicator can be used as a proxy to the objective indicators on health care personnel and expenditure, which have proven to be very difficult to measure comparatively across countries. When self-assessed health and life expectancy at birth are compared for the regions of the BSR, the two indicators correlate at -0.77, which means that slightly more than half of the variation in one of them can be explained by variation in the other.

The ESS (European Social Survey) conducts surveys[10] where respondents are asked to assess their own general health on a five item scale. Please note that the scale is inversed so that one equals “very good” and five equals “very bad”. The data for NW Russia are for the entire Northwest Federal District.

No general east-west division in health status

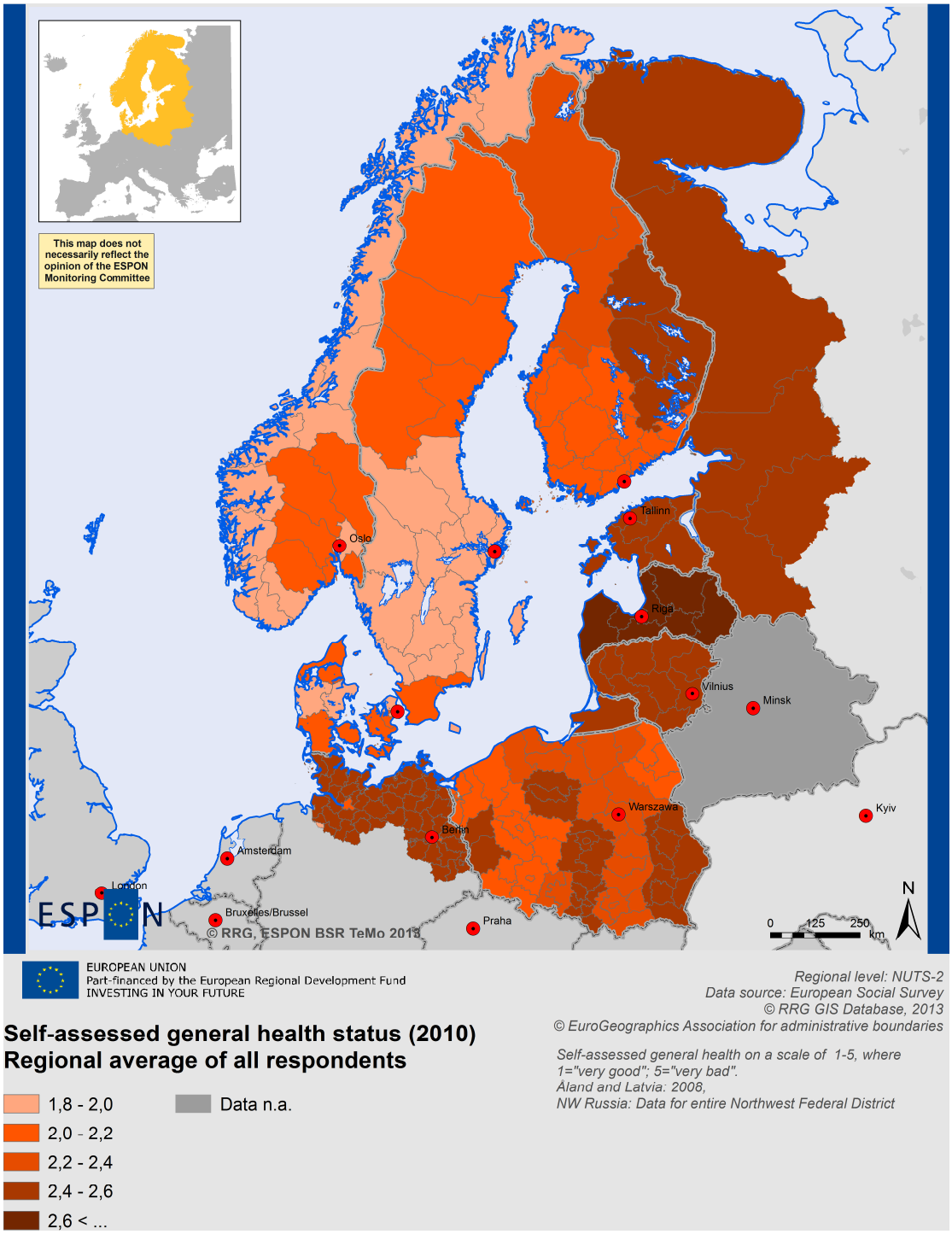
Figure 25 portrays the situation in 2010 in the BSR at NUTS level 2. Data for Belarus are not available. Self-assessed health shows a pattern where the boundary between east and west, albeit clearly recognisable, is not as sharp as that which regards e.g. life expectancy.

The worst self-assessed health status in the BSR can generally be found in the Baltic States and the new German Länder. Also Podkarpackie, Łódzkie, Śląskie and Lubelskie in Poland score very low. The worst of the western BSR can be found in eastern Finland, a region renowned for its poorer than average health status, largely related to dietary differences and general life style.

At the other end of the scale then we find Stockholm, Copenhagen and most other Danish, Swedish and Norwegian regions. Of the German regions, Bremen ranks fifth in all BSR. Of the eastern BSR territories, Zachodniopomorskie (i.e. Szczecin) is in this respect on a par with Hamburg or Åland.

[10] The EU-SILC (Survey on Income and Living Conditions) will tentatively produce also regionalised data on this topic in forthcoming rounds.

Figure 25: Self-assessed general health status in the BSR 2010



No clear-cut territorial pattern in BSR health status

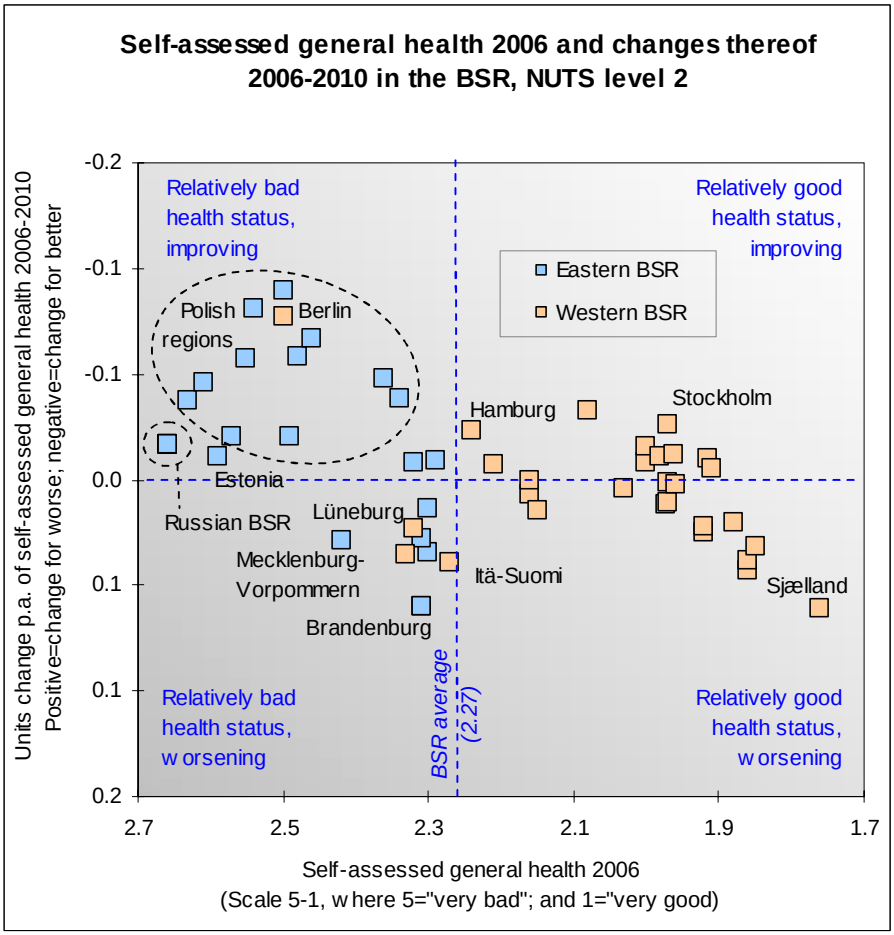
There appears to be no very clear-cut territorial dimension in the health status of the BSR population. In some cases (e.g. Denmark, Sweden) though large city regions tend to score just slightly better than their surrounding hinterland, in the BSR tentatively an indication of a better health care service network in urban areas than in rural and/or peripheral ones. In other instances this is however not the case (e.g. Finland), so no general rule can be postulated based upon this.

On a big scale cohesive trends in health status, on a smaller scale not

Changes in the health status of the BSR population tend on a big scale to move towards being levelled out. By and large we find the worst performers having improved their relative status most, and vice versa. The x-axis of Figure 26 depicts the situation at the start of the period 2006 and the y-axis changes between this and 2010. Regions in the upper left corner (that apart from Berlin are all in the eastern BSR) have improved their position during the period.

Several former East German regions however are moving in the other direction (lower left corner), as is the case also with the aforementioned Eastern Finland.

Figure 26: Subjective health 2006 and changes thereof 2006-2010



Data sources: ESS3-2006 ed. 3.0, ESS4-2008 ed. 3.0, ESS5-2010 ed. 2.0 Norwegian Social Science Data Services, Norway – Data Archive and distributor of ESS data. Åland, Latvia. Lithuania: data n/a. NW Russia: refers to the entire Northwest Federal District.

Albeit the scale of data is such, that these changes are not enormous, some well-off regions in this respect are also moving in the wrong direction, most notably Sjælland in Denmark and Mellersta Norrland in Sweden.

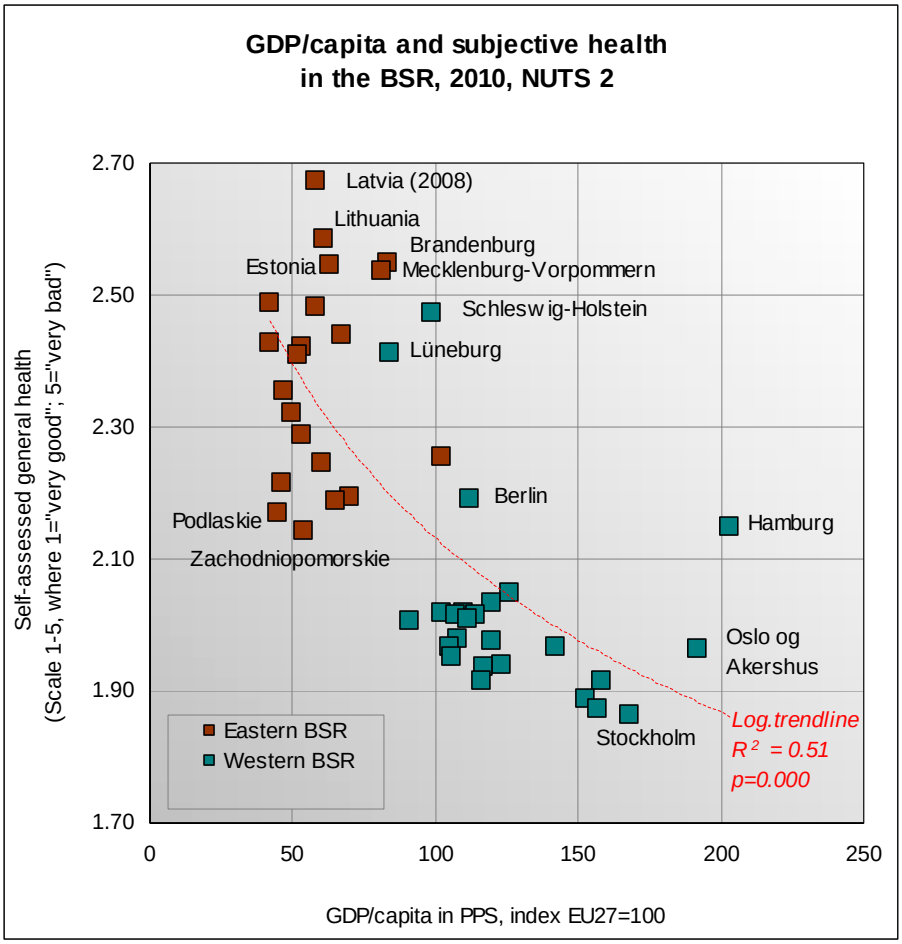
Economic welfare explains only part of health in the BSR

The relationship between self-assessed health status and economic wealth (here proxied by GDP/capita) is not a straightforward one. On a global scale it is well-

known that such a relationship exists up till a certain levelling-out point, whereas at the regional level in the BSR, that relationship is more modest (Figure 27).

The general pattern for the entire BSR is discernible, of course, and GDP is able to statistically significantly explain some half of the variation in health status. Deviations to it are numerous and not easily explainable. Particularly regions in the eastern BSR appear not to have any relationship with health status and GDP/capita. Among the wealthiest regions (Oslo, Hamburg) the deviations from the general pattern stem from narrowly defined urban regions leading to high GDP/capita values.

Figure 27: GDP/capita and subjective health 2010



Data sources for GDP: Eurostat, Rosstat. Data for NW Russia estimated through the ratio of national GDP of Russia in international $ PPP compared to the corresponding value for EU27. Data source for subjective health: ESS Round 5: European Social Survey Round 3 Data (2010). Data file edition 2.0. Norwegian Social Science Data Services, Norway – Data Archive and distributor of ESS data. Åland & Latvia: 2008. NW Russia: refers to the entire Northwest Federal District.

Two measures for relative and absolute poverty

We now introduce two other measurements for material welfare than merely GDP: the first relative; and the second absolute.

Within the target for "Inclusive growth", the EU 2020 headline goal is that at least 20 million people should be lifted out of the risk of poverty or social exclusion by the year 2020. A person is defined as being in risk of poverty if his/her equivalised (by household size) income after social transfers is below 60 % of the

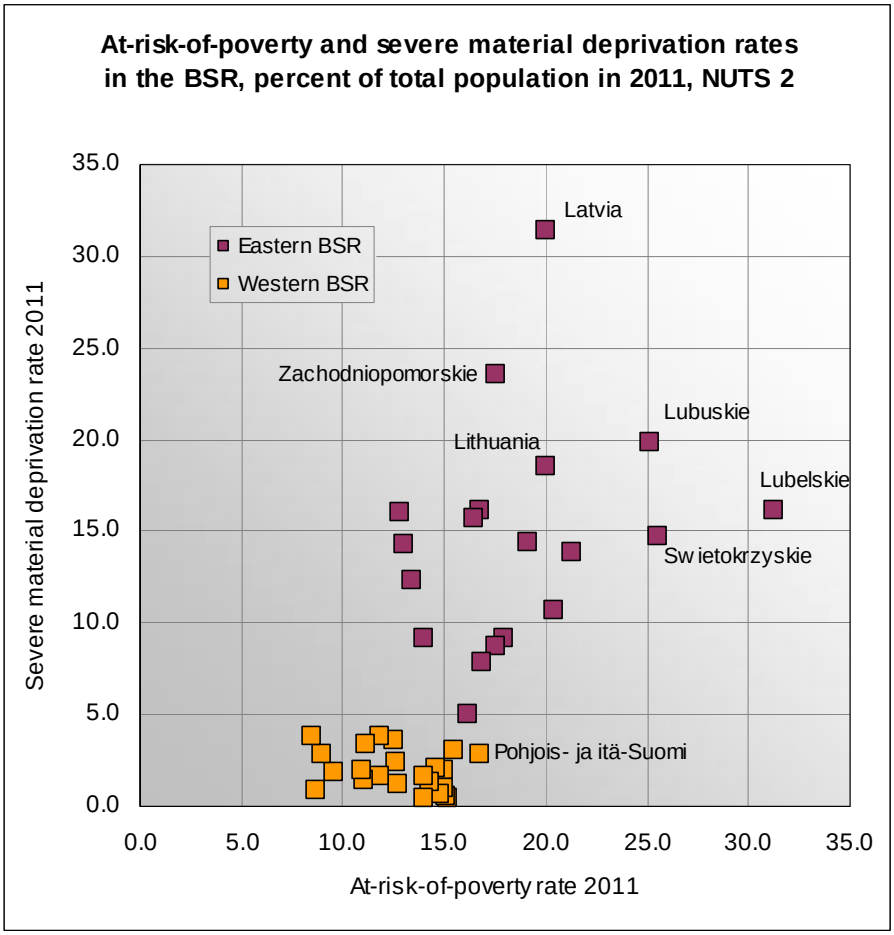
corresponding national median. Although it is here reported per individual, its primary measurement unit is the household. The at-risk-of-poverty rate is useful for comparing some distributional aspects of monetary well-being but being a relative indicator (related to the national median), it should not be utilised for cross-country comparisons of absolute levels of poverty.

Severe material deprivation targets persons having their living conditions severely constrained by a lack of resources. The indicator is defined as the share persons experiencing at least four out of nine following deprivations items: cannot afford: 1) to pay rent or utility bills; 2) keep home adequately warm; 3) face unexpected expenses; 4) eat meat, fish or a protein equivalent every second day; 5) a week holiday away from home; 6) a car; 7) a washing machine; 8) a colour TV; or 9) a telephone. This indicator is a headline indicator for the EU 2020 Strategy.

Large differences in east-BSR poverty

Figure 28 shows the relationship between the two indicators at NUTS level 2 in the region in 2011 distinguishing between east and west BSR. No data are available for Belarus or NW Russia.

Figure 28: Regional differences in relative and absolute poverty in the BSR 2011



Data source: Eurostat. Data for Belarus & NW Russia n/a.

Relative poverty in western BSR shows some regional differentiation, but not very large (x-axis). Western BSR regions with the largest income differences are in Finland, where northern and eastern Finland as well as southern Finland (excl. Helsinki) have 16-17 % of the population living under the poverty threshold. Also some Swedish more rural regions (Mellersta Norrland and Småland med öarna) lay above 15 % in this respect.

Missing from the graph (due to no data available for severe material deprivation) are all German regions. However, in 2010 Bremen with 21.1 % and Berlin with 19.2 % under the poverty threshold topped the western BSR ranking by far.

In contrast, most regions in the western parts of the BSR with low shares of poverty are urban, Helsinki with 8.5 % having the lowest. Also Stockholm, Oslo and Copenhagen all lay between 11 and 12 %. This demonstrates that the urban paradox, so predominant in most larger continental cities, has yet not reached their Nordic counterparts.

In contrast to the western BSR, differences in eastern BSR are substantial, ranging from 12-13 % in Polish Dolnoslaskie, Slaskie or Opolskie to more than 31 % in Lubelskie. Also in Swietokrzyskie and Lubuskie more than a quarter of the population live under the national poverty threshold. In BSR Germany, Mecklenburg-Vorpommern tops the list with 22.4 % in 2010.

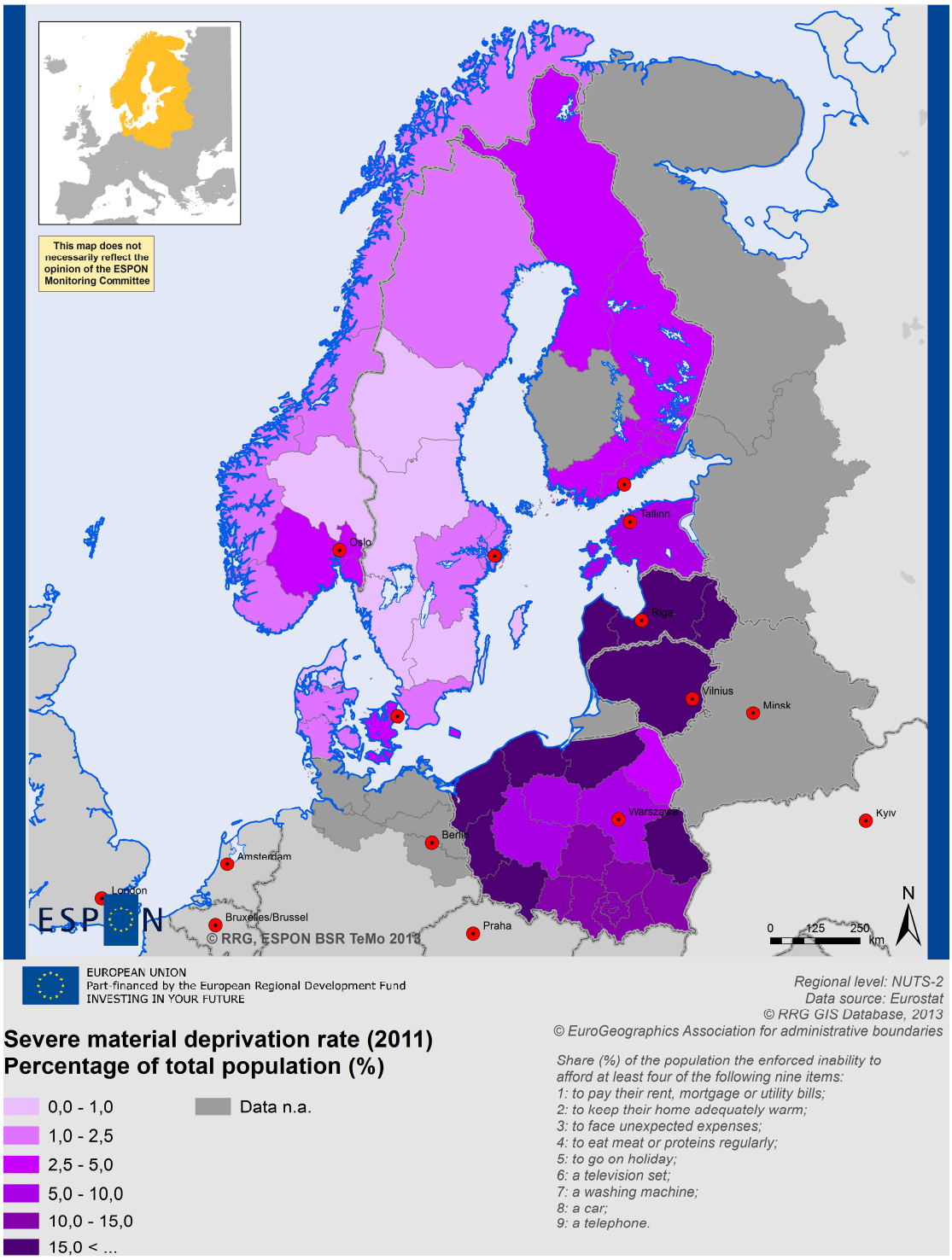
Eastern BSR differences in absolute poverty (y-axis in Figure 28, and Figure 29) are larger still. In Latvia, 31.4 % of the population have their living conditions severely constrained by a lack of material resources. The contrast to e.g. Estonia is substantial, where the corresponding rate lays at only 8.7 % of the population. Podlaskie (5.0 %) and Wielkopolskie (7.9 %) in Poland have the lowest rates of the eastern BSR.

In this respect the western BSR has very few materially deprived persons. All regions' values range from 0.4 % (Swedish Småland med öarna) to 3.8 % (Helsinki). Helsinki hence has the lowest shares of relative poor in the western BSR but the highest share of absolute poverty.

No straightforward territorial patterns

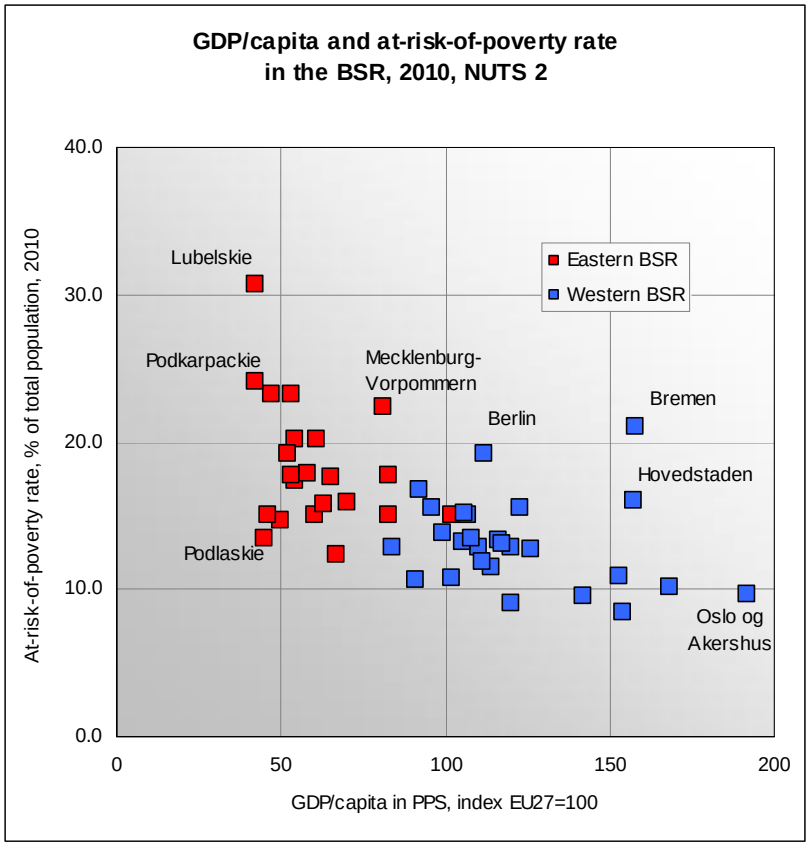
Beyond the obvious east-west dimension in the BSR (where Annex 6 a and b demonstrate this gap and changes therein during the time frame 2005 to 2010/11), no straightforward territorial patterns are noticeable when studying relative and absolute poverty in the region. This is corroborated also by looking at the map in Annex 7 on page 117. The regions with least or most shares of poor do not even when studied by country share that many common features, which entails that other than purely territorial aspects (e.g. general social policy) may be strong determinants for poverty at the regional level.

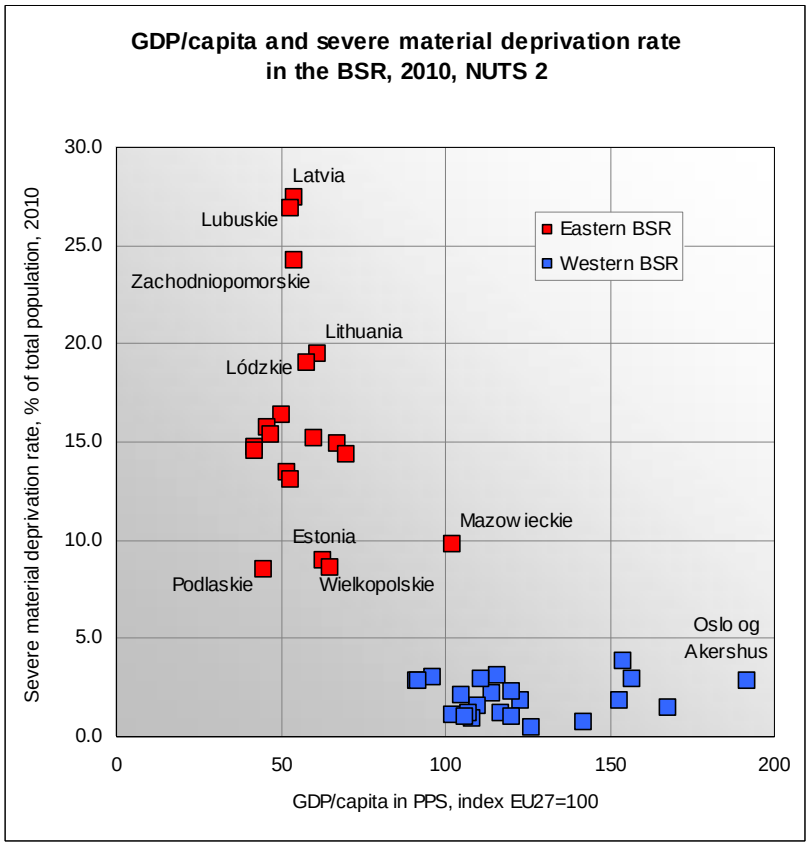
Figure 29: Severe material deprivation rate in the BSR 2011



Such lack of clear-cut territorial patterns is also demonstrated when studying both relative and absolute poverty through the lens of GDP. On the surface and at a macro regional scale, increased levels of material wealth (GDP) show a decreasing tendency of both relative and absolute poverty (Figure 30 a and b). However, when subdivided into east and west BSR, the general patterns vanish.

Figure 30 a and b: Relative and absolute poverty in the BSR vs. GDP in 2010





Data source: Eurostat. Data for Belarus & NW Russia n/a.

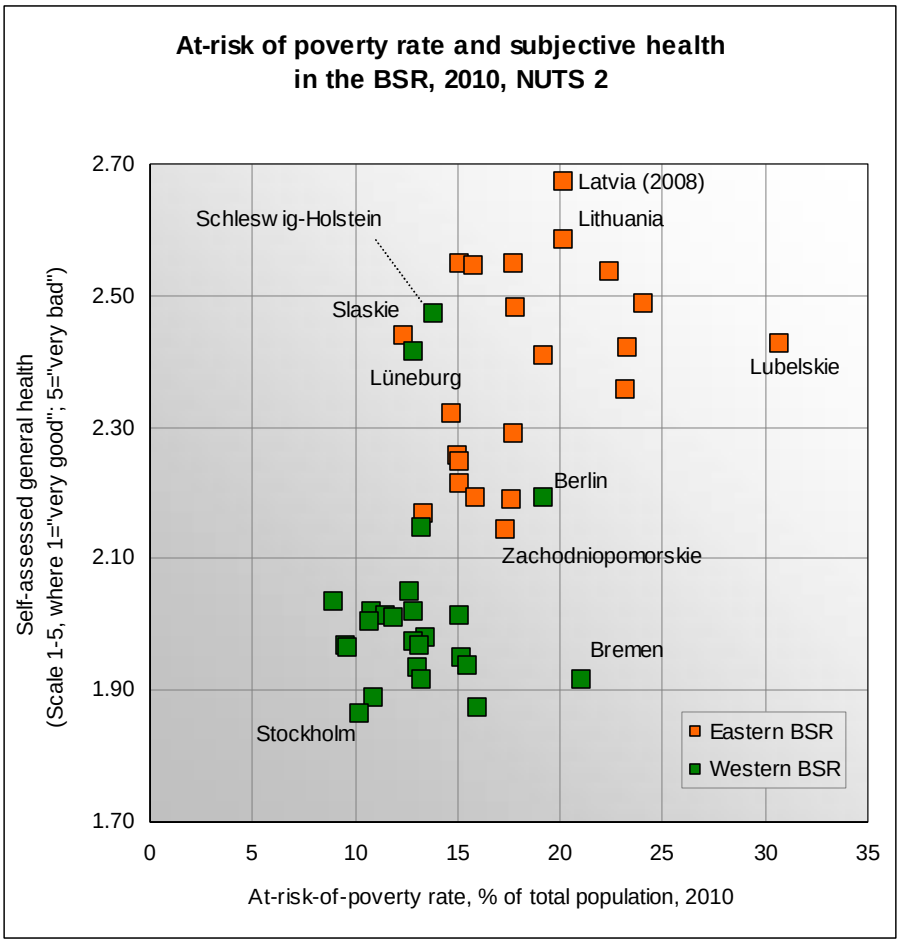
For relative poverty, the eastern BSR regions display some coherence with general wealth levels, where more wealth in general entails smaller shares of relative poverty. This is natural, since increases in material wealth in these regions bring about a larger middle class which in turn means smaller income differences.

However, no such relationships exist between general levels of material wealth and absolute poverty levels, neither in eastern BSR nor in western ditto.

Poor health and poverty not hand in hand in the BSR

Finally closing the circle, Figure 31 compares the rate of relative poverty with the levels of self-assessed general health. Compared as such, the primary BSR tendency is that larger income differences tend to result in worse health, and vice versa. The relationship is not fully straightforward, and exceptions abound, particularly when examining this relationship in western BSR.

Figure 31: At-risk-of-poverty and subjective health in the BSR 2010



Data source for at-risk-of-poverty rate: Eurostat. Data source for subjective health: ESS Round 5: European Social Survey Round 3 Data (2010). Data file edition 2.0. Norwegian Social Science Data Services, Norway – Data Archive and distributor of ESS data. Åland & Latvia: 2008.

It nonetheless on the surface may appear that regions in the BSR, east and west alike, have already passed the stage many developing countries are in, where

large income differences are also manifested in such basic factors as health care. However, bearing in mind that large income differences in the BSR were also associated with low income levels in general, and that low income levels were generally connected to bad health, entails that one cannot make such a conclusion.

Territorial cohesion in the BSR: a synthetic multidimensional assessment

The vast flows of different messages from the previous sections of this chapter are difficult to interpret coherently. Trends and patterns cross-sect each other, and supra level trends tend to be hidden in the shadows of particular thematic details. We thus here make an approach to synthesize the different BSR patterns and trends into one compact and coherent package.

We attempt this by utilising ten specific macro level measurement techniques that cover all major aspects of territorial cohesion in the BSR, i.e. distribution, convergence, and specifically targeted BSR cohesion objectives. All indicators have clear territorial character highlighting the interplay and performance of different regions across the BSR. Accordingly, they can be applied for different types of territories (as illustrated by indicators 6-10) as well as for macro regional evaluations (1-5). The proposed techniques as such are nothing new in themselves; on the contrary, all are well-established since decades. We have merely consistently applied these techniques in a coherent manner on a limited number of variables in the monitoring system.

Naturally these ten methods could have been applied on any other suitable variables (provided that they meet certain basic criteria), but we have deliberately chosen to utilise these ten methods on three core variables only (population, employment, and GDP). We believe these three basic variables are able to act as mirrors for a wider array of thematic and conceptual themes, incorporating factors such as the knowledge economy, innovation, entrepreneurship, agglomerational economies, and the like. Having said that, it is also fairly apparent that particularly environmental or social issues are not given adequate focus here.

However, the advantage of utilising specifically these three variables is that we (owing to full BSR data coverage at required spatial level) are able to incorporate events that cover the entire BSR, not only western or the EU parts of it.

The ten indicator methods are described in the info box hereunder.

Rapid info box - Ten indicators for BSR territorial cohesion

This info box contains short descriptions on the ten indicators utilised for measuring overall territorial cohesion in the BSR. In this paper, we have chosen to apply these methods on three core variables (population, employment, GDP) but naturally *these ten methods can be applied on any suitable variables*, provided that they meet certain basic criteria listed below.

Distribution indicators (1-3)

The three first indicators measure overall cohesion in a distributive manner, each from its own specific point of view.

(1.) The Gini Concentration Ratio (GCR) is one of the most widely utilised inequality indicators. It measures the dispersion of a phenomenon and it operates within the range 0-1, where a value of 0 would indicate perfect equality (i.e. in our case that all regions would be exactly the same) and a value of 1 in turn maximum inequality (i.e. that all that is measured would be concentrated into a single region alone). A GCR value of e.g. 0.45 could be interpreted as the amount (45 %) required to be shifted for perfect equality to take place. Apart from being non-spatial, the GCR has the analytic limitation that it reacts in relative terms equally on changes within the middle band of regions as it does to changes in the extremes, which is troublesome, for it is most often occurrences at the extreme ends of the scale that are of interest to policy. The exact formula for the GCR can be found in Annex 10.

(2.) The Atkinson index seeks to address this shortcoming of the GCR by introducing a sensitivity parameter (ε value) that enables giving greater emphasis to, in our case, small or low performing regions. It operates on a similar scale as the GCR, i.e. 0 would indicate perfect equality and a 1 maximum inequality. For the purpose of this analysis the sensitivity parameter (ε value) is always set at 0.8, which implies that greater weight is given to changes among the lower performers. By comparing the results of the Atkinson index to those of the GCR, we are able to draw conclusions whether the changes in inequality stem from the changes in the lowest performers or not. The precise formula for the index can be found in Annex 10.

(3.) The 80/20 ratio (also known as the Kuznets ratio) is a simple bivariate analytic technique that concerns the relationship between the highest (top 20 %) and the lowest (bottom 20 %) performers. It is calculated as the ratio between these two and does as such not concern itself at all with what happens in the three middlemost quintiles. The higher the value, the larger is the discrepancy between the two extreme groups, and vice versa. A value of e.g. 8.0 indicates that the best performing group (i.e. the top quintile or the highest 20 % of regions) has eight times more of what is measured than the corresponding lowest performing group.

Convergence indicators (4-5)

The following two indicators measure the *process* of convergence by means of two commonly used standard techniques. By applying both methods in parallel, one can obtain a picture whether the process of convergence – or lack thereof –

is of a *sigma type* (i.e. reduction of disparities in general) or of a *beta type* (i.e. convergence through a catch up of the low performers).

(4.) Sigma-convergence occurs when disparities in general are reduced. It is commonly measured simply by the *coefficient of variation*, which is calculated as standard deviation divided by the mean of all regions. The higher the value, the larger are the overall differences between all regions, and vice versa. This indicator is very sensitive to extreme outliers and can be used as a supplement to e.g. the GCR. A catch-up process of the poorest performers affects the value as much as would similar reductions among the best performers. The formula for the calculation can be found in Annex 10.

(5.) Beta-convergence concerns itself primarily with disparity reduction via a catch-up process by the poorest performers. It is (in this paper) measured by means of a linear regression model where the dependent variable is the level of the region at beginning of a year and the independent variable the change that has occurred during this particular year. By looking at the unstandardised "b" regression coefficient from each model, one can obtain a picture of how much the growth rate is affected by the initial level. A negative rate implies increasing convergence, as it de facto (on average) implies that the lower a region's performance is, the higher has been its growth rate. A positive value indicates the opposite, i.e. a pull-off by the best performers.

Targeted BSR territorial cohesion indicators (6-10)

The remaining five indicators are targeting five specific aspects of territorial cohesion with particular relevance in a BSR context. Simple though they are from a methodical point of view, they nonetheless are able to provide a more diversified picture of different aspects of territorial cohesion in the BSR with a clear focus on regional specifities, and may be used in addition to the more traditional indicators described above. One aim of these is to capture the three principal divides of the BSR. Each indicator is bivariate meaning that it compares two groups of regions against each other. The last four of these indicators are based on four different DG Regio territorial typologies (supplemented by information on Belarus and NW Russia) and as such can only be applied on data available at NUTS level 3. Each indicator is calculated as a straightforward ratio, and for example a value of 1.3 would indicate that the numerator (e.g. "east" in the "east/west ratio" or "south" in the "south/north ratio") has 30 % more of the measured entity than has the corresponding denominator.

(6.) The east/west ratio compares the amount of a phenomenon in eastern BSR to that in western ditto. Eastern BSR is comprised of the new German Länder, the Baltic States, Poland, Belarus and NW Russia. The Nordic countries and former West Germany including the NUTS 3 region of Berlin are in turn classified as Western BSR.

(7.) The south/north ratio is based on the DG Regio typology of sparsely populated areas (supplemented by information on NW Russia and Belarus). All regions classified as sparse in the typology (i.e. less than 12.5 inhabitants/km² at NUTS 3 level or less than 8 inhabitants/km² at SNUTS level 2 in NW Russia and Belarus) are classified as "north, the remaining areas as "south".

(8.) The urban/rural ratio is based on the DG Regio Typology on urban-rural regions supplemented by information on NW Russia and Belarus. The indicator compares the class "predominantly urban regions" with the class "predominantly rural regions". The latter class includes both regions "close to a city" as well as "remote" regions. This indicator hence excludes the middlemost category of the typology ("Intermediate regions") and is able to provide a crude picture on

relative changes between the top and bottom section of the urban-rural hierarchy.

(9.) The non-border/border ratio is based on the DG Regio typology "Border regions - internal and external" supplemented by information on Belarus and NW Russia. It compares the external border regions of the BSR to all the remaining regions. Based on this typology, there are no external border regions identified in Denmark and BSR Germany. Please note that for reasons related to easier interpretation, we have throughout calculated the ratio as "non-border regions" divided by "border regions" instead of the opposite.

(10.) The coast/inland ratio is based on the DG Regio "Typology on coastal regions", where coastal regions are classified on basis of the (low, medium, high or very high) share of population living within the coastal zone. Our indicator compares the entire group of coastal NUTS 3 regions to all other regions.

Why not just apply this on a single variable instead, why go through the trouble of doing it all three times? One advantage of this multi-thematic approach is that it acts as a quality and sensitivity control in itself. Our hypothesis is that the three chosen variables should co-vary at least to a moderate extent, and by comparing each indicator we are able to corroborate the findings and tentatively avoid messages that could stem from statistical anomalies in just one of them.

The most difficult to grasp of these ten indicators are probably the Gini and the Atkinson indices. Why would for example the second one be needed at all to support the first one, they both measure largely the same, don't they? The difference between the Gini index and the Atkinson ditto is illustrated in the following hypothetical example with GDP.

If we would artificially change the actual values of GDP in 2010 for the middlemost quintile (i.e. group nr 3/5) of the BSR regions, and in parallel do the same for the lowest quintile (5/5), the Gini index displays "more increased cohesion" for the change in the middlemost group than for that at the lower end (owing to their larger size, which creates more change in the entire distribution). A straightforward interpretation of this information (without knowing exactly where the change took place) is clearly problematic, and misleading conclusions are likely to be made.

For the same hypothetical change, however, the Atkinson index in contrast displays "more increased cohesion" for the change in the lower end than for the corresponding change in the middlemost range of regions, whereupon one may also conclude precisely where the "increased cohesion" visible in both indices actually stems from.

In Table 5 through Table 7 below, we present the ten indicators applied on GDP, employment and population. For quick reference, the tables contain for each indicator a brief summary of the most apparent trends discernible in the material.

Table 5: Ten indicators for BSR territorial cohesion in GDP 2005-2010

Based on total GDP in PPS at NUTS level 3 (Belarus and NW Russia: SNUTS2)
(n=238)

Type	Indicator	Note	2005	2006	2007	2008	2009	2010	*Short interpretation of trend*
Distribution indicators	Gini Concentration Ratio	[1]	0.509	0.511	0.513	0.516	0.520	0.527	*Gradually increasing concentration throughout the period with a large leap after 2009.*
	Atkinson index (ε =0.8)	[2]	0.311	0.313	0.315	0.319	0.324	0.332	*Inequality increasing gradually throughout the period. Largest leap after 2009.*
	80/20 (or Kuznets) ratio	[3]	12.8	12.9	12.9	13.2	13.6	14.2	*Rather balanced development up till 2007, then a big leap after the 2008 financial crisis in favor of the largest regions.*
Convergence indicators	Sigma-convergence	[4]	1.46	1.46	1.48	1.51	1.53	1.54	*Gradually increasing polarisation throughout the period.*
	Beta-convergence	[5]	:	-1.358	-4.330	-0.753	-1.585	-0.660 (*)	*Regions with low GDP/capita catch up till 2009, after which no statistically significant correlation between level of GDP/capita and its relative growth rate [(*) p-value = 0.248].*
Targeted BSR territorial cohesion indicators	East/west ratio	[6]	0.96	0.99	1.03	1.07	1.13	1.13	*Eastern BSR strengthening its position up till 2009, after which a balanced development*
	South/north ratio	[7]	16.47	16.61	17.09	17.18	18.41	17.92	*Northern regions loosing to southern ones up till 2009, after which position strengthened.*
	Urban/rural ratio	[8]	1.78	1.81	1.83	1.87	1.92	1.94	*Urban regions gaining throughout the period, with a slight ease-off after 2009.*
	Non-border/border ratio	[9]	7.05	6.87	6.80	6.69	6.72	6.62	*Border regions gradually gaining throughout the period; a small backslash in 2009.*
	Coast/inland ratio	[10]	0.934	0.947	0.943	0.950	0.923	0.921	*Coastal dominance increasing till 2008, after which inland regions have grown faster.*

Notes on method

[1] Standard measure for overall inequality within the range 0-1, where a value of 0 would indicate perfect equality and a value of 1 in turn maximum inequality.

[2] Inequality measure within the range 0-1 that enables greater emphasis to low (or high) performers. A value of 0 would indicate perfect equality and a value of 1 in turn maximum inequality. Sensitivity parameter (ε value) is here set at 0.8, which gives greater weight to changes in regions with a small GDP.

[3] Inequality measure for top and bottom extremes. Ratio of GDP in PPS in the 20 % of the largest to the 20% of the smallest regions in terms of GDP.

[4] Standard convergence indicator utilising the coefficient of variation (calculated as standard deviation divided by the mean). The higher the value, the larger all the overall differences between all regions.

[5] Standard convergence indicator measuring a catch-up process. Measured with the unstandardised "b" regression coefficient from a linear model where the dependent variable is GDP/capita in PPS at beginning of period, and the independent variable the %-unit change to the EU average. A negative value equals convergence, i.e. regions with a low level grow faster than those with a higher one, and a positive the opposite.

[6] Ratio of GDP in PPS in eastern BSR to that in Western BSR

[7] Ratio of GDP in PPS in non-sparsely populated regions to that in sparsely populated ones.

[8] Ratio of GDP in PPS in predominantly urban regions to that in predominantly rural ones. Disregards the "Intermediate" class.

[9] Ratio of GDP in PPS in non-border areas to that in external border regions. No external border regions in Denmark and BSR Germany.

[10] Ratio of GDP in PPS in coastal regions to that in non-coastal ones. Coastal regions include all levels of "coastality".

Table 6: Ten indicators for BSR territorial cohesion in employment 2005-2009

Based on total employment at NUTS level 3 (Belarus and NW Russia: SNUTS2)
(n=238)

Type	Indicator	Note	2005	2006	2007	2008	2009	*Short interpretation of trend*
Distribution indicators	Gini Concentration Ratio	[1]	0.495	0.497	0.498	0.498	0.503	*Slowly icreasing concentration throughout the period, but with a big leap after 2008.*
	Atkinson index (ε =0.8)	[2]	0.295	0.296	0.298	0.298	0.303	*Slight increase in inequality up till 2008, after which inequality increases more sharply.*
	80/20 (or Kuznets) ratio	[3]	12.5	12.7	12.9	13.0	13.1	*Largest regions increasing their chunk up till 2007, after which slower polarisation.*
Convergence indicators	Sigma-convergence	[4]	1.291	1.287	1.280	1.274	1.301	*Inreasing overall convergence till 2008, after which disparities again grow.*
	Beta-convergence	[5]	:	0.054	0.040	0.031 (*)	-0.003 (*)	*Decreasing convergence till 2007, after which no statistically significant correlation between size and growth [(*) p-value > 0.05].*
Targeted BSR territorial cohesion indicators	East/west ratio	[6]	1.71	1.71	1.72	1.73	1.74	*East-BSR's share of jobs increasing steadily throughout the period.*
	South/north ratio	[7]	18.77	18.90	19.19	19.61	19.88	*Sparsely populated regions loose in relative terms throughout the period.*
	Urban/rural ratio	[8]	1.42	1.43	1.44	1.43	1.49	*Rather balanced till 2008, after which "predominantly rural areas" loose in relative terms.*
	Non-border/border ratio	[9]	4.13	4.15	4.17	4.17	4.20	*Border regions gain in relative terms throughout the period.*
	Coast/inland ratio	[10]	0.70	0.70	0.69	0.68	0.67	*Inland regions grow faster in relative terms throughout the period.*

Notes on method

[1] Standard measure for overall inequality within the range 0-1, where a value of 0 would indicate perfect equality and a value of 1 in turn maximum inequality.

[2] Inequality measure within the range 0-1 that enables greater emphasis to low (or high) performers. A value of 0 would indicate perfect equality and a value of 1 in turn maximum inequality. Sensitivity parameter (ε value) is here set at 0.8, which gives greater weight to changes in smaller regions (in terms of employment) than to large ones.

[3] Inequality measure for top and bottom extremes. Ratio of nr of jobs in the 20 % of the largest to the 20% of the smallest regions in terms of nr of jobs.

[4] Standard convergence indicator utilising the coefficient of variation (calculated as standard deviation divided by the mean). The higher the value, the larger all the overall differences between all regions.

[5] Standard convergence indicator measuring a catch-up process. Measured with the unstandardised "b" regression coefficient from a linear model where the dependent variable is (log.) size of employment at beginning of period, and the independent variable the % change in nr of jobs. A negative value equals convergence, i.e, smaller regions grow faster than larger ones, and a positive value the opposite.

[6] Ratio of nr of jobs in eastern BSR to those in Western BSR

[7] Ratio of nr of jobs in non-sparsely populated regions to those in sparsely populated ones.

[8] Ratio of nr of jobs in predominantly urban regions to those in predominantly rural ones. Disregards the "Intermediate" class.

[9] Ratio of nr of jobs in non-border areas to those in external border regions. No external border regions in Denmark and BSR Germany.

[10] Ratio of nr of jobs in coastal regions to those in non-coastal ones. Coastal regions include all levels of "coastality".

Table 7: Ten indicators for BSR territorial cohesion in population 2007-2011

Based on total population 1 January respective year at NUTS level 3 (Belarus and NW Russia: SNUTS2)
(n=238)
Data for NW Russian regions for 2011 estimated on basis of average annual change during 2007-2010.

Type	Indicator	Note	2007	2008	2009	2010	2011	*Short interpretation of trend*
Distribution indicators	Gini Concentration Ratio	[1]	0.462	0.463	0.463	0.465	0.467	*Gradually increasing concentration throughout the period with a larger leap in 2010.*
	Atkinson index (ε =0.8)	[2]	0.264	0.265	0.266	0.269	0.270	*Gradually increasing inequality throughout the period with a larger leap in 2010.*
	80/20 (or Kuznets) ratio	[3]	11.0	11.1	11.2	11.3	11.4	*The largest regions steadily increasing their share of population throughout the period.*
Convergence indicators	Sigma-convergence	[4]	1.104	1.107	1.110	1.131	1.142	*Gradually increasing polarisation up till 2009, after which this trend is more pronounced.*
	Beta-convergence	[5]	:	0.294	0.374	0.262	0.217	*The larger the region in terms of population, the faster has been its growth throughout the period, and vice versa. Changes during 2009 were particularly polarising.*
Targeted BSR territorial cohesion indicators	East/west ratio	[6]	1.98	1.96	1.95	1.94	1.93	*Eastern BSR steadily loosing to western BSR.*
	South/north ratio	[7]	20.15	20.22	20.27	20.66	20.81	*Northern regions loosing steadily to southern ones, with trend strengthened after 2009.*
	Urban/rural ratio	[8]	1.13	1.13	1.14	1.15	1.16	*Urban regions gaining steadily throughout the period.*
	Non-border/border ratio	[9]	3.88	3.90	3.92	3.94	3.97	*Border regions steadily loosing throughout the preiod.*
	Coast/inland ratio	[10]	0.61	0.61	0.62	0.62	0.63	*Coastal dominance increasing throughout the period.*

Notes on method

[1] Standard measure for overall inequality within the range 0-1, where a value of 0 would indicate perfect equality and a value of 1 in turn maximum inequality.

[2] Inequality measure within the range 0-1 that enables greater emphasis to small (or large) regions. A value of 0 would indicate perfect equality and a value of 1 in turn maximum inequality. Sensitivity parameter (ε value) is here set at 0.8, which gives greater weight to changes in regions with a small population.

[3] Inequality measure for top and bottom extremes. Ratio of population in the 20 % of the largest regions to that in the 20% smallest ones.

[4] Standard convergence indicator utilising the coefficient of variation (calculated as standard deviation divided by the mean). The higher the value, the larger are the overall differences between all regions.

[5] Standard convergence indicator measuring a catch-up process. Measured with the unstandardised "b" regression coefficient from a linear model where the dependent variable is (log) population at beginning of period, and the independent variable the %-unit change in population. A negative value equals convergence, i.e. regions with a small population grow faster than those with a higher one, and a positive the opposite.

[6] Ratio of population in eastern BSR to that in Western BSR

[7] Ratio of population in non-sparsely populated regions to that in sparsely populated ones.

[8] Ratio of population in predominantly urban regions to that in predominantly rural ones. Disregards the "Intermediate" class.

[9] Ratio of population in non-border areas to that in external border regions. No external border regions in Denmark and BSR Germany.

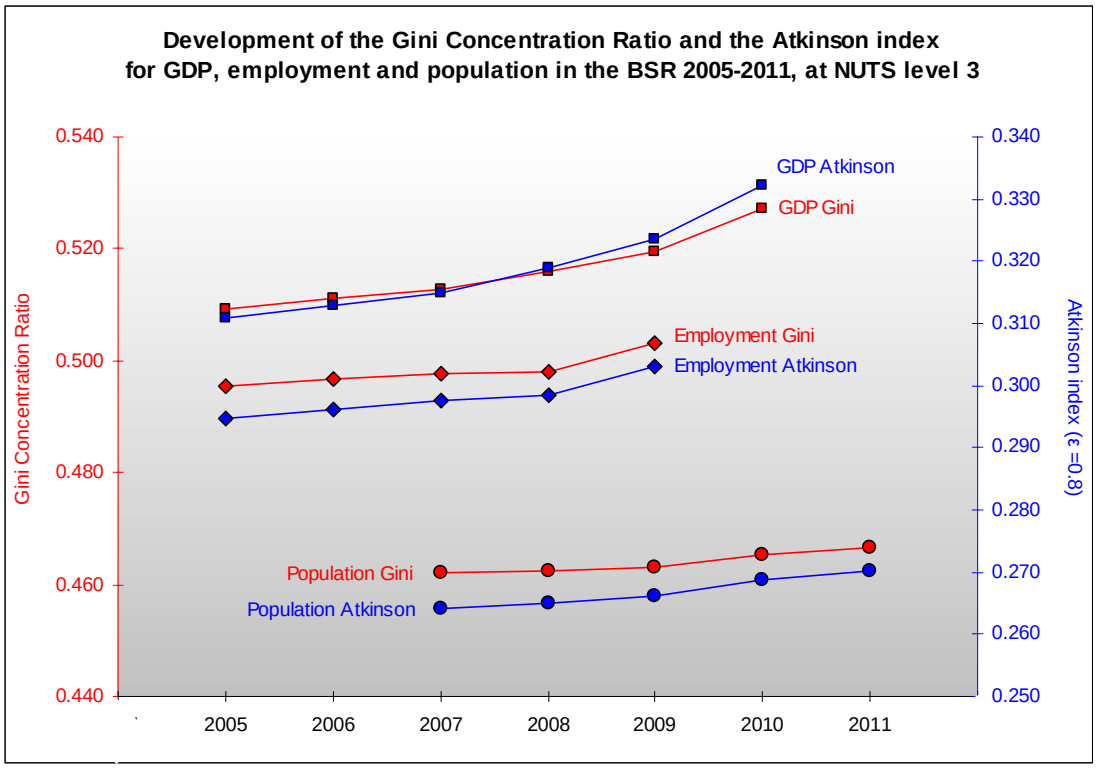
[10] Ratio of population in coastal regions to that in non-coastal ones. Coastal regions include all levels of "coastality".

Main message: increasing concentration in and polarisation of the BSR

During the latter half of the past decade, the BSR has at a macro level undergone a process of increased concentration. The re-distribution of economic activity and humans has by and large been a case of polarisation, where those in the most vulnerable position have taken the worst beating.

Figure 32 depicts the development of the Gini Concentration ratio (left scale) and the Atkinson index (right scale) for the period 2005-2011 for the three analysed variables: GDP; employment; and population.

Figure 32: The Gini Concentration Ratio and the Atkinson index in the BSR 2005-2011



Data sources: Table 5 through Table 7 on pages 63-65.

Assessing all six trend lines jointly, we see first and foremost the mega trend of an increasing concentration of economic activity, jobs as well as population in the BSR, as all lines are pointing upwards. Here end the similarities, though.

The difference in the relative position of the GDP, employment and population trend lines further indicates that economic activity in the BSR is much more concentrated than jobs, which in turn are much more concentrated than the BSR population, testifying of the unbalanced spatial distribution of economic activity in the region, or alternatively, of the currently untapped demographic potential.

Eastern BSR metropolitan areas get biggest gain in regional value-added

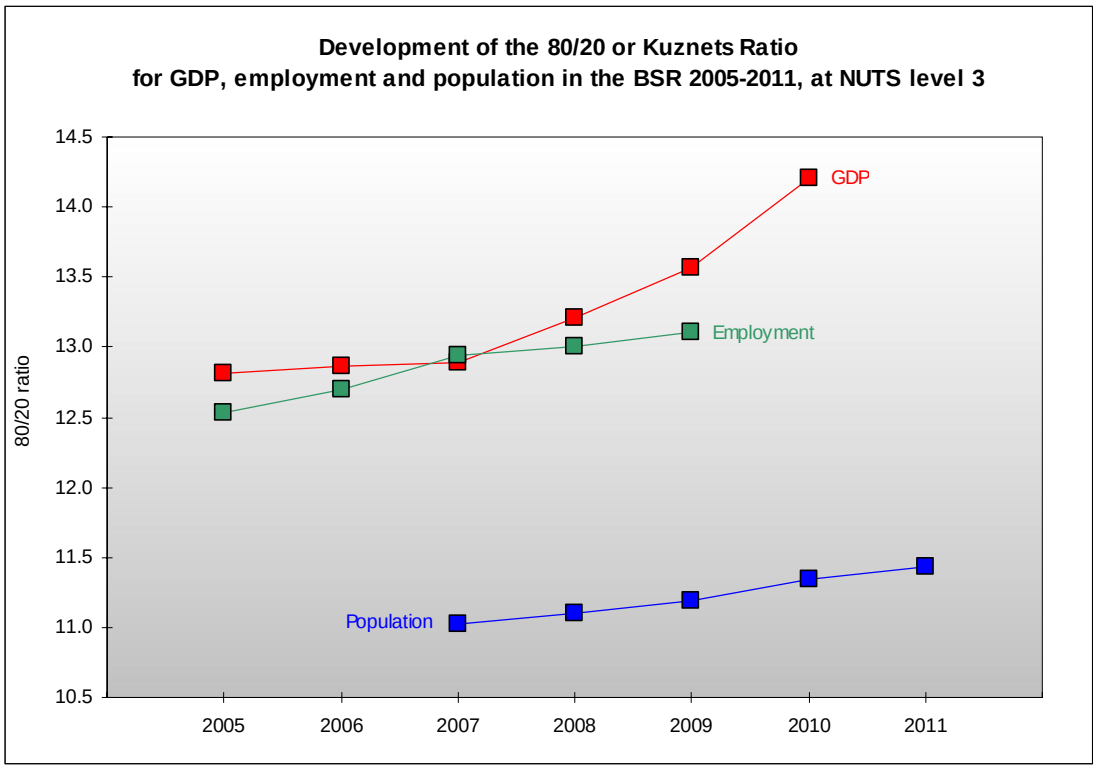
In terms of economic value-added we see, when comparing the two curves (i.e. the red Gini and the blue Atkinson), that initially (2005 to ca. 2008) there has been a moderate increase in concentration to fewer and fewer regions in the BSR.

The steeper slope of the Atkinson curve indicates that small regions have lost to larger ones.

The more rapidly upward pointing slopes after ca. 2008 indicate that this process has caught even more speed. What is more, the steeper slope of the Atkinson index entails that this concentration of economic value-added has largely been an affair of even further relative shifts from small regional economies to large ones. This notion is corroborated when studying the steep increase in GDP in favour of the very largest regions in Figure 33 (80/20 ratio) below.

This message stands in stark contrast to the Beta convergence indicator (Table 5 on page 63), which told the story of regions with low GDP/capita closing in on the wealthier ones up till 2009, after which no evidence was found between level and growth rate. The discrepancy between the two indicators is explained by the fact that the Beta convergence indicator utilises GDP/capita as a primary measurement unit, whereas the other ones descried above use total GDP (i.e. without the population component).

Figure 33: The 80/20 ratio in the BSR 2005-2011



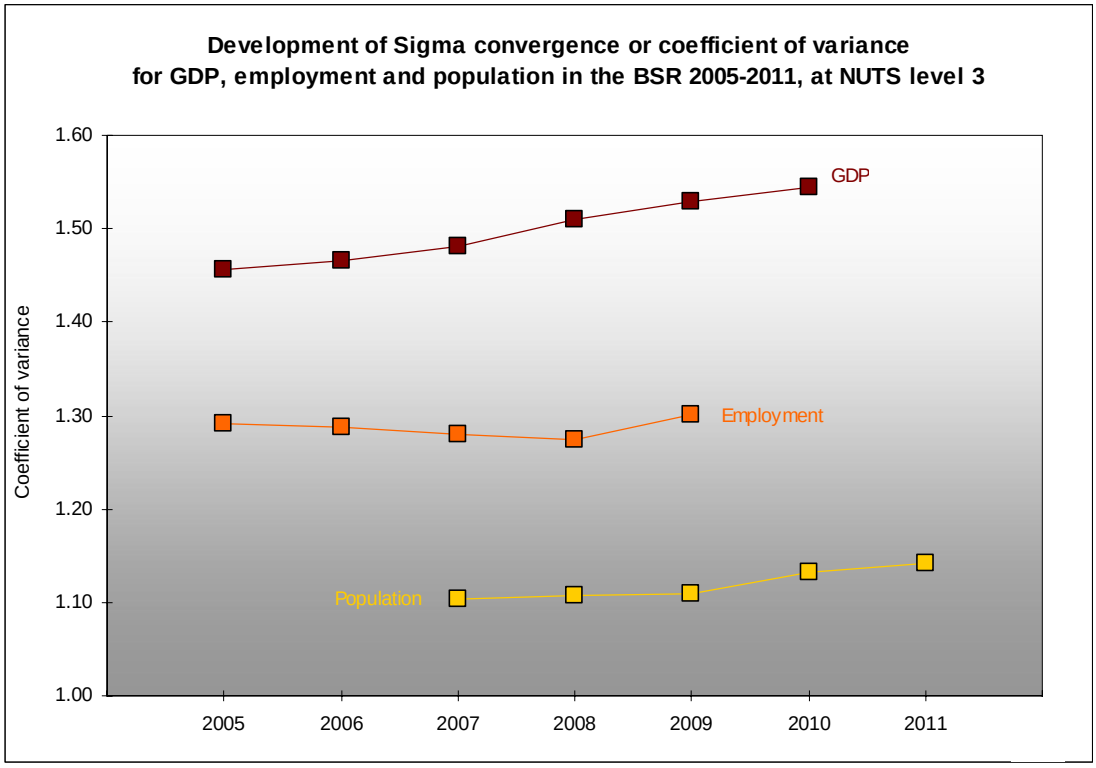
Data sources: Table 5 through Table 7 on pages 63-65.

From these crosscutting signals we can deduct that the gradual shift of value-added from the smaller to the larger regional economies of the BSR, and simultaneously from the richer to the poorer ones, has primarily been a process of a relative decline of smaller but wealthier regional economies (i.e. western BSR peripheral/rural regions) in relative favour of large but less wealthy ones (i.e. eastern BSR, capital and other metropolitan areas). Or in other words: a simultaneous process of polarisation and cohesion! It appears as though the largest fall-between class are the small peripheral and/or rural regions in particularly the eastern BSR.

Semi-small regions loose most jobs, metropolitan dominance unchallenged

The corresponding trends in employment are also complex and somewhat difficult to assess coherently. Both the Gini concentrations Ratio as well as the Atkinson index tell a story of gradually and more or less up till 2008 linearly increasing concentration of jobs in the BSR. After the 2008 crisis, this concentration has caught up further speed. Looking at the 80/20 ratio, we can from the break-off point in 2007 (i.e. when the largest 20 % of regions did not anymore gain on the smallest 20 % ditto) assume that the rapid concentration process of post-2008 is the result of a gradual decline in employment in the small but not the smallest BSR regions. Such a notion is corroborated by the employment trend analyses conducted earlier on in this case study, as well as by the Beta convergence indicator on employment, which said that, on average, the smaller the labour market, the worse has been its development.

Figure 34: Sigma convergence in the BSR 2005-2011



Data sources: Table 5 through Table 7 on pages 63-65.

The Sigma convergence indicator (Figure 34) tells an opposing story regarding employment concentration. It describes a process of gradual de-concentration up till the year 2008 (where the positive development of particularly SMESTOs implied increasing polycentric development), whereupon differences once more started to increase. This indicator is, as said, very sensitive to outliers, and the group of 20-30 largest metropolitan areas have seen continuous growth throughout the period (i.e. also after 2008), whereupon the statistical contrast to most other regions entails a message of increasing concentration. Such a message is of course correct as such.

Concentration of BSR citizens continues regardless of economic trends

In many cases a very similar story could be told concerning the concentration of population in the BSR. Small regions in the BSR loose a steady battle against the large population centres in the regions. The biggest difference between the concentration of economic value-added and jobs on the one hand, and the corresponding concentration of people on the other, is that the process of concentration of BSR citizens continues unabated regardless of any economic trends. We hence see a gradual and slow-grinding shift of population from small to large, rural to urban, and so on.

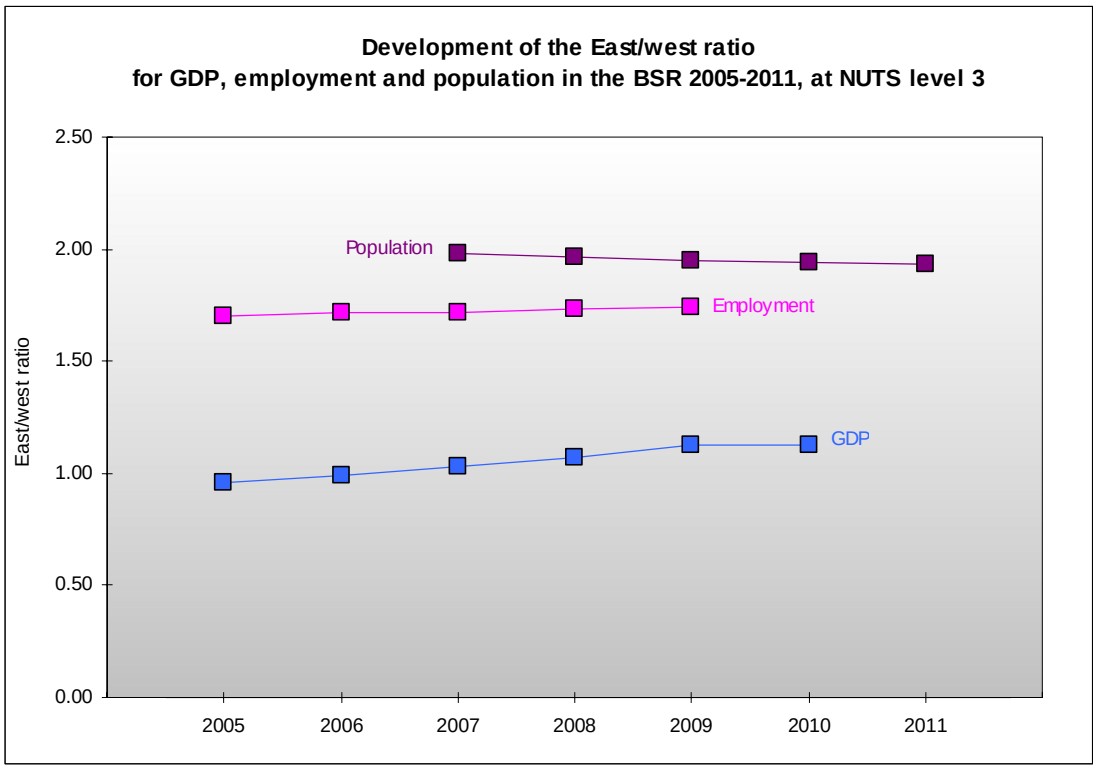
Three principal BSR divides re-considered

We finally revert back to the original three BSR territorial divides and try to summarise the findings from the entire chapter. As a backbone for this summary, we utilise three targeted BSR territorial cohesion indicators from Table 5 through Table 7 suitable for the task, namely the East/west, the South/north as well as the Urban/rural ratio.

The BSR east-west divide

The East/west ratio has regarding economic value-added seen a gradual shift in favour of eastern BSR up till 2008, whereupon the development has been balanced favouring neither shores of the Baltic Sea (Figure 35). At this level we hence can see a general tendency for decreased east-west disparities. However, at the same time the gradual shifts in both jobs and people have not followed apace, and particularly in population, eastern BSR is constantly loosing the battle.

Figure 35: The East/west ratio in the BSR 2005-2011



Data sources: Table 5 through Table 7 on pages 63-65.

This implies a process of increasing productivity in the east BSR, where less and less people, and also in relative terms less work force, are through their economic activity able to create more and more value-added. Out of natural reasons such a shift is not equally apparent in western BSR.

The previous east-west physical border is no longer the most pronounced material welfare gap in the BSR as disparities across national borders have generally been reduced. That the largest gaps to-day can be found in a context of the urban hierarchy and this particularly in the eastern BSR (albeit most major metropolitan areas also in the west are being segregated from their surroundings) is a factor that at this level could be interpreted as increasing east-west socio-economically territorialised polarisation.

In terms of higher education, the BSR shows cohesive development trends but e.g. the R&D intensity still splits BSR in East and West, as is the case with employment rates. The eastern BSR still lagging behind in accessibility, but catch-up is rapid. However, e.g. Internet access in households follows a clear-cut east-west gap.

The eastern BSR displays huge internal variations in life expectancy and the gap to western BSR is substantial. Also these development trends are cohesive, however. In terms of general health, the east-west divide is not clear-cut and east-west differences in both relative and absolute poverty are fairly large, and do not show any signs of being drastically reduced.

In summary then, one could conclude that the BSR east-west divide is alive and kicking, but particularly in issues related to economic development, the gap is in a more or less steady process of being eradicated.

The BSR north-south divide

Recent trends in general territorial development in the BSR point towards increasing spatial polarisation further aggravating the already existing unbalanced regional structures also regarding the BSR North. Sparsely populated, remote and rural regions in the north of the BSR have generally experienced a gradual decline in virtually all aspects of socioeconomic development vis-à-vis the more populous southerly core areas of the BSR.

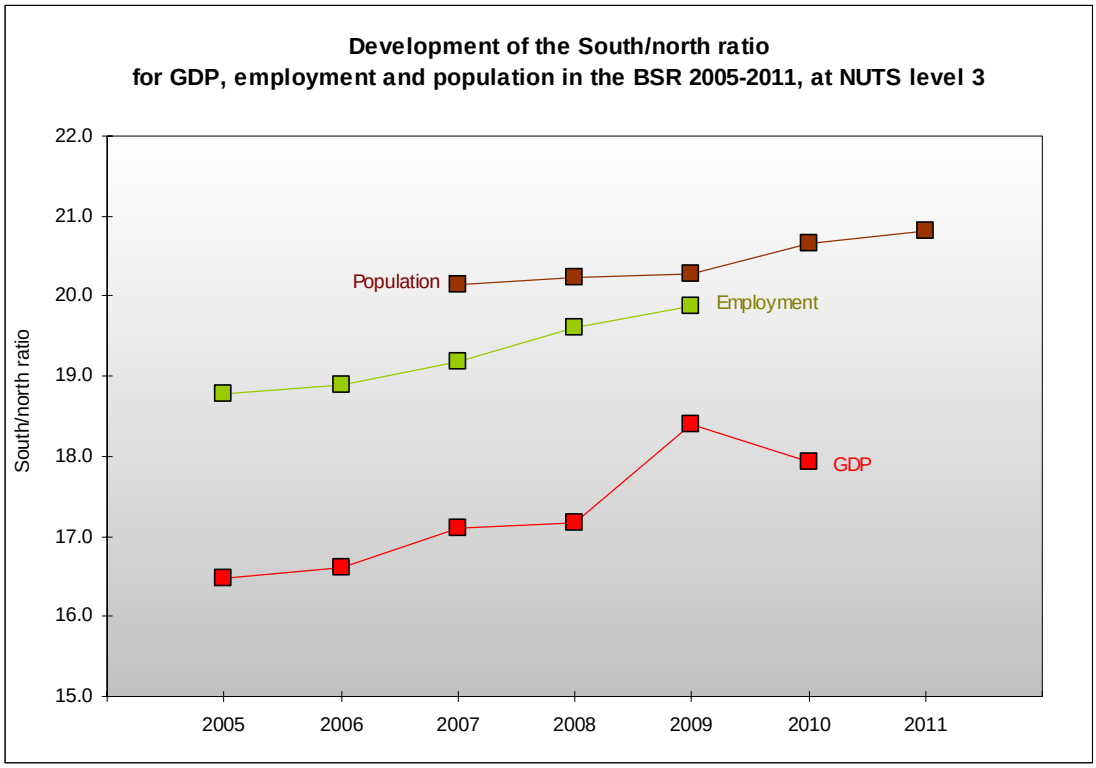
Figure 36 depicts the development of the south/north ratio over the period 2005-2011 for the three variables population, employment and GDP. The general trend is that of a relative decline.

That the three trend lines are situated at a certain distance from each other is an indication that the North of the BSR is most disadvantaged in terms of population, and least so in terms of economic value-added.

It is precisely in economic terms that the relative decline has been the most rapid. When the ratio of GDP in 2005 was that of some 16:1 in favour of the south, it had increased to well over 18:1 by 2009. The subsequent decline in southern dominance after 2009 may be explained by many factors, not least the rapid economic shrinking of some of the largest regional economies in the BSR. However, much of the value-added in many northerly regions stems from large scale mining, oil and gas, and other such extraction of raw materials. Such economic activity tends to be less sensitive to very rapid shifts in the global economy, which leads to more stable economies in the north. In the Nordic countries, the public sector is also a major economic contributor in the most sparsely populated regions, and it is as such also less sensitive to rapid fluctuations. The relative decline in employment has continued unabated

throughout the period examined, as has that of population, albeit the relative decline has not been as steep.

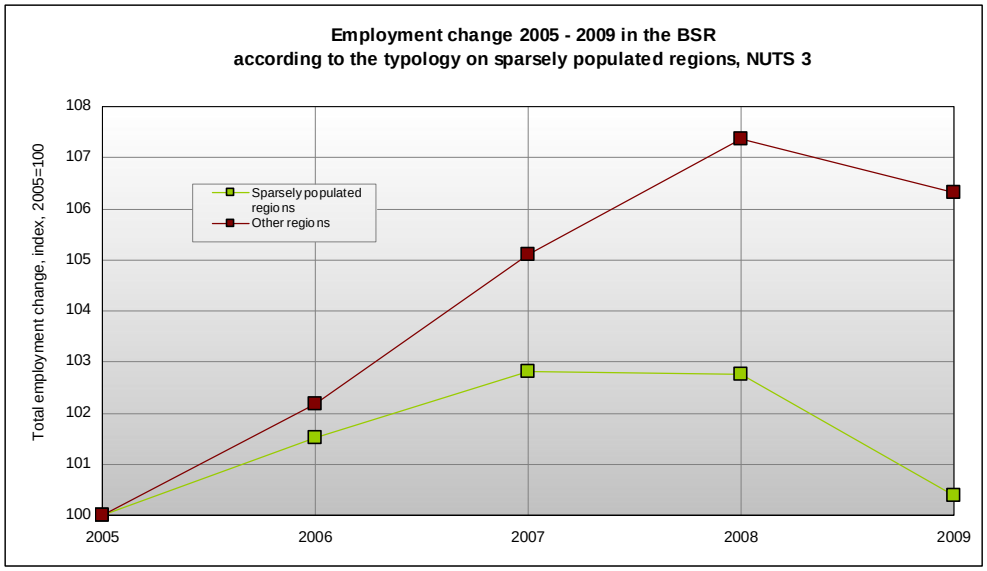
Figure 36: The south/north ratio in the BSR 2005-2011



Data sources: Table 5 through Table 7 on pages 63-65.

In absolute terms, sparsely populated regions in the BSR experienced a continuous employment growth up till 2007, albeit at a more modest rate compared to all other regions in the BSR (Figure 37). The subsequent fall was also steeper for the BSR North than for the other regions taken as a group.

Figure 37: Employment change in sparse and other regions of the BSR 2005-2009



Data source: Eurostat, Belstat, Rosstat

Hence, together with border regions, sparse regions are in general the most disadvantaged types of territories and are generally lagging behind in most aspects of socioeconomic development, particularly when examined in a national context.

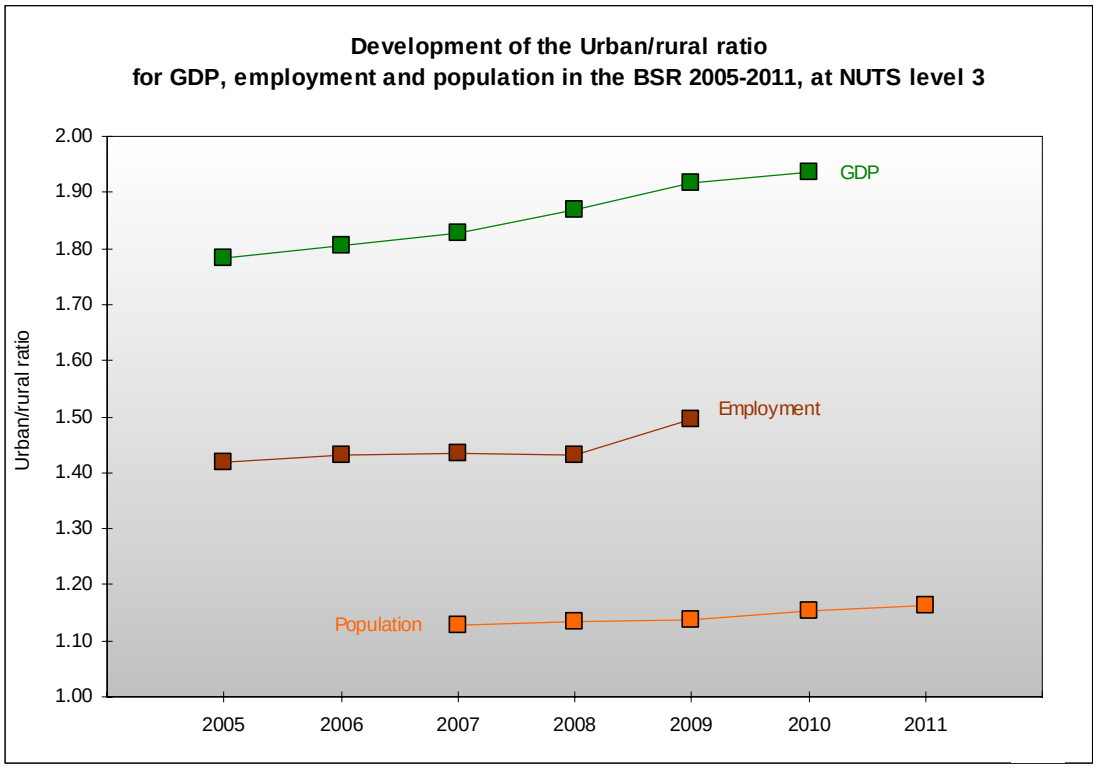
Migration patterns in the BSR display a clear north-south divide. Net migration rates for the sparsely populated regions have on average been negative for most of the period, and the weak demographic structures in the sparsely populated areas stand in stark contrast to those elsewhere in the region.

Physical accessibility in particular manifests the relative weak standing of the BSR North. Multimodal accessibility in sparse regions is close to half that of the BSR in general. What is more, recent changes (2001-2006) indicate also on this point that the situation for the sparsely populated areas is getting worse despite investments in transport infrastructure.

The BSR urban-rural divide

The last of the three BSR divides is in many respects the most difficult to grasp. Yet, it is tentatively also the profound among the three.

Figure 38: The urban/rural ratio in the BSR 2005-2011



Data sources: Table 5 through Table 7 on pages 63-65.

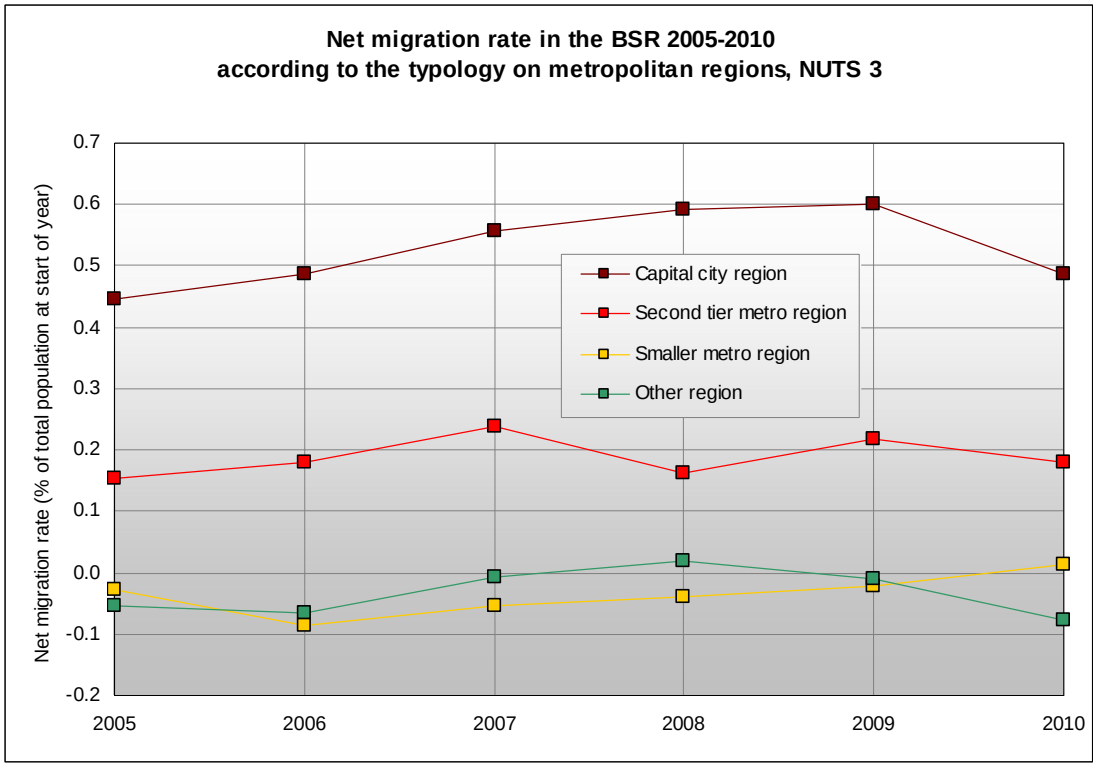
The multidimensional approach regarding the urban-rural gap (Figure 38) indicates that rural areas in the BSR have taken as a group a population that is some 10 percent smaller (the ratio = roughly 1.10) than the combined urban population of the region. In terms of number of jobs, however, the urban areas exceed rural areas by close to fifty percent and in terms of GDP by nearly the double. Such figures illustrate clearly the magnitude of the urban-rural gap in the BSR.

Looking at the trends in Figure 38, we see that the gap is generally getting wider still, most so in terms of employment.

Such territorial divides in the BSR are most pronounced in the light of the urban hierarchy. With very few exceptions the rural areas generally occupy the bottom positions regarding most aspects of socioeconomic development. Demographic structures are weak, rural areas have an accessibility some 20 % lower than the BSR on average, and more than 40 % lower than urban areas,

The core rural areas are handicapped by lack of opportunities for economic development outside the sphere of primary production, often low levels of education, and substandard infrastructure which results in bad accessibility and connectivity to larger centres, despite not being amongst the most peripheral regions.

Figure 39: Net migration in the BSR according to the typology on metropolitan regions



Data sources: Eurostat, Statistics Denmark, Statistics Finland, Belstat, Rosstat- Denmark: Net migration for 2005 estimated as the average value for 2006-2010. NW Russia: Net migration for 2010 estimated as the average value for the period 2005-2009

Most indications point towards a strengthening also of the urban-rural divide in terms of migration. Figure 39 depicts the net migration rate for four types of BSR territories divided along the urban hierarchy. Both smaller metro regions but also "other regions" (i.e. non urban, i.e. rural) display far lower levels of migration than the more urbanised areas of the BSR. The financial crisis appears also to have affected rural migration harder than any other types of regions. Only ten urban regions swallow 47 % of all migration surplus in the BSR.

3 Migration patterns in the BSR

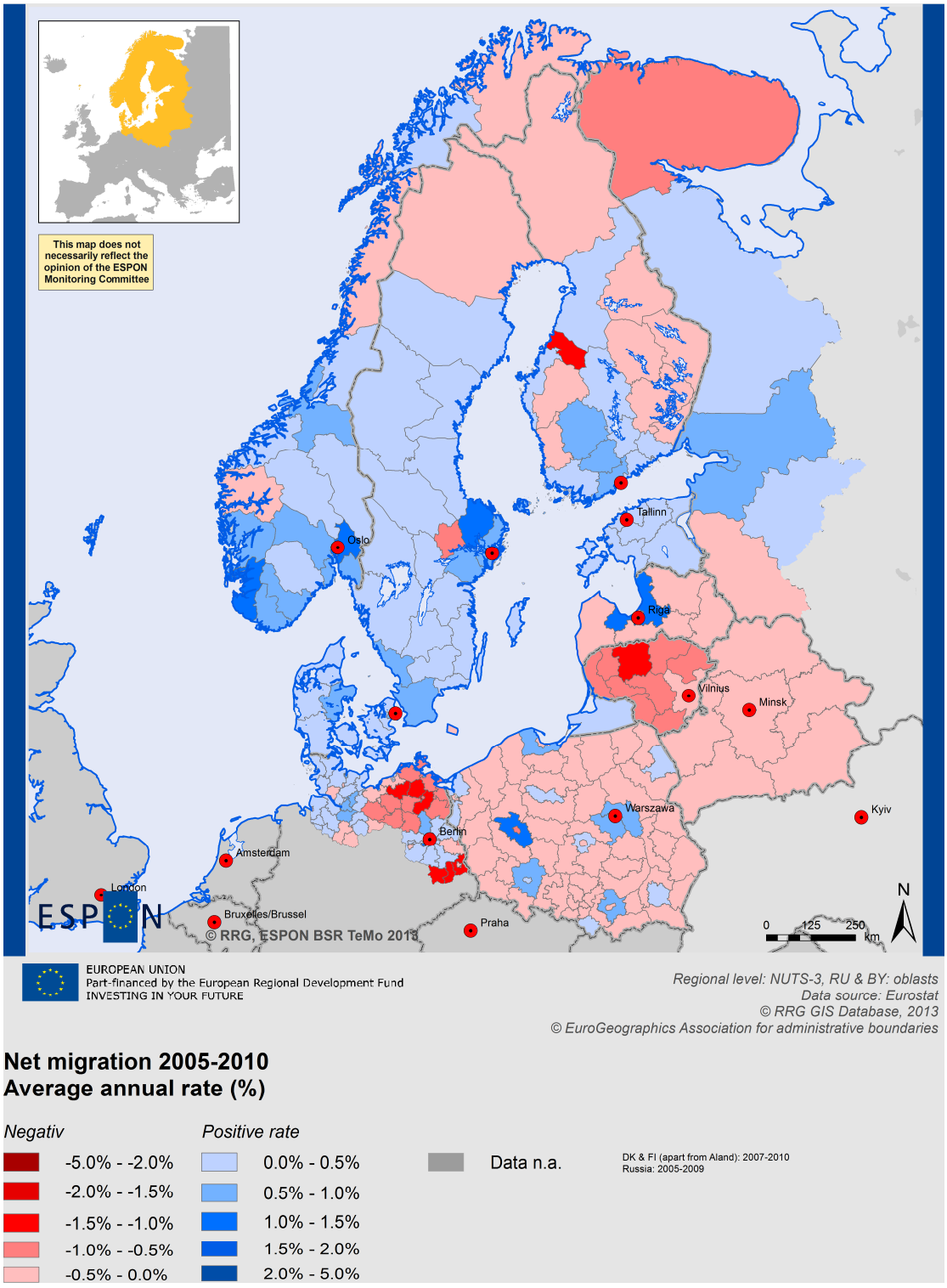
The key messages of this test case are:

- The concentration of BSR population continues to a large extent.
- Urban sprawl is re-shaping many large urban areas in the BSR.
- Only ten urban regions swallow 47 % of all migration surplus in the BSR.
- The summarised loss due to out-migration in the BSR amounts in five years to a region like the Republic of Karelia being totally deserted, whereas every 2½ years, housing, roads, schools, business facilities, public transport, etc. equalling a city the size of Stockholm needs to be performed somewhere in the BSR.
- Data shows unequivocally that in the entire BSR, regions with acknowledged territorial handicaps (sparse, border, rural, peripheral) are suffering worst in terms of population drainage through migration.
- Regarding migration, SMESTO regions however have as a group not been affected by the financial downturn of 2008 as much as other urban areas. The economic slowdown some times acts as a balancing force between core and periphery.
- Europe is the primary reference point for global BSR migration. This concerns both emigration from and immigration to the region.
- The BSR displays a substantial integrative trend in intra-BSR migration flows. More people migrate between BSR countries than to the rest of Europe.
- A multivariate data analysis indicates that among the specific territorial features relevant for the BSR, the east-west dimension has by far the strongest influence on migration. Also having the status as the national capital or a secondary city, being a predominantly urban or an intermediate region, as well as lying by the coast, all have a positive effect on net migration.
- Sparsity, closeness to a city as well as border status however does not affect migration when all other aspects are taken into account. It is very important to note that it should not be interpreted as if such characteristics would not matter. Rather to the contrary, …
- … the results reveal specifically the persistently handicapping socio-economic and locational characteristics of these areas for which targeted policies are direly needed. Hence: territories matter.
- Among socioeconomic background factors, slightly depending on which other aspects are taken into account, also the unemployment rate, GDP/capita, or in certain conditions air quality, appear to exert some effect on migration. Also soil sealing is connected to migration. The last two variables should however be interpreted as satellite measurements on urbanity rather than as a direct explanatory variables in themselves.
- Migration in the BSR does not aid in the achievement of the overarching horizontal EU goal of territorial cohesion. Migration appears to strengthen both the east-west and the north-south divides of the BSR.
- Most indications point towards a strengthening also of the urban-rural divide.
- BSR migration also appears to counter effect the achievement of most overarching EU 2020 strategy goals, albeit regarding specifically poverty reduction, it could also be argued to the contrary.

Migration as a proxy for attractivity

People migrate to places where they can find work and housing, get an education, or where the quality of life is perceived as high. Cultural or social connections do also play a significant part in migration.

Figure 40: Net migration rate in the BSR 2005-2010



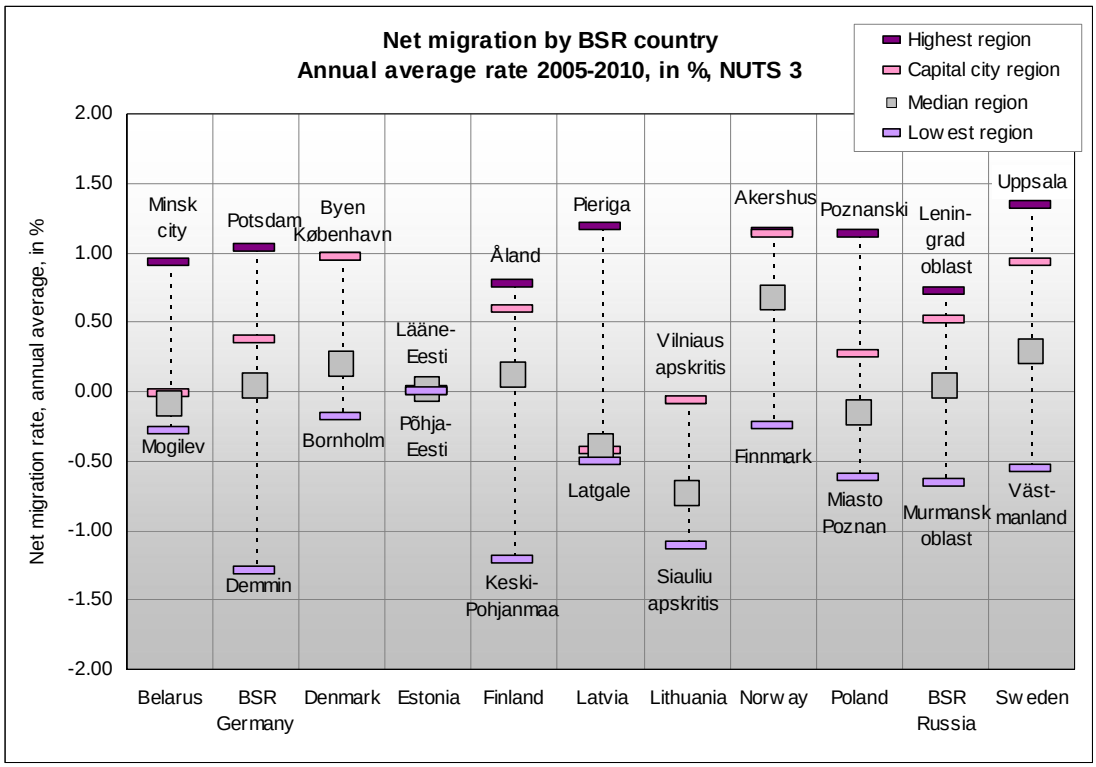
Owing to its broad encompassment of several socioeconomic or cultural phenomena, migration is also one of the traditional indicators examined in assessing regional polarisation and it is often also used as measurement of regional attractivity or lack thereof. The specific indicator of net migration is included as an official indicator for the EU Sustainable Development Strategy as well as in the ESPON project INTERCO.

Eastern BSR and many traditional peripheries loose to migration

The BSR has for several decades displayed an ongoing trend in concentration of population, and still does so (see e.g. Annex 8 on total population change). This is to a large extent the result of migratory movements (which in the BSR explain as much as 83.2 of the regional variation in total population change), albeit also ageing and/or low fertility as such helps to aggravate the lack of settlement sustainability. Figure 40 depicts the trend in the BSR during the latter years of the past decade.

The overall pattern is that most of eastern BSR as well as the traditional peripheries in western BSR are till date still being drained of their population by out- and/or emigration. The situation in the BSR is by far still worst in former East-Germany, but also Lithuania for example, show equally high rates. At the winning end of the scale are typically capital and surrounding regions in most countries as well as other larger urban areas. The situation is more balanced in the western parts of BSR Germany, Denmark and southern Norway and Sweden.

Figure 41: Net migration by country in the BSR 2005-2010



Data source: Eurostat, Belstat, Rosstat. NW Russia: 2005-2009; Finland & Denmark: 2007-2010.

The traditional pattern of national concentration is thus still highly evident in nearly all countries of the BSR. This is evident when examining Figure 41, which depicts the same data as in the map (Figure 40) above, but separately by

country. In all BSR countries there are regions on both sides of the zero line, indicating a national restructuring of population due to migration.

A closer look at for example Latvia or Poland as well as Sweden and Norway in Figure 41 reveals that urban sprawl is a major force shaping many large urban areas around the BSR. In the extreme Polish case, the city of Poznan is the largest looser in the country in terms of net migration whereas the surrounding region in turn is the largest winner. Albeit the relative values get lost in the sheer size of St Petersburg, also here the surrounding Leningrad oblast is growing at a rapid rate.

Persons matter, not only percentages

However, at the end of the day migration is also about persons, not only percentages. A large influx of migrants implies, apart from the obvious employment, also for example an increased demand for new housing as well as education, child care, etc. facilities that the receiving region will need to cater for. In the long run sustained in- or immigration also puts increased pressure on land use and transport system etc.

Table 8: Top and bottom ten regions in the BSR in absolute and relative net migration 2005-2010

Net migration by number of persons, average per year during 2005-2010

	Top ten BSR regions			**Bottom ten BSR regions**	
	Persons	(In %)		Persons	(In %)
Sankt-Peterburg (RU)	24 100	(0.5 %)	Murmansk oblast (RU)	-5 500	(-0.7 %)
Stockholm (SE)	18 100	(0.9 %)	Kauno apskritis (LT)	-4 600	(-0.7 %)
Minsk City (BY)	16 700	(0.9 %)	Siauliu apskritis (LT)	-3 900	(-1.1 %)
Berlin (DE)	12 700	(0.4 %)	Miasto Poznan (PL)	-3 400	(-0.6 %)
Leningrad oblast (RU)	11 900	(0.7 %)	Mogilev region (BY)	-3 100	(-0.3 %)
Skåne (Malmö, SE)	10 900	(0.9 %)	Riga (LV)	-3 000	(-0.4 %)
Hamburg (DE)	9 100	(0.5 %)	Katowicki (PL)	-2 600	(-0.3 %)
Uusimaa (Helsinki, FI)	8 300	(0.6 %)	Grodno region (BY)	-2 200	(-0.2 %)
Warszawski-zachodni (PL)	6 800	(0.9 %)	Panevezio apskritis (LT)	-2 200	(-0.8 %)
Byen København (DK)	6 400	(1.0 %)	Brest region (BY)	-2 100	(-0.2 %)

Net migration relative to population, average per year during 2005-2010

	Top ten BSR regions			**Bottom ten BSR regions**	
	In %	(Persons)		In %	(Persons)
Uppsala (SE)	1.3	(4 300)	Demmin (DE)	-1.3	(-1 100)
Pieriga (LV)	1.2	(4 500)	Keski-Pohjanmaa (FI)	-1.2	(-800)
Akershus (NO)	1.1	(5 900)	Spree-Neiße (DE)	-1.1	(-1 500)
Poznanski (PL)	1.1	(6 400)	Siauliu apskritis (LT)	-1.1	(-3 900)
Oslo (NO)	1.1	(6 400)	Elbe-Elster (DE)	-1.1	(-1 300)
Potsdam (DE)	1.0	(1 600)	Mecklenburg-Strelitz (DE)	-1.0	(-900)
Rogaland (Bergen, NO)	1.0	(4 100)	Oberspreewald-Lausitz (DE)	-1.0	(-1 300)
Byen København (DK)	1.0	(6 400)	Güstrow (DE)	-1.0	(-1 000)
Buskerud (NO)	1.0	(2 400)	Frankfurt a.d. Oder (DE)	-1.0	(-600)
Minsk City (BY)	0.9	(16 700)	Uckermark (DE)	-1.0	(-1 300)

Data source: Eurostat, Belstat, Rosstat. NW Russia: 2005-2009; Finland & Denmark: 2007-2010.

Table 8 lists, in its upper left corner, the ten NUTS 3 /SNUTS 2 regions that had the largest migration surplus in absolute terms. St Petersburg is by virtue of its

size the natural leader in the BSR in this respect, with on average 24 000 excess migrants each year during the period. Also other large cities such as Stockholm, Minsk, Berlin and Malmö are high on this list.

Apart from Minsk and Copenhagen, no other top ten regions in relative terms (lower left corner of table) are the same as those which attract the largest absolute numbers. At the other end of the scale (the right side of the table) are the regions that have lost most persons due to migration. These are all in eastern BSR with Murmansk topping the list by loosing on average 5 500 persons per year.

Only ten urban regions swallow 47 % of all migration surplus in the BSR

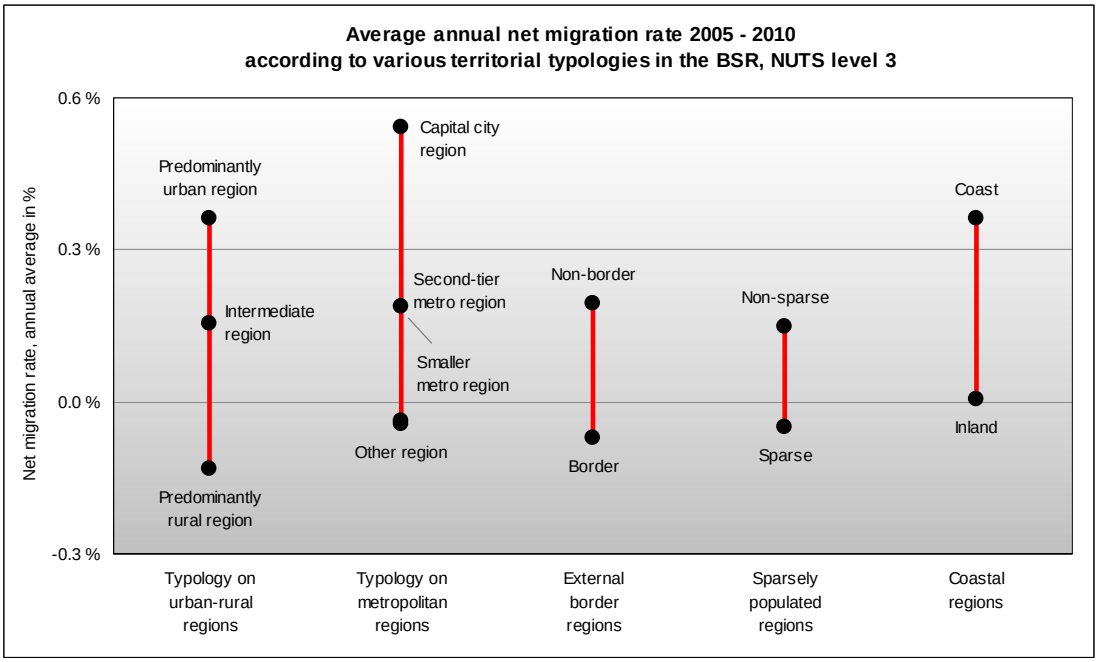
If we summarise all net migration for the period 2005-2010 in the BSR, we see that some 47 % of all migration surplus in the BSR ended up in the ten, primarily urban or periurban regions alone listed in Table 8.

The summarised net loss of all out-migration regions in the BSR during the five year period 2005-2010 amounted to well over 700 00 persons. The corresponding net gain in all in-migration regions of the BSR was nearly 1.6 million persons.

Putting such figures into some sort of a context, they would for instance equal to the existing housing and infrastructure stock for a region like the Republic of Karelia having been been deserted during only five short years.

On the other hand, somewhere in the BSR, a construction equalling a city the size of Stockholm needs to be performed as a green field investment from scratch in every two and a half years, complete with housing, roads, schools, business facilities, public transport, etc, etc. By all standards does the overall societal bill for such rapid regional polarisation appear to be fairly high.

Figure 42: Average net migration rate according to various typologies in the BSR 2005-2010



Data source: Eurostat, Belstat, Rosstat. NW Russia: 2005-2009; Finland & Denmark: 2007-2010.

Territorially handicapped regions taking the worst beating

Taking a closer look at the migration patterns, Figure 42 presents BSR wide data for average net migration during the period 2005-2010 subdivided by various relevant territorial typologies. A familiar pattern emerges.

Table 9: Annual net migration by according to various typologies in the BSR 2005-2010

	2005	2006	2007	2008	2009	2010
The Baltic Sea Region (BSR)	0.11	0.11	0.16	0.17	0.17	0.12
of which:						
- western BSR	0.33	0.37	0.49	0.47	0.46	0.48
- eastern BSR	-0.01	-0.03	0.00	0.01	0.03	-0.07
Typology on urban-rural regions						
Predominantly urban regions	0.28	0.31	0.39	0.36	0.41	0.35
Intermediate regions	0.12	0.13	0.18	0.19	0.16	0.13
of which:						
- close to a city	*0.13*	*0.13*	*0.17*	*0.19*	*0.16*	*0.13*
- remote	*0.07*	*0.09*	*0.19*	*0.17*	*0.10*	*0.17*
Predominantly rural regions	-0.11	-0.15	-0.10	-0.07	-0.07	-0.17
of which						
- close to a city	*-0.15*	*-0.20*	*-0.17*	*-0.15*	*-0.15*	*-0.25*
- remote	*-0.01*	*-0.01*	*0.09*	*0.13*	*0.15*	*0.05*
Typology on metropolitan regions						
Capital city regions	0.45	0.49	0.56	0.59	0.60	0.49
Second-tier metro regions	0.15	0.18	0.24	0.16	0.22	0.18
Smaller metro regions	-0.03	-0.09	-0.05	-0.04	-0.02	0.01
Other regions	-0.05	-0.06	-0.01	0.02	-0.01	-0.08
Typology on regions in external border programmes						
Border regions	-0.08	-0.09	-0.07	-0.02	-0.04	-0.18
Non-border regions	0.15	0.16	0.22	0.22	0.23	0.20
Typology on sparsely populated regions						
Sparsely populated regions	-0.12	-0.14	-0.09	-0.09	0.00	0.03
Not sparsely populated regions	0.12	0.12	0.18	0.18	0.18	0.12
Typology on coastal regions						
Coastal regions	0.25	0.33	0.40	0.44	0.41	0.35
Non-coastal regions	0.02	-0.03	0.02	0.00	0.03	-0.03

Colour coding:

- > 0.50 %
- 0.31 - 0.50 %
- 0.11 - 0.30 %
- -0.10 - 0.10 %
- < -0.10 %

Data sources: Eurostat, Statistics Denmark, Statistics Finland, Belstat, Rosstat- Denmark: Net migration for 2005 estimated as the average value for 2006-2010. NW Russia: Net migration for 2010 estimated as the average value for the period 2005-2009

On the urban-rural axis, predominantly urban regions are in a clear lead whereas predominantly rural regions on the other hand are at the bottom, with intermediate regions being just that, intermediate. When addressing the issue from the point of view of a more pronounced urban hierarchy, a similar pecking order emerges.

What is more, border regions, sparsely populated ones, as well as inland areas all appear hampered by negative, or in the case of inland areas at least in relative terms lower, levels of migration.

Coupling mentally the pattern emerging from the five pillars in this graph together, will rather clearly indicate that in the BSR, regions with acknowledged territorial handicaps are suffering worst in terms of population drainage through migration.

The reality is however probably not as straightforward as could be concluded from only this. Thus, Table 9 presents the same data as in Figure 42, but depicting each year separately instead of lumping them together in a temporal average. Furthermore, it also presents for the urban rural typology summarised data for the sub classes of intermediate and predominantly rural regions (that due to graphical reasons were omitted from the previous figure).

It is evident that annual fluctuations for a specific type of territory may be fairly large even if we are dealing with data that summarises all regions of this type across the BSR. Hence e.g. border regions in the BSR closed in on a nearly balanced account in 2008, only to be plunged in to a severe negative downturn after that year.

The detail that predominantly rural *remote* regions display a far better rate than predominantly rural regions *close to a city* stems from the fact the former category in the typology contains primarily regions from Norway, Sweden and Finland, whereas the latter category is overrepresented by regions in Latvia, Lithuania and eastern Germany.

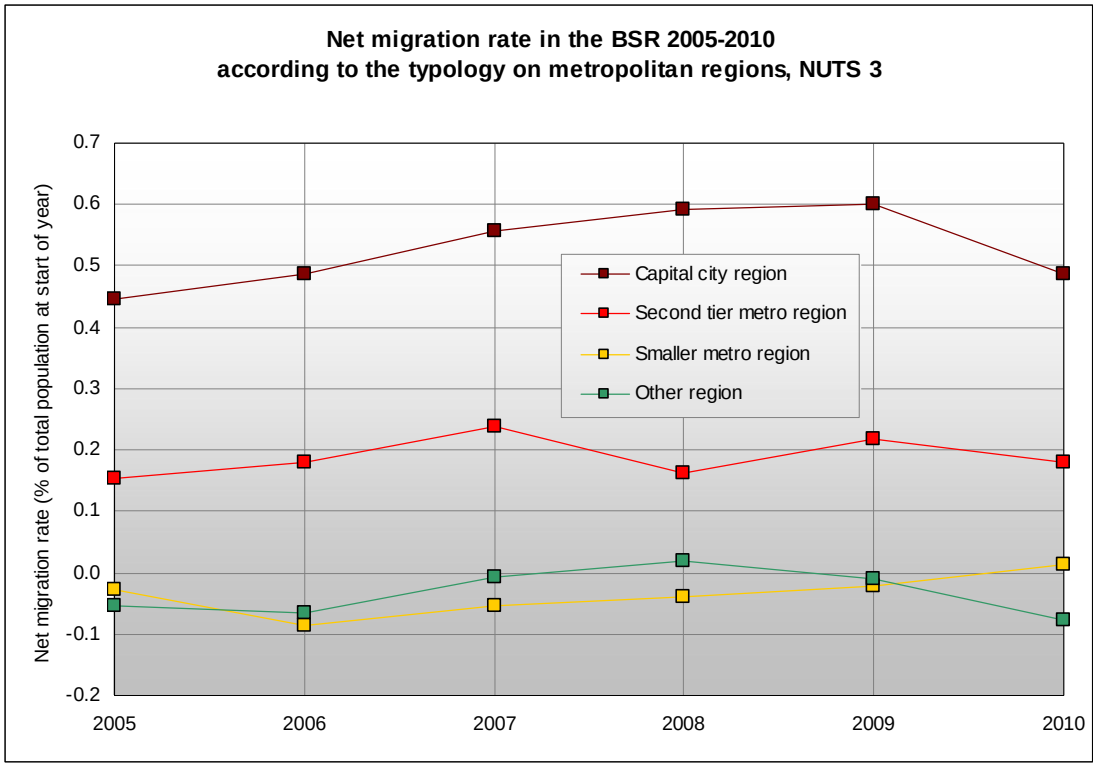
Smaller metro regions survived the financial crisis best

A still more detailed look at migration in the light of the typology on metropolitan regions (Figure 43) reveals that the financial crisis of 2008 did affect smaller metropolitan areas least. In fact such SMESTO regions have as a group managed to raise the levels to a minuscule but still positive level by 2010.

In most BSR countries migration trends tend to a certain extent to follow economic cycles, where polarisation generally increases the higher the growth rate in a country, and vice versa. Thus, from a spatial balance point of view, the slowdown of the global economy has had certain positive effects on this group of small- and medium-sized towns in the BSR.

In secondary cities taken as a group, the growth in migration curbed already in 2007, whereas for the capital regions of the BSR, 2009 appears to have been the most difficult year.

Figure 43: Net migration in the BSR according to the typology on metropolitan regions



Data sources: Eurostat, Statistics Denmark, Statistics Finland, Belstat, Rosstat- Denmark: Net migration for 2005 estimated as the average value for 2006-2010. NW Russia: Net migration for 2010 estimated as the average value for the period 2005-2009

Global migration surplus for the BSR

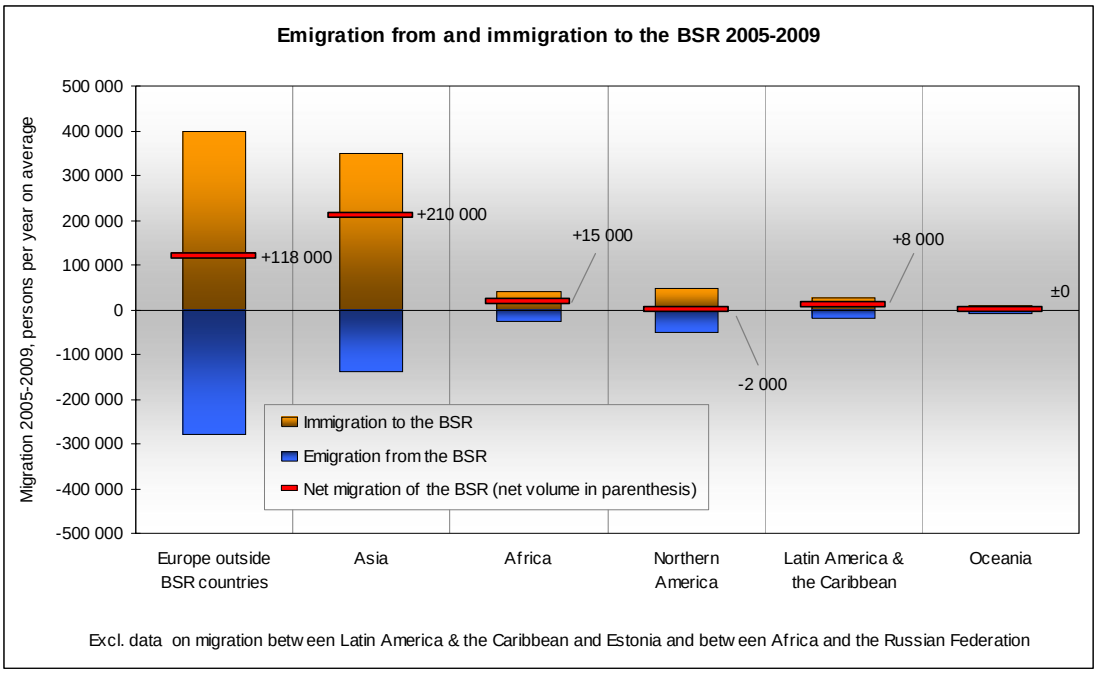
Nearly 800 000 persons emigrate from the BSR countries[11] annually, and part of the severe depletion of population in countries such as Latvia or Lithuania can be accounted to emigration abroad rather than re-settlement domestically. Despite such large volumes, the BSR is nonetheless a magnet for international migrants, and the global net volumes between BSR countries and the rest of the world are positive (Figure 44).

Europe outside BSR countries is the primary origin (as well as destination) to BSR countries, Asia taking the second position. Perhaps unexpectedly, migration to and from Northern America remains rather modest in this comparison, as is the case with the rest of the globe as well.

Even if we separate the Russian Federation as well as Germany from these numbers, these relationships remain very similar.

[11] These data include the entire Russian Federation and Germany.

Figure 44: Global migration volumes to and from BSR countries 2005-2009



Data source: United Nations, DESA Population Division, Migration Section.

Europe primary source for immigration to the BSR, Asia runner-up

A closer look at immigration to the BSR (Table 10) indicates that also most individual BSR countries have a similar pattern what comes to attracting migrants, albeit that the volumes differ markedly. There are exceptions, however. While most countries attract immigrants in the first instance from Europe and in the second instance from Asia, both Lithuania and Poland have Northern America in the second place. This most likely concerns return migration of former emigrants.

When separating entire Germany and entire Russian Federation from the data, we note that still nearly 160 000 persons immigrate to the remaining nine countries, 41 % of which come from Europe outside the BSR and roughly a third from Asia. Sweden with 54 000 immigrants annually is the principal BSR destination for global migrants, followed by Denmark, Norway and, to a lesser extent, Finland. Immigration from the outside world remains rather modest to Estonia or Latvia, and in relation to its large population, also Poland.

Table 10: Global immigration to the BSR 2005-2009 by country

	Immigration 2005-2009, persons per year on average									
	Belarus	Denmark	Estonia	Finland	Germany	Latvia	Lithuania	Norway	Poland	Russian Feder.	Sweden
Europe outside BSR	2 721	19 363	387	4 814	279 027	1 015	3 714	9 225	4 489	54 320	19 140
Asia	3 533	10 334	140	5 022	122 960	133	398	9 069	493	172 563	24 037
Africa	93	2 063	12	1 321	26 126	8	31	3 601	123		7 645
Northern America	120	7 317	125	918	31 449	102	669	1 939	1 612	602	2 821
Latin America & the Caribbean	15	1 372		410	21 805	16	31	1 133	52	28	2 892
Oceania	3	1 338	12	239	5 180	10	20	449	162	33	830
Total immigration from outside the BSR	6 484	41 787	676	12 723	486 547	1 283	4 862	25 415	6 931	227 546	57 365

	Immigration 2005-2009, persons per year on average					
	BSR total		BSR excl. Russia		BSR excl. Russia & Germany	
	Persons	In %	Persons	In %	Persons	In %
Europe outside BSR	398 216	45.7	343 896	53.4	64 869	41.2
Asia	348 681	40.0	176 118	27.3	53 158	33.7
Africa	41 022	4.7	41 022	6.4	14 896	9.5
Northern America	47 672	5.5	47 071	7.3	15 622	9.9
Latin America & the Caribbean	27 752	3.2	27 725	4.3	5 920	3.8
Oceania	8 275	0.9	8 241	1.3	3 061	1.9
Total	871 619	100.0	644 073	100.0	157 526	100.0

Data source: United Nations, DESA Population Division, Migration Section. Data on immigration from Latin America & the Caribbean to Estonia and immigration from Africa to the Russian Federation missing.

While immigration to entire Germany follows a similar pattern as in most other BSR countries, immigration to Russia does not, where Asian immigrants, to a large extent from former Soviet states in central Asia, clearly dominate immigration to the country. Whether or not this is the case also for the Russian parts of the BSR cannot be unveiled from this data.

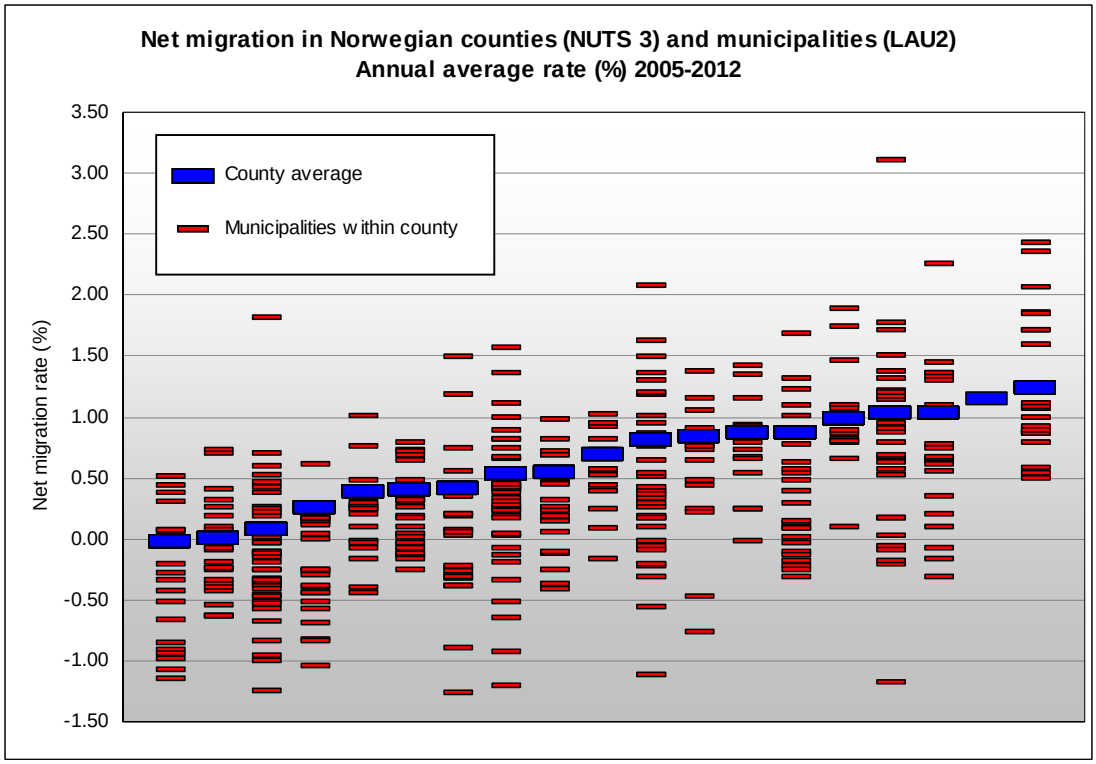
The integrative force of BSR migration

Judging from these volumes, one might assume that the BSR population by and large are leaving the region. This is not the case. When comparing BSR emigration to Europe outside the BSR (which is the primary global destination) and internal migration between BSR countries, we see that of all European emigration from the BSR, more than half (52.3 %) actually ends up in the region. This could be interpreted as in the long run acting as a powerful force in strengthening intra-BSR macro level spatial integration.

A diversity of local migration patterns

Hitherto we have investigated regional migration in the BSR at the NUTS 3 level. While this may appear a suitable spatial level for the analysis of patterns at a macroregional level, it is nonetheless important to keep in mind that such data does not tell the entire story. Hidden behind these regional numbers is a huge diversity of local patterns.

Figure 45: Net migration rate in Norwegian counties and municipalities 2005-2012



Data source: Statistics Norway

Figure 45 above illustrates this point. The blue squares depict the net migration rate for each Norwegian country (an annual average rate for 2005-2012 so as to avoid rather volatile yearly fluctuations). For each county, the thinner red lines refer to the corresponding municipal values within that county. As is evident from the figure, the average county rates are to a large extent not able to truthfully illustrate the actual events “on the ground”.

Despite the fact that net migration during the period was negative in only 2 counties (out of all 19), in as much as 17 of them were there also municipalities that were loosing population due to migration. Conversely, also in the two counties (Finnmark & Sogn og Fjordane on the far left in the graph) that had an average negative rate were there several municipalities that are gaining population through a positive migratory balance.

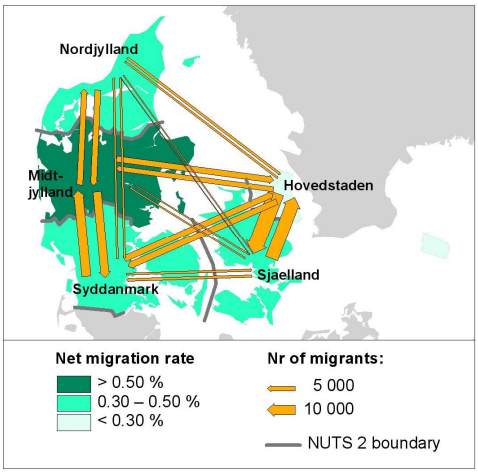
When examining the distribution across counties and municipalities within them, it is also evident that the rate of variation is much larger *within* counties than *between* them. In only two counties (Akershus and Østfold, as well as Oslo, which is a single municipality itself) is the local variance in net migration smaller than is the corresponding comparable variance between Norwegian counties.

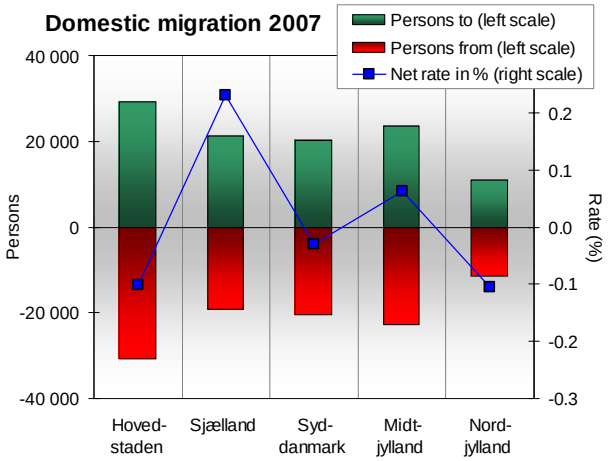
If applied on the rest of the BSR, such an analysis would probably produce very similar results. In this respect then, territorial cohesion in terms of population movements in the BSR would at the local level display both more and less integrative patterns.

What adds to the complexity in terms of migratory movements is that the net rates do not disclose the entire traffic behind these. An example from Denmark illustrates this point. In Figure 46, flow data on domestic migrants between Danish NUTS 2 regions is illustrated by the arrows in the map inset in the upper

left corner. The largest absolute flows occur in the first instance out (!) from the capital Copenhagen to the surrounding Sjaelland, and in the second instance in the opposite direction. Domestic net migration in the capital region is thus negative. The second largest flows occur between southern and central Jutland in the west of Denmark.

Figure 46: Gross and net regional domestic migration flows in Denmark 2007





	Gross domestic migrants		Net domestic migration		Total net migration Domestic and international	
	Persons from	Persons to	Persons	Rate (%)	Persons	Rate (%)
Hovedstaden	30 829	29 160	-1 669	-0.10	4 473	0.27
Sjælland	19 227	21 109	1 882	0.23	3 801	0.47
Syddanmark	20 562	20 199	-363	-0.03	3 911	0.33
Midtjylland	22 656	23 414	758	0.06	6 132	0.50
Nordjylland	11 471	10 863	-608	-0.11	1 912	0.33

Data source: Eurostat, Statistics Denmark

When comparing such gross flows to the net ones, we see that the net rates generally are but a small fraction of the total flows, around or less than 5 % in all but one case in this Danish data. Adding to the complexity of interpreting total net rates is the additional factor of immigration. By merely looking at the total net rate for e.g. Copenhagen, one would be inclined to draw the conclusion that the total surplus of some 0.27 % indicates its relative position in the Danish system to be at least acceptable. Yet, if 30 800 persons leave the region for other parts of Denmark in a single year, and only 29 200 move the other way, such is not really the case.

Driving forces of regional migration in the BSR: territory matters

Finally, we conduct a statistical analysis with the data at our disposal in order to single out which of these background factors affect migration most. We also utilise some territorial typologies as input data into the equations. By doing so, we may obtain a picture of how certain, for the BSR, relevant specific territorial features affect migration. We utilise linear regression with all available tentatively relevant data at NUTS level 3. We do this in five stages. All statistical outputs are available in Annex 9 on page 119.

Firstly we study the effect on net migration (average 2005-2010) of those four NUTS 3 variables where we have full data sets for all 238 NUTS 3 / SNUTS 2 regions in the BSR. These are: GDP/capita in PPS 2010; average employment change 2005-2009; average unemployment rate 2005-2009; and real GDP change 2005-2010.[12]

We see that out of the four examined variables, only unemployment rate and GDP/capita actually affect net migration statistically. In the BSR unemployment seems to affect migration the most: holding the other three examined variables constant, a one percent increase in the unemployment rate on average leads to a 0.05 %-unit increase in out-migration, which is not that much.

However, when we *secondly* introduce the territorial typologies[13] as control variables (i.e. taking into account their statistical effect)) into the same equation, we see that regarding net migration in the BSR at NUTS level 3, whether or not a region is in the eastern BSR affects migration twice as much as does the unemployment rate. Also the status of national capital (incl. St Petersburg) affects migration more than unemployment. Also, whether a region on the urban-rural axis is an intermediate region (as opposed to predominantly rural) affects migration, as does "coastality".

Holding the control variables constant, GDP/capita no longer exerts any influence on migration. In contrast, accounting for all BSR territorial specifities, real economic growth rate seems to affect migration to a certain extent. The remaining variables do not affect migration statistically.

Such was the case with data for the entire BSR. We now *thirdly* introduce four additional variables that are available only for the EU Member States of the BSR (hence omitting the 33 regions of Belarus, Norway and BSR Russia from the analysis). These variables are: Youth unemployment rate (2008); Multimodal accessibility (2006); New soil sealing/capita (2006); and Air quality measured as nr of days micro particles exceed norm value (2009).

When examining these eight variables' (which as noted cover only the EU parts of the BSR) effect on net migration, we se that air quality exerts a moderately strong effect on net migration levels. It does so inversely, i.e. the better the air quality; the more positive appears the migration to be. In decreasing order of magnitude also the unemployment rate, multimodal accessibility, soil sealing as well as youth unemployment rate seem to affect net migration.

Regarding new soil sealing per capita, we see that the relationship is negative; entailing that less soil sealing implies more migration. Since low levels of soil

[12] We utilise the universally accepted statistical significance threshold (P 2-tail) of 0.05 which denotes that when we interpret the results, we are sure that the estimated regression coefficient is significant (i.e. different from zero) with at least 95 % confidence. In multiple regression, the P-value can be insignificant for a particular variable included even when the overall model (i.e. all variables jointly) has a corresponding significant one.

[13] We have incorporated as dummy variables the following territorial typologies in the analysis: East-West, sparse-non-sparse, coast-inland, urban-rural typology and the closeness of a city type from this, as well as the metropolitan typology.

sealing per inhabitant is a predominantly urban phenomenon, we should interpret this relationship so that rather than the soil sealing as such, the urbanity of a region is the principal denominator.

Similarly, youth unemployment has a weak positive statistical connection with migration, i.e. the more unemployed youth, the higher the net in-migration. This is not as strange as it seems as it stems from the fact that youth unemployment is predominantly an urban affair, and further predominantly an affair for large urban areas, which also tend to have highly positive net migration rates. The highest youth unemployment rates in the BSR could (in 2008) be found in (order of magnitude) the NUTS 3 regions of Berlin, Gothenburg, Stockholm, Malmö, Helsinki, Hamburg and Warsaw.

The remaining three variables (GDP/capita, GDP growth and employment growth) do not affect net migration at all when all other features above are taken into account.

When we *fourthly* also introduce the territorial typologies once more into the same equation, air quality maintains its top position among explanatory factors for variations in net migration rates in the EU parts of the BSR. Among other strongly explanatory factors we find both such tied to specific territorial features (capital status, being in eastern or western BSR) as well as socioeconomic indicators (unemployment rate, soil sealing, real economic growth, and GDP/capita[14]). Finally, also regarding the urban-rural typology, being an intermediate region (as opposed to a predominantly rural one) seems to affect migration. The remaining three socioeconomic variables (employment change, accessibility, and youth unemployment rate) appear not to have any statistical influence on net migration. Similarly, none of the remaining indicators for territorial specifities (among which are border region status, sparsity, "coastalness", and closeness to a city) none appear to have any statistical influence on migration.

It is important to note that it should not be interpreted as if such features would not matter. However, when many of the negative aspects associated with these regions (e.g. high unemployment rate, low economic growth rate, low GDP/capita), are already controlled for, the statistical effect of this is as if border status or sparsity would not count. Furthermore, many socioeconomic features are already inherently incorporated in the typologies themselves (remoteness, for example), the effects of which are cleared out when the same variables are included in themselves. Rather to the contrary, these results reveal precisely the persistently handicapping socio-economic and locational characteristics of these areas for which targeted policies are direly needed.

With all the eight variables above in connection to the dummy variables on specific territorial features, one can (statistically significantly with a 95 % confidence) explain as much as 57 % of the variation in net migration rates at NUTS level 3 in the EU MS of the BSR.

The persistence of air quality among top explanatory factors calls for further scrutiny. We hence pick out all those that were significant at the $p<0.05$ level and renew the regression. In practice this means that we only take into account those variables that had an impact in the last run, namely air quality, unemployment rate, new soil sealing/capita, real GDP change, GDP/capita level, as well as capital

[14] Here, GDP/capita however has a *negative* relationship with migration (i.e. the lower the regional GDP/capita, the higher the net in-migration). This statistical peculiarity most likely stems from the fact that when all other effects are cleaned out – effects such as the east-west-, city size-, rurality-, etc dimensions – what remains is the fact that metropolitan fringe regions tend to have substantially high positive net migration rates (as a result of urban sprawl), but their GDP/capita tends to be extremely low in comparison (as a result of the "boundary effect" on commuting for jobs to the city core). Hence this anomality is probably merely an effect of the regional NUTS 3 delimitation.

status, the east-west dimension as well as the intermediately urban region – status.

When doing so, we see that air quality is no longer statistically significant. Instead, the capital status, the east-west dichotomy, as well as the unemployment rate are ale to explain considerable variation in net migration. Also soil sealing seems to be significant, albeit this, as already stated above, has to be interpreted in the sense of "negative rurality".

Finally, *fifth*, we also study how much territorial specifities alone affect migration. When doing so, we once more have the advantage of full BSR coverage. Among the specific territorial features in the BSR, the east-west dimension is by far the strongest explanatory factor for net migration. Holding all other features constant, whether or not a region is in the east or in the west affects net migration with close to a half percentage unit. Also having the status as the national capital, being predominantly urban or intermediate (as opposed to predominantly rural), being a secondary city region (as opposed to "other region") and lying by the coast all have a positive effect on net migration. Sparsity, closeness to a city as well as border status however does not.

The role of migration in achievement of principal BSR and EU policy goals

Regarding the role of migration in alleviating the three principal divides of the BSR, the results are not surprisingly rather straightforward. Migration appears to strengthen both the east-west and the north-south divides of the BSR.

Regarding the urban-rural divide, results are not totally unequivocal. Looking at migration from a strict urban hierarchy point of view, the results are unambiguous, and migration acts as a polarising force in widening the gap along the urban ladder. Current migration patterns in the BSR do not aid in balancing territorial development, diminishing territorial divides or alleviating their consequences. Nor do they help in maintaining at least the existing polycentricity level of the settlement structure.

However, at the same time migration also acts as a driving force in strengthening the urban nodes of the BSR. Capital and secondary cities in particular are well catered for in this respect. Only ten urban regions swallow 47 % of all migration surplus in the BSR. Particularly for smaller BSR countries, such strengthening of agglomerational effects for a selected number of larger cities can have positive effects in a larger perspective, as these centres are hence able to compete better on the international arena. It is also evident that such agglomerational policies have played a partial role in reducing disparities between the countries of the BSR.

In terms of specific territorial assets, or rather the (diminishing) possibilities to develop such, migration as a phenomenon drains precisely such regions that are already most handicapped, such as sparse, peripheral, border, or rural areas.

In terms of overarching EU 2020 strategy goals, migration in the BSR appears to counter effect the achievement of these goals. Smart growth in the territorially handicapped regions is not being alleviated by the migration of the young and well-educated. The inclusive growth priority of higher employment rates is being met in migration surplus areas whereas in the sending regions, the situation is the opposite. The same dichotomy concerns the overarching EU goal of better educational attainment e.g. by reduction of school drop-out rates, as the migrants typically are amongst the most well-educated, or those with the highest ambitions to become such.

Regarding the reduction of poverty goal, current migration streams in many cases aids this by providing migrants far better education and employment possibilities

in the urban nodes of the BSR than the sending peripheral rural areas are able to offer. On the other hand, the social prerequisites for the remaining population are worsening e.g. through a reduced tax base, diminishing requirements for local services, diminishing opportunities to develop the local economy, and other such issues. In this respect the outcome of BSR migration is dichotomous what comes to reduction of poverty.

Finally – essentially going without saying – the current pattern in migration in the BSR does not aid in the achievement of the overarching horizontal EU goal of territorial cohesion.

In terms of policy making migration should perhaps even to a wider extent than is the case to day be acknowledged as one of the most powerful processes of shaping and influencing territorial development.

It triggers, reinforces and/or hinders many territorial cumulative processes leading to the implosion of some regions, congestion in a few others, a need for change of administrative cooperation and practices, urban sprawl, the need of reshaping technical infrastructure, and many other negative and costly aspects

The territorial impacts of migration should therefore be assembled and their relation to other policies with a strong territorial dimension (policies reinforced by or reinforcing migration) assessed.

4 BSR border regions – handicapped with large potential

The key messages of this test case are:

- We are focussing on regions in the BSR that during the programming period 2007-2013 participate in external CBC programmes as well as their Russian and Belarusian counterparts on the other side of the land border, but …
- … we also take a look at cross-border differences in the BSR.
- External border regions represent a large economic contribution potential that still to-day appears underutilised.
- Between 2009 and 2010, border regions accounted for more than 13 % of the total BSR economic growth, a value-added far beyond their relative share of the economy.
- Border regions in general still to-day perform worse than the rest of the BSR, …
- … and they are particularly severely handicapped when examined in their national context.
- Net migration in external border areas is down to less than half that of their respective countries, employment change some 11 % worse, unemployment rate some 5 %-units higher, GDP/capita 12 %-units below, and accessibility some 18 %-units below.
- Border regions appear very vulnerable to external economic shocks. Following the economic crisis of 2008, these regions have experienced a much steeper fall in e.g. migration or a much larger relative decline in employment than have the non-border areas of the BSR.
- Remote, sparse and rural border regions appear performing worse than other border regions, but the results are not unequivocal.
- The national cross-border material welfare gaps (in terms of GDP) within the BSR are primarily on the decrease.
- Most, in relative terms, large national gaps in the BSR are between eastern BSR countries, albeit also between Finland and Norway on the one hand and BSR Russia on the other, the differences are still also substantial.
- Despite being severely handicapped particularly in a national context, the lack of development of external border regions does not appear to particularly reinforce neither the east-west nor the north-south divide of the BSR as such. Most border regions are fairly urbanised which implies less focus also on the urban-rural divide.
- Reduced cross-border disparities along external BSR borders aid in achieving generic territorial cohesion goals.
- The underutilised development potential of border regions constitutes a future source for increased economically sustainable growth.

How did we statistically identify BSR border regions?

Throughout this paper we have identified border regions in the BSR according to the official ESPON typology "Border regions - internal and external". This typology considers all regions participating in the core areas of cross-border cooperation programmes in the programming period 2007-2013. In the EU/EFTA part of the BSR this implies 37 NUTS 3 regions that participate in programmes involving countries outside both the EU and EFTA. We have extended this typology so that the R. of Karelia, and the oblasts of Murmansk, Leningrad, Novgorod, and Kaliningrad in NW Russia as well as Brest, Grodno and Vitebsk oblasts in Belarus are included as border regions. By doing this, we are with these 45 regions (out of the 238 in total) able to capture the most significant border dimension also between the eastern and western BSR. It can be noted though that no Danish or (BSR) German regions participate in external CBC programmes. This affects the outcome of the analysis to a certain extent.

By focussing on external border regions only we have thus excluded all internal border regions between separate EU MS of the BSR. The rationale for this is basically twofold. On the one hand many EU and EFTA Member States, particularly the Nordic countries, are thoroughly integrated and the border status as such does not imply a substantially different relative socioeconomic stance vis-à-vis the non-border areas of these countries. On the other hand close to half of all BSR regions within EU/EFTA would be characterised as internal border regions, something which from an analytic point of view would not add value to the analysis, rather the contrary. This particularly since more than four fifths of thus identified non-border areas would be Polish or German interior regions. Furthermore, 26 NUTS 3 regions are both internal and external border regions at the same time, and an analysis of such overlapping groups of regions is conceptually confusing.

Potential economic contribution of border regions large

During the three last years of the past decade, border regions taken as a group accounted for only 8.7 % of all BSR Gross Domestic Product. They nevertheless at the same time also accounted for some 19.4 % of all jobs in the BSR, hence implying an economic productivity (per employed) far below the rest of the BSR.

However, in the one year period 2009-2010 for example, border region's share of the total GDP growth of the entire BSR was as much as 13.2 %, i.e. far beyond their relative share.

BSR border regions can thus be said to represent a growing but currently still underutilised development potential in the region.

Border regions perform worse than the rest of the BSR

When analysing all 45 BSR external border regions in the BSR and comparing them to the rest of the BSR, it appears as the socioeconomic status and development of the border regions is to a large extent worse than that of their non-border peer regions.

As is evident in Table 11, net migration in border regions is on average lower than that in non-border ones. Such is also the case regarding creation of new jobs. The relatively measured faster real economic growth rate of border regions (3.0 % on average per year 2005-2010, as opposed to 2.2 for non-border regions) is explained by the rapid growth in economic output in particularly BSR Russia, Belarus and Poland, as well as northern Sweden and Norway. This, and out-migration from many border areas, also explains the faster development of

GDP/capita vis-à-vis non-border areas, albeit the gap between border and non-border areas is still substantial (35 points to EU average). A similarly large gap still exists also in terms of multimodal accessibility.

Table 11: Border region performance in comparison to other regions of the BSR

	Real GDP growth	Net migration	Employment change	GDP per capita in PPS, index: EU27=100			Accessibility, index: EU27=100		
	Average annual 2005-2010	Average annual rate 2005-2010	Average annual 2005-2009	ca. 2005	ca. 2009	Development ca. 2005-2009: points change to the EU27 average	2001	2006	Development 2001-2006: points change to the EU27 average
Regions in external border programmes	3.0	-0.1	1.1	46	53	+8	49	51	+2
Other regions	2.2	0.2	1.4	82	88	+6	84	86	+2

Data sources: Eurostat, Rosstat, Belstat, Spiekermann & Wegener (2009): Multimodal and air accessibility Update, ESPON 2009. GDP/capita: Belarus and NW Russia: estimations of BELSTST/ROSSTAT data through the ratio of national GDP of Russia and Belarus in international $ PPP compared to the corresponding value for EU27. DK041, DK042, FI181, FI182: 2009. Real economic growth rate estimated by applying a national level GDP deflator (EU/EFTA: Eurostat, BY & RUS: World Bank) on GDP in current prices in euros, whereupon GDP in fixed 2005 prices is obtained. Belarus, Norway & Brandenburg: 2008-2010. Net migration: Denmark and Finland (apart from Åland): 2007-2010; NW Russia: 2005-2009.

Owing to the classification of these border areas, an analysis such as the above is however partially misleading. We therefore also look at the border areas in relation to their countries in order to single out whether or not such external areas are handicapped in a relative socioeconomic sense or not.

External border regions severely handicapped in their national context

Examining external border regions in relation to their respective countries (Table 12), it is apparent that border regions perform particularly badly. Net migration in external border areas is down to less than half that of their respective country on average, employment change some 11 % worse, the unemployment rate some 5 %-units higher, GDP/capita 12 % below, and accessibility some 18 % below. Such numbers disclose parts of the predicaments facing external border areas.

That the real economic growth rate in external border areas has on average been on a par with the rest of the nations is once more to a large extent due to the exceptionally high economic growth rate in NW Russia as well as Belarus as well as northern Norway and Sweden.

Table 12: Border region performance in comparison to national averages

	Real GDP growth Average annual 2005-2010	Net migration rate Average annual 2005-2010	Employment change Average annual 2005-2009	Unemp-loyment rate 2009	GDP/capita in PPS 2009	Accesibility multimodal, 2006 (excl. NW Russia & Belarus)
Regions in external border programmes	101	44	89	105	88	82

For each indicator data refers to external border regions performance in comparison to the unweighted interregional national averages and indexed to the overall BSR performance. Data sources: Eurostat, Rosstat, Belstat, Spiekermann & Wegener (2009): Multimodal and air accessibility Update, ESPON 2009. GDP/capita: Belarus and NW Russia: estimations of BELSTST/ROSSTAT data through the ratio of national GDP of Russia and Belarus in international $ PPP compared to the corresponding value for EU27. DK041, DK042, FI181, FI182: 2009. Real economic growth rate estimated by applying a national level GDP deflator (EU/EFTA: Eurostat, BY & RUS: World Bank) on GDP in current prices in euros, whereupon GDP in fixed 2005 prices is obtained. Belarus, Norway & Brandenburg: 2008-2010. Net migration: Denmark and Finland (apart from Åland): 2007-2010; NW Russia: 2005-2009.

Border regions vulnerable to external shocks

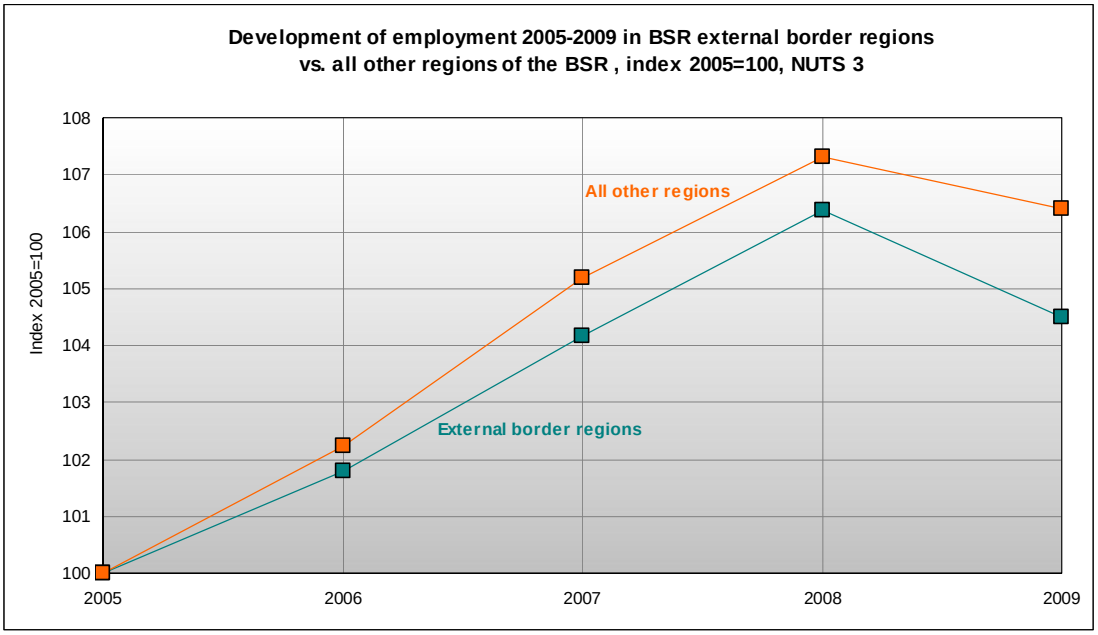
Border areas appear to have taken a worse beating than other areas in the financial crisis of 2008. As is evident in Figure 47, followed by a more modest employment growth throughout the latter half of the last decade, also the decline after the economic downturn has been steeper in border areas than in the remains of the BSR.

A similar but even steeper downturn in net migration is also discernible in border regions, for which the average BSR rate fell from -0.02 % in 2008 to -0.18 % in 2010, as opposed to +0.20 % for non-border areas.

External border regions account for some 19.4 % of all jobs in the BSR. However, during the period of employment growth (2005-2008), border regions share of the total job increase of the BSR was only 17.5 % and their share in the subsequent total loss (2008-2009) was as much as a third (33.5 %). As a consequence of this, the border regions as a group display substantial difficulties in reaching the overall employment targets of the EU2020 strategy.

More generally it appears that the precarious and often more peripheral geographic location of border regions, in many cases also combined with their dependency on cross-border trade and traffic, are more vulnerable to external economic shocks than non-border regions of the BSR.

Figure 47: Development of employment in external border regions vs. in all other regions of the BSR 2005-2009



Data source: Eurostat, Belstat, Rosstat. SNUTS 2 for Belarus and NW Russia.

We have hitherto looked at border regions in terms of BSR averages. Such information does not reveal the entire story and, after all, certain border regions are performing fairly well despite (or due to) their border status.

Remote, sparse and rural border regions appear performing worse than other border regions

By looking at border regions in terms of their other specific territorial features (i.e. beyond "borderness") we may obtain further indications as to their specific character. We analysed total employment growth for 2005-2009 (for which we have consistent data sets) as well as Real GDP growth 2005-2010 (for which we imputated 2005-2007 data for Brandenburg, Norway and Belarus based on the development 2008-2009).

Employment growth 2005-2009 was on average 5.4 % for the non-sparse border regions as opposed to only 0.2 % for the sparsely populated border regions. Similarly, real GDP growth was 3.1 %-units better for non-sparse border regions than for the sparse ones.

Closeness to a city (as defined through the ESPON typology on urban-rural regions) was another major explaining factor for the border regions as a group. Border regions "close to a city" had an employment growth of 5.3 % while those "remote" only showed a 0.8 % increase in the number of jobs between 2005 and 2009. The corresponding difference in real economic growth was 3.5 %-units in the favour of urban closeness. Furthermore, border regions that are smaller metropolitan areas display exceedingly better growth rates both in employment (+10 %-units better) as well as economic growth (+8.3 %-units) than do border regions that lack even smaller metropolitan areas.

Based on the findings above it thus appears as though border regions that are more urbanised or are close to a city and that are not sparse ones are faring far better than their remote, sparse and rural counterpart border regions.

Roughly similar differences are however also discernible among the non-border regions of the BSR, whereupon one cannot conclude that borderness as such does affect the performance. It is very probable that national differences as such, and differences in the particular spatial position and hierarchy in their national contexts, functionalisation, and numerous other statistically intangible aspects that are beyond the scope of this test, are far better explanations as to why some border regions flourish and others do not.

Reduced national cross-border welfare gaps in the BSR

We now shift the focus from the overall position of external border regions vis-à-vis non-border ones to relative disparities across particular national border stretches inside the BSR. Well aware that GDP as such is only able to measure material welfare to a limited extent, we nonetheless assume an analytic position where GDP/capita when adjusted for differences in purchasing power is able to reflect at least crude disparities in material welfare.

Table 13 hence lists the average national cross-border disparities in GDP/capita in PPS across land borders of the BSR in 2005 and in 2010, as well as the changes in these disparities during this period. This data refers to unweighted average disparity across all land border stretches between any two BSR countries. The principal unit is the stretch of border tied to a particular pair of NUTS 3 /SNUTS 2 regions. The calculations are by necessity based on unweighted average disparities across each national stretch, regardless of the actual length of the NUTS 3 border stretch. The information has thus to be considered indicative only.

Looking first at the current status in 2010, we see that the highest welfare gap across any land border stretch within the BSR exists between Belarus and Lithuania, where differences in GDP/capita particularly between Vilniaus apskritis (w. GDP/capita 89 % of the EU average) on the one hand and Vitebsk (29 %) and Grodno (30 %) oblasts on the other imply a huge relative difference across this border stretch. The lower average disparity on the Lithuanian-Belarusian border is however the result of substantially smaller differences between e.g. Utenos or Alytaus apskritises and Vitebsk and Grodno oblasts respectively.

In comparison to the Lithuanian-Belarusian border, disparities on the Finnish-Russian border appear actually quite modest. In contrast to the former, the relative differences across the Finnish-Russo border have however decreased substantially in only five years owing to the relatively stable economic growth on the Russian side of the border.[15] The same can be said about the Norwegian-Russian border between Norwegian Finnmark and Murmansk oblast.

Albeit the levels are quite different, a welfare gap of roughly similar proportions exist also between Denmark and Sweden, where the affluence of Copenhagen vis-à-vis the relatively average GDP/capita levels of southern Sweden (i.e. Skåne county incl. Malmö) imply a statistically large discrepancy.

As mentioned above, the largest decreases in cross-border differences in this respect have occurred between Finland and Russia, where the discrepancy is nearly halved in merely five years. Also on the Norwegian-Russian border in the north, disparities have decrease by nearly 25 percentage units. Apart from these two border stretches, most major decreases in cross-border differences in the BSR have occurred in eastern BSR.

The seemingly dramatic reduction in cross-border disparities between Belarus and BSR Russia is a statistical anomaly. Within the BSR area, the countries share only one stretch of border, namely that between Pskov oblast in Russia and Vitebsk

[15] Combined with rapid depopulation leading to higher per capita values.

ditto in Belarus. At the beginning of the period the ratio in GDP/capita between the two regions was 20/27. Largely owing to the dramatic population decline in Pskov combined with a stable economic growth rate, this ratio had by the year 2010 decreased to 30/30, i.e. a zero percent disparity.

Table 13: Average national cross-border disparities in GDP/capita in PPS across land borders of the BSR 2005 and 2010

	Average disparity across NUTS 3 land borders in GDP/capita in PPS		
	Crossborder disparity on average in %		%-units change in disparity
	2005	2010	2005-2010
All regional land borders of the BSR (between and within BSR countries)	*32.8*	*32.5*	*-0.3*
All regional land borders between BSR countries	53.8	42.4	-11.4
of which between:			
Estonia and BSR Russia	62.0	55.0	-7.0
Estonia and Latvia	39.6	16.1	-23.6
Latvia and BSR Russia	32.5	11.9	-20.6
Latvia and Belarus	12.5	7.1	-5.4
Latvia and Lithuania	50.2	43.4	-6.8
Lithuania and Poland	5.7	0.0	-5.7
Lithuania and BSR Russia	39.6	37.9	-1.7
Belarus and Lithuania	121.1	117.4	-3.8
Belarus and BSR Russia	35.0	0.0	-35.0
Belarus and Poland	30.4	35.5	+5.1
Poland and BSR Russia	25.6	14.6	-11.0
Poland and BSR Germany	68.1	50.8	-17.3
BSR Germany and Denmark	34.1	32.7	-1.4
Denmark and Sweden	62.0	69.4	+7.4
Norway and Sweden	9.0	11.5	+2.4
Norway and BSR Russia	90.7	67.6	-23.1
Sweden and Finland	29.4	51.1	+21.7
Finland and Norway	14.2	26.6	+12.5
Finland and BSR Russia	127.3	76.2	-51.1

Data refers to unweighted average disparity percentage. Data sources: EU/EFTA countries: Eurostat; Belarus and NW Russia: estimations of BELSTST/ROSSTAT data through the ratio of national GDP of Russia and Belarus in international $ PPP compared to the corresponding value for EU27. Belarus, Norway & Brandenburg: 2008-2010; DK041, DK042, FI181, FI182: 2005-2009

Moving in the other direction in turn are primarily northern Nordic border stretches. The largest increases in relative disparities have occurred between Finland and Sweden and Finland and Norway. The high per capita economic growth rate in both Troms and Finnmark in Norway as well as Norrbotten in Sweden combined with the relatively stable situation in Finnish Lappi implies increasing statistically measured disparities. How much disparities in real material well-being have increased cannot however be judged based on this data.

For those interested in this particular theme, chapter 2 takes a more detailed look at various types of cross-border disparities in the BSR.

The role of border areas in achievement of principal BSR and EU policy goals

We will finally briefly speculate as to the role of the border areas in reaching generic EU goals on territorial cohesion as well as in addressing similar BSR specific aims.

The role of border areas in alleviating the three specific territorial divides of the BSR is not a straightforward issue. One explanation is that many border areas contain or are close to large urban nodes, such as Trojmiejski or Gdansk in Poland, or Kaliningrad or Murmansk in BSR Russia. Or, in the extreme case of Vilnius, they are even capitals in themselves. A vast majority (62 %) of the external border areas in the BSR are, according to the ESPON typology of urban-rural regions, situated “close to a city”.

Based on the material at our disposal, there are thus no explicit indications that lack of development of external border regions as such would reinforce neither the east-west divide of the BSR, nor that of the north-south one as such. Along the urban-rural axis again, as indicated above, most external border regions are urbanised, or situated close to larger urban nodes. In this respect border areas do thus not contribute to a widened generic urban-rural divide of the BSR either.

This notwithstanding, border areas in the BSR appear severely handicapped, particularly when viewed in their specific national context. If one hence approaches the issue from the point of view of underutilised potential, then the perspective changes slightly. It is evident that targeted development of border regions in the BSR could aid the reaching overarching goals of economically sustainable growth by better harnessing the currently underutilised potential of these regions. In some respects our data above indicate that border regions are indeed travelling this route.

As is the case with the generic BSR goals, also the corresponding macro level EU ones are unambiguous as to border regions in the BSR. Were such date available however, most border regions would probably score fairly low on issues related to smart growth and development of the knowledge economy.

Regarding the overarching horizontal goal of increased territorial cohesion, the current trend in the development of border areas contributes to the alleviation of territorial divides at the local level by clearly reduced welfare disparities between external border regions in the BSR, thus also aiding the EU 2020 achievement of greater social inclusion and reduced poverty.

Although policy recommendations or even evaluation is way beyond the scope for this work, some brief notes that have emerged during the preparation of this case study, may nonetheless be appropriate.

It appears as though current policies designed for diminishing border divides work properly alleviating some of key divides but they have tentatively reached their limits in the BSR, not least in the context of smart growth or the knowledge economy.

In a BSR context, such current type of policies are functional in the case of cooperation between more developed regions (such as Helsinki - St. Petersburg) or in a context of still existing large cross-border disparities (Eastern Finland-Russian Karelia) that by definition tend to induce flows of goods and people, provided that the basic infrastructure is there and sufficient institutional arrangements are in place.

A situation where cross-border disparities have been reduced but the regions are still at the beginning of their catching up process (e.g. Poland-Kaliningrad) could tentatively be addressed with other types of policies complementing more traditional ones.

Finally, there also appears still to be a need to strengthen border areas “backward” accessibility. Many BSR border regions are remote in their national context, and linking two remote cross-border regions to each other might not necessarily always be sufficient in itself.

5 Benchmarking the region – the BSR vs. the North Sea & the Alpine Space

The key messages of this test case are:

- The BSR has far outperformed its peer regions in economic growth primarily due to the rapid catch-up of eastern BSR.
- The 2008 crisis hit the BSR severely, but not as much as the NSR.
- Despite rapid catch-up, the material welfare gap of the BSR is still in a league of its own compared to the peer regions. This gap is so large primarily due to increasing discrepancies in the eastern BSR rather than the traditional east-west divide of the region.
- Three million new jobs in the BSR 2005-2008 implied twice the growth rate as e.g. in the NSR.
- Post-2008 job losses in the BSR similar as those in the NSR.
- The BSR is inaccessible in comparison to its peer regions, but gradually gaining in on them.
- The BSR on the whole is not as attractive to migrants as its peer regions …
- … albeit east-west differences are marked: east is loosing, west is gaining.
- The BSR lags behind its peer regions in the general health status of its population. Interregional differences in the BSR are pronounced in comparison.
- The rate of increase of built-up surface is fast in the EU parts of the BSR in comparison to the peer regions. No data on non-EU parts of the BSR exist.
- The air quality of the BSR appears not markedly different from that of its peer regions. However, no comparable data on the non-EU parts of the BSR are available.
- Benchmarking the BSR against other transnational or macro regions by utilising information in the monitoring system is both possible and in all probability also to a certain extent beneficial.

The BSR compared to what?

In this chapter, we briefly benchmark the Baltic Sea Region against two transnational areas of Europe, namely the North Sea transnational region (NSR) and the Alpine Space transnational region. In economic terms, the three regions are roughly of similar size. The economy of the Alpine space is only some 15 % larger than the BSR, and that of the North Sea some 5 % larger. In population terms the peer regions are somewhat smaller, around 60 % of the BSR, and area wise considerably smaller. The three regions however share roughly similar tendencies of central/peripheral polarisation both in pure geographic terms as well as on the urban-rural or core-periphery axis.

What makes them distinct however is the fact that only the BSR is subdivided a still existing “east-west” division. In this sense the introduction of e.g. the

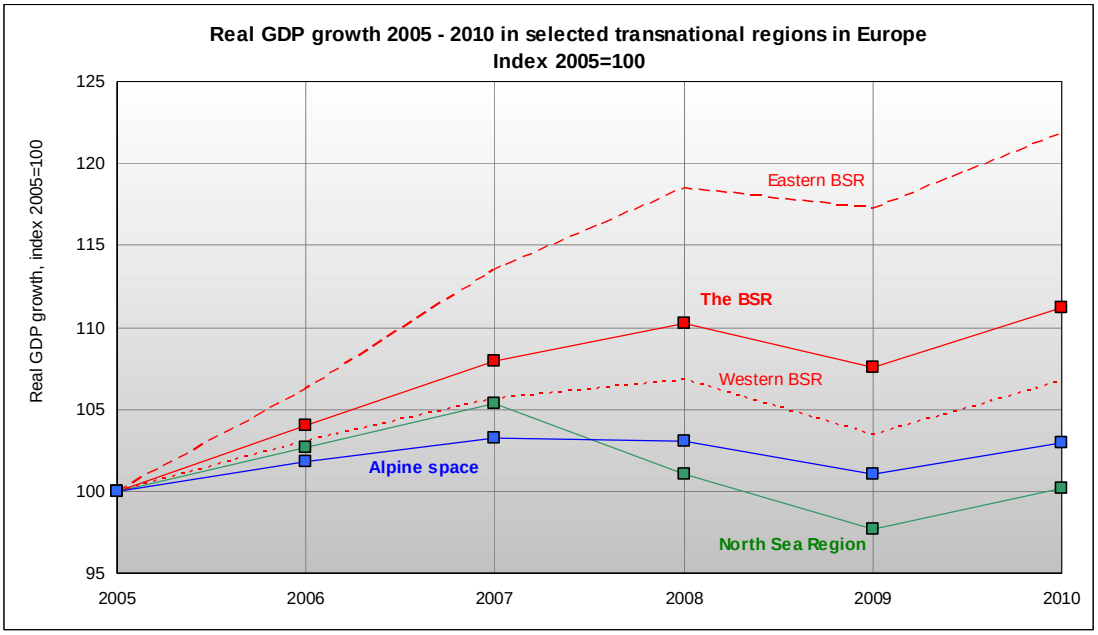
Danube area as a peer region would have made sense. However, lack of data for parts of the Danube macro area would still to this day severely restrict any meaningful statistical comparison.

The BSR outperforming in economic growth

The rate of real economic growth has been much faster in the BSR than in the benchmarked transnational regions. During 2005-2010, the BSR outperformed the Alpine Space by 8.2 percentage units, and the North Sea Region by as much as 11.0 percentage units (Figure 48).

A lion's share of this comparable advancement is due to the rapid catch-up of eastern BSR, where summarised economic growth 2005-2010 outperformed its western counterpart by as much as 15.1 percentage units.

Figure 48: Real GDP growth in selected transnational regions in Europe 2005-2010

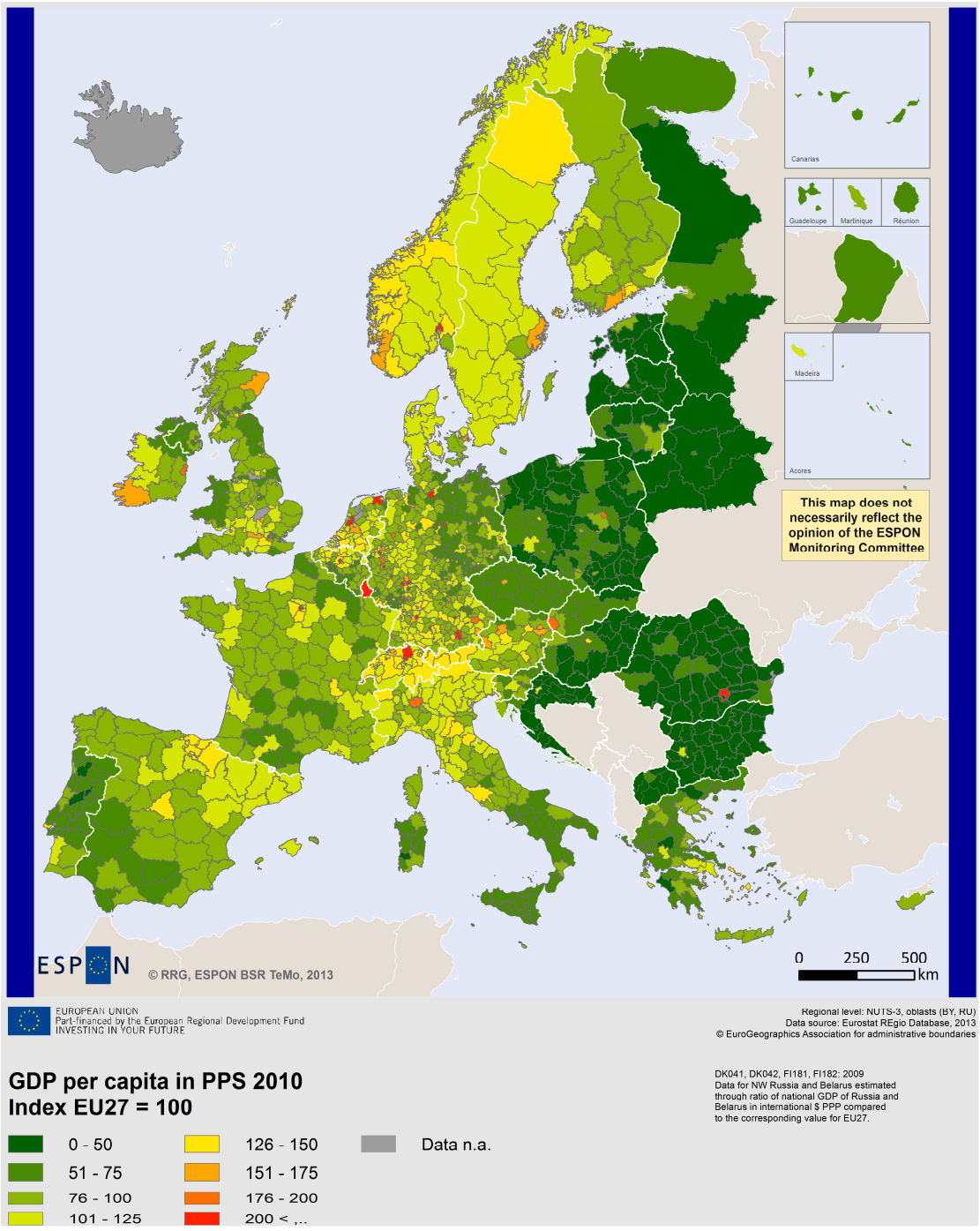


Data sources: EU/EFTA countries: Eurostat; Switzerland: Bundesamt für Statistik; Belarus: BESLTAT; NW Russia: ROSSTAT. Real economic growth rate estimated by applying a national level GDP deflator (EU/EFTA: Eurostat, BY & RUS: World Bank) on GDP in current prices in euros, whereupon GDP in fixed 2005 prices is obtained. Belarus, Norway, Brandenburg & 4 regions in the Netherlands: data for 2008-2010; Switzerland: 2009-2010; Italy: 2010 only; Liechtenstein & Leeds (UK): data n/a. 2005 data estimated by interpolating missing values backwards: should be considered indicative alone.

The 2008 crisis hit the BSR economy hard, but the NSR harder

The 2008 downturn in economic growth was in the BSR more severe than was the case in the Alpine Space, but less so than in the NSR. The reduction in economic output was particularly severe in the western parts of the BSR, where production between 2008 and 2009 fell three times as much than was the case in the east. Furthermore, also the subsequent catch-up of particularly the eastern BSR, but also the western parts of it, was more rapid lifting the BSR far above its peer regions in this sense.

Figure 49: GDP/capita in PPS in the ESPON space and the BSR 2010



Material welfare gap of the BSR still persistent

Despite the relatively faster growth rat of the BSR, the material welfare gap of the region, here represented by GDP/capita in 2010 (Figure 49) is still much persistent when compared to the peer regions.

At a first glance, this appears not to be the case. Indeed, in 2010, the difference between the highest and the lowest value of regional GDP/capita ranged from 332 to 55 (=277 points) in the Alpine space, 357 to 58 (=299 points) in the NSR and 248 to 28 in the BSR, which would indicate smallest differences in the BSR.

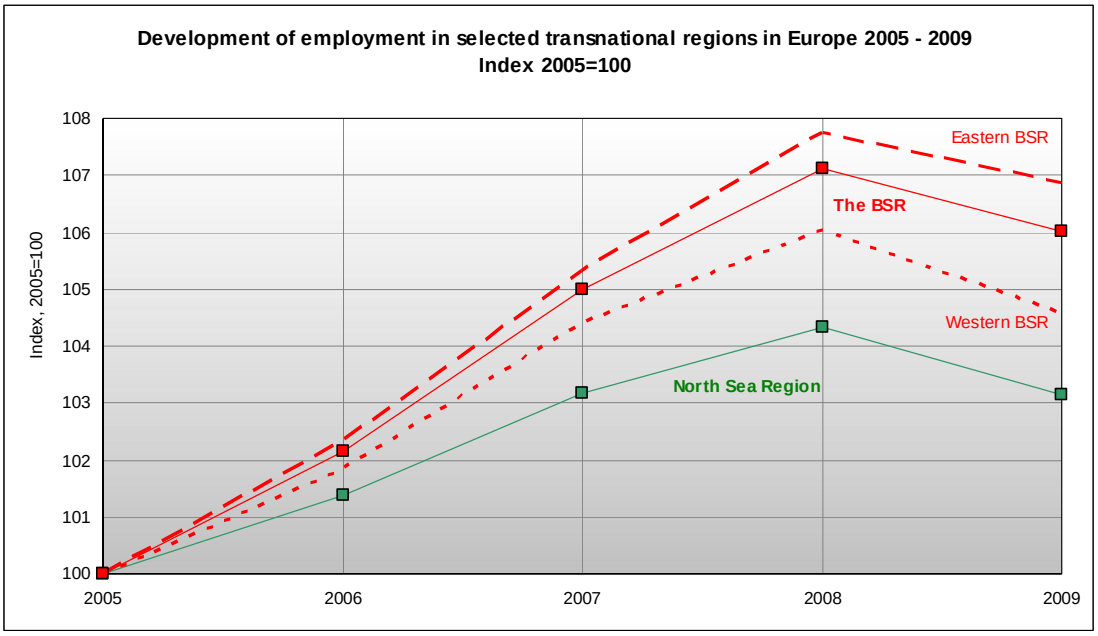
Table 14: Interregional differences in GDP/capita in PPS in selected transnational areas of Europe 2010

	Alpine Space	North Sea	The BSR	Eastern BSR	Western BSR
Minimum regional value	55	58	28	28	62
Maximum regional value	332	357	248	188	248
Distance max-min regions	277	299	220	160	186
Median region	110	101	80	53	106
Standard deviation of all regions	41.2	35.7	36.4	26.0	28.9
Interregional mean	117	108	83	62	111
Coefficient of variance	0.35	0.33	0.44	0.42	0.26

Data sources: EU/EFTA countries: Eurostat; Belarus and NW Russia: estimations of BELSTAT/ROSSTAT data through the ratio of national GDP of Russia and Belarus in international $ PPP compared to the corresponding value for EU27. Belarus, Norway & Brandenburg: 2008-2009.

However, when not only considering the uttermost extremes but also the overall distribution of NUTS 3 regions between these extremes in the three peer areas, then the spatial inequality of the BSR rises to levels much above its peer regions (Table 14). These differences are not as expected primarily due to an east-west gap in the BSR, but they are pronounced within the eastern parts of the region. This is indicated by a coefficient of variance for E-BSR (0.42) being nearly on a par with the corresponding ditto for the entire BSR (0.44). However, one may also note that interregional differences in the Western parts of BSR only are even slightly lower than those of the other two peer regions.

Figure 50: Employment growth in selected transnational regions in Europe 2005-2009



Data source: Eurostat, Belstat, Rosstat

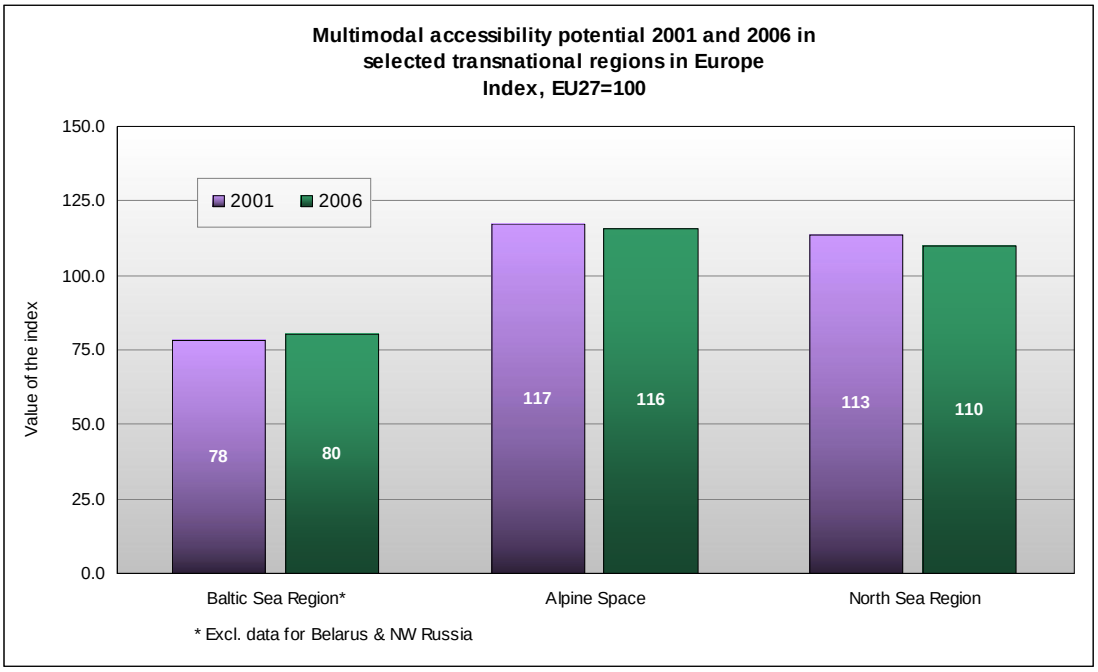
Three million new jobs in the BSR 2005-2008, half a million lost after the crisis

During the three-year period 2005-2008, some three million new jobs were created in the BSR, two in the east, one in the west. In relative terms this implied an employment increase of some 6 %, twice the corresponding growth rate of the NSR (Figure 50). Poland accounted for a large share of this increase. In the subsequent crisis of 2008, the BSR lost approximately half a million jobs, equally distributed between east and west alike. In relative terms the reduction in the BSR was of a similar magnitude as that in the NSR. In relative terms however the downturn in the eastern BSR was close to twice as high as that in the western parts of the region.

The importance of accessibility

In a region like the BSR, accessibility to services, markets and jobs is key to ensure that every part of the territory is able to benefit from well-being standards, and from equal development potentials, by providing access and connectivity to transport and ICT infrastructures, facilities and services, especially for remote, isolated, sparsely populated areas and areas (ESPON BSR TeMo Interim report, p. 20). Accessibility thus plays a key role in balancing territorial development, helps diminishing territorial divides or alleviating their negative impacts.

Figure 51: Multimodal accessibility potential in selected transnational regions in Europe 2001 and 2006



Data source: Spiekermann & Wegener (2009): Multimodal and air accessibility Update, ESPON 2009.

The BSR inaccessible in comparison to peer regions

The average multimodal accessibility potential of the BSR is more than 30 % lower than the corresponding rate for the Alpine Space (Figure 51). This is in a way natural, for the Alpine Space is amongst the most accessible regions of Europe. The fact that accessibility of the BSR also is some 27 % lower than the

NSR, like the BSR home to some of Europe's more extreme peripheries, however implies that the communication network of the BSR is still severely handicapped in comparison to the others.

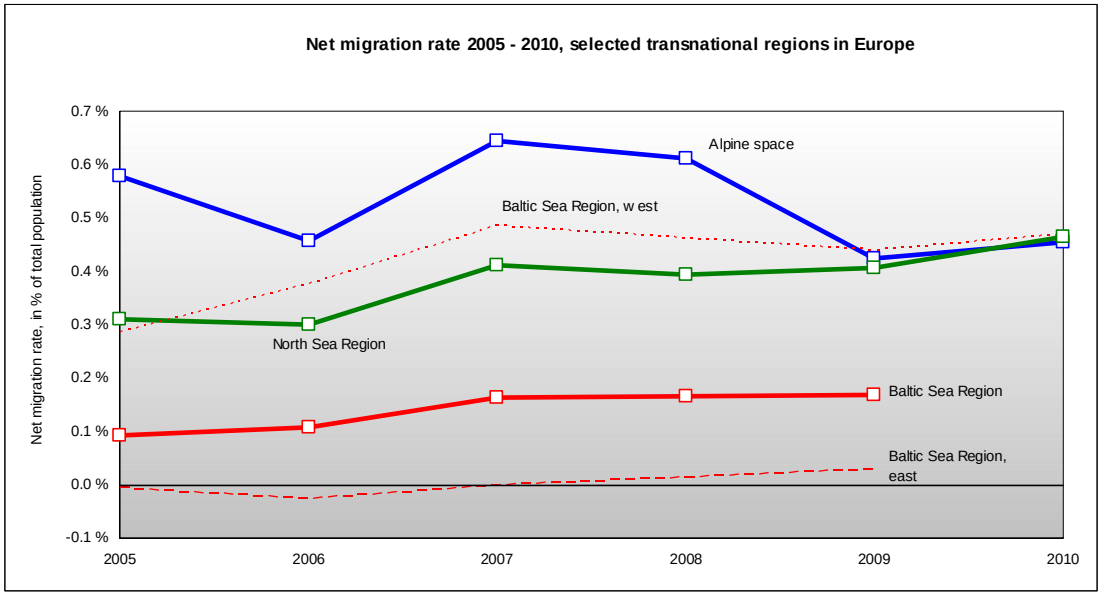
This data however includes neither the regions in NW Russia nor in Belarus, an inclusion of which would most likely further lower the region's relative standing. On the other hand, if an inclusion of these areas in the BSR total accessibility would be coupled with an extension of accessibility to the populous areas around Moscow or Ukraine (which is not the case in this data), then the lowering or lifting affect on total BSR accessibility would most likely remain modest.

BSR slowly improving relative accessibility

In contrast to the two peer regions, the BSR has during the period 2001-2006 increased its accessibility by two percentage units compared to the EU27 average. The trend in the two peer regions in contrast points in another direction. As a comparison to the EU average inevitably implies that if someone gains (in relative terms), some one else looses, this development is not in any way unique.

Investments in transport infrastructure in particularly the eastern BSR imply that a gradual shift towards the EU average is foreseeable at least in the near future. In the long term, however, the region's sparse and scattered population most likely entails that a total levelling out of the differences is not very likely. A simple linear extrapolation of the 2001-2006 trend would imply that the BSR would surpass the NSR in multimodal accessibility already in 2013, and even the Alpine space as soon as in 2018 …

Figure 52: Net migration rate in selected transnational regions in Europe 2005-2010



Data source: Eurostat, Belstat, Rosstat

The BSR not as attractive to migrants as its peer regions

The BSR on the whole is not attractive to migrants. Migration to the BSR has during the latter years of the last decade on average been only a quarter of that of the Alpine Space, and also roughly a third of the corresponding rate in the NSR (Figure 52).

This is largely due to substantial emigration for the eastern BSR. Indeed, net migration to the western BSR has been stronger in relative terms than to the NSR, and also after 2009 converging on the high attractivity of the Alpine Space.

BSR and NSR migration unaffected by 2008 crisis, unlike the Alpine space

Migration rates in the Alpine Space were reduced to two thirds after the financial crisis of 2008. Such a development is not perceptible in the BSR, where east and west alike have displayed similar modest rates of increase also after this year. The attractivity of the NSR appears to be on a slightly faster increase than that of the BSR.

General health status of the BSR lagging behind

The EU Sustainable Development Strategy as well as the EU 2020 Strategy, and particularly its "inclusive growth" priority, both emphasise the importance of poverty reduction and combating social exclusion. Also the "GDP and Beyond" initiative with its focus on human well-being is closely connected to issues of quality of life and well-being. In all its simplicity, life expectancy at birth is a commonly accepted meta indicator for the general health status of a population, and in the extension a measurement of the overall quality and effectiveness of the health care system in a country or a region.

The median life expectancy at birth of the NUTS 2 regions of the BSR was 77.8 years in 2010. The corresponding median value for the NSR was 80.8 years and for the Alpine Space as much as 82.0 years.[16] Little as this difference may seem in relative terms, it is nonetheless a gap representing several decades of development in health care, health education, etc.

Huge regional variations in physical health in the BSR

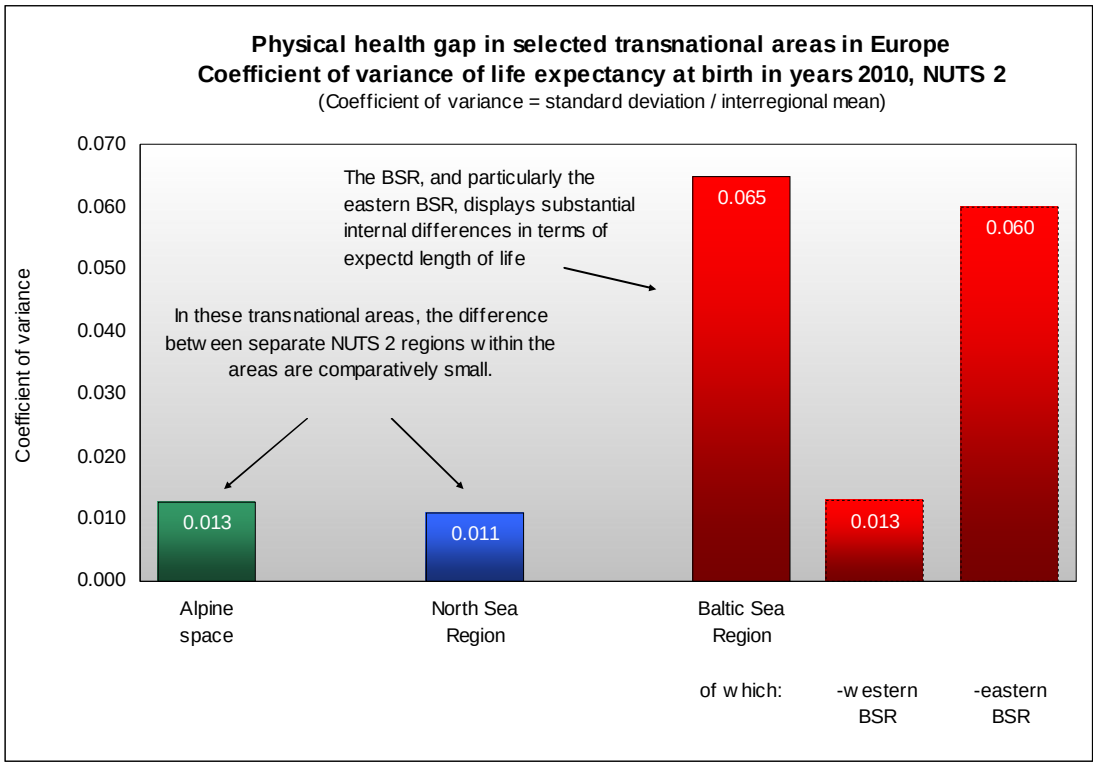
What truly separates the BSR from its continental counterpart regions is the huge gap between east and west in terms of general population health. While median regional life expectancy in western BSR is on a par (80.7 years in 2010) with that of the NSR, the same value for the eastern BSR is as low as 75.6 years. The interregional inequality within the BSR is thus expectedly on a far higher level than is the case in the peer regions.

Regional variations within the eastern BSR range from as much as 79.2 years in Mecklenburg-Vorpommern to as little as 64.5 years in Novgorod or Pskov oblasts, a value worse than the corresponding one for e.g. the Yemen (65.1 years in 2010 according to the UN Human Development Indicators).

This overall discrepancy between eastern and western BSR has remained rather stable throughout the years since the mid-1990s, indicating that particularly in NW Russia the dismantling of the health care system since the fall of the iron curtain has not yet been remedied.

[16] The data type does not allow for additions, hence the references to the interregional medians.

Figure 53: Extent of regional physical health gap in selected transnational areas of Europe 2010



Data source: Eurostat, Rosstat, Belstat. NW Russia: 2009. Brandenburg: data n/a.

Alongside low levels of fertility the gradual increase in life expectancy is however also one of the contributing factors to the ageing of the population.

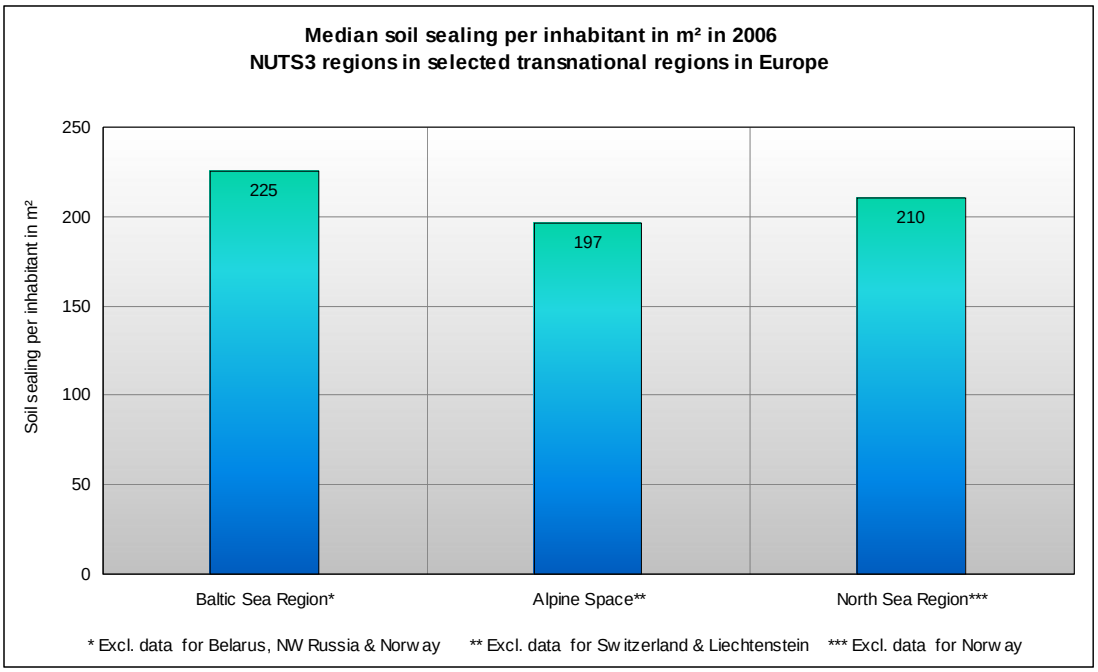
Land pressure increase high in the BSR in comparison

Soil sealing is a measure of how much land is converted to artificial or built surface. Hence this indicator is associated with land take for economic, transport or residential development and is associated with changes in settlement structures.

Based on NUTS 3 level data for the EU parts of the BSR (thus excluding NW Russia, Belarus and Norway), some 225 m² of land per capita was converted from green or agricultural space into artificial land in the year 2006 (Figure 54). This data is based on the interregional median in the BSR, not its average. The corresponding value for the peer regions was 210 m² / inhabitant in the NSR and as little as 197 m² in the Alpine Space. The rate of change in the BSR thus exceeded that of its peer regions.

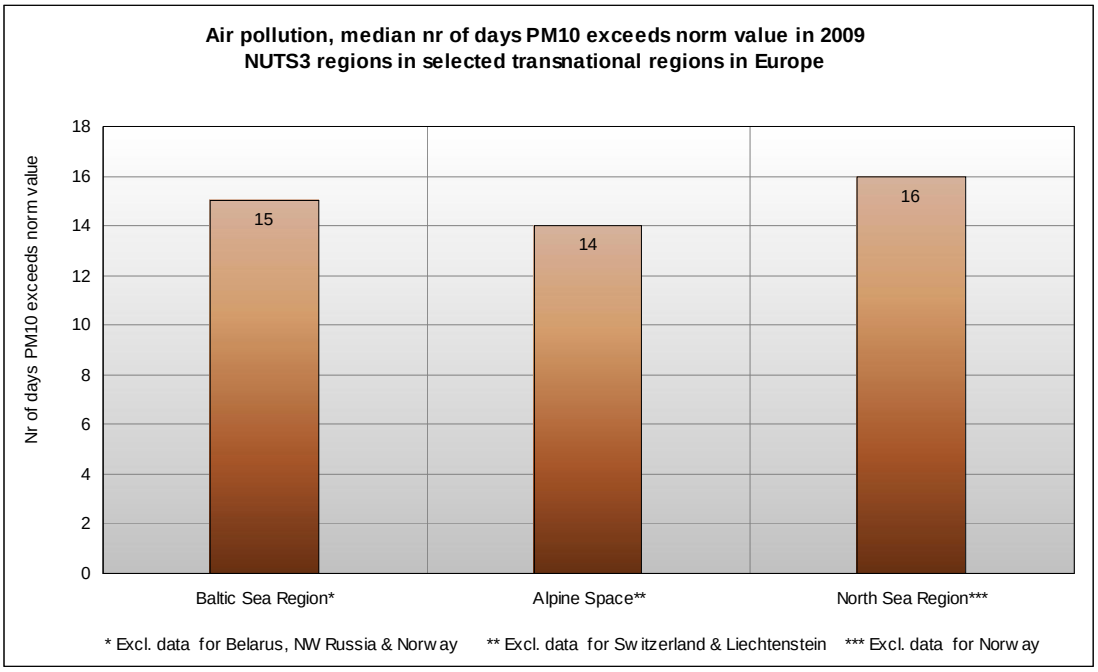
However, this indicator does not take into account the amount of available un-built surface per inhabitant, and in such a comparison, the BSR would most likely exceed its peer regions by horse lengths. Indeed, when examining which types of regions have the highest new soil sealing rate in the BSR, particularly semi-sparsely populated agricultural regions stand out, whereas densely built urban areas score very low on this indicator.

Figure 54: Soil sealing per inhabitant 2006 in selected transnational regions of Europe



Data source: EEA, Eurostat, REGIO-GIS

Figure 55: Air pollution 2009 in selected transnational regions of Europe



Data source: GMES Promote project, JRC, EFGS, REGIO-GIS

Relatively good air quality in EU parts of the BSR

Air quality in the EU is measured y a number of background measurement stations primarily in larger cities. This data is then extrapolated to cover all regions of the EU. Levels of ozone and of the small particle density are the most

commonly used measurements in this respect, of which the later bears high relevance for the BSR. Figure 55 displays the number of days per year that the critical levels have been exceeded in terms of concentration of small particulate matter (PM10, µg/m³) at surface level. The data are presented in population-weighted averages at NUTS 3 level, where the median of each macro area has been displayed.

In the most average BSR EU region, the air quality was deemed as very poor on 15 days during the year 2009. This number does not doffer markedly from those of its peer regions. However, as data for Norway and particularly for Belarus and NW Russia is excluded, this estimate has to be considered indicative alone.

6 Towards the Final Report: Critical evaluation of the monitoring system

The final subtask of this WP which involves a critical evaluation of the monitoring system with regard to its functionality in being able to provide sufficient information for assessing territorial cohesion in the BSR. The lessons learned from these four test cases serve as a backbone for the assessment on the monitoring system's ability to highlight central features for possible policy deficits, development and/or evaluation.

It would not however be meaningful to merely evaluate the success or failure of these four case studies in a vacuum, i.e. based merely on technical aspects such as data coverage, comparability or timeliness, and other such issues.

Rather, we deem stakeholder and/or user feedback of the test case results presented in this report as the primary reference pool for such an evaluation.

Based on the user feedback received, strengths and weaknesses emerging from the testing process will be identified and tentative suggestions for readjusting the monitoring framework will be forwarded.

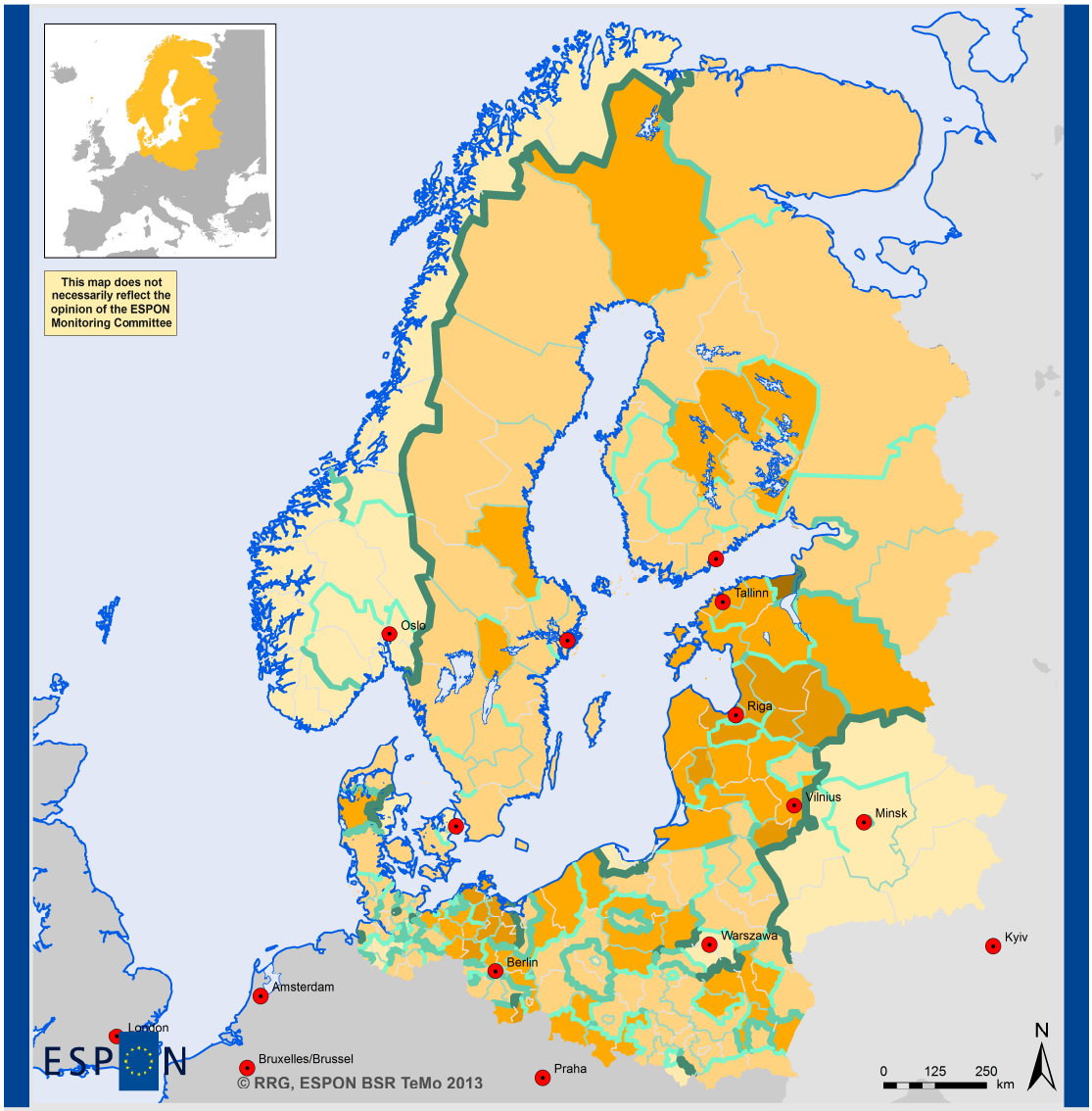
This evaluation will also provide an assessment of whether the way in which the results are visualised corresponds to the user needs, or whether the visualisation approach (of WP 2.4) is in need of further development.

Timing & reporting of WP 2.3

This WP is scheduled to run for 14 months from November 2012 until December 2013. The results of the paper at hand will be discussed at the fourth Steering Committee meeting in September 2013. At this stage, these findings will also be used as feedback for the final construction of the monitoring system. The final results, that include the critical evaluation of the entire monitoring system, will be reported in the Final Report of February 2014.

Annexes

Annex 1, map: Territorial discontinuity of unemployment rates in the BSR 2009



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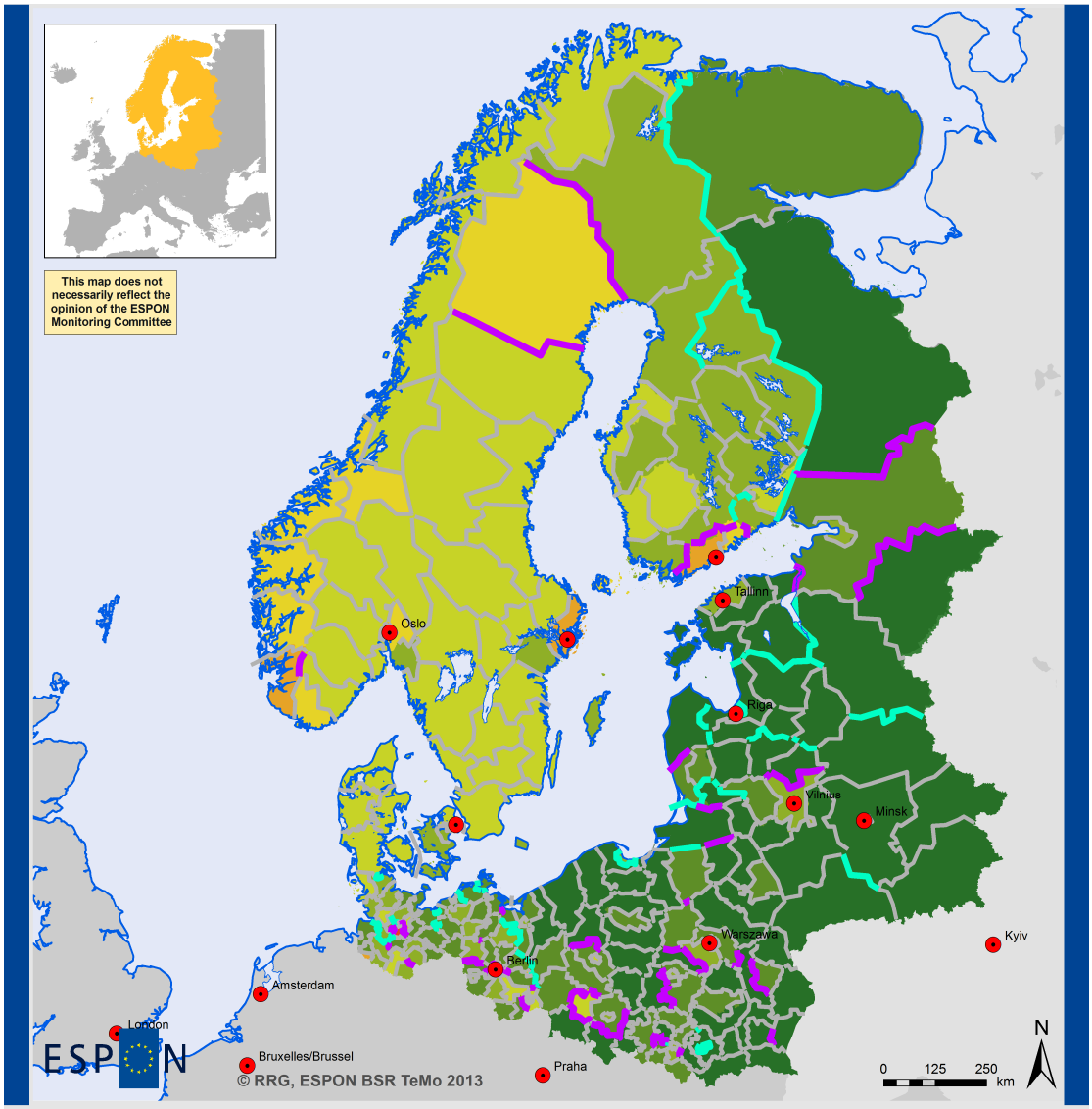
Territorial discontinuity in unemployment rate (2009)

Regional level: NUTS-3, RU & BY: oblasts
Data source: Eurostat (EU/EFTA countries), Belstat (Belarus), Rosstat (NW Russia)
© RRG GIS Database, 2013
© EuroGeographics Association for administrative boundaries
© Eurofutures Finland 2011

Territorial discontinuity	*Unemployment rate (%)*
0 - 10	1 - 5
10 - 25	6 - 10
25 - 50	11 - 15
50 - 100	16 - 20
100 < ...	21 - 25
	26 - 29

Annex 2, map: Change of territorial discontinuity of GDP/capita in the BSR 2005-2010



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Regional level: NUTS-3, oblasts (BY, RU)
Source: Eurostat (EU/EFTA countries), Belstat / Rosstat (BY, RU)
© EuroGeographics Association for administrative boundaries
© Eurofutures Finland 2011

Changes in territorial discontinuity at NUTS-3 level in GDP per capita in PPS 2005-2010

Changes in cross-border disparities

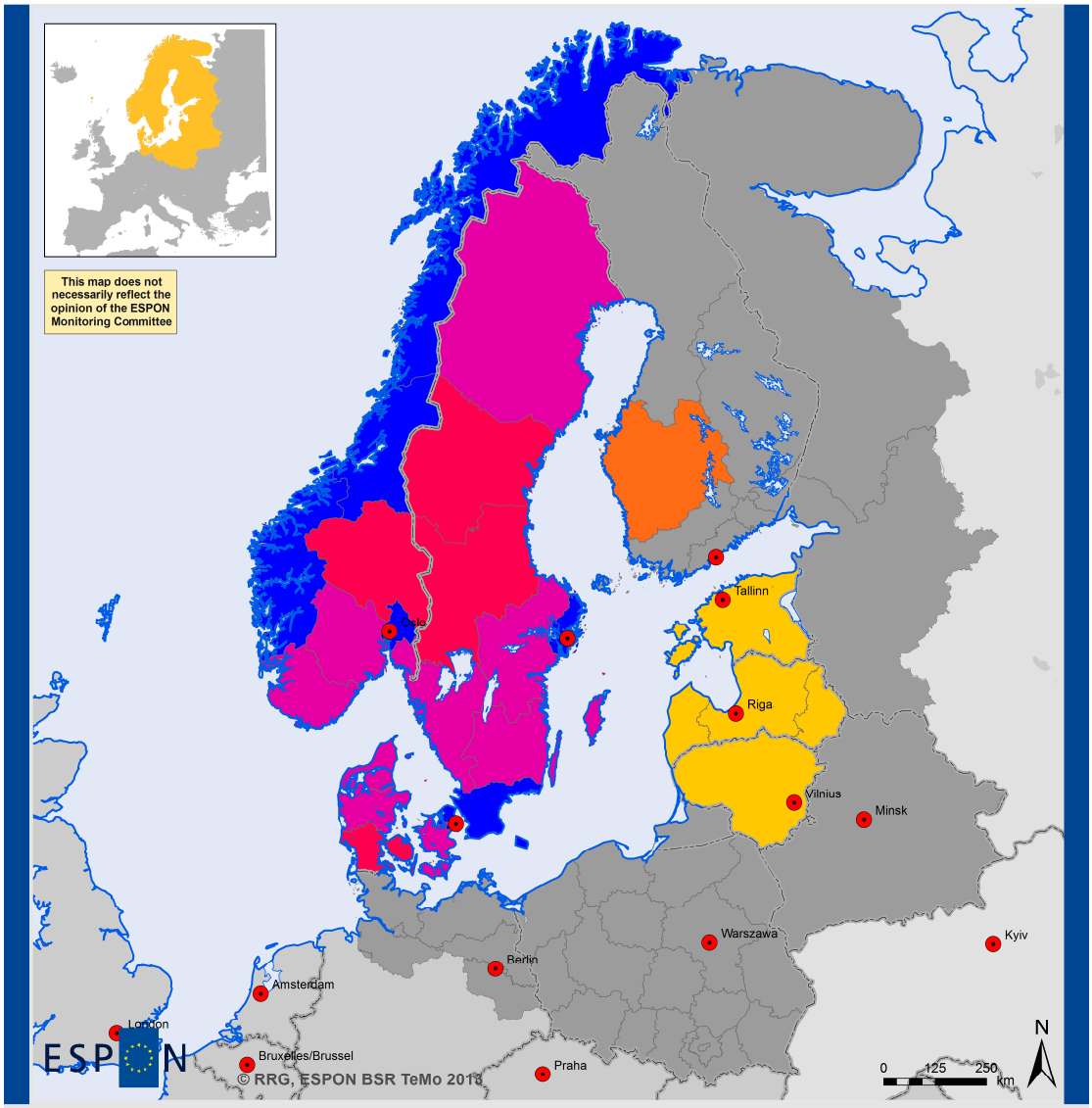
- Disparity reduced >15%-units
- Disparity largely unchanged
- Disparity increased >15%-units

GDP/capita in PPS Index EU27=100

- 0 - 50
- 51 - 75
- 76 - 100
- 101 - 125
- 126 - 150
- 151 - 175
- 176 - 200
- 200 < ...

BY, NO, Brandenburg: 2008-2010
DK041, DK042, FI181, FI182: 2005-2009
Data for NW Russia and Belarus estimated through ratio of national GDP of Russia and Belarus in international $ PPP compared to the corresponding value for EU27.

Annex 3 , map: Households with access to the Internet in the BSR 2011



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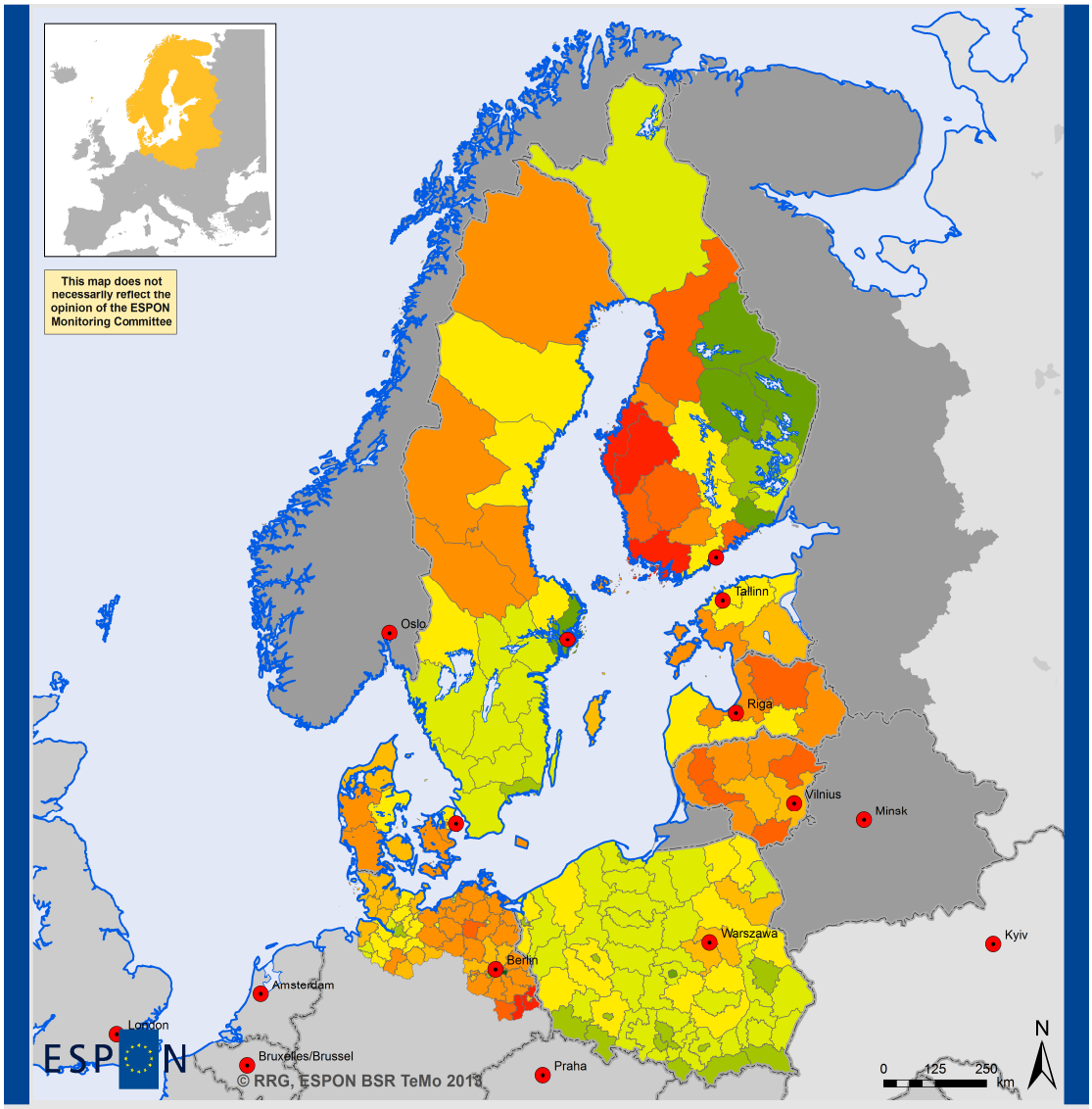
Household with access to internet (2011)
Proportion of all households (%)

- 62 - 71
- 72 - 83
- 84 - 87
- 88 - 91
- 92 - 100
- Data n.a.

Regional level: NUTS-2
Data source: Eurostat
© RRG GIS Database, 2013
© EuroGeographics Association for administrative boundaries

Data not available for Germany, Poland, NW Russia, Belarus and for three regions in Finland.

Annex 4, map: Soil sealing per inhabitant in the BSR 2006



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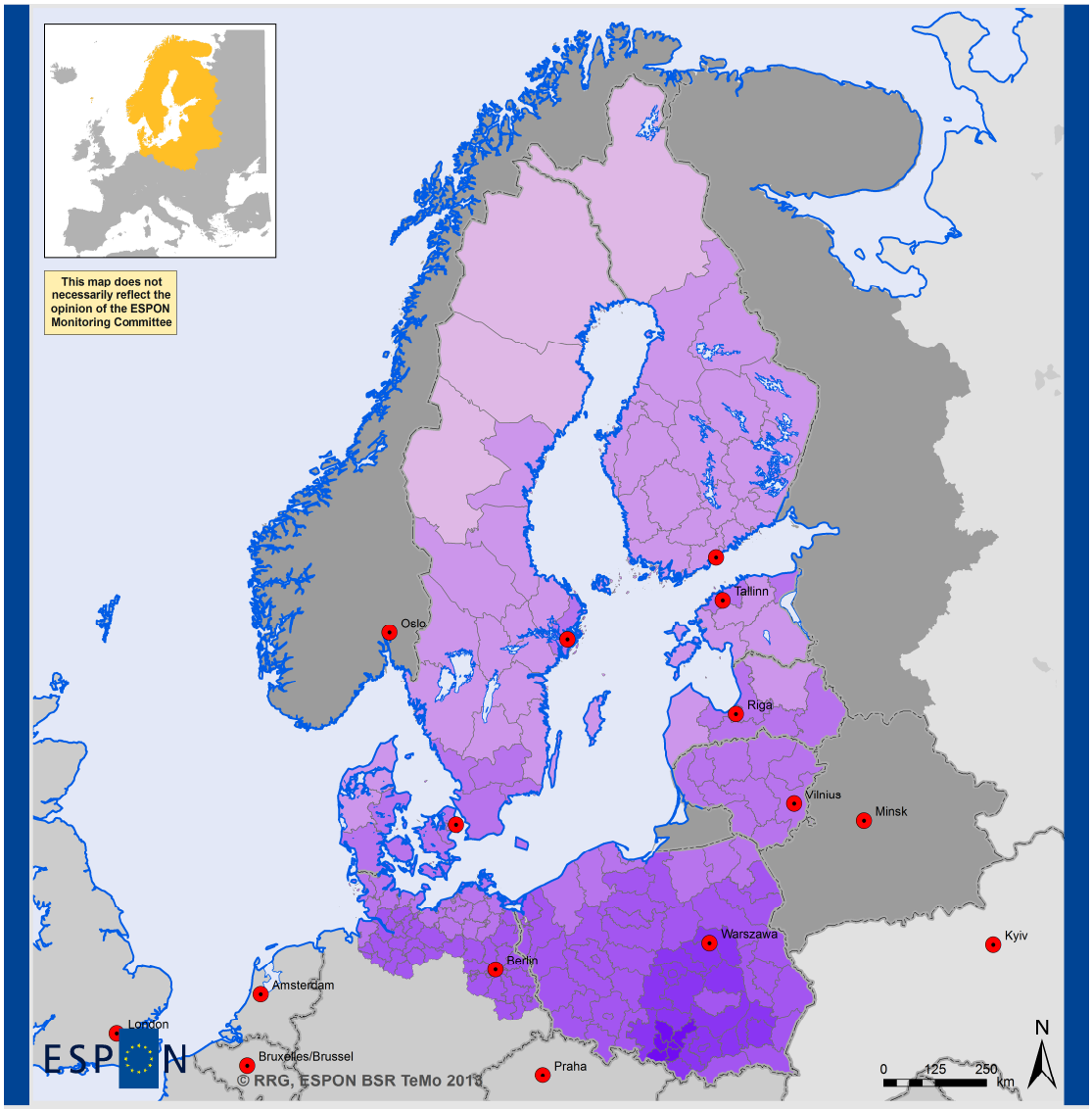
Regional level: NUTS-3
Data source: 5th Cohesion Report, EEA, Eurostat
© RRG GIS Database, 2013
© EuroGeographics Association for administrative boundaries
Data not available for Norway, Russia, Belarus

Soil sealing per capita (2006)
New annual soil sealing through land take (sqm per inhabitant)

35 - 50	201 - 250	Data n.a.
50 - 75	251 - 300	
76 - 100	301 - 400	
101 - 150	401 - 500	
151 - 200	501 - 744	

Annex 5, map: Air pollution levels in the BSR 2009



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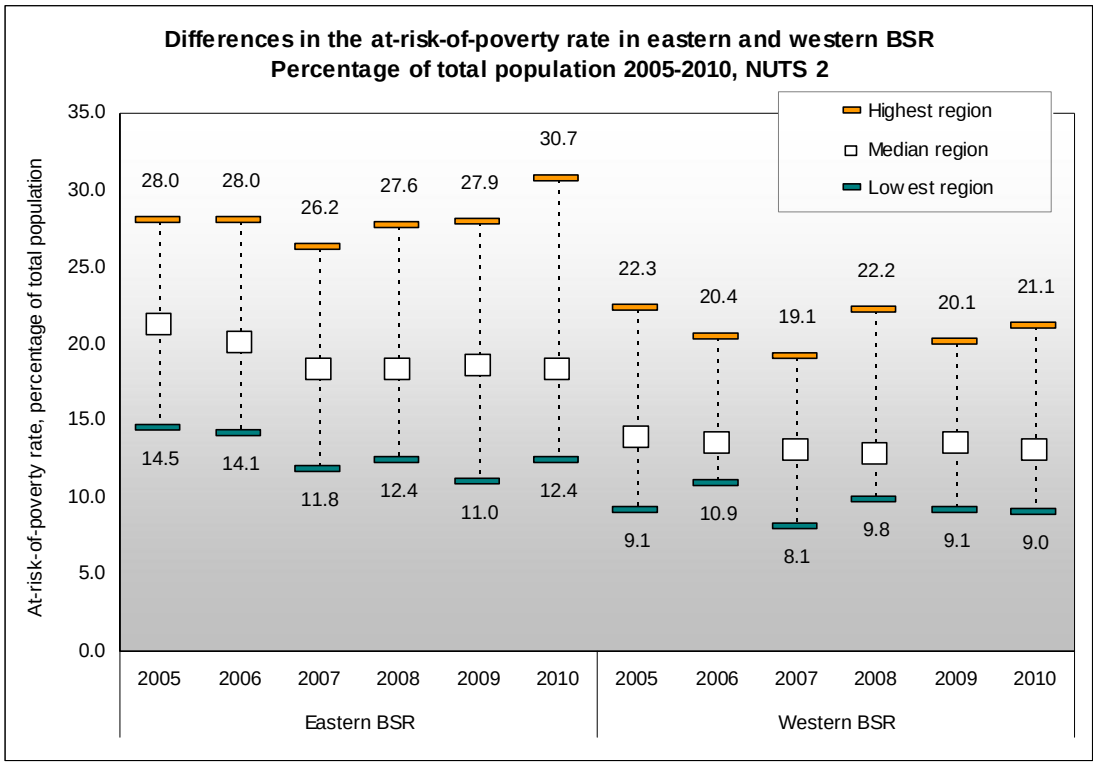
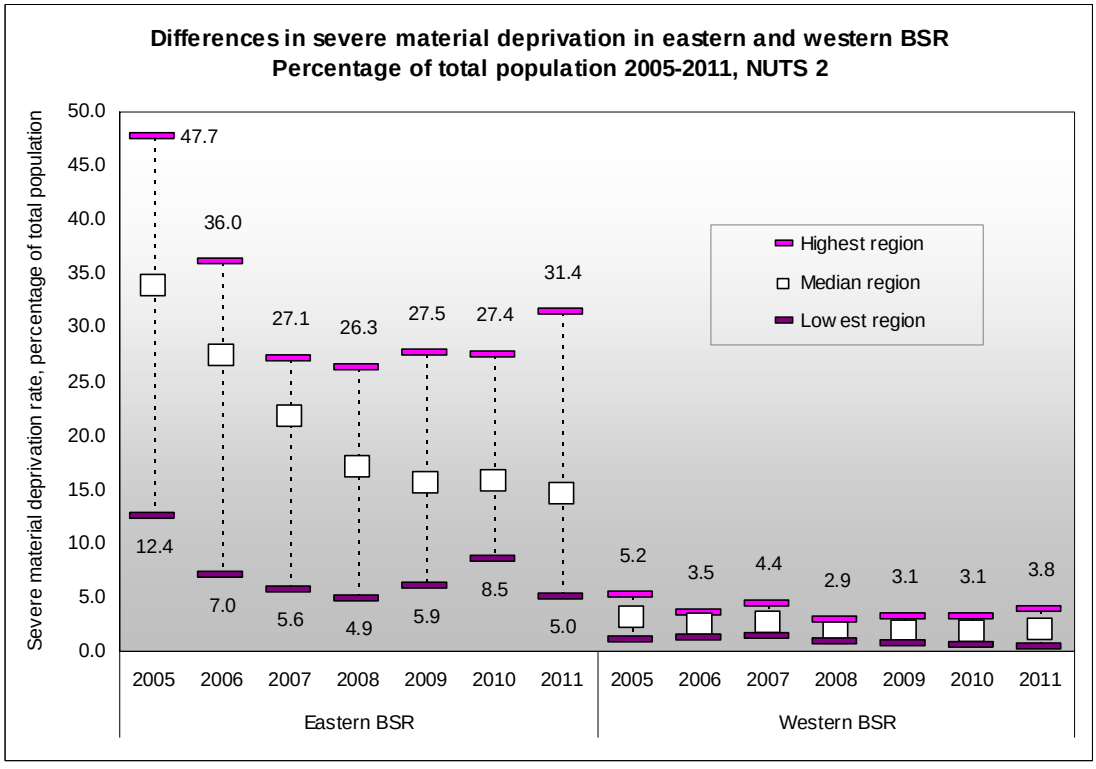
Regional level: NUTS-3
Data source: 5th Cohesion Report, JRC, EFGS
© RRG GIS Database, 2013
© EuroGeographics Association for administrative boundaries
Data not available for
Iceland, Norway, Switzerland, Russia, Belarus, and
French Overseas Territories

Air pollution: PM10 (2009)
Number of days per year where PM10 exceeds norm value

- 4 - 5
- 6 - 10
- 11 - 15
- 16 - 20
- 21 - 25
- 26 - 29
- Data n.a.

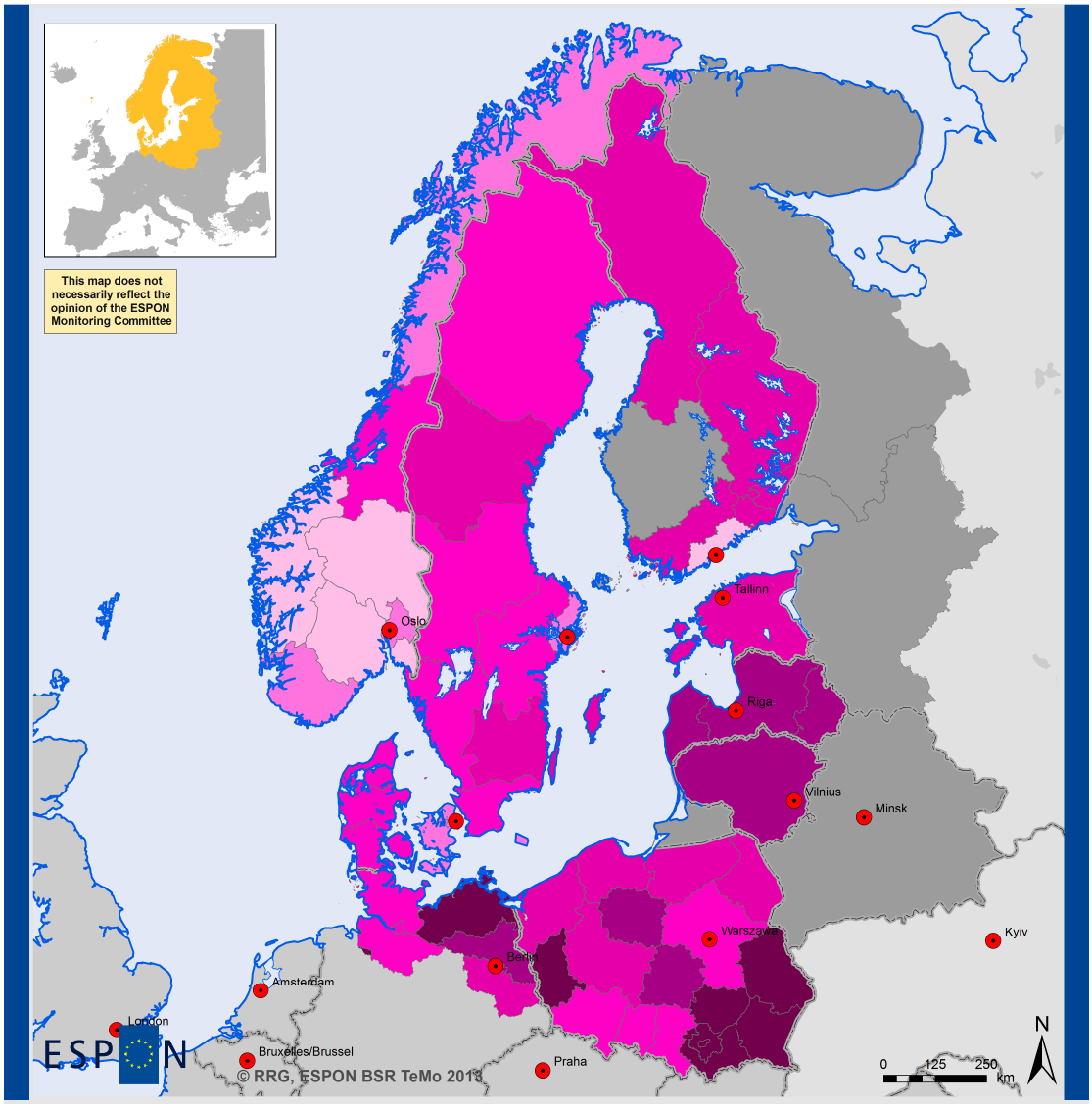
Annex 6 a and b: Regional spread of relative and absolute poverty in eastern and western BSR 2005-2010/11





Data source: Eurostat. Data for Belarus & NW Russia n/a.

Annex 7, map: At-risk-of-poverty rate in the BSR 2011



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Regional level: NUTS-2
Data source: Eurostat
© RRG GIS Database, 2013
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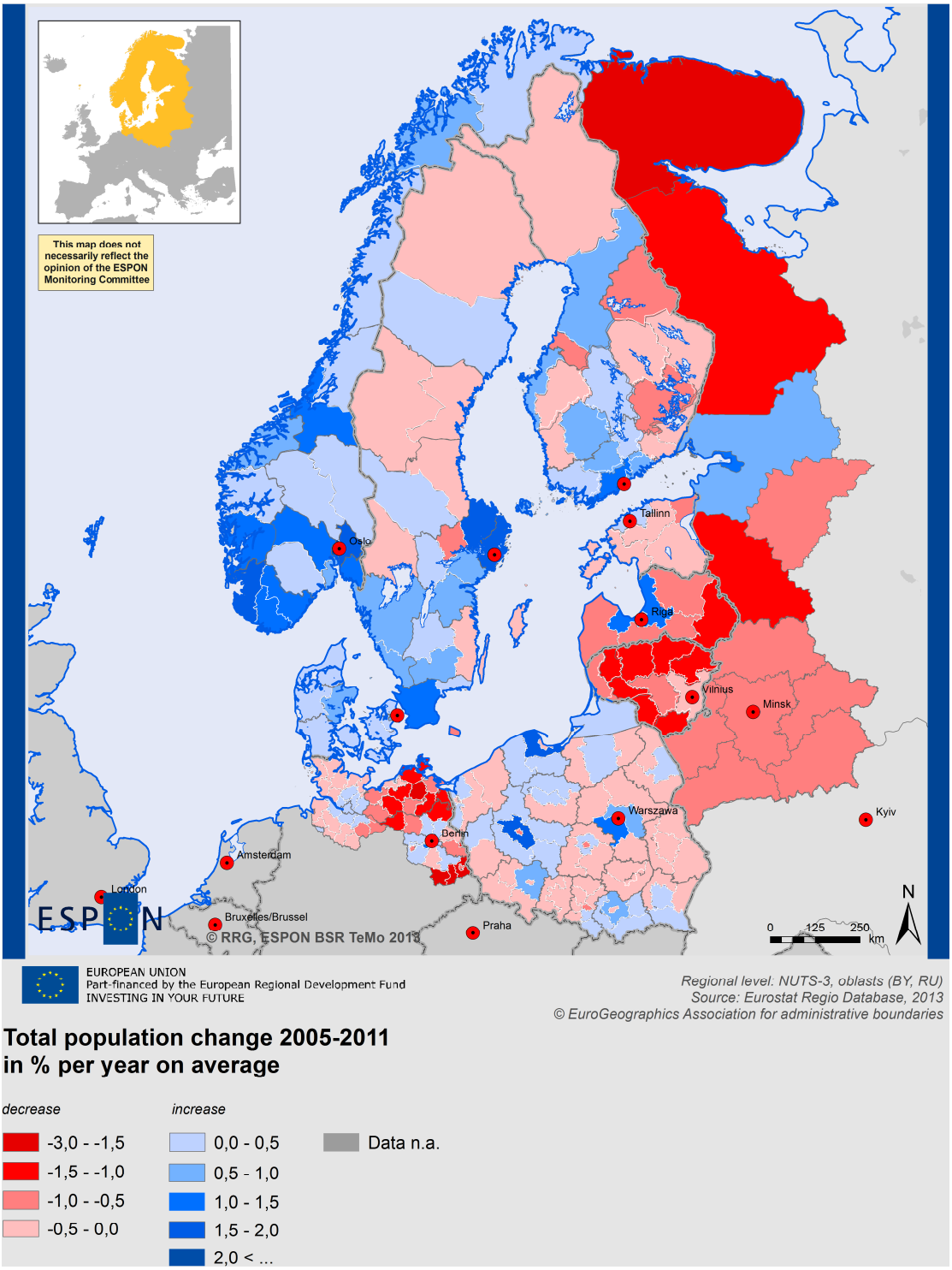
At-risk-of-poverty rate (2011)
Percentage of total population (%)

- 0 - 10,0
- 10,0 - 12,5
- 12,5 - 15,0
- 15,0 - 17,5
- 17,5 - 20,0
- 20,0 < ...
- Data n.a.

Share (%) of persons with an equivalised disposable income (after social transfers) below the at-risk-of-poverty threshold, which is set at 60 % of the national median equivalised disposable income after social transfers.
Germany: 2010

Annex 8, map: Total population change in the BSR 2005-2011



Annex 9: Statistical outputs for migration background factor regression analysis

a) Migration vs. all four available NUTS 3 variables with full coverage, *without* territorial typologies

Dep Var: NET_MIGRATIO N: 238 Multiple R: 0.599 Squared multiple R: 0.358

Adjusted squared multiple R: 0.347 Standard error of estimate: 0.407

Effect	Coefficient	Std Error	Std Coef	Tolerance	t	P(2 Tail)
CONSTANT	0.106	0.119	0.000	.	0.895	0.372
GDP_PER_CAP	0.004	0.001	0.311	0.875	5.553	0.000
EMPLOYMNT_CH	1.561	1.761	0.052	0.807	0.887	0.376
UNEMPLO_RATE	-0.052	0.007	-0.419	0.785	-7.077	0.000
REAL_GDP_CHA	0.002	0.011	0.013	0.727	0.209	0.834

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
Regression	21.528	4	5.382	32.540	0.000
Residual	38.538	233	0.165		

*** WARNING ***
Case Pieriga is an outlier (Studentized Residual = 4.364)
Case Oslo has large leverage (Leverage = 0.113)
Case Miasto Warsz has large leverage (Leverage = 0.144)

Durbin-Watson D Statistic 2.050
First Order Autocorrelation -0.031

b) Migration vs. all four available NUTS 3 variables with full coverage, *with* territorial typologies

Dep Var: NET_MIGRATIO N: 238 Multiple R: 0.747 Squared multiple R: 0.557

Adjusted squared multiple R: 0.530 Standard error of estimate: 0.345

Effect	Coefficient	Std Error	Std Coef	Tolerance	t	P(2 Tail)
CONSTANT	0.364	0.129	0.000	.	2.826	0.005
GDP_PER_CAP	-0.001	0.001	-0.074	0.390	-1.036	0.301
EMPLOYMNT_CH	1.530	1.660	0.051	0.655	0.922	0.357
UNEMPLO_RATE	-0.027	0.008	-0.216	0.527	-3.521	0.001
REAL_GDP_CHA	0.036	0.011	0.198	0.567	3.343	0.001
D_EAST_BSR	-0.446	0.080	-0.439	0.318	-5.560	0.000
D_BORDER	-0.069	0.066	-0.054	0.752	-1.054	0.293
D_SPARSE	-0.189	0.100	-0.104	0.656	-1.896	0.059
D_COAST	0.158	0.052	0.154	0.760	3.020	0.003
D_CAPITAL	0.504	0.094	0.323	0.546	5.360	0.000
D_SECONDARY	0.080	0.088	0.056	0.511	0.901	0.369
D_SMALLMETRO	-0.055	0.074	-0.040	0.702	-0.745	0.457
D_CLOSE_CITY	-0.085	0.076	-0.067	0.559	-1.125	0.262
D_PRED_URBAN	0.160	0.101	0.110	0.412	1.582	0.115
D_INTERMEDIA	0.212	0.058	0.210	0.604	3.665	0.000

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
Regression	33.476	14	2.391	20.053	0.000
Residual	26.591	223	0.119		

*** WARNING ***
Case Murmanskaya has large leverage (Leverage = 0.181)
Case Miasto Warsz has large leverage (Leverage = 0.205)
Case Keski-Pohjan is an outlier (Studentized Residual = -5.084)

Durbin-Watson D Statistic 2.072
First Order Autocorrelation -0.048

c) Migration vs. all eight available NUTS 3 variables (BY. NO & RU missing), *without* territorial typologies

33 case(s) deleted due to missing data.

Dep Var: NET_MIGRATIO N: 205 Multiple R: 0.675 Squared multiple R: 0.456

Adjusted squared multiple R: 0.434 Standard error of estimate: 0.367

Effect	Coefficient	Std Error	Std Coef	Tolerance	t	P(2 Tail)
CONSTANT	0.920	0.204	0.000	.	4.512	0.000
GDP_PER_CAP	-0.001	0.001	-0.079	0.431	-0.987	0.325
EMPLOYMNT_CH	2.749	1.891	0.099	0.601	1.454	0.148
UNEMPLO_RATE	-0.053	0.008	-0.396	0.715	-6.348	0.000
REAL_GDP_CHA	0.011	0.014	0.063	0.481	0.834	0.405
YOUTH_UNEMPL	0.020	0.008	0.155	0.787	2.611	0.010
ACCESSIBILTY	0.006	0.001	0.351	0.412	4.269	0.000
SOIL_SEALING	-0.001	0.000	-0.198	0.742	-3.245	0.001
AIR_QUALITY	-0.046	0.009	-0.470	0.368	-5.407	0.000

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
Regression	22.116	8	2.765	20.531	0.000
Residual	26.391	196	0.135		

*** WARNING ***
Case Västra Götal has large leverage (Leverage = 0.175)
Case Stockholms l has large leverage (Leverage = 0.161)
Case Pohjanmaa has large leverage (Leverage = 0.176)
Case Pieriga is an outlier (Studentized Residual = 4.172)
Case Miasto Warsz has large leverage (Leverage = 0.173)
Case Keski-Pohjan is an outlier (Studentized Residual = -4.297)
Case Berlin has large leverage (Leverage = 0.346)

Durbin-Watson D Statistic 2.171
First Order Autocorrelation -0.088

d-1) Migration vs. all eight available NUTS 3 variables (BY. NO & RU missing), *with* territorial typologies

33 case(s) deleted due to missing data.

Dep Var: NET_MIGRATIO N: 205 Multiple R: 0.755 Squared multiple R: 0.570

Adjusted squared multiple R: 0.529 Standard error of estimate: 0.335

Effect	Coefficient	Std Error	Std Coef	Tolerance	t	P(2 Tail)
CONSTANT	0.977	0.237	0.000	.	4.123	0.000
GDP_PER_CAP	-0.002	0.001	-0.169	0.342	-2.053	0.041
EMPLOYMNT_CH	2.118	1.793	0.076	0.557	1.182	0.239
UNEMPLO_RATE	-0.034	0.011	-0.252	0.372	-3.193	0.002
REAL_GDP_CHA	0.031	0.013	0.169	0.424	2.296	0.023
YOUTH_UNEMPL	0.006	0.007	0.045	0.672	0.775	0.440
ACCESSIBILTY	0.002	0.001	0.101	0.311	1.178	0.240
SOIL_SEALING	-0.001	0.000	-0.209	0.656	-3.518	0.001
AIR_QUALITY	-0.032	0.011	-0.326	0.191	-2.971	0.003
D_EAST_BSR	-0.273	0.102	-0.275	0.218	-2.674	0.008
D_BORDER	-0.112	0.077	-0.086	0.667	-1.454	0.148
D_SPARSE	-0.148	0.132	-0.066	0.678	-1.123	0.263
D_COAST	0.112	0.058	0.111	0.694	1.926	0.056
D_CAPITAL	0.483	0.109	0.319	0.445	4.427	0.000
D_SECONDARY	0.134	0.100	0.099	0.424	1.340	0.182
D_SMALLMETRO	-0.012	0.079	-0.009	0.641	-0.154	0.878
D_CLOSE_CITY	0.008	0.083	0.006	0.614	0.093	0.926
D_PRED_URBAN	0.102	0.114	0.072	0.358	0.892	0.373
D_INTERMEDIA	0.143	0.064	0.146	0.540	2.227	0.027

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
Regression	27.659	18	1.537	13.709	0.000
Residual	20.848	186	0.112		

*** WARNING ***
Case Västra Götal has large leverage (Leverage = 0.243)
Case Miasto Warsz has large leverage (Leverage = 0.235)
Case Keski-Pohjan is an outlier (Studentized Residual = -5.295)
Case Berlin has large leverage (Leverage = 0.395)

Durbin-Watson D Statistic 2.100
First Order Autocorrelation -0.061

d-2) Migration vs. all variables (BY. NO & RU missing) that were statistically significant at the p<0.05 level in the regression above

33 case(s) deleted due to missing data.

Dep Var: NET_MIGRATIO N: 205 Multiple R: 0.718 Squared multiple R: 0.516

Adjusted squared multiple R: 0.496 Standard error of estimate: 0.346

Effect	Coefficient	Std Error	Std Coef	Tolerance	t	P(2 Tail)
CONSTANT	0.776	0.200	0.000	.	3.875	0.000
AIR_QUALITY	-0.013	0.008	-0.131	0.415	-1.697	0.091
D_CAPITAL	0.543	0.083	0.359	0.814	6.518	0.000
D_EAST_BSR	-0.343	0.097	-0.345	0.260	-3.542	0.000
UNEMPLO_RATE	-0.035	0.010	-0.261	0.484	-3.651	0.000
SOIL_SEALING	-0.001	0.000	-0.205	0.764	-3.604	0.000
REAL_GDP_CHA	0.034	0.012	0.188	0.563	2.844	0.005
GDP_PER_CAP	-0.000	0.001	-0.024	0.525	-0.356	0.723
D_INTERMEDIA	0.162	0.050	0.165	0.953	3.247	0.001

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
Regression	25.039	8	3.130	26.139	0.000
Residual	23.469	196	0.120		

*** WARNING ***
Case Pohjanmaa has large leverage (Leverage = 0.173)
Case Pieriga is an outlier (Studentized Residual = 3.677)
Case Miasto Warsz has large leverage (Leverage = 0.152)
Case Keski-Pohjan is an outlier (Studentized Residual = -4.661)
Case Berlin has large leverage (Leverage = 0.171)

Durbin-Watson D Statistic 2.206
First Order Autocorrelation -0.113

e) Migration vs. all territorial typologies only

Dep Var: NET_MIGRATIO N: 238 Multiple R: 0.665 Squared multiple R: 0.443

Adjusted squared multiple R: 0.418 Standard error of estimate: 0.384

Effect	Coefficient	Std Error	Std Coef	Tolerance	t	P(2 Tail)
CONSTANT	0.087	0.083	0.000	.	1.044	0.298
D_EAST_BSR	-0.449	0.061	-0.442	0.683	-7.371	0.000
D_BORDER	-0.002	0.071	-0.002	0.805	-0.030	0.976
D_SPARSE	-0.155	0.109	-0.086	0.674	-1.421	0.157
D_COAST	0.126	0.057	0.123	0.799	2.226	0.027
D_CAPITAL	0.509	0.098	0.326	0.626	5.207	0.000
D_SECONDARY	0.189	0.093	0.134	0.566	2.027	0.044
D_SMALLMETRO	0.033	0.080	0.024	0.743	0.420	0.675
D_CLOSE_CITY	-0.074	0.082	-0.058	0.592	-0.908	0.365
D_PRED_URBAN	0.235	0.106	0.161	0.464	2.219	0.027
D_INTERMEDIA	0.211	0.064	0.209	0.620	3.322	0.001

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
Regression	26.593	10	2.659	18.034	0.000
Residual	33.473	227	0.147		

*** WARNING ***
Case Keski-Pohjan is an outlier (Studentized Residual = -3.912)

Durbin-Watson D Statistic 1.943
First Order Autocorrelation 0.020

Annex 10: Statistical formulas for the Gini Concentration Ratio, the Atkinson index and Sigma convergence

Gini Concentration Ratio:

$$G = \frac{\sum_{i=1}^{n} \sum_{j=1}^{n} |x_i - x_j|}{2 n^2 \mu} \quad \text{or} \quad G = \frac{\sum_{i=1}^{n} (2i - n - 1) x_i'}{n^2 \mu}$$

Atkinson:

$$A(\varepsilon) = 1 - \frac{OC}{OB} = 1 - \frac{y_{EDE} * \sqrt{2}}{\bar{y} * \sqrt{2}} = 1 - \frac{y_{EDE}}{\bar{y}} \quad \text{where} \quad y_{EDE} = \left[\frac{1}{n} \sum_i y_i^{1-\varepsilon} \right]^{\frac{1}{1-\varepsilon}}$$

Sigma convergence:

$$\frac{\sigma_i}{\bar{X}} \quad \text{where} \quad \hat{\sigma}_i = \sqrt{\sum \frac{(X_i - \bar{X})^2}{n-1}}$$

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