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Spatial monitoring Germany and neighbouring regions

Spatial structures and linkages

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Contents

1 Introduction

With the establishment of the European Single Market (from 1993 onwards), the elimination of border controls (from 1995 onwards) and the introduction of the European Economic and Monetary Union (from 1999 onwards), the perception of border regions has appeared to change: border regions are no longer situated in peripheral national territories but are instead in the middle of major transnational regions. Via bilateral and multilateral agreements in cross-border and transnational cooperation measures, they make a significant contribution to overcoming borders and bringing together border regions. In many fields, they act as realised "spatial laboratories" of European integration by taking the form of Euroregions, cross-border working groups or European Groupings of Territorial Cooperation (EGTCs), as well as parts of Interreg A and B.

However, different languages and cultures, and in particular different legal, social and administrative systems on both sides of the border often still prove to be almost insurmountable barriers, for instance in utilising infrastructures and services. Furthermore, despite extensive regulations on the freedom of movement of workers, a cross-border labour markeit still seems a long way. In many fields of public services, especially the education and health sectors, cross-border services remain the exception. Only in the fields of transport, retailing and leisure, borders are hardly a hindrance today.

Regional structures and their changes in areas near borders, but also in some areas far away from borders, are characterised on the one hand by the declining importance of national boundaries and on the other by the continued existence of other barriers. Just as in national reporting systems of countries and regions, in-depth information on regional structures and development is very important for joint cross-border actions on all spatial levels. Only an overall view of the respective sub-regions on both sides of national borders makes it possible to show regional contrasts and common structures and developments, detect functional differences and cooperate in recognising existing potentials for functional synergies across national borders.

Reporting on regional development in the federal territory and in Europe is one of the original tasks of the Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR) in the Federal Office for Building and Regional Planning (BBR), as defined in the Spatial Planning Law (Raumordnungsgesetz, ROG). Its amendment in 2008 formally underlined the cross-border perspective of spatial monitoring by explicitly naming the neighbouring regions of Germany (§ 25 ROG).

Taking the analytical perspective beyond the borders of Germany is not a new phenomenon for spatial monitoring on the federal level. Since the mid-1990s, the BBSR has been researching and providing advice in aspects of European regional and urban development, informing the Federal Government and the federal states on regional developments in Germany and Europe as part of its spatial monitoring. A cross-border perspective is also particularly important with respect to federal research programmes on questions of regional planning and urban development. For instance in the Demonstration Projects of Spatial Planning (Modellvorhaben der Raumordnung, MORO) by the Federal Ministry of Transport and Digital Infrastructure (BMVI) in the German-Polish border region, cross-border planning principles played an important role. Similarly, metropolitan border regions were the focus of the pilot project on national partnerships in cross-border functional regions.

However, integrating the regions neighbouring the German border into spatial monitoring means changing the regional statistical perspective from German to European statistics. Furthermore, along borders and in their neighbouring regions, specific regional questions arise that can only be analysed by taking into account and using different national and regional statistical sources. To that aim, a key factor is integrating local expertise and regional knowledge and making it useful by involving regional partners.

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In that context, the BBSR spatial monitoring system for Germany ought to be supplemented by regular reporting on the neighbouring regions abroad in the medium term. The Demonstration Project of Spatial Planning (MORO) entitled "Spatial Monitoring Germany and Neighbouring Regions" was established for that purpose, creating basic information by using regional insight and expertise.

With the explicit inclusion of the regional level, this MORO follows the hypothesis that cross-border spatial monitoring of Germany requires at least two levels of spatial analysis: a national and a regional perspective. National cross-border spatial observation analyses the overall regional development of Germany and its neighbouring regions. Cross-border connections and interdependences are reflected using nationally relevant core indicators. Monitoring at the regional level yields an in-depth analysis of bi- or multilateral aspects of cross-border spatial development. The regional level cannot be clearly defined; especially the pilot project regions have shown that the spatial resolution and delimitation of the regional level depends very much on which questions are being studied.

With the help of model regions, the thematic scope and appropriate spatial extent for cross-border spatial observation were determined and translated into a data and indicator model. Several workshops with regions, political decision-makers, statistical offices and institutions in Germany and its neighbouring countries focused on the themes of the specific information demand and ways to meet it. The potentials for shaping future cooperation and the possible division of tasks among the regions, federal states and the Federal Government and/or the BBSR were also discussed, along with the implementation of such a national spatial monitoring following the end of the project.

The main tasks of this MORO included producing a comprehensive catalogue of requirements and deriving an appropriate data and indicator model for cross-border spatial monitoring; plus practical evidence of the benefits by producing a prototypical spatial monitoring report for Germany with a cross-border perspective; and finally the formulation of recommendations to implement the developed approach – the latter while paying particular attention to possible cooperation between institutional actors.

Six key questions shaped the MORO project:

- → Which themes and aspects are especially important for a cross-border spatial monitoring at national level, what are their regional dimensions and how do different regional conditions affect those topics?
- → Which indicators are required to reflect the regional processes and which spatial level is relevant in which regional setting?
- → What is the data situation and which data sources are appropriate for the indicators? In this context, to what extent is information demand going beyond what can be provided by e.g. the statistical offices of the federal states? Which alternative sources can be used?
- → What experience can the regions contribute and how can different actors from regions, federal states and the Federal Government complement each other?
- → How can synergies between different institutional and regional actors be achieved and how can actors in Germany and abroad be involved?
- → What formal and possibly institutional recommendations for action can be derived for the long-term establishment of spatial monitoring including neighbouring regions in Germany and abroad?

Model regions

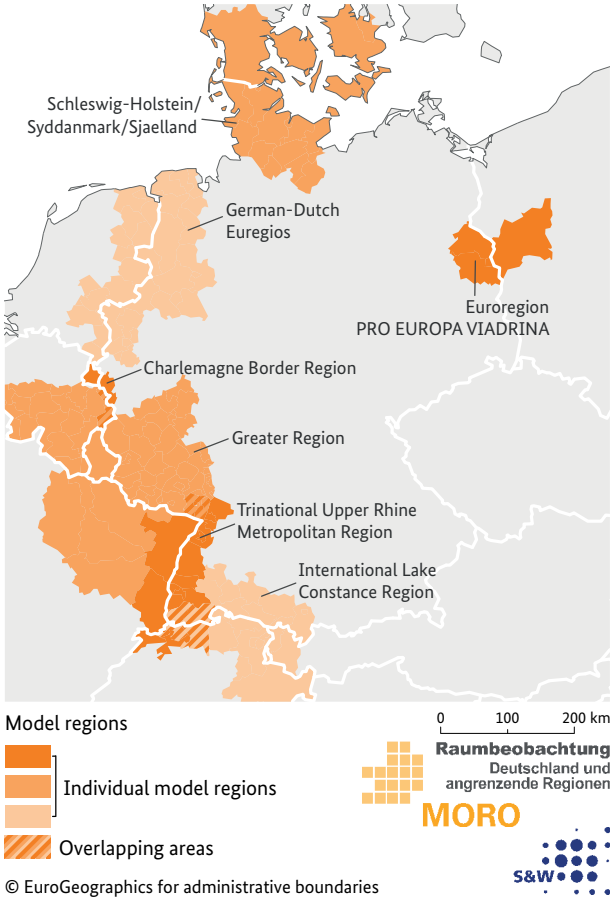
Seven model regions participated in the Demonstration Project of Spatial Planning (MORO) “Spatial monitoring Germany and neighbouring regions”, following an open application and selection process in 2015/2016:

- → Schleswig-Holstein/Syddanmark/Sjælland
- → Euroregion PRO EUROPA VIADRINA
- → International Lake Constance Region
- → Trinational Upper Rhine Metropolitan Region
- → Greater Region
- → Charlemagne Border Region
- → German-Dutch Euregios

The northern, western and south-western border regions of Germany are completely involved, while the eastern border is only sparsely represented (Figure 1.1). The seven model regions represent regions of all of Germany’s neighbouring countries (with the exception of regions in the Czech Republic).

The model regions vary greatly, not just in terms of their size and form of organisation (Table 1.1). They also began this MORO with different depths of experience with respect to cross-border spatial monitoring. In three model regions (Greater Region, Trinational Upper Rhine Metropolitan Region and the International Lake Constance Region), cooperation had already been established for many years, along with advanced information systems of cross-border spatial monitoring. They are (partially) public and are based on geodata and statistical data. These systems originally stem from Interreg projects. The other model regions have done cross-border spatial monitoring mainly

Figure 1.1: Model regions



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as project work and (by necessity) only incrementally. Deploying relevant additional actors (state and regional planning, statistical offices etc.), they used this MORO to determine efforts and benefits of systematic cross-border spatial monitoring and thereby assessed and promoted the specific issue of its long-term establishment.

Purpose of the report

This report presents selected results of the MORO "Spatial monitoring Germany and neighbouring regions". The aim is to demonstrate what form cross-border spatial monitoring could take for Germany and which analytical insight can be gained from it. This publication therefore has a mainly prototypical character for a form of long-term reporting that has yet to be established.

The report is divided into three sections:

→ This introduction discusses the background of this MORO and its exemplary report, as well as providing a brief outline of the thematic field.

→ The main part of the report contains the analytical sections, in which the key themes of cross-border spatial monitoring are addressed with an appropriate cross-border perspective. In addition to assessing demographic and socio-economic indicators, a special focus lies on presenting cross-border regional linkages.

→ The final section provides an outlook with recommendations to shape a continous cross-border spatial monitoring.

The analyses and presentations of the thematic chapters are designed as a multi-level spatial approach. A national perspective is mainly taken – with Germany and its neighbouring regions overall or with a regional focus on the situation on both sides of the borders. The discussions at the MORO workshops and events concluded that it is not appropriate to make a strict delimitation of border corridors, since each question has a different spatial context. As a consequence, the maps in this report also present regions in Germany that are situated further away from the border.

The national perspective is complemented by in-depth regional studies contributed by the model regions. These in-depth regional studies are aimed at demonstrating that the cross-border spatial monitoring of Germany cannot limit itself to a national perspective. Instead, specific questions and problems exist on regional levels, requiring more detailed regional study. Furthermore, some data enabling the in-depth spatial analysis of individual aspects only exist on a regional level.

In addition to this report "Spatial monitoring Germany and neighbouring regions" in the series "MORO Praxis", further results of this MORO project will be published:

→ The model regions will themselves publish the results they have achieved; the BBSR will provide links to individual brochures, reports or websites on the MORO project site.

→ A final research report will summarise the insight gained from the MORO project. It will discuss aspects such as data availability, spatial delineation and resolution, indicators and actors from the perspective of continuous cross-border spatial monitoring.

→ Furthermore, a short version of this report will be published in German, as well as in the languages of all neighbouring countries (Danish, Polish, Czech, French and Dutch).

Table 1.1: Model regions

Model region	Inhabitants (2016)	Area in km²	Countries	Organisational form	Responsible
Schleswig-Holstein/ Syddanmark/Sjælland	4,600,000	35,179	DE, DK	Project-related cooperation for MORO	Federal State of Schleswig-Holstein
Euroregion PRO EUROPA VIADRINA	810,000	10,710	DE, PL	Euroregion	Euroregion PRO EUROPA VIADRINA
International Lake Constance Region	5,600,000	28,978	DE, AT, CH, LI	Cross-Border Regional Planning Commission	Regionalverband Bodensee-Oberschwaben
Trinational Upper Rhine Metropolitan Region	6,000,000	21,237	DE, CH, FR	European region	Regionalverband Mittlerer Oberrhein
Greater Region	11,500,000	65,619	DE, BE, FR, LU	European region/EVTZ	Federal State of Rhineland-Palatinate
Charlemagne Border Region	890,000	2,196	DE, BE, NL	Cross-border municipal cooperation	StädteRegion Aachen
German-Dutch Euregios	10,000,000	35,155	DE, NL	MORO project-related cooperation between four Euregios	EUREGIO

The Border

The landscape is wide. Mountains, valleys and lakes. Trees rustle, sources spring and grass sways in the wind.

Barbed wire runs straight across a clearing in the forest, through the wood and over the causeway: the border. Men stand on both sides, but those on the other side have blue uniforms with yellow buttons, while here they have red uniforms with black buttons. They stand there with their rifles, some smoking, all with serious expressions.

So there it is, our border. Here our realms collide – each paying great attention that the inhabitants of the other empire do not cross the frontier. Here, you can still whistle on this blade of grass, leap over that stream and cross that path. But then – Halt! No further! Here is the border. One more step – and you are in a different world. One more step – and you may be punished for something you could still do without sanction here. One more step – and you may slander the Pope. One more step – and you become quite an outlaw, a "foreigner".

Ugh, foreigner! You are the most miserable creature under the European sun. Foreigner! The ancient Greeks named their foreigners barbarians – but they were hospitable towards them. Here you are chased from place to place, you foreigner of our times. Here you will not receive any entry papers or find a home, here you cannot eat bacon nor take any with you from there – foreigner!

And the thing they call Europe has become a rag with colourful patches, where everyone is a foreigner as soon as you stick your nose outside your village. There are more foreigners than residents in this blessed part of the world...

After this war, after such displacement, compared to which the previous little migratory day-trips were child's play, after bloody marches by peoples half way across Europe, the affairs of every parish have become hellishly important. The old line of Greiz-Schleiz-Reuß and the People's Republic of Bavaria and autonomous Silesia and France and Congress Poland – it is always the same. Everyone considers their patch to be the most important of all and is unwilling to yield even the smallest jot. First of all and for a start we draw a demarcation line. We separate. We need a border. Because we are our own thing.

Yet a single world stretches beneath the foolish people, one ground beneath them and one sky above them. The borders criss-cross through Europe. But no-one is able to separate people for long – neither borders nor soldiers – against their wishes.

Today we would laugh at someone who passionately argued in favour of tearing down the borders between Berlin and Magdeburg! One day, when the time has come, that is precisely the way one will laugh about an international pacifist in 1920. It is our common task to ensure that time comes sooner.

Kurt Tucholsky alias Peter Panter, Berliner Volkszeitung, June 27, 1920.

2 Borders

Clear boundary lines to define state territories only appeared in Europe with the development of nation states around two hundred years ago. State borders therefore played a separating and differentiating role – both from a political and from a socio-cultural perspective. Thus, borders have mainly been regarded as barriers. At the same time, borders represent interesting interfaces and offer opportunities for cross-border interaction and cooperation.

The German term *Grenze* (border) was coined in the Middle Ages and is derived from the Old Polish word *graniza/graenizen/greniz*. It replaced the word *Mark*, which had been previously used in the German-speaking area, gradually spreading from east to west and establishing itself. Even today, the word is used in most Slavonic languages, including Polish (*granica*) and Czech (*hranice*), and so in both of Germany's eastern neighbours. The word and its meaning have also found their way into other Germanic languages, such as Dutch (*grens*) and Danish (*grænse*). Only the French language uses a different, Romance, family of languages as the source for its word for border (*frontière*).

Two fundamental meanings are ascribed to the German term *Grenze* (Duden 2017): firstly a dividing line that mostly has a spatial character. The line can divide political entities such as countries and states, as well as areas held by different owners or with different natural qualities; in that sense, it can also be merely a perceived dividing line between opposite areas and aspects. In the second group of meaning, the term *Grenze* is often used metaphorically and addresses more virtual, often not clearly definable limitations, e.g. "the limits of feasibility". But state borders have also acquired a "double meaning as state boundaries and as symbolic social and cultural lines of inclusion and difference, material and imagined, physical and cultural" (Kolossov et al. 2012, p. 7). In this report the term "*Grenze" (*border) is used in its narrower sense of state boundaries.

The state border is a constituting property of a state, marking out the spatial territory of its sovereignty and forming the basis of social (cross-border) relations (Kireev 2015). In Europe, the development of continuous borderlines to define a country's territory as a state is a relatively new phenomenon. "It was not until the Reform absolutism of the late 18th century and the 'Atlantic revolutions' in the USA and France that the compact, sovereign territorial state, which could define norms within its borders and apply effective administration and jurisdiction using professional experts, became standard in the European North-Atlantic region." (Fahrmeir 2016, p. 13) The formation of national state borders also led to the dismantling of fortifications around towns and cities, which had become obsolete. Furthermore, in the second half of the 19th century, systematic controls of travellers at borders were rare, since commercial activities were not to be obstructed and subsequent checks were possible through effective administration (ibid.).

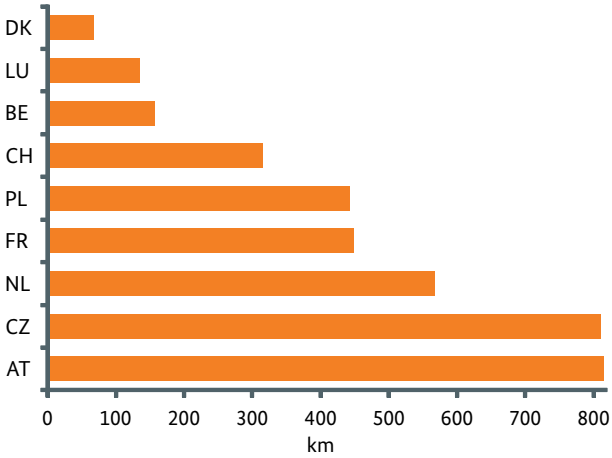
Travel restrictions and border controls reintroduced in Europe with the outbreak of World War I were only reduced after World War II in a lengthy process of European integration. This led to the European Single Market, with its four basic freedoms (free movement of goods, labour, services and capital), as well as the Schengen Area, which abolished stationary border controls and made large parts of territorial borders in Europe invisible. However, in the context of refugee migration and counter-terrorism, the importance of state borders appears to be growing rapidly again.

2.1 Germany and its borders

Germany's borders have constantly shifted over the last two centuries. The rise of nation states, the location of Germany in the midst of Europe with many neighbours, and the wars in Europe caused an "oscillating edge" (Paasch 2009). Since the Saarland joined the Federal Republic of Germany in 1957, the external borders of both German states and the reunited Germany have no longer changed, with the exception of small-scale corrections to the exact line of the border. Today's external borders of Germany were all confirmed by international law upon its reunification, including the confirmation of the Oder-Neisse border with Poland – with the exception of Lake Constance and the Ems estuary.

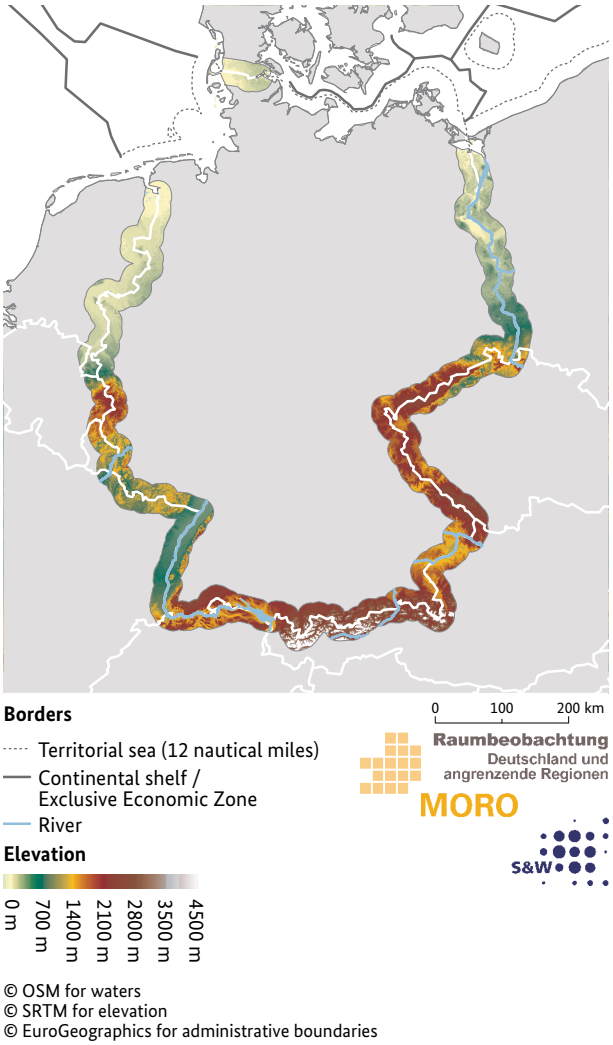
The length of the land borders of Germany with its nine neighbouring states is around 3,750 km (Figure 2.1). The longest common borders are with the Czech Republic and Austria, both of which are over 800 km long. The shortest

Figure 2.1: Length of German land borders



Origin of data: Destatis (reference year: 2000)

Figure 2.2: Border types



land border is with Denmark, at only 67 km, followed by the borders with Luxembourg and Belgium, each with a length of about 150 km.

About half the land borders are situated in topographically varied regions with medium and high mountain ranges, while the rest of the borders run along lowlands (Figure 2.2). Major rivers such as the Rhine in the southwest and the Oder in the northeast of Germany mark long stretches of Germany's borders. The North Sea and the Baltic Sea provide common sea borders with the Netherlands, Denmark and Poland, as well as with the United Kingdom, Norway and Sweden, with which there is no common land border.

2.2 Borders as barriers and opportunities

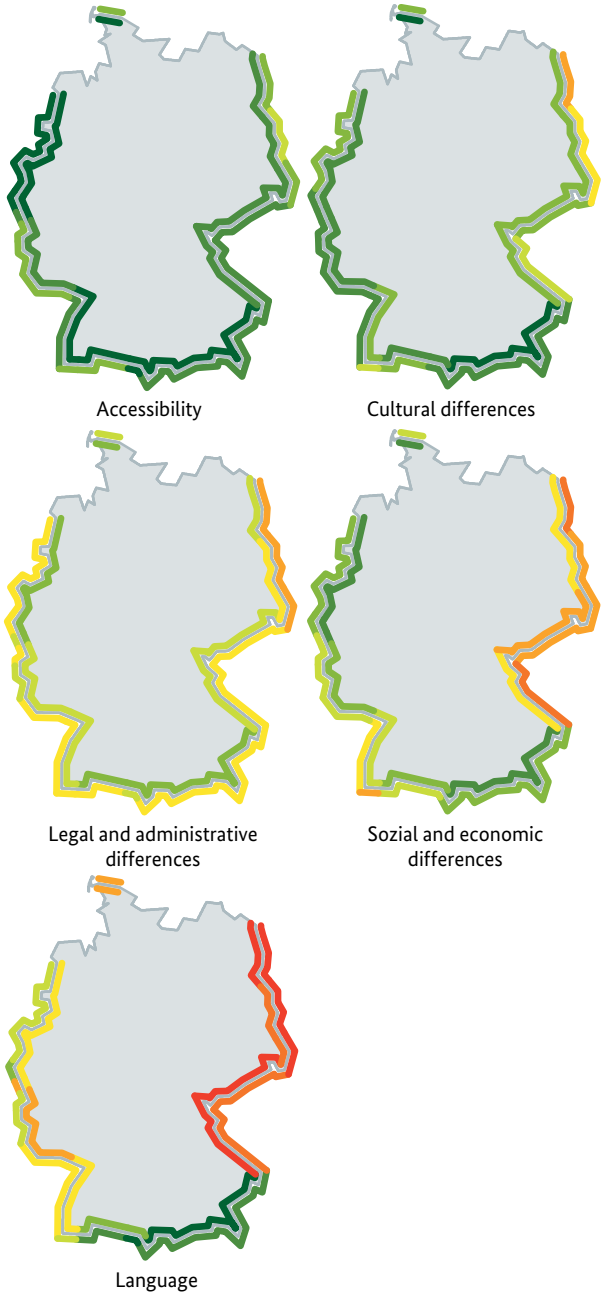
The role of state borders is ambivalent for border regions. On the one hand, they form clear boundaries, while on the other, they offer specific potentials and options that are unavailable in other regions. The key categories of hindrances to the development of cross-border regions are (Gramillano et al. 2016):

- Socio-economic disparities;
- Physical obstacles that reduce cross-border accessibility;
- Cultural obstacles such as language barriers, cultural differences and low levels of trust towards people on the other side of the border;
- Normative and institutional hindrances as a result of different organisational forms, processes and regulations.

However, border regions also have particular qualities and potentials that make them areas of special opportunities (Gramillano et al. 2016):

- Specific integration of markets, especially the labour market;
- The human and social capital available in cross-border regions;
- The integrated provision of public services in cross-border (urban) regions:
- The common management of natural resources;
- Regional competitiveness that can result from specific product innovations, as well as industrial and cultural attraction.

Figure 2.3: Borders as barriers



Origin of data: European Commission Eurobarometer 422
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A European Commission survey of around 40,000 inhabitants of border regions in Europe studied cross-border mobility, the extent of mutual trust and the significance of barriers with respect to cross-border cooperation (European Commission 2015). Filtering the results for the German and neighbouring regions, it is possible to indicate where which type of barriers are perceived as hindrances and to what extent (Figure 2.3):

- Cross-border accessibility hardly represents a barrier any longer. From a German perspective, at no border mobility to a neighbouring country is seen as a hindrance. Equally, from the perspective of the population of the relevant neighbouring country, access from the border region to Germany is not regarded as a problem. However in individual border sections (Belgium-Rhineland-Palatinate, France-Saarland/Rhineland-Palatinate, Switzerland-Baden-Wuerttemberg, Poland-Germany), cross-border accessibility is considered poorer than from a German perspective.
- Cultural differences between the border regions are also not considered a major barrier. That particularly applies from a German perspective, while from a foreign perspective the proportion of the population in the individual border regions who perceive cultural differences as a barrier is often far higher. That especially applies to the Polish border regions and the Czech border regions with Bavaria. The border region along the Upper Rhine is the only one in which the German perspective is slightly more critical than on the French side with respect to cultural differences.
- Legal and administrative differences between countries are identified much more clearly as barriers for cross-border cooperation. Around half the inhabitants of the border regions name this factor as a hindering factor. From a German perspective, it is named to a lesser degree as an aspect in the border regions with the Netherlands, Switzerland and Austria. By contrast, around two thirds of those asked in Polish border areas perceive the legal and administrative differences as a clear barrier.
- There are significantly greater differences between border regions with respect to perceiving economic and social differences as barriers. From a German perspective, there are no problems in this respect towards Denmark, the Netherlands, Belgium, Luxembourg, France (from the Saarland and Rhineland-Palatinate), Switzerland and Austria, although there are towards

the Czech Republic and Poland. The view from almost all neighbouring countries is somewhat more critical. Especially, the Czechs consider the economic and social differences with Bavaria to be problematic.

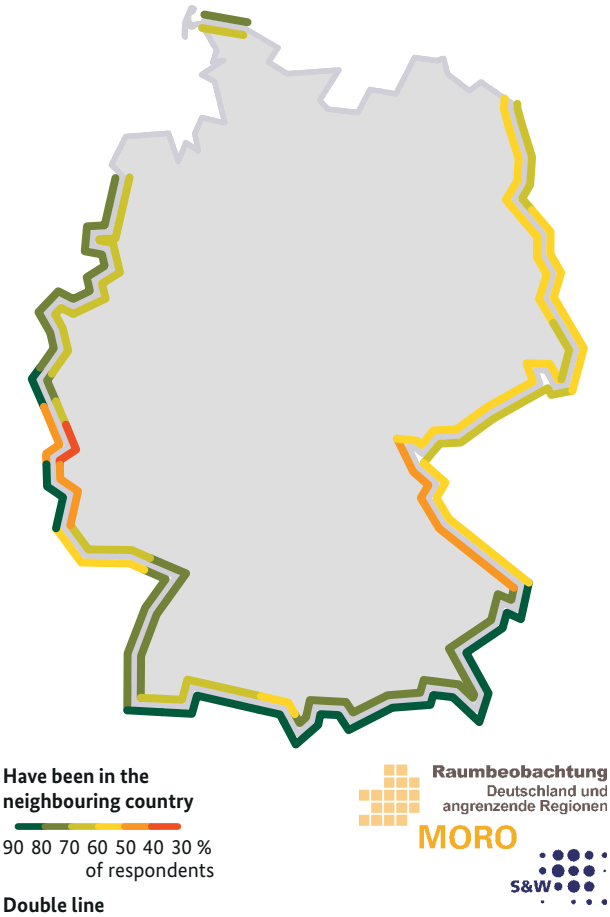
→ Language differences form the greatest barrier. The situation on the borders is split roughly three ways. As can be expected, there are no problems between Germany, Switzerland and Austria. Between Germany and Denmark, the Netherlands, Belgium, Luxembourg and France, around half to two thirds of those asked state that language differences are an obstacle. Almost all those asked in the border regions with the Czech Republic and Poland consider the different languages to be a major hindrance.

Across all factors, the least problematic barriers are seen in the border regions with Switzerland and Austria, closely followed by the Netherlands and Denmark, and then Belgium, Luxembourg and France. By comparison, the German-Czech and German-Polish borders appear to experience continuing barriers with respect to legal, administrative, economic, social and especially language aspects. "In the specific case of the German-Polish border region, the cultural dimension of border demarcation is more persistent than for instance in other, older European internal borders. This is due to the special history of this border region, which prevented the development of a regional and also cross-border identity for a long time. Shifting borders as a result of World War II and the resulting exchange of populations, as well as the sealed-off border during the 'Cold War', led to the feeling on both sides of the (river) border of living at the end of the world" (Pauli 2015, p. 3f.).

In the past, cross-border mobility across Germany's external borders has risen constantly. With the abandonment of stationary border controls in implementing the Schengen Area, to which all of Germany's neighbouring states belong, the last visible obstacles to cross-border mobility were removed, although Germany and its neighbouring states Austria, France and Denmark have reintroduced (partial) border controls as a result of the international refugee crisis and counter-terrorism measures.

The proportion of people living in border regions who have been to the neighbouring country before varies considerably depending on the region (Figure 2.4). Within

Figure 2.4: Cross-border mobility

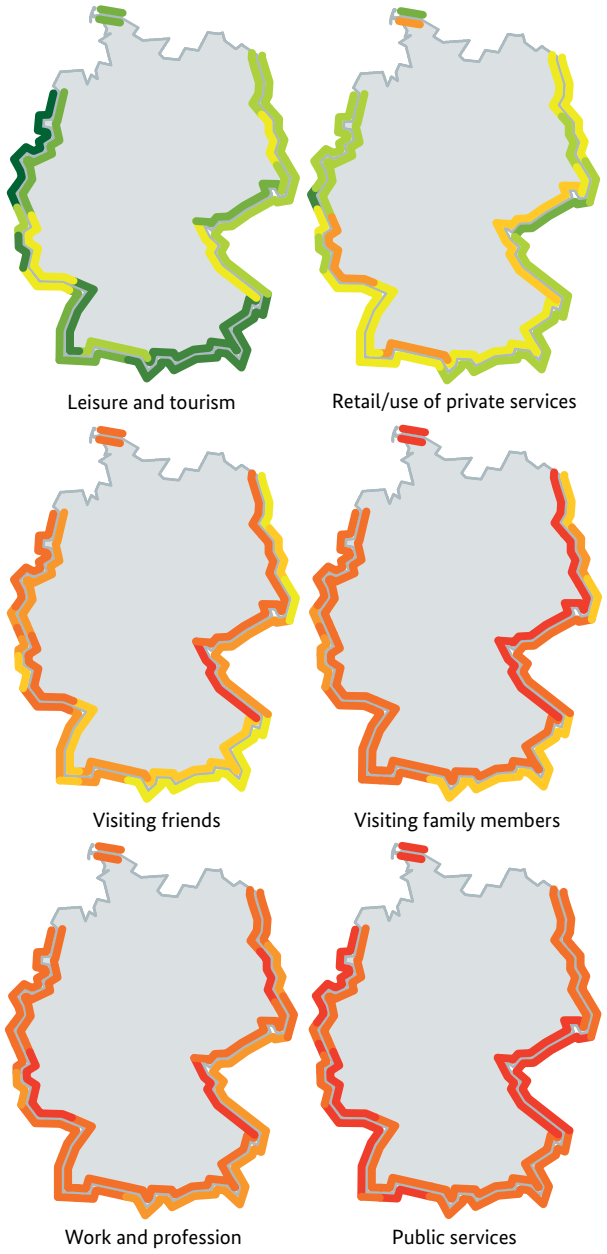


Origin of data: European Commission Eurobarometer 422

the border regions, the proportion of people living in the foreign part who have visited Germany is several percentage points higher than the proportion of people living in Germany who have been to the neighbouring country before.

The highest cross-border mobility values of 70 to 90 percent were stated in the German-Danish and German-Dutch regions, along the Upper Rhine border with France, the German-Swiss region and the German-Austrian region. The figure falls significantly in the German-Czech and German-Polish border regions to between 40 and 60 percent. The lowest cross-border mobility rate lies in parts of the German-Belgian border region, especially from the German direction. Thus the inhabitants with the

Figure 2.5: Reasons for cross-border mobility



Double line
Inner side: data for German areas
Outer side: data for neighbouring areas

Origin of data: European Commission Eurobarometer 422
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least cross-border mobility are in the Eifel and Hunsrück areas, followed by those in Bavaria near the border to the Czech Republic. It seems that the historical duration of largely open borders is an important factor for the scale of cross-border mobility. The period is decades longer with respect to northern, western and southern neighbouring countries than with the two eastern countries.

The ranking of reasons to travel to the respective neighbouring country in the border regions of Germany and its neighbouring countries (Figure 2.5) mirrors the overall European ranking of stated reasons (European Commission 2015):

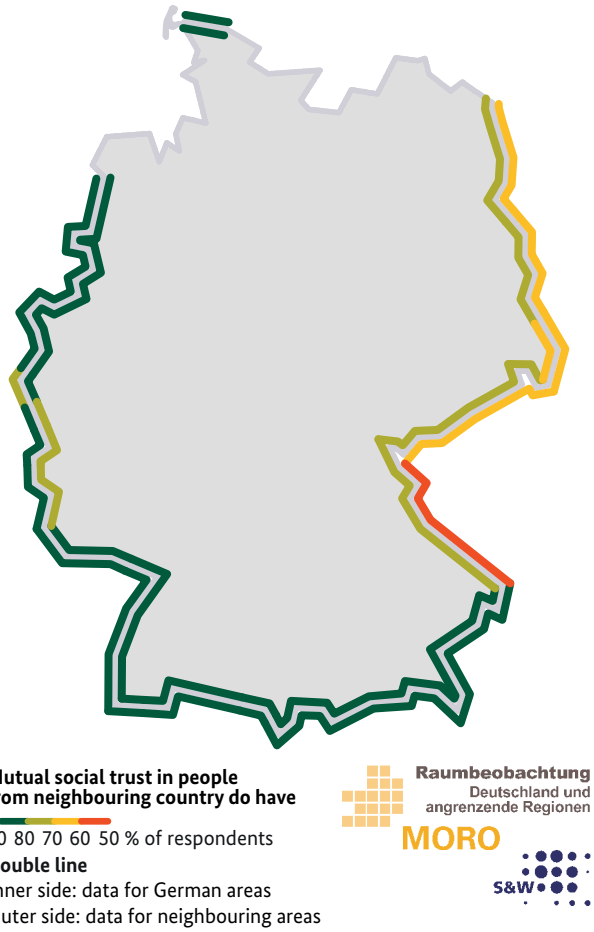
- The reason for travelling to the respective neighbouring country is mainly leisure-orientated and of a tourist nature. The highest values are in the German-Danish and German-Dutch border region, along the Upper Rhine in the German-French border region and generally in the German-Swiss and German-Austrian border regions. Yet also in other border regions, at least half of those who have visited the neighbouring country travelled for these reasons.
- Retailing and using private services follows as the second most important reason for travelling across the border. The extent of that form of cross-border mobility is around twenty percentage points lower than for leisure or tourism purposes. Furthermore, the differences between the individual border regions are more significant. Shopping traffic from Denmark, Belgium and parts of France, as well as Switzerland, Austria and the Czech Republic is considerably more significant than in the other directions.
- Visiting friends and family is a far less frequent reason for cross-border travel. The highest proportion of up to 50 percent for such trips was stated in travel from Poland and Austria to Germany.
- Of those asked that had already been to the neighbouring country, only a very small number (mostly significantly less than 10 percent) state the reason as “work” and especially “using public services”; the latter refers to public health and educational services.

The European integration process in general and specifically cross-border cooperation require mutual trust among the population and its actors. Based on the indicator that indirectly describes that category, very high values are achieved throughout Europe in this respect.

82 percent of inhabitants of border regions could well imagine having a person from the neighbouring country as their boss, colleague, neighbour or family member (European Commission 2015).

That high level of mutual trust also applies to the border regions of Germany with its neighbouring states, albeit with a certain degree of regional variation (Figure 2.6). With values of mostly 80 to 90 percent, trust in people from the neighbouring country in the German-Danish, German-Dutch, German-Belgian, German-Luxembourg, German-French, German-Swiss and German-Austrian border regions is very high. Mutual trust in the German-Czech and German-Polish border regions is both lower and also contrast on either side of the border. While levels of trust in people in neighbouring countries are high in German border regions, at 70 to 80 percent, they are significantly lower in the other direction. In Polish border regions and in the border regions between the Czech Republic and Saxony and Thuringia, between 60 and 70 percent of people express trust in the neighbouring German people. In the Czech border region with Bavaria, the value is only 58 percent, representing one of the lowest trust rates in all border regions in Europe (European Commission 2015). That relatively low rate is mainly due to an unwillingness to imagine a German as one's boss on the Czech side.

Figure 2.6: Cross-border trust



Origin of data: European Commission Eurobarometer 422
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2.3 Cross-border integration and cooperation

Cross-border integration has many aspects. According to Durand (2015), they can be grouped into four basic dimensions (Table 2.1):

- → The structural dimension includes spatial characteristics and indicates common qualities and complementary aspects, as well as the dynamics of convergence and divergence.
- → The functional dimension indicates cross-border exchange processes with goods and the movement of people.
- → The institutional dimension is characterised by very diverse cooperation measures.
- → The non-material dimension refers more to subjective elements in developing cross-border identities.

In this chapter, the institutional and non-material dimensions are only touched upon, since the report focuses on structural and functional dimensions in the following chapters.

The institutional dimension of cross-border and transnational cooperation has advanced widely in Europe. In that respect, cross-border cooperation can "be seen as a way of recreating proximity, since borders usually appear to be elements that separate and distance" (Wassenberg and Reitel 2015, p. 8).

Cross-border cooperation is one aspect of European integration processes, even though from a historical perspective, there were different system goals and different instruments were used (Wassenberg and Reitel 2015). European integration processes were driven forward by

states with the intention of closer cooperation between European nations in many fields, especially through a European legal system that is superordinate to national legal regulations. A particularly powerful instrument to break down barriers ("de-bordering tool", Koeppen 2015) is the Single European Market with its free movement of labour, services, goods and capital. By contrast, cross-border cooperation has been initiated by local and regional actors since the late 1950s, originally for very pragmatic reasons to tackle everyday problems in border regions; they were then developed further into the diverse cooperation measures we know today.

Both development processes have gradually become more congruent, whereby above all European regional policy with its programmes on territorial cooperation provided decisive impetus. "As a result, Europe today is a structure of varying shape, but its borders reveal several types of integration, of which territorial cooperation is one of the most successful" (Wassenberg and Reitel 2015, p. 22).

Germany is one of the countries that are represented in the most important alliances in Europe and in which European integration processes have therefore advanced the most. Germany is a member of the European Union, the Council of Europe, the Schengen Area and the Eurozone, with its common currency of the Euro. All of its neighbouring states are in the Council of Europe and the Schengen Area, but there are exceptions with respect to other alliances. Switzerland is not a member of the European Union, but connected to it by bilateral agreements. Denmark, Poland and the Czech Republic have retained their national currencies and are therefore not members of the Eurozone; the same applies to Switzerland since it is not an EU-member.

On the level of cross-border collaboration and territorial cooperation, Germany with its regions, town and cities – not least due to its central location in Europe with direct neighbouring states – is also involved in a wide range of different forms of cooperation:

- → Cross-border cooperation in the direct vicinity of the frontier is supported by Interreg A. Germany is participating in a total of 13 Interreg A programmes, most of which are administrated decentrally (Figure 2.7).
- → All of Germany's border regions are members of one or (in the case of spatial overlaps) more of the 31 European regions/Euroregions/Euregios with German participation (Figure 2.8).
- → A new legal instrument has been introduced with the European Grouping of Territorial Cooperation (EGTC) (Zillmer and Lüer 2017), which is increasingly used in addition to other forms of cooperation on territorial collaboration.
- → Transnational collaboration in cross-border cooperation areas is organised within Interreg B (Böhmer et al. 2017). Germany is involved in six such regions (Figure 2.9).

Table 2.1: Dimensions of cross-border integration

Dimension	Process	Description
Structural	Structuring	→ Spatial and social composition → Dynamics of the convergence or divergence of spatial development
Functional	Exchange	→ Cross-border economic interdependences and flows → Individual and common spatial and social practices
Institutional	Organisation	→ Networks of actors (politics, economics, civic society, culture) and the development of cross-border cooperation → Actors' willingness to cooperate and coordinate strategies and common projects → Cross-border planning and policy
Non-material	Representation	→ Common cultural, social and political preferences → Adaptation of identities and sense of identifying with the cross-border region → Perception of cross-border integration by actors and the population

Source: Durand (2015)

Figure 2.7: German Interreg A regions

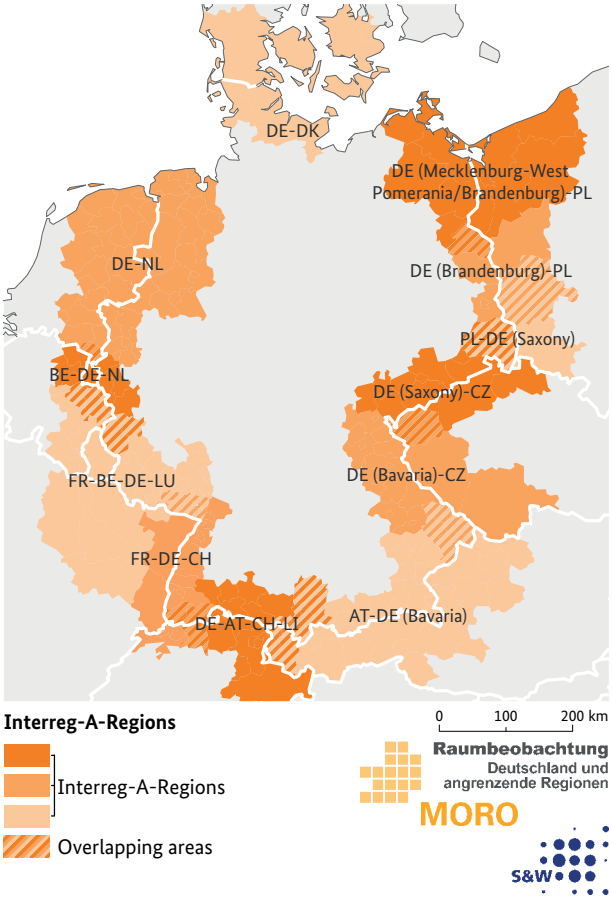

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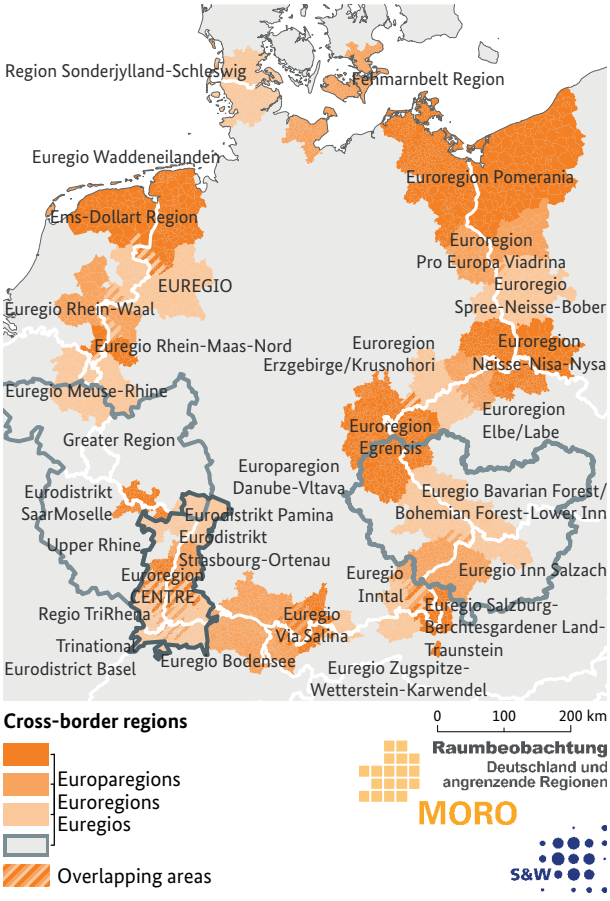
Figure 2.8: Cross-border regions with German participation



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2.4 Cross-border spatial monitoring

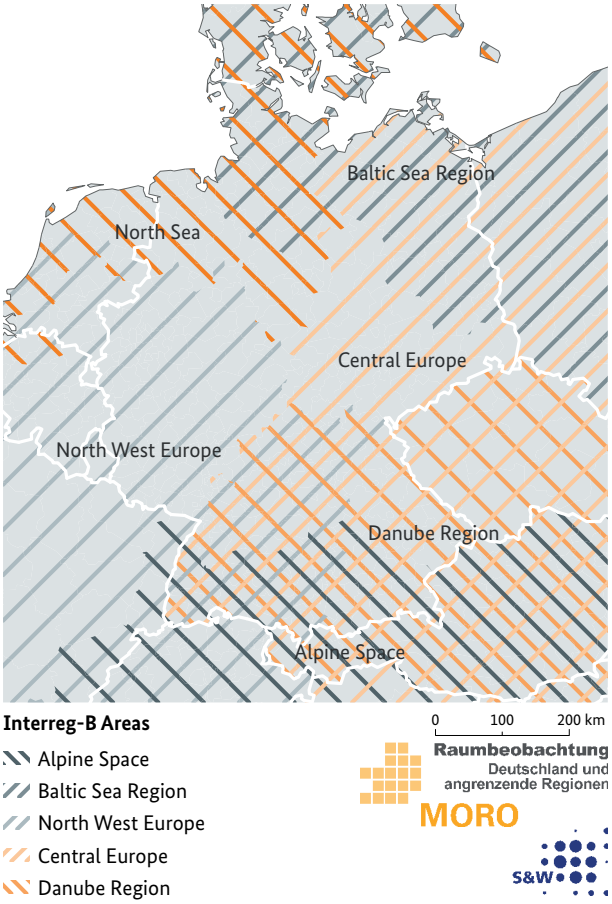
On all spatial levels – from the local, regional up to the national level – a solid information base is required to carry out cross-border cooperation and to steer spatial development. This is undisputed among all actors involved.

All parties also agree that the various spatial levels of action cannot be managed by means of cross-border spatial monitoring on a "one-size-fits-all" principle. In the MORO project, the metaphor of different necessary "altitudes" has emerged, i.e. different spatial levels require different spatial and functional resolutions for the observed themes. For instance on a national and transnational level, numerous aspects of spatial development are best reflected on the NUTS-3 level and by using standard indicators, while local and regional levels often require higher spatial and content-related differentiation. Furthermore, on different spatial levels, very different topics might get into the focus that may not be so relevant on other levels.

National and transnational cross-border spatial monitoring

Cross-border spatial monitoring on a national level and with narrower analytical references to the neighbouring regions has not yet been established in Germany and is therefore the subject of this spatial planning pilot project (MORO). The Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR) has been operating mature spatial observation systems for decades. On a national level, continuous spatial monitoring is a key element of providing information on spatial structures and developments on German territory, using a wide-

Figure 2.9: Interreg B regions with German participation



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spread system of indicators that are also accessible online (BBSR 2017). Normally, data is only recorded for regional units within the German Federal Republic. Furthermore, BBSR studies of European regions, towns and cities analyse the living conditions in the different regions of Europe (Schmidt-Seiwert et al. 2017). This is generally implemented on a Europe-wide scale, with less focus on the neighbouring regions.

However, systematic, continuous spatial monitoring that is specifically aligned towards border regions is not carried out either in other European countries on a national level – with one exception: in the neighbouring country of France, the MOT (Mission Opérationnelle Transfrontalière) was founded 20 years ago by the French government, specifically supporting cross-border actors and their activities, but explicitly also with the task of observing border regions on both sides of the French national border. In addition to recording and analysing spatial development in the border corridors, it especially focuses on analysing cross-border cooperation measures and governance structures with respect to a wide range of themes (MOT 2007; 2015).

The activities of transnational spatial monitoring in Europe are more extensive. In particular in the Nordic countries, harmonised, transnational spatial observation has long been carried out as a matter of course for the five countries of Denmark, Finland, Iceland, Norway and Sweden. At regular intervals, Nordregio, the spatial research institute established by the Nordic Council, publishes (among others) a report on the state of the Nordic regions (Nordregio 2016) – however without an explicit analytical focus on border regions.

Apart from the above-mentioned BBSR activities, spatial monitoring on an overall European level is mainly carried out by Eurostat, DG REGIO and ESPON. Basic regional data are provided by Eurostat, the European Union's statistical office, and published annually in the regional statistical yearbook, although without an explicit cross-border perspective (Eurostat 2017). The European Commission Directorate General for Regional and Urban Policy (DG REGIO) supplements Europe-wide spatial monitoring with extensive analyses, which are presented at regular intervals, especially in reports on economic, social and territorial cohesion. The current Cohesion Report (European Commission 2017a) includes a section on cross-border cooperation and the territorial dimension of cohesion policy, particularly referring to barriers in border regions.

The European spatial observation network ESPON analyses and processes Europe-wide, spatially relevant information for political and other actors, mostly with a thematic focus. ESPON has carried out individual projects explicitly on spatial monitoring, including the Europe-wide "ETMS – EU Territorial Monitoring System" (ESPON ETMS 2014) and the pilot project for a transnational co-operation region entitled "BSR-TeMo – Territorial Monitoring for the Baltic Sea Region" (ESPON BSR TeMo 2013). Key ESPON results were processed specifically for cross-border and transnational cooperation regions (ESPON TerrEvi 2012). Other ESPON projects, both in the

field of territorial monitoring and in processing spatial evidence for Interreg programme regions, are currently being prepared.

Regional cross-border spatial monitoring

In German border regions, cross-border spatial monitoring mainly takes place within the model regions of this Demonstration Project of Spatial Planning (MORO), whereby the different initial situations at the start of the MORO continue to be in place. While the north-western and eastern model regions are still at the beginning of a process of systematic spatial monitoring despite individual prior attempts through supporting programmes, the three south-western model regions of the Greater Region, the International Lake Constance Region and the Trinational Metropolitan Upper Rhine Region have more long-term experience, especially with respect to methodological and data-related developments for cross-border monitoring. At the same time, it is apparent that regional development strategies and concepts, and the development of monitoring approaches and geoportals are closely related to each other. These three model regions have developed publicly accessible geoportals that provide information on the region and its spatial development to interested people using statistical indicators and (partially interactive) maps. The "GIS-GR", as well as the geoportals "GISOR/GeoRhena" and "DACH+ Raumentwicklung und Raumbeobachtung" play a pioneering role in Germany with respect to developing cross-border WebGIS.

A number of important preparatory tasks were carried out in the other model regions, where there had been no previous systematic cross-border spatial monitoring. In Schleswig-Holstein, the German-Dutch Euregios and in the Euroregion PRO EUROPA VIADRINA, progress was achieved with comprehensive studies on harmonising data on the labour market and cross-border commuters. In the Charlemagne Border Region, the "Locator" economic stimulus programme operates a modern cross-border Internet tool for businesses interested in moving to a location, including extensive search functions and underlying information. In the Euroregion PRO EUROPA VIADRINA, a comprehensive WebGIS was developed to present cross-border information.

The in-depth regional information presented on the following pages for the MORO model region Schleswig-Holstein/Syddanmark/Sjælland is exemplary in demonstrating how the establishment of a common cross-border spatial monitoring system can be initiated on a regional level. Selected content-based results from the model regions can be found in the thematic chapters of this report as examples of in-depth regional information.

Spatial monitoring in German border regions is hardly carried out in a structured way outside the model regions of this MORO. When data and indicators are collected systematically, it is mostly as part of updating regional development concepts. One such example of cross-border spatial monitoring is the "Cross-Border Friendship Database" (CBFD) of the statistical offices for the German-Polish-Czech Border Region (CZSO 2017). However, in most border regions, cross-border spatial monitoring is only carried out as part of a specific project. In that context, topics of greater importance are settlement and spatial structure, land use, population, the economy and the labour market, as well as education, tourism and transport.

On the road to spatial monitoring in the German-Danish border region

The Federal State of Schleswig-Holstein and the Danish regions of Syddanmark and Sjælland form the natural geographic connections between northern and central Europe. Their situation is characterised by their proximity to Hamburg and Copenhagen – two of the most attractive and most economically powerful major cities in Europe. In future, the Fehmarn Belt bridge will bring the two metropolitan regions even closer together, offering great opportunities for German-Danish cooperation in benefiting from the dynamism of both major cities. At the same time, there are relevant challenges for spatial monitoring.

Whether for transport, economic development, research and development, demand for skilled labour, culture, regional development or the quality of life: there is no theme of the Federal State of Schleswig-Holstein's development that can still be considered within the confines of its own borders only. In the global competition between regions, demand is growing for the development of large-scale economic and cross-border interaction regions, as well as increased support for their visibility.

Only the southern part of Schleswig-Holstein has been involved in systematic spatial monitoring as part of the metropolitan region of Hamburg. Along with the two Danish neighbouring regions of Sjælland and Syddanmark, spatial monitoring in the past has only been project and demand-related; there is no systematic monitoring of this border region. However, for a long time, there were considerations and preparatory work to develop a joint database using the example of the Danish-Swedish Øresund statistical database (www. orestat.se). Its implementation was thwarted by different demands from actors and a lack of funds. However, participation in this spatial planning pilot project now enables a new attempt at achieving that goal.

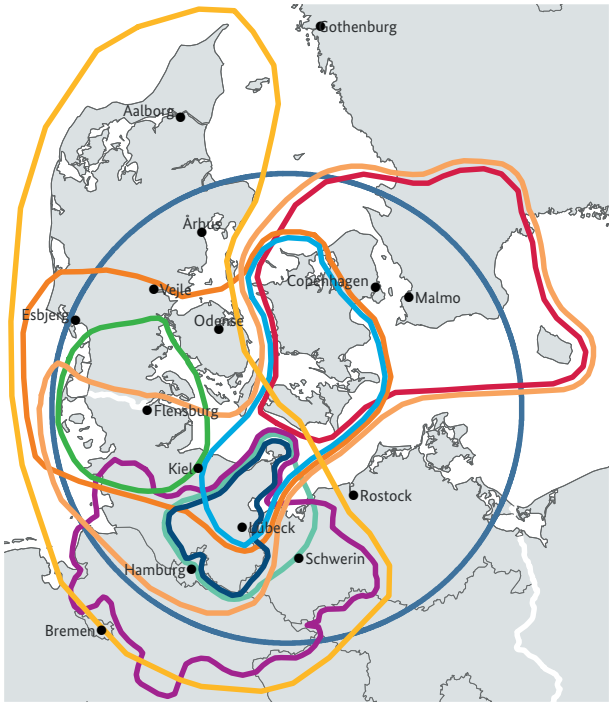
Schleswig-Holstein, Syddanmark and Sjælland form the core region of German-Danish cooperation, which has grown together historically, and is complemented by additional actors and regions from Germany, Denmark, Sweden and Norway depending on the requirements and themes addressed. The cooperation regions are defined with different scopes, representing a challenge for a spatial monitoring system. To reflect both small and large-scale interdependences, an inner core area (Schleswig-Holstein, Syddanmark, Sjælland) will thus be defined instead of a fixed area of reference. This will be complemented by flexibly definable areas for further exploration that may include all of Denmark or even reach as far as Oslo depending on the theme or context.

The different "spatial settings" of cooperation are reflected in the large number of cooperation measures (Figure 2.10), with partners and actors that are potential users of a joint spatial monitoring system. In the closer border area, the focus lies on themes such as cross-border commuting, tourism, cross-border trade and cultural exchange, which are especially addressed by the two organisations "Region Sønderjylland-Schleswig" and the Fehmarn Belt Committee. On a regional level, cooperation is orientated towards the concepts of the Interreg 5A programme "Germany-Denmark". On a large-scale level, it is implemented along transnational development corridors such as the Jutland Route (and its extensions towards Oslo and Gothenburg) or the STRING cooperation along the Fehmarn Belt axis (see Figure 2.11) and is focused on aspects of transport and economic policy. These different thematic focuses reveal a large number of themes to which systematic German-Danish spatial monitoring can and should contribute valuable information. This could therefore lead to a significant added value for existing cooperation.

In early 2017, a workshop was held with potential users of and data sources for a German-Danish spatial monitoring system. Exchange of information between representatives from existing spatial monitoring systems (such as the Hamburg metropolitan region or the Øresund region), as well as in small group discussions, clearly showed that spatial and sectoral planners, representatives from the tourist, transport and economic sectors and project actors are very interested in systematic spatial monitoring, recognising its potential to support their daily work, as well as to consolidate and further develop cross-border cooperation. Key actors in providing the service are the statistical and cartographic institutions and offices on both sides of the border region. Their confirmed support is essential for the establishment and management of a common spatial monitoring system.

To fulfil the strongly varying user expectations depending on the geographic and sectoral background, a German-Danish spatial monitoring system must cover a broad range of themes. These include labour, education, retailing and public services, as well as tourism, traffic flows, economic

Figure 2.10: Existing cooperations in the German-Danish border region



Existing cooperations (spring 2017)

- INTERREG 5 A-Programme
- STRING
- Fehmarnbelt Business Council
- Fehmarnbelt-Committee
- Regional Management Fehmarnbelt
- Region Sønderjylland-Schleswig
- HanseBelt e.V.
- Metropolitan Region Greater Copenhagen
- Metropolitan Region Hamburg
- Jütland Corridor

0 50 100 km

Raumbeobachtung Deutschland und angrenzende Regionen

MORO

RRG

Origin of data: Ministerium für Inneres, ländliche Räume und Integration des Landes Schleswig-Holstein © RRG GIS Database, RRG 2017
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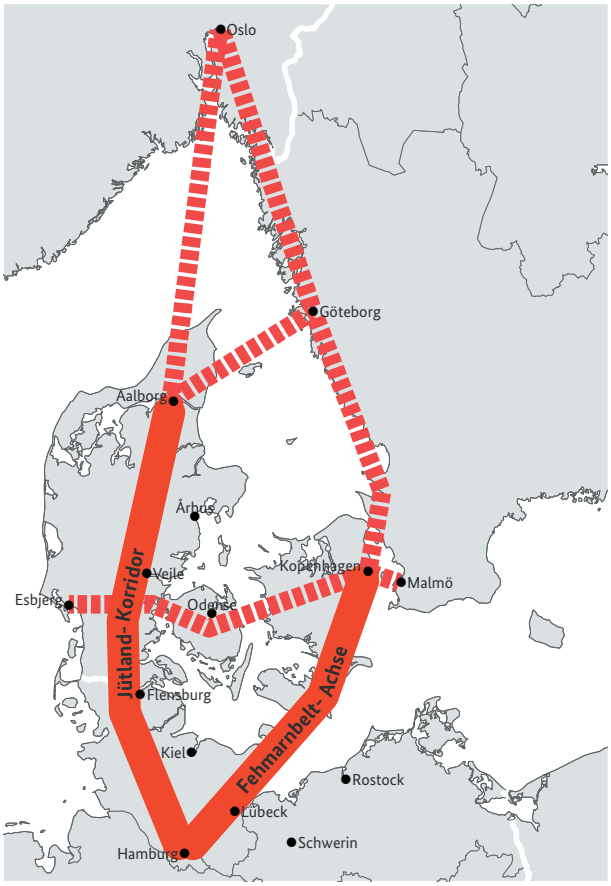
Figure 2.11: Development corridors and existing cooperation in the German-Danish border region



Development and cooperation corridors

- Main axis
- Secondary axis

0 50 100 km

Raumbeobachtung Deutschland und angrenzende Regionen

MORO

RRG

Origin of data: Ministerium für Inneres, ländliche Räume und Integration des Landes Schleswig-Holstein
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interdependences and research and development. Ideally, the system should provide raw data, (harmonised) basic and context indicators, as well as further information and analyses. In addition to the respective status quo, timelines should demonstrate cross-border dynamics. Some users require a statistical database from which raw data and indicators can be downloaded on a small-scale level (grid and communities) for their own further processing; other users prefer finished maps for downloading and interactive GIS applications to produce their own maps and analyses.

The added value of cross-border spatial monitoring lies not only in the provision of data, but also in particular in the associated greater visibility of cross-border cooperation German-Danish cooperation therefore regards spatial monitoring also as a marketing tool to highlight the potentials of the region between the two major cities of Hamburg and Copenhagen. To that aim, a joint website in the form of a "regional development portal" should be established, which will include data, indicators, maps and analyses, as well as general information on the German-Danish border region in German, Danish and English (where required), including links to actors and cooperation organisations.

In the early summer of 2017, encouraged by the positive feedback from the workshop, the project partners from Schleswig-Holstein, Syddanmark and Sjælland produced a comprehensive concept for a spatial monitoring system with the above-stated content, functions, data and indicators. In the autumn of 2017, options on technical implementation (including cost estimates) were explored. Implementation is scheduled to begin in early 2018.

3 Spatial and settlement structure

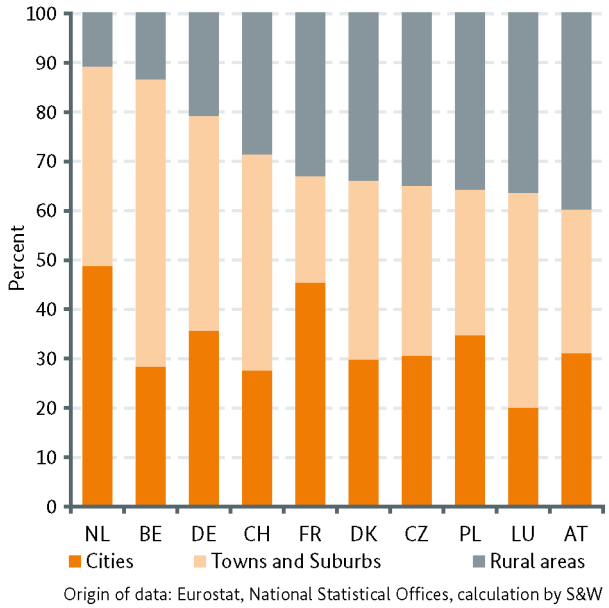
The location and size of human housing, production and leisure developments have a spatially structuring effect. Subdividing space into sovereign state territories and inner-urban administrative units reveals relationships and dependencies with different intensities, including strong boundaries for living spaces. The spatial and settlement structure, which has become differentiated over the centuries as a result of economic, social and political change processes, is connected to the location, intensity and duration of variations in the way boundaries have been drawn. Borders mark the respective political, administrative and economic dividing lines of their times; often they are also places where regions with contrasting socio-cultural characteristics meet. Today, the borders of Germany and its neighbouring countries are largely permeable. This chapter investigates the settlement structure patterns and forms of spatial organisation in border regions. Cross-border indicators are used with respect to urbanisation, defining the type of functional space, the population potential, land use, land consumption and agricultural and environmental conservation.

3.1 Urbanisation and urban systems

In Germany and its neighbouring countries, communities with an originally traditional, rural character have transformed into urban, collaboratively organised societies. The proportion of the population living in urbanised structures has continuously grown. In 2015, 36 percent of Germany's population lived in larger cities, while 43 percent lived in small towns and suburban communities (Figures 3.1 and 3.2).

A high proportion of the population in densely populated urban spaces can also be found in the Netherlands (49 %), France (45 %) and Poland (35 %). In view of the high-level population density in both countries, the population proportions of rural communities in the Netherlands (11 %) and Belgium (14 %) are very low. Of all of Germany's neighbouring countries, Belgium has the highest proportion of people living in small towns and suburban communities (58 %). As in Germany, high proportions of this urbanisation type can also be found in Switzerland (44 %), Luxembourg (43 %) and the Netherlands (40 %). By contrast, the proportion is particularly low in France (21 %), where there is thus a stronger spatial distinction between urban and rural areas (Figure 3.2). High population proportions in rural communities can be found in Austria (40 %), Poland (36 %) and the Czech Republic (35 %), where they are even higher than each of the other two types of municipality.

Figure 3.1: Population proportions according to degree of urbanisation in Germany and its neighbouring countries in 2015



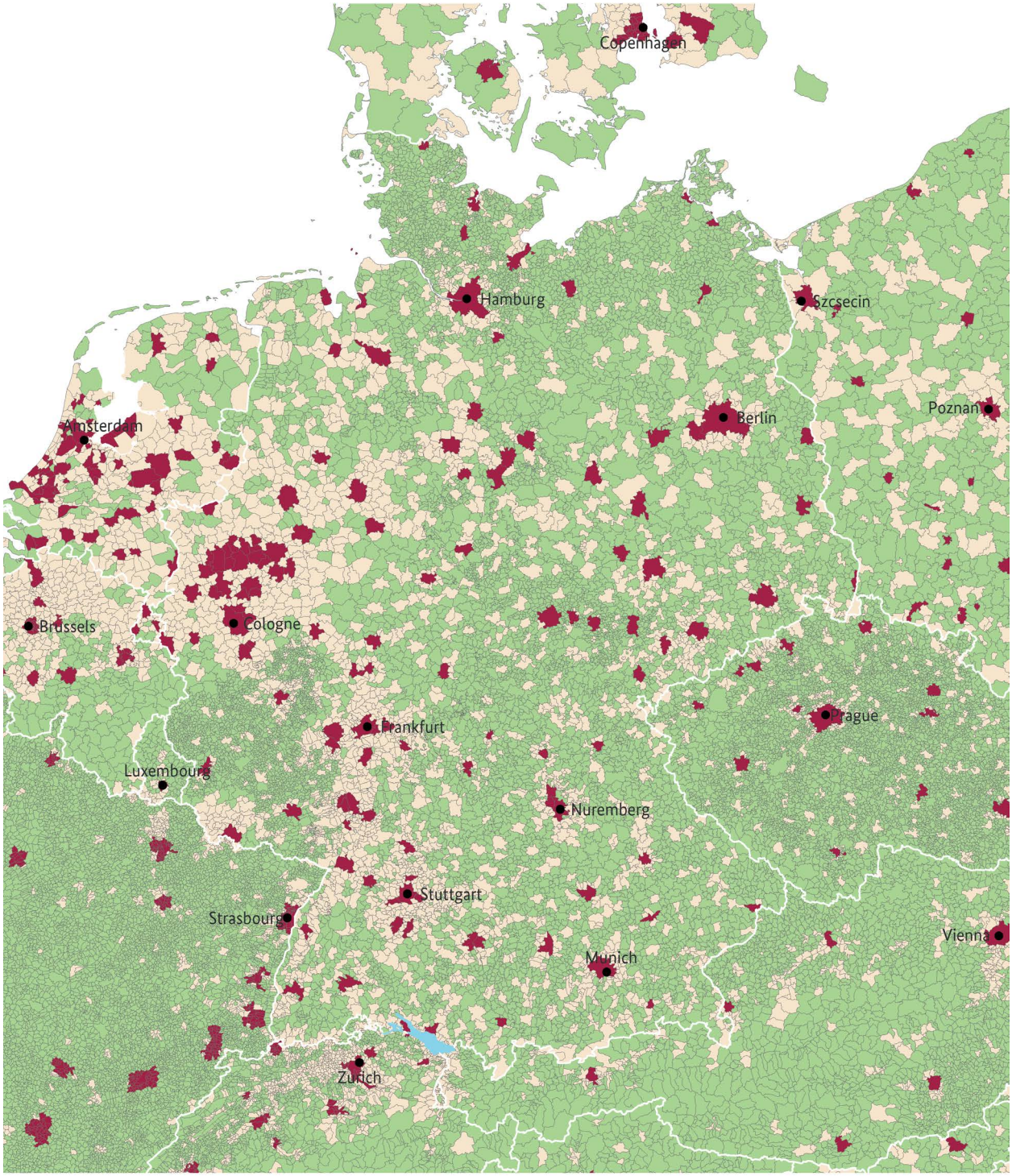
Origin of data: Eurostat, National Statistical Offices, calculation by S&W

Most border corridors also tend to have a lower level of urban communities and are less strongly urbanised than the respective national average (Figure 3.3). Only western Poland is an exception in this respect, where a higher proportion of the population lives in cities compared to other regions of the country.

i Degree of urbanisation

In the Eurostat system to assess the degree of urbanisation (DEGURBA – Degree of Urbanisation), municipalities are classified into three types: cities, small town/suburban and rural. This classification is based on a small-scale analysis of population density, i.e. the number of inhabitants in grid squares with an area of 1 km² and their mutual neighbourly relationships.

Figure 3.2: Degree of urbanisation of municipalities in Germany and its neighbouring countries in 2014



Origin of data: Eurostat, Degree of Urbanisation (DEGURBA), LAU2, DK=LAU1
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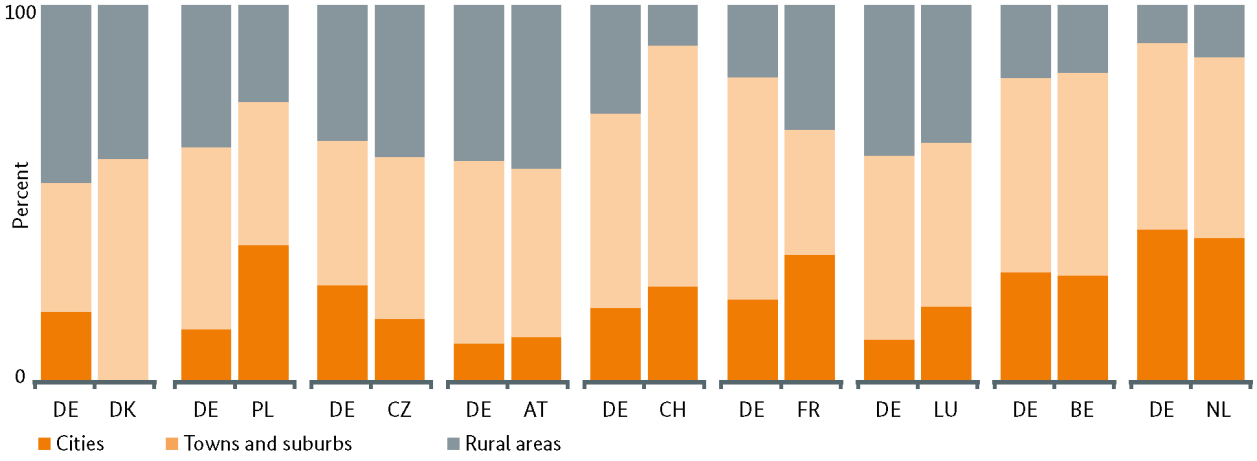
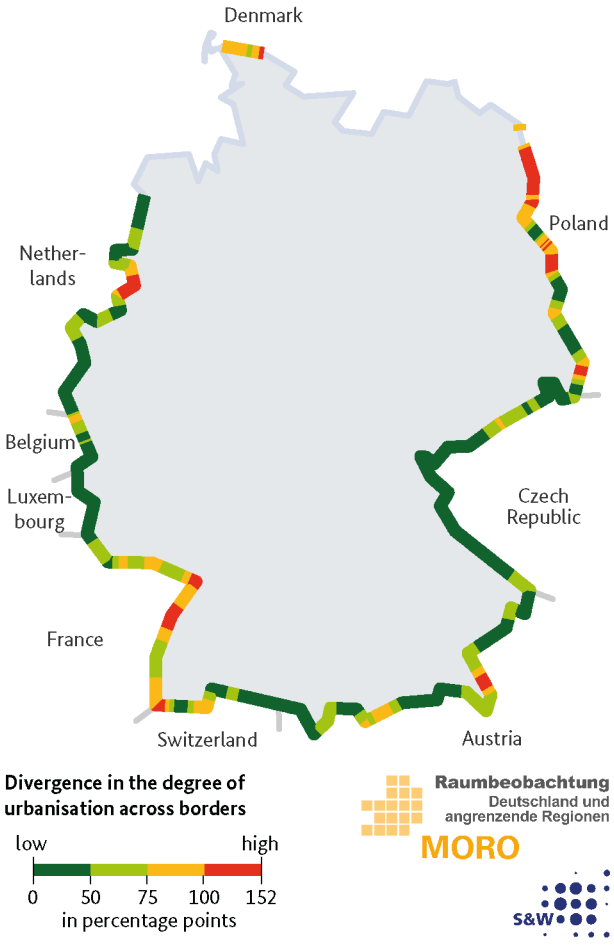
Figure 3.3: Population by degree of urbanisation in the border regions in Germany and its neighbouring countries in 2015



Origin of data: Calculation by S&W for border areas (< 50 km distance to border) based on Eurostat, National Statistical Offices

The majority of the population near borders lives in small towns, suburbs and rural communities. For instance Germany's border regions with Denmark, Poland, the Czech Republic, Austria and Luxembourg have a very rural character. The border regions between Germany and Switzerland, Germany and Belgium, and Germany and Denmark on the Danish side have a strong small-town settlement structure. However, a relatively high urban population proportion can be found in the German-Dutch, German-Belgian and German-French border regions.

Figure 3.4: Divergence in the degree of urbanisation in border regions in 2015



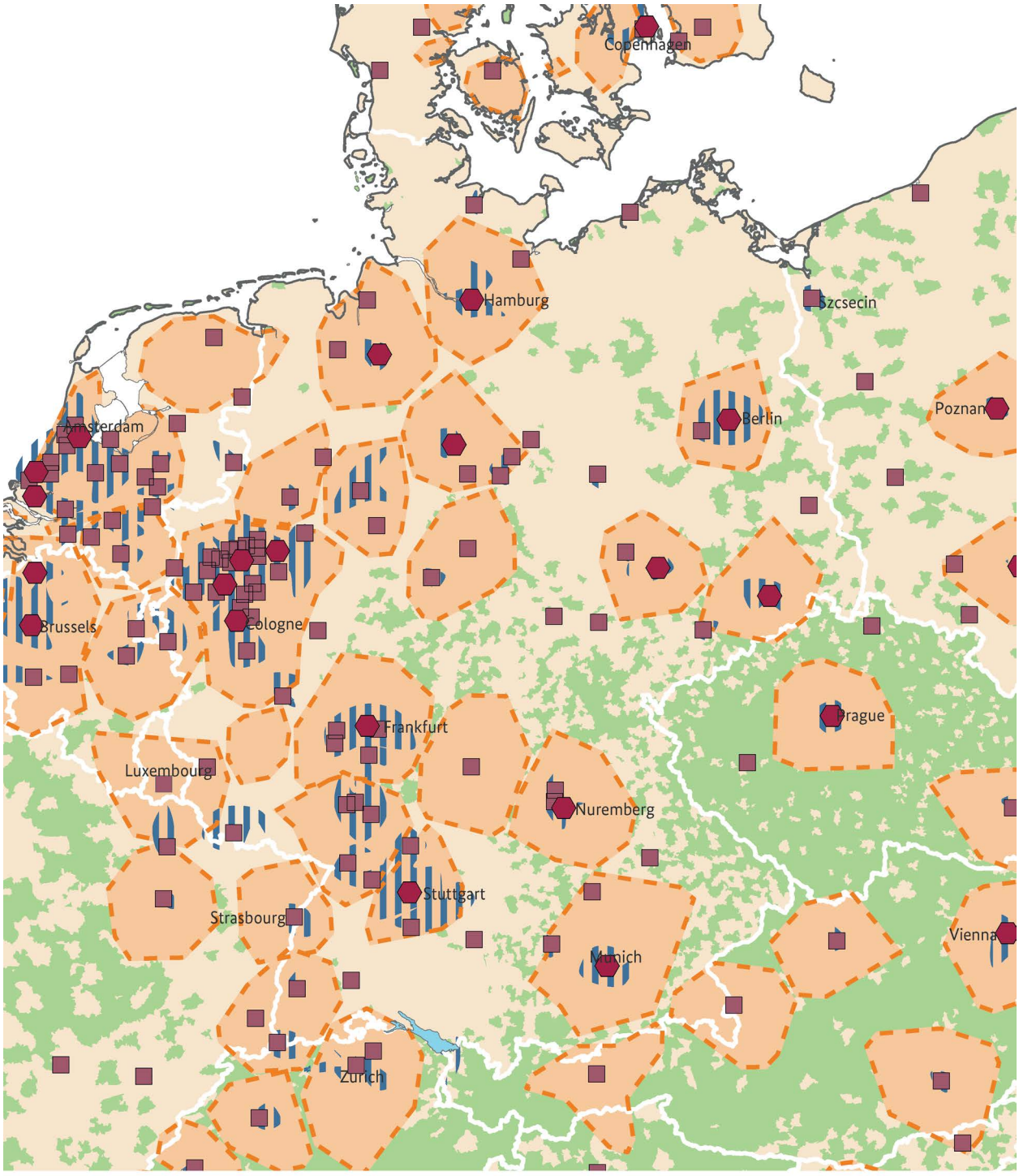
Total difference between the relative population shares according to DEGURBA classification.
Origin of data: Calculation by S&W based on Eurostat and National Statistical Offices (LAU2)

In some areas, the level of urbanisation differs clearly along the borders (Figure 3.4). These differences are prominent along the German-Danish, German-Polish and German-French borders, as well as near Salzburg and Basel and the German-Dutch border. Such differences do not necessarily indicate an imbalance in the urban system near borders. Instead, they signify a cross-border organisation of functional spaces, in which the functions of a local centre are served by major cities on the other side of the border. This results in regionally significant cross-border interdependencies in the fields of trade, transport and the labour market. Such structures exist for instance in the regions around the cities of Szczecin, Frankfurt (Oder), Salzburg, Basel, Strasbourg, Karlsruhe and Enschede, all of which are situated close to borders.

The spatial and settlement structures in Germany and its neighbouring regions are highly differentiated in terms of their functions (Figure 3.5). While a large number of major cities and agglomerations exist in western and south-western areas, the other regions are characterised by a much higher proportion of areas that are distant from major cities.

The major European metropolitan regions have a special function. They are hotspots of population, the economy, capital, infrastructure, knowledge and culture. Thus they are regarded as driving forces of social, economic and cultural development in Europe and as key components of the European integration process.

Figure 3.5: Types of spatial and settlement structures in Germany and its neighbouring regions



Origin of data: BBSR European and Urban Spatial Monitoring, National Statistical Offices
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Some metropolitan areas are situated in border regions. Larger cross-border metropolitan regions of European importance that include areas in Germany can be found along the western and southern border, namely the Maas-Rhine Euregio with the Aachen-Liège-Maastricht urban triangle, the Greater Region including Luxembourg, the Trinational Upper Rhine Metropolitan Region with Strasburg and Basel, the Lake Constance Region with Zurich, and the metropolitan region of Salzburg. The "Cross-Border Metropolitan Regions" Initiative (IMeG) was established by actors from the first four above-mentioned border regions to break down barriers in cross-border spatial development (BMVBS 2013).

3.2 Regional population potential

The population density and level of urbanisation of a region only provide a limited indication of the locational relationship between the communities and therefore the potential for exchange between the populations living there. Such living conditions with respect to spatial and settlement structure can be illustrated by presenting the regional population potential (Spangenberg 2003).

Very high regional population potentials with figures of over 1 million inhabitants can be found in the major European metropolitan regions (Figure 3.6). The Rhine-Ruhr agglomeration and the monocentrally structured capital region of Berlin achieve the highest figures in this respect. Between the metropolitan areas in western Germany and its neighbouring countries, there are large, connected settlement and transport corridors in which there is a high probability of spatial interaction.

Away from the metropolitan regions, rather rurally structured areas with low population potentials are evident. They are primarily situated in the German-Danish border region, along the North Sea coast, in the north of eastern Germany, in northwestern Poland, in the south-western Czech Republic, in eastern France, in northern Austria and in the high Alpine regionss of Austria and Switzerland. Large areas of those regions have a regional population potential of below 100,000 inhabitants.

The border regions on both sides of Germany's external borders are characterised by rather contrasting spatial and settlement structures. In the west and on the border with Switzerland, there are mainly urban and small-town border regions with a high regional population potential. The regional population potential is also relatively high along the Saxony-Czech border. A cross-border settlement and transport corridor exists between Dresden and Prague.

A lower regional population potential exists along the German-Danish border, as well as in large parts of the German-Polish border corridor, the Bavarian-Bohemian border, the Bavarian-Tyrolean border and the Eifel region. With the exception of the region around Szczecin, the regional population potential in the German-Polish border corridor on the Polish side is lower than on the respective German side, as is the case with the Bavarian-Bohemian border corridor on the Czech side and the Bavarian-Tyrolean border corridor on the Austrian side.

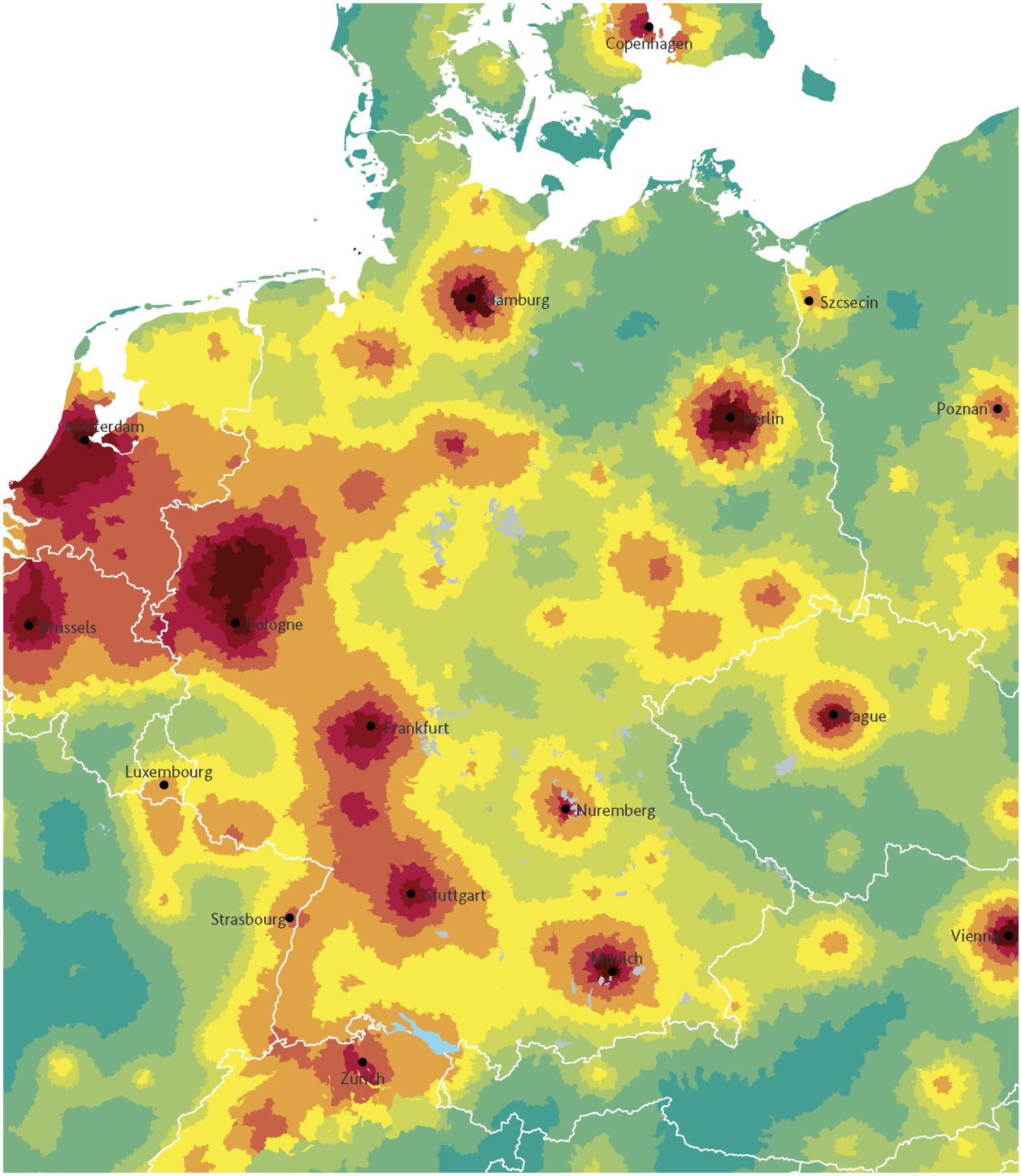
The effect of open borders is clear in comparing the regional population potential with and without the population potential provided by the neighbouring countries (Figure 3.7). In the German-Dutch-Belgian border region, the regional population potential rises by more than 150,000 inhabitants if the population from the neighbouring country is taken into account. In the Upper Rhine region, the Greater Region, the region around Lake Constance and many other border regions, the population potential from the neighbouring country contributes to a clear increase in the regional population potential.

These effects are not limited to urban or metropolitan border regions. Even in more rural regions, the population living beyond the border has a relatively large significance for the population potential (Figure 3.8). Its proportion is especially high in all communities situated directly on the border and is

i Regional population potential

The regional population potential is a classic measure of population geography to demonstrate the theoretically possible interaction potential, for instance for communication or business processes. It is calculated as a function of the linear distance between the municipalities and the number of their inhabitants. The greater the size of the population near a municipality and the shorter the distance required to travel, the higher the interaction potential.

Figure 3.6: Regional population potential in Germany and its neighbouring regions in 2015



Regional population potential of municipalities in 2015

Distance-weighted population potential

- above 1,500,000
- 1,000,000 to 1,500,000
- 750,000 to 1,000,000
- 500,000 to 750,000
- 300,000 to 500,000
- 200,000 to 300,000
- 150,000 to 200,000
- 100,000 to 150,000
- 50,000 to 100,000
- below 50,000
- Residents free area

0 50 100 km

Raumbeobachtung Deutschland und angrenzende Regionen

MORO

S&W

Origin of Data: Calculation by S&W following the BBSR modelling approach with data from National Statistical Offices
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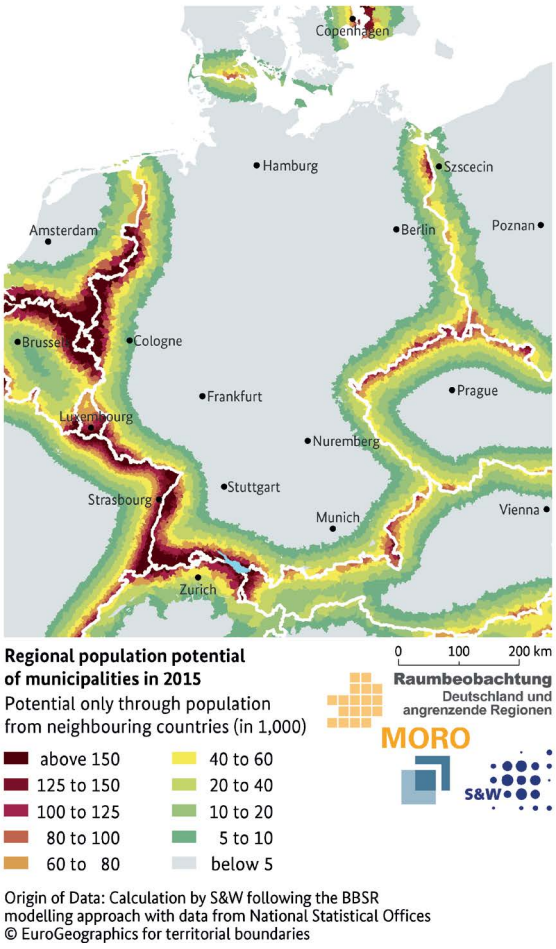
Figure 3.7: Absolute population figures of neighbouring countries in the regional population potential in 2015



Origin of Data: Calculation by S&W following the BBSR modelling approach with data from National Statistical Offices
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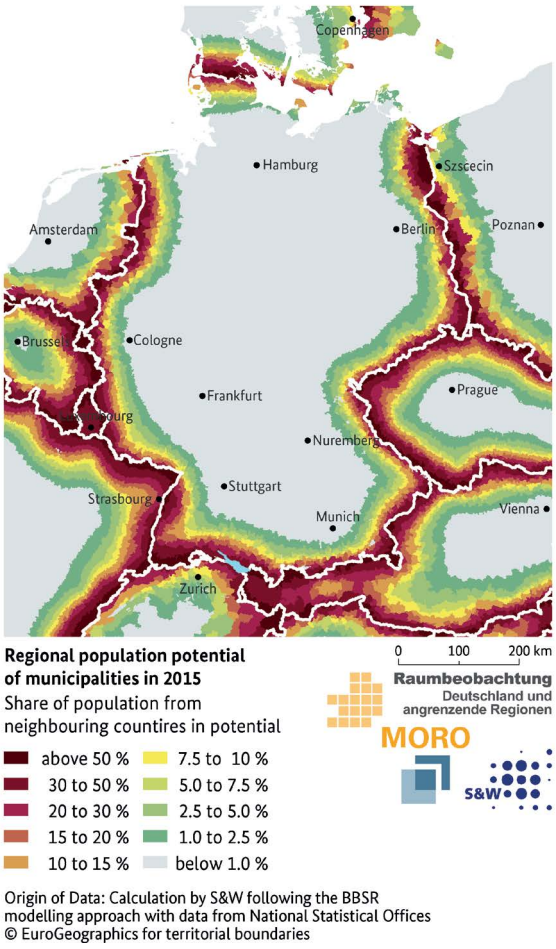
Figure 3.8: Relative shares of inhabitants from neighbouring countries in the regional population potential in 2015



Origin of Data: Calculation by S&W following the BBSR modelling approach with data from National Statistical Offices
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often even more than 50 percent. In some areas, high proportions from the neighbouring country reach far beyond the direct border location, as is the case for instance in the east of Mecklenburg-West Pomerania in the region of Szczecin, in Austria in Tyrol and Vorarlberg, in eastern France, eastern Belgium and in the Dutch province of Limburg.

3.3 Land use

Germany's territory covers an area of around 360,000 km². In 2012, the share of developed settlement and transport areas (artificial land) was 9.4 percent; 56.4 percent were agricultural land, 31.5 percent were forests and natural land, while 2.8 percent were wetlands and water areas (according to CORINE, see info-box). In Germany, the proportion of agricultural land, forests and semi natural land is comparable with those in the comparable large neighbouring countries France and Poland, as well as those in the Czech Republic (Figure 3.9).

Germany has a relatively dense population. The Benelux countries are the only neighbours with an even higher population density. This particularly applies to Belgium, with 21 percent developed settlement and transport areas. The shares of developed land are significantly lower in France (5.5 %), Austria (5.6 %) and Poland (5.7 %).

In the Alpine countries of Switzerland and Austria, the shares of forests and semi natural land is relatively high (leading to smaller agricultural land shares). The opposite is the case in the flatter coastal countries of Denmark, Belgium and the Netherlands, where the countryside is predominantly characterised by agricultural land. The Netherlands are also characterised by a high proportion of wetland and water areas.

In Germany and the neigbouring regions, land use is characterised by large spatial differences in the distribution of settlement, agricultural, forests and semi natural areas (Figure 3.10). In addition to settlement areas, agricultural land dominates in the northern regions with their low-lying and flat land. By comparison, the regions in the east and in particular all the mountainous areas south of the central European uplands have greater shares of forests.

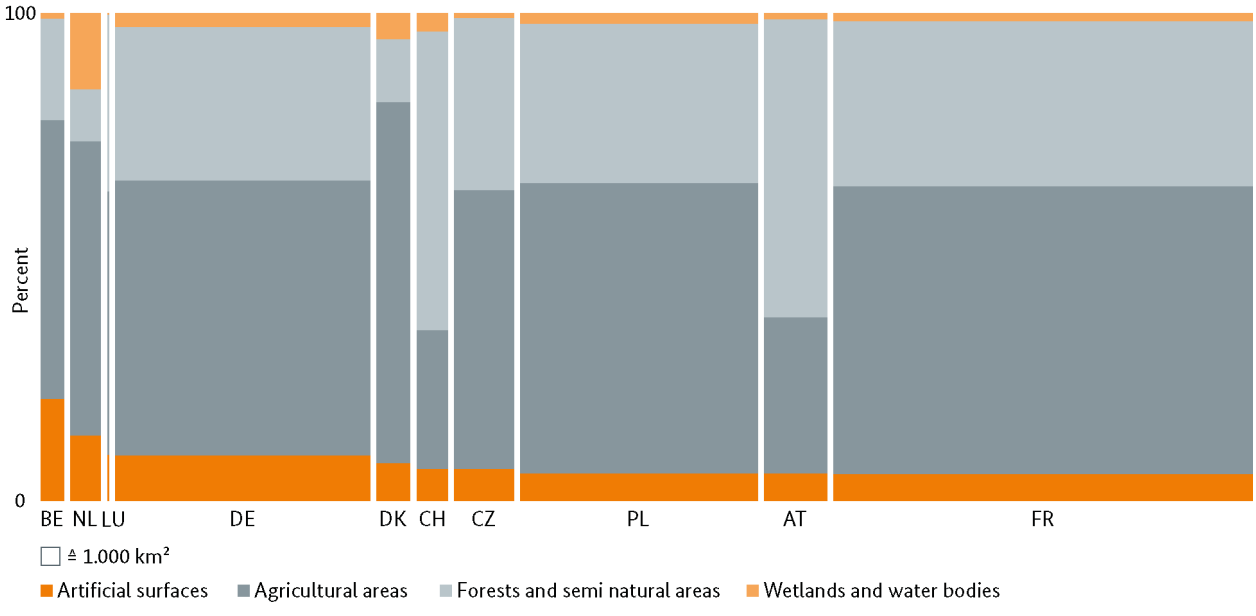
In the border regions, the respective land use proportions are accordingly varied (Fig 3.11). The proportions of agricultural land in the German-Danish (83 %) and the German-Dutch (70 %) border regions are especially high. In the remaining border regions, the proportions lie between 45 and 51 percent. Only in the border corridor between Germany and Austria it is lower, which is due to the considerably lower proportion of agricultural land on the Austrian side (24 %).

CORINE – Land use monitoring

Land use is an important indicator to reflect how space is organised through human activities and also to illustrate the intensity of environmental pollution. For almost thirty years, the European Union has been monitoring land use and its changes in Europe, using satellite images to produce the so-called CORINE data (Coordination of Information on the Environment). These have been released for the years 1990, 2000, 2006 and 2012.

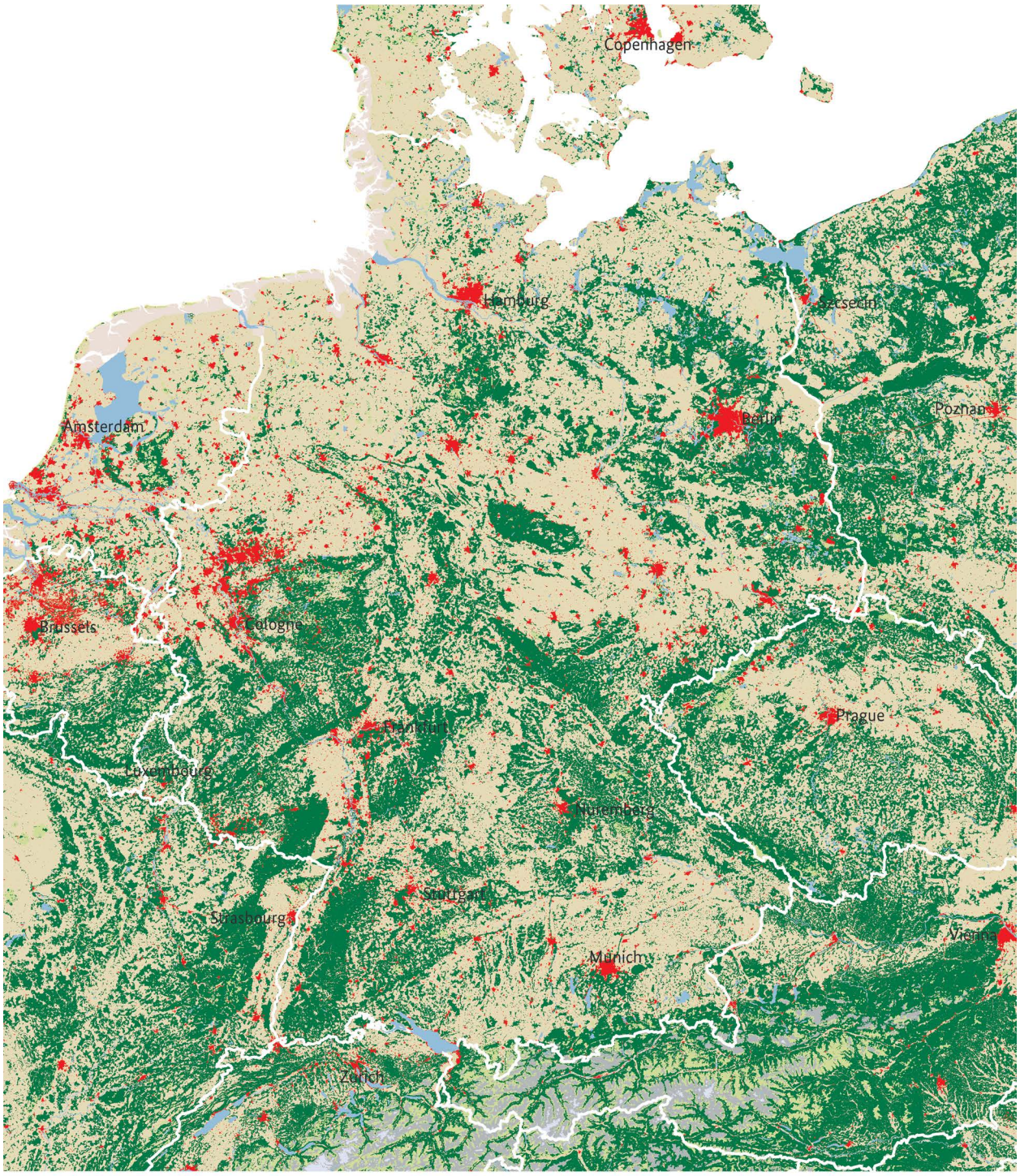
Since the recorded minimum land area is 25 ha, small-scale uses are not taken into account; only changes with a size of 5 ha and above are recorded. This leads to discrepancies compared to the official land use statistics classified according to actual use in Germany, which is much more precise since it fully analyses the land on the basis of real estate cadasters. The CORINE data have the advantage of being uniformly produced, comprehensive, transnational data for all of Europe.

Figure 3.9: Land use by share and area in Germany and its neighbouring countries in 2012



Origin of data: Calculation by S&W based on European Environmental Agency, CORINE Land Cover (CLC12)

Figure 3.10: Land use in Germany and its neighbouring regions in 2012



Origin of data: European Environmental Agency, CORINE Land Cover (CLC 2012)
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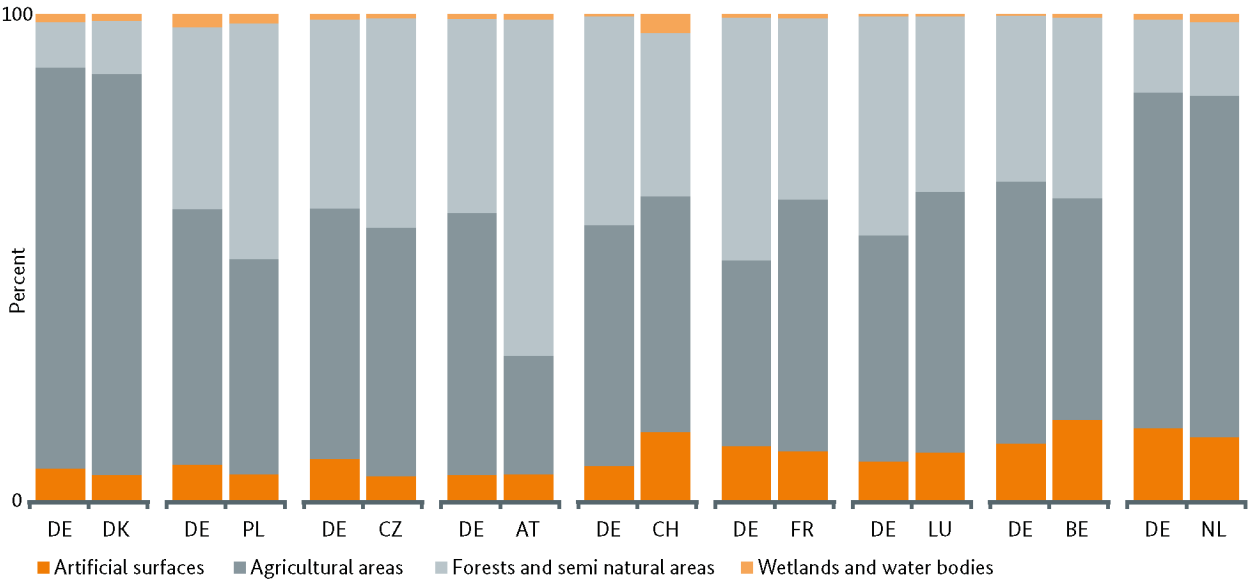
Figure 3.11: Land use in the border regions in Germany and its neighbouring countries in 2012



Origin of data: Calculation by S&W for border areas (< 50 km distance to border) based on European Environmental Agency, CORINE Land Cover (CLC12)

The share of developed settlement and transport areas is particularly high in the German-Dutch and German-Belgian border regions, at 14 percent. The proportion of developed land is also relatively high in the German-French and German-Swiss border regions, at 11 and 10 percent respectively. Areas with less relative importance of settlement and transport land use are found in the German border regions with Luxembourg (9 %), the Czech Republic (7 %), Poland (6 %), Denmark (6 %) and Austria (5 %).

Apart from the differences between the border regions, the land use within the individual border regions is nevertheless similar. On both sides of the border, the differences in land use proportions are rather marginal. Very comparable patterns of land use lie on both sides of the German-Danish, German-Dutch and German-Czech borders.

In the German-Polish border region, the proportion of agriculturally used land on the German side is 9 percent higher than on the Polish side, where the proportion of forests is accordingly higher. Inversely, in the German-French and German-Luxembourg border regions, the forest proportion is somewhat larger on the German side.

While the German-Swiss border area shows otherwise relatively similar figures, the proportion of developed land is higher on the Swiss side. The situation in the German-Austrian border region shows greater contrasts. This is mainly due to the high proportion of semi natural areas on the Austrian side, as a result of the mountainous countryside there.

3.4 Land consumption

The pursued political aim is to reduce land consumption and introduce circular land use management to prevent further urban sprawl, preserve natural environments and habitats, and protect against climate and flooding consequences. However, progressive land consumption is a process with negative consequences that arise gradually and which is almost imperceptible on a local level with respect to intensity and scope.

Compared to the number of inhabitants, developed settlement and transport areas grew the most in Denmark between 2006 and 2012. The greatest relative growth was recorded in the Netherlands (+4.1 %), followed by Poland (+2.8 %), France (+2.7 %) and Denmark (+2.4 %). In Austria (+1.1 %), Germany (+1.0 %), Belgium (+0.5 %) and Switzer-

land (+0.2 %), new land consumption for settlements and transport was lower (Figure 3.12).

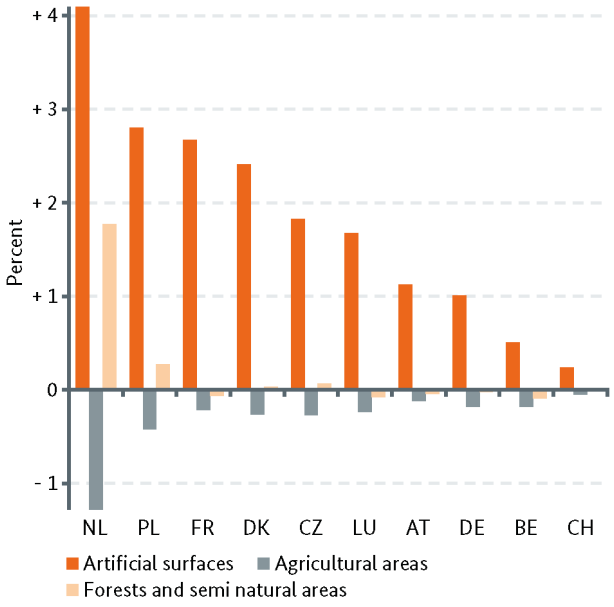
Between 2006 and 2012, the focus of new land consumption for settlement and transport purposes was widely spread out across the regions (Figure 3.13). Only in the Netherlands it occurred almost throughout the whole country. In the Czech Republic, changes mainly occurred in the region around Prague and along central transport corridors. The effects of land use by new transport infrastructures can also be clearly seen in Poland and France.

Between 2006 and 2012, the proportion of forests and semi natural areas affected by land use remained unchanged or fell slightly in most countries. In the Netherlands (+1.8 %), Poland (+0.3 %) and the Czech Republic (+0.1 %), it even increased by a small amount.

Continued land consumption in Germany and its neighbouring regions especially affects agricultural land. Compared to the population size, the greatest such loss was experienced in Poland, the Netherlands and Denmark. The highest relative loss of agriculturally used land occurred in the Netherlands (-1.3 %), followed by much lower rates in Poland (-0.4 %), the Czech Republic and Denmark (each with -0.3 %) and Luxembourg, France, Germany and Belgium (each with -0.2 %). In Austria and Switzerland, the share of agricultural land only fell minimally.

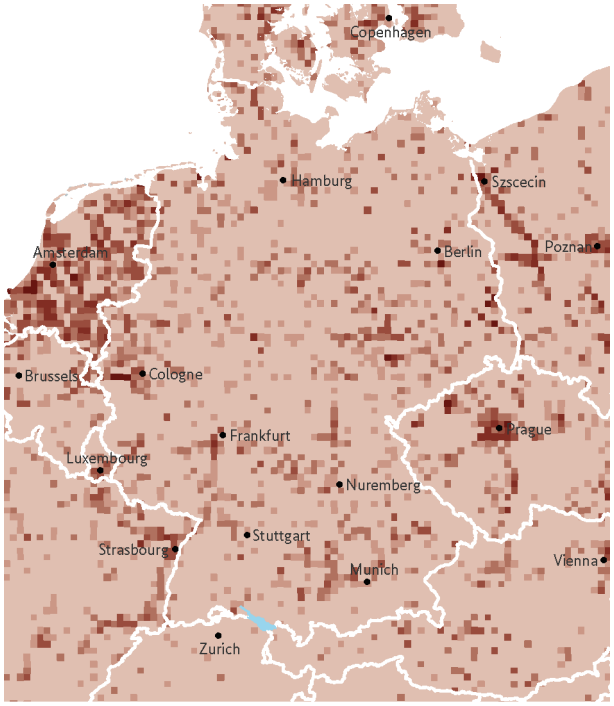
From the perspective of environmental protection, progressive land consumption means that valuable land is lost in Germany and its neighbouring countries. A large number of agriculturally used areas with a high level of biodiversity and a high ecological value were widely

Figure 3.12: Percentage change of land use in Germany and its neighbouring countries between 2006 and 2012



Origin of data: European Environmental Agency, CORINE Land Cover (CHA12)

Figure 3.13: Land consumption for new settlements and transport between 2006 and 2012



Land consumption between 2006 and 2012
Increase of artificial surfaces per 10 km² as yearly average

- above 50 ha
- 25 to 50 ha
- 10 to 25 ha
- 5 to 10 ha
- 2.5 to 5 ha
- below 2,5 ha

0 100 200 km

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Origin of data: Calculation by S&W for raster cells of 10 km² based on data from the European Environmental Agency, CORINE Land Cover Changes (CHA12)
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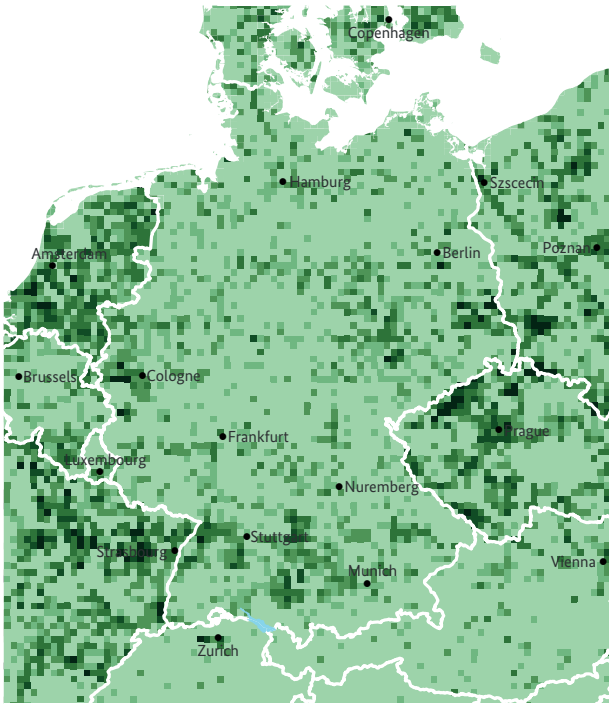
used for other purposes, particularly in the Netherlands, eastern France and parts of Poland, the Czech Republic and Germany (Figure 3.14). The lost semi natural areas had been extensively used agricultural and forestry land, fallow land, biodiverse wetlands, green areas, fields, managed fruit-tree meadows, vineyards and highly structured landscape elements that are regionally typical, such as hedges, field margins, field shrubs and small waterways. They are now used as settlement or transport areas, or for intensive agricultural purposes with a lower ecological value.

Figure 3.14: Consumption of land with a high ecological value for agricultural purposes between 2006 and 2012



Origin of data: Calculation by S&W for raster cells of 10 km² based on data from the European Environmental Agency, CORINE Land Cover Changes (CHA12)
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3.5 Nature and landscape conservation

Environmental protection is a public task that increasingly requires international coordination. In signing the 1989 Bern Convention, the European states have undertaken to establish a transnational, coherent network called the "Emerald Network of Areas of Special Conservation Interest", which is aimed at protecting endangered and typical habitats for indigenous plant and animal species. Within the European Union, the policy was implemented by its member states through the Natura 2000 network, comprising partly overlapping flora-fauna-habitats (FFH areas) and bird sanctuaries (Figure 3.15). The Natura 2000 network is the largest transnational, coordinated network of nature reserves in the world.

In 2015 the Natura 2000 network in Germany included 4,557 FFH areas and 742 bird sanctuaries, with a number of spatial overlaps. Together, they cover 15.4 percent of the land area of Germany and around 45 percent of its marine area. A disproportionally high share of Natura 2000 areas are forests. Overall, a quarter of German forests have attained the status of Natura 2000 areas.

Transnational, large-scale reserve zones are situated in the Wadden Sea, the Flensburg Firth, the Bay of Pomerania, along the German-Polish and German-Czech borders and in the Karwendel mountain range. The proportion of Natura 2000 conservation areas compared to the total land area is quite different in individual EU countries. It is especially high in Luxembourg (27 %) and Poland (20 %), while the level is approximately the same in Germany and Austria (15 % respectively), the Czech Republic (14 %) and in the Netherlands, France and Belgium (13 % each). Only Denmark (8 %) has a relatively low proportion.

The designation of legal nature reserves and landscape conservation areas of international, national and regional importance is the responsibility of the respective national authorities. The IUCN protected area categories allow the classification of protected areas according to an internationally comparable system. Strictly protected natural reserves with prohibited access and wilderness areas are the exception. In Germany and its neighbouring regions, larger national parks and classic biotope and species protection areas dominate. Such conservation areas for natural environments and habitats are subject

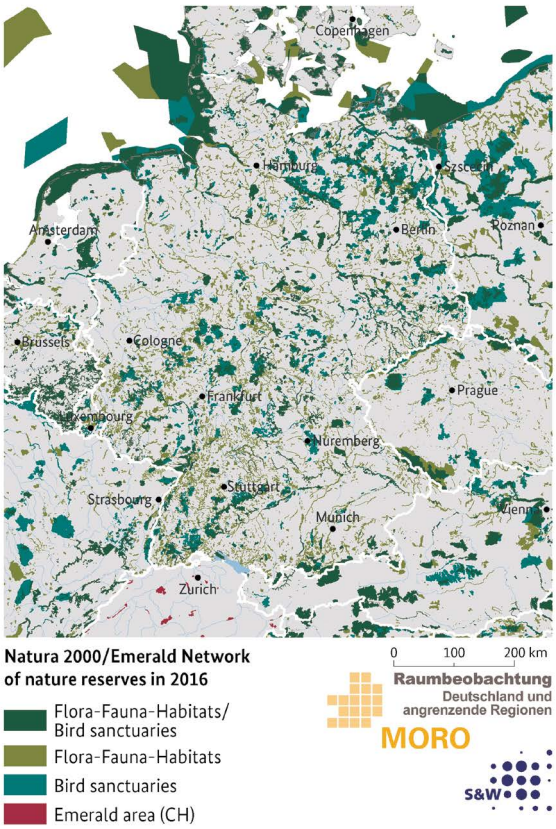
to continuous conservation-area management and have been established in all neighbouring countries (Figure 3.16).

In 2015, there were a total of 8,743 nature reserves in Germany, covering 3.9 percent of the country's land area. The average size of a nature reserve is 156 ha, whereby 60 percent of all German nature reserves are smaller than 50 ha. Large-scale nature reserves can in particular be found in the federal states of Mecklenburg-West Pomerania, Brandenburg, Saxony-Anhalt and Bavaria. In the neighbouring countries, the proportion of large-scale nature reserves is higher than in Germany.

Landscape conservation areas have less stringent use restrictions than nature reserves. With 8,598 landscape conservation areas covering 27.6 percent of the country's area, Germany has a high number of conservation zones to protect the landscape, natural environments and cultural landscapes. In neighbouring countries, recognised landscape conservation areas are mostly more compact.

Biosphere Reserves designated by UNESCO serve to preserve the cultural landscape, protect biodiversity and further develop human-environmental relationships. With the Palatinate Forest-Northern Vosges region (DE/FR, since 1998) and the Krkonoše region (PL/CZ, since 1992), two UNESCO Biosphere Reserves exist where the cultural landscape and natural heritage are protected transnationally.

Figure 3.15: Natura 2000/Emerald Network in Germany and its neighbouring regions in 2016



Origin of data: European Commission, General Directorate Environment (GD ENV), CH=Bundesamt für Umwelt (BAFU), Openstreetmap and contributors for water bodies
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i IUCN protected area categories

The International Union for Conservation of Nature (IUCN) is an umbrella association of international government and non-governmental organisations. It classifies nature reserves and landscape conservation areas according to an internationally comparable system. IUCN protected area categories do not form a hierarchy and instead classify the conservation aim and the conservation area's management. The Common Database on Designated Areas (CDDA) is operated by the European Environment Agency (EEA).

Figure 3.16: IUCN-category reserves in Germany and its neighbouring regions in 2016

Protected natural and landscape areas by IUCN-categories in 2016

- Strict nature reserve / wilderness area (CH, CZ, DK, FR, LU)
- National park to protect eco-systems and for leisure activities (AT, CZ, DE, DK,LU, NL, PL)
- Natural monument or feature (AT, CZ, DK, FR)
- Habitat/Species management area (nature reserves) (AT, BE, CH, CZ, DE, DK, FR, LU, NL, PL)
- Protected landscape/seascape (AT, BE, CZ, DE, DK, FR, PL)
- Other protected areas

0 50 100 km

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Origin of data: European Environmental Agency, Estonian Environmental Register 2017, Environmental Institut Finland 2017, partly set assumptions for IUCN-categories for Denmark, Poland and Rhineland-Palatinate

Environmental protection in the Trinational Upper Rhine Metropolitan Region

Sustainably ensuring natural livelihoods is a significant aim of international cooperation in the Trinational Upper Rhine Metropolitan Region. Even during the process of establishing a corridor or location, cross-border (infrastructural) projects must already take into account areas that are strictly protected, either legally or contractually, such as nature reserves of international, national or regional importance. They also form the basis of planning, for instance in transnational biotope network planning. As contracted by the Upper Rhine Conference, the geoportal GeoRhena carries out cross-border spatial monitoring of nature reserves within its mandate region (Figure 3.17).

One of the oldest treaties on environmental protection on an international level is the 1971 Ramsar Convention. It is an agreement on a voluntary basis with respect to the preservation of wetlands that are especially important as biotopes for water and mudflat birds. The German-French Ramsar area in the Upper Rhine region has a length of 190 kilometres and includes the floodplains of the Rhine and some of its tributaries.

The Natura 2000 areas are also internationally important and are based on EU law. They are divided into flora-fauna-habitats and bird sanctuaries. In the Upper Rhine region, large parts of Natura 2000 conservation areas are situated within the Upper Rhine valley and in the neighbouring high and medium-sized mountain regions. On the French side, the Natura 2000 areas are especially large and coherent compared to the German side. However, the Natura 2000 areas on the German side cover a larger proportion of the overall area. Switzerland plays a special role: the Natura 2000 regulations do not apply in the non-EU country, but in signing the Europe-wide 1989 Bern Convention, Switzerland undertook to preserve especially valuable European species and habitats (the so-called Emerald Network Areas). The legally protected areas in Switzerland are generally designated as nature reserves.

The UNESCO-designated Biosphere Reserves in border areas such as the Upper Rhine region are also internationally important. They include the Palatinate Forest and the Northern Vosges region in the north-west of the metropolitan region, as well as a coherent area of around 630 km² in the Southern Black Forest.

The Ramsar areas and biosphere reserves in the Trinational Upper Rhine Metropolitan Region cover an area of 2,492 km² (12.4 % of the region's total area), while the Natura 2000 areas even cover an area of 3,681 km² (18.3 % of the region's total area).

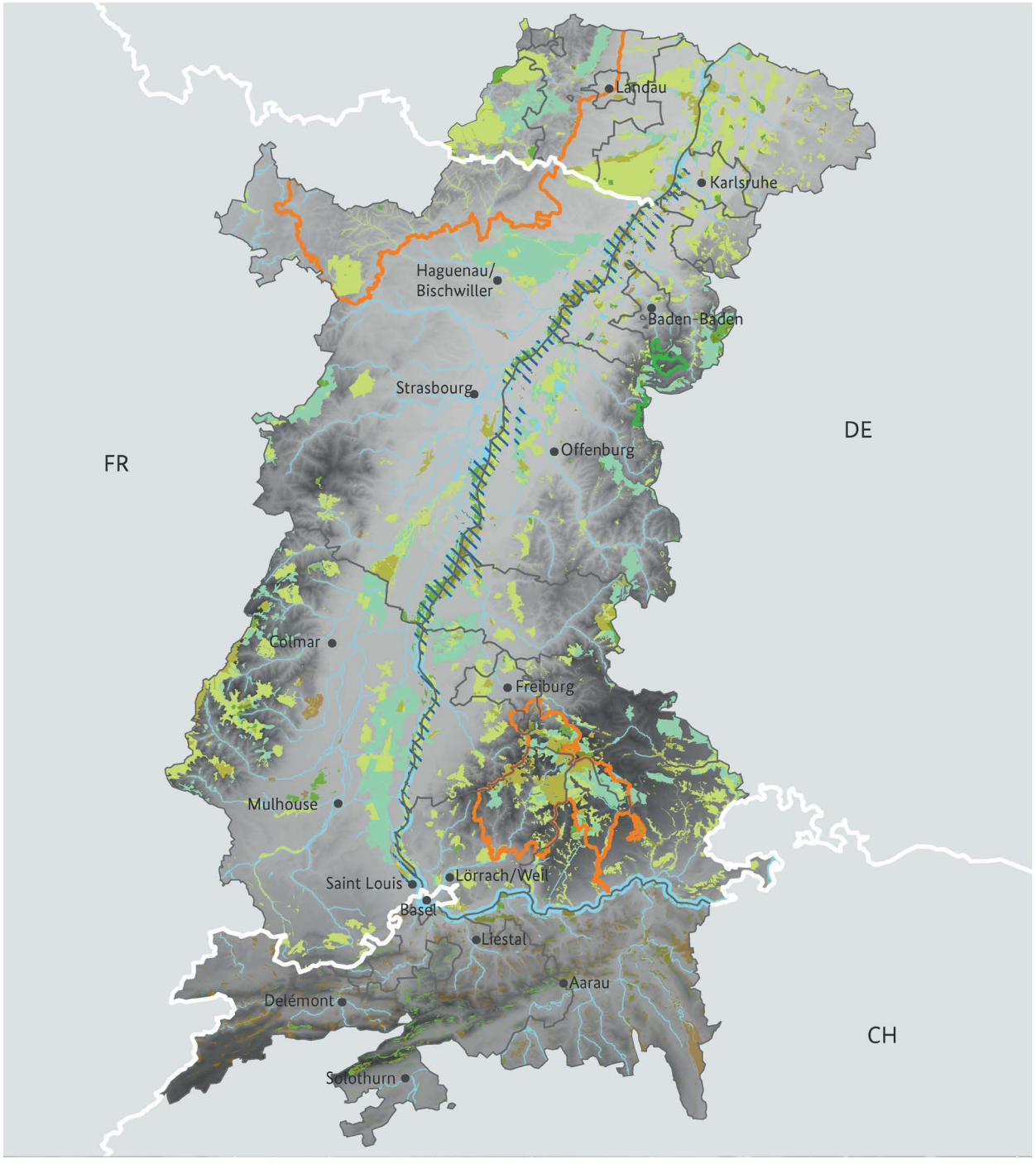
Nature reserves of national or regional importance are legally or contractually designated on the level of the relevant state or municipality. One special aspect in Switzerland is that each canton has its own system to protect areas worth preserving. Unlike France and Switzerland, there are no regional nature reserves in Germany. The focus of national nature reserves lies on protecting sections of the landscape that are important from the perspective of environmental protection or regional studies, as well as habitats and species. The areas shown on the map are nature reserves with an unlimited regulatory mandate and areas with contractually designated environmental protection.

National parks shown on the map are nationally or regionally regulated, with the aim of preserving the natural dynamics, as undisturbed natural processes as possible, scientific environmental monitoring, education with respect to nature and experiencing nature. The Black Forest National Park has existed since 2014 and is divided into northern and southern parts.

Protected forests are a separate category (and are classified in the two protection levels of "Bannwald" and "Schonwald"). On the German side, these forests are diversely distributed over small areas and functionally distinct, with the exception of a large area in the Palatinate Forest Biosphere Reserve. In France, the so-called "réserves biologiques forestières" are either exceptionally rare areas, have especially rich habitats or require special protection. In Switzerland, protected forests are designated in the Alpine regions.

The national and regional nature reserves, national parks and protected forests in the Trinational Upper Rhine Metropolitan Region cover an area of 1,064 km² (5.3 % of the region's total area).

Figure 3.17: Nature reserves in the mandate territory of the Upper Rhine Conference in 2016



Origin of data: GeoRhena, AE Ökologie und Naturschutz der ORK, DREAL, Cellule SIG Région Grand Est, Région Grand Est, LUBW, République et Canton du Jura, Kanton: BS, BL, SO, AG

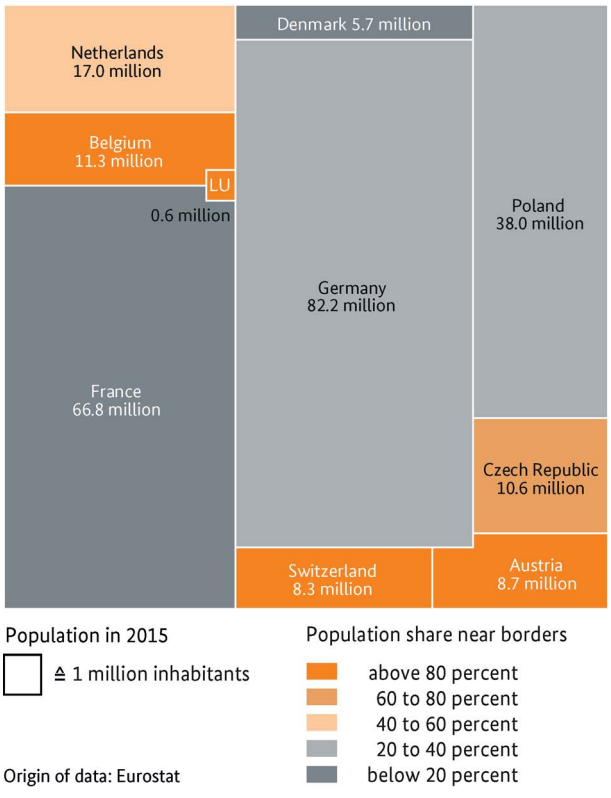
4 Demography

Societies and their spatial organisation are characterised by human activities, whereby demographic processes play a key role. Changes in the population size and structural composition, for instance with respect to age, gender and nationality, have an influence on spatial structures and determine the development of countries, regions and cities. Today, large areas of Germany and its neighbouring regions are affected by demographic change. At the same time, spatial mobility of many people has increased and the amount of cross-border migration has risen. This chapter investigates population development since the 1960s and in the recent past, the natural and spatial population changes and their effects on the overall population's proportion of foreign citizens, as well as their age structures, focusing particularly on border regions.

4.1 Population near borders

In terms of population, Germany is Europe's largest country, with approximately 82 million inhabitants. Together, the nine neighbouring countries comprise about twice as many inhabitants as the population of Germany (Figure 4.1). The Federal State of North Rhine-Westphalia, which is the most populous state in Germany, (approx. 18 million inhabitants), already has a higher population than the neighbouring Netherlands (approx. 17 million inhabitants). The next largest German federal states of Bavaria (approx. 13 million inhabitants) and Baden-Wurttemberg (approx. 11 million inhabitants) have larger populations than the neighbouring countries of Belgium (11 million inhabitants), the Czech Republic (10.5 million inhabitants), Austria (8.7 million inhabitants), Switzerland (8.3 million inhabitants) and Denmark (5.7 million inhabitants). Germany's neighbouring countries with the largest population are France (approx. 67 million inhabitants) and Poland (approx. 38 million inhabitants), while the smallest neighbouring country is the Grand Duchy of Luxembourg (approx. 0.6 million inhabitants).

Figure 4.1: Population in Germany and its neighbouring countries in 2015

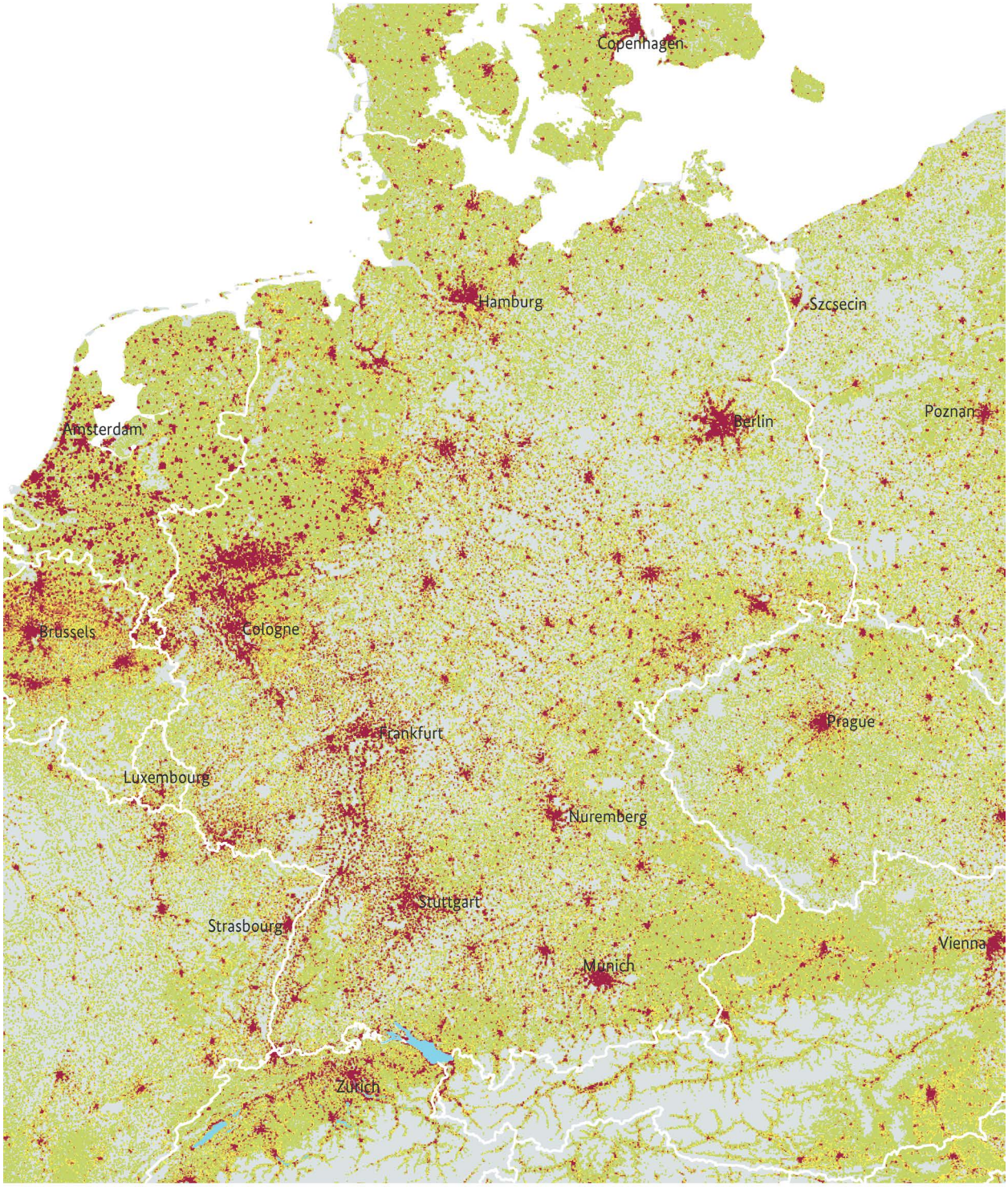


Origin of data: Eurostat

Figure 4.2 presents population densities on a small scale. 23.5 million people in Germany live near a border, representing 29 percent of the population. In this context, living near a border is defined as being resident up to 50 km from a land border with a neighbouring country. As a result, a higher proportion of people live near borders in countries that cover a small area than in those with a larger territory. Thus, practically all inhabitants of Luxembourg live near a border. In Belgium and Switzerland, the proportion is still 90 percent, while 80 percent of Austrians also live near a border. In the Czech Republic (62 %) and the Netherlands (56 %), more than half of the population also lives near a border.

The proportion of people living near a border is significantly lower in countries with large territories, such as Poland (25 %) and France (19 %). The lowest proportion is in Denmark (5 %), because its territory only has one short land border to the south (with the German Federal State of Schleswig-Holstein) that can be applied to this definition of living near a border.

Figure 4.2: Population density in Germany and its neighbouring regions in 2011



Population density in 2011

- above 1,000 inhabitants/km²
- 500 to 1,000 inhabitants/km²
- 250 to 500 inhabitants/km²
- 100 to 250 inhabitants/km²
- 1 to 100 inhabitants/km²

0 50 100 km

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Origin of data: GEOSTAT population grid 2011 (Eurostat, EFGS, Bundesamt für Statistik (BFS), Statistics Netherlands)
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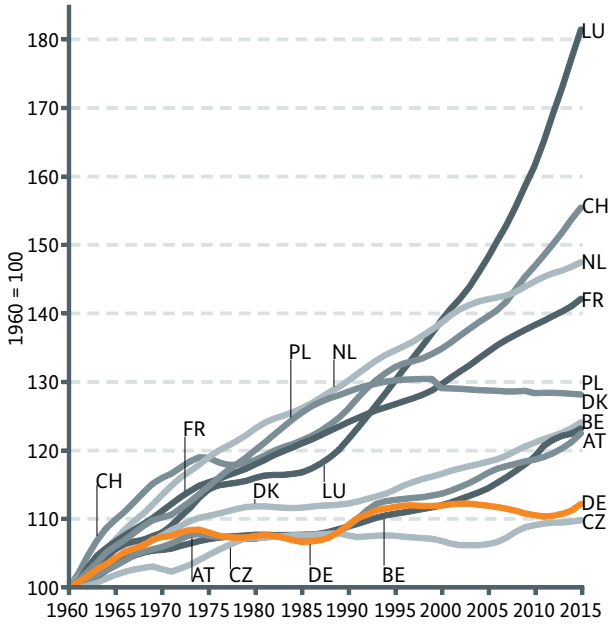
4.2 Population development since 1960

Between 1960 and 2015, population sizes have increased in Germany and its neighbouring states. The relative population increase was higher in almost every country compared to Germany, which has experienced a population growth of 12 percent in the last 55 years (Figure 4.3). The only exception is the Czech Republic, which has had a lower population growth rate than Germany at 10 percent. In Austria, Belgium, Denmark and Poland, population increased by 22 to 28 percent. Significantly higher growth rates were recorded in France (+42 %), the Netherlands (+47 %) and Switzerland (+55 %). The Grand Duchy of Luxembourg (+81 %) has seen the largest population increase; according to current forecasts, it is expected that by 2020, it will have doubled its population size compared to 1960.

The highest growth rates occured in the 1960s (Figure 4.4). This is firstly the result of the natural positive population development of the time, when the birth rate was higher than the death rate. Secondly, not only in the then Federal Republic of Germany, but also in the other western European countries, workers from the Mediterranean region were invited on a massive scale to work there. In Germany, Austria, Switzerland and the Netherlands, the population of a large number of regions grew more rapidly in the 1960s than in any subsequent period. The dynamic change was only surpassed in some regions in northern Germany, Rhineland-Palatinate and Bavaria in the 1990s after the collapse of Communism.

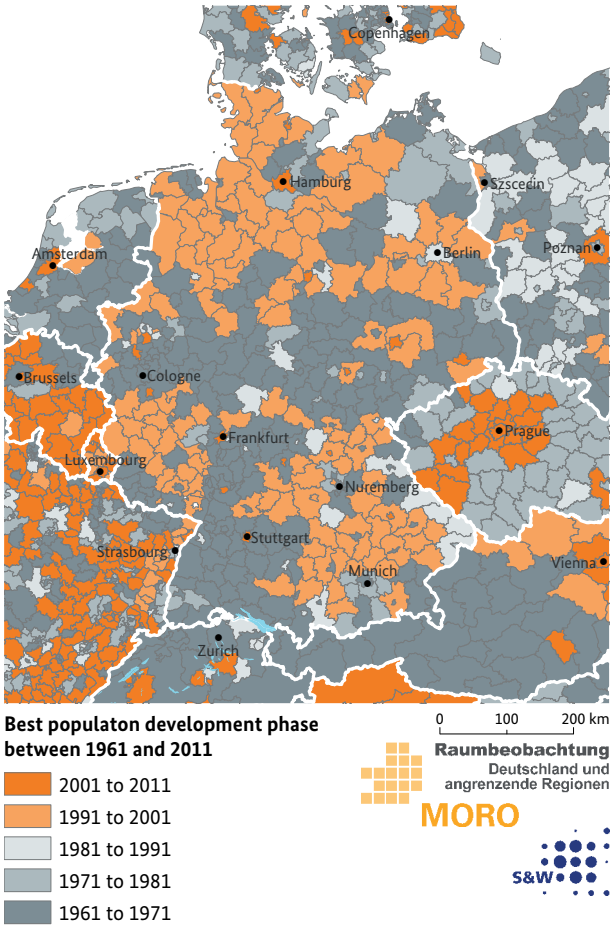
In Belgium, Luxembourg and eastern France, most regions have experienced their strongest population growth in the recent past. In the Czech Republic, many regions grew relatively quickly in the 1970s, but the current dynamic population development in Prague, central Bohemia and Plzeň is the strongest. By contrast, the patterns in Denmark and Poland are relatively heterogeneous.

Figure 4.3: Population development since 1960 in Germany and its neighbouring countries



Origin of data: Eurostat (smoothed values)

Figure 4.4: Ten-year period with the best population development in the regions between 1961 and 2011



Origin of data: Calculation by S&W based on Eurostat data
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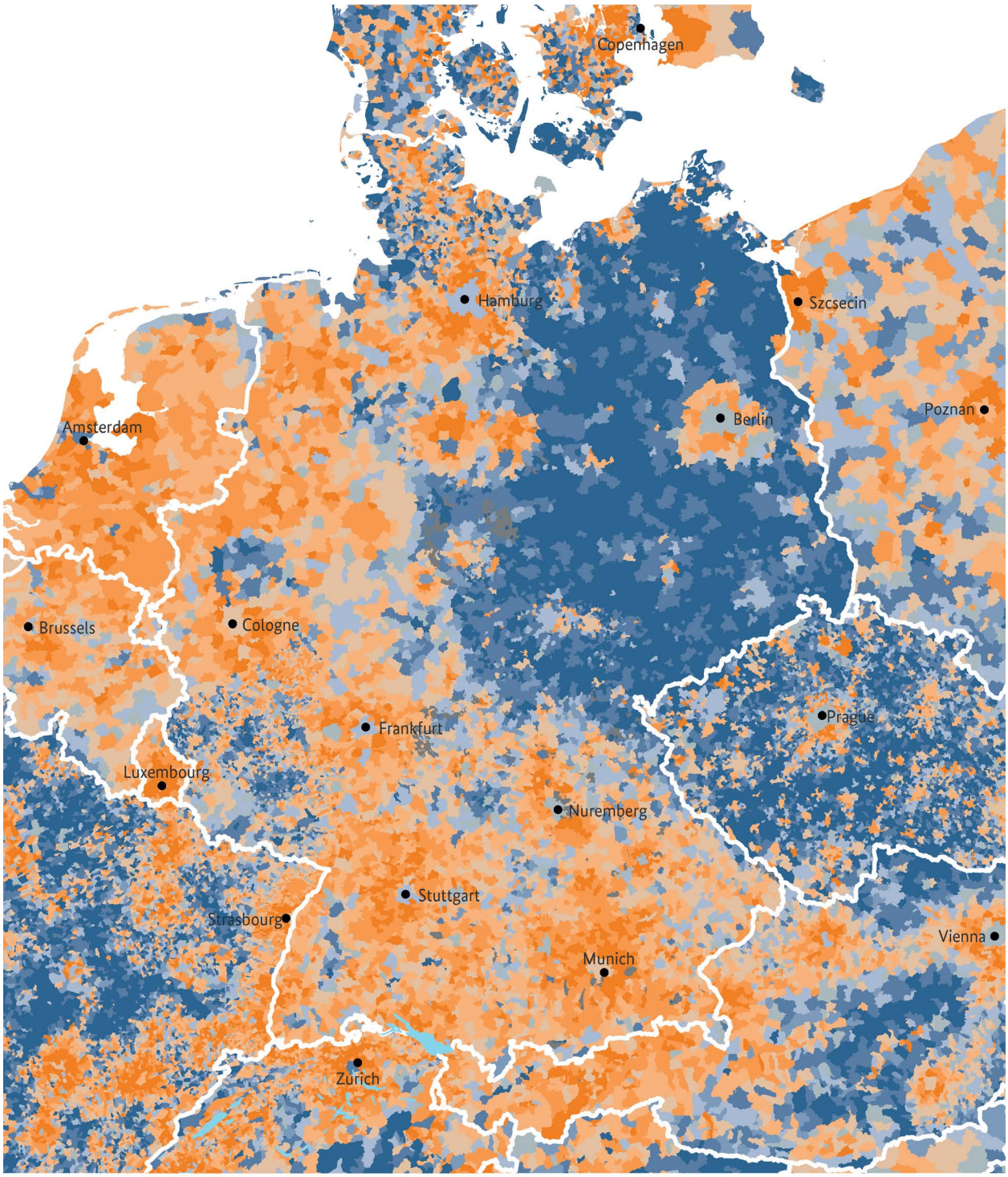
Figure 4.5: Population development in the municipalities of Germany and its neighbouring regions between 1961 and 2011



Origin of data: European Comission, Directorate-General for Regional and Urban Policy (REGIO), Historical population data, Eurostat, Statistical Offices of EU Member States

Only in France, Luxembourg and the Netherlands is the population development since 1960 characterised by a constant increase in size. In Germany and its other neighbouring countries, the overall positive population development mostly included individual interim periods with falling population figures. Especially in the mid-1970s, most western European countries experienced declining population levels. As a result of economic recession, a large number of foreign workers who had been invited in the 1960s returned to their homelands. At the same time, there was a significant decline in birth rates, which has continued to this day. In Germany, there have been more deaths than births every year since 1972.

The 1980s were characterised by a renewed rise in population figures as a result of the economic upturn and migration. A clear turnaround occurred with the fall of the "Iron Curtain" and the beginnings of open borders in Europe. In the 1990s, population figures rose in western and northern European countries especially through migration from the former Socialist states in central and eastern Eu-rope. The attraction and success of the European Union led to sustained immigration to western Europe.

In Germany, the population reached more than 80 million for the first time in 1991, although it had decreased in its eastern part. In Poland and the Czech Republic, the population change is also negative; Poland's population size had risen by 30 percent since 1960, but has been falling since the late 1990s. Poland is Germany's only neighbouring country with a continuously shrinking population. While the Czech Republic also experienced declining population numbers between 1989 and 2003, its population has been growing steadily since the country joined the EU in 2004, especially in the region around its capital city.

Looking at the development of municipal populations, there are distinct differences. Large areas with similar development tendencies can be detected (Figure 4.5). Within Germany, the fundamentally contrary development in western and eastern regions is striking. The GDR was an emigration country until the Berlin Wall was built in 1961 and this continued to be so in eastern Germany since German reunification. Almost all cities, towns and municipalities there have seen dwindling populations – with only a few exceptions, such as Berlin and Potsdam. Some areas in western Germany continue to be affected by shrinking populations, such as the Ruhr region, which is undergoing structural transformation, some coastal areas of Schleswig-Holstein and rurally structured communities in Rhineland-Palatinate. Some of those shrinking municipalities are situated near borders with Belgium, Luxembourg or France.

Communities with disproportionally high population growth rates can be found in the areas around major cities and regional centres, where regional growth belts are clearly recognisable. In the neighbouring countries, that applies to Copenhagen, Szczecin, Poznan, Prague, Vienna, Linz, Salzburg, Innsbruck, Zurich, Basel, Colmar, Strasburg, Nancy, Metz, Luxembourg and Randstad in the Netherlands.

The population on both sides of the German border has developed in highly contrasting ways, especially along the German-Polish border. The most striking contrast in development between 1961 and 2011 exists in the north: while in the German communities in West Pomerania and Brandenburg, the population has shrunk (sometimes considerably), the region of West Pomerania in Poland, with Szczecin at its centre, has grown significantly. Similarly contrasting developments can also be seen along the German-Luxembourg and Bavarian-Czech borders, the latter though with an inverse trend: the German communities are growing while the Czech municipalities have fewer inhabitants.

Within the neighbouring countries, there are differences in population dynamics, especially in eastern France, the Czech Republic and Austria. While French communities grew near the German-French border along the Rhine and in metropolitan regions, communities in the rural areas inbetween are characterised by falling population numbers. Almost everywhere, small, peripheral communities located apart from major centres in the Czech Republic experienced population decline. In Austria, population decreased in northern Lower Austria and in the communities in the eastern Alpine foothills.

4.3 Recent population development since 2011

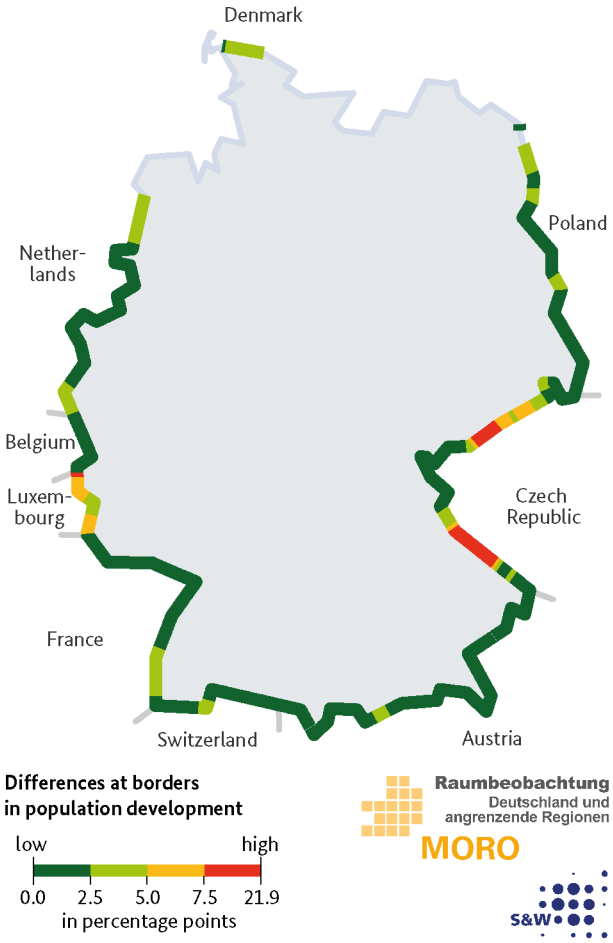
The latest trends in municipal population development between 2011 and 2015 are shown in Figure 4.7. The trend of growing metropolitan regions and shrinking rural areas continues. Thus it is currently particularly all the core cities in prosperous regions that are experiencing significant population growth as a result of migration. Particularly high growth rates were recorded in Copenhagen, Amsterdam, Berlin, Frankfurt (Main), Luxembourg, Stuttgart, Munich, Vienna and Zurich.

With respect to the border regions, specific patterns of population development are evident (Table 4.1 and Figure 4.6). The German-Danish border region is experiencing slight population growth on the German side and population decline on the Danish side. Along the German-Polish border, the extent of the formerly contrary population development has lessened; this is above all due to weaker population growth on the Polish side, where the majority of communities have shrunk in recent years.

The greatest population development divergence currently exists along the German-Czech border, whereby the following distinction must be made: while the population along the Saxony-Northern Bohemia border is decreasing on the German side and growing slightly on the Czech side, the population figures on the Bavarian-Czech border are relatively stable on the German side and diminishing significantly on the Czech side.

By contrast, the population development along Germany's borders with Austria, Switzerland and France is fairly balanced. Populations are largely growing at the same rate on

Figure 4.6: Population development at the borders between 2011 and 2015



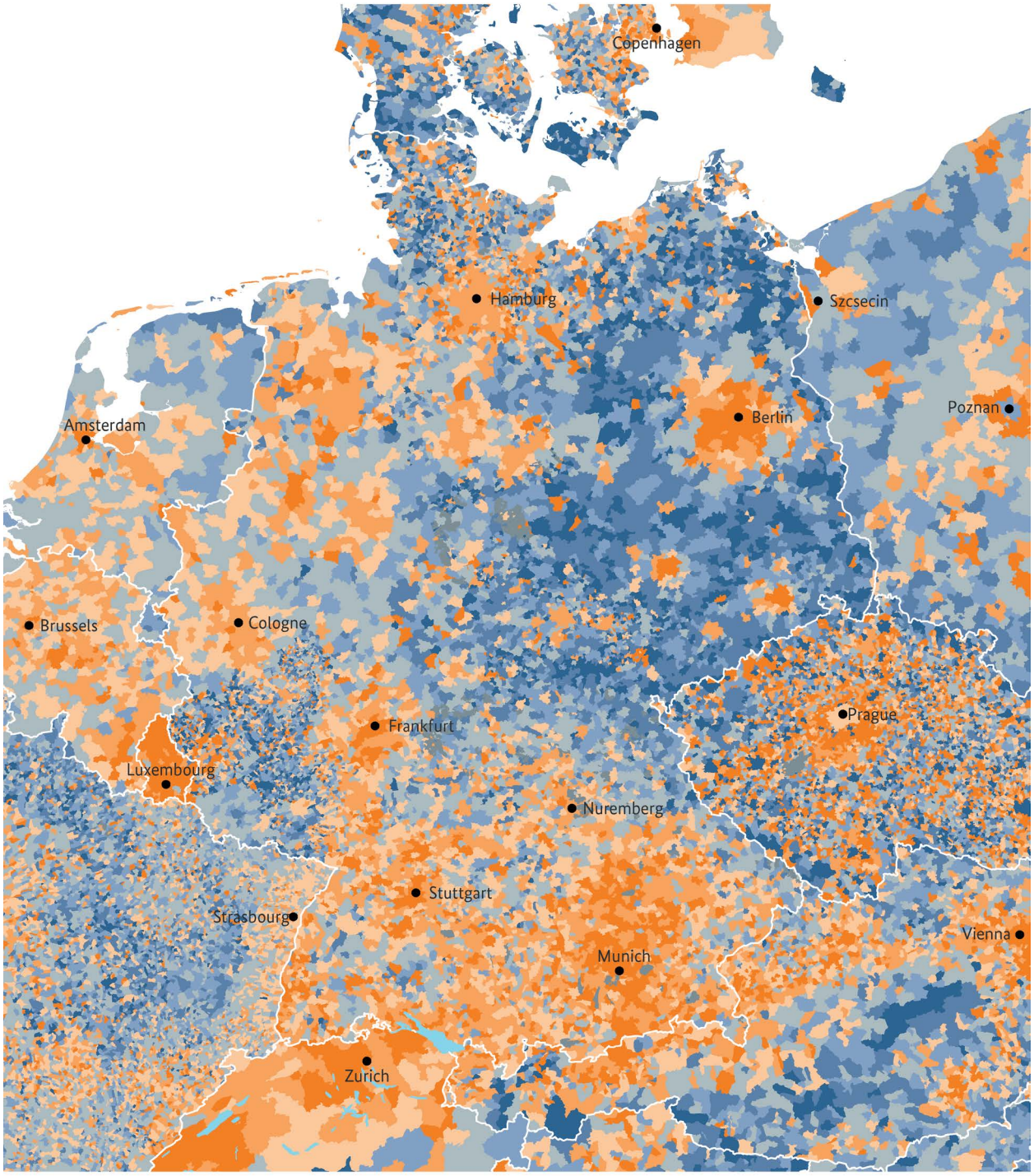
Origin of data: Calculation by S&W based on data from National Statistical Offices (LAU2)

Table 4.1: Relative population development in the border regions on both sides of the border between 2011 and 2015

Border regions between DE and...	DK	PL	CZ	AT	CH	FR	LU	BE	NL
Population development in the neighbouring country	+2.3 %	-0.3 %	+0.5 %	+3.4 %	+4.7 %	+2.3 %	+9.8 %	+1.9 %	+1.5 %
in border regions (< 50 km)	-1.7 %	-0.4 %	-8.4 %	+3.4 %	+4.5 %	+0.7 %	+9.8 %	+1.4 %	+1.0 %
Population development in Germany	---------- +2.3 % ----------								
in border regions (<50 km)	+1.1 %	-0.8 %	-0.1 %	+3.4 %	+3.6 %	+2.4 %	+1.0 %	+2.4 %	+2.2 %

Sources: Calculation by S&W based on national statistical offices

Figure 4.7: Population development in the municipalities of Germany and its neighbouring regions between 2011 and 2015



Population development in municipalities between 2011 and 2015

- above +5,0 percent
- +2.5 to +5.0 percent
- +1.0 to +2.5 percent
- -1.0 to +1.0 percent
- -2.5 to -1.0 percent
- -5.0 to -2.5 percent
- below -5.0 percent
- Residents free area

0 50 100 km

Raumbeobachtung Deutschland und angrenzende Regionen

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Origin of data: Calculation by S&W based on data from National Statistial Offices (LAU2, CH=LAU1)

both sides of the border, while the relative growth in Germany is even higher than the national average. The population in the Grand Duchy of Luxemburg is growing very rapidly as a result of migration. Only a few German municipalities with good transport connections to Luxembourg share the strong growth trend of the Grand Duchy; most German communities in the German-Luxembourg border region are shrinking slightly.

The population development along the German-Belgian border is relatively balanced, where the German communities are growing somewhat faster than their Belgian counterparts. Near the German-Dutch border there has been a turnaround on the Dutch side in recent years: Dutch communities near the border, which experienced growth for many years, have been shrinking again in recent times. Between 2011 and 2015, the communities on the German side grew slightly or maintained their population sizes. In the northern border region (between the provinces of Groningen and Drenthe and the German Federal State of Lower Saxony) this led to opposing population dynamics.

4.4 Components of population development

Population development is mainly determined by two components, namely natural and spatial population movements. Natural population development is the result of fertility and mortality, i.e. it is the result of the relationship between births and deaths. Spatial population development is the result of changes of residence. It is calculated on the basis of migration.

Since the end of the baby boom period in the 1950s and 1960s, the fertility rate in Germany has remained significantly lower than 2.1 (Figure 4.8). In recent decades, Germany has had one of the lowest birth rates in the world, although for a time, Poland and the Czech Republic had even lower rates. According to the 2016 microcensus, one in five women in Germany remain childless. Only in the last six years has the fertility rate in Germany risen again. This is firstly due to the growing proportion of foreign women with a higher birth rate and secondly, there is a catch-up effect of postponed births because the average age of German women having their first child is rising. The current fertility rate in Germany is 1.5.

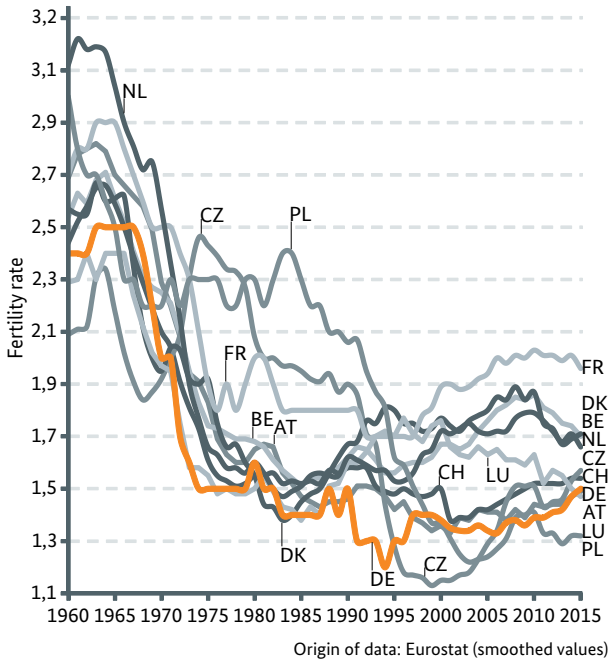
The fertility rate has not developed in the same way in all of Germany's neighbouring countries. In France, the fertility rate is by far the highest at 2.0, followed by Belgium, Denmark and the Netherlands, at 1.7. The decline in birth rates in those countries was less drastic than in Germany. By contrast, Poland and the Czech Republic experienced a dramatic fall in birth rates in the 1990s: Poland currently has the lowest fertility rate of all countries in this study, at 1.3. In the remaining neighbouring countries, the birth rate is comparable to Germany, where the fertility rate has been rising recently, as is the case for Denmark, the Czech Republic and Austria.

Life expectancy levels in Germany and its neighbouring regions are among the highest in the world. Thanks to the raised standard of living and medical and technical advances in the health sector, life expectancy has risen on average by 11 years in the last 55 years. Since the early 1990s, it has risen steadily in all countries by around 0.2 to 0.3 years per annum (Figure 4.9). Switzerland has the highest life expectancy, at 83 years, followed by France and Luxembourg, where average life expectancy at birth

i Fertility rate, life expectancy and migration balance

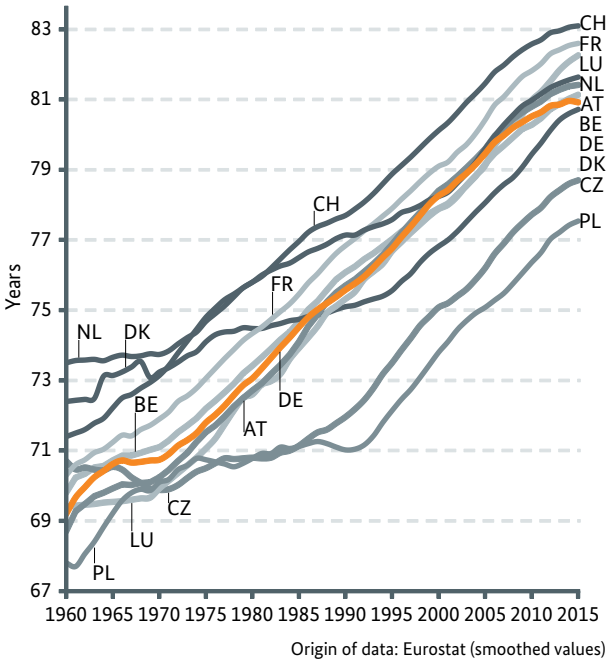
The *fertility rate* denotes the average number of children a woman bears during her lifetime. Mathematically, in modern societies with low infant and child mortality rates, each woman must have 2.1 children for the population to remain at a constant level by natural means.
Life expectancy at birth measures the average number of years a person will live if the mortality conditions at the time of birth remain constant throughout that person's life.
The *migration balance* is the sum of people moving to and out of a country or region. A positive migration balance represents an immigration gain (net immigration), while a negative migration balance signifies an emigration loss (net emigration).

Figure 4.8: Fertility rates in Germany and its neighbouring countries since 1960



Origin of data: Eurostat (smoothed values)

Figure 4.9: Life expectancy in Germany and its neighbouring countries since 1960



Origin of data: Eurostat (smoothed values)

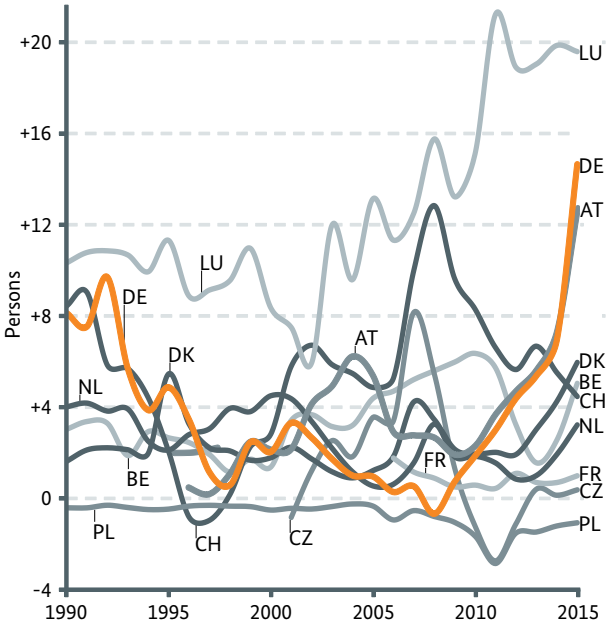
is over 82 years. In Germany, Denmark, Austria, Belgium and the Netherlands, average life expectancy at birth is around 81 years. Within Belgium however, there are significant contrasts between the Flemish and the Wallonian region: Flanders has a rate of over 82 years, while Wallonia's rate is below 80 years.

While life expectancy in western European countries has risen almost constantly since 1960, a clear gap developed with respect to Poland and the Czech Republic in the period between 1975 and 1990. Current average life expectancy in Poland and the Czech Republic is 77.5 and 78.7 respectively, the lowest rates of the countries in this report. Significant regional differences therefore developed along the border with Poland and the Czech Republic. Life expectancy at birth on the German side is up to three and a half years longer than on the Polish or Czech side.

Figure 4.10 presents the development of the relative migration balance per 1,000 inhabitants since 1990 for Germany and its neighbouring countries. The national migration balance has experienced certain fluctuations. In Germany, the net immigration in the early 1990s was very high: in the peak year of 1992, around 800,000 migrants and refugees immigrated to Germany. Restrictions to asylum law and the high unemployment rate led to a less positive migration balance in the following years. In 2008, when the economic crisis broke out, there was even a negative migration balance. Since 2009, immigration has been rising again significantly. The reason for this is the strong growth primarily in the number of refugees from war and crisis zones, as well as citizens from the European Union seeking employment in Germany. 2015 experienced the peak to date in terms of international refugee immigration, when around 900,000 people sought shelter in Germany. One reason for the increase in inner-European migration is the freedom of movement of labour within EU states. Since 2011 and 2014 respectively, that has also applied to people from countries that joined the EU in 2004 and 2007 as the European Union expanded eastwards. As a result of opening the labour market, Poland and the Czech Republic lost part of their populations in 2011 and 2012 through emigration.

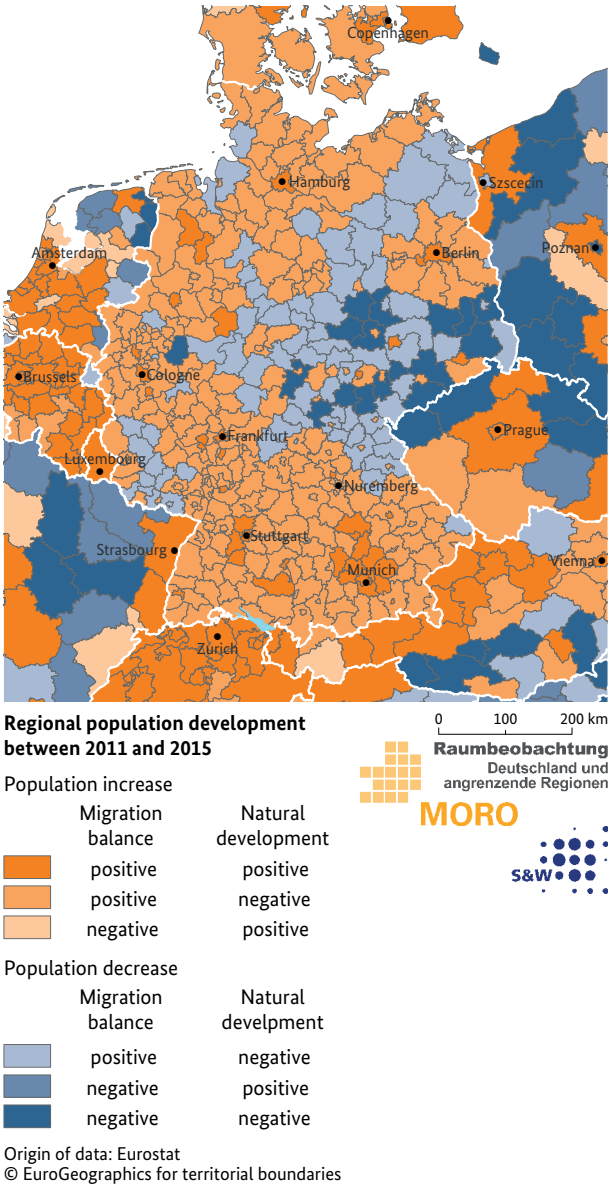
In recent years, only a few of Germany's neighbouring states experienced a comparably intense increase in net immigration per 1,000 inhabitants, namely Austria and (to a considerably lesser extent) Denmark, Belgium and the Netherlands. In Switzerland, which experienced strong immigration growth in the 2000s, the immigration rates

Figure 4.10: Migration balance per 1,000 inhabitants in Germany and its neighbouring countries since 1990



Origin of data: Eurostat (smoothed values)

Figure 4.11: Influence of individual components on regional population development between 2011 and 2015



Origin of data: Eurostat
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have been falling since 2009. Nevertheless, Switzerland, like Germany and almost all of its neighbouring countries, remains an immigration country. This is particularly the case for Luxembourg, with a net immigration rate of around 20 immigrants per 1,000 inhabitants, the highest in Europe. The only emigration country among Germany's neighbouring states is Poland, which has experienced an annual negative migration balance since 1990.

The influence of natural and spatial population components on population development in the regions is shown in Figure 4.11. Areas on the German border that are simultaneously growing due to their natural population development and their migration gains can be found in the greater Szczecin region, Austria, Switzerland, the Alsace, Luxembourg, Belgium and the southern Netherlands. On a small-scale, growing and shrinking regions are often situated close to each other. For instance Szczecin agglomeration, near the German-Polish border, and the Alsace region are growth centres, while other areas of West Pomerania and the Grand Est region are shrinking.

Regions near borders that shrink both due to their natural development and migration losses can be found in eastern Brandenburg, Saxony, western Poland, northern Bohemia and the northern Netherlands. In the majority of such cases, the population development is characterised by mutually weakening development trends. For instance it is not only in the regions of Germany that a negative natural development trend is combined with a positive migration balance. However, the migration gains cannot compensate for the surplus of deaths everywhere.

4.5 Foreign population

Germany and its neighbouring countries have highly contrasting proportions of foreigners in their overall populations (Figure 4.12). Generally, the proportion of foreigners in urban (metropolitan) areas is higher than in rural regions.

At the same time, on a larger scale, there are clear differences between levels in individual countries, with great variances. While the proportion of foreigners in the Polish population is below one percent throughout the country, it is over 45 percent in Luxembourg. In Vienna, large parts of Switzerland, Brussels, eastern Belgium with its German-speaking communities, Munich, Stuttgart, Nuremberg, Frankfurt (Main), Cologne and Düsseldorf, more than one in five people are foreign citizens.

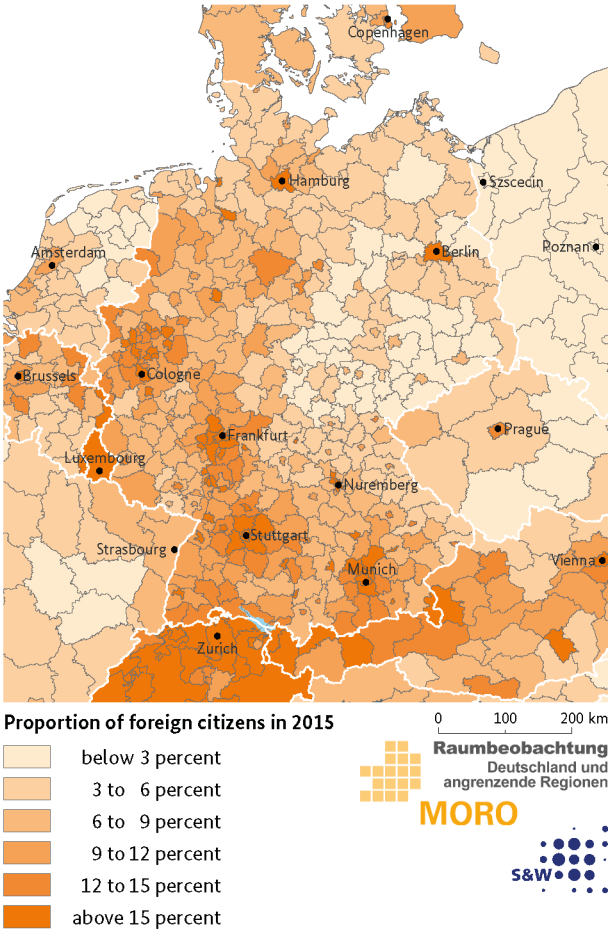
The rate is far lower at under three percent in southern and eastern Bohemia, the north-east of the Netherlands and parts of eastern France and eastern Germany. The proportion of foreigners in eastern Germany has risen slightly in recent years as a result of refugee immigration and is strikingly high along the German-Dutch border in the County of Bentheim (Grafschaft Bentheim, approx. 15 %) and in the rural district of Kleve (13.5 %); this is mainly due to the nearby border, because most foreign citizens living there are Dutch nationals. Similarly high values are seen on the German side in areas where the borders of three countries meet, such as the metropolitan region around Aachen (14.3 %), in the rural district of Lörrach (13.7 %), as well as along the German-Swiss border in the rural district of Konstanz (13.6 %), Tuttlingen (13.8 %) and in the district of Schwarzwald-Baar-Kreis (13.2 %), as well as in cities in the vicinity of borders.

In general, people decide to emigrate for socio-economic and political reasons. A distinction should be made between migration by EU citizens within the European Union, who are free to move around the entire EU-region, and citizens of non-member countries who often immigrate due to social and political instability in their country of origin. In 2015, 2.4 million citizens of non-member countries immigrated into the European Union.

Labour movement with the aim of better employment opportunities and higher wages is the most significant form of internal EU migration. It is followed by changes of residence mostly to areas near the border in a neighbouring country. This primarily occurs when real estate prices and the cost of living is significantly lower on the other side of the border compared to one's own country.

Currently, almost 2.4 million Polish citizens live abroad in an EU country or in Switzerland. The other two countries with the largest number of their citizens living abroad in an EU country or Switzerland are Germany (1.2 million) and France (821,000). In percentages, these proportions are highest in Luxembourg and Poland, both at over 5 percent (Figure 4.13), but for different reasons: while in the case of Poland this is due to labour migration, citizens of Luxembourg mainly move their residence to the

Figure 4.12: Regional shares of foreign citizens in 2015



Origin of data: National Statistical Offices (PL,HU,HR=2011, FR=2014)
Foreignsers are defined as persons without citizenship of the reporting country
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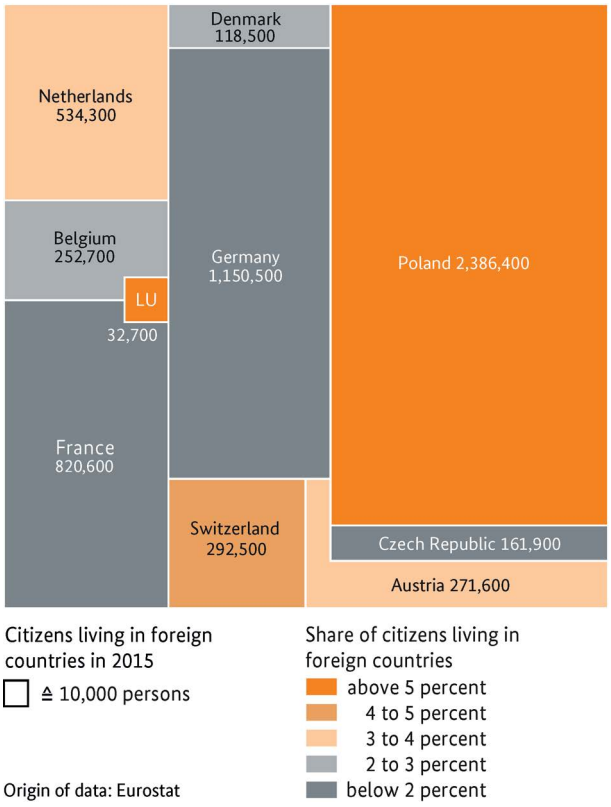
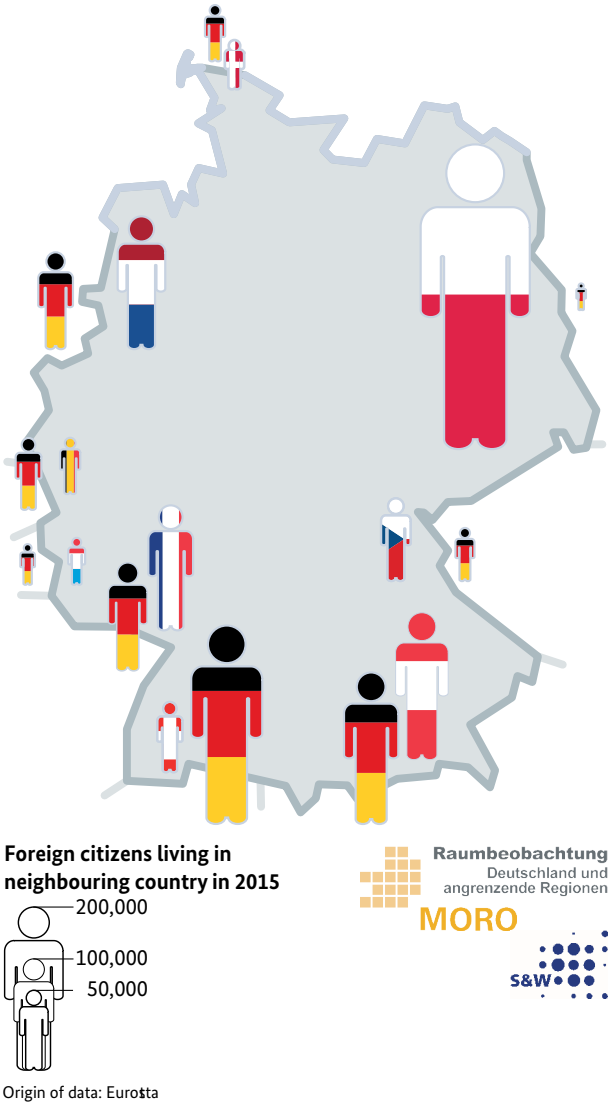
Figure 4.13: Citizens of Germany and neighbouring countries abroad (European Union plus Switzerland) in 2015



Origin of data: Eurostat

Figure 4.14: Number of foreign citizens in a neighbouring country in 2015



Origin of data: Eurostat

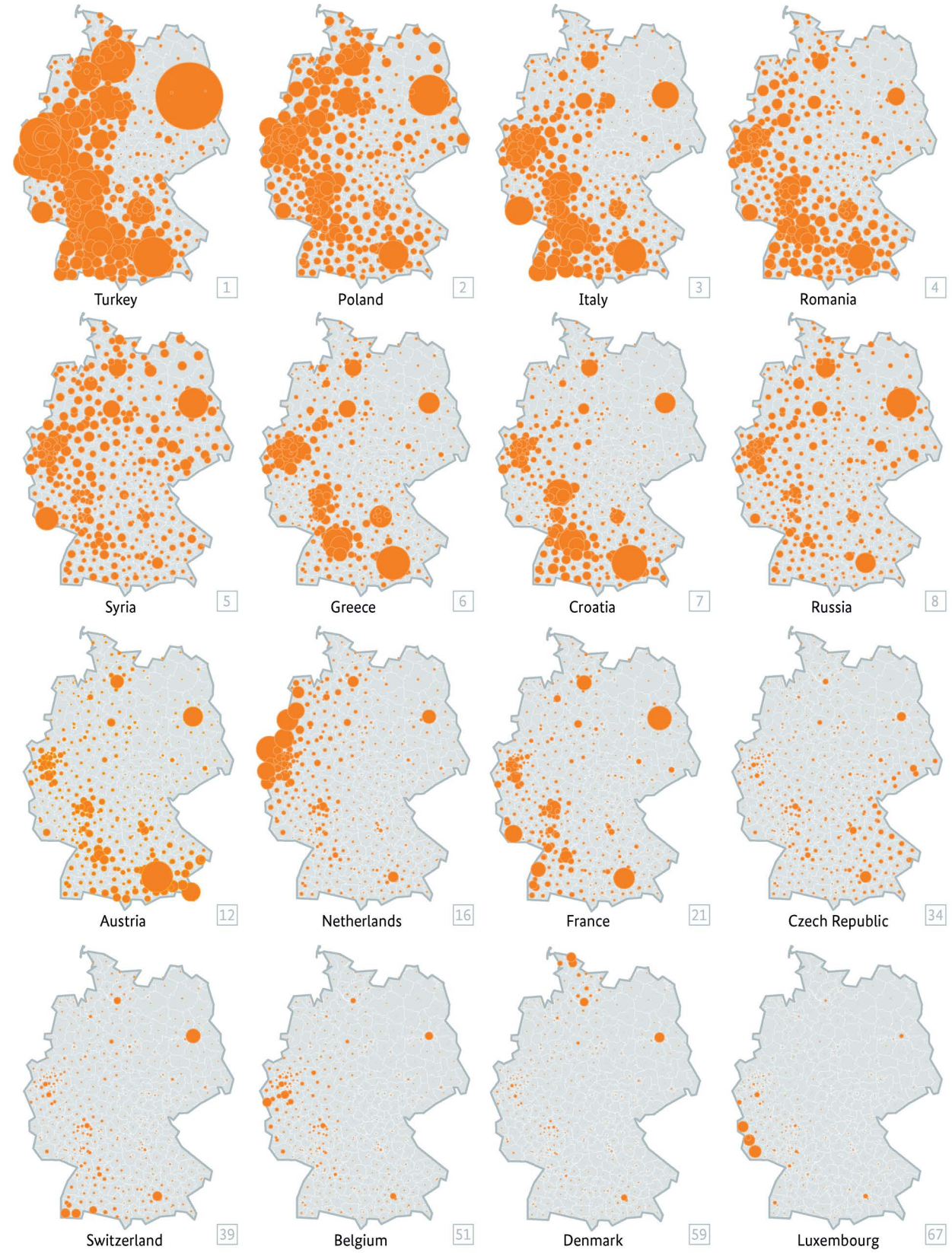
neighbouring Germany, e.g. to Trier or its surroundings. The Swiss also have a high relative proportion of citizens living in an EU country (4.5 %), while the corresponding rate for Germany, France and the Czech Republic (<2 %) is the lowest.

Most emigrants are of working age. If they come from Germany, they prefer German-speaking foreign countries (Figure 4.14). A comparison between Germany and its nine neighbouring countries with respect to the volumes of migration shows relatively balanced figures for almost all states. Very great imbalances only exist with respect to Poland and Switzerland: while over 700,000 Polish citizens live in Germany, only around 5,300 Germans live in Poland; the approximately 300,000 Germans in Switzerland compare with only around 40,000 Swiss citizens in Germany.

In Germany, 1.5 million Turkish citizens form the largest group of immigrants and mainly live in western Germany and Berlin (Figure 4.15). This distribution pattern is typical for many other immigrant groups, including the 700,000 Polish immigrants. Apart from living in Berlin, only few Poles live in Germany near the German-Polish border.

The majority of citizens of the remaining neighbouring countries have German residency near the border with their respective country. This is particularly striking in the case of Dutch and Luxembourg citizens settling in the respective regions near the border.

Figure 4.15: Foreign citizens by nationality in districts in Germany in 2015



Origin of data: Bundesamt für Statistik (Destatis), 2017, © GeoBasis-DE/BKG 2017 for territorial boundaries

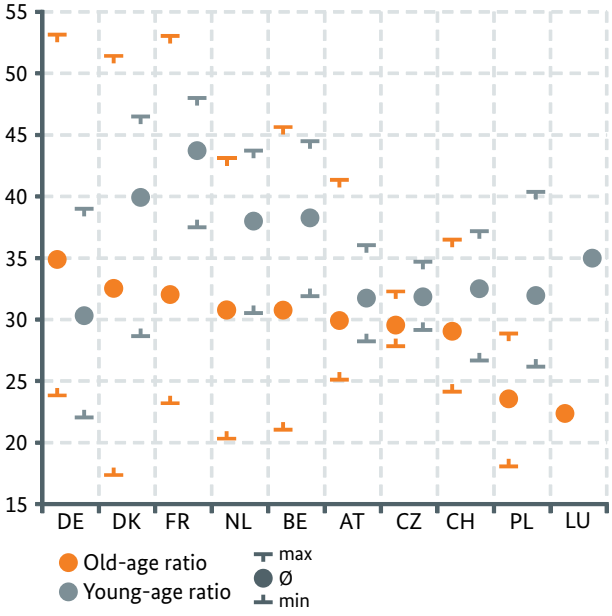
By contrast, the population distribution of Syrians, who very rapidly became the fifth largest population group in Germany, is relatively even. This is due to the application of the so-called Königstein Distribution Key with which refugees arriving in Germany are distributed between the country's federal states.

4.6 Population age structure

The populations of Germany and its neighbouring countries are ageing massively. Almost all municipalities are affected by long-term demographic ageing, albeit with different intensities. Structurally weak, peripheral regions are especially affected; work-related emigration firstly leads to the loss of important labour forces and secondly deprives the region of potential parents.

Only in the western and northern European metropolitan regions has the average age of the population not grown and remained unchanged between 2011 and 2015; in some parts, it even fell slightly due to educational and employment-related migration from within the country or abroad. The greatest benefit in this respect was experienced in major cities such as Berlin, Hamburg, Munich, Frankfurt (Main), Cologne, Vienna, Zurich, Brussels, Amsterdam and Copenhagen.

Figure 4.16: Young-age ratio and old-age ratio in NUTS 3 regions in Germany and its neighbouring countries in 2015



Origin of data: Calculation by S&W based on data from Eurostat

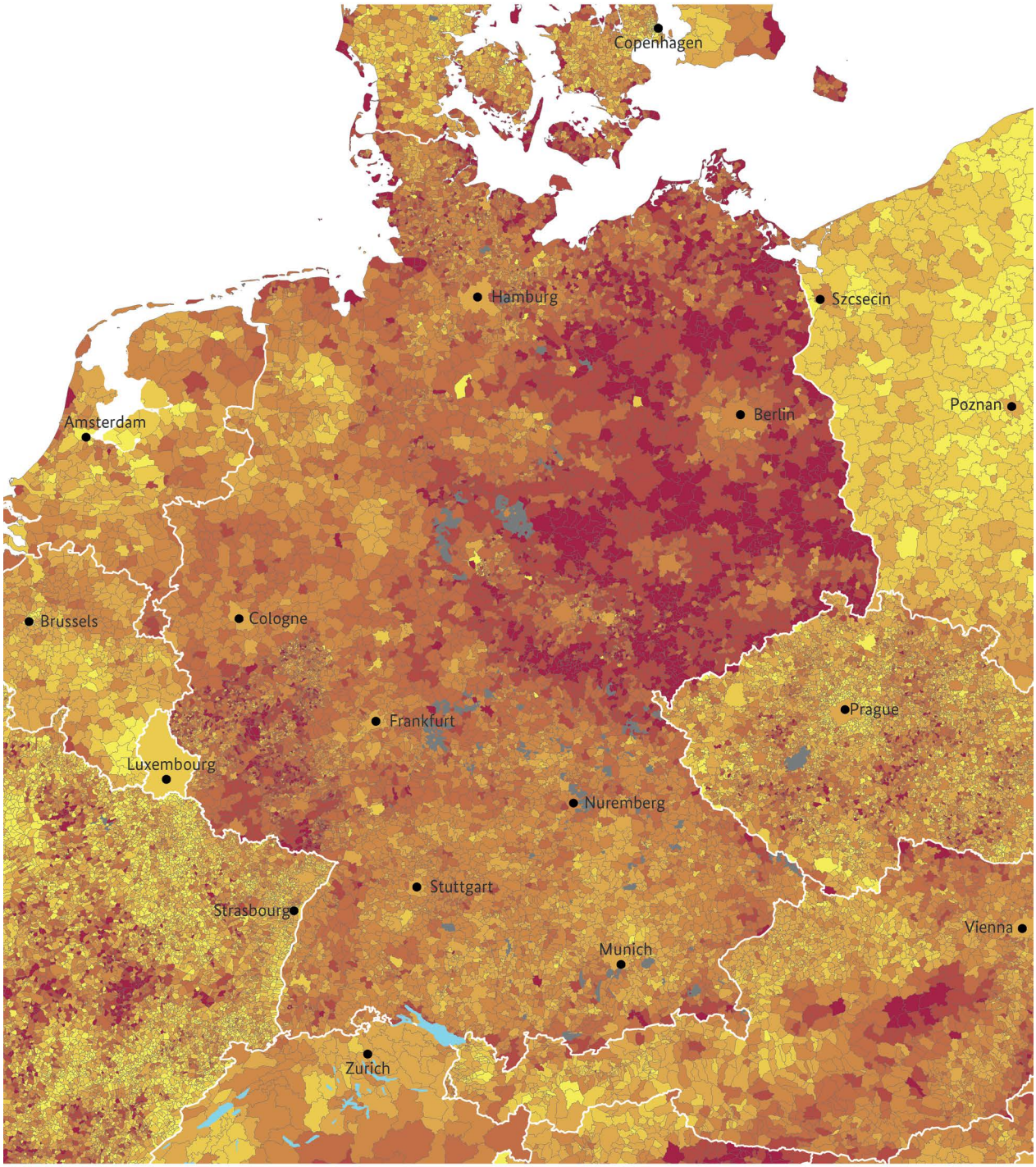
Germany's population is considerably older than the populations of its neighbouring countries (Figure 4.16). Compared to the neighbouring regions, Germany has the lowest proportion of young people and the highest proportion of older people. The population has a particularly high average age in the municipalities in eastern Germany, in the region of the former GDR (Figure 4.17). In some parts of the Federal State of Rhineland-Palatinate, on the Danish islands of Langeland and Lolland, in the Czech Republic and in eastern France, there are small rural communities with a predominantly older population structure. Furthermore, health resorts – on the coast, in the mountains or inland – have a relatively high proportion of older people.

There is a particularly strong age disparity along the border between Germany and Poland: a comparatively old population on the German side is on average six and a half years older than the population on the Polish side. A less striking, yet still notable contrast is evident along the German-Czech and the German-Luxembourg borders, while the age difference is relatively small along the German-Austrian and German-French borders. The average population age in the neighbouring border areas of Denmark, Switzerland, Belgium and the Netherlands is hardly younger than in Germany.

i Youth age, old age and dependency ratio

Youth age, old age and dependency ratios are demographic indicators to describe population structures. The *youth age ratio* shows the number of young people who are not yet of working age compared to the number of people of working age. The *old age ratio* indicates the number of older people who are no longer of working age compared to those of working age. The *dependency ratio* shows the number of people who are not of working age compared to those who are of working age. All three demographic indicators are based on age limits (below 15 years, 15 to 64 years, 65 years and above) and do not take aspects such as the actual ability to work or actual employment into account.

Figure 4.17: Average age in the municipalities in Germany and its neighbouring regions in 2015



Origin of data: Calculation by S&W based on data from National Statistical Offices (LAU2, HU,HR,LU=N3, CH=LAU1)

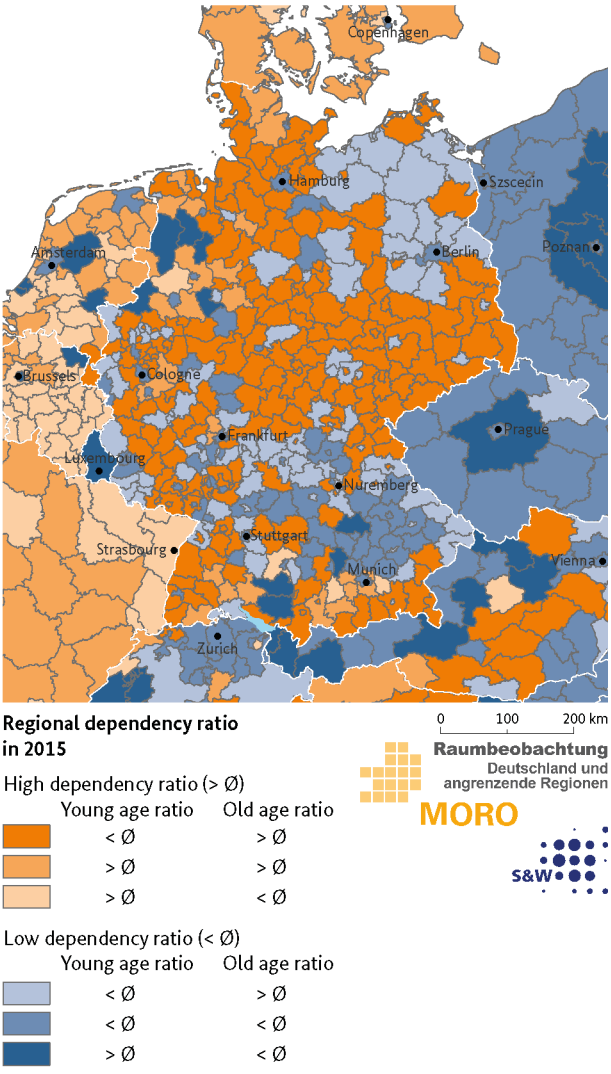
Often, Germany's border with its neighbouring countries also marks a boundary with respect to different trends in population development. The ageing structure of the population has an influence on the current and future care situation of a society and its competitiveness. Generally, both old age and dependency ratios show a rising trend. The higher the dependency ratio, the greater the social problems with respect to funding or generating the means for rising expenditure in services of general interest and social welfare.

An above-average dependency ratio exists in France and large parts of Denmark, Belgium and the Netherlands (Figure 4.18). Poland, the Czech Republic, Luxembourg and most Austrian and Swiss regions have a below-average dependency ratio.

In Germany, there are relatively contrasting conditions in the different regions: a very high dependency ratio of more than 70 per 100 people exists in Saxony, the Harz region, the coastal areas of Schleswig-Holstein and some parts of Lower Saxony. Lower dependency ratios can be found in the major cities and regional centres, as well as in large parts of Franconia, the Upper Palatine region and northern Upper Bavaria. The dependency ratio in the growth belt around Berlin and in large parts of Mecklenburg-West Pomerania is still below average, but nevertheless between 62 and 65 dependents per 100 persons.

Overall, the current dependency ratio in Germany is also moderate compared to neighbouring regions. This is expected to change noticeably in the near future. The low young age ratio in Germany, which currently masks a higher dependency ratio, combined with the progressive (over-)ageing of the population, could become a problem for Germany's further social and economic development.

Figure 4.18: Regional dependency ratio in 2015



Origin of data: Calculation by S&W based on data from Eurostat, Average values (dependency ratio 65.9, young age ratio 33.7, old age ratio 32.2) reflect Germany plus neighbouring regions

Population development in the Charlemagne Border Region

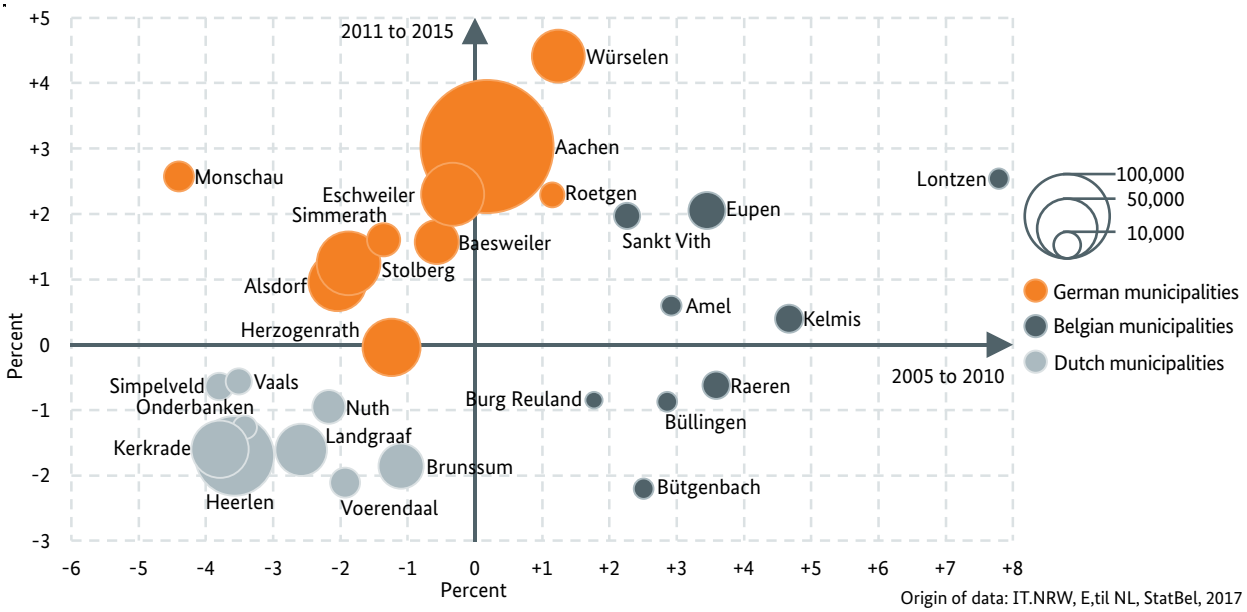
Approximately 890,000 people live in the 28 municipalities of the Charlemagne Border Region. It has a clear north-south structural alignment with respect to its population distribution, settlement structures and land use (Figure 4.20).

In the north-west, the Dutch and German communities from Eschweiler and Stolberg to Heerlen and Brunssum form a densely developed, cross-border urban network. The majority of the inhabitants of the Charlemagne Border Region, namely around 60 percent or 0.5 million people, live there on an area covering 30 percent of the overall region. These are the former Aachen and Limburg coal-mining areas, in which, based on the mine locations, the municipalities experienced their main growth during the peak period of coal-mining. After the mines' closure in the 1960s to 1990s, a deep-rooted, still ongoing structural transformation occurred, which was met by national adaptation programmes such as "Van zwart naar groen", IBA 2012-2020 in the Netherlands, the "Zukunftsinitiative Montanregionen", the "Zukunftsinitiative für die Regionen Nordrhein-Westfalens" and the transnational EuRegionale 2008 in Germany. Currently, mainly the innovative region of the Rhine coal-mining area, to which the German municipalities of the border region belong, is receiving support to manage the structural transformation in connection with the planned ending of brown coal surface mining, with targeted measures to support sustainable economic, landscape and urban development. On the Dutch side, the IBA Parkstad 2012-2020 is a comparable programme that goes even further with its pioneering measures. It clearly adds momentum to consistent regional development. The Parkstad has transposed this German format across the border to drive forward the structural transformation in all areas of the region in an innovative way. The aim is to use the broad participation of the population to activate new impetus and initiatives that would otherwise be impossible.

About 28 percent of the region's population live in the city of Aachen, which forms its regional centre. The settlement structure divides into northern, densely populated core area and southern, more agricultural and forestry-based transitional areas towards the Eifel region; thus the city belongs both to the northern and to the central parts of the region.

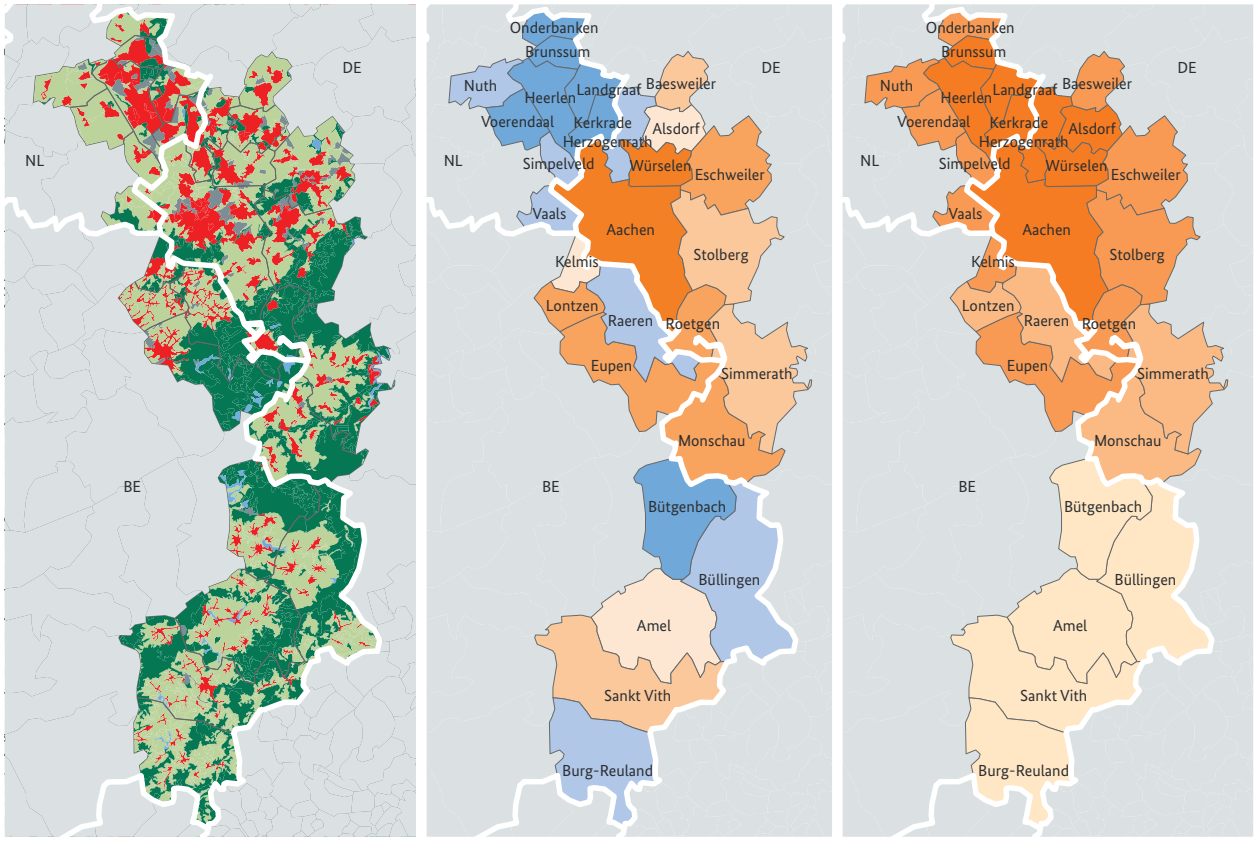
There is an area of small towns and rural districts in the region's central section, which covers the northern half of eastern Belgium with the capital city of Eupen and the southern communities of the StädteRegion Aachen (Aachen district). Covering a quarter of the region's overall territory, its population has a size of 83,000 people, representing nine percent of the region's total population. Structurally, the area is characterised by agriculture and forestry.

Figure 4.19: Municipal population development in the Charlemagne Border Region, 2011-2015 compared to 2005-2010



Origin of data: IT.NRW, E,til NL, StatBel, 2017

Figure 4.20: Land use, population density and development of the Charlemagne Border Region



Origin of data: CORINE Land Cover (CLC), 2012
IT.NRW, CBS NL, StatBel, Ministerium der Deutschsprachigen Gemeinschaft/Ostbelgien
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Several dams ensure the water supply for large parts of the region. The southern part of the Charlemagne Border Region is inhabited by approximately 30,000 people or just over three percent of the overall population. The sparsely populated area in the southern half of eastern Belgium is mainly characterised by agricultural and forestry-orientated communities; the area covers more than a third of the overall area of the Charlemagne Border Region.

The population development of the Charlemagne Border Region has a heterogeneous spatial pattern (Figure 4.20, centre). The Dutch communities are losing inhabitants, while the StädteRegion Aachen has population gains. The eastern Belgian communities are developing heterogeneously. A comparison between the periods of 2005-2010 and 2011-2015 also indicates a change in dynamics (Figure 4.19):

→ The Dutch communities are the only group that have experienced declining population numbers throughout both periods. The reason for this includes young people moving to areas of the Netherlands that are more attractive to that population group (a long-term consequence of structural transformation) – resulting in a loss of potential family-founders. Another consequence is an over-ageing population.

→ Between 2005 and 2010, the eastern Belgian municipalities had a consistently positive population development, which has also continued in its northern half and the larger municipalities in the south during the period between 2011 and 2015. By contrast, the remaining communities in the southern half and the municipality of Raeren recently experienced declining population figures.

→ Between 2005 and 2010, municipalities in the urban region of Aachen experienced both growing and shrinking trends, followed by a largely positive population development. The two major universities there, with their technological competences, form one basis of that development, making Aachen more attractive as a residential, economic and educational location.

5 Economy and trade

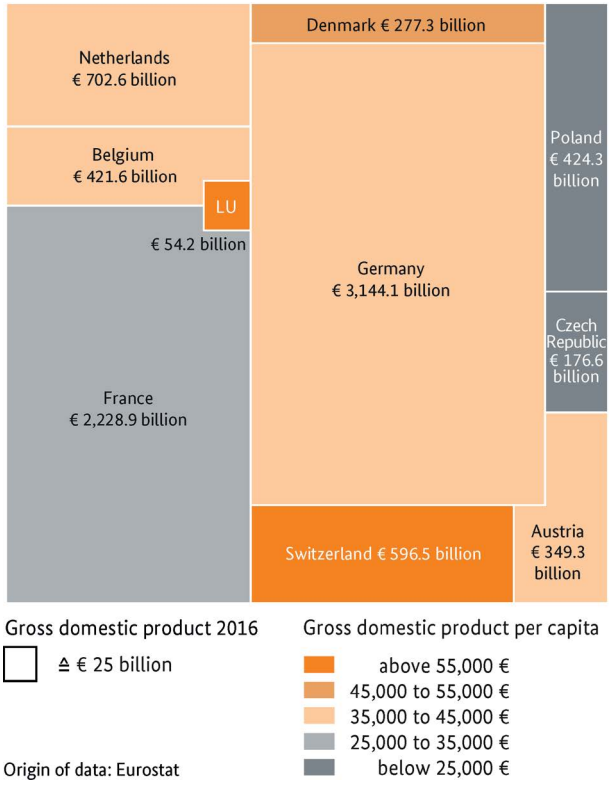
The production and exchange of goods and services are decisive for prosperity and there is evidence that long-distance trade has existed since ancient times. International economic relationships have spread massively as a result of globalisation and due to a reduction in the number of customs barriers. Today the national economies and markets are more intertwined than ever. Yet there are differences between countries with respect to performance capacity and their level of specialisation. This chapter presents economic performance and economic growth, cross-border trade between neighbouring regions and the differences in prices and incomes between the respective regions.

5.1 Economic performance and growth

Based on its gross domestic product (GDP) in 2016, Germany is the largest national economy in Europe and the fourth largest economy in the world. Its nominal economic performance was € 3,144 billion, representing a GDP per capita of € 38,100 (Figure 5.1).

The economic performance of Germany differs strongly from some of its neighbouring countries. In 2016, France, the next strongest neighbouring state of Germany, was the third-largest national economy in Europe, with a GDP of € 2,229 billion and the sixth largest in the world. France's GDP per capita is € 33,300, which is lower than in Germany and almost all of Germany's neighbouring countries. Only the Czech Republic (€ 16,700) and Poland (€ 11,000) have much lower values. The GDP per capita in Belgium (€ 37,400), Austria (€ 40,000) and the Netherlands (€ 41,300) are roughly on a par with Germany, while the figure in Denmark is around a quarter higher (€ 48,400). Switzerland (€ 71,200) and Luxembourg (€ 92,900) have by far the highest GDP per capita. In Luxembourg, the GDP per capita was thus almost two and a half times the German figure, more than five times as high as the Czech Republic and over eight times as high as Poland.

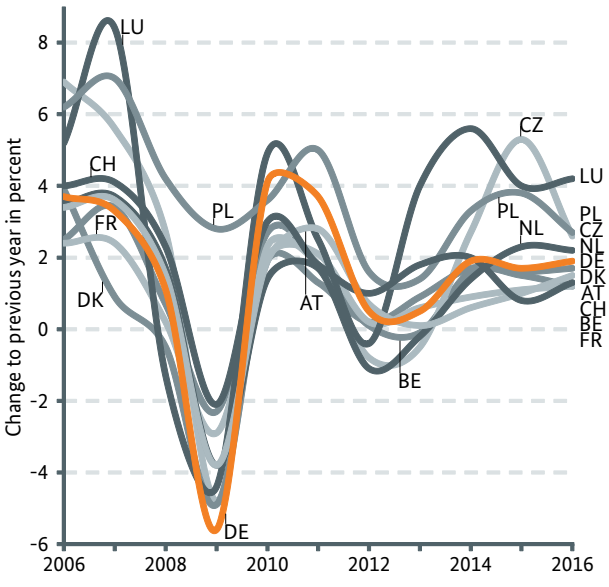
Figure 5.1: Gross domestic product in Germany and its neighbouring countries in 2016



Origin of data: Eurostat

The development of the real-terms GDP in Germany and its neighbouring countries shows that all national economies with the exception of Poland shrank in 2009 as

Figure 5.2: Development of the real-terms gross domestic product in Germany and its neighbouring countries since 2006



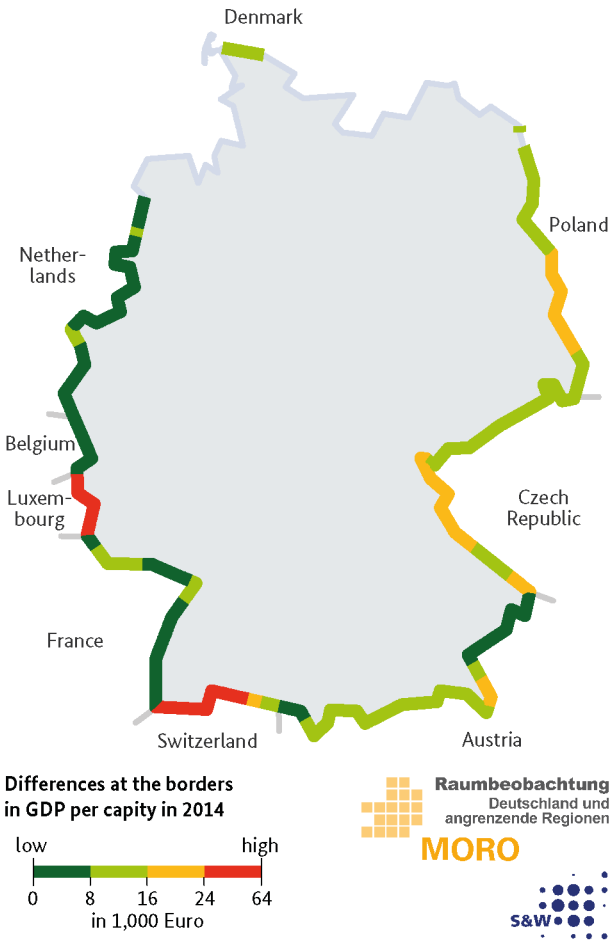
Origin of data: Eurostat (smoothed values)

a result of the global financial and economic crisis (Figure 5.2). Germany's economy was particularly affected for a short time in 2009. But even from the following year onwards, all national economies once again showed positive developments. That recovery was only interrupted for a short time and in individual countries by the so-called Euro crisis. For three years now, all national economies have achieved positive annual change rates. The highest real growth rates in 2016 were achieved by Luxembourg (+4.2 %), Poland (+2.7 %) and the Czech Republic (+2.6 %). Also in the Netherlands (+2.2 %), the growth rate was higher than in Germany (+1.9 %). Lower relative growth rates occured in Switzerland (+1.3 %), France (+1.2 %) and Belgium (+1.2 %).

There is also an uneven spatial distribution of economic power. There are clear differences between rich and poor regions. In Germany, there are economically powerful agglomerations in the south (e.g. Munich and Stuttgart) and west (e.g. Frankfurt a. M., Düsseldorf). These are hotspots of economically important industrial and service corporations with high demand for highly qualified labour. Structurally weaker regions such as the south-western Palatinate, the Märkisch-Oderland or the Ore Mountains in Saxony have few companies with innovative drive, are sparsely populated and are often situated near a border.

In 2014, the GDP per capita in border regions was lower compared to the national average (Table 5.1). That trend applied equally to the German border regions and most border regions in neighbouring countries. Only in Switzerland and Austria GDP per capita was higher near the border with Germany than the respective national averages. There, possible adverse effects of being located near a border are more than compensated by the economic performance of metropolitan regions that are already close to borders, such as Basel, Zurich, Innsbruck and Salzburg.

Figure 5.3: GDP per capita near borders in 2014



Origin of data: Calculation by S&W based on data from Eurostat, BFS and National Statistical Offices (LAU2)

Table 5.1: GDP per capita in the border regions on both sides of the border in 2014

Border regions between DE and...	DK	PL	CZ	AT	CH	FR	LU	BE	NL
GDP per capita in the neighbouring country	47,000 €	10,700 €	14,900 €	38,700 €	64,800 €	32,300 €	88,300 €	35,900 €	39,300 €
in border regions (< 50 km)	46,800 €	9,700 €	11,400 €	41,900 €	74,100 €	28,600 €	88,300 €	25,400 €	31,800 €
GDP per capita in Germany	----------	----------	----------	----------	36,100 €	----------	----------	----------	----------
in border regions (<50 km)	32,300 €	25,700 €	26,200 €	34,400 €	34,400 €	35,900 €	28,000 €	31,400 €	30,900 €

Source: Calculation by S&W based on Eurostat and national statistical offices

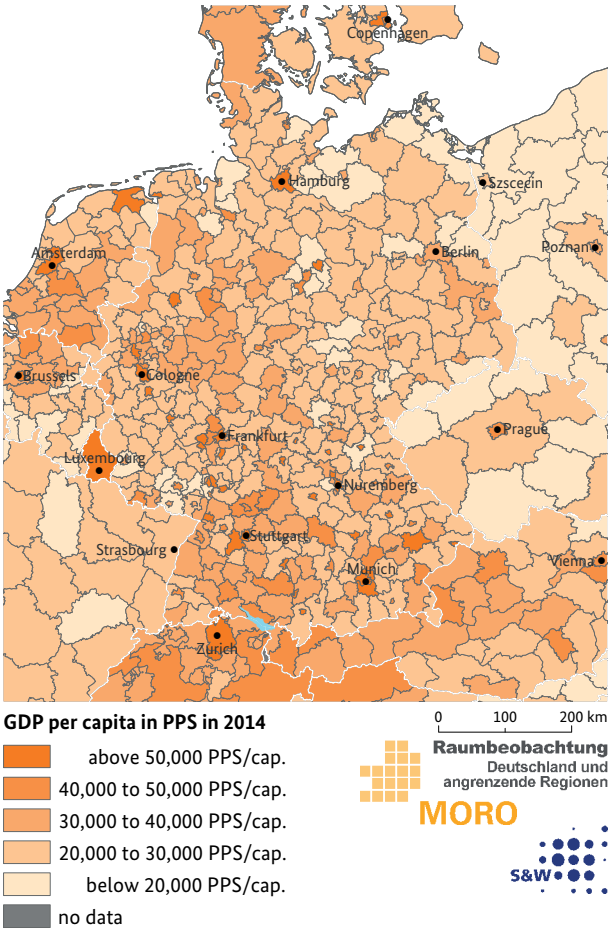
In some parts, there are great differences between the German and neighbouring foreign border regions (Figure 5.3). The economic divergence is clearest in the German-Luxembourg and German-Swiss border regions. The GDP per capita in Luxembourg and in north-western Switzerland is several tens of thousands of Euros higher than on the German side. However, one should take into account the fact that in those two regions, the proportion of employees commuting into the country is relatively high compared to the population size and that GDP per capita applies to the resident population. Nevertheless, the regions' economic power is undoubtedly great.

In the German-Danish border region, the GDP per capita on the Danish side is also more than ten thousand Euros higher than on the German side. The opposite is the case at Germany's eastern border with Poland and the Czech Republic: in those border regions, the GDP per capita on the German side is more than ten thousand Euros higher than on the Polish and Czech sides. The ratios are relatively balanced in the other regions.

Although the perceived economic disparity between these countries is lessened if one takes the price structure and purchasing power into account, differences nevertheless remain evident. In 2014, once adjusted to purchasing power standards (PPS), the GDP per capita in PPS in Germany was 54 percent lower than in Luxembourg and 79 percent higher than in Poland. The coexistence of rich economic and labour centres on the one hand and poorer regions elsewhere still remains if one takes the different purchasing power standards into account (Figure 5.4). Regional economic divergences are visible to a greater or lesser extent in the border regions.

The clearest differences in PPS-adjusted GDP per capita can be seen at the German-Luxembourg border, where

Figure 5.4: Regional GDP per capita in Purchasing Power Standards (PPS) in 2014



Origin of data: Eurostat, Bundesamt für Statistik (BFS)
One PPS corresponds to the EU-average of the purchasing power of one Euro
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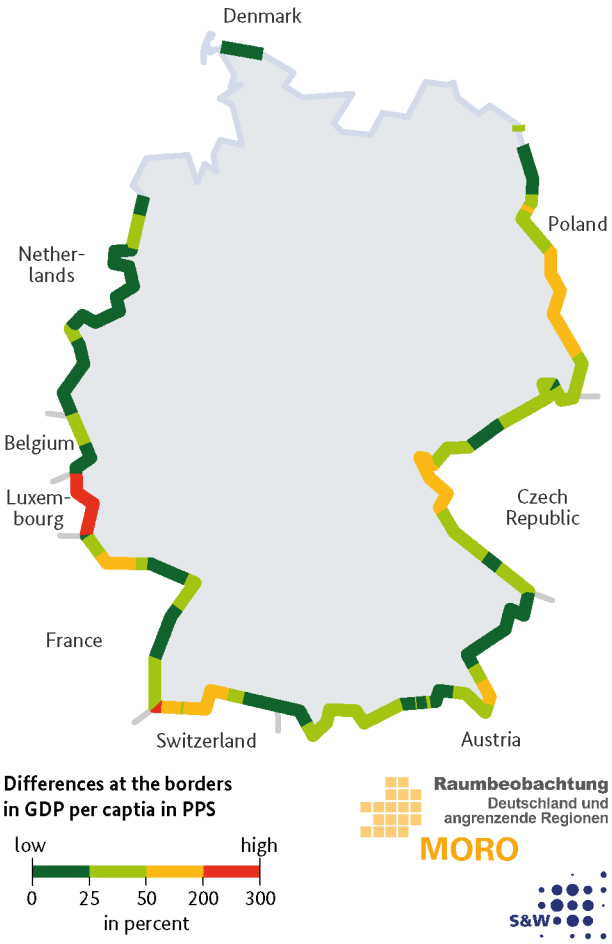
the GDP per capita in PPS is more than twice as high on the Luxembourg side (Figure 5.5). However, on the German-Danish border, the economic differences disappear if one takes purchasing power into account. The same applies to parts of the German-Polish and the German-Czech border region. For instance in the northern border region between Mecklenburg-Western Pomerania in Germany and Polish West Pomerania, the differences in PPS-adjusted GDP per capita in PPS are relatively small.

At the same time, stronger regional differentiation is apparent along the borders. Between Brandenburg and the Voivodeship of Lubuskie, or between Saxony and Bavaria in Germany and the Czech Karlovy Vary region, there are

i Purchasing Power Standards (PPS)

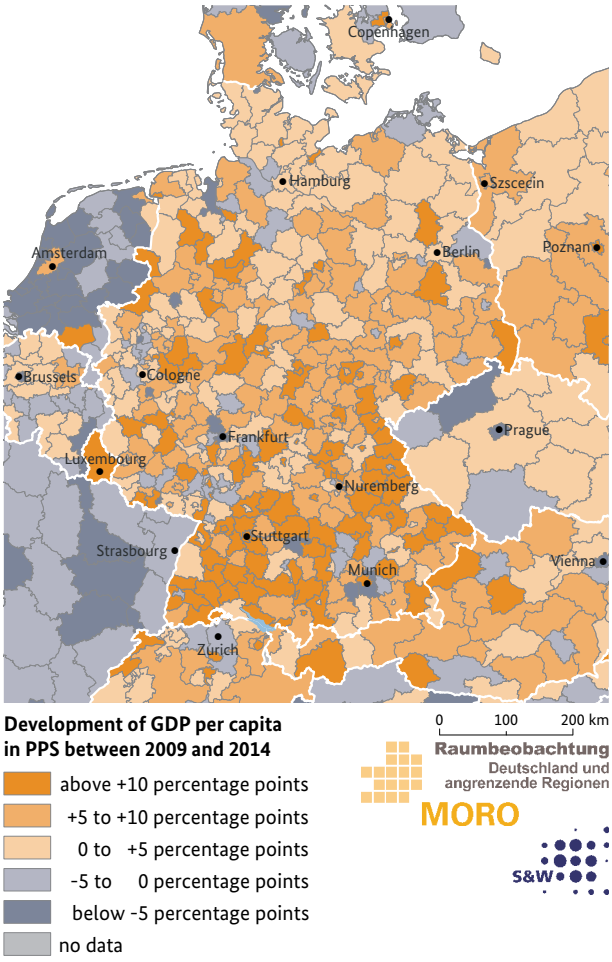
Currency and price level differences between countries can be levelled out using purchasing power standards (PPS). One PPS corresponds to the average purchasing power of one Euro for a representative set of goods and services within the European Union.

Figure 5.5: GDP per capita in PPS near borders in 2014



Origin of data: Calculation by S&W based on data from Eurostat. BFS and National Statistical Offices (LAU2)

Figure 5.6: Regional development of GDP per capita in PPS between 2009 and 2014



Origin of data: Eurostat, Bundesamt für Statistik (BFS)
Given is the difference in percentage points between 2009 and 2014 in relation to the EU-average (EU=100 in each year)

still noticeable differences even if one takes purchasing power into account.

A comparison of the change in GDP per capita in PPS since 2009 compared to the EU average shows clear regional differences (Figure 5.6). Regions that grow especially quickly result in positive percentages with respect to change compared to the EU average; regions with below-average growth produce negative percentages. With a few exceptions, the regions in Germany have experienced economic growth that is higher than the average growth in the EU. The highest relative growth was achieved in the regions of southern Germany. The development was also positive in almost all of the Polish, Austrian and Swiss regions, as well as in Luxembourg. All these regions have developed better than the EU average of all regions since the economic crisis.

By comparison, the Netherlands, France and numerous regions in Belgium and the Czech Republic have fallen behind. In those countries, the border regions especially experienced slower economic development compared to the EU average. Since at the same time, the German regions there experienced above-average growth, the divergence increased in those border corridors.

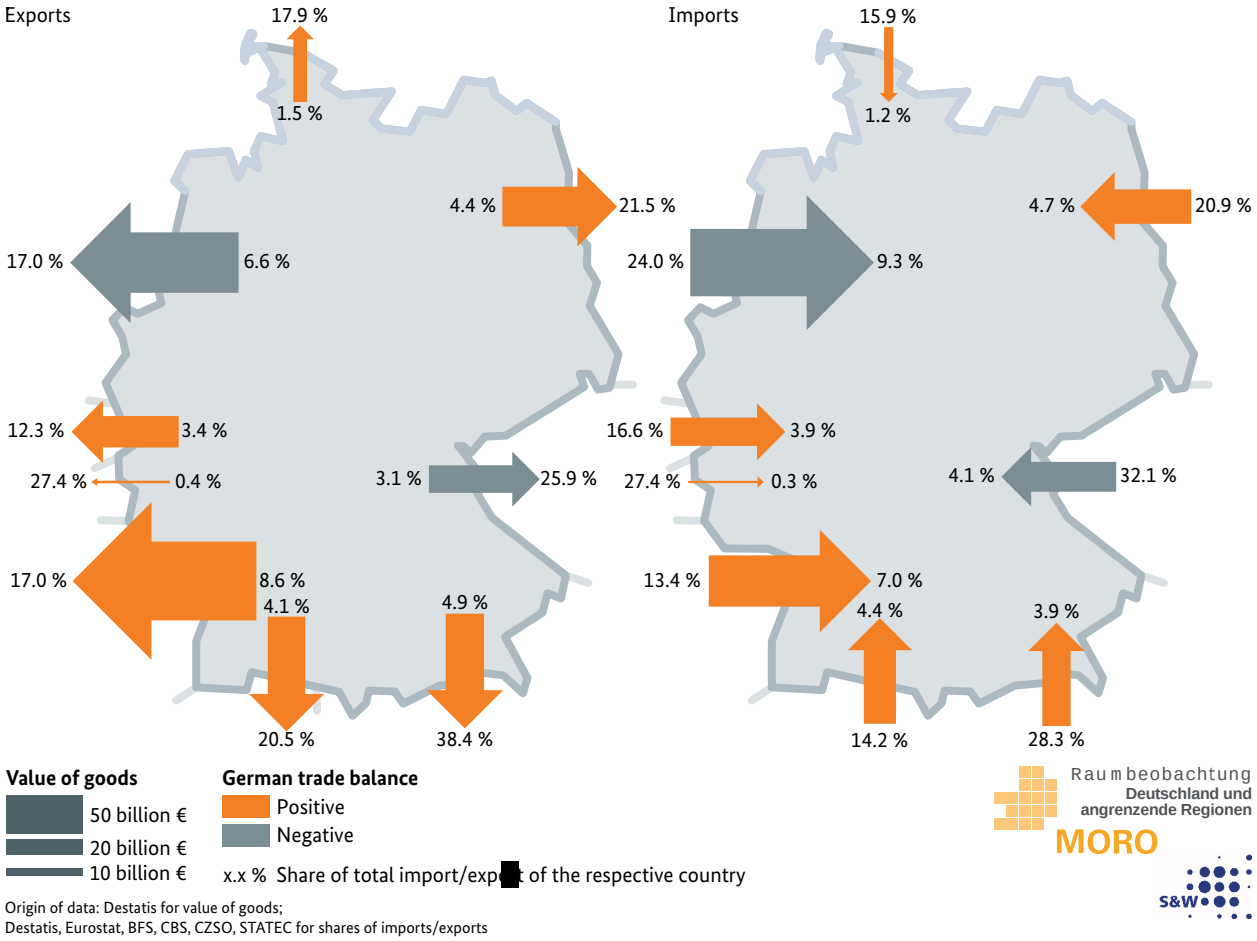
5.2 Cross-border trade

Germany is a globally operative exporting country with a considerable foreign trade surplus. The majority of German foreign trade is with other highly developed countries, whereby the United States was the most important buyer country in 2015. The second most important trade partner in terms of the value of exports was Germany's EU-neighbour France: in 2015, the total value of goods exported from Germany to France was € 102.8 billion, representing 8.6 percent of German exports that year (Figure 5.7).

By contrast, France exported products with a significantly lower value of € 66.8 billon to Germany (7 % of Germany's imports). After China, the second most important country for Germany in terms of imports was the Netherlands, whereby the seaports play an important role as hubs for international trade. In 2015, goods worth a total of € 87.9 billion were imported from the Netherlands to Germany (representing 9.3 % of all of its imports). By comparison, Germany exported goods worth € 79.2 billion to the Netherlands, resulting in a trade surplus of € 8.7 billion for the Netherlands. Aside from the Netherlands, the only other neighbouring country to have a trade surplus with Germany is the Czech Republic (€ +2.7 billion). Germany has a trade surplus with all other neighbouring countries (and most other countries worldwide).

In 2015, Germany exported 37.0 percent of its exports to its immediate neighbours. Its automotive and commercial vehicle, electrical engineering, mechanics and chemicals industries are all sectors in which the German economy is most competitive worldwide. The products of those

Figure 5.7: External trade between Germany and its neighbouring countries by value of goods in 2015



Origin of data: Destatis for value of goods;
Destatis, Eurostat, BFS, CBS, CZSO, STATEC for shares of imports/exports

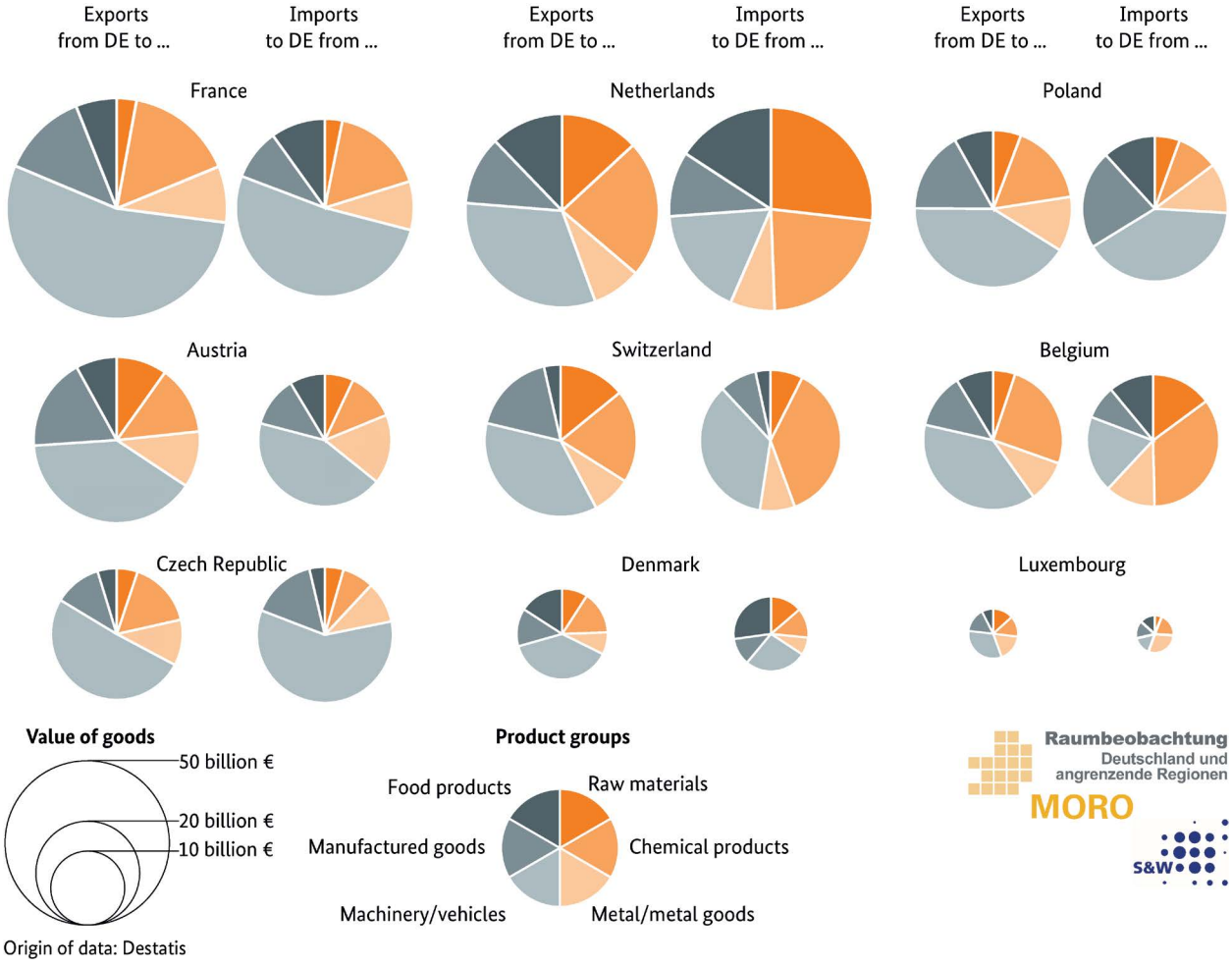
sectors determine German exports and the exchange of goods with its neighbouring countries (Figure 5.8).

Germany and its neighbouring countries are closely linked via vivid trade relationships. In 2015, Germany drew 39.0 percent of its imports from its neighbouring countries. The economic development in the neighbouring countries is thus heavily dependent on the development of the German economy and demand from Germany, which is the largest trading partner for each of its neighbouring countries, generally by a large gap to the country following next.

In the Czech Republic, the share of exports to Germany represented 32.1 percent of the overall value of all exports. Austria (28.3 %), Luxembourg (27.4 %), the Netherlands (24.0 %) and Poland (20.9 %) also had a very high share of exports to Germany, followed by Belgium (16.6 %), Denmark (15.9 %), Switzerland (14.2 %) and France (13.4 %).

Imports from France and the Czech Republic included a high proportion of machineries and vehicles, which is due to the automotive industries located in those countries (Citroën, Peugeot and Renault in France, Škoda in the Czech Republic). A large proportion of the value of goods imported to Germany from Poland, Austria and Switzerland also belongs to the sectors of machines/vehicles and metal/metal goods. In Belgium, the Netherlands and Switzerland, raw materials and chemical products comprise a considerable share of exports to Germany. The

Figure 5.8: External trade between Germany and its neighbouring countries by product group in 2015

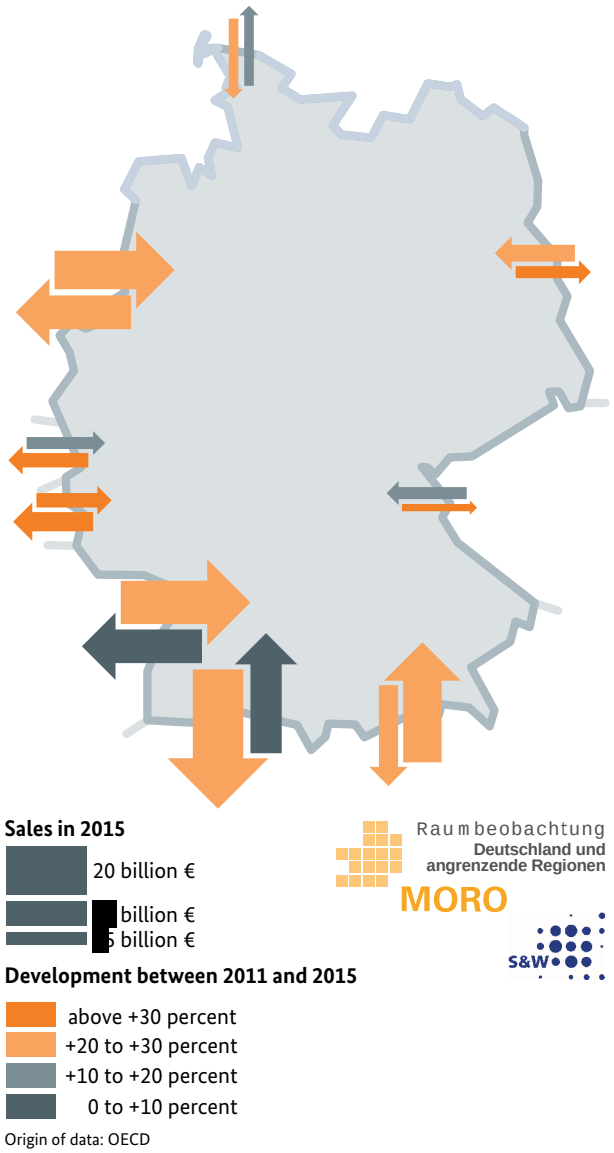


Origin of data: Destatis

Netherlands also exports refined petroleum products and natural gas. The proportion of food products exported from the Netherlands and Denmark to Germany was particularly high.

Services play an increasingly important role in transnational economic relationships. High sales were especially achieved in business-related services, transport services and travel. The share of financial services is also very high between Germany and Luxembourg. In 2015, Germany achieved its highest sales in services with Switzerland (€ 21.1 billion), the Netherlands (€ 14.0 billion) and France (€ 13.6 billion). The highest sales to Germany in the service sector were achieved in France (€ 18.0 billion), Austria (€ 16.2 billion) and the Netherlands (€ 15.6 billion). Between 2011 and 2015, total sales in services have increased considerably (Figure 5.9).

Figure 5.9: Exchange of services between Germany and its neighbouring countries in 2015

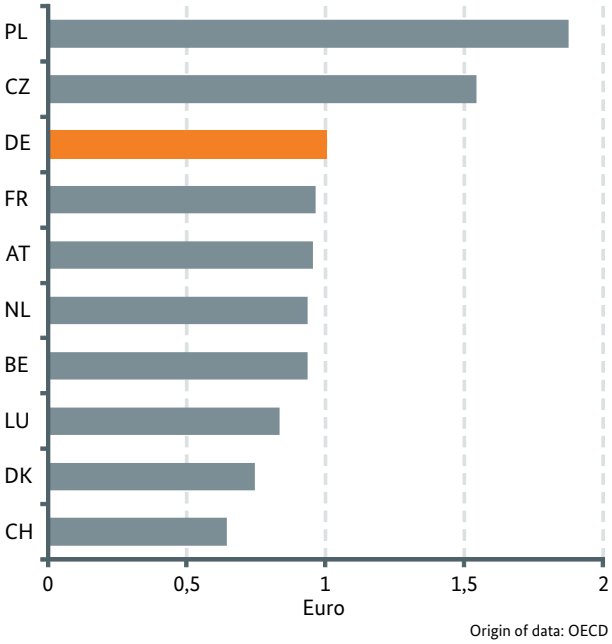


Origin of data: OECD

5.3 Prices and income differences

A comparison between Germany and its neighbouring countries reveals enormous differences in terms of prices and purchasing power. Prices are lowest in the eastern neighbouring countries. While the price level in Germany (104 %) is roughly similar to the EU average (100 %), a comparable basket of goods and services in Poland costs 53 percent of the EU average and 66 percent in the Czech Republic (Eurostat 2017). In the other German neighbouring countries, consumers must pay more for their goods and services. Life in Luxembourg and Denmark is considerably more expensive than the EU average (124 % and 139 % respectively). In Switzerland (162 %), the price level is more than one and a half times the level of Germany.

Figure 5.10: Value of one Euro earned in Germany in its neighbouring countries (in May 2017)



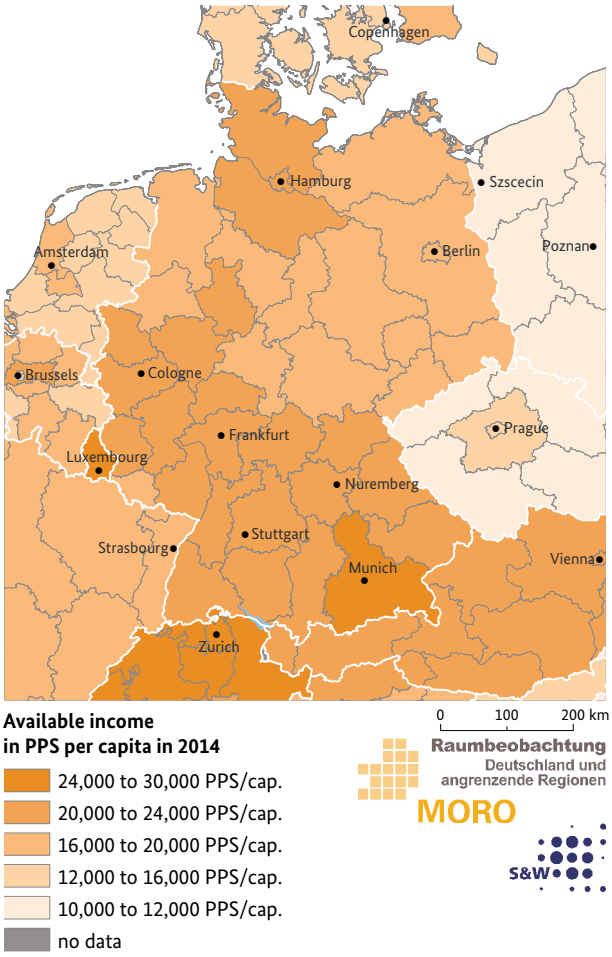
Origin of data: OECD

As a result, the value of money is different in the neighbouring countries (Figure 5.10). One Euro earned in Germany is worth almost twice as much on a national average in Poland (€ 1.87) and over one and a half times as much in the Czech Republic (€ 1.54). Life in other countries is more expensive than in Germany. One "German Euro" is worth the least in Luxembourg (€ 0.83), Denmark (€ 0.74) and Switzerland (€ 0.64).

Such strong price differences are a key factor in explaining cross-border shopping travel (cf. Chapter 2.3, Figure 2.5). The cheaper prices for food in Germany lead Swiss people living near the border to come to Germany for their shopping. It is also worthwhile for Danish consumers to travel into the German border area in Schleswig-Holstein, especially with respect to confectionary and alcoholic beverages, which are highly taxed in Denmark. Border regions with other neighbouring countries experience shopping travel in both directions, depending on the groups of goods with strongly contrasting prices due to different taxation. However this is not a mass phenomenon. Fuel tourism, which began in the 1990s, has largely reduced in recent years, as fuel prices have converged and the according price advantages on the other side of the border have dwindled. Prices with respect to clothing and shoes in individual countries have also become more similar.

Different price levels must always be regarded in conjunction with the respective income differences. High prices are mostly compensated by higher incomes. A regional perspective shows that the available income per inhabitant is distributed very disproportionately (Figure 5.11). The real income per capita according to purchasing power standards (PPS) in southern Germany is higher than in eastern Germany and Lower Saxony. The lowest real income can be found in Poland and the Czech Republic. In the Netherlands, parts of Belgium and in the high-priced Denmark, the PPS-adjusted income per capita is comparatively low. In north-eastern France, it is slightly lower than the income level in Lower Saxony and eastern Germany. The highest PPS-adjusted income per capita is achieved in Switzerland and Luxembourg, at a level that is almost three times as high as in Poland and the Czech Republic.

Figure 5.11: Available income in Purchasing Power Standards (PPS) in 2014



Origin of data: Eurostat, BFS, STATEC, CH=2012/2014, LU=2011

The differences in the border regions are particularly striking. The available per capita income in Poland and the Czech Republic along the border with Germany is just over 10,000 PPS, compared to 18,000 PPS in eastern Germany and 20,000 PPS in southern Germany. There are also considerable differences in favour of the German side along the borders with Denmark, France, the Netherlands and Belgium. German PPS-adjusted income per capita is lower than on the other side of the border with Switzerland and Luxembourg: in the German border regions, the available per capita income is over 20 percent lower than in the neighbouring Swiss and Luxembourg regions.

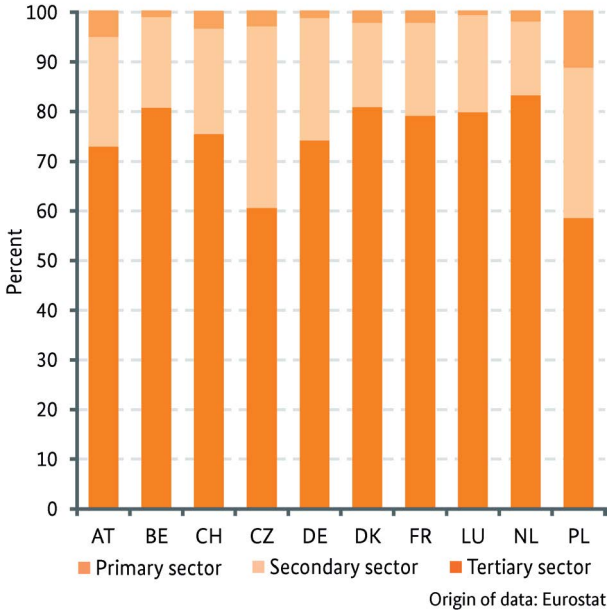
6 Labour market and cross-border commuters

For a long time, labour markets were very nationally orientated. The free movement of labour, one of the fundamental principles of the single European market, is aimed at internationalising and thereby stabilising labour markets. This chapter presents the structure of labour markets in Germany and its neighbouring regions, as well as the extent of their interdependencies. In doing so, it investigates the sectoral employment structure, employment rates, unemployment rates and cross-border commuting to work. The latter also focuses on detailed regional examples as an indicator of international integration.

6.1 Sectoral employment structure

The labour markets in Germany and its neighbouring countries have very different characteristics. Although in all those countries, the largest number of people are employed in the service sector, with a rising trend, the proportions of employees vary in the individual economic sectors (Figure 6.1). In particular, the employment structures in Poland and the Czech Republic diverge from those in the service and information-orientated western European societies. On the German labour market, industrial processing and the service sector are of key importance. In 2014, almost 74 percent of employees in Germany worked in the tertiary sector, with 23.6 percent in the secondary sector and only 1.5 percent in the primary sector. With the exception of Austria, all other western European neighbouring countries have a higher proportion of employees in the service sector.

Figure 6.1: Employment shares by economic sector in Germany and its neighbouring countries in 2014



Jobs in Germany and the neighbouring regions are concentrated in the west and south of Germany, the Benelux countries, Switzerland and in individual major cities such as Copenhagen, Hamburg, Berlin, Prague and Vienna (Figure 6.2).

The employment shares of different economic sectors vary greatly in Germany and its neighbouring regions (Fig 6.3). A high proportion of employees (20 %) work in agriculture in Poland and Austria. In rurally structured

Figure 6.2: Regional employment in 2014

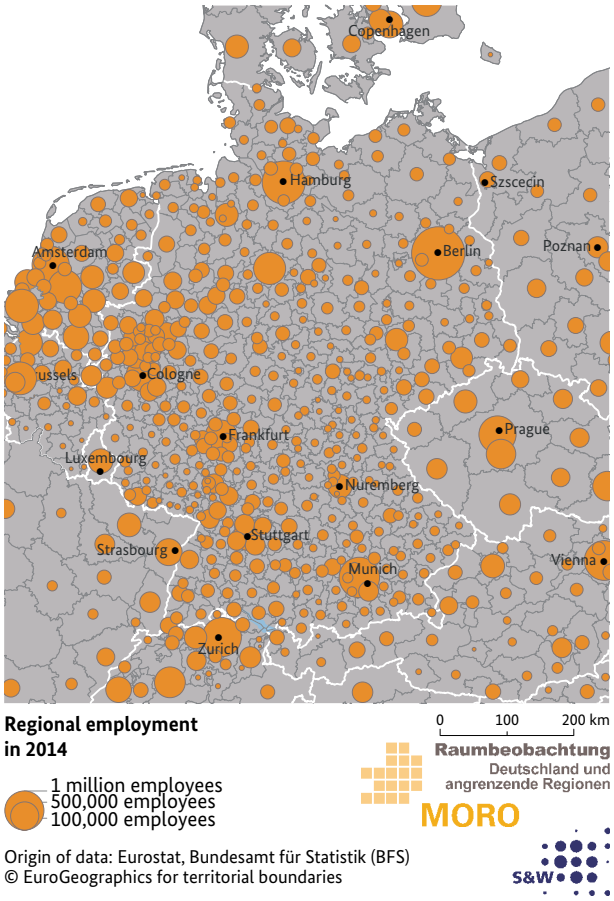
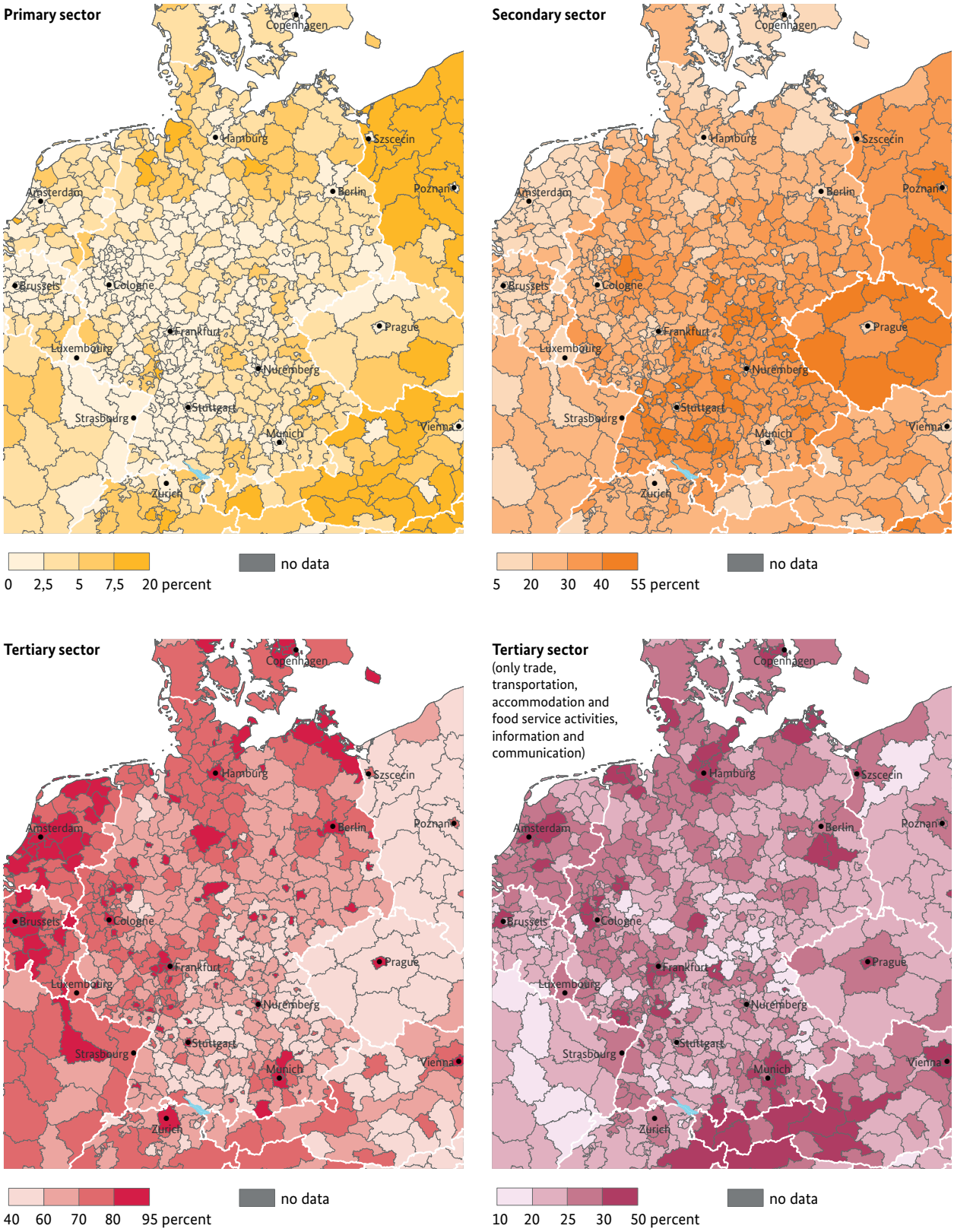


Figure 6.3: Regional employment shares by economic sector in 2014



Origin of data: Eurostat, Bundesamt für Statistik (BFS)
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regions in the north and south of Germany, south-eastern Bohemia, Switzerland, the Champagne region, the Belgian province of Luxembourg and parts of the Netherlands (e.g. North Limburg), the employment share in the primary sector is still above five percent.

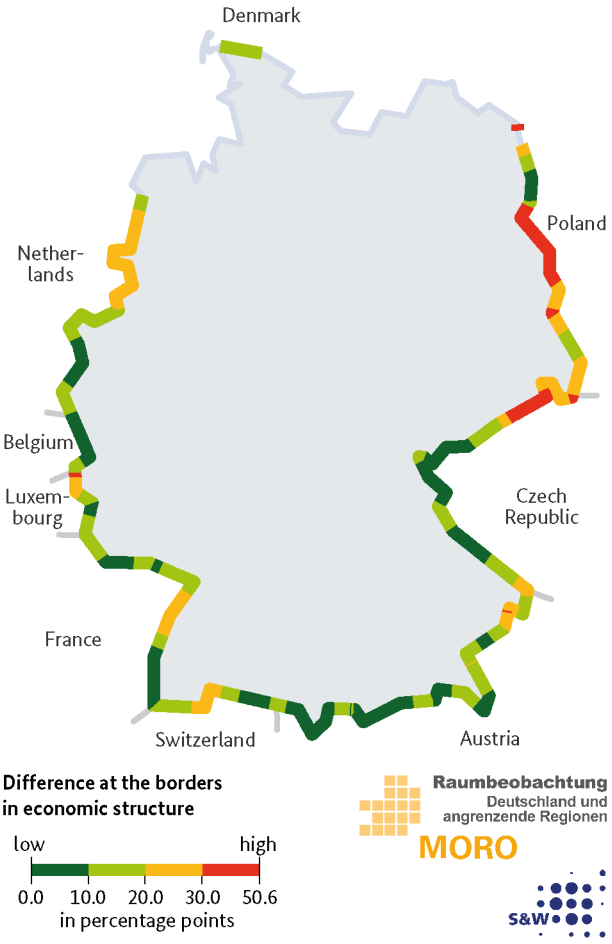
The Czech and Polish labour markets have a strongly industrial and commercial character. More than a third of employees in the Czech Republic work in the manufacturing sector and that proportion is particularly high near the border. In Poland, the proportion of people employed in the secondary sector in the Voivodeships of Wielkopolskie (Greater Poland) and Dolnośląskie (Lower Silesia) is especially high. In Germany, almost a quarter of employees belong to the manufacturing sector. Especially in the west and south of Germany, the labour market has a strong industrial and commercial character, combined with great innovative drive in small and medium-sized businesses. In Hesse, Thuringia, Baden-Wurttemberg and Bavaria, the share of employees in the secondary sector is over 40 percent in many regions. In this respect, the German labour market clearly differs from those in neighbouring western regions. In Germany's western European neighbouring countries, the proportion of employees in the industrial sector is considerably lower than in Germany, resulting in larger differences with respect to employment in the secondary sector in almost all of Germany's border regions compared to the neighbouring country.

In 2014, the Netherlands (82.9 %), Denmark (80.6 %), Belgium (80.5 %), Luxembourg (79.5 %) and France (78.8 %) had a higher proportion of employees in the service sector than Germany (73.9 %), while the level was significantly lower in the Czech Republic (60.3 %) and Poland (58.3 %). In regions with a relatively low amount of manufacturing and at the same time a high level of service-intensive economic and financial centres with administrative functions, the proportion of employees in the service sector was even higher than the respective national average. Using the example of Prague, one can see that capital city regions are also service-sector regions. The divergences in the proportion of services along the borders compared to the overall employment reflect national differences. As a result, the German border regions with Poland and large parts of the Czech Republic have a higher proportion of service-sector employment than the border regions in those countries. Inversely, in almost all other border regions, foreign neighbouring regions have a higher proportion of service-sector jobs in the overall labour market.

The domains of trade, transport, accommodation and food services, information and communication play a special role within the service sector. Regions with accordingly high employee shares can in particular be found in tourist regions in Germany, Austria and Switzerland.

In some parts, the sectoral employment structure differs strongly on both sides of the border, while elsewhere there are similarities (Figure 6.4). It is possible that two effects overlap in this respect: firstly, the regional employ-

Figure 6.4: Divergence at the borders in the sectoral economic structures in 2014

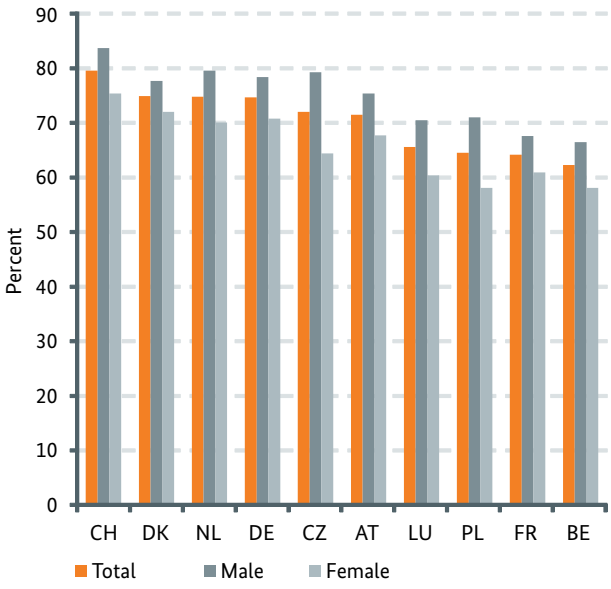


Presented are the cumulated total differences of percentage differences of employment shares in economic sectors.
Origin of data: Calculation by S&W based on data from Eurostat, BFS and National Statistical Offices (LAU2)

ment structure is influenced by the national employment market; secondly, the economic structure is determined by a strong disparity between urban and rural areas.

As a consequence, medium or large cities near borders can accentuate the differences in the sectoral economic structure of a border region. This is for instance the case with Dresden with respect to the German-Czech border, while the remaining rurally structured areas on both sides of the border, e.g. between Bavaria and western Bohemia, show hardly any or no differences at all in the sectoral employment structure despite different national labour markets. Economic centres near borders can also have the effect of reducing differences in the employment structures, as can be seen in the Szczecin region: the divergences in the economic structure are greatest on the German side of the German-Polish border corridor. Only in the region around Szczecin is the sectoral employment structure on both sides of the border comparable without further limitation, with an above-average proportion of employees in the service sector.

Figure 6.5: Employment rates by sex in Germany and its neighbouring countries in 2016



Origin of data: Eurostat

6.2 Employment

In 2016, the employment rate in Germany was 74.7 percent (Figure 6.5), which is almost as high as in Denmark (74.9 %) and the Netherlands (74.8 %). Only Switzerland had a higher level (79.6 %). By contrast, employment rates in Luxembourg (65.6 %), Poland (64.5 %), France (64.2 %) and Belgium (62.3 %) were comparatively low. The Czech Republic (72.0 %) and Austria (71.5 %) have rates that lie in the midfield among Germany's neighbours.

Everywhere, the employment rate of men is higher than that of women. The lowest female employment rate is in Belgium and Poland (both at 58.1 %), while the Czech Republic (14.9 %) and Poland (12.9 %) have the highest gender-related divergence with respect to employment rates. In 2016, the employment rate in Germany was 7.6 percentage points higher for men (78.4 %) than for women (70.8 %). Only France (6.7 %) and Denmark (5.7 %) have smaller gender-specific differences in the employment rate.

The regional employment-rate distribution largely reflects the differences on the national labour markets, since the regional differences within one country are usually smaller than the contrast between neighbouring regions on either side of the border (Figure 6.6).

The population in the Swiss and southern German regions has the highest employment rate. The level is also very high in the Netherlands, western Rhineland-Palatinate, south-eastern and south-western Saxony and Brandenburg.

The employment rate is very low in the Belgian provinces of Hainaut, Brussels, Namur and Liège, as well the north-east of France. The Polish Voivodeships of Lubuskie and West Pomerania, which border with Germany, also have very low employment rates.

Employment rate

The employment rate measures the proportion of the working-age population (between 15 and 64 years) in contractually regulated employment compared to all people in that age group. The employment rate is a key social indicator for analysing the labour market.

Accordingly, there are very large differences in the border regions on the German-Belgian, German-French and German-Polish borders, while the differences along other border corridors are very small or non-existent.

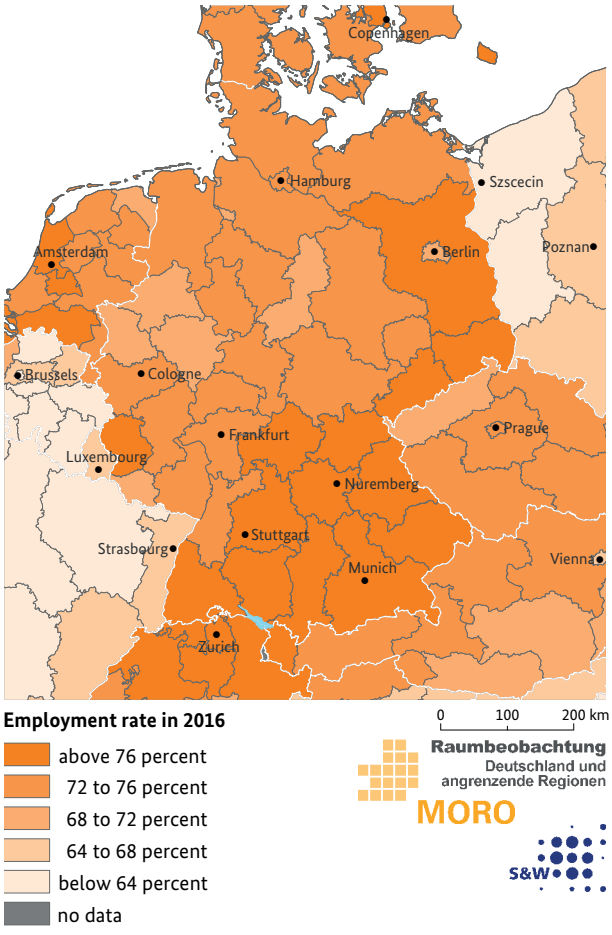
The distribution of employment rates between countries and their regions can mainly be attributed to the labour-market participation of the younger population aged between 15 and 24, as well as the older population aged between 55 and 64 (Figure 6.7), since the employment rates of 25 to 54 year-olds, the core age group among employees, remains at a high, almost equal level between 80 and 85 percent in all countries. In Germany, the employment rate among 25 to 54 year-olds was 83.9 percent in 2016. Lowest rates are to be found in France (79.9 %) and Belgium (79.1 %), the Czech Republic (85.7 %) and Switzerland (86.3 %) with the highest rates.

The employment rate for younger employees does however experience considerable variation. The striking differences between countries, ranging in 2016 between 22.7 percent in Belgium and 62.5 percent in Switzerland, are mainly due to two factors: the situation on the relevant vocational training and labour markets and the different duration of various educational pathways. In 2016, the employment rate in Germany for this younger age group was 45.7 percent.

The employment rate for the older age group of 55 to 64 year-olds is very different in the countries in this study, also due to different retirement ages. In 2016, the figure in Germany (68.6 %) was comparatively high. In Germany's neighbouring countries, only Switzerland (71.5 %) has an even higher rate among older people. The rate of older people in employment in France (49.8 %), Austria (49.2 %), Poland (46.2 %), Belgium (45.4 %) and Luxembourg (39.6 %) is considerably lower than in Germany.

In terms of the average number of working hours a week, the different characteristics of the respective labour

Figure 6.6: Regional employment rates in 2016



Origin of data: Eurostat
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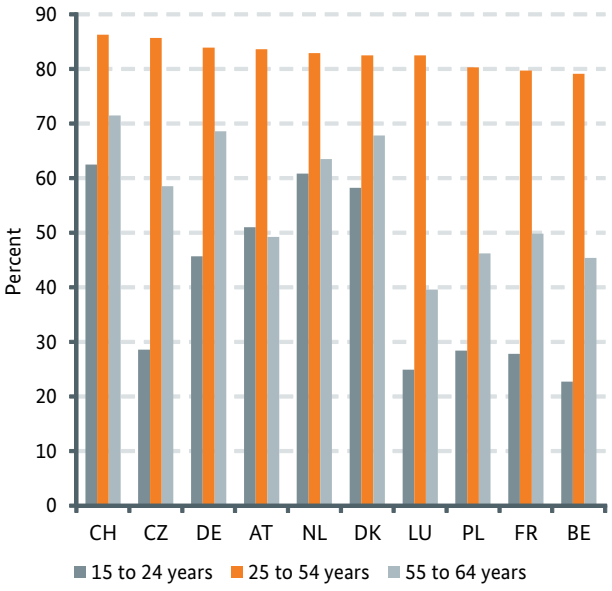
Figure 6.7: Employment rates by age groups in Germany and its neighbouring countries in 2016



Origin of data: Eurostat

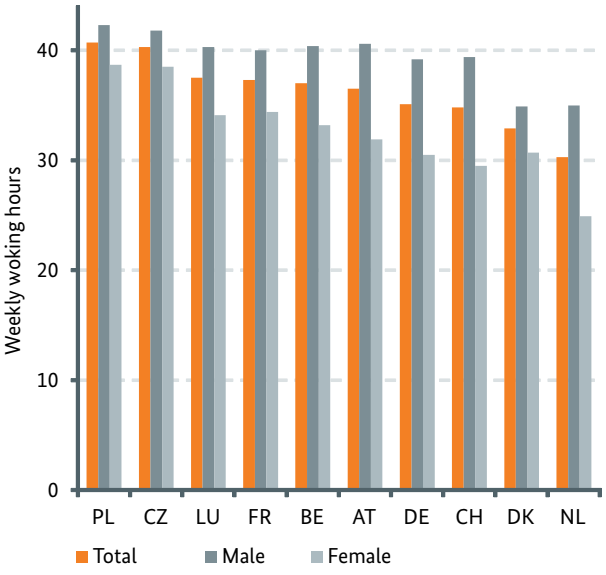
markets are reflected in Germany and its neighbouring countries (Figure 6.8). In 2016, the average number of weekly working hours in Germany was 35.1 hours, whereby men worked significantly longer than women, at 39.2 compared to 30.5 hours.

Weekly working hours for women in Austria (31.9 h), Denmark (30.7 h) and Switzerland (29.5 h) are comparable with Germany. Women's average working hours are the lowest in the Netherlands (24.9 h), while the gap to men's weekly working hours (35.0 h) remained the largest there. The most working hours a week are done in Poland (40.7 h) and the Czech Republic (40.3 h). In these labour markets, which are traditionally characterised by full-time employment, the part-time employment proportion is significantly below ten percent (2016: Poland 6.4 % and the Czech Republic 5.7 %, Figure 6.9). There are only small differences between the weekly working hours of men and women.

In 2016, the part-time employment share was clearly higher in Luxembourg (19.2 %) and France (18.3 %). In the same year, Germany's total part-time employment rate of 26.7 percent included only 9.4 percent of male employees, but 46.5 % of female employees. Part-time employment figures are similar in Austria (27.8 %), Denmark (26.4 %) and Belgium (24.7 %), followed by Switzerland (36.9 %) with a considerable gap. The proportion of male part-time employees was relatively high in Denmark (16.8 %) and Switzerland (15.8 %).

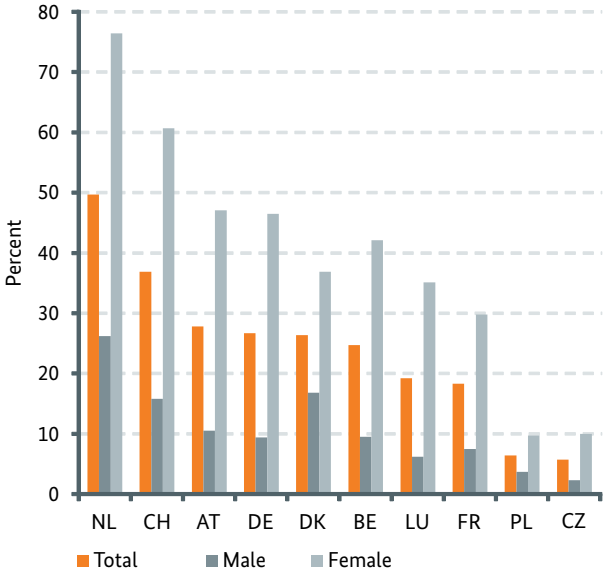
The Dutch labour market is characterised by a very high proportion of part-time employment (2016: 49.7 %). Encouraging part-time employment is a key pillar of employment and family policy in that country. In the Netherlands, a quarter of men and three quarters of women are employed part-time.

Figure 6.8: Weekly working hours in Germany and its neighbouring countries in 2016



Origin of data: Eurostat

Figure 6.9: Shares of employees with part-time work in Germany and its neighbouring countries in 2016



Origin of data: Eurostat

6.3 Unemployment

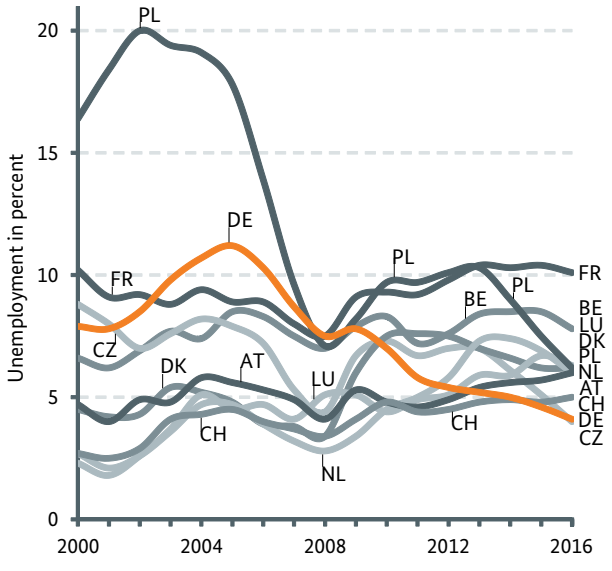
The labour markets in the individual countries have developed very differently in recent years. In Germany, the unemployment rate reached its highest level in 2005 at around twelve percent. It has been falling since then, with the exception of a brief rise in 2009 at the start of the financial and economic crisis. The current unemployment rate in Germany is very low at 4.1 percent (Figure 6.10).

In 2016, only the Czech Republic (4.0 %) had an unemployment rate that was similarly low to Germany. The rate is higher in the other neighbouring countries. In all countries with the exception of Germany, the Czech Republic and Poland, it was higher than the level recorded in 2008.

In France, the unemployment rate was 10.4 percent, the highest among all of Germany's neighbouring countries. It is followed by some margin by Belgium (7.8 %), Luxembourg (6.3 %), Poland and Denmark (both 6.2 %), the Netherlands and Austria (both 6.0 %) and Switzerland (5.0 %).

The greatest fluctuations in the unemployment rate were seen in Poland. At the start of the last decade, i.e. before joining the European Union, it was around 20 percent. After a drastic decline in the period between 2005 and 2008, and a slight increase in the subsequent years, the unemployment rate fell quickly again in the last three years and is now even below the level of many of Germany's neighbouring states.

Figure 6.10: Development of unemployment in Germany and its neighbouring countries between 2000 and 2016



Origin of data: Eurostat (smoothed values)

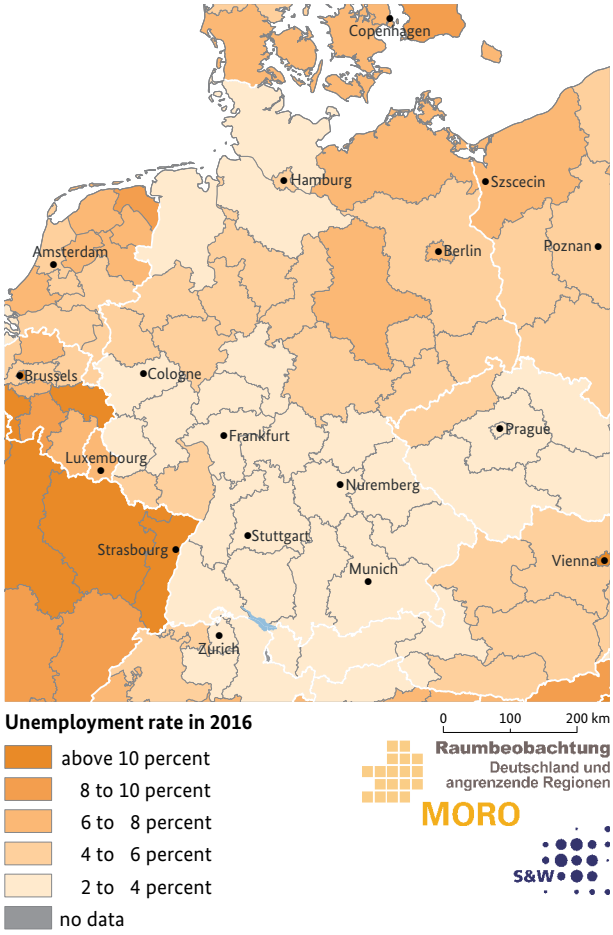
Regional unemployment rates are strongly determined by the general level in the respective countries, but becoming more differentiated within the countries themselves (Figure 6.11). In 2016, the unemployment rate was lowest in southern Germany and parts of western and northern Germany – as is the case with eastern Switzerland, western Austria and large parts of the Czech Republic. It is considerably higher in eastern Germany – especially in the federal states of Berlin, Saxony-Anhalt and Mecklenburg-West Pomerania.

At the eastern border of Germany with Poland and the Czech Republic, and on the southern border with Austria and Switzerland, unemployment rates are on a relatively similar level (Figure 6.12). However, the differences are considerable on Germany's western external border. The unemployment rate in north-eastern France and in the Belgian province of Liège is above 10 percent, while the neighbouring German regions range between only 2.7

i Unemployment rate

Data on unemployment are recorded in a uniform manner in accordance with the concept of the United Nations International Labour Organisation (ILO). That makes unemployment internationally comparable, which is why the concept was applied in this document. According to the ILO concept, unemployed people are counted as unemployed regardless of their registration status with unemployment agencies; however, people are considered as employed as soon as they are in paid employment for one hour a week. By contrast, unemployment according to the unemployment statistics of the German Federal Employment Agency (Bundesagentur für Arbeit) only takes registered unemployed people into account as unemployed and considers unemployed people with marginal employment as unemployed. The unemployment rate of the Federal Employment Agency is therefore higher than the corresponding ILO figure.

Figure 6.11: Regional unemployment in 2016



Origin of data: Eurostat
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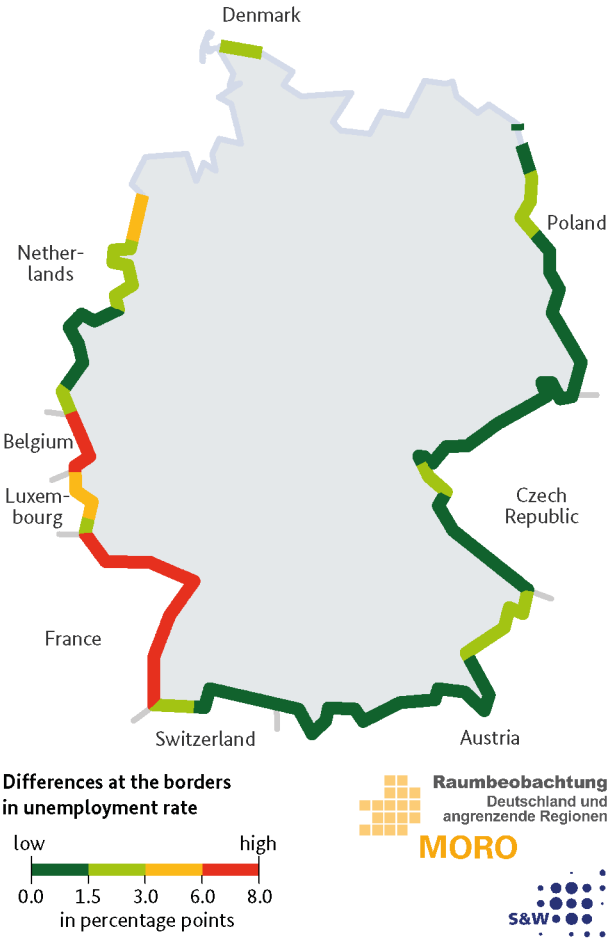
Figure 6.12: Unemployment on both sides of the border in 2016



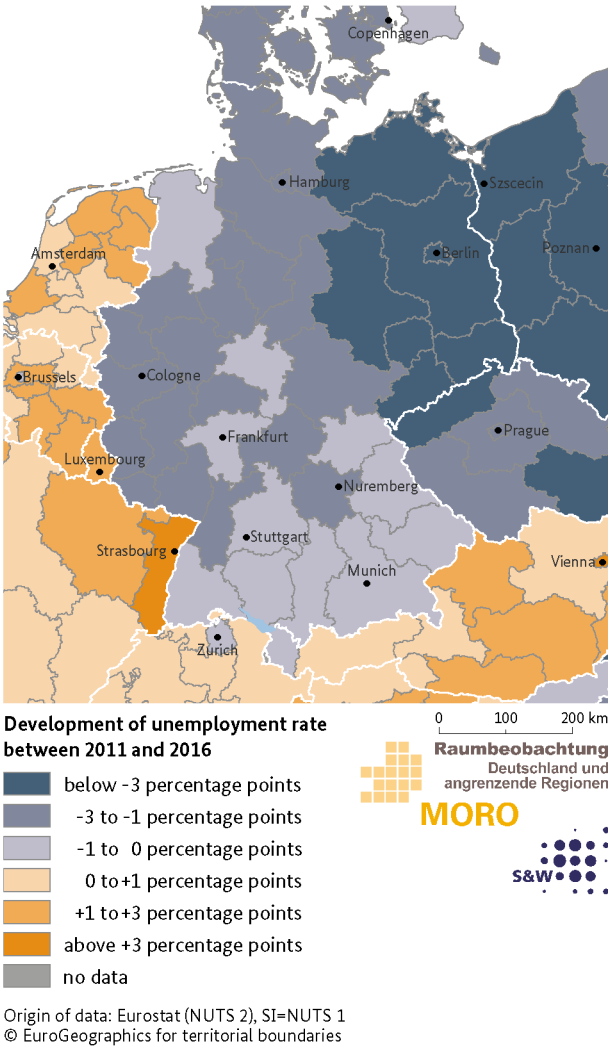
Origin of data: Calculation by S&W based on data from Eurostat and National Statistical Offices (LAU2)

percent (Trier region) and 4.9 percent (Saarland). In recent years, contrary development in the unemployment rates there led to a significant rise in the differences on both sides of the border. Somewhat smaller, but nevertheless perceptible differences in the unemployment rates of the border regions can be seen on the German border with Luxembourg, the northeast of the Netherlands and Denmark.

On the western and southern border of Germany, the unemployment rate developed in highly contrasting ways in recent years (Figure 6.13). With the exception of the Zurich region, unemployment there rose on the foreign side of all border regions, while falling on the German side. However, on Germany's northern and eastern border, unemployment fell on both sides of the border. The unemployment rate declined most strongly in eastern Germany, western Poland and the north-west of the Czech Republic.

One particular problem for regional labour markets is the unemployment of young people, i.e. people aged between 15 and 25 years. The recession that followed the economic and financial crisis hit young people harder. Compared to its neighbouring countries, Germany has a lower unemployment rate among young people. In 2016, the figure in southern Germany was even below five percent in some parts.

Figure 6.13: Development of regional unemployment between 2011 and 2016



Origin of data: Eurostat (NUTS 2), SI=NUTS 1
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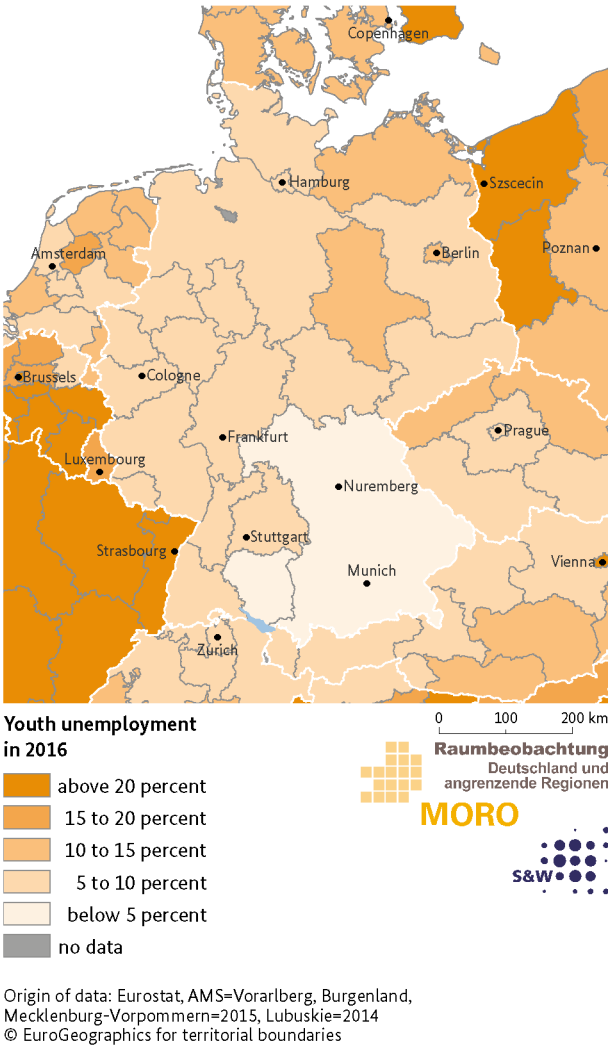
Figure 6.14: Regional youth unemployment in 2016



Origin of data: Eurostat, AMS=Vorarlberg, Burgenland, Mecklenburg-Vorpommern=2015, Lubuskie=2014
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In 2016, the north-west of Poland, the north of France and the Belgian region of Wallonia were affected by a very high level of unemployment among young people, namely over 20 percent. The differences between the border regions on both sides of the border were accordingly stark there.

6.4 Cross-border commuting

Key factors with respect to cross-border commuting for work purposes are the regionally different employment prospects and the contrasting income and cost of living. In Germany, the majority of cross-border commuters live near the border with Switzerland, Luxembourg, France, the Netherlands and Austria. In 2016, the overall number of cross-border commuters from Germany was 284,400 (Figure 6.15).

The highest number of cross-border commuters came from France, namely 454,000 people, about a tenth of whom commuted to Germany. France is followed by Poland (180,000), Belgium (109,000), Austria (62,000), the Czech Republic (56,000) and the Netherlands (44,000). A comparatively small number of people commuted from Switzerland (22,000), Denmark (18,000) and Luxembourg (7,000).

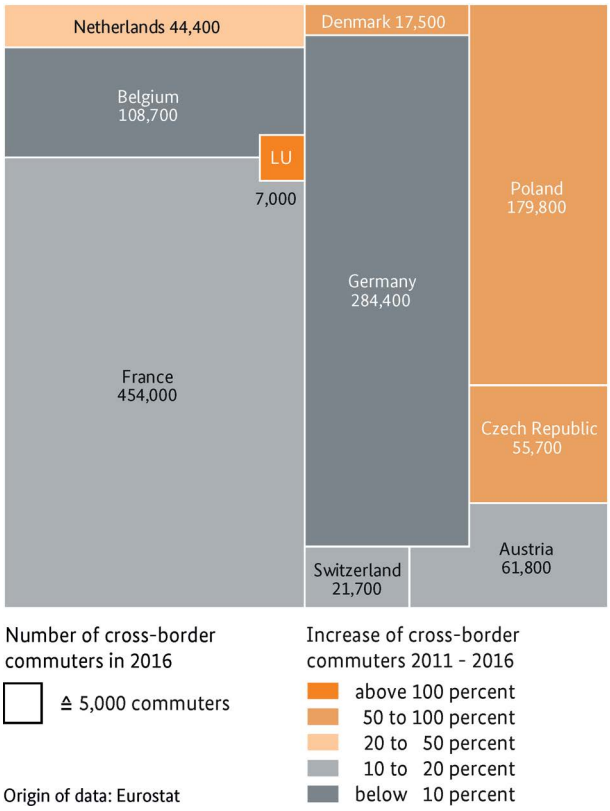
In all countries, the number of cross-border commuters has increased in the last five years. The highest relative growth was experienced by Luxembourg (+133 %), followed by Denmark (+90 %), the Czech Republic (+81 %), Poland (+71 %) and the Netherlands (+41 %). In the remaining neighbouring countries, the number increased by between 9 and 20 percent. In Germany (+8.5 %) the relative increase was the lowest, since the number of cross-border commuters only increased in the west.

In 2016, the highest number of commuters from abroad travelled to Switzerland (300,000). 180,000 cross-border commuters travelled to the much smaller Luxembourg, representing 42 percent of people employed there. In Germany (164,000) and Austria (148,000), the number of commuters from abroad remained lower.

Cross-border commuting is spatially concentrated in the Greater Region, along the Upper Rhine and in Switzerland (Figure 6.17). In 2016, high proportions of cross-border commuters among employees at their place of residence could be found in the French regions of Franche-Comté (11.2 %), Lorraine (11.1 %), Alsace (8.2 %) and in the Austrian region of Vorarlberg (10.3 %). In Germany, a similarly high proportion of cross-border commuters was recorded in the region of Trier and in the Upper Rhine area, while the Saarland rercords only slightly lower levels.

Germany offers an attractive labour market to cross-border commuters from abroad. The low unemployment level combines with increasing demand for employees

Figure 6.15: Cross-border commuters in Germany and its neighbouring countries in 2016



in apprenticeship occupations, care for the old and sick, accommodation and food services, and the building sector. In the eastern neighbouring regions in Poland and the Czech Republic, where average wages are considerably

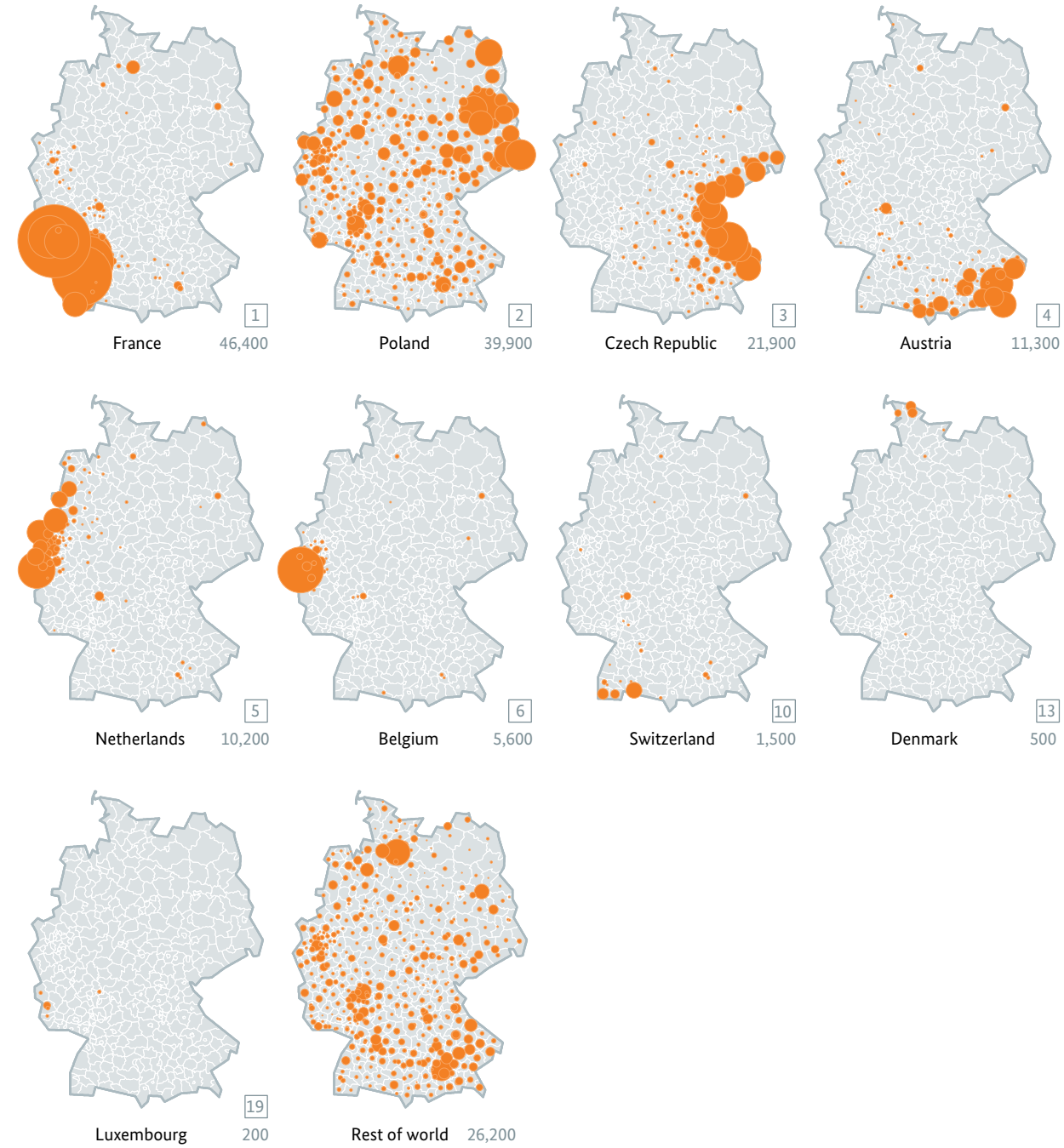
i Cross-border commuters

Cross-border commuters are people who commute between the country where they reside and the country where they work or receive training or education. Generally, cross-border commuters cross the national border usually every day, but at least once a week. Cross-border commuting within the European Union is encouraged and facilitated by the free movement of labour, which affords the right to freely choose the place of residence and free access to employment. Swiss citizens also enjoy the freedom to move within the EU. For citizens of Poland and the Czech Republic, the right of free movement of labour was initially restricted after the eastward expansion of the EU in 2004. Since May 1, 2011, employees from Poland and the Czech Republic can work without restrictions in Germany.

Official statistics record employees liable to pay social security contributions (e.g. cross-border commuters to Germany). However, there are still gaps in the data, particularly with respect to those commuting out of the country and the location of residence and employment abroad.

Quelle: S&W auf der Grundlage von Eurostat

Figure 6.16: Inbound commuters into Germany by country of origin in 2016



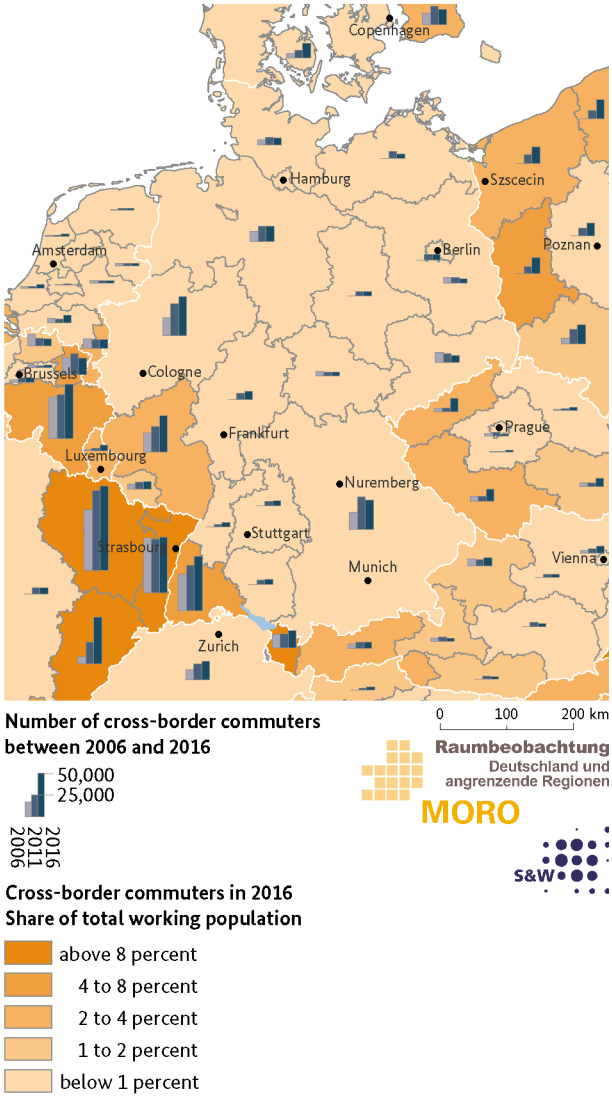
Raumbeobachtung Deutschland und angrenzende Regionen
MORO
S&W

Origin of data: Bundesagentur für Arbeit, only workers subject to social insurance contribution, only values > 9
Rest of world = other countries except neighbouring countries of Germany

lower, the number of cross-border commuters to Germany and their proportion of all employees has increased noticeably.

The largest group of cross-border commuters to Germany comes from France (Figure 6.16). In 2016, 46,400 people lived in France and worked in Germany, including 13,000 German citizens. Poland and the Czech Republic are the next most significant countries of origin; in the same year, they contributed 39,900 and 21,900 cross-border commuters respectively. Together, cross-border commuters from those three neighbouring countries represent two thirds of cross-border commuters coming to Germany. They were followed by Austria (11,300), the Netherlands (10,200) and Belgium (5,600). Only a very small number of cross-border commuters came to Germany from Switzerland (about 1,500), Denmark (about 500) and Luxembourg (about 200). The proportion of German citizens among them who live abroad and work in Germany cannot be determined. It is to be expected that almost everywhere, foreign cross-border commuters are in the majority; in individual neighbouring regions (e.g. in Belgium), one can however assume high proportions of cross-border commuters of German nationality.

Figure 6.17: Number of cross-border commuters by region in 2006-2016 and share of total working population in 2016



Origin of data: Eurostat, calculation by S&W: Saxony-Anhalt=2015, Mecklenburg-West Pomerania=2013, Thuringia=2011, Bremen/Hamburg no absolute figures
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With the exception of cross-border commuters from Poland, the employment locations of cross-border commuters to Germany is focused on areas near the border. The number of foreign cross-border commuters to economically powerful metropolitan regions further away from borders, namely Hamburg, Berlin, Rhine-Ruhr, Frankfurt (Main) and Munich, was relatively small. The commuter pattern from Poland was more spatially dispersed: on the one hand, they also concentrate on areas near the border, including Berlin, while on the other, a considerable number of cross-border commuters from Poland also cover large distances into all other regions of Germany.

The cross-border labour market in the German-Dutch border region

From a regional perspective, the German-Dutch labour market cannot yet be described as integrated. That applies both to the border region between Lower Saxony and the Netherlands, and to the North Rhine-Westphalian border with the Netherlands. This section discusses the examples of the levels of qualification and education, and commuter interrelationships.

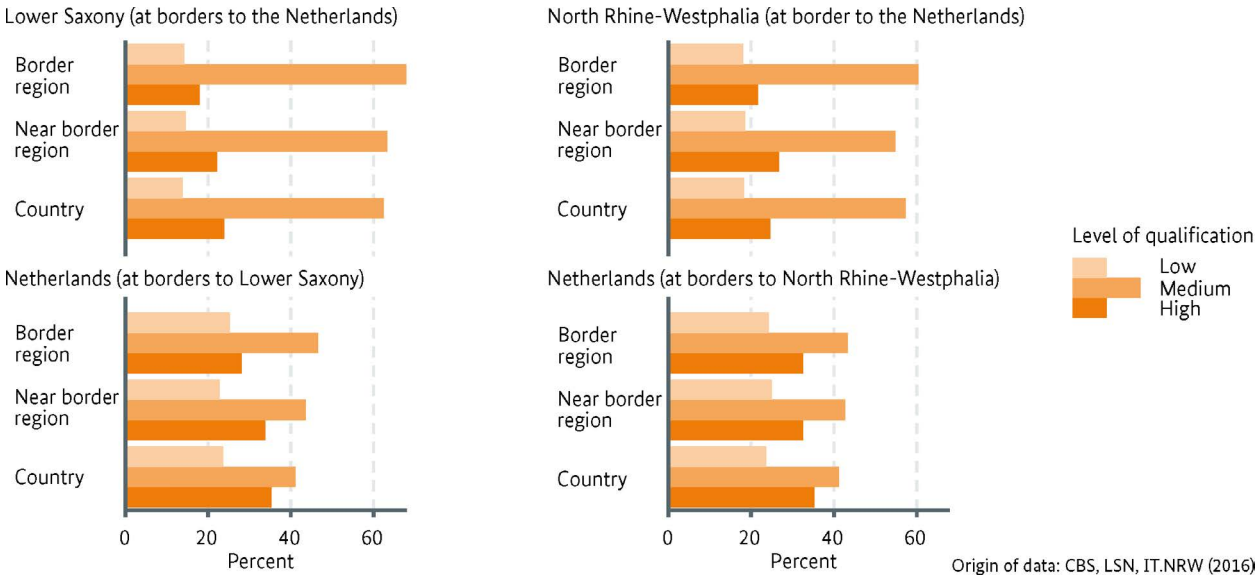
On both sides of the border, the level of qualification and education is lower than the respective national average (Figure 6.18) and this particularly applies to the shares of highly qualified employees. In the Netherlands, 35.3 percent of all employees are highly qualified, compared to the Dutch side of the border regions with Lower Saxony, at 28.1 percent, and with North Rhine-Westphalia, at 32.5 percent. On the German side, the share of highly qualified employees in all of Lower Saxony is 23.8 percent, compared to only 17.9 percent in the Lower Saxony-Netherlands border region. Overall in North Rhine-Westphalia, the proportion of highly qualified employees is 24.6 percent, while the level is 21.6 percent on the German side of the North Rhine-Westphalian border region with the Netherlands.

In the German-Dutch border region, there is a comparatively large number of employees with medium-level qualification: in the Netherlands, the national average is 41.1 percent, while on the Dutch side of the border regions with Lower Saxony and North Rhine-Westphalia, the levels are 46.5 and 43.3 percent respectively. On the German side, the average proportion of employees with medium-level qualifications throughout Lower Saxony is 62.4 percent, compared to 67.9 percent in the border region with the Netherlands. The average figure for all of North Rhine-Westphalia is 57.3 percent, compared to 60.3 percent in the border region with the Netherlands. There is a similar situation with respect to employees with low-level qualifications, with a tendency towards a higher proportion in the border regions than the relevant averages at national or federal state level.

On both sides of the border, the relative level of training and education is lower than the respective averages at national or federal state level. That conforms to the comparable spatial structure in those regions, which mainly consist of rural areas with individual conurbations. In locations with universities or universities of applied sciences, the proportions of highly qualified people are higher than the respective regional average.

The number of people living in the Netherlands and working in the Lower Saxony border region is extremely low (Figure 6.19): in 2014, there were fewer than 1,000 people in employment with social security contributions,

Figure 6.18: Level of qualification in the border region between Lower Saxony and the Netherlands (left) and in the border region between North Rhine-Westphalia and the Netherlands (right)

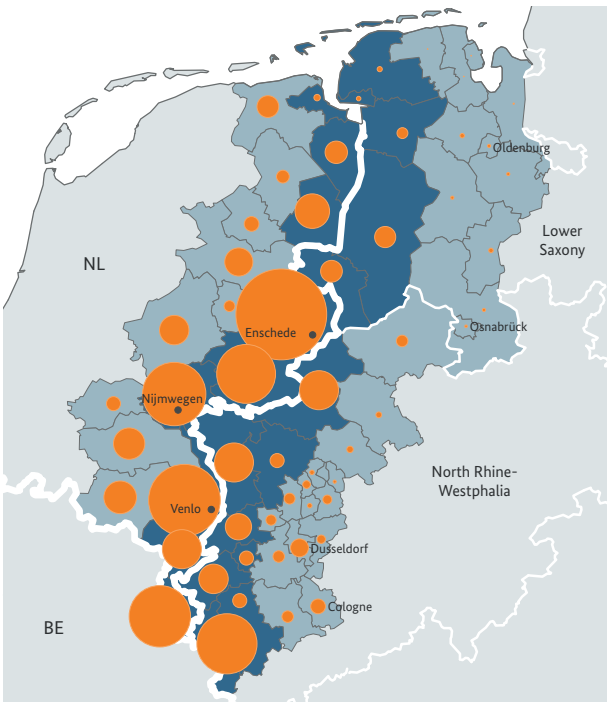


Origin of data: CBS, LSN, IT.NRW (2016)

or 0.3 percent. Inversely, around 10,000 employees from Germany work in the Dutch border region, representing 1.7 percent of people in employment with social security contributions. The reasons for this low amount of cross-border employment are difficult to determine. Aside from language, legal and administrative obstacles, Lower Saxony has no major conurbations in the west, the border region is relatively sparsely populated and long journeys to workplaces in more remote areas are unattractive.

Another reason for the low level of cross-border commuting could be that people working on the other side of the border have also moved their residence there. However, this in fact only applies to a few people. For instance in 2014, the proportion of people with German nationality who lived and worked in the Dutch border region was only 0.3 percent of all employees. The proportion of people with Dutch nationality who lived and worked in the Lower Saxony border region was also only 0.5 percent. Cross-border commuters from Germany to the Netherlands are mainly Dutch citizens. Their share of all cross-border commuters in the Lower Saxony border region is over 60 percent. These are probably to a large extent people who have immigrated to Germany from the Netherlands, but have retained their Dutch jobs. Inversely, there is only an extremely low number of German employees who live in the Netherlands and work in their home country.

Figure 6.19: Cross-border commuters at work location on the German-Dutch border in 2014



Origin of data: CBS, IT.NRW, LSN (2014)
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Between 2012 and 2014, the number of cross-border commuters from the Netherlands to North Rhine-Westphalia rose slightly by three percent. During the same period, the number of people living in North Rhine-Westphalia and working in the Netherlands decreased by eight percent. Most of the latter are cross-border commuters from North Rhine-Westphalia to the Netherlands: in 2014, the number was almost 27,000 people, while only 9,350 commuted in the other direction. Large increases in commuters from the neighbouring country were recently experienced in the districts of Borken (+16 %), Steinfurt (+35 %) and the towns and cities in the Ruhr region (+19 %). Apart from the cities of Arnhem and Nijmwegen, plus the South Limburg section of the Province of Limburg, the Dutch border region now attracts fewer employees from Germany.

On closer examination of the labour regions, it is apparent that on the Dutch side, the regions of Twente and Achterhoek have a relatively high proportion of cross-border commuters. One can presume that this is due to the traditionally strong cross-border economic relations and the settlement of businesses near the border there. Since both regions are situated in the vicinity of Lower Saxony and North Rhine-Westphalia, statements on whether commuters to those regions live in Lower Saxony or North Rhine-Westphalia are uncertain.

The small number of cross-border commuters along the German-Dutch border can above all be ascribed to differences, in some cases even incompatibilities, in the fields of languages, law and administration.

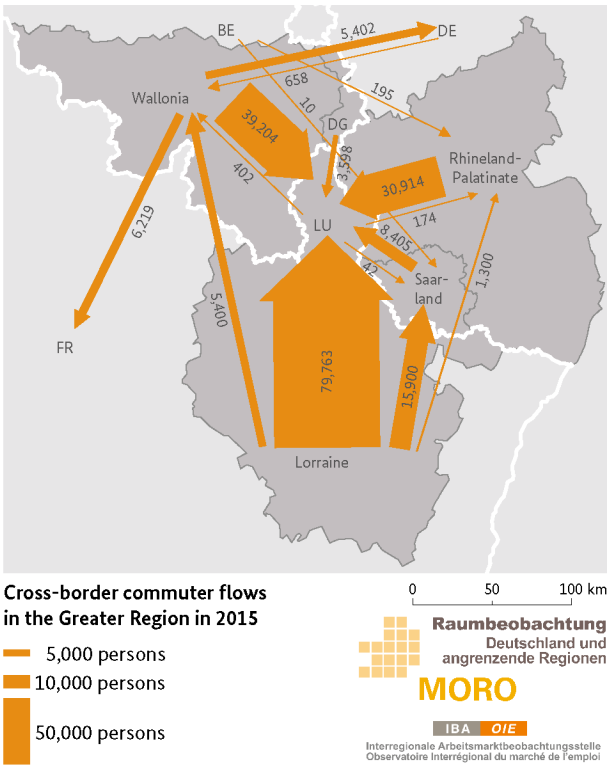
Commuter flows in the Greater Region

The total number of work-related commuters from the Greater Region who cross the national borders on a daily basis is 194,700. Of those, around 80 percent commute to the Grand Duchy of Luxembourg (158,300 commuters), who primarily come from Lorraine (79,800), Rhineland-Palatinate (30,900), Wallonia (39,200) and the Saarland (8,400) (Figure 6.20). The attractive labour market in the Grand Duchy of Luxembourg is the reason for that mobility behaviour.

The cross-border commuter flow in the other direction, from Luxembourg, if at all recorded, is extremely limited: for instance only 40 people from Luxembourg commute to the Saarland. Lorraine has by far the largest number of outward-bound cross-border commuters, with 102,400 people, of whom 15,900 travel to their workplaces in the Saarland, thereby making it the second most important target for cross-border commuters in the Greater Region after Luxembourg.

The upper Mosel valley constitutes the focal area with respect to work-related commuters between Germany and Luxembourg. The cities of Luxembourg, with around 150,000 jobs, and Trier, with almost 54,000 jobs with social security contributions, are the area's economic centres. Important employment locations can also be found in the medium-level centres of Wittlich (13,280), Bitburg (10,460) and Merzig (10,120 jobs).

Figure 6.20: Cross-border commuter flows in the Greater Region



Visualisation following calculations by IBA/OIE
Origin of data: BA, IGSS, INAMI, INSEE (estimates)
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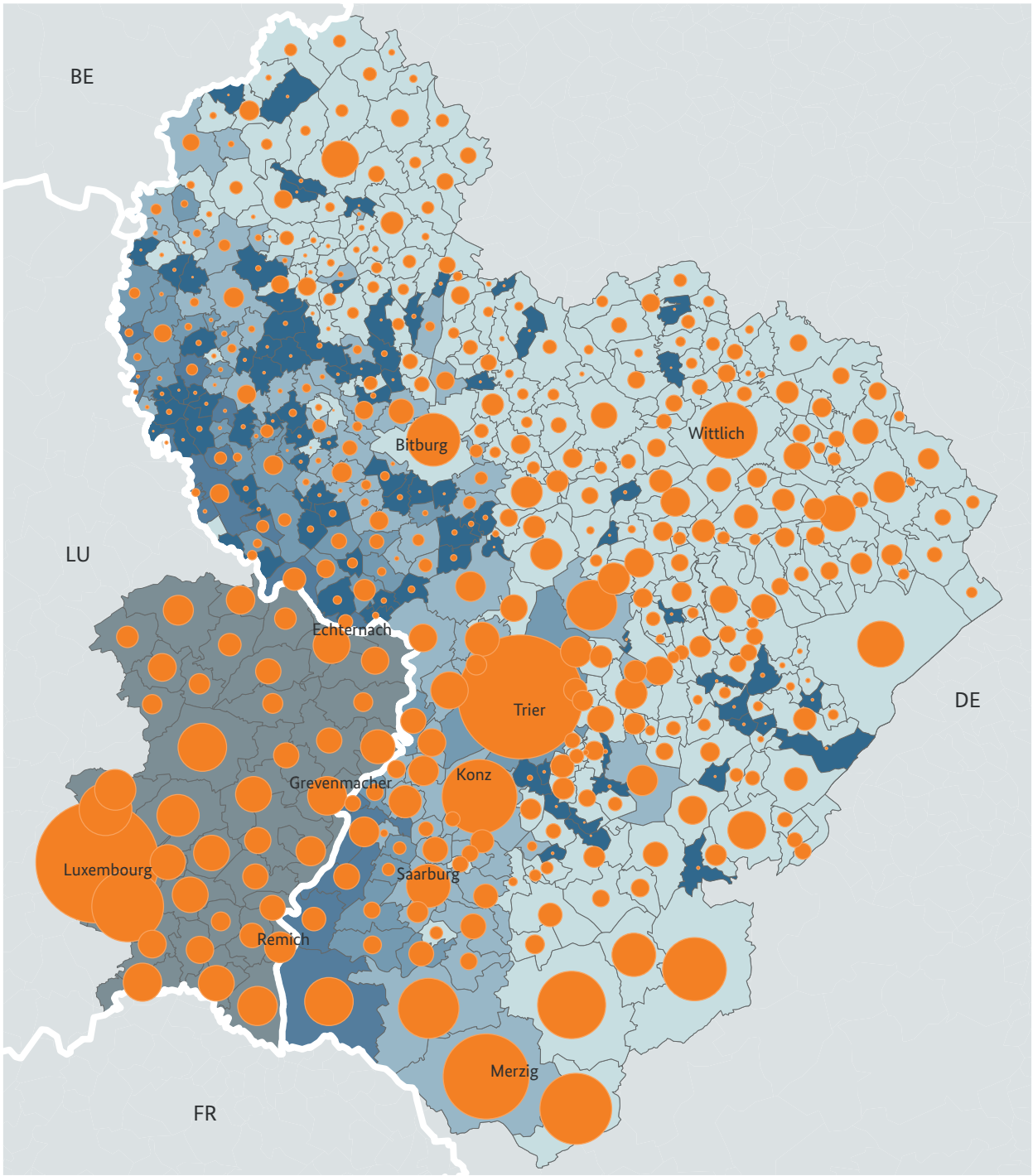
Figure 6.21 presents the absolute figures of work-related commuters per municipality and the respective proportion of cross-border commuters from Germany to Luxembourg. Work-related commuters are employees who do not live at the location of their work. The absolute work-related commuter figures also include cross-border commuters. However on the German side, they only include those commuting to Luxembourg. The largest municipality on the German side is Trier with 15,300 outbound work-related commuters. The city of Luxembourg has almost the same amount of outbound work-related commuters, namely 14,700. However, both cities are mainly inbound commuter cities, since the number of people commuting there far exceeds the number of outbound commuters. In the area of Luxembourg, the number of outbound commuters per community ranges between 271 and 14,700, depending on the district, whereby the cross-border commuters only make up a negligible proportion, namely between zero and 15,300 in the German part of the region. Municipalities with low numbers of outbound commuters can especially be found in the northern German part of the region, in the Hunsrück and in the Mosel-Saargau area.

Generally, the spatial linkages with the Grand Duchy of Luxembourg are higher the nearer a community is located to the border with Luxembourg. The percentage of work-related commuters to Luxembourg compared to the overall number of outbound commuters is far beyond 80 percent in several small communities in the Eifel and Hunsrück regions. If communities are situated further than 20 kilometres away from the border, they rarely have a share of commuters to Luxembourg that is higher than 20 percent.

In absolute figures, the largest volumes of cross-border commuters travelling to Luxembourg come from communities in the Saarland and from Trier. There are 6,830 commuters travelling from Trier to the Grand Duchy of Luxembourg, representing more than half of all the work-related outbound commuters from Trier. Around 1,600 of the 2,340 outbound commuters from the border location of Perl travel to Luxembourg, so a considerably higher number of people there commutes abroad to Luxembourg than to other municipalities within Germany.

Figure 6.21: Outbound commuters and cross-border commuters in the upper Mosel valley



Origin of data: STATEC, IGSS, Bundesagentur für Arbeit
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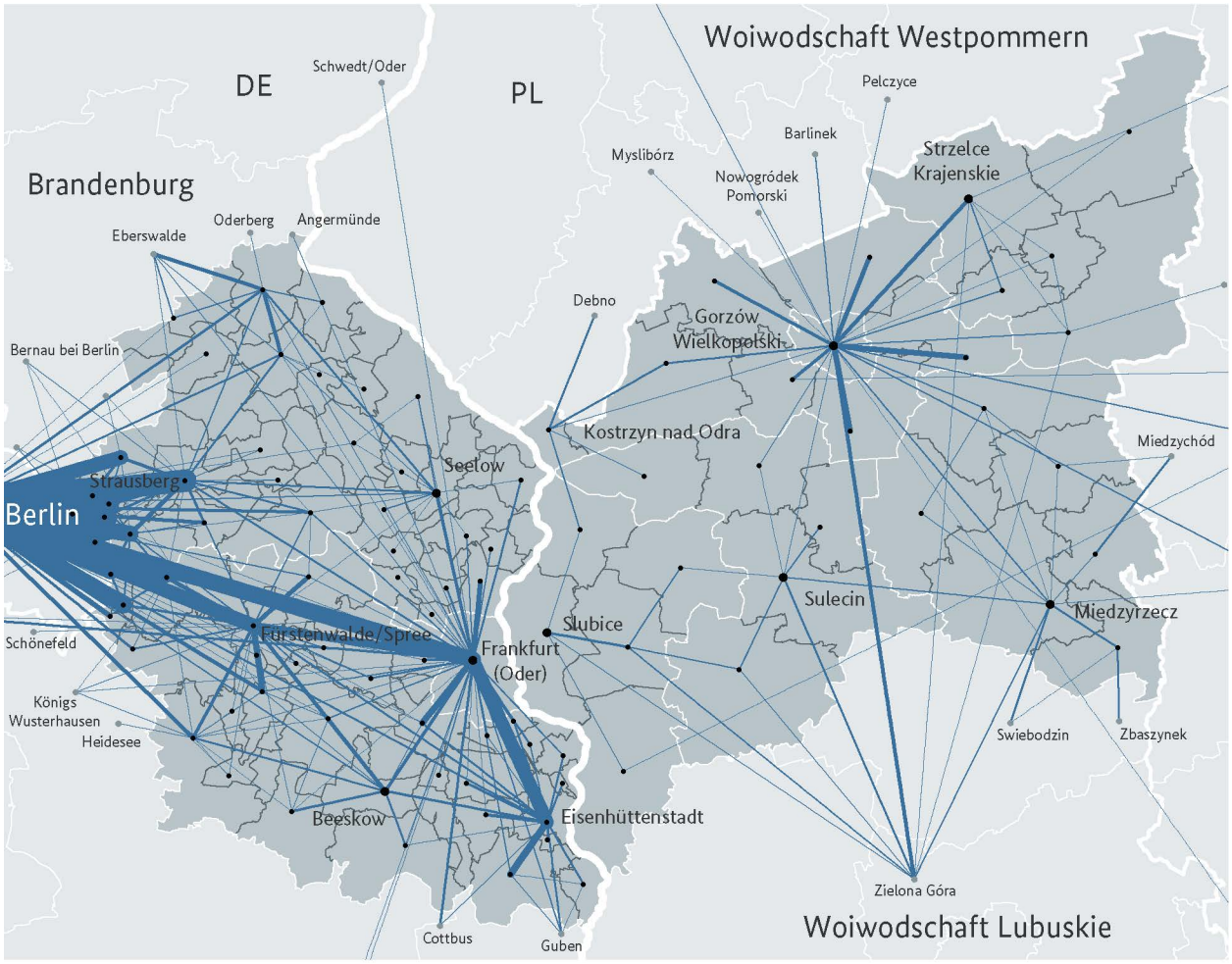
LE GOUVERNEMENT DU GRAND-DUCHÉ DE LUXEMBOURG
Ministère du Développement durable et des Infrastructures
Département de l'aménagement du territoire

Commuter flows in the Euroregion PRO EUROPA VIADRINA

The Euroregion PRO EUROPA VIADRINA is one of the four Euroregions along the German-Polish border. On the German side, it is situated in the east of the Federal State of Brandenburg, while the Polish side is in the northern part of the Voivodeship of Lubuskie. Geographically, the Euroregion is situated between the major cities of Berlin in the west, Szczecin in the north and Poznań in the east.

Figure 6.22 presents the intra-state commuter flows of people in employment with social security contributions on both sides of the border in 2011 (for commuter flows of 75 people and above). The commuter linkages reflect the job centrality of the municipalities and the catchment areas of the major and medium centres. The dominance of Berlin is striking. In recent years, commuter linkages with

Figure 6.22: Commuter flows in the Euroregion PRO EUROPA VIADRINA on the German and Polish sides (without cross-border commuters) in 2011



Commuter flows in the Euroregion PRO EUROPA VIADRINA in 2011 (without cross-border commuters)

- 100 persons
- 500 persons
- 1,000 persons
- 2,000 persons

0 15 30 km

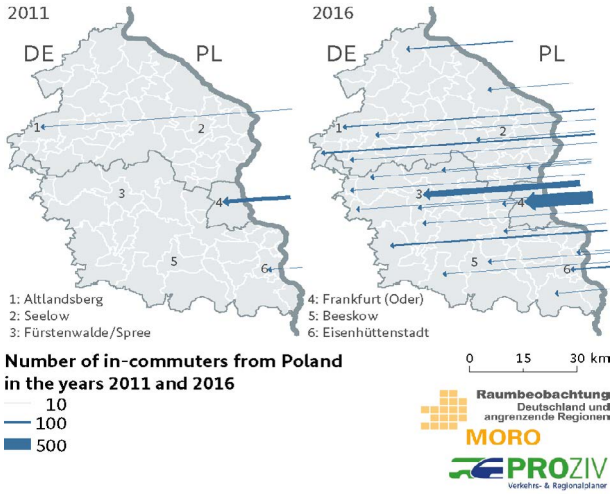
Origin of data: Bundesagentur für Arbeit 2011 (employees with social security contribution only), Glówny Urzad Statystyczny, NSP 2011, shown are flows of more than 75 persons in both directions
Territorial boundaries: Euroregion PRO EUROPA VIADRINA

Berlin have increased even further in both directions. The number of outbound commuters from the German part of the Euroregion into Berlin is now approximately 39,400, while the number of commuters from Berlin into the region is around 12,750. Within the Euroregion, the axes between Frankfurt (Oder), Fürstenwalde/Spree and Berlin, as well as between Frankfurt (Oder) and Eisenhüttenstadt are prominent as important commuter corridors.

In the Polish part of the Euroregion, Gorzów Wielkopolski has the largest centrality. Extensive commuter linkages exist with Zielona Góra, which is one of the two main cities of the Voivodeship of Lubuskie, together with Gorzów Wielkopolski. Tangential internal regional commuter flows on both sides of the border also exist, but are not so prevalent. Despite the almost identical number of inhabitants on the German and Polish sides of the Euroregion, the number of people commuting between their place of residence and their workplace is greater on the German side. However, there is only limited direct comparability due to the methodological specifics in recording the commuter data in Germany (using the employment statistics of the Federal Employment Agency) and in Poland (based on the Polish micro-census).

After Poland became a member of the European Union in 2004, was included in the Schengen Region in 2007 and adopted the law on the free movement of labour in 2011, the political conditions were established for a rapid development of mutual transnational transport interdependencies in the German-Polish border region. Figure 6.23 illustrates the development of commuter flows from Poland into the German part of the Euroregion PRO EUROPA VIADRINA. Commuter volumes of ten people or more are presented, whereby the current data source does not yet indicate the Polish place of residence. Similarly, there is no data on cross-border commuters in the opposite direction, i.e. from Germany to Poland. Between 2011 and 2016, the number of those in employment with social security contributions who commute from Poland to the German part of the Euroregion has increased by almost 800 percent, namely from 198 to 1,576. In 2011, only three municipalities registered more than ten employees from Poland, compared to 24 municipalities today, representing large areas of the German part of the Euroregion. The main employment locations are Frankfurt (Oder) and Fürstenwalde/Spree. Furthermore, significantly rising numbers of transit

Figure 6.23: Development of inbound commuter volumes from Poland into the German part of the Euroregion PRO EUROPA VIADRINA between 2011 and 2016



Origin of data: Bundesagentur für Arbeit 2011-2016, employees with social security contribution only, flows over 10 persons only
Administrative boundaries: Euroregion PRO EUROPA VIADRINA

commuters have a noticeable effect on the intensity of use of the transport infrastructures in the region. For instance the number of commuters between Poland and Berlin increased from 65 in 2011 to 2,132 in 2016. The 50 percent increase between 2015 and 2016 alone demonstrates the great necessity for action in the field of transport. The transportation of goods by heavy goods vehicles on the A2/A12 also increased by 25 percent between 2010 and 2015. Every year, around two million air passengers also travel to Berlin's airports from Poland, especially from the directly neighbouring voivodeships.

The increase in the number and distribution of employment locations and of transit commuters has the effect that all cross-border transport connections (road, railway and bus only between Frankfurt (Oder) and Słubice) are being increasingly used. In view of this development, the regional and national construction authorities face great challenges for all modes of transport. In the Euroregion PRO EUROPA VIADRINA, a transnational and multi-transport mode approach is being applied to intensively address the increasing number of traffic jams on the A2/A12 motorway and the overloaded railway connections on the lines Berlin – Frankfurt (Oder) – Rzepin (– Zielona Góra – Wrocław) – Poznań – Warsaw and Berlin – Kostrzyn nad Odrą – Gorzów Wielko-polski, seeking possible transport policy solutions.

7 Transport and accessibility

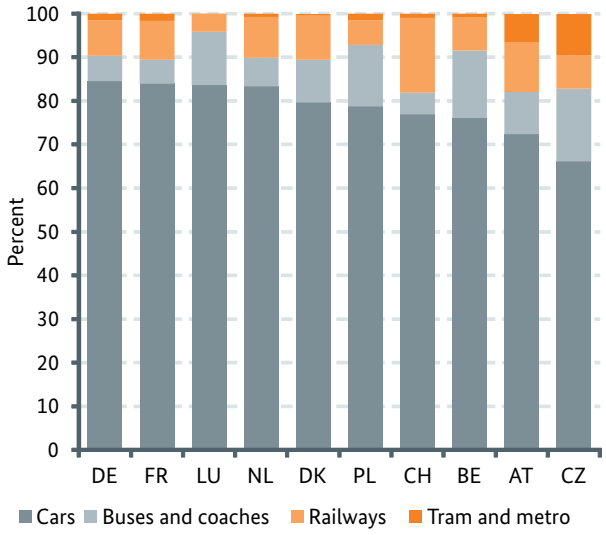
The close interdependencies of Germany with its neighbouring countries in private, social, economic and political constellations also lead to a constantly increasing amount of traffic – both in terms of passenger and freight transport. Accessibility is a factor with a strong spatially differentiating effect. It reflects how favourable a place's location is with respect to different opportunities. Appropriate destinations in the neighbouring countries often lead to a significant increase in accessibility. That especially applies to regions near borders. Leisure and tourist activities are the most often stated reasons for travelling to a neighbouring country.

7.1 Passenger transport

In Germany and all of its neighbouring countries, the dominant choice of transport mode is the automobile (Figure 7.1). With respect to the traffic volumes of motorised vehicles, measured in passenger kilometres, Germany has the highest proportion of automobiles compared to any of its neighbouring countries, at a level of almost 85 percent, and a public transport share of only 15 percent, thus representing the strongest dominance of cars. However, most countries are only a few percentage points behind, with only the Czech Republic (66.1 %) and Austria (72.4 %) having significantly lower automobile proportions in the motorised modal split. In the Czech Republic, Belgium and Poland, buses and coaches play a more significant role, with a share of 15 percent of the modal split. The highest railway proportions are achieved by Switzerland (17.1 %) as well as Austria, Denmark and the Netherlands – each with 10 percent; in Germany, the proportion is 8.2 percent. Underground and trams play a significant role in the Czech Republic (9.5 %) and Austria (6.6 %) in the choice of transport mode, while the other countries have very low rates (below 1 %).

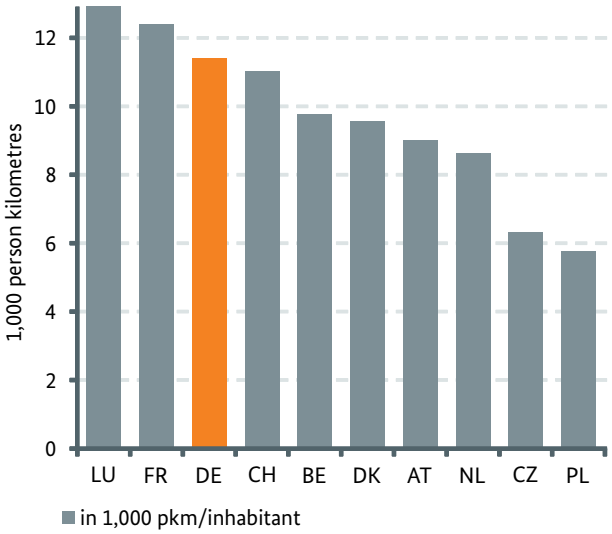
In all neighbouring countries, automobile traffic has significantly increased in the last ten years. The greatest increase in the number of kilometres travelled by car was in Poland, at almost 70 percent, while in the other countries, the increase is comparatively small at mostly around 10 percent. However, the total annual amount of car kilometres travelled per inhabitant is still lowest in Poland (5,758 km), followed by the Czech Republic (6,307 km) (Figure 7.2). Germany has the third highest per capita driving performance (after Luxembourg and France); almost twice as high as the two neighbouring eastern countries.

Figure 7.1: Modal split of motorised passenger transport based on passenger kilometres in 2014



Origin of data: European Commission

Figure 7.2: Car kilometres per inhabitant in 2014



Origin of data: Eurostat

In all countries, the respective mileages are far lower for railway transport (Figure 7.3). Switzerland has the highest relative annual railway use compared to Germany and all neighbouring countries, at 2,500 km per person. In Austria, France, Denmark and Germany, railways are used much less, with an annual mileage between 1,000 and 1,500 km per inhabitant. Poland is the neighbouring country with the lowest mileage with respect to per capita annual railway travel, at 420 km. Poland is also the only neighbouring country in which the number of railway kilometres per inhabitant has decreased in the last ten years, while the figures are rising in Germany and all other neighbouring countries.

One reason for the dominance of the car in passenger transport mileage is its constantly growing availability. In 2015, a total of almost 130 million automobiles were registered in Germany and its neighbouring countries (Figure 7.4), almost a third of which in Germany (44.4 million cars), a quarter in France (32.3 million cars) and almost a sixth in Poland (20.7 million cars). In the Netherlands, over 8 million cars were registered, while Belgium, Switzerland, Austria and the Czech Republic had around 5 million registered cars each; Denmark recorded 2.4 million registered automobiles.

Figure 7.4: Number of cars in Germany and its neighbouring countries in 2015 and development since 2000

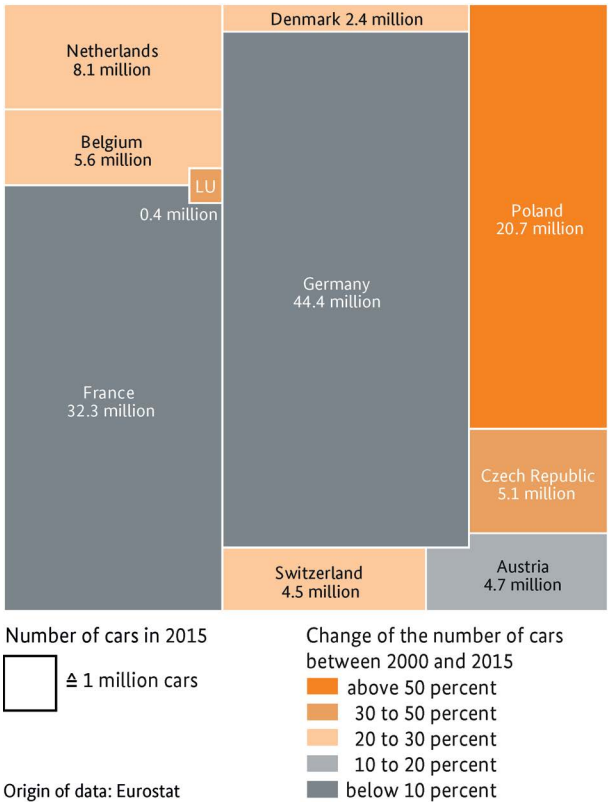
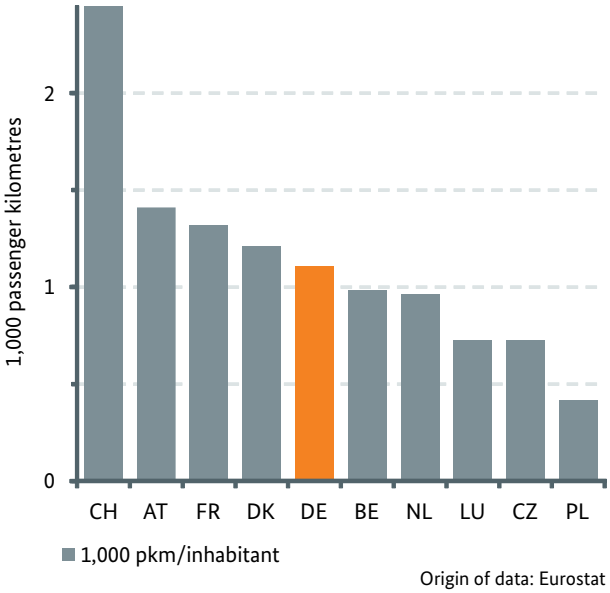
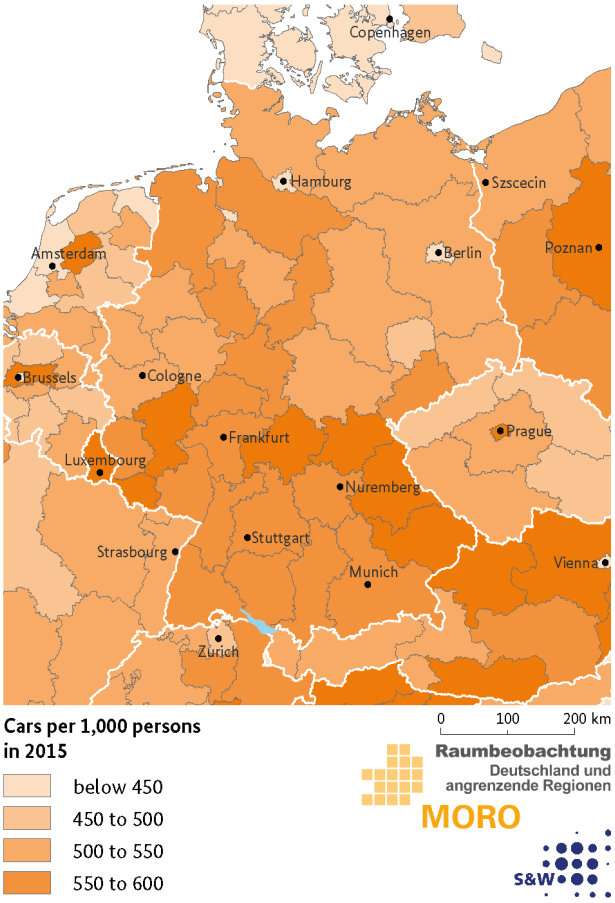


Figure 7.3: Railway kilometres per inhabitant in 2014



The stock of automobiles in the last 15 years has changed greatly in some areas. In large western countries, such as France (8.4 %) and especially Germany (4.7 %), there was a comparatively low increase in the number of cars. Significantly higher growth rates were recorded in smaller western countries such as Austria (almost 16 %), the Netherlands, Belgium, Switzerland and Denmark (between 20 and 30 %) and Luxembourg (41.5 %). The highest increases were seen in the eastern neighbouring countries, reflecting the economic growth and the population's increased prosperity there: the number of registered cars in the Czech Republic grew by almost 50 percent, while the figure in Poland was even 107 percent. The different growth rates with strong catch-up processes in the eastern central European countries have led to a very strong convergence in the number of cars owned per person in the different countries. While Poland had 260 cars per 1,000 inhabitants in the year 2000, the figure was already over 500 in Austria and Germany and 600 cars in Luxembourg. By

Figure 7.5: Cars per 1,000 inhabitants in 2015



Origin of data: Eurostat
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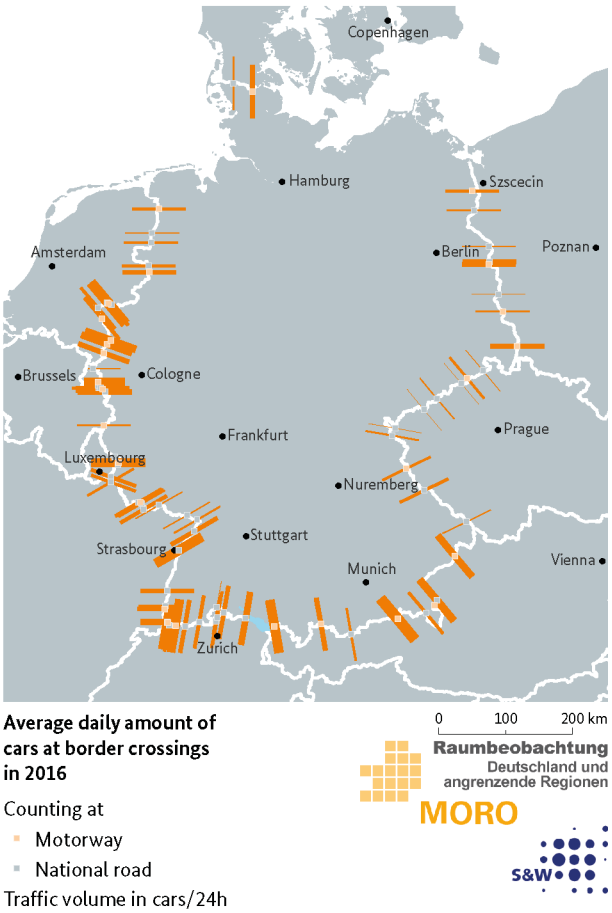
Figure 7.6: Cross-border car traffic in 2014



Origin of data: Bundesanstalt für Straßenwesen
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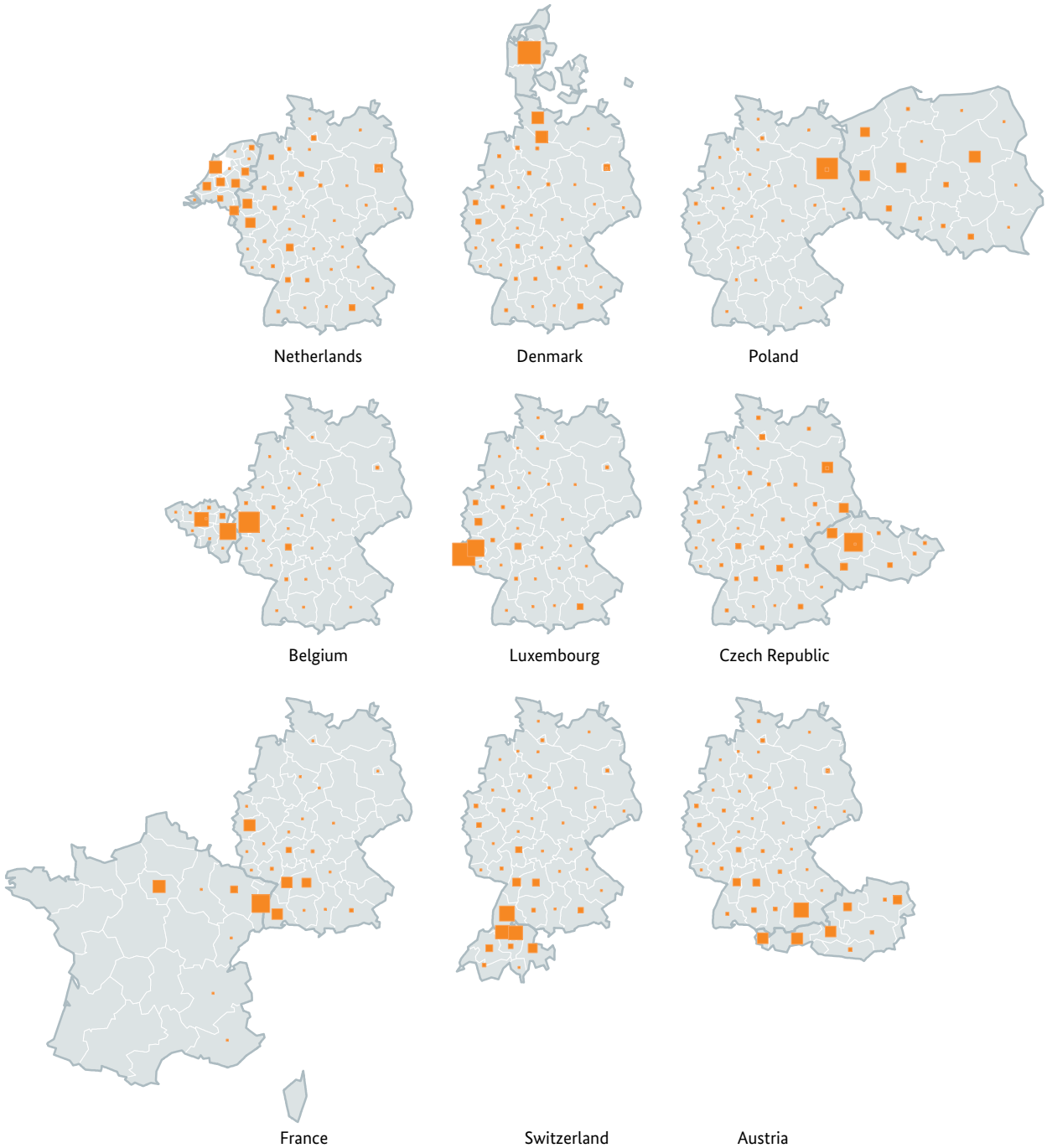
2015, the figures in Poland, Austria and Germany were at the same level with 550 cars per 1,000 inhabitants.

However, there are considerable regional differences within the countries (Figure 7.5). In the core cities of agglomerations, car ownership is often lower than in the surrounding regions and in rural areas. However, the opposite is the case in the Czech Republic, where the highest car ownership levels are in Prague. German border regions often have higher motorisation rates than the respective regions on the other side of the border. That is particularly the case along the borders with Denmark, the Netherlands and the Czech Republic. The situation is inverse on the German-Polish border, with higher car ownership rates on the Polish side, especially compared to Saxony and parts of Brandenburg.

Transport flows with the neighbouring countries can only be presented using examples. For cross-border car traffic, there are traffic volume statistics for the motorways and most important national roads (Figure 7.6). In 2014, a daily average of 950,000 cars were recorded at the 80 border crossings with counting systems as they went in or out of Germany. The flows of automobile transport are particularly high along the borders with the south-eastern Netherlands, Belgium, Luxembourg, France, Switzerland and Austria; in 2014, some border crossings were recording over 30,000 cars per day. Car volumes were lower at the border crossings with counting systems with Denmark, Poland and especially the Czech Republic.

Figure 7.7: Passenger rail linkages between Germany and its neighbouring countries, 2005-2015



Rail linkages between Germany and neighbouring countries by region of origin between 2005 and 2015

10 percent (of rail passengers of respective country)

0 200 400 km

Origin of data: Calculation by S&W based on Eurostat
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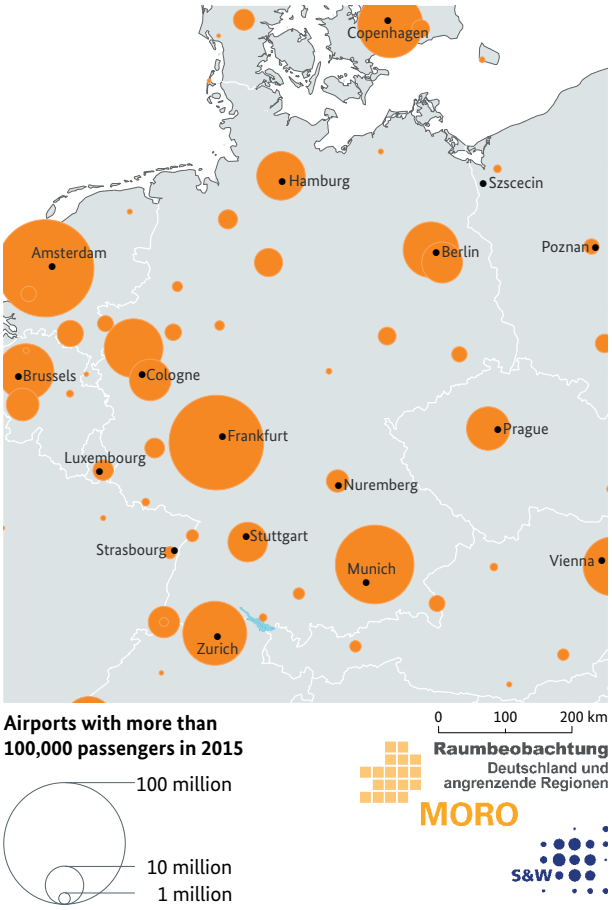
Raumbeobachtung Deutschland und angrenzende Regionen
MORO
S&W

Figure 7.8: Passenger volumes at airports in Germany and its neighbouring countries in 2015



Origin of data: Eurostat
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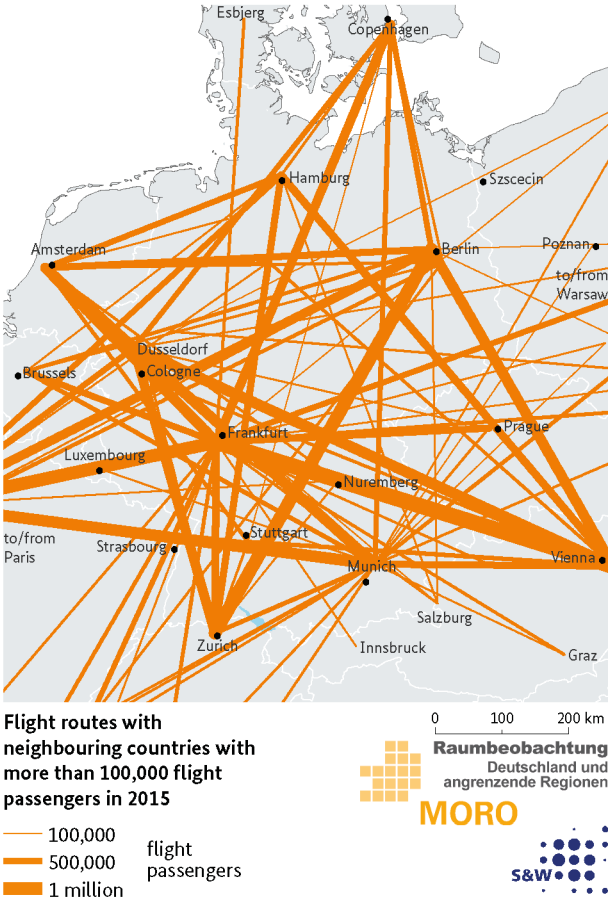
Figure 7.9: Important flight routes between Germany and its neighbouring countries in 2015



Origin of data: Eurostat
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Figure 7.7 presents rail passenger flows with the neighbouring countries according to the country and region of departure. For each of the nine neighbouring countries, it presents the percentage of those beginning a journey into that country by region in Germany, and the percentage of passengers by region starting their journey to Germany from the neighbouring country (regions are not shown for Denmark and Luxembourg). For many countries, two spatial patterns overlap: firstly, it is the regional rail traffic in border regions, with high proportions of passengers starting and ending their journeys near borders; secondly, there is a large amount of international long-distance travel with connections to more distant metropolitan regions.

The importance of international airports in Germany and its neighbouring countries can be seen in Figure 7.8; it shows a clear hierarchy with respect to air passenger numbers. The flight routes between Germany and the neighbouring countries with the highest passenger numbers are shown in Figure 7.9. These are mainly connections between the major German airports and the capital cities of the neighbouring countries. The highest numbers of air passengers in 2015 were achieved on the routes towards Amsterdam, Paris, Zurich, Vienna and Copenhagen.

7.2 Freight transport

Freight transport is also dominated by the proportion transported by road (Figure 7.10). In all countries, trucks

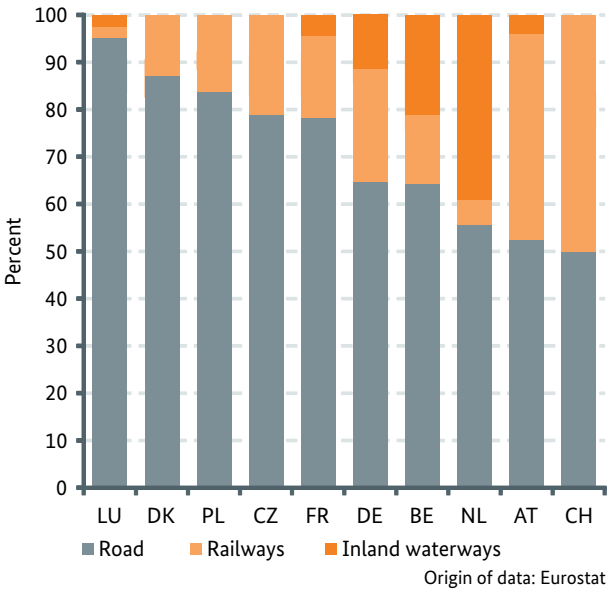
are the most important and most used mode for transporting goods. This is most striking in countries such as Luxembourg, Denmark, Poland, the Czech Republic and France; in 2014, the proportion of road freight transport on the overall volume of freight transport was almost 80 percent or more in those countries – measured in tonne-kilometres (tkm). Germany and Belgium both had rates of 64 percent. In the Netherlands (56 %), Austria (53 %) and Switzerland (50 %), road freight transports only made up about half of all freight transport. In the Netherlands, the proportion of shipping freight was very high (39.1 %), while Austria (43.6 %) and Switzerland (50.0 %) showed high levels of rail freight. In Germany, a quarter of the freight transport volume (in tkm) used the railways.

In 2014, trucks registered in Germany transported a total freight volume of 310 billion tkm – the highest amount compared to all neighbouring countries (Figure 7.11). Polish trucks transported 250 billion tkm and French lorries 165 billion tkm per year. They are followed at significantly lower volumes by the Netherlands (71 billion tkm) and the Czech Republic (54 billion tkm). Polish, Czech and Dutch trucks transported more goods abroad than in their home country. Of the 250 billion tkm transported by Polish trucks, only 100 billion tkm were journeys within Poland, compared to 150 billion tkm abroad. That was over three times as much as German trucks transported abroad (47 billion tkm). The mileage distribution is completely different for French trucks: out of the 165 billion tkm transported, over 90 percent was within France (151 billion tkm), with only 14 billion tkm on trips abroad. These partly very internationally oriented transport services by truck fleets of neighbouring countries are reflected on the roads in Germany. In 2016, vehicles recorded by the toll system for trucks covered 32.5 billion km on tolled roads in Germany. That included 13.3 billion km by trucks that had not been registered in Germany, representing over 40 percent of total freight traffic on that roads. By far the largest proportion of those foreign trucks were Polish (4.8 billion km), followed by the Czech Republic (1.4 billion km), Romania and the Netherlands (1 billion km each) (Figure 7.12).

Trucks from other neighbouring countries on German roads have a much lower mileage, which is also far less than the truck fleets from other countries that do not border directly with Germany, such as Hungary, Slovakia, Lithuania, Bulgaria and Slovenia.

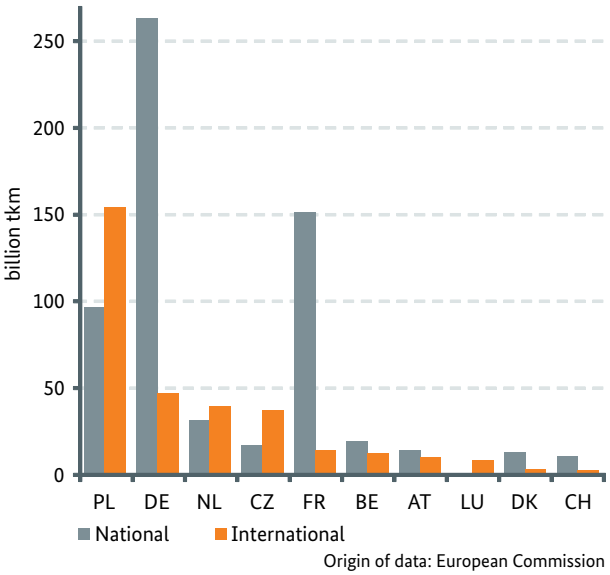
The road freight transport flows between Germany and its neighbouring countries are correspondingly intensive. In 2014, the average daily number of trucks crossing the external border of Germany at places with counting systems was around 160,000 (Figure 7.13). That cross-border truck

Figure 7.10: Modal split in freight transport in 2014



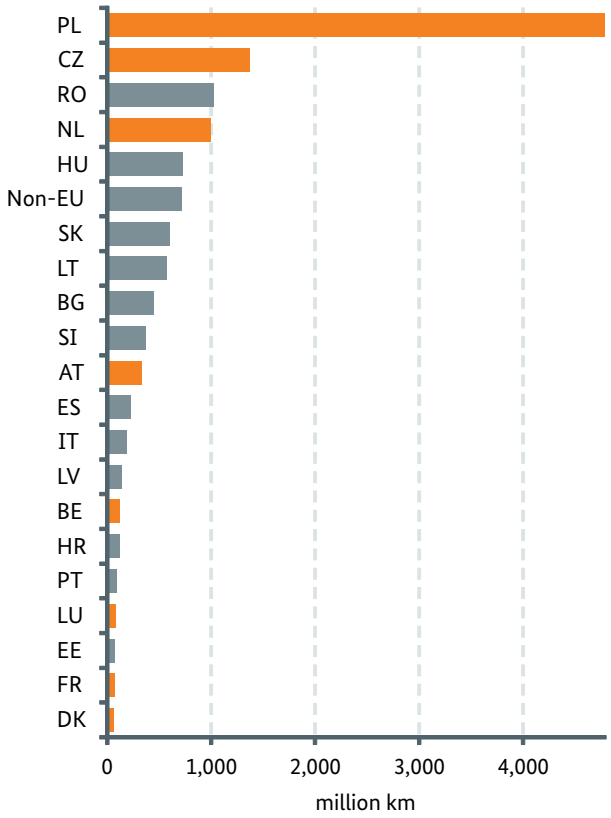
Origin of data: Eurostat

Figure 7.11: National and international road freight transport volumes in 2014



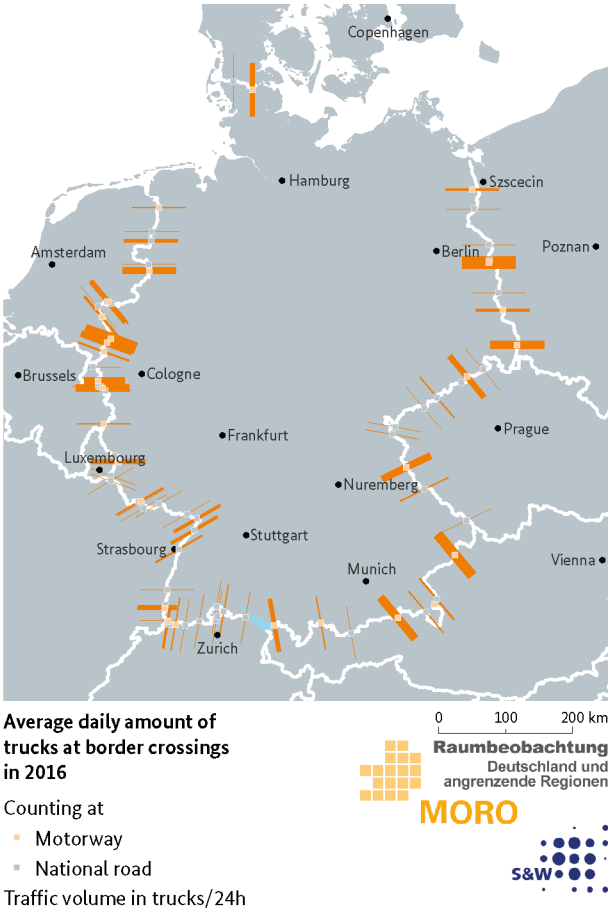
Origin of data: European Commission

Figure 7.12: Transport volumes of trucks registered abroad on tolled roads in Germany in 2016



Origin of data: Bundesamt für Güterverkehr

Figure 7.13: Cross-border truck traffic in 2014



Origin of data: Bundesanstalt für Straßenwesen
Heavy traffic figures presented include cars with trailer
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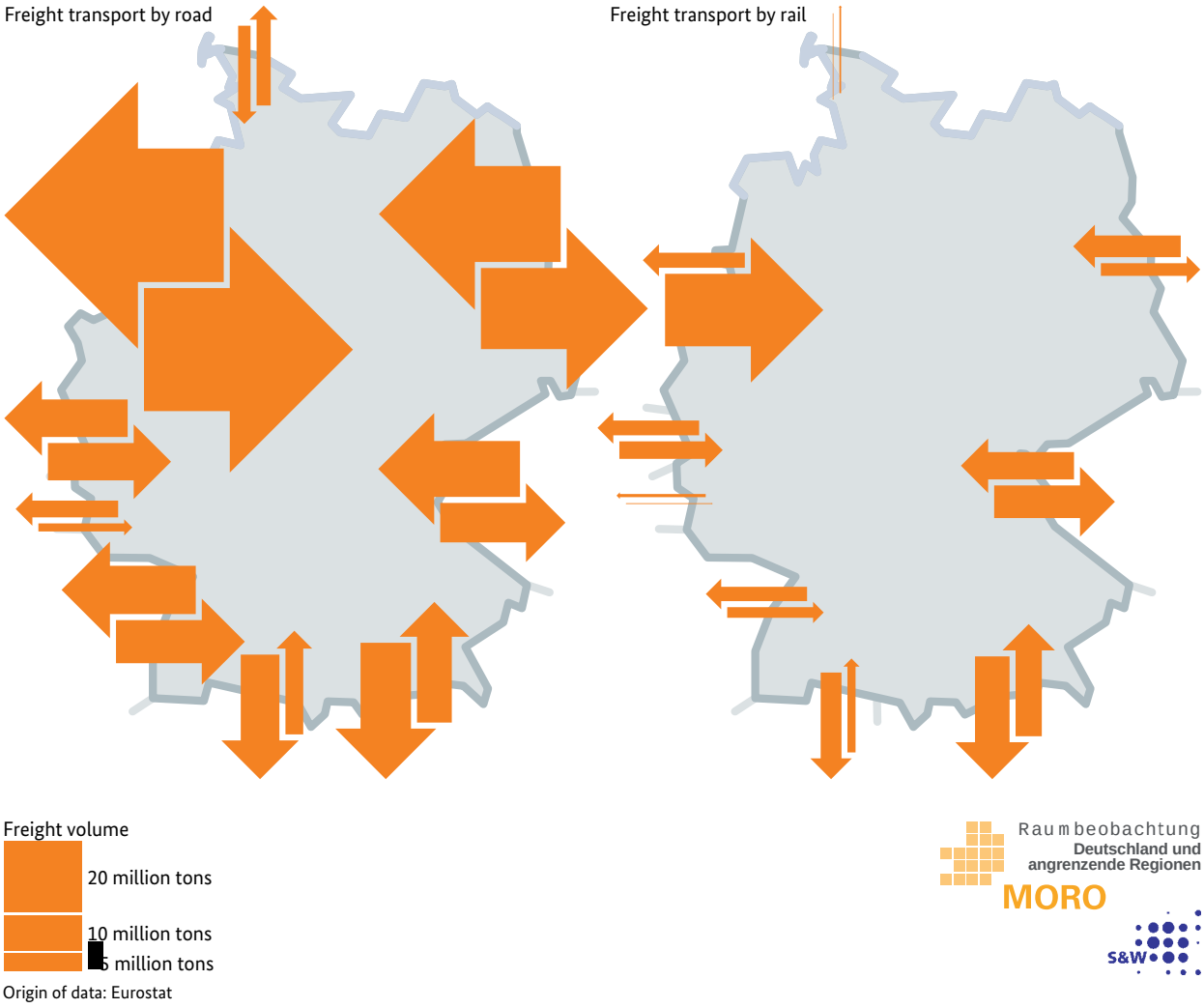
traffic is focused on a few routes. Busy routes include those to the Netherlands (A4, A30, A40, A61) and Belgium (A 44), where particularly the hinterland transport of the North Sea ports is handled, as well as the route to Austria (A3, A93 connecting to the Brenner motorway), to the Czech Republic from Nuremberg (A6) and Dresden (A17), and to Poland via the two most important crossings near Frankfurt (Oder) (A12) and Görlitz (A4). Truck traffic is noticeably low at border crossings to Switzerland.

The volume of freight goods exchanged between Germany and its neighbouring countries on the road is significantly higher compared to freight transported by rail (Figure 7.14). Both maps in the diagram include neither the transit traffic from neighbouring countries through Germany nor such traffic from Germany through neighbouring countries. The largest exchange of freight goods by road occurs both in exports and imports with the Netherlands, followed by Poland. The lowest road freight transport occurs between Germany and Luxembourg and Denmark respectively. On the railways, most goods are brought to Germany from the Rotterdam ports in the Netherlands. There are also considerable railway flows in both directions with respect to the Czech Republic and Austria.

7.3 Accessibility

Accessibility is a multidimensional concept with many facets, concepts and definitions. “The” accessibility does not exist. Instead, one or more accessibility indicators must be defined for each question to reflect the relevant

Figure 7.14: Germany's transport flows with its neighbouring countries, freight transport by road in 2015 and freight transport by rail in 2016



Origin of data: Eurostat

context. In the framework of cross-border spatial monitoring, the following four transport accessibility aspects are presented as examples. A first accessibility indicator was already introduced in Chapter 3 of this report ("Spatial and settlement structure") with the population potential.

Accessibility is also an economic location factor. One decisive aspect for the economic success of a town, city or region is its location in the European, or also just national, space with its transport access to input materials, services and sales markets. Such competition-related accessibility aspects in the regions of Germany and its neighbouring

i Accessibility potential

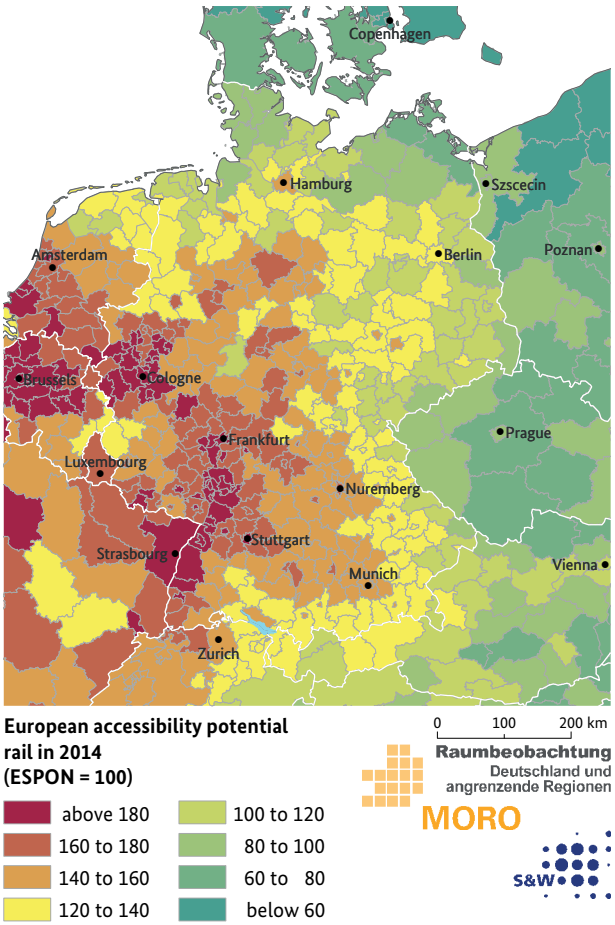
Accessibility as competitive location factor is often presented using accessibility potential indicators in studies on the whole of Europe. A region's accessibility is determined from the sum of all considered opportunities (e.g. population, gross domestic product or jobs) in all European regions. These opportunities are each weighted according to the travel requirements (time, costs or a combination of both) incurred to access them.

countries are presented in Figure 7.15 – measured as the accessibility potential with the population as the destination figure and railway travel times as the transport cost. Accessibility patterns are decisively determined by European high-speed railway routes. Towns, cities and regions along the Rhine rail corridor in Germany and the major cities in Belgium and France have the highest European accessibility potential. High potential is also achieved in regions in Switzerland and the Netherlands. All German regions (apart from those in the north and north-east of the country) achieve accessibility levels above the European average. All regions in Germany's northern and eastern neighbouring countries have lower levels. The accessibility of border regions is based according to their location with respect to the railway network, especially in relation to high-speed rail lines. Border regions in the west and south-west of Germany achieve accessibility values that are among the highest in all of Europe.

The picture is different if one limits the accessibility potential to the regions within their own country (Figure 7.16), since national accessibility structures space very differently. Almost all border regions are to be regarded as peripheral now; exceptions due to their own high potential are the border regions in the west of North Rhine-Westphalia and in the Upper Rhine region.

Another form of accessibility is the travel time to the next airport offering attractive flight connections (Figure 7.17). This form of accessibility reflects the endowment with

Figure 7.15: European accessibility potential in 2014



Origin of data: S&W Accessibility Model
based on RRG GIS Database, 2014
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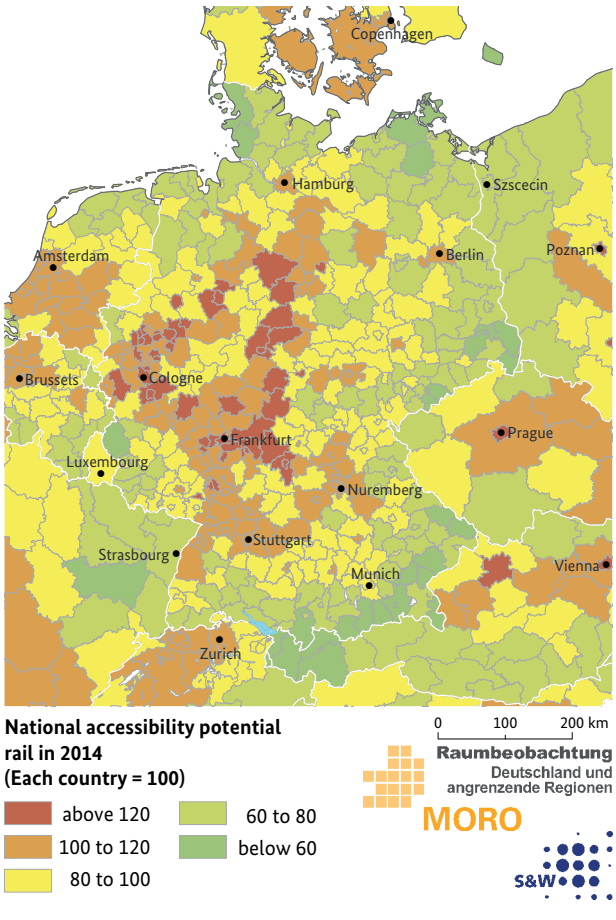
Figure 7.16: National accessibility potential in 2014



Origin of data: S&W Accessibility Model
based on RRG GIS Database, 2014
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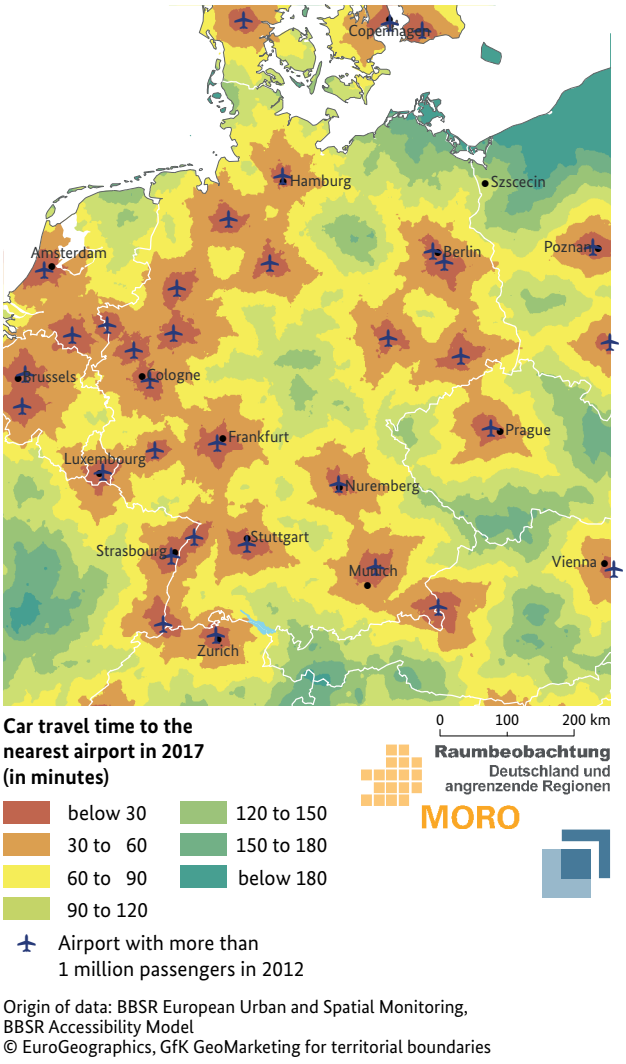
Figure 7.17: Car travel time to the nearest airport in 2017



Origin of data: BBSR European Urban and Spatial Monitoring, BBSR Accessibility Model
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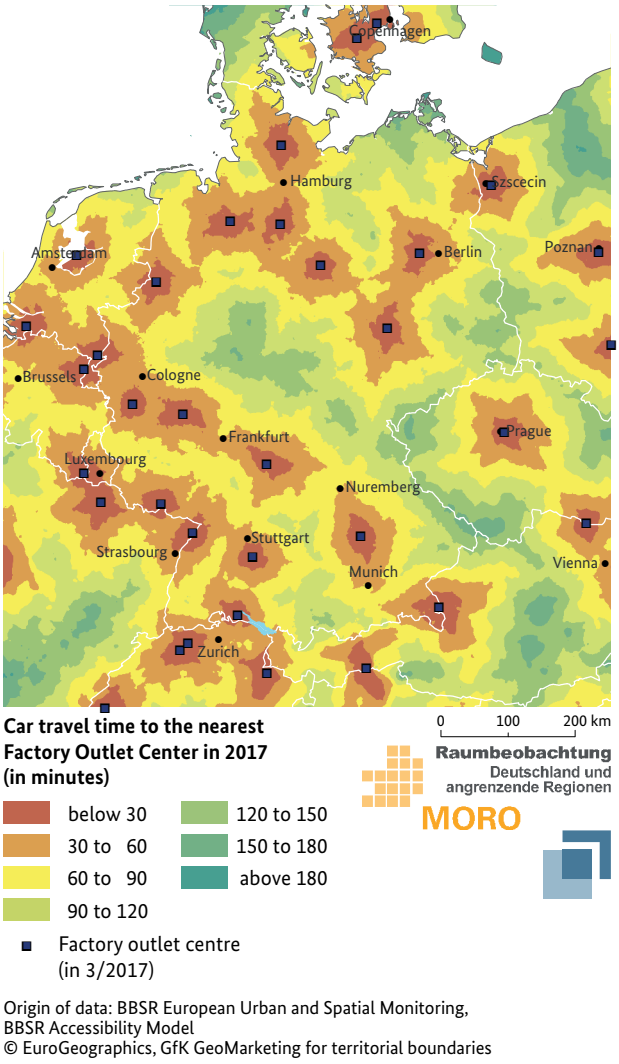
Figure 7.18: Car travel time to the nearest factory outlet centre in 2017



Origin of data: BBSR European Urban and Spatial Monitoring, BBSR Accessibility Model
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opportunities to reach more distant destinations. Almost all regions can reach an airport with passenger volumes of over 1 million in under 90 minutes by car. Regions considered peripheral based on access to airports are also visible in the centre of the country (along the former inner-German border) and especially in Mecklenburg-West Pomerania. Border regions in the west and south of Germany have good access to airports. In many of these border regions, the most accessible airport is across the border rather than in one's own country. By contrast, some border regions in the German-Austrian, Bavarian-Czech and especially the German-Polish region are situated significantly further away from airports. In those areas, the travel time from the respective neighbouring country to an airport in Germany is often two hours or more.

Factory outlet centres are a special form of retailing that often deliberately seeks locations in border regions to also serve the markets in the other respective country. Thus, in most border regions in the north, west and south of Germany, there are relatively short travel times to such facilities, while a broad corridor in the centre of Germany is much further away from them (Figure 7.18). That also applies to border regions with the Czech Republic and Poland, from where often a two or even three-hour car drive is required to reach a factory outlet centre.

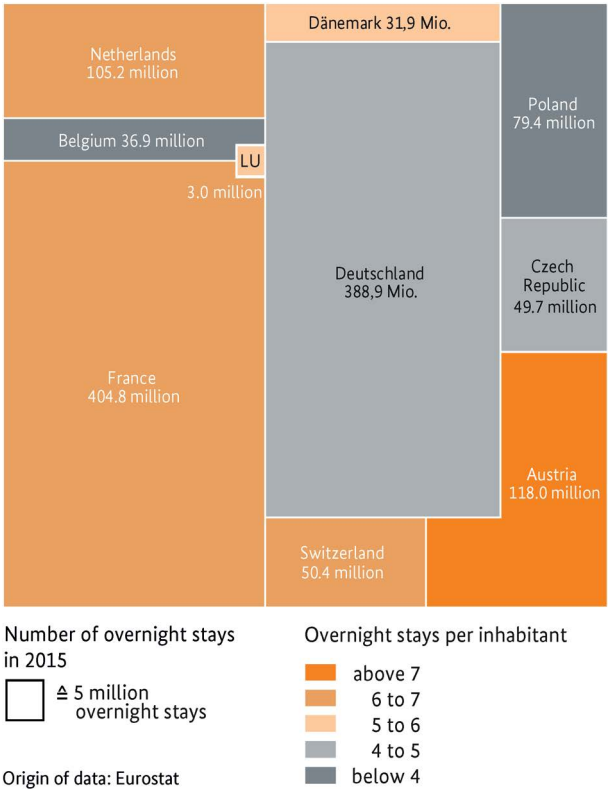
7.4 Travel and tourism

The booming travel and tourism industry is an important economic sector. For many regions, business, trade and holiday travel is a substantial basis of employment and income. In 2015, 389 million overnight stays were registered in accommodation services, 21 percent of which were from people from abroad. Among Germany's neighbouring countries, the number of overnight stays was only higher in France than in Germany (Figure 7.19). Standardised by inhabitants, Austria was by far the most popular travel destination in 2015 among Germany's neighbouring countries, followed by the Netherlands, Switzerland, France and Denmark.

Austria is Germany's third favourite travel destination after Spain and Italy. Among the neighbouring countries, it is followed by France, the Netherlands and the Czech Republic. In Austria, France, the Czech Republic and Poland, more guests were accommodated from Germany in 2015 than guests from those neighbouring countries in Germany (Figure 7.20). Most guests in Germany came from the Netherlands (14 %), Switzerland (8 %) and the USA (7 %). In the neighbouring countries, visitors from Germany mostly formed the largest proportion of foreign overnight guests. Only in Belgium (1st NL, 2nd FR), Luxembourg (1st NL, 2nd BE) and France (1st GB, 2nd NL) Germans were in third place.

The majority of overnight stays provided by accommodation services are concentrated on tourist and capital city regions (Figure 7.21). In the tourist-orientated regions of the North Sea and Baltic coasts, in Luxembourg, the Eifel region, along the Mosel and Saar rivers and in the Austrian

Figure 7.19: Number of overnight stays in Germany and its neighbouring countries in 2015



Origin of data: Eurostat

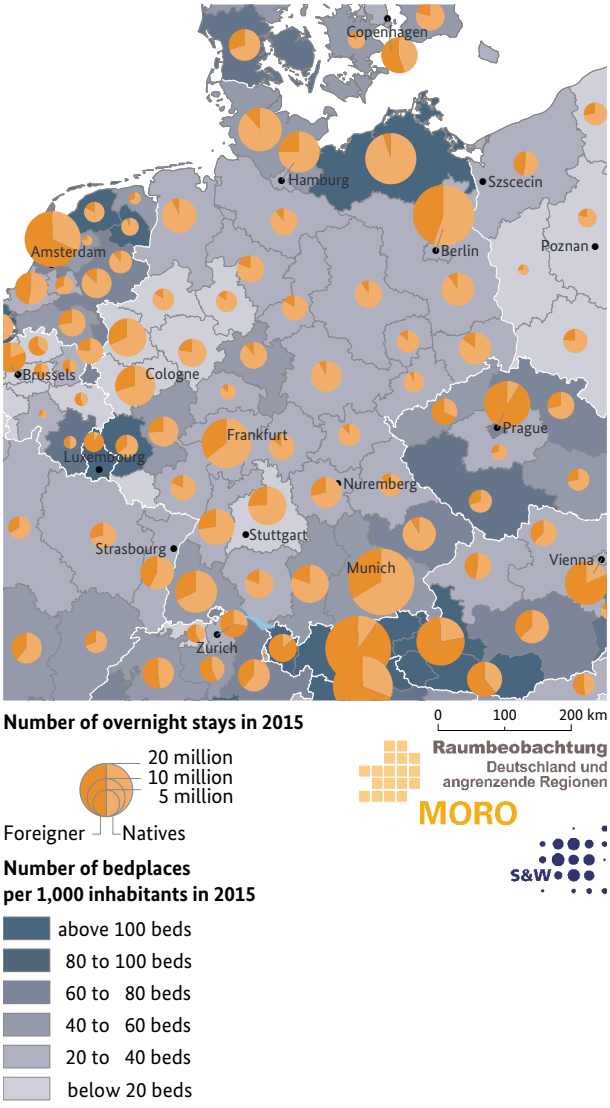
Figure 7.20: Number of overnight stays in neighbouring countries in 2015

Origin of data: Eurostat, number of overnight stays spent at tourist accommodation establishments

Alpine region, the availability of accommodation facilities in 2015 in relation to the population was highest, with over 100 bed-places per 1,000 inhabitants.

There are great differences with respect to the origin of the guests. In neighbouring capital city regions (e.g. Copenhagen, Prague, Vienna, Zurich, Luxembourg, Brussels and Amsterdam), the proportion of travellers from abroad is especially high. In other tourist destination regions, the situation is more differentiated: in coastal areas, lowlands and the low mountain ranges, most regions are preferred by guests from the same country. By contrast, most overnight stays in the north-west of the Czech Republic and Alpine regions are provided to guests from abroad.

Figure 7.21: Regional number of overnight stays and accommodation capacity per 1,000 inhabitants in 2015



Origin of data: Eurostat, Overnight stays in tourist accommodation establishments
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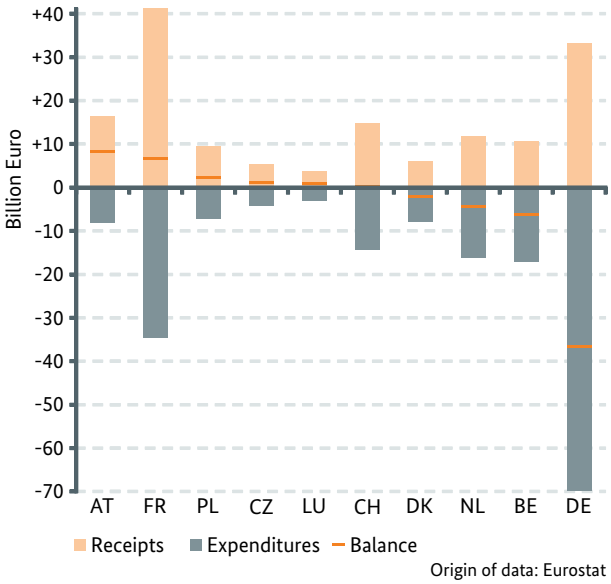
In Luxembourg and Austria, the share of travellers from abroad is particularly high. In 2015, the proportion of income from international travel and tourism compared to total value added in Luxembourg (7.4 %) and Austria (4.8 %) was significantly higher than in other neighbouring countries. In the balance of payments statistics, those countries are followed by the Czech Republic (3.3 %), Belgium (2.6 %), Switzerland and Denmark (both 2.2 %), France (1.9 %) and the Netherlands (1.8 %). In 2015, the lowest share was in Germany (1.1 %).

In 2015, Germans spent € 69.9 billion on international travel and tourism. France (€ 34.6 billion), Belgium (€ 17.1 billion), the Netherlands (€ 16.1 billion) and Switzerland (€ 14.5 billion) followed by a considerable margin (Figure 7.22). On balance, despite high income, Germany achieved a deficit of € 36.6 billion. Belgium (€ -6.3 billion), the Netherlands (€ -4.2 billion) and Denmark (€ -2.0 billion) also registered a negative balance. Surpluses were achieved in Austria (€ +8.2 billion), France (€ +6.8 billion), Poland (€ +2.3 billion), the Czech Republic (€ +1.2 billion), Luxembourg (€ +0.9 billion) and Switzerland (€ +0.3 billion).

Figure 7.22: Receipts-expenditure balance of international travel and tourism in Germany and its neighbouring countries in 2015



Origin of data: Eurostat

Accessibility of the regional centres in the Greater Region

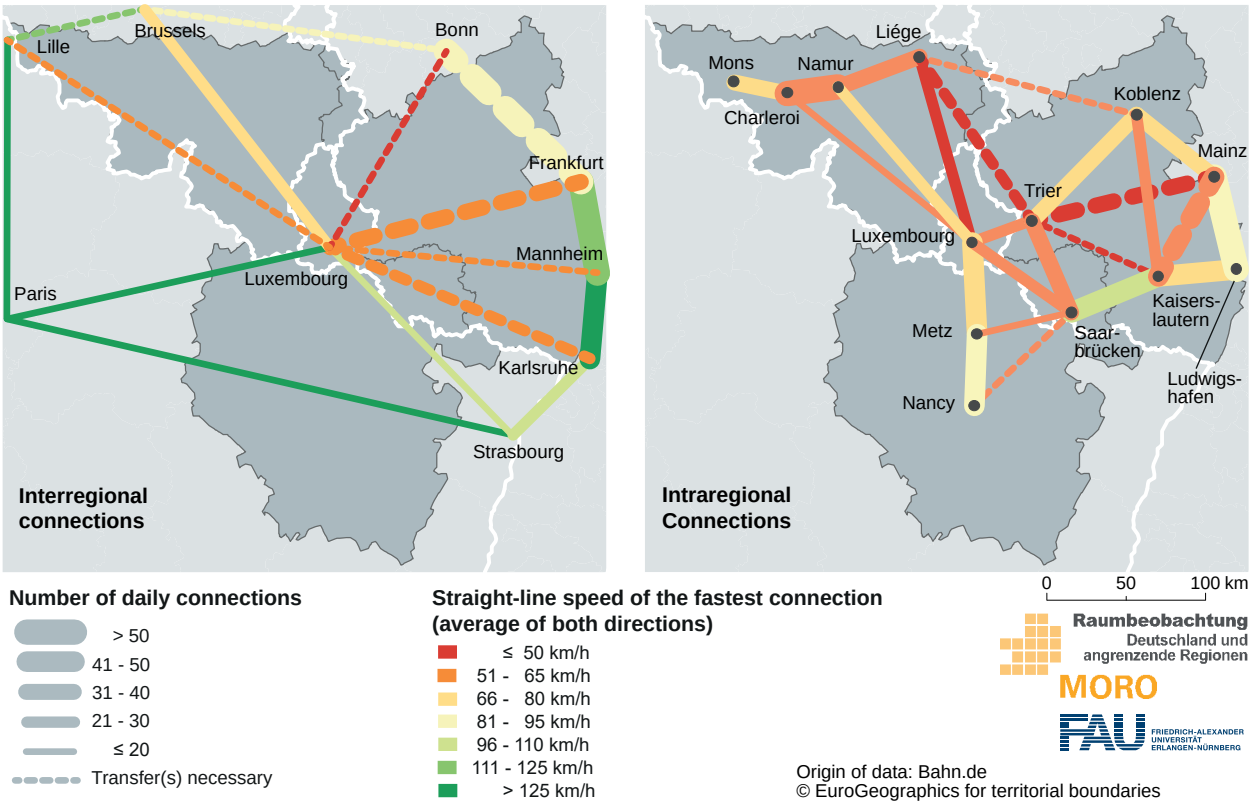
Cross-border interdependencies on the "Greater Region's" labour market are considerable and constantly increasing (see the regional in-depth information on the Greater Region in Chapter 6). That also increases cross-border traffic flows. However, the trend is affecting a transport infrastructure that was not originally intended for daily work-related commuters: important underlying transport policy decisions were made at a time when the border regions were regarded more as peripheral areas and not as part of highly dynamic, international labour markets. The transnational labour market in the Greater Region mainly developed in the 1990s. The transport infrastructure has been gradually expanding in response, for instance with the Luxembourg-Trier motorway and the TGV connections to France.

Travel time and thus the achievable travel speed also form an important criterion for the quality of transport connections from the perspective of their users. To assess the quality, the straight-line speeds between the centres in the Greater Region and their surroundings were used. These are calculated with the actual travel time between two locations via the transport networks, divided by the straight-line distance between them.

The railway infrastructure of the Greater Region is analysed from two spatial perspectives, namely the supra-regional and the intra-regional connection quality (Figure 7.23). The map shows the respective straight-line speeds, the frequency of the connections on workdays and the necessity to change trains during the journey.

The left map in Figure 7.23 presents the supra-regional connections to the core of the Greater Region, shown here with the example of the city of Luxembourg as metropolitan core of the transnational linkages. Fast railway connections from Luxembourg to Paris and Strasbourg offer good travel speeds. The lines connecting Luxembourg to Brussels and the German cities are much slower. The metropolitan quality of the Greater Region confirmed by a wide range of economic indicators is not reflected in the quality of its accessibility. That especially applies

Figure 7.23: Quality of passenger railway connections in the Greater Region



Origin of data: Bahn.de

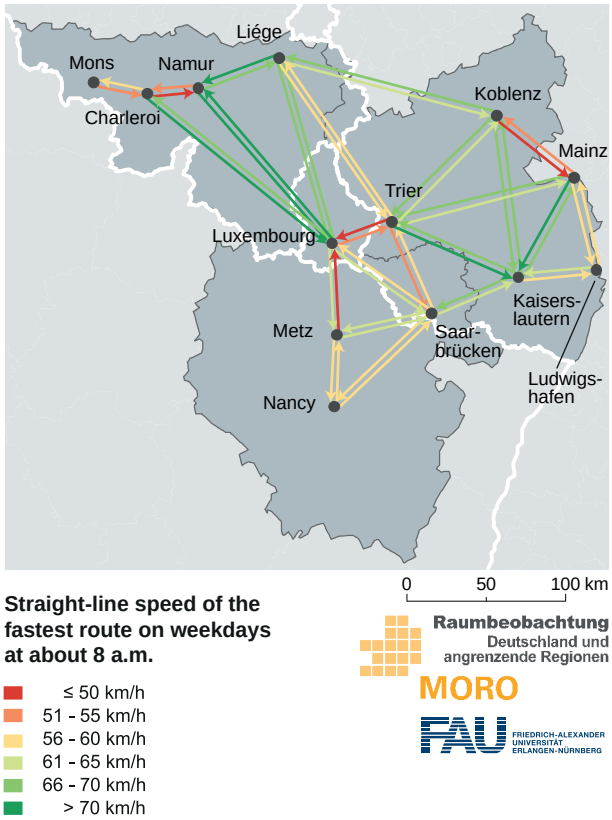
in comparison with the connection qualities between centres located around the Greater Region. These are connected to each other by TGV and ICE trains with high travel speeds, which are only achieved to the same extent in Luxembourg with respect to French major cities.

The right map in Figure 7.23 presents the connection qualities in passenger railway traffic for selected routes between the regional centres of the Greater Region. Since no trains run between Saarbrucken and Luxembourg, here, travel times of a direct express bus from station to station for this connection were used. The prevalence of red highlights the relatively slow speeds. Of the cross-border connections, the Nancy – Metz – Luxembourg axis is more frequently served than the Namur – Luxembourg axis. Cross-border connections to Germany often require changing trains and are comparatively slow. There is also a similar situation within the national parts of the regions. Even though a large number of trains run on a number of key routes, the connections have relatively low speeds, among others also due to a lack of high-speed tracks.

Figure 7.24 presents the road-related transport quality as straight-line speed in motorised private transport, differentiated according to travel direction and measured during the morning rush hour. In the case of faster connections, the infrastructure largely appears to cope with the demand, while the slower routes indicate congestion or a lack of quality and capacities in the road network. Some relationships show comparatively slow and yet differing speeds in different directions, which are typical characteristics of the morning commuter traffic. This can be seen both within connections in one country (Charleroi – Namur and Koblenz – Mainz), but also between Trier and Luxembourg or Metz and Luxembourg. Thus, metropolitan linkages show a comparatively similar picture on both intranational and transnational connections.

A comparison of railway and road transport shows a tendency towards higher average speeds for train connections compared to car when measured between city centres. That highlights the underlying potential of the railways, especially when stations are well connected. At the same time, the range of travel speeds by rail is significantly greater than with automobiles due to the different qualities of the routes, technical standards and frequencies.

Figure 7.24: Quality of connections in motorised individual transport during the rush hour in the Greater Region



Origin of data: google.maps.com (record dates 27.-29.06.2017
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The high-ranking metropolitan functions evident in the economic structure and the rapidly grown cross-border labour market of the Greater Region are only partially reflected in the realm of transport. Bottlenecks exist in many fields of transport infrastructure – in supra-regional railway connections, in regional train connections and in road connections at least during the rush hour. The findings indicate the justification of the spatial planning Leitbild of a “cross-border polycentric metropolitan region” and at the same time show the clear necessity for action with respect to metropolitan accessibility.

Tourism in the four-country Lake Constance region

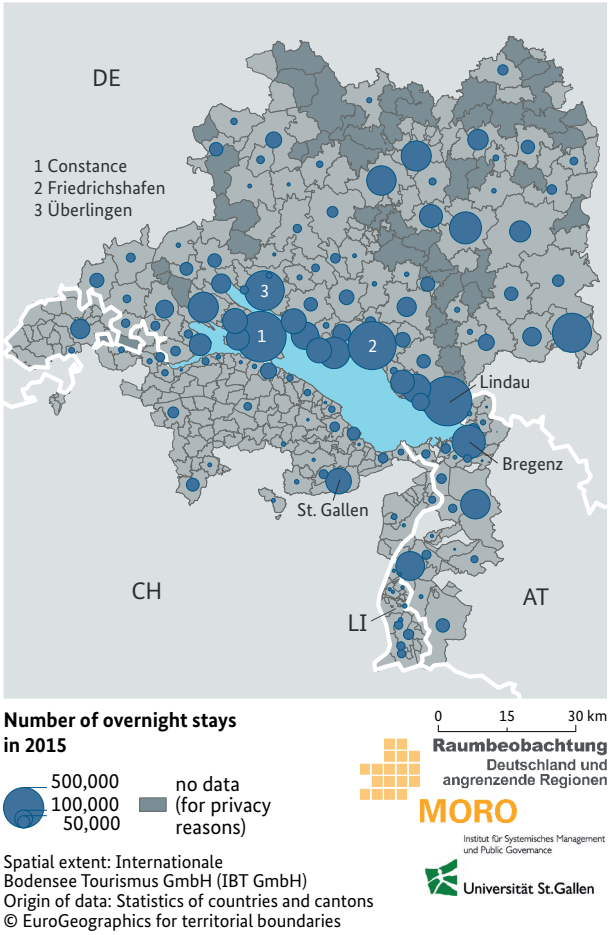
The international Lake Constance region is one of the most renowned tourist destinations in the German-speaking area. Current surveys show that Lake Constance is regularly among the ten best-known holiday destinations in Germany (Inspektours GmbH 2015). Lake Constance is also well known as a supra-regional tourist brand and many people have visited the region before: almost 90 percent of Germans know Lake Constance or have spent time in the Lake Constance region in the past (Scherer et al. 2005).

Tourism in the Lake Constance region has a long tradition. As early as in the mid-19th century, Lake Constance tourism experienced its first boom and already then, there was cross-border collaboration on aspects of tourism (Beritelli and Scherer 2014). At the time, the first joint marketing organisations were created for Lake Constance tourism, which still exist today, albeit in a new form. Tourist products were also coordinated internationally at an early date. For instance in 1857, the so-called "White Fleet" was founded, in which the national shipping companies on Lake Constance coordinated their lines and prices across borders and produced a joint timetable. That collaboration still works today, although the formerly public shipping companies have been privatised in the meantime. Currently, the boats of the "White Fleet" transport around four million passengers on Lake Constance a year.

The international Lake Constance region is visited by several millions of people every year, of whom around two thirds come from Germany. In 2015 alone, these people generated eleven million overnight stays[1]. However, the region is not only attractive for "classic" holiday-makers, but is visited by around 20 to 25 million day-trippers a year as well. Furthermore, some four million people living in the surrounding region use Lake Constance for recreation and leisure activities. Day-trippers, locals and also visitors staying overnight focus their activities on the attractions in the direct vicinity of the lake. They include for instance the island of Mainau, the lake dwellings in Unteruhldingen, the island of Reichenau and of course the urban municipalities of Constance, Lindau, Meersburg and Überlingen. It is estimated that six million people a year visit the city of Constance alone.

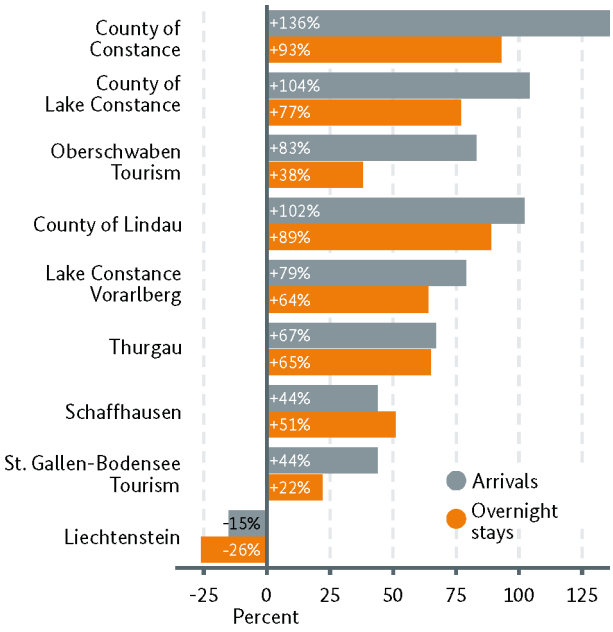
Until now, tourism on Lake Constance was mainly focused on the German side of the lake (Figure 7.25), where around 55 percent of all overnight stays are generated. The intensity of tourism, i.e. the number of overnight stays per inhabitant, is also far higher than average there. By contrast, the Swiss southern side of Lake Constance has not been intensively used for tourism to date, as the extremely low number of guests there highlights. Furthermore, the limited amount of existing accommodation capacity indicates that tourism does not play a major role there.

Figure 7.25: Number of overnight stays provided by commercial accommodation services in 2015, by municipality



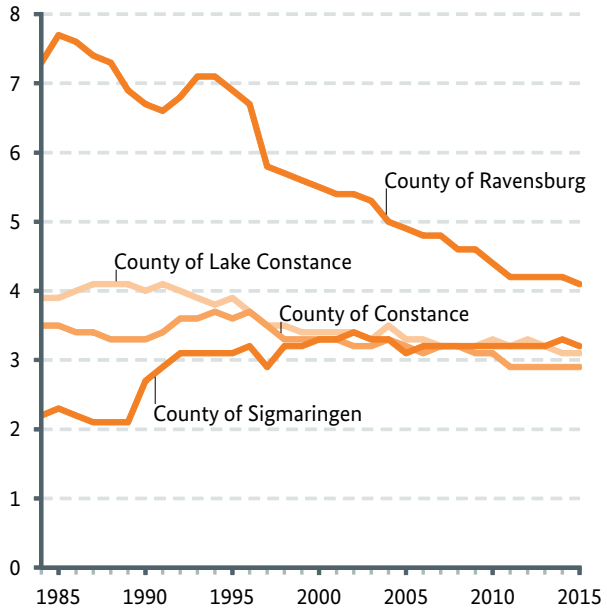
[1] The statistical data from the individual countries have been harmonised here according to the guidelines of the Statistical Platform of Lake Constance to achieve comparability. Actual overnight accommodation figures are higher, since for instance overnight stays in private quarters or private holiday apartments have not been included in this calculation.

Figure 7.26: Development of guest arrivals and overnight stays between 1997 and 2015 by destination



Origin of data: IMP-HSG 2016

Figure 7.27: Development of the average period of stay since 1984 in the Baden-Wurttemberg Lake Constance region



Origin of data: IMP-HSG 2016

In recent years, accommodation figures in the entire Lake Constance region have continuously risen (Figure 7.26). For instance since 1997, the number of arriving guests has increased by almost 90 percent, with overnight stays increasing by 63 percent. In 2015 alone, the overall number of overnight stays in the Lake Constance region rose by 275,000 compared to the previous year.

The development in the number of guests varies greatly in the region's different areas. Not all towns and communities can benefit from the evident growth in the tourist sector. The importance of larger towns and cities is striking with respect to tourism in the Lake Constance region. They are largely responsible for such positive developments in the region. With their considerable share of arriving visitors and overnight stays, they have a key influence on overall developments. Today, around a quarter of all overnight stays in the Lake Constance region are in the German locations of Constance, Lindau, Friedrichshafen and Überlingen. By contrast, the development of many of the other towns and communities is stagnating and some are even losing market shares; that also applies to communities situated directly on the shore of Lake Constance.

The average period of stay has remained unchanged for a long time or only fallen slightly (Figure 7.27). The only exception is the rural district of Ravensburg, where the reduction has been much more significant due to the importance of the spa and bathing tourism there.

Due to the large number of guests, tourism is an important sector for the regional economy of the Lake Constance region. Overnight guests generate roughly the same sales as day-trippers and leisure tourists (DWIF 2014). However, the contribution of tourism to the regional value added should not be over-estimated because even in the area where tourism is strongest, namely the Baden-Wurttemberg County of Lake Constance, the tourist share of the overall value added is only five percent (Scherer and Strauf 2012). However, the contribution to the region's location factor and quality of life is nevertheless very great. Current surveys carried out as part of the regional "Foresight Study Lake Constance 2030" clearly show that in particular the German shore of Lake Constance will expect continued growth in the tourism sector in the future (Scherer et al. 2017).

8 Living environment

The environment in which citizens in Germany and its neighbouring countries live is on the one hand determined by natural geographic and climatic conditions. On the other, different cultural traditions and the respective social and economic circumstances lead to regionally diversified living conditions. Family constellations and forms of living are currently transforming and are affected by a large number of influencing factors. The conditions on the labour market and available infrastructures in the fields of different supplies, health, education and participation determine the quality of the living environment. At the same time, demographic changes make it necessary to adapt in providing services of general interest. This chapter examines the living situation and environment in Germany and its neighbouring countries.

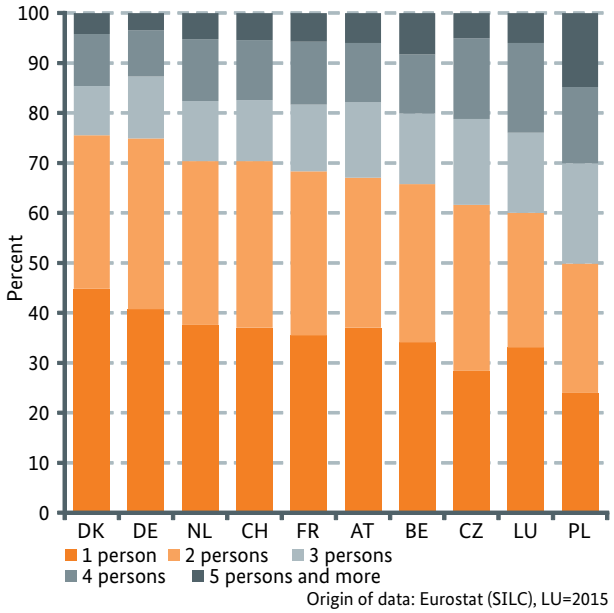
8.1 Household and family

The classic family constellation of a large family with multigenerational cohabitation has long become obsolete. By the 1970s if not before, the small family with parents and several children had become the social standard, but this is also less prevalent today. Fewer children live in "classic" families and an increasing number of couples do not have children. The number of households with patchwork families, single-parent families and persons living alone has increased. As a result, the proportion of small households with one or two persons is constantly increasing.

In January 2016, the average household size in Germany was 2.0 persons, which is the same as in Denmark. Three quarters of all households there consisted of one or two persons (Figure 8.1). Single-person households form the largest proportion in Denmark (45 %), Germany (41 %) and Germany's other neighbouring countries with the exception of the Czech Republic (28 %) and Poland (24 %). In Germany, the proportion of large households with five or more persons was especially low at three percent.

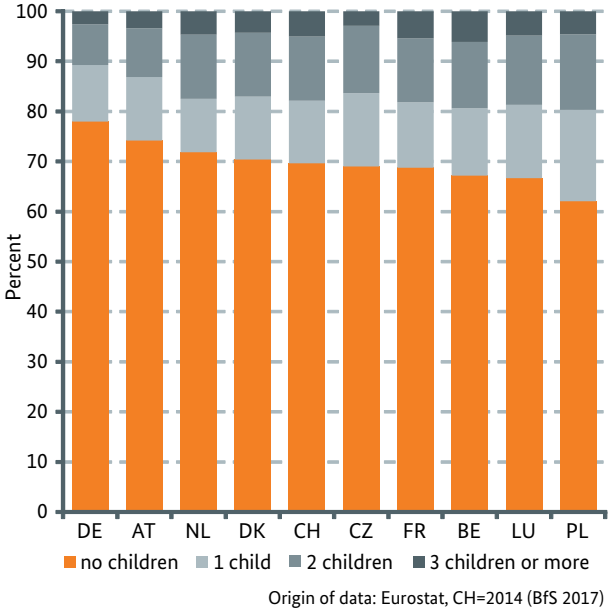
In 2016, Poland registered the highest average household size with 2.8 people per household. The proportion of single and two-person households in Poland (50 %) was

Figure 8.1: Households by size in Germany and its neighbouring countries in 2016



Origin of data: Eurostat (SILC), LU=2015

Figure 8.2: Households by number of children in Germany and its neighbouring countries in 2016



Origin of data: Eurostat, CH=2014 (BfS 2017)

comparatively low, while the share of larger households with five or more persons (15 %) was relatively high. In the other countries, the average household size was 2.2 (France, the Netherlands, Austria, Switzerland), 2.3 (Belgium) and 2.4 (Czech Republic, Luxembourg) persons per household.

In Germany, 78 percent of all households in 2016 had no children under the age of 25 (Figure 8.2). That was also the highest rate among Germany's neighbouring countries. Germany was followed by Austria (74 %), the Netherlands (72 %), Denmark and Switzerland (both 70 %). In Poland (62 %), the proportion of households without children was the lowest.

In Germany, the share of households with three or more children was below three percent. There was a considerably higher proportion of such households in Belgium (6 %), France, Switzerland, the Netherlands and Poland (all 5 %).

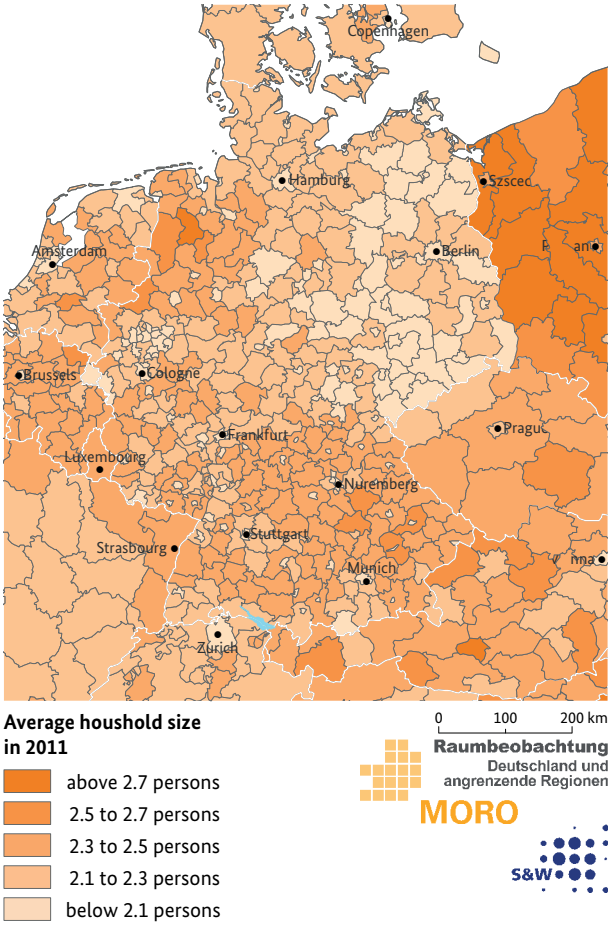
In 2016, although only 22 percent of German households had children, well over a third of the overall population of Germany lived in households with children. In most cases, these were households with one child (51 %), followed by households with two children (37 %) and three children or more (12 %). That ratio among households with children is comparable with the distribution in Austria and Poland. In those countries too, there was a relatively large proportion of households with one child in 2016.

The relationship between households with one child and those with two children is more balanced in the Czech Republic, Luxembourg, France and Belgium, while in the Netherlands, Denmark and Switzerland, there are more households with two children than with one.

Looking at households with children, the proportion of households with three or more in 2016 was highest in Belgium (19 %), France, Switzerland and the Netherlands (all 17 %).

There are strong regional differences in average household size (Figure 8.3). In more rural areas with a higher proportion of families with children, it tends to be higher than in regions with an urban character. In Berlin and other eastern German major cities with a very high proportion of single-households, the average household size is now lower than 1.85 persons per household.

Figure 8.3: Regional average household size in 2011



Origins of data: Eurostat (Census 2011), calculation by S&W

Within Germany, the very small household size in many regions of eastern Germany are striking. Especially along the border with Poland, there are therefore considerable differences between the household structures on the German and the Polish sides. For instance in 2011, the rather small eastern German households (with an average of fewer than 2.1 persons) in the Polish border region compared with the larger households on the Polish side with an average of over 2.7 persons.

8.2 Housing

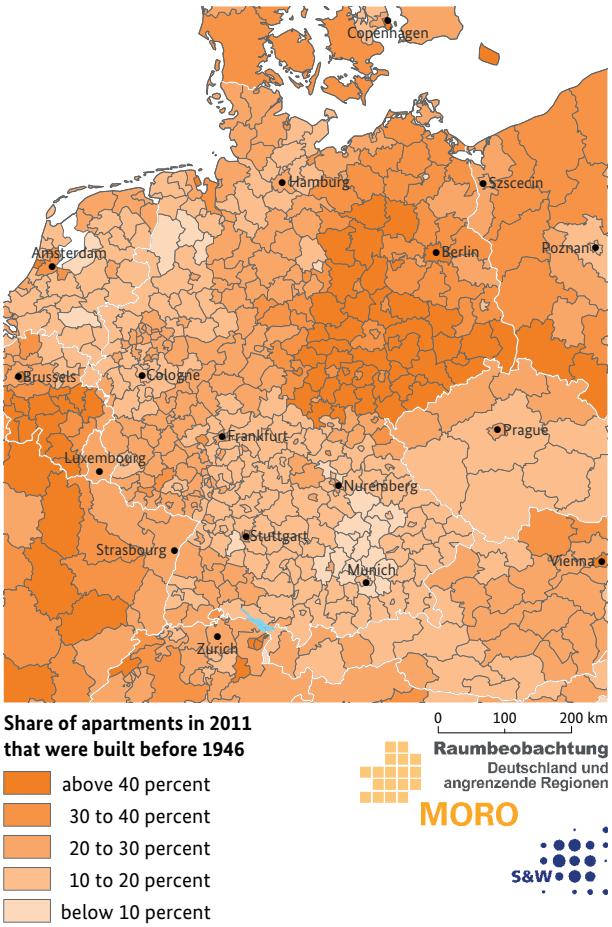
Housing is a basic human need and also a fundamental right. The home, a personal living space for individuals and family cohabitation, provides protection and places for retreat and personal development. In view of those functions, the importance becomes clear firstly of the quality of housing and secondly of the resulting potentials of living there. In this respect, there are differences between Germany and neighbouring regions.

In particular in Berlin, Saxony, Saxony-Anhalt and Thuringia, but also in Lower Saxony, eastern France and Wallonia, there are still large volumes of older housing, having been built before 1946 (Figure 8.4). In Denmark, Mecklenburg-West Pomerania, Brandenburg and large parts of western Poland, Switzerland and the Netherlands, the proportion of older housing is also high.

In the individual border regions, the differences on either side of the border are relatively small. However there are exceptions on the German-Belgium border, with a much higher proportion of older apartments in Belgium, and the German-Czech border, with higher shares of old buildings in Saxony.

From the year 2000 onwards, considerable construction work rejuvenated the housing stock, particularly

Figure 8.4: Regional share of apartments in 2011 that were built before 1946



Origin of data: Eurostat (Census 2011)
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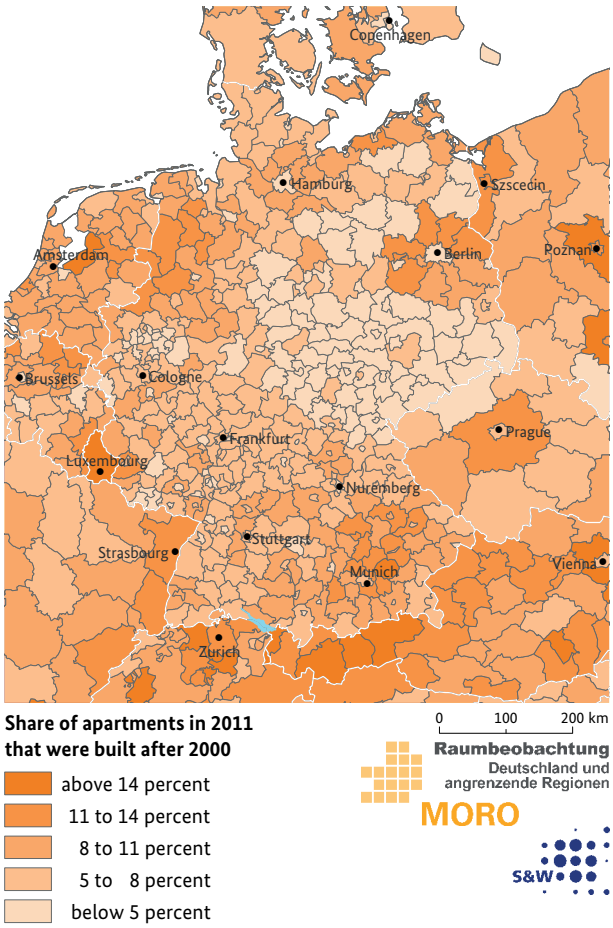
Figure 8.5: Regional share of apartments in 2011 that were built after 2000



Origin of data: Eurostat (Census 2011)
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in areas around prospering metropolitan regions and major cities, for instance in the catchment areas around Berlin, Munich, Poznan, Wroclaw, Prague, Vienna, Innsbruck, Zurich, Luxembourg and Amsterdam (Figure 8.5). Furthermore, many border regions also received more modern housing stock. For instance in 2011, in the area surrounding Szczecin, as well as the southern external border of Germany on the Austrian and Swiss sides, the Alsace and the Emsland, the proportions of apartments built after 2000 were over eleven percent.

In 2016, 42 percent of the German population lived in single-family homes, i.e. in detached houses (26 %) or semi-detached or terraced housing (16 %) (Figure 8.6). The rate was only lower in Switzerland (34 %), while in the other neighbouring countries, it was in parts considerably higher, with the highest levels in Belgium (78 %) and the Netherlands (76 %). In countries with a comparatively urban character, especially in the Netherlands, semi-detached and terraced housing has greater significance compared to elsewhere.

In Switzerland (63 %), Germany (57 %) and the Czech Republic (52 %), the majority of the population lived in single-storey apartments in 2016. Of those in Germany, 40 percent lived in buildings with fewer than ten residential units and 17 percent lived in buildings with ten or more residential units. The proportion of people in Germany living in apartment buildings with 10 or more residential units is the lowest compared to the overall size of the population living in apartment buildings. Large apartment buildings are particularly common in Denmark, Poland, the Czech Republic, the Netherlands and France.

In Germany and its neighbouring countries, a large proportion of the population lived in owner-occupied dwellings in 2016 (Figure 8.7). The proportions were the highest in Poland (83 %), the Czech Republic (78 %) and the Benelux countries (69-73 %). The lowest ownership rates could be found in Austria (55 %), Germany (52 %) and Switzerland (43 %). In Switzerland, the Netherlands and Denmark, a large proportion of those living in owner-occupied dwellings were still paying off the loan or mortgage used to buy the property. By contrast, in 2016, the majority of Poles (72 %) and Czechs (59 %) lived in unmortgaged housing.

Figure 8.6: Population in Germany and its neighbouring countries by dwelling type in 2016

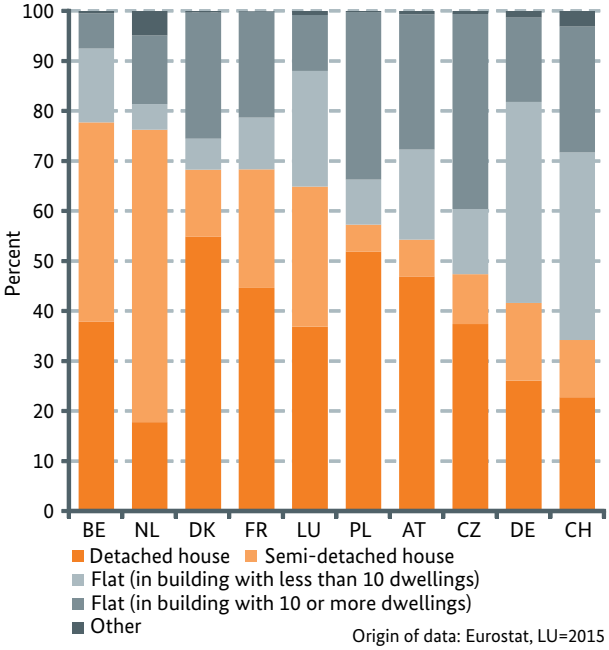
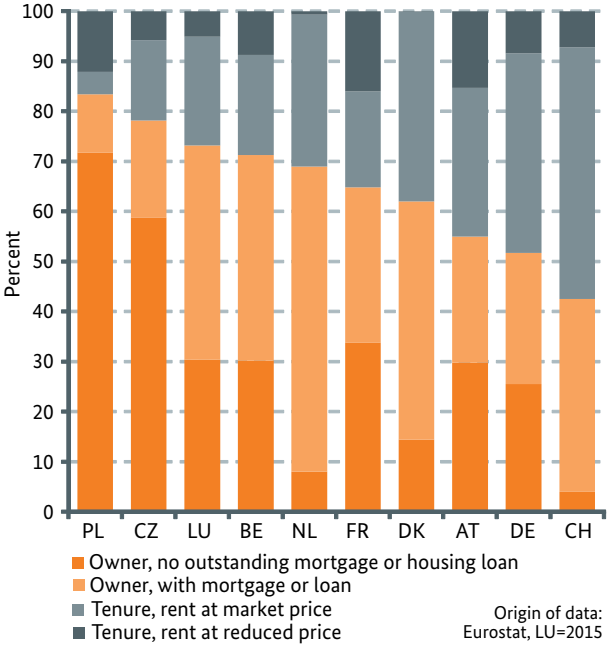


Figure 8.7: Population in Germany and its neighbouring countries by tenure status in 2016

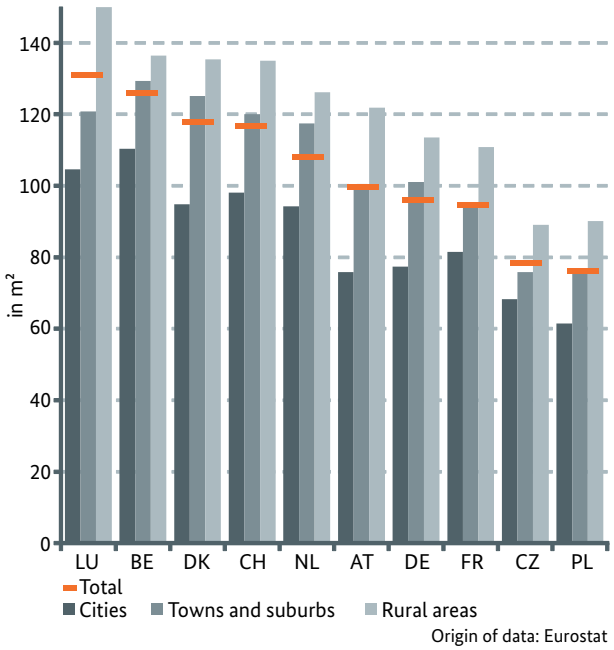


In 2016, the proportion of the population living in rented accommodation at market rent prices was high in Switzerland (50 %), Germany (40 %), Denmark (38 %), the Netherlands (30 %) and Austria (30 %). By contrast, a comparatively large number of people in France (16 %), Austria (15 %) and Poland (12 %) lived in rented dwellings at a reduced rent or for free.

The ownership type and particularly the spatial location have an indirect influence on the size of an apartment, because living space is less expensive in rural regions than in urban areas. Consequently, the average floor space in towns and cities is less than “in the countryside”. Austria and Luxembourg show the largest differences in floor space size between urban and rural areas (Figure 8.8).

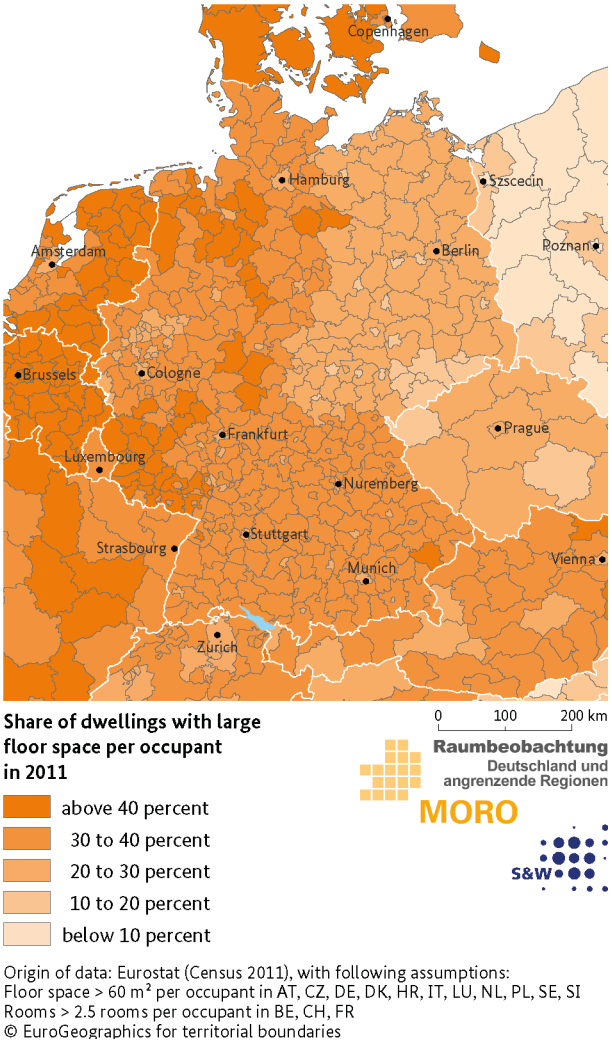
In 2016, apartments in Luxembourg (131 m²) had the largest average floor space, followed by Belgium (124 m²), Denmark (118 m²), Switzerland (117 m²) and the Netherlands (107 m²). In Austria (100 m²), Germany and France (both 94 m²), apartments were still considerably larger than in the Czech Republic (78 m²) and Poland (75 m²). The average apartment floor space was lowest there despite a high ownership rate for all urbanisation types. The proportion of apartments providing their residents with a large amount of per capita living space also differs greatly depending on the region (Figure 8.9). Firstly, the proportion is lower in major cities and urban regions than in surrounding and rural areas. Secondly, it is smaller in the east than in the west. For instance in 2011, proportions of over 40 percent were achieved in Belgium, the Netherlands, France and parts of western Germany. The rate is considerably lower in eastern Germany, the Czech Republic and Poland. In fact regional levels of below ten percent were recorded in Poland.

Figure 8.8: Floor space per dwelling by degree of urbanisation in Germany and its neighbouring countries in 2016



Origin of data: Eurostat

Figure 8.9: Regional shares of dwellings with large floor in 2011



Origin of data: Eurostat (Census 2011), with following assumptions:
Floor space > 60 m² per occupant in AT, CZ, DE, DK, HR, IT, LU, NL, PL, SE, SI
Rooms > 2.5 rooms per occupant in BE, CH, FR
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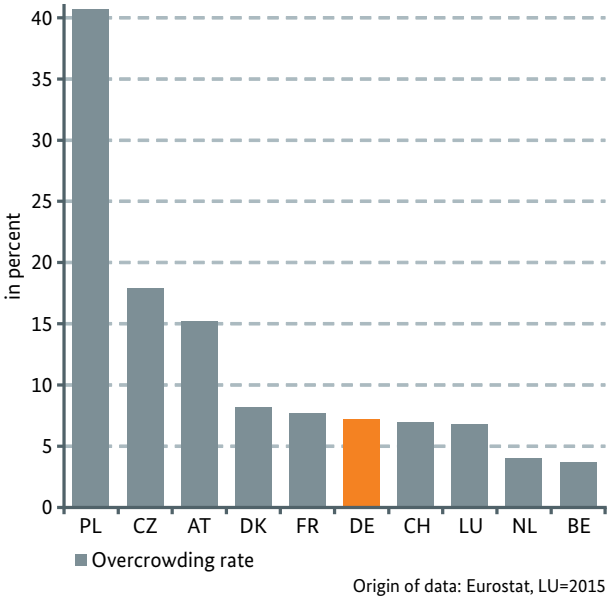
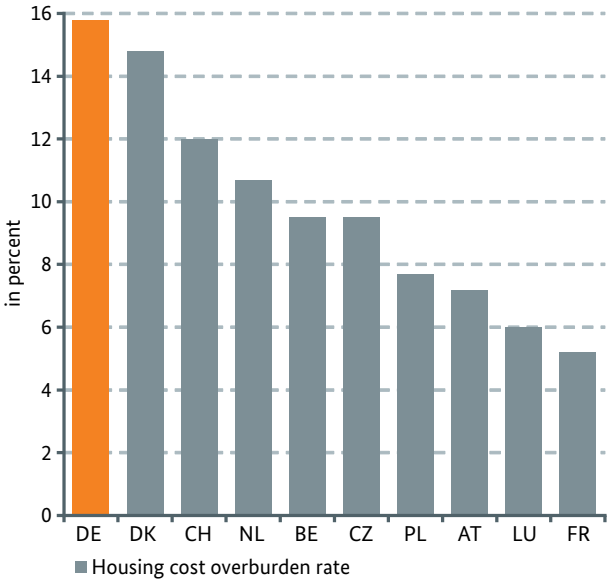
Figure 8.10: Overcrowding rate in Germany and its neighbouring countries in 2016



Origin of data: Eurostat, LU=2015

Figure 8.11: Housing cost overburden rate in Germany and its neighbouring countries in 2016



Origin of data: Eurostat, LU=2015

Inversely in 2016, the share of people living in apartments considered to be overcrowded was extremely high in Poland (41 %) (Figure 8.10). Poor people and those threatened by poverty are particularly affected by cramped living conditions. The housing situation is considerably better in Germany (7 %) and the other neighbouring countries. With the exception of the Czech Republic (18 %) and Austria (15 %), all overcrowding rates in 2016 were below ten percent. The lowest rate was recorded in the Netherlands and Belgium (both 4 %). Correspondingly, the proportions of those countries' populations living in housing considered to be under-occupied were the highest (67 % in Belgium, 51 % in the Netherlands). The under-occupancy rate in Germany was 35 percent in the same year.

In most household budgets, housing costs are the largest expenditure item. The burden is above average for single-person households and low-income earners. On average in Germany, 27 percent of available income is spent on housing. The rate is similarly high or only slightly lower in Denmark (27 %), the Netherlands, Switzerland (both 25 %) and the Czech Republic (23 %).

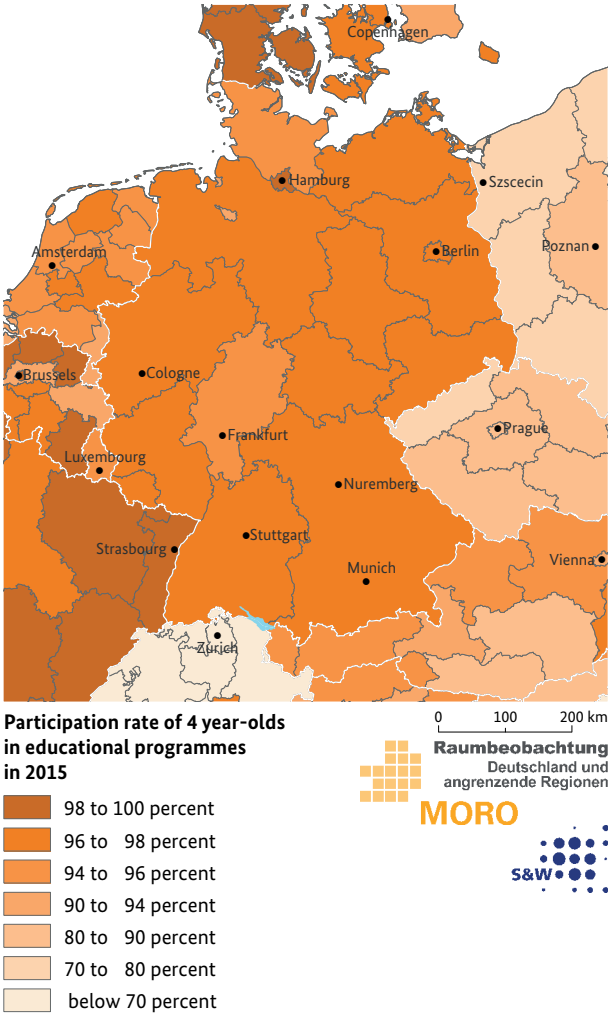
In 2016, the proportion of the population spending more than 40 percent of available equivalent income for housing was the highest in Germany (15.8 %) (Figure 8.11), followed by Denmark (14.8 %), Switzerland (12 %) and the Netherlands (10.7 %). In Poland (7.7 %), Austria (7.2 %), Luxembourg (6.0 %) and France (5.2 %), the proportion of the population spending more than 40 percent of available income was the lowest.

The greatest burden lies on tenants renting housing at market rent prices. Owner-occupied households are rarely affected. Only in Poland and Germany, more than ten percent of the population with credit-financed real estate indicated that they spent more than 40 percent of available income for credits and associated residential costs.

8.3 Education

General education and vocational training play a key role in social and economic development. Even in the first years of their lives, children receive the foundation for later successful learning. Institutional forms of early childhood learning and pre-school education in crèches, kindergartens, "school kindergartens" and similar facilities are therefore very relevant. High-quality possibilities of support and funding and the training of social and language skills, as well as general knowledge, decisively increase individual development, participation and promotion prospects.

Figure 8.12: Regional participation rate of 4 year-olds in educational programmes in 2015



Origin of data: Eurostat
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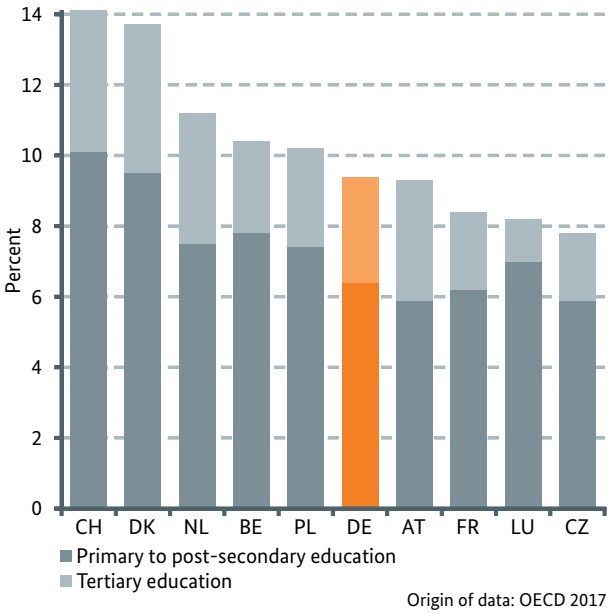
In Germany and its neighbouring regions, the rates of participation in educational programmes at a pre-school age differ very greatly (Figure 8.12). Regardless of minor regional differences, the participation rate of 4 year-olds in educational programmes is relatively high in France, Belgium, Denmark, Germany, the Netherlands and Luxembourg. In Kärnten, the Steiermark, the Czech Republic and Poland, the rates are considerably lower. The lowest participation rates among 4 year-olds are recorded in Switzerland. However, in that country, practically all children attend a kindergarten from the age of five. In 2014, the share of the gross domestic product spent on infant and pre-school education in Germany was 0.68 percent; the rate in Switzerland (0.24 %) was the lowest of all neighbouring countries.

A different ratio is evident for expenditure on school, university and vocational education. In 2014, compared to the total state expenditure, Switzerland (14.1 %) and Denmark (13.7 %) spent the highest proportion on education (Figure 8.13). That includes ongoing expenses and investment, as well as transfer payments to companies and private parties, such as financial support for apprentices, pupils and students. Germany (9.4 %) is in a midfield position in this respect behind the Netherlands (11.2 %), Belgium (10.4 %) and Poland (10.2 %).

Figure 8.13: Proportion of expenditure on education compared to total public expenditure in Germany and its neighbouring countries in 2014



Origin of data: OECD 2017

In 2014, the public proportion of expenditure on school and vocational education in the field of primary to post-secondary education in Germany was 6.4 percent. France (6.2 %), Austria and the Czech Republic (both 5.9 %) spent the smallest share of expenditure. Germany (3.0 %) is in a midfield position with respect to spending on tertiary education (universities and universities of applied sciences), in fifth place behind Denmark (4.2 %), Switzerland (4.0 %), the Netherlands (3.7 %) and Austria (3.4 %). The lowest proportion in this sector was spent by France (2.2 %), the Czech Republic (1.9 %) and Luxembourg (1.2 %).

Aside from funding, the teacher-pupil ratio provides an important indication of the teaching conditions at schools. The education system in Austria provides a very good supervision situation: in 2015, the average ratio was one teacher to ten pupils (Figure 8.14). In Germany's primary and lower secondary education, an average of 14 pupils were taught by each teacher, with 13 pupils per teacher in higher secondary education. Compared to the neighbouring countries, that teacher-pupil ratio represents a low rank position. In 2015, only the Czech Republic (15.2), the Netherlands (16.4) and France (17.1) had a worse ratio in primary and lower scondary education; with respect to higher secondary education, only the Netherlands (18.0) and Denmark (13.1) came behind Germany.

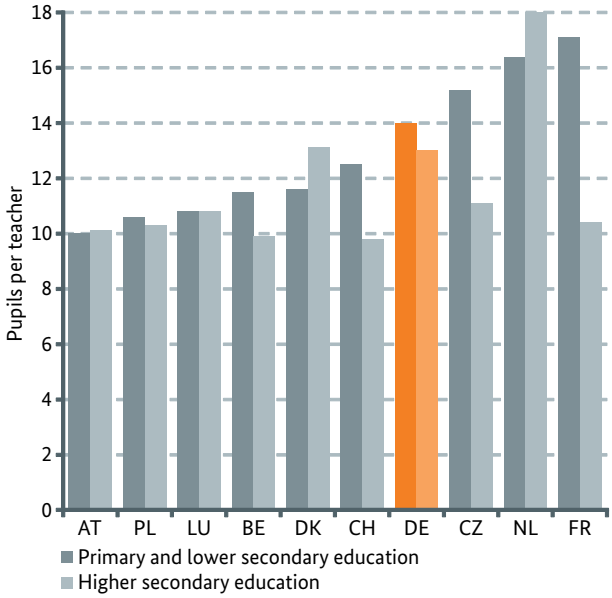
In most countries, the pupil-teacher ratio in primary and lower secondary education is worse than in higher secondary education. In 2015, a significantly better personnel ratio for higher secondary education compared to primary and lower secondary education was achieved by France (10.4), the Czech Republic (11.1), Switzerland (9.8) and Belgium (9.9).

Foreign language skills are becoming increasingly important for individual employability and for European integration and competitiveness. In all studied countries, English is the most common foreign language learned by pupils in higher secondary education (Figure 8.15). With the exception of Denmark (82 %) almost all pupils in all countries had English language skills in 2015.

German as a foreign language was a standard subject in schools in Luxembourg (100 %), the Czech Republic (59 %), the Flemish communities in Belgium (50 %), Poland (47 %), the Netherlands (42 %), Denmark (28 %), France (21 %) and the French communities in Belgium (6 %).

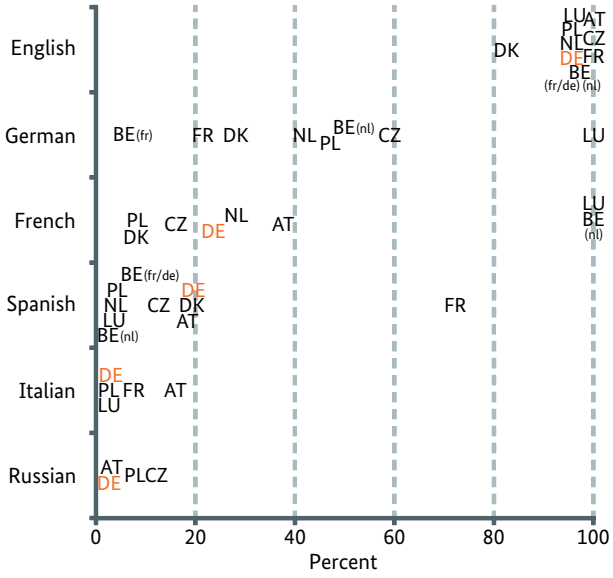
In Germany, the proportion of pupils with French language skills (24 %) was similar to the level of pupils in France with German language skills. The situation is dif-

Figure 8.14: Number of pupils per teacher in primary and secondary education in Germany and its neighbouring countries in 2015



Origin of data: Eurostat, CH=2014/higher secondary: only general, DK=2014

Figure 8.15: Proportion of pupils in higher secondary education according to foreign language taught in Germany and its neighbouring countries in 2015

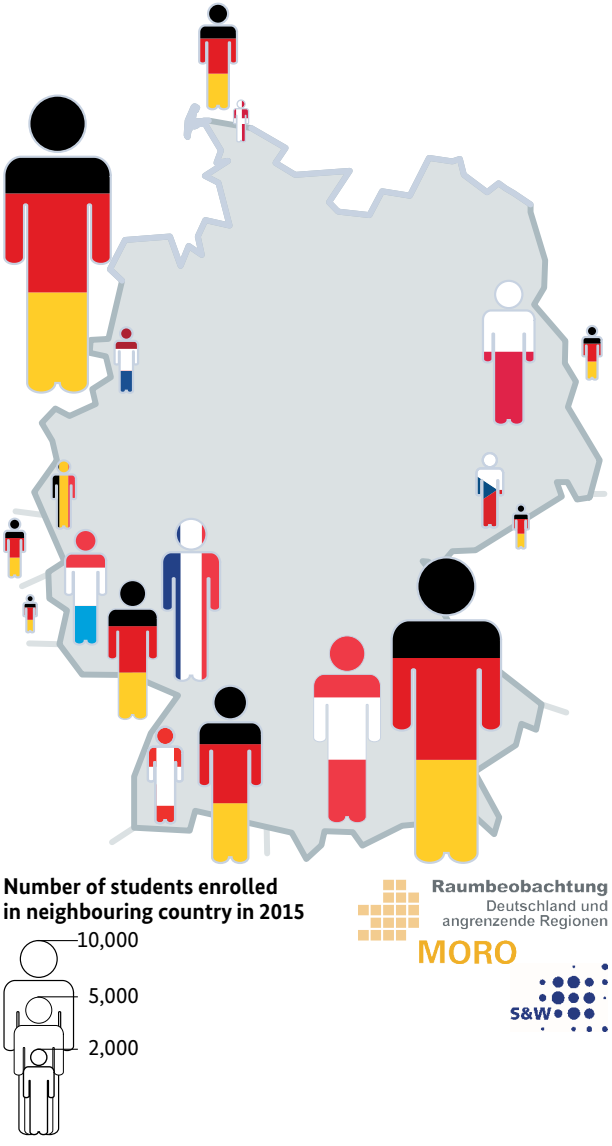


Origin of data: Eurostat, only values above 1 % shown, DK=2016, CH=no data

ferent with the other neighbouring countries: although in the border regions, it is occasionally possible to learn the language of the neighbouring country, the overall proportion of pupils in Germany with Danish, Polish, Czech or Dutch language skills is below 0.1 percent.

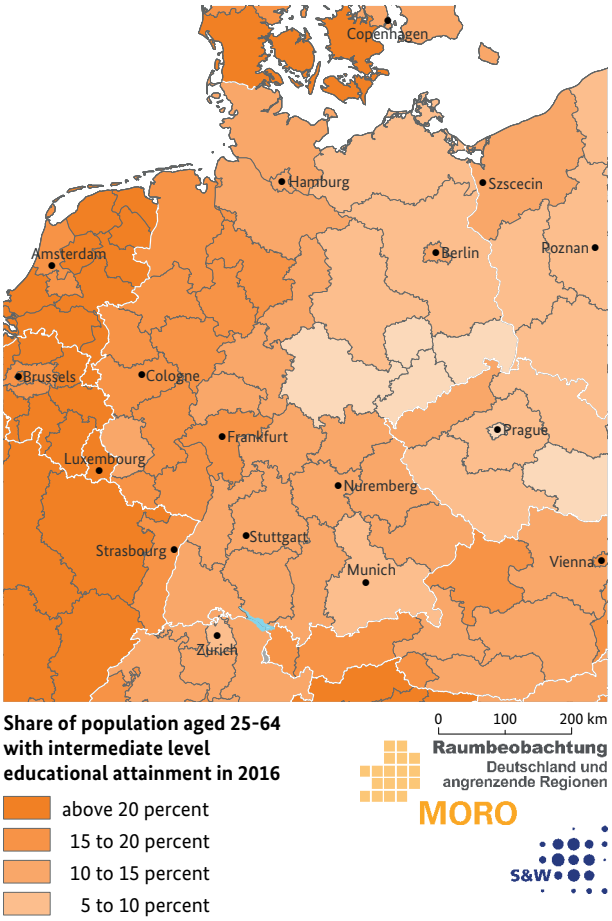
Nevertheless, a considerable number of students has enrolled to study in neighbouring countries (Figure 8.16). In 2015, most students from Germany who studied abroad went to Austria (approx. 25,000), the Netherlands (approx. 23,000) and Switzerland (approx. 8,000). There and in Denmark, the number of students from Germany is higher than the number of students from those countries who come to study in Germany, in some cases by a significant margin. In 2015, the diverse and extensive range of study courses on offer in Germany was used in large numbers by students from the neighbouring countries of Austria (approx. 10,000), France (approx. 7,000), Poland (approx. 6,000) and Luxembourg (approx. 4,000).

Figure 8.16: Number of students enrolled in neighbouring countries in 2015



Origin of data: Eurostat

Figure 8.17: Regional shares of population aged 25-64 with intermediate level educational attainment in 2016



Origin of data: Eurostat, Intermediate level=ISCED-2011-Level 0-2
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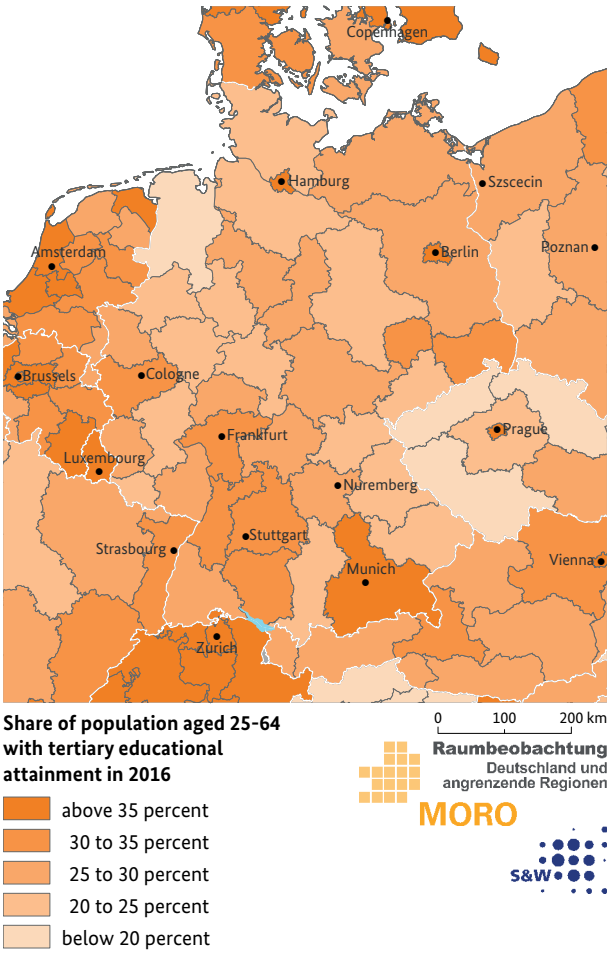
For years, the proportion of people who have graduated from a university has continuously grown. However, the share of people with an intermediate level or tertiary educational attainment differs greatly depending on the

Figure 8.18: Regional share of 25 to 64 year-olds with tertiary educational attainment in 2016



Origin of data: Eurostat, Tertiary educational attainment=ISCED-2011-Level 5-8
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region (Figs. 8.17 and 8.18). In Denmark and the western neighbouring countries, the proportion of people aged 25 to 64 with an intermediate level educational attainment is significantly higher than in the eastern neighbouring countries. In more eastern regions, there is a larger proportion of people who completed their education either with vocational training or with a university-entrance certificate. Correspondingly, the share of people with tertiary educational attainment is mostly lower.

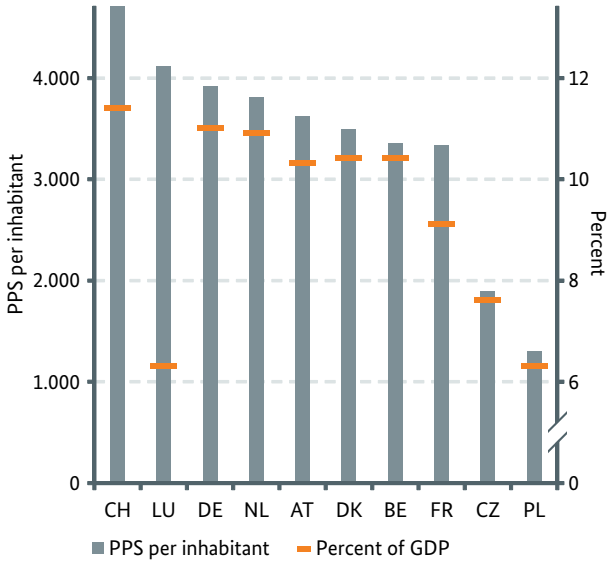
The percentage of the population with tertiary educational attainment is above-average in metropolitan regions and everywhere in Switzerland, Denmark and the Benelux countries. Overall, there is a strong distinguishing pattern characterised by regional economic centres that act as destination for educational and employment migration.

8.4 Health care

Affordable, universal access to good health care is a permanent subject of widespread discussions in Germany and its neighbouring states. In the past decades, the costs of the health care sector have risen everywhere. This occurred regardless whether the health system is organised through social security insurance or by the state – or whether it is mainly funded by taxation (Denmark), mainly contribution-based financed (Germany, Poland, the Czech Republic, France, Belgium, Luxembourg and the Netherlands) or by almost complete funding parity (Austria).

Expressed in purchasing power standards (PPS), the highest per capita expenditure on health care in 2014 occurred in Switzerland, followed by Luxembourg, Germany and the Netherlands (Figure 8.19). The clearly lowest health care expenditure in relation to the population size was recorded in the Czech Republic and Poland. In Germany, health care expenditure represented 11.0 percent of the gross domestic product (GDP), the second highest value after Switzerland (11.4 %). In France (9.1 %), the Czech Republic (7.6 %), Luxembourg (6.3 %, despite high per capita

Figure 8.19: Health care expenditure in Germany and its neighbouring countries in 2014



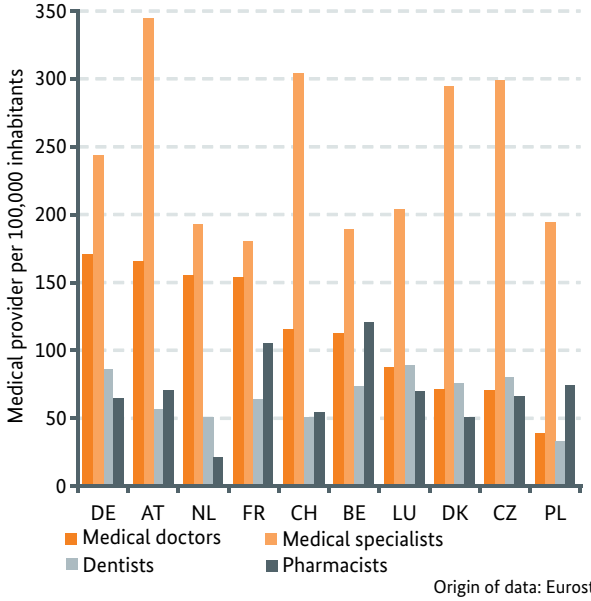
Origin of data: Eurostat

health expenditure) and Poland (6.3 %), the expenditure shares were smaller.

The number of doctors per 100,000 inhabitants differs in the individual countries (Figure 8.20). In relation to population size, the highest density of practicing doctors (excluding dentists) in 2015 was recorded in Austria (510), followed by Switzerland (420), Germany (414), the Czech Republic (369), Denmark (366), the Netherlands (347) and France (334). The lowest ratios were achieved in Belgium (302), Luxembourg (291) and Poland (233).

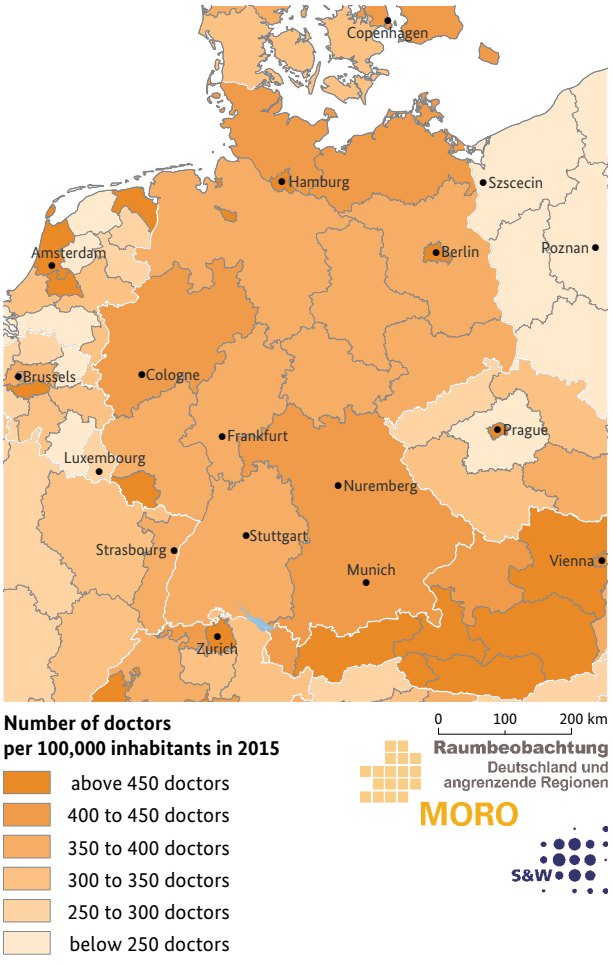
In 2015, the density of professionally active general practitioners was highest in Germany (170), followed by Austria (165), the Netherlands (155) and France (154).
The lowest density was recorded in Poland (38). The highest density of specialist doctors was seen in Austria (344), Switzerland (304), the Czech Republic (299) and Denmark (295). Germany (243) followed in fifth place, while France (180) recorded the lowest density. A comparatively high density of dentists was achieved in Luxembourg (89), Germany (86) and the Czech Republic (80), while Poland had the lowest level (33). The most pharmacists per 100,000 inhabitants were recorded in Belgium (121) and France (105), with the lowest number in the Netherlands (22).

Figure 8.20: Number of doctors/pharmacists per 100,000 inhabitants in Germany and its neighbouring countries in 2015



Origin of data: Eurostat

Figure 8.21: Regional number of doctors per 100,000 inhabitants in 2015



Origin of data: Eurostat, DE=N1, SI=N0, CZ=2013, SE,FR,DK=2014
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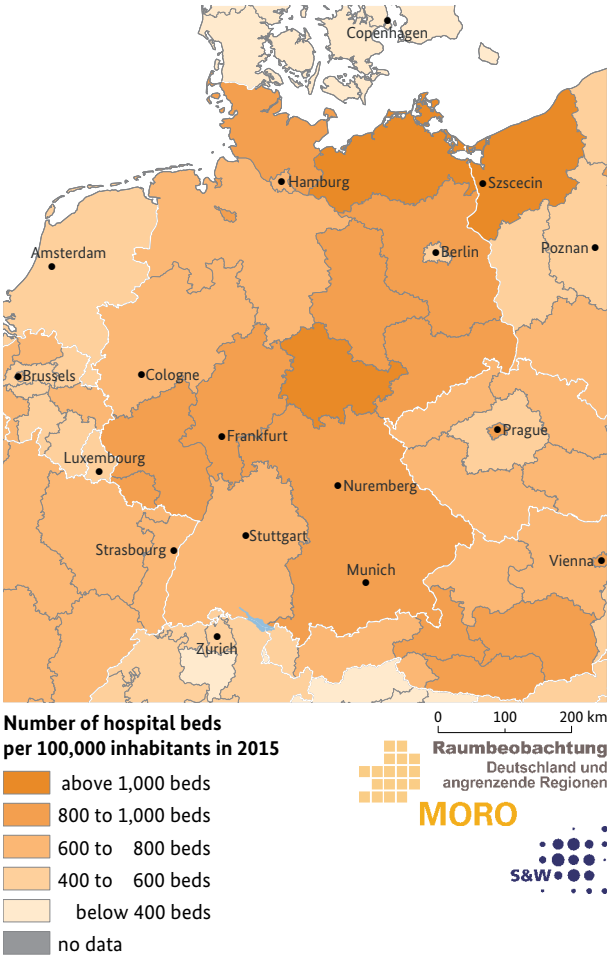
The number of doctors per 100,000 inhabitants differs considerably depending on the region. The regional densities of doctors reflect the national situations (Figure 8.21). For instance Austrian regions have the highest levels. On the other hand, the effects of major cities and regional centres on the density of doctors are visible, as can be clearly seen for instance in Berlin, Prague, Zurich, Brussels and Amsterdam. Due to the large number of high-quality medical services, also for the surrounding catchment area, the density of doctors is much higher there than in the surrounding regions. The spatial effects become all the more visible with an increasingly clear distinction between regional centres and their catchment areas. These effects cannot be seen in Germany because

Figure 8.22: Regional number of hospital beds per 100,000 inhabitants in 2015



Origin of data: Eurostat, DE=N1, SI,NL=N0, FR=2014, NL=2013
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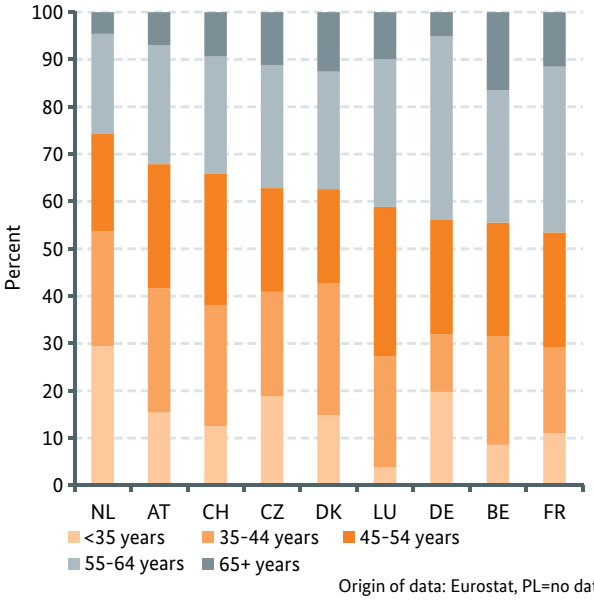
the density of doctors is presented on the spatial level of federal states.

In 2015, the number of hospital beds per 100,000 inhabitants was highest in Germany (813), followed by Austria (755), Poland (663), the Czech Republic (649), Belgium (618) and France (613). In the regions, there are strongly contrasting levels of in-patient health care facilities (Figure 8.22). The highest number of hospital beds per 100,000 inhabitants was achieved by Mecklenburg-West Pomerania and the Polish voivodeship of West Pomerania. The rate is also very high in Thuringia.

Demographic change poses a special challenge to the health care sector. Ageing populations and increasing morbidity rates are rapidly increasing the demand for health care services. At the same time, the number of hospital beds is falling due to the declining number of clinics. Rural regions are especially affected by further cuts in the health care sector and it is feared that a lack of medical personnel and supply shortages will be the consequence, especially due to the difficulty in finding replacements for the positions of general practitioners in the countryside. Presumably, cross-border mobility is likely to increase further among doctors and people working in the health sector.

In 2015, 39 percent of all doctors in Germany were aged between 55 and 64 and around 44 percent were aged 55 years or above (Figure 8.23). A higher proportion was only recorded in Belgium (44 %) and France (47 %). The quota of doctors in France aged 65 years or above and soon to retire was already over ten percent, as was also the case in Denmark, the Czech Republic and Luxembourg. In the Netherlands, the proportion of doctors aged under 35 has risen rapidly and is now at 29 percent. No age data for Poland are available.

Figure 8.23: Age structure of doctors in Germany and its neighbouring countries in 2015



Origin of data: Eurostat, PL=no data

Housing market in the Charlemagne Border Region

Actors in the Charlemagne Border Region are particularly interested in the transnational housing market around the tri-national border between Germany, the Netherlands and Belgium, firstly due to existing interdependencies and secondly due to contrasting developments in different areas of the region and the countries.

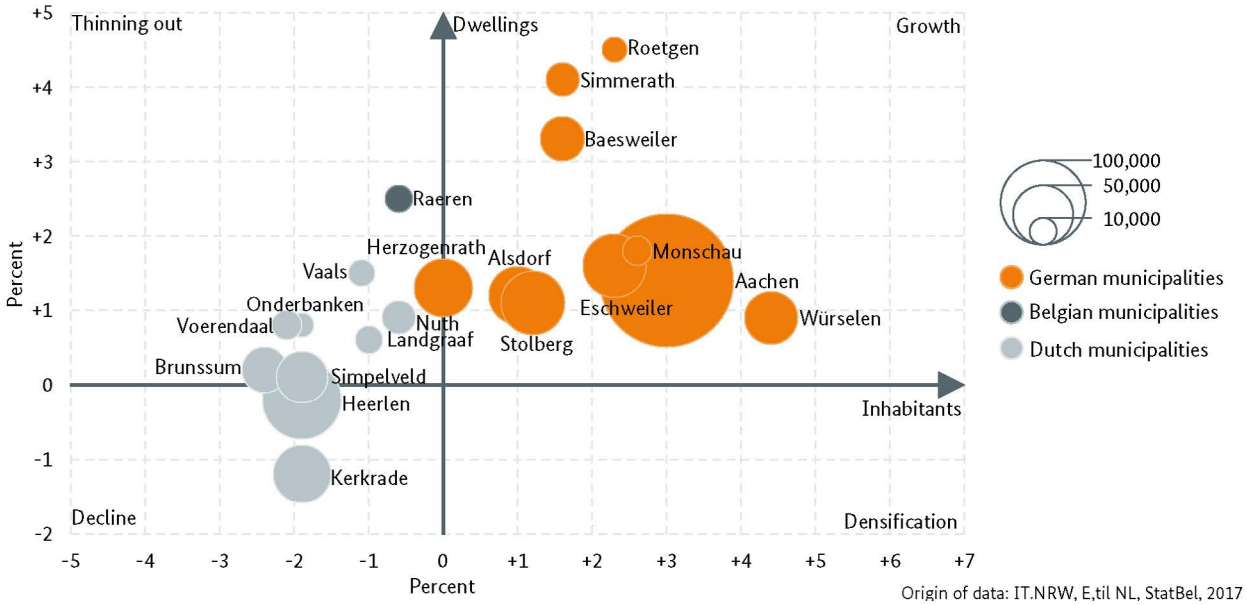
In 2013, the first transnational housing market report was published for the German and Dutch communities and the Belgian municipality of Raeren (Provincie Limburg et al. 2014). It was a response to the realisation that the housing market is growing ever closer together on a transnational level and therefore transnational understanding and concepts are sensible to ensure reasonable developments. In doing so, it was assumed that by 2030, the population sizes in the border region will tend to fall and that at the same time, an over-ageing population can be expected.

The resulting conclusion was that the housing stocks in the border region must be adapted and modernised. Above all, housing potential must be activated and made accessible for young families with children. With respect to housing monitoring, it was also concluded that the collected indicators for in-depth assessment of the (sub-regional) developments must become more comprehensive, which requires, among others, constant coordination between the transnational partners.

A total of around 444,000 dwellings are available in the Charlemagne Border Region. Municipalities with the largest housing stocks are situated in the north of the border region (Figure 8.25, left). The housing density per hectare land for housing and leisure includes very intensive (Heerlen, Aachen), sparse (central region) and very dispersed land use (southern areas and the southern part of eastern Belgium) (Figure 8.25, centre). In 2011/2012, the dwellings were inhabited by an average of 1.99 persons. In Nuth, Baesweiler, Lontzen, Raeren and Amel, the figure was even 2.2 persons, while in the city of Aachen and the municipality of Vaals, only 1.8 persons shared one apartment (Figure 8.25, right). The figures firstly indicate the sizes of the households, which vary significantly depending on the community. Secondly, they can also be an indicator of vacancy, which is probably the case in Vaals, as the following circumstances suggest.

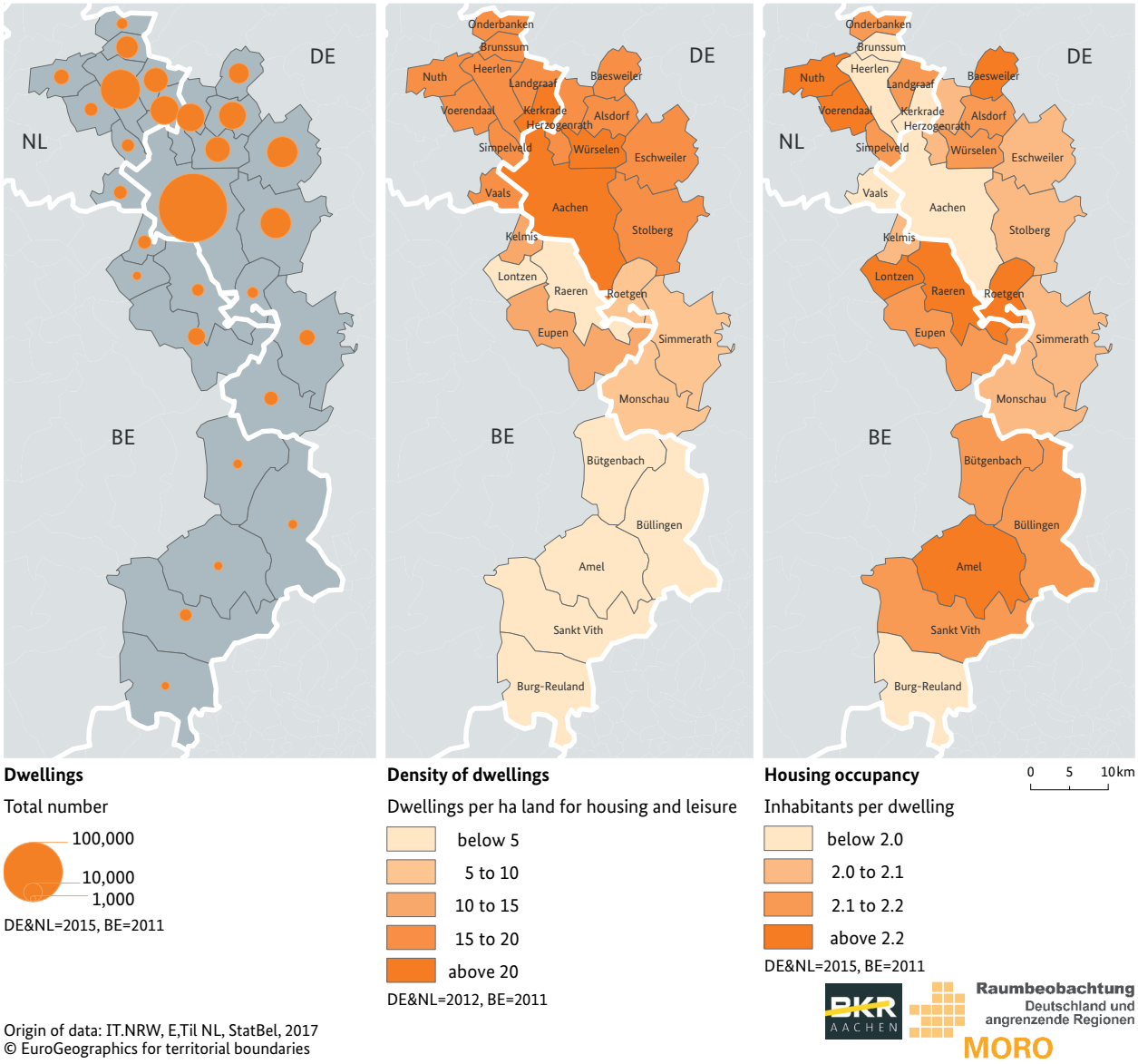
Detailed study of the sub-region of the German and Dutch communities of the Charlemagne Border Region reveals positive housing developments, from which the former core of the Limburg coal mining region, Parkstad Limburg and Kerkrade are however excluded. That

Figure 8.24: Inhabitant-related development trends on the housing market of municipalities in the Charlemagne Border Region



Origin of data: IT.NRW, E,til NL, StatBel, 2017

Figure 8.25: Housing market in the Charlemagne Border Region



Origin of data: IT.NRW, E,Til NL, StatBel, 2017
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Raumbeobachtung Deutschland und angrenzende Regionen MORO

corresponds with the simultaneous widespread negative population development in this area and indicates two fundamentally contrasting development patterns: while in the communities of the urban region of Aachen, population size and number of dwellings are growing, the population of communities on the Dutch side is shrinking, even where housing stocks are growing. As a result, the Aachen housing market is under pressure from considerable demand, with continuously rising prices, while the Dutch communities are experiencing increasing vacancy, leading to financing problems and, in some parts, housing stock is already being demolished.

Figure 8.24 shows these developments and the two underlying development patterns:

→ In German communities, consistently positive population and housing development is evident since the municipalities are growing. However, it is visible that population development in Eschweiler, Monschau, Würselen and Aachen will exceed housing growth, suggesting an increasing housing shortage. In Alsdorf, Herzogenrath and Stolberg, the development is relatively balanced, while in Baesweiler, Roetgen and Simmerath, excess housing growth can be observed that cannot be explained by the population development.

→ Among the Dutch communities, Heerlen and Kerkrade show clear shrinking trends, both with respect to population sizes and to the number of apartments. In the remaining municipalities, although there is a consistent fall in the number of inhabitants, the volume of housing stock is growing. In these parts, a thinning out process is evident where ever fewer people face an ever-growing stock of housing.

9 Results and conclusion

This report entitled “Spatial monitoring Germany and neighbouring regions. Regional structures and linkages” has depicted the spatial information that is currently available for transnational analysis. The report has also used specific methods to present the information graphically in a way that makes the overall structures and developments in Germany and the German regions, cities and towns in the context of the neighbouring countries and their regions comparably visible. For instance the report presents many common aspects and differences in the current conditions and developments in recent years with respect to Germany and its regions, and the neighbouring countries and their respective regions. There are however no clearly discernable patterns in this respect; instead, the spatial structures and processes strongly depend on the respective topic observed.

As was to be expected, much information does not exist in a comparable spatial scope or regional subdivision for Germany and its neighbouring countries. This may be deplored as a deficiency, however, often strongly aggregated indicators on a national level already demonstrate the common aspects and differences between Germany and its neighbouring regions. This report mostly uses the regional level for observation of Germany and its neighbouring regions. It is the most important level for German spatial monitoring, since it alone enables comprehensive and yet spatially differentiated analyses. However, the in-depth regional information contributed by the model regions that supplements this report additionally shows that aside from the national perspective, a level of analysis with a regional and small-scale focus should be an integral part of spatial monitoring for Germany and its neighbouring regions.

Relevant indicators of cross-border spatial monitoring have been processed for the individual thematic chapters of the report – in particular in the fields of spatial structure, demographics, the economy and the labour market. These are basic, generally used indicators that reflect spatial structures. The data are provided by national and regional statistical offices or Eurostat, often by default. With a few exceptions, appropriate data on regional linkages and flows are not available.

To be able to analyse and understand cross-border spatial interaction as well, a significant improvement in the collection and provision of such data on a regional and small-scale level is required. Innovative, internationally comparable data collection methods with a high level of detail are necessary. In this context, the cross-border labour market was especially named by the model regions as one of the most important fields for which interdependency data are not available in an appropriate form. The capture of cross-border commuter flows using uniform recording of residence and work location data will be a key indicator for sustained transnational spatial monitoring. Other important themes with a high demand for interlinkages data are trade, retailing, the use of services, tourism and leisure, services of general interest and the overarching field of transport.

This report does not precisely delimitate border regions. Activities in preparation for this MORO and also initial MORO workshops highlighted the fact that a strict delineation for spatially analytical purposes cannot live up to reality. Instead, different cross-border processes and linkages have very different spatial scopes, which in some cases extend far beyond the narrow delimitation of a border region into the respective countries. Also for this reason, cartographic presentations of indicators were initially produced for the entire observed area of Germany and its neighbouring countries. Border corridors with a width of up to 100 kilometres have been used only to analyse selected indicators with respect to common aspects and differences near borders.

Due to a lack of demarcation of border regions, verbal-argumentative statements are only made in individual cases in this report, however no quantitative analyses on the situation of border regions were carried out in comparison to other regional types in Germany and its neighbouring countries. The purely schematic definition of border regions by the European Commission, according to which border regions are only NUTS 3 regions situated directly on a national border, is too monofunctional for this document. It is more appropriate to use a multilevel spatial definition of border regions. Using such a concept, it is possible to delimitate areas in the direct vicinity of a border and to use one or more additional delineation methods to do justice to different spatial interdependencies. Such a system of border region demarcation including a typology of border regions would have considerable advantages in the action-orien-

tated analysis of border regions, both in comparing them to each other and in comparing them to other spatial categories.

This report demonstrates that the information base for systematic and comprehensive cross-border monitoring is still very patchy in many fields or even non-existent – especially below the national level. In recent years, however, many actors have increasingly become aware of this deficit, leading to the introduction of appropriate initiatives:

- With its current Communication on boostening growth and cohesion in EU border regions, the European Commission has explicitly named cross-border spatial monitoring as one of the ten priorities (European Commission 2017b).
- A pilot project derived from that aimed at collaboration between a number of national and regional statistical offices to explore the integration of labour market data, administrative and census data and mobile communications data (Van der Valk 2017). Cooperation between statistical offices is a key prerequisite of sustained data-supported transnational spatial monitoring.
- ESPON, the European Territorial Observatory Network, is strengthening its activities in the field of territorial research with respect to border regions (European Commission 2017b).
- On a transnational level, spatial monitoring systems such as in the Nordic countries (Nordregio 2016) or the Baltic Region (Linkaits 2017) are being expanded.
- On a national level, institutions for border regions such as the MOT (Mission Opérationnelle Transfrontalière) in France or initiatives such as this MORO "Spatial monitoring Germany and neighbouring regions" are still the exception in Europe. At the same time, they achieve high national and international awareness levels and can therefore become anchors of further and in-depth activities.
- On a regional level in Germany and its neighbouring regions, the model regions of this MORO certainly play a pioneering role for other regions. Approaches to cross-border spatial monitoring systems have been conceptually improved and their content expanded. In this respect, it is apparent that the development of a meaningful cross-border spatial monitoring system is achievable, particularly as a result of cooperation between actors from German federal states and regional planning agencies and their counterparts on the other side of the border.

Sustained cross-border spatial monitoring certainly requires such pluralism of activities, while also needing the systematic and sustainable pooling of actors from the fields of planning policy, administration, statistics and spatial research in appropriate networks and with binding agreements. One example of such an agreement is the 2017 Hambach Declaration on German-French cooperation in border regions, which states the necessity of cross-border spatial monitoring: "We intend to create the conditions for the cross-border exchange of data and the free, uncharged provision of harmonised data files in appropriate formats for the activities in border regions. In doing so, we will particularly also expand and consolidate cooperation in the field of geographic information systems (cartographic transformation of statistical and other, particularly spatial data). (...) Cooperation between statistical offices also contributes to coherent spatial development. By continuously providing cross-border structural data to policy makers, the economy and the population, it also ensures transparency and citizen-friendliness in a border area that is growing together." (Hambacher Erklärung 2017, p. 17f, translated)

Spatial monitoring is not an end in itself. Instead, it should be regarded as gathering, consolidating and analytically processing information in preparation for action. It provides early information to policy and decision makers on spatial developments that are relevant to planning, as well as indicating the effectiveness of measures. This especially applies to cross-border spatial monitoring, where specific developments can hardly be explained without knowledge of the situation in the neighbouring region, let alone being able to steer them in a coordinated way. Cross-border spatial monitoring can be regarded as a multi-level process. The model regions of this MORO have shown that in addition to improving knowledge and therefore the grasp of the processes on the other side of the border, the common development of regional strategies forms the key basis of justification for their cross-border spatial monitoring systems. Practical experience has shown difficulties on the one hand, but equally on the other, that common challenges can be detected sooner, synergies can be used more easily in almost all fields and regional economic potential can be tapped more efficiently. Measures of European regional and

structural policy can be developed more effectively using meaningful, cross-border indicators, while also assessing common development potentials in a more targeted way.

On a national level, the activity orientation in Germany is less clearly pronounced spatially due to the federal planning system. Cross-border spatial monitoring is particularly legitimised by the Spatial Planning Act (Raumordnungsgesetz) and less as a result of transnational spatial development strategies with neighbouring countries. Recently however, initial development processes have been launched that may be sensible to expand in order to also justify cross-border spatial monitoring on a national level from a planning perspective comparable to regional activities. These include updated versions of spatial development guidelines (MKRO 2016), in which especially the competitiveness guideline has cross-border references; integrating guidelines into concrete spatial action requires appropriate spatial information extending beyond the territory of the Federal Republic of Germany. Secondly, the future concept for the German-Polish interaction area (Ausschuss für Raumordnung 2016) is a development approach for cross-border regional strategy that involves national levels; both at the initial preparation stage and in implementation, spatial information is required to analyse and monitor developments. Furthermore, sectoral planning is being carried out in other departments – the development of a trans-European transport network is perhaps the most significant policy field in this respect; such measures have also an international and therefore cross-border level of action, and also have clear spatial implications.

To conclude, it should be noted that cross-border spatial monitoring will become increasingly important in a Europe that is growing ever closer together, as is recognised by many actors. More intensive and systematic collaboration between actors is required to significantly improve cross-border spatial monitoring. That includes both actors in the field of spatial analysis and planning, and also actors (potentially) providing data. Germany – the European country with the most neighbours – can play a key activating and coordinating role in this process:

"Overcoming Borders" – also in spatial monitoring.

Source: stockpics/Fotolia

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Border divergence maps

Border divergence maps provide information on the regional differences in border regions, e.g. in the population development between 2011 and 2015 (Figure 4.6) or the unemployment rate in 2016 (Figure 6.12). Methodologically, border-regional differences are recorded at 1,668 border points that subdivide the external border of Germany into even sections of 1,500 m in length. Based on those border points, the statistical reference value is determined for both sides of the border. Calculations are weighted in terms of distance and population size for municipalities on both sides of the border that are situated within a 50 km radius. That means the closer the community is situated to the border and the more inhabitants living there, the more strongly its indicator value is taken into account in calculations. Indicators based on a superordinate statistical spatial level are, if necessary, first disaggregated to the municipal level.
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Overview of national statistical offices

Amt für Statistik (AS), Principality of Liechtenstein
Bundesamt für Statistik (BFS), Switzerland
Bundesanstalt Statistik (STAT), Austria
Centraal Bureau voor de Statistiek (CBS), Netherlands
Český statistický úřad (ČSÚ), Czech Republic
Danmarks Statistik, Denmark
Državni zavod za statistiku (DZS), Croatia
Główny Urząd Statystyczny (GUS), Poland
Institut national de la statistique et des études économiques (INSEE), France
Institut national de la statistique et des études économiques du Grand-Duché de Luxembourg (STATEC), Grand Duchy of Luxembourg
Istituto Nazionale di Statistica (ISTAT), Italy
Központi Statisztikai Hivatal (KSH), Hungary
Statistični urad Republike Slovenije (SURS), Republic of Slovenia
Statistics Belgium (Direction générale Statistique/Algemene Directie Statistiek/Generaldirektion der Statistik und der Wirtschaftsinformation), Belgium
Statistisches Bundesamt (Destatis), Germany
Statistiska centralbyrån (SCB), Sweden

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Volker Schmidt-Seiwert (Classification of spatial and settlement structures)

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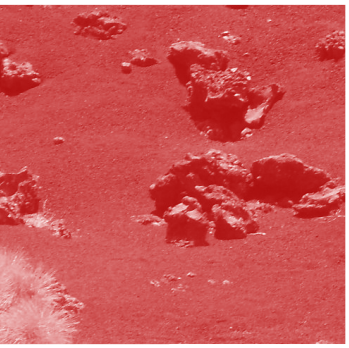

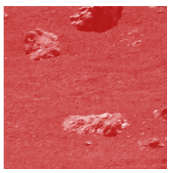

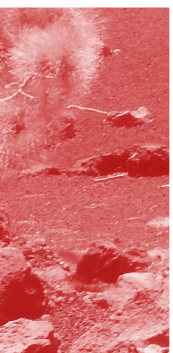

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