

Cohesion in Europe towards 2050

Eighth report on economic,
social and territorial cohesion



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Foreword



As we publish this 8th Cohesion Report, the world begins a third year of the COVID-19 pandemic. We in Europe are striving for a strong and balanced recovery — and indeed, the decisive action taken at European level has averted worse consequences, and our economy is rebounding faster than expected. However, EU-average data often hide significant regional differences. Experience shows that crises risk opening cracks in our common house — will the recovery leave some regions behind?

The Report's preliminary findings reveal that the pandemic has tested our health care systems, and it has tested our economic and social structures — and exposed sharp regional differences in all of them. The restrictions on movement of people and goods have led to a sharp recession in some regions. Closing national borders has affected border regions disproportionately. In short, new territorial and social disparities have emerged.



Beyond the impact of the pandemic, this Report's rich analysis reveals a variety of trends in territorial cohesion within the Union — some trends are positive, but some are cause for concern. The majority of less developed regions continue to catch up, but many transition regions are falling behind. Employment rates are higher than ever before, but regional disparities remain high and pockets of deprivation persist, even in prosperous regions. Levels of tertiary education continue to increase, but so does the innovation divide. Trust in the EU has been growing, but remains low in some regions, namely rural areas. Quality of governance has been improving, but the rule of law has deteriorated in some Member States.

Over several decades, EU cohesion policy has reduced territorial disparities, boosted economic growth and improved the quality of life. It has played a central role in promoting the upwards social convergence advocated by the European Pillar of Social Rights. The new 2021–2027 cohesion policy programmes will continue this good work, in close coordination with the financial might of the NextGenerationEU package.

But challenges remain and policies must adapt — the world is changing fast. How can cohesion policy support the green and digital transition? How can it respond to demographic challenges? How can it avoid the creation of new disparities or the exacerbation of existing ones? How can it bring innovation to all regions, promote effective cross-border cooperation and strengthen links between cities and rural areas? How can it better promote the social inclusion and participation in the labour market of women, people with disabilities, the young, low-skilled workers, migrants and ethnic minorities, and people who live in deprived areas?

In an uncertain and challenging environment, we must ask ourselves: what are the best tools and approaches to continue delivering a more competi-

tive, socially cohesive, territorially balanced and future-proof Union? Not just in the next few years, but in the next 30 years. How can cohesion policy keep playing its role as the strong motor of Europe's "convergence machine"? This is a necessary discussion, and a discussion that must be fed with facts: the rich content and analysis in this report will help nourish the debate.

A stylized, handwritten signature in black ink, likely belonging to Elisa Ferreira.

Elisa Ferreira,
Commissioner for Cohesion
and Reforms

A stylized, handwritten signature in black ink, likely belonging to Nicolas Schmit.

Nicolas Schmit,
Commissioner for Jobs and
Social Rights

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Lexicon

Cohesion policy: Covers all the programmes supported by the following funds: the European Social Fund (ESF+), the European Regional Development Fund (ERDF) and the Cohesion Fund (CF). It is also known as regional policy.

Structural Funds: The European Social Fund (ESF+) and the European Regional Development Fund (ERDF).

Abbreviations

AI	Artificial Intelligence
ANC	Area facing natural or other specific constraints
AROPE	At Risk of Poverty or social Exclusion
BCR	Benefit-to-Cost Ratio
CAP	Common Agricultural Policy
CEAP	Circular Economy Action Plan
Cedefop	European Centre for the Development of Vocational Training
CEF	Connecting Europe Facility
CF	Cohesion Fund
CLC	CORINE Land Cover
CLLD	Community-Led Local Development
COFOG	Classification of Functions of Government
CRII	Coronavirus Response Investment Initiative
CRiT	Coal Regions in Transition
CV	Coefficient of Variation
DG ECFIN	Directorate-General for Economic and Financial Affairs, European Commission
DG REGIO	Directorate-General for Regional and Urban Policy, European Commission
EAFRD	European Agricultural Fund for Rural Development
EAGF	European Agricultural Guarantee Fund
EEN	Enterprise Europe Network
EIBIS	European Investment Bank investment survey
EIS	European Innovation Scoreboard
EQI	European Quality of Government Index
ERDF	European Regional Development Fund
ERP	Enterprise Resource Planning
ESD	Effort Sharing Decision
ESF+	European Social Fund (the former abbreviation was ESF)
ESIF	European Structural and Investment Funds
ETS	Emissions Trading Scheme
EU	European Union
EUIPO	European Union Intellectual Property Office
EU-SILC	EU statistics on income and living conditions
EU-SPI	EU Regional Social Progress Index
EUSSM	EU Strategy on Sustainable and Smart Mobility
FDI	Foreign Direct Investment
FemAI	Female Achievement Index
FemDI	Female Disadvantage Index
FUA	Functional Urban Area
GBER	General Block Exemption Regulation
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GNI	Gross National Income
GVA	Gross Value Added

GVC	Global Value Chain
HDEP	High Decarbonising Employment Potential
IPCC	Intergovernmental Panel on Climate Change
ISCED	International Standard Classification of Education
ISCO	International Standard Classification of Occupations
ITI	Integrated Territorial Investment
JRC	Joint Research Centre, European Commission
JTF	Just Transition Fund
JTM	Just Transition Mechanism
LAI	Local Autonomy Index
LAU	Local Administrative Unit
LBM	LUISA base map
LFS	(EU) Labour Force Survey
LIFE	L'Instrument Financier pour L'Environnement
MAD	Mean Absolute Deviation
MFF	Multi-Annual Financial Framework
MNE	Multinational Enterprises
NECP	National Energy and Climate Plan
NEETS	Not in Employment, Education or Training
NMVOC	Non-Methane Volatile Organic Compound
NSI	National Statistical Institute
NUTS	Nomenclature of Territorial Units for Statistics
OECD	Organisation for Economic Co-operation and Development
OP	Operational Programme
PISA	(OECD) Programme for International Student Assessment
PO	Policy Objective
pp	percentage point
PPS	Purchasing Power Standards
RAI	Regional Authority Index
RCI	Regional Competitiveness Index
RDEP	Restricted Decarbonising Employment Potential
REACT	Recovery Assistance for Cohesion and the Territories of Europe
RIS	Regional Innovation Scoreboard
RTDI	Research, Technological Development and Innovation
SDEP	Slow Decarbonising Employment Potential
SDG	Sustainable Development Goals
STEM	Science, Technology, Engineering and Mathematics
TED	Tenders Electronic Daily
TEN-T	Trans-European Transport Network
TFP	Total Factor Productivity
TJTP	Territorial Just Transition Plan
VEG-GAP	Vegetation for Urban Green Air Quality Plans
VET	Vocational Education and Training
WGI	Worldwide Governance Indicator
WJP	World Justice Project
YEI	Youth Employment Initiative

For ease of reading, funds are consistently referred to by their current name even if some of these funds have changed name over time.

Member States and their abbreviation

BE	Belgium
BG	Bulgaria
CZ	Czechia
DK	Denmark
DE	Germany
EE	Estonia
IE	Ireland
EL	Greece
ES	Spain
FR	France
HR	Croatia
IT	Italy
CY	Cyprus
LV	Latvia
LT	Lithuania
LU	Luxembourg
HU	Hungary
MT	Malta
NL	Netherlands
AT	Austria
PL	Poland
PT	Portugal
RO	Romania
SI	Slovenia
SK	Slovakia
FI	Finland
SE	Sweden

Geographical groupings

Member State groupings

By geographic area

Eastern Member States: BG, CZ, EE, HR, LV, LT, HU, PL, RO, SI, SK

Southern Member States: EL, ES, IT, CY, MT, PT

North-western Member States: BE, DK, DE, IE, FR, LU, NL, AT, FI, SE

By level of development

Less developed Member States: BG, EL, HR, LV, LT, HU, PL, RO (GNI per head below 75% of EU-27 average in 2015–2017).

Moderately developed Member States: CZ, EE, CY, MT, PT, SI, SK (GNI per head between 75% and 90%).

Highly developed Member States: BE, DK, DE, IE, ES, FR, IT, LU, NL, AT, FI, SE (GNI per head at least 90% of EU-27 average in 2015–2017).

Less developed and moderately developed Member States are those eligible for support by the Cohesion Fund 2021–2027.

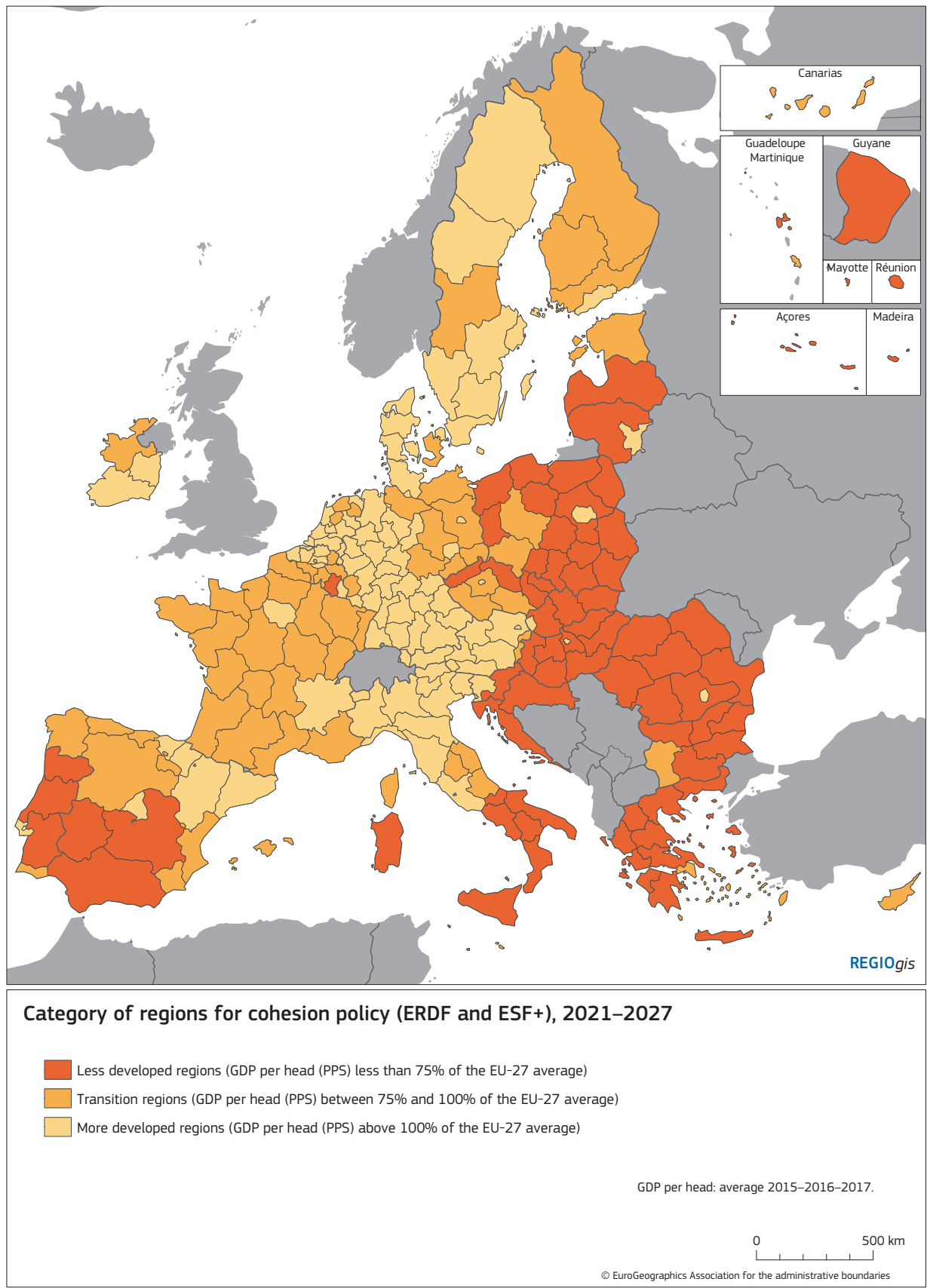
Types of NUTS 2 regions

Cohesion policy in the period 2021–2027 uses three categories of regions based on the GDP per head for the years 2015, 2016 and 2017 (see Map).

Less developed regions: GDP per head (PPS) below 75% of the EU-27 average.

Transition regions: GDP per head (PPS) between 75% to 100% of the EU-27 average.

More developed regions: GDP per head (PPS) above 100% of the EU-27 average.



Types of regions and areas

Metropolitan regions

This is a classification of regions at NUTS 3 level, established as EU territorial typology in the TERCET Regulation. This classification was developed in co-operation with the OECD. It consists of NUTS 3 approximation of all functional urban areas of more than 250 000. Two types of metropolitan regions are identified: capital and other. The capital metropolitan region contains the national capital. A detailed methodology is included in the Eurostat Methodological manual on territorial typologies (2018 edition).

Predominantly urban, intermediate, predominantly rural regions

This is a classification of regions at NUTS 3 level, established as EU territorial typology in the TERCET Regulation. A detailed methodology is included in the Eurostat Methodological manual on territorial typologies (2018 edition).

Border areas

Border areas, as defined for analytical purposes, are areas of at least 25 km width along terrestrial borders inside the EU, along terrestrial borders with EFTA countries, and in Ireland along the border with Northern Ireland.

Outermost regions

EU outermost regions are Canarias (Spain), Guyane, Guadeloupe, La Réunion, Martinique, Mayotte and Saint-Martin (France), Açores and Madeira (Portugal). For the purpose of the NUTS classification, Saint-Martin is part of the NUTS 2 region Guadeloupe.

Degree of urbanisation

Cities: local administrative units with more than 50% of their population in an urban centre.

Towns and suburbs: local administrative units with more than 50% of their population in urban clusters but less than 50% living in an urban centre.

Rural area: local administrative units with more than 50% of their population in rural grid cells.

The degree of urbanisation classification is based on a typology of 1 km² grid cells. At grid cell level, a more detailed typology has been defined, distinguishing six classes:

- Cities
- Towns
- Suburbs
- Villages
- Dispersed rural areas
- Mostly uninhabited areas.

For more information see:

<https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/ks-02-20-499>

Cities, commuting zones and functional urban areas

Cities: same definition as above.

Commuting zones: contiguous local administrative units with at least 15% of their working population commuting to a city.

Functional urban areas: the city plus its commuting zone.

For more information see:

<https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/ks-02-20-499>

Highlights

1. Introduction

The 8th Cohesion Report presents the main changes in territorial disparities over the past decade and how policies have affected these disparities. It highlights the potential of the green and digital transitions as new drivers of EU growth, but argues that without appropriate policy action new economic, social and territorial disparities may appear. Finally, it launches a reflection on how cohesion policy should evolve to respond to these challenges and in particular how to ensure that place-based, multilevel and partnership led approaches continue to improve cohesion, while building on synergies and mainstreaming cohesion objectives into other policies and instruments.

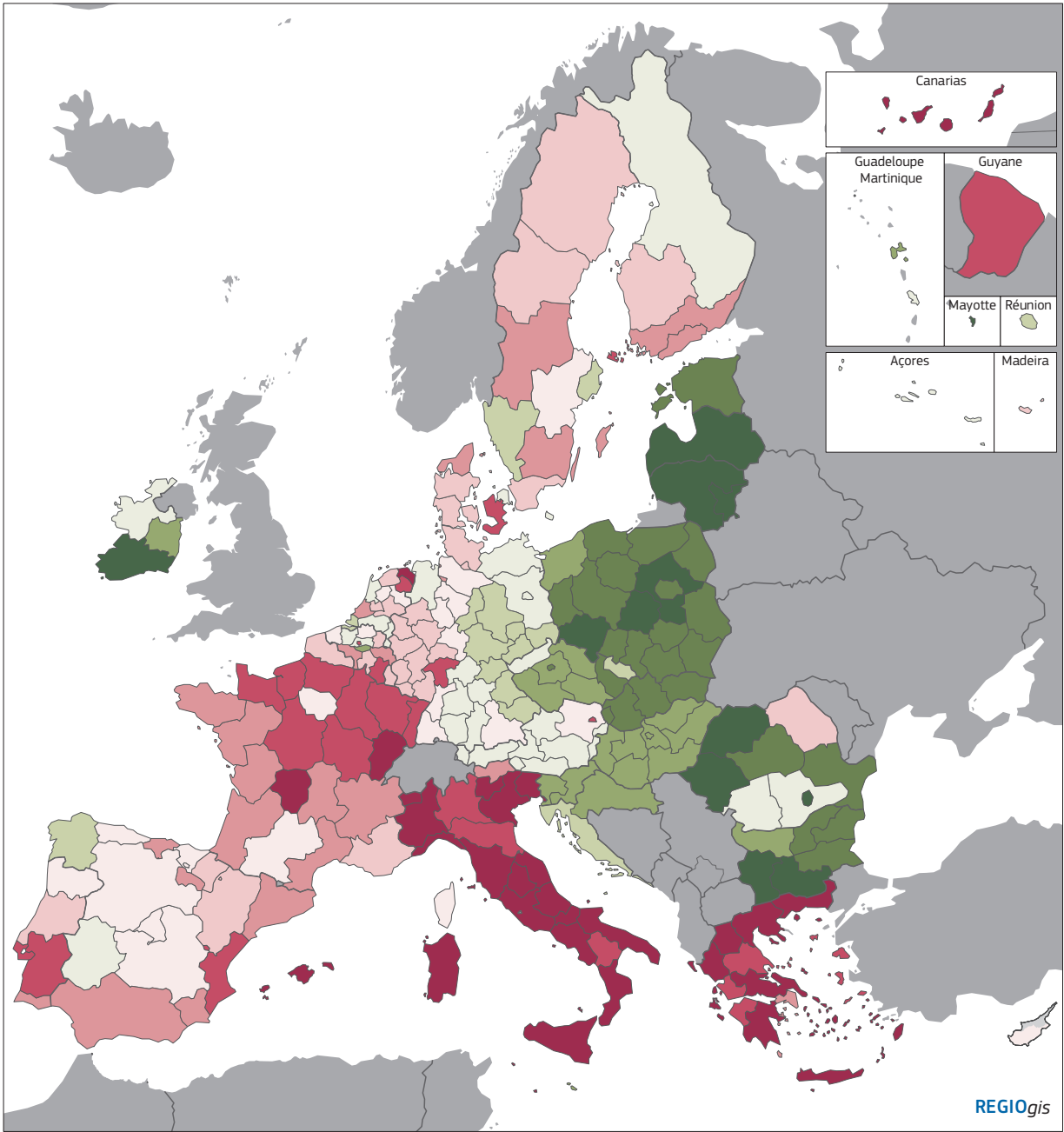
2. Cohesion in the European Union has improved, but gaps remain

The Cohesion Report assesses the long-term evolution of regional disparities, but also briefly addresses the dramatic short-term effects of the COVID-19 pandemic. This has had an asymmetric impact on EU regions, reflecting different regional healthcare capacities, restrictions and economic structures. COVID-19 has already increased EU mortality by 13% (Chapter 1), but the impact so far is higher in less developed regions where mortality increased by 17%¹. The pandemic led to the largest recession since 1945, affecting especially sectors that depend on personal interaction, such as tourism, and drastically altered our jobs, schools and social interactions, while travel restrictions had a disproportionate impact on border areas.

Convergence has been driven by high growth in less developed regions, but their low cost-advantages and returns on infrastructure investment may shrink over time.

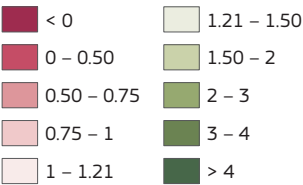
Since 2001, less developed eastern EU regions have been catching up with the rest of the EU, leading to a substantial reduction of the GDP per capita gap (Map 1). Their high growth rates have been fuelled by structural transformation, notably a shift of employment out of agriculture and into higher value added sectors. Some of these regions have relied on infrastructure investment and low costs to promote growth. However, the returns on infrastructure investment will decline and low cost advantages will shrink if real wages grow faster than productivity, especially in the tradeable sectors. To avoid a development trap in the future, less developed regions will need to boost education and training, increase investments in research and innovation, and improve the quality of their institutions.

¹ Less developed regions have a GDP level at less than 75% of the EU average, transition regions between 75% and 100%, and more developed regions more than 100%.



Map 1 Growth of GDP per head, 2001-2019

Average percentage change on the preceding year



EU-27= 1.21
Source: DG REGIO based on JRC and Eurostat data.

0 500 km

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Several middle-income and less developed regions, especially in the southern EU, have suffered from economic stagnation or decline (Map 1), suggesting they are in a development trap² (Map 2). Many were hit by the economic and financial crisis in 2008 and have struggled to recover since. Long-term growth will require reforms of the public sector, an upskilled labour force and a stronger capacity to innovate.

Capital metropolitan regions perform better than other regions. Between 2001 and 2019, real GDP per head in metropolitan (metro) regions grew faster than in other EU regions (Chapter 2). In the southern and the eastern EU, both capital and other metro regions had higher GDP and employment growth per capita, leading to a growing concentration of economic activity and employment in these regions. In the north-western EU, however, metro regions and other regions grew at similar speeds, while only the capital regions grew slightly faster.

Significant progress has been made in improving employment and social inclusion³, but important structural challenges remain.

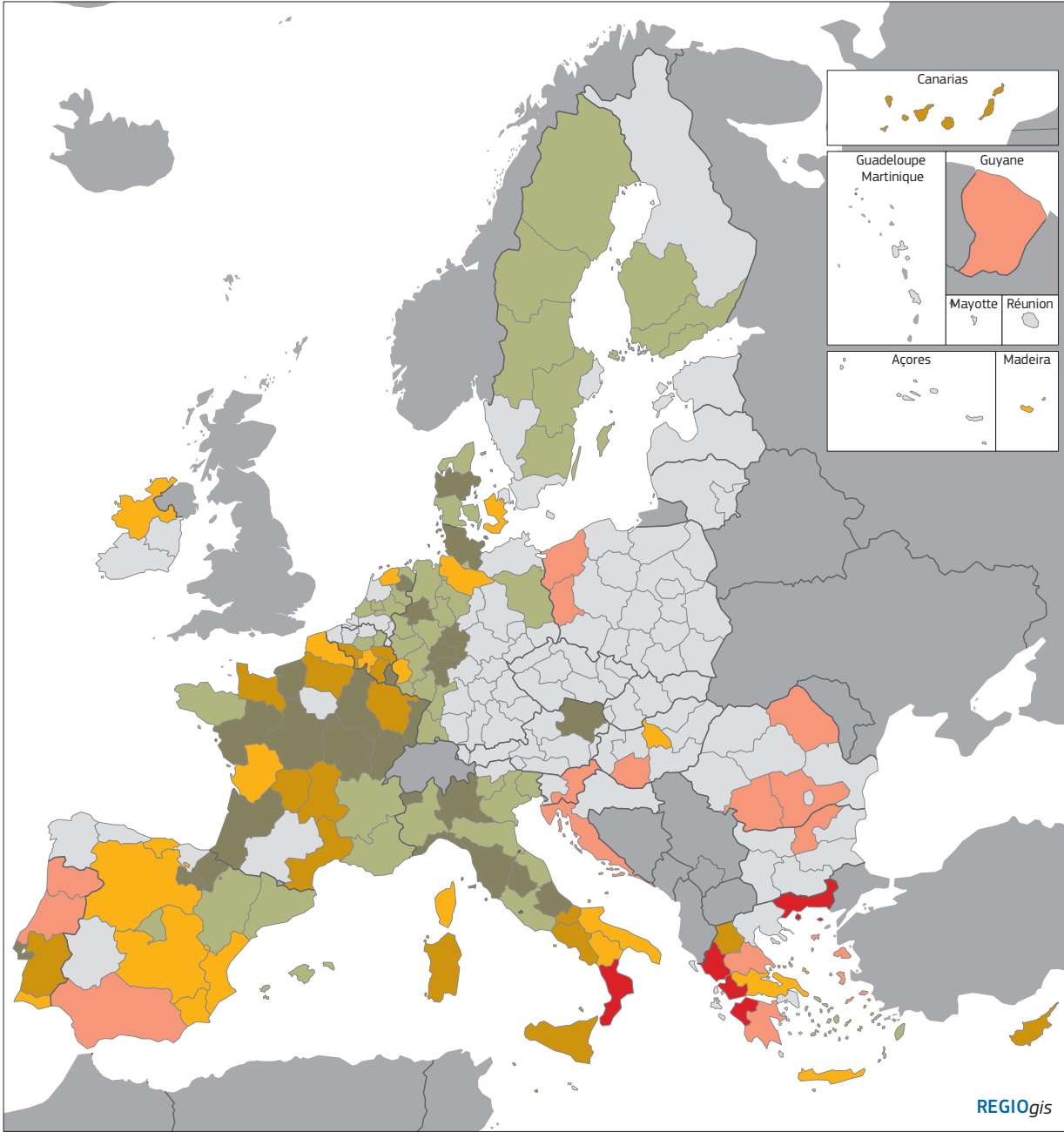
Employment has been growing, but regional disparities remain larger than before 2008 (Chapter 5). The economic crisis in 2008 led to a significant spike in regional disparities in both employment and unemployment rates. At the EU level, the employment rate has fully recovered from the crisis and reached its highest value in 2019 at 73% of those aged 20–64. Regional disparities have fallen since 2008, but remain wider than before the economic crisis. Employment rates in less developed regions remain far below those in more developed regions (Map 3).

Reducing regional employment disparities requires more employment growth and a reduction of the gender gap. In less developed regions, the gender employment gap is almost twice that in more developed regions (17 vs 9 percentage points). Overall, women in less developed regions are more likely to be disadvantaged compared to men in the same region and less likely to have a high level of achievement compared to women in other regions.

The number of people at risk of poverty and social exclusion has fallen by 17 million between 2012 and 2019, mostly due to the decline of the number of people in severe material deprivation in eastern Member States. Reaching the EU 2030 target of reducing the number of people at risk of poverty or social exclusion by at least 15 million requires maintaining the current rate of poverty reduction over the next decade. The pandemic, however, increased the number of people at risk of poverty and social exclusion by 5 million in 2020.

² A region is considered trapped if its growth has slowed down and is lower than EU and/or national growth. Map 2 shows the regions which were mostly or frequently trapped between 2000 and 2019. Regions in grey were mostly not trapped.

³ See the regional dimension of the social scoreboard
<https://ec.europa.eu/eurostat/web/european-pillar-of-social-rights/indicators/data-by-region>



Map 2 Number of years in a development trap during 2001–2019 by level of GDP per head in 2000

GDP/head (index EU-27=100) vs. years

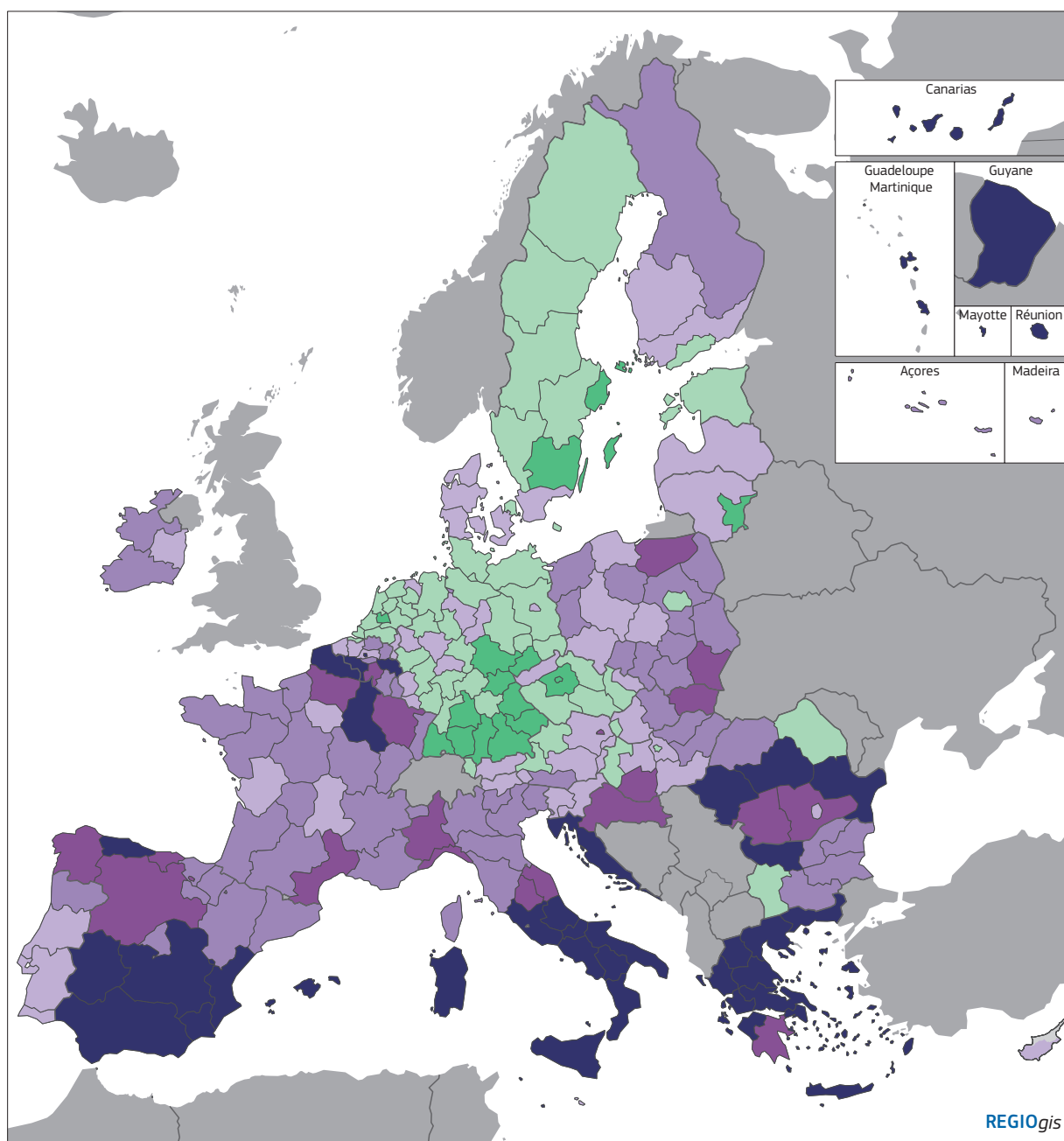
< 75%, 10–14 years 75 - 100%, 10–14 years > 100%, 10–14 years
< 75%, 15–19 years 75 - 100%, 15–19 years > 100%, 15–19 years

less than 10 years in a development trap

Six capital regions have been merged with the surrounding regions to limit distortions in the GDP/head values.
Source: DG REGIO calculations based on JRC and Eurostat data.

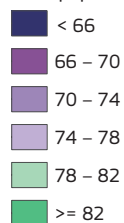
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Map 3 Employment rate (20–64), 2020

% of population aged 20–64



EU-27 = 72.5

The employment rate target is 78% by 2030.

Source: Eurostat (lfsd_r_lfe2empt).

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Health disparities have been shrinking. Life expectancy has increased faster in less developed regions over the past decade than other regions. Nevertheless, life expectancy is still low compared to the EU average in many eastern regions (Map 4). The pandemic reduced life expectancy in 2020 in almost all Member States, but this is likely to be temporary (Chapter 1). The pandemic also highlighted the regional differences in healthcare capacity.

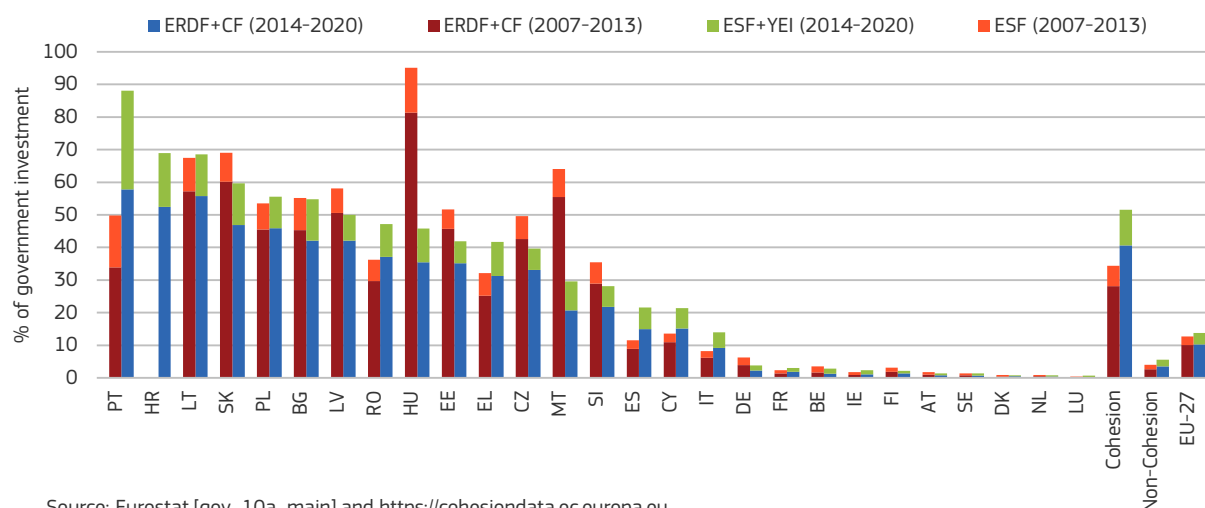
Cohesion policy has helped to reduce disparities.

Economic modelling indicates that in 2023, GDP per head will be 2.6% higher in less developed regions due to support from cohesion policy in 2014–2020. This model also shows that the gap between GDP per head in regions representing top and bottom deciles will fall by 3.5% (Chapter 9).

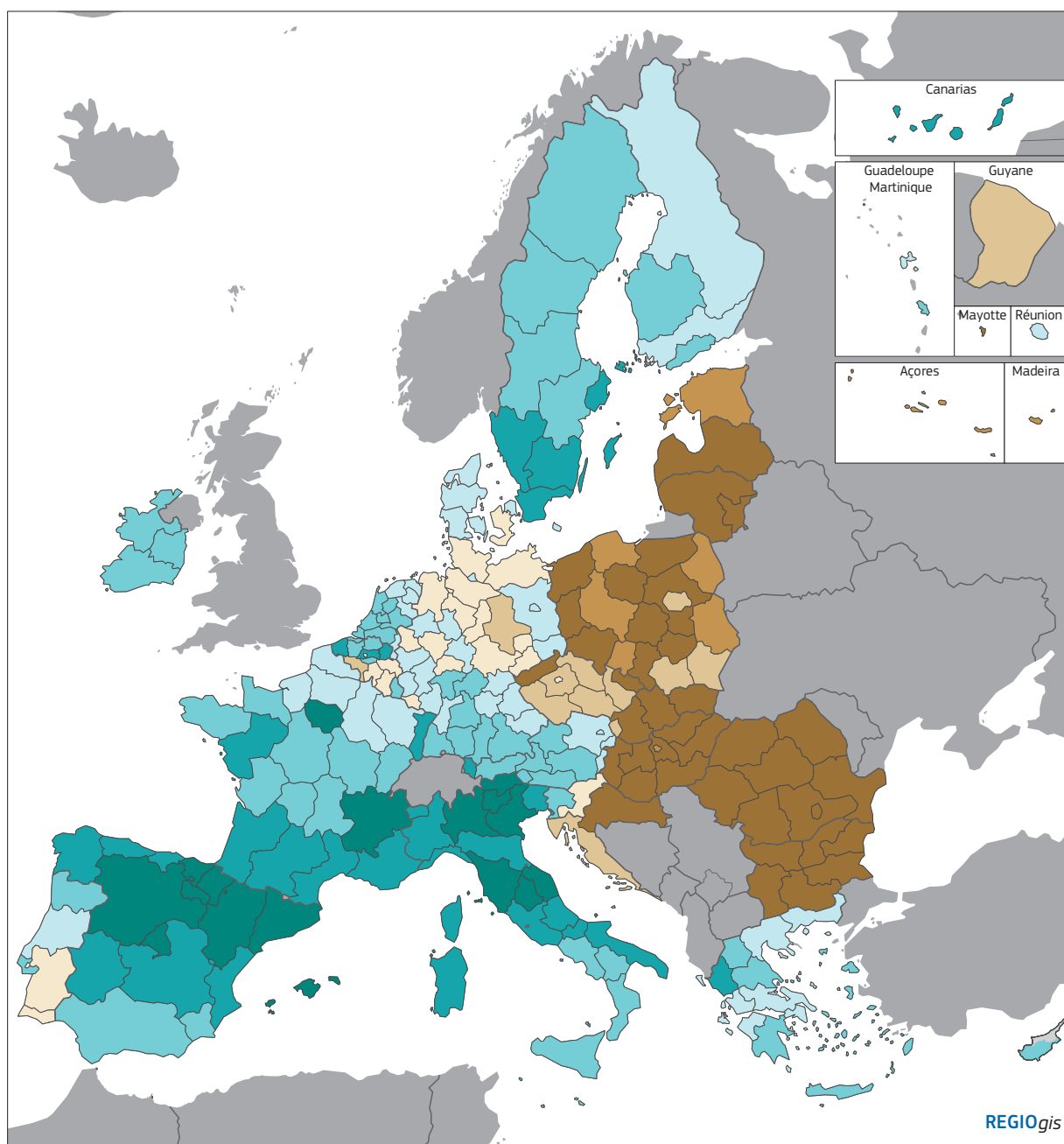
Following the contraction of national public investments due to the economic and financial crisis, **cohesion policy became a more important source of investment** (Chapter 8). In cohesion countries, cohesion funding grew from the equivalent of 34% to 52% of total public investment from the 2007–2013 programming period to the 2014–2020 programming period (Figure 1). Without cohesion policy, the reduction in public investment would have been even bigger in these countries.

Cohesion policy responded quickly **to the COVID-19 crisis by mobilising additional funding, making spending on the crisis response eligible and allowing higher co-financing rates.** This helped Member States and regions respond to the crisis. However, cohesion policy should now return to its core mission of reducing regional disparities and promoting long-term regional development.

Figure 1 ERDF and Cohesion Fund allocations relative to government investment in the 2007–2013 and 2014–2020 periods

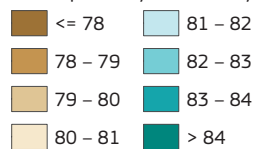


Source: Eurostat [gov_10a_main] and <https://cohesiondata.ec.europa.eu>



Map 4 Life expectancy, 2019

Life expectancy at birth in years



EU-27 = 81.3

Source: Eurostat (demo_r_mlifexp).

0 500 km

3. Drivers of regional growth tend to boost cohesion

Investments in infrastructure, skills, innovation and governance have continued to drive convergence in recent years. Nonetheless, gaps remain and many drivers of growth remain concentrated in more developed regions and urban areas. Recent research shows that the effectiveness of these investments depend on an appropriate region-specific investment mix and a good institutional and macro-economic framework.

In the 2014–2020 programming period, almost half of cohesion policy investment supported infrastructure, largely due to needs in the eastern EU. This has helped to reduce the road transport performance gap in the eastern EU and **to close it in the southern EU** (Chapter 4). This investment has also improved rail performance in the southern and the eastern EU. Nevertheless, more investment is still needed in the eastern EU, in particular to support the shift to a carbon neutral economy.

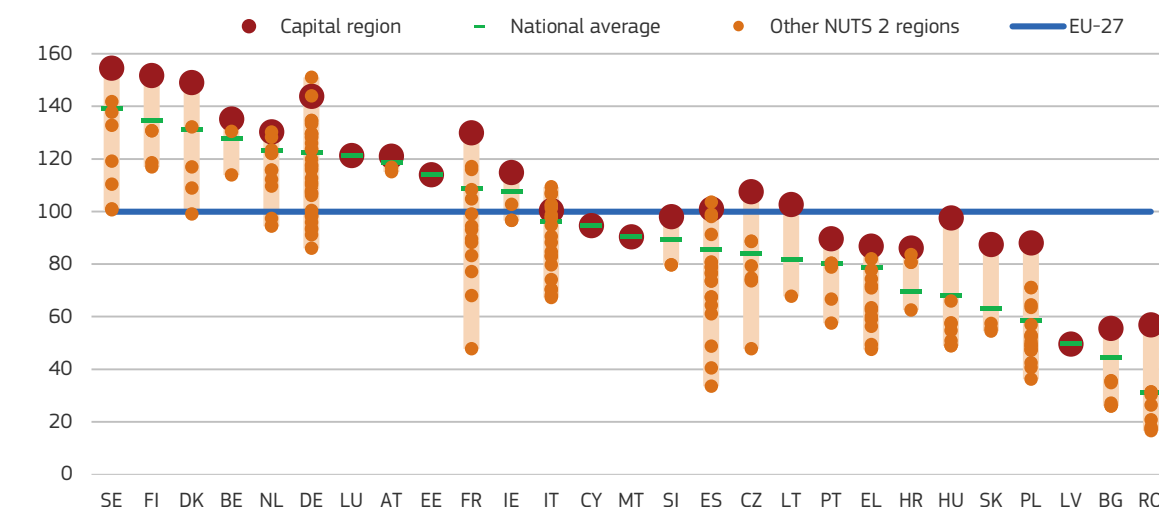
Basic broadband access is almost universal in the EU, but very-high-speed connections are only available to two out of three city residents and one out of six rural residents (Chapter 4). Transport and IT infrastructure investments alone do not automatically lead to higher growth rates. They need to be accompanied by policies that create a favourable environment for companies to grow and help workers to access new employment opportunities in all regions.

Sufficient investment in environmental protection, clean energy and the provision of associated services is essential to ensure long-term sustainability, competitiveness and quality of life. **Air and water pollution have been reduced, but still remain too high in many less developed regions.** The air pollution caused by fine particulate matter is high in many eastern regions. Within the EU it leads to an estimated 400,000 premature deaths a year. Ozone concentrations remain too high in many southern regions. Waste water treatment has improved throughout the EU, but more investments are still needed in many less developed and transition regions to protect and improve water quality (Chapter 3).

Skills endowments are unevenly distributed and concentrated in more developed regions and especially capital regions. Less developed regions lag far behind transition and more developed regions in terms of tertiary education, life-long learning and digital skills. Despite improvements at the EU level, gaps between regions have remained wide. When many workers lack a secondary education, closing the productivity gap becomes harder. Educational attainment and skills also display a large urban-rural divide. City residents are more likely to have a university degree, to participate in training and to have good digital skills than rural residents.

Entrepreneurship is critical for growth, but tends to be concentrated in larger cities. New firms are particularly important to diversify economic activities and create jobs in low growth regions. The Recommendation on Effective

Figure 2 Innovation performance of EU regions, 2021



AT, BE, FR: N1

Source: Regional Innovation Scoreboard 2021 (N1/N2), European Innovation Scoreboard 2021 (n0)

Active Support to Employment (EASE)⁴ following the COVID-19 crisis highlights how upskilling, reskilling and entrepreneurial support can promote inclusive job-to-job transitions taking into account the regional context.

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Innovation is the key determinant of long-term regional economic growth, **but the regional innovation divide in Europe has grown**. While certain Member States have made significant progress in catching up, many regions, including in more developed Member States, lag behind (Figure 2). This is due not only to a lack of investment in R&D, but also weaknesses in regional innovation ecosystems. Better innovation diffusion at national and regional level can help less developed and transition regions to catch up. Smart specialisation strategies, which were introduced in cohesion policy for 2014–2020, can help to address this divide, but will need to focus more on regional potential.

This innovation divide is exacerbated by **weak innovation and limited human capital spill-overs from international trade linkages and value chains** in many less developed and transition regions. In spite of often significant foreign direct investment (FDI) and exports, many regions fail to capture the benefits for local firms and workers. Poor take-up of digital technologies, managerial practices and industry 4.0 technologies in business and the public sector means that many regions are unprepared to take advantage of new opportunities and are vulnerable to potential reshoring as value chains evolve.

Governance in the EU is mostly improving, but gaps remain between and within Member States (Map 5⁵) (Chapter 7). Improving institutions can contribute to more effective investment, higher levels of innovation and entrepre-

4 Commission Recommendation on an effective active support to employment following the COVID-19 crisis (EASE) — C(2021) 1372, 4.3.2021.

5 The index is based on a regional survey that measures the quality of local police, education and health care and corruption, nepotism and discrimination in the provision of these services.

neurship, which are critical for long-term economic growth. All Member States have improved their business environment, but significant variations remain. The effectiveness of the justice system also differs between Member States and in a few Member States the rule of law has deteriorated over time.

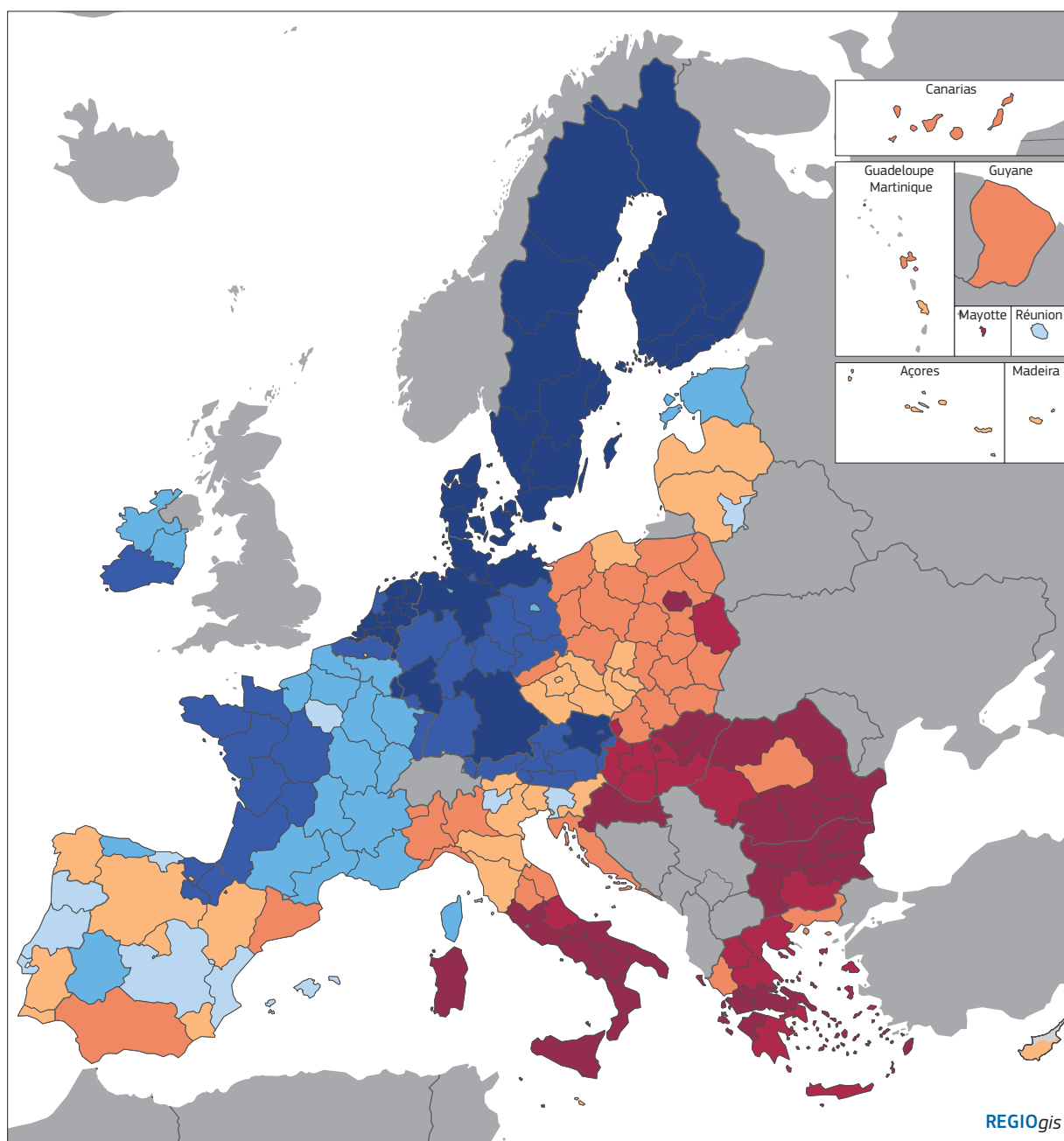
The role and capacity of sub-national governments in economic development remains uneven, although they carry out most public investment, notably in relation to the energy transition and adaptation to climate change (Chapter 8). Place-based policies are particularly important in countries with significant internal economic disparities. Local and regional autonomy has grown slowly in cohesion countries during the past decades, but remains lower than in the rest of the EU. Since managing cohesion policy programmes is challenging for regions with little autonomy and less experience in carrying out public investments, cohesion policy has helped strengthen administrative capacity and the implementation of regional development strategies, notably through territorial instruments and cooperation within functional areas.

4. New opportunities for growth, but risks of new disparities

In the next 30 years, the EU's growth will be driven by the green and digital transitions. These will bring new opportunities, but will require significant structural changes that are likely to create new regional disparities. If ignored, the demographic transition may undermine both cohesion and growth. The way these transitions are managed will determine whether all regions and citizens, wherever they live, will be able to benefit from these transitions. Without a clear territorial vision of how these processes will be managed and an ambitious implementation of the European Pillar of Social Rights, a growing number of people may feel that their voices are not heard and the impact on their communities are not considered, which may fuel discontent with democracy. To prepare Europe to deal with these challenges, it is essential to promote job-to-job transitions to green and digital sectors and bridging related skills shortages, as proposed in the EASE Recommendation.

The green transition and especially the goals of a carbon neutral and circular economy will transform our economies. It will boost employment in sectors such as renewable energy, recycling, design, renovation and ecosystem services, but may adversely affect sectors that need to reduce their emissions and the regions in which they are located (Maps 6 and 7). Natural capital in rural regions may boost jobs in managing ecosystem services and renewable energy. The social impact of the EU goal of being climate-neutral by 2050 will thus differ from one region to another and may be higher in those with high poverty rates. This will require the support of policy instruments such as the Just Transition Fund.

The digital transition is moving forward at different speeds across Europe. Its completion will require expanding very-high-speed internet access, boosting digital skills and investing in IT equipment. This will benefit rural areas be-



Map 5 European Quality of Government Index, 2021

Standard deviation, range from poor quality (negative) to high quality (positive)

< -1.2	0 – 0.3
-1.2 – -0.9	0.3 – 0.7
-0.9 – -0.5	0.7 – 1.1
-0.5 – 0	> 1.1

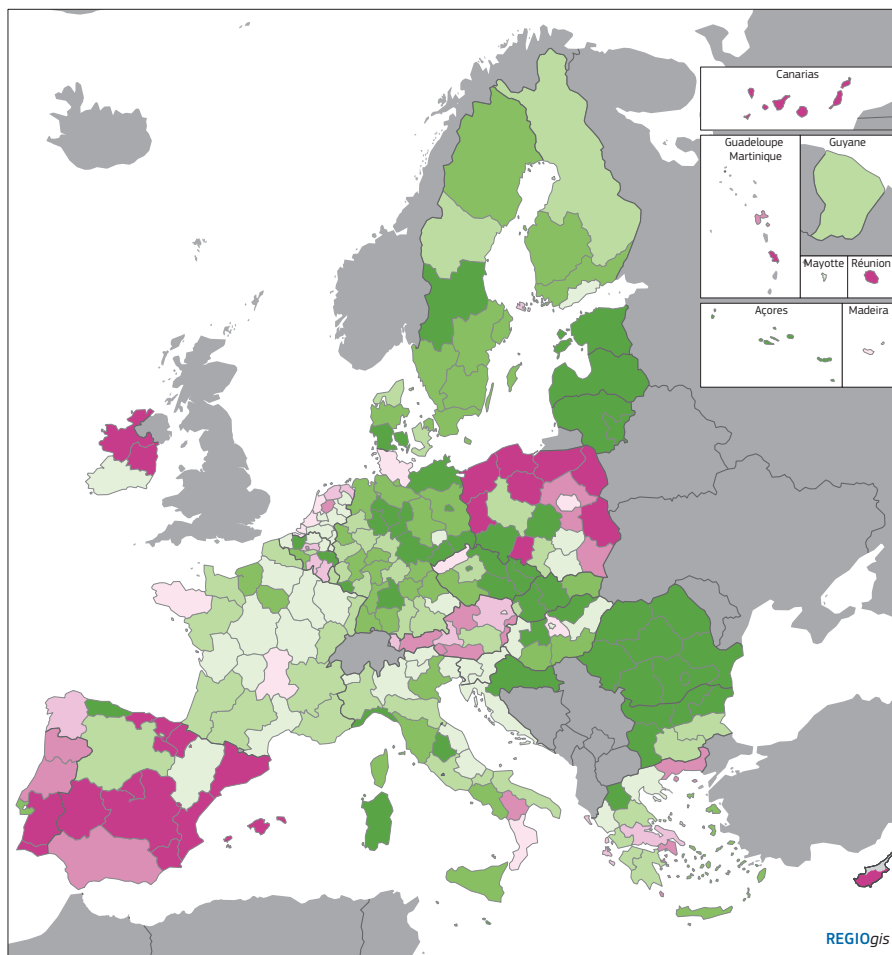
Scores are expressed in z-scores; the EU average is therefore equal to 0. Positive (negative) values reflect higher (lower) quality of government than the EU average.

All Member States at the NUTS 2 level.

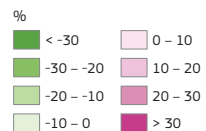
Source: The Quality of Government Institute, University of Gothenburg.

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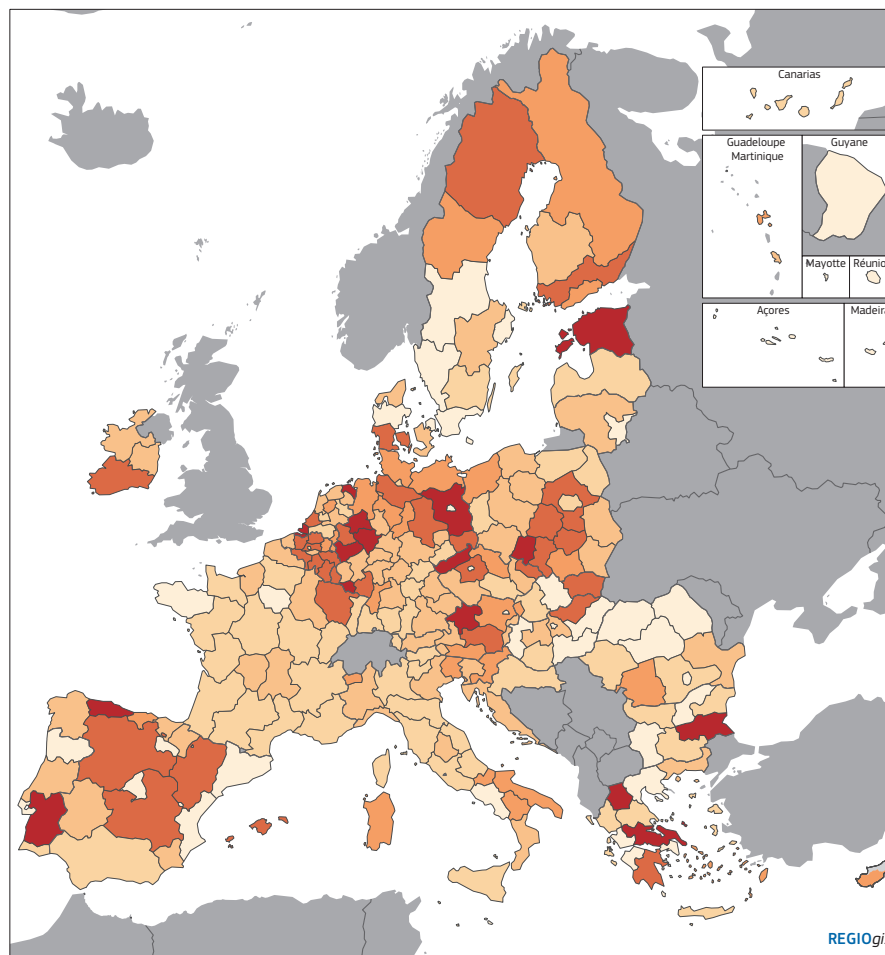
Map 6 Change in total CO₂ emissions from fossil fuels, 1990–2018



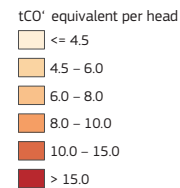
Source: JRC-EDGAR gridded CO₂ data.

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Map 7 CO₂ emissions from fossil fuels per head, 2018



Source: Crippa et al. (2019).

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cause their internet connections tend to be slow and their digital skills below average. Faster internet access will allow more people to work from home, improve access to online services, including training, health and e-commerce, and may encourage more services to move out of major urban centres. Less developed Member States will benefit more from this transition as their firms lag behind in their use of digital technologies, e-commerce and e-business practices.

Demographic change, notably ageing, will affect all regions, but rural regions first. Over the next decade, population aged 65 and above is projected to grow by more than 25% in one out of five regions. The working age population is projected to shrink by more than 10% in one out of four regions. The population below 20 is projected to shrink by more than 10% in one out of three regions. Overall, the share of population living in a shrinking region is projected to increase from 34% to 51% between 2020 and 2040 (Chapter 6). Rural regions are especially affected as they are already shrinking (Table 1). These trends may affect growth potential, skills development and access to services.

In recent years, some places in Europe experienced sluggish or declining economic opportunities, social mobility and quality of life. Such long-term economic decline has fed a growing discontent among citizens. Eurobarometers show that rural residents are more likely to think that their voice does not count and to distrust the EU. However, citizens have more confidence in regional and local governments than in national or EU-level authorities. To ad-

Table 1 Natural population change, net migration and total population change by urban-rural regional typology and by type of metro region, 2010–2020

<i>Average annual change per 1000 residents</i>	<i>Natural population change</i>	<i>Net migration</i>	<i>Total population change</i>	<i>Average annual change per 1000 residents</i>	<i>Natural population change</i>	<i>Net migration</i>	<i>Total population change</i>
North-western EU				North-western EU			
Urban	2.5	4.1	6.6	Capital metro	5.1	3.3	8.4
Intermediate	0.1	3.8	3.9	Other metro	0.5	4.5	5.0
Rural	-1.3	2.5	1.2	Non-metro	-0.8	2.7	1.8
Southern EU				Southern EU			
Urban	0.0	2.5	2.6	Capital metro	1.0	2.7	3.7
Intermediate	-1.7	1.9	0.2	Other metro	-0.5	2.5	2.0
Rural	-4.7	1.0	-3.7	Non-metro	-2.5	1.5	-1.0
Eastern EU				Eastern EU			
Urban	-0.5	2.7	2.2	Capital metro	-0.3	4.7	4.5
Intermediate	-1.9	-0.4	-2.3	Other metro	-1.0	0.2	-0.7
Rural	-1.9	-2.3	-4.2	Non-metro	-2.4	-2.3	-4.7
EU-27				EU-27			
Urban	1.2	3.3	4.5	Capital metro	2.7	3.5	6.2
Intermediate	-0.9	2.1	1.2	Other metro	0.0	3.2	3.2
Rural	-2.0	0.4	-1.6	Non-metro	-1.8	0.8	-1.0

Source: Eurostat [demo_r_gind], DG REGIO calculations.

dress these concerns, the green and digital transitions should be fair and just, managed in an inclusive manner and developed in partnerships with regional and local governments.

5. Challenges for cohesion policy

The Strategic Foresight Report⁶ highlights climate and other environmental challenges, digital hyperconnectivity and technological transformations, pressure on democracy, shifts in the global order and demography as major trends. Over the past two decades, cohesion policy has reduced economic, social and territorial disparities. Yet the major green, digital and demographic transitions may create new disparities, increase demands on national and local authorities, feed popular discontent and put pressure on our democracies. These challenges will also affect other developed countries. Policy exchanges with other interested countries could further enrich our policy debate.

How can cohesion policy, together with other EU policies, address these new challenges? Europe's citizens need to have confidence in their future, wherever they live. Cohesion policy can reassure Europeans in three ways: first, by offering them a positive economic perspective for their region; second, by addressing their concerns about their quality of life, employment opportunities and social inclusion, and third, by ensuring that the costs and benefits of meeting new challenges are shared fairly. This can be done by identifying the best responses to these new drivers of disparities, strengthening the role of regions and factoring in territorial impact of horizontal EU policies. In line with the goal of upward social convergence of the European Pillar of Social Rights, a broad policy debate under these headings, should be launched to feed into the development of the policy post 2027.

Addressing new drivers of disparities by:

- **Ensuring a fair transition.** Shifting to a climate neutral, circular economy, protecting our environment, restoring nature and reducing pollution will generate many benefits, but its costs should be distributed fairly. The Just Transition Mechanism could be extended to address the social costs of climate change mitigation and adaptation and the other environmental challenges, including through better anticipation of structural change, fighting against poverty, investing in skills and working closely with social partners and civil society actors at all territorial levels.
- **Strengthening resilience and responsiveness to asymmetric shocks.** The pandemic underscores the need for cohesion policy to be able to respond to unexpected shocks, notably linked to globalisation and technological change. Regions heavily dependent on a few narrow tradeable manu-

⁶ https://ec.europa.eu/info/strategy/strategic-planning/strategic-foresight/2021-strategic-foresight-report_en

facturing or service sectors are particularly vulnerable. Diversification of economic activity, notably in relation to the digital transition in combination with place-based policies, such as smart specialisation strategies, can help regions become more productive and less vulnerable to shocks.

- **Helping regions to respond to demographic change.** Firms will have to adapt to a shrinking labour force by recruiting more from groups with lower employment rates such as youth, women and non-EU migrants, and by investing more in innovation, labour saving and augmenting technologies, and in adult learning, in particular of older and low-skilled workers, which would help to reach the Porto Summit goals⁷. Primary and secondary schools will have to adjust to the lower number of pupils, while other public services and healthcare will need to serve a growing number of older residents.
- **Addressing pressure on democracy and its values.** Territorial instruments to engage local actors in cities, towns, rural areas, coastal areas and islands and the partnership principle in cohesion policy can help address pressure on democracy by increasing ownership of European policies. Territorial cooperation creates new communities of common interest and supports the visible delivery of public goods at different territorial levels.

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Strengthening the role of regions in building Europe's future by:

- **Creating new economic perspectives for less developed and peripheral regions.** Less developed regions and peripheral regions may need a new development paradigm. This should take account of emerging opportunities, international links, the territorial distribution of specific needs and endowments, and the provision of public goods such as strategic resources, biodiversity, renewables and amenities.
- **Embedding innovation in all regions.** Addressing weaknesses in the diffusion and adoption of new ideas and technologies and encouraging broad-based innovation will ensure that all regions can reap the benefit of an increasingly knowledge-intensive economy.
- **Strengthening cross-border and interregional cooperation.** The pandemic highlighted the difficulties of having to cross a national border for work, education, healthcare and other services. Road and rail transport performance are lower in border regions. Addressing these issues requires better governance of functional border areas, a stronger coordination of services, infrastructure and investments, and exchange of experience supported by pan-European research.

⁷ Including the goal that each year at least 60% of adults follow a training. <https://www.2021portugal.eu/media/icfksbgyp/porto-social-commitment.pdf>

- **Strengthening urban-rural links and the role of smaller cities and towns in supporting rural areas.** Large cities and their metropolitan regions often drive economic development. Certain smaller cities, towns and villages provide access to a wide range of public and private services. Their role as regional centres means they provide an anchor point for the wider region. Strengthening their role could boost economic development and improve quality of life. While urban areas have distinct challenges, further reinforcing links within functional areas could benefit both urban and rural residents. The long-term vision for rural areas⁸ provides a framework to address the challenges facing rural areas.
- **Addressing the needs of left behind places.** Some regions are confronted with the legacy of structural changes that have shrunk traditional sources of employment leading to skills mismatches and environmental degradation, creating development traps. Such areas are often located in middle-income countries or regions. They require targeted policies to integrate these communities into the broader regional and national economy, in line with the principles of the European Pillar of Social Rights.

Developing the tools to deliver cohesion towards 2050 by:

- **Increasing the effectiveness of place-based policies.** The need to complement nation-wide structural policies with place-based policies is increasingly recognised. Smart specialisation shows how to build on local assets to strengthen competitiveness and the innovation ecosystem. Locally targeted Territorial Just Transition Plans direct European support to the firms, workers and communities most affected by climate-driven structural change. This approach should be strengthened for other key policy objectives under cohesion policy, notably for the green and digital transitions. In addition, the integrated territorial development approach and the dedicated policy objective ‘Europe closer to citizens’ should be fully utilised.
- **Further streamlining the delivery of cohesion policy for beneficiaries.** Based on simplifications and flexibility already introduced in the 2021–2027 programming period, both under cohesion policy and other relevant investment-related funds, explore additional beneficiary-friendly improvements in the delivery of the policy. At the same time the key tenets of a place-based and participatory delivery, such as multi-level governance and partnership principle, should be reinforced.
- **Strengthening the role of cohesion policy in unlocking public and private investment in the green, digital and demographic transitions.** Cohesion policy can play a greater role in encouraging investment at regional, city and local levels, leveraging private sector resources and supporting the necessary institutional adaptations. This means ensuring that

⁸ COM(2021) 345 final, 30.6.2021.

public and private actors at the appropriate level have the necessary capacity to sustain such investment through tax revenues, user charges, fees and other sources of income in the longer-term. Such efforts should be linked to support from the Commission to strengthen the framework conditions for sustainable finance.

- **Increasing investments in people throughout their life.** Making Europe competitive and cohesive in the future will require investing more and better in people's education and training, including their skills, creativity and potential to create businesses and to innovate. This will be essential in order to successfully navigate the technological, green and digital transitions ahead of us. To strengthen its social cohesion and address the needs of left-behind groups, Europe needs to invest in targeted activation and social inclusion measures while continuing to support policy reforms aimed at an inclusive development.
- **Enhancing complementarities within other EU policies.** The current approach to synergies within the EU budget, which concentrates on inputs and financial flows, needs to be more focused on real policy complementarities. A specific regional focus needs to be given to new policy areas — such as strategic interdependencies, social climate policy, European Industrial Alliances — where cohesion policy could be particularly relevant. Territorial impact assessments and rural proofing should be strengthened, so that the needs and specificities of different EU territories are better taken into account. The principle of “do no harm to cohesion”, meaning no action should hamper the convergence process or contribute to regional disparities, should be further developed and integrated in policy making.
- The EU's Recovery and Resilience Facility will provide up to €724 billion to Member States. Of this funding, 37% has to support climate action and 20% the digital transition. Ensuring that these resources **contribute to cohesion** in a coordinated way will be a key challenge.

The 2022 Cohesion Forum will launch a debate among stakeholders on the lessons to be drawn from the recent crisis and a reflection on future challenges for cohesion policy, ensuring that no territory is left behind.



Chapter 1

The regional dimension of the COVID-19 pandemic

- The outbreak of the COVID-19 pandemic has led to at least 872 000 more deaths in the EU compared with previous years. Excess mortality was higher in less developed regions than in transition and more developed ones. Although the first wave primarily affected north-western regions and southern regions, the following waves led to the highest mortality in eastern regions.
- The restrictions put in place to contain the pandemic led to the deepest post-1945 recession. The impact was largest on southern regions, especially those dependent on tourism, where the reduction in hours worked and GDP were the most severe.
- The travel restrictions not only affected the tourism sector, but also border areas where people could no longer cross a national border to go to work or to access services.
- Thanks to job-retention schemes, the impact on employment and unemployment was much smaller compared with the reduction in hours worked and GDP. This allowed the EU to avoid a big spike in unemployment.
- The number of people usually working from home doubled. This increase was highest in many of the capital regions. These regions typically have a more developed service economy, host jobs that can more easily be done remotely, have a highly educated labour force, and have a high-quality IT infrastructure. All these factors facilitated the increase in working from home.

Chapter 1

The regional dimension of the COVID-19 pandemic

1. The health impact of the pandemic

Between March 2020 and July 2021 the COVID-19 pandemic led to excess mortality¹ in the EU of at least 872 000 deaths. In other words, compared with the average of the five previous years, the number of deaths since the start of the pandemic was 13% higher. This includes deaths directly resulting from COVID-19 and those caused indirectly because of the saturation of hospital capacity and lack of usual care. For example, half of the NUTS 3 regions for which data are available experienced at least one week with over double the usual mortality.

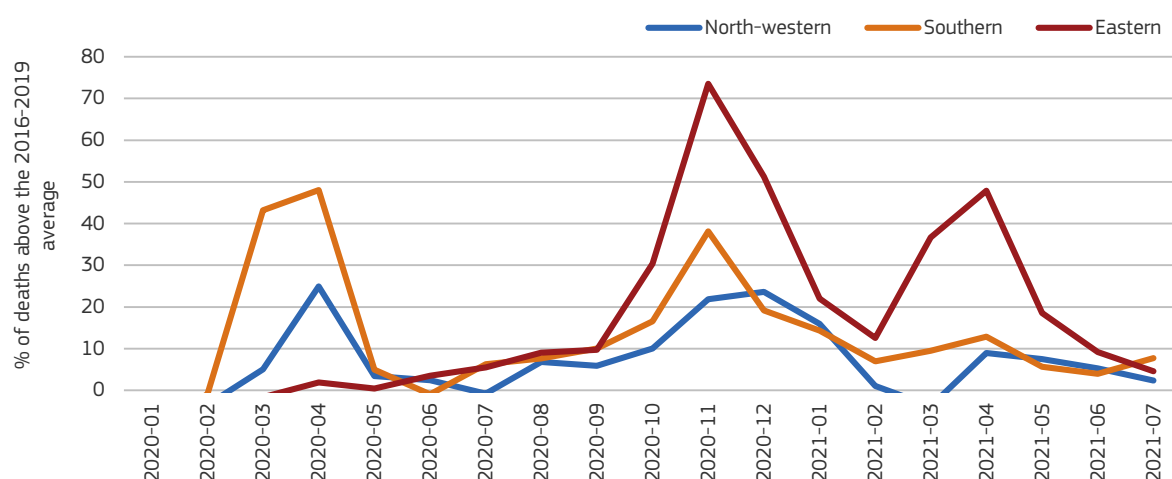
The excess mortality during the first wave mainly affected regions in Italy, Spain, France, Belgium and the Netherlands. During the second wave, excess mortality was predominantly highest in regions in eastern Europe — in Poland, Bulgaria, Slovenia,

Czechia, Romania and Hungary (Figure 1.1 and Map 1.1).

Regional excess mortality since the start of the pandemic shows the cumulative impact of the different waves (Map 1.1). It reveals hotspots in northern Italy and Madrid, which were heavily affected in the first wave, as well as in Poland, Czechia, Slovakia and Bulgaria, which were more affected in later waves. Overall², less developed regions had the highest excess mortality rate (17% higher) as compared with transition regions (11%) and more developed regions (12%).

The excess mortality rate during the first wave was highest in urban regions and peaked at 80% in April 2020, whereas it was lower than 40% in intermediate regions and only 20% in rural regions. During the second wave, rural regions had the highest excess rate, which peaked at 55%, whereas it was somewhat lower in towns and suburbs (48%) and cities (43%) (Figure 1.2).

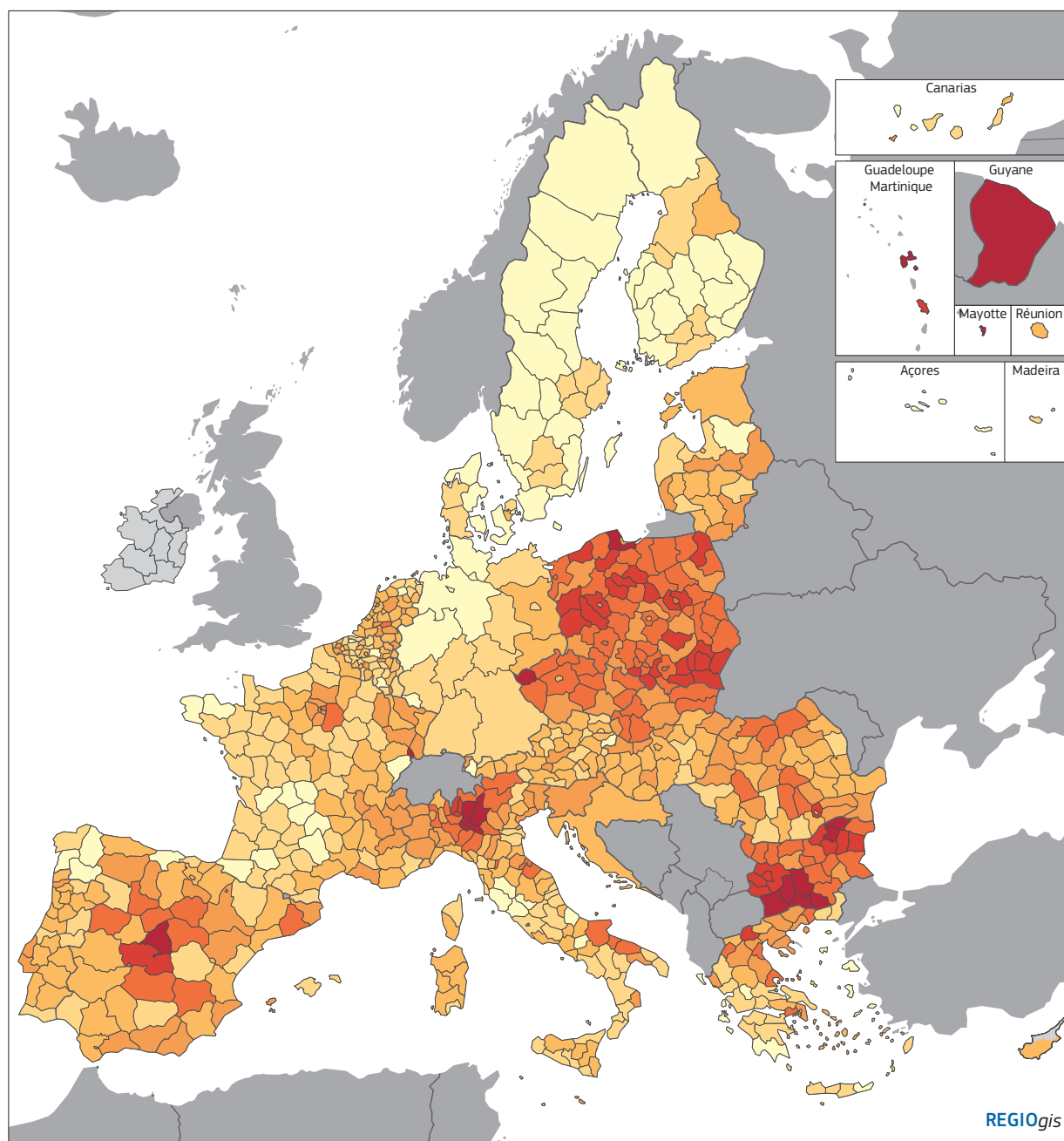
Figure 1.1 Excess mortality by geographic region in the EU, January 2020–July 2021



Source: Eurostat [demo_mexrt] and DG REGIO calculations.

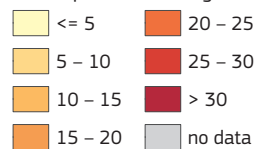
1 https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Excess_mortality_-_statistics

2 Data for Ireland, Slovenia and three German regions (DE9, DEB, DED) are missing at the regional level.



Map 1.1 Excess mortality since week 9 of 2020

% compared to average 2015–2019

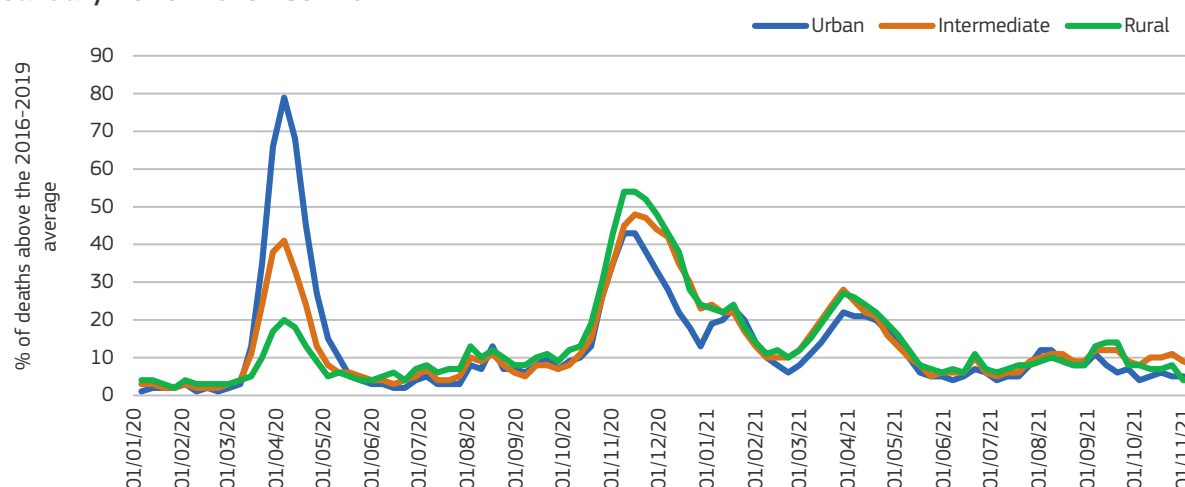


The most recent week for which data are available varies between week 38 of 2021 and week 47 of 2021.
Source: Eurostat (demo_r_mweek3) — data extracted on 02/12/2021.

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Figure 1.2 Excess mortality per week by urban-rural regional typology in the EU, January 2020–November 2021



Because of missing NUTS 3 data, DE, EE, IE, HR, MT and SI are not included.
Source: Eurostat [demo_r_mweek3] and JRC modelling.

Box 1.1 Cities and regions in the frontline of the fight against the pandemic

The annual *EU Regional and Local Barometer* report by the European Committee of the Regions highlights the current and future challenges for cities and regions in the EU. The latest edition¹ of this report covers a wide range of issues, including the potentially asymmetric financial and health impacts of the pandemic², and Member States' recovery and resilience plans.

The report highlights the concern that the pandemic may reduce sub-national finance through a combination of falling revenues and rising expenditures³. A first rough estimate indicates that this could lead to a funding gap of €180 billion for EU local and regional authorities, if left unaddressed. Fortunately, significant EU and national support to local and regional authorities is likely to have mitigated this effect, but it may still leave some regions and cities

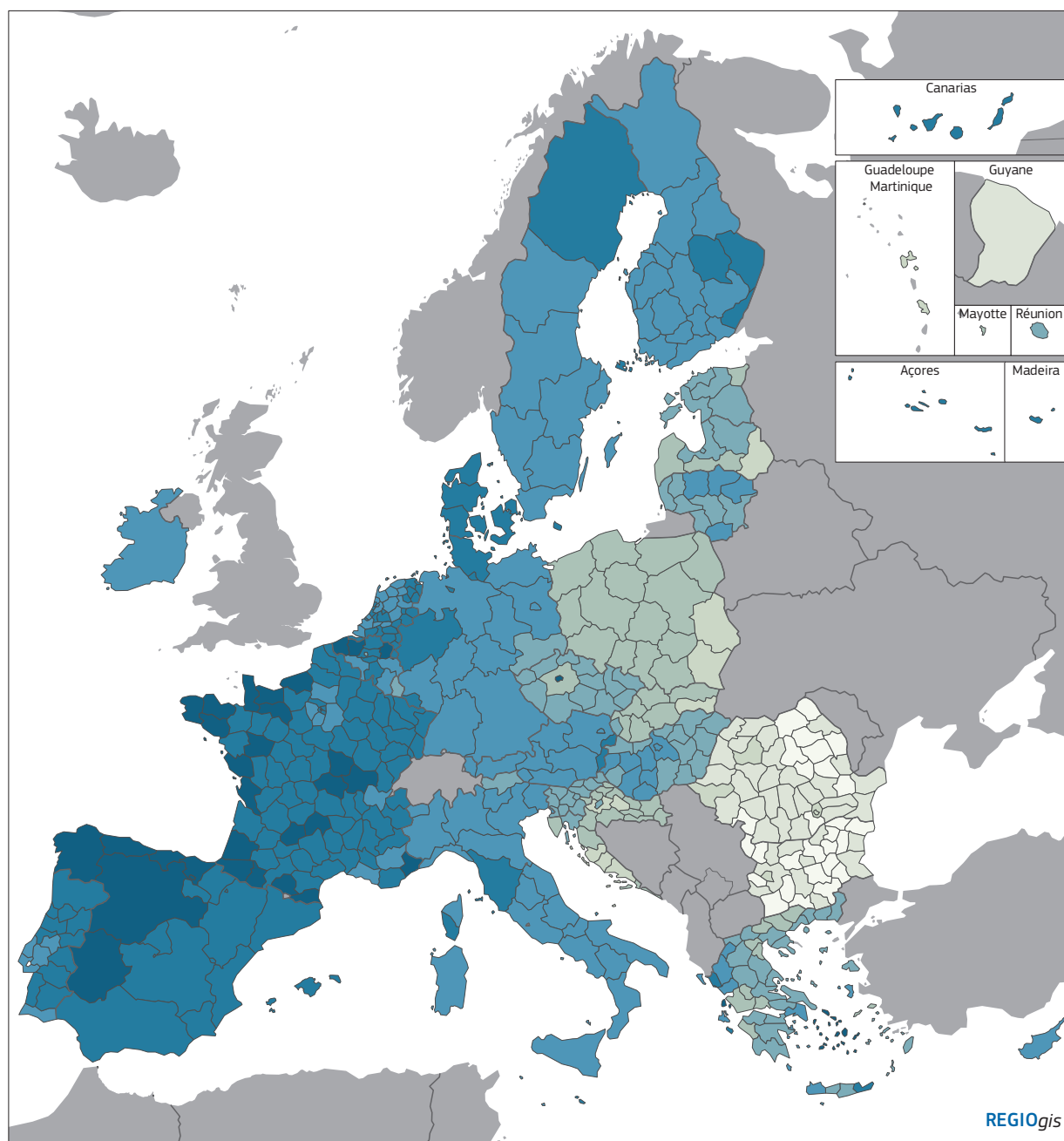
more exposed than others. The report also discusses the multiple causes of the asymmetric health impact of the pandemic, including differences in age structure, mobility, restrictions, underlying health issues, healthcare capacity and the uptake of the vaccines. The report concludes that only a place-sensitive policy response can factor in these big spatial differences.

The report argues that local and regional authorities should be closely involved in the preparation and implementation of the recovery and resilience plans. A first assessment indicates that local and regional authorities were not consistently consulted during the preparation of these plans, and that some of these consultations only had a limited impact on the final plans.

1 European Committee of the Regions (2021a).

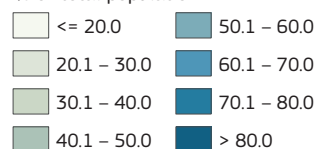
2 OECD (2020a).

3 European Committee of the Regions (2021b).



Map 1.2 People fully vaccinated against COVID-19, November 2021*

% of total population



* Data have been accessed early November 2021. Due to the variety in sources, the actual periods covered and the definitions used are not necessarily harmonised.

Source: DG REGIO calculations based on data from ECDC, national sources and Eurostat.

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Because of COVID-19, life expectancy in 2020 fell in almost all Member States. The biggest reductions were in Spain (-1.6 years) and Bulgaria (-1.5 years). In only two Member States, Denmark and Finland, did life expectancy increase, though only marginally³

Vaccines offer the best way out of the pandemic. In November 2021, approximately 70% of the total population had been fully vaccinated. Uptake of vaccinations, however, differed between and within Member States. Data reported in November indicated that in multiple regions in Romania and Bulgaria less than 20% of the population was fully vaccinated, while in many regions in Belgium, France and Spain more than 80% of the population was fully vaccinated (Map 1.2).

2. The economic impact of the pandemic

The depth of the economic recession during the pandemic was affected by three main factors. First, the length and the strictness of lockdown measures implemented by national, regional and local authorities to limit the spread of the virus. The places with stricter lockdown measures tended to experience a deeper recession⁴ Second, some types of economic activities were much more affected than others. Services (notably accommodation and those relating to culture, leisure, tourism) and activities generally requiring proximity particularly suffered from the containment measures. Member States and regions that were more dependent on these sectors saw a bigger drop in their economic activity. Third, the policy response of Member States, regions and local authorities varied in scope and intensity, in part reflecting the differential impact of the pandemic.

2.1 Pandemic restrictions

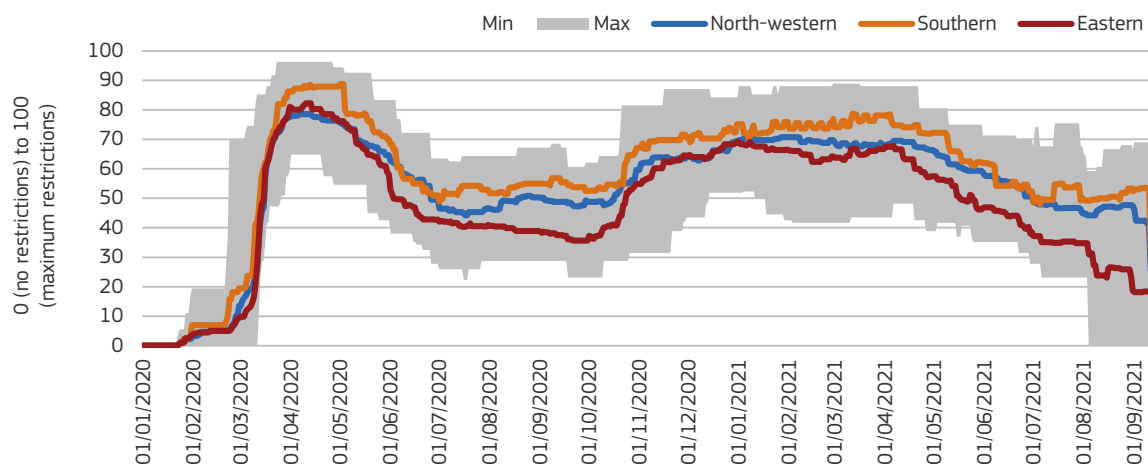
Restrictions imposed in response to the pandemic did not differ greatly between EU Member States (Figure 1.3). Restrictions peaked in April 2020, were relaxed in summer 2020, and were increased again during autumn and winter 2020–2021. Restrictions started to recede slowly in May 2021 and continued to do so up to September. On average, restrictions in eastern Member States were slightly less strict, while southern Member States had the tightest ones and north-western Member States were in between the two.

The difference between Member States, however, was greater as regards specific kinds of restriction. For example, some Member States had long periods during which people were required not to leave their homes except for a short period of daily exercise, grocery shopping or essential trips. On the other hand, some Member States imposed no stay at home requirements for almost the whole period, and others imposed only modest restrictions. Eastern Member States tended to have the fewest restrictions and the southern ones the most. During the first wave, north-western Member States imposed similar restrictions to the eastern ones, whereas during the second and third waves they had a stricter approach more similar to southern Member States (Figure 1.4).

The stay at home requirements and the internal movement restrictions meant that people had to rely more on local facilities and amenities. The requirement to work from home and the closure of schools meant that many people in cities were crowded into small living spaces during the day. This highlighted the benefit of nearby green areas that were open to the public. In most cities the majority of residents can reach at least one hectare of green urban area by walking a short distance. In a number of cities, however, less than half the people have easy access to green urban spaces. This is the case in all the cities in Cyprus, Malta and Romania, and some big cities in Italy, France and Portugal, where fewer than half the residents have a green urban area within 400 metres walking distance of their home (Map 1.3), The working

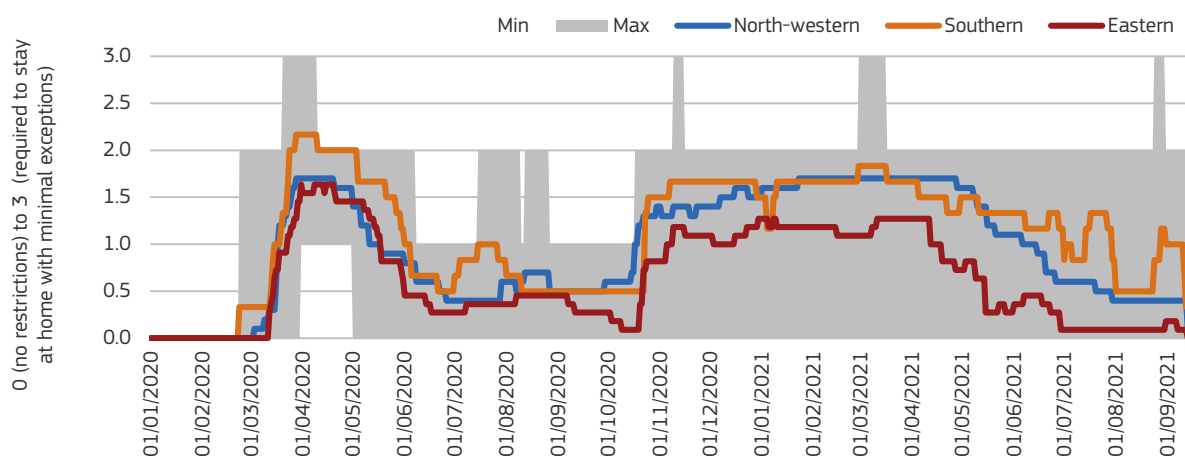
³ Data for Ireland are not yet available for 2020.

⁴ Sapir (2020).

Figure 1.3 Stringency index by geographic region in the EU, January 2020–September 2021

Unweighted averages of country indices.

Source: Oxford COVID-19 Government Response Tracker, Blavatnik School of Government, University of Oxford.

Figure 1.4 Stay at home requirement index by geographic region in the EU, January 2020–September 2021

Unweighted averages of country indices.

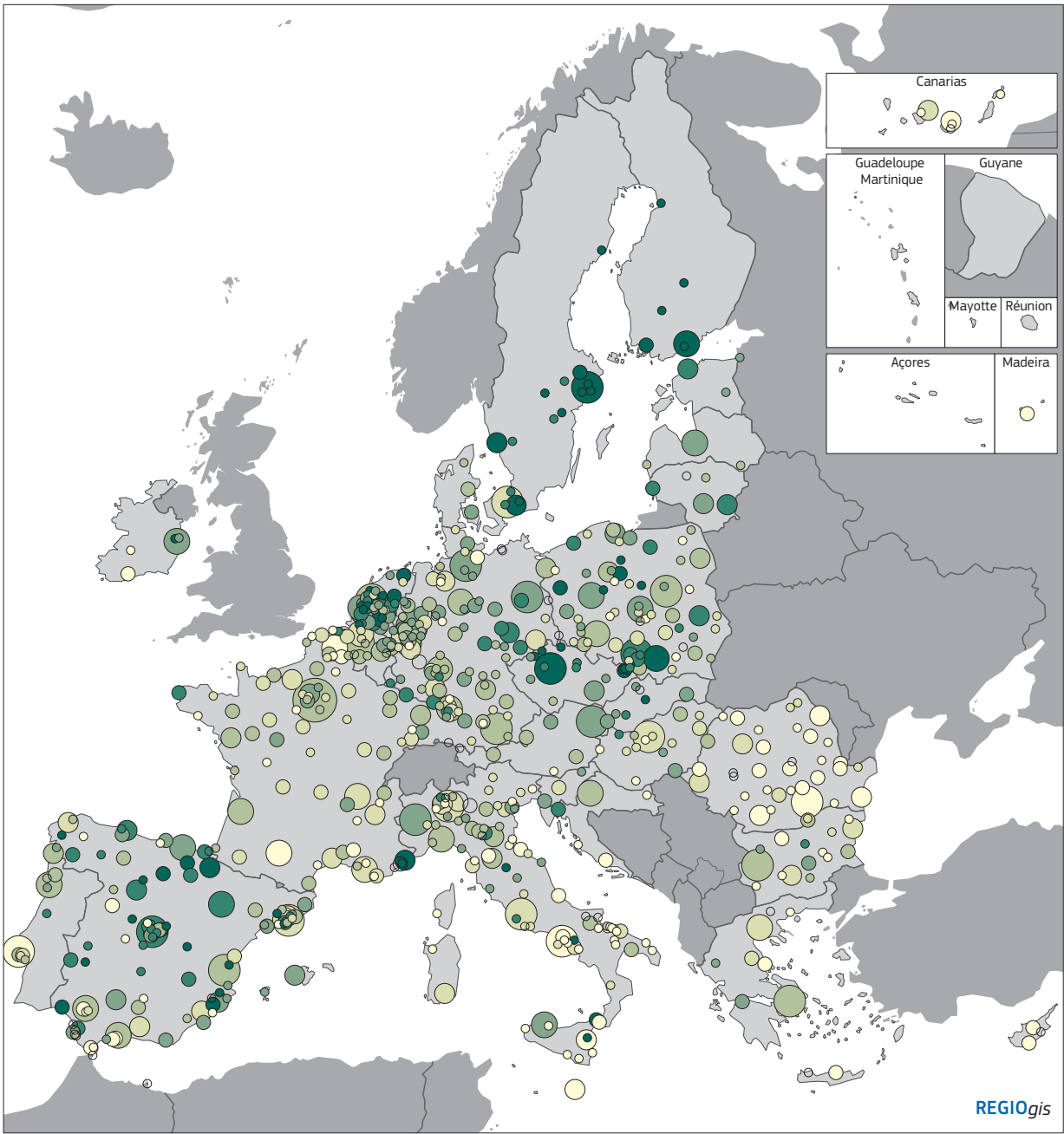
Source: Oxford COVID-19 Government Response Tracker, Blavatnik School of Government, University of Oxford.

from home requirements and remote lessons also posed challenges for households without fast internet connections, which is more often the case in rural areas.

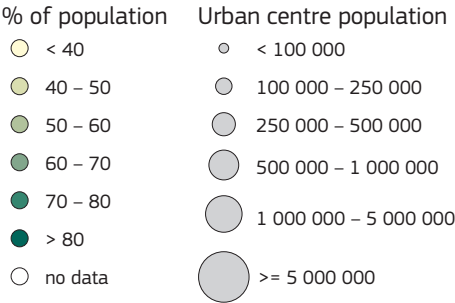
2.2 The biggest post-war recession

The COVID-19 pandemic triggered the deepest post-war recession in Europe. Real GDP growth in

the EU averaged 2.1% per year between 2014 and 2019. In 2020, real GDP fell by 6.0%. All economic sectors were affected by the consequences of containment measures, the disruption of global supply chains, the sharp reduction in demand for goods and services, and the fall in tourism, business travel and recreation. Across Europe and the rest of the world, the crisis led to unprecedented policy responses to mitigate the effects of the shock and strengthen the recovery.



Map 1.3 Population with access to green urban areas of at least one hectare within 400 metres of walking, 2018

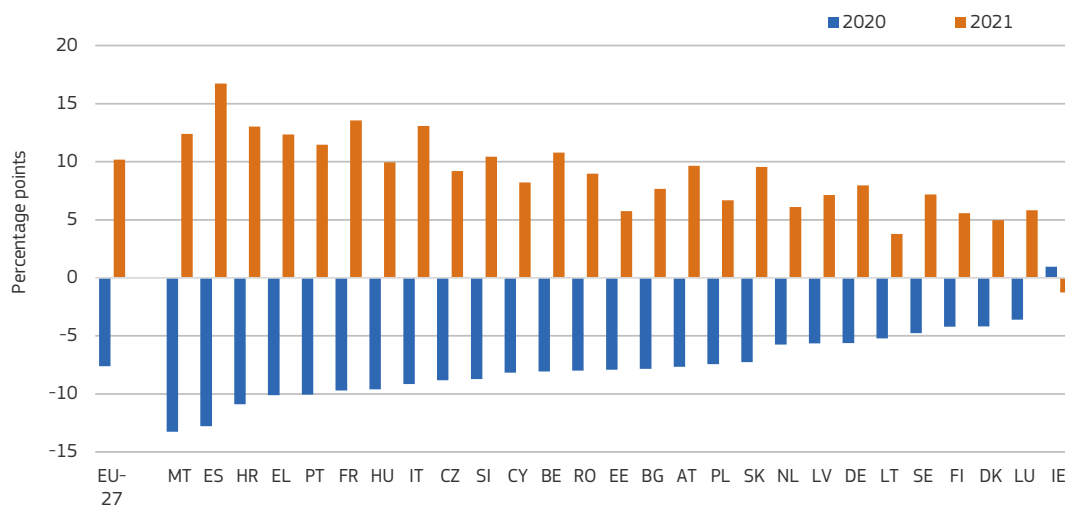


Access = being able to reach green urban areas (or forests) of at least 1 ha within 400 m walking.
Source: DG REGIO based on Copernicus Urban Atlas 2018 and TomTom data.

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Figure 1.5 Change in real GDP growth relative to the previous year, 2020 and 2021



Source: Eurostat [nama_10_gdp] and DG ECFIN Spring 2021 forecast.

The economic impact of the COVID-19 crisis has varied widely across Member States (Figure 1.5). Between 2019 and 2020, there was a reversal in real GDP growth of around 13 percentage points (pp) in Malta and Spain (GDP increasing by 5.5% in 2019 and falling by 7.8% in 2020 in the first case, and increasing by 2.0% before falling by 10.8% in the second case); whereas the reduction was less than 5 pp in Finland, Denmark and Luxembourg, and in Ireland there was even a small increase. Economic activity rebounded in 2021, in particular in the Member States where it had fallen the most⁵.

2.3 The tourist sector was most affected

Restrictions on movement within countries and limits on non-essential travel brought tourism to a standstill. The number of nights spent by tourists plummeted with the outbreak of the pandemic and the strict travel restrictions (Figure 1.6), generally falling by more than 90% compared with the same month in the previous year. The number of nights spent by domestic tourists recovered in the summer of 2020 but then fell again. Those spent by international tourists remained extremely low throughout 2020 and the first half of 2021. Overall

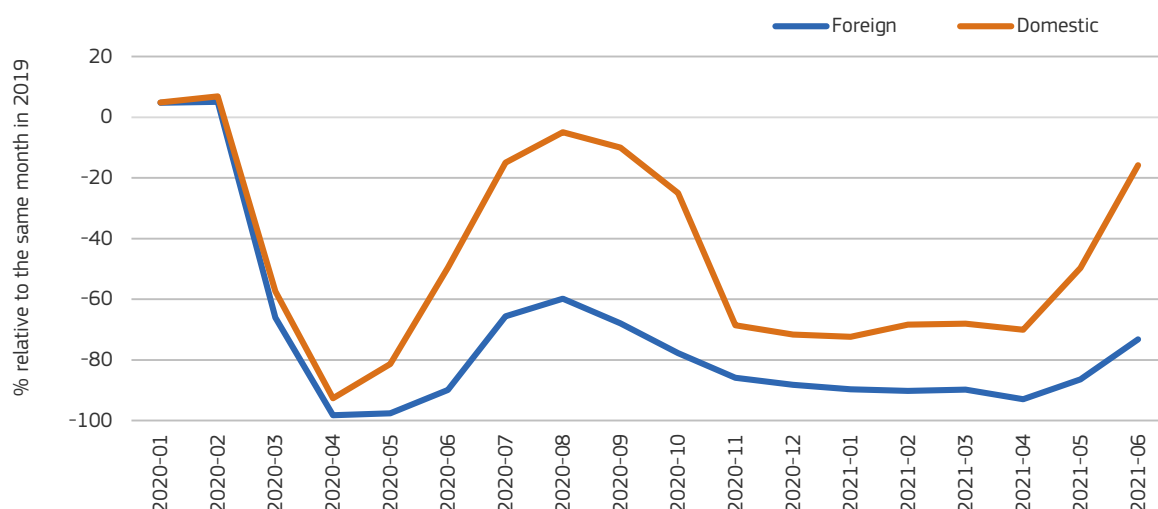
in 2020, the number of nights spent dropped by 54% in comparison with 2019, but those spent by international tourists fell by far more (70%) than those spent by domestic ones (39%).

These reductions were primarily caused by the restrictions on international travel that were introduced after the start of the pandemic. By the summer of 2020, all Member States had instituted some restrictions and these mostly stayed in place until summer 2021 (Figure 1.7). The restrictions on internal movement were part of the response to the first wave of the pandemic, but were loosened in summer 2020. During the second and third waves, internal restrictions remained much laxer. This allowed domestic tourism to recover somewhat during the summer of 2020, but the number of nights spent by tourists in the winter and spring of 2021 remained much lower than in 2019.

The restrictions on international travel also disproportionately affected border areas. People who usually crossed a national border for work, education, healthcare or other services were suddenly no longer able to do so. After the initial restrictions were put in place, although some borders made allowance for cross-border commuting, many did not, which underlines the need for a better governance system for functional border areas.

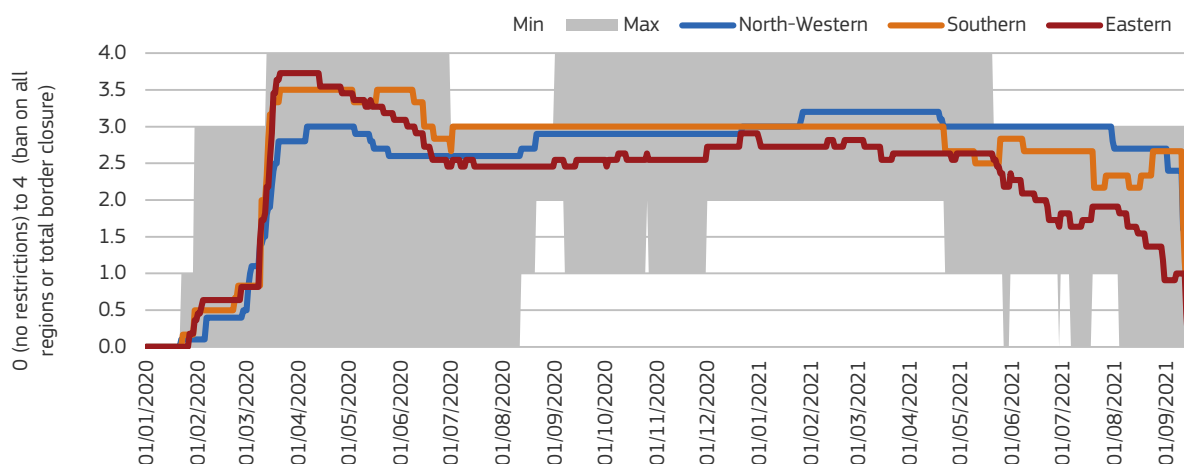
5 European Commission (2021a).

Figure 1.6 Change in the number of nights spent in tourist accommodation in the EU, January 2020–June 2021



Source: Eurostat [tour_occ_nim].

Figure 1.7 International travel restrictions index by geographic region in the EU, January 2020–September 2021



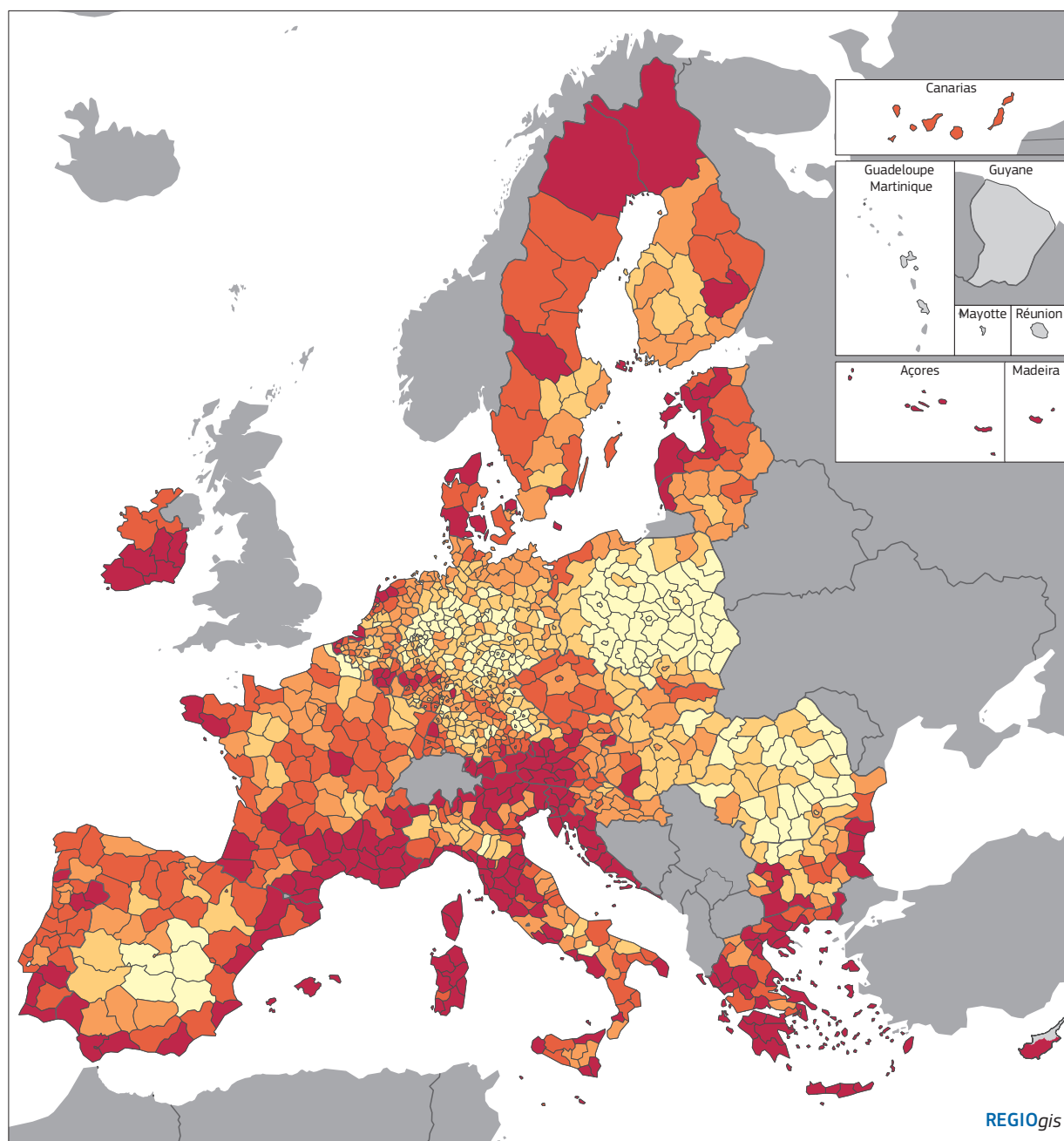
Unweighted averages of country indices.

Source: Oxford COVID-19 Government Response Tracker, Blavatnik School of Government, University of Oxford.

The Member States with the biggest reductions in the number of nights spent per resident were Cyprus, Malta, Croatia, Greece and Spain, with reductions of more than double the EU average (Figure 1.8). The reductions were much smaller in Member States with generally relatively few tourist nights per resident.

Some regions are particularly dependent on tourism, including many of the Mediterranean islands

and some coastal regions, the Alpine regions, the Black Sea coast, Algarve and the Canary Islands. Some capitals and large cities also attract many tourists, but they are less dependent on tourism than coastal or mountain destinations because of much stronger and more diversified economies. To identify the regions most dependent on tourism, three indicators can be combined: nights spent per



Map 1.4 Tourism vulnerability of NUTS 3 regions, 2018

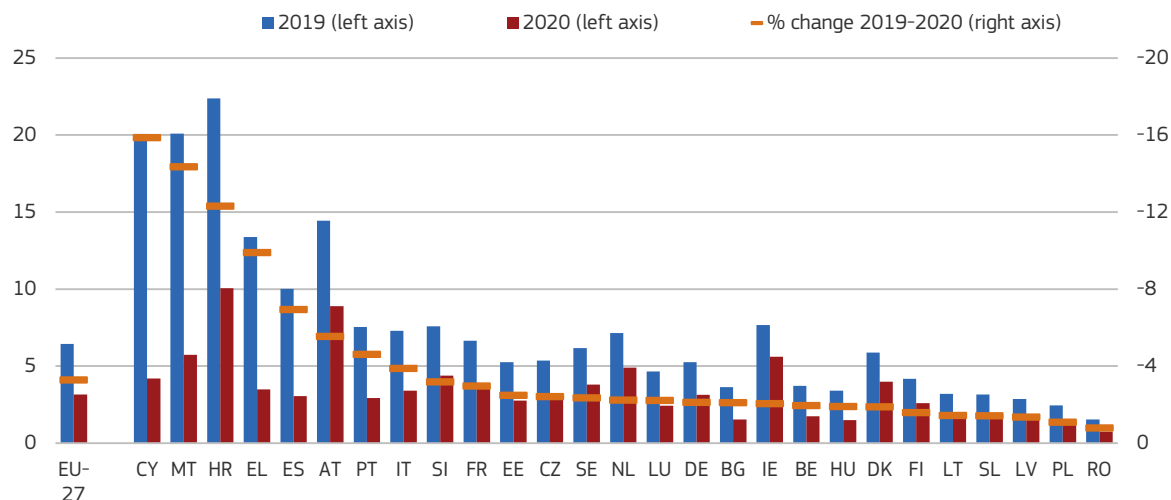
Vulnerability score

- 1 – 3
- 4 – 6
- 7 – 12
- 13 – 27
- 28 – 64
- no data

Source: JRC, F. Batista et al. (2018).

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Figure 1.8 Annual number of tourist nights per resident, 2019 and 2020

Source: Eurostat [tour_occ_nim], DG REGIO calculations.

resident, seasonality of nights spent and the share of foreign tourists⁶.

Regions scoring highly on all three indicators are likely to have been more affected by the reduction in travel and nights spent. For example, the Mediterranean coastal and island regions are likely to have been particularly heavily affected (Map 1.4).

Tourism is not the only sector to have suffered from the economic downturn triggered by the pandemic. Contact-intensive services⁷ were also severely affected. In the second quarter of 2020, activity in these sectors was 25% below pre-COVID-19 levels⁸. Other sectors were less affected but still experienced a sharp drop in activity, notably manufacturing (down by 19%) and construction (down by 15%). Services with significant scope for working remotely and with high-skilled workers, such as ICT, banking and finance, contracted much less (by less than 10%) and these activities tended to rebound more quickly.

2.4 The impact on the EU labour market was muted

The pandemic's impact on the labour market was much more limited due to the many job-retention schemes put in place shortly after the outbreak of the crisis. As a result, the economic slowdown did not lead to large increases in unemployment. The EU unemployment rate only went up by 0.5 pp between December 2019 and June 2021, from 6.6% to 7.1%, with a peak at 7.7% in September 2020. By contrast, in the United States, which did not rely as much on job-retention schemes, the unemployment rate doubled from 3% to 6% between December 2019 and June 2021, with a peak of 14% in April 2020 (Figure 1.9).

At the EU level, employment⁹ fell by 3 million, or 1.5%, between 2019 and 2020. The southern EU lost the most employment (2.7%). The reduction in the eastern EU was smaller (1.2%), while in the north-western EU it fell by the least (0.9%). Employment started to recover in the second quarter of 2021 but has not yet reached its 2019 level.

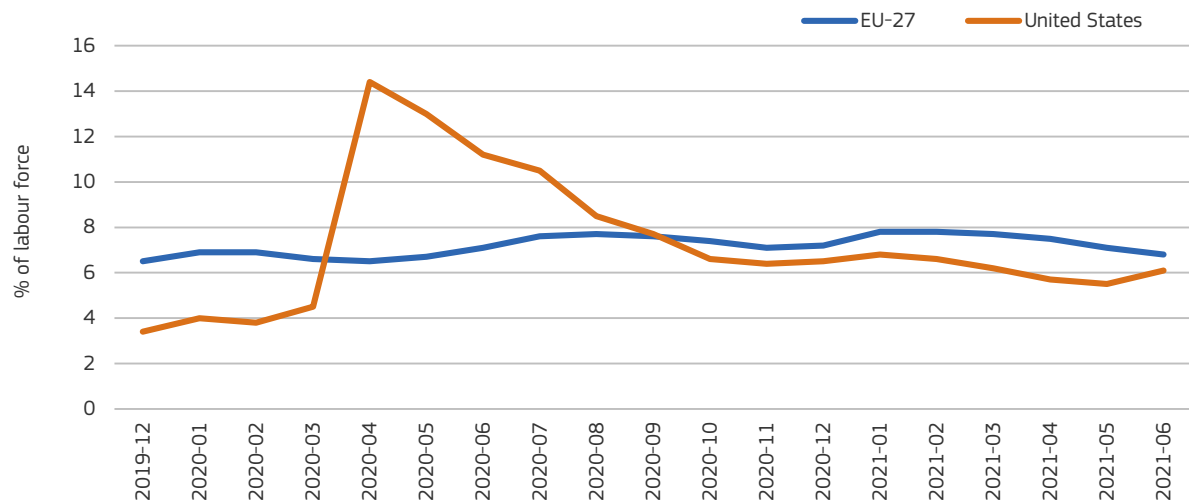
As reflected by the unemployment figures, the employment rate (of those aged 20–64) in the EU also fell by relatively little, by 0.7 pp between

⁶ Batista e Silva et al. (2018).

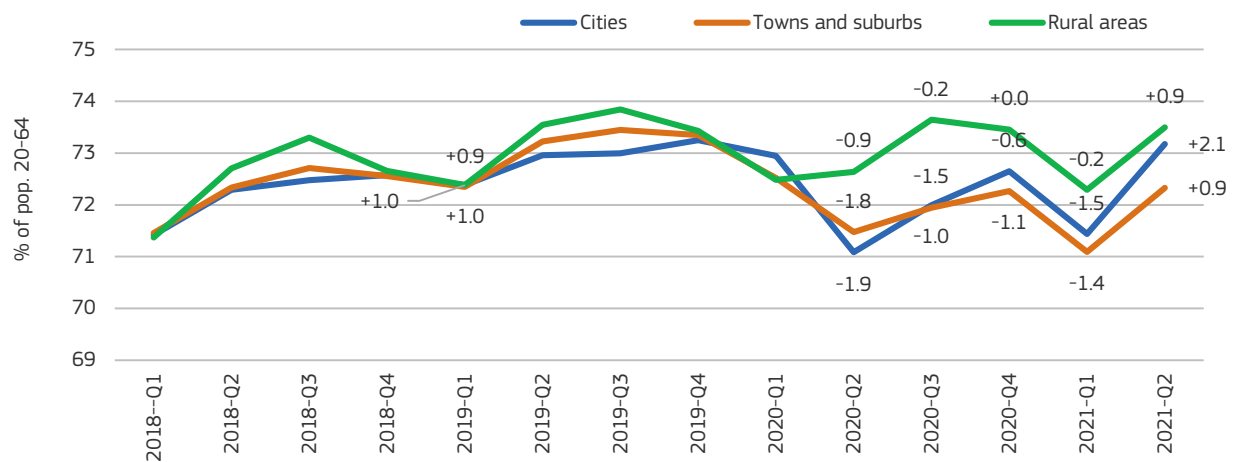
⁷ Trade, transport and accommodation, along with arts, entertainment and other service activities.

⁸ European Commission (2021b).

⁹ Source: Eurostat, National Accounts; domestic employment.

Figure 1.9 Unemployment rate in the EU and the United States, December 2019–June 2021

Source: Eurostat [une_rt_m].

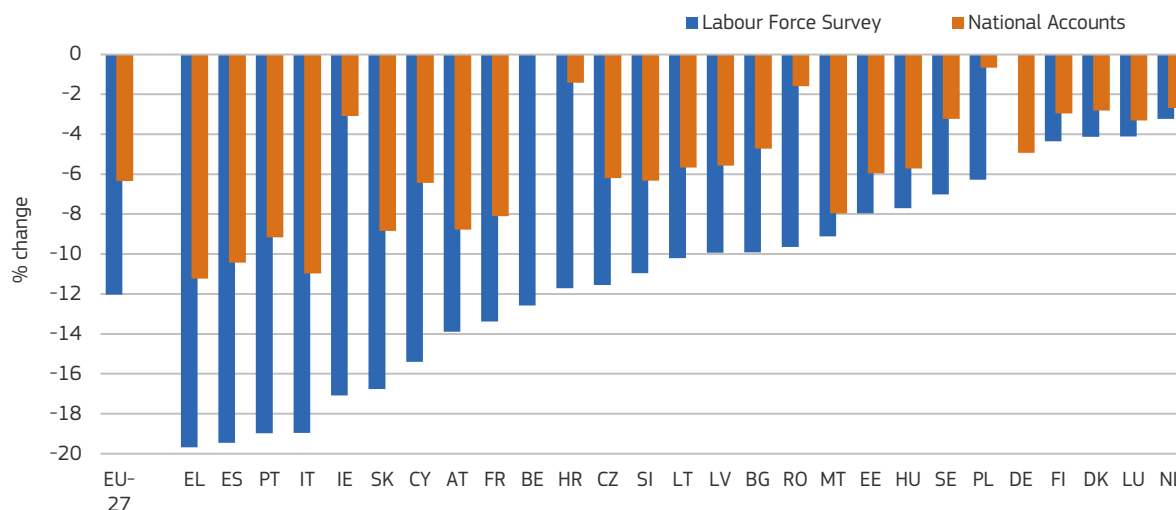
Figure 1.10 Quarterly employment rate by degree of urbanisation in the EU, 2018–2021

Labels show year-on-year change in pp.

Source: Eurostat, LFS (non-seasonally adjusted) [lfsq_pgauws].

2019 and 2020. The reduction was largest (1.4 pp) in the southern EU, followed by the north-western EU (0.6 pp) and the eastern EU (0.2 pp). Across the EU, the employment rate declined the most in towns and suburbs (1.1 pp) between 2019 and 2020, followed by cities (0.7 pp), and it barely fell at all in rural areas (by 0.3 pp). The quarterly figures show that the reduction was largest in cities

in the second quarter, but it was then overtaken by the fall in towns and suburbs (Figure 1.10).

Figure 1.11 Change in hours worked, 2019–2020

Source: Eurostat LFS [nama_10_a10_e] and ad hoc extraction.

2.5 Hours worked dropped substantially

Because of the pandemic, the number of hours worked declined significantly in the EU between 2019 and 2020, though the scale of the reduction depends on the source of the data used and the working time for which hours are measured. The Labour Force Survey (LFS), which measures weekly hours, indicates a reduction in the EU of 12%; whereas the national accounts data¹⁰, which measure annual hours, show a reduction of 6% (Figure 1.11). Both sources agree, however, that the biggest reductions occurred in Greece, Spain, Portugal and Italy. The LFS data also show that regions with large tourist economies were especially affected (Maps 1.4 and 1.5). More developed regions were slightly less affected (with a reduction of 10% based on LFS data) than transition and less developed regions (a fall of 13% in each).

The biggest reduction in hours worked over the period occurred in the accommodation and food services sector (by 52%) and the arts, entertainment and recreation sector (by 36%). The two broad occupational groups most affected were service and sales workers (which showed a fall of 27%) and elementary occupations (one of 23%).

2.6 A big shift to working from home

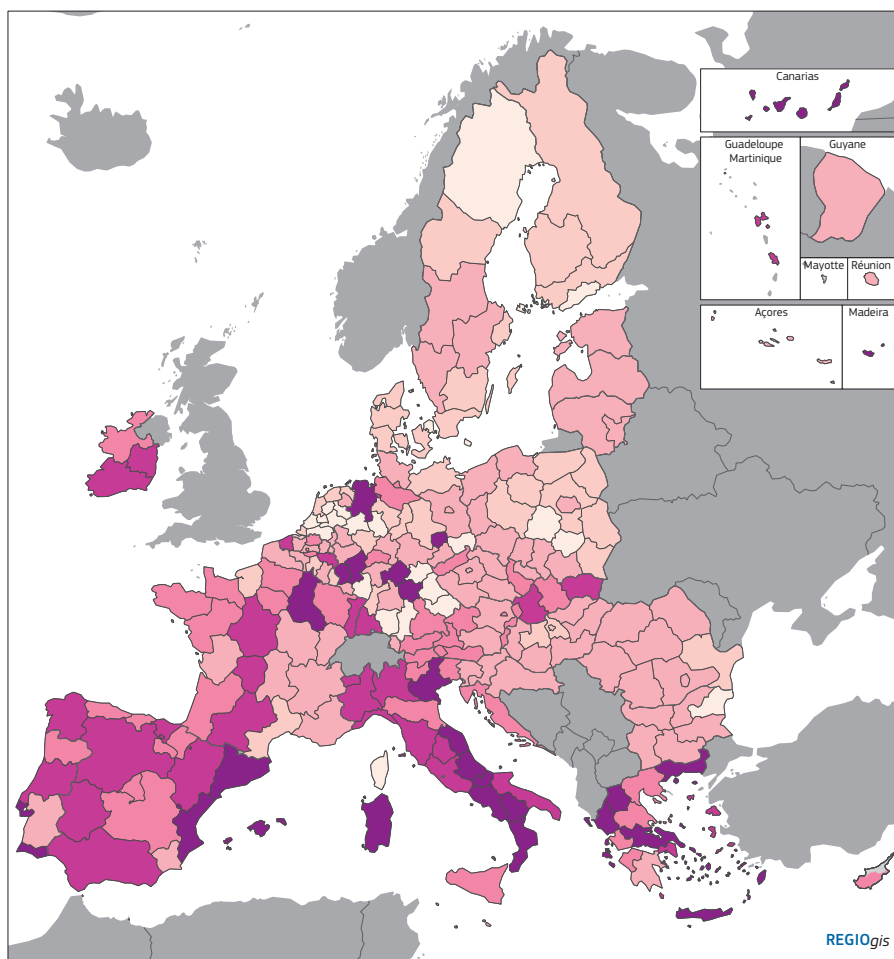
In 2019¹¹, 5.5% of the employed population in the EU usually worked from home. Because of the pandemic, and the requirement to work from home where possible, the proportion more than doubled to 12.4% in 2020. The capacity to work from home depends on the type of activity concerned. Some jobs can only be performed in person, as noted above, such as many jobs in health-care, manufacturing and agriculture. Many of the regions with large cities saw big increases in the proportion of people working from home, reflecting the large share of economic activities which can be performed remotely (usually by high-skilled workers). In particular, the increases were over 15 pp in the Brussels, Helsinki, Dublin, Paris, Cologne and Vienna regions (Map 1.6). The distribution of critical¹² and 'teleworkable' jobs strongly depends on the degree of urbanisation. Rural areas tend to have a larger share of 'non-teleworkable' jobs than cities, towns and suburbs¹³.

11 Eurostat, LFS ad hoc module 2019.

12 Critical jobs can be defined as all those occupations that need to be performed even during a pandemic in order to keep citizens healthy, safe and fed.

13 European Commission (2021c).

10 2020 data for 11 Member States are flagged as provisional.



Map 1.5 Change in actual hours worked per week, 2019–2020

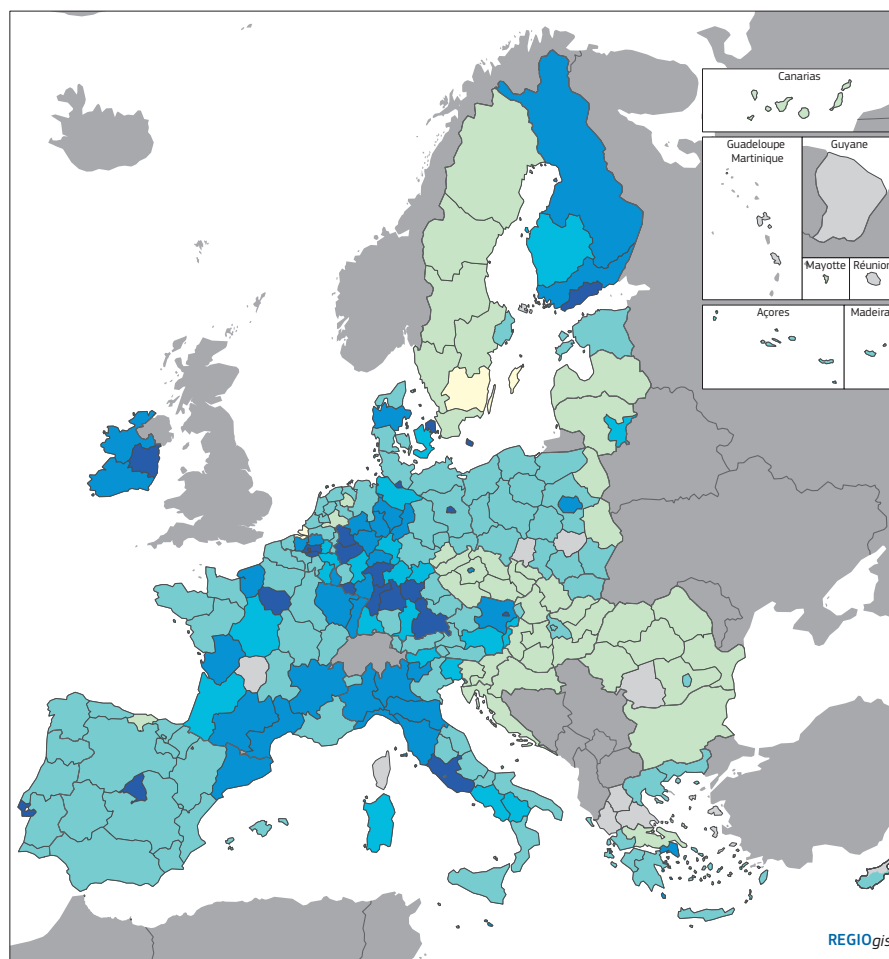
%

- < -20.0
- 20.0 – -17.0
- 17.0 – -13.3
- 13.3 – -6.5
- 6.5 – -3.0
- >= -3.0
- no data

EU-27 = -13.3
People aged 20–64 years.
Source: Eurostat Labour Force Survey.

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Map 1.6 Change in the share of people usually working from home, 2019–2020

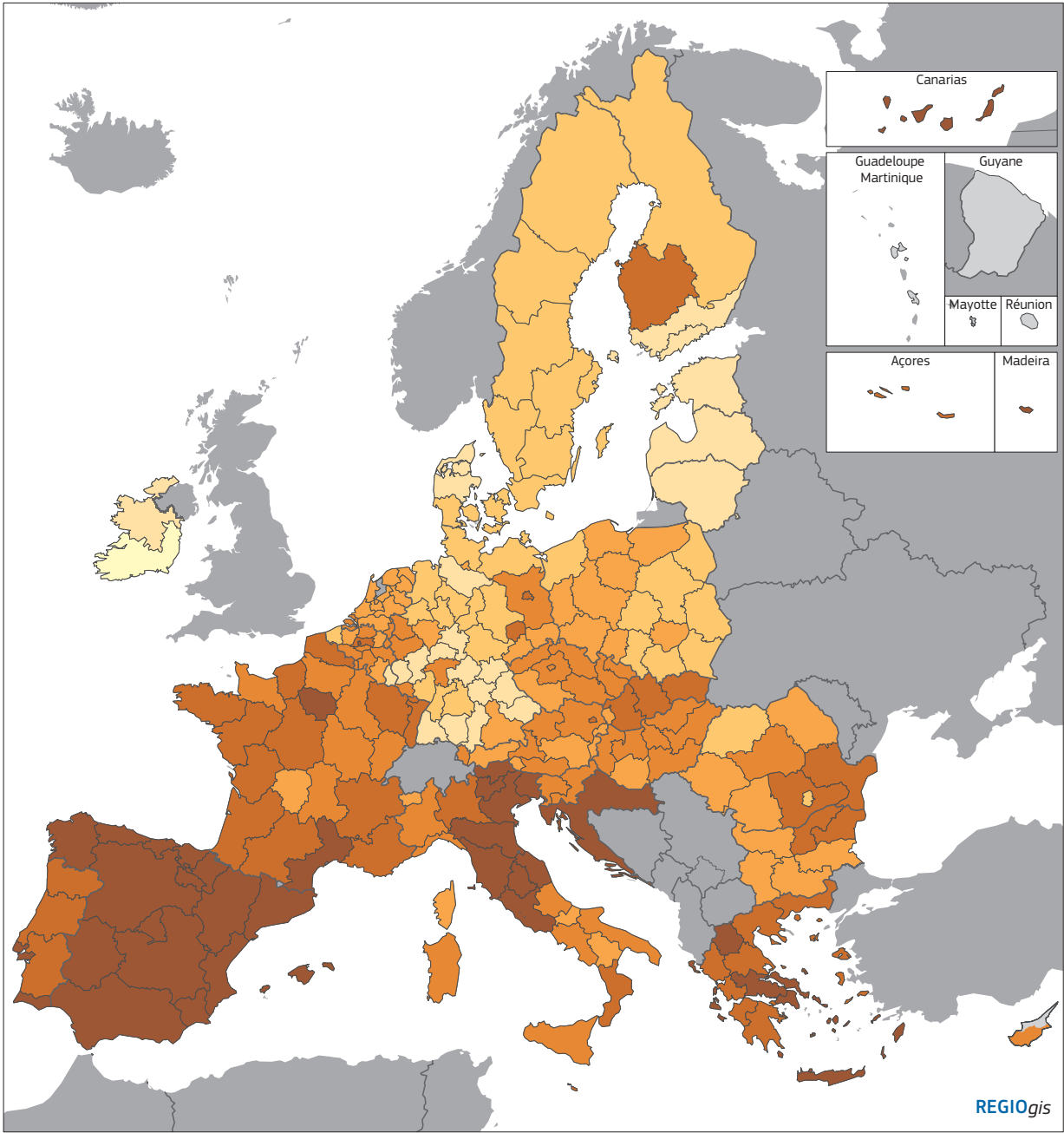
Percentage points

- < 0.0
- 0.0 – 2.5
- 2.5 – 6.9
- 6.9 – 8.0
- 8.0 – 12.0
- > 12.0
- no data

EU27 = 6.9
People in employment aged 20–64 years.
Source: Eurostat Labour Force Survey.

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Map 1.7 Simulated regional GDP impact of the crisis in 2020

- % change with respect to baseline
- | | |
|------------|---------|
| -13.8 – -8 | -4 – -3 |
| -8 – -6 | -3 – 0 |
| -6 – -5 | 0 – 16 |
| -5 – -4 | no data |

Source: JRC and RHOMOLO.

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2.7 Regional impact is likely to be highly variable

Regional GDP data for 2020 are not yet available, which limits the extent to which the impact of the COVID-19 pandemic on the economies of the EU regions can be assessed. A modelling exercise¹⁴ using national data and the RHOMOLO regional model, however, gives an indication of the potential regional impact. It shows a particularly severe impact on southern European regions and France, and less effect on Nordic and eastern regions (Map 1.7). The model suggests that in Spain, Italy, France and Greece, some regions are likely to experience a particularly sharp reduction in GDP. This is especially so for those with a large share of value-added in wholesale and retail trade, transport and accommodation (i.e. in the sectors where tourism is important), which is line with the actual changes in hours worked in 2020 indicated above.

14 Based on national figures for 2020 on employment, output in the various NACE sectors, exports and the rise in uncertainty assumed to be reflected in an increase in interest rates, Sakkas et al. (2021) used the RHOMOLO model to estimate the impact of the crisis on NUTS 2 regions. The magnitude of the shocks is calibrated so that the ranking of Member States in terms of output loss is, so far as possible, in line with the latest real GDP growth figures for 2020 published in European Commission (2021a).



Chapter 2

A smarter Europe

- After the financial and economic crisis years and their aftermath, the EU economy is growing again, with growth being particularly high in low-income Member States.
- After a long period of convergence, since the crisis in 2008 regional disparities in GDP per head have stopped shrinking. Regional disparities in employment and unemployment rates increased dramatically after the economic crisis. Since 2013, they have started shrinking again, but remain significantly greater than in 2007.
- GDP per head in the less developed regions is converging towards the EU average through both faster productivity growth and increased employment. This trend is primarily driven by developments in regions in the eastern Member States, whereas many less developed regions in the southern Member States are failing to catch up and are experiencing decline and divergence.
- The last two decades have witnessed a modernisation of the agricultural sector, evidenced by a long-term and ongoing increase in productivity and decrease in employment. These developments have been particularly pronounced in the less developed regions, which have experienced a sectoral restructuring of the economy.
- Transition regions, with a GDP per head between 75% and 100% of the EU average, seem stuck in a 'development trap'. Between 2001 and 2019, their growth in GDP per head was far below the EU average, and their productivity growth and employment creation were lower than in other regions. Their manufacturing sectors are smaller than those in regions with a lower or higher GDP per head and their innovation and education systems and institutional quality are not strong enough to be competitive at the global level.
- Innovation in the EU remains highly concentrated in capital and other metropolitan regions. In north-western EU countries, good regional connections, high digital readiness, a skilled labour force and an attractive business environment have enabled surrounding regions to benefit from proximity to highly innovative ones. In southern and eastern EU countries, the most innovative regions are less strong and, accordingly, neighbouring regions reap little benefit. These patterns could lead to a widening research and innovation divide between EU regions.

Chapter 2

A smarter Europe

Regional economic convergence¹ has stopped in the EU, and divergence could become a threat to economic progress² at a time when globalisation poses new challenges to economic cohesion. Although the evidence suggests that the EU economy as a whole has benefited, and continues to benefit, from globalisation, these benefits are not automatically and evenly transmitted to all regions.

This chapter examines recent trends in economic cohesion in regions and cities across the EU, as reflected in GDP per head and in the underlying developments in productivity and employment. It assesses the risk of regions falling into a 'development trap' and discusses the factors underlying regional competitiveness, including entrepreneurship, digitalisation and innovation. It also presents an aggregate indicator, the Regional Competitiveness Index (RCI), intended to summarise the different dimensions of competitiveness.

The main concern throughout the chapter is to highlight the performance of the less developed regions against the more developed ones, and of rural areas compared with cities.

1. Recent trends in convergence and divergence between EU Member States and regions

In 2019, over 1 in 4 people in the EU (29%) lived in a NUTS 2 region with GDP per head below 75% of the EU average in PPS terms³, most of them in

eastern Member States⁴, Greece, Portugal, Spain and southern Italy, as well as in the outermost regions⁵ (Map 2.1). In Bulgaria, GDP per head was below 50% of the EU average in all regions, except in Yugozapaden, the capital city region.

Over the 2001–2019 period, GDP per head in real terms increased in the vast majority of EU regions (Map 2.2), albeit at a modest rate in most cases. Growth was particularly high in the eastern Member States and Ireland. In most regions in Greece, however, GDP per head fell over this period — as it did in Italy, both in many of the more developed regions in the north and in many of the less developed ones in the south. At the same time, growth was very low in transition regions in the north of France.

Between 2001 and 2008, nearly all regions experienced growth in GDP per head (Map 2.3). Overall, growth was above average in both the less developed and the transition regions, with rates of over 5% per year in many of those in eastern Member States. This is in line with mainstream economic growth theories, which predict that growth will tend to be higher, the lower the initial level of GDP per head. Most of these regions are in less developed and moderately developed Member States⁶, where for the most part growth was faster than the EU average (Figure 2.1). In Romania and Bulgaria, where the growth rate was particularly high, the catching-up was not uniform across the country but was driven by the capital city region. Regions in southern Italy, however, did not follow this pattern of catching-up. They already experienced negative growth in the 2000s even though their GDP per head was well below the EU average.

1 In this report 'economic convergence' primarily refers to a decrease in regional disparities in GDP per capita. However, the chapter also discusses trends in disparities in related concepts such as productivity and employment.

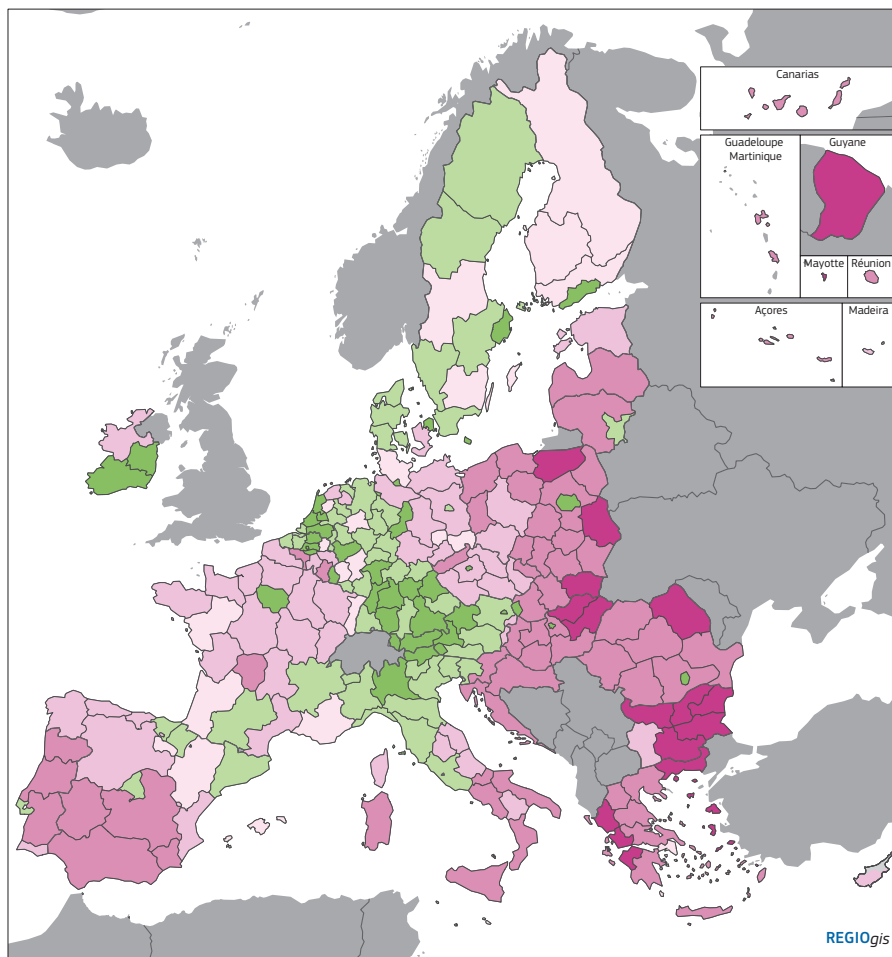
2 Iammarino et al. (2017).

3 GDP per head in PPS (purchasing power standards) terms is the total value of goods and services produced per inhabitant adjusted for differences in price levels.

4 Eastern Member States are those in central and eastern Europe that have joined the EU since 2004.

5 The EU includes nine outermost regions: Guadeloupe, La Réunion, Mayotte, Guyane, Martinique, Saint-Martin (France), Madeira and Açores (Portugal) and Canarias (Spain).

6 See the Lexicon section for the list of less developed and moderately developed Member States.



Map 2.1 GDP per head (PPS), 2019

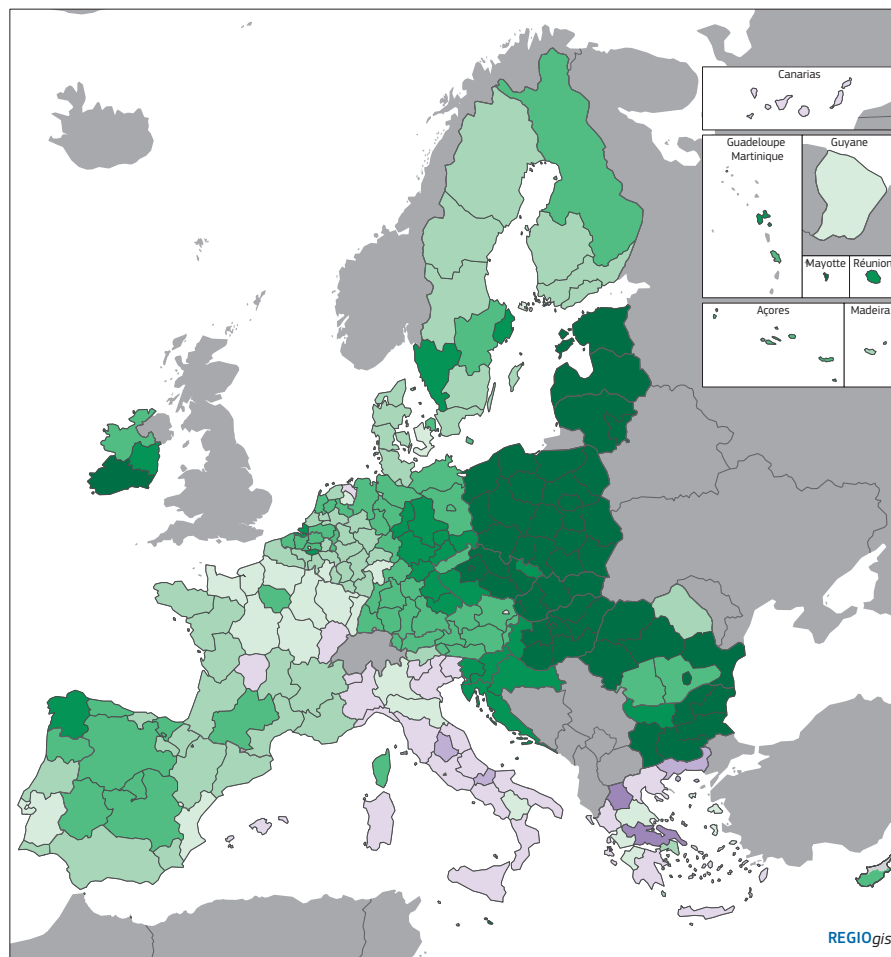
Index, EU-27 = 100

- < 50
- 50 – 75
- 75 – 90
- 90 – 100
- 100 – 125
- >= 125

Source: Eurostat (nama_10r_2gdp).

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Map 2.2 Growth of GDP per head, 2001–2019

Average percentage change on the preceding year

- < -2.5
- 2.5 – -1.5
- 1.5 – -1.0
- 1.0 – -0.5
- 0.5 – 0.0
- 0.0 – 0.5
- 0.5 – 1.0
- 1.0 – 1.5
- 1.5 – 2.5
- > 2.5

EU-27 = 1.2
Source: DG REGIO based on JRC and Eurostat data.

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Map 2.3 Growth of GDP per head between 2001 and 2019, main sub-periods

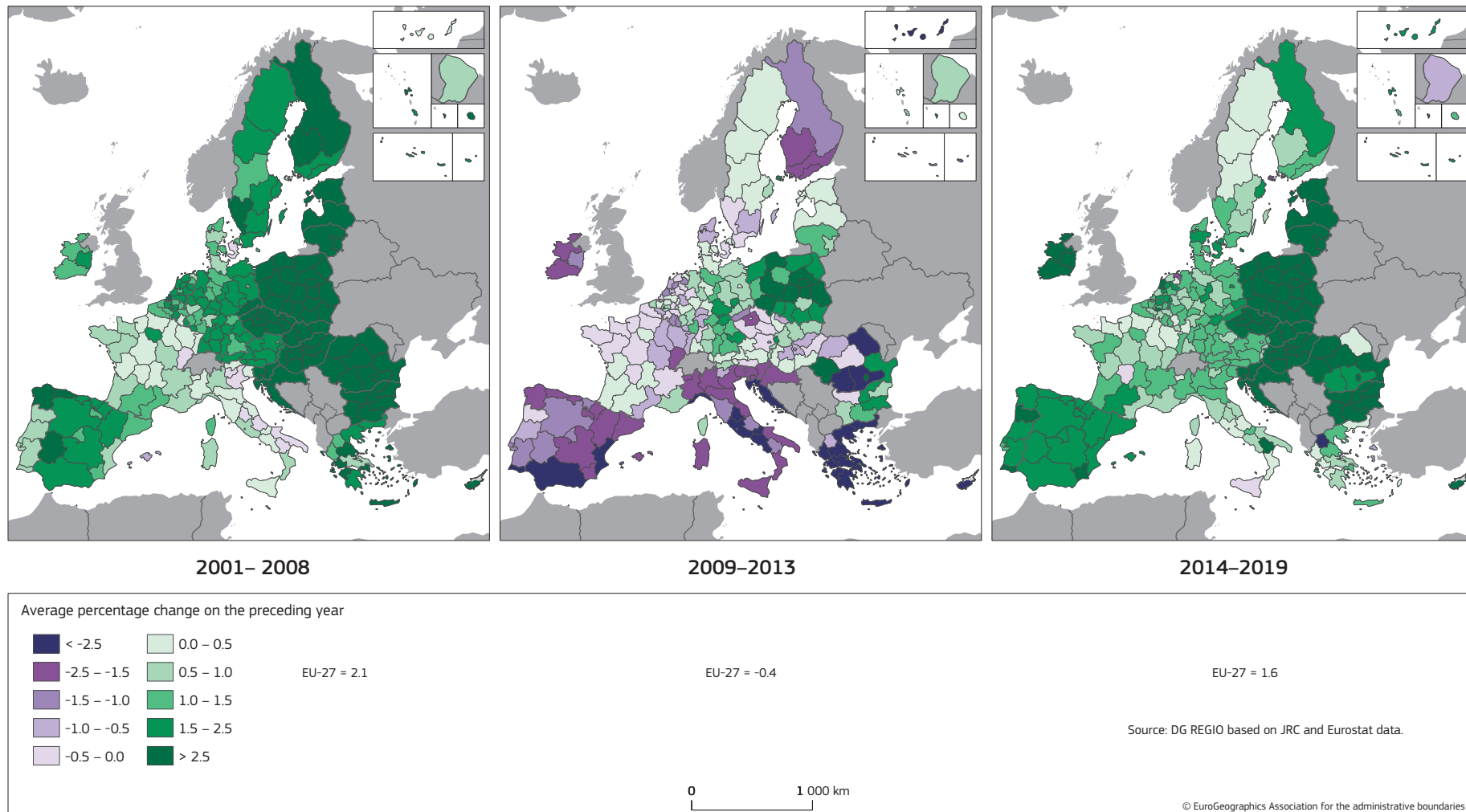
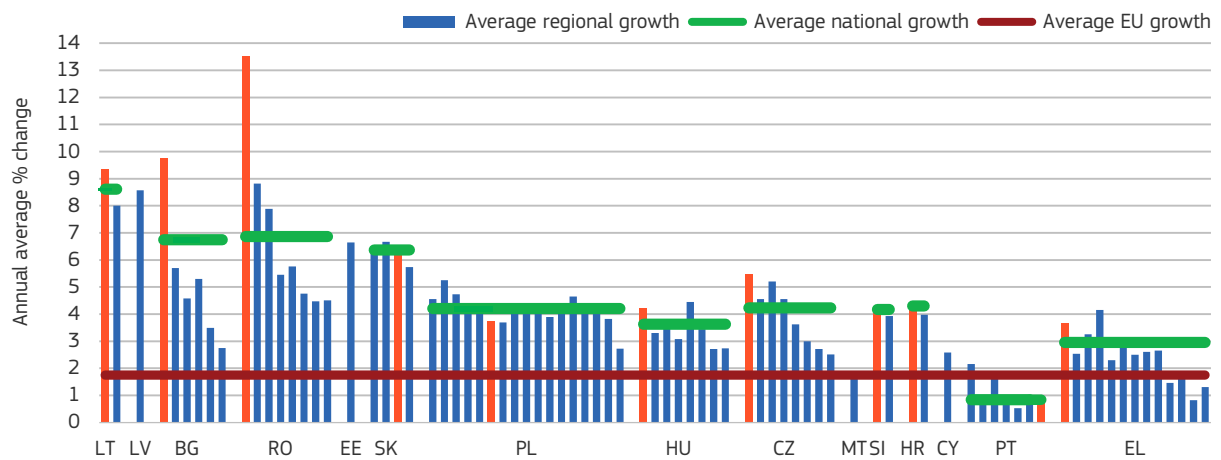


Figure 2.1 Growth rates of GDP per head in regions in less developed and moderately developed Member States, 2001–2008



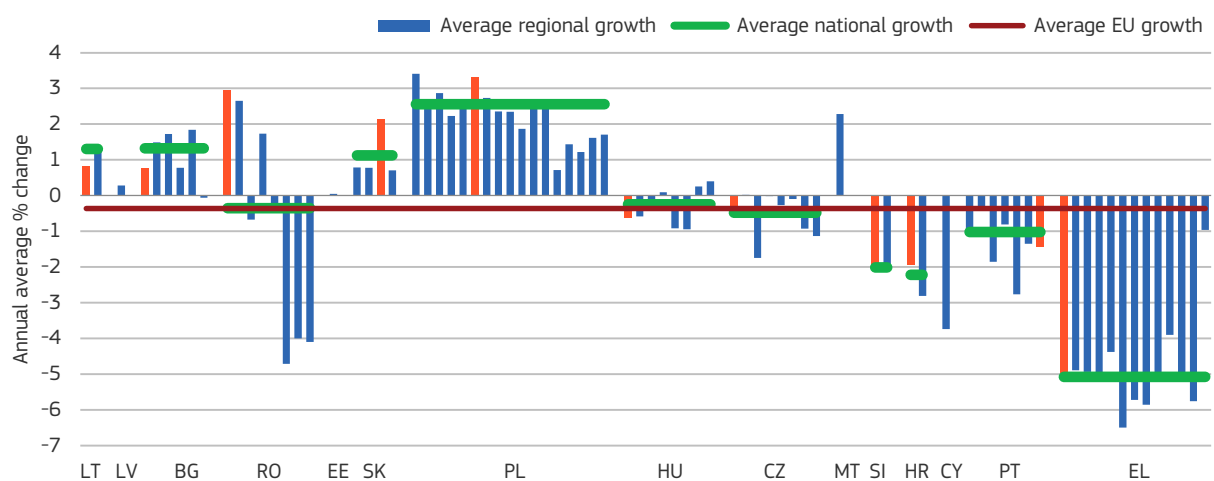
Regions are ranked by the growth rates of GDP per head over the period 2001–2019. Capital city regions are indicated in red.
Source: ARDECO and Eurostat [nama_10r_2gdp], DG REGIO calculations.

The global financial crisis of 2007–2008 led to GDP per head in the EU declining between 2009 and 2013. Around 60% of the EU population lived in regions with a declining GDP per head (Map 2.3, Figure 2.2). The regions hit hardest were mainly in the southern EU countries, though also in Romania, Ireland and Finland. In most Greek regions, the reduction in GDP per head averaged over 3% per year. The crisis led to many of the less developed and transition regions growing more slowly (or

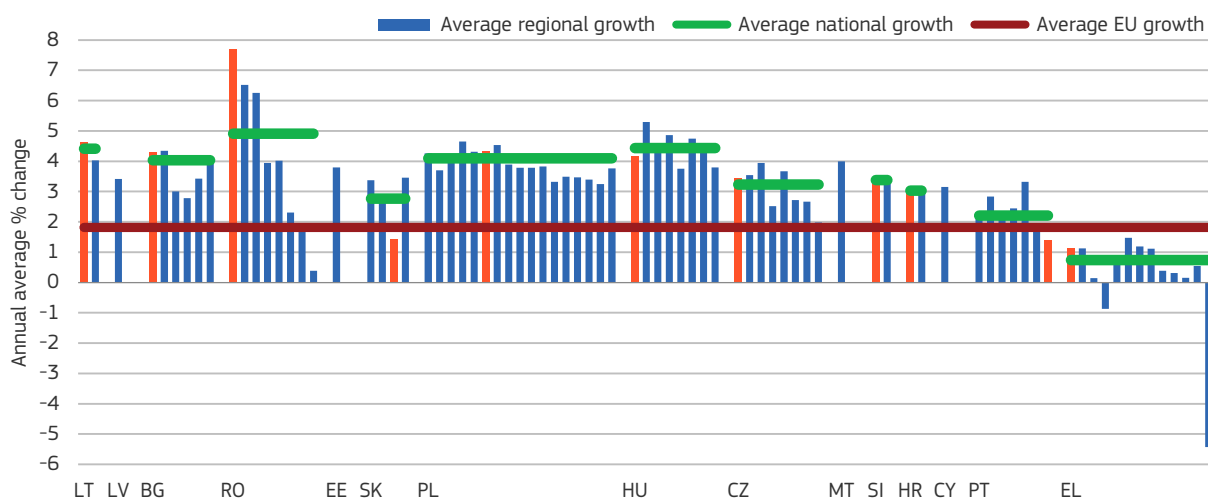
shrinking more quickly) than the EU average during this period, so reversing the tendency towards convergence. The process of convergence was, therefore, brought to an end and disparities began to widen again. Most regions in Poland, and some in Bulgaria and Romania, were notable exceptions.

The 2014–2019 period shows a clear recovery from the Great Recession (Map 2.3, Figure 2.3). Almost all regions experienced growth in GDP per

Figure 2.2 Growth rates of GDP per head in regions in less developed and moderately developed Member States, 2009–2013



Regions are ranked by the growth rates of GDP per head over the period 2001–2019. Capital city regions are indicated in red.
Source: ARDECO and Eurostat, DG REGIO calculations.

Figure 2.3 Growth rates of GDP per head in regions in less developed and moderately developed Member States, 2014-2019

Regions are ranked by the growth rates of GDP per head over the period 2001-2019. Capital city regions are indicated in red.
Source: ARDECO and Eurostat, DG REGIO calculations.

head, though at a lower rate than in the pre-crisis period. High growth rates were restored in most eastern regions, so contributing again to convergence. By contrast, growth in many north-western regions remained below pre-crisis rates, Ireland being the main exception. In many regions in the hard-hit southern Member States, especially in Portugal and Spain, growth rates recovered; but in Greece, and many regions in Italy, growth remained low.

Overall, in 2019 more than a quarter of the EU population lived in a region where by then real GDP had still not returned to pre-crisis levels. This includes the entire population of Greece and Cyprus, 80% of Italians and a third of Spaniards, but also 75% of the Finnish population and over a third of Austrians. In most of the eastern Member States, GDP per head had returned to pre-crisis levels in all or nearly all regions. However, in Romania and Croatia 40% and 25% of the population, respectively, live in regions where this is not the case.

Prior to the 2007–2008 crisis, disparities in GDP per head in the EU were shrinking⁷, mainly because of regions with the lowest levels growing faster than average (Figure 2.4). However, in the years

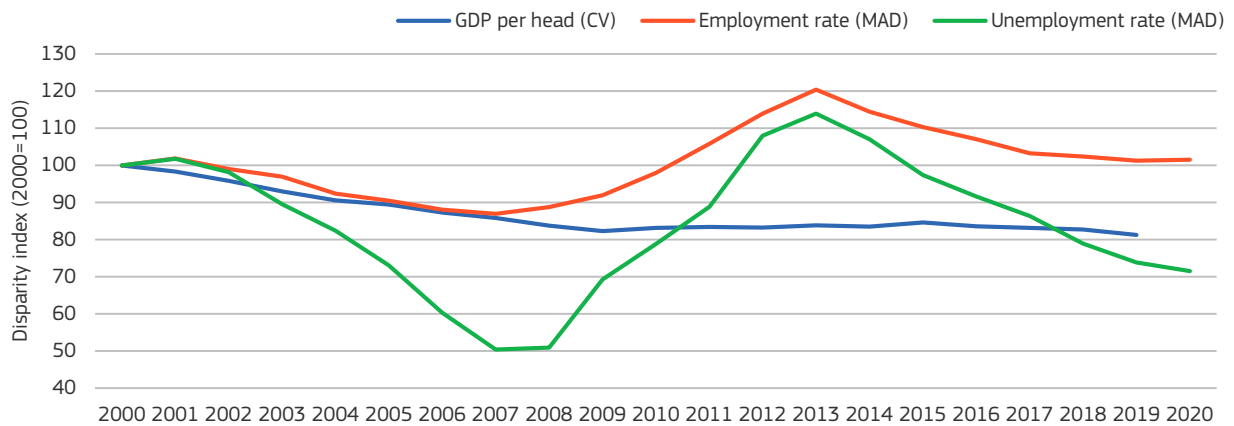
immediately following the crisis, regional disparities widened slightly. There are signs that the long-term process of regional convergence, which was interrupted by the crisis, has resumed, although at a very slow pace.

Regional disparities in employment and unemployment rates⁸ also narrowed from 2000 up to the financial crisis, after which they widened to reach a new peak in 2013. They then began narrowing again; but in 2020 the disparities in both were wider than in 2008. Disparities in the employment rate remain at much the same level as in 2000.

The economic convergence of regions over the period 2001–2019, as noted above, was mainly driven by the catching-up of many of the less developed ones, their GDP per head growing faster than elsewhere, except in 2010 and 2011 immediately following the global financial crisis (Figure 2.5). The average picture, however, hides differing trends among less developed regions. While there has been strong growth and significant catching-up in those in eastern Europe, many less developed regions in southern Europe have experienced sluggish or negative growth and their GDP per head is

⁷ The coefficient of variation, weighted by total regional population, fell by 12% during 2001–2008.

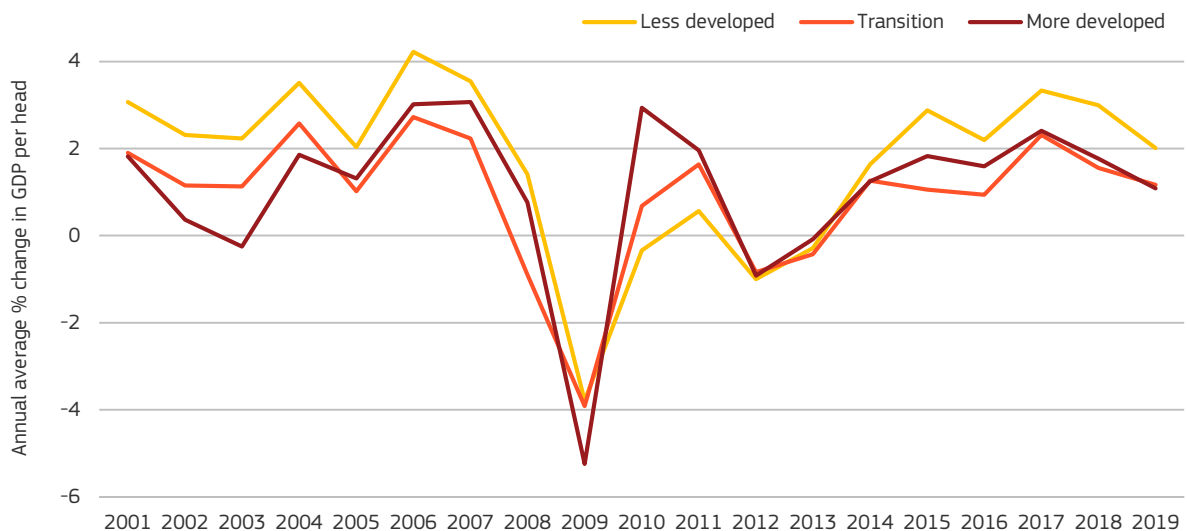
⁸ As measured by the mean absolute deviation weighted by the total regional population.

Figure 2.4 Regional disparities between NUTS 2 regions in the EU, 2000–2020

Disparities are measured by the coefficient of variation (CV) and the mean absolute deviation (MAD). Both are weighted by the population in each region.

The analysis is based on the NUTS 2 level but regions which are part of the same metropolitan area are combined.

Source: Eurostat [nama_10r_2gdp, reg_lmk], DG REGIO calculations.

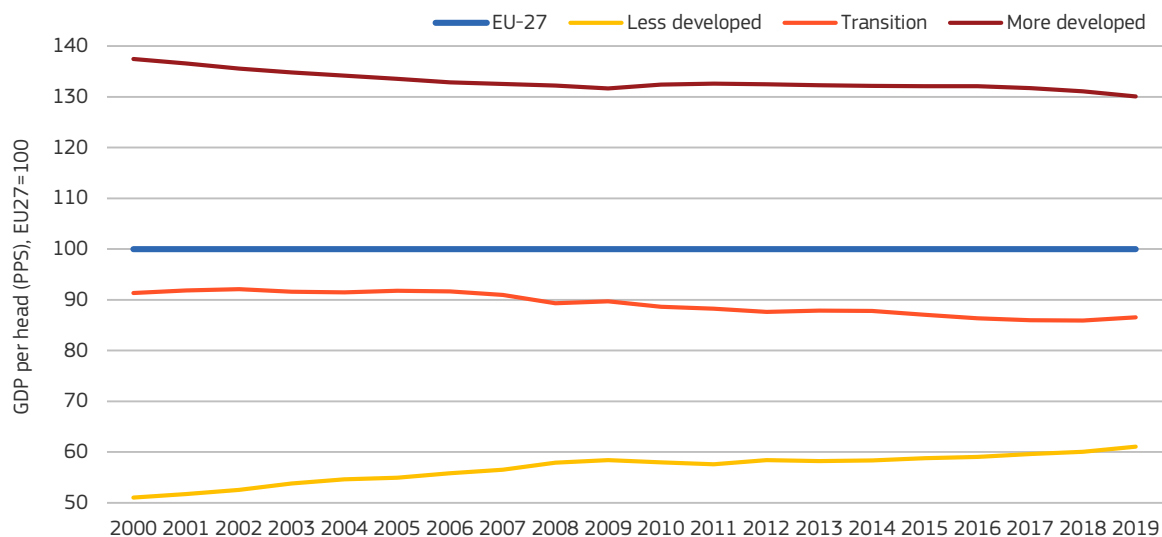
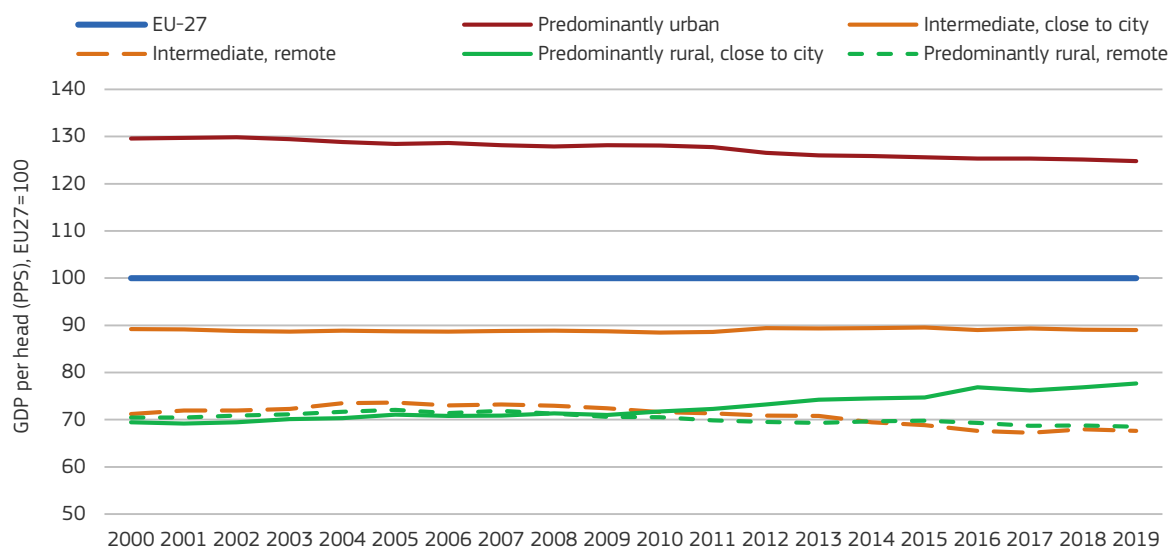
Figure 2.5 Growth of real GDP per head by level of regional development, 2001–2019

Source: ARDECO, Eurostat [nama_10r_2gdp] and DG REGIO calculations.

diverging away from the EU average (Section 2.3 below examines these trends further).

The transition regions, however, do not follow the same pattern. From 2005 onwards, growth in these regions was below the EU average, except in 2009. As a result, GDP per head, in PPS terms, diverged from the EU average instead of converging (Figure 2.6a).

Predominantly rural regions have a GDP per head, in PPS terms, around 70% of the EU average (Figure 2.6b). Over the period 2001–2019 rural regions close to cities showed convergence to the EU average. This did not, however, hold for remote rural regions where GDP per head fell slightly relative to the EU average. Remote intermediate regions also diverged from the EU average over this period.

Figure 2.6 Changes in GDP per head (PPS) in EU regions, 2000-2019**a) By level of development****b) By urban-rural regional typology and remoteness**

Source: ARDECO, Eurostat [nama_10r_2gdp] and DG REGIO calculations.

The growing interdependence of the world's economies has had a highly differentiated impact on EU regions⁹. Although some have been well positioned to take advantage of the new opportunities it offers, others have been hit by job losses, stagnating wages and shrinking market shares as a result of low-cost competitors moving into more

technologically advanced sectors (see also Section 2.4 below).

⁹ European Commission (2017a).

Box 2.1 EU outermost regions

The EU includes nine outermost regions, geographically remote from the continent in the Caribbean basin, the Macaronesia area and the Indian Ocean. They are Canarias (ES), Guadeloupe, Guyane, La Réunion, Martinique, Mayotte, Saint-Martin (FR), Madeira and Açores (PT). They are governed by the provisions of the Treaties and form an integral part of the Union.

Around five million people live in the outermost regions, some of which have significant population growth due to inward migration. The natural growth rate in population is also relatively high as in most of these regions the population is much younger than in the mainland EU.

GDP per head in the regions is below the EU average (Table 2.1). In Mayotte, with a population of around 270 000 in 2019, it is only around a third of the EU average, meaning that the region has the lowest GDP per head in the EU. GDP per head is also low in Guyane (45% of the EU average) and La Réunion (68%). The low GDP per head in these three regions is primarily linked to low employment rates; and also, in the case of Guyane and Mayotte, to low productivity per worker. Productivity is also low in Madeira and Açores. The share of working-age people in the total population in the outermost regions is in most cases closer to the EU average; though in Mayotte, reflecting the large number of young people, it is well below, and in Canarias, Madeira and Açores well above.

Table 2.1 GDP per head and its components in outermost regions, 2019

	GDP per head (PPS) (€)	Productivity (GDP per worker) (€)	Employment rate (% of working age population)	Working age population (% aged 20–64 in total population)
EU-27	31 278	72 057	73.1	59.4
Canarias	22 928	57 071	61.4	65.4
Guadeloupe	22 215	72 083	55.4	55.6
Martinique	23 042	64 244	63.7	56.3
Guyane	14 188	53 329	50.9	52.3
La Réunion	21 123	70 610	52.1	57.4
Mayotte	9 016	47 781	43.3	43.6
Região Autónoma dos Açores	21 911	48 473	71.2	63.5
Região Autónoma da Madeira	23 768	50 542	74.1	63.5

The outermost region of Saint-Martin is included in the NUTS 2 region of Guadeloupe.

Source: Eurostat [nama_10r_2gdp, lfst_r_lfe2emprr_custom_1270645], DG REGIO calculations.

Box 2.2 Economic growth and local economies: a spatial analysis of regional resilience in the EU

A recent study¹ focuses on the crisis and post-crisis years (2008–2015) and examines the factors helping regions to recover from the Great Recession, the main aim being to identify the characteristics of regions that showed economic resilience and any potential spill-over effects.

Regions in the EU-27 plus the UK are classified into two regimes, based on their initial GDP per head in 2008: a north-western group of relatively high-income regions and a group of southern and eastern lower-income regions. The main questions analysed are as follows.

1. What are the factors associated with a region's capacity to cope with economic adversity and maintain economic well-being?
2. Are the determinants of economic growth and resilience the same across regions at different levels of economic development (in terms of GDP per head)?

The main part of the analysis is based on an economic growth model where regional growth depends on growth in neighbouring regions and a set of initial endowments, from classical ones (initial level of GDP per head, population growth, human capital and investment) to more complex components of regional competitiveness (quality of government, business sophistication, technological readiness and innovation). The model also takes account of the geographical proximity of regions when assessing their economic development and detects spatial spill-over effects when present, including cross-border ones². Based on this model, the analysis identifies which of these factors has contributed to economic growth in the regions and the size of the effect. A more in-

depth discussion of the theoretical framework and assumptions underlying the analysis is provided in Annoni et al. (2019). The main findings, summarised in Table 2.2, are as follows.

Spatial effects are found to be important in all regions. Regions benefit from being surrounded by high-growth ones in both the north-western and south-eastern regimes. Human capital is an important factor of development in both, with basic education being particularly relevant: having large shares of low-educated people appears to be a more important impediment to growth than having smaller shares of high-educated people.

In the north-western regime, the quality of institutions is an essential determinant of growth, which accords with recent findings in the literature that highlight good institutions as a key growth factor, especially at more advanced stages of development³. In the north-western regime of the EU (plus the UK), regions were more resilient if they had higher public and private investment. Results also indicate that high investment levels induce significant positive spill-over effects, suggesting that larger shares of investment in a region have positive effects on the growth rate of neighbouring regions.

A business environment with high-value-added activities is also a key element of regional resilience.

In the southern and eastern regime, the absorption of technology is important for growth and has positive spill-over effects on neighbouring regions as well. Indeed, spill-over effects are more important generally in southern and eastern regions than in north-western regions, where such effects were possibly significant in earlier periods.

1 Annoni et al. (2019).

2 LeSage and Fischer (2008).

3 Annoni and Catalina-Rubianes (2016); Pike et al. (2017).

Table 2.2 Summary of direct and spillover effects

	North-western regions		Southern and eastern regions	
	Direct	Spillover	Direct	Spillover
GDP growth	n.a.		n.a.	
Initial GDP per head				
Public and private investment				
Population growth				
Quality of institutions				
Lower secondary education				
Higher education and training				
Technological readiness				
Business sophistication				

n.a.: not applicable.

Green shades indicate positive impact; red shades indicate negative impact (the darker the colour, the more significant the estimated coefficient).

Source: Annoni et al. (2019).

2. Productivity in less developed Member States is catching up

2.1 Employment in agriculture and industry is shrinking while productivity is increasing

Regions at different levels of development tend to have different economic structures. Less developed regions tend to have relatively large shares of employment in agriculture and industry (Table 2.3). In 2018, over 12% of employment in these regions was in agriculture, three times more than in transition regions and eight times more than in more developed ones. Around 21% of employment was in industry, 6 pp more than in transition and more developed regions. Transition and more developed regions are more comparable in terms of their employment shares, with more employed in finance and insurance and in public administration.











































































The sectoral composition of gross value-added (GVA) follows the same general pattern as employment, but the differences between regions at different levels of development tend to be less pronounced. Notably, despite the large workforce

in agriculture in less developed regions, GVA from agriculture is modest, implying low productivity.

Employment in agriculture fell between 2001 and 2018, especially in the less developed regions (by over 3% per year), reflecting their economic restructuring and agricultural modernisation. The latter led to a substantial increase in productivity in the sector and an increase in GVA. Given the large share of employment in agriculture in these regions, this process is likely to continue. The same pattern is observed in the transition and more developed regions, but the reduction in employment and growth in GVA were less than half that in less developed regions.

Employment in industry also declined in each of the three types of regions, though much less so than in agriculture. Despite the loss of labour, GVA increased substantially, as did productivity, especially in the less developed regions. The EU single market has created more potential for specialisation in higher-value-added sectors, enabling less developed and some transition regions to maintain a larger share of employment in industry, because they have an attractive balance between labour costs, productivity and accessibility.

Table 2.3 Employment and GVA by NACE sector and category of regions, shares in 2018 and changes 2001–2018

<i>Share in 2018 (%)</i>	Employment				GVA			
	Less developed	Transition	More developed	EU-27	Less developed	Transition	More developed	EU-27
A: Agriculture, forestry and fishing	 12.4	 3.9	 1.6	 4.8	 4.7	 2.5	 0.9	 1.7
B-E: Industry (except construction)	 20.6	 14.8	 14.8	 16.2	 22.5	 18.8	 20.8	 20.6
F: Construction	 7.0	 6.8	 5.7	 6.3	 5.9	 6.0	 4.6	 5.1
G-J: Wholesale and retail trade; et al.	 26.2	 27.1	 28.2	 27.4	 24.5	 21.7	 24.8	 24.1
K-N: Financial and insurance activities; et al.	 9.0	 15.0	 19.4	 15.9	 19.5	 24.7	 28.6	 26.6
O-U: Public administration; et al.	 24.7	 32.4	 30.3	 29.4	 23.0	 25.3	 20.3	 22.0
Total	100	100	100	100	100	100	100	100
<i>Average % change on the preceding year, 2001–2018</i>								
A: Agriculture, forestry and fishing	 -3.4	 -1.5	 -1.3	 -2.7	 0.9	 0.4	 0.2	 0.5
B-E: Industry (except construction)	 -0.4	 -0.6	 -0.7	 -0.6	 2.2	 1.2	 1.3	 1.4
F: Construction	 0.5	 -0.4	 0.0	 0.0	 0.0	 -0.6	 -0.1	 -0.2
G-J: Wholesale and retail trade; et al.	 1.2	 1.0	 0.9	 1.0	 1.3	 0.8	 1.5	 1.4
K-N: Financial and insurance activities; et al.	 2.5	 2.0	 2.1	 2.1	 2.3	 1.9	 1.9	 1.9
O-U: Public administration; et al.	 0.7	 0.7	 1.2	 1.0	 1.6	 1.6	 1.6	 1.6
Total	0.0	0.6	0.8	0.6	1.6	1.2	1.5	1.5

Green bars indicate positive changes, red bars indicate negative changes.

Source: Eurostat [nama_10r_3empers], ARDECO, Cambridge Econometrics, AMECO, DG REGIO calculations.

Box 2.3 Decomposing growth in GDP per head

Growth in GDP per head can be broken down into three main components: changes in productivity (GDP per person employed); changes in the employment rate (employment relative to the population of working age); and changes in the share of the working-age population in the total. Accordingly, the following identity holds:

$$\frac{\text{GDP}}{\text{Total population}} = \frac{\text{GDP}}{\text{Employment}} \times \frac{\text{Employment}}{\text{Working-age population}} \times \frac{\text{Working-age population}}{\text{Total population}}$$

The same identity can be expressed in terms of changes: the change in GDP per head is the sum of the changes in productivity, the employment rate and the share of the working-age population.

The construction industry showed little growth over the 2001–2018 period and even contracted slightly in transition regions. By contrast, employment and GVA in services increased in all regional groups over the period, particularly in financial activities — especially so in less developed regions.

2.2 Productivity is the main factor underlying growth in GDP per head

Over the 2001–2019 period, GDP per head increased in the vast majority of EU regions (Map 2.4 and Table 2.4). The increase was largely associated with productivity growth¹⁰, and to a lesser extent with employment growth. The working-age population as a share of the total decreased slightly in the EU and in most regions over this period. Many less developed regions, especially those located in the eastern Member States, had above-average productivity and employment growth, offset only slightly by a decline in the share of the working-age population, so that growth of GDP per head was above the EU average. This, however, masks the fact that in a number of these regions, mainly in Greece and Italy, GDP per head fell over this period, with productivity falling and the employment rate declining or increasing relatively little, combined with a shrinking share of the working-age population. In most of the EU outermost regions GDP per head remained at the same level or decreased.

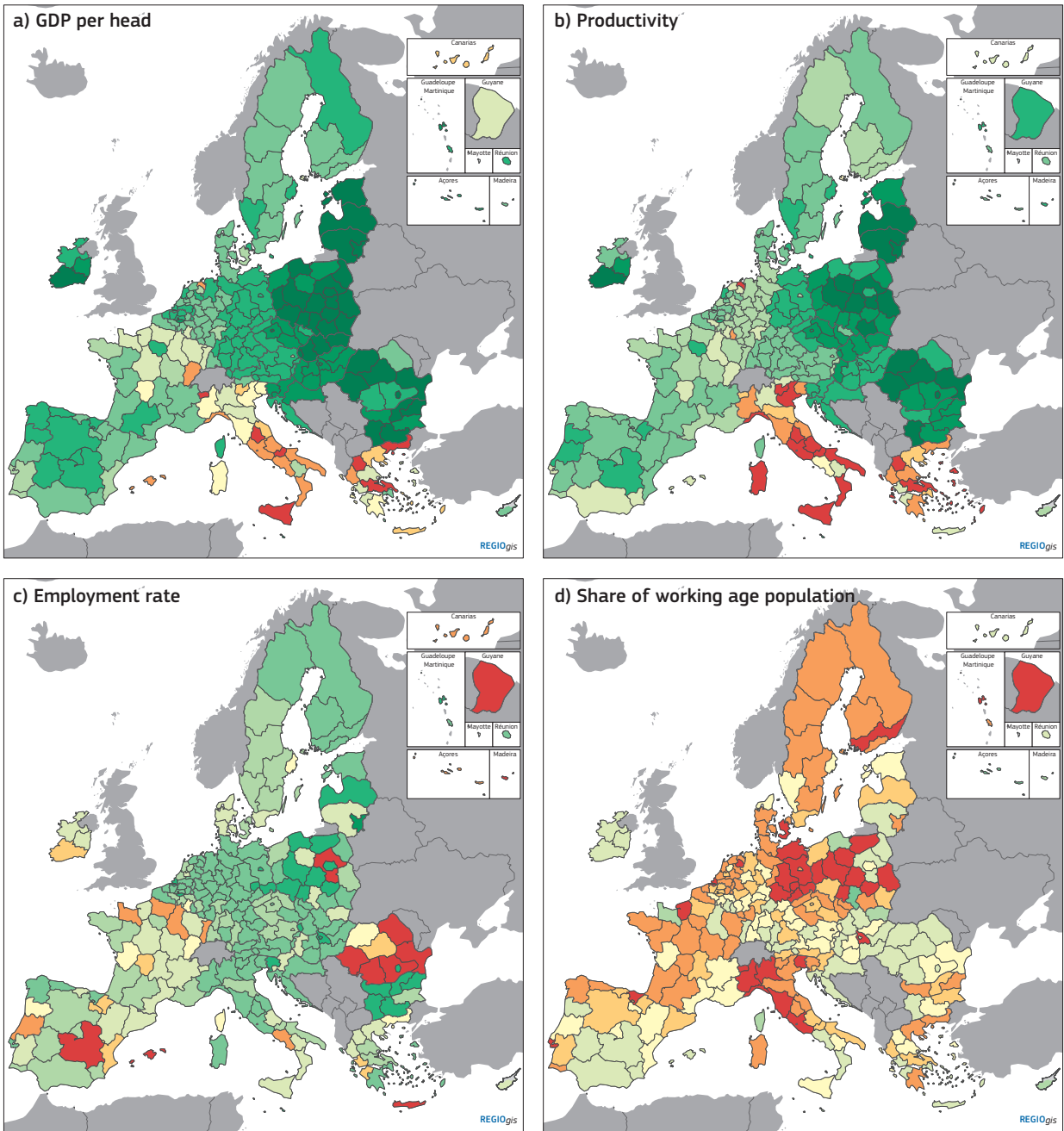
From 2001 to 2008, GDP per head in the EU grew by 1.8% per year in real terms, with productivity

growing by 1.2% per year and an increase in the employment rate adding another 0.4% per year (Table 2.4). In many less developed regions, where GDP growth was substantially higher than the EU average, productivity growth was also the main component of growth in GDP per head, and even more so than in the EU as a whole, while the employment rate remained unchanged.

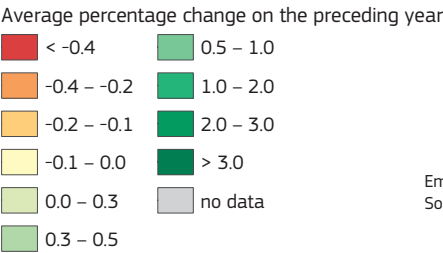
Between 2009 and 2013, GDP per head in the EU declined by 0.4% per year. Employment also declined (by 0.5% per year) as both the employment rate and the share of the working-age population fell, while productivity continued to increase, though at a slower rate. This pattern of change is mirrored in each group of regions, but it is more pronounced in the less developed regions and less pronounced in the more developed ones. Accordingly, the less developed regions, as a group, experienced the sharpest decline in GDP per head, but also in the employment rate.

Between 2014 and 2019, growth of GDP per head resumed in every regional group. Unlike in the period before the financial crisis, however, growth was strongly associated with an increase in the employment rate, which more than offset a reduction in the share of the working-age population, while labour productivity grew more slowly than in the pre-crisis period. Again, this pattern of change was more pronounced in the less developed regions. On the other hand, recovery was more subdued in the transition regions, with GDP per head growth being only slightly more than half that in less developed regions, much the same as in the pre-crisis period.

¹⁰ Note that this productivity growth, being measured as GDP per person employed, does not reflect the decrease in the average hours worked per person employed during this period.



Map 2.4 Growth of GDP per head, productivity, employment rate and working-age population, 2001–2019



Employment rate defined as workplace-based employment divided by population aged 20–64.
Source: DG REGIO based on JRC and Eurostat data.

Table 2.4 Decomposition of annual average change in GDP per head, 2001–2019 and sub-periods

	GDP per head	Productivity	Employment	Share of working-age population
<i>Average % change on the preceding year</i>				
2001-2019				
EU-27	1.22	0.88	0.50	-0.17
Less developed regions	1.69	1.53	0.21	-0.05
Transition regions	0.90	0.62	0.49	-0.22
More developed regions	1.06	0.66	0.61	-0.21
2001-2008				
EU-27	1.76	1.16	0.43	0.15
Less developed regions	2.79	2.26	0.00	0.52
Transition regions	1.47	0.81	0.44	0.22
More developed regions	1.49	0.93	0.67	-0.12
2009-2013				
EU-27	-0.36	0.50	-0.53	-0.33
Less developed regions	-0.98	0.46	-1.23	-0.21
Transition regions	-0.59	0.47	-0.65	-0.41
More developed regions	-0.31	0.21	-0.17	-0.36
2014-2019				
EU-27	1.82	0.81	1.46	-0.45
Less developed regions	2.51	1.46	1.73	-0.68
Transition regions	1.38	0.50	1.53	-0.64
More developed regions	1.66	0.67	1.20	-0.22

Green bars indicate positive changes, red bars indicate negative changes.

Less developed regions exclude Mayotte.

The employment rate is workplace-based employment divided by population aged 20-64.

Source: Eurostat [nama_10r_3empers], ARDECO, Cambridge Econometrics, AMECO, DG REGIO calculations.

Box 2.4 Metro and non-metro regions

Capital metro, other metro and non-metro regions are defined as follows. Metro regions are NUTS 3 regions, or groupings of NUTS 3 regions, representing functional urban areas of more than 250 000 inhabitants. Capital metro regions are those that include the national capital. Non-metro regions are all others.

More details can be found at:
http://ec.europa.eu/eurostat/statistics-explained/index.php/Territorial_typologies_for_European_cities_and_metropolitan_regions

2.3 Capital metropolitan regions perform better than other regions

In 2019, metropolitan (metro) regions accounted for 59% of the population in the EU, 63% of employment and 68% of GDP. Accordingly, they are major centres of employment and business activity with higher productivity than elsewhere.

Between 2001 and 2019, real GDP per head in metro regions grew faster than in others in all parts of the EU (Table 2.5). This was a result mainly of above-average growth rates in capital city regions, though other metro regions also outperformed non-metro regions, except in the north-western Member States.

In regions in the eastern and north-western Member States, the growth of GDP per head was mainly associated with productivity growth. The pattern is different in southern Member States, where productivity growth was very low during this period and most of the (modest) growth in GDP per head was associated with growth in employment. In capital metro regions in the eastern and southern Member States, the contribution of employment growth to GDP growth was double the average, reflecting a continuing concentration of employment there.

Employment in both metro and non-metro regions increased between 2000 and 2008, although at a faster rate in capital metro regions than in other metro regions and by more in the latter than in non-metro regions (Figure 2.7). In the follow-

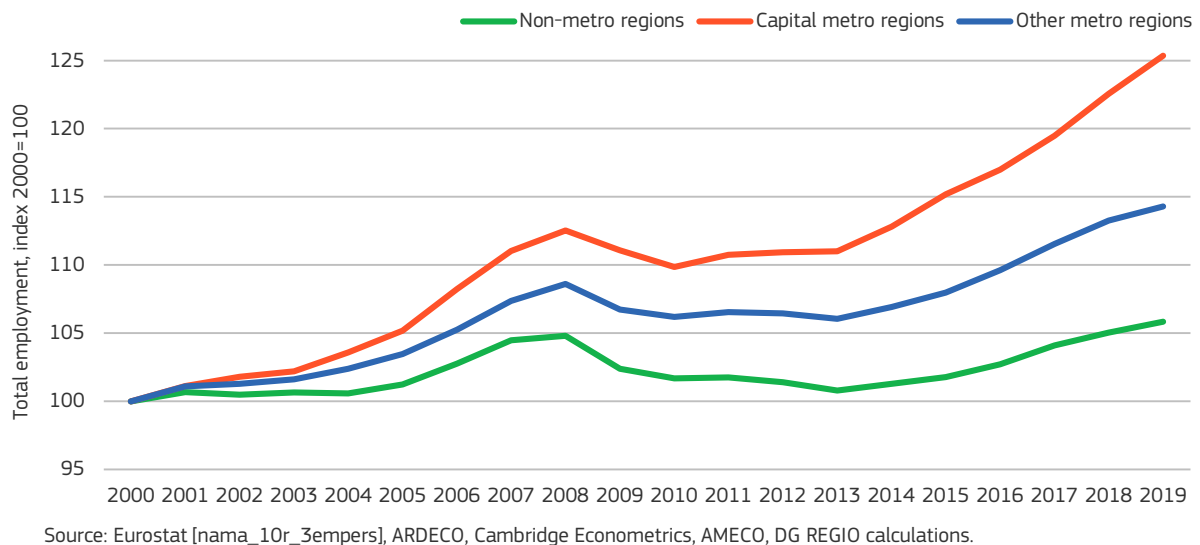
Table 2.5 Changes in GDP per head, productivity and employment per head by type of region, 2001–2019

	GDP per head	Productivity	Employment relative to population
<i>Annual average % change on the preceding year</i>			
Eastern Member States			
Capital metro regions	4.1	2.8	1.3
Other metro regions	3.5	3.0	0.5
Non-metro regions	3.2	3.0	0.2
Total	3.6	3.1	0.5
North-western Member States			
Capital metro regions	1.3	1.1	0.2
Other metro regions	1.0	0.6	0.3
Non-metro regions	1.1	0.8	0.3
Total	1.1	0.8	0.3
Southern Member States			
Capital metro regions	0.6	0.1	0.5
Other metro regions	0.4	0.2	0.2
Non-metro regions	0.1	0.1	0.1
Total	0.3	0.1	0.2

Employment relative to population combines the employment rate and the working-age population as a share of the total.

Source: Eurostat [reg_eco10], ARDECO, Cambridge Econometrics, AMECO, DG REGIO calculations.

Figure 2.7 Evolution of total employment (number employed) in metro and non-metro regions, 2000–2019



ing two years, it declined markedly in all regions. In the capital city regions it began to recover in 2010, with the growth rate accelerating in 2013 and continuing at the same pace up to 2019, when total employment was significantly higher than before the 2007–2008 crisis. In other metro regions recovery was more hesitant. Employment remained below pre-crisis levels up until 2015, and from then to 2019 its growth rate was more modest than in the capital city regions. In non-metro regions the effect of the financial crisis was more sustained; employment only began to increase in 2013 and it grew by much less than in metro regions up to 2019, only reaching pre-crisis levels in 2018.

3. Development traps¹¹ and related risks for European regions

3.1 Regional stagnation and development traps

It has become increasingly clear over recent years that not all regions in the EU with a GDP per head below the average are catching up. Regions can be categorised into different groups, defined in terms

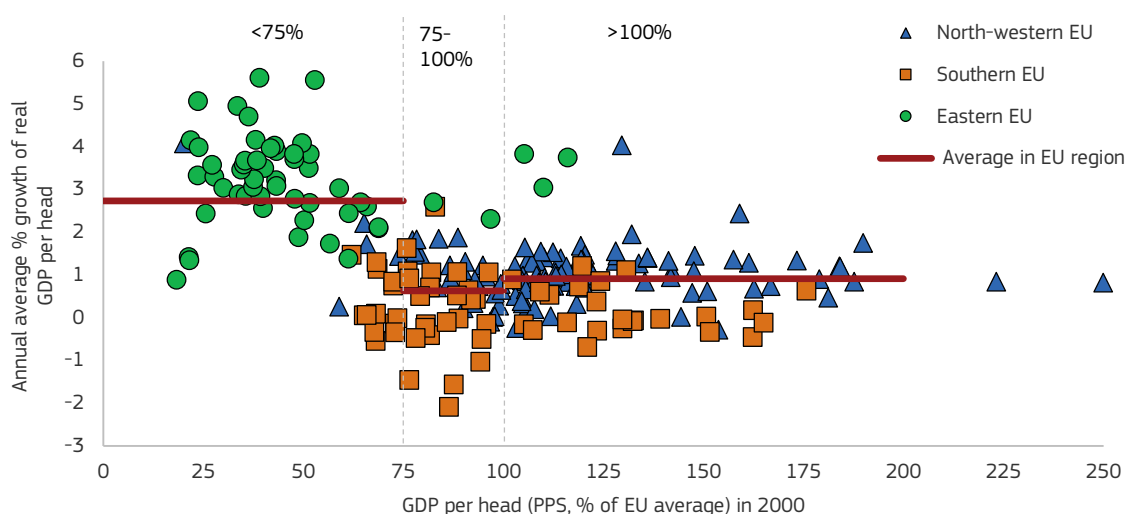
of their level of GDP¹², but also by their rates of GDP growth.

Relating the annual growth of real GDP per head over the 2001–2019 period to the initial level of development of regions in 2000, as measured by GDP per head, reveals some striking patterns (Figure 2.8).

Some of the patterns are in line with convergence theory. In particular, many of the regions with GDP per head below 75% of the EU average in 2000 displayed strong growth over the subsequent 19 years, demonstrating rapid catching-up. These regions are mainly those in eastern EU Member States. Conversely, many of the southern EU regions failed to achieve comparably high growth rates. A non-negligible number of southern regions experienced a reduction in GDP per head over the period, even if their initial GDP per head was below 75% of the EU average. Consistent with convergence theory, regions with above-average GDP per head in 2000 tended to have lower rates of growth.

11 Professors Simona Iammarino, Andrés Rodríguez-Pose and Michael Storper contributed substantially to the content of this section.

12 Throughout this section regions are classified based on their GDP per head relative to the EU in 2000. The thresholds applied correspond to those currently used to classify regions as less developed, transition or more developed, but differ from those used in 2000. These group labels are therefore not used in this section.

Figure 2.8 Annual growth in real GDP per head in EU regions by level of development, 2001–2019

Source: Eurostat [nama_10r_2gdp], DG REGIO calculations.

However, growth in the group of regions with GDP per head between 75% and 100% of the EU average (i.e. the middle category), does not show any indication of catching up. Indeed, average growth in these regions was below that of those with above-average GDP per head. Many of them, primarily those in southern EU Member States, experienced lengthy periods of low or negative growth, weak productivity increases, and low employment creation or even job losses.

Iammarino et al. (2020) develop a concept of development traps, which is based on more dimensions than just a slowdown in GDP growth. It covers three dimensions of the economic dynamism of a region: GDP per head, productivity and employment. Some 45% of the population of the above-mentioned middle category regions in 2000 were in regions where growth was very low¹³ over the 2001–2019 period (Figure 2.9). Moreover, a third of the population were in regions where productivity growth was very low, and 40% were in regions with very low employment creation relative to the change in population. All of these population shares are higher, in some cases considerably, than in other regions.

Since 2000, an increasing number of regions have experienced stagnating economic development after reaching a level of GDP per head of 75–100% of the EU average (Map 2.5). As this group has grown larger over time, transition out of it has become rarer. Indeed, only one region (Zahodna Slovenija) out of a total of 53 regions in the middle category in 2000 managed to achieve above-average GDP per head by 2019¹⁴. On the other hand, in 18 of these regions, mainly in the southern EU, GDP per head fell below 75% of the EU average, implying divergence and increasing disparities.

The low growth of regions in the middle category suggests that they may have fallen into a development trap. Many of them are less cost-competitive than less developed regions, characterised by the low cost of capital and labour, and by being less innovative or productive than more developed regions. Accordingly, their costs tend to be too high to compete with less developed regions and their innovation systems not strong enough to compete with more developed regions. This makes it very difficult for them to escape the development trap

¹³ Here, very low growth is defined as annual average growth over the period in the bottom quartile of regions ranked by the rate of growth (i.e. in the 25% with the lowest growth over the period 2001–2019).

¹⁴ It is worth noting that Zahodna Slovenija improved its performance over the period in terms of the indicators identified here as determining factors of the risk of being 'development-trapped', with an above-average share of industry in GVA, above-average R&D expenditure relative to GDP and an above-average share of the working-age population with tertiary education. Institutional quality, however, remains below the EU average.

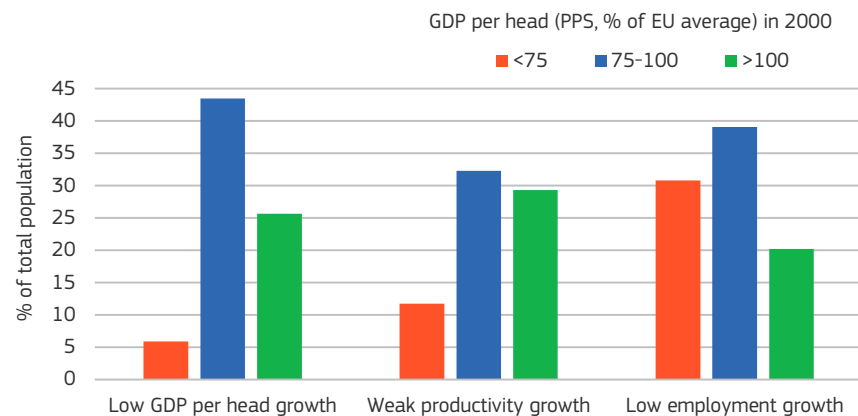
and achieve higher GDP per head. While some of these regions had low GDP per head earlier and were catching up until some years ago, others were formerly relatively prosperous but have moved into a prolonged period of relative economic decline. Indeed, in a quarter of the regions with above-average GDP per head in 2000, mainly in north-western but also in southern Member States, GDP per head had fallen below the EU average by 2019 (Map 2.5).

3.2 Identifying development traps in EU regions

In Iammarino et al. (2020) the risk of a region being in a development trap in a specific year is assessed in terms of the pattern of growth of GDP per head, productivity and employment, as well as their growth relative to that of the Member State the region is located in and the EU average.

Analysis based on this approach shows that the number of years that regions were in a development trap over the 2001–2019 period varies greatly between them (Map 2.6). In general, regions that were in a development trap in 15 years or more during this period (henceforth called 'development-trapped' regions) are concentrated in southern EU Member States (especially in Greece and Italy) or are rural or old industrial regions in France. Some of the regions, however, are also located in many of the north-western Member States. Development traps thus affect regions at different levels of initial development. Accordingly, three types of development-trapped regions can be identified in terms of their GDP per head in 2000.

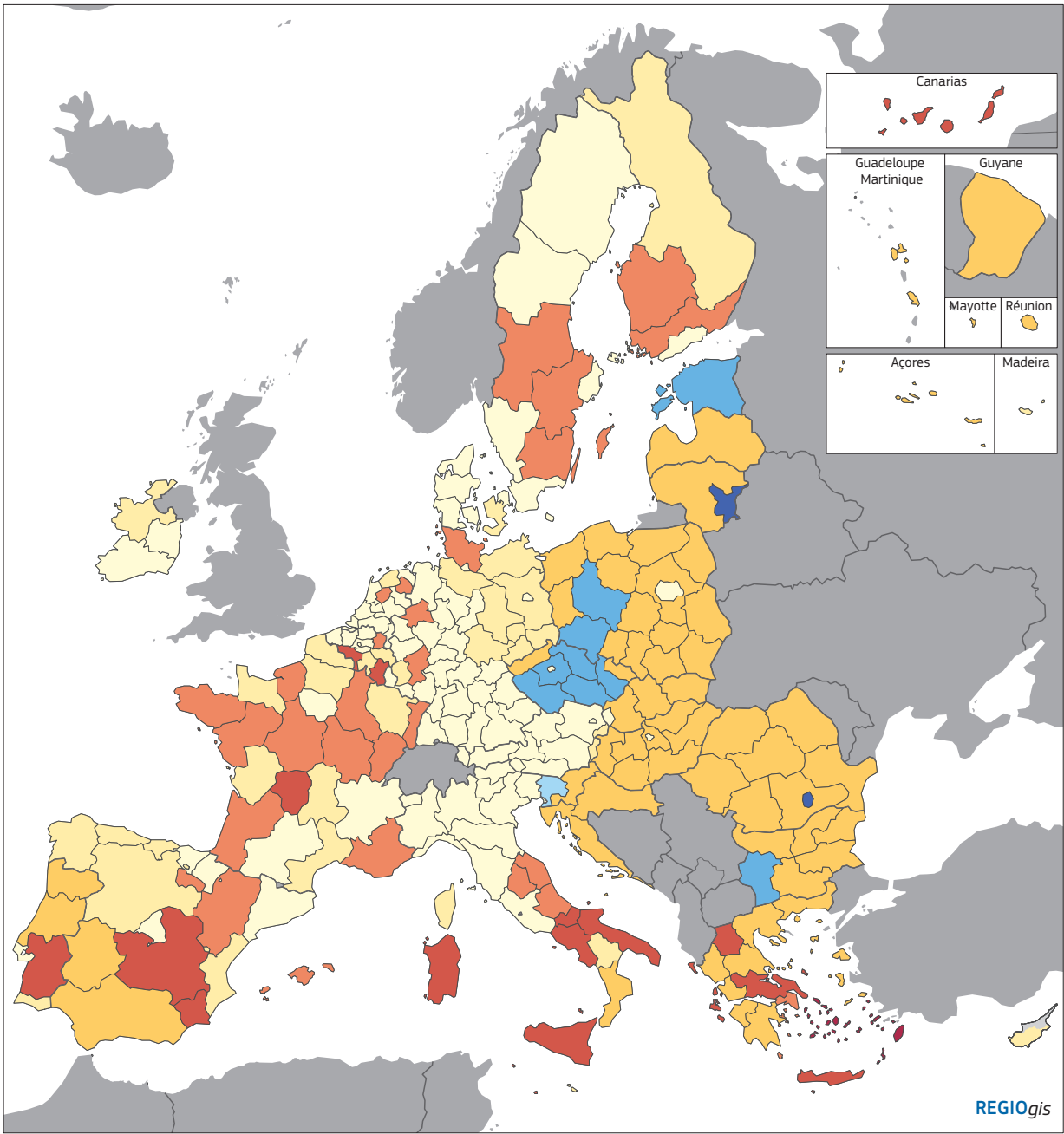
Figure 2.9 Population living in regions with very low growth in GDP per head, productivity and employment, 2001–2019 by initial level of GDP per head



Very low growth is defined here as annual average growth over the period in the bottom quartile of regions.

Source: Eurostat [nama_10r_2gdp], ARDECO, Cambridge Econometrics, AMECO, DG REGIO

- **Development-trapped regions with very low GDP per head**, which receive substantial cohesion policy support, but which, unlike most of the other less developed EU regions, have struggled to sustain long-term growth, so consistently lag behind other regions in the EU. Regions in this group include Calabria in Italy, and Anatoliki Makedonia, Thraki and Ipeiros, and Dytiki Ellada in Greece.
- **Development-trapped regions with slightly below-average GDP per head** (between 75% and 100% of the EU average in 2000), but where economic dynamism has since stagnated. Accordingly, they have struggled to improve their standing, often in both relative and absolute terms. This group includes a number of regions in the Italian Mezzogiorno and regions in Portugal, Greece and Cyprus, as well as several regions in France and Wallonia in Belgium.
- **Development-trapped regions with above-average GDP per head**, which despite still being relatively prosperous have experienced frequent or long periods of below-average growth in GDP, productivity and employment, often because of the demise of industries that used to be their main source of wealth. This group includes a number of regions in northern and central Italy, various regions in France, and



Map 2.5 Transition of regions between development categories, 2000–2019

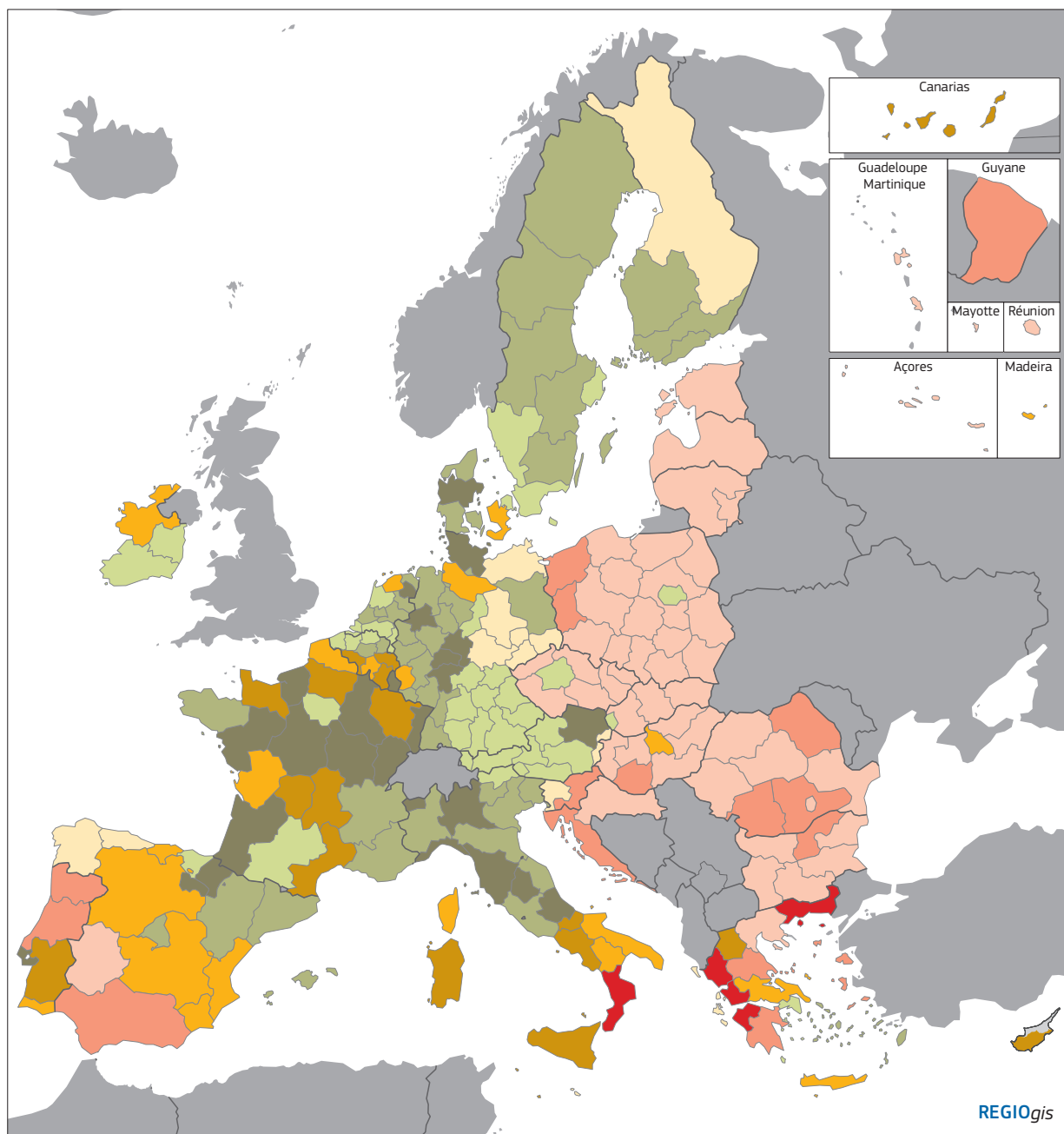
Transition matrix of GDP per head in PPS (index, EU-27 average = 100), 2000–2019

2000 \ 2019	< 75	75 – 100	>= 100
< 75			
75 – 100			
>= 100			

Source: DG REGIO based on Eurostat data (nama_10r_3gdp).

0 500 km

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Map 2.6 Number of years in a development trap during 2001–2019 by level of regional GDP per head in 2000

GDP/head (index EU-27=100) vs. years

< 75%, 0 – 9 years	75 – 100%, 0 – 9 years	> 100%, 0 – 9 years
< 75%, 10 – 14 years	75 – 100%, 10 – 14 years	> 100%, 10 – 14 years
< 75%, 15 – 19 years	75 – 100%, 15 – 19 years	> 100%, 15 – 19 years

Six capital regions have been merged with the surrounding regions to limit distortions in the GDP per head values.
Source: DG REGIO calculations based on JRC and Eurostat data.

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Box 2.5 How to calculate the risk of being in a development trap?

The methodology developed by Iammarino et al. (2020) to assess whether an NUTS 2 region is in a development trap in a specific year is based on the development over time of three variables: (i) GDP per head at constant prices; (ii) GVA per person employed (productivity) at constant prices; and (iii) the ratio of employment to the total population.

For each of these three variables, the growth rate of the region over the five-year period preceding the year in question is compared with three benchmarks:

- the growth rate in the region itself over the five years preceding this five-year period;
- the growth rate over the five-year period in its Member State; and
- the average growth rate in the EU over this period.

This results in nine comparisons (or six for Member States with only one NUTS 2 region).

Based on these comparisons, various risk indicators are calculated. The indicator used in this report is calculated as follows. For each of the nine comparisons, if the recent growth rate in the region is lower than the benchmark, the region receives a score of one; if not, a score of zero. The risk of the region falling into a development trap in the year in question is given by the average score over the nine (or six) comparisons.

For the analysis here, a region is considered to be in a development trap in a specific year if the risk of being trapped is greater than 0.5. A region is considered development-trapped over the period 2000–2019 if in 15 or more years the risk is greater than 0.5.

a few in Spain, Portugal, Germany, Denmark, Austria and the Netherlands.

The reasons for falling into a development trap differ between regions. However, there are a number of common traits, including (for example) the levels of value-added in industry, human capital, innovation endowment and institutional quality.

EU regions that were development-trapped in 2000–2019 tend to have a smaller share of industrial output in total production, smaller endowments of human capital (fewer workers with tertiary education) and lower levels of support for science and technology (Table 2.6). Regions with a better quality of local government, and so a more favourable institutional environment, tend to fare better than those with low government efficiency, limited transparency and accountability, and more corruption. Development-trapped regions also tend to have higher old-age dependency rates and less demographic dynamism, though this is likely to be as much a consequence as a cause of being trapped.

The differing characteristics of the regions suggest different approaches to avoiding being devel-

opment-trapped, depending on a region's level of development. The chances of a region with below-average GDP per head in 2000 avoiding being trapped are improved by having a better quality of government and larger industrial output. The latter would also improve the chances of transition regions in this respect. For more developed regions, the chances of staying out of a development trap are better if they have higher R&D investment and a more highly educated workforce. In all regions, the chances could be improved by increasing the share of the working-age population with tertiary education.

Regional development traps are a serious risk for the future of the EU. Springing these traps and so liberating the untapped economic potential of the many struggling and stagnating regions in the EU would not only increase their GDP, productivity and employment, but would also boost the growth potential of the EU as a whole. This is not just an economic matter: the sub-par economic performance and lack of employment opportunities are causing social costs and political resentment towards what is increasingly regarded as a system that does

Table 2.6 Socio-economic characteristics of development-trapped regions and other regions by level of GDP per head

	Development trapped?	GDP per head (PPS) in 2000, index			
		< 75%	75–100%	>100%	All
% of industry in GVA, 2018	Yes	10.5	13.4	19.4	17.7
	No	25.7	19.7	20.8	21.3
R&D expenditure as % of GDP, 2017	Yes	0.73	1.29	1.76	1.60
	No	0.93	1.36	2.67	2.30
% of population 25–64 with tertiary education, 2019	Yes	19.5	25.1	29.3	27.5
	No	26.3	31.3	36.9	32.7
Institutional quality index (EQI), 2017	Yes	-1.71	-0.29	0.31	-0.08
	No	-0.71	0.11	0.76	0.11
% of population by GDP per head, 2017	-	26.2	17.9	55.9	100.0
% of population trapped by GDP per head, 2017	-	3.0	38.0	22.7	20.3

Source: Eurostat [nama_10r_3gva, rd_e_gerdreg, edat_lfse_04], ARDECO, Cambridge Econometrics, AMECO, World Bank, DG REGIO calculations.

not benefit areas that are left behind, leading to a growing geography of discontent¹⁵.

Since development traps can occur at different levels of development, and appear to be a particular risk for transition regions, they may require policy responses that go beyond the poorest regions. Assisting all regions that are development-trapped to become more dynamic will help to reduce regional inequalities and counter the threat of rising discontent in EU societies.

4. Competitiveness of EU regions

4.1 Innovation, digitalisation and smart specialisation

Innovation is an important driver of long-run productivity growth and, as such, is a key factor in supporting the competitiveness of firms. This is especially important for firms in the EU, which increasingly have to compete with firms in developing regions of the world, such as in south-east Asia, which benefit from cheaper labour, less labour market regulation and fast technological catch-up¹⁶. The capacity to innovate, and to take

up innovation produced elsewhere, is of prime importance — especially since, unlike cost-reduction strategies, innovation is in principle without bounds, and so is central to sustaining growth over the long term.

However, concern has risen about a growing research and innovation divide, linked to geographical concentration of the most innovative firms and research centres, both within Member States and across the EU. Although concentration can result in positive externalities of research and innovation, the core areas are very often located in more developed regions¹⁷, so widening geographic disparities¹⁸. This research and innovation divide may be further fuelled by the ongoing process of digitalisation.

Measuring innovation is widely recognised as challenging^{19, 20}. The most commonly used indicator, the number of patent applications, gives only an

15 See Dijkstra et al. (2020), who show that political discontent with the EU in Member States and regions is linked to an important extent to economic and industrial decline.

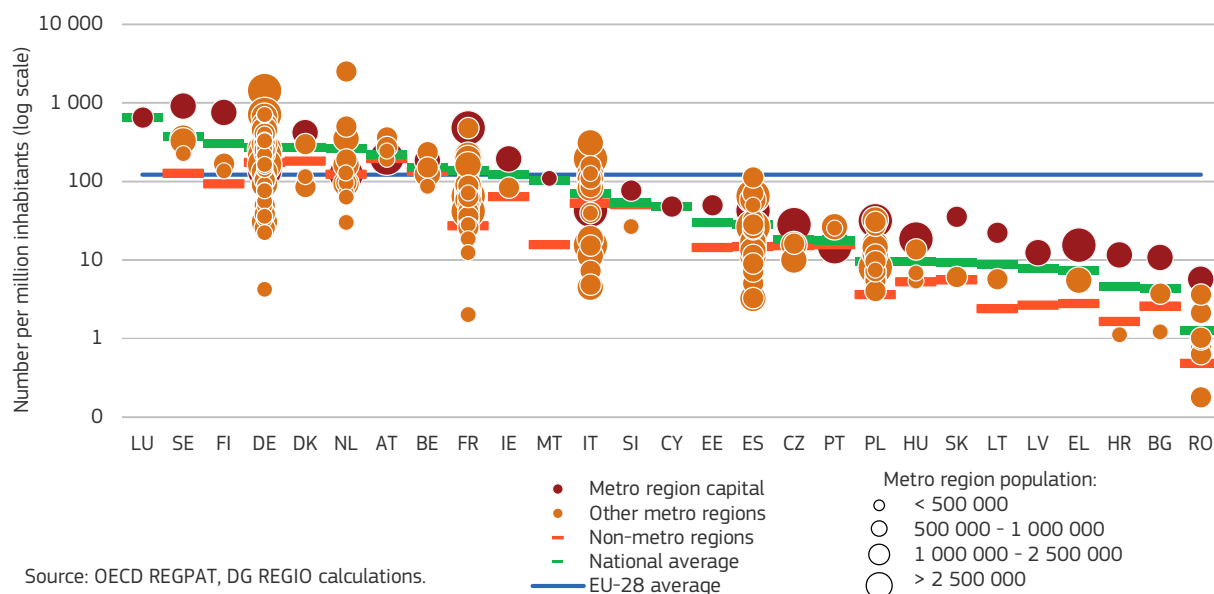
16 World Economic Forum (2019).

17 See Rodríguez-Pose (2020) for an analysis of the economic consequences of the research and innovation divide in the EU.

18 For example, European Commission (2020a) concludes that an increasing concentration of economic and innovative activities in capitals and metro areas compared with declining or peripheral areas leads to negative developments in regions with low capacity to exploit innovation.

19 OECD and Eurostat (2018).

20 This is particularly true in a sub-national context, which highlights the need to work on better territorial innovation data, as mentioned (for example) in the Commission's Communication on a long-term vision for rural areas (European Commission, 2021d).

Figure 2.10 Patent applications to the European Patent Office by type of region, 2016–2017

approximate measure of real innovation activity because it captures only innovations registered at the European Patent Office. These relate mainly to technological innovation in industry, whereas many if not most innovations in services, which are often intangible, remain unpatented²¹. Nevertheless, though limited, patents provide a useful means of comparing performance in technological innovation across regions.

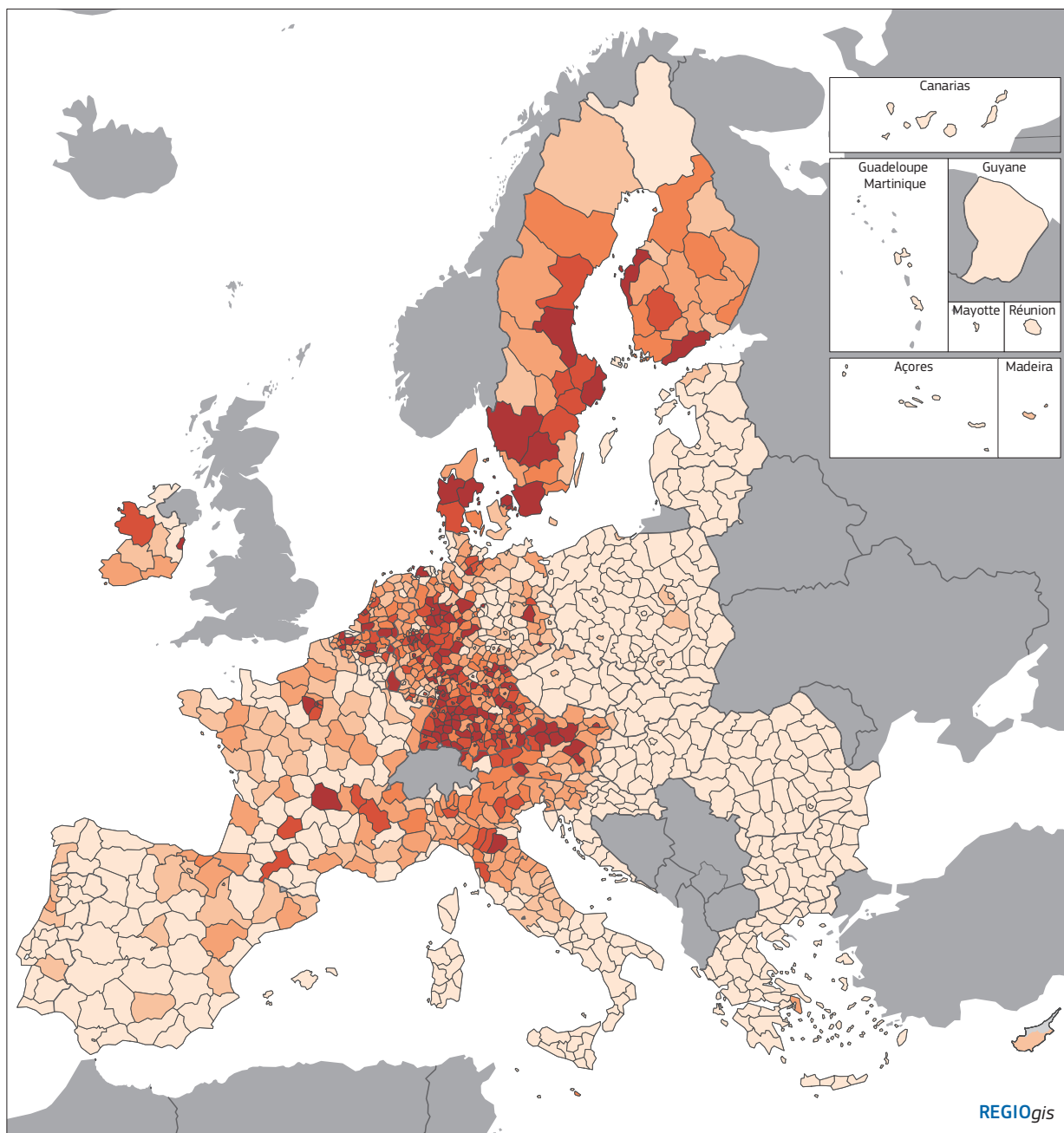
Over the period 2016–2017, 122 patent applications per million inhabitants were registered at the European Patent Office (Map 2.7). These show a distinct spatial pattern, the regions with most applications being located mostly in the north-western Member States and in northern Italy. At the NUTS 3 level, Ludwigshafen in Germany, home to BASF, had the highest number (3 224 per million inhabitants in the period), followed by Erlangen, home to a major Siemens site (2 558), and Zuidoost-Noord-Brabant in the Netherlands (2 529), home to Philips. The degree of concentration suggests a regional innovation divide between the most advanced Member States and regions and the others.

Metro areas tend to offer an environment that is particularly conducive to the development of new ideas, products and processes. A vast literature explains the reasons for this — the presence of a creative and skilled workforce, and specialised clusters of economic activity, universities and research institutes²². There are clear differences in patenting activity between metro regions (around 167 applications per million inhabitants) and non-metro regions (around 58 per million inhabitants) (Figure 2.10). In quite a few metro regions, however, applications are lower than in non-metro regions in the same Member States, indicating that not all metro regions offer a favourable innovation environment. Still, the distinct spatial pattern of patent applications and their concentration in metro areas are further indications of a research and innovation divide in the EU.

A widely used indicator of innovation capacity, rather than performance, is expenditure on R&D relative to GDP, which is a measure of input into the innovation process, or the effort made, rather than of output. As in the case of patents, however, R&D expenditure is likely to underestimate innovation activity, particularly in sectors outside industry where non-technological and non-research-based innovation is common.

21 This also holds for practices in primary production and organisational and social forms of innovation that can contribute to social capital.

22 European Union and UN-HABITAT (2016).



Map 2.7 Patent applications to the European Patent Office (EPO), average 2016–2017

Applications per million inhabitants

- < 25
- 25 – 50
- 50 – 100
- 100 – 150
- 150 – 250
- ≥ 250

EU-27 = 121.7

Source: DG REGIO based on OECD REGPAT database July 2021 and Eurostat population data (nama_10r_3popgdp).

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Box 2.6 Global value chains, foreign direct investment and inequality¹

Technological change coupled with the intensification of global value chains (GVCs) has spurred the need to place national and regional economic development and innovation policy in an open and interdependent framework. Multinational enterprises (MNEs), by carrying out different forms of investment abroad, are considered key actors behind the connectivity and global economic integration of countries and regions worldwide, while also being critical players in international trade flows. Often described as “two sides of the same coin”², trade and investment seem to be intertwined in a more complex manner within GVCs³. In fact, trade flows can be equity-led or non-equity-led. The former involves networks of foreign affiliates established via foreign direct investment (FDI), which are highly engaged in GVCs⁴ while non-equity-led trade involves more contractual partners and arm’s-length external suppliers⁵. As such, trade in GVCs and FDI are complementary phenomena that need to be taken into account simultaneously when trying to capture the geographical and functional dimension of global connectivity.

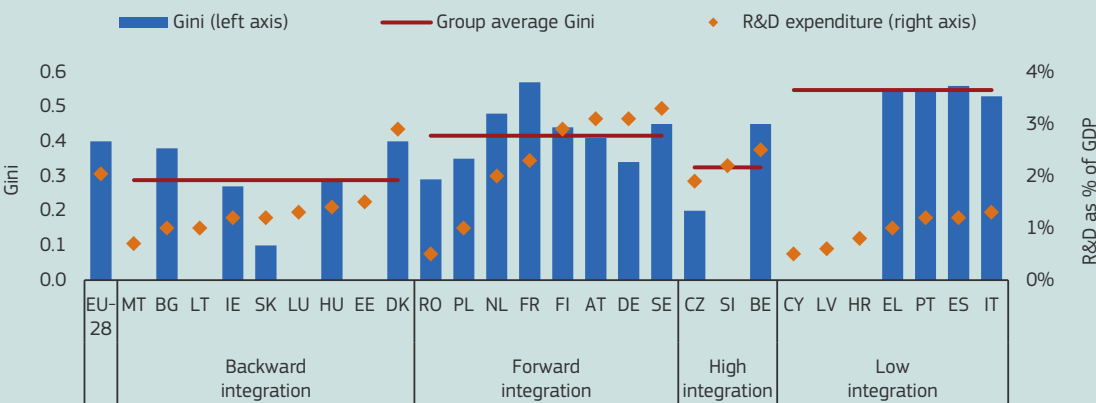
Two measures of GVC participation can be distinguished: (a) backward linkages — the share of for-

eign value-added in the total exports of a country; and (b) forward linkages — domestic value-added embodied in exports of intermediates that are further re-exported to third countries, expressed as a ratio of gross exports. By looking at the relative position of each country with respect to the EU average, it is possible to identify four broad groups of economies:

- 1. **high GVC integration:** higher backward to higher forward (H–H) linkages;
- 2. **low GVC integration:** lower backward to lower forward (L–L) linkages;
- 3. **Backward GVC Integration:** Higher Backward lower forward (H–L) linkages; and
- 4. **forward GVC integration:** lower backward to higher forward (L–H) linkages.

The *forward GVC integration* group comprises the most innovative countries in terms of R&D expenditure (as well as patents), Poland and Romania being exceptions. Within this group there is a relatively wide inter-regional dispersion of GDP as measured by the Gini coefficient (Figure 2.11). Conversely, *low GVC integration* economies show low values of R&D (and patents), but also have large economic dispari-

Figure 2.11 GVC profile, R&D expenditure and Gini-coefficient by Member State, 2015



The GINI coefficient is not provided for countries with only one or two NUTS 2 regions.
Source: Eurostat, DG REGIO calculations.

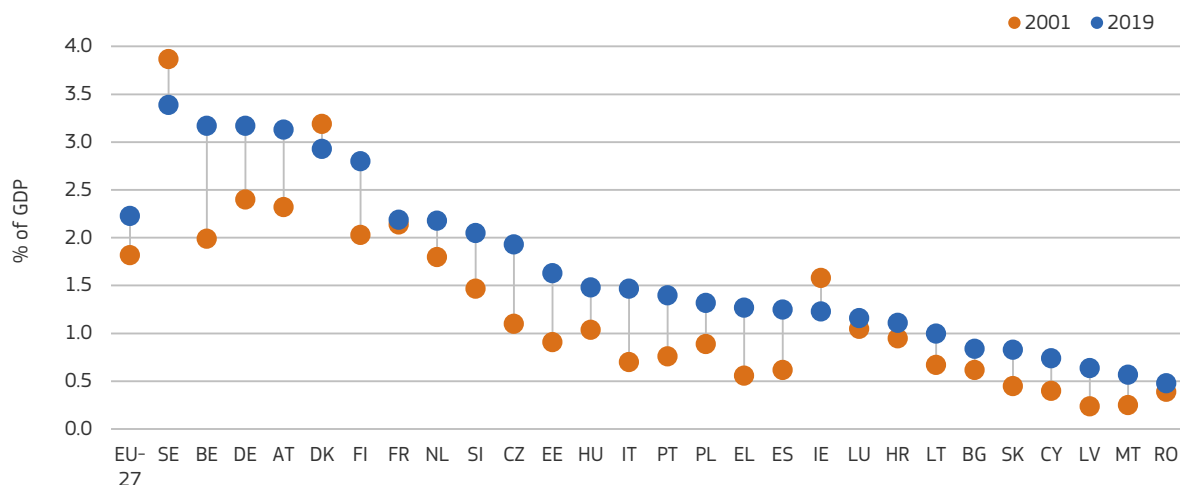
1 This Box provides a summary of the report “Foreign direct investment, global value chains and regional economic development in Europe”, prepared by Comotti et al. (2020) for the Directorate General for Regional and Urban Policy of the European Commission.
2 Krugman (2007).
3 OECD (2018), p. 31.
4 E.g. Altomonte et al. (2012).
5 Taglioni and Winkler (2014).

ties. The *high GVC integration* countries show varying economic disparities, while *backward GVC integration* countries show low shares of R&D expenditure (except Denmark) and lower economic disparities.

Leading industrial regions in Europe follow patterns and hierarchies similar to those of capital regions. Higher levels of both inward and outward FDI characterise advanced regions in the *forward GVC integration* economies such as Bayern, Baden-Württemberg, Hessen, Nordrhein-Westfalen, Niedersachsen and Rheinland-Pfalz (Germany), Zuid-Holland and

Noord-Holland (the Netherlands), Sydsverige (Sweden) and Pomorskie and Malopolskie (Poland). Equally, some key industrial regions in the *low GVC integration* countries display relatively high levels of both inward and outward FDI: Piemonte (Italy), and Cataluña, País Vasco, Galicia and Andalucía (Spain). Flanders (Belgium), in the *high GVC integration* category, follows a similar pattern, while industrial eastern EU regions in the *backward GVC integration* group mostly show internationalisation profiles skewed towards inward FDI.

Figure 2.12 Total expenditure on R&D, 2001 and 2019



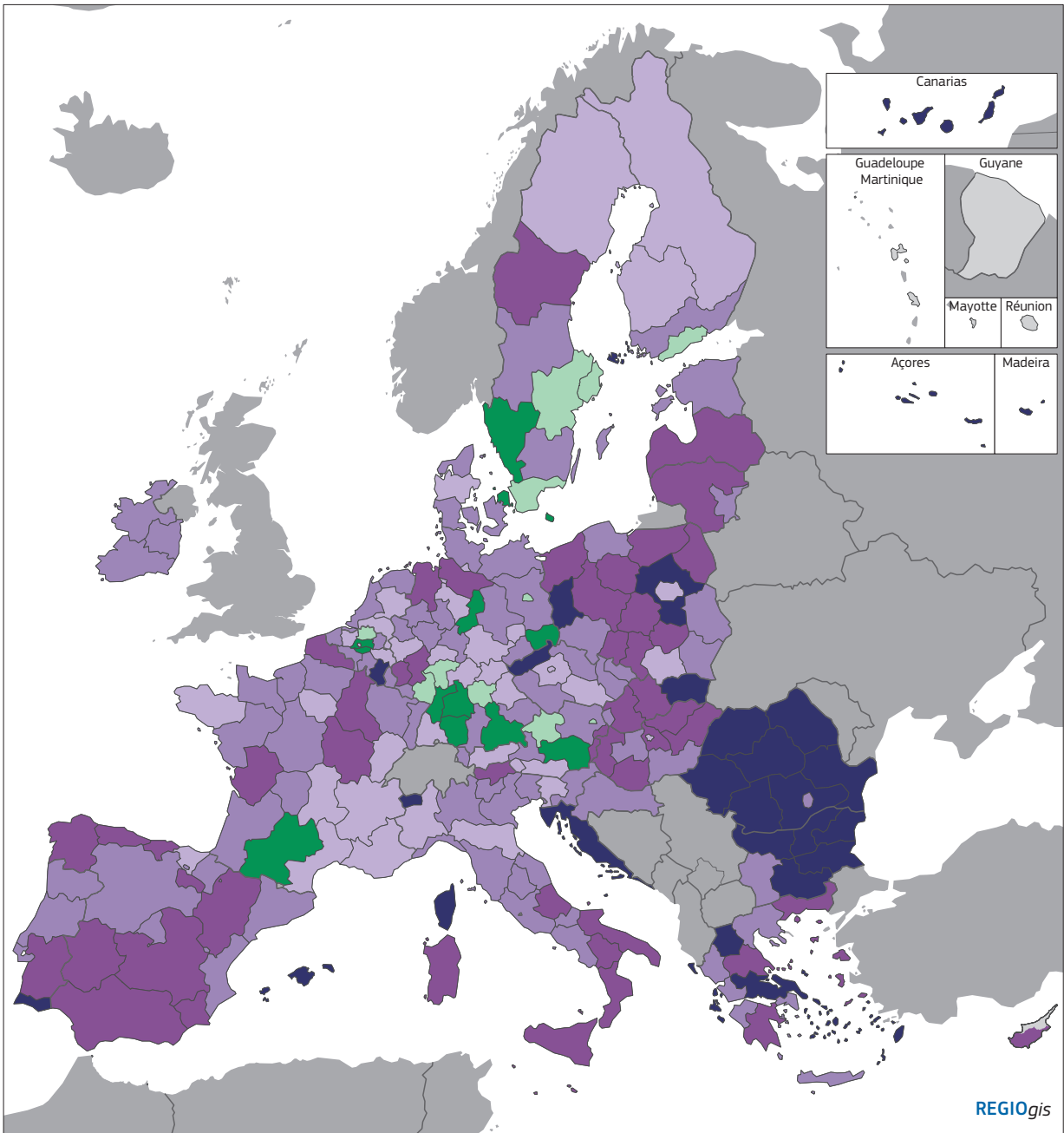
The 2001 figure for LU relates to 1999, for MT and HR to 2002.
Source: Eurostat [rd_e_gerdreg], DG REGIO calculations.

Expenditure on R&D in the EU amounted to 2.2% of GDP in 2019 (Figure 2.12) and increased only marginally over the previous two decades (from 1.8% of GDP in 2001). The expenditure rate increased in all Member States, except for Sweden and Finland, where it had already reached a high level in 2001, and Luxembourg²³. Despite the overall increase, in most Member States the expenditure rates for the most part remain well below those in other highly developed economies, especially Japan (where expenditure was 3.2% of GDP in 2019) or the US

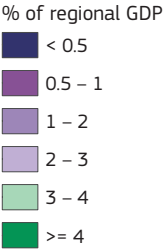
(where it was 3.1%). There is also no evidence of convergence in rates within the EU, Member States with comparatively low R&D expenditure in 2001 having the smallest increase in spending over the 2001–2019 period, suggesting a widening research and innovation divide between Member States.

R&D expenditure in the EU is highest in the north-western regions (at an average of 2.7% of GDP in 2019) and lowest in the east (1.3%) and south (1.4%). At the NUTS 2 level, spending is highest, at over 7% of GDP, in Braunschweig and Stuttgart in Germany and Brabant Wallon in Belgium (Map 2.8).

23 The decrease in Luxembourg is linked to the fact that business R&D spending has fallen strongly over the past decade. This is possibly related to the potentially large impact of the behaviour of a few multinational companies on official business R&D statistics (see: OECD (2019)).



Map 2.8 Total expenditure on R&D, 2019



EU-27 = 2.23
The EU-2020 target is 3%.
BE (except BE10), IE: 2017
FR: 2013
ES63, ES64: 2015
Source: DG REGIO based on Eurostat data (rd_e_gdreg).



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Figure 2.13 Total expenditure on R&D, 2019

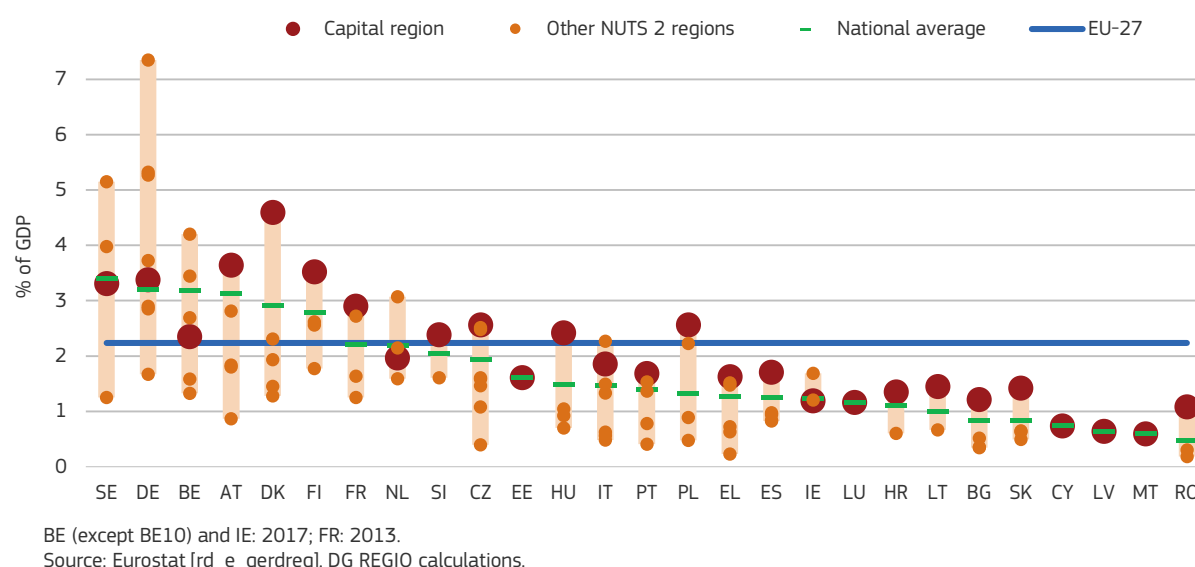


Table 2.7 Total R&D expenditure and the distance to the Europe 2020 target, 2019

	Less developed	Transition	More developed	EU-27
R&D as % of GDP	1.0	1.4	2.5	2.2
Distance to EU target (pp difference)	2.0	1.6	0.5	0.8
% of population living in regions that have reached the EU target	0.0	2.9	20.1	11.9

BE (except BE10) and IE relate to 2017. FR relates to 2013.
Only those regions for which data are available are included.
Source: Eurostat [rd_e_gerdreg], DG REGIO calculations.

In general, regions with the highest R&D expenditure tend to be the most developed, and often include capital cities (Belgium and Germany are notable exceptions) (Figure 2.13). Of the 20 regions with the highest expenditure, 19 are more developed (with GDP per head above the EU average), while two thirds of the 50 regions with the lowest expenditure are less developed (with GDP per head below 75% of the average).

In 2019, expenditure on R&D relative to GDP exceeded the Europe 2020 target of 3% only in a small number of NUTS 2 regions, accounting for just 12% of the EU population (Table 2.7). These are all more developed regions in the north-west of the EU, except Dresden (Germany) which is a transition region. None of the less developed regions met the 3% target, with expenditure on average over 2 pp below the target.

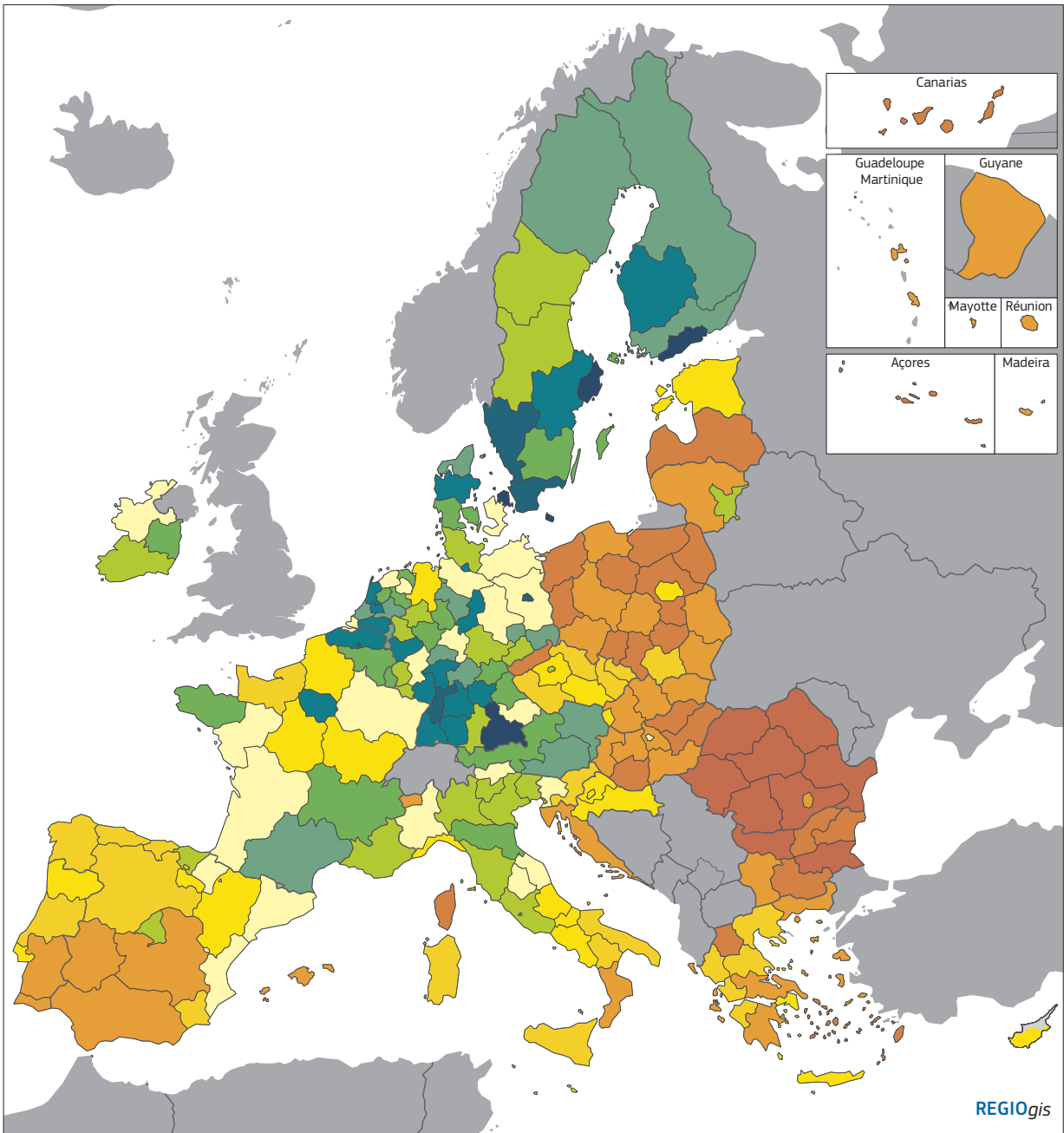
The Regional Innovation Scoreboard

The Regional Innovation Scoreboard (RIS) 2021 highlights the key role innovation plays in regional development²⁴. The RIS, an extension of the European Innovation Scoreboard (EIS), assesses the innovation performance of regions on the basis of a sub-set of the indicators included in the EIS. In 2021, it covers 215 regions in the EU²⁵, plus 30 regions in Norway, Serbia, Switzerland and the UK.

The most innovative regions in the EU by this measure are Oberbayern (Germany), Hovedstaden

²⁴ Regional Innovation Scoreboard 2021, available at: https://ec.europa.eu/info/research-and-innovation/statistics/performance-indicators/regional-innovation-scoreboard_en.

²⁵ All Member States are covered at the NUTS 2 level except for Austria, Belgium and France, which are covered at the NUTS 1 level.



Map 2.9 Regional performance groups, 2021

- | | |
|----------------------|--------------------|
| Emerging innovator - | Strong innovator - |
| Emerging innovator | Strong innovator |
| Emerging innovator + | Strong innovator + |
| Moderate innovator - | Leader innovator - |
| Moderate innovator | Leader innovator |
| Moderate innovator + | Leader innovator + |

Source: European Commission — Regional Innovation Scoreboard 2021.

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Box 2.7 Regional Innovation Scoreboard (RIS) methodology

The 2021 edition of the RIS provides a comparative assessment of innovation systems across regions. It is based on data for 21 of the indicators used in the EIS. This set of indicators covers higher education, scientific publications, ICT skills, R&D expenditure, business innovation and patenting. Data come from a variety of sources including Eurostat, SCOPUS (Science-Metrix), the community innovation survey (Eurostat and national statistical offices) and the European Union Intellectual Property Office (EUIPO).

Indicator values are normalised by using the min-max procedure: i.e. the difference between the observed score and the maximum score across all re-

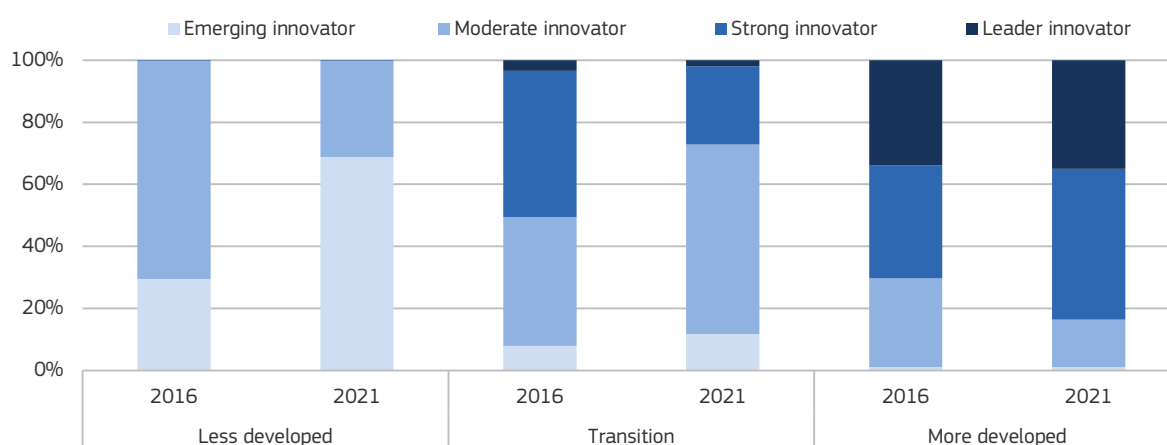
gions is calculated and then divided by the range between the minimum and the maximum scores across all regions. The overall RIS score is calculated as the unweighted average of the indicator scores. The RIS then classifies regions into four innovation performance groups based on their overall RIS score relative to the EU average: leader innovators (26 EU regions); strong innovators (55 EU regions); moderate innovators (69 EU regions); and emerging innovators (65 EU regions). A more detailed breakdown of these performance groups is obtained by splitting each group into a top third, middle third and bottom third.

(Denmark), Etelä-Suomi (Finland) and Stockholm (Sweden) (Map 2.9). Despite some regional variation within countries, the ranking of regions largely matches that of Member States, suggesting that indicator values at the regional level are affected by national characteristics. Most regional ‘innovation leaders’ are in Member States which are also identified as ‘innovation leaders’ or as ‘strong innovators’, and almost all of the regional ‘moderate’ and ‘modest’ innovators are in Member States categorised in the same way. However, regional

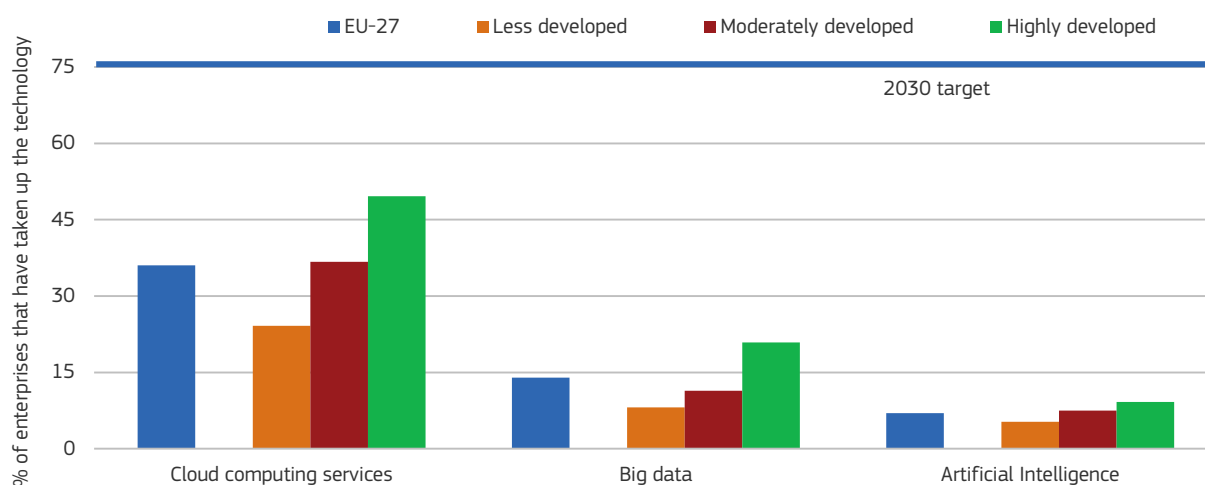
‘pockets of excellence’ are evident in some ‘moderate innovator’ Member States, including capital city regions in Czechia, Spain, and Lithuania as well as País Vasco in Spain, while some regions in ‘strong innovation’ Member States lag behind.

There is a close relationship between the level of development of regions and the innovation score (Figure 2.14). In 2021 about 70% of the population of less developed regions live in an ‘emerging innovator’ region, which is twice the 2016 level.

Figure 2.14 Share of EU population by Regional Innovation Scoreboard category and regional level of development, 2021 and 2016



In cases where the RIS score is only available at NUTS 1 level, it is assumed that the same score applies to the latter's constituent NUTS 2 regions. Calculations for both years are based on 2021 population data and level of development classification. Source: Regional Innovation Scoreboard 2021, DG REGIO calculations.

Figure 2.15 EU enterprise take-up of digital technologies by Member State level of development, 2020

All EU enterprises outside the financial sector with 10 or more employees are covered (Eurostat code 10_C10_S951_XK).
Source: Eurostat [isoc_eb], DG REGIO calculations.

This indicates that a large number of less developed regions that used to be moderate innovators have become emerging innovators. Furthermore, none of the population of less developed regions lives in a 'strong' or a 'leader innovator' region. Accordingly, during the last five years, the less developed regions have fallen further behind in terms of innovation, rather than catching up with the other regions. At the other end of the spectrum, 'leader innovators' are almost exclusively in the group of more developed regions, with only 2% of the population in transition regions living in a region in this category in 2021. The majority of 'strong innovators' are also in the more developed regional group, with 84% of the population of these regions in 2021 living either in a 'strong' or a 'leader innovator' region, up from 70% in 2016.

In general, the RIS confirms the wide diversity of EU regions in terms of innovation performance, so highlighting the fact that innovation has a strong regional dimension. Because of this, measures supporting innovation, including cohesion policy programmes, need to take explicit account of the regional or local context when devising the kind of support to provide. As it is inherently place-based, the 'smart specialisation' approach helps in this regard.

Expanding digitalisation

Digital technologies have the potential to boost more inclusive and sustainable growth by spurring innovation, generating efficiencies and improving services²⁶. The current Commission has put the green and digital transition — the 'twin transition' — on top of the political agenda as the two trends that will shape Europe and its future. A goal of the EU is to boost the digital transformation of businesses by encouraging the take-up of three digital technologies²⁷: cloud computing services; use of big data; and artificial intelligence (AI). The objective is that 75% of European enterprises²⁸ will have taken these up by 2030.

The take-up of cloud computing in 2020 was greater than for the other two technologies (Figure 2.15), and the share of enterprises using it was twice as large as in 2014 — a rate of increase which, if it continues, will enable the 2030 target to be achieved. The take-up of big data and AI remains much lower, which might be a result of these being newer and possibly less generally applicable from a business perspective.

26 See OECD topic on digitalisation and innovation at <https://www.oecd.org/g20/topics/digitalisation-and-innovation>.

27 European Commission (2021e).

28 All enterprises outside the financial sector with 10 or more employees (Eurostat code 10_C10_S951_XK).

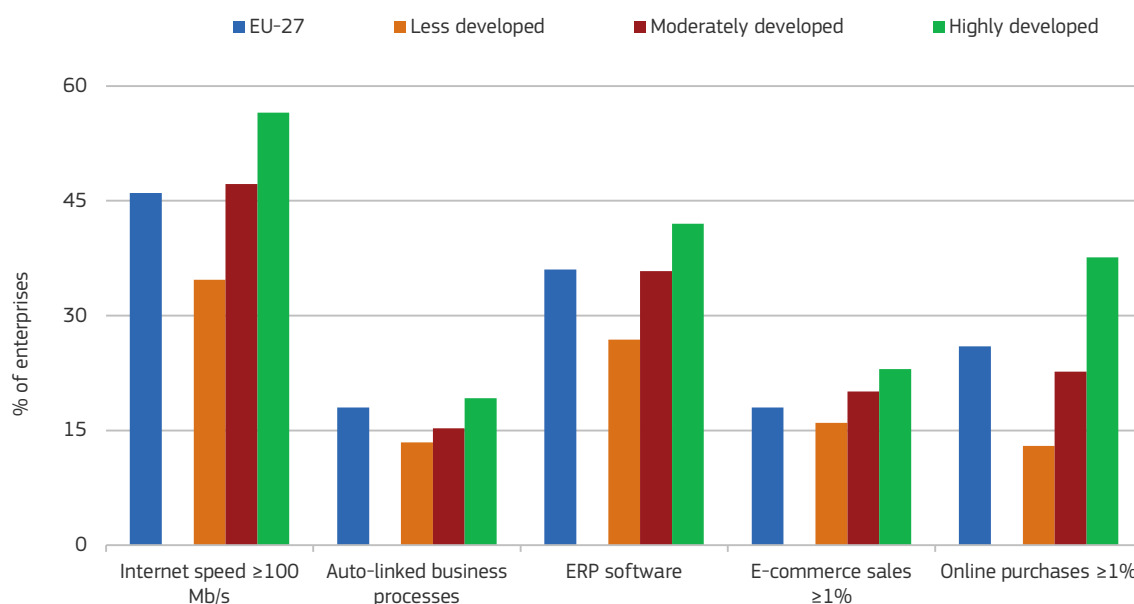
The take-up of digital technologies in the EU masks pronounced differences between Member States. For each of the three technologies, businesses in less developed countries lag behind, the take-up being highest in highly developed Member States.

A similar pattern is seen for the take-up of e-commerce and e-business technologies (Figure 2.16). A sufficiently fast internet connection is required for such take-up. On average, some 46% of enterprises in the EU have broadband with a speed of at least 100 Mb/s, but the figure is smaller in less developed Member States. Businesses in less developed Member States also lag behind in terms of the take-up of two specific e-business solutions, namely: the use of business processes which are automatically linked to those of their suppliers or customers; and the use of enterprise resource planning (ERP) software to share information between different functional areas. The same is the case

for e-commerce sales and online purchases. Both the share of enterprises with e-commerce sales of at least 1% of turnover and the share with online purchases of at least 1% of the total are smaller in less developed Member States, although the difference compared with other Member States is larger for the latter share.

These results confirm that digitalisation may further fuel the research and innovation divide, at least between Member States. Given the increasing importance of digital technologies for enterprises to remain competitive, this is a cause for concern from a cohesion perspective. Since technology take-up is an important driver of economic convergence, less developed Member States risk falling further behind rather than catching up, if their businesses do not innovate by adopting digitalisation. Moderately developed Member States may also see their capacity to compete diminished

Figure 2.16 EU enterprises take-up of e-commerce and e-business technologies by Member State level of development, 2020



All EU enterprises outside the financial sector with 10 or more employees are covered (Eurostat code 10_C10_S951_XK).

Data on ERP software relate to 2019; auto-linked business processes to 2017; and online purchases to 2018, except AT, DE, IT, SE, EU27 (2017), EE, HR, SI (2016), and FI, MT (2015).

The full definitions of the five indicators are: (1) a maximum contracted download speed of the fastest fixed-line internet connection of at least 100 Mb/s; (2) enterprises with business processes automatically linked to those of their suppliers and/or customers; (3) enterprises with ERP software packages to share information between different functional areas; (4) enterprises with e-commerce sales of at least 1% of turnover; and (5) enterprises purchasing at least 1% of the total online.

Source: Eurostat [isoc_eb, isoc_ec], DG REGIO calculations.

Box 2.8 Smart specialisation strategies

Smart specialisation is a place-based approach to the governance of innovation policy that focuses investment in research and innovation on selected areas of activity, identified through a wide and inclusive process to mobilise the local knowledge of relevant stakeholders, including businesses, public bodies, research organisations and civil society.

Conceived in the 2014–2020 programming period, smart specialisation strategies are defined by Regulation (EU) 1301/2013 as *“the national or regional innovation strategies which set priorities in order to build competitive advantage by developing and matching research and innovation own strengths to business needs in order to address emerging opportunities and market developments in a coherent manner, while avoiding duplication and fragmentation of efforts.”*

In practical terms, the smart specialisation approach concentrates resources into carefully defined ‘priority areas’. These priority areas can be framed in terms of knowledge fields or activities (not only science-based but also social, cultural and creative ones) or sub-systems within an economic sector or cutting across sectors. They can also correspond to specific market niches, clusters, technologies or applications of technologies to specific societal and environmental challenges. These priority areas should at the same time be in line with the region’s existing assets and be able to take advantage of innovation opportunities.

Smart specialisation strategies were introduced in 2014–2020 as an *ex ante* condition for all investment priorities under Thematic Objective 1 of the European Regional Development Fund (ERDF). A distinct feature is that Member States or regions need to identify priorities for investment through an ‘entrepreneurial discovery process’, involving key innovation stakeholders, business, and all actual or potential innovation actors that may possess crucial knowledge about new activities to establish in the country or region.

Smart specialisation was an integral part of EU cohesion policy in the 2014–2020 period. A total of 180 smart specialisation strategies were formulated in this period, with ERDF investment of over €40 billion (€68 billion including national co-financing).

A partial transition towards innovative and smart transformation

Although it is still too early to assess the impact of smart specialisation on innovation, jobs and productivity, there is already some evidence of how the policy has been implemented on the ground and its effect on policy-making.

A recent study¹ shows that in most regions the prioritisation of investment was based on a broad and inclusive ‘entrepreneurial discovery process’, which in most cases was specifically set up for formulating the smart specialisation strategy. About half of the 180 strategies, as well as about half of the ERDF funding available for these, concerned projects in the agrofood & bioeconomy (21%), health & life sciences (15%) or ICT & industry 4.0 (15%) sectors. Although the extent of prioritisation differs between the regions, there is evidence that the selected priorities closely reflect the scientific and technological profile of regions and public and private sector strengths.

Strategies do not necessarily match the current economic structure as reflected in the sectoral division of employment, but they more often prioritise sectors in transformation, as measured by growth rates of employment. Smart specialisation eligibility criteria seem to have been generally well applied in selecting projects, and the resulting ERDF investment in research and innovation largely match the priority areas selected.

Although challenges remain, new practices in public administration seem to have emerged at national, regional and local level. In particular, recent studies, based on policy-maker perceptions and case studies², suggest that the

1 Prognos and CSIL (2021).

2 Hegyi et al. (2021); Guzzo and Gianelle (2021).

smart specialisation experience has improved co-ordination and strengthened the network of relations between regional and local actors, as well as making the decision-making process and the governance of innovation policy more inclusive. It seems also to have helped reorganise and/or establish co-ordination bodies, platforms, and thematic working groups and clusters. Nevertheless, the effectiveness of co-ordination between the public and private sectors and within public authorities remains an issue in several regions. More efforts are needed in the future in this regard, along with strengthening the skills and resources to perform policy functions. A clear and, if possible, dedicated structure of governance has proved to be important in this respect.

Box 2.9 Business demography statistics

Employer business demography statistics at regional level show where firms (with at least one employee) are located in the EU, and their dynamics in terms of births, deaths and growth. This section examines indicators of the number of firms relative to population, employees per firm, firm birth rates (firms created relative to population), firm death rates (closures relative to population), and the proportion of ‘high growth’ firms (defined here as firms with at least 10 employees growing by over 10% per year over a three-year period).

For more details see: http://ec.europa.eu/eurostat/statistics-explained/index.php/Structural_business_statistics_at_regional_level.

if they fail to do likewise, so risking falling into, or remaining in, a development trap (as indicated in Section 2.3 above).

4.2 Firm dynamics in EU regions

In 2018, the number of firms²⁹ with at least one employee — termed ‘employer firms’ here — was largest relative to the population in Greece, Cyprus, Luxembourg, Slovenia (for which only national data are available) and most parts of Hungary and Estonia (Map 2.10). This may reflect a relative absence of large firms. Although the number of firms varies greatly between regions within Member States, the national context appears to be an important factor. In most Member States, the number of firms relative to the population is highest in the capital metro regions, except for France, Italy, Austria and Spain. This is in part because many firms, especially large ones, have their headquarters there. The headquarters function also contributes to the higher number of employees per firm

in the capital metro region³⁰. In general, non-metro regions tend to have fewer employer firms per inhabitant than metro regions.

Firms may locate in more urbanised areas to benefit from agglomeration economies, from ‘matching’, ‘sharing’ and ‘learning’³¹. Cities tend to have larger labour markets, allowing better matching between labour demand and supply, and enable better sharing of inputs and infrastructure, while the fact that people work and live in close proximity facilitates learning from one another.

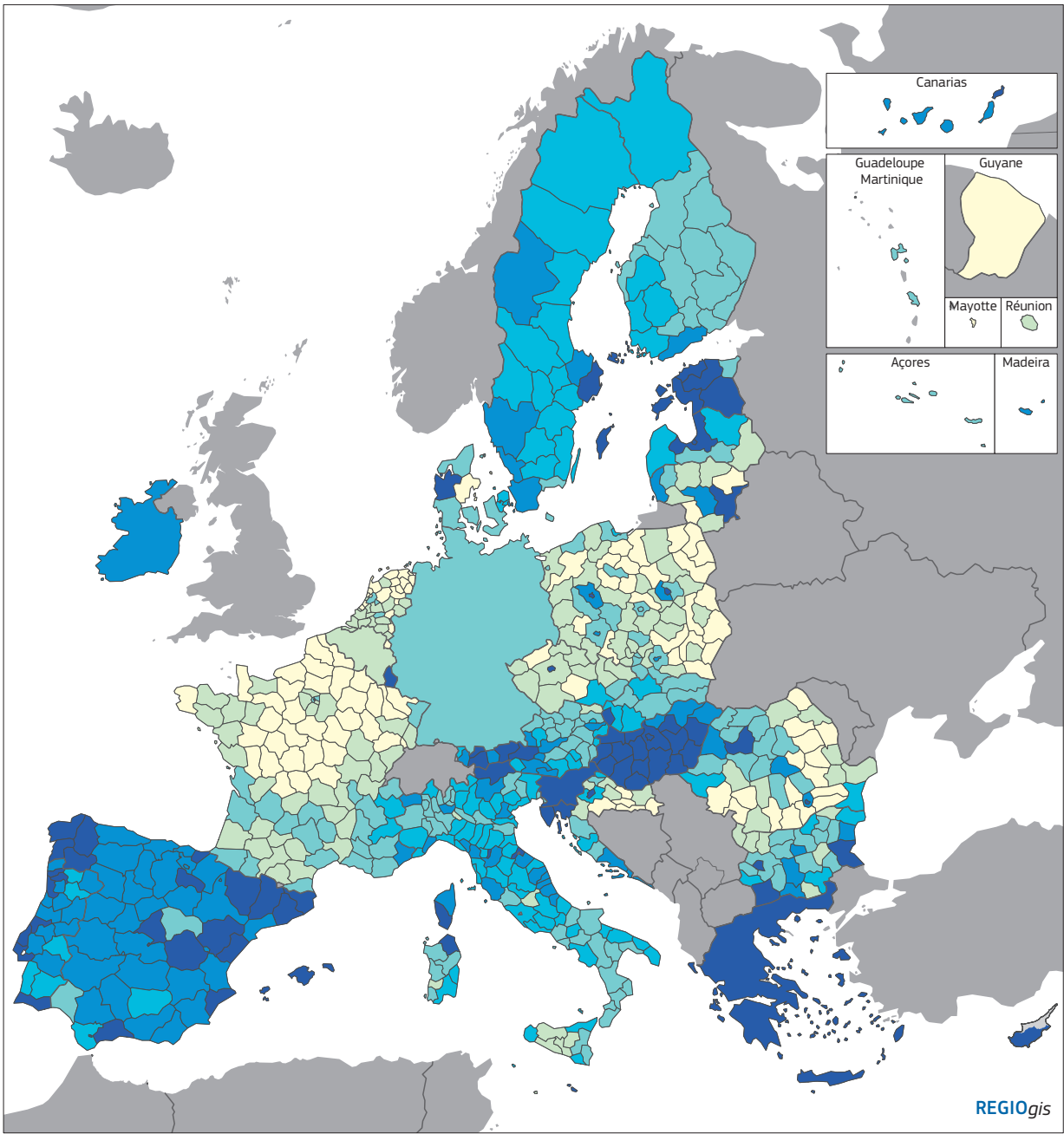
New enterprise creation is one of the main drivers of economic development and employment creation. New firms can help to open new sectors and higher-value-added markets, so contributing to the structural transformation of an economy³². They may also help to increase competitiveness by pushing incumbent enterprises to become more efficient.

29 All firms in the business economy, as defined by NACE Rev.2, are covered, except insurance activities of holding companies (sector K642).

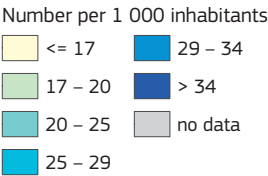
30 Some caution is needed in interpreting this result. Some large enterprises may be composed of multiple local units, located in different regions, but with their employment registered in the head office often located in the capital city. This may inflate the number of employees counted as working there.

31 Duranton and Puga (2020).

32 Dent et al. (2016).



Map 2.10 Active employer businesses, 2018



BE: 2017
Source: Eurostat (bd_esize_r3 and bd_9eg_l_form_r2).



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Box 2.10 Regional cohesion: corporate divergences and how to address gaps

The pandemic has highlighted gaps among regions and societal groups. Firms across the EU were hit by the COVID-19 shock to different extents, depending on sectoral activities and their ability to adapt to the pandemic situation. The crisis accelerated structural economic and societal change, creating some risks for cohesion as firms are adjusting at different speeds to the emerging recovery phase, marked by a stronger emphasis on digitalisation.

The European Investment Bank's Investment Survey (EIBIS)¹, an annual corporate survey that gathers insights on the investment landscape in the EU, helps shed light on the effects of the COVID-19 crisis on investment and how these link to regional cohesion. For this, firms' responses are grouped depending on their location in less developed, transition, and more developed regions².

EIBIS results show that cuts to investment activity triggered by COVID-19 came on top of lower initial investment activity, particularly in less developed regions. Here, 79% of firms undertake investment, compared with 85% in transition, and 87% in more developed regions³. Firms in less developed and transition regions tend to be smaller, and fewer tend to export, compared with those in more developed regions. Firms' investment activities in less developed and transition regions tend to be tilted towards tangibles; a smaller share of firms target investment

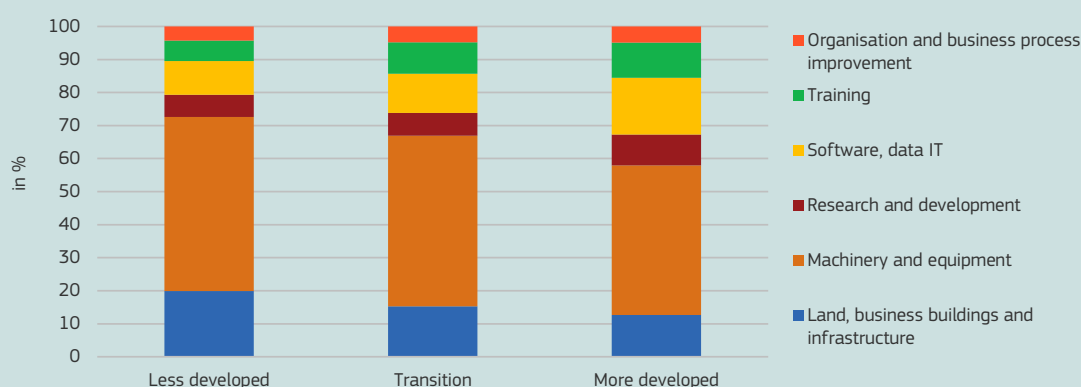
towards R&D compared with peers in more developed regions, where more active innovators (firms that heavily invest in R&D) are located (Figure 2.17).

Firms in less developed and transition regions operate in a more challenging environment and report obstacles to investment more often; and they find considerably more often that their investment is hindered by uncertainty, energy costs and lack of access to transport infrastructure and finance.

A more challenging investment environment, together with structural differences pre-dating the pandemic, can hamper adjustment to the emerging recovery phase. Fewer firms in less developed and transition regions have reacted to the pandemic by becoming more digital, while many in more developed regions are pulling ahead.

Policy measures have helped to limit the immediate adverse impact of the pandemic on jobs. However, a higher share of firms expect the COVID-19 outbreak to lead to a decrease in employment in the longer term (19% in less developed and 14% in transition regions compared with 12% in more developed ones). Structural shifts towards a greener and more digital economy and innovation will also be important to maintain competitiveness and support economic catch-up in less prosperous regions, and to maintain and nurture good-quality employment op-

Figure 2.17 Composition of investment by regional level of development, 2020



The results cover all firms who have invested in the last financial year (excluding "don't know" and refused responses).

The results concern replies to the survey question: "In the last financial year, how much did your business invest in each of the following with the intention of maintaining or increasing your company's future earnings?"

Source: EIBIS 2021.

portunities in the longer term. EIBIS analysis shows that the pandemic has had a negative impact on human capital formation, with fewer adults participating in training and schools being closed across the EU. What is more, school closures are likely to have accentuated regional disparities, as less wealthy Member States closed schools for longer. This underscores the need to invest in human capital as

part of recovery strategies to the mitigate risks of rising territorial and social divergences in the future.

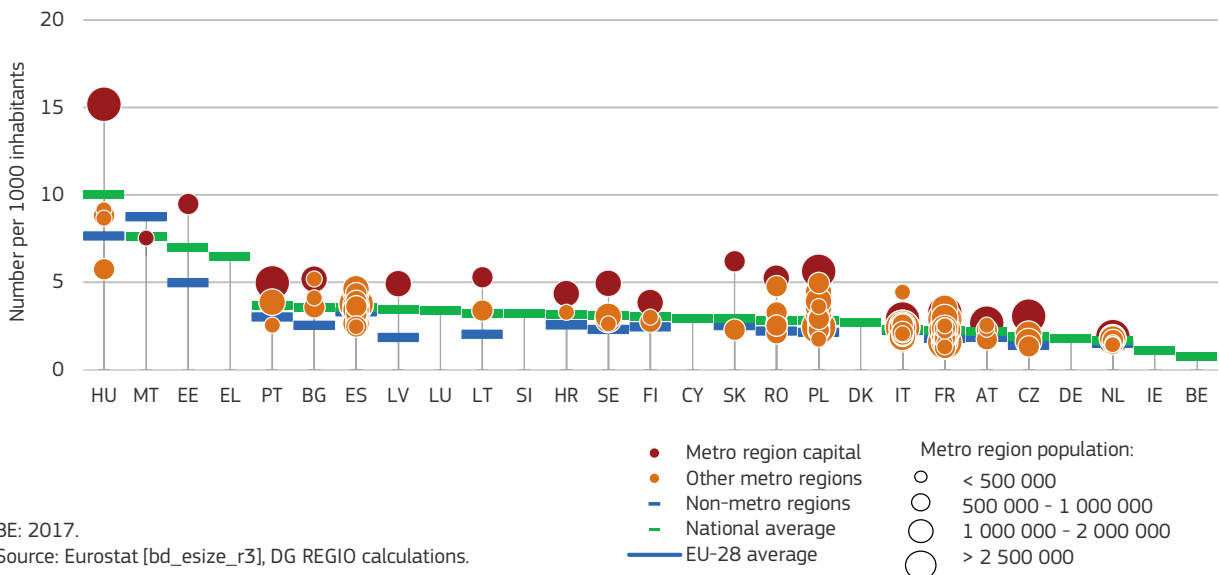
1. Available at this link: <https://www.eib.org/en/publications-research/economics/surveys-data/eibis/index.htm>.
2. For further information on the methodology see: Delanote and Wruuck (2021).
3. Based on EIBIS 2020, available at this link: <https://www.eib.org/en/publications/econ-eibis-2020-eu>.

In 2018, the number of newly created employer firms relative to the population tended to be higher in capital metro regions in both more developed and less developed Member States, with birth rates in Budapest and Tallinn being particularly high (Figure 2.18). Paris, Rome and Madrid are exceptions, birth rates being lower than in other metro regions in the Member States concerned. In many sectors, firms operating in metro regions tend to face more competition because of the larger market and so a greater risk of being forced out of business if they are uncompetitive³³. High death rates, therefore, often go with high birth rates, as in Budapest and Tallinn, though death rates tend

to be lower than birth rates, particularly in metro regions³⁴.

High-growth enterprises³⁵ play an important role in the economic growth of cities and regions through their contribution to productivity and innovation³⁶. In 2018, capital metro regions typically had the highest number of high-growth firms per head. The only exceptions were Lisbon, Amsterdam, Rome, Paris and Vienna, but even there the number was still above the country average (Figure 2.19). In all Member States, the number was higher in metro regions than non-metro regions.

Figure 2.18 Employer firm birth rates by type of region, 2018



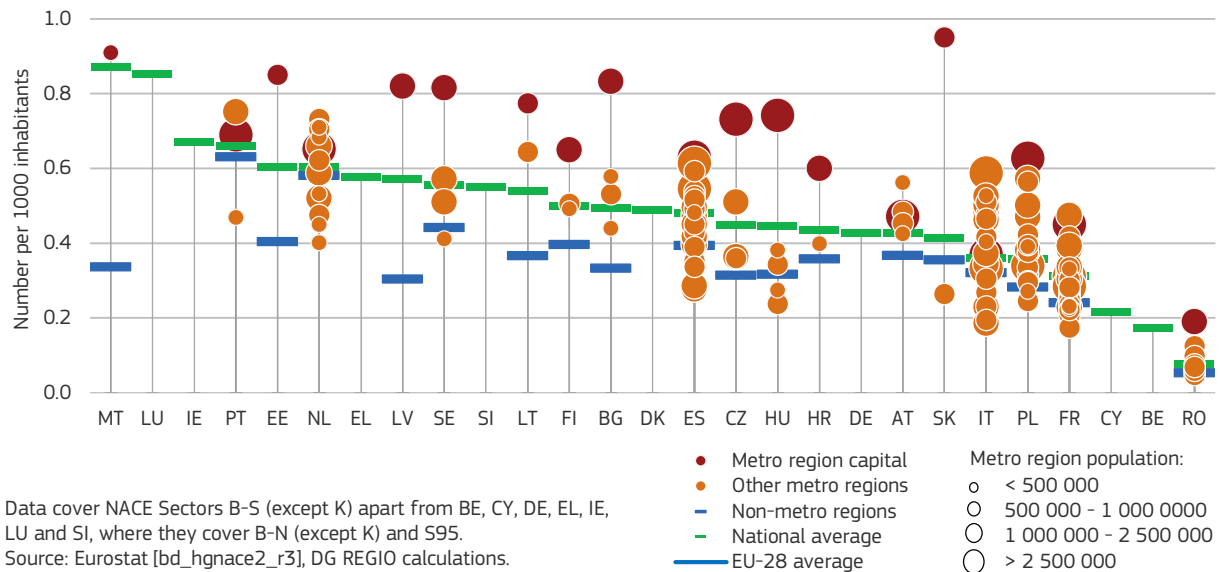
33 Melitz and Ottaviano (2008); Combes et al. (2012).

34 This may reflect the fact that firms can cease operating without being formally closed down.

35 High-growth enterprises are those which had at least 10 employees at the beginning of the period and where employment increased by over 10% per year over the subsequent three years.

36 Acs et al. (2008).

Figure 2.19 Number of high-growth firms by type of region, 2018



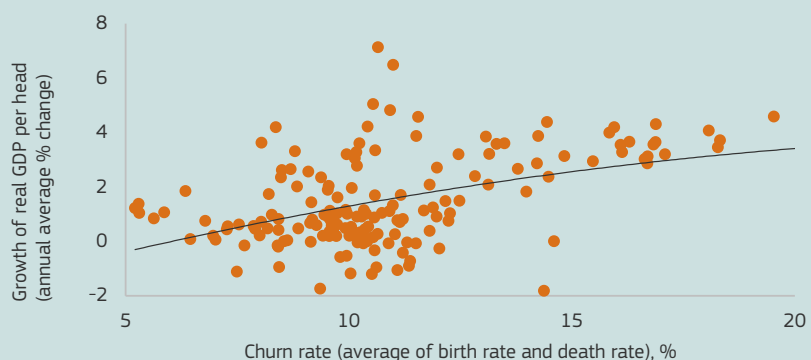
Box 2.11 Creative destruction and GDP growth in EU regions

The economic concept of creative destruction is described by Schumpeter (1942) as “*the process of industrial mutation that continuously revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one*”. As a concept it is studied as a possible driver of economic growth, often in an endogenous growth context¹. In the literature on firm and employment dynamics, creative destruction is in many cases measured by the average of the rate of firm creation and the rate of firm destruction, also known as the business churn rate.

There is a significant positive relationship between the churn rate and the average annual growth rate of real GDP in EU NUTS 2 regions

over the 2008–2018 period (Figure 2.20), primarily reflecting the fact that nearly all regions with churn rates above 12% had above-average GDP growth². Among regions with lower churn rates the relationship is weaker and, indeed, many of these had high growth.

Figure 2.20 Creative destruction and GDP growth in EU regions, 2008–2018



The precise period covered differs between regions because of data gaps for the churn rate.
Source: Eurostat, DG REGIO calculations.

1 See e.g. Aghion and Howitt (1992).

2 The single exception is Guyane, which could be considered an outlier.

Box 2.12 Entrepreneurship is crucial for regional development, but start-ups and ‘scale-ups’ face particular financing constraints

Start-ups and scale-ups need capital. EU start-ups, however, have more difficulty in obtaining venture capital than their US counterparts. EU scale-ups have even more difficulty in growing and remaining independent than US firms. An additional problem is that venture capital is usually concentrated in a few places, often in the capital city.

To boost investment opportunities from venture capital and make funding more accessible to small and innovative enterprises, the Commission in 2016 launched a pan-European Venture Capital Fund-of-Funds under the start-up and scale-up initiative¹. This complements other financial instruments under the EU programme for the competitiveness of enterprises and SMEs (COSME) and Horizon 2020’s Innovfin to facilitate SME access to guarantees, loans

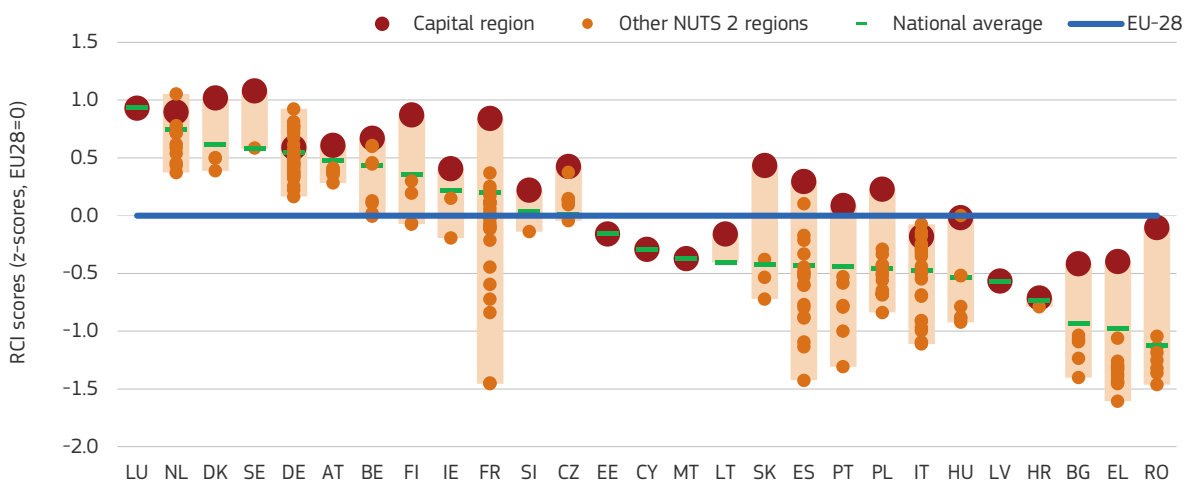
and equity capital through local financial institutions in the Member States.

To help start-ups and scale-ups, and building on the single digital gateway² and existing national and European contact points, the European Commission has set up the Enterprise Europe Network (EEN), which provides ‘scale-up advisors’ in all regions to provide advice to SMEs on relevant national and EU regulations, funding and partnering opportunities, and how to participate in cross-border public procurement.

2 The single digital gateway refers to an initiative to create a single point of access to the information, administrative procedures and assistance services that individuals and businesses need to become active in another EU Member State. By the end of 2023 at the latest, users will be able to perform a number of procedures in all EU Member States without any physical paperwork, such as registering a car or claiming pension benefits.

1 COM(2016)733 final.

Figure 2.21 Distribution of regional RCI 2019 scores by Member State



Source: DG REGIO.

4.3 Regional competitiveness in Europe

Regional competitiveness indicates the ability of a region to offer an attractive and sustainable environment for firms and residents to live and work in. Launched in 2010 and updated regularly since, the RCI is designed to capture the different dimensions of competitiveness for EU NUTS 2 regions³⁷. It allows regions to monitor and assess their development over time as compared with other regions³⁸. The most recent edition of the RCI was published in 2019. It shows that, more than 10 years after the crisis, there is still a clear north-west/south-east divide across the EU (Map 2.11).

In line with previous editions, the 2019 RCI shows a polycentric pattern with a strong performance by most capital city regions and others with large cities, which benefit from agglomeration economies, better connectivity and high levels of human capital.

Capital city regions tend to be the most competitive, except in the Netherlands (where the capital city region is ranked second), Italy (where Lombardia is the most competitive region) and Germany (Figure 2.21).

The gap between the capital city region and others is particularly wide in France, Spain, Portugal and many of the eastern Member States. This can be a reason for concern as it puts pressure on the capital city region while possibly leaving resources under-used in other regions.

In general, higher levels of GDP per head are associated with higher levels of competitiveness. However, this relationship is stronger at lower levels of GDP — among more prosperous regions there is more variation in competitiveness.

³⁷ See Annoni and Kozovska (2010), Dijkstra, Annoni and Kozovska (2011), Annoni and Dijkstra (2017) and Annoni and Dijkstra (2019).

³⁸ All RCI editions are built on the same approach as the Global Competitiveness Index of the World Economic Forum.

Box 2.13 The Regional Competitiveness Index (RCI) methodology

The 2019 edition of the RCI is based on a set of 74 indicators selected from 84 candidate indicators (some indicators used in 2016 have been replaced). Most indicator values available span the period 2015–2017, some are for 2018, while a few go back to 2014.

Data come from a wide variety of sources, including the Quality of Government Index (University of Gothenburg), Worldwide Governance Indicators (World Bank), Global Competitiveness Index (World Economic Forum), various Eurostat indicators, and the RIS (DG GROW).

Following the same methodology as previous editions, the indicators are grouped into 11 dimensions of competitiveness capturing aspects that are relevant for productivity and long-term development. In turn, these 11 dimensions are organised into three sub-indices: basic, efficiency and innovation. The basic group includes five dimensions: (1) institutions; (2) macro-economic stability; (3) infrastructure; (4) health; and (5) basic education, which are the key drivers for all economies. As a regional economy develops and its competitiveness increases, a more skilled labour force and a more efficient labour market come into play as part of the efficiency group, which includes three dimensions: (6) higher

education, training and lifelong learning; (7) labour market efficiency; and (8) market size. At the most advanced stage of development, the innovation group becomes more important, consisting of three dimensions: (9) technological readiness; (10) business sophistication; and (11) innovation. Indicator values are normalised as z-scores: i.e. by calculating the difference between the observed score and the mean score across regions and dividing by the standard deviation.

EU regions are divided into five development stages based on their average 2015–2017 GDP per head (in PPS terms) relative to the EU average. The weights attached to the three sub-indices used to calculate the overall RCI differ between stages of development (Table 2.8).

The 2019 RCI tracks the performance of all NUTS 2 regions in EU Member States. As in previous editions, the regions that are part of the same functional urban area are combined, which is the case for six capital functional urban areas (i.e. those of Vienna, Brussels, Prague, Berlin, Budapest and Amsterdam).

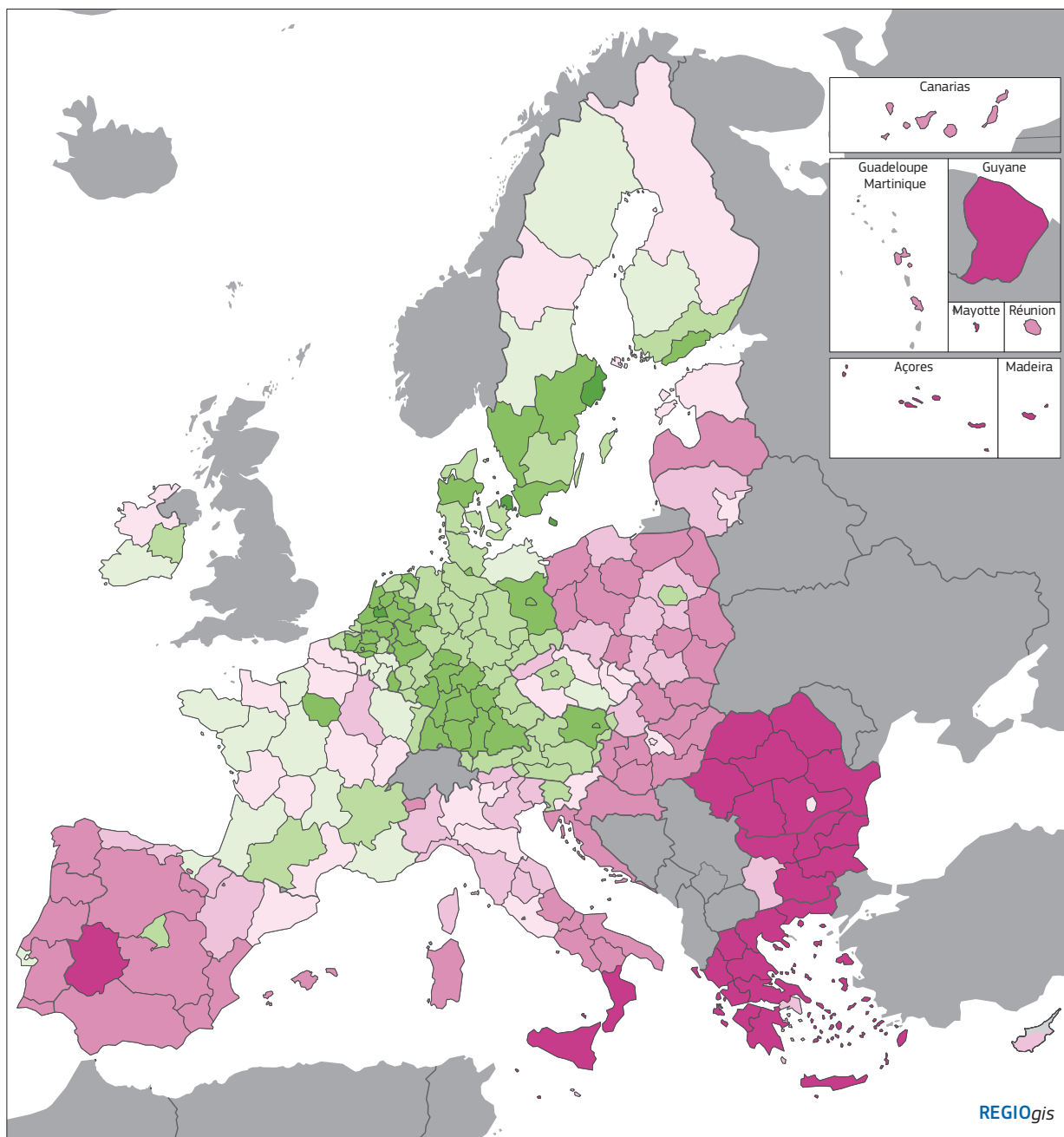
For further details on the methodology, see Annoni et al. (2019).

Table 2.8 Weights of the three RCI sub-indices per development stage

Stage of development	Basic sub-index	Efficiency sub-index	Innovation sub-index
Stage 1: GDP index <50	30.00	50.00	15.00
Stage 2: GDP index 50–75	31.25	50.00	18.75
Stage 3: GDP index 75–90	27.50	50.00	22.50
Stage 4: GDP index 90–110	23.75	50.00	26.25
Stage 5: GDP index ≥ 110	20.00	50.00	30.00

The GDP index is calculated based on the EU average=100.

Source: Annoni et al. (2019).



Map 2.11 Regional Competitiveness Index — RCI 2019

Index: values range from low (negative) to high (positive)

■ < -1	■ 0 – 0.2
■ -1 – -0.5	■ 0.2 – 0.5
■ -0.5 – 0.2	■ 0.5 – 1
■ -0.2 – 0	■ > 1

Source: DG REGIO.

0 500 km

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Countryside near Toulouse (France) - Olivier LAURENT Photos/Shutterstock.com

Chapter 3

A greener, low-carbon Europe

- The EU has adopted the European Green Deal, with the goal of making the EU economy climate-neutral by 2050. This will require a rapid reduction in greenhouse gas (GHG) emissions, more investment in green technologies and protection of the natural environment.
- GHG emissions dropped by 24% between 1990 and 2019. This suggests the EU will meet its 2020 target of reducing GHG emissions by 20%. The new 2030 target, as part of the 'Fit for 55' package, is a reduction of 55%. This will imply large reductions in emissions both within and outside the Emissions Trading System (ETS).
- Energy consumption has decreased significantly in the EU over recent decades. Nevertheless, the latest figures indicate that the 2020 energy-efficiency target will be missed. The 2030 target is more ambitious and will require additional efforts.
- The share of renewables in energy consumption in the EU rose steadily from 11% in 2006 to 19% in 2018, close to the 2020 target of 20%, but some Member States are lagging behind their 2020 national targets. The target of 40% by 2030 will require combined efforts to boost production of renewable energy and reduce total energy consumption.
- Climate change affects a growing number of EU regions, but the impact differs depending on their geography and the structure of their economy. Sectors such as tourism and agriculture are likely to be particularly affected.
- Only 40% of EU water bodies are in a good ecological state. Despite significant progress, several rural areas and less developed regions still need important investment in wastewater treatment.
- The share of waste recovered increased from 46% in 2004 to 54% in 2018 in the EU. This helps to protect the environment, recycle raw materials and recover energy. Nevertheless, the rates of recycling and incineration with energy recovery remain low in several Member States.
- The emissions of most major air pollutants have significantly shrunk in the EU. Exposure to air pollutants, however, is still high in many cities. A third of city residents live in cities where at least one of the air pollution thresholds is exceeded.
- Biodiversity loss and the degradation of ecosystem services continue in the EU across terrestrial, freshwater and marine ecosystems. Protecting and restoring biodiversity can help to improve the flow of ecosystem services and to mitigate climate change and its impacts. For example, investing in urban vegetation or wetlands can reduce the impact of heatwaves and floods, provide more habitat for endangered species, reduce air and noise pollution, and provide spaces for leisure, thus improving urban quality of life. In rural areas, fostering high-diversity landscapes can increase ecological connectivity and help species to adapt to climate change, while at the same time enhancing ecosystem services such as pollination, climate and water regulation, and erosion protection.

Chapter 3

A greener, low-carbon Europe

Recent extreme events, such as deadly flooding in Germany and Belgium or uncontrollable forest fires in Greece, illustrate the challenges faced by the EU in tackling the consequences of climate change. According to the last report from the Intergovernmental Panel on Climate Change (IPCC), almost the entire 1.1°C of warming since the pre-industrial era is due to human activity¹. The IPCC gives a 50% chance that a 1.5°C warming could be reached before 2040. As a result, the negative impacts of climate change will become more frequent and more severe and all regions in the EU will be affected.

At the same time, the world is facing a massive extinction episode. This translates into a rapid fall in biodiversity that affects all parts of the world. At present, one million of the eight million species known on the planet are at risk of being lost due to the impact of human activities, including land- and sea-use changes, over-harvesting, climate change, pollution and invasive alien species. Biodiversity loss due to human pressures continues also in the EU, undermining the capacity of ecosystems to deliver benefits to humans. However, the quality of our environment is essential to human well-being and to maintaining the provision of key ecosystem services such as climate regulation, flood protection, air and water quality, soil fertility, pollination and the production of food, fuel, fibre and medicines.

This chapter looks at the main trends related to climate change and the environment. It assesses the extent to which the EU has or has not reached some of its key policy targets in the area. It also analyses how and to what extent EU regions are affected by the consequences of climate change and how they perform in preserving the quality of their environment.

1. EU climate action and the European Green Deal

Climate change and environmental degradation are the most challenging threats to living conditions in Europe and, indeed, in the world as a whole. In response, the EU has adopted the European Green Deal — a new growth strategy with ambitious targets for resource-efficiency, competitiveness, greenhouse gas (GHG) emissions and inclusiveness. The goal is to make the EU economy and society climate-neutral by 2050 by cutting emissions, investing in green technologies and protecting the natural environment. A European climate law has been proposed by the Commission to make the goal legally binding².

Over recent decades, the EU has adopted a series of targets for GHG emissions, energy efficiency and the share of renewables in energy consumption, with the aim of achieving the transformation to a low-carbon economy. The EU key targets were set in the following frameworks (Table 3.1):

- the 2020 climate and energy package adopted in 2007, which was aimed at a 20% cut in GHG emissions (from 1990 levels), a 20% share of renewables in energy consumption and a 20% improvement in energy efficiency by 2020;
- the 2030 climate and energy framework adopted in 2014, which upgraded the 2020 targets to respectively 40%, 32% and 32.5%;
- the European Green Deal, in which the Commission proposed an update of the 2030 target for reducing GHG emissions by 55% and raised the targets relative to renewables and energy efficiency to 40% and 36% respectively; and
- the 2050 long-term strategy aimed at making the EU climate-neutral by 2050.

1 Intergovernmental Panel on Climate Change (2021).

2 European Commission (2018b).

Table 3.1 Key EU climate and energy targets

Target timeline	2020	2030	2030	2050
Policy framework	2020 climate and energy package	2030 climate and energy framework	EU climate law and 'Fit for 55' package	EU climate law and 'Fit for 55' package
Year of adoption	2007	2014	2021	2021
Targets				
GHG emissions reduction	20.0%	40.0%	55.0%	Net zero GHG emissions
Share of renewables in energy consumption	20.0%	32.0%	40.0%	not available
Increase in energy efficiency	20.0%	32.5%	36.0–39.0%	not available

Source: European Commission.

In July 2021, the European Commission adopted a series of legislative proposals setting out how it intends to achieve climate neutrality in the EU by 2050, including the intermediate target of a net reduction in GHG emissions of at least 55% by 2030. The 'Fit for 55' package³ combines: the application of emissions trading to new sectors, and a tightening of the existing EU Emissions Trading System (ETS); the accelerated use of renewable energy and greater energy efficiency; a faster roll-out of low-emission transport modes; the alignment of taxation policies with the European green deal objectives; measures to prevent carbon leakage; and tools to preserve and grow the EU's natural carbon sinks. At the same time, a more transparent and dynamic governance process has been set up to help meet the 2030 targets and the EU's international commitments under the Paris Agreement, involving an integrated monitoring system and reporting rules.

For these plans to succeed, action in all parts of the EU economy is needed, notably: investment in environmentally friendly technologies; targeted R&D and innovation; cleaner, cheaper and healthier forms of private and public transport; decarbonisation of the energy sector; and improvements in the energy efficiency of buildings.

1.1 Reducing greenhouse gas emissions

Under the 2020 climate and energy package⁴, the EU committed to reducing GHG emissions by 20% by 2020 relative to 1990. The pursuit of this objective was supported by two instruments, the ETS and the Effort Sharing Decision (ESD).

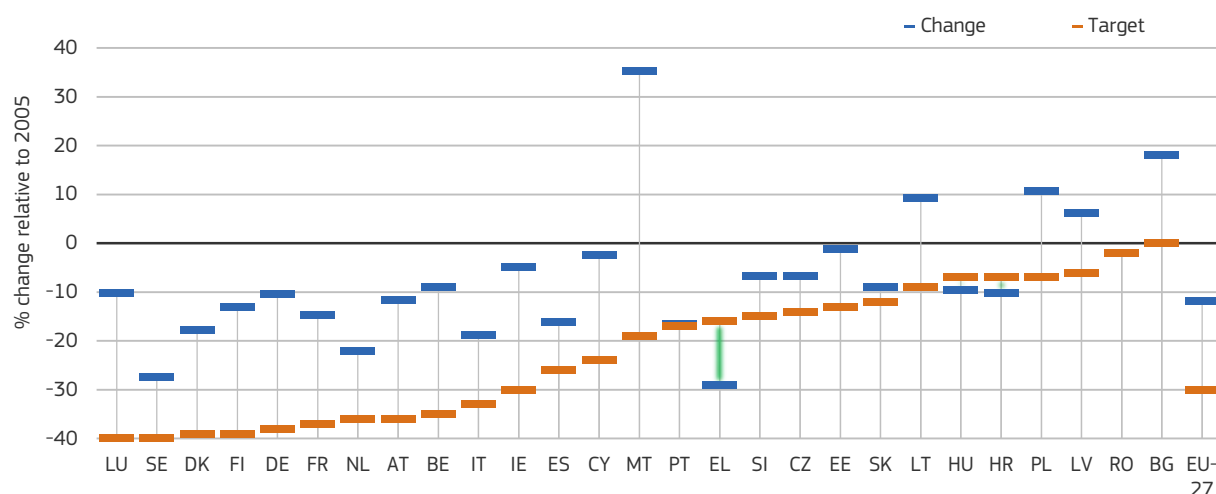
The ETS is a market-based tool for cutting emissions from large-scale power and industrial plants and aviation. It covers around 45% of the EU's total emissions, and the target at the time was to reduce these emissions by 21% below the 2005 level by 2020. The ESD covers sectors not included in the ETS, such as transport, buildings, agriculture (emissions other than carbon dioxide — CO₂) and waste, which account for around 55% of EU emissions. Member States have committed to national 2020 targets, set according to their levels of development — from a 20% cut for the most developed countries to a maximum increase of 20% for the least developed, relative to 2005. The ESD objective is to reduce emissions in the sectors it covers by 10%.

According to the latest figures available, the EU is likely to have met its 2020 target. Between 1990 and 2019, GHG emissions were reduced by 24%, while EU GDP grew by around 60%. Accordingly, the GHG emission intensity of the economy, de-

3 European Commission (2021f).

4 The 2020 climate and energy package is a set of binding legislative measures to ensure the EU meets its climate and energy targets for 2020. The targets were set by EU leaders in 2007 and enacted in legislation in 2009. They are also the headline targets of the Europe 2020 strategy for smart, sustainable and inclusive growth.

Figure 3.1 Change in greenhouse gas emissions outside the Emissions Trading System, 2005-2018 and Europe 2030 targets



Member States with actual changes above their target are highlighted.

Source: Eurostat, Regulation(EU) 2018/842 and Commission Implementing Decision (EU) 2020/2126.

financed as emissions relative to GDP, fell to less than half of the 1990 level⁵. EU-27 emissions covered by the ESD were 10% lower in 2019 than in 2005, so the 2020 target is likely to have been achieved.

In 2014, the EU enacted legislation to reduce emissions by at least 40% by 2030. National emission targets for ESD sectors have been revised to achieve a reduction of 30% by 2030 relative to 2005. These targets, enshrined in a 2018 Regulation⁶, involve reductions ranging from 0 to 40%. Although all Member States have committed to not increasing emissions from their ESD sectors, emissions have risen in Malta, Latvia, Lithuania and Poland (Figure 3.1)⁷.

In 2018, levels of ESD emissions were lower than the 2030 target only in Greece, Hungary and Croatia and were well above it in a number of Member States, either because the target was set at a high level (as in Luxembourg, Finland, Germany and Belgium — a cut of 35% or more in all cases) or because emissions have been reduced only slightly (as in Ireland) or have increased (as in Bulgaria, Latvia, Lithuania, Malta and Poland).

Under the European Green Deal, as noted above, the EU launched the 2030 Climate Target Plan under which it set a more ambitious target of cutting emissions by at least 55% below 1990 levels by 2030, instead of 40%, on the way to becoming climate-neutral by 2050.

GHG emissions per head vary substantially within Member States. This is notably the case in Spain, Portugal, Germany, Greece, Bulgaria and Poland, where some regions are emission hot spots (Map 3.1)⁸. Many factors can explain differences in high emission levels, including, in particular: the level and composition of economic activity; the energy efficiency of production plants and buildings; the use of renewable energy; and land use, climate and geography⁹.

Between 1990 and 2018, GHG emissions were reduced in most EU regions, but they increased

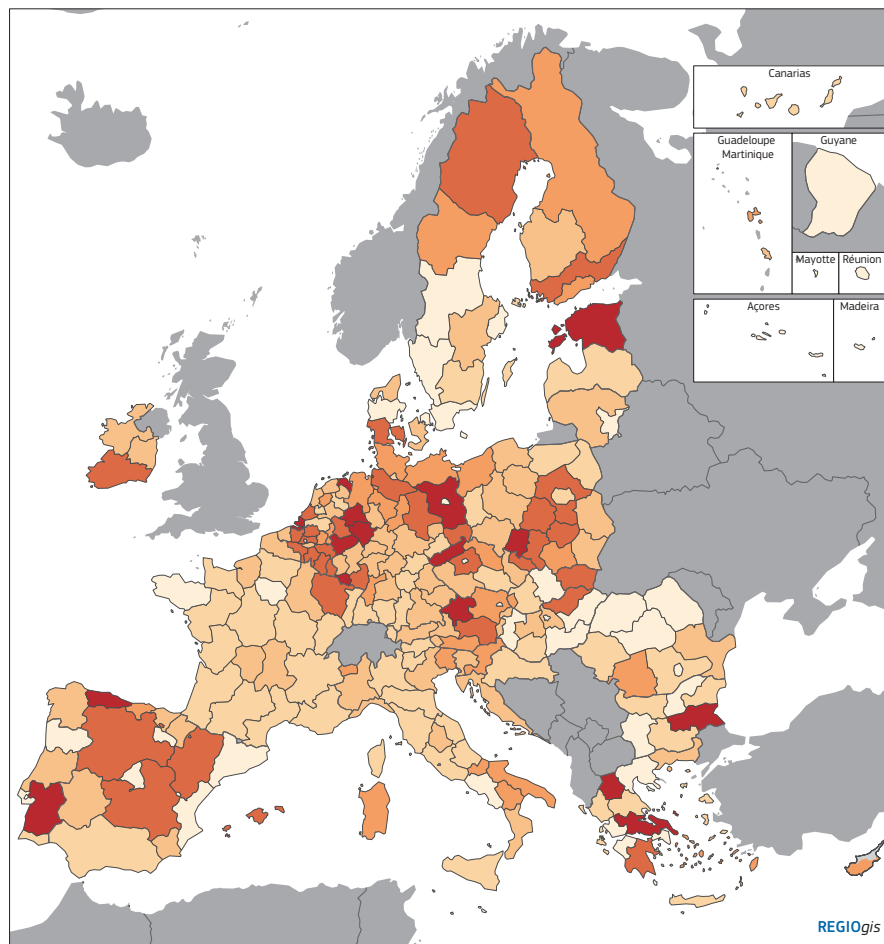
⁵ European Commission (2020b).

⁶ European Union (2018a).

⁷ The national targets under the ESD should be revised in the context of the 'Fit for 55' package, but they have not been set yet.

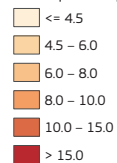
⁸ The figures are based on EDGAR (Emissions Database for Global Atmospheric Research), which provides emissions data and grid maps for all countries from 1970 to 2015 (2018 for CO₂), for both air pollutants and GHG, calculated in a consistent way to be comparable between countries. In order to estimate the regional location of emissions, EDGAR uses international activity data (mainly energy balance statistics from the International Energy Agency [IEA] for 2017, IEA CO₂ emissions by main fuel type and BP statistics) and emission factors from various technological databases and proxies. Because of differences in methodology, the figures do not always match official estimates provided by Member States at national level.

⁹ Crippa et al. (2019).



Map 3.1 CO₂ emissions from fossil fuels per head, 2018

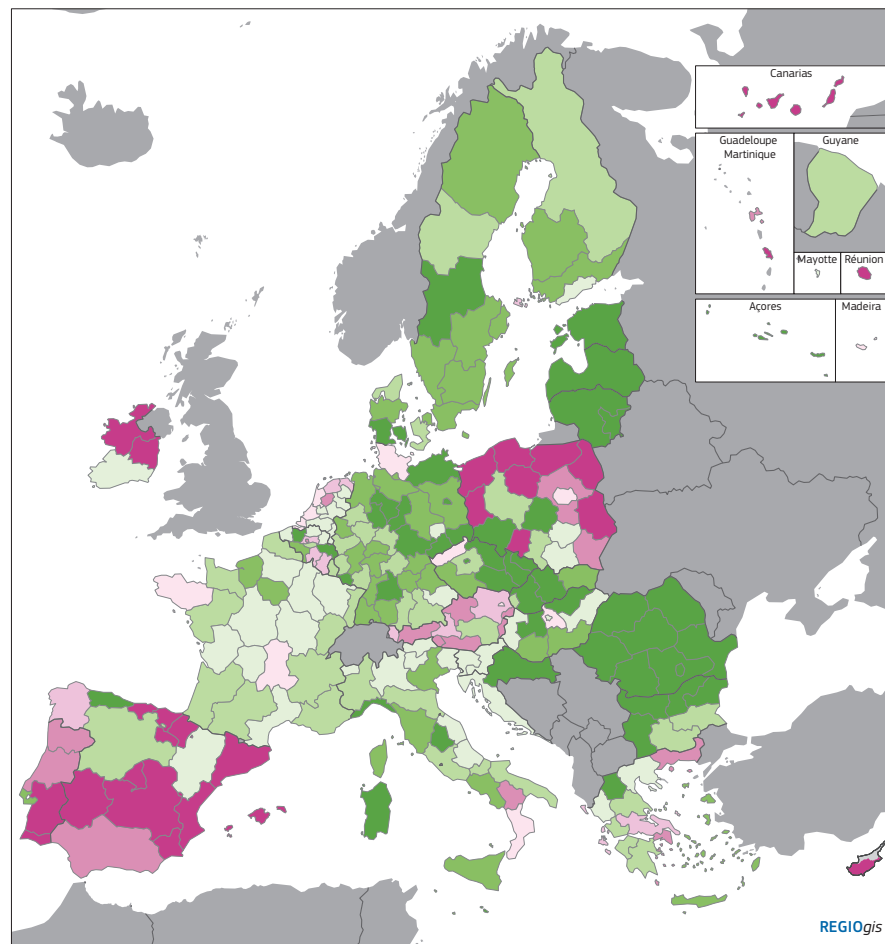
tCO₂ equivalent per head



Source: Crippa et al. (2019).

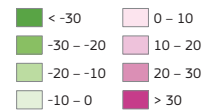
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Map 3.2 Change in total CO₂ emissions from fossil fuels, 1990–2018

%



Source: JRC-EDGAR gridded CO₂ data.

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significantly in some of them, notably in Cyprus, Ireland, Spain and Poland, where they soared by more than 30% (Map 3.2).

1.2 Increasing energy efficiency

Increasing energy efficiency is key to protecting the environment, reducing GHG emissions and improving the quality of life. The EU has set ambitious targets for 2020 and 2030, focusing on the sectors where the potential for savings is the greatest, such as buildings.

As part of the 2020 climate and energy package, the objective set in 2007 was to improve energy efficiency by 20% by 2020¹⁰ compared with the projections made at that time. To achieve this objective, Member States were asked to set their own indicative national energy-efficiency targets¹¹.

In 2018, the 2012 Directive on energy efficiency was amended¹² to establish a target for 2030 of reducing EU energy consumption by at least 32.5%¹³. A reduction in energy consumption, however, does not necessarily signify an improvement in energy efficiency. The main determinants of energy use are GDP growth and the share of manufacturing in the economy. Changes in energy consumption, therefore, reflect not only changes in energy efficiency but also fluctuations in economic activity as well as changes in the structure of the economy.

In 2019, primary and final energy consumption¹⁴ had fallen by 9.7% and 5.5% respectively compared with their 2005 levels. However, primary and final energy consumption levels were respectively 3.0% and 2.6% above the 2020 targets and 19.9% and 16.3% above the 2030 targets. It is therefore likely that the EU will miss its 2020 targets, and it is still far from the 2030 targets, implying a need for additional efforts to make the EU economy more energy-efficient.

Progress in reducing energy use varies markedly between Member States. In 2018, only 11 of the 27 Member States had lowered primary energy consumption below their 2020 target, and only nine had reduced final consumption below the target. In a number of Member States, the reduction required to meet the targets was still considerable (Cyprus, Malta, Bulgaria and France in respect of primary energy consumption; and Lithuania, Hungary, Malta and Slovakia in respect of final consumption) (Figure 3.2).

1.3 Boosting renewable energy

Renewable sources play an increasing role in the production of energy in the EU. The share of renewables in gross final consumption of energy in the EU rose steadily from 11% in 2006 to 19% in 2018. In the 2020 climate and energy package of 2007, the objective was to raise this share to at least 20% by 2020, with a 10% share of renewables in transport. EU Member States have committed to meeting binding national targets for the share of renewables in energy consumption under a 2009 Directive¹⁵. These range from 10% in Malta to 49% in Sweden.

The 2030 climate and energy framework, agreed in 2014, set the target of reaching a share of 32% of renewables in energy consumption by 2030; but, as part of the 'Fit for 55' package, the Commission

10 The 20% energy-efficiency target was enacted in legislation with the adoption of Directive on energy efficiency in 2012.

11 European Union (2012). Member States' targets are included in their national action plans and annual progress reports (https://ec.europa.eu/energy/topics/energy-efficiency/targets-directive-and-rules/national-energy-efficiency-action-plans_en?redir=1). With the withdrawal of the United Kingdom, the EU's energy consumption figures for 2020 and 2030 were adjusted to the situation of 27 Member States.

12 European Union (2018b).

13 The Fit for 55 package has set the EU target at 36%; but national targets have not been set yet for the ESD.

14 Primary energy consumption measures total domestic energy demand, while final energy consumption refers to what end-users actually consume. The difference relates mainly to what the energy sector needs itself and to transformation and distribution losses.

15 European Union (2017).

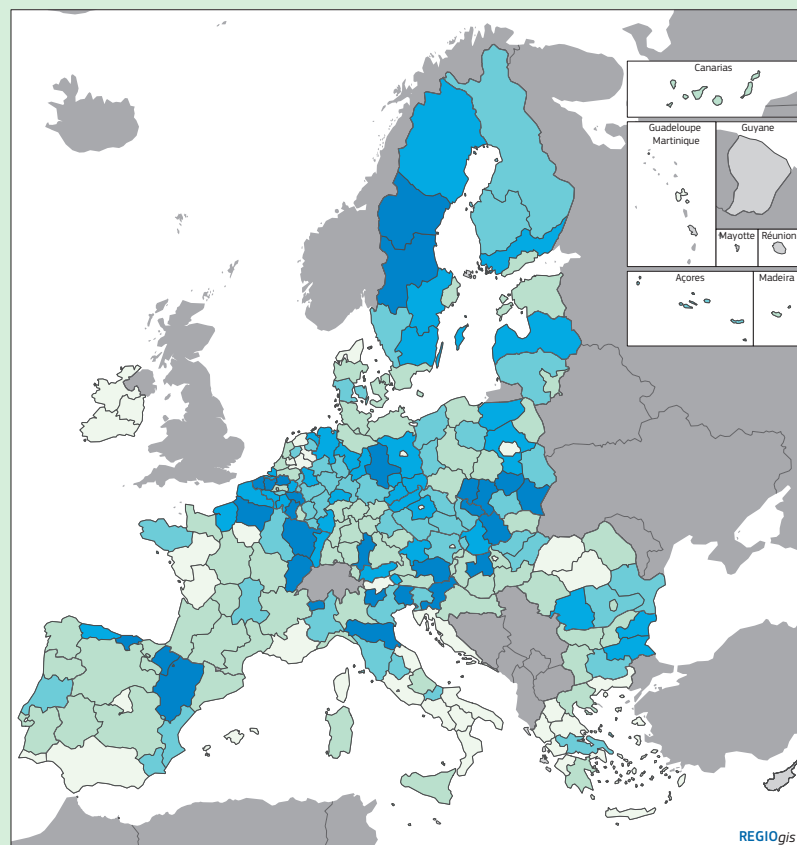
Box 3.1 Employment in EU ETS installations

The EU ETS was launched in 2005 and is the world's biggest GHG trading programme, covering around 14 000 factories, power stations and other companies in the EU, most of them highly energy-intensive installations. The key principle of the ETS is to set a total annual quantity of GHG (measured in CO₂ equivalent) and sell it by auction to the installations involved.

The geographical distribution of the ETS installations among EU NUTS 2 regions is very heterogeneous. A recent study¹ estimates that employment in ETS installations corresponds to around 1% of the EU-27 total employment but with some regional variations (Map 3.3). In 2018, people employed in ETS installations constituted more than 3% of total employment in seven NUTS 2 regions, the highest being 4.1% in Közép-Dunántúl (Hungary). At NUTS 3 level, the share of employment in ETS installations exceeded 10% in three regions, with the highest being 14% in Gotlands län (Sweden). Five out of the top 10 regions were located in Germany.

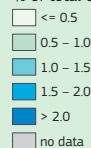
There has been a concern that the ETS adds costs to companies, implies a loss of competitiveness and encourages the relocation of activities to places where environmental regulations are less stringent. However, an increase in the price of carbon can lead to a variety of different responses from industry apart from reducing activity and/or employment, such as improving energy efficiency, changing the type of energy used, adapting technology, or innovating.

This is confirmed by a number of studies on the impact of the ETS on firms' performance and on employment, which generally conclude that: (i) the ETS offers competitive advantages compared with alternative regulatory scenarios; and (ii) the ETS has so far not had any statistically significant impact on regulated firms' employee numbers or profits. Instead, the ETS induced regulated companies to increase investment, notably in carbon-saving technologies².



Map 3.3 Employees in ETS stationary installations, 2018

% of total employment



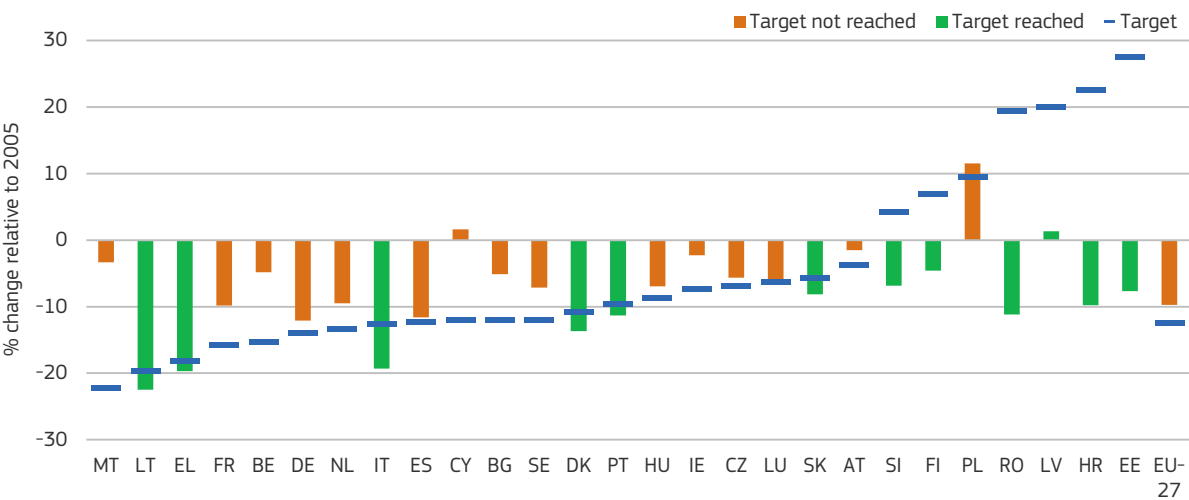
Source: PPMI study for DG REGIO.

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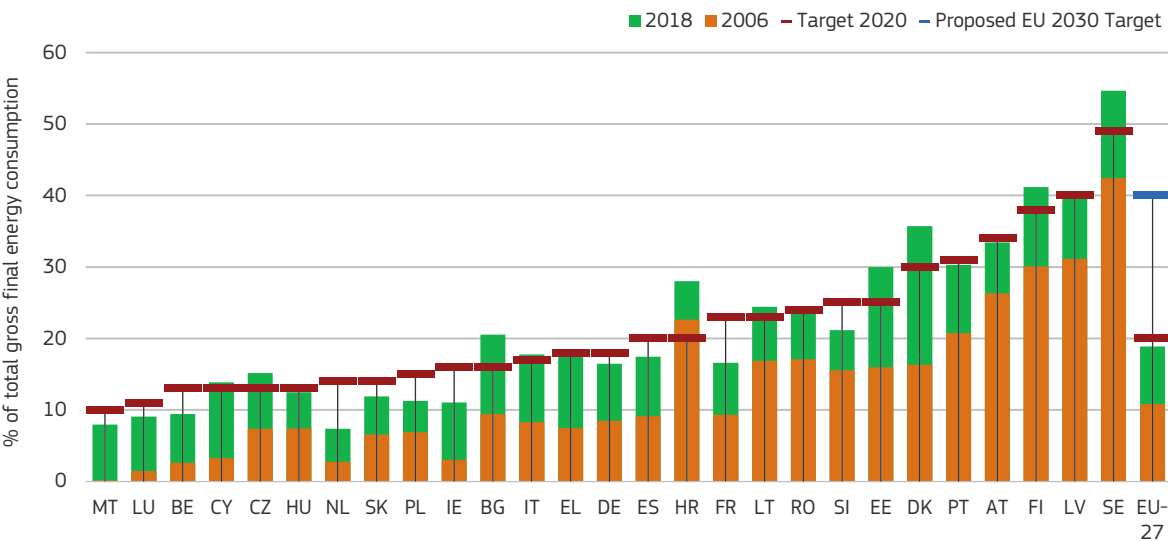
- 1 European Commission (2021h).
- 2 See for instance: Abrell et al. (2011) or Dechezleprêtre et al. (2018).

Figure 3.2 Change in primary energy consumption, 2005-2019 and 2030 target



Source: Eurostat.

Figure 3.3 Share of renewables in gross final energy consumption, 2006, 2018 and 2020 target



Source: EEA, Eurostat [t2020_31].

has proposed to increase this target to 40%¹⁶. For this target to be reached, the share of renewables would have to double compared with the levels of 2018.

16 To reach the 2030 target, the overall binding target of 40% of renewables in the EU energy mix will be complemented by indicative national contributions, showing what each Member State should contribute to reaching the collective target.

The share of renewables in energy consumption varies substantially across the EU. In 2018, it was over 40% in Finland and Latvia, and close to 55% in Sweden (Figure 3.3). It is much smaller in other Member States — below 10% in Malta, Luxembourg, Belgium and the Netherlands — though it has increased significantly in recent years. In 2018, 13 Member States had reached their national target set for 2020, with Sweden, Estonia and Denmark exceeding it by over 5 pp.

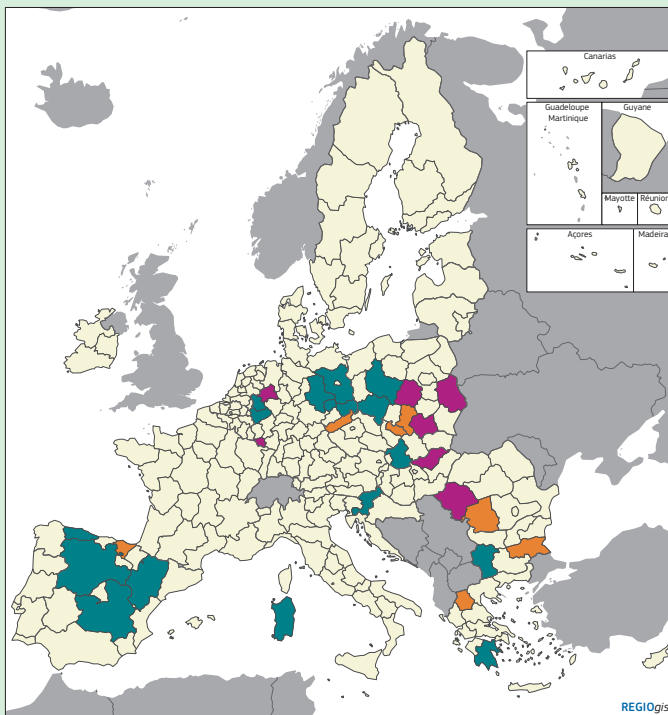
Box 3.2 Coal regions in transition

The deployment of renewable energy sources (RES) can be an opportunity for many regions. This is notably so for coal regions in transition¹ (CRiT), which could facilitate energy transition and support post-mining communities through the jobs induced by the installation of renewable energy production capacity. Recent research by the Joint Research Centre (JRC) suggests up to 315 000 jobs could be created in CRiTs by 2030 by deploying renewable energy technologies, as projected in the EUCO3232.5 energy scenario². Around 200 000 additional full-time equivalent jobs a year could be created by realising the potential for energy efficiency in residential buildings³.

Transition opportunities vary across regions (Map 3.4). In most CRiTs in the EU, clean energy and energy-efficiency technologies could trigger more jobs than in their coal industry at present, while in a number of others potential employment with such technologies is similar to that in coal.

In Map 3.4, regions are grouped as follows:

- 17 regions with high decarbonising employment potential (HDEP), where potential employment in RES sectors is currently comparable to coal-related jobs. Future decarbonisation will result in the latter being exceeded, though support may be needed to realise the potential fully.
- Seven regions with slow decarbonising employment potential (SDEP), which can potentially develop decarbonising sectors to compensate for the loss of coal-related jobs. The pace of change estimated in the EUCO3232.5 scenario could generate transitional imbalances, so that support might be needed to accelerate the development of these sectors.
- Seven regions with restricted decarbonising employment potential (RDEP), which under the EUCO3232.5 scenario do not develop employment in decarbonising sectors to a level similar to existing coal-related jobs. Support might be needed to mobilise untapped potential or to promote alternative employment options.



Map 3.4 Decarbonising employment potential of coal regions in transition

Category of regions
 ■ high decarbonising employment potential
 ■ slow decarbonising employment potential
 ■ restricted decarbonising employment potential
 ■ other regions

Source: JRC: Kapetaki, Z., Ruiz, P. et al. (2020).

0 500 km

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1 The JRC has identified the European CRiTs that will be affected by the reduction in coalmining and coal-powered-plant activities, estimating that more than 200 000 jobs may be at risk. See: Alves Dias et al. (2018).

2 To estimate the potential impact of the EU's climate and energy targets for 2030, the Commission has developed the EUCO set of scenarios. The most recent scenario, EUCO3232.5, models the impact of achieving the target for improving energy efficiency by 32.5% and the target for the share of renewables in energy consumption of 32%, as agreed in the 'Clean energy for all Europeans' package. This scenario was used in the Commission's June 2019 assessment of Member States' draft national energy and climate plans (NECPs).

3 The analysis considers the nature and duration various types of job created. The jobs relating to operations and maintenance are assumed to last 15 years from installation, those relating to equipment manufacture and installation one year each (the former before the installation).

At the same time, some Member States are still far from their target, such as Belgium, France and Ireland where the share of renewables in 2018 was still less than 75% of the national 2020 target. For the Netherlands to meet their target, the share of renewables would need to have almost doubled between 2018 and 2020.

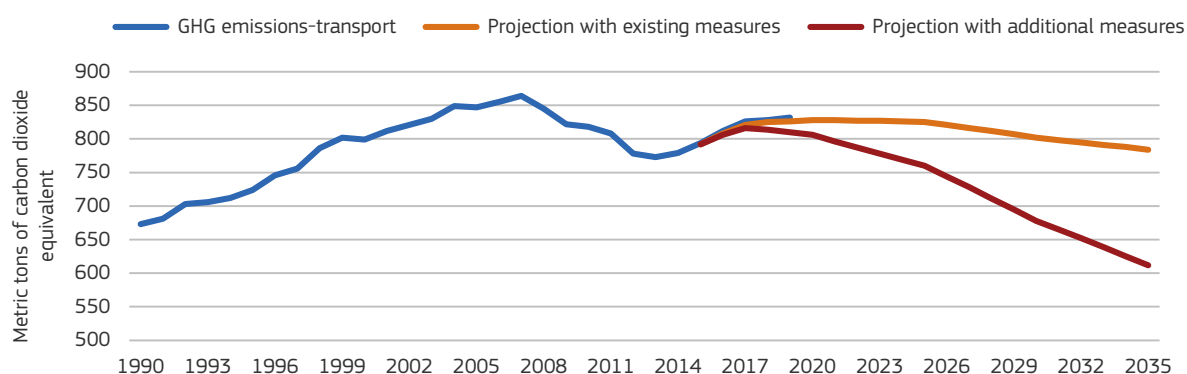
The capacity to produce renewable energy is closely linked to the geography of countries and regions. The production of wind energy is easier in coastal regions, such as those of north-western Europe and along the Baltic Sea, Atlantic Ocean and some Mediterranean coasts. The production of hydro-electricity requires suitable geophysical features, while the potential for solar energy production is higher in southern European regions where there are many more days of sunshine. In 2018, however, the installed photovoltaic (solar panel) capacity per head in the EU was largest in Germany (590 watts per inhabitant), followed by the Netherlands (401) and Belgium (394)¹⁷; in Spain (197) and Portugal (88) it was much less, despite these Member States having among the highest solar energy potentials in the EU.

1.4 Achieving low-carbon transport

After a sharp drop between 2008 and 2014 as a consequence of the 2008 economic crisis, GHG emissions from transport in the EU increased between 2014 and 2019 at rates similar to those in the period 1990–2008, at just under 2% a year¹⁸ (Figure 3.4). This implies that transport has not followed the general tendency for GHG emissions to decline in recent years. Its contribution to overall GHG emissions in the EU has therefore become more significant.

Projections suggest that GHG emissions from transport will decline relatively little over the next few years and will remain higher than in 1990, even with measures currently planned in Member States. Further action is therefore needed, particularly in road transport but also in aviation and shipping, where demand is pushing emissions up in both absolute and relative terms. Emissions reductions in all transport sub-sectors will need to be much more ambitious if the sector as a whole is to contribute its fair share to the goals set out in the European Green Deal.

Figure 3.4 GHG emissions in the transport sector since 1990 and projections to 2035, EU-27



The figure shows the trend in the GHG emissions in the transport sector since 1990 and projections to 2035, at EU level (EU-27). The values shown include all domestic transport emissions as well as international aviation and international maritime transport. 2019 value is a preliminary estimate based on approximated GHG inventories reported by Member States under the MMR Regulation (EU) No 525/2013. This does not include shipping (assumed unchanged). The 'with existing measures' scenario reflects existing policies and measures and the 'with additional measures' scenario also includes further planned policies and measures reported by Member States until March 2020. Source: EEA.

17 EurObserv'ER (2020).

18 European Environment Agency (2021a).

Figure 3.5 Passenger travel by transport mode, 2019

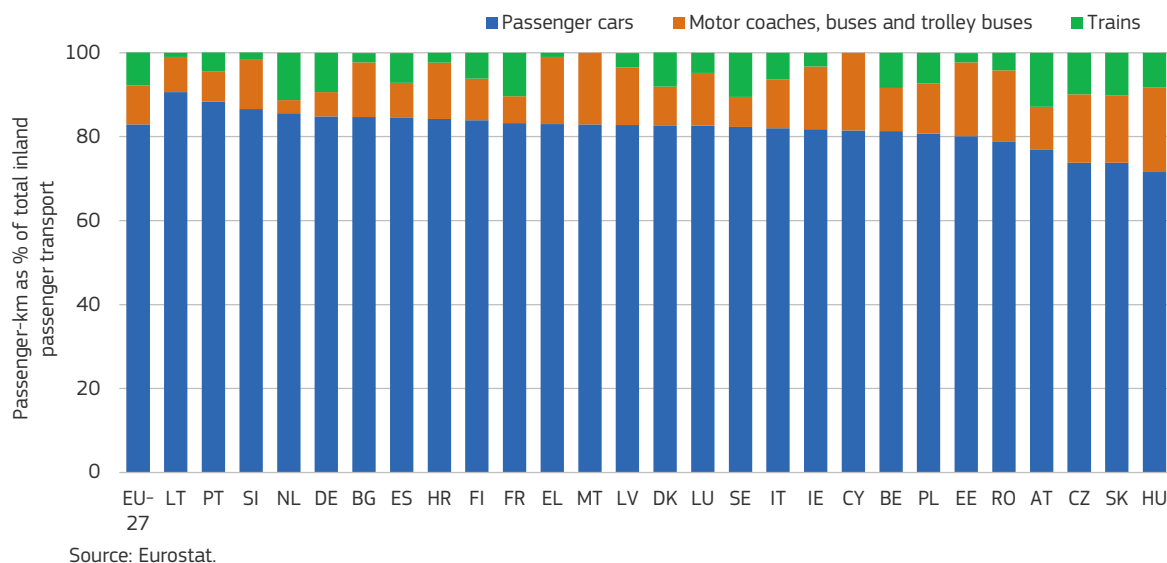
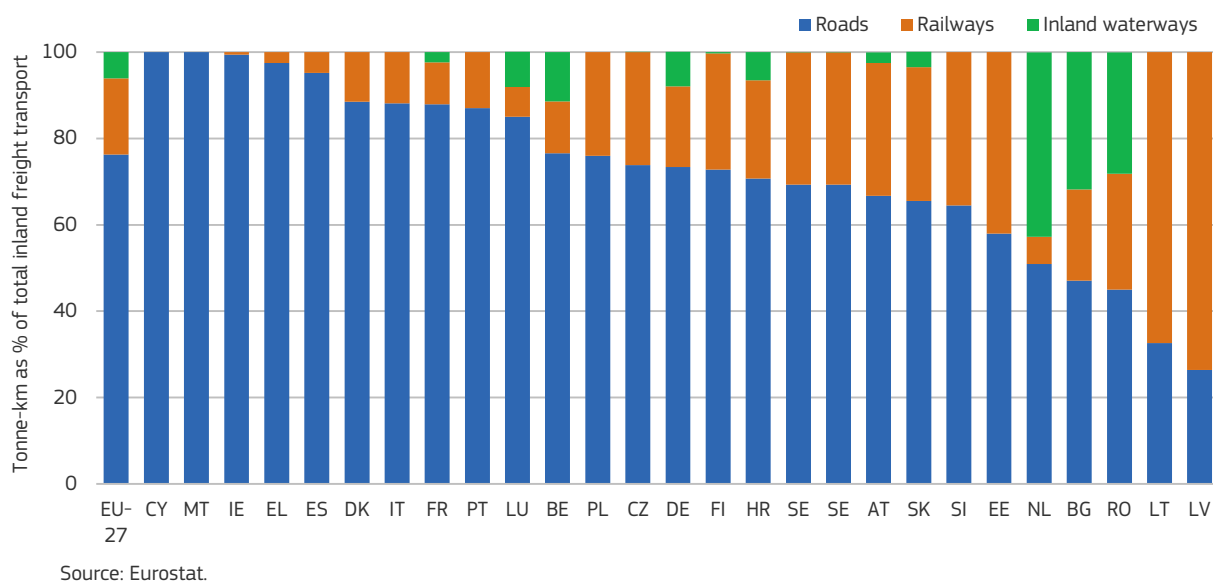


Figure 3.6 Freight transport by mode, 2019



The new EU strategy on sustainable and smart mobility (EUSSM)¹⁹ includes measures aimed at significantly reducing CO₂ and polluting emissions in all modes of transport, with the objective of reducing emissions by 90% by 2050. As part of

the strategy, the Commission will foster the use of more sustainable transport modes, such as rail and inland waterways.

The use of cars remains predominant for passenger travel and has even expanded slightly in recent years (Figure 3.5). In 2014, cars were used for 82.2% of inland travel and in 2019 for 82.8%. The share of passenger travel by train increased slightly from 7.7% to 8.0%, meaning that the share by

¹⁹ The EUSSM was announced by the European Commission as part of its Communication on the European green deal. The EUSSM is designed to contribute to the achievement of the EU green deal target of reducing transport-related GHG emissions by 90% by 2050.

buses, trams and trolleybuses fell from 10.1% to 9.2%. Cars account for less than 80% of passenger travel in only five Member States (Romania, Austria, Slovakia, Czechia and Hungary), while in Lithuania the share is over 90%.

These trends are a matter of concern, as transport is responsible for almost a quarter of EU GHG emissions and is the main cause of air pollution in cities. Roads are by far the biggest emitter, accounting for over 70% of all GHG emissions from transport in 2019. Emissions from road transport, however, are expected to diminish as it decarbonises faster than other modes. The largest increases are expected in aviation and international maritime transport, which are likely to account for a bigger share of transport emissions in coming years.

As in the case of passenger travel, most goods in the EU are transported by road (Figure 3.6). In 2019, 76.6% of freight was carried by road, up from 73.9% in 2014. In eight Member States, the share was over 80%, the highest being 98% and 99% in Greece and Ireland respectively (Malta and Cyprus have no inland waterways and railways transport, therefore the share freight carried by road is 100%). At the other end of the scale, over half of freight is transported by rail or inland waterways in Bulgaria, Romania, Latvia and Lithuania.

2. Reducing the impact of climate change

Climate change is recognised as the most serious threat to human societies around the world. Scientists see an increase in global temperatures of 2°C relative to pre-industrial times as the threshold beyond which there is a very real risk that dangerous and possibly catastrophic changes in the global environment will occur. The past three decades have been warmer than any previous decade since records began in 1850. All parts of the world are potentially affected by the consequences of a rapid rise in temperature and the various climatic changes that are associated with it. Southern, and part of eastern, Europe will experience more frequent and severe heatwaves, for-

est fires and droughts. Already northern Europe is becoming much wetter, with an increasing risk of floods and extreme weather events, while coastal areas face the devastating consequences of rising sea levels from the melting of polar ice sheets and glaciers. The marine environment is also heavily affected by climate change, and these impacts are projected to increase dramatically, with severe implications for marine currents and for vulnerable ecosystems such as coral reefs, biological resources and food chains.

The effects of climate change pose a major challenge for a growing number of EU regions. Around 7% of the EU population live in areas at high risk of floods, and over 9% live in areas where there are already over 120 days a year without rain. The exposure of EU regions to the damaging effects of climate change, however, differs widely between them, depending on their location but also the structure of their economies, given that sectors such as tourism or agriculture are likely to be particularly affected.

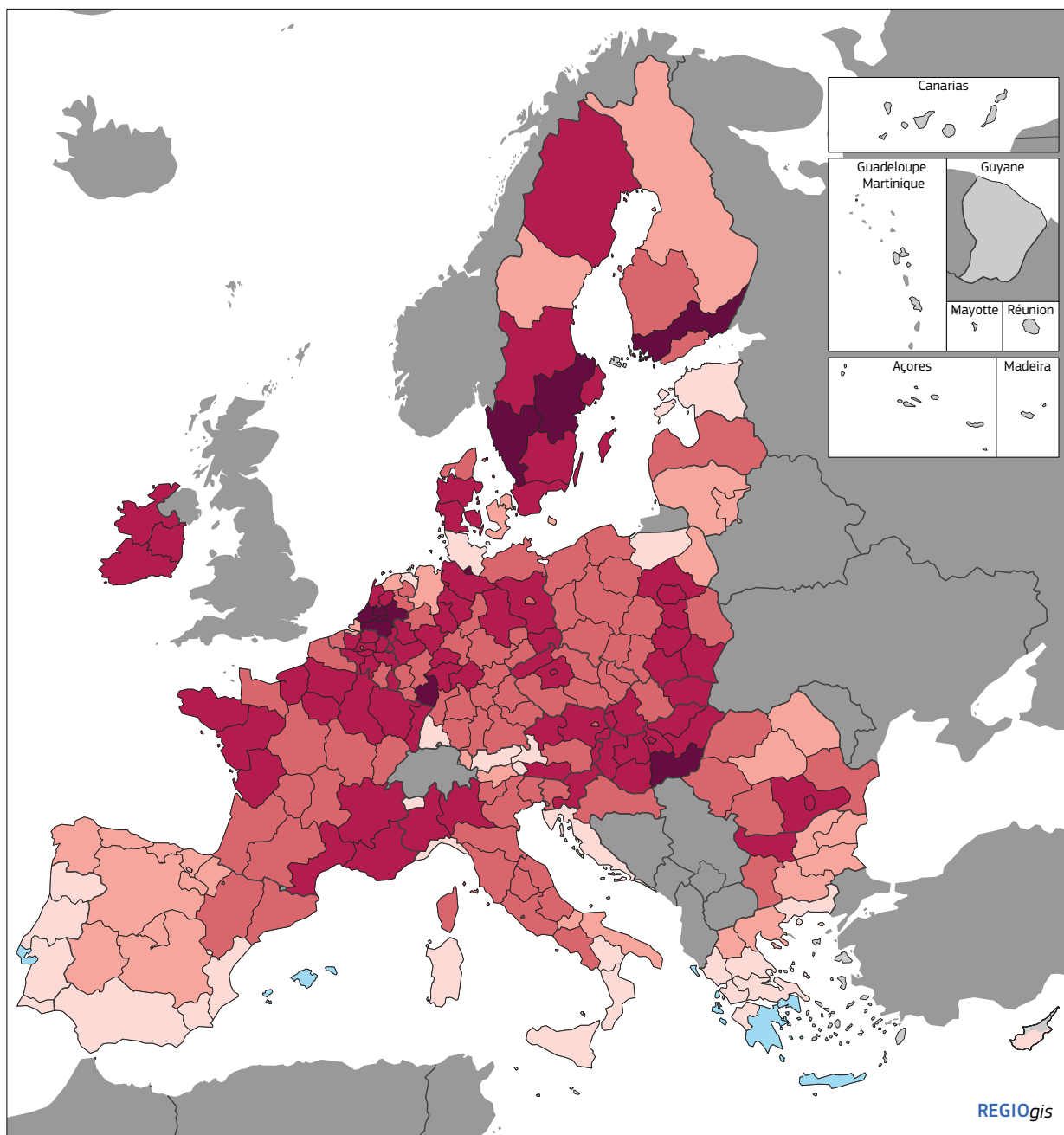
2.1 The threat of floods from climate change

Flooding is a major cause of economic damage and loss of life in Europe and other parts of the world²⁰. Despite considerable efforts to reduce the risk, the damage from floods appears to have increased over recent decades²¹. Ongoing climate change coupled with growing land take, especially in flood plains, is likely to further increase the social and economic damage in the EU.

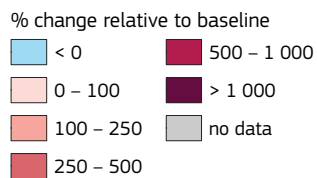
The greater risk of floods for future societies makes it important to identify adaptation strategies that are effective and sustainable in economic, social and environmental terms. In particular, such strategies need to be assessed in terms not only of their effectiveness in reducing potential damage, but also of the economic costs involved (e.g. for building and maintaining defences). According to recent estimates of the consequences of river

²⁰ See for instance: Alfieri et al. (2015).

²¹ Paprotny et al. (2018).



Map 3.5 Economic damage due to flooding under the 3°C warming scenario, 2100



EU-27 = 498
Source: JRC.

0 500 km

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flooding²², if no mitigation and adaptation measures are taken and global temperatures rise by 3°C by the end of the century, economic losses in the EU from river flooding will grow to nearly €50 billion a year, or over six times more than at present, and nearly three times as many people would be exposed to flooding²³. The damaging effects are projected to increase with higher temperatures and economic growth in almost all EU regions, although Member States in eastern Europe would suffer larger losses relative to their GDP (Map 3.5). Limiting global warming to 1.5°C would halve economic losses and the size of the population exposed to river flooding in the EU.

Strategies for reducing flood risks can substantially limit the projected losses due to climate change. However, these strategies have different costs as well as benefits, as illustrated by a recent study which assessed four different approaches to limiting the damage from coastal flooding²⁴, as follows.

- Strengthening existing dyke systems is likely to have larger benefits than costs, but tends to transfer risks downstream by stimulating further the development of human settlements and activities in risk zones behind flood barriers, which can result in catastrophic effects in case of failure.
- Retention areas and dykes require large investment but can reduce the economic and human losses substantially.
- Flood-proofing buildings can markedly reduce losses with limited investment, but they do not prevent floods from happening and so can only partly prevent flood damage.
- Relocation can produce the largest benefits but tends to be the least cost-effective, though the costs involved vary substantially; it also tends to have low social acceptance.

Results suggest that reducing flood peaks using retention areas has strong potential for lowering the effects in a cost-efficient way in most EU Member States (see Section 3.2). Implementing such a strategy at EU level could reduce the economic damage and the size of the population exposed to flooding by over 70% by 2100. Moreover, retention areas have many additional benefits, such as: restoring the natural functioning of flood plains; improving the ecosystem by improving nutrient removal, water filtration and the replenishment of groundwater reservoirs; providing fish-spawning habitats; and providing opportunities for recreation and nature-based activities. Depending on local circumstances, other strategies than creating retention areas may be more suitable.

2.2 Protecting Europe's coasts against rising seas

Coastal zones are areas of high interest. Over 200 million people in the EU live within 50 km of the coast, stretching from the north-east Atlantic and the Baltic to the Mediterranean and Black Sea; and in the EU's outermost regions. The evidence is that migration to coastal zones is continuing. Such areas in many cases are locations for major commercial activities, and support diverse ecosystems with important habitats and sources of food.

Coastal zones are particularly vulnerable to climate change due to the combined effects of rising sea levels and the increasing frequency and intensity of storms, adding to already significant pressures from human activities. The mean global sea level has increased by 13–20 centimetres since pre-industrial times²⁵ and at an accelerating rate since the 1990s, the rise since 1950 being explicable by global warming²⁶. This has already contributed to coastal erosion and made Europe's coasts more susceptible to hazards. The continued rise in sea levels from global warming could result in unprecedented coastal flood losses in the EU unless additional coastal protection and measures to reduce risks are implemented.

22 Dottori et al. (2020).

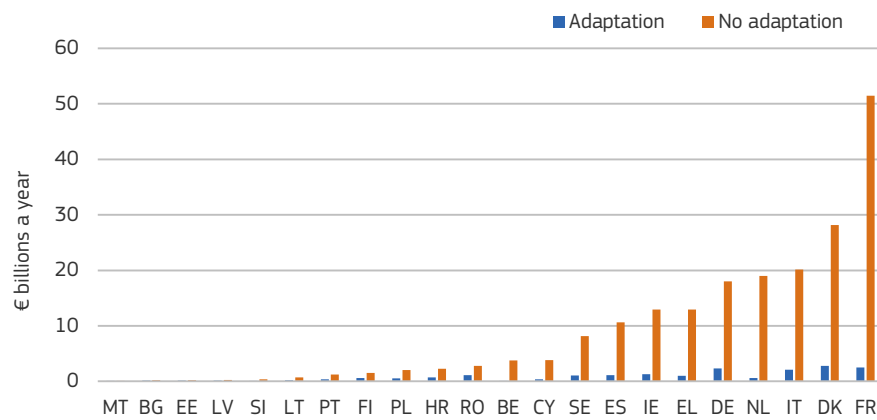
23 *Ibid.*

24 Vousedoukas et al. (2020).

25 See for instance: Dangendorf et al. (2019).

26 Fasullo and Nerem (2018).

Figure 3.7 Estimated damage to coastlines in 2100 without and with adaptation measures (high-emissions scenario)



Projections to 2100 corresponding to a high emissions, global warming scenario called "RCP8.5" frequently referred to as "business as usual", which is a likely outcome if concerted efforts are not made to cut GHG emissions.

Source: Vousdoukas et al. (2020).

This is affirmed by a recent study²⁷, which assesses the costs and benefits of applying additional protection through dyke improvements. The largest amounts of damage are projected for France, Denmark, Italy, the Netherlands and Germany (Figure 3.7 and Map 3.6), though for some Member States the potential damage is larger in relation to GDP, such as for Cyprus (5%), Greece (3%) and Denmark (2%). Appropriate adaptation measures are therefore needed to lessen these damaging effects.

As argued by the authors, raising dyke levels along the EU coast could significantly reduce damage from flooding. The costs and benefits involved, however, vary markedly along coastal sections. The presence of human settlements makes investing in dykes economically beneficial, typically when the population density exceeds 500 people per square km. In urbanised and major economic areas, the benefits of raising dykes tend to be several times the costs. Under a high-emissions scenario, this would be the case for around 23% of the EU coastline. For the remainder, additional protection against coastal flooding is not needed or is not economically beneficial. This is either because natural barriers will provide sufficient protection against the rise in sea levels or because the costs

of increasing dyke levels outweigh the benefits, such as in almost uninhabited areas or along winding coastlines.

The analysis suggests that the average increase in the height of coastal defences needed where further protection is required is one metre under a high-emissions scenario. In Slovenia, Latvia, Poland, Germany and the Netherlands it is well above this, and in Belgium it is over 2 metres. This implies that,

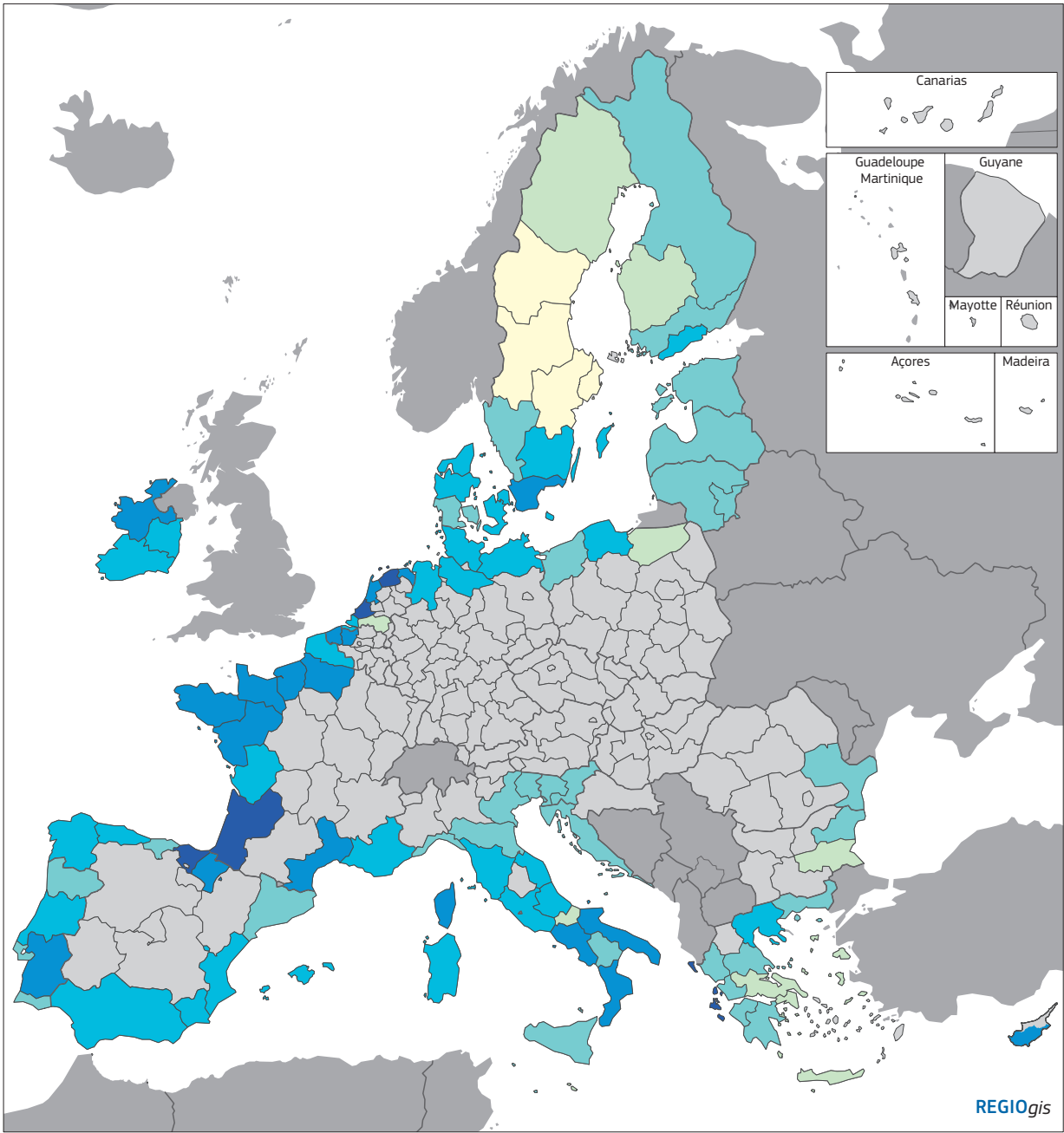
along many such areas, the shoreline might well become disconnected from hinterland areas.

When benefits and costs are aggregated across coastal sections of NUTS 2 regions, the benefit-to-cost ratio (BCR) is highest in urban centres (Map 3.6). Adaptation brings large net economic benefits in the Ionian Islands (a BCR of 30 under a high-emissions scenario), País Vasco (27), Aquitaine (16), Calabria (11.3), Basse-Normandie (14), Pays de la Loire (13), Puglia (11) and Alentejo (11).

Aggregating the results for coastal sections to the Member State level shows the Netherlands to have the highest BCR under a high-emissions scenario (18), followed by Greece (12), France and Belgium (11 for each). By contrast, the BCR is low — though still over 1 — in Bulgaria, Finland, Romania, Croatia and Malta (3 or less in each case).

Investments in green infrastructure can also provide an efficient way to enhance EU coastal defences against rising sea levels. In particular, protecting and restoring coastal ecosystems such as seagrass meadows and coral reefs can buffer the impacts of storms and help to reduce coastal erosion while bringing simultaneous benefits for biodiversity and natural resources.

²⁷ Vousdoukas et al. (2020).



Map 3.6 Benefit to cost ratio in 2100 of elevating dykes, under a moderate mitigation and high emissions scenario

Benefit to cost ratio

0	8 – 16
≤ 2	> 16
2 – 4	no data
4 – 8	

Source: JRC, PESETA.

0 500 km

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2.3 Infrastructure is also at risk

The EU has an extensive transport network, with around 5 million km of paved roads, 0.5 million km of railways, over 2 400 airports and almost 2 000 seaports, with a combined estimated value of around €9 trillion. This is particularly susceptible to climate hazards and so is generally built to withstand the variations in temperature as indicated by historical observations, or according to regional standards of construction. However, rises in average temperatures or greater frequency of extreme weather events as a result of increased GHG emissions are likely to lead to increased economic losses.

A recent study²⁸ estimates the direct effects of flooding and heatwaves (two of the most damaging climate-related hazards according to a 20-year review by the UN Office for Disaster Risk Reduction²⁹) on the transport network in the EU, covering the modes of roads, railways, airports and seaports. For each hazard, the effect is estimated as the change in expected annual damage for global warming levels of 1.5, 2 and 3°C relative to 1981–2010.

As would be expected, flood risk is concentrated in areas prone to flooding with high-value infrastructure, such as motorways and electrified railways. Some 95% of potential flood damage comes from roads and railways, with airports and seaports accounting for only 4%. The estimated cost of potential damage to railways is particularly high, at almost twice that of roads, reflecting the much higher costs of reconstruction and their location in lower-lying terrain.

Nearly all regions in the EU are expected to experience increasing flood damage to their infrastructure as a result of climate change, particularly those prone to flooding in north-western and eastern Europe, where the damage could in some cases be over six times the present damage with global warming of 3°C. For most southern regions, damage to transport infrastructure from floods is

projected to increase less dramatically, but could still be over twice as high as today (Map 3.7).

Road maintenance costs are also projected to rise in all EU regions as a result of more frequent spells of extreme heat. The most significantly affected Member States in terms of additional costs are Bulgaria, Poland, Greece, Ireland and Romania. Future risks can be alleviated by upgrading roads or doing more frequent maintenance.

Most of the increased maintenance costs are on tertiary and rural roads, which are generally managed by local authorities. Since their road maintenance budgets already tend to be constrained, damage from climate change could be particularly problematic for them.

The buckling of railway lines is also likely to occur more frequently with global warming, thus increasing maintenance costs. The biggest increases (of up to 10% with global warming by 3°C) are projected for regions in Germany and southern Spain, because of stress-free temperatures³⁰ being likely to be exceeded most often. Significant increases are also likely in regions in Belgium, France, Sweden, Finland, Poland and Czechia.

2.4 Unevenly distributed impact of extreme temperature events

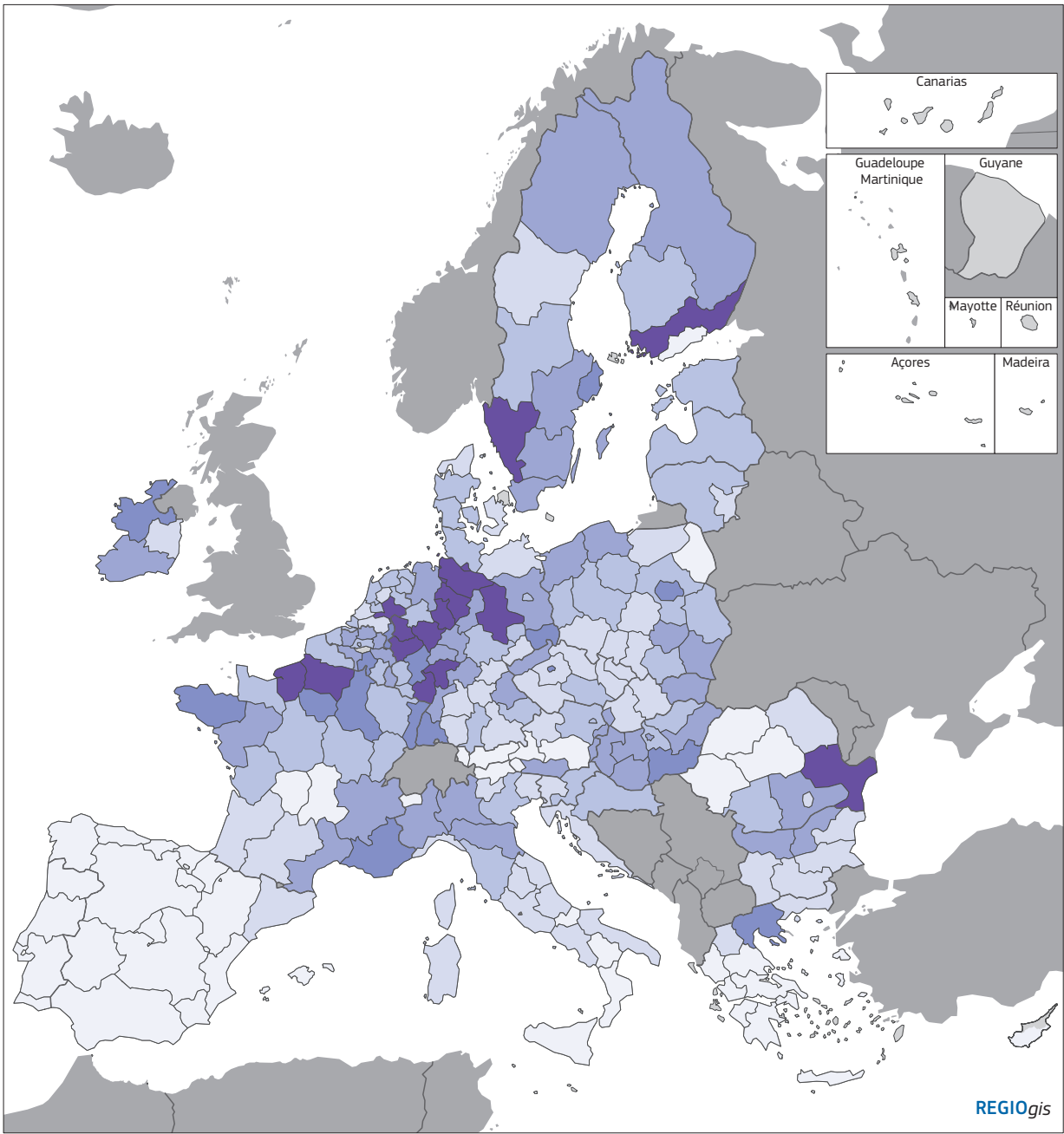
Extreme heat events are projected to happen more frequently and become more intense with climate change. The number of people exposed to heatwaves in the EU is projected to grow from 10 million per year (average 1981–2010) to nearly 300 million per year in the scenario of 3°C global average warming by the end of this century³¹ (Map 3.8).

30 The stress-free (or neutral) temperature is the point at which the rail is not in tension or compression. The stress-free temperature is usually set at 5°C or so above the mid-point between the lowest and highest temperature the rail is likely to reach. Railway companies need to monitor the stress-free temperature of rails to identify risks, plan effective maintenance and maintain safety and operating performance.

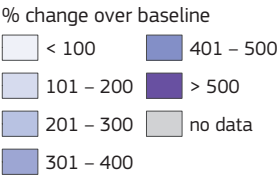
31 The PESETA IV study of the human impacts of heat and cold extremes provides a quantitative assessment of human exposure to and mortality from these extremes in Europe. The methodology integrates empirical data on human losses from disasters, past climate information, Eurostat demographic data and high-resolution climate and socio-economic projections.

28 Feyen et al. (2020).

29 Pascaline and Rowena (2018).



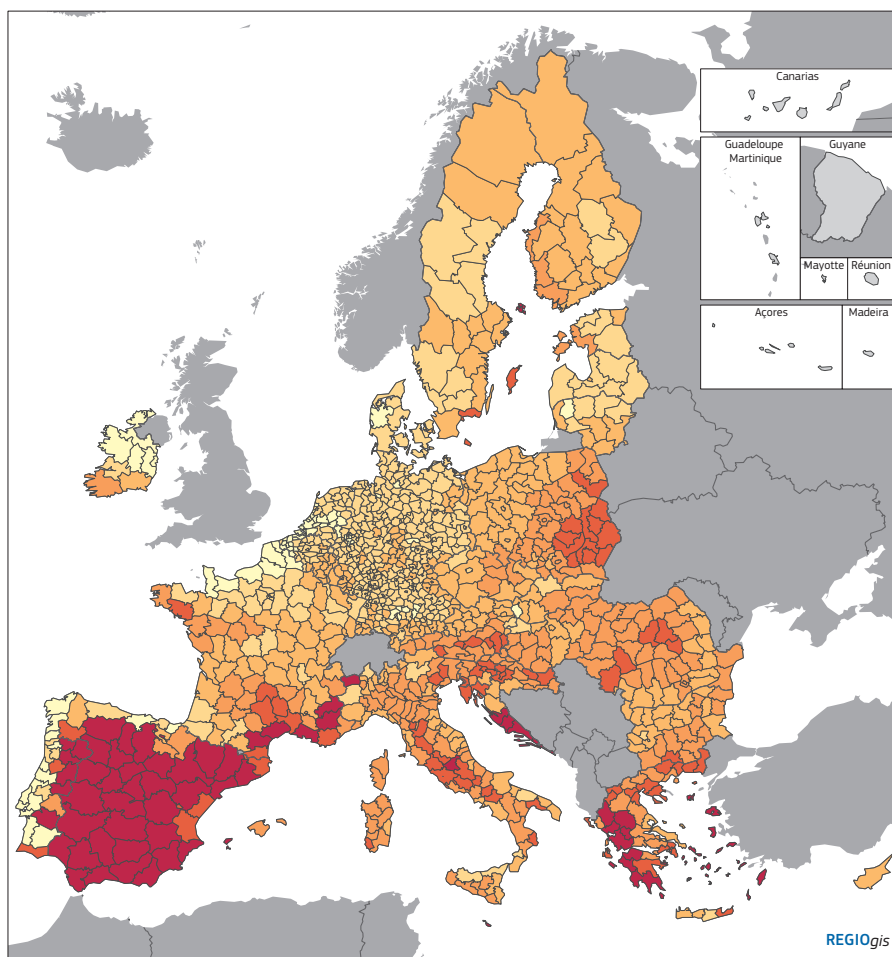
Map 3.7 Expected annual damage to infrastructure in 2100 due to inland flooding under a global warming scenario of 3°C



Source: JRC.



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Map 3.8 Projected change in human exposure to heat waves under a global warming scenario of 3°C in 2100

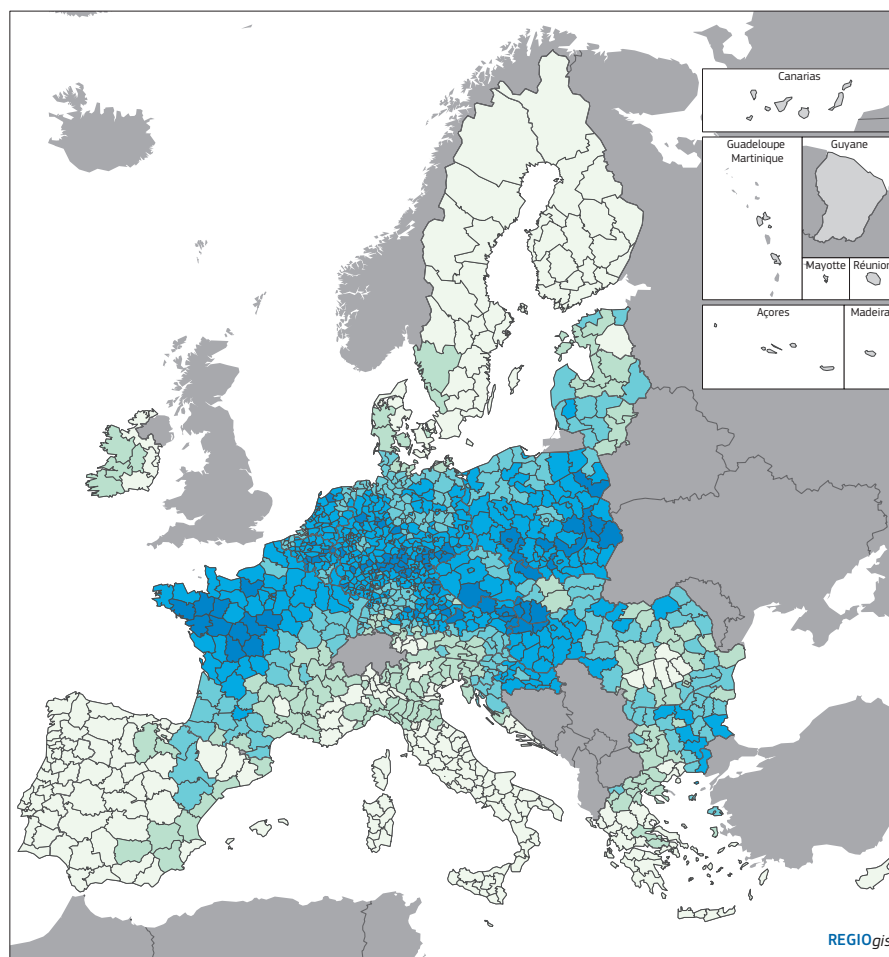
% change relative to baseline



Source: JRC, G.Naumann et al. (2020).

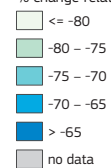


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Map 3.9 Projected change in human exposure to cold waves under a global warming scenario of 3°C in 2100

% change relative to baseline



Source: JRC, G.Naumann et al. (2020).



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As a result, the number of fatalities from extreme heat could increase to nearly 100 000 per year if no mitigation measures are taken, which is significantly higher than the current 2 750 annual deaths.

The exposure of the population to the risk of extreme temperatures varies considerably across EU Member States and regions. The risk of being exposed to extreme heat should increase in southern Europe, whereas milder winters could significantly reduce exposure to extreme cold — nearly 10-fold with 3°C global average warming by the end of this century (Map 3.9). Heatwaves, human exposure to risk and fatalities are projected to increase everywhere in Europe, but Cyprus, Greece, Malta and Spain could see a 40-fold increase in mortality from heatwaves if no adaptation and mitigation actions are taken.

In order to limit risk exposure and an increase in fatalities linked to extreme heat, a wide range of measures can be taken, including improved design and insulation of houses, schools and hospitals, education or early warning systems. This risk also needs to be taken into consideration in urban planning in order to minimise the urban heat island effect³². In that perspective, urban green infrastructure can play an important role, notably by increasing tree and vegetative cover, installing green or reflecting roofs, or using cool pavements (see Section 3.5).

3. Improving our environment

The EU faces unprecedented challenges of environmental sustainability, notably from accelerating biodiversity loss, degradation of ecosystem services, depletion of scarce resources and various forms of pollution, with the associated risk to human health and well-being.

32 Urban heat islands are urbanised areas that experience higher temperatures than outlying areas. This is often due to the fact that structures such as buildings, roads and other infrastructure absorb and re-emit the sun's heat more than natural landscapes such as forests and water bodies.

As pointed out by a series of recent scientific reports³³, current trends in production and consumption are fundamentally unsustainable.

The EU has launched many policy initiatives to address these challenges, putting in place a broad range of legislation to reduce air, water and soil pollution. These have produced substantial benefits over recent decades. EU citizens enjoy some of the best water quality in the world and over 18% of the EU land area has been designated as protected for nature. As part of the European Green Deal, the European Commission adopted: the EU biodiversity strategy 2030, which acknowledges nature restoration as a key contribution to both climate change mitigation and adaptation; the 'farm to fork strategy'³⁴; the zero pollution action plan³⁵; the EU forest strategy³⁶; and the EU soil strategy³⁷. The 8th environmental action plan is designed to support the objectives of the European Green Deal and the transition towards a climate-neutral, resource-efficient and regenerative economy while improving the status of ecosystems.

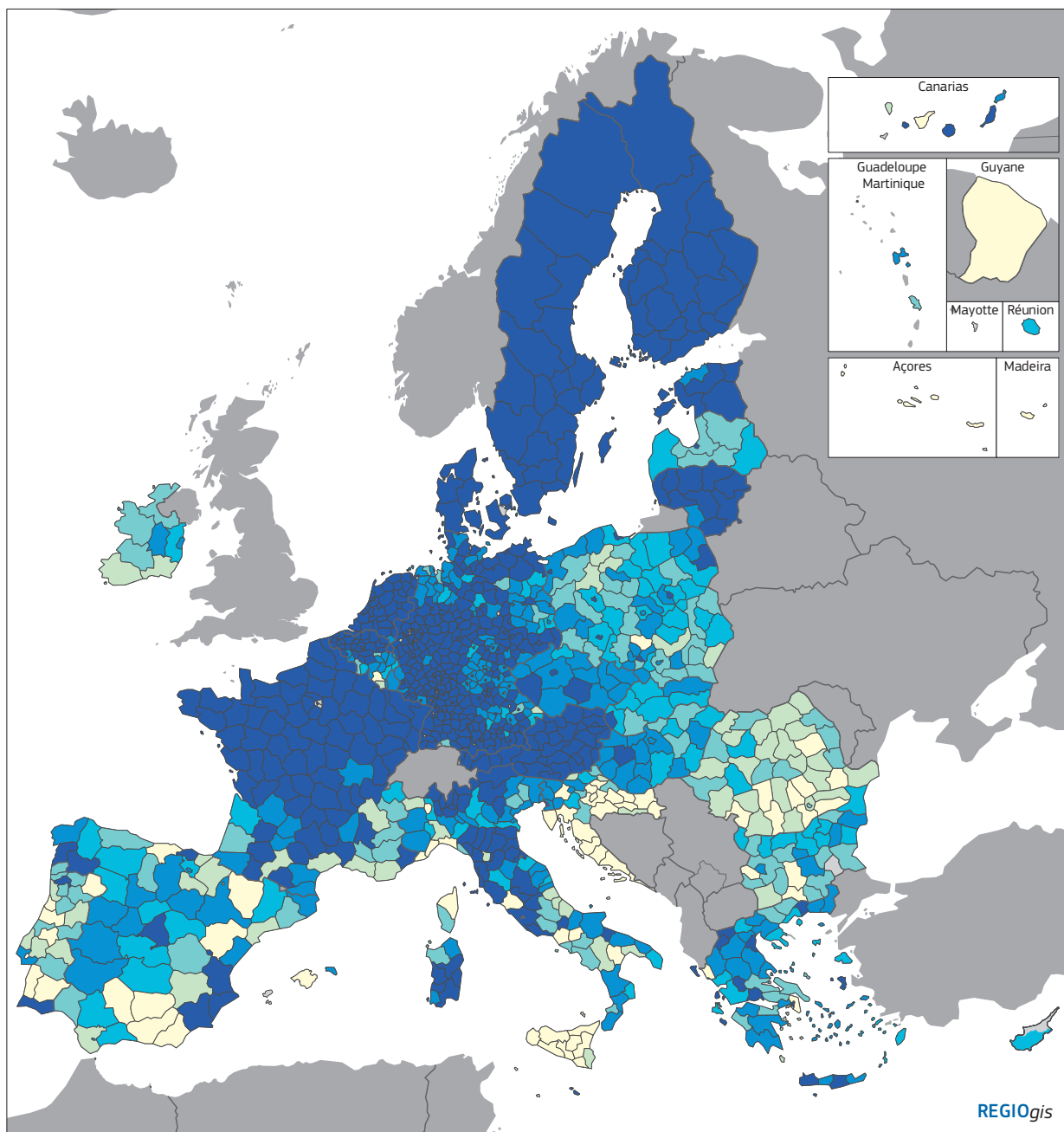
33 Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (2019); International Resource Panel (2019); and United Nations Environment Programme (2019).

34 The farm to fork strategy sets ambitious targets for 2030 on: reducing the use and risk of chemical pesticides and the use of more hazardous pesticides by 50%; reducing nutrient losses by at least 50%; reducing the use of fertilisers by at least 20%; reducing the sales of anti-microbials for farmed animals and in aquaculture by 50%; and reaching 25% of agricultural land under organic farming. The reform of the CAP and the national CAP strategic plans to be in place as of 2023 will contribute to achieving those targets.

35 The zero-pollution action plan for 2050 is aimed at reducing air, water and soil pollution to levels no longer considered harmful to health and natural ecosystems. It includes key 2030 targets: improving air quality to reduce the number of premature deaths caused by air pollution by 55%; improving water quality by reducing waste, plastic litter at sea (by 50%) and microplastics released into the environment (by 30%); improving soil quality by reducing nutrient losses and chemical pesticide use by 50%; reducing the number of ecosystems where air pollution threatens biodiversity by 25%; reducing the share of people chronically disturbed by transport noise by 30%; and significantly reducing waste generation and residual municipal waste by 50%.

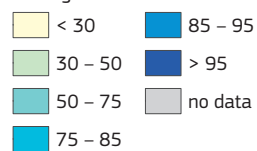
36 The new EU forest strategy for 2030 supports the EU's biodiversity objectives as well as the GHG reduction target of at least 55% by 2030 and climate neutrality by 2050.

37 European Commission (2021g). The aim of the EU soil strategy is to help achieve land degradation neutrality by 2030. The strategy will consider challenges such as identifying contaminated sites, restoring degraded soils, defining the conditions for their good ecological status and improving the monitoring of soil quality.



Map 3.10 Urban wastewater receiving more stringent treatment, 2018

% of generated load



EU-27 = 85.1

Source: DG REGIO based on EEA data.

0 500 km

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These EU initiatives have set targets to tackle environmental challenges via concerted action and systemic solutions. Their delivery will greatly depend on support from EU and national policy and funding instruments.

3.1 More investment needed to improve water quality

Essential for human health and well-being, water is also a key resource for agriculture, certain industries, energy production and transport. Water and wetland areas are also necessary for the provision of a number of ecosystem services (e.g. floodplains) and indispensable for preserving biodiversity as habitats for many species.

The condition of water bodies in the EU is a concern. Only 40% of these are in a good ecological state and many wetlands are in a poor condition³⁸. Even though various sources of pollution have been reduced over the past decade, the pressure from nutrients³⁹, hazardous substances and over-abstraction of water remains high. This implies that the objective set in the 2000 Directive on a water framework, of achieving a good qualitative and quantitative status of all water bodies by 2015, has still not been reached.

Most EU citizens benefit from good water services (such as drinking water supply, and wastewater collection and treatment) but access to those services is still lacking in a number of regions, notably rural areas and less developed regions.

The 1991 Directive⁴⁰ on urban wastewater treatment has a key role in reducing water pollution in the EU by requiring Member States to collect and treat urban wastewater. Its objective is for all wastewater to be collected and suitably treated. Implementing the Directive requires significant investment in new infrastructure but also in the maintenance and extension of existing facilities.

38 European Environment Agency (2019).

39 Nutrient pollution is caused by excess nitrogen and phosphorus in the air and water. Nitrogen and phosphorus are nutrients that are natural parts of aquatic ecosystems.

40 European Union (1991).

The considerable investment made in improving urban wastewater treatment has helped to reduce concentrations of organic matter and nutrients in surface waters. In 2018, more than 98% of urban wastewater was collected⁴¹, though there are still a number of agglomerations where infrastructure needs to be built or improved. Only around 89% of wastewater was collected in Croatia and 85% in Cyprus, while in Romania the figure was less than 80%, with just 57% being collected in Sud-Muntenia.

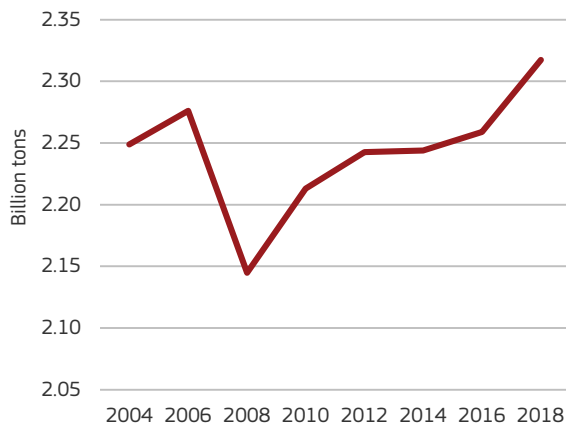
Significant effort is still required regarding treatment⁴². In the EU, around 7% of urban wastewater failed to meet secondary treatment (biological) standards in 2018, and over 16% did not meet more stringent standards (removal of phosphorus and nitrogen). Almost 79% of EU regions provide at least secondary treatment of 90% of their urban wastewater, but this share falls to 57% for more stringent treatment. Less than 30% of urban wastewater receives tertiary treatment in Croatian regions, some regions in Italy, Romania and Spain and in a number of French and Portuguese outermost regions (Map 3.10).

3.2 Waste production remains high, but more is recovered

The 2008 Directive on a waste framework is the EU's legal framework for treating and managing waste. It is aimed at protecting the environment and contributing to the EU's transition to a circular economy. It sets objectives and targets to improve waste management, stimulate innovation in recycling and limit landfilling. In 2020, the European Commission also adopted the new circular economy action plan (CEAP) as one of the main building blocks of the European Green Deal, with the objec-

41 These figures do not systematically correspond to the targets set in the Directive, as in some Member States not all agglomerations are required to comply with the provisions of the Directive because of transitional periods.

42 The level of treatment partly determines the effect of wastewater on aquatic ecosystems. Primary (mechanical) treatment removes part of the suspended solids, while secondary (biological) treatment uses aerobic or anaerobic micro-organisms to decompose most of the organic matter and retain some of the nutrients. Tertiary (advanced) treatment removes the organic matter even more completely.

Figure 3.8 Waste generation, EU-27, 2014-2018

Source: Eurostat.

tive of reducing pressure on natural resources and creating sustainable growth and jobs.

In 2018, more than 2.3 billion tons of waste were produced in the EU (i.e. around 5.2 tons per person). Waste generation follows the business cycle closely (Figure 3.8). It fell in 2008 when the financial and economic crisis struck, but increased with the recovery to levels higher than before. Behaviour as regards the generation of waste, therefore, does not seem to change much over time.

Construction is the main source of waste generation in the EU (being responsible for 36% of the total in 2018), followed by mining and quarrying (26%), manufacturing (11%), waste and water services (10%), households (8%), other services and energy (4% each). Most waste generated by construction, mining and quarrying is classified as major mineral waste, which represented around 65% of the total waste generated in the EU in 2018.

Waste generation per head is much higher in some Member States than others (Figure 3.9). In Finland, the figure was around 23 tons in 2018 as against only one ton in Latvia. In general, Member States with high levels of waste per inhabitant also have large shares from mining and quarrying, such as Romania, Finland, Sweden and Bulgaria, and/or construction and demolition activities, such as Luxembourg. For instance, around 30% of waste

generated comes from mining and quarrying in Estonia⁴³ while this sector accounts for only 0.1% of waste generated in Latvia.

Waste management has been slowly improving in the EU. The share of waste recovered (i.e. recycled or incinerated with energy recovery) increased from 46% in 2004 to 54% in 2018. The quantity of waste subject to disposal (mainly going to landfill — 39% of the total in 2018) fell from 1 027 million tons in 2004 to 984 million tons in 2018, a reduction of 4%.

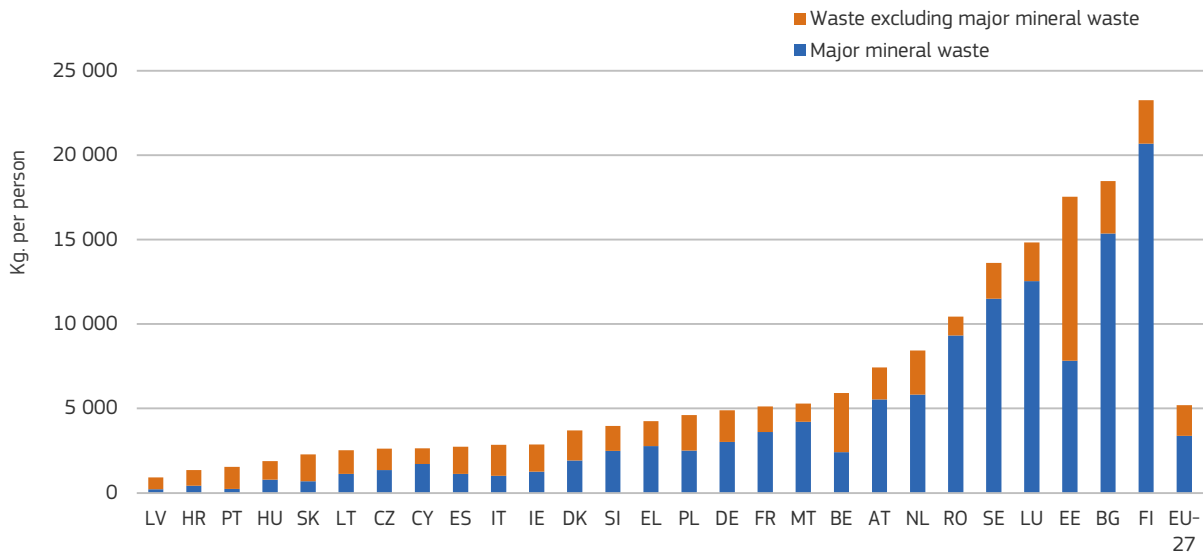
However, some Member States still lose a significant amount of 'secondary raw materials', such as energy, metals, wood, glass, paper and plastics, which they could potentially obtain from waste recovery. Although the share of recovered waste increased in most Member States between 2010 and 2018, it fell in Cyprus, Finland, Greece, the Netherlands, Romania and Spain. In 2018, the share was smaller than 25% in Sweden, Finland, Greece, Romania and Bulgaria (where it was only 3%), while it was over 90% in Denmark and Slovenia (Figure 3.10).

The share of waste recycled has slightly increased in the EU-27, from 37% of total waste treated in 2010 to 38% in 2018. Recycling is by far the most important treatment mode in Italy and Belgium, where it reaches respectively 79% and 77% of waste treated. It is above 50% in only eight Member States and is much lower in others, for example in Bulgaria and Romania where only 3% of waste is treated by recycling.

Reuse, prevention and recycling are key to developing a circular economy. They are also essential for reducing sanitary risks and improving the quality of the environment. They help to reduce GHG emissions (directly by cutting emissions from landfills and indirectly by recycling materials which would otherwise need to be extracted and processed). In Member States where the share of recovered waste is small, there is a particular need to improve waste management, stimulate innova-

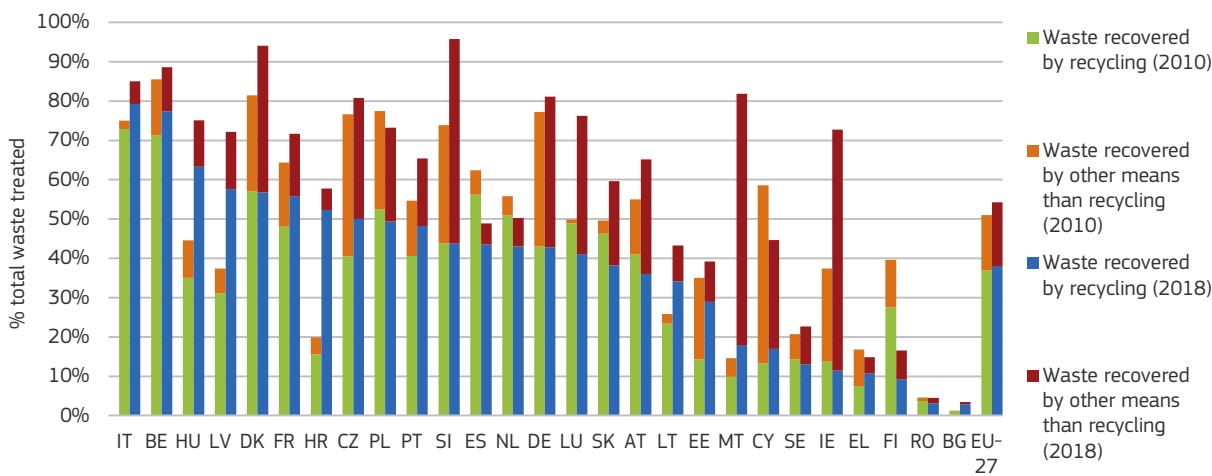
⁴³ The large quantity of waste excluding major mineral waste generated in Estonia is from energy production based on oil shale.

Figure 3.9 Waste generation per head, 2018



Source: Eurostat.

Figure 3.10 Share of waste recovered, 2010 and 2018



Source: Eurostat [env_wastrt].

tion in recycling, limit the use of landfill, and introduce incentives to change consumer behaviour.

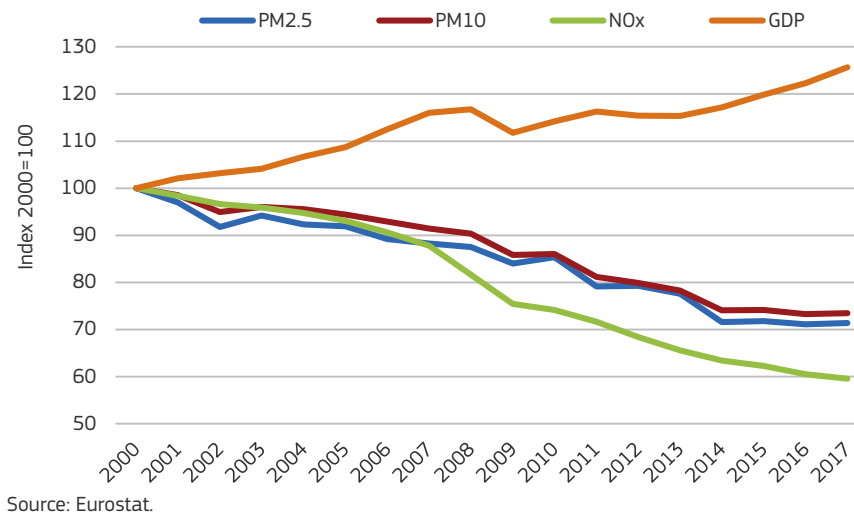
3.3 Air quality has improved, but more needs to be done

Clean air is a critical natural resource for humans, plants and animals. Most pollutants are emitted by a wide range of human activities, in addition to

some natural sources such as volcanic eruptions or dust from wind erosion. The EU has implemented a number of policies and pieces of legislation, such as the 2008 Directive on air quality⁴⁴ and the 2016 Directive on national emission reduction commit-

⁴⁴ European Union (2008). The Directive establishes standards for a range of pollutants including ozone (O₃), particulate matter (PM_{2.5} and PM₁₀) and nitrogen dioxide (NO₂).

Figure 3.11 Emissions of selected air pollutants and GDP (constant price), EU-27, 2000–2017



ments⁴⁵, which are helping to steadily improve air quality. However, hot spots of pollution remain, which require efforts at EU, national and local level.

Emissions of most main air pollutants fell in the EU between 2000 and 2017, while GDP increased (Figure 3.11). Air pollution seems now to be decoupled from economic activity, reflecting changes in both technology (e.g. cleaner transport) and behaviour (e.g. increased use of renewable energy).

The reduction in emissions has led to a general improvement in air quality. In 2019, the EU complied with the 2010 ceilings set under a 2001 Directive for total emissions of four main air pollutants: nitrogen oxides (NO_x), non-methane volatile organic compounds (NMVOCs), sulphur dioxide (SO₂) and ammonia (NH₃)⁴⁶. Only four Member States exceeded their national emission ceilings for NH₃ (Croatia, Czechia, Ireland and Spain)⁴⁷.

However, substantial efforts are needed to reduce emission levels to meet the 2030 reduc-

tion commitments, with 11 Member States 30% above their NO_x target and 10 with PM_{2.5} emissions needing be halved (Table 3.2).

Table 3.2 shows how much emissions still need to be reduced to comply with the 2030 emission ceilings. Positive figures (in red) mean that further reductions are needed. Negative figures (in green) mean the emissions are below the ceiling. The required emission reduction is

calculated as the percentage difference between 2019 reported emissions and the emission-reduction commitments for 2030 onwards.

Although at EU level air polluting emissions have been reduced, there are large regional differences regarding air quality (Map 3.11 and Map 3.12).

High concentrations of airborne particulate matter are caused by emissions from diesel engines or from coalmining, agriculture and other heavy industry. It is also affected by atmospheric conditions, as pollution levels rise with sunshine and high temperatures. In some places, burning wood, coal and other solid fuels in domestic stoves, especially during winter, also leads to locally high fine particulate matter emissions (notably of PM_{2.5})⁴⁸. Accordingly, high concentrations of particulate matter are mostly observed in eastern and southern Europe and parts of industrial and densely populated regions of Italy, Germany, Belgium and France.

The most prominent source of NO₂ is the burning of fossil fuels in internal combustion engines, though also in heating and power plants. Emissions of

⁴⁵ European Union (2016). The Directive sets national emission reduction commitments for the years 2020–2029 and from 2030 onwards.

⁴⁶ According to the provisions of Directive 2016/2284/EU, the emission ceilings for 2010 (established under a 2001 Directive) remain applicable until the end of 2019.

⁴⁷ European Environment Agency (2021b).

⁴⁸ It is estimated that solid fuel combustion in households is responsible for under 3% of total energy consumption in the EU but for over 45% of emissions of primary PM_{2.5}, i.e. three times more than road transport (Amann et al., 2018).

Table 3.2 Distance to 2030 targets

% of 2019 levels	NH ₃	NM VOC	NO _x	PM _{2.5}	SO ₂
Hungary	31	32	40	53	33
Romania	10	21	35	55	27
Czechia	9	36	36	51	11
Cyprus	-15	7	27	38	83
Slovenia	4	21	32	38	25
Germany	27	-4	48	15	24
Poland	11	9	18	47	20
Portugal	6	23	28	37	8
Spain	14	14	15	45	3
Lithuania	3	33	37	-2	6
Ireland	9	23	30	3	0
Croatia	5	18	26	31	-22
Italy	1	15	26	25	-14
France	9	0	37	12	-7
Bulgaria	-1	27	9	40	-26
Denmark	10	-21	25	25	-3
Greece	-5	7	10	7	14
Slovakia	28	-3	8	-3	1
Austria	17	-5	45	13	-40
Latvia	19	12	5	19	-28
Luxembourg	22	11	48	-28	-30
Netherlands	2	-13	25	-3	-38
Finland	4	2	5	-3	-59
Sweden	10	-5	47	-43	-73
Estonia	6	-10	-25	-30	-29
Belgium	-2	-22	11	-15	-65
Malta	-6	26	62	6	-274
EU-27	12	15	36	28	12
<i>Number of MS</i>					
<i>Below target</i>	5	8	1	8	14
<i>More than 30% above target</i>	1	3	11	10	2

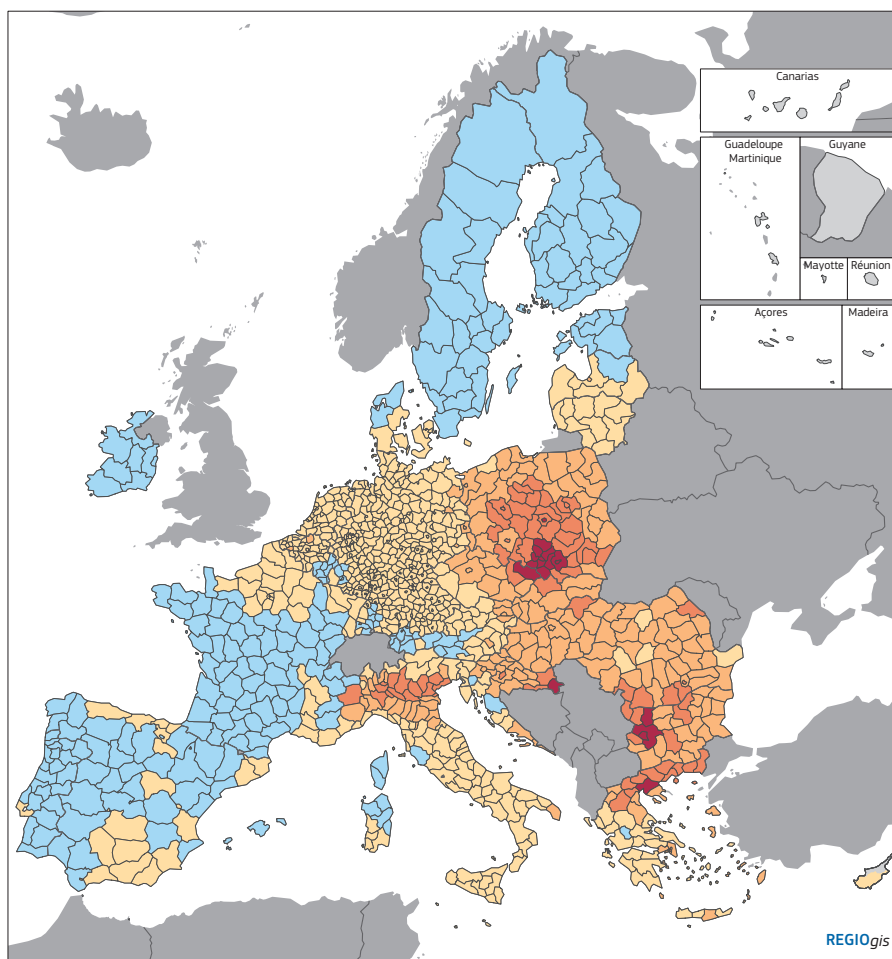
The table shows how much emissions still need to be reduced to comply with the 2030 emission ceilings. Positive figures (in red) mean that further reductions are needed. Negative figures (in green) mean the emissions are below the ceiling. The formula = 2018 emissions/2030 emission ceiling - 1 ceiling, expressed in percentage terms. For example, -10% means that the emissions need to be reduced by 10% to comply with the ceiling. Member States are ranked by average distance to the 2030 targets from high to low. Source: EEA.

NO₂, therefore, come mainly from motor vehicles, though also from non-combustion processes such as welding, the manufacture of nitric acid and the use of explosives. Moreover, in street ‘canyons’, where streets are flanked by tall buildings and there is a large volume of traffic, NO_x emissions can be very high, leading to air quality standards for NO₂ being exceeded.

In 2018, the highest NO₂ concentrations were found in the Netherlands, Belgium, western Germany and northern Italy (Map 3.13). High concentrations are also found in many eastern and southern regions,

as well as in the EU core regions with high population densities and a concentration of industry and transport networks.

O₃ is created by chemical reaction between NO_x and volatile organic compounds in the presence of sunlight. Consequently, O₃ is most likely to reach unhealthy levels in hot, sunny urban environments. High concentrations mostly occur in northern Italy, south and east France, and Spain; but also



Map 3.11 Concentration of fine airborne particulate matter (PM_{2.5}) in NUTS 3 regions, 2018

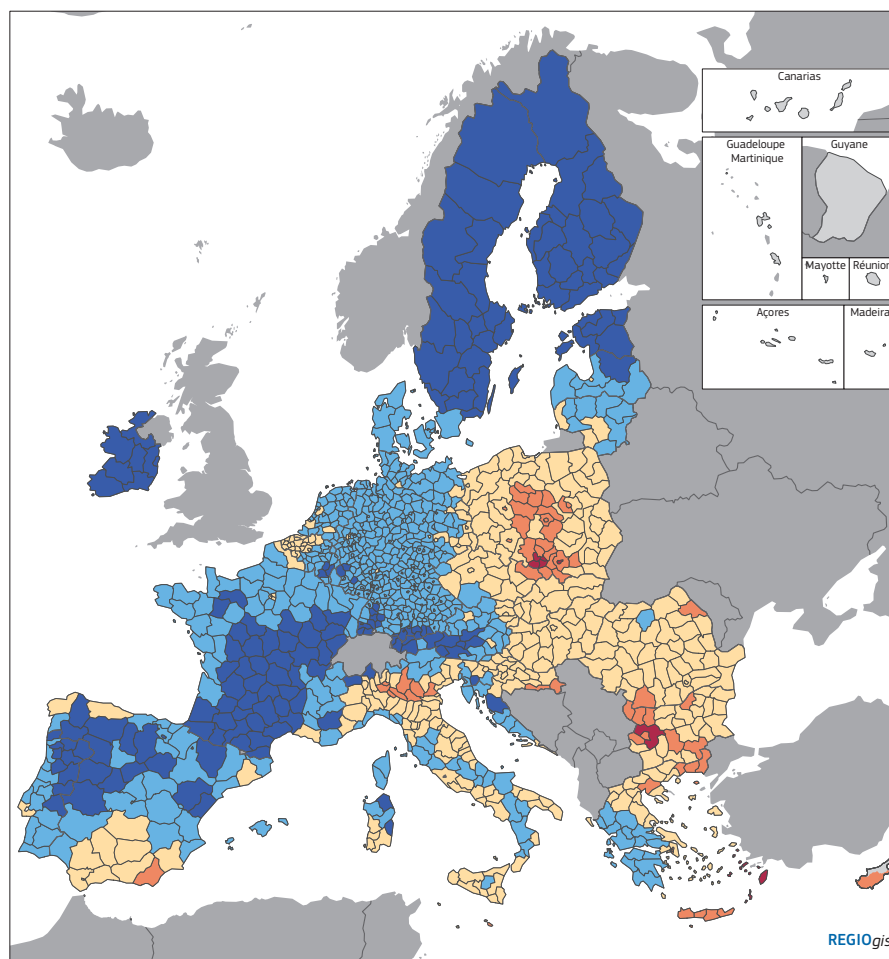
Annual average concentration ($\mu\text{g}/\text{m}^3$)

- < 10
- 10 – 15
- 15 – 20
- 20 – 25
- ≥ 25
- no data

Population-weighted average of interpolated data.
The WHO guideline is < 10 $\mu\text{g}/\text{m}^3$.
The EU limit value is 25 $\mu\text{g}/\text{m}^3$.
EU-27 = 13.7
Source: EEA.

0 500 km

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Map 3.12 Concentration of airborne particulate matter (PM₁₀) in NUTS 3 regions, 2018

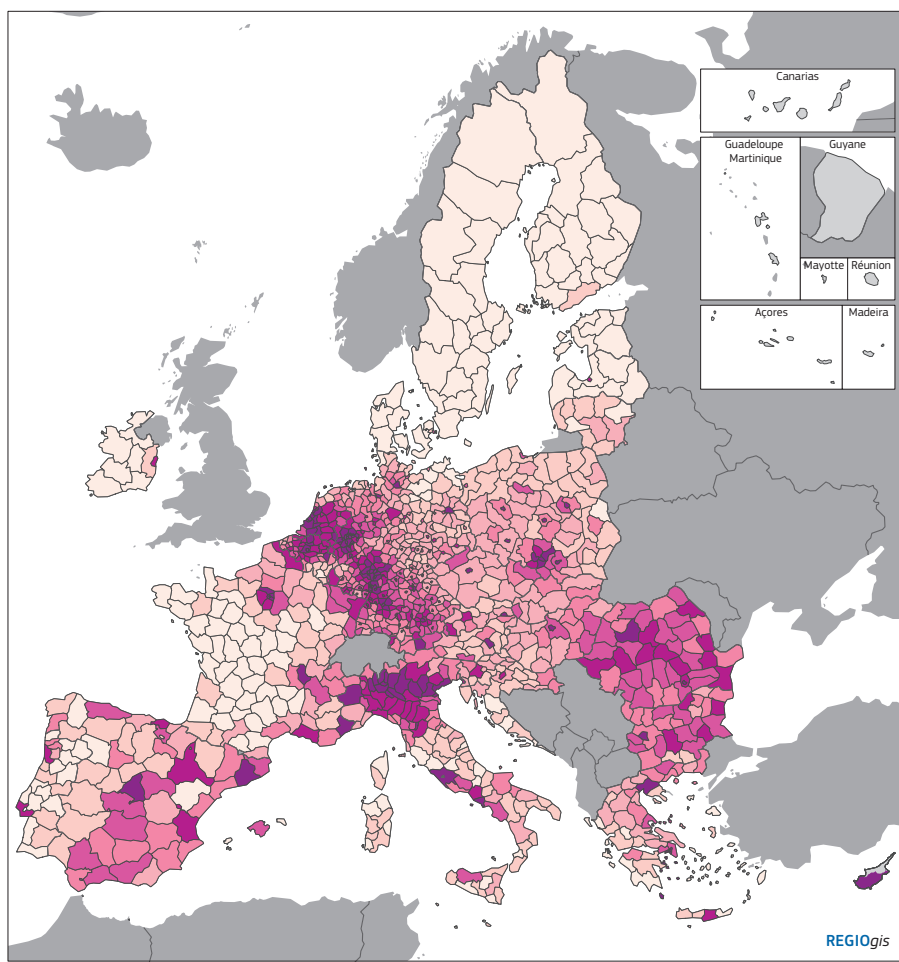
Annual average concentration ($\mu\text{g}/\text{m}^3$)

- < 15
- 15 – 20
- 20 – 30
- 30 – 40
- ≥ 40
- no data

Population-weighted average of interpolated data.
WHO guideline: < 20 $\mu\text{g}/\text{m}^3$.
EU limit value: 40 $\mu\text{g}/\text{m}^3$.
EU-27 = 21.1
Source: EEA.

0 500 km

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Map 3.13 Concentration of NO₂ in NUTS 3 regions, 2018

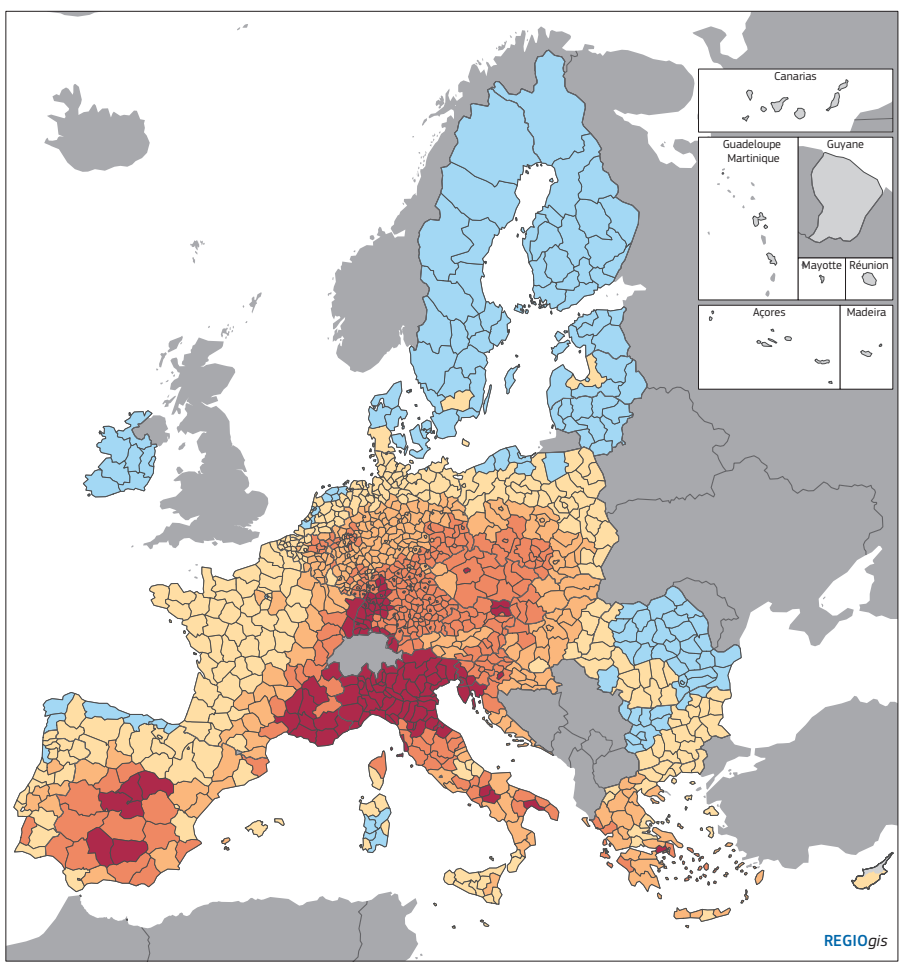
µg/m³

< 10.1	16.2 – 18.1
10.1 – 12.7	18.1 – 21.1
12.7 – 14.5	≥ 21.1
14.5 – 16.2	no data

EU-27 = 17.5
Population-weighted average of interpolated data
Sources: EEA, JRC, DG REGIO.

0 500 km

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Map 3.14 Concentration of ground-level ozone in NUTS 3 regions, 2016–2017–2018

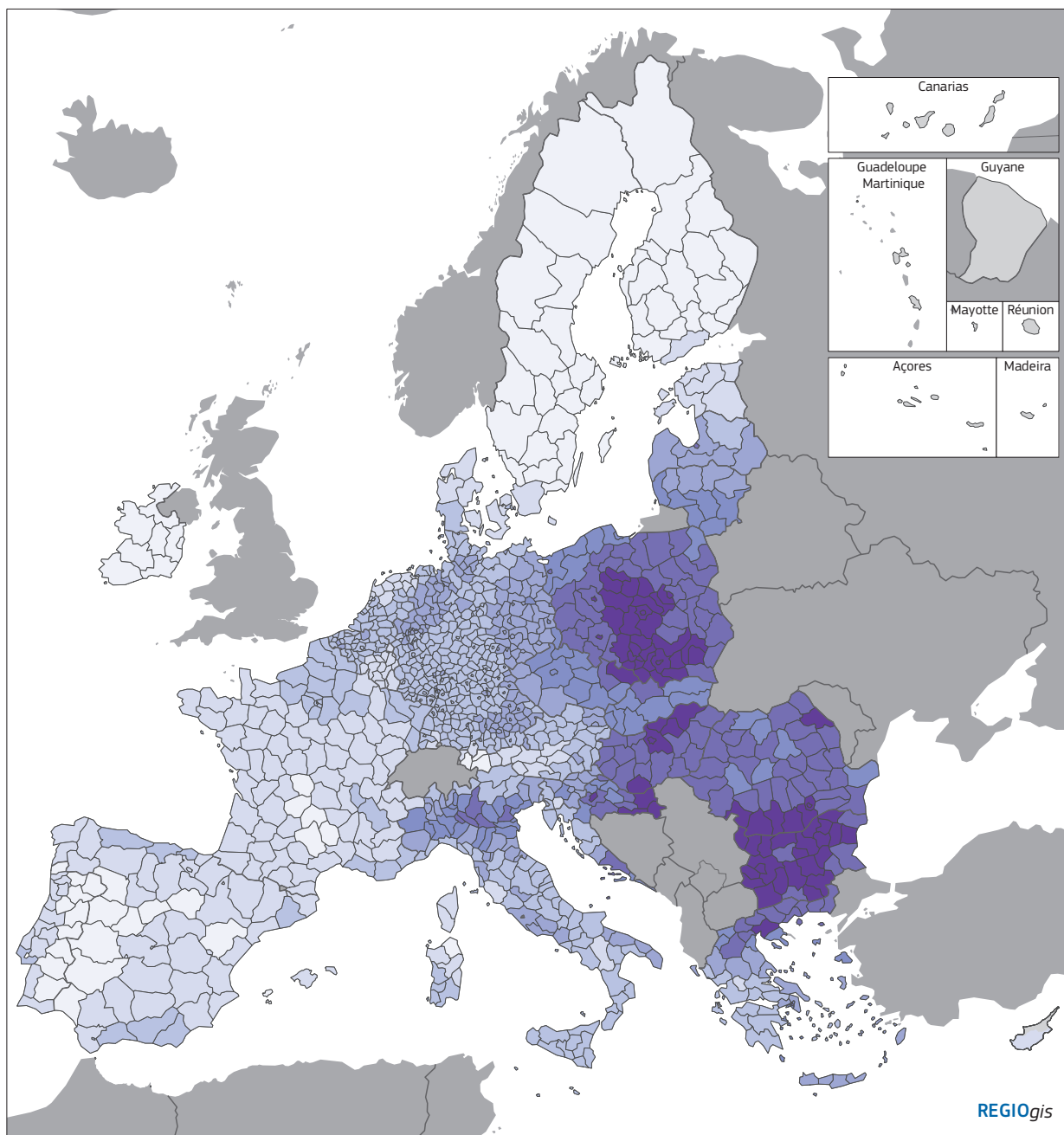
Concentration in µg/m³ exceeded for 25 days

< 100
100 – 110
110 – 115
115 – 120
≥ 120
no data

EU-27 = 111
WHO guideline: < 100 µg/m³.
EU target: value of 120 µg/m³ should not be exceeded more than 25 days per year (averaged over 3 years).
Source: EEA, JRC, DG REGIO.

0 500 km

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Map 3.15 Years of life lost attributed to exposure to PM_{2.5}, 2018

Years of life per 100 000 inhabitants

<= 400	1 000 – 1 250
400 – 600	1 250 – 1 500
600 – 800	> 1 500
800 – 1000	no data

EU-27 = 870
Source: EEA.

0 500 km

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in southern Germany, Czechia and part of Austria (Map 3.14)⁴⁹.

Exposure to pollutants is particularly high in urban areas, where most of the EU population lives. Since 2000, the percentage of urban citizens exposed to pollutant levels above EU standards set to protect human health has fallen⁵⁰. However, poor air quality remains an issue and potentially harmful levels are still recorded in many areas.

This is particularly true for some pollutants such as PM₁₀ and O₃, with respectively 10% and 21% of the EU urban population still exposed to levels above EU limit values in 2019. Exposure to other pollutants is less severe, but nonetheless 3% of the urban population lived in zones exceeding the EU limit values for NO₂, and 1% for PM_{2.5}. For SO₂, the percentage exposed to levels above the limit value has dropped to less than 0.1% in the last 10 years.

Exposure to air pollution can cause a wide range of illnesses (cardiovascular problems, respiratory infections, aggravated asthma or cancer). It is estimated that exposure to PM_{2.5} is responsible for around 400 000 premature deaths in the EU every year, while in 2017 exposure to NO₂ and O₃ was responsible for around 70 000 and 15 000 premature deaths, respectively⁵¹. Those living in eastern Europe are particularly at risk, with premature death rates reaching 174 per 100 000 inhabitants in Bulgaria and 133 in Hungary, well above the EU average of 79.

The areas where the impact on health from exposure to PM_{2.5} is greatest, in terms of years of life lost, are those with the highest concentrations, which also tend to be regions with low GDP per head (Map 3.15). There is, therefore, a strong link between low income levels and exposure to air pollution.

49 O₃ concentrations can be very volatile, as they are highly dependent on meteorological conditions. It is therefore more relevant to report a three-year average, which is also the timespan adopted in the 2008 Directive on air quality to set the target for protection of human health.

50 European Environment Agency (2021c).

51 European Environment Agency (2019).

3.4 Rural areas are becoming more built up

Land cover

Sound management of land is essential for maintaining key productive resources and ecosystem services. Productive land and fertile soil are needed to provide food, facilitate the nutrients cycle, protect biodiversity, regulate and purify water, and mitigate climate change.

Current land-use practices and management affect the condition of land and soils and often result in loss of productive land. Unsustainable agricultural and forestry practices, construction of buildings and infrastructure and climate change are the main reasons for degradation of land.

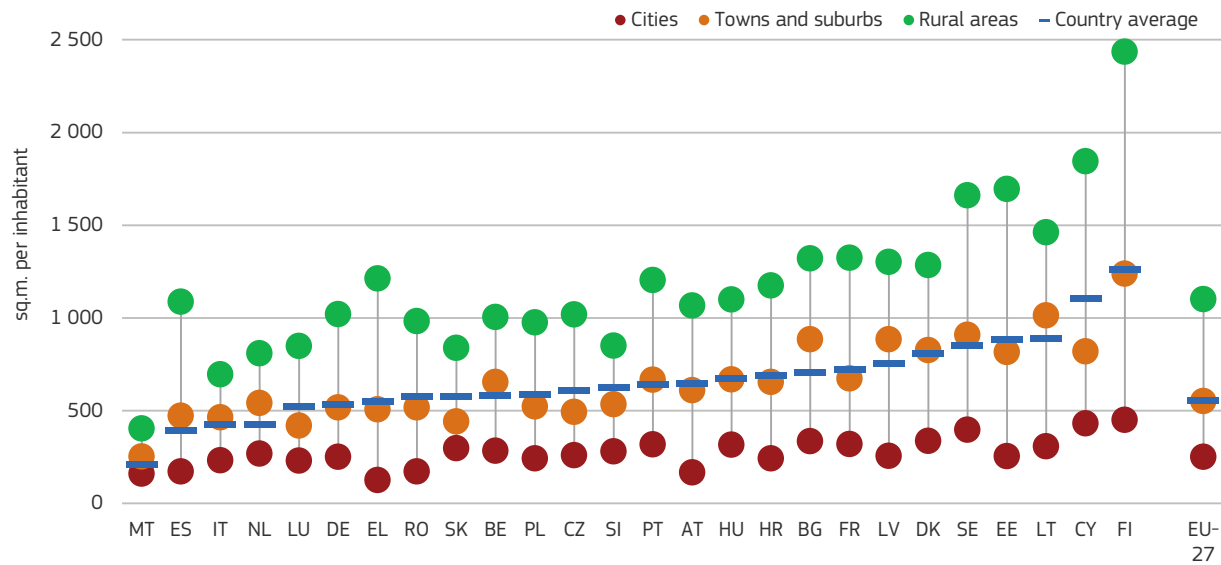
Imperviousness

Soil sealing, or imperviousness, is a major concern, as it results in the loss of many of the functions that soil performs. The increase in imperviousness stems from new construction, which covers soils with impervious artificial material such as asphalt and concrete.

The extent of imperviousness varies considerably across the EU. It is highly correlated with population density, but imperviousness per inhabitant shows wide variations in land use between types of region.

Built-up land and transport infrastructure constitute the bulk of sealed areas. On average in the EU, as shown by the LUISA base map (LBM)⁵², land clas-

52 The LBM is an enhanced version of the CORINE land cover (CLC) map, consisting of a series of geospatial data fusion processes whereby highly detailed land-use information from trusted datasets is integrated, with the CLC as the starting point. The LBM has a spatial resolution of one hectare for built-up areas and five hectares for non-built-up areas. However, the LBM is still based on the classification of relatively large areas, and hence does not constitute a continuous land-use measure. Also, although the same data sources were used to produce maps for both 2012 and 2018, input data may not always be fully comparable. This is especially the case for the accounting of changes in the urban fabric for geographical units such as municipalities or NUTS regions. However, the effect of differences in input data is limited because the LBM uses a robust approach taking account of multiple sources of information and classifies areas by broad classes of imperviousness.

Figure 3.12 Built-up land and transport infrastructure per head by degree of urbanisation, 2018

Source: JRC.

sified as built-up areas and transport infrastructure per inhabitant is four times greater in rural areas than in cities (Figure 3.12). Built-up land and transport infrastructure in rural areas is relatively limited in Malta, Italy, the Netherlands, Slovakia, Luxembourg, Slovenia, Poland and Romania, where it is less than 1 000 square metres per inhabitant, compared with Cyprus and Finland where it reaches 1 845 and 2 435 square metres respectively.

Between 2012 and 2018, land classified as built-up areas and transport infrastructure in EU cities remained the same, whereas it increased significantly in rural areas. Here, the increase per head has been higher than in cities in almost all Member States (Figure 3.13). The biggest increases were in Finland and Lithuania, where they amounted to over 40 square metres per year on average. The above suggests that population growth in cities will have a smaller effect on the extent of built-up land and transport infrastructure than population growth in rural areas.

There are also wide variations across EU regions, sealed areas per inhabitant being much lower in most regions in eastern Europe than in some regions in France, Spain, Portugal and Germany (Map 3.16).

Land-use dynamics: the case of agricultural land abandonment

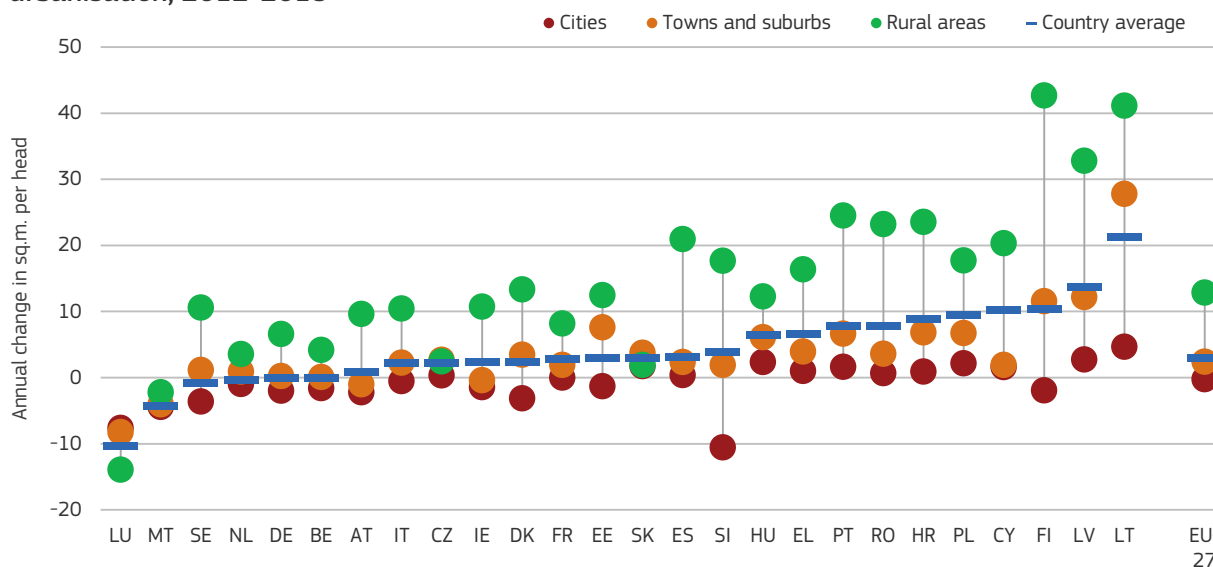
Abandonment of agricultural land⁵³ is the largest change in land use that is occurring in Europe. Agricultural land abandonment in mountainous and remote areas has been widely analysed, owing mainly to: the depopulation of some rural areas; the low income and productivity of farming activities relative to new, non-farming opportunities; and the unfavourable natural constraints that need to be overcome (such as for instance the difficulties to cultivate on slopes)⁵⁴.

The consequences of land abandonment on biodiversity and other ecosystem services vary over time and between locations⁵⁵. The most significant negative impacts can occur in areas where traditional, extensive land-management practices have been maintaining high-biodiversity habitats and landscape features. Abandonment may alter the biological, geological, chemical and water cycles, as well as changing vegetation and the proper-

⁵³ Agricultural land abandonment commonly refers to land that: was previously used to grow crops or for grazing; does not have farming functions anymore; and has not been converted to forest or artificial areas either. See for instance: Perpiña Castillo et al. (2021).

⁵⁴ See for instance: Lasanta et al. (2016).

⁵⁵ Ustaoglu (2018).

Figure 3.13 Change in built-up land and transport infrastructure per head by degree of urbanisation, 2012-2018

Source: JRC.

ties of the soil. It may result in an increase in the frequency of forest fires, soil erosion, landslides and desertification, and transform the landscape. It can also lead to revegetation, with new forest replacing herbaceous plants and shrubs, resulting in increased carbon sequestration, conservation of biodiversity, improvements in the quality and supply of water, recovery of the soil and stimulation of eco-tourism.

Recent projections⁵⁶ of the territorial patterns of land abandonment up to 2030 show that the proportion of agricultural land expected to be abandoned in EU NUTS 3 regions varies from less than 2% to over 30% (Map 3.17). Almost 5% of NUTS 3 regions are likely to have over 15% of their agricultural land affected by land abandonment. The areas most affected could be targeted by policy-makers to prevent or minimise the adverse consequences and to foster appropriate forms of

land management to create high-quality natural areas⁵⁷.

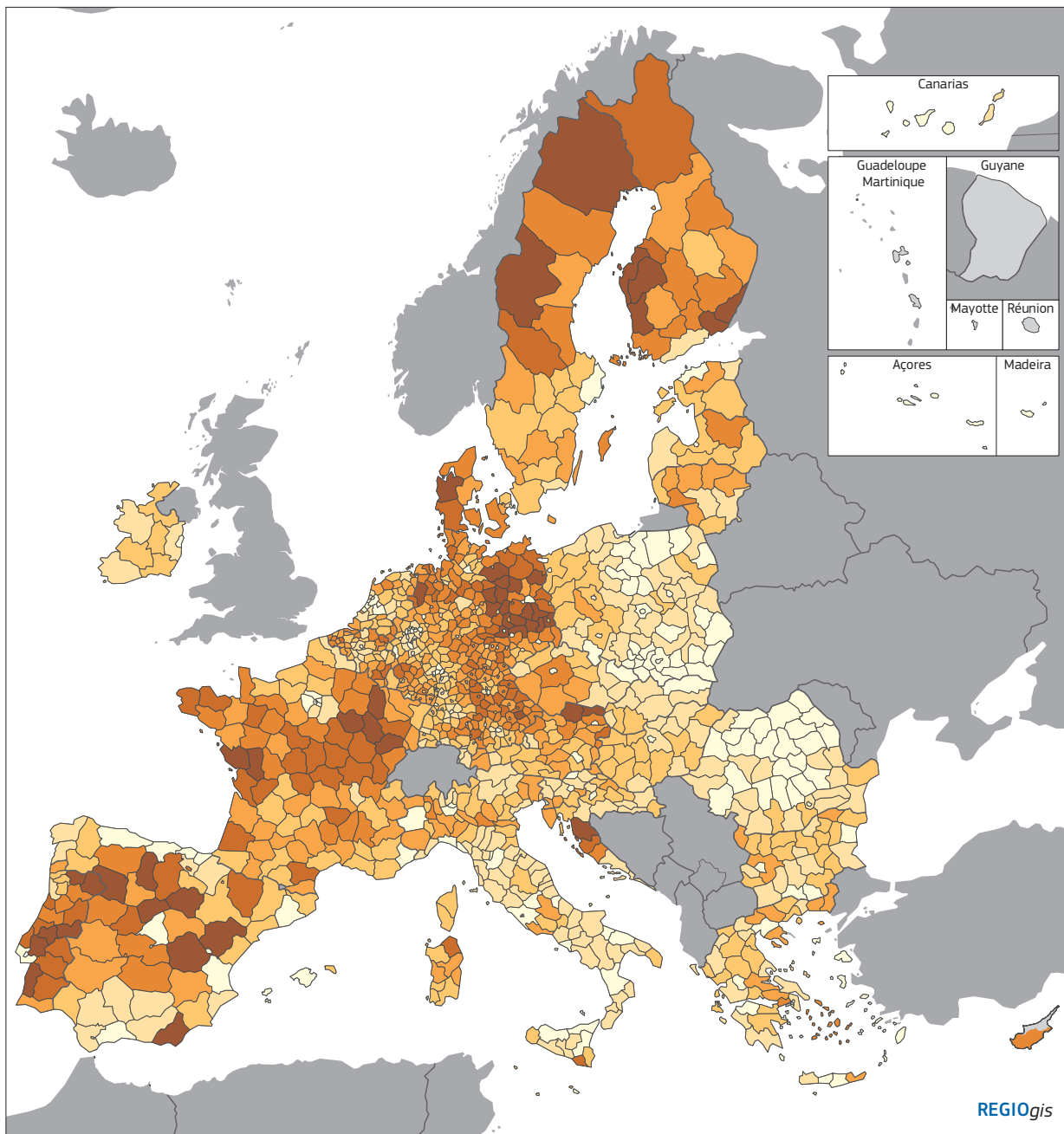
3.5 More investment needed to restore ecosystems, and develop green infrastructure and nature-based solutions

Biodiversity and nature are essential to maintaining life by providing ecosystem services, such as the provision of food, pollination, carbon sequestration, mitigation of natural disasters and recreational opportunities. As a result, loss of biodiversity has fundamental consequences for society, the economy and human health and well-being.

Despite its efforts, the EU is continuing to lose biodiversity at an alarming rate and many EU policy targets will not be achieved. In particular, there has been limited progress towards the 2020 target of improving the conservation status of habitats, covered by a 1992 Directive, and the target for bird populations under a 2009 Directive. For example, 60% of the species and 81% of the habitats

⁵⁶ Perpiña Castillo et al. (2018). Their projections are based on the LUISA territorial modelling platform. LUISA is a pan-European modelling platform developed by the JRC to generate alternative scenarios of territorial development, in order to understand better the effects of certain EU policies in an integrated spatial framework.

⁵⁷ For instance, areas facing natural or other specific constraints (ANCs) are those that are more difficult to effectively farm due to specific problems caused by natural conditions. In order to prevent this land from being abandoned, the EU provides support through both rural development and income-support schemes.



Map 3.16 Imperviousness per inhabitant, 2018

m² per inhabitant

<= 150	300 – 350
150 – 200	350 – 400
200 – 250	> 400
250 – 300	no data

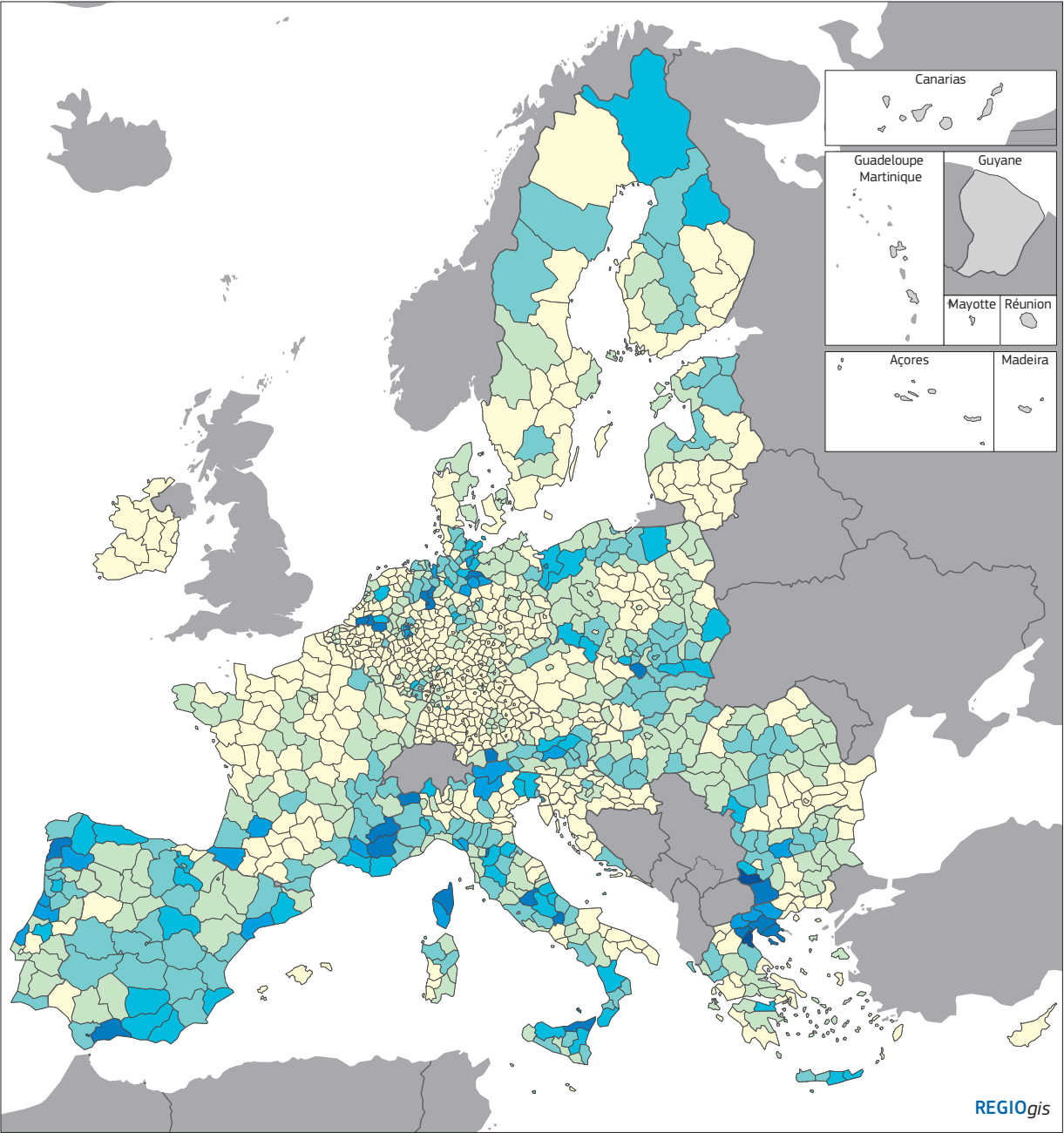
EU-27 = 199

Aggregated from imperviousness values measured at 10 m resolution.

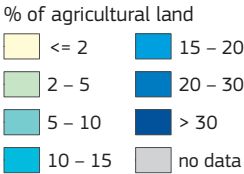
Source: DG REGIO based on Copernicus and Eurostat data.

0 500 km

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Map 3.17 Expected share of agricultural land abandonment at NUTS 3 level, 2030



Source: Vallecillo et al. (2020).



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protected under the Directive on habitats are assessed as having a poor or bad conservation status⁵⁸. Recent assessments indicate that the loss of biodiversity and ecosystem services continues across the EU.

There has been some progress, however, notably in the designation of protected areas. The EU Natura 2000 network, aimed at safeguarding Europe's most valuable and threatened species and habitats, now covers 18% of the EU land area and almost 9% of the sea, making it the world's largest network of protected areas.

The Natura 2000 network is now largely complete on land, though some Member States still need to propose further sites for a number of species and habitats to complete their national network. Progress in designating Natura 2000 sites in the marine environment, however, has been much slower. This is largely because of a lack of scientific information on the distribution of protected marine habitats and species at the level of detail required for sites to be identified and appropriate management to be introduced.

Under its biodiversity strategy for 2030⁵⁹, the EU will implement a series of measures to reverse these trends. These include placing at least 30% of land and 30% of sea areas in the EU under protection, restoring degraded ecosystems, increasing organic farming and biodiversity-rich landscape features on agricultural land, restoring at least 25 000 km of EU rivers to a free-flowing state, halting and reversing the decline in pollinators, planting three billion trees and reducing the use of, and risks from, pesticides by 50% by 2030. In order to boost ecosystem restoration efforts, the Commission will propose, in 2022, an EU nature restoration law.

Nature-based solutions tap into ecosystem restoration in order to tackle major societal challenges, while also providing benefits for biodiversity. Some examples of nature-based solutions include investments in:

- wetland and floodplain restoration in order to mitigate flood risk and improve water regulation, while also providing habitat for valuable plant and animal species, fish-spawning grounds, nutrient reduction benefits, groundwater replenishment and recreation opportunities;
- high-diversity landscape features on agricultural land that can increase ecological connectivity, provide a mosaic of habitats, allow species to migrate and adapt to climate change, while at the same time enhancing ecosystem services such as pollination, climate and water regulation, and erosion protection; and
- urban green areas that can support and reconnect wildlife while also helping to mitigate flooding, urban heat and air pollution, and providing recreation opportunities.

Ecosystems deliver services which bring value to the economy, captured by ecosystem accounts. The European Commission's 'INCA' project provided an initial estimate of the economic value based on a set of seven ecosystem services in the EU in 2019, amounting to €234 billion, which is comparable to the gross value added of agriculture and forestry combined⁶⁰.

Healthy ecosystems play an important role in regulating the water cycle and controlling river flooding. Even where flood-defence structures are in place, ecosystems such as wetlands and restored and reconnected floodplains act together to reduce flood peaks and keep them within safe limits. Ecosystems with the highest potential to reduce run-off are wetlands and flood plains, followed by woodland and forest.

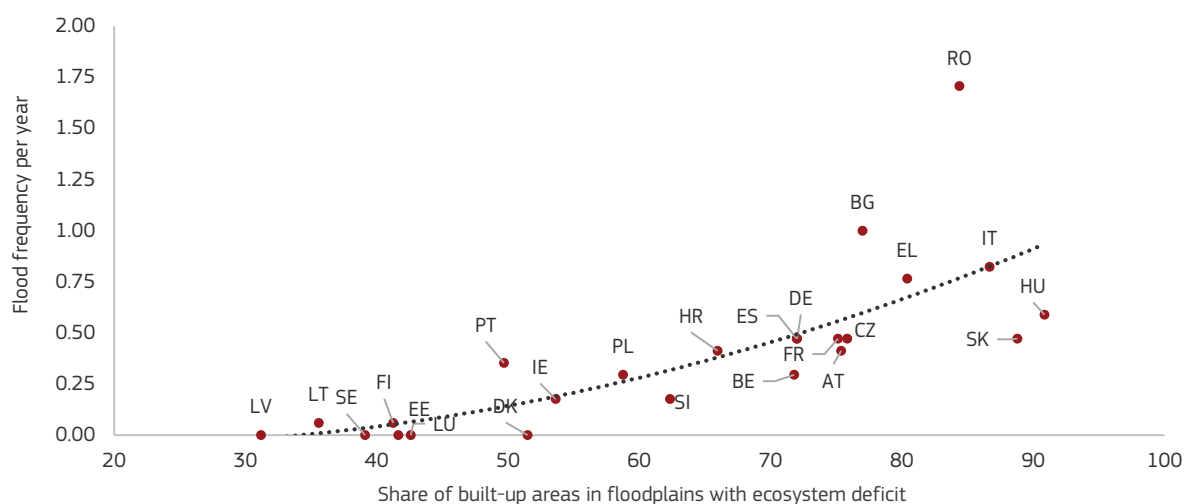
In recent years (see Sections 3.2 and 3.3), losses from river floods have increased considerably because of the location of economic activity in flood plains in combination with heavier rainfall in some regions⁶¹. According to a recent study, some 13% of built-up areas in the EU are located in

58 European Environment Agency (2020).

59 European Commission (2020c).

60 Vysna et al. (2021).

61 European Environment Agency (2016).

Figure 3.14 Relationship between the share of built-up areas in floodplains with ecosystem deficit and flood frequency

Source: JRC.

flood plains, so requiring protection from floods⁶². Sustainable ecosystem management to reduce the risk of floods is, therefore, recognised as a priority measure under the Sendai framework for disaster risk reduction⁶³.

The value of the protective role performed by ecosystems against floods is estimated at around €16 billion, the equivalent to €823 000 per square km of built-up area in flood plains. The ecosystem deficit shows that for 68% of these areas, or 9% of the total built-up area in the EU, flood risks could be reduced by improving upstream ecosystems (Map 3.18).

A reduction in the ecosystem deficit to protect settlements against floods could significantly reduce the frequency of floods, as indicated by the correlation of the latter with this deficit (Figure 3.14). This highlights the importance of the role of ecosystems in mitigating flood damage.

Green infrastructure can also play a key role in mitigating other consequences of climate change,

such as the increase in the severity of the urban heat island effect.

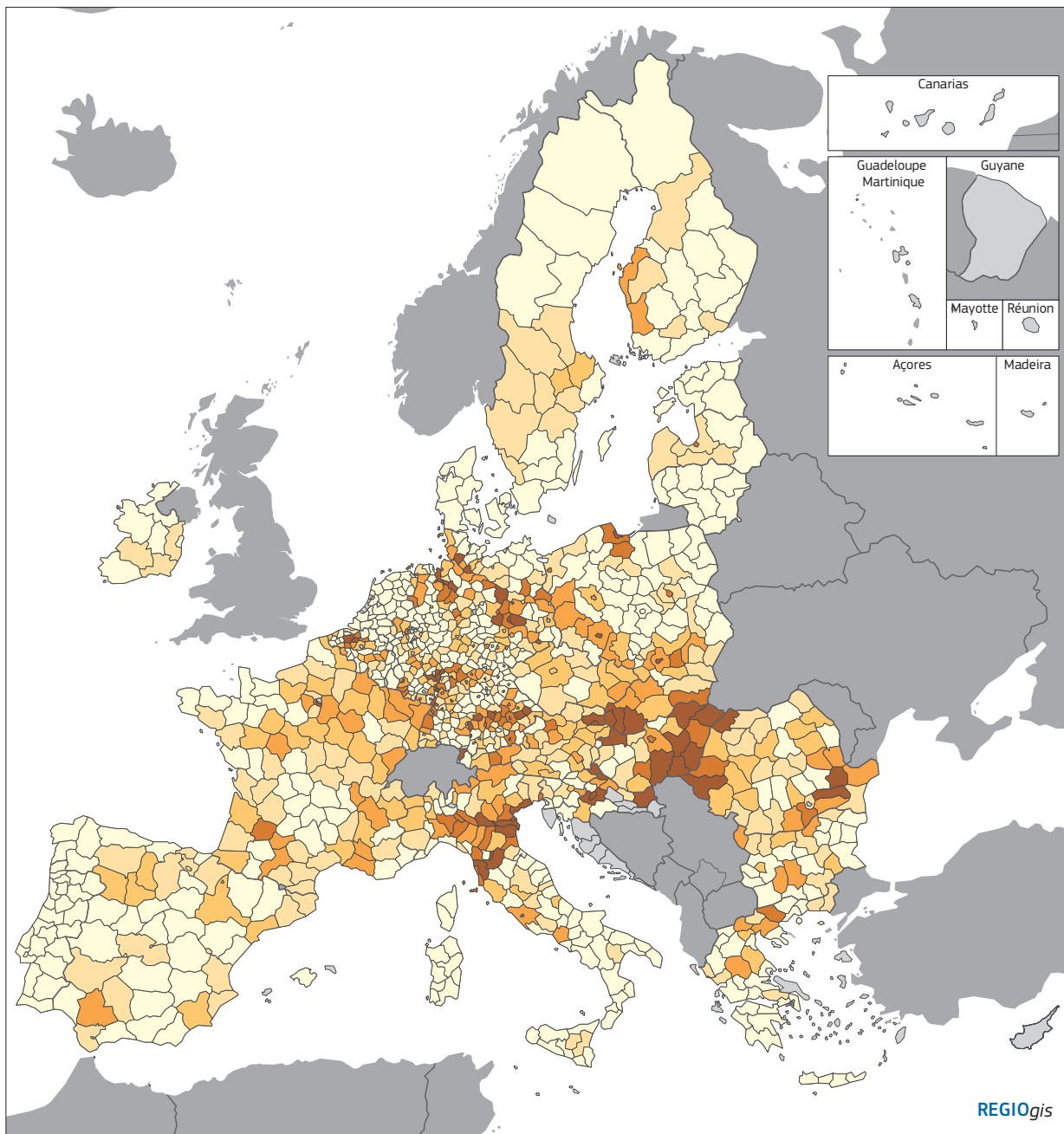
Surface and air temperatures are generally higher in cities than in rural surroundings. Built-up areas trap more solar radiation than natural vegetation, with a consequent rise in temperature. It is not exceptional for certain areas in cities to be several degrees warmer than the countryside during the summer. Heating and transport further increase the heat released in urban areas. These urban heat islands can become so warm during heatwaves that they increase the risk of heat-related human illnesses and mortality. Increasing urbanisation and more frequent heatwaves as a result of climate change are expected to increase further the impact of urban heat islands in the next decades.

Vegetation in and around cities, such as trees, urban parks and forests, mitigate extreme urban temperatures. Not only do trees provide shade, they also cool the surrounding area by evaporating water through their leaves.

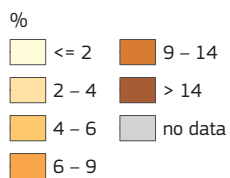
The impact of urban vegetation on urban temperatures can be measured using *in situ* weather stations, which monitor the air temperature, as well as through remote sensing of the land surface temperature. Land surface temperature data, collected for 601 functional urban areas in Europe,

62 Vallecillo et al. (2020). 'Built-up areas' corresponds to CORINE land cover map, level 1 artificial surfaces (see CLC nomenclature at: https://land.copernicus.eu/eagle/files/eagle-related-projects/pt_clc-conversion-to-fao-lccs3_dec2010).

63 United Nations (2015).



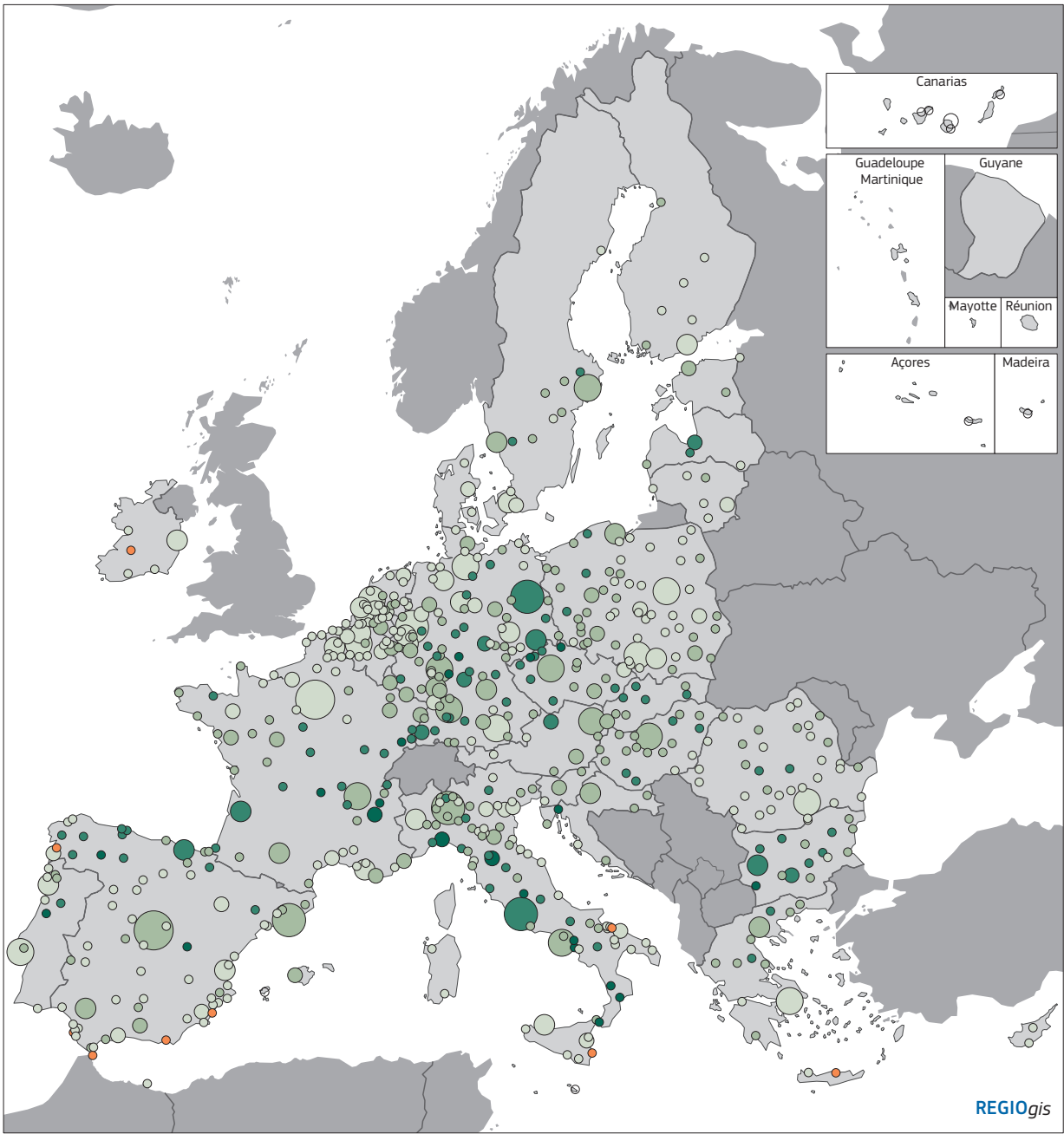
Map 3.18 Built-up areas where improved ecosystem services could reduce flood risk, 2012



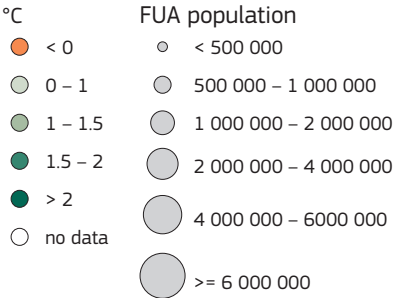
Source: JRC.

0 500 km

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Map 3.19 Cooling effect of vegetation in FUAs, 2018



Source: JRC.



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are used in a model to estimate the effect of urban and peri-urban vegetation on temperature reduction (Map 3.19)⁶⁴. The results suggest that, on average, European cities would be up to 5°C hotter without vegetation. On average, urban vegetation cools cities by 1.07°C. In cities distant from the sea, the impact of vegetation on temperature reduction is, in general, higher than in coastal cities. In a few cases, urban green spaces can be hotter than built-up areas, in particular in Mediterranean cities where the cooling capacity of urban trees and forests decreases during extended periods of water scarcity.

The cooling effect of vegetation in cities is local and limited to green areas. Consequently, almost half of the urban population does not live close enough to urban green areas to benefit from temperature reduction by trees and urban forests, especially in cities where urban green areas are scarce. Increasing tree cover in cities can be an effective strategy to reduce the heat intensity in cities⁶⁵. As a rule of thumb, adding a proportion of tree cover equal to 16% of the functional urban area will reduce the average urban temperature by 1°C.

⁶⁴ Maes et al. (2021).

⁶⁵ The results of the VEG-GAP (vegetation for urban green air quality plans) project — part of the EU's LIFE (L'Instrument Financier pour l'Environnement) programme — identify the best vegetation choices for urban green, e.g. avoiding vegetation that emits O₃ precursors.



Chapter 4

A more connected Europe

- For journeys between EU cities of up to 500 km, rail has the potential to successfully compete with short-haul flights in terms of total travel time, provided that a sufficient rail operating speed can be achieved. Speeds of around 140 km per hour appear to be sufficient for rail to consistently outperform air flights for trips of this distance or less.
- For journeys in the EU of up to 90 minutes, cars are usually a better option than trains. Nevertheless, in most eastern Member States more investment in the road network could substantially improve accessibility. By rail it tends to take much longer to reach destinations, particularly in rural and border areas, but the total time of a rail trip can often be significantly reduced by cycling to and from stations.
- Within metro areas, the ability to reach nearby locations by car is strongly affected by congestion. Fortunately, most people living in cities in the EU have good access to public transport; though when suitable infrastructure is in place, bicycles can be a much quicker way of reaching nearby destinations than public transport.
- The EU aims to cut road traffic fatalities by at least 50% between 2020 and 2030, reducing them to less than 25 per million inhabitants. There are only a few regions where the rate at present is this low, highlighting the need for a co-ordinated effort to improve transport infrastructure and user behaviour. By lowering speed limits, many cities now have a fatality rate well below the 2030 target, but road safety needs to improve further to meet the 2050 vision of zero fatalities.
- Broadband connections in the EU show a clear digital divide both between rural and urban areas and between less developed and more developed regions. The provision of digital services and the capacity to operate successfully in a global business environment increasingly rely on fast and effective broadband connections. Unless the gap is closed, the competitiveness of less developed and rural areas is likely to deteriorate, leading to even greater disparities.

Chapter 4

A more connected Europe

Mobility of people is an enabler of economic and social life. Well targeted infrastructure investment and network design are crucial for a transport system that provides accessibility to people and businesses, as well as for reducing regional disparities in connectivity.

Despite the benefits, mobility involves costs to society. These include GHG and pollutant emissions, but also accidents and congestion, all of which affect health and well-being. The EU transport strategy¹ is currently focused on the transition to sustainable and smart mobility, which involves reducing significantly its GHG emissions, and inter alia requires a decisive shift in modes of transport.

This chapter shows that, in terms of accessibility and connectivity, rail passenger transport, in particular, has the potential to be a substitute for short-distance flights and road journeys between cities, provided that network design, service frequency, and travel speed are sufficient to make it an attractive alternative.

In the urban environment, congestion poses another important challenge. Here, the potential for more sustainable modes, including public transport and non-motorised means of moving around, is very high due to the concentration of the population and shorter journey distances.

This chapter also covers other aspects of a sustainable passenger transport system, including electric vehicle charging infrastructure and road safety. Importantly, an increase in road safety might boost the take-up of non-motorised modes of transport, bicycles in particular, which in turn would further contribute to low-emission mobility.

Finally, the chapter focuses on broadband connections, which, in an increasingly digitalised world, have become an important aspect of connected-

ness. Good coverage and fast digital connections are important in all areas, especially in remote or sparsely populated ones, where transport networks are less developed and digital connectivity can play an important role in ensuring access to essential services.

1. Rail can compete with short-haul flights²

In 2021, the Commission proposed an action plan to boost long-distance and cross-border passenger rail services³. This builds on efforts by Member States to make key connections between cities faster by: better managing capacity; co-ordinating timetabling; creating facilities for sharing rolling stock; and improving infrastructure to stimulate new train services, including at night.

Improving high-speed rail⁴ services could provide travellers with an alternative to short-haul flights, which would not only reduce CO₂ emissions but also free up scarce airport capacity and avoid maintaining unprofitable air routes. Depending on operating speed, boarding time⁵, taxiing time and travel time to reach the airport or station⁶, high-speed rail can be a viable alternative to air travel up to distances of 500 km⁷.

1 European Commission (2020e).

2 The analysis in this section focuses on a comparison of travel times and does not look at other aspects relevant to transport mode choices such as transport prices, comfort and safety.

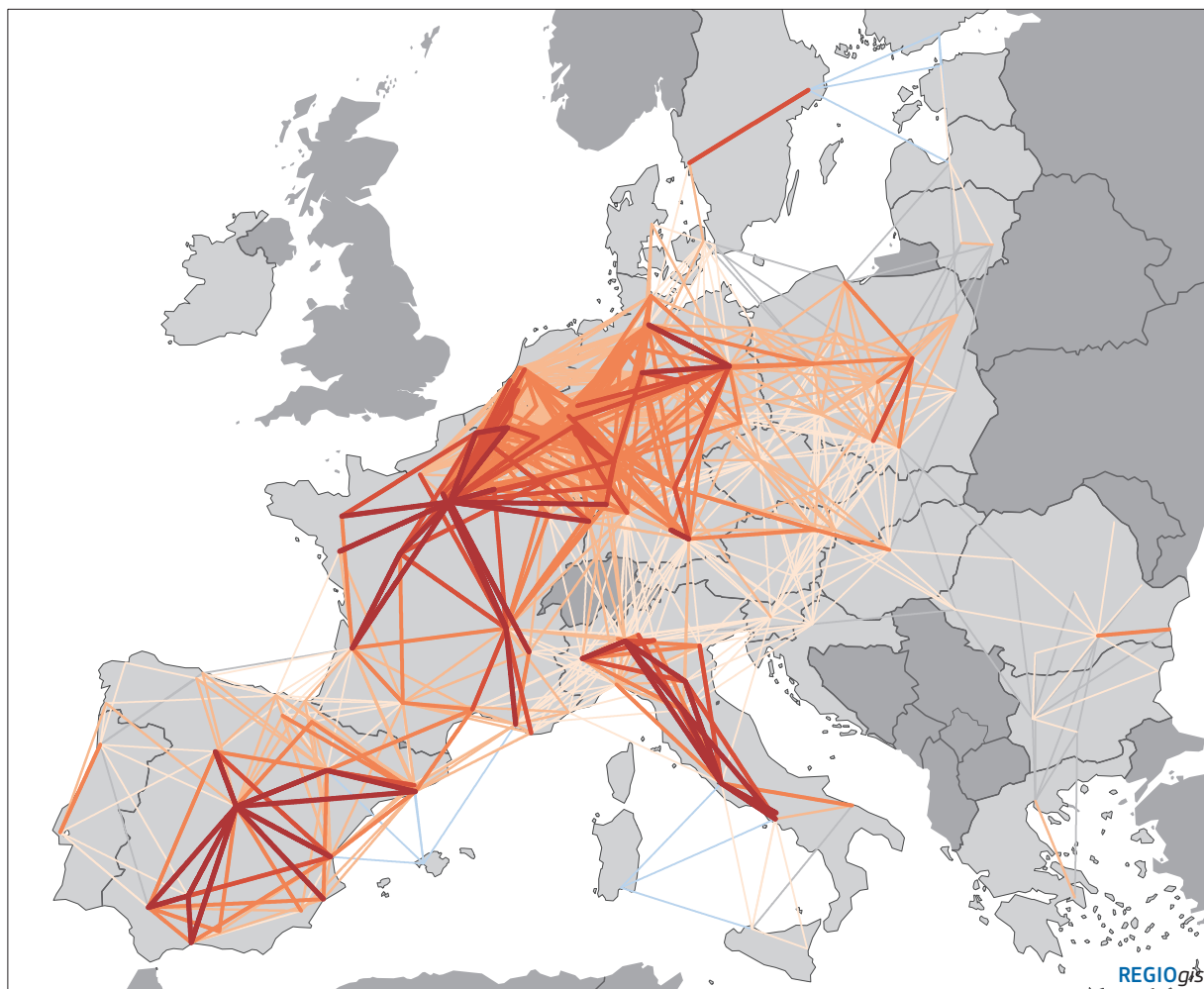
3 European Commission (2020e).

4 A high-speed train, as defined by Eurostat, is “a train designed to operate at a speed of at least 250 km/h on dedicated high speed lines”, and a tilting high-speed train as “a train with a tilting system designed to have an operating speed of 200 km/h or above on upgraded high speed lines”.

5 The time between arrival at the airport or rail station and the actual departure.

6 Rail stations tend to be located in or very close to urban areas and so to be more accessible than airports.

7 Some authors consider a viable distance for high-speed rail to be up to 1 000 km, or even 2 000 km if night trains are considered (see e.g. Rothengatter et al. (2011); Chiara et al. (2017); Sun et al. (2017); Prussi and Lonza (2018)).



Map 4.1 Speed of rail connections between major urban centres in the EU, 2019

km/h

— < 60

— 60 – 90

— 90 – 120

— 120 – 150

— > 150

— no connection within 10 hours

— overseas*

Speeds are based on optimal travel time on a weekday relative to the straight-line distance. Only urban centres located within 500 km from each other were considered.

In addition, each pair of urban centres must contain an urban centre that has more than 500 000 inhabitants (or represents the national capital) and the other urban centre has to have at least 200 000 inhabitants.

*Overseas: links between city pairs involving a sea crossing where neither a fixed railway link or a train ferry is available.

Source: DG REGIO based on data from UIC, national and regional rail operators, JRC.

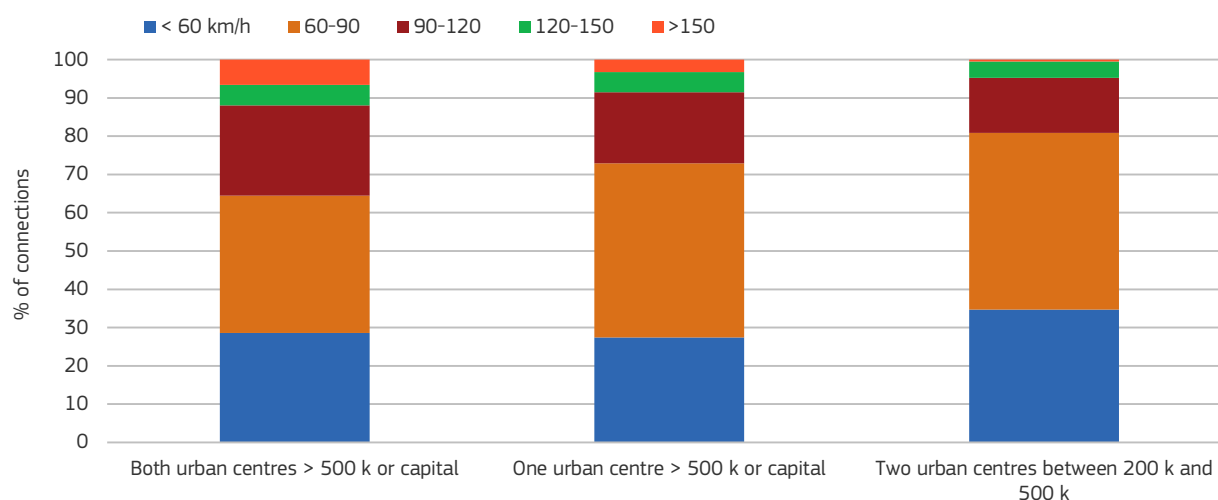
0 500 km

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Figure 4.1 Speed of rail connections between major urban centres by geographic region, 2019

Only urban centres located within 500 km of each other are considered. In addition, urban centres must have at least 200 000 inhabitants.

Source: DG REGIO.

Figure 4.2 Speed of rail connections between major urban centres by population size, 2019

Only urban centres located within 500 km of each other are considered. In addition, urban centres must have at least 200 000 inhabitants.

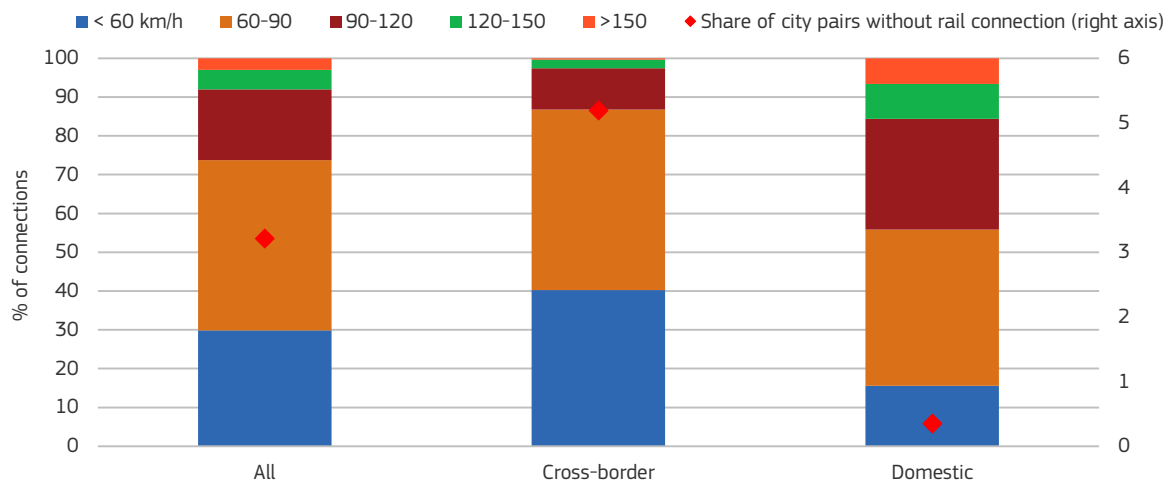
Source: DG REGIO.

High-speed trains account for 31% of total passenger-kilometres by rail in the EU⁸. In France and Spain, it is close to 60%. However, over half of Member States do not yet have any high-speed railway lines at all.

For the 1 356 rail connections between EU cities with 200 000 inhabitants or more (or which are national capitals) and located within 500 km of each other, the speed of the fastest train service⁹ is considerably less than that of high-speed rail (Map 4.1 and Figure 4.1). On only 3% of these lines is the speed above 150 km per hour. The propor-

8 This figure relates to all high-speed trains including tilting trains able to travel at 200 km per hour, which do not necessarily require high-speed infrastructure.

9 The fastest service available for departure during a weekday in 2019 between 6:00 and 20:00.

Figure 4.3 Speed of cross-border and domestic rail connections between major urban centres, 2019

Only urban centres located within 500 km of each other are considered. In addition, urban centres must have at least 200 000 inhabitants.

Source: DG REGIO.

tion is the largest in the south of the EU, where both Italy and Spain have a well developed high-speed rail network. In the north-west, the number of high-speed connections, which are mainly in France and Germany, is similar, but the proportion is smaller. Because of higher population density, the rail network is denser, with more short-distance connections with lower speeds. Nevertheless, the north-western EU has the largest proportion of rail connections faster than 90 km per hour and only a few pairs of cities without any connection at all. The rail network is less developed in the eastern EU, with no connection between 20% of city-pairs and no connections with speeds above 150 km per hour. Indeed, on most routes the speed is still below 60 km per hour.

The share of connections with speeds above 150 km per hour is greater between large urban centres (i.e. with populations of over 500 000) (at 7%) than between small ones with populations of 200 000 to 500 000 (1%) or between large and small centres (3%) (Figure 4.2). There is a similar difference for the share of connections with speeds of over 90 km per hour (36% between large city-pairs and 19% between small ones). Despite some progress towards technical interoperability, rail travel across EU borders is still hindered by many obstacles. The rail network has numerous gaps where the national railways are

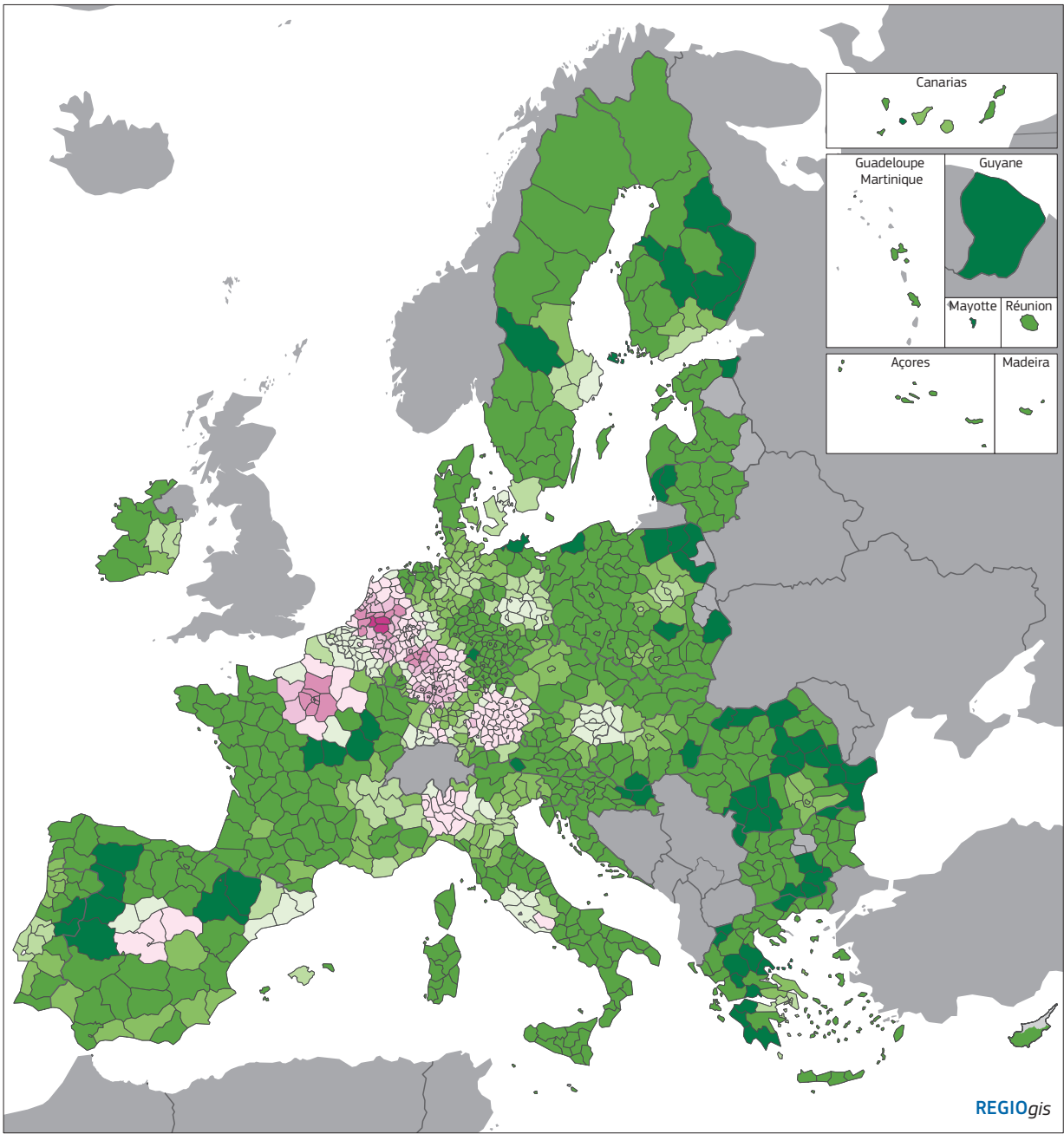
not properly connected¹⁰. Over 5% of city-pairs in different Member States are not connected by rail, against only 0.3% within the same Member State (Figure 4.3)¹¹. Speeds on cross-border connections also tend to be lower than on domestic connections. About 40% of the former have speeds below 60 km per hour, compared with 16% of the latter. Moreover, only 0.4% of cross-border connections have speeds of over 150 km per hour.

On average, EU citizens have access to 556 flights within 90 minutes of driving time. However, access to passenger flights is highly uneven across the EU, ranging from a number of regions in the south of the Netherlands, where people have access to over 2 500 flights a day, to regions in eastern Poland, Bulgaria, Estonia and Latvia, where inhabitants have no access to any flights within 90 minutes driving time (Map 4.2). Access to flights is notably greater in regions close to large urban centres, capital cities in particular, where large airports tend to be located.

As indicated above, any realistic comparison of travel by train with travel by air has to take account of differences in the time needed for accessing

¹⁰ European Commission (2018a).

¹¹ It should be noted that these routes, whether cross-border or domestic, may be served by long-distance bus connections, which could be a reason for there being no rail connection.



Map 4.2 Access to passenger flights by NUTS 3 region, 2019

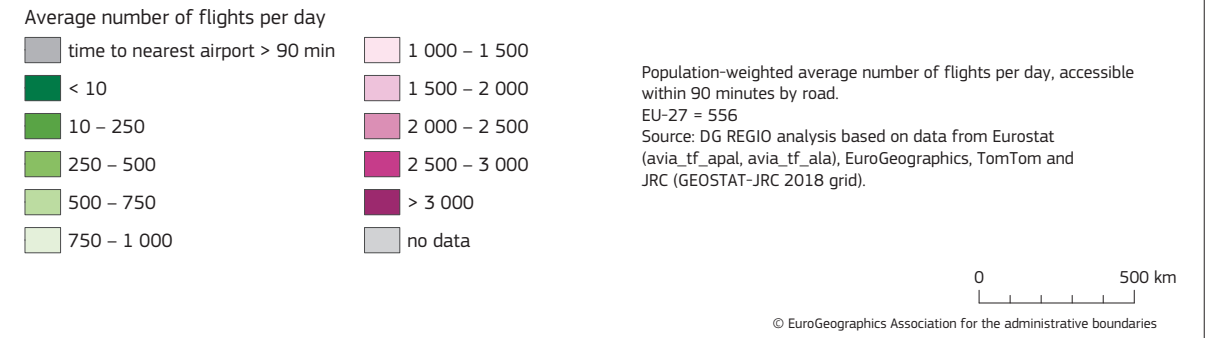
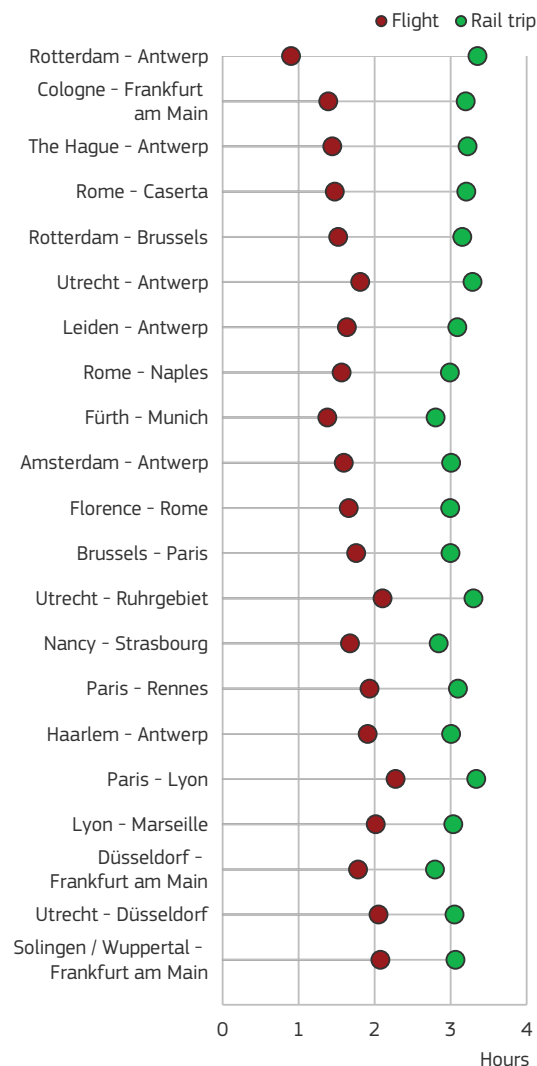


Figure 4.4 Total travel time by rail and air on selected routes, 2019



Routes are ranked by the difference in travel time between rail and air.

Source: DG REGIO, DG JRC based on SABRE airline data.

airports or rail stations, waiting times and actual departure and arrival times¹². Some 297 connections between EU cities¹³ within 500 km of each other are served by both rail and air. On 68 of these routes, the total travel time by rail is shorter

12 The assumptions used for the present analysis are as follows. Time before boarding the first train — 15 minutes; check-in and boarding at the departure airport — 60 minutes; taxiing assumed to be included in the flight time — 30 minutes; and transfer time at the arrival airport — 30 minutes. A flight speed of 500 km per hour is assumed. If more than one connection between airports is available linking the same urban centres, the travel time of the connection with the highest number of passengers is taken.

13 As before, this concerns pairs of urban centres with at least 200 000 inhabitants each (or which are capital cities) and located less than 500 km from each other.

than that by air; and on 21 of them, the difference is an hour or more (Figure 4.4). The routes concerned are mainly in and between the Netherlands, Belgium, Germany and France but also include three domestic connections in Italy.

Although planes tend to outperform trains for distances of over 300 kilometres, there are still many routes of this distance where the reverse is the case (Figure 4.5). This indicates that rail has the potential to successfully compete with aviation for relatively long distances, providing a sufficient operating speed can be achieved. For the routes considered here, train speeds of 140 km per hour appear to be sufficient for rail to outperform air (Figure 4.6).

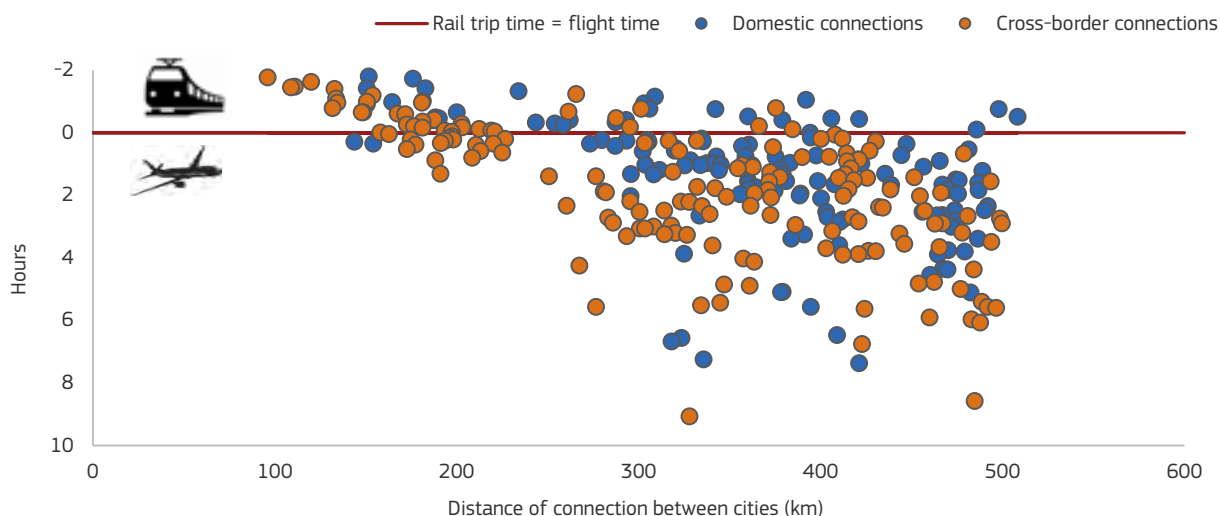
2. Road and rail performance for day trips and beyond differs between Member States and degree of urbanisation

Outside cities, public transport tends to be less developed in terms of network density and service frequency. Distances are often too great to use a bicycle or to walk. As a result, car dependency tends to be higher. For travel to places up to 120 km away, trains are the main alternative to cars, providing there is a railway station nearby. For longer distances of up to 500 km between larger urban centres, trains can outperform cars (as well as planes, as seen above).

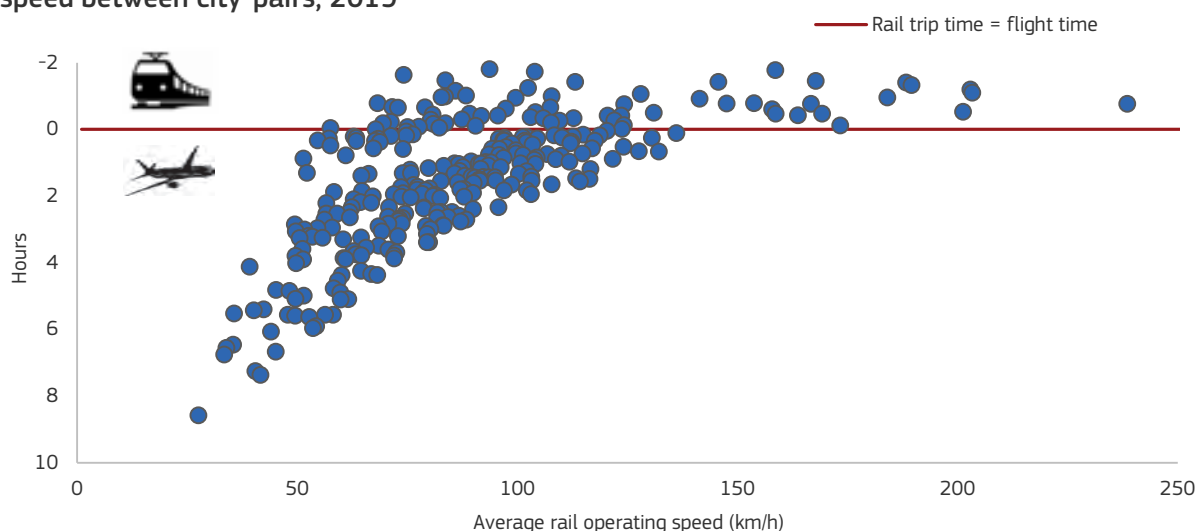
2.1 Passenger rail performance is poor, particularly in rural areas, but improves if the rail trip is combined with a bicycle ride

As a sustainable means of transport, rail is pivotal in the design and construction of the trans-European transport network (TEN-T), as it is in the EU's climate policy.

The extent to which travellers are willing to consider using trains depends in large measure on the time journeys take as compared with using a car.

Figure 4.5 Difference in travel time by rail as opposed to air according to distance between city-pairs, 2019

Negative values on the vertical axis indicate that the total travel time by train is less than that by air.
Source: DG REGIO, DG JRC based on SABRE airline data.

Figure 4.6 Difference in travel time by rail as opposed to air according to train operating speed between city-pairs, 2019

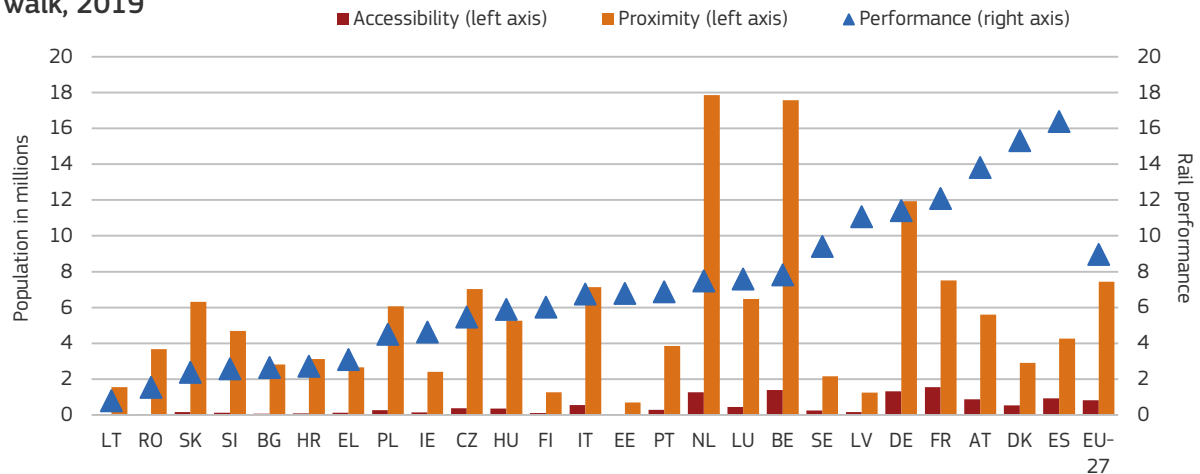
Negative values on the vertical axis indicate that the total travel time by train is less than that by air.
Source: DG REGIO, DG JRC based on SABRE airline data.

It also depends on the ease of reaching the departure station and of reaching the final destination from the arrival station¹⁴. A realistic comparison between train and car use needs to take a door-to-door perspective, where the performance also

depends on the means of travel (walking, cycling, public transport, car) used in combination with the train. It needs, in addition, to take account of the frequency of the train service, which means that the travel time may differ between travellers constrained in their choice of departure and/or arrival times, such as commuters, and those able to be flexible about these times (see Box 4.1).

¹⁴ The focus of the transport analyses in this chapter is on accessibility and travel times and does not take into account other determining factors of travel choice behaviour, which include first of all direct transport costs such as ticket prices, but also aspects relating to safety and comfort.

Figure 4.7 Accessibility, proximity and transport performance by rail plus a short walk, 2019



Accessibility is defined as the population that can be reached within 90 minutes of travel time; proximity as the population living within a 120 km radius and rail performance as the ratio of the former to the latter.

The figures assume travelling at an optimal time. A short walk is defined as a walk not more than 15 minutes. Countries with no railways (CY, MT) are not included.

Source: REGIO-GIS.

Rail performance (defined in this section as the population that can be reached within 90 minutes divided by the population living within a 120 km radius — see Box 4.2) varies substantially between Member States (Figure 4.7). Spain has the highest performance, followed by Austria and Germany. The eastern EU Member States, particularly Lithuania and Romania, have the lowest performance¹⁵.

The high performance of rail transport does not always translate into good accessibility. For example, the high performance in Denmark translates into only medium-level accessibility, suggesting that the low level of proximity (i.e. the dispersed nature of population) offsets the quality of the rail network and services. Similarly, in Sweden, where rail performance is similar to that in the Netherlands and Belgium, accessibility is relatively low, because of low proximity, reflecting its low population density. Conversely, accessibility by rail is highest in the Netherlands and Belgium, though rail performance is only average.

In all Member States, rail performance is much lower than performance by car. The number of people in the EU that can be reached by car within

Box 4.1 Flexible versus time-constrained rail journeys

The estimates of performance in this sub-section are based on the assumption that travellers do not have any time constraints, can plan their journey using the fastest train service available and do not have to wait at stations. Journeys with constraints on departure times may be more relevant for day-to-day travel, such as for commuting. This restricts the choice of service and may involve waiting time if connections are involved, depending on the frequency of services. Indeed, the attractiveness of trains for commuting is dependent on good service frequencies. Performance for time-constrained journeys is obviously lower. Urban areas with the highest performance in this case are now in Austria and France, as well as Denmark, suggesting very frequent services in and around their cities. Performance in urban areas in the Netherlands is almost the same as in Belgium, though performance using the fastest available connection is much higher in Belgium (as shown in Figure 4.8a). This indicates that services in Belgium are less frequent than in the Netherlands.

¹⁵ These comparisons assume that the rail trip is combined with short walks to and from the stations, and that the traveller can optimise the timing of the journey.

Box 4.2 Deriving policy-relevant indicators: accessibility in terms of proximity and transport performance

Improving accessibility (i.e. the ease of reaching destinations or activities distributed in space) is one of the main goals of transport policies. Accessibility indicators combine the effectiveness of transport systems with the spatial distribution of places. However, the accessibility of a city can be high because of a good transport system or because the city is large and dense with many potential destinations, and people, concentrated in a small area. In order to distinguish between the two, the International Transport Forum together with the European Commission and the OECD has developed a methodological framework based on three components, as follows (summarised in Table 4.1).

Absolute accessibility is the total number of destinations, or the population, that can be reached (by driving, cycling, walking or taking public transport) within a given time from a particular place. As indicated above, it encompasses both the size and density of a city or a particular area and the transport network that connects the place in question to other places both within the city and outside.

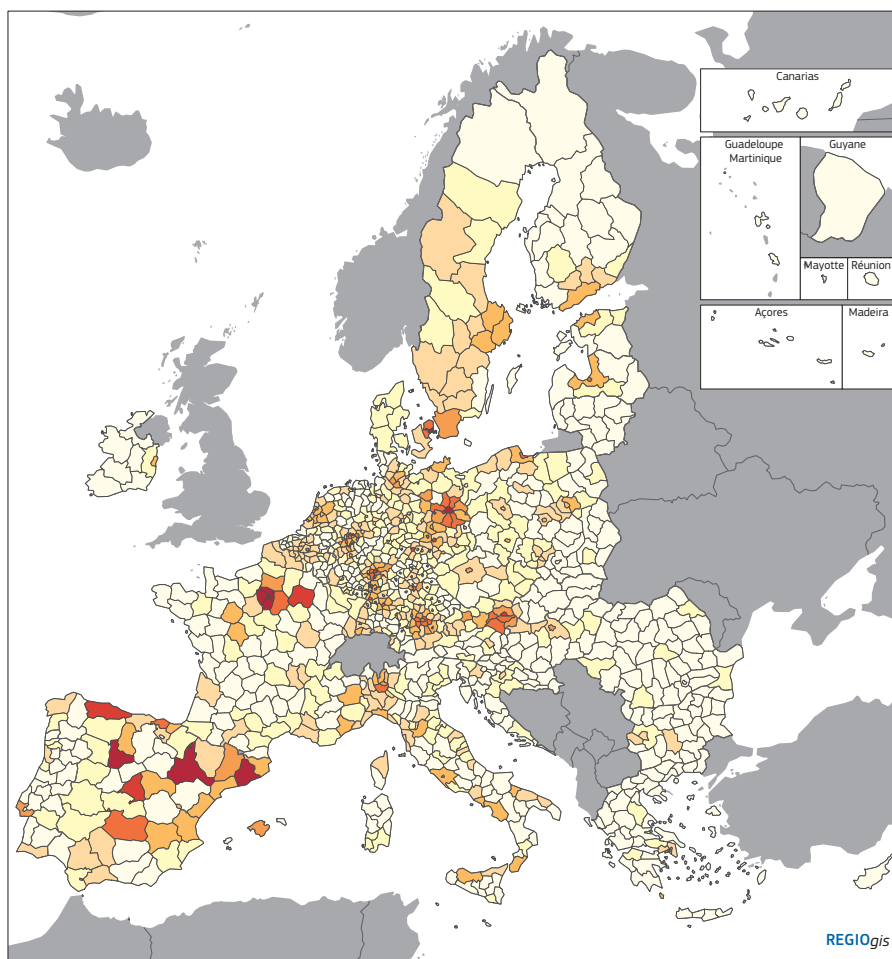
Proximity refers to the spatial concentration around the origin of a trip and the potential destinations or number of people that can be reached. It measures the number of destinations, or population, within a given distance from the origin regardless of the time required to travel to them. Proximity in the present context is determined by geographical characteristics and land-use policy that affect the distance between the origin and potential destinations for travellers.

Transport performance for any mode takes explicit account of the spatial distribution of destinations. It relates the total number of destinations, or population, accessible (by car, public transport or bicycle) to the number of destinations, or population, nearby (i.e. within a given radius). It is calculated as the ratio between absolute accessibility using a given mode and proximity to potential destinations or the population that can be reached. A ratio of one or more means that the performance of a particular mode is high, and a ratio close to zero means that it is low, in terms of providing access to nearby destinations. Although the ratio is somewhat abstract, it avoids the bias resulting from the number of destinations or size of population surrounding the location concerned. It incorporates several aspects of the effectiveness of the mode being assessed in providing access to destinations, such as, in the case of public transport: the frequency of service; the vehicle speed; the number of stops and changes; and the distance to the nearest stop or station. Note that this concept of transport performance is narrowly defined within an accessibility context and as such does not reflect other quality aspects of a transport system such as ticket prices, environmental costs, traffic safety or access to parking.

A feature of this set of indicators is that accessibility is the product of proximity and transport performance. These two together, therefore, indicate the effect of land-use patterns and transport networks on accessibility.

Table 4.1 Accessibility indicators

Accessibility indicator	Description
Absolute accessibility	Number of destinations, or the population, reachable within a fixed amount of time with a given mode (i.e. accessible destinations or population).
Proximity	Total number of destinations, or the population, within a certain distance (i.e. nearby destinations or population).
Transport performance	Ratio of accessible destinations, or population, to nearby destinations or population.



Map 4.3 Transport performance by rail (combined with a short walk), 2019

Population within a 1h30 travel / population within a 120 km radius x 100

<= 2.5	15 – 20
2.5 – 5	20 – 27.5
5 – 10	27.5 – 35
10 – 15	> 35

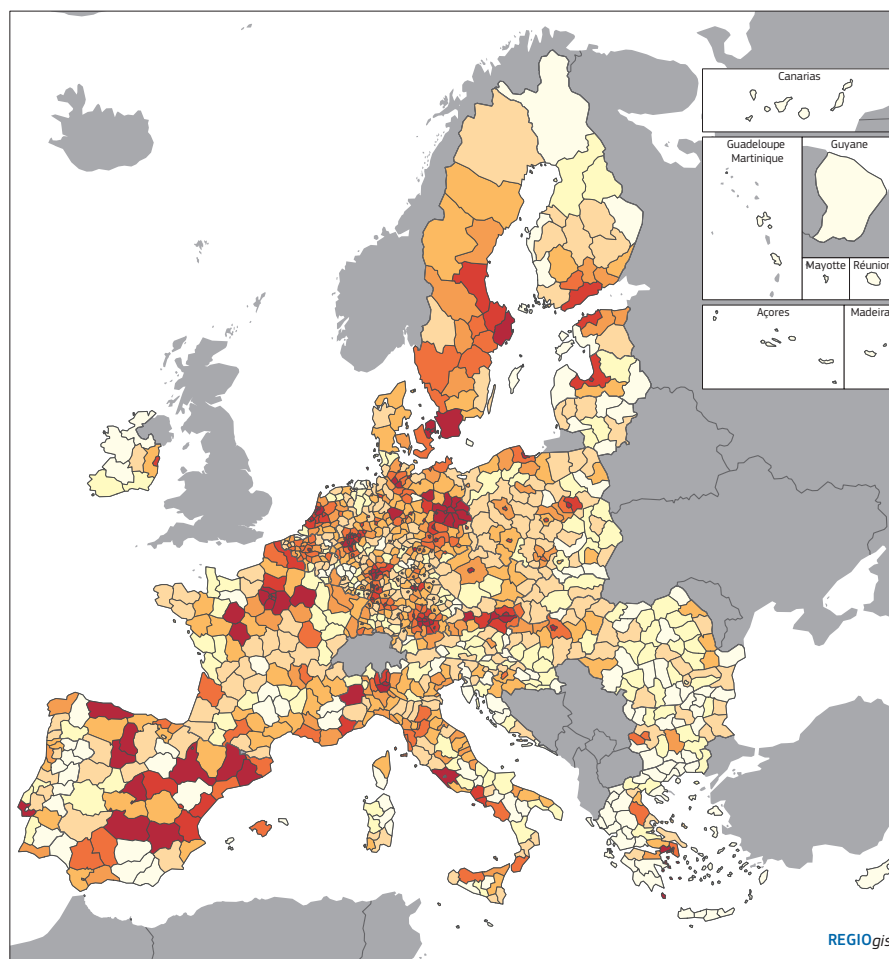
EU-27 = 9.0

Performance using optimal trips available for departure during morning peak hours.

Source: REGIO-GIS, UIC, railway operators, JRC.

0 500 km

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Map 4.4 Transport performance by rail (combined with a short bike ride), 2019

Population within a 1h30 travel / population within a 120 km radius x 100

<= 2.5	15 – 20
2.5 – 5	20 – 27.5
5 – 10	27.5 – 35
10 – 15	> 35

EU-27 = 21.3

Performance using optimal trips available for departure during morning peak hours.

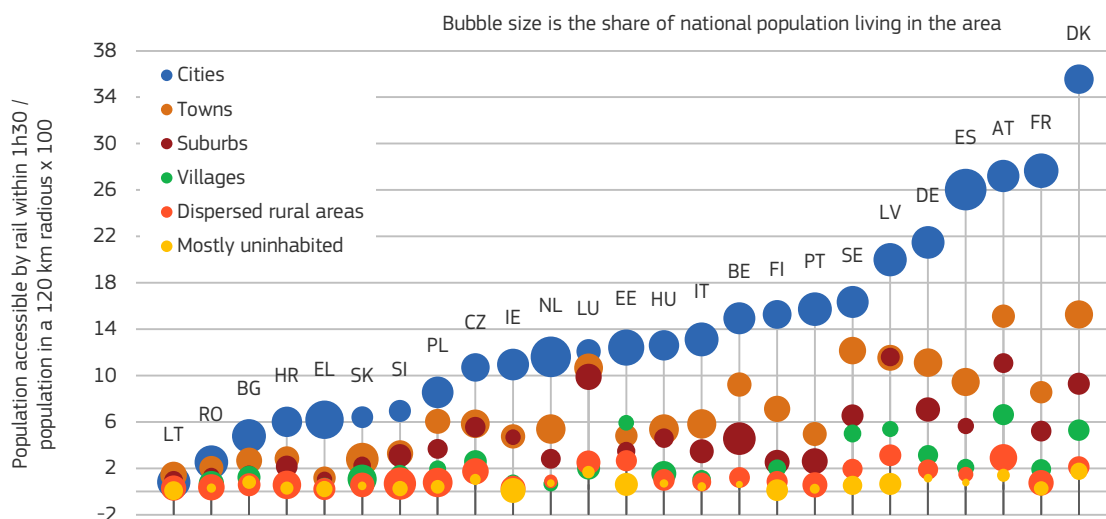
Source: REGIO-GIS, UIC, railway operators, JRC.

0 500 km

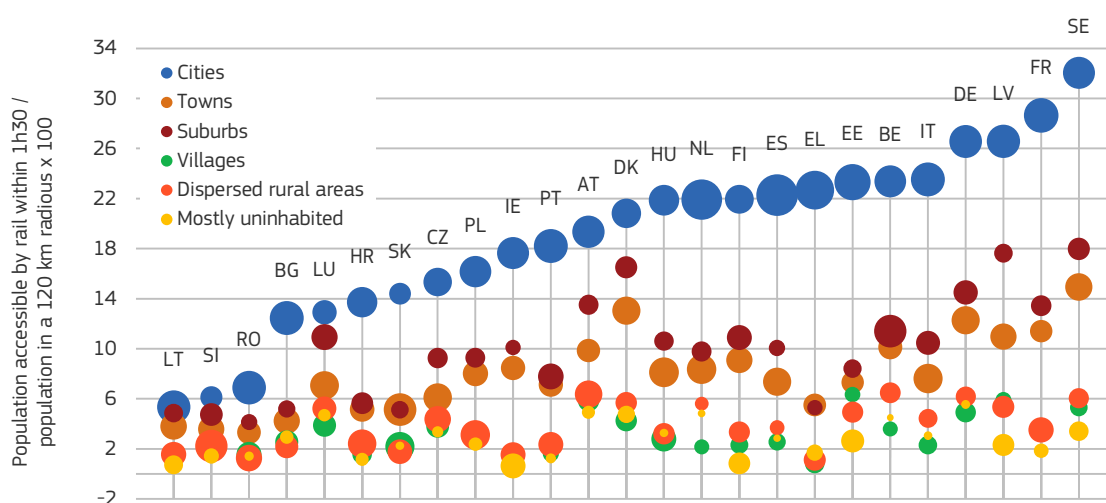
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Figure 4.8 Rail performance by degree of urbanisation level 2, 2019

a) Rail trip combined with a short walk



b) Increase in rail performance if combined with a short bicycle ride instead of a short walk



Countries ranked by the value of cities; countries without railways (CY, MT) are not shown.

A short bike ride is defined as a bike ride not more than 15 minutes.

Source: REGIO-GIS.

90 minutes is nine times more than by rail. This, however, assumes that people walk to and from the station. Using other means can increase rail performance significantly (see below).

Rail performance varies even more between regions (at the NUTS 3 level) (Map 4.3). Again assuming the rail journey is combined with walking to and from the station, around 12% of people in the EU, mainly living in urban areas, have access to a relatively decent rail service (performance indica-

tor above 20). The top-performing regions include Paris and surrounding regions, Berlin, Barcelona, København and its surrounding region, and Wien, but also Zaragoza and Valladolid in Spain, because of the presence of high-speed train services. However, in all NUTS 3 regions, rail performance is lower than road (see below), which hardly encourages people to travel by train, especially if they need to travel frequently.

Box 4.3 Degree of urbanisation level 2

This typology classifies 1 sq km grid cells into six categories based on population size and density.

1. A city has a population of at least 50 000 in contiguous high density cells ($>1\,500$ inh./km²)
2. A town has a population between 5 000 and 50 000 in high or moderate density cells (>300 inh./km²)
3. Suburbs are moderate density cells that part of a cluster with a population of at least 5 000, but are not part of a town
4. A village has population between 500 and 5 000 in moderate density cells
5. Dispersed rural areas are low density cells (between 50 and 300 inh./km²)
6. Mostly uninhabited areas are very low density cells (between 0 and 50 inh./km²)

For a more comprehensive description, see: <https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/ks-02-20-499>

Rail performance improves significantly if travel by train is combined with a short bike ride instead of a short walk (Map 4.4). This increases the average performance indicator in the EU from nine to 21, and the proportion of the population with access to a performance indicator above 20 to 40%. In a number of metro regions in France and Germany, including Berlin and Paris, the rail performance indicator reaches around 80 or above. However, rail performance remains lower than that of road in all regions.

As expected, whether walking or cycling to the station, rail performance tends to be highest in cities, followed by towns (Figure 4.8a). It is lowest in rural areas (see Box 4.3 for definitions), reflecting the fact that train stations tend to be located in or close to urban centres and that the population is more dispersed in rural areas.

For rail journeys combined with a short walk, urban areas in Denmark, France, Austria and Spain have the highest performance, especially in Denmark with its dense suburban rail network in Copenhagen and surrounding areas. In most Member States, smaller towns are less well connected than larger cities, though in Luxembourg, Sweden and Poland, the performance is similar.

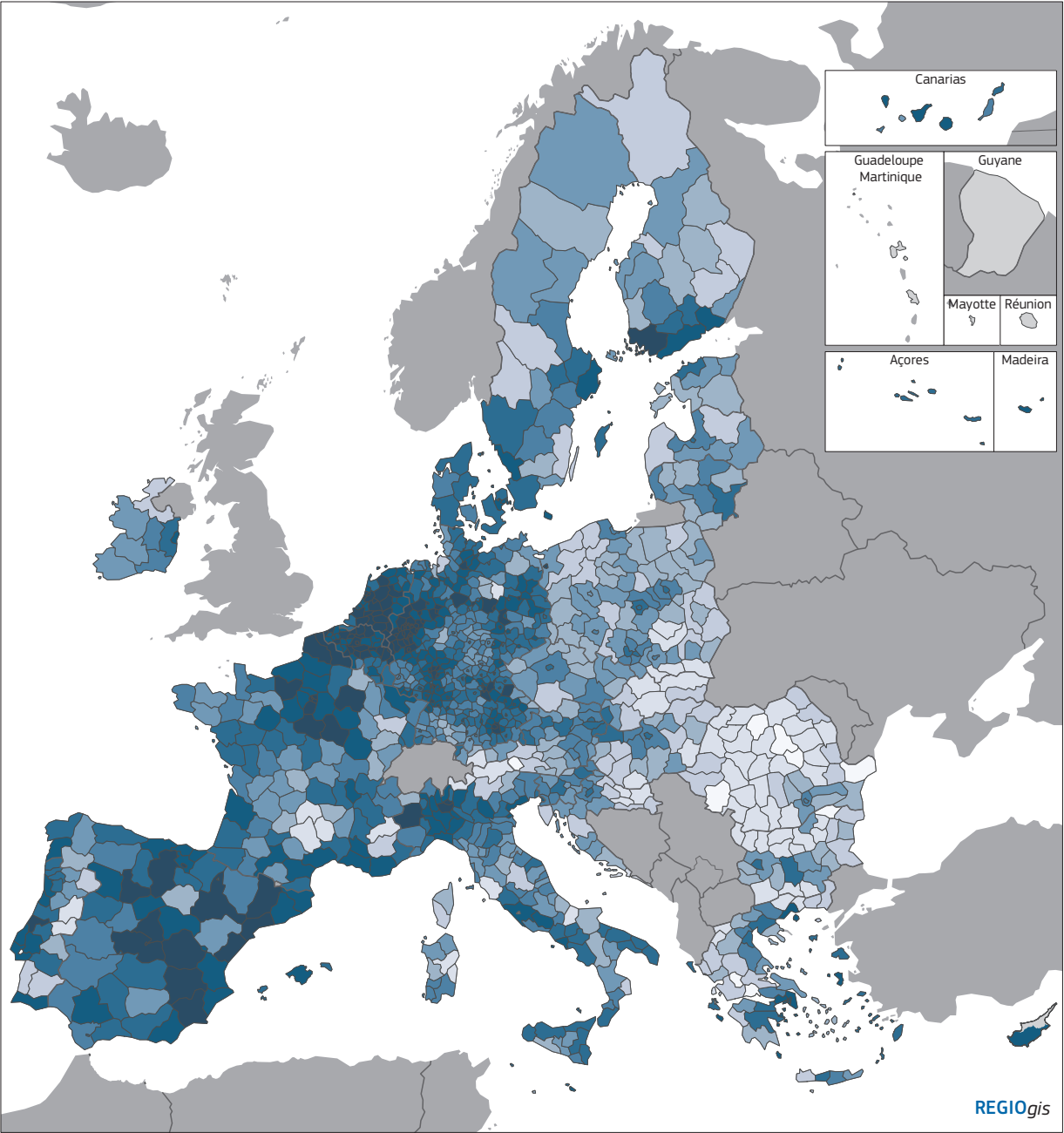
Using a bicycle instead of walking to the station increases the rail performance ratio to over 50 in cities in Denmark and France. In all Member States, cities benefit the most from the rail-bicycle combination in terms of their transport performance score (Figure 4.8b). However, rail performance also improves in towns and suburbs by using a bicycle, especially in Sweden, Germany and Denmark — as well as in rural areas, if less so. This argues in favour of further developing cycle-friendly infrastructure around railway stations.

2.2 Road performance is higher than rail, but remains low in some Member States and rural areas

Road performance¹⁶ by car in 2018 varied substantially between Member States, being highest in Belgium and the Netherlands (Figure 4.9). Both of these countries are relatively small and highly urbanised, with a dense road network. Malta and Cyprus are third and fourth, reflecting the fact that both islands are relatively small and most destinations can be reached within 90 minutes. Portugal and Spain, two Member States in which there has been several decades of substantial cohesion policy investment in transport infrastructure, now have road performance above the EU average and similar to that of Germany and France. Road performance is lowest in Slovakia and Bulgaria because their road networks are not yet fully developed, but also because of mountainous areas where the road network is constrained by geography¹⁷.

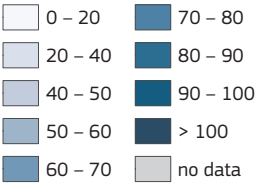
¹⁶ For a description of the transport performance indicator see Box 4.2.

¹⁷ In addition, there may be economic constraints, as roads in mountainous areas are more costly to build and maintain.



Map 4.5 Transport performance by car by NUTS 3 region, 2018

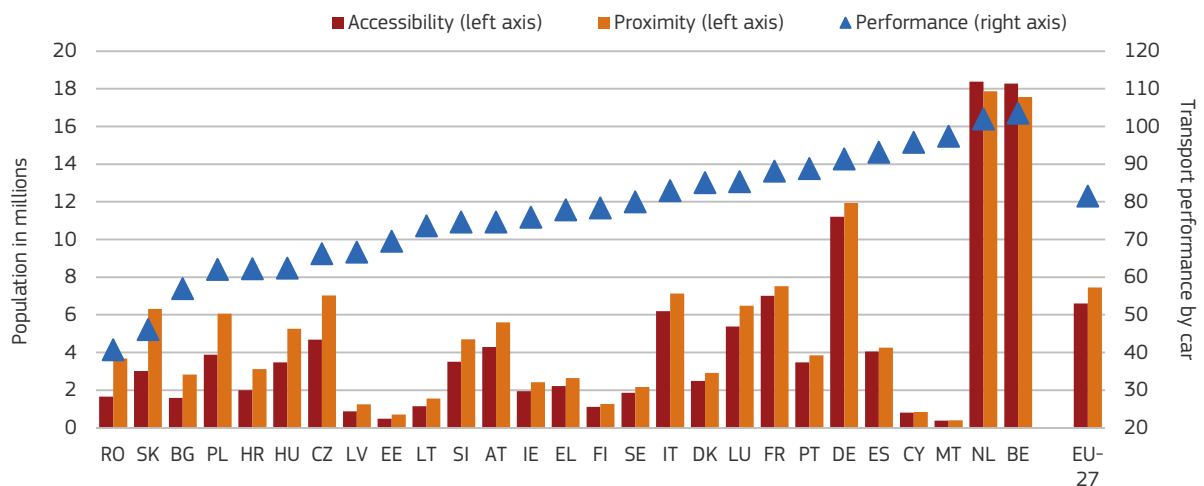
Population within a 1h30 travel / population within a 120 km radius x 100



EU-27 = 81.5
Source: REGIO-GIS, Eurostat, JRC, TomTom.



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Figure 4.9 Accessibility, proximity and transport performance by car, 2018

Accessibility is defined as the population that can be reached within 90 minutes of travel time by car; proximity as the population living within a 120 km radius; car performance is calculated as the ratio of the former to the latter (see also Box 4.2).

Source: REGIO-GIS.

There is a close link between accessibility and proximity across Member States. Accessibility alone, however, is not a suitable indicator of road performance because it is to a large degree determined by proximity (i.e. how many people live nearby). For example, in Finland or Sweden, accessibility is less

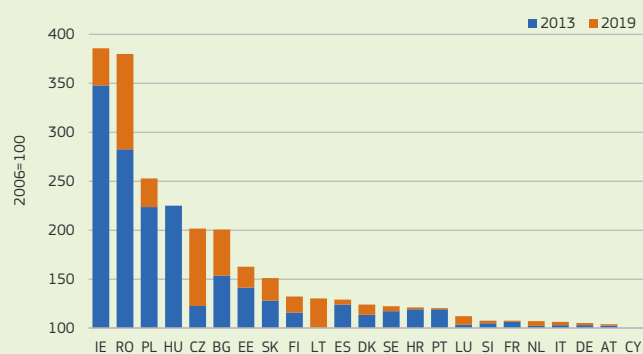
than half that in Poland, but this does not mean that Sweden and Finland need more investment in roads to catch up. Road performance shows that in Finland and Sweden, around 80% of the population within a 120 km radius can be reached in 90 minutes, as against only 62% in Poland.

Box 4.4 The increase in motorway length over recent years varies strongly between Member States

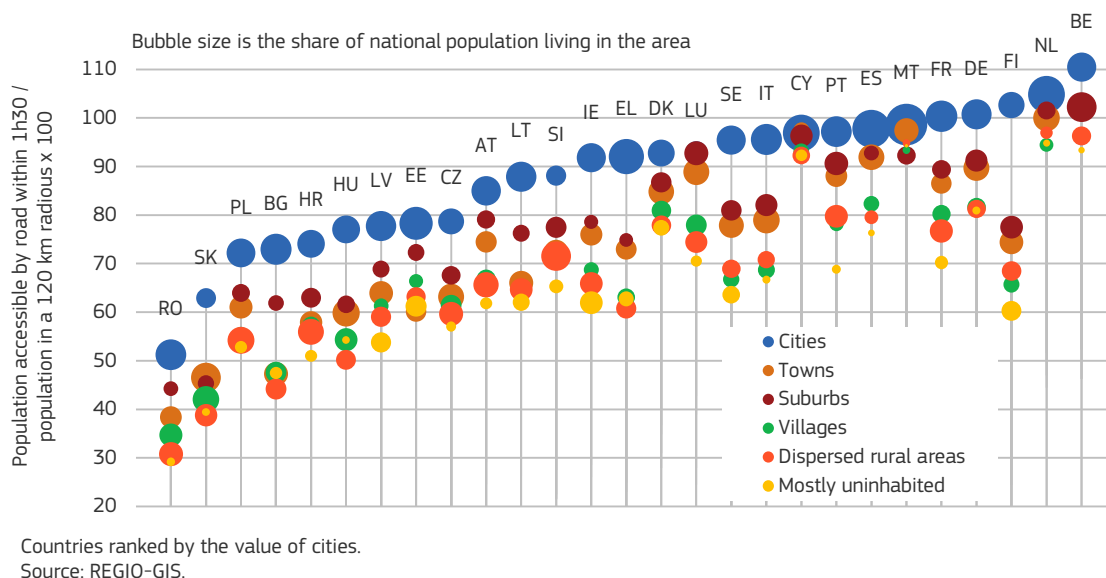
Investment in new motorways can help to increase road transport accessibility and performance. Road transport accessibility and performance are statistically related to the density of motorways and their share in the road network at large.

In the period 2006–2019 the length of motorways increased in all Member States, except Cyprus, where it remained unchanged (Figure 4.10). However, there is large variation across Member States, with motorway length in Ireland and Romania increasing by almost fourfold over this period, while in Austria, Germany, Italy, Netherlands, France and Slovenia, the increase was below 10%. The increase was on average larger in eastern Member States,

where there were comparatively few motorways at the beginning of the period.

Figure 4.10 Motorway length, 2006–2019

BE, LV, EL, MT: no data. DK, ES and IT: 2018.
Source: Eurostat [road_if_motorwa].

Figure 4.11 Road performance by car and degree of urbanisation level 2, 2018

Road performance by car also varies substantially between regions within Member States, both in less developed Member States (especially in Bulgaria, Greece and Poland) and more developed ones (particularly in France and Finland) (Map 4.5). Road performance tends to be relatively low in regions in eastern Europe, and high in densely populated regions in the Netherlands and Belgium, as well as in many Spanish regions. In several of the latter, though not densely populated on average, the population is concentrated in densely populated cities, towns and villages, with decent road networks providing access to a large population within 90 minutes of driving. Most of the capital metro regions have high road transport performance; this stands out particularly in Bulgaria, Croatia, Romania and Slovakia, where overall road performance is low.

As in the case of rail, road performance differs according to the degree of urbanisation. Cities have the highest performance in all Member States. The performance for cities not only reflects intra-urban trips but also strongly depends on the travel time between the city and surrounding areas of up to 120 km away, which may well include rural areas. Despite their generally high performance, there are large differences between cities in different Member States (Figure 4.11). Whereas in the Netherlands, Belgium, Finland, Germany and

France, the road performance indicator exceeds 100, it is below 75 in Romania, Slovakia, Bulgaria, Poland and Croatia. In addition, in the latter Member States there are large differences in performance between the three types of urban area because of the low performance in towns and suburbs. There are also large differences in this respect in many other Member States. In some, this reflects low average population density and the long distances between places, especially in Finland and Sweden.

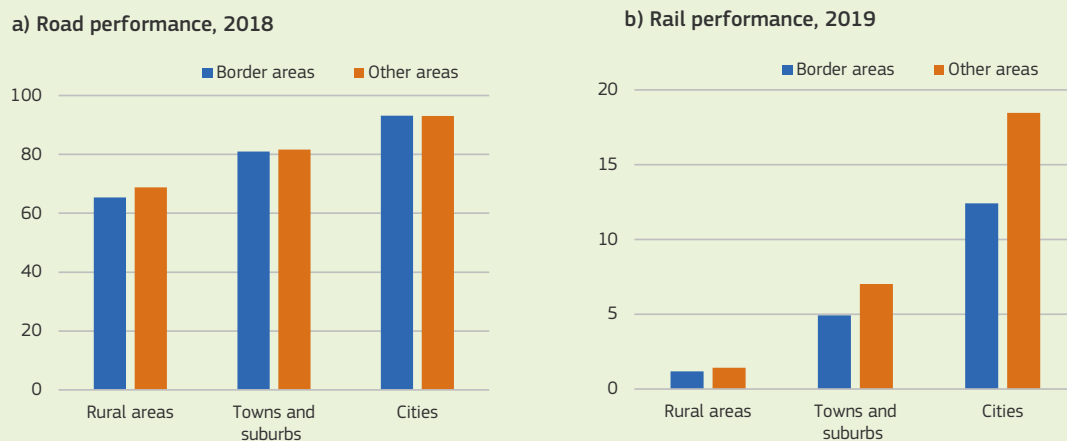
The three types of rural areas have the lowest road performance in all Member States, but this does not necessarily indicate a lack of roads. In fact, the road network per head is four times longer in villages than in cities, 10 times longer in dispersed rural areas and 20 times longer in mostly uninhabited areas. A more dispersed population means that more roads are needed to provide a given degree of access. Road performance is therefore particularly low in dispersed rural areas and the mostly uninhabited ones. Rural areas have a road performance similar to that in urban areas only in the densely populated Member States of Belgium and the Netherlands, and in Malta and Cyprus. In these Member States, the areas concerned tend to be sparsely populated areas close to (or even surrounded by) more densely populated and well connected ones, rather than being remote from these. In most Member States, however, perfor-

Box 4.5 Transport performance is lower in border areas

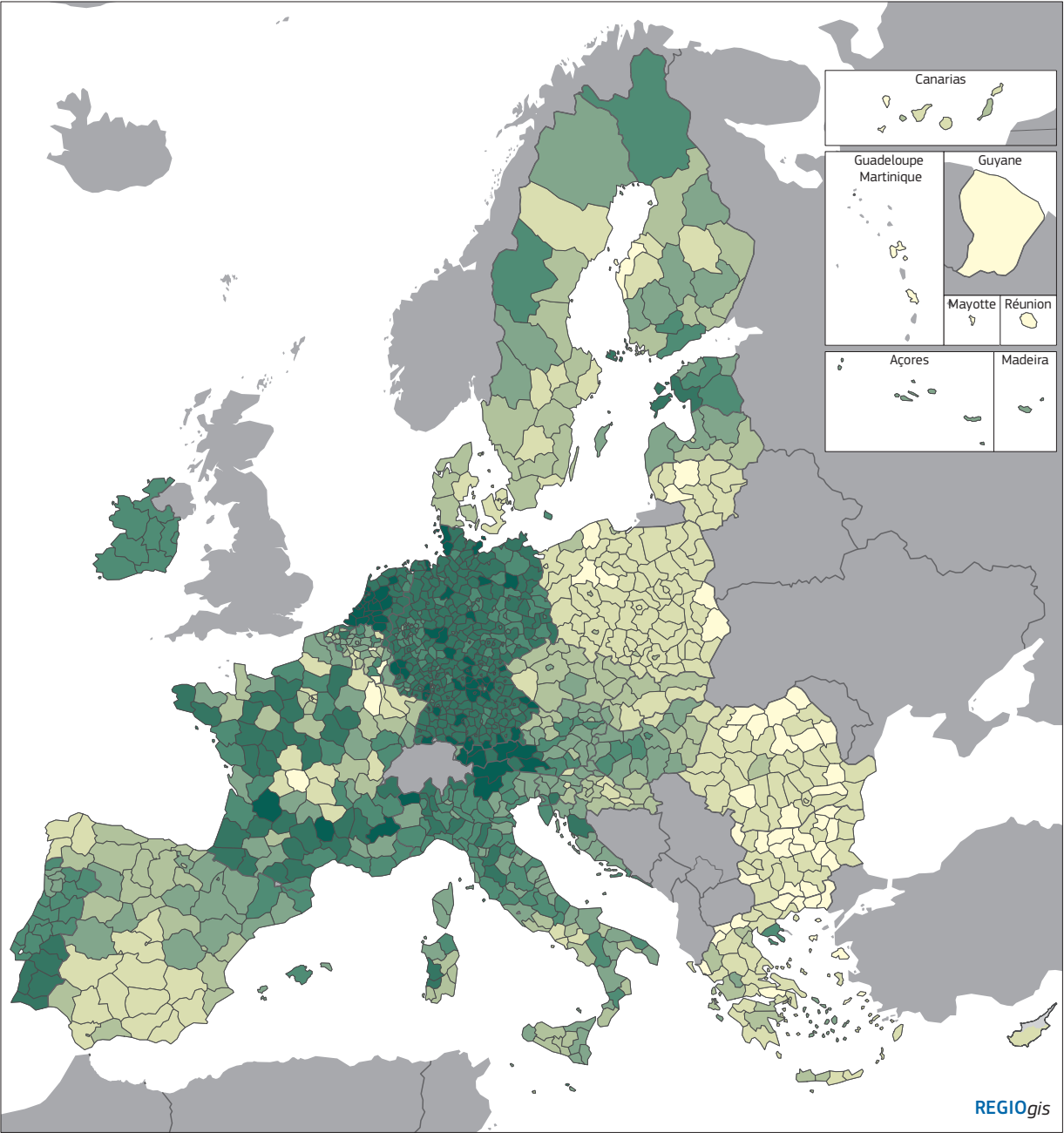
1 out of 7 EU residents live within 25 km of a national land border. Although EU transport policy places considerable emphasis on cross-border infrastructure investment and connectivity, road transport performance is lower in border areas than in other areas (Figure 4.12a). This difference is more pronounced in rural areas. In cities, towns and suburbs, road performance is more similar between border and other areas. In addition to the complexity of coordinating cross-border infrastructure, the low performance in border areas is also affected by natural obstacles along these borders, such as mountains and large rivers. Indeed, some of the lowest performances are found near borders in mountainous areas (Poland-Slovakia, Austria-Italy, Bulgaria-Greece) or along a river border (Bulgaria-Romania). Conversely, the best performances are found in the flat and comparatively densely populated areas along the borders between the Benelux Member States, France and Germany.

Compared with roads, cross-border rail transport is hindered by a variety of additional obstacles relating to technical inter-operability, timetable coordination and administrative issues, among other factors. Consequently, and despite the emphasis EU transport policy has placed on overcoming these issues, the European railway area still features numerous gaps on the continent's land borders where the national railway networks are not properly connected. Indeed, the difference in rail transport performance between border and non-border areas is larger than for road transport (Figure 4.12b), which is even more notable when seen in relation to the lower average performance of rail. The lower performance of rail in cross-border areas is more pronounced for cities and for towns and suburbs. This may be linked to the fact that rail networks are in most cases primarily designed to connect cities and towns with suburbs, and that it is therefore in these areas that the impact of missing cross-border connections is strongest.

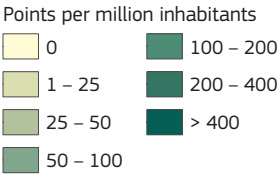
Figure 4.12 Transport performance in border and non-border areas by degree of urbanisation



Source: REGIO-GIS.



Map 4.6 Electric vehicle charging points, 2021



Operational public or private charging points (July 2021).
EU-27= 120.34
Source : DG REGIO based on open ChargeMap data.

0 500 km

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mance in rural areas is considerably lower than in urban areas. Even so, there is large variation across Member States, with rural areas in north-western and southern Member States, including in Germany, France, Spain and Italy, showing a higher performance than those in eastern Member States such as Romania, Slovakia and Bulgaria.

2.3 The roll-out of electric vehicle charging points is still uneven

The transition to alternative-fuel vehicles, needed to reduce dependence on oil and to mitigate the environmental impact of road transport, depends on the building-up of an infrastructure network for such vehicles, in particular electricity charging points.

In 2021, the number of charging points in the EU is just 120 per million inhabitants. The largest numbers relative to population are in some of the alpine regions in Austria and Italy, in various parts of Germany and the Netherlands, and in a few regions in France (Map 4.6). The charging infrastructure, on the other hand, is relatively underdeveloped in regions in Lithuania, Poland, Romania, Bulgaria, Greece, Cyprus and Denmark. The variation between regions across the EU largely reflects differences between Member States rather than within them, suggesting the importance of differences in national policies with respect to charging infrastructure. Nevertheless, there is considerable regional variation in some Member States, including France and Spain.

3. Connecting to nearby destinations: transport performance in cities and metro areas

3.1 The majority of people living in cities have good access to public transport

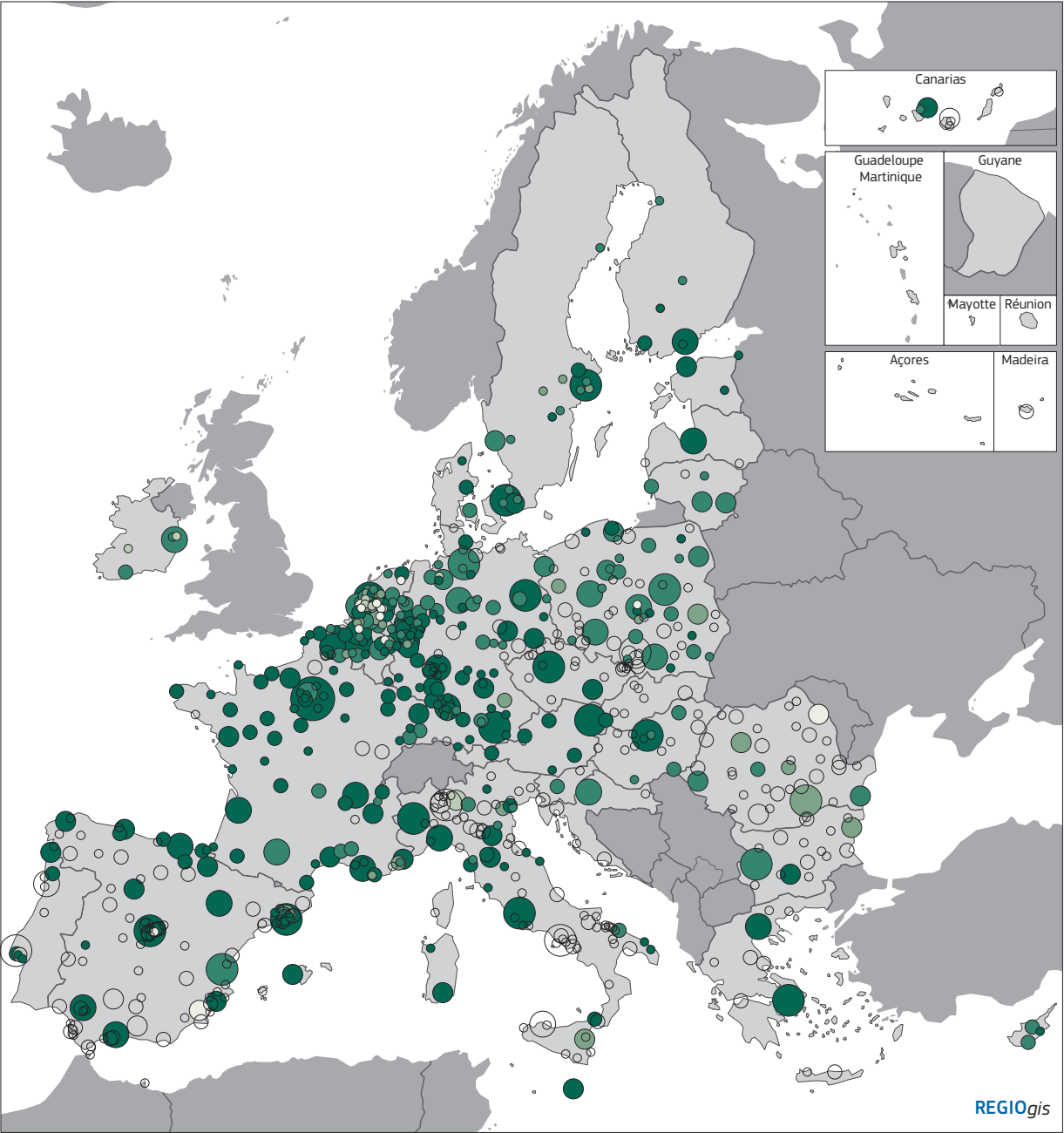
The 11th UN Sustainable Development Goal (SDG) is to make cities and human settlements inclusive,

safe, resilient and sustainable. Public transport is important to achieving this goal. Indeed, one of the targets of the goal is to provide access to safe, affordable, accessible and sustainable transport systems for all, and to improve road safety, notably by expanding public transport — paying special attention to the needs of women, children, people with disabilities and older people, especially those in vulnerable situations. The core indicator used to measure progress towards this target is the share of the population with easy access to a public transport stop or station, whether bus, tram, metro or train, and the frequency of services when they get there. The assumption is that people are willing to walk up to 500 metres to reach a bus or tram stop and/or up to a kilometre to reach a train or metro stop.

Access to a public transport stop within such a distance is not a problem in the vast majority of urban centres in the EU (Map 4.7). In more than half of the cities covered, this applies to over 95% of the population. In only 12 of the 384 cities is the share below 80%, many of them being smaller Dutch cities, where a large proportion of journeys in the city are made by bicycle. Member State averages range from 88% in Romania to 99% in Luxembourg, with the proportion across the EU averaging 94% in cities of fewer than 100 000 people, and 98% in those of over two million. Access to public transport stops in other human settlements (i.e. outside of cities) can be expected to be much lower than in cities, although data to analyse this are not readily available.

3.2 Within cities, nearby locations can more easily be reached by bicycle than public transport

In addition to access to conveniently located public transport stops, the frequency of service and the destinations or population that can be reached are also key aspects of sustainable mobility in cities. This sub-section assesses public transport performance in EU cities, defined as the share of population inside the city within a radius of 7.5 km that can be reached within 30 minutes of ‘door-to-door’ travel time.



Map 4.7 Population with a public transport stop within walking distance, 2018–2019

% of population

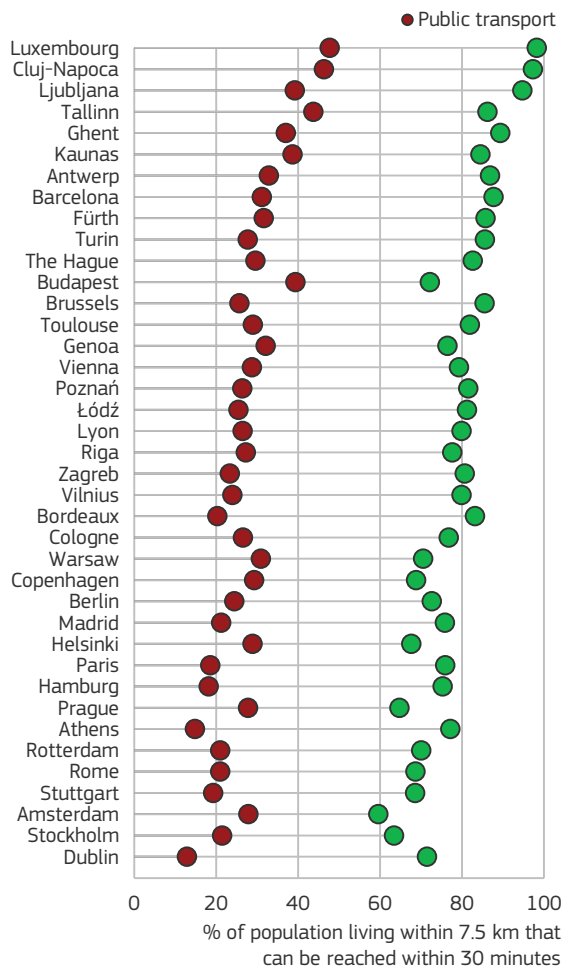
- | | |
|---------|-----------------------|
| < 80 | < 100 000 |
| 80 – 85 | 100 000 – 250 000 |
| 85 – 90 | 250 000 – 500 000 |
| 90 – 95 | 500 000 – 1 000 000 |
| >= 95 | 1 000 000 – 5 000 000 |
| no data | >= 5 000 000 |

UN SDG indicator 11.2.1: bus or tram stop within 500 m and/or train or metro stop within 1 km.
Source: public transport operators, UIC, Eurostat, NSIs, Copernicus Urban Atlas 2018, OpenStreetMap, TomTom, REGIO-GIS.

0 500 km

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Figure 4.13 Performance by bicycle and public transport for trips up to 30 minutes, 2018*



*The precise reference year varies between Member States but most of the data relate to 2018. Cities are ranked by the average performance of public transport and cycling. Source: DG REGIO.

Across the 39 EU cities analysed, the public transport performance indicator for trips that can be made within 30 minutes averages a modest 29 (Figure 4.13), which means that a city resident can reach 29% of the population living within 7.5 km by public transport within 30 minutes. The indicator, however, varies from 13 in Dublin to 48 in Luxembourg.

Facilitating sustainable urban mobility goes beyond the provision of an efficient public transport service. Walking and cycling, as well as other forms of micro-mobility, are well suited to making short-distance trips within cities, and encouraging these can help to reduce traffic congestion.

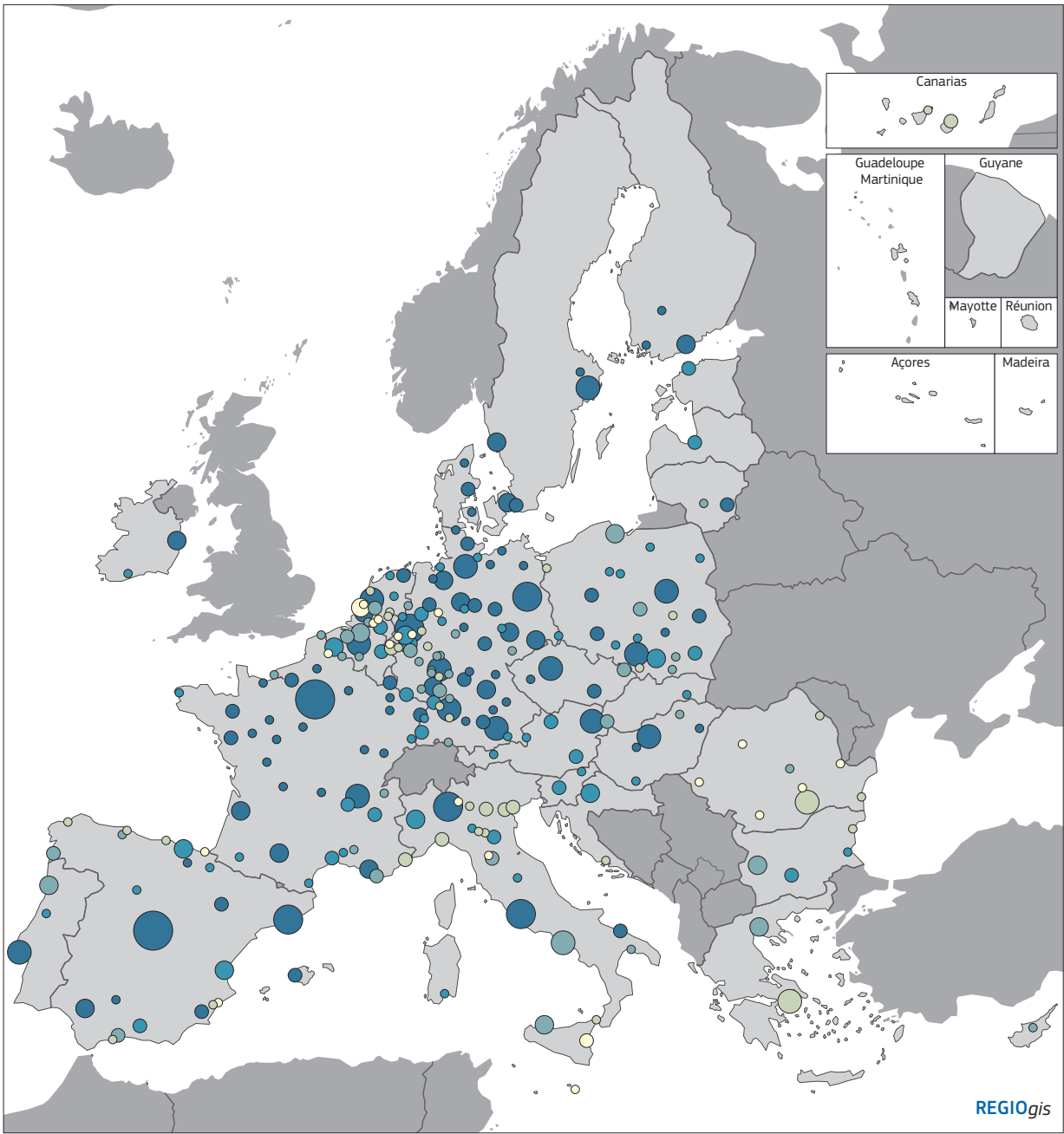
In each of the 39 cities covered, bicycle performance for short trips is much higher than that of public transport, in that many more people within a radius of 7.5 km can be reached within 30 minutes. The absence of waiting times, inherent in the use of public transport, is a key part of the difference. However, it should be noted that not all streets in cities are suitable for cycling, and the analysis excludes roads where cycling is not allowed (mostly urban motorways) and is adjusted for speeds on streets going uphill. The ease of use of bicycles also depends on the support measures provided, in the form of bicycle lanes, traffic restrictions and speed limits. As these are not taken into account here, the indicator can be seen as a measure of potential bicycle performance. Actual performance depends on the extent to which these are provided and the general support given to bicycle riding.

Despite the difference in performance between public transport and bicycles, there is some consistency in the city rankings of the two. As for public transport, Cluj-Napoca (Romania) and Luxembourg top the ranking for bicycle performance (with values close to 100), while Tallinn, Ljubljana and Gent also have relatively high performance for both bicycles and public transport.

3.3 The performance of cars in metro areas is strongly affected by congestion.

Although stimulating the take-up of more sustainable transport modes (along with creating synergies between them and easing multimodality) is one of the cornerstones of urban transport policy in the EU, the car remains the main form of travel in most cities, being responsible, on average, for two thirds of commuter journeys.

The road performance indicator by car in free-flowing conditions (i.e. no congestion) in 257 selected EU metro areas averages 430, and ranges from 800 in Madrid to 100 in Timisoara (Romania). The highest figures are in cities in Spain, France, Denmark and Germany, and the lowest in cities in Romania, Malta and Cyprus (Map 4.8).



Map 4.8 Road performance by car under free flow traffic conditions in major FUAs, 2017

Population reached within 30 minutes /
population within a 10 km radius x 100

- < 200
- 200 – 300
- 300 – 400
- 400 – 500
- 500 – 600
- >= 600

FUA population

- < 500 000
- 500 000 – 1 000 000
- 1 000 000 – 2 000 000
- 2 000 000 – 4 000 000
- 4 000 000 – 6 000 000
- >= 6 000 000

Performance relates to the population within the FUA.
FUAs with population larger than 250 000.
Source: Christodoulou et al. (2020).

0 500 km

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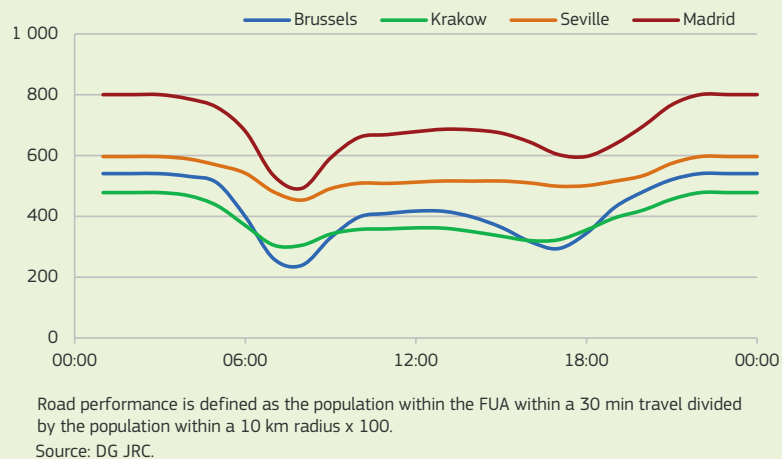
Box 4.6 The impact of congestion over the course of the day

Road performance in a selection of EU metro areas¹ follows a distinct pattern over the day, which clearly reflects the impact of the morning and evening peaks on traffic speeds (Figure 4.14). For each of the four metro areas covered, the effect of traffic congestion on road performance is greater during the morning peak between 7:00 and 9:00 than during the evening one. This is possibly because school runs combine with commuting in the morning but not in the evening, there may be more flexibility about the timing of return trips, or there could be fewer bottlenecks when travelling from the city centre to the periphery than vice versa (since the capacity of roads outside cities tends to be greater than inside — i.e. it is easier and quicker for cars to move from a small space into a larger one than vice versa).

Road performance in cities depends largely on the number of daily commuters and the modes of

transport used by them. Brussels and Madrid experience particularly sharp declines in performance as a result of congestion. During both the morning and evening peaks, performance in Brussels falls below that of Krakow. During the day, between the morning and evening peaks, performance remains lower than after the evening peak and at night, indicating that free-flow speeds are never reached during this period.

Figure 4.14 Hourly variations over the course of a day in road performance by car in Brussels, Krakow, Madrid and Seville, 2017



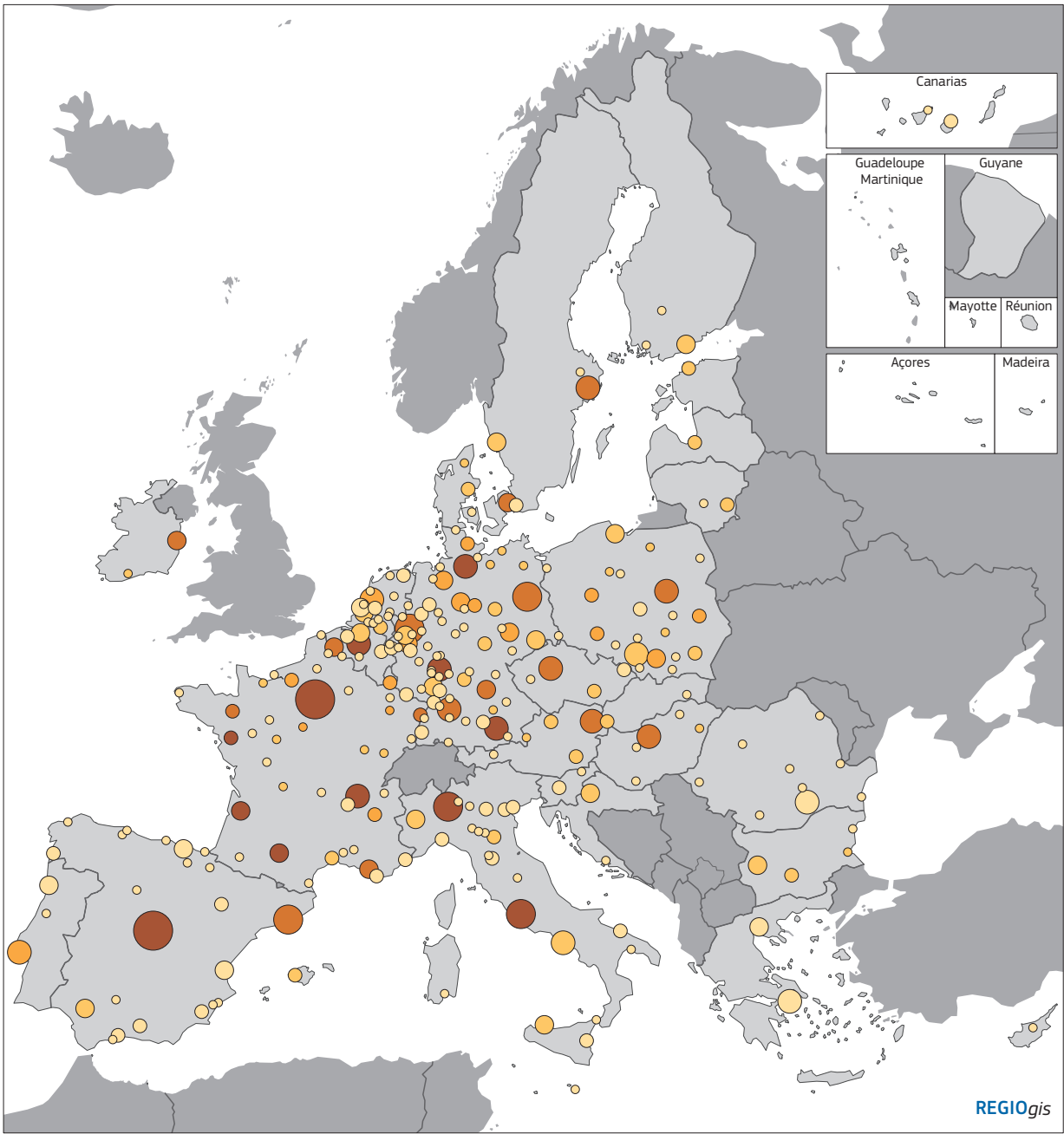
¹ The four metro areas are selected on the basis that they vary significantly in terms of geographic position, size, status of infrastructure, and levels of congestion.

In general, road performance by car tends to be higher the more populous the metro area. Nevertheless, the relationship between total population and performance is not very close, and in many smaller cities in Spain, France and Germany (such as Zaragoza, Rennes and Braunschweig) the performance is very high.

Long-term demographic trends show a continuous increase in the share of population living in metro areas. One consequence of this, combined with increasing car ownership and use, is road congestion. Congestion varies greatly over time and between places and has a strong influence on accessibility and car performance, affecting both

commuting trips between the city and surrounding areas and trips within the city. Increasing the capacity of roads, however, does not necessarily reduce congestion in the medium term, as people tend to respond by travelling longer distances and more by car. More and longer car journeys also increase GHG emissions and air pollution.

Among the 257 metro areas covered here, the impact of congestion on road performance is greatest in some of the largest cities, including Paris, Milan, Toulouse, Munich, Madrid and Brussels (Map 4.9). This reflects the volume of commuter traffic, only Milan applying congestion charges. By contrast, in many of the smaller metro areas across the EU,



Map 4.9 Effect of congestion on road performance by car in major FUAs, 2017

Change in the population reached within 30 minutes/
Population within a 10 km radius x 100

- < -250
- -250 – -200
- -200 – -150
- -150 – -100
- -100 – 0
- ≥ 0

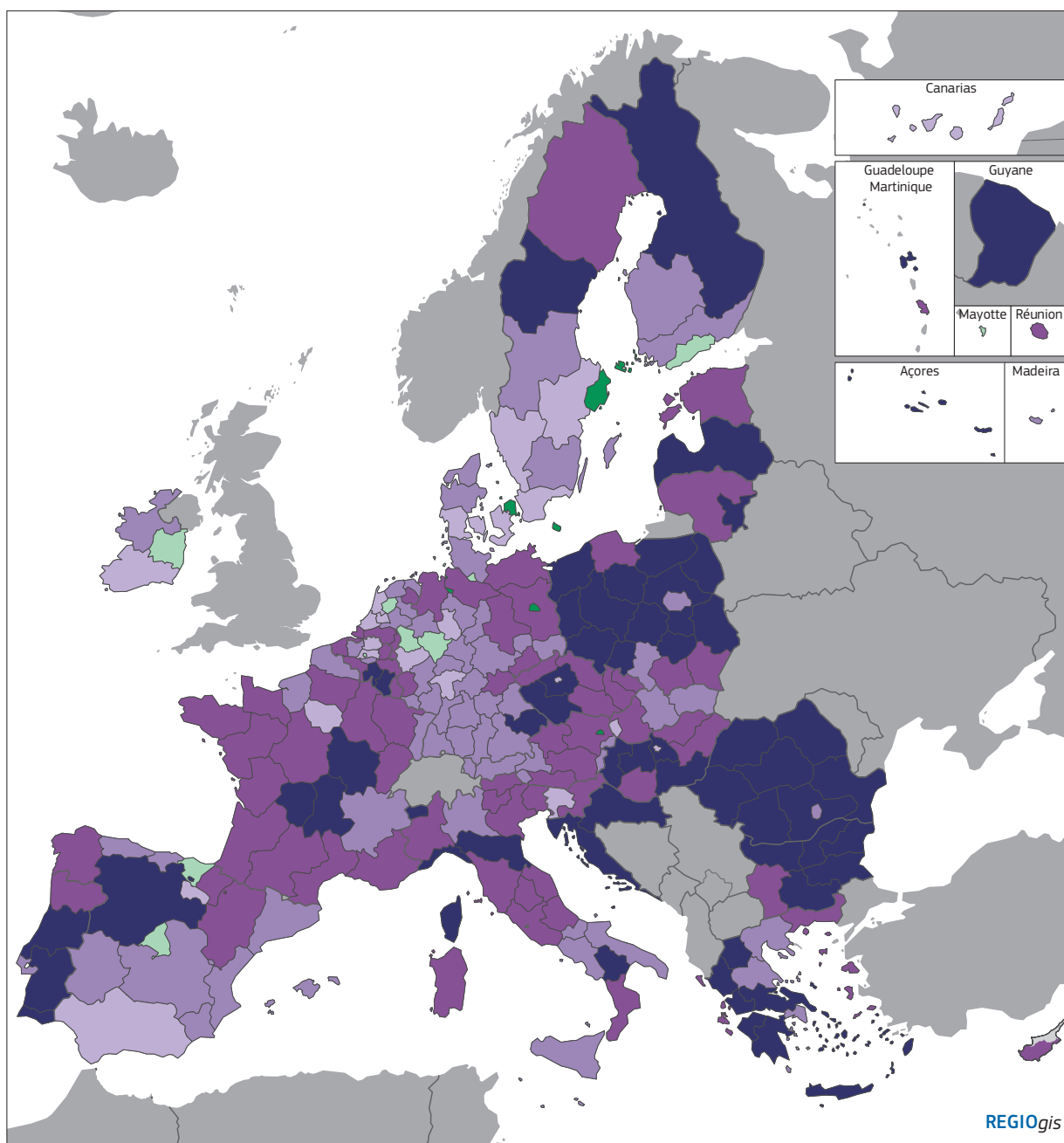
FUA population

- < 500 000
- 500 000 – 1 000 000
- 1 000 000 – 2 000 000
- 2 000 000 – 4 000 000
- 4 000 000 – 6 000 000
- ≥ 6 000 000

Performance relates to the population within the FUA.
FUAs with population larger than 250 000.
Difference between morning peak congestion and free flow.
Source: Christodoulou et al. (2020).

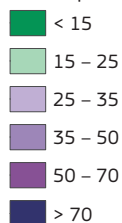
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Map 4.10 Road traffic fatalities, 2018–2019

Deaths per million inhabitants



EU-27 = 52.7

The EU target for 2030 is a reduction of 50% relative to 2019, amounting to about 25 road fatalities per million inhabitants.

Source: Eurostat (tran_r_acci).

0 500 km

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peak-hour congestion has almost no noticeable impact on performance.

Although in some metro areas the gains will be larger than in others, congestion could be reduced substantially by increasing the share of journeys made by public transport and bicycle. The bicycle in particular offers a fast and green substitute for cars within cities (as seen above).

3.4 Traffic fatalities are still too high in most EU regions, but many cities have met the 2030 reduction target

The transition to sustainable mobility is linked to a reduction in traffic accidents. First, this is because a small number of traffic accidents is one aspect of a sustainable transport system. Second, an increase in road safety might boost walking or the use of bicycles, which in turn would contribute to sustainable mobility. The long-term goal of the EU is to move close to zero road deaths by 2050 ('vision zero'). To this end, the aim is to reduce the number of road deaths by 50% between 2020 and 2030¹⁸, or to achieve a reduction to not more than 25 road fatalities per million inhabitants by 2030¹⁹.

Road traffic fatalities in the EU declined by almost 40% between 2008 and 2018. Nevertheless, the number still averaged 52.7 per million inhabitants in 2018 — over twice the 2030 target — though with large differences between regions (Map 4.10). The road traffic fatality rate is, on average, higher in less developed regions (69.9) than in transition regions (56.7) and more developed ones (40.3). The regions with the highest figures — with over 90 deaths per million — are mostly in eastern and southern Member States, especially in Romania, Portugal, Greece, Bulgaria, Croatia and Poland. However, rates in the Belgian provinces of Luxembourg and Namur are similarly high, with 122 and 107 recorded road fatalities per million

inhabitants, respectively. The rate is notably lower in capital city regions. This is true for those in the north-west of the EU, especially Wien, Berlin, Stockholm, Bruxelles/Brussel, and Helsinki-Uusima, which, together with Madrid, have among the lowest rates of all regions. It is also true for eastern EU capital city regions, such as Praha, Budapest, Warszawski stołeczny and București-Ilfov, where the rates are not as low, but still much lower than in other regions in their Member States.

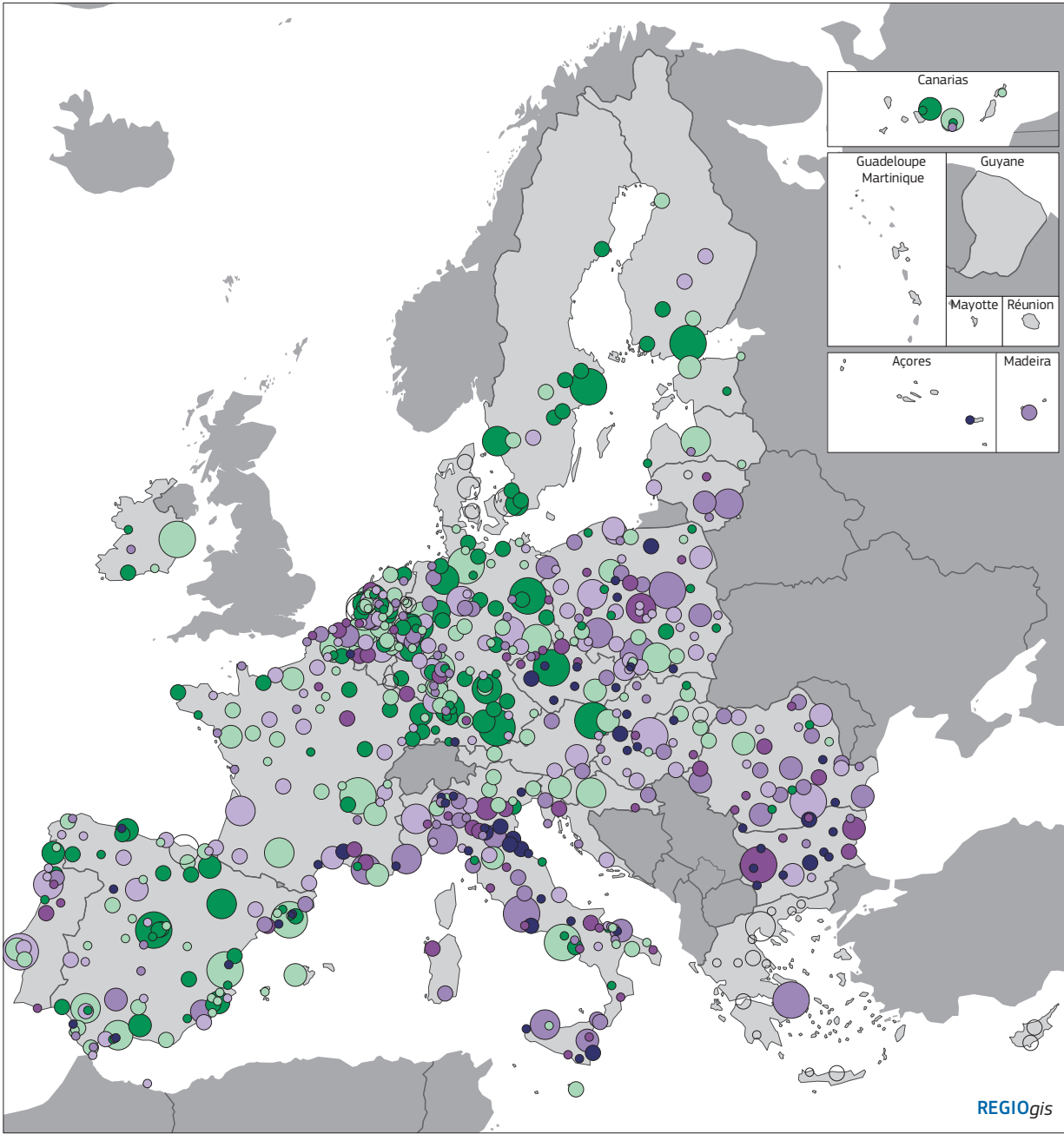
The lower fatalities in capital city regions may be a manifestation of a more general relationship between road safety and the degree of urbanisation in a region. Data for 771 cities in the EU show that the average fatality rate in cities (33.6 per million inhabitants) is much lower than the overall rate in the EU (52.7) (Map 4.11). This is possibly because traffic speeds are lower in urban areas, as is car use because of the availability of public transport, and average journeys are shorter than in other areas. Average fatality rates are higher in the eastern EU Member States, although many cities in Italy and some cities in Belgium, France and Spain also have high rates. Larger cities tend to have lower rates than smaller ones, and capital cities stand out with particularly low rates.

4. Broadband connections show an urban-rural divide

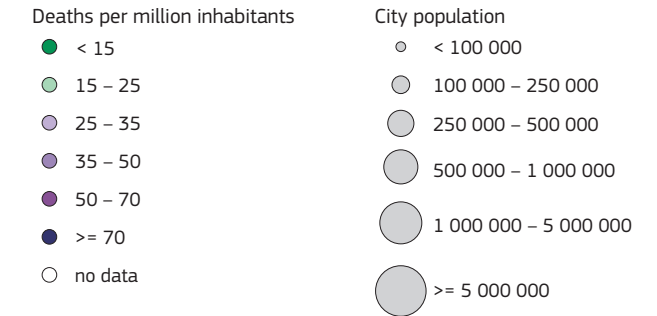
Access to high-capacity telecommunication networks is a key factor of competitiveness and of the development potential of EU regions. The provision of digital services and the capacity to operate successfully in a global business environment increasingly rely on fast and effective broadband connections. The highly developed regions are in most cases already well endowed in this regard, but there are still serious gaps in many of the less developed ones. Unless corrected, this difference in broadband connection can further increase territorial disparities in economic growth and levels of prosperity. This is because highly developed regions already have the infrastructure for reaping the benefits and being competitive in an increasingly digital economy, whereas less developed re-

18 European Commission (2019c).

19 In agreement with the Member States it was decided to use the baseline of 2019, on the basis that 2020 was an exceptional year with the number of deaths falling by 17% between 2019 and 2020.



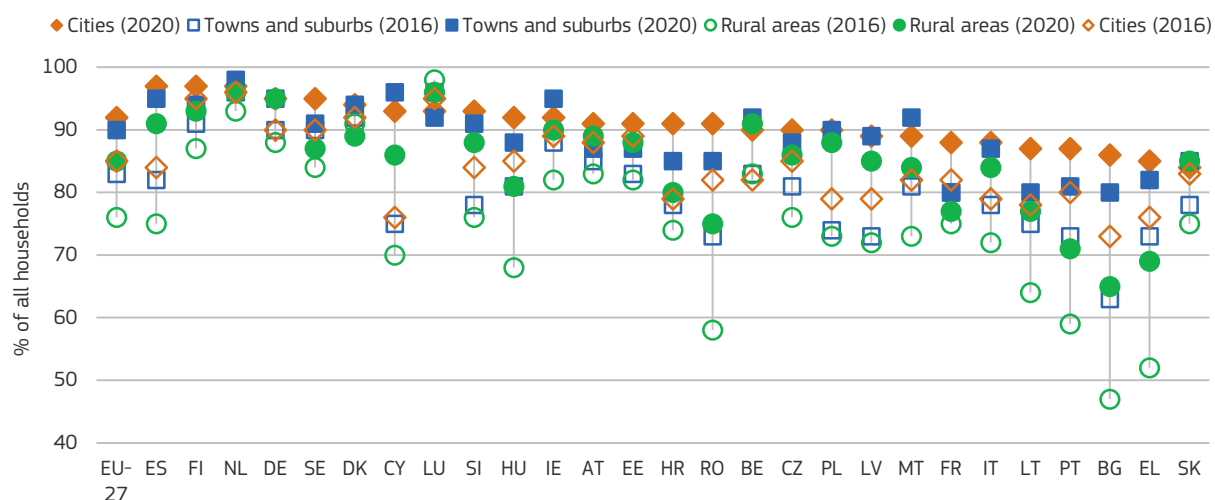
Map 4.11 Road traffic fatalities in cities, 2018–2019



Latest available data (between 2013 and 2019).
The EU target for 2030 is a reduction of 50% relative to 2019,
amounting to about 25 road fatalities per 1 million inhabitants.
Source: Eurostat (urb_ctrn) and DG MOVE (CARE database).



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Figure 4.15 Households with broadband subscriptions by degree of urbanisation, 2016 and 2020

France: 2016 and 2019. The EU figure for 2020 is an estimate.

Source: Eurostat [isoc_ci_it_h], DG REGIO calculations.

regions stand to be increasingly excluded from economic opportunities.

4.1 Broadband subscription rates are lower in rural areas

Between 2016 and 2020²⁰, the share of EU households with broadband subscriptions increased from 82% to 89%. The increase was slightly more in rural areas (9 pp) than in cities, towns and sub-

urbs (7 pp) (Figure 4.15). Nevertheless, the share remained higher in cities (92%) than in rural areas (85%), with towns and suburbs in between (90%). The same pattern applies to most Member States, although there are some exceptions where there is little difference between types of areas, mainly in small and/or densely populated Member States with few remote areas, such as the Benelux Member States, Denmark, Malta and Cyprus. However, in Germany, Slovakia and Poland the share of households with broadband is also similar in cities, towns and suburbs, and rural areas.

As would be expected, the share of households connected increased between 2016 and 2020 throughout the EU²¹. Over these four years, there was some convergence in the share across the EU, the increase being larger in Member States where the initial share was relatively small.

4.2 Broadband connection speed is lower in rural areas

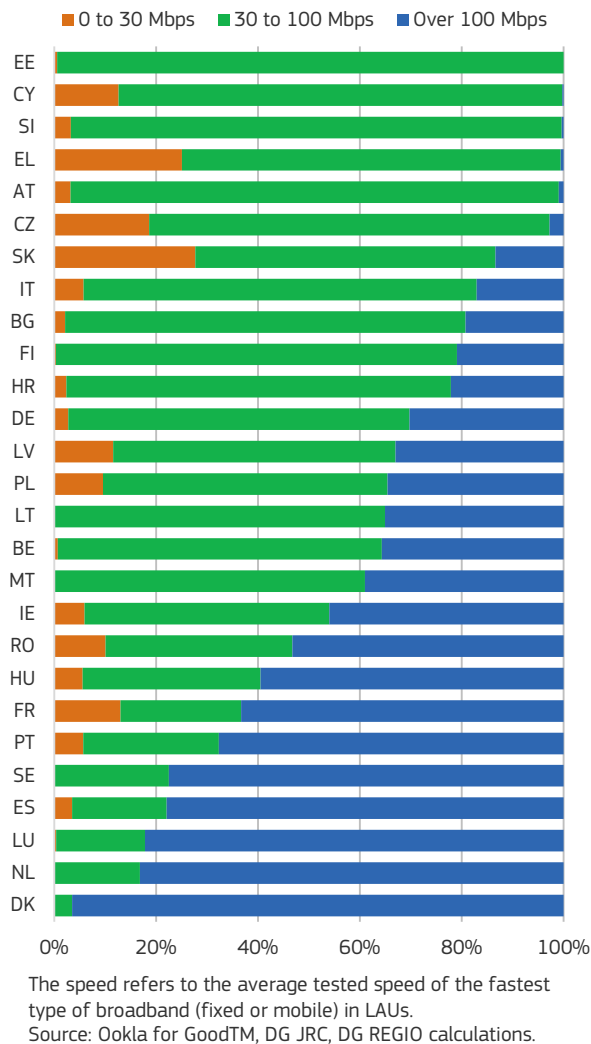
Broadband connection speed is an indicator of the reliability of internet connections for particular activities such as remote working.

Box 4.7 Data on broadband connection speeds

Extensive data on broadband connection speeds in the EU is provided by Ookla for GoodTM, which contains records of hundreds of millions of consumer-initiated connection speed tests (Speedtest®) for the last quarter of 2020. This section uses the average tested speed at LAU (Local Administrative Unit) level as the basis for the analysis. Note that the speed test data do not provide information on the broadband coverage or the number of subscriptions per household. The actual connection speed may also vary within LAUs.

21 Luxembourg changed its survey design and data collection methodology in 2018: its shares in 2016 and 2020 are therefore not comparable.

Figure 4.16 Population by average tested broadband connection speed in their LAUs, 2020



In 2016 the EU set a target of having “access to 30 Mbps or above by all citizens and at least 50% of households with a connection over 100 Mbps” by 2020²². In its Communication on a digital compass²³, the Commission laid out its vision for 2030 to empower citizens and businesses through the digital transition, and set new targets of “all European households [being] covered by a Gigabit network, with all populated areas covered by 5G”.

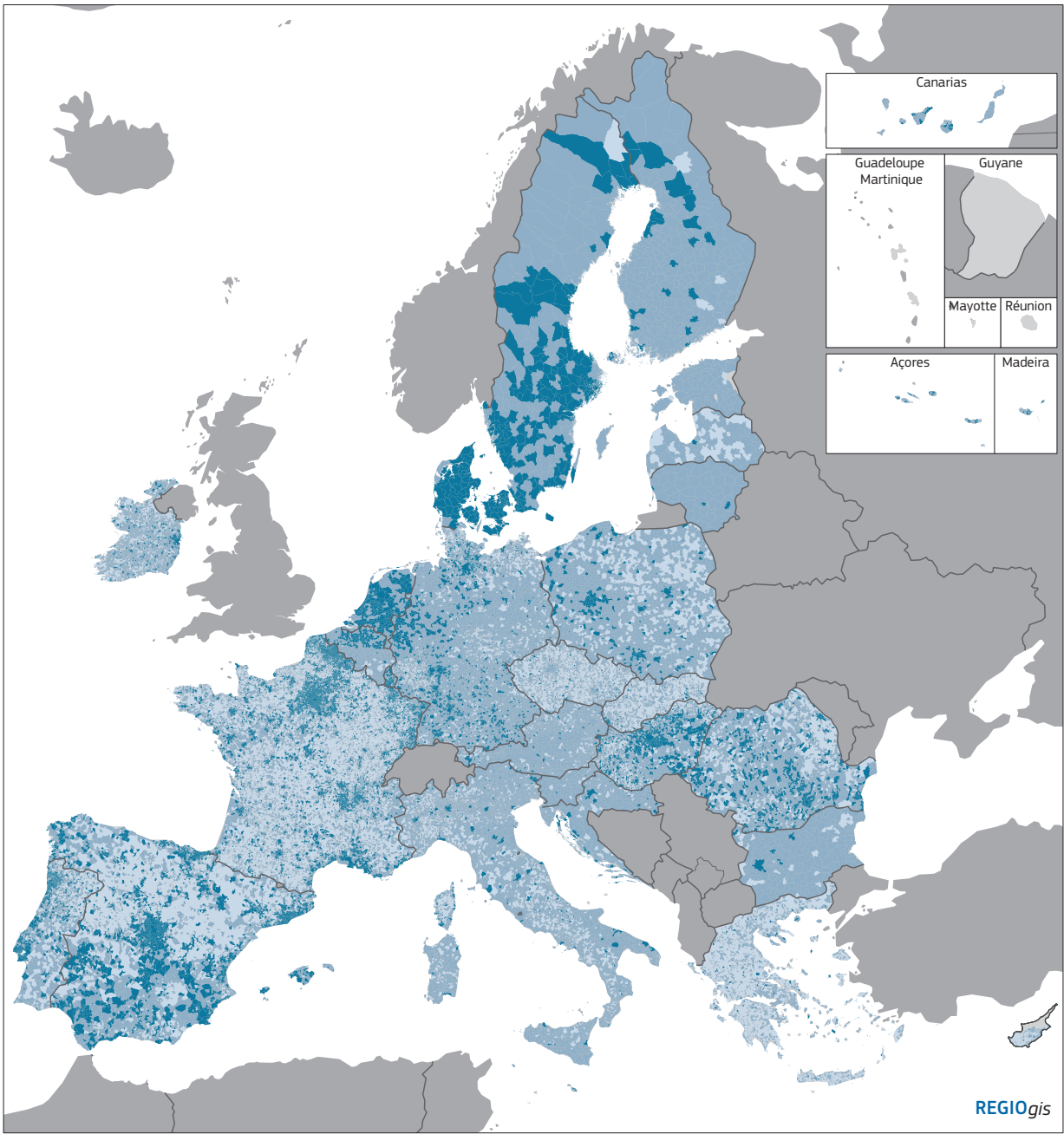
22 A connection speed of 30 Mbps is sufficient for one household member to carry out typical household online activities, including teleworking and online learning. However, the required speed increases if multiple users are engaged in activities simultaneously. See for example: <https://www.fcc.gov/consumers/guides/broadband-speed-guide>.

23 European Commission (2021e).

Concerning the targets for 2020, in only four Member States (Denmark, Lithuania, Malta and the Netherlands) did the whole population live in an LAU with tested broadband connection speeds above 30 Mbps at the end of 2020 (see Box 4.7); although in five other Member States this was the case for over 99% of the population (Figure 4.16). In Slovakia and Greece, over a quarter of the population still lived in an area where connection speeds were below 30 Mbps, and in only nine Member States were the majority of households in an area with speeds of over 100 Mbps. In Estonia, Cyprus, Slovenia, Greece, Austria and Czechia, less than 10% of the population lived in such areas. These indicators suggest that only Denmark and the Netherlands have achieved both the EU targets, but that Sweden and Luxembourg are very close. 13 Member States appear to have achieved neither. This implies that the pace of installation of broadband has been too slow in many Member States to meet the 2020 target.

The average tested speeds of broadband connections show particular spatial patterns, with speeds above 30 Mbps in and around cities being common in all Member States (Map 4.12). Outside cities, differences between Member States are more pronounced, with connection speeds above 30 Mbps throughout Malta, the Netherlands, Sweden and Denmark, and lower than this in a large proportion of LAUs outside cities in Latvia, Ireland, Czechia, Slovakia and Greece. A clear digital divide between areas is evident in many Member States, including France, Spain, Poland, Hungary and Romania, where (very) high connection speeds in cities contrast with low speeds in other areas.

There is a significant divide in broadband connection speeds between cities and rural areas (Figure 4.17 and Figure 4.18). Almost the entire EU population in cities live in LAUs with tested connection speeds above 30 Mbps, and a large proportion in LAUs with speeds above 100 Mbps. In rural areas across the EU, by contrast, a substantial share of the population — in Greece and Slovakia, the majority — have to make do with speeds below 30 Mbps. Only in Denmark and Luxembourg do more than half the rural population have access to speeds over 100 Mbps. In France, there are large differences



Map 4.12 Average tested connection speed of broadband in Local Administrative Units, 2020

- Mbps
- < 30
 - 30 – 100
 - >= 100
 - no data

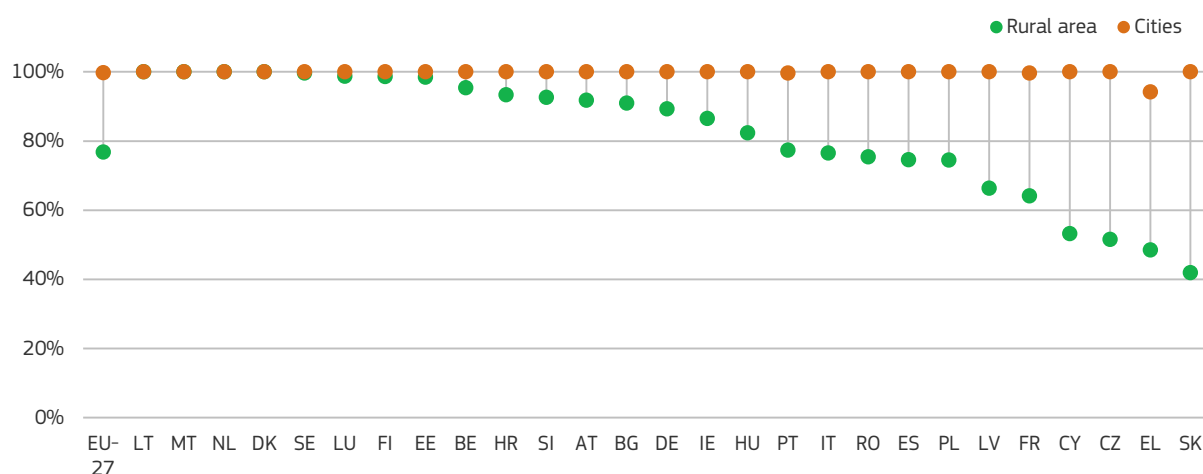
The classification is based on the average speed of the fastest type of broadband (fixed or mobile) per LAU.
Source: Ookla for Good (TM), JRC, REGIO-GIS.

0 500 km

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between rural areas: 1 in 5 people in these areas have access to speeds above 100 Mbps, but 1 in 3 are limited to speeds below 30 Mbps.

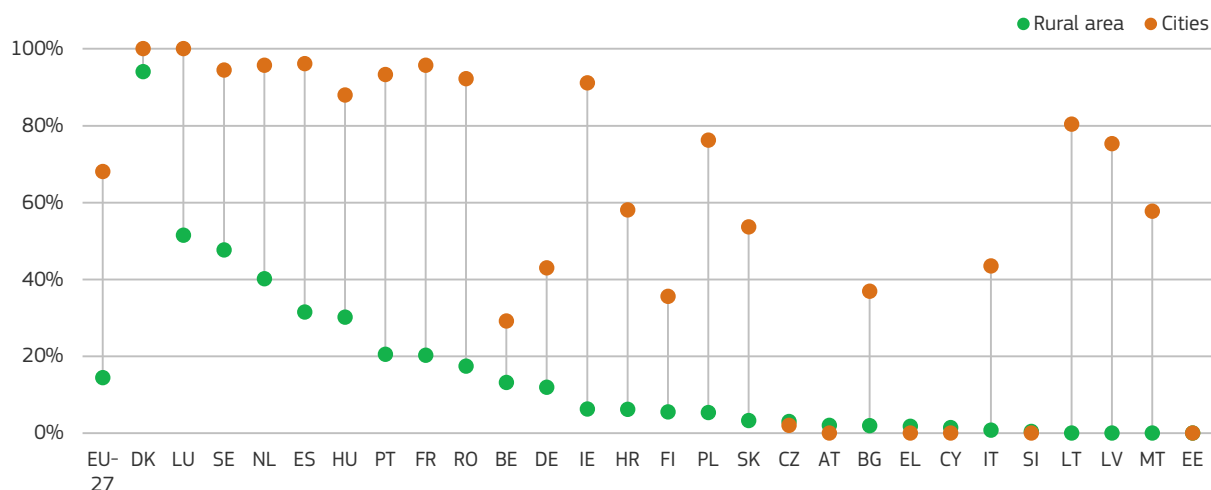
Figure 4.17 Population in cities and rural areas with an average tested broadband connection speed in their LAUs of over 30 Mbps, 2020



The speed refers to the average tested speed of the fastest type of broadband (fixed or mobile) in LAUs.

Source: Ookla for GoodTM, DG JRC, DG REGIO calculations.

Figure 4.18 Population in cities and rural areas with an average tested broadband connection speed in their LAUs of over 100 Mbps, 2020



The speed refers to the average tested speed of the fastest type of broadband (fixed or mobile) in LAUs.

Source: Ookla for GoodTM, DG JRC, DG REGIO calculations.



Chapter 5

A more social and inclusive Europe

- Until the COVID-19 outbreak, labour markets in EU Member States and regions were on a steady path to recovery from the adverse effects of the 2008 economic and financial crisis. Only a small impact of the COVID-19 pandemic is visible so far on the employment and unemployment figures. Between 2013 and 2020, the employment rate in the EU of those aged 20–64 rose by 5 pp to reach 72.5%, 0.7 pp lower than in 2019.
- The employment rate in 2020 was 5.5 pp below the EU 2030 target of 78%. The rate was higher in more developed regions (76%) than in transition regions (72%), and lowest in less developed regions (67%), though in the latter it rose by 7 pp between 2013 and 2020.
- Between 2013 and 2020, unemployment fell in all EU Member States, from a high of 11.4% to 7.1% (up from 6.7% in 2019). The rate was highest in less developed regions (8.8%), followed by transition regions (7.9%), and was lowest in more developed regions (5.6%).
- In 2019, around 91 million people in the EU (20% of the population) were at risk of poverty or social exclusion. The rate was slightly higher in rural areas (22%) than in cities (21%) and in towns and suburbs (19%), but it declined in all three cases between 2012 and 2019.
- Migrants (defined as foreign-born) are concentrated in regions in the north-west of the EU, mainly in cities where economic opportunities are more, and support networks most developed. The employment rate of non-EU migrants has increased, but remains lower than for the native-born (62% as against 74% in 2020) in most regions, especially for those with tertiary education.
- The risk of poverty and social exclusion for those not born in the EU is double that of the native-born, with the rate of material deprivation being particularly high.
- Despite the strong political commitment to achieve gender equality in the EU, large differences remain between women and men in different aspects of life. In 2020, for instance, the employment rate of men aged 20–64 was 11 pp higher than for women, much the same as in 2013.
- The disadvantages faced by women and what they can achieve differ widely across the EU, with women achieving most in Nordic regions and being disadvantaged most in southern and eastern regions.
- The EU Regional Social Progress Index, a measure designed to capture aspects of well-being not fully reflected in GDP, shows great variations across EU regions, with less developed regions scoring particularly poorly and Nordic regions performing well.

Chapter 5

A more social and inclusive Europe

1. Before the COVID-19 outbreak hit, labour markets across EU regions were experiencing a period of positive trends

In 2019, prior to the COVID-19 pandemic, the EU had the highest employment and lowest unemployment rates on record¹. The pandemic had only a small impact on these rates². The employment rate for those aged 20–64 in 2020 was only slightly lower than in 2019 (72.5%, down just 0.7 pp), but still 2.5 pp short of the Europe 2020 target of 75%. The Commission has proposed a target of increasing the employment rate to at least 78% by 2030³. As of 2020, only five EU Member States had already met this new target: Sweden, Germany, Czechia, Estonia and the Netherlands.

The employment rate in 2020 had returned to pre-crisis levels in all Member States except Greece where, at 61%, it was still 5 pp lower than in 2008. In Hungary it was 14 pp higher than in 2008, and in Malta 18 pp higher.

The employment rate, however, varies markedly across regions (Map 5.1 and Map 5.2) and types of regions (Table 5.1). In 2020 the rate in more developed regions averaged 76%, whereas in less developed regions it was well below this at 66% (though up 7 pp from 2013), with the average rate in transition regions lying in between (72%). The employment rate is increasing most in less devel-

oped regions — catching up in regions in the east of the EU and recovering in regions in Spain and Portugal — as well as in Ireland, which was hit hard by the economic and financial crisis.

Between 2013 and 2020, unemployment fell in all EU Member States, from 11.4% to 7.1% (it was 6.7% in 2019). It declined most in Greece, Spain and Croatia (by 10 pp or more in each case). It was highest in 2020 (at 8.8%) in less developed regions, followed by transition regions (7.9%) and more developed ones (5.6%). On average, the highest unemployment rates were in southern EU regions (12%) and the lowest in eastern ones (4.4%) (Map 5.3 and Map 5.4).

The unemployment rate is the main indicator used to measure labour under-utilisation in an economy, but it gives only a partial picture of the extent of mismatch between labour supply and demand.

Box 5.1 What is labour market slack?

Labour market slack is defined as the sum of those aged 15–74 who are unemployed, under-employed part-time workers, and the potential additional labour force. The latter includes people who are available for work but not actively seeking a job — ‘discouraged’ workers — and those seeking work but not immediately available (e.g. those waiting for the results of a job interview).

Labour market slack can be expressed as a share of the extended labour force, the latter including the potential entrants as well as the employed and unemployed as conventionally defined.

For more details, see ‘Eurostat Statistics Explained’:
https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Labour_market_slack_%E2%80%93_annual_statistics_on_unmet_needs_for_employment.

1 European Commission (2020f), p. 13.

2 Although the labour market in the EU has been severely hit by the pandemic and associated containment measures, the impact has mainly been on the quarterly (rather than annual) employment figures and on total hours worked. The increase in unemployment was kept down by the job-retention schemes introduced by governments (European Central Bank Economic Bulletin 8/2020 and ‘Eurostat Statistics Explained’ on *labour markets in the light of the COVID 19 pandemic — quarterly statistics*). The impact of the COVID-19 crisis on total hours worked in EU regions has been considered in Chapter 1 of this report.

3 As part of the European Pillar of Social Rights Action Plan, which was welcomed by EU leaders during the Social summit in Porto on 7–8 May 2021 and the European Council on 25 June 2021.

Table 5.1 Employment and unemployment rates by group of regions and degree of urbanisation, 2020 and changes 2013–2020

		More developed regions	Transition regions	Less developed regions	EU
Employment rate	2020 (%)	76.3	71.8	66.1	72.5
(% of population 20–64)	Change 2013–2020 (pp)	3.5	4.7	3.5	5.0
Unemployment rate	2020 (%)	5.6	7.9	8.8	7.1
(% of labour force 15–74)	Change 2013–2020 (pp)	-2.6	-5.0	-6.9	-4.4
		North-western EU	Southern EU	Eastern EU	EU
Employment rate	2020 (%)	76.4	64.8	73.8	72.5
(% of population 20–64)	Change 2013–2020 (pp)	2.8	5.5	8.3	5.0
Unemployment rate	2020 (%)	5.4	12.0	4.4	7.1
(% of labour force 15–74)	Change 2013–2020 (pp)	-2.1	-7.3	-5.7	-4.4
		Cities	Towns and suburbs	Rural areas	EU
Employment rate	2020 (%)	72.2	72.0	73.0	72.5
(% of population 20–64)	Change 2013–2020 (pp)	5.0	4.2	5.5	5.0
Unemployment rate	2020 (%)	8.0	6.9	5.9	7.1
(% of labour force 15–74)	Change 2013–2020 (pp)	-4.3	-3.9	-4.9	-4.4

Source: Eurostat [lfst_r_lfe2emprt] and [lfst_r_lfu3rt], DG REGIO calculations

Table 5.2 Labour market slack by group of regions, 2020 and changes 2013–2020

		More developed regions	Transition regions	Less developed regions	EU
Labour market slack	2020 (%)	12.9	16.4	11.9	14.5
(% of extended labour force)	Change 2013–2020 (pp)	-4.2	-10.1	-9.6	-4.8
		North-western EU	Southern EU	Eastern EU	EU
Labour market slack	2020 (%)	13.2	11.8	12.3	14.5
(% of extended labour force)	Change 2013–2020 (pp)	-1.7	-18.0	-3.5	-4.8

Source: Eurostat [lfst_r_sla_ga], DG REGIO calculations

The concept of ‘labour market slack’ (see Box 5.1) is instead a measure of the full extent of labour force under-utilisation.

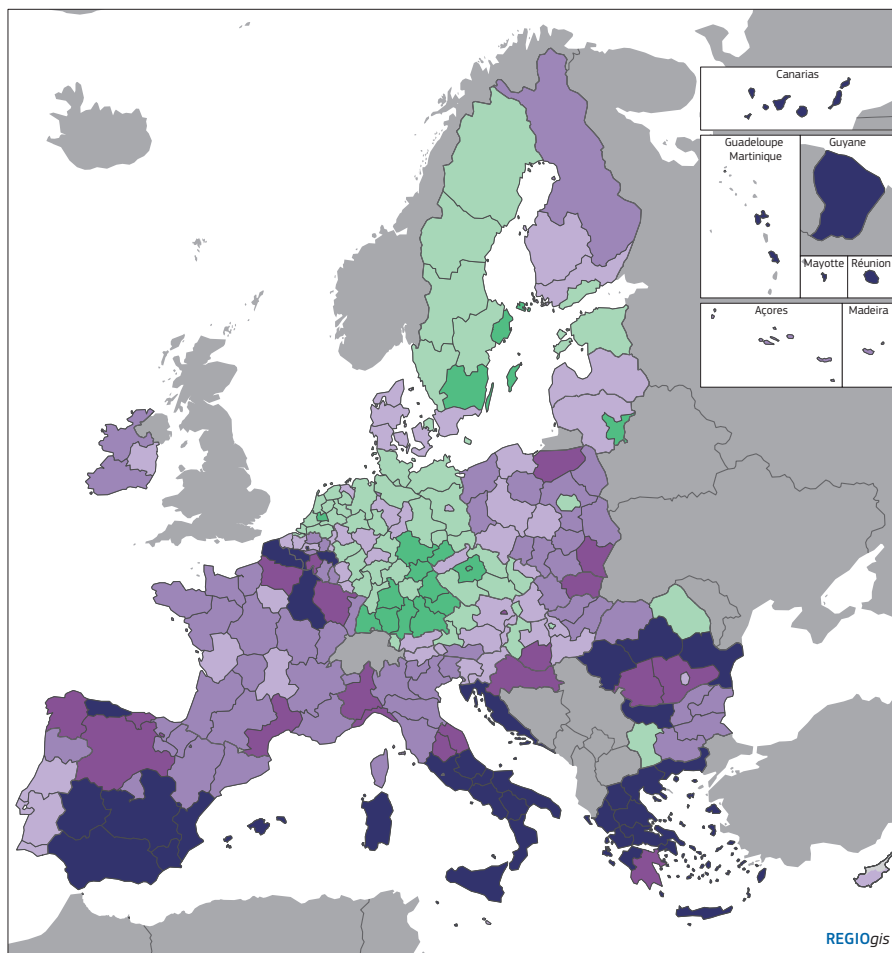
In 2020, labour market slack in the EU amounted to 14.5% of the extended labour force (as against 13.4 % in 2019): this was more than double the unemployment share⁴, one of its components,

which accounted for 6.7 % of the extended labour force (Table 5.2)⁵.

Labour market slack exceeds 20% of the extended labour force in a number of regions in southern Italy, Greece and Spain. In the economic recovery from 2013 to 2020, labour market slack dimin-

4 As a share of the extended labour force.

5 For more information, see ‘Eurostat Statistics Explained’: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Labour_market_slack_%E2%80%93_annual_statistics_on_unmet_needs_for_employment#Focus_on_the_potential_additional_labour_force.



Map 5.1 Employment rate (20–64), 2020

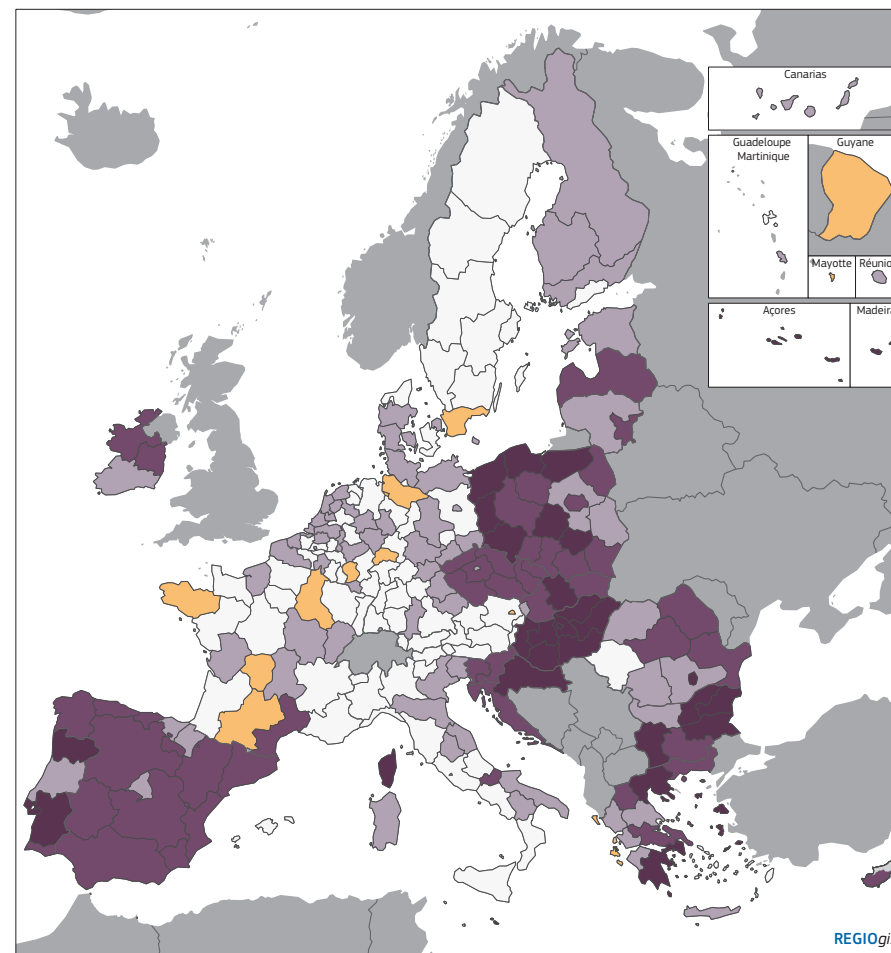
% of population aged 20–64

- < 66
- 66 – 70
- 70 – 74
- 74 – 78
- 78 – 82
- >= 82

EU-27 = 72.5
The employment rate target is 78% by 2030.
Source: Eurostat (lfsd_r_lfe2emprr).

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Map 5.2 Change in employment rate (20–64), 2013–2020

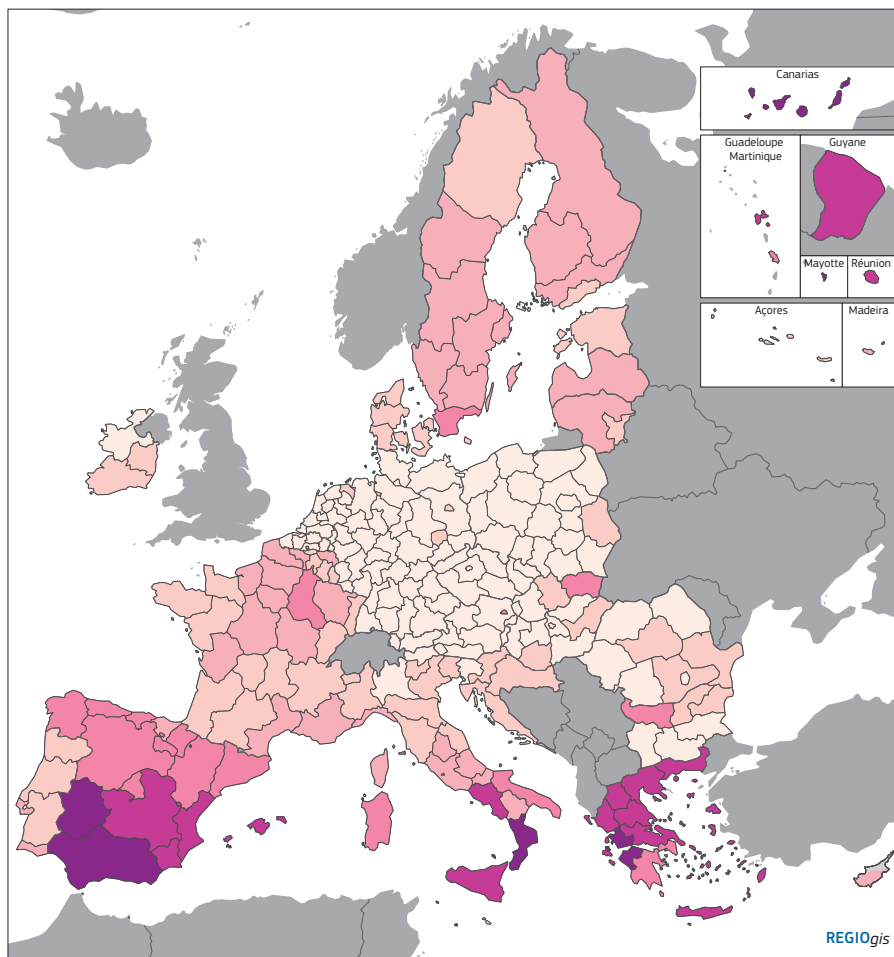
Percentage point change

- <= 0
- 0 – 3
- 3 – 6
- 6 – 9
- > 9

EU-27 = 5
Source: Eurostat (lfsd_r_lfe2emprr).

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Map 5.3 Unemployment rate, 2020

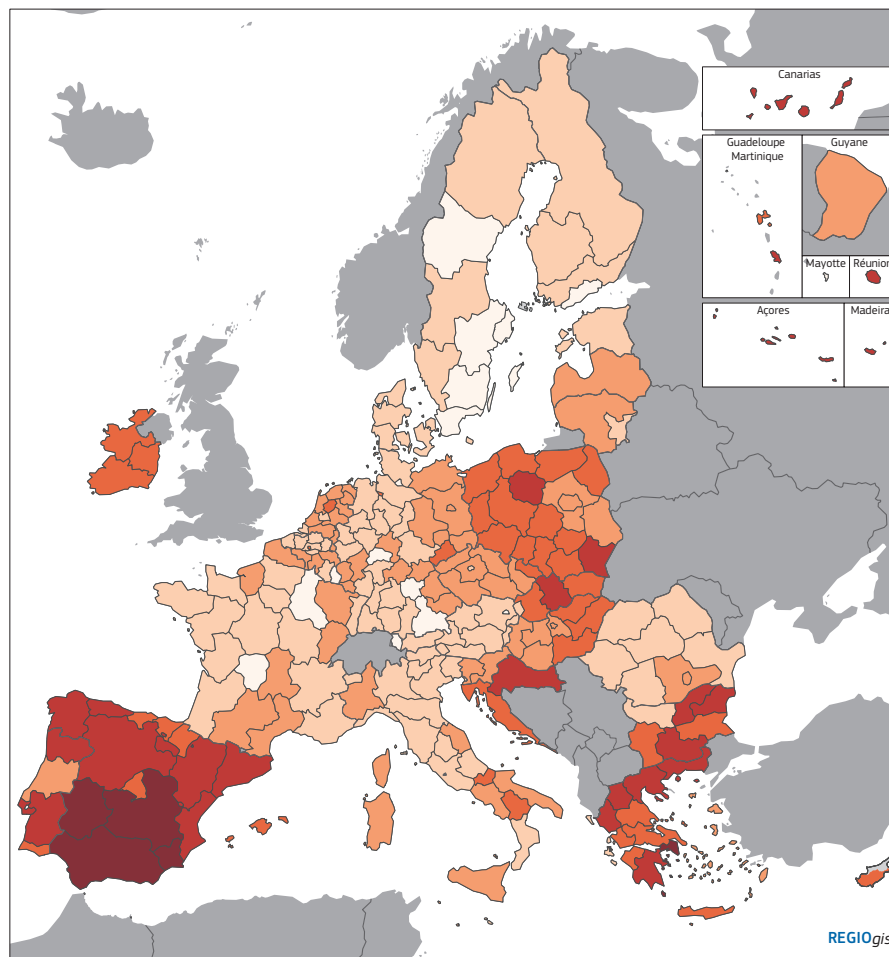
% of labour force

- < 5
- 5 – 7.5
- 7.5 – 10
- 10 – 15
- 15 – 20
- > 20

EU-27 = 7.1
Source: DG REGIO based on Eurostat data (lfst_r_lfu3rt).

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Map 5.4 Change in unemployment rates, 2013–2020

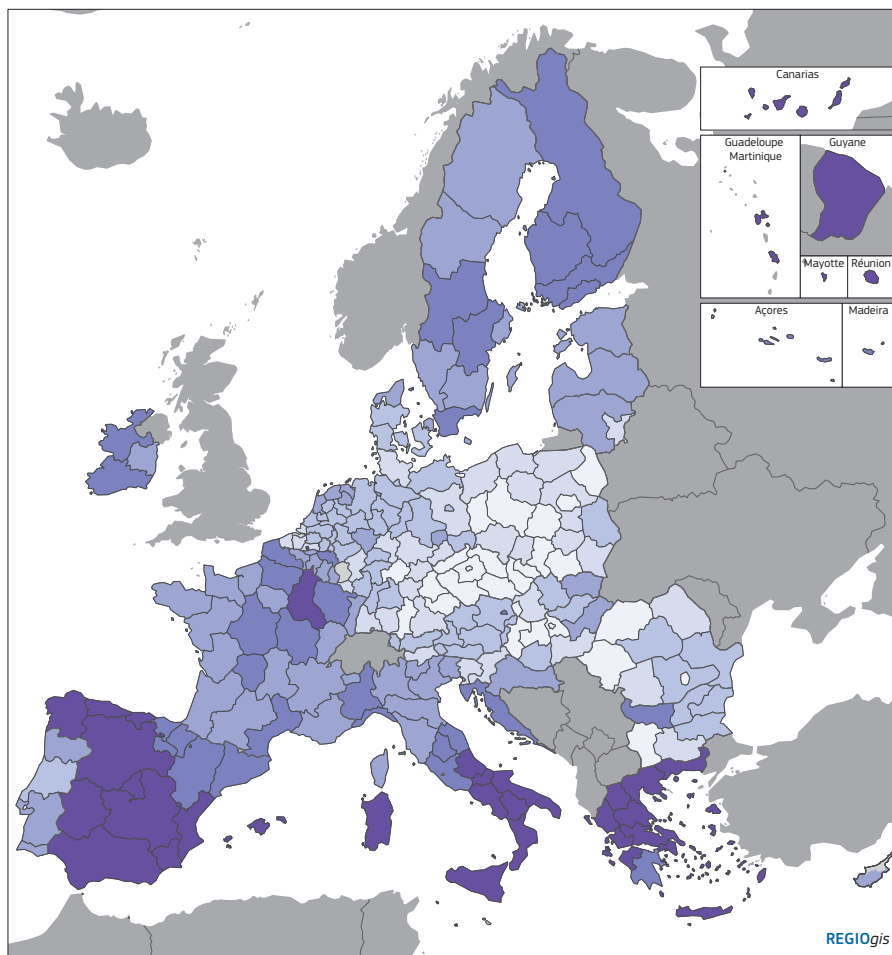
Percentage point change

- ≤ -12
- 12 – -9
- 9 – -6
- 6 – -3
- 3 – 0
- > 0

EU-27 = -4.4
Source: Eurostat (lfst_r_lfu3pers, lfst_r_lfp2act).

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Map 5.5 Labour market slack, 2020

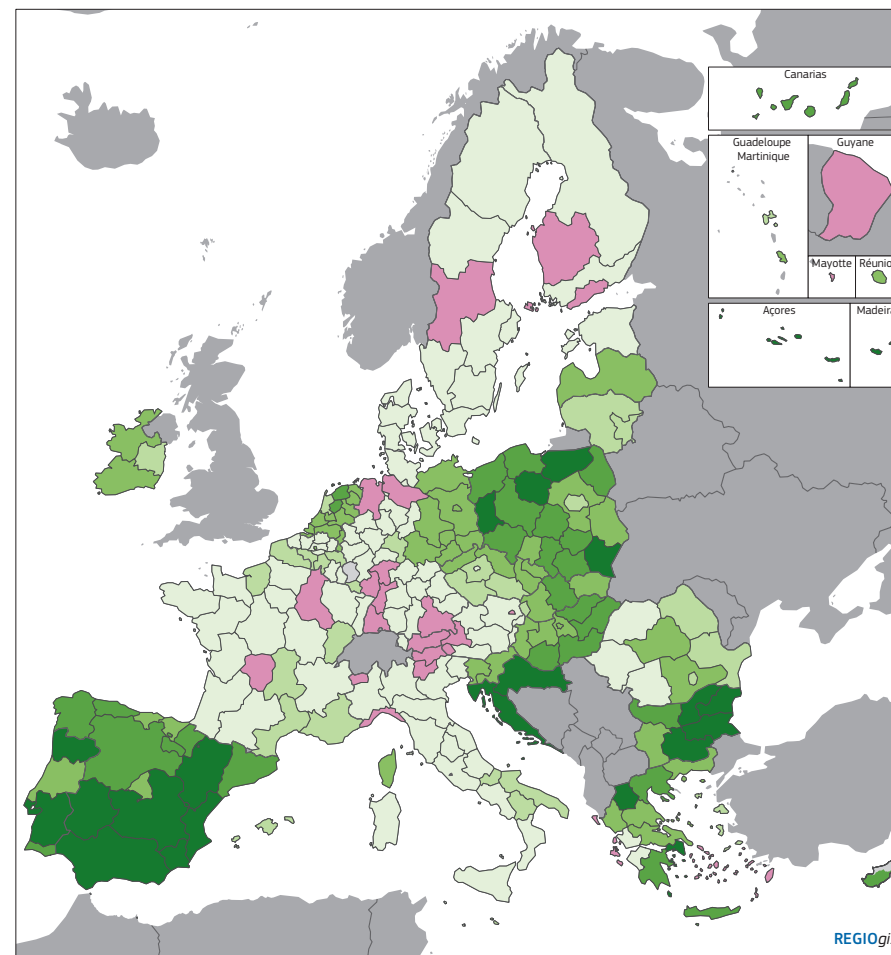
% of the extended labour force

- ≤ 6
- 6 – 9
- 9 – 12
- 12 – 16
- 16 – 21
- > 21

EU-27 = 14.5
Source: Eurostat (lfst_r_sla_ga).

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Map 5.6 Change in labour market slack, 2013–2020

Percentage point change

- ≤ -12
- 12 – -9
- 9 – -6
- 6 – -3
- 3 – 0
- > 0

EU-27 = -4.8
Source: Eurostat (lfst_r_sla_ga).

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Box 5.2 The 2020 European Skills Agenda for sustainable competitiveness, social fairness and resilience

The 2020 European Skills Agenda is a five-year plan to help individuals and businesses develop more and better skills and put them to use¹, by:

- strengthening fairness and sustainable competitiveness, as set out in the European Green Deal;
- ensuring social fairness, putting into practice the first principle of the European Pillar of Social Rights — access to education, training and lifelong learning for everybody, everywhere in the EU; and
- building resilience to react to crises, based on the lessons learnt during the COVID-19 pandemic.

It builds upon the 10 actions of the Commission's 2016 Skills Agenda. It also links to the:

- European Green Deal
- European Digital Strategy

- Industrial and Small and Medium Enterprise Strategy
- Recovery Plan for Europe
- increased support for youth employment.

It sets clear and measurable objectives to be achieved by 2025, based on a set of quantitative indicators:

- at least 50% of adults aged 25–64 participating in learning during the previous 12 months;
- at least 30% of low-qualified adults aged 25–64 participating in learning during the previous 12 months;
- at least 20% of unemployed aged 25–64 having a recent learning experience; and
- at least 70% of those aged 16–74 having at least basic digital skills.

1 Further details at: <https://ec.europa.eu/social/main.jsp?catId=1223&langId=en>.

ished in almost all EU regions, particularly those in Spain (Map 5.5 and Map 5.6).

The weight of those not counted as unemployed in labour market slack is substantial in some Member States, implying a need for labour market policies to target those concerned. In the Netherlands, Ireland and Finland, those not counted as unemployed in 2020 accounted for over 60% of the slack, whereas in Lithuania, Greece and Slovakia they made up less than a third.

2. Regions with large cities have a better educated labour force, a smaller share of school drop-outs, and higher student achievement

With its European Green Deal and Digital Decade, the EU has set ambitious plans to shift towards a climate-neutral, fair and digital economy. At the same time, the ongoing digital transformation,

speeded up by the COVID-19 pandemic, is changing the way people work⁶. The green and digital transition will create new opportunities but also new challenges.

With adequate accompanying policies in place, this twin transition can boost sustainable competitiveness and create new good-quality jobs. The impact on employment, however, will vary by occupation, sector, region and Member State. As a direct and indirect result of the transition, job losses are expected in the mining and extractive industries, and in traditional energy production⁷. In addition, other energy-intensive, or hard-to-abate, sectors (such as transport and the automotive and steel industries) are facing major challenges of restructuring, implying job changes within sectors and regions as well as massive labour reallocation between them. The green transition also poses major social chal-

6 European Commission (2020f); OECD (2020b).

7 Kapetaki et al. (2021); Mandras and Salotti (2021).

lenges, which will affect disproportionately particular population groups, notably those already in vulnerable situations. For instance, energy poverty affects around 7% of the EU population (i.e. over 30 million people), who are unable to keep their homes adequately warm, many of them living in cities⁸. This form of poverty affects not only low-income households but also lower middle-income households in many Member States.

To realise the opportunities and mitigate the risks, both digital skills and the skills needed for sustainability will become increasingly indispensable, not only in nearly all jobs but also in everyday life (for instance, in education and health).

The importance of education and continuing training for economic growth and productivity is also widely recognised in empirical economic research⁹. In 2020, the European Commission launched its New Skills Agenda and set a number of target indicators for 2025 to improve the skills of the workforce¹⁰, support the green and digital transitions, and achieve a fast recovery from the socio-economic impact of the pandemic. On adult learning, for instance, the objectives to be achieved by 2025, as proposed in the skills agenda, include at least 50% of people aged 25–64 participating in training during the previous 12 months¹¹ by 2025 and at least 20% of unemployed adults having recent experience of training. By 2030, it is proposed under the European Pillar of Social Rights Action Plan that at least 60% of people aged 25–64 should participate in training every year¹².

In 2020, around 9% of those aged 25–64 participated in lifelong learning¹³. The proportion was highest in the years 2018–2020 in more developed and transition regions, at 13% on average, as against only 5% in less developed regions (Table 5.3). This only partly reflects national tendencies (Map 5.7). In less developed regions, the figure was the same as in 2011–2013, so there was no increase over this seven-year period.

The proportion is smallest in regions in the east of the EU (only 4.5% of those aged 25–64 participating in education and training during the preceding four weeks in 2018–2020), with no visible change in recent years (Map 5.7 and Map 5.8). It is largest in regions in France, Netherlands, Belgium, Denmark, Finland and Sweden, at over 25%, and larger in cities than other areas.

Reducing high rates of early leaving from education and training should help to improve labour market outcomes and eradicate pockets of socio-economic deprivation¹⁴. Research shows that those dropping out of education prematurely have a higher risk of being unemployed, working part time or having a fixed-term contract than those completing secondary education. It also shows that they tend to earn less¹⁵ and are in poorer health¹⁶.

A newly agreed target at EU level is to reduce the share of early leavers — those aged 18–24 with no qualifications beyond basic schooling and no longer in education or training — to 9% or less by 2030¹⁷. This compares with 9.9% in 2020, though with wide differences between and within Member States, the share ranging from 3.8 % in Greece to 16.7 % in Malta.

At regional level, the largest shares of early leavers are in Spain, southern Italy, Bulgaria and Romania, with Figures of around 25% in Ceuta and Melilla in

8 European Commission (2019a).

9 Mankiw et al. (1992); Hanushek and Woessmann (2007); Gennaioli et al. (2013); Woessmann (2016); European Commission (2019a) Chapter 3, Section 2; European Commission (2021c) chapter 3, sections 3.3 and 3.4.

10 European Commission (2020h).

11 The 2021 Council Resolution on education and training (European Union, 2021) reduced the reference level to 47%. The indicator measures the share of adults aged 25–64 who report participating in at least one form of formal or non-formal education or training over the previous 12 months. This is currently measured by the EU Adult Education Survey, which is conducted every five years (most recently in 2016). From 2022, this information will also be available from the EU Labour Force Survey (LFS) every other year.

12 The headline target for adult learning welcomed by EU leaders at the social summit in Porto in May 2021 and at the European Council in June 2021.

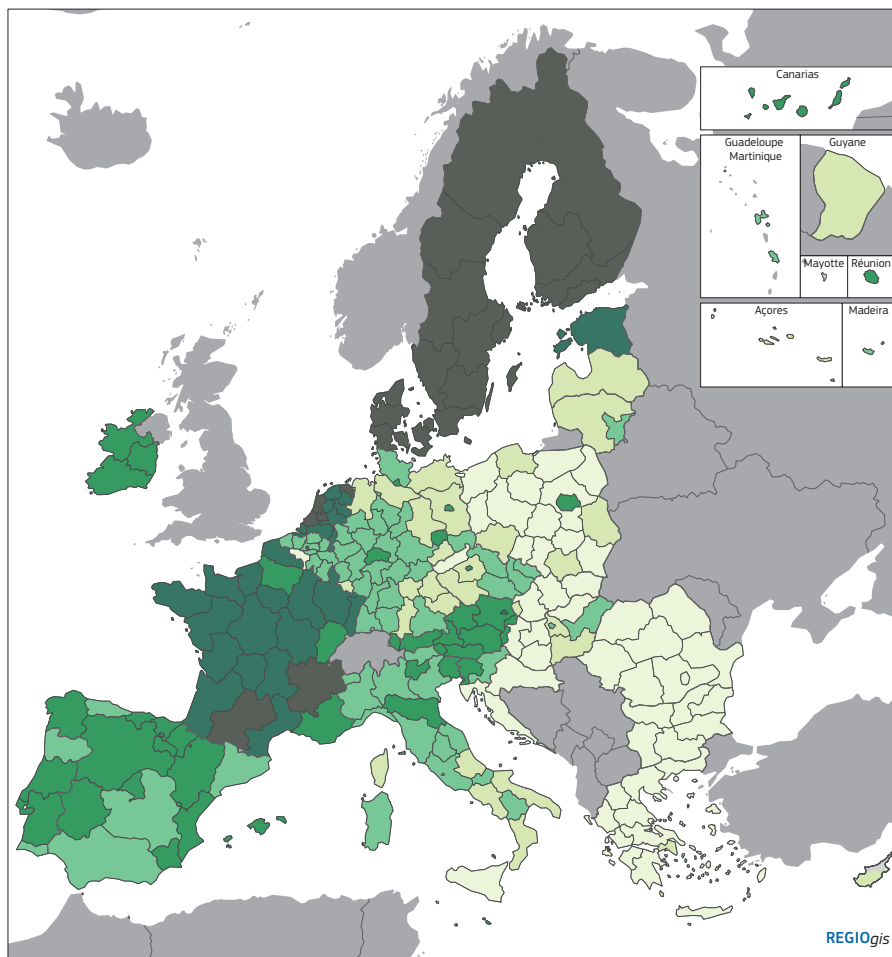
13 The indicator measures the share of people who participated in education or training in the preceding four weeks. It differs significantly from the target of taking part in learning during the previous 12 months.

14 De Witte and Rogge (2013); Hanushek and Woessmann (2007).

15 Campolieti et al. (2010); Falch et al. (2010); Brunello et al. (2012).

16 Arendt (2005); Kempter et al. (2011); Brunello et al. (2013).

17 European Union (2021).



Map 5.7 Participation of adults aged 25–64 in education and training, average 2018–2020

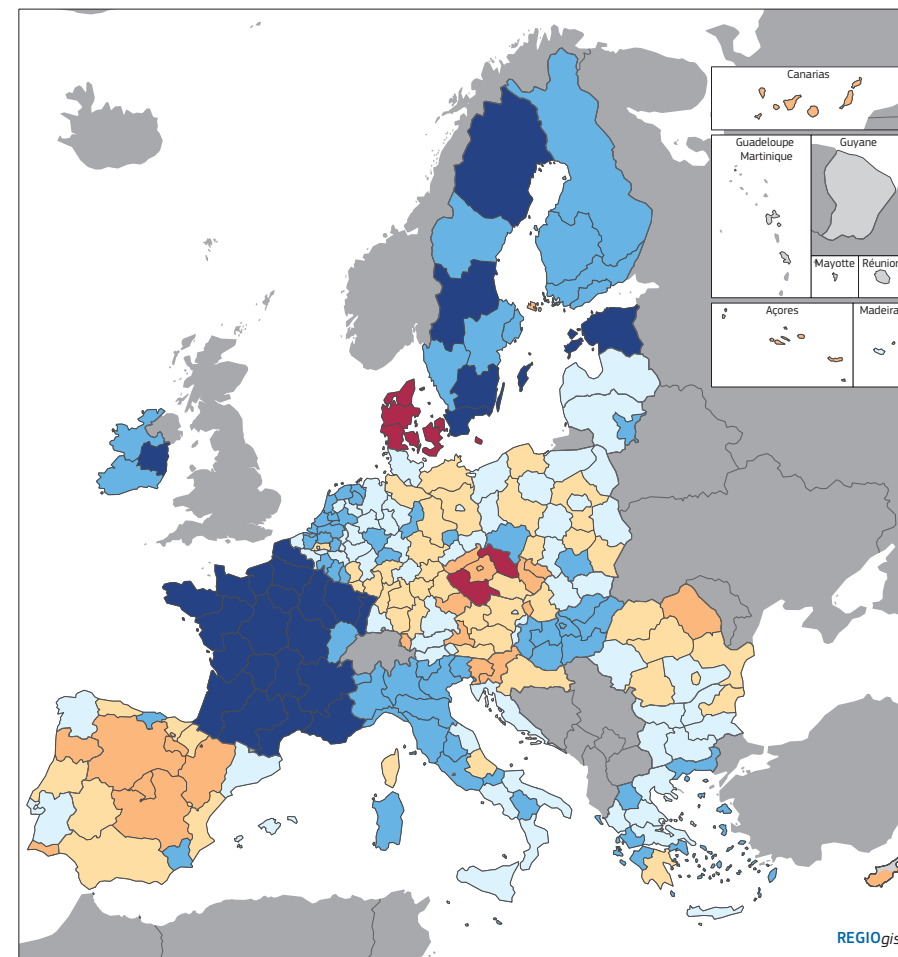
% of population aged 25–64

- < 5
- 5 – 7
- 7 – 10
- 10 – 15
- 15 – 20
- > 20

EU-27 = 9.2
Source: Eurostat (trng_ifse_04).

0 500 km

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Map 5.8 Change in the participation of adults aged 25–64 in education and training, average 2011–2013 to 2018–2020

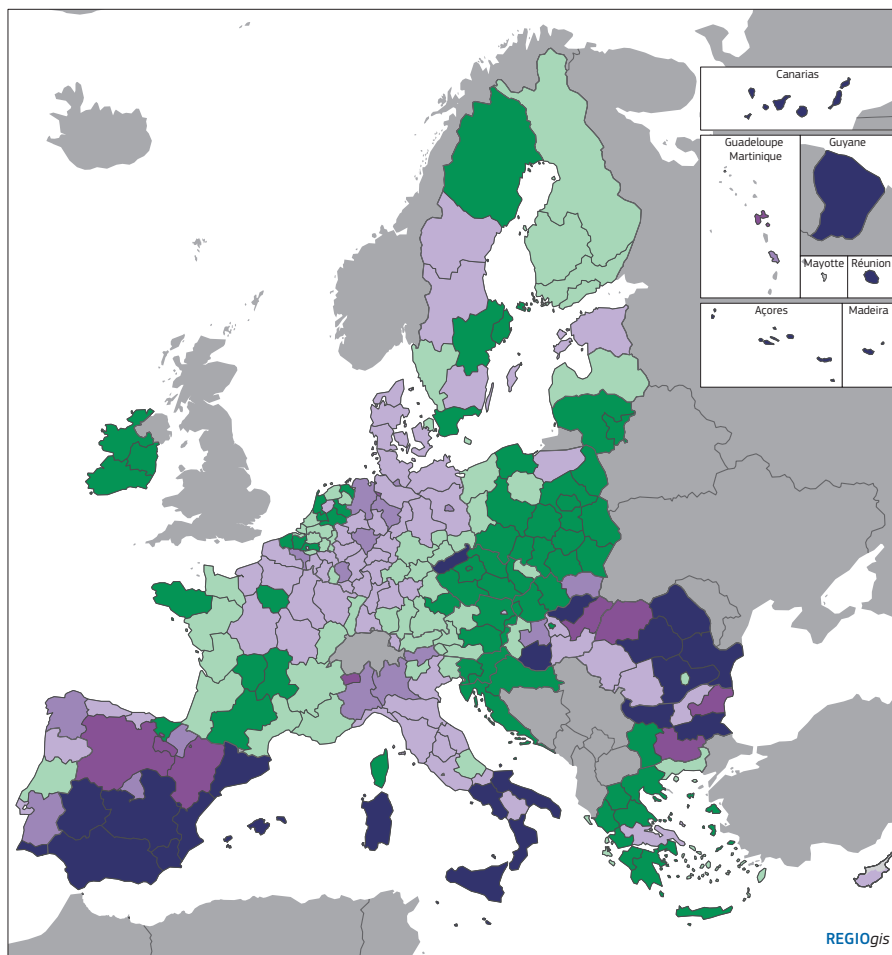
% of population aged 25–64

- < -5
- 5 – -1
- 1 – 0
- 0 – 1
- 1 – 5
- > 5
- no data

EU-27 = 1.52
Source: Eurostat (trng_ifse_04).

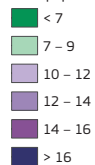
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Map 5.9 Early leavers from education or training, average 2018–2020

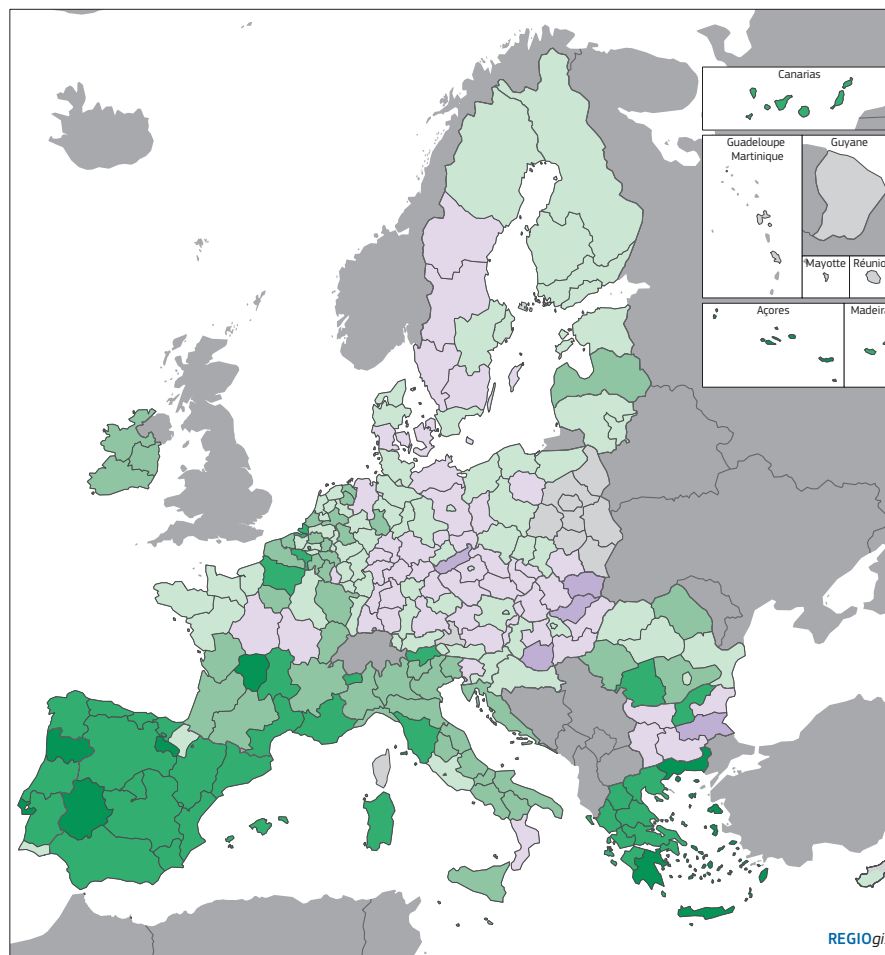
% of population aged 18–24



EU-27 = 9.9
The target is less than 9% by 2030.
Source: Eurostat (edat_ifse_16).

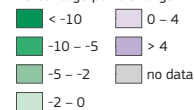
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Map 5.10 Change in share of early leavers from education and training, average 2011–2013 to 2018–2020

Percentage point change



EU-27 = -2.3
Source: Eurostat (edat_ifse_16).

0 500 km

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Table 5.3 Life-long learning and early leavers from education and training, by group of regions and degree of urbanisation, 2018–2020

	More developed regions	Transition regions	Less developed regions	EU
Participation of adults in education and training (% aged 25–64)	12.2	12.4	4.9	9.2
Early leavers from education and training (% aged 18–24),	9.4	9.5	12.1	9.9
	North-western EU	Southern EU	Eastern EU	EU (2017–2019)
Participation of adults in education and training (% aged 25–64)	14.0	8.8	4.5	9.2
Early leavers from education and training (% aged 18–24),	8.9	13.8	8.8	9.9
	Cities	Towns and suburbs	Rural areas	EU
Participation of adults in education and training (% aged 25–64), 2020	11.5	8.1	6.8	9.2
Early leavers from education and training (% aged 18–24), 2020	8.7	11.2	10.5	9.9

Source: Eurostat [tmg_lfse_04] and [edat_lfse_16], DG REGIO calculations.

Spain, Yugoiztochen in Bulgaria and the two outermost regions of Açores in Portugal and Guyane in France (Map 5.9). Nevertheless, the share fell substantially (by over 10 pp) in regions in Spain and Greece as well as in Portugal between 2011–2013 and 2018–2020 (Map 5.10)¹⁸. It increased — by more than 4 pp — in the regions of Dél-Dunántúl and Észak-Magyarország in Hungary, Yugoiztochen in Bulgaria, Východné Slovensko in Slovakia and Severozápad in Czechia.

The share also varies between cities (8.7 % in 2020), where it is already below the 2030 target, towns and suburbs (11.2 %) and rural areas (10.5 %).

In more developed and transition regions the share is only slightly above the target (around 9.5% in both in 2018–2020), whereas in less developed regions it is much further above it (12.1%), due to a high share of early leavers in regions in the south of the EU (Table 5.3). Early leavers increased in all three regional groups between 2011–2013 and 2018–2020.

2.1 Highly skilled workers live mainly in EU capital city regions

A well educated workforce is key to economic development and prosperity. University education boosts upward social mobility and improves employment prospects. The share of those aged 25–64 with tertiary education, however, varies markedly across regions (Figure 5.1). Capital city regions tend to have a more highly educated population than others¹⁹. Demand for highly skilled labour attracts those with tertiary education and makes it easier for them to find a job matching their skills. At the same time, firms are also more likely to find the skills they need in such areas. In most Member States, therefore, university graduates are concentrated in and around the capital city region.

The strategic framework for European co-operation in education and training ('ET 2020') sets a target of reducing the under-achievement of young people aged 15 in reading, maths and science to 15% or less, on the grounds that: *"underachieving in basic skills implies not being equipped to thrive in the labour market and the broader society. Therefore,*

¹⁸ A three-year average has been used because of data reliability issues at NUTS 2 level.

¹⁹ European Union and UN-HABITAT (2016).

Figure 5.1 Regional variation in shares of those aged 25-64 with tertiary education (ISCED 5-8), 2020

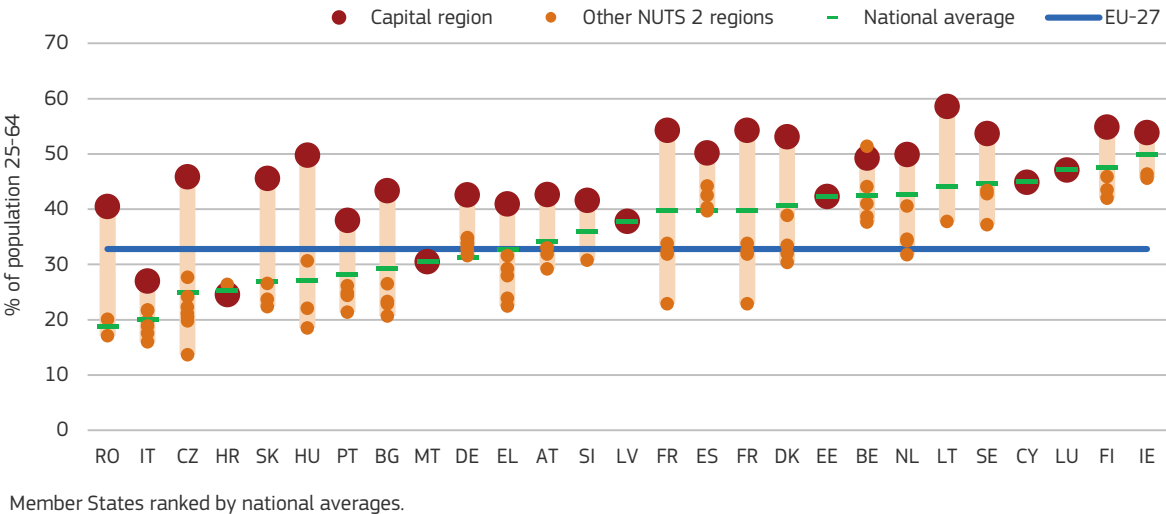
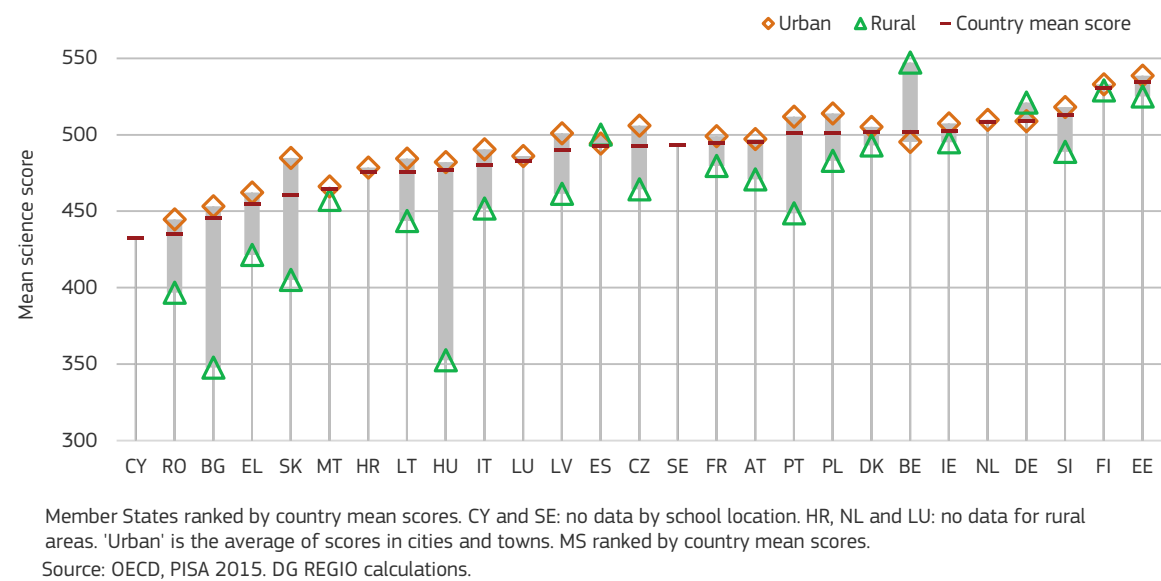


Figure 5.2 Science performance by school location, PISA 2015



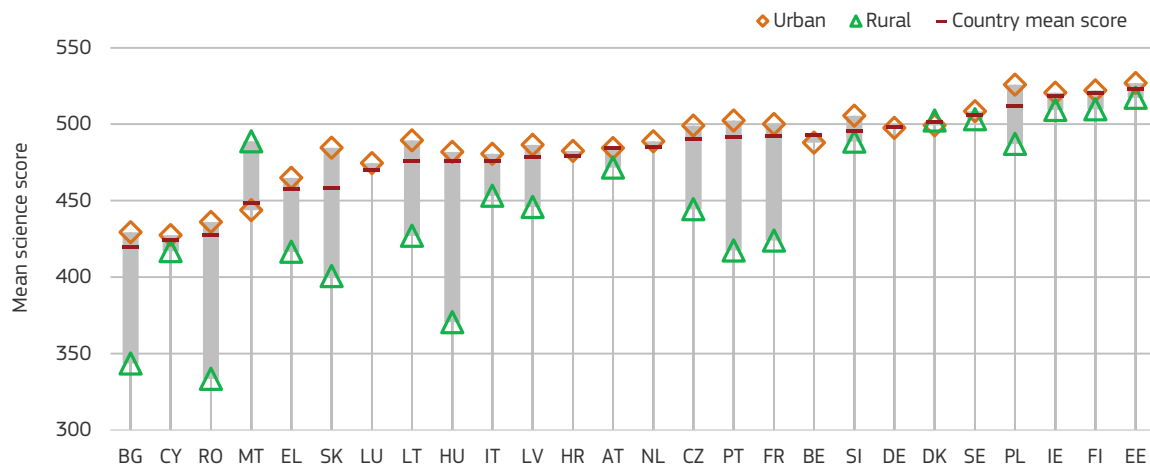
*the cost of underachievement is significant both for the individual and for society at large*²⁰.

According to the 2018 PISA survey (the OECD Programme for International Student Assessment) the majority of EU Member States have not yet reached this target, with around 22% of those tested having a low proficiency in each of maths,

reading and science (Map 5.11). The largest proportions with low proficiency (over 38% in all three disciplines) were in Bulgaria, Romania and Cyprus — while at the other end of the scale, Finland, Estonia and Poland had reached the 15% target and Denmark, Ireland and Slovenia were close to it. Achievement levels also differ between schools in rural areas and cities.

20 European Commission (2020i).

Figure 5.3 Reading performance by school location, PISA 2018



Member States ranked by country mean scores. ES: no data. BE, NL, DE, HR, and LU: no data for rural areas. 'Urban' is the average of scores in cities and towns. MS ranked by country mean scores.
Source: OECD, PISA 2018 and DG REGIO calculations.

The OECD assessed performance by school location in 2015 for science and in 2018 for reading²¹. Performance in science was higher in cities than in rural areas / villages in all Member States covered by the survey, except for Belgium (Figure 5.2)²². The urban-rural divide in this regard is particularly marked for schools in Bulgaria and Hungary. Students in city schools score up to around 30 points higher in science than those in rural schools (roughly equivalent to one year of schooling). The gap remains significant (around 16 points) after allowing for differences in the economic status of schools and students²³.

Reading performance in 2018 was higher in urban than in rural areas in all Member States covered by the survey, though there were marked differences in the size of the gap. While it was negligible in Austria, Sweden, Denmark and Ireland, it was substantial in Romania, Bulgaria, Hungary, Slovakia and Portugal (Figure 5.3).

“Rapid digitalisation over the past decade has transformed many aspects of work and daily life ... Basic digital skills should become part of the core transferable skills that any citizen should have to be able to develop personally; engage in society as an active citizen; use public services; and exercise basic rights.”²⁴

“Ensuring that everyone has the right skills for an increasingly digital world is essential for an inclusive labour market and to spur innovation, productivity and growth”²⁵. The newly agreed target at the EU level is that by 2025 at least 70% of those aged 16–74 should have at least basic digital skills. In 2019, the proportion was only 56%. Only in more developed Member States (66%) was the proportion close to the target, whereas in moderately developed (49%) and less developed Member States (42%) it was well below (Figure 5.4). In the EU, around 29% of those aged 16–74 reported having a low level of digital skills and 25% a basic level, only 31% reporting having a level higher than basic. The difference in the latter proportion between highly developed Member States and less developed was especially pronounced — 43% as against only 24%. The share of rural residents who

21 The OECD-PISA approach allocates schools to rural areas if they are in a village, hamlet or rural area with fewer than 3 000 people, to towns if they are in settlements with between 3 000 and 100 000 inhabitants; and to cities if they are in settlements with more than 100 000 people. Performance in science was not assessed by school location in 2018.

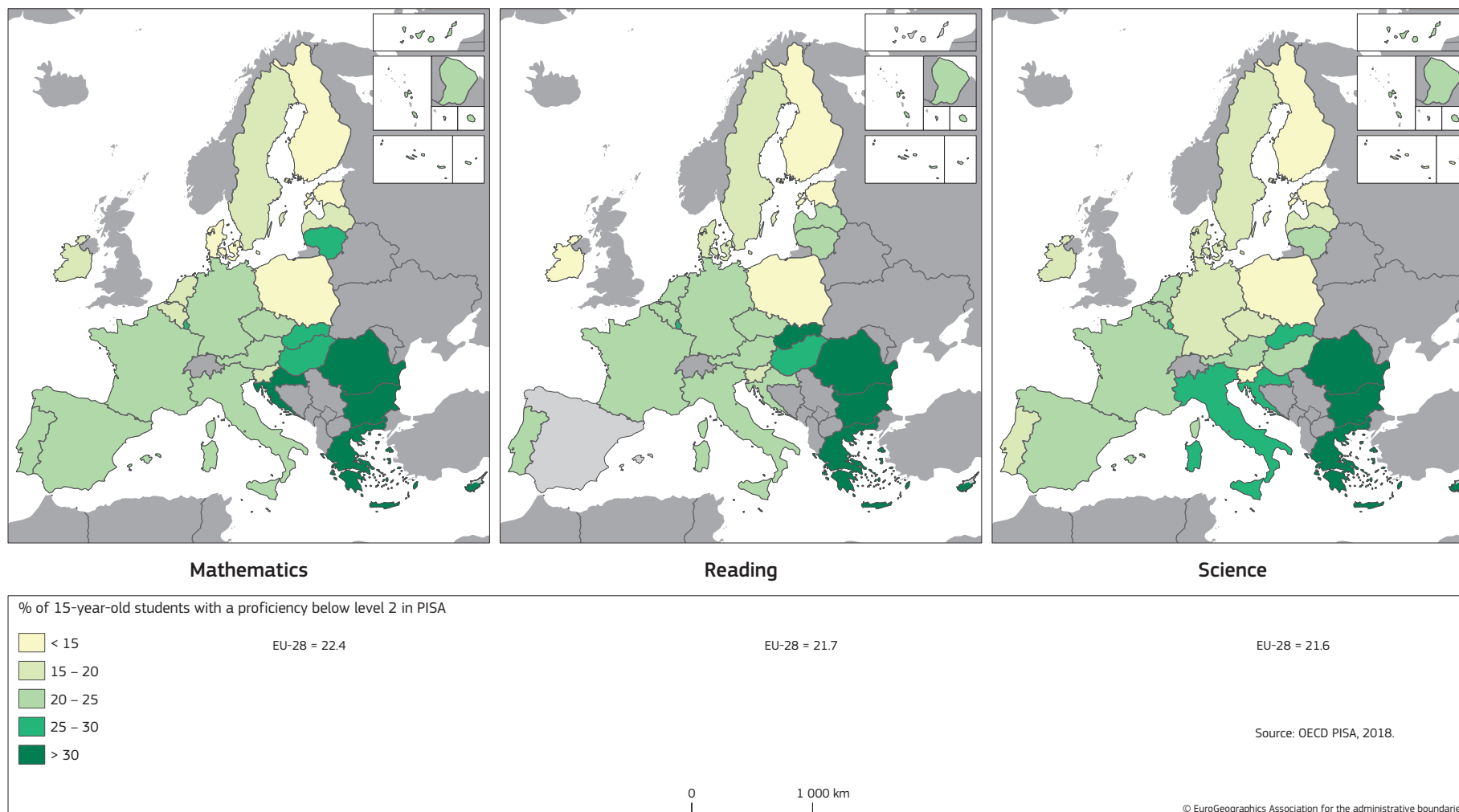
22 'Urban' is the average of scores in towns and cities.

23 For more detail, see: Echazarra and Radinger (2019).

24 European Commission (2020j), pp. 3 and 9.

25 OECD (2016).

Map 5.11 Proportion of 15-year-olds with low proficiency in mathematics, reading and science, 2018



Box 5.3 Main labour market and education indicators in EU outermost regions

The EU has nine outermost regions (grouped into eight NUTS 2 regions), where around five million people live¹. They are geographically remote from the continent in the Caribbean basin, Macaronesia and the Indian Ocean. In 2020, employment rates in all outermost regions were below the EU average, ranging from 43% in Mayotte to 71% in Região Autónoma dos Açores. Only the latter had an unem-

ployment rate below the EU average (6.1%), rates in Canarias and Mayotte being over three times higher than the average. Despite high unemployment rates, Canarias is the only outermost region where the proportion of those aged 25-64 with tertiary education is above the EU average (34.4% in 2020); in all other regions, it is well below (see Table below).

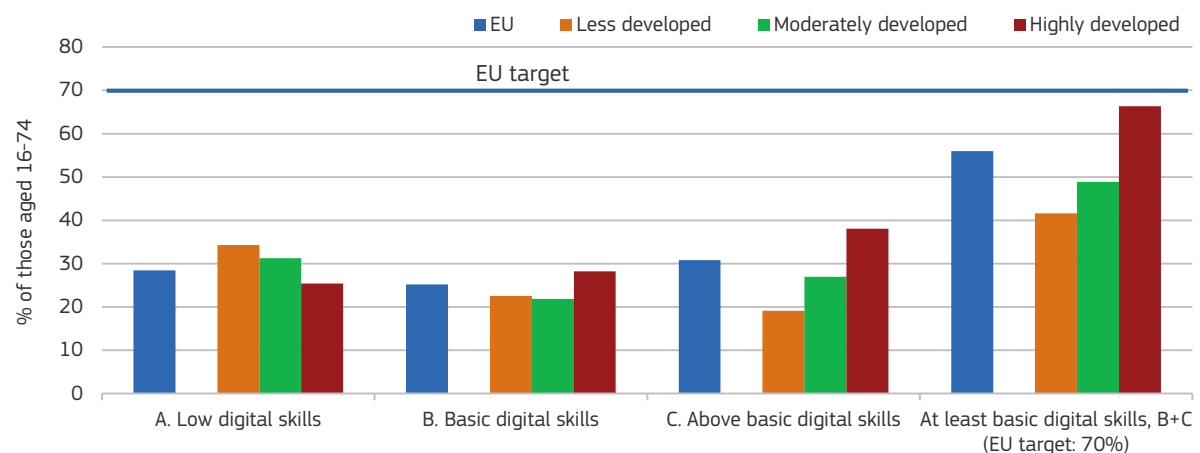
Table 5.4 Employment, unemployment and tertiary education in EU outermost regions, 2020

	Employment rate (% of pop. aged 20–64)	Unemployment rate (% of labour force)	Tertiary educated (% of pop. aged 25–64)
EU-27	72.3	7.1	32.8
Canarias	57.1	22.6	34.4
Guadeloupe	56.3	17.5	23.3
Martinique	62.4	12.4	27.1
Guyane	49.5	16.1	18.7
La Réunion	54.0	17.4	22.9
Mayotte (2019)	43.3	30.1	n.a.
Região Autónoma dos Açores	71.1	6.1	15.8
Região Autónoma da Madeira	70.9	8.1	22.9

Employment and unemployment rates for Mayotte are for 2019 for reliability issues.

- 1 The nine outermost regions (Saint-Martin is part of the NUTS 2 region of Guadeloupe) are governed by the provisions of the Treaties and form an integral part of the Union.

Figure 5.4 People's levels of digital skills by Member State level of economic development, 2019



For Member State grouping by level of development, see Lexicon; latest year available: 2019.

Box 5.4 The Skills-OVATE tool

Better skills intelligence can channel migration towards the regions and occupations experiencing skill shortages. The EU aims to make skills intelligence more accessible by publishing online real-time information on skills demand at regional level. The Skills-OVATE tool¹, developed with the European Centre for the Development of Vocational Training (Cedefop), provides detailed information on jobs and skills published by employers in online job adverts, and indicates the intensity of demand for different occupations in all EU countries, broken down by sector and NUTS 2 region. As such, it potentially provides a way of tackling regional skills disparities on the labour market. The tool, which has recently been improved, is to be included in the Europass portal.

EU support for strategic national upskilling action (Action 3 of the 2020 European Skills agenda)

The Commission plans to help Member States to prepare holistic, all-of-government national skills strategies, building on the work already undertaken with the OECD in 11 Member States as well as on existing national strategies. It will help to establish or review strategies where needed and to monitor progress in implementing them. It will encourage the rejection of gender and other discriminatory stereotypes and put a particular emphasis on the

importance of transversal and entrepreneurial skills, as well as the skills needed for digital and green transitions, such as those acquired through science, technology, engineering and mathematics (STEM) studies.

The Commission will join forces with the European Network of Public Employment Services to develop peer learning events to spotlight skills needed in the labour market (particularly for the unemployed and those in short-time work) and to strengthen skills intelligence and skill-matching in the light of the long-term challenges stemming from the green and digital transitions. Activities will focus on increasing the provision of guidance services, including for those in employment, particularly vulnerable groups, and on closing skills gaps, notably digital. The opportunities offered by cross-border co-operation will also be explored.

Through the recently adopted Pact on migration and asylum, the Commission will aim to improve legal pathways to the EU, including by relaunching the negotiations on the Blue Card Directive, to attract highly skilled workers. The Pact will provide credible offers of legal migration places as part of new talent partnerships with third countries, and explore new means of legal migration.

1 Skills online vacancy analysis tool for Europe. For more details: <https://www.cedefop.europa.eu/en/data-visualisations/skills-online-vacancies>.

had at least basic digital skills was 14 pp lower than of city residents.

These differences are a matter of concern. As the demand for digital skills and an educated workforce increases, areas with poor performance risk missing out on being able to take advantage of new economic opportunities and may limit the uptake of e-services. This also depends on the availability and affordability of high-speed infrastructure.

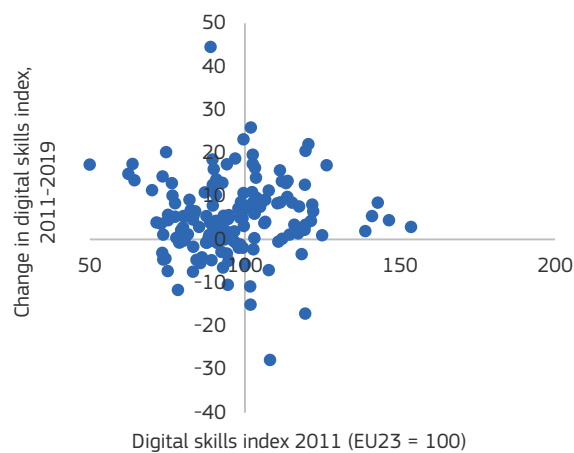
Average digital skills intensity²⁶ of occupations in the labour market varies markedly between EU

Member States. Over the past decade signs of convergence can be seen at Member State level, but this is not so at regional level (Figure 5.5). Across EU regions, there is no evidence over the period 2011–2019 of a faster growth in digital skills in regions with low initial levels (in 2011)²⁷.

26 The digital skills intensity indicator measures the average number of digital skills used by workers based on the international standard classification of occupations (ISCO). For more details on the indicator, see Barslund (2021, forthcoming).

27 Source: European Commission (2021c), Chapter 3.

Figure 5.5 Change in digital skills in NUTS 2 regions, 2011–2019



Source: Barslund (2021, forthcoming).

3. Poverty and social exclusion have declined in the EU, but remain high in the southern EU and in rural areas in the eastern EU

In 2019, around 91 million people in the EU (17.9 million of them were children aged 0–17) were at risk of poverty or social exclusion (AROPE — see Box 5.5), this amounted to 20% of the total population. The EU has a target of reducing the number concerned by at least 15 million by 2030²⁸.

Having peaked at 24.9% in 2012, the proportion of people identified as AROPE fell over the following seven years, mainly because of a sharp decline in severe material deprivation (from 10.2% in 2012 to 5.4% in 2019). Marked variations exist between EU regions (Map 5.12), with a large share of the

²⁸ According to the headline target set in the European Pillar of Social Rights Action Plan (European Commission, 2021), welcomed by EU leaders at the Porto Social summit and the European Council.

Box 5.5 What it means to be at risk of poverty or social exclusion

People who are AROPE in the EU are identified through a combination of three indicators:

- **at risk of poverty** (or relative monetary poverty), defined as living in a household with equivalised¹ disposable income in the previous year below 60% of the national median;
- **severe material deprivation**, defined as being unable to afford any four or more of nine items included in the EU Statistics on Income and Living Conditions (EU-SILC) survey²; and
- **living in a household with very low work intensity**, defined as living in a household where those aged 18–59 worked for only 20% or less of the time they could potentially have worked during the previous year if they had worked full time throughout the year.

People identified as AROPE are those recorded under any one of these three indicators.

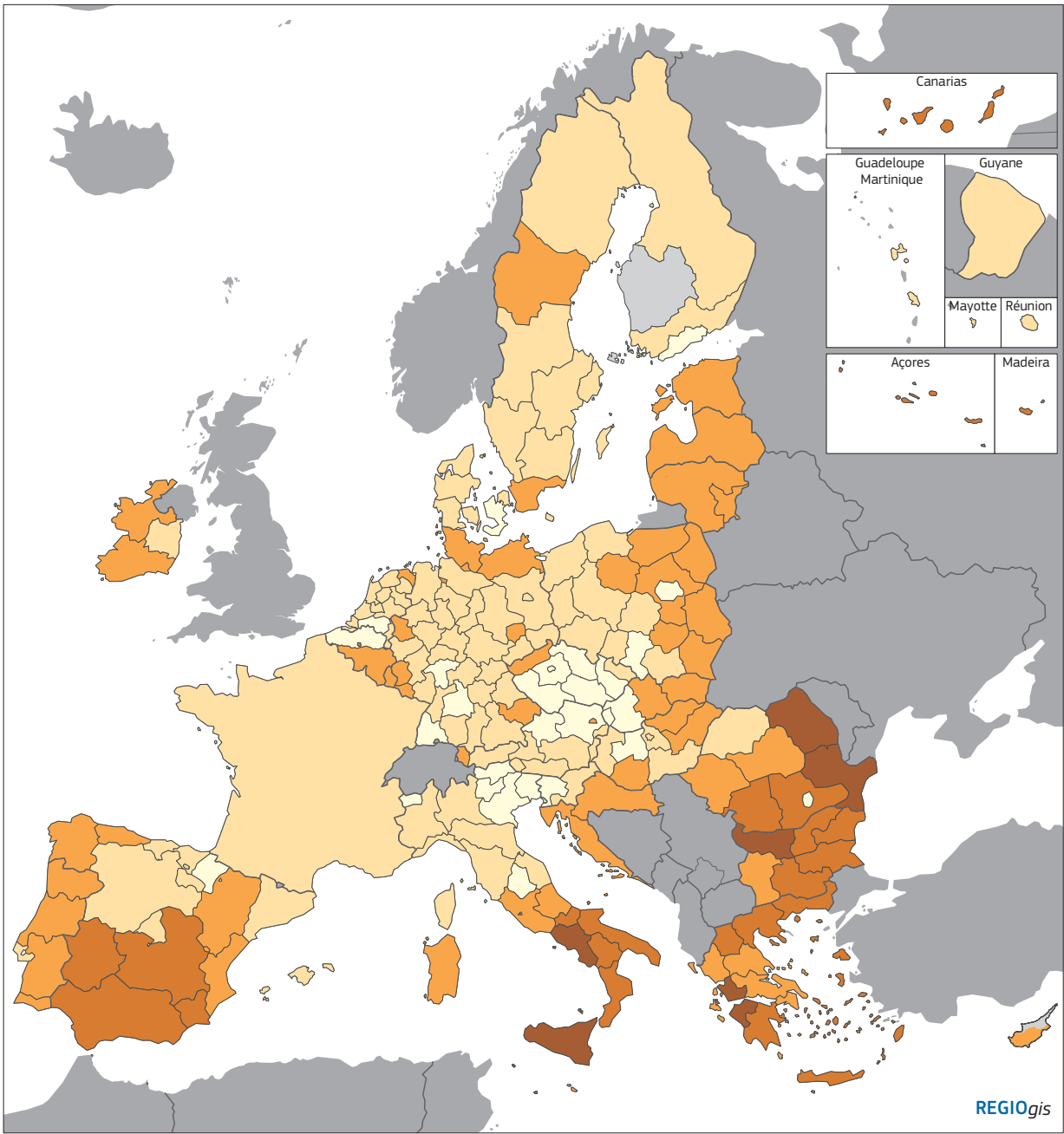
EU Statistics on Income and Living Conditions (EU-SILC)

The EU-SILC are the main source of data in the EU on poverty and social exclusion. The survey from which the statistics derive covers a representative sample of households in all Member States. The survey is carried out each year and the data on income, and therefore on the risk of poverty and low work intensity, relate to the year preceding the survey (i.e. for the 2019 survey, the risk of poverty and low work intensity relate to 2018), whereas material deprivation relates to the year of the survey (i.e. 2019).

See: <https://ec.europa.eu/eurostat/web/microdata/european-union-statistics-on-income-and-living-conditions>.

¹ *Equivalised* means that income is adjusted for differences in the size and composition of households.

² The nine items are: a colour TV; a washing machine; a telephone; a car; a meal of meat or fish or the equivalent every other day; a week's annual holiday away from home; an ability to avoid being in arrears on mortgage payments, rent, utility bills, hire purchase instalments or loans; an ability to make ends meet; and an ability to keep the house adequately warm.



Map 5.12 Population at risk of poverty or social exclusion, 2019

- % of total population
- < 14
 - 14 – 20
 - 20 – 30
 - 30 – 40
 - > 40
 - no data

EU-27 = 20.9
AT = 2018
Source: Eurostat (ilc_peps11).

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Map 5.13 Indicators of poverty and social exclusion, 2019

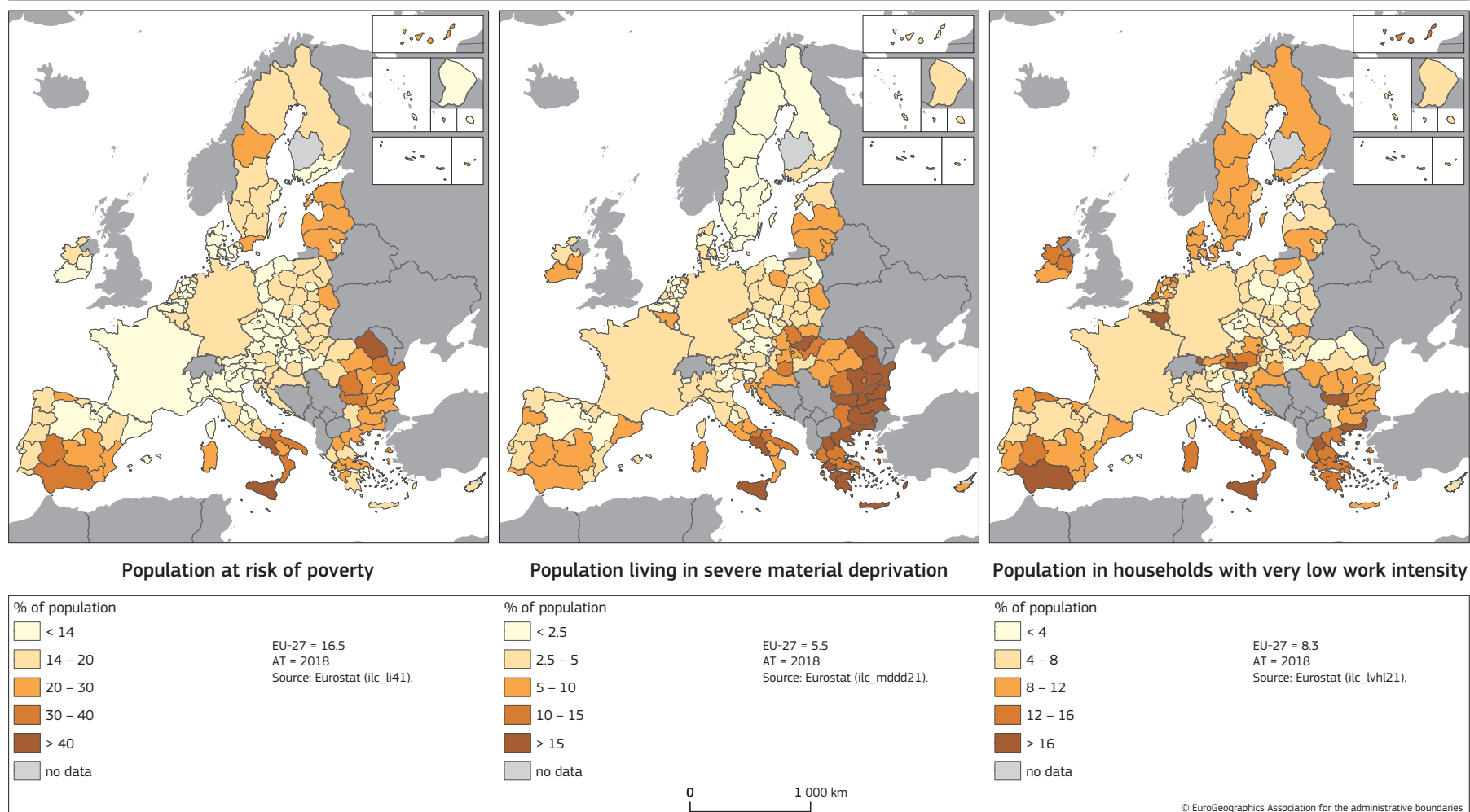
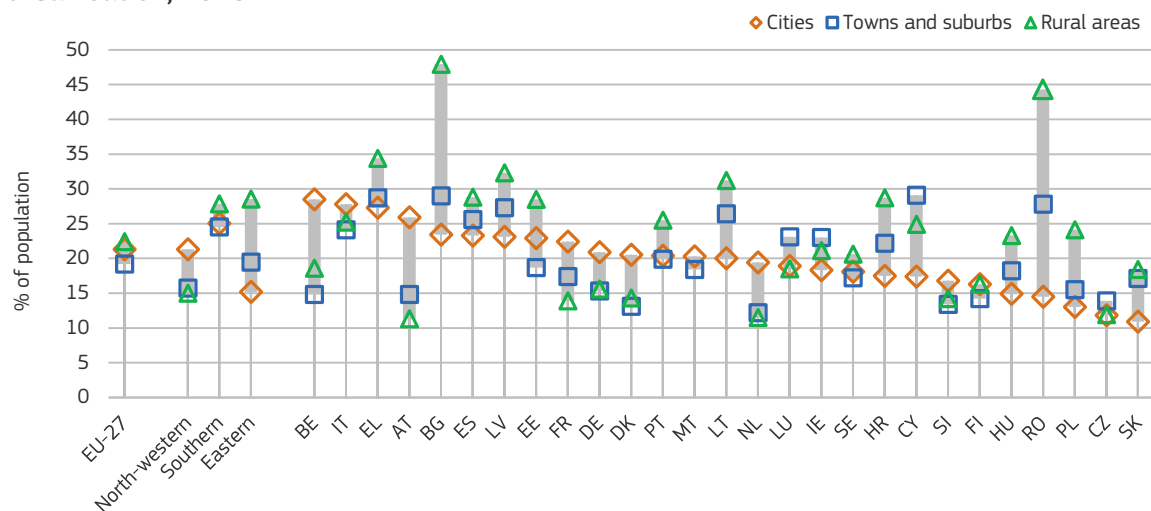
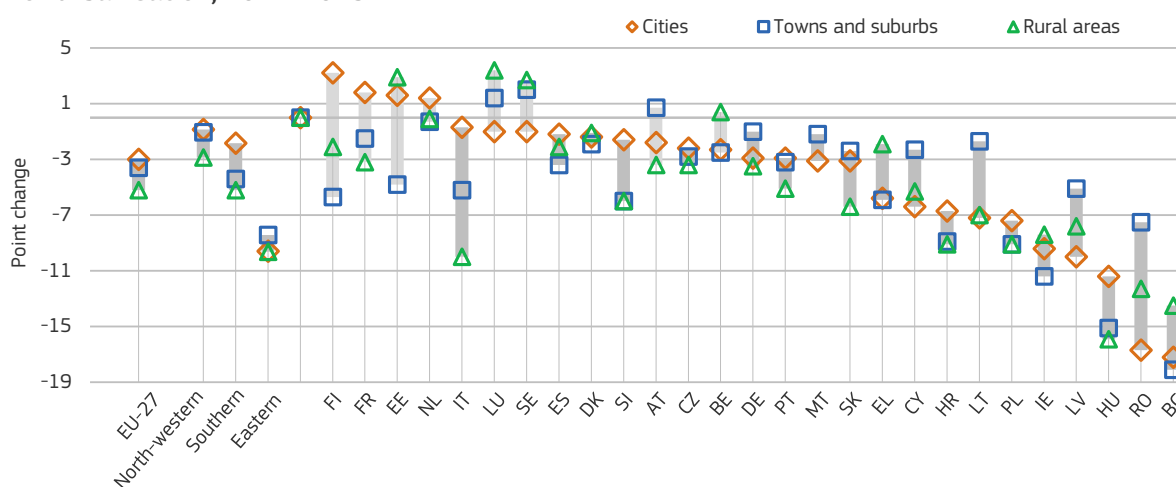


Figure 5.6 Proportion of people at risk of poverty or social exclusion by degree of urbanisation, 2019**Figure 5.7 Change in the proportion of people at risk of poverty or social exclusion by degree of urbanisation, 2012-2019**

population at risk (above 30%) in a number of regions in Spain, Italy, Greece, Romania and Bulgaria.

In the EU, the AROPE rate was slightly higher in rural areas (22.4%) in 2019 than in cities (21.3%) and towns and suburbs (19.2%), though it declined in all three areas between 2012 and 2019, the

biggest reduction being in rural areas (Figure 5.6 and Figure 5.7)²⁹.

In the eastern EU, poverty and social exclusion was an issue mainly in rural areas, where in 2019 28.5% of people, over 1 in 4, were at risk — well above the rate in towns and suburbs (19.5%) and

²⁹ In the period between 2012 and 2019 the AROPE rate fell by 3.0 pp in cities, 3.6 pp in towns and suburbs, and 5.2 pp in rural areas (source: Eurostat).

Box 5.6 The European Pillar of Social Rights and its Action Plan¹

The European Pillar of Social Rights was proclaimed by the European Parliament, the Council and the European Commission at the Social summit for fair jobs and growth in Gothenburg on 17 November 2017. The President-elect of the European Commission, Ursula von der Leyen, committed to the Pillar in her speech before the European Parliament in Strasbourg in July 2019 and in her political guidelines for the mandate of the next European Commission, announcing further action to implement the associated principles and rights.

The Pillar sets out a number of key principles and rights to support fair and well-functioning labour markets and welfare systems. It supports the convergence towards better working and living conditions among participating Member States. Although it is primarily conceived for the euro area, it is applicable to all Member States wishing to participate. The principles are grouped into three broad categories:

- **equal opportunities and access to the labour market**, which includes equal access to education and training, gender equality and active support for employment;
- **fair working conditions**, which includes the right to secure and adaptable employment, fair wages, information about working conditions and protection in case of dismissal, consultation with social partners, support in achieving a suitable work-life balance, and a healthy and safe working environment; and
- **social protection and inclusion**, which includes the right to childcare and support for children's education, unemployment benefits and access to activation measures, minimum-income support, old-age pensions, af-

fordable healthcare, support for people with disabilities, affordable long-term care, housing and access to essential services.

The pillar reaffirms rights already present in the EU but complements them by taking account of new realities. As such, it does not affect principles and rights already contained in the binding provisions of EU legislation. By putting together rights and principles set at different times, in different ways and in different forms, it aims to make them more visible, understandable and explicit.

On 4 March 2021, the European Commission adopted the European Pillar of Social Rights Action Plan, and proposed three headline targets for the EU to reach by 2030:

1. at least 78% of the population aged 20-64 to be in employment;
2. at least 60% of all adults aged 25-64 to participate in training every year; and
3. a reduction of at least 15 million in the number of people identified as AROPE.

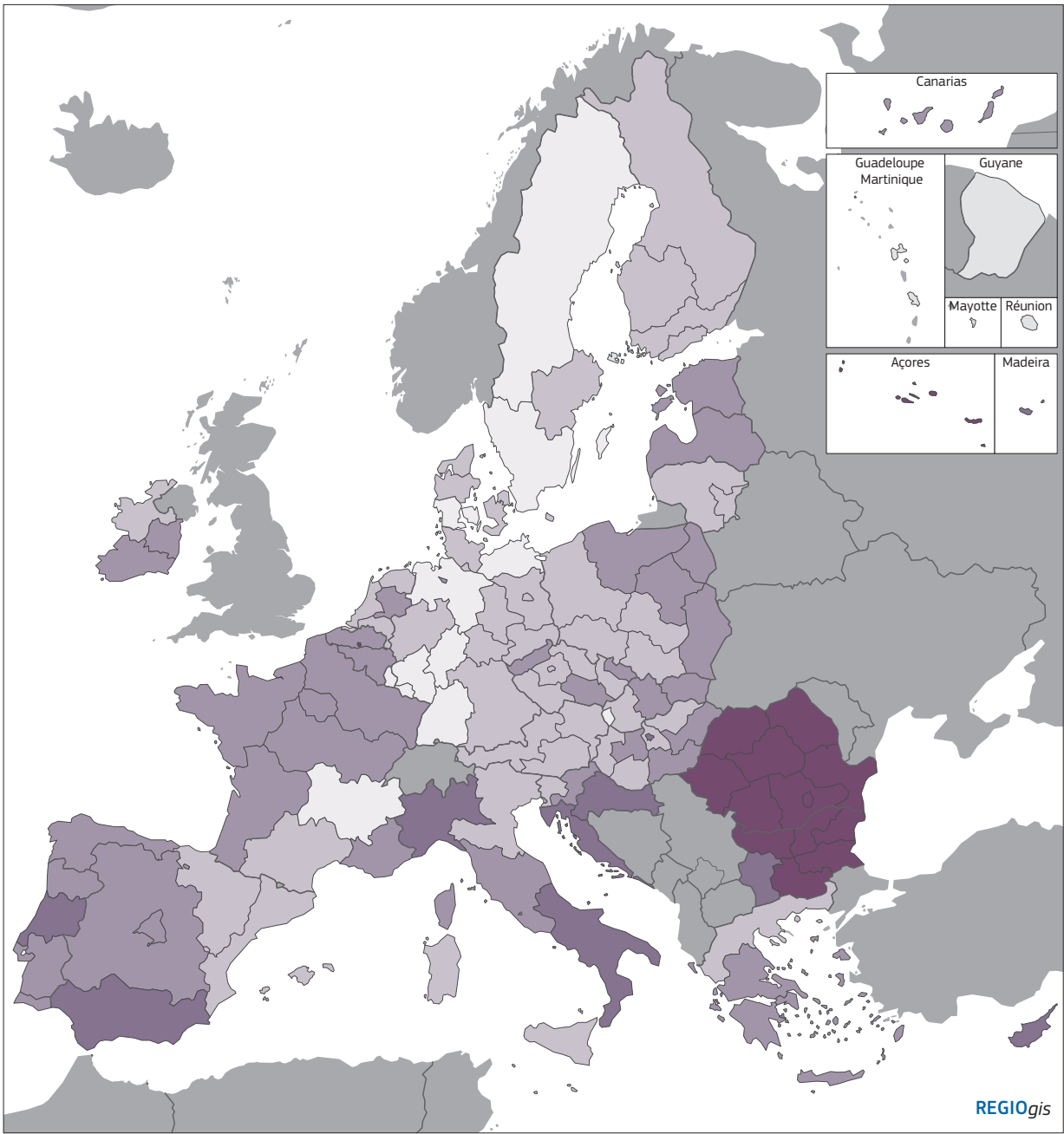
These targets have been welcomed by EU leaders at the Porto social summit in May 2021 and at the European Council of June 2021. Member States have been invited to set national targets for each of the indicators. Progress towards both the EU-level and national targets will be monitored through the European Semester.

The Action Plan also includes a proposal for a revised Social Scoreboard, to better track progress towards the Pillar principles in a more comprehensive manner. The yearly Joint Employment Report provides regional breakdowns (at NUTS 2 level) of the Social Scoreboard headline indicators for which such information is available.

¹ European Union (2017b) and European Commission (2021c).

in cities (15.2%). In rural areas in Bulgaria and Romania, the rate was much higher, at over 40%. Between 2012 and 2019 the rate fell by almost 10 pp in cities and rural areas, and by over 8 pp in towns and suburbs.

In the southern of the EU, poverty and social exclusion was spread more evenly and remained at a high level: in 2019 around 1 in 4 people were at risk in all three types of areas. By contrast, in the north-west of the EU, the AROPE rate in cit-



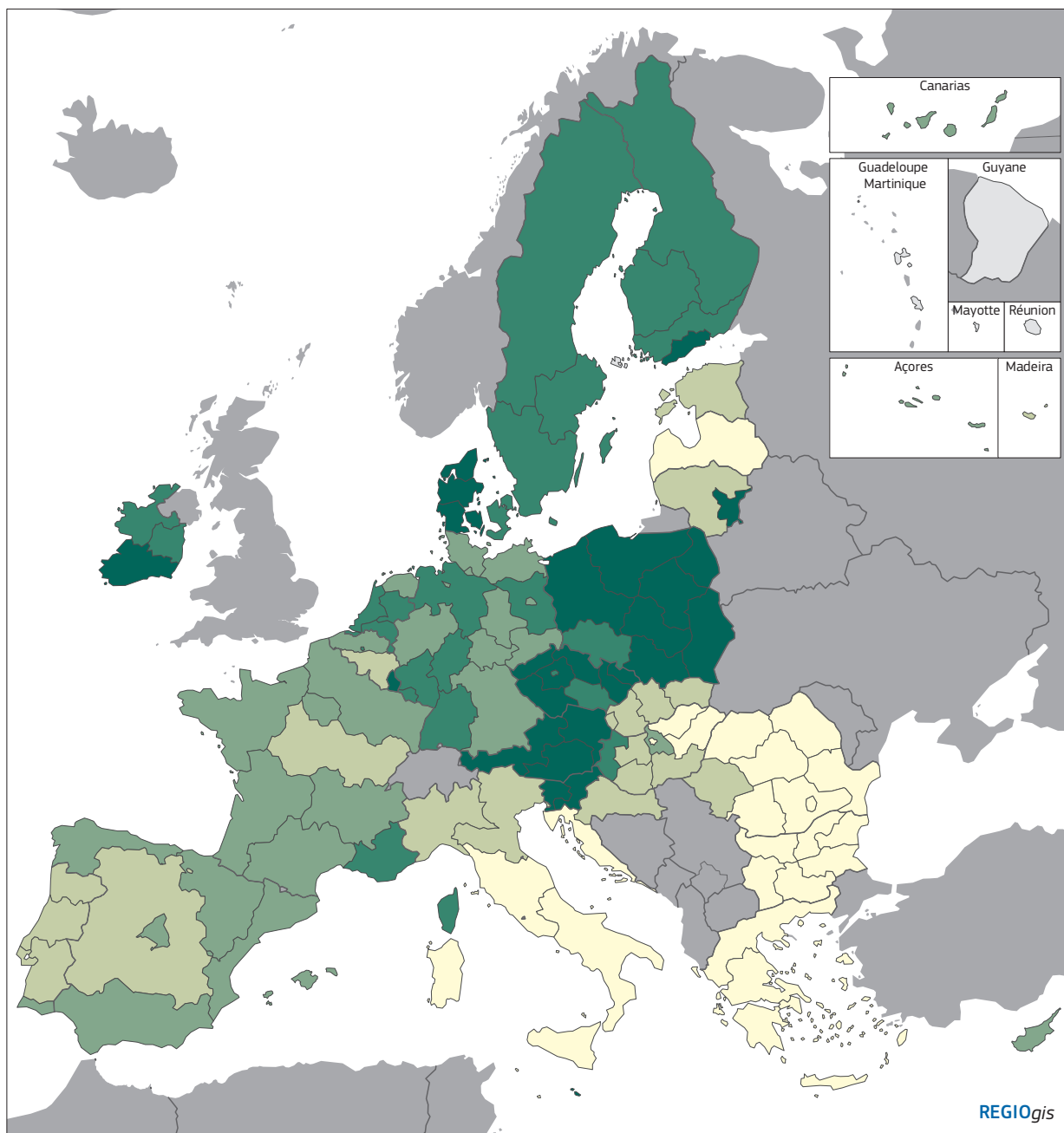
Map 5.14 Food poverty, 2019

- % reporting being unable to afford to buy food (population aged 15+)
- <= 5.0
 - 5.1 – 10.0
 - 10.1 – 15.0
 - 15.1 – 20.0
 - > 20.0
 - no data

Percentages are based on all respondents excluding don't know and refused to answer.
Question: Have there been times in the past 12 months when you did not have enough money to buy food that you or your family needed?
Source: Gallup World Poll (WP40).

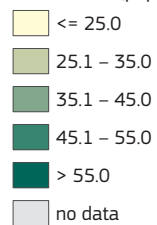
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Map 5.15 Satisfaction with efforts to deal with the poor, 2019

% Satisfied (population aged 15+)

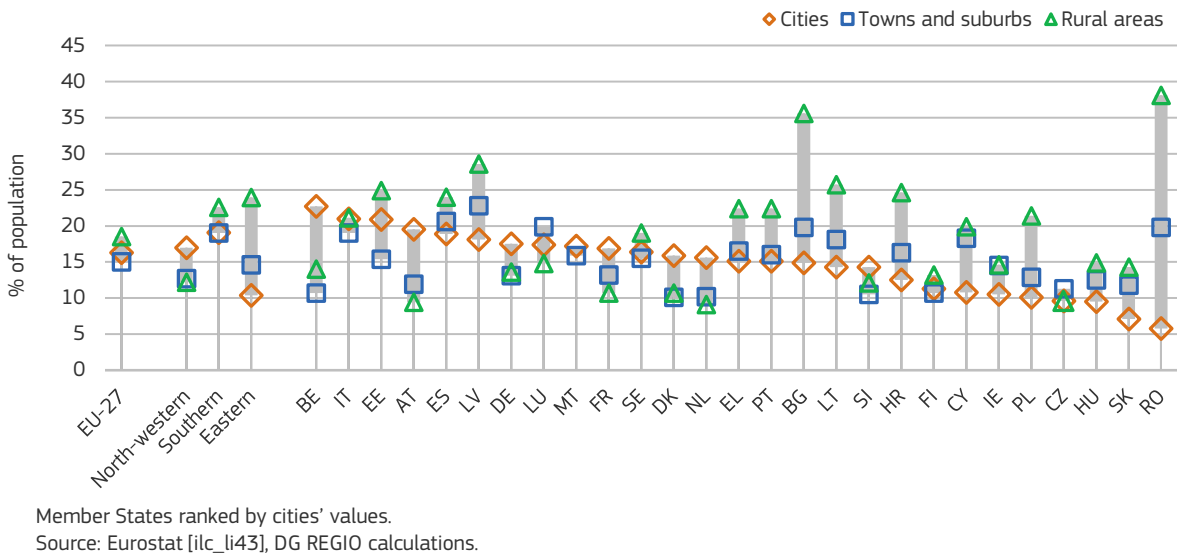


Percentages are based on all respondents excluding don't know and refused to answer.
Question: Are you satisfied or dissatisfied with efforts to deal with the poor?
Source: Gallup World Poll (WP131).

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Figure 5.8 The at-risk-of-poverty rate by degree of urbanisation, 2019



ies (21.3%) was higher than in towns and suburbs (15.7%) and rural areas (15%).

There is some difference in the incidence of the three indicators making up the AROPE measure. Across the EU, most of the people counted as AROPE in 2019 — 16.5% of the population in the EU — were at risk of poverty, a measure of relative monetary poverty.

A larger proportion of households were at risk of poverty in rural areas (18.5%) in 2019 than in cities (16.3%) or towns and suburbs (15.0%) (Figure 5.8). At the same time, rural areas had a smaller proportion of households with very low work intensity, which suggests that their higher risk of poverty was due to lower incomes rather than lower employment rates. Between 2012 and 2019, a large number of Member States experi-

Figure 5.9 Change in the at-risk-of-poverty rate by degree of urbanisation, 2012-2019

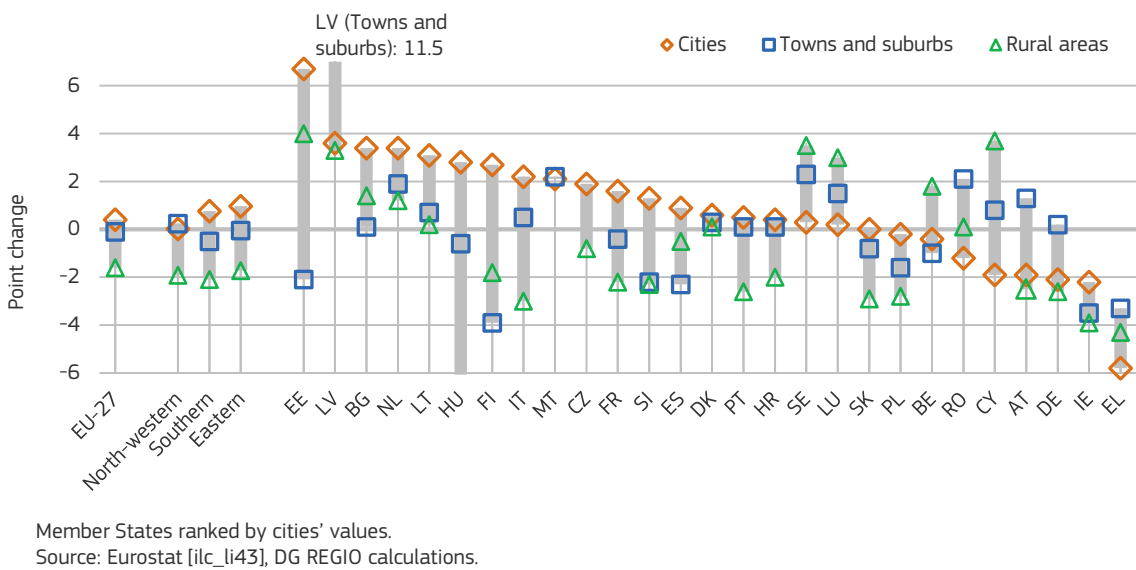


Figure 5.10 Proportion of people living in households with very low work intensity by degree of urbanisation, 2019

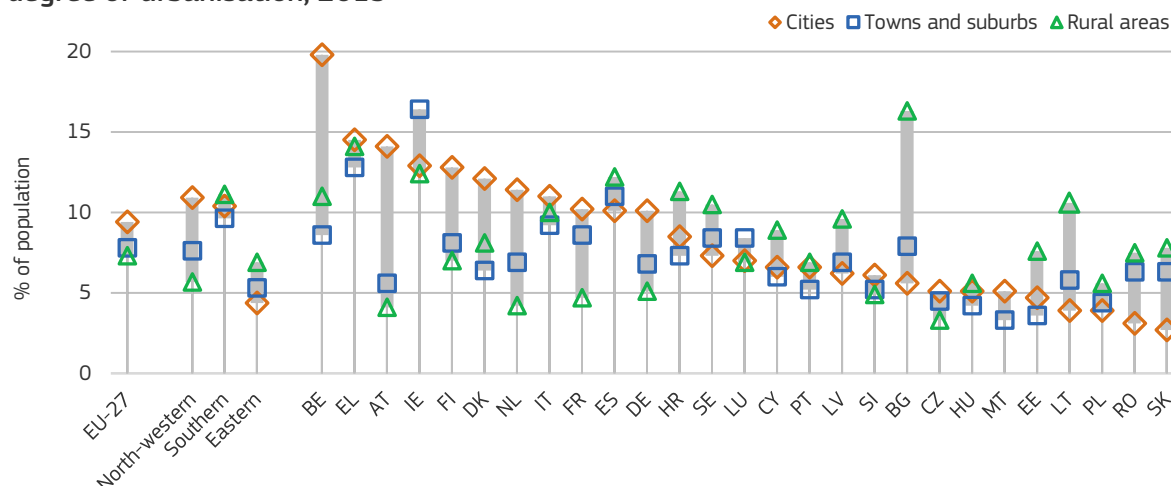
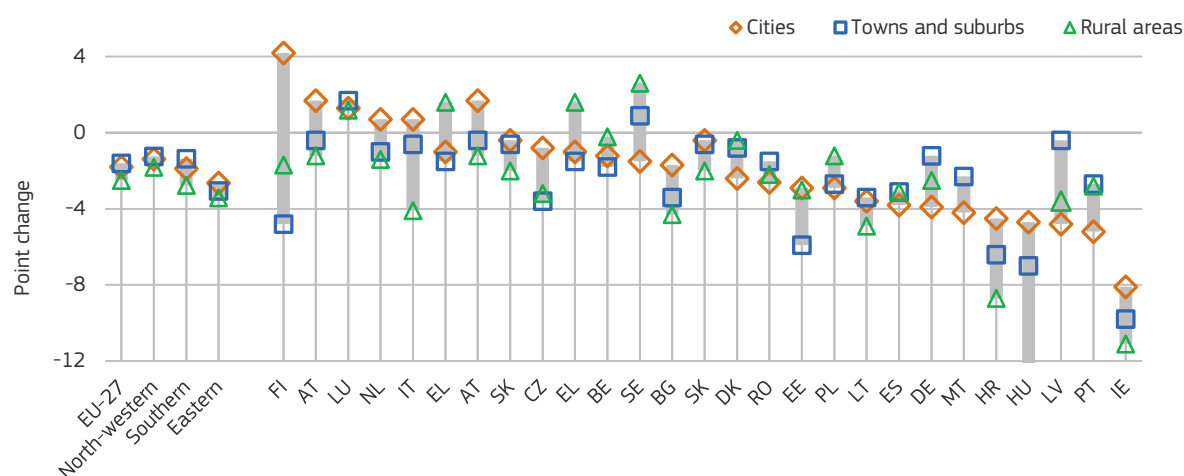


Figure 5.11 Change in proportion of people living in households with very low work intensity by degree of urbanisation, 2012-2019



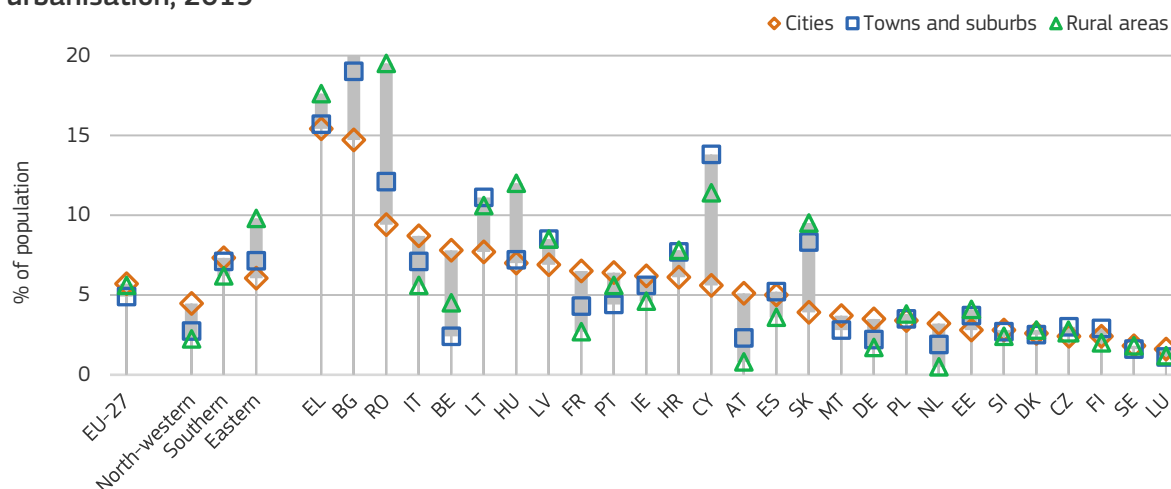
enced an increase in the at-risk-of-poverty rate among people living in cities (Figure 5.9).

In rural areas in Romania and Bulgaria the risk of poverty was particularly high, with rates of 35% and 38% respectively. Not surprisingly, the largest proportions of people (above 20%) reporting being unable to afford to buy food for themselves or their family members in the previous 12 months were all in these regions, the proportions being

largest of all in Sud-Est (37%) and Sud-Muntenia (35%) in Romania (Map 5.14)³⁰.

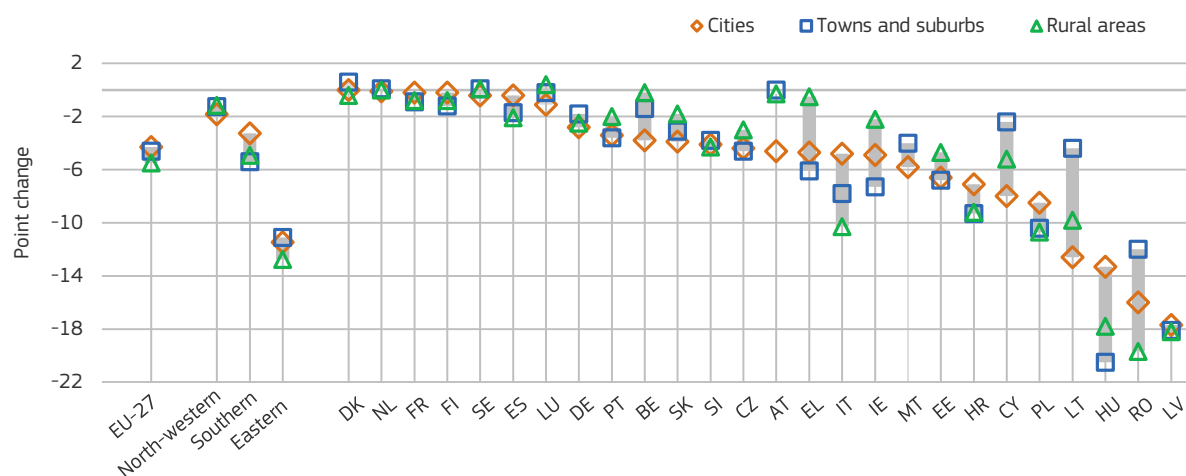
People's satisfaction with their government's efforts to tackle poverty also varies across regions (Map 5.15), ranging from 77% being satisfied in Malta in 2019 to only 7% in Severoiztochen in

³⁰ Source: Gallup World Poll Survey for 2019.

Figure 5.12 Proportion of people living in severe material deprivation by degree of urbanisation, 2019

Member States ranked by cities' values.

Source: Eurostat [ilc_mddd23], DG REGIO calculations.

Figure 5.13 Change in proportion of people living in severe material deprivation by degree of urbanisation, 2012-2019

Member States ranked by cities' values.

Source: Eurostat [ilc_mddd23], DG REGIO calculations.

Bulgaria³¹. Fewer than a quarter of people were satisfied with government efforts in this regard in the NUTS 1 regions of Centro and Sud in Italy, in Greece, Romania, Bulgaria and Latvia, and in a number of regions in Croatia and Hungary.

In contrast to the risk of poverty, the proportion of people living in low-work-intensity households

in 2019 was larger in cities (9.4%) than in towns and suburbs (7.8%) and rural areas (7.3%) across the EU, a pattern largely driven by the situation in cities in the north-west (10.9%) and south (10.4%) of the EU (Figure 5.10). In Belgium, 1 person in 5 (20%) in cities lived in a low-work-intensity household. In rural areas, the largest proportions living in such households were in Bulgaria (16.3% in 2019). Between 2012 and 2019, however, the proportion

31 Ibid.

declined in rural areas in both the southern and eastern EU (by around 3 pp) (Figure 5.11).

Severe material deprivation (not being able to afford any four or more of nine basic items included in the EU-SILC survey; see Box 5.5) was highest in areas in the southern and eastern, especially in rural areas in the eastern EU, where around 10% of people were severely deprived in 2019 (Figure 5.12). Nevertheless, in areas in the eastern EU, between 2012 and 2019 the proportion fell by 13 pp in rural areas and 11 pp in cities and towns and suburbs (Figure 5.13).

In the north-western EU, severe material deprivation was higher in cities than rural areas (affecting 4.5% of the population in 2019 as against 2.2% in rural areas), though the difference narrowed slightly between 2012 and 2019 (the proportion affected declining by 1.8 pp in cities and 1.1 pp in rural areas). Although many cities in the north-western EU have high levels of GDP per head, many of them also had high levels of inequality, as reflected in higher at-risk-of-poverty rates, higher concentrations of deprivation, and more households with low work intensity than in other areas.

4. Non-EU migrants encounter more challenges in labour markets and face higher risks of poverty

4.1 Migrants are mainly concentrated in cities in the north-western EU

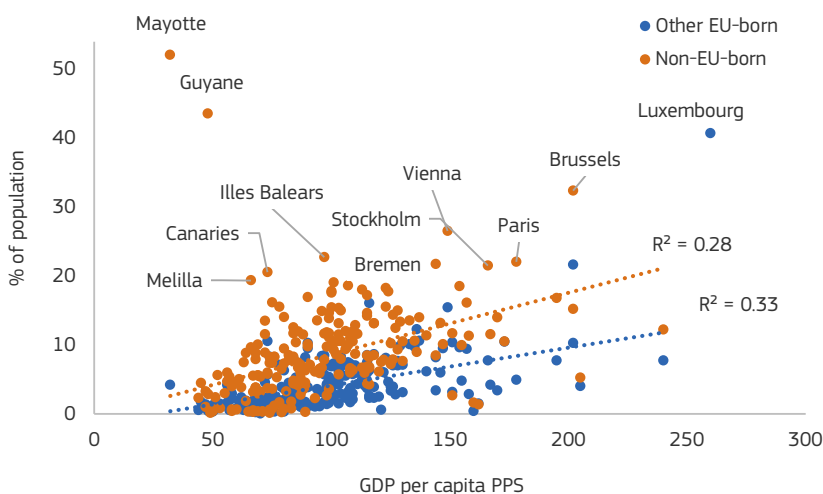
Within the EU, the share of non-EU migrants (defined as the population born outside the EU) is more than double the share of EU migrants (those born in a different EU country) (9% vs 4% in 2020). Accordingly, most Member States have more non-EU-born migrants than EU-born migrants (Map 5.16 and Map 5.17). Luxembourg is a clear exception, with 40% of EU-born as against 13% born outside the EU. Overall, there are few non-EU migrants in the eastern EU — except in the Baltic States, where a significant share of the population was born in Russia.

Capital city regions and regions with a large city in the north-western and southern EU tend to have larger numbers of migrants, especially from outside the EU. Regions, where non-EU migrants make up 20% or more of the population, include the outermost regions of Mayotte, Guyane, Canarias, the Illes Balears and the capital city regions of Bruxelles/Brussel, Wien, Paris and Stockholm. The

share of EU migrants is over 10% in some regions of Belgium, Germany, Luxembourg, Austria, Ireland and Finland. There are few people from other EU countries that have moved to eastern regions.

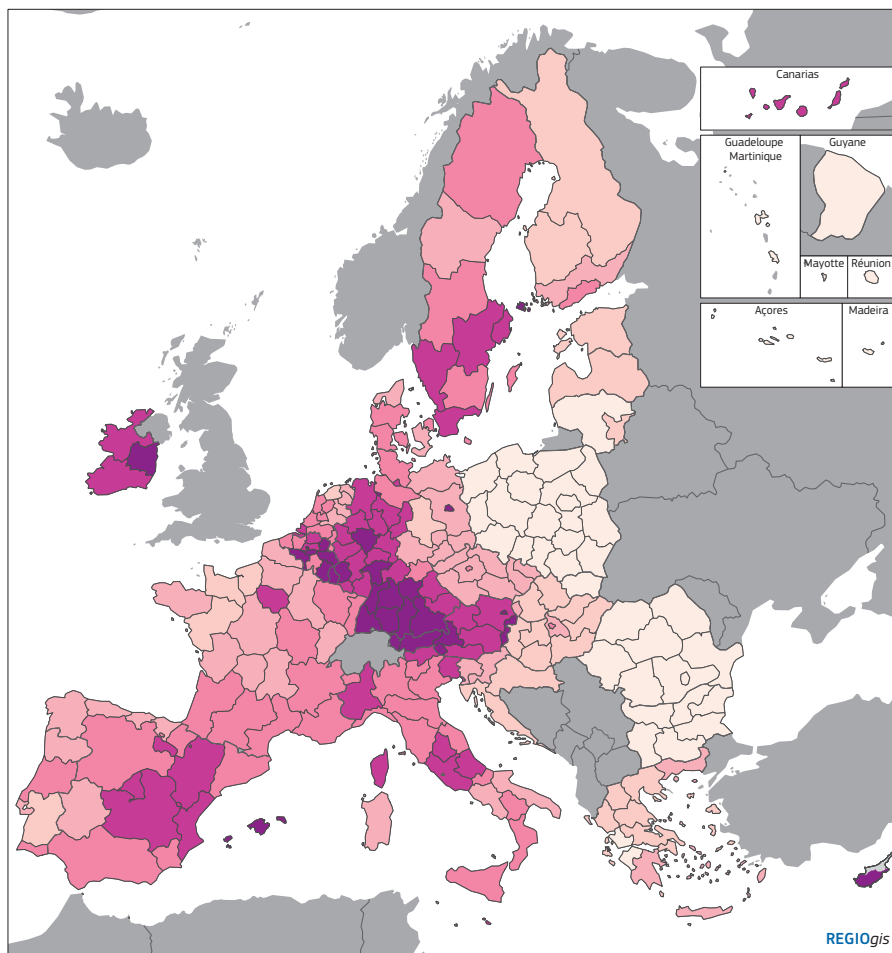
The share of migrants tends to be larger in regions with high levels of GDP, good job opportunities and a history of migration³². The correlation between GDP per head and the share of non-EU

Figure 5.14 Share of migrants relative to GDP per head in NUTS 2 regions in the EU, 2020



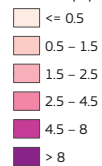
BG, PL and RO: no regional data.

Source: Eurostat [lfst_r_lfsd2pwc] and [nama_10r_2gdp], DG REGIO calculations.



Map 5.16 People born in another EU country, 2020

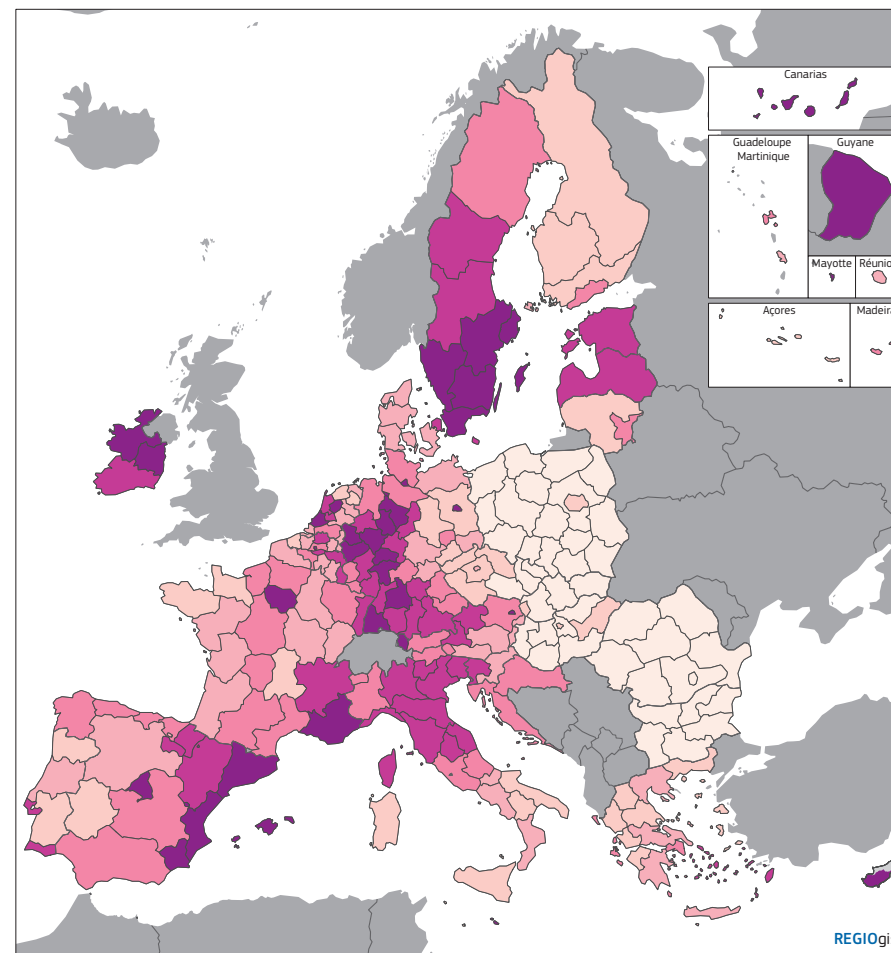
% of the population (ages 15–74)



EU-27 = 3.7
 DG REGIO estimates for BG, FR, HU, PL, RO.
 Source: DG REGIO based on Eurostat data (lfst_r_lfsd2pwc).

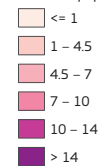
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Map 5.17 People born outside the EU, 2020

% of the population (ages 15–74)

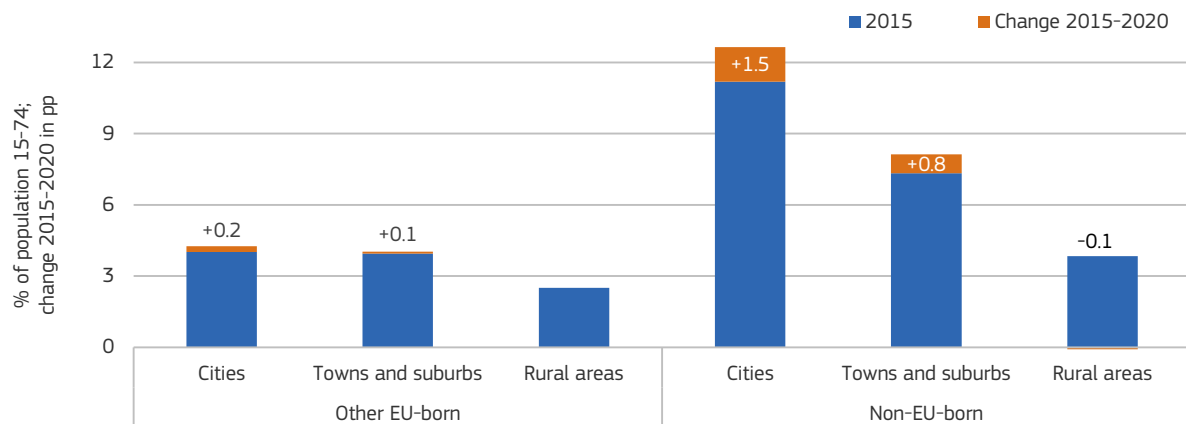


EU-27 = 8.8
 DG REGIO estimates for BG, FR, HU, PL, RO.
 Source: DG REGIO based on Eurostat data (lfst_r_lfsd2pwc).

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Figure 5.15 EU and non-EU migrants (15-74) in the EU by degree of urbanisation, 2015-2020



The other-EU-born and non-EU-born population in Germany were estimated for 2015 based on: a) the foreign population in 2015; b) the population by citizenship in Germany in 2015 and c) the population shares by country of birth in 2017 and 2018.

Source: Eurostat [lfst_r_pgauwsc], DG REGIO calculations.

migrants is slightly stronger than for EU-born migrants (Figure 5.14).

Non-EU migrants are concentrated in cities³³, where they accounted on average for 13% of the population in 2020 against 8% in towns and suburbs and less than 4% in rural areas (Figure 5.15). The share also increased by more in cities between 2015 and 2020 (1.5 pp) than in towns and suburbs (0.8 pp), while it remained unchanged in rural areas.

EU migrants are far less concentrated in cities, and account for approximately the same proportion of the population as in towns and suburbs (4% in 2020). They are less present in rural areas (accounting for only 2.5% of the population). Between 2015 and 2020, their share increased only in cities and then only slightly (by 0.2 pp).

4.2 The employment rate of non-EU migrants increased, but more for men than for women

In the EU, the overall employment rate of people aged 20–64 increased by 3.3 pp, to 72.5%, between 2015 and 2020 (when, because of COVID-19, it

was slightly below the 2019 level). The rate for the native-born increased by 3.7 pp, more than for the two migrant groups (2.9 pp for EU migrants and 1.6 pp for non-EU migrants). In particular, migrants living in rural areas secured a fundamental role in sustaining certain types of agricultural production with a constant demand for temporary work, while in cities they successfully fill the demand in certain services³⁴. The gap between the native-born and the non-EU-born had been narrowing, supported by EU policies³⁵. It widened only in 2020, suggesting that the employment of migrants was hit more by the pandemic and the measures put in place to control it (Figure 5.16).

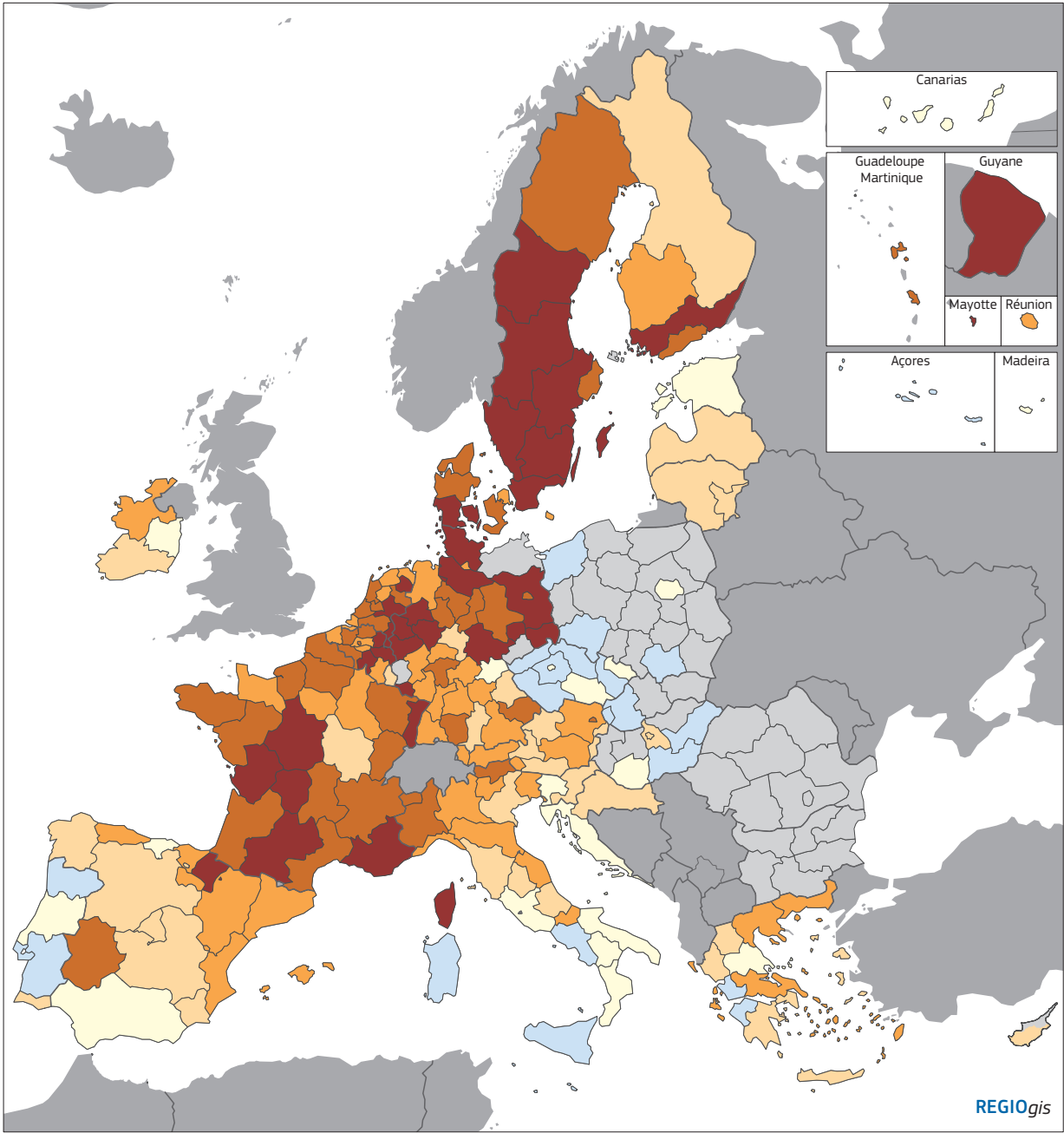
EU migrants have a similar employment rate to native-born people (Figure 5.17). The majority of EU migrants hold EU citizenship, so have the same residency and labour market rights as the native-born³⁶. Accordingly, they are free to move to regions with higher wages and more employment opportunities and tend to face fewer obstacles to

³⁴ Natale et al. (2019).

³⁵ The EU policies on legal migration include labour migration (with special directives for highly qualified workers subject to the Blue Card Directive, seasonal workers and inter-corporate transferees) as well as students and researchers, family reunification and long-term residents.

³⁶ Free movement of workers is one of the four freedoms enjoyed by EU citizens. It is guaranteed by the Article 45 of the Treaty on the Functioning of the European Union.

³³ *Ibid.*



Map 5.18 Difference in employment rate between non-EU-born and native-born, 2020

Percentage point difference (non-EU-born – native-born aged 20–64)

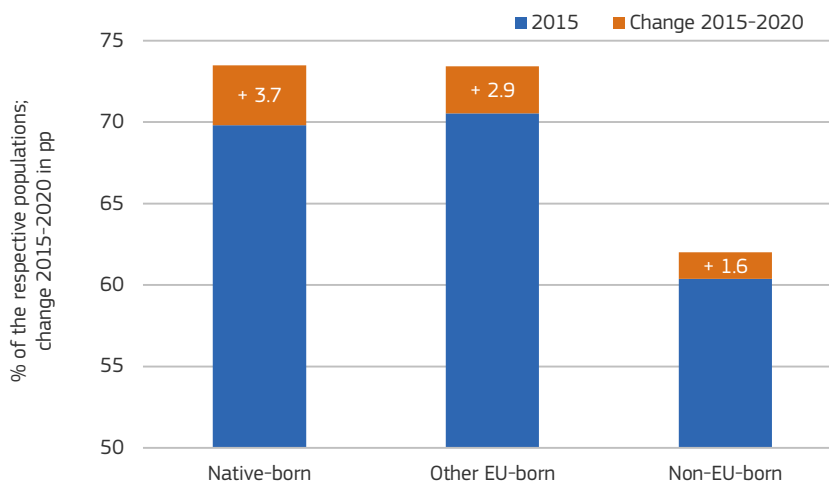
- ≤ -20
- 20 – -15
- 15 – -10
- 10 – -5
- 5 – 0
- > 0

EU-27 = -11.5
Source: Eurostat, EU LFS (lfst_r_lfe2emprc).

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Figure 5.16 Employment rates (20-64) for native-born and migrants in the EU, 2015-2020



Source: Eurostat [lfst_r_pgauwsc], DG REGIO calculations.

women, it was almost double the rate for men (28 pp as against 15 pp).

In most cases, the employment rate of non-EU migrants is higher in regions with a high native-born employment rate³⁸, but this is also where the gap with the native-born tends to be widest, especially for women (Map 5.18). The gap, therefore, averages 15 pp in the north-western EU compared with only 5 pp in the southern EU and 2 pp in the east-

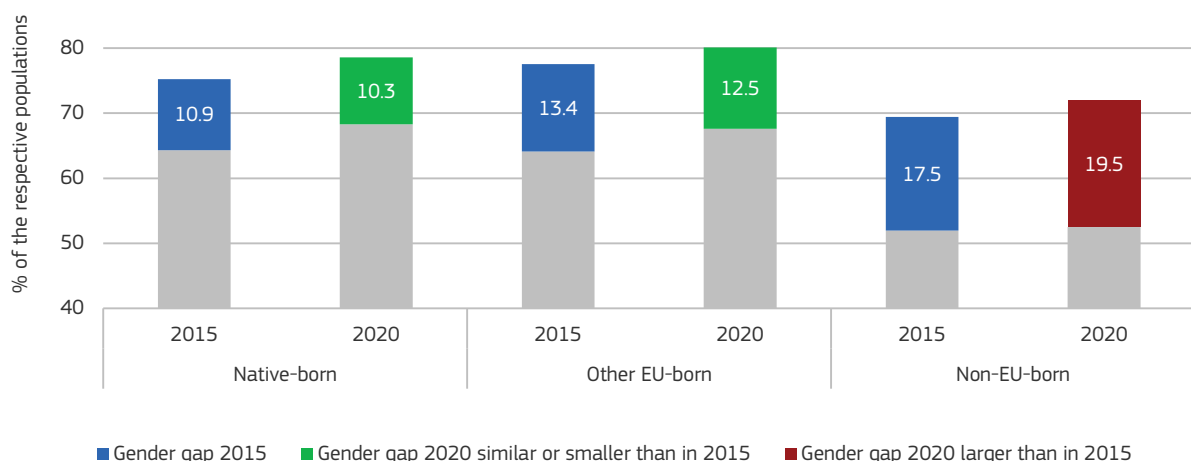
relocating than non-EU migrants if they lose their jobs³⁷.

Non-EU migrants, despite progress, have a substantially lower employment rate than the native-born (62% as against 74%), mainly because of a low rate for women (53%). In Sweden and Belgium, the overall gap in the rate was 20 pp in 2020; for

ern EU (Figure 5.18). There is little difference in the employment rates of the three groups between cities and rural areas.

In the EU, the overall gender gap in the employment rate remained unchanged between 2015 and 2019 and narrowed slightly in 2020, when the rate for men was 78% and that for women 67%

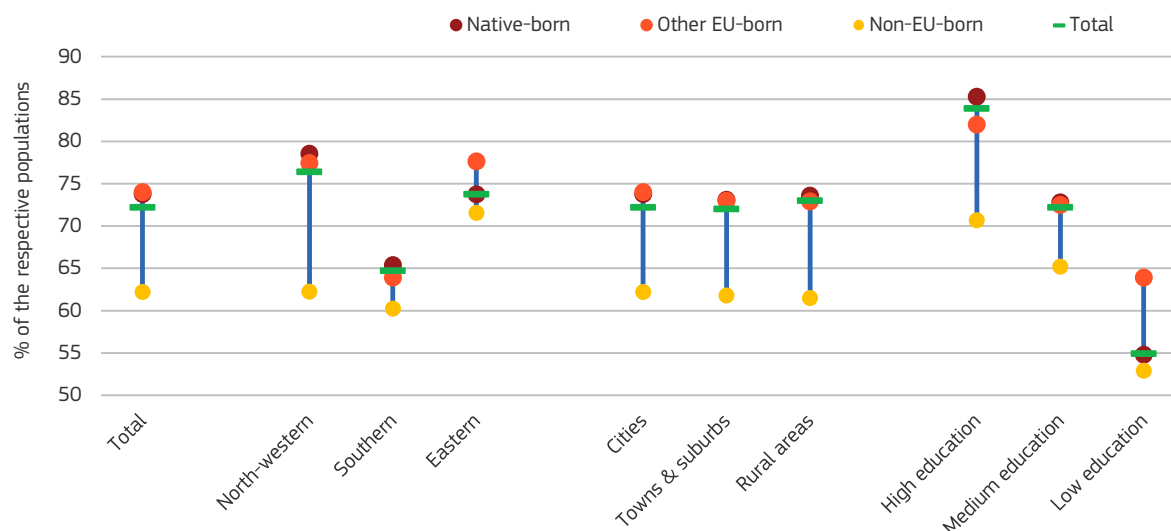
Figure 5.17 Employment rates and gender employment gap (20-64) in the EU for native-born and migrants, 2015 and 2020



Grey bar parts are for employment rates for females, bar tops are for employment rates for males.
Source: Eurostat [lfst_r_pgauwsc], DG REGIO calculations.

37 See European Commission (2021i) for annual information on intra-EU labour mobility.

38 OECD (2021a).

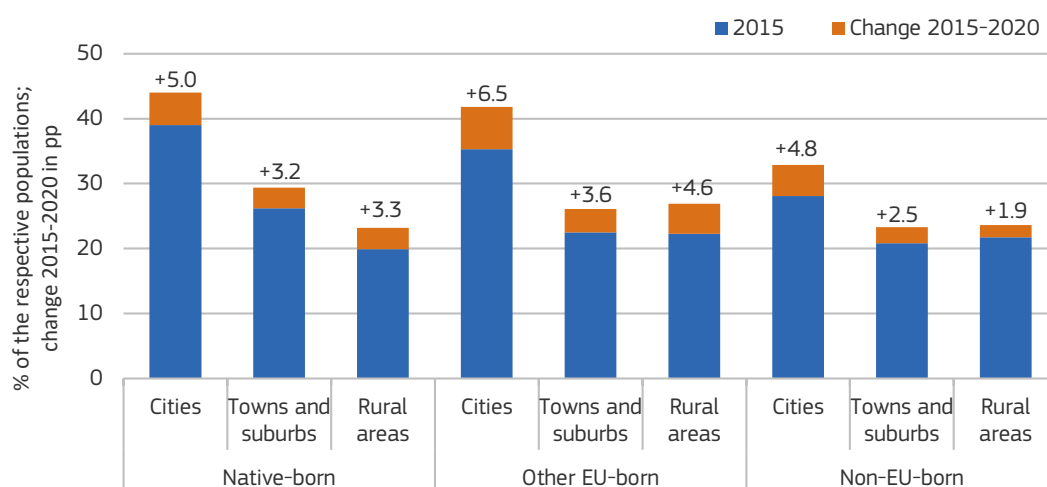
Figure 5.18 Employment rates (20-64) for native-born, EU-born migrants and non-EU-born in the EU, 2020

Source: Eurostat [lfst_r_eredcobu], DG REGIO calculations.

(see Section 5.5). Conversely, the COVID-19 pandemic halted the increase in the employment rate for non-EU migrant women, and the gender gap for non-EU migrants widened by 3 pp to 20 pp as against 11 pp for the native-born.

4.3 Non-EU migrants with tertiary education have the widest employment gap, while the tertiary education attainment level is 4 pp lower

For people with basic education, the employment rate of non-EU migrants is just 2 pp lower than for the native-born. The gap between the two widens to 8 pp for those with upper secondary education and to 15 pp for those with tertiary education. This

Figure 5.19 Native-born people and migrants aged 25-64 with tertiary education by degree of urbanisation, 2015-2020

Source: Eurostat [edat_lfs_9915], DG REGIO calculations.

Box 5.7 Migration and regional economic development

A forthcoming OECD report¹ assesses the uneven impact of migration on regions and cities. One of its chapters analyses the impact of migration on regional development through innovation, international trade, labour markets and overall economic growth.

Migrants tend to increase regional GDP per head and contribute to regional economic convergence within and across Member States in Europe. Migrants can increase regional GDP per head because they are younger and often bring complementary skills and fill shortages in critical positions. The study finds that, on average, a 10% increase in the migrant population share is associated with 0.15% higher GDP per head. This effect is stronger for less developed regions, especially in lower-income EU Member States. Overall, for the 25% poorest regions in a Member State, the positive effect of migration on GDP per head is more than twice as high (0.36%). As a result, migration can help less developed regions catch up with the rest of the Member States concerned and the rest of the EU.

Migrants contribute to innovation by bringing new ideas to their host regions in OECD countries. Using detailed information on patents and the share of migrants in municipalities, the study shows that migrants raise the patenting activity in their local area and boost local innovation. However, these positive effects are limited to areas that were already inno-

vative with high patenting levels, mainly located in urban areas.

The presence of migrants influences regions' international trade. In Europe, migrants help their host regions establish new trade networks, reduce information costs, create demand for goods from origin countries and boost regional exports and imports. On average, a 10% increase in the number of migrants in a given European region leads to 3.2% higher imports, including intermediates used in exports, and a 1.2% increase in exports. This impact is higher for regions with more high-skilled migrants, and most relevant for extra-EU trade.

The labour market response to migrants varies across European regions and by type of worker. An increase in the share of migrants is linked to a short-term slowdown of growth in the native employment rate, especially among low-skilled workers. This effect weakens or disappears over time as regional labour markets adapt. In regions with higher levels of GDP per head, migrants are more easily absorbed in the labour force, resulting in little or no effect on the native workforce.

The report concludes that targeted policies could help to spread the benefits of migration for regional development. For instance, investing in the upskilling of native workers (especially those without a tertiary education) and of less developed regions could help address labour market challenges and strengthen regional development.

1 OECD (2022, forthcoming).

is primarily due to a substantial gap for women (19 pp), as well as more generally perhaps to difficulties in getting foreign qualifications recognised (Figure 5.19).

A third (33%) of the native-born and EU migrants aged 25–64 have tertiary education, compared with 29% of non-EU migrants. For all three groups, the tertiary-educated tend to be concentrated in cities. This is especially so for the native-born, for whom the proportion tertiary-educated is almost double in cities than in rural areas (44% against 23%). For EU migrants, the difference is smaller

(42% vs 27%), and for non-EU migrants smaller still (33% vs 24%).

Migrants aged 15–24 are more likely to be neither in employment nor in education or training than the native-born (20% vs 10%).

4.4 Non-EU migrants have double the risk of poverty and social exclusion

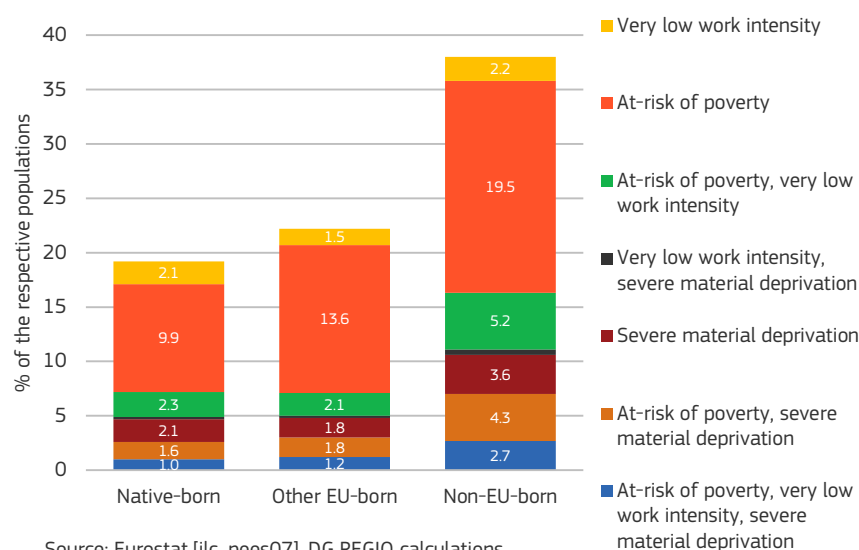
In 2019, around 10 million migrants aged 15 and over were considered to be AROPE. This consisted of two million EU migrants (22% of their total

number) and 8.5 million non-EU migrants (38% of their number). The proportion was 3 pp lower than in 2015 for both groups. Economic and labour market improvements led to a fall in the proportion of people living in very low-work-intensity households, while there was an even larger reduction in those suffering severe material deprivation, especially among non-EU migrants. The fact that there was only a small reduction in those at risk of poverty, however, indicates that many non-EU migrants still have very low incomes.

Indeed, the AROPE rate for non-EU migrants was double that of the native-born in 2019. The proportion of non-EU migrants at risk of poverty and simultaneously in a situation of severe material deprivation and in a household with very low work intensity was almost three times that of the native-born (2.7% as against 1%) (Figure 5.20).

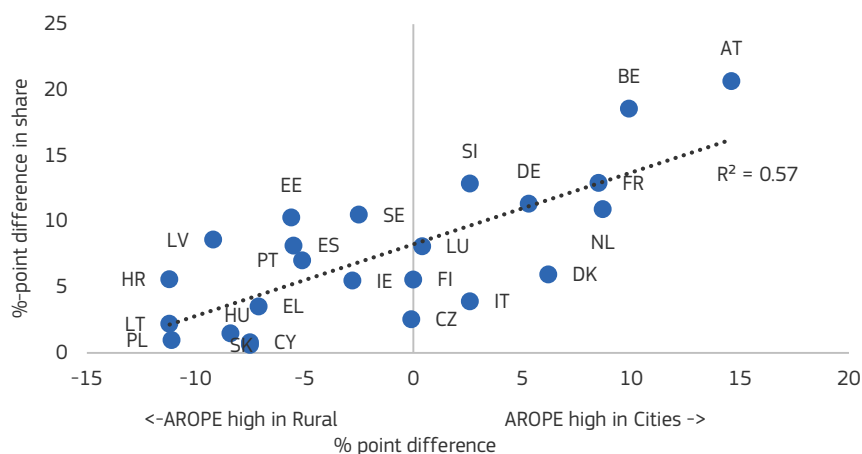
The AROPE rate for the population as a whole in 2019 varied only slightly between cities (21.3%), towns and suburbs (19.2%) and rural areas (22.4%). However, the high concentration of migrants in cities — 45% of the other-EU-born and nearly 60% of the non-EU-born live in cities, compared with less than 40% of the native-born — means that the number of migrants deemed to be AROPE may have been higher in cities than in rural

Figure 5.20 Intersection between sub-populations of AROPE in the EU for native-born and migrants, 2019



Source: Eurostat [ilc_pees07], DG REGIO calculations.

Figure 5.21 Difference in shares of migrants and difference in the AROPE rate (pp) between cities and rural areas in the EU, 2019

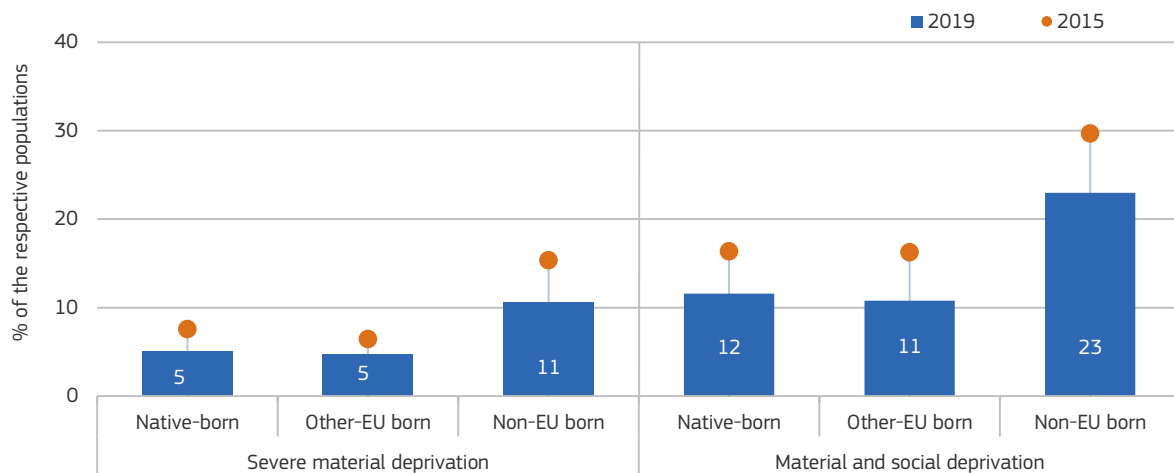


The horizontal axis shows the difference (in pp) in AROPE rate between cities and rural areas. The vertical axis shows the difference (in pp) in the share of migrants in the total population between cities and rural areas.

Source: Eurostat [ilc_peps13] and [lfst_r_pgauwsc], DG REGIO calculations.

areas. This was especially the case in Belgium and Austria (Figure 5.21).

Material and social deprivation (see definition in the note to Figure 5.22) has fallen since 2015 across the EU. However, it is more prevalent among non-EU migrants than other groups, affecting roughly twice the share of these as compared with the native- and EU-born. This was especially the case in

Figure 5.22 Deprivation rates in the EU for the native-borns and migrants (18+), 2015 and 2019

Severe material deprivation: for at least four items out of the following, could not afford:

- to pay their rent, mortgage or utility bills;
- to keep their home adequately warm;
- to face unexpected expenses;
- to eat meat or proteins regularly;
- to go on holiday;
- a television set;
- a washing machine;
- a car;
- a telephone.

Material and social deprivation: for at least five items out of the following was unable for financial reasons to:

- face unexpected expenses;
- afford one week's annual holiday away from home;

- avoid arrears (in mortgage, rent, utility bills and/or hire purchase instalments);
- afford a meal with meat, chicken or fish or vegetarian equivalent every second day;
- keep their home adequately warm;
- afford a car/van for personal use;
- replace worn-out furniture;
- replace worn-out clothes with some new ones;
- have two pairs of properly fitting shoes;
- spend a small amount of money each week on themselves ('pocket money');
- have regular leisure activities;
- get together with friends/family for a drink/meal at least once a month;
- have an internet connection.

2019 in rural areas (26%) as compared with cities (24%) and towns and suburbs (22%).

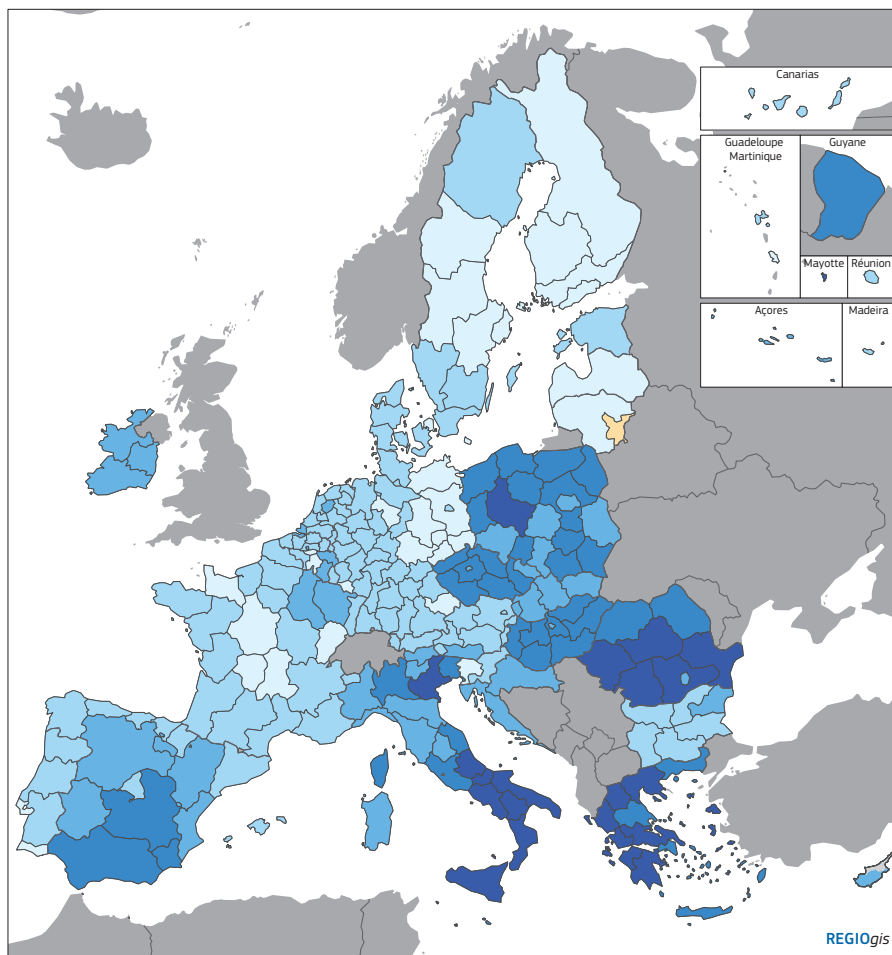
5. Where women thrive in the EU

Gender equality is one of the fundamental values of the EU and features prominently in the European Pillar of Social Rights. One of the UN SDGs is to achieve gender equality and empower all women and girls by 2030 (SDG5), while the recently adopted EU Gender Equality Strategy for 2020–2025 is intended to ensure that all EU policy areas contribute to gender equality.

In some EU regions women are able to improve their economic, social and political positions, while in others they are held back. Despite the strong political commitment to achieving gender equality in the EU, large differences between women and men remain in various aspects of life, such as access to the labour market, pay and working conditions, and leadership in decision-making³⁹.

In 2020, the employment rate of men (aged 20–64) in the EU was around 11 pp higher than for women (78% as against 67%), and the gap has

³⁹ The European Pillar of Social Rights calls, in principle 2, for equality of treatment and opportunity between women and men in the labour market, terms and conditions of employment, and career progression; and for the right to equal pay.



Map 5.19 Difference between female and male employment rates (ages 20–64), 2020

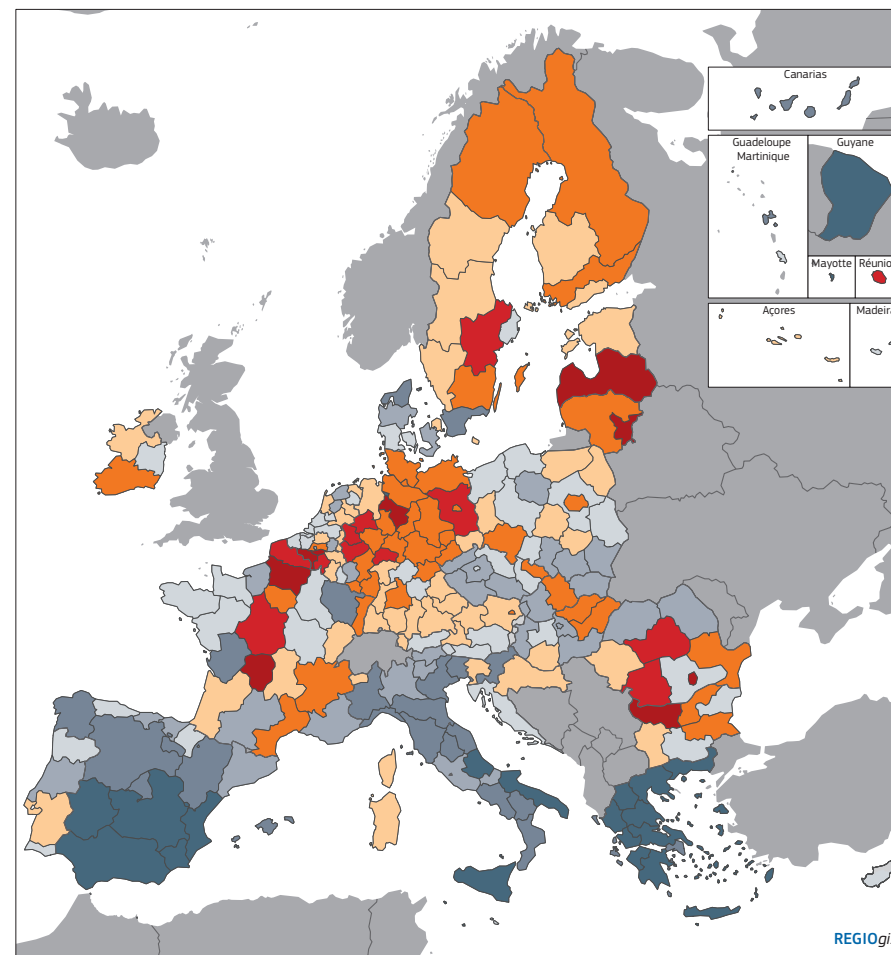
Percentage point d'ère (female – male)

- < -20
- -20 – -15
- -15 – -10
- -10 – -5
- -5 – 0
- > 0

EU-27 = -11.1
Source: Eurostat (lfst_r_lfe2empt).

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Map 5.20 Difference between female and male unemployment rates, 2020

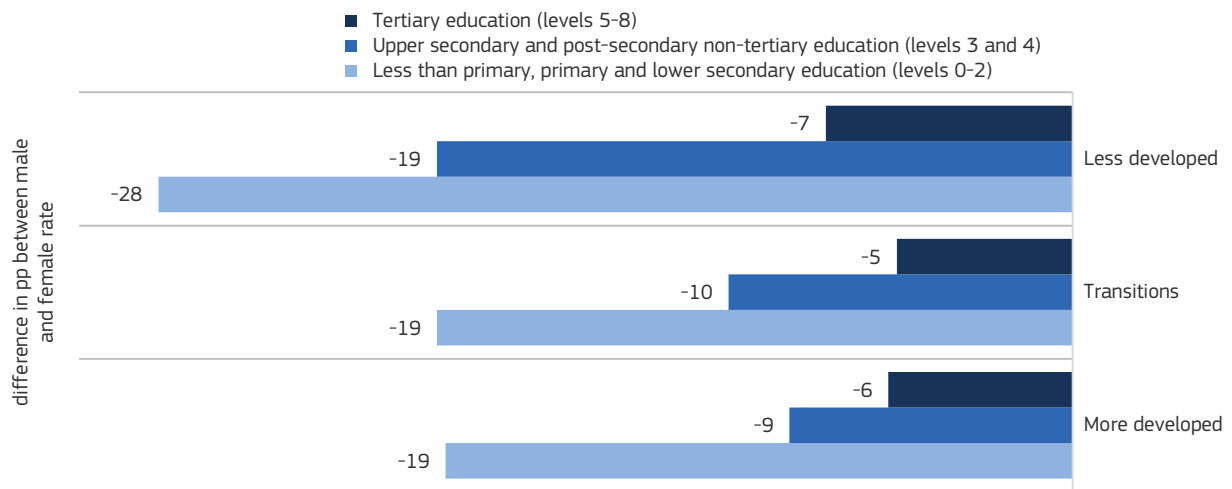
Percentage point d'ère (female – male)

- < -1.8
- -1.8 – -1.2
- -1.2 – -0.6
- -0.6 – 0
- 0 – 0.8
- 0.8 – 1.8
- 1.8 – 4
- > 4
- no data

EU-27 = 0.6
DE: 2019
Source: Eurostat (lfst_r_lfp2act, lfst_r_lfu3pers).

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Figure 5.23 Gender gap in employment rate by level of education and group of regions, 2020

Source: Eurostat [lfst_r_lfe2emprc], DG REGIO calculations.

remained unchanged over recent years (at least since the recovery started in 2013). The gender gap was particularly wide in less developed regions (17 pp in 2020) and in regions in the southern and eastern EU (15 pp in both) (Table 5.5). Employment rates for men were higher than for women in all regions, except the capital city region in Lithuania, but with marked differences between them (Map 5.19). The gap was over 20 pp in 2020 in Malta, Corse, in several regions in Greece and Romania, and in southern Italy. The gender gap in the employment rate was wider the lower the level of education, and was widest in less developed regions for all education levels (Figure 5.23).

The far lower employment rates of women, however, do not translate into higher unemployment rates (Map 5.20), because many more women than men are not actively looking for a job. *“It is often missing care facilities for children and dependent elderly and gender stereotypes that hamper women’s participation in the labour market and in entrepreneurship”*. At the EU level, women’s unemployment rates were only 0.5 pp higher than for men in 2020, though the gap was wider in less developed regions (1.5 pp) than in transition ones (0.5 pp), with the rate for women being higher than for men in southern EU regions especially (3 pp higher). Only in regions in the north-western

Table 5.5 Gender gap in employment and unemployment rates by group of regions, 2020

	More developed regions	Transition regions	Less developed regions	EU
Gender gap (F-M) in employment rates (20-64), pp	-9.0	-9.1	-17.2	-11.0
Gender gap (F-M) in unemployment rates (15-74), pp	0.0	0.5	1.5	0.5
	North-western EU	Southern EU	Eastern EU	EU
Gender gap (F-M) in employment rates (20-64), pp	-7.0	-15.4	-14.6	-11.0
Gender gap (F-M) in unemployment rates (15-74), pp	-0.5	2.8	0.0	0.5

Source: Eurostat [lfst_r_lfe2emprt] and [lfst_r_lfu3rt]. DG REGIO calculations.

EU was the rate lower for women than for men (Table 5.5).

5.1 Women in the EU have higher education levels than men

In the EU, more women aged 25–64 have tertiary education than men, and this is the case in all regions, except in several regions in Germany, Austria, and southern regions in the Netherlands. On average, 35% of women in this age group were university graduates in 2018–2020, as opposed to 30% of men. The gap tends to be smaller in more developed regions and in regions in the north-western EU (Table 5.6). In Estonia, Latvia and

Finland, the share of women with tertiary education was 16 pp — or more — larger than for men.

Women in political power

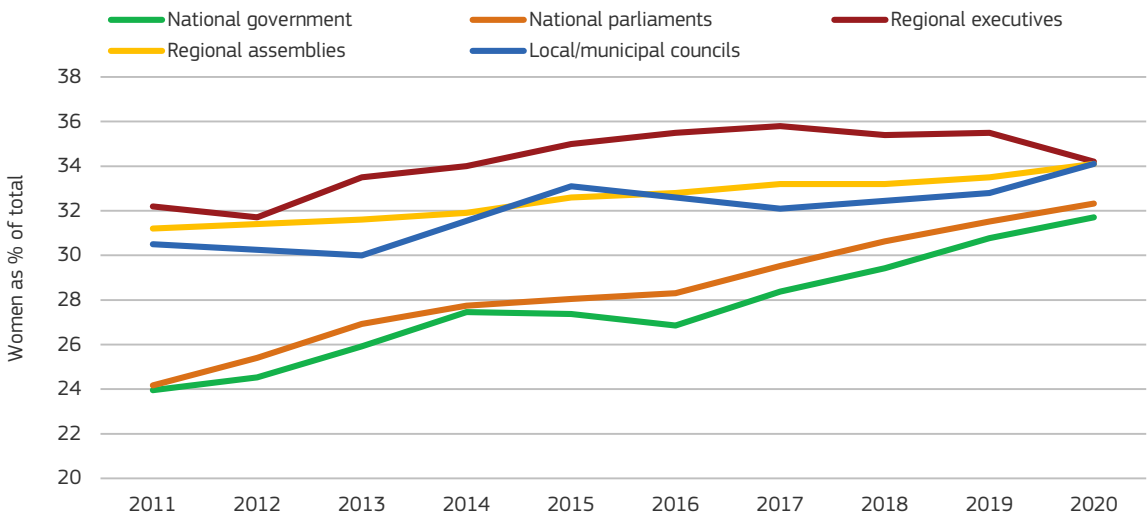
In 2003, the Council of Europe recommended balanced participation of women and men in all decision-making bodies in political and public life, with the proportion of women not falling below 40%. In addition, the UN Sustainable Development Agenda calls for full and effective participation and equal opportunities for leadership for women at all levels of political and economic decision-making (SDG5). To date, progress is still slow and wide differences exist throughout the EU.

Table 5.6 Gender gap in tertiary education by group of regions, average 2018–2020

	More developed regions	Transition regions	Less developed regions	EU
% point difference in the share of women and men aged 25–64 with tertiary education	1.8	6.5	7.4	4.8
	North-western EU	Southern EU	Eastern EU	EU
% point difference in the share of women and men aged 25–64 with tertiary education	1.7	5.7	8.8	4.8

Source: Eurostat Table [edat_lfse_04], DG REGIO calculations.

Figure 5.24 Women and political power in the EU, 2011–2020



Source: European Institute for Gender Equality (EIGE), DG REGIO calculations.

In 2020, only 1 in 3 members of national governments and parliaments, regional assemblies and executives, and local councils were women (Figure 5.24). While the share of women was 8 pp higher than in 2011 in national governments and parliaments, the increase in share in regional executives (2 pp higher), regional assemblies (3 pp higher) and local councils (just under 4 pp higher) was considerably less. At this rate, the share of women in national governments and parliaments would reach 50% by 2040, in local councils only in 2060, in regional assemblies in 2070 and in regional executives in 2090.

Part of the reason for the relatively slow progress at regional and local levels may be that they started from a significantly larger share of women at the beginning of the period than in national governments and parliaments. Regions with small shares of women in regional assemblies in 2010, therefore, experienced the largest increases in the subsequent 11 years.

Box 5.8 Gender Equality Strategy 2020–2025¹

The Gender Equality Strategy covers the European Commission's work on gender equality, and sets out the policy objectives and main points of action for the 2020–2025 period.

The key objectives are: ending gender-based violence; challenging gender stereotypes; closing gender gaps in the labour market; achieving equal participation across different sectors of the economy; addressing the gender pay and pension gaps; closing the gender care gap; and achieving gender balance in decision-making and in politics.

The implementation of this strategy is based on a dual approach of targeting measures to achieve gender equality, and strengthening gender mainstreaming. The latter will be pursued by systematically including a gender perspective at all stages of policy design in all EU policy areas, internal and external.

1 European Commission (2020k).

In 2021, women made up at least half of regional assemblies in only 16 out of 285 cases. Two regional assemblies in Hungary have no women members at all, and in several regional assemblies in Hungary and Romania fewer than 10% of members are women. The share of women is largest (40% or more) in regional assemblies in Spain, France, Sweden and Finland (Map 5.21). Worryingly, in some EU regions, mainly located in the eastern EU, not only was the share of women small in 2010, it also diminished further in the 11 years to 2021 (Map 5.22).

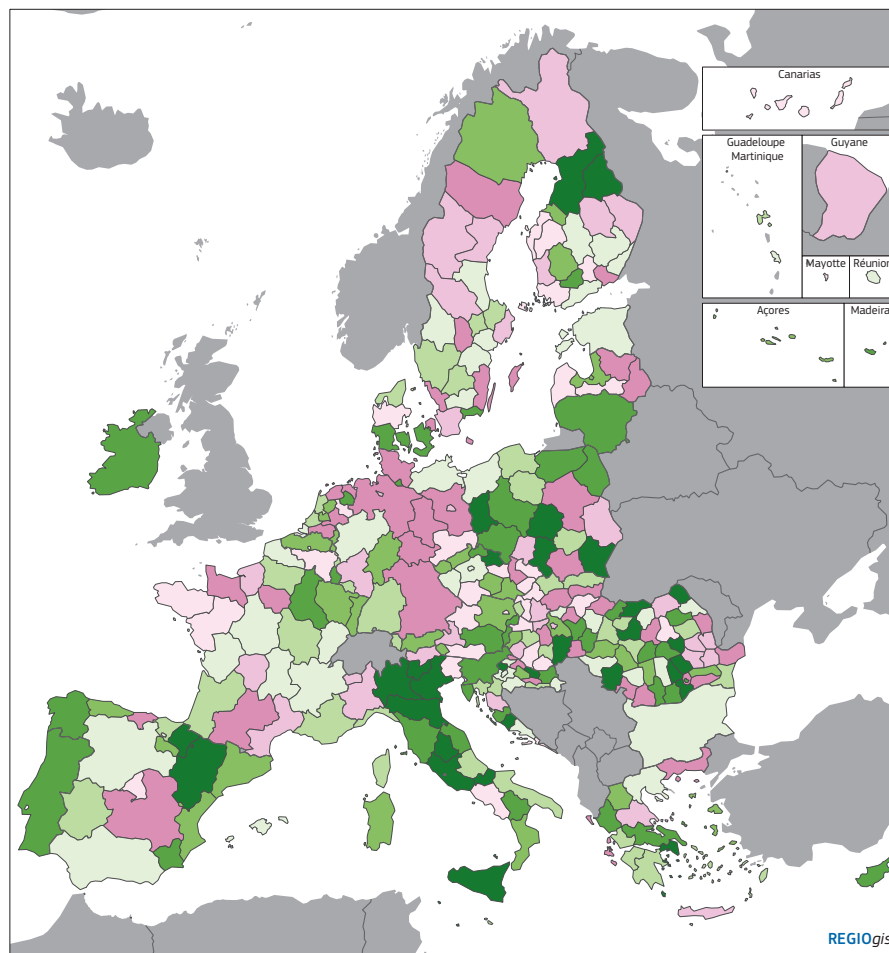
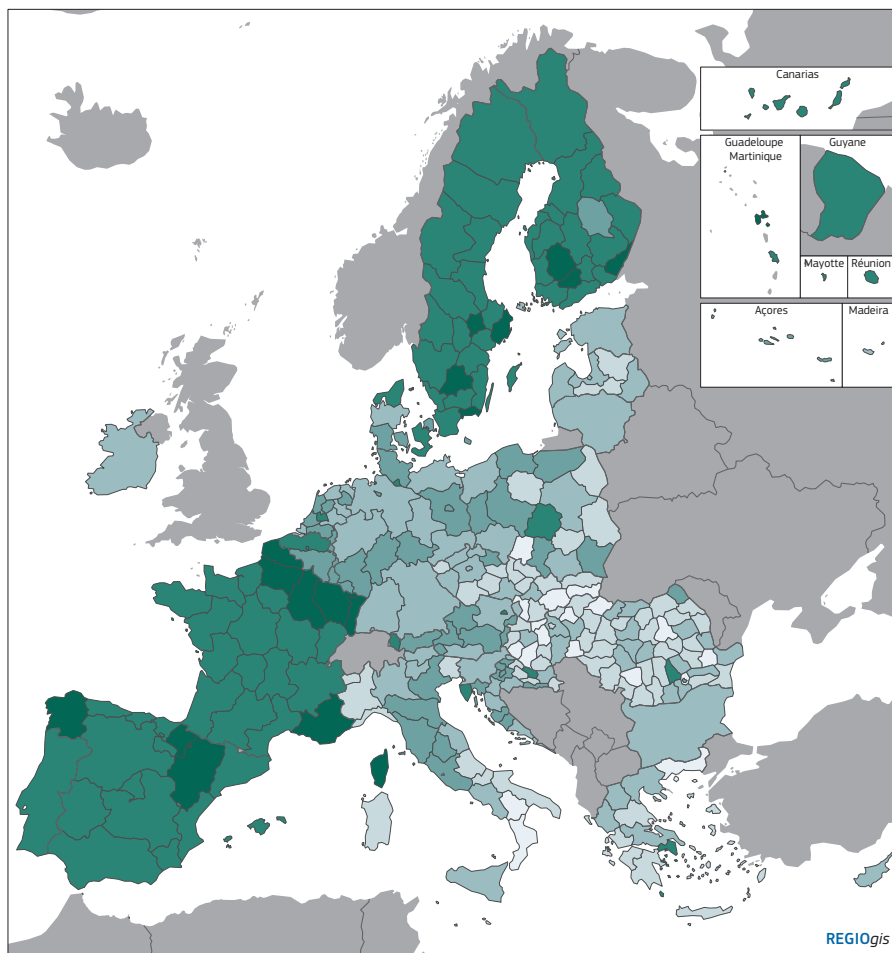
5.2 Women's life satisfaction and views about job opportunities and their personal safety

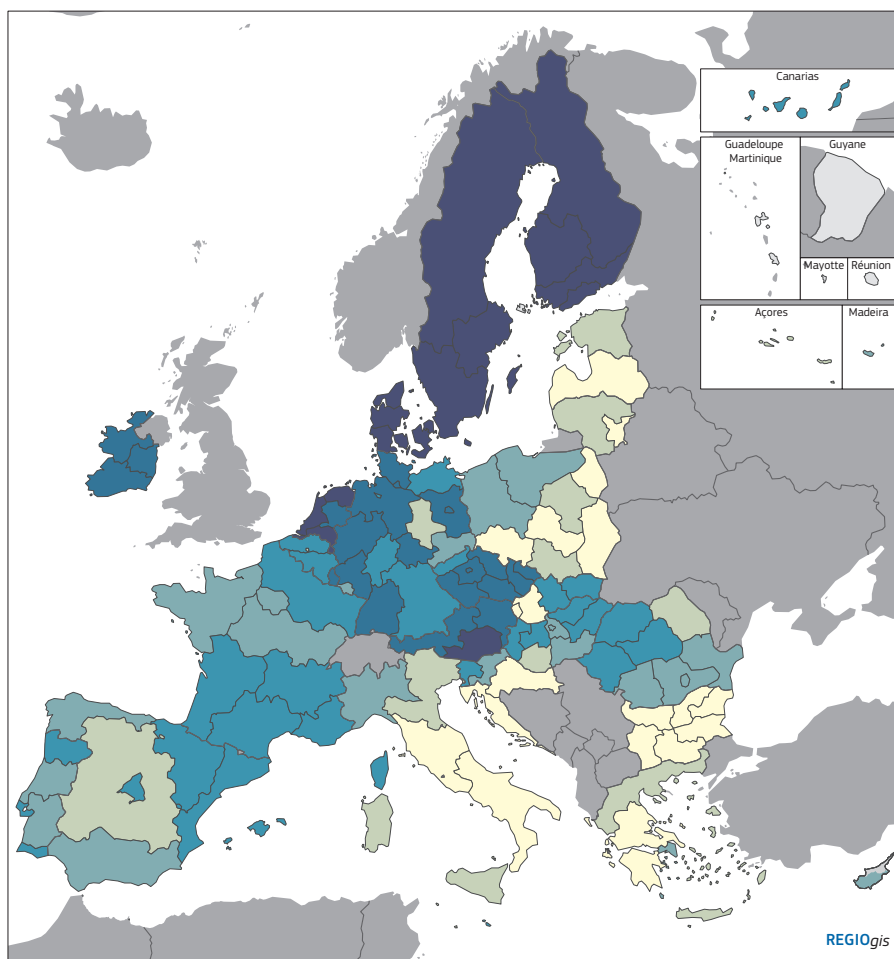
When asked about whether they are satisfied with their lives, around 33% of women in the EU in 2019 reported being satisfied, as against 35% of men, though this small difference in the average hides large differences in many Member States and regions (Map 5.23). Fewer than 20% of women were satisfied with their life in all regions in Bulgaria and Croatia, and in a number of regions in Greece

Box 5.9 Gender dimension in the multi-annual financial framework 2021–2027

The newly adopted multi-annual financial framework (MFF) for the years 2021–2027 includes a gender dimension throughout, and more specifically in various EU funding and budgetary guarantee instruments (particularly ESF+, the ERDF, Creative Europe, the European Maritime and Fisheries Fund, the Cohesion Fund and the InvestEU programme). Funding will support women's labour market participation and work-life balance, invest in care facilities, support female entrepreneurship, combat gender segregation in certain professions and address the unbalanced representation of girls and boys in parts of education and training.

For more details on the 2021–2027 MFF: https://ec.europa.eu/info/strategy/eu-budget/long-term-eu-budget_en.





Map 5.23 Women feeling satisfied with their lives, 2019

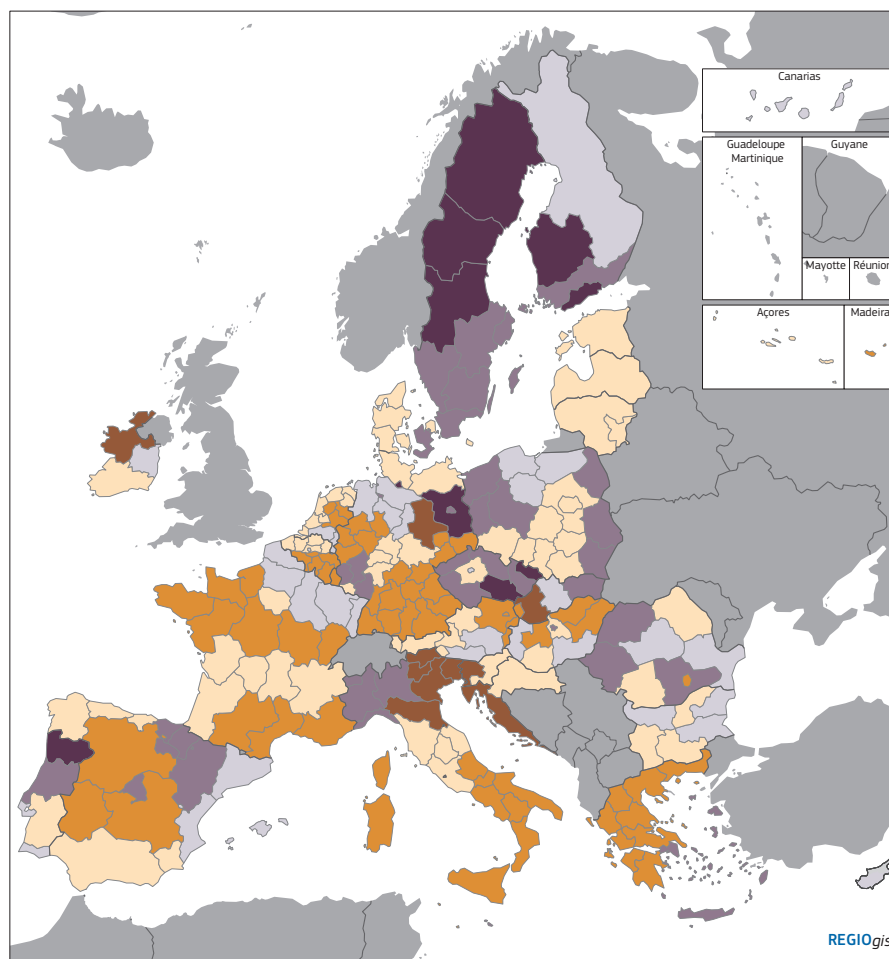
% of women aged 15+

- <= 20.0
- 20.1 – 25.0
- 25.1 – 30.0
- 30.1 – 40.0
- 40.1 – 50.0
- > 50.0
- no data

Percentages are based on respondents who answered 8, 9 or 10 in the question: Please imagine a ladder with steps numbered from 0 at the bottom to 10 at the top. The top of the ladder represents the best possible life for you and the bottom of the ladder represents the worst possible life for you. On which step of the ladder would you say you personally feel you stand at this time? Source: Gallup World Poll (WP16).

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Map 5.24 Gender gap in feeling satisfied with their lives, 2019

Percentage point difference (female–male)

- <= -10
- 10 – -5
- 5 – 0
- 0 – 5
- 5 – 10
- > 10

Percentages are based on respondents who answered 8, 9 or 10 in the question: Please imagine a ladder with steps numbered from 0 at the bottom to 10 at the top. The top of the ladder represents the best possible life for you and the bottom of the ladder represents the worst possible life for you. On which step of the ladder would you say you personally feel you stand at this time? Source: Gallup World Poll (WP16).

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and Italy. Indeed, the figure was below 10% in Severoiztochen (6%) and Severen tsentralen (7%) in Bulgaria, and in Kontinentalna Hrvatska (9%) in Croatia (though in these regions, the figure was also below 10% for men). By contrast, the proportion was over 70% in all regions in Finland, where in Helsinki-Uusimaa and LänsiSuom a much larger share of women than men (13 pp more) reported being satisfied with their lives. On the other hand, the reverse was the case in Sachsen-Anhalt in Germany (the share being 25 pp less for women than for men) and in north-east Italy (6 pp less) (Map 5.24).

When asked about job opportunities, 51% of men across EU regions believed that, in 2019, it was a good time for finding a job in the area where they lived (i.e. that there were significant job opportunities open to them) as against only 40% of women. There were, however, wide differences across regions (Map 5.25). Whereas only 10% of women had a positive opinion on job opportunities in their area in the NUTS 1 region of Italy, including Sicily and Sardinia, almost 90% of women had a positive opinion in Praha in Czechia. The gap between men and women was widest in the Região Autónoma da Madeira in Portugal (5% for men as against 24% for women), followed by Saarland (67% for men, 44% for women) and Rheinland-Pfalz (78% for men, 55% for women) in Germany. By contrast, in Helsinki-Uusimaa in Finland, and Bremen in Germany, more women than men had a positive opinion of job opportunities. More women than men also had a positive opinion in Lithuania, though here the overall satisfaction level was low (28% for women, 22% for men) (Map 5.26).

People who feel safe and trust others also tend to be more satisfied with their lives. Those who have experienced crime, or have a fear of crime, tend to engage less in outdoor activities and to report higher levels of distress and lower levels of well-being. Safety is one of the aspects of life for which the place where a person lives matters, particularly for women. According to a recent survey conducted in European cities, around 80% of men felt safe walking alone at night, but only 64% of women. Across EU regions, fewer than 40% of women felt safe in Észak-Alföld in Hungary (35%), Nord-

Est in Romania (38%) and Kentriki Ellada in Greece (39%). At the other extreme, over 80% of women felt safe in Luxembourg (81%), in the capital city region in Lithuania (82%), in a number of regions in southern Austria and Slovenia (around 83%) and Noreste in Spain (84%) (Map 5.27). Differences between women and men were particularly large (above 30 pp) in Wallonia in Belgium, Voreia Ellada in Greece, central Italy, and Dél-Dunántúl and Észak-Alföld in Hungary (Map 5.28).

5.3 When women achieve less, they also tend to be at a disadvantage

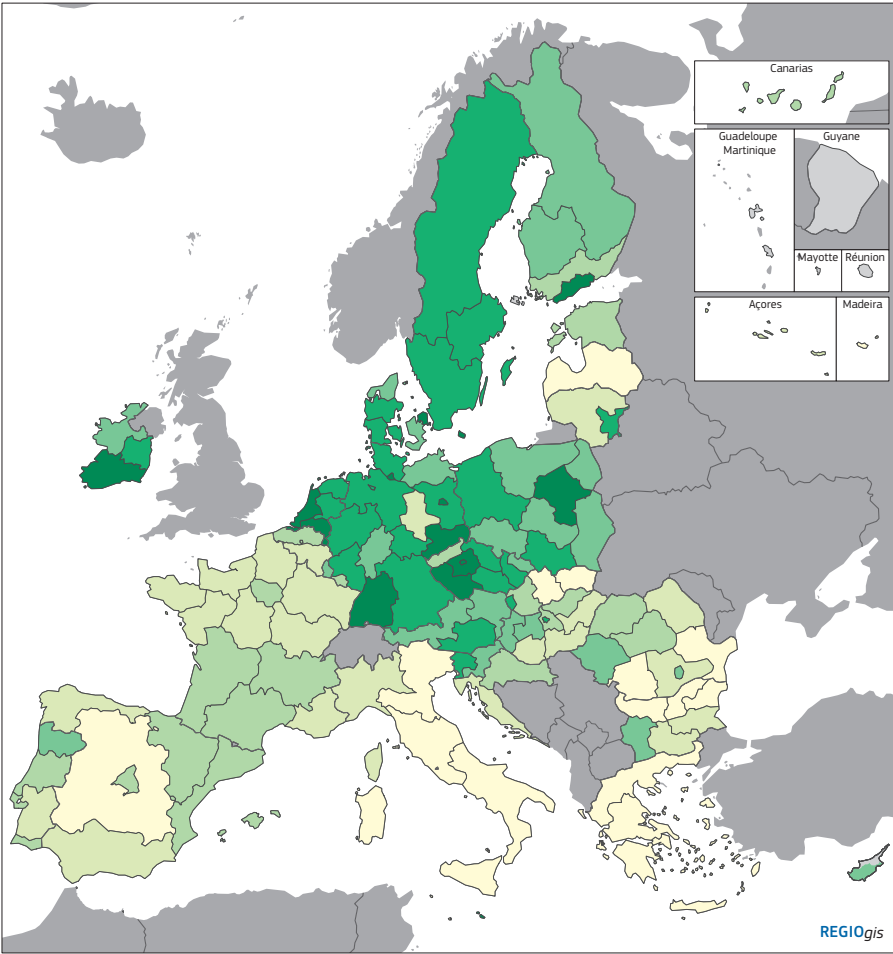
Two composite indices have been constructed to capture how well women are achieving in different regions, relative to the best performing women in the EU and relative to men — the *Female Achievement Index* (FemAI) for the former and the *Female Disadvantage Index* (FemDI) for the latter (Map 5.29).

Women achieve most in Nordic Member States and most Austrian regions, and achieve least in regions in the southern and eastern EU. They face the least disadvantage in the majority of regions in the Nordic Member States as well as in France and Spain — least of all in Auvergne in France, La Rioja and Galicia in Spain and the capital city region in Finland — and are disadvantaged most in regions in Greece and Romania.

5.4 Comparing female achievement and disadvantage

Regions where women achieve least and are disadvantaged most are largely located in the southern and eastern EU, whereas they achieve most and are disadvantaged least in the north-west of the EU.

Above-average achievement and below-average disadvantage is the best combination. This is quite common in north-western regions and Spain. The next best combination is both achievement and disadvantage being above average, which implies that while women achieve much in these regions,



Map 5.25 Women declaring it is a good time to find a job, 2019

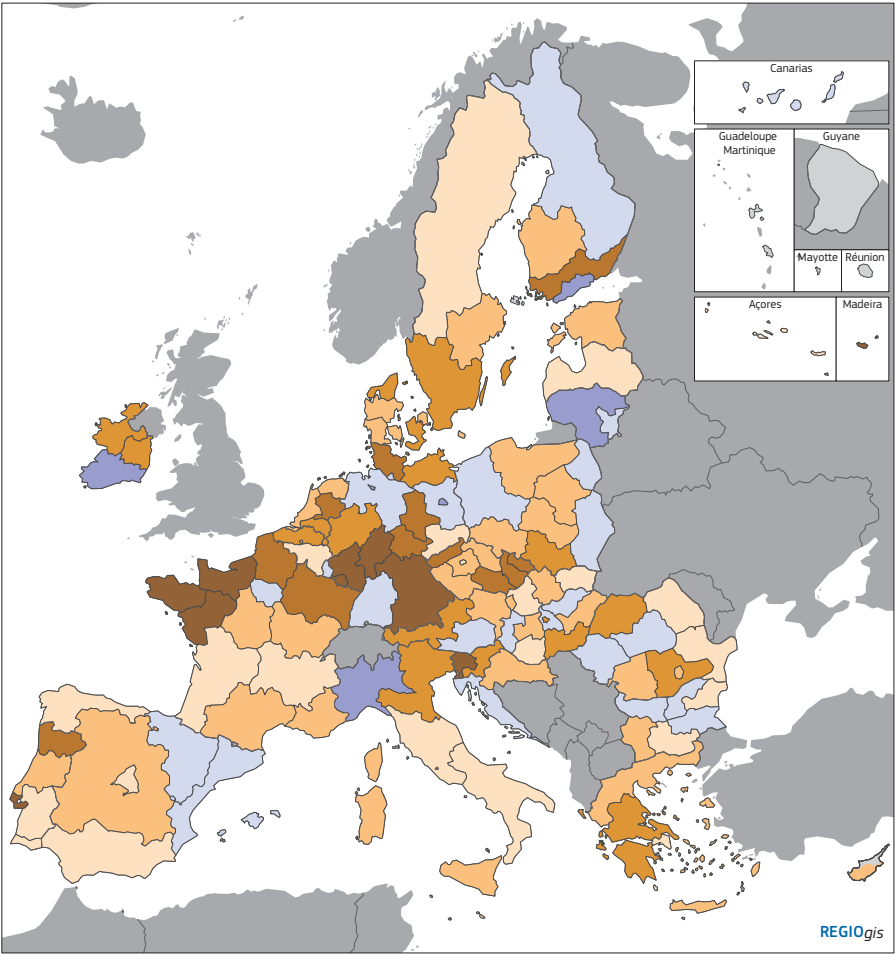
% of women aged 15+

< 25	55 – 65
25 – 35	>= 65
35 – 45	no data
45 – 55	

Percentages are based on all respondents excluding don't know and refused to answer. Question: 'Thinking about the job situation in the city or area where you live today, would you say that it is now a good time to find a job?'
Source: Gallup World Poll (WP89).

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Map 5.26 Gender gap in declaring it is good time to find a job, 2019

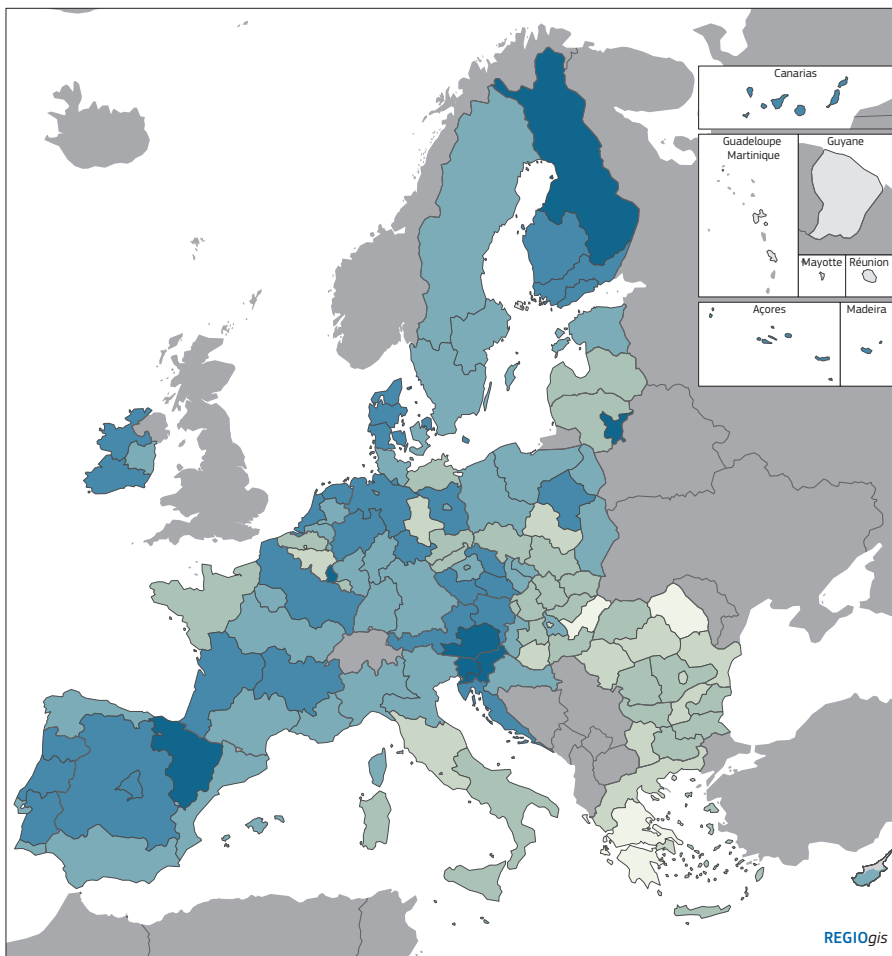
Percentage point difference (female – male)

< -20	-5 – 0
-20 – -15	0 – 5
-15 – -10	> 5
-10 – -5	no data

Percentages are based on all respondents excluding don't know and refused to answer. Question: 'Thinking about the job situation in the city or area where you live today, would you say that it is now a good time to find a job?'
Source: Gallup World Poll (WP89).

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Map 5.27 Women feeling safe walking alone at night, 2019

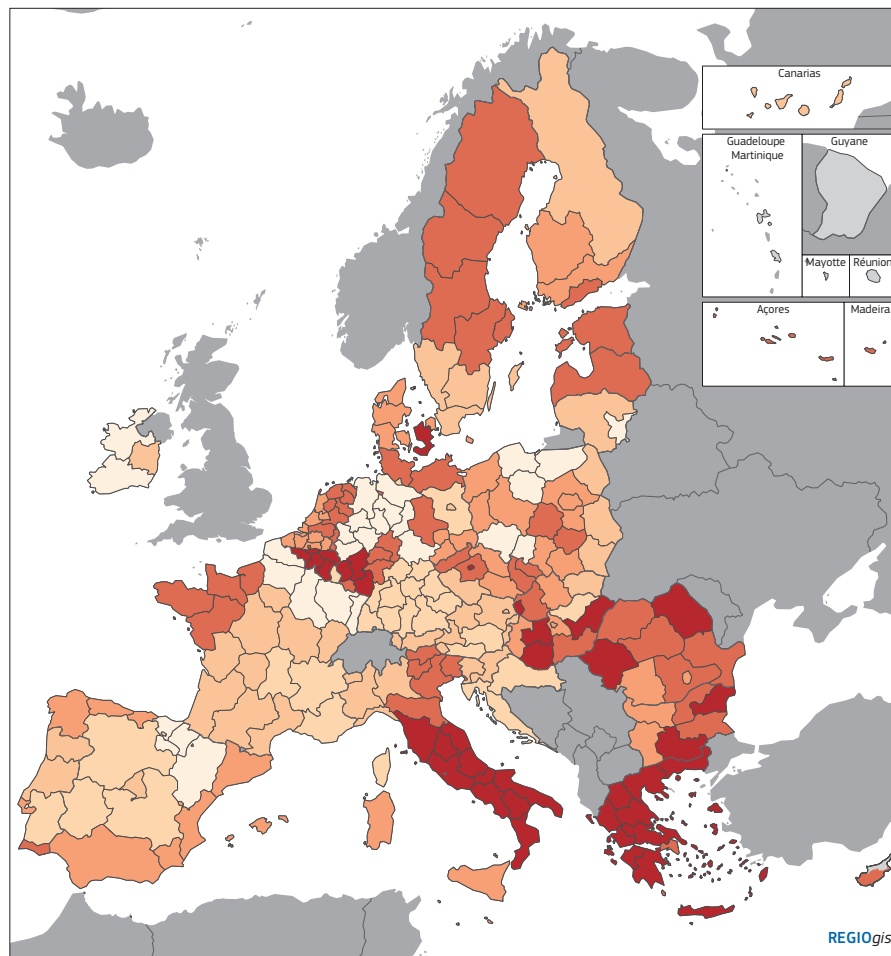
% of women aged 15+

≤ 40.0
40.1 – 50.0
50.1 – 60.0
60.1 – 70.0
70.1 – 80.0
> 80.0
no data

Percentages are based on all respondents excluding don't know and refused to answer.
Question: Do you feel safe walking alone at night in the city or area where you live?
Source: Gallup World Poll (WP113).

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Map 5.28 Gender gap in feeling safe walking alone at night, 2019

Percentage point difference (female – male)

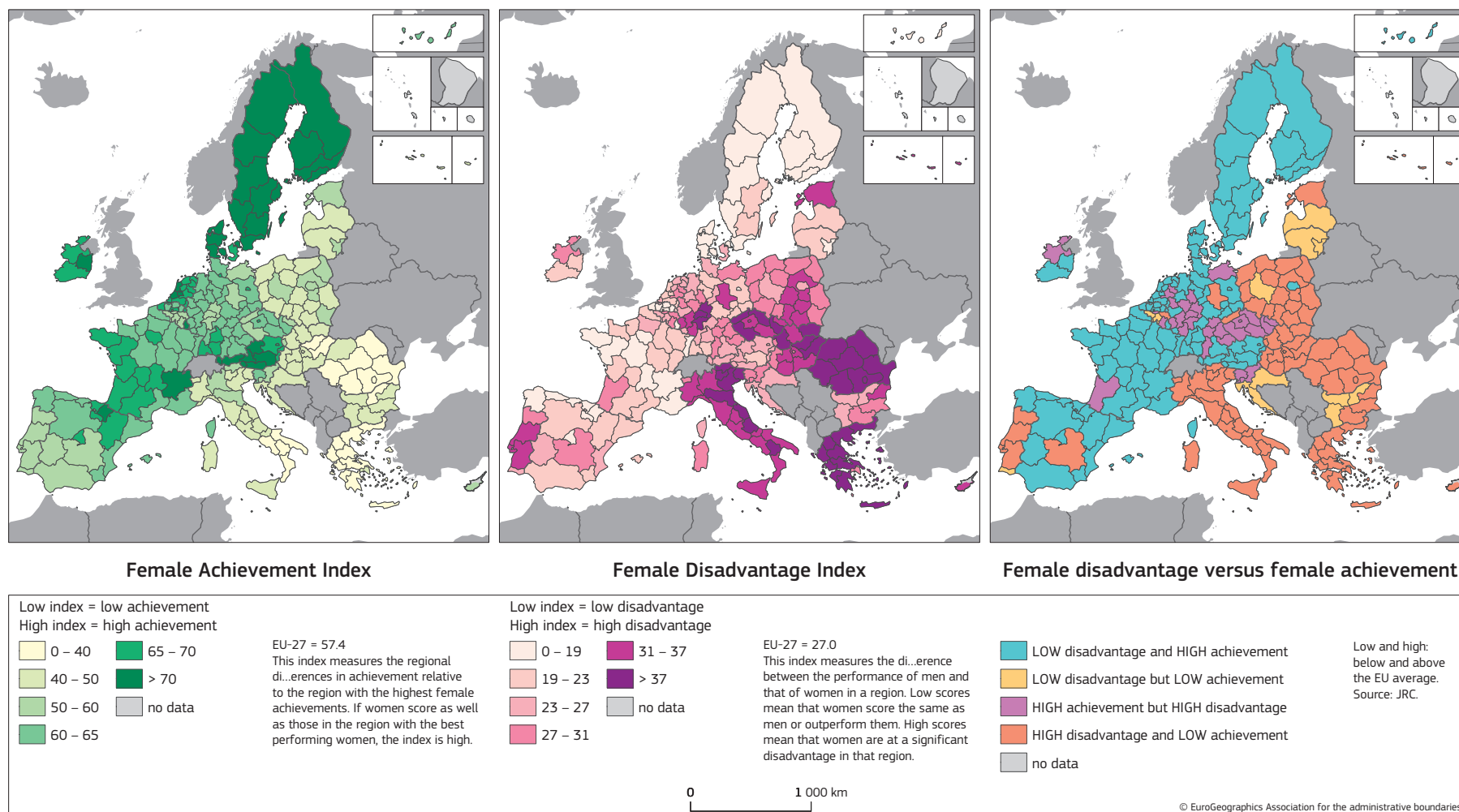
≤ -25	-10 – -5
-25 – -20	-5 – -1
-20 – -15	no data
-15 – -10	

Percentages are based on all respondents excluding don't know and refused to answer.
Question: Do you feel safe walking alone at night in the city or area where you live?
Source: Gallup World Poll (WP113).

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Map 5.29 Female Achievement and Disadvantage Index, 2021



Box 5.10 The Regional Gender Equality Monitor: the conceptual framework

The Regional Gender Equality Monitor consists of two composite indices: the Female Achievement Index (FemAI) and the Female Disadvantage Index (FemDI). The first measures the level of achievement of women compared with the best performing region, and varies between 0 (lowest performance) and 100 (best performance). The second measures women's performance relative to men, and varies between 0 (signifying parity with men) and 100.

The indices are calculated for 235 NUTS 2 regions and are based on 33 indicators grouped into seven domains: work and money; knowledge; time; power; health; safety, security and trust; and quality of life.

The *work and money* domain measures the extent to which there is access to employment and good working conditions, and gender inequalities in financial resources; the *knowledge* domain covers education attainment, participation in education and training, gender segregation and early leaving from education; the *time* domain covers the time spent in social activities; the *power* domain covers the extent of involvement in decision-making; the *health* domain covers health status and access to health services; the *safety, security and trust* domain covers perceptions of personal safety in the areas where men and women live, and the extent of trust towards family, social circles and authorities; and the *quality of life*

Table 5.7 Regional Gender Equality Monitor 2021

1. Work and money	2. Knowledge	3. Time	4. Power
Full-time and part-time employment rate	Graduates of tertiary education	Regularly participate in a leisure activity	Share of ministers in national governments
Unemployment rate	Formal or non-formal education and training	Donated money to a charity	Share of members in national parliaments
Employed with tertiary education	Early leavers from education and training*	Helped a stranger who needed help	Share of members in regional assemblies
Mean monthly earnings	Young people neither in employment nor in education and training	Volunteered time to an organisation	Share of members of regional executives
			Share of members of local/municipal councils
5. Health	6. Safety, security and trust	7. Quality of life	
Self-perceived good or very good health	Safety at night	Feel well-rested	
Health problem that prevents from living a normal life	Relatives and friends count on for help	Smile or laugh a lot	
Life expectancy in absolute value at birth*	Women treated with respect and dignity	Experience enjoyment	
Malignant neoplastic and cardiovascular diseases death rate*	Voiced your opinion to a public official	Life satisfaction	
No unmet medical needs		Opportunities to make friends	
No unmet dental needs		Satisfied with the freedom	

33 indicators in FemAI Index

30 indicators in FemDI (missing indicators in FemDI indicated with *)

Maximum number of indicators by domain 6 in: health; and quality of life

Minimum number of indicators by domain 4: in work and money; knowledge; time and; safety, security and trust

domain covers various aspects of this as well as job satisfaction.

Indicators are from different data sources, but mainly Eurostat (EU-LFS and EU-SILC), Gallup world poll and the European Institute of Gender equality (EIGE).

For more details, including, see Norlén et al. (2021) and interactive tools available at: https://ec.europa.eu/regional_policy/en/information/Maps/gender-equality-monitor.

they face disadvantages as men achieve more. This is the case in Czechia, Slovenia and some north-western EU regions.

The third best combination is low achievement and low disadvantage, which means that in the regions concerned low achievement is not because of women being disadvantaged, but because of men and women both achieving less than average. There are only 13 regions where this is the case: three each in Belgium and Bulgaria, two in Croatia and Lithuania, and one each in Latvia, Poland and Portugal.

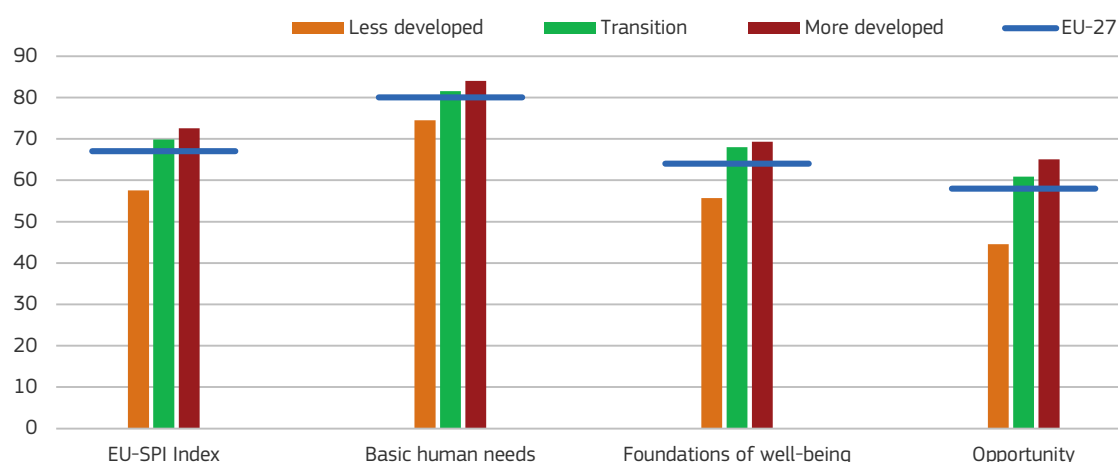
The least favourable combination is low achievement and high disadvantage, which means that women have limited achievement because they are disadvantaged relative to men but also because men's achievement is low as well. The regions concerned account for 36% of the EU population and are mostly less developed ones in the eastern and southern EU.

6. Measuring social progress at the regional level

The EU Regional Social Progress Index (EU-SPI) builds on the approach of the global Social Progress Index, which is aimed at measuring “*the capacity of a society to meet the basic human needs of its citizens, establish the building blocks that allow peoples and communities to enhance and sustain the quality of their lives, and create the conditions for all individuals to reach their full potential*”. Economic indicators are excluded from the EU-SPI, to allow it to be compared with indicators such as GDP per head.

The 2020 edition indicates a score of 67 out of 100 for the EU as a whole, with marked differences between EU regions at different stages of economic development (Map 5.30). Nordic regions

Figure 5.25 EU Regional Social Progress Index 2020, by group of regions

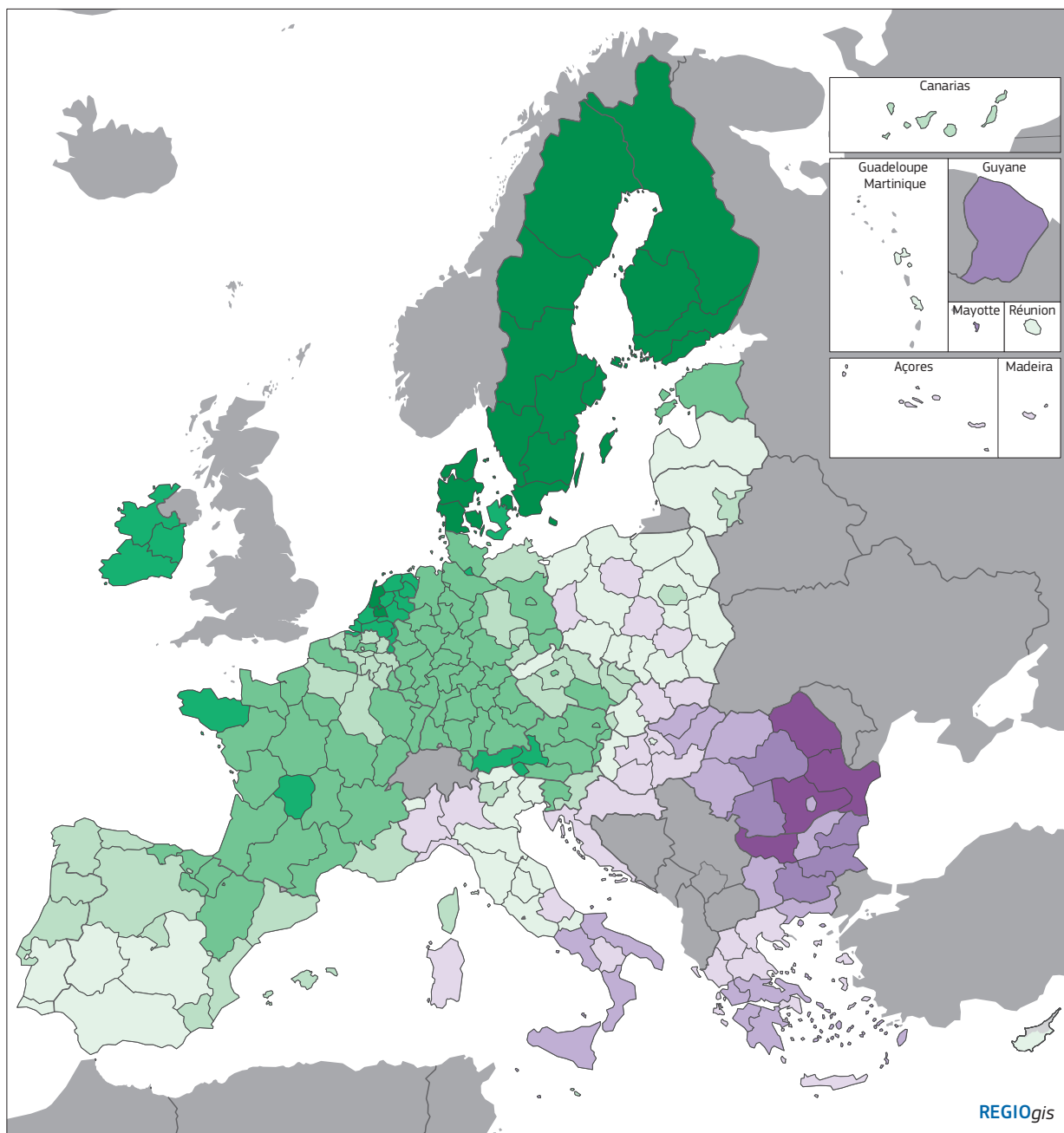


Source: Annoni and Bolsi (2020), DG REGIO calculations.

score relatively highly, while regions in the south and east of the EU tend to have low scores. All the top 10 regions are located in Sweden, Finland or Denmark, Övre Norrland in Sweden having the highest score, as in the 2016 version of the index. Regions in the bottom 10 are mostly in Bulgaria and Romania but also include the two French outermost regions of Guyane and Mayotte.

Whereas more developed regions have an average score of 73 and transition regions one of 70, the score for less developed regions is only 58 (Figure 5.25).

Although the EU — as a whole — scores well on the basic components (80 out of 100), it does less well on the foundations of well-being (64) and even less well on the opportunity dimension (58) (Map 5.31). Most regions score well on basic human needs, except for those in Romania and Bulgaria. There are larger differences for the other two dimensions, for which a clear spatial pattern emerges, with regions in the south and east EU having low scores for the opportunity dimension in particular.



Map 5.30 European Regional Social Progress Index, 2020

Index

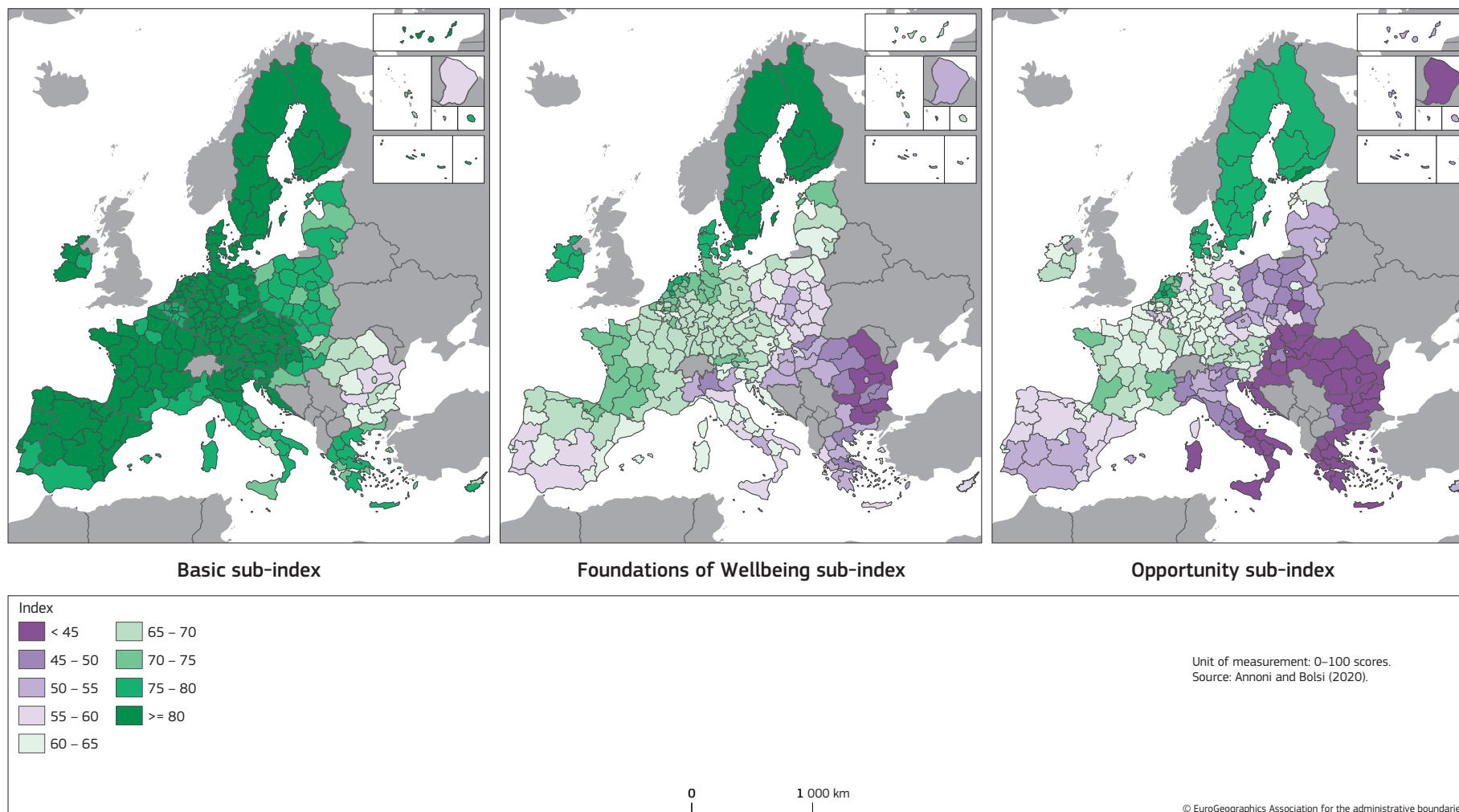
< 45	65 – 70
45 – 50	70 – 75
50 – 55	75 – 80
55 – 60	>= 80
60 – 65	

Unit of measurement: 0–100 scores.
Source: Annoni and Bolsi (2020).

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Map 5.31 European Regional Social Progress Index — sub-indices, 2020



Box 5.11 EU-SPI: the EU Regional Social Progress Index (SPI)

The EU-SPI is a composite indicator, first published in 2016. The 2020 edition is based on 55 individual social and environmental indicators.

The index includes three dimensions of social progress: basic human needs; foundations of well-being; and opportunity — each of which has four components.

The index is based on the assumption that these three dimensions are necessary to describe social progress. Basic needs have to be satisfied to achieve good levels of social development; the foundation dimension includes more advanced factors of social and environmental progress; and the opportunity di-

mension includes the 'most advanced' elements of a cohesive and tolerant society. From a policy perspective, these three dimensions involve different levels of difficulty. It is, for example, easier to satisfy basic needs than to improve societal attitudes.

Data come from a range of sources, including Eurostat, Gallup World Poll, DG REGIO, the European Environmental Agency and the European Institute for Gender Equality.

For more details see: Annoni and Bolsi (2020) and https://ec.europa.eu/regional_policy/en/information/Maps/social_progress2020.

Table 5.8 2020 European Union Regional Social Progress Index

Basic human needs	Foundations of wellbeing	Opportunity
1. Nutrition and basic medical care Mortality rate before 65 Infant mortality Unmet medical needs Insufficient food 2. Water and sanitation Satisfaction with water quality Lack of toilet in dwelling Uncollected Sewage Sewage treatment 3. Shelter Burden cost of housing Housing quality due to dampness NEW Overcrowding Adequate heating 4. Personal security Crime NEW Safety at night Money stolen NEW Assaulted/Mugged NEW	5. Access to basic knowledge Upper secondary enrolment rate age 14-18 Lower secondary completion rate Early school leavers 6. Access to information and communications Internet at home Broadband at home Online interaction with public authorities Internet access NEW 7. Health and wellness Life expectancy Self-perceived health status Cancer death rate Heart disease death rate Leisure activities NEW Traffic deaths 8. Environmental quality Air pollution NO ₂ NEW Air pollution ozone Air pollution PM ₁₀ Air pollution PM _{2.5}	9. Personal rights Trust in the national government Trust in the legal system Trust in the police Active citizenship NEW Female participation in regional assemblies NEW Quality of public services 10. Personal freedom and choice Freedom over life choices Job opportunities NEW Involuntary part-time/temporary employment NEW Young people not in education, employment or training NEET Corruption in public services 11. Tolerance and inclusion Impartiality of public services Tolerance towards immigrants Tolerance towards minorities Tolerance towards homosexuals Making friends NEW Volunteering NEW Gender employment gap 12. Access to advanced education and LLL Tertiary education attainment Tertiary enrolment Lifelong learning Female life-long education and learning NEW
55 indicators 14 new to this edition <i>Source: Annoni and Bolsi, 2020.</i>	Maximum number of indicators by component: 7 in Opportunity/Tolerance and inclusion Minimum number of indicators by component 3 in Foundations of wellbeing/Access to basic knowledge	



Chapter 6

A Europe closer to its citizens

- EU has not yet started to shrink, but already 1 in 3 people live in a region that lost population over the past decade.
- Because of a declining number of women of child-bearing age, and a fertility rate that has been below replacement level for four decades, projections show that the EU population will start to shrink in the coming decades. The share of the population living in a shrinking region is projected to reach 50% by 2040.
- Life expectancy has been increasing and converging within the EU over the past decade, but disparities remain substantial. Life expectancy is particularly low in eastern rural regions, whereas in the north-western Member States rural life expectancy is much the same as, or higher than, that in urban regions.
- Thanks to a high and increasing life expectancy and the ageing of the baby-boom generation, the population aged 65 and over is projected to grow in virtually all regions, whereas the number of working-age people, teenagers and children is projected to decline. Reductions are projected to be more than double the EU average in many southern and eastern regions.
- People in rural areas in the EU are, on average, equally satisfied with life as those in cities. Whereas in eastern Member States more city dwellers are satisfied with life than rural residents, the reverse is the case in north-western ones.
- Household incomes are higher on average in cities than in rural areas in almost all Member States. In the north-west of the EU, however, more rural households are satisfied with their financial situation than households in cities. This may be due to the high and growing cost of housing in the latter compared with the former.
- Rural residents have to travel further than their urban counterparts to reach many public and private services. Although some local services are situated within walking or cycling distance, rural residents tend to have to rely on cars or buses to reach most services.
- Regional centres offer more services to people living in the surrounding area than other settlements of the same size. Those villages, towns and smaller cities that are the largest settlement within a 45-minute drive are more likely to have shops, primary and secondary schools, banks, doctors, pharmacies, hospitals and a university — meaning that they can function as an economic and social anchor-point for the wider region.
- Compared with city dwellers, rural residents are less likely to trust the EU, say that their voice counts in the EU or feel attached to the EU. This urban-rural divide can contribute to political polarisation. Rural residents are more likely to trust regional and local government, highlighting the importance of involving the latter in regional and local development strategies.

Chapter 6

A Europe closer to its citizens

1. Demographic change

Throughout the 1960s, 1970s and 1980s, natural growth was the main source of the increase in the population of the EU. Every year, more babies were born than people who passed away. On average, natural growth added two million people per year to the EU population over this period. Natural growth, however, steadily declined over these three decades (Figure 6.1). Over this period, migration had a relatively small impact, adding only 150 000 people per year to the total population, and in some years more people moved out of the EU than moved in.

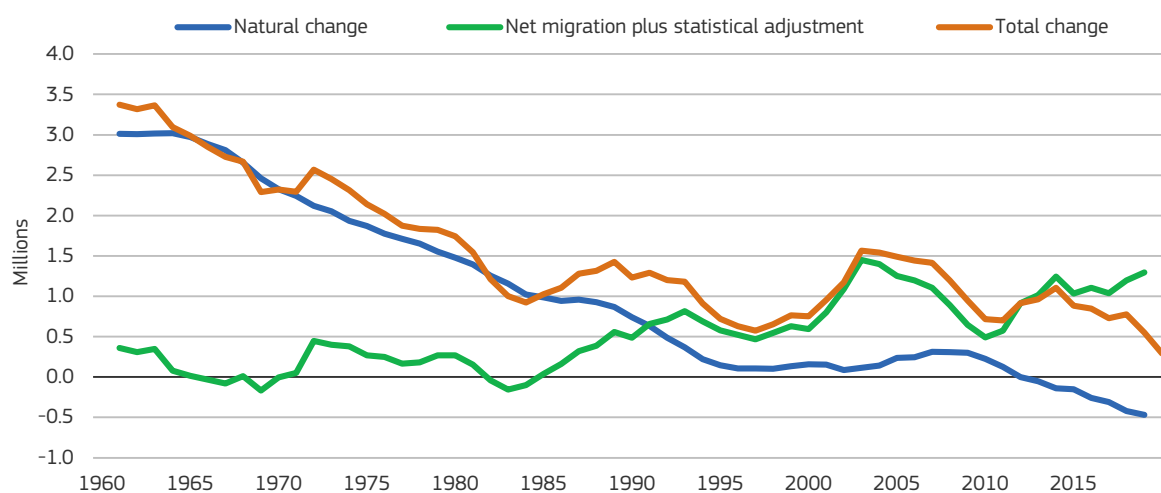
Since 1992, migration has contributed more than natural change to population growth in the EU. During the 1990s and 2000s, natural growth was low, adding only 250 000 people per year to the population compared with 800 000 from migration. In the 2010s, natural growth became negative, leading to a natural reduction in the population of 150 000 per year, whereas migration added one million per year.

The higher levels of net inward migration since 2000 have led to an increase in the population born outside the EU. In 2020, the share of the population born outside the EU reached 8%, up from 6% in 2011. The total foreign-born population, including those born in other EU Member States, reached 12% in 2020, compared with 10% in 2011 and 8% in 2001.

The increase in the foreign-born population was mainly concentrated in the southern and north-western Member States, where it increased (respectively) from 5% of the total to 12%, and from 11% to 16% (Figure 6.2). This puts the north-west of the EU slightly ahead of the USA, which had a foreign-born population share of 14% in 2019¹. In the east of the EU, the share of the foreign-born population is much smaller (4% compared with

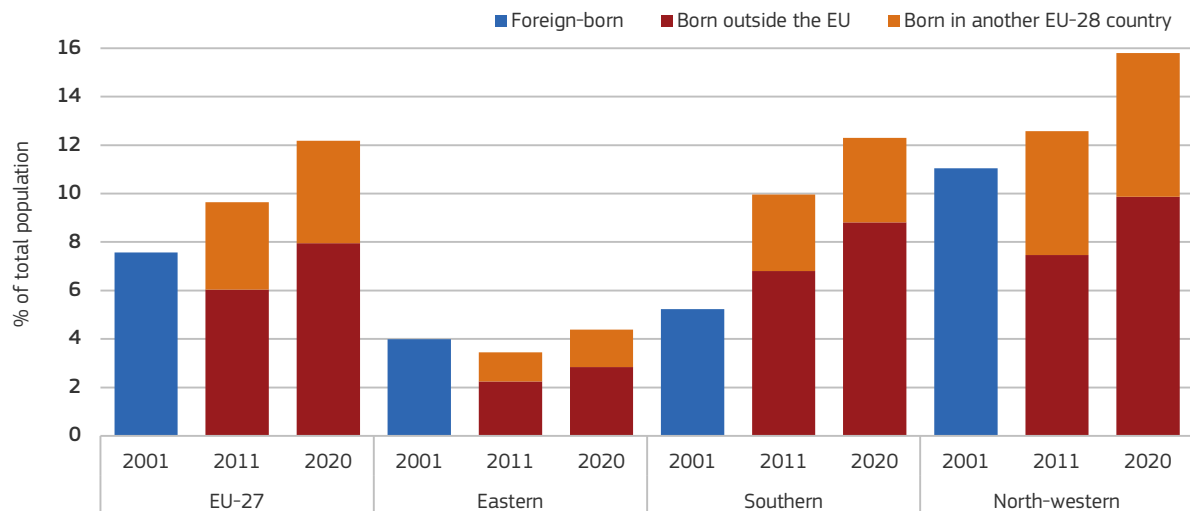
¹ Movement within the EU is considerably easier than moving to the USA from abroad, but harder than moving within the USA. As a result, neither the share of foreign-born people nor the share of those born outside the EU is the exact equivalent to the foreign-born in the USA. The share of the non-EU-born in the north-western EU is 10%, which is lower than the share of the foreign-born in the USA.

Figure 6.1 Total change in population, natural change and net migration in the EU, 1961-2019 (three year rolling average)



Source: Eurostat [demo_gind].

Figure 6.2 Foreign-born population in the EU, 2001–2020



Source: Eurostat 2001 [cens_01nscbirth], 2011 [cens_11cob_n], 2020 [migr_pop3ctb].

12% in the EU as a whole). It has also not changed much over the past two decades.

1.1 During the 2010s deaths outnumbered births

During the 2010s, the EU population grew by 1.9 per 1 000 inhabitants per year (Table 6.1). This was considerably slower than in the 2000s, when the rate was 2.9 per 1 000. In the 2010s, the natural change was negative (−0.3 per 1 000), but this was offset by net inward migration (of 2.2 per 1 000). Over this period, the highest population growth rate was in the north-western EU (4 per 1 000 inhabitants per year) through a combination of a positive natural change and net inward migration (Map 6.1). Population growth in the southern EU was lower, as a result of a larger natural reduction and a similar net migration rate. The population in the eastern EU declined (by 2 per 1 000) because of net outward migration and a significant natural reduction.

In all three geographic regions, natural change and net migration follow the same pattern: they are highest in urban regions, and lowest (and often negative) in rural ones (Table 6.2). This leads to substantial differences in demographic trends, with relatively high population growth in urban re-

gions in the north-western EU (7 per 1 000 residents) and significant decline in rural regions in the east and south of the EU (4 per 1 000 residents). The natural change is negative or close to zero in urban, intermediate and rural regions in three geographic regions of the EU, with only one exception: north-western urban regions. This underlines the importance of migration for total population change. Net migration is positive for all three types of region at the EU level, but much more so for urban than rural regions (3.3 per 1 000 as against 0.4). Net inward migration offset a negative natural change in north-western rural regions, southern intermediate regions and eastern urban regions. Only eastern intermediate and rural regions had net outward migration, which further added to the natural reduction in population.

Table 6.1 Natural population change, net migration and total population change, 2010–2019

Average annual change per 1 000 residents	Natural population change	Net migration	Total population change
EU-27	-0.3	2.2	1.9
North-western EU	0.8	3.6	4.4
Southern EU	-1.1	2.1	1.0
Eastern EU	-1.6	-0.4	-2.1

Source: Eurostat [demo_r_gind], DG REGIO calculations.

Map 6.1 Total population growth, natural growth and net migration, 2010–2019

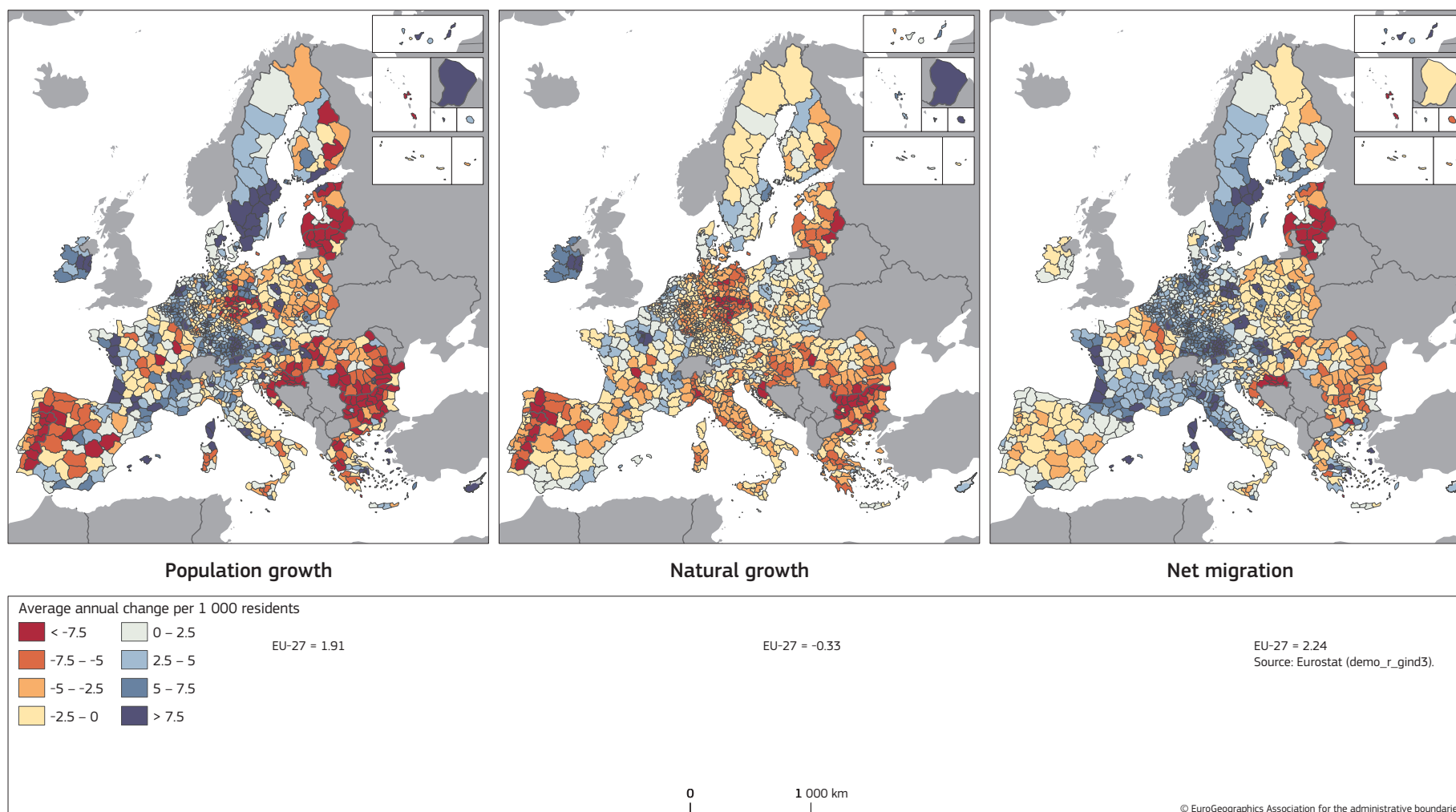


Table 6.2 Natural population change, net migration and total population change by urban-rural regional typology and by type of metro region, 2010–2019

<i>Average annual change per 1000 residents</i>	<i>Natural population change</i>	<i>Net migration</i>	<i>Total population change</i>	<i>Average annual change per 1000 residents</i>	<i>Natural population change</i>	<i>Net migration</i>	<i>Total population change</i>
North-western EU				North-western EU			
Urban	2.5	4.1	6.6	Capital metro	5.1	3.3	8.4
Intermediate	0.1	3.8	3.9	Other metro	0.5	4.5	5.0
Rural	-1.3	2.5	1.2	Non-metro	-0.8	2.7	1.8
Southern EU				Southern EU			
Urban	0.0	2.5	2.6	Capital metro	1.0	2.7	3.7
Intermediate	-1.7	1.9	0.2	Other metro	-0.5	2.5	2.0
Rural	-4.7	1.0	-3.7	Non-metro	-2.5	1.5	-1.0
Eastern EU				Eastern EU			
Urban	-0.5	2.7	2.2	Capital metro	-0.3	4.7	4.5
Intermediate	-1.9	-0.4	-2.3	Other metro	-1.0	0.2	-0.7
Rural	-1.9	-2.3	-4.2	Non-metro	-2.4	-2.3	-4.7
EU-27				EU-27			
Urban	1.2	3.3	4.5	Capital metro	2.7	3.5	6.2
Intermediate	-0.9	2.1	1.2	Other metro	0.0	3.2	3.2
Rural	-2.0	0.4	-1.6	Non-metro	-1.8	0.8	-1.0

Source: Eurostat [demo_r_gind], DG REGIO calculations.

Examining the changes by metro region shows that the fastest total population growth occurred in the capital metro regions, whereas in the non-metro regions it grew more slowly or declined. In the north-west of the EU, all three types of region experienced population growth. In the southern EU, only the metro regions grew, while in the eastern EU only the capital metro regions grew. The high population growth rates in the capital metro regions is likely to lead to pressure on the housing market and more demand for public and private services.

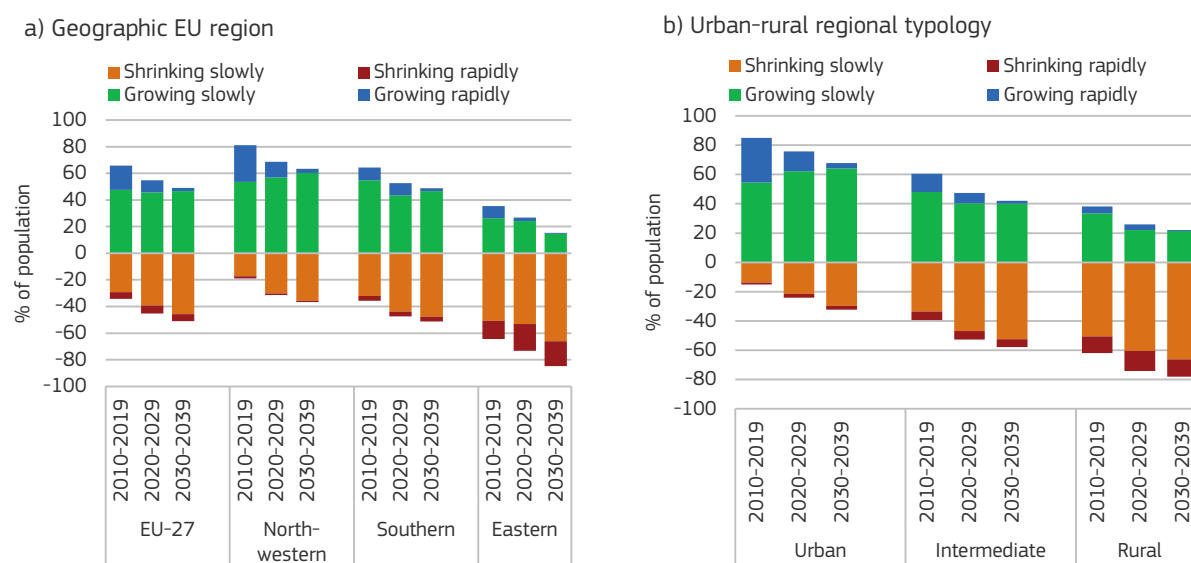
1.2 More and more regions will need to adjust to a shrinking population

The population reductions in the eastern EU mean that 2 out of 3 people there lived in a region that lost population over the past decade. This was the case for only 1 out of 5 people in the north-west of the EU and 1 out of 3 in the south of the EU (Figure 6.3). Projections indicate that the share of people in the EU living in a shrinking region will increase from 34% in 2020 to 45% in 2030 and

51% in 2040. This will affect all three geographic regions, with the share of the population living in a shrinking region increasing by around 18 pp between 2020 and 2040, with urban, intermediate and rural regions being affected equally.

Taking account of the speed of change, the proportion of people living in rapidly growing regions is likely to shrink over time (from 18% of the EU total in 2020 to 2% in 2040), while the share living in rapidly declining (or depopulating) regions is likely to remain stable (at about 5%). Rapid reduction primarily affects people living in eastern regions (14% in 2020 and 30% in 2030). Southern regions have a smaller share of people living in a rapidly shrinking region (4% and projected to remain stable), while in the north-western EU rapidly shrinking regions are almost entirely absent.

Rapid reductions in population are more likely to occur in rural regions than in urban ones (11% as against 1%) and this gap is likely to remain in the future (14% as against 3% in 2030).

Figure 6.3 Population by type of demographic change by geographic EU region and by urban-rural typology, 2010–2040

Rapid growth is defined as at least 7.5 per 1 000 inhabitants per year; rapid shrinking is -7.5 per 1 000 inhabitants per year.

Source: Eurostat [demo_r_pjangrp3] for the years 2010–2019 and [proj_19rp3] for the years 2020–2029 and 2030–2039. Share of population refers to the population at the end of the period (i.e. 1 January 2020, 1 January 2030 and 1 January 2040 respectively). For some regions, a slightly shorter time period was used for the period 2010–2019.

1.3 Life expectancy is high and converging

Natural population change is calculated by subtracting deaths from births. The number of births depends on the fertility rate and the age structure of the population. A higher fertility rate means more births, as does a larger share of women of child-bearing age. The number of deaths depends on both life expectancy and the age structure. A higher life expectancy means fewer deaths, as does having a lower proportion of older people. Whereas fertility rates and life expectancy are widely known, the impact of the age structure is less prominently reported. This, however, is substantial and difficult to change. It is called ‘population momentum’ to underline this point.

The EU has three key demographic characteristics: 1) a high life expectancy; 2) a stable and relatively low total fertility rate; and 3) as a consequence, an old and ageing population.

The EU has one of the highest life expectancies at birth in the world, 81.3 years in 2019 (Figure 6.4). Outside Europe, only eight countries have a higher

life expectancy². People living in Spain and Italy have the highest expectancy in the EU (84.0 and 83.6 years at birth respectively), while the lowest is in Romania and Bulgaria (75.6 and 75.1 respectively).

Life expectancy at birth increased in all Member States between 2002 and 2019³. At the EU level, it increased from 77.6 in 2002 to 81.3 in 2019. Over this period life expectancy also converged at the national and regional level, because the increase in life expectancy was faster in the Member States and regions with a lower life expectancy.

Life expectancy at birth is below 76 in many parts of Bulgaria and Romania and the eastern regions of Hungary, as well as in Latvia (Map 6.2). In a number of regions, mainly located in France, Italy and Spain but also in southern Sweden, life expectancy is over 83. Infant mortality has a major impact on life expectancy. In the EU, infant mortality is generally low. In 2019, an average of 3.4

² United Nations (2019).

³ It dropped in 2020 due to the COVID-19 pandemic. See Chapter 1 for more detailed analysis.

Figure 6.4 Life expectancy at birth, 2002-2019

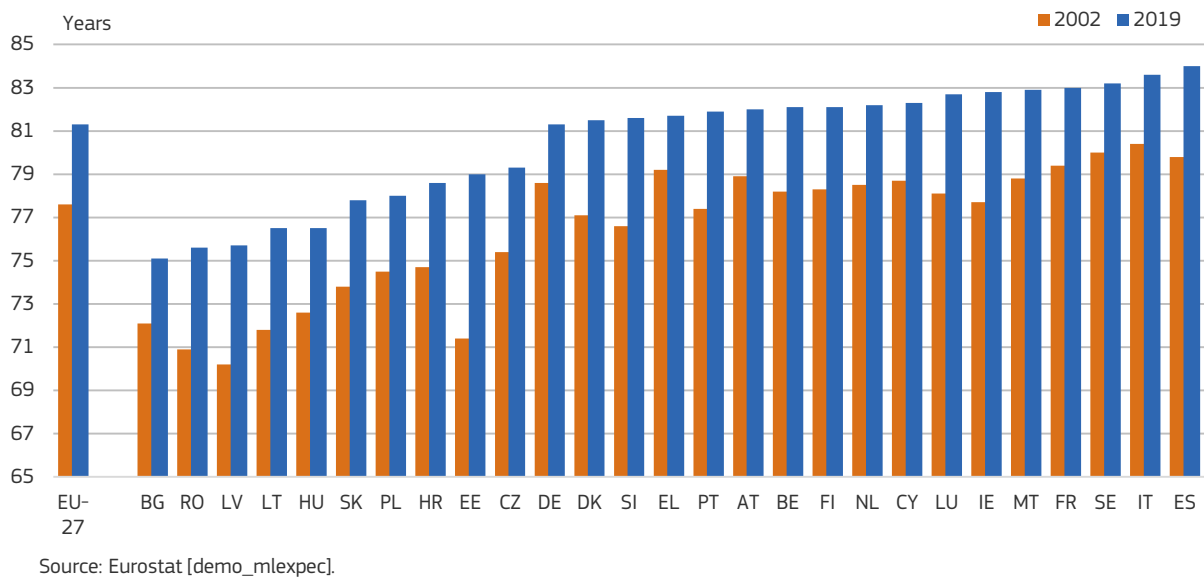
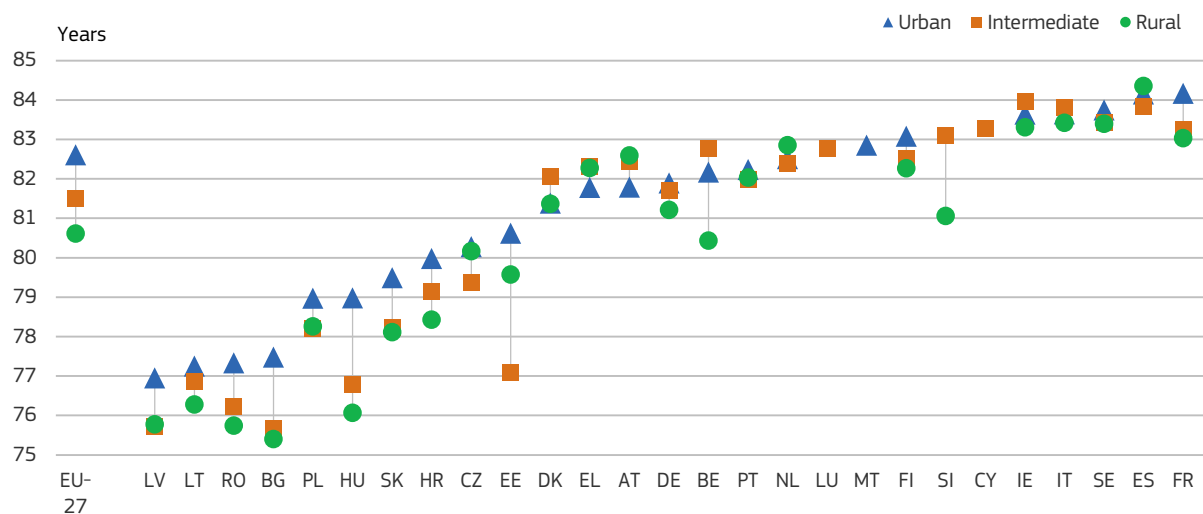


Figure 6.5 Total life expectancy at birth by urban-rural regional typology, 2019



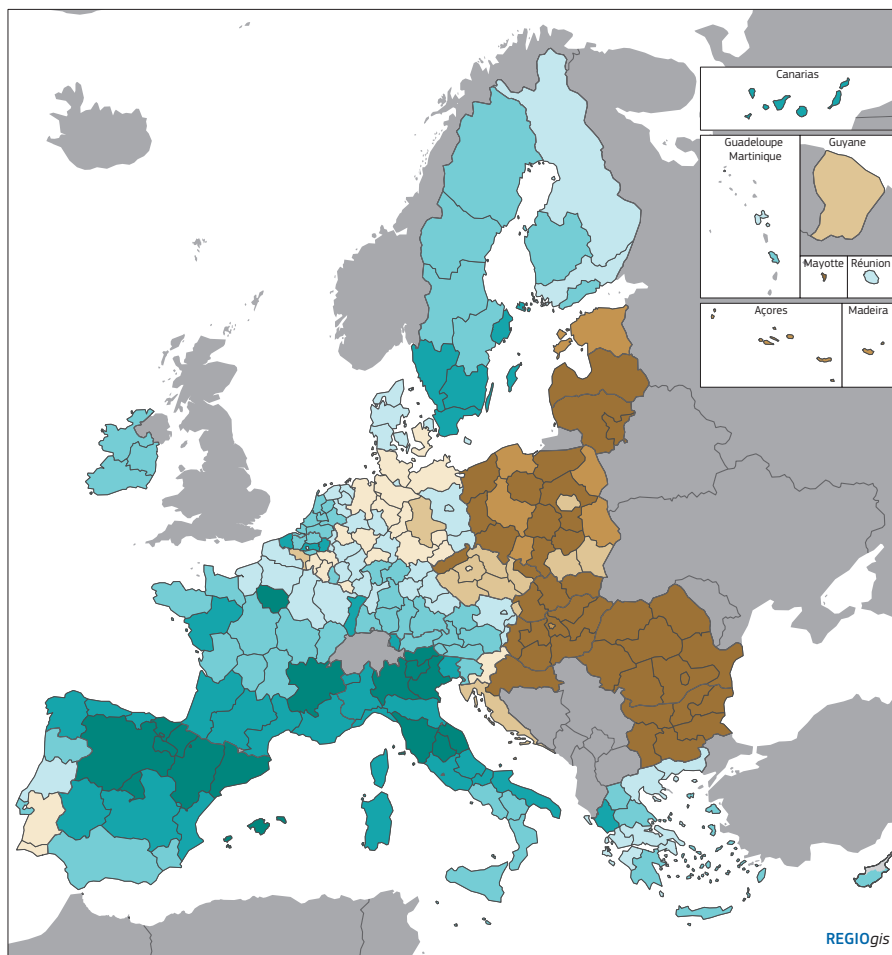
children per 1 000 born alive died before reaching the age of 1. Infant mortality, however, was above 6 per 1 000 in 18 NUTS 2 regions, mainly in Romania, Bulgaria, all the French overseas regions, and the two Spanish regions in North Africa of Ceuta and Melilla (Map 6.3).

On average, life expectancy is four years lower in less developed regions (78.3) than in more developed ones (82.7). The gap, however, has been

shrinking, with larger increases in less developed regions than in more developed ones (Table 6.3).

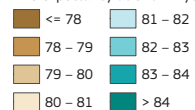
Average life expectancy is two years higher in urban regions than in rural ones (Figure 6.5)⁴. This difference is primarily due to the Member States

4 This new set of life expectancy at birth figures for NUTS 3 regions differs slightly from the national and NUTS 2 figures and should not be compared with the latter. For more information see: Eurostat (2020).



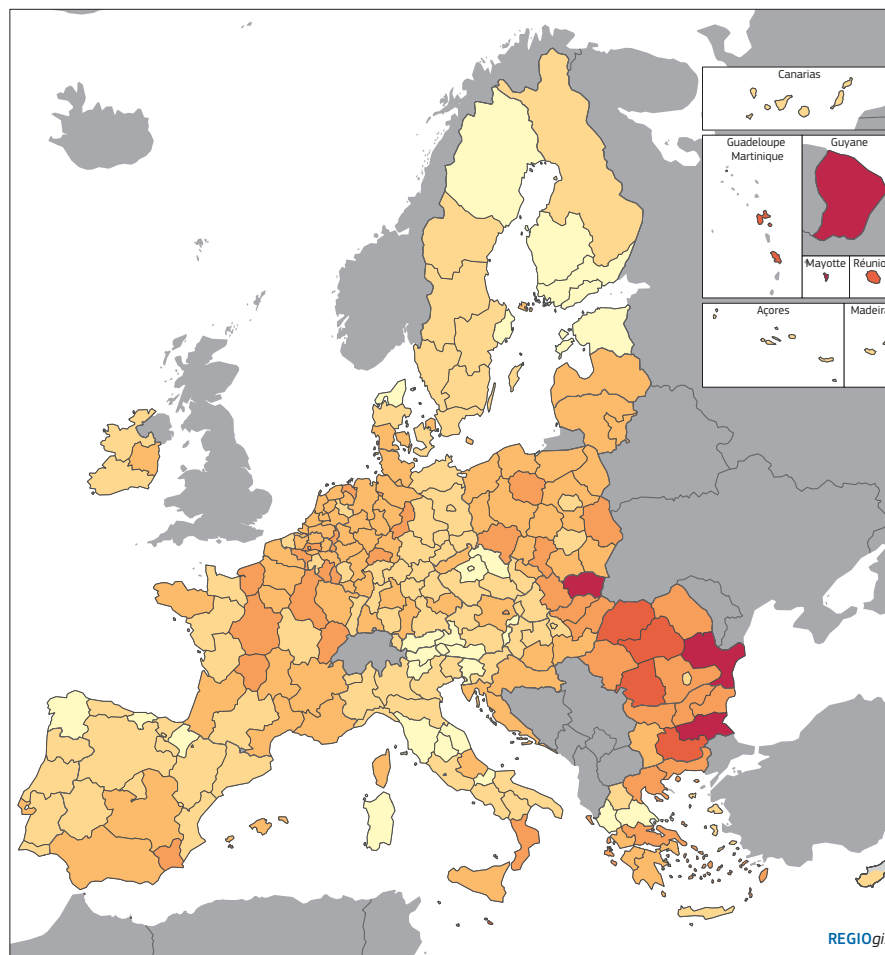
Map 6.2 Life expectancy, 2019

Life expectancy at birth in years



EU-27 = 81.3
Source: Eurostat (demo_r_mlfexp).

0 500 km



Map 6.3 Infant mortality, 2019

Deaths under 1 year of age/1000 live births



EU-27 = 3.4
FRY3: 2017
Source: Eurostat (demo_r_minfind).

0 500 km

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Table 6.3 Life expectancy at birth (years) by type of region, 2009–2019

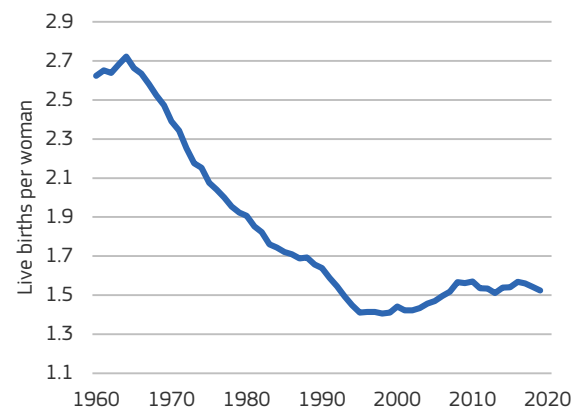
	2009	2019	2009–2019
Less developed	76.4	78.3	1.9
Transition	80.3	82.0	1.7
More developed	81.1	82.7	1.6
EU-27	79.7	81.4	1.7

Source: Eurostat [demo_r_mlifexp], DG REGIO calculations.

with a relatively low life expectancy, where the gap between urban and rural regions tends to be wider. In a number of Member States with a high life expectancy, expectancy is, in fact, higher in rural regions than in urban ones. This is the case in Spain, Austria, Greece and the Netherlands.

1.4 Fertility is low and stable

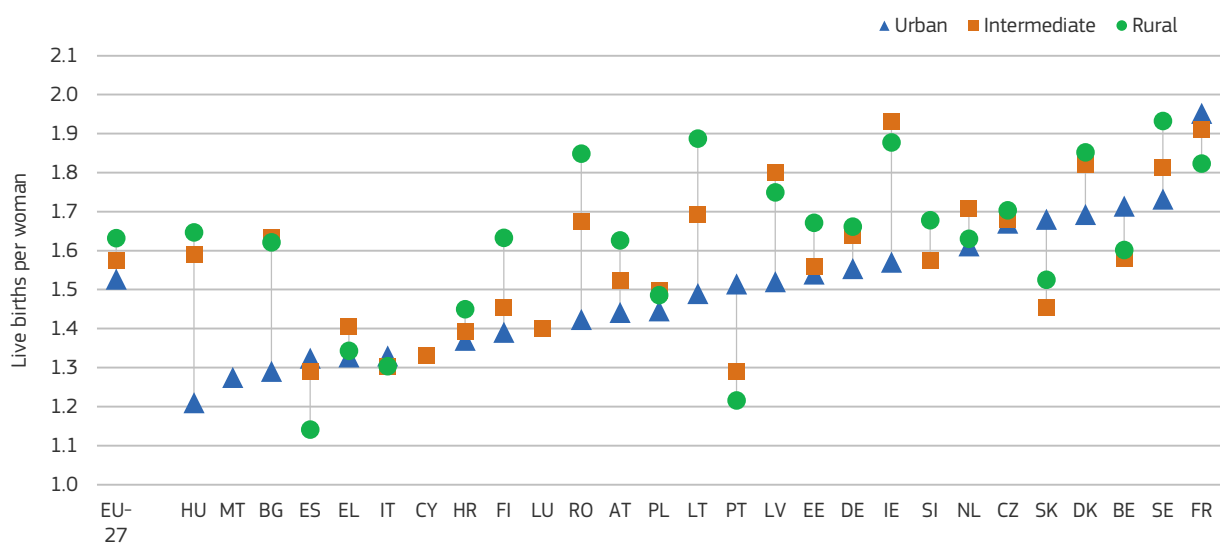
In the EU, a total fertility rate of 2.1 is needed, in the absence of migration, to have a stable population. The last time the overall fertility rate in the EU was this high was in 1975. Since 1990 the rate has hovered around 1.5 (Figure 6.6). As a result, the natural population change became negative in the EU in 2010. Without net inward migration, the

Figure 6.6 Total fertility rate, EU-27, 1960–2019

Source: Eurostat [demo_find], DG REGIO calculations and the Human Fertility Database.

natural change would have become negative even earlier.

Fertility rates differ between and within Member States. At the EU level, fertility rates are slightly higher in rural regions than in urban ones (1.6 vs 1.5). Because the share of women of child-bearing age in rural regions is smaller than in urban regions, rural regions have a lower birth rate despite having a higher fertility rate (Figure 6.7).

Figure 6.7 Fertility rate by urban-rural regional typology, 2019

Source: Eurostat [demo_r_find3].

The gap between urban and rural regions is widest in Bulgaria, Hungary, Lithuania and Romania. In only four Member States is the urban fertility rate higher than the rural (Belgium, Portugal, Slovakia and Spain).

1.5 An ageing baby-boom generation

When the first population pyramid was published in 1874, high birth and death rates meant that it actually resembled a pyramid: wide at the bottom and narrow at the top. Higher life expectancy and low fertility rates in the EU have led to a radically different age structure. Today the EU's population 'pyramid' looks more like a light bulb, narrower at the bottom and wider in the middle before becoming narrow again at the top (Figure 6.8). The wide middle is due to a larger number of births in the past, often referred to as a baby boom.

The EU population aged 0–29 is 44 million (or 24%) smaller than the population aged 30–59. This generation gap is the equivalent of 10% of the EU's total population and is significantly larger than the current number of people born outside the EU (44 million as against 36 million⁵). Although future migration is likely to fill some of this gap, it

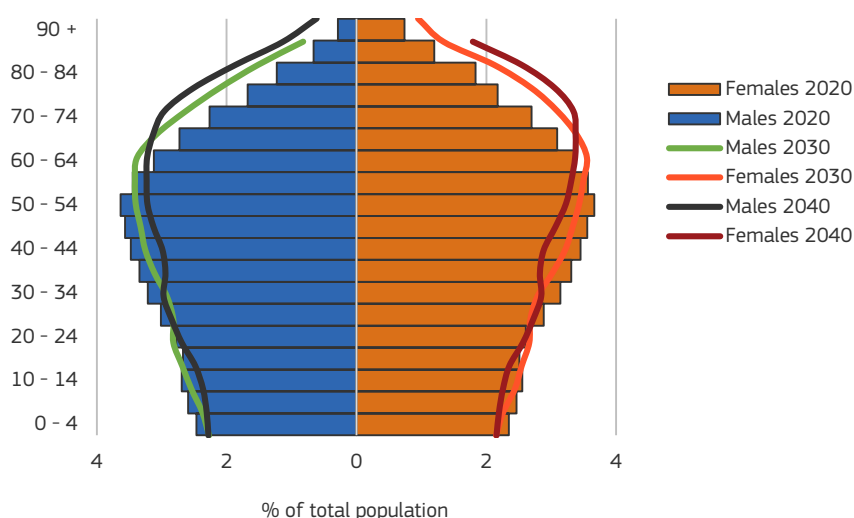
is unlikely to fill the whole gap. As a result, the EU population will start to shrink in the coming years and decades. For example, Eurostat's latest population projections comprise one baseline scenario and five sensitivity tests, and all of them show a declining EU population. The baseline scenario indicates that the population aged 65 and over will grow rapidly, by 18% by 2030, whereas the population younger than this will decline by 5%.

The age structure also has an impact on the birth rate. As the younger generation gets older, the number of women of child-bearing age will diminish, leading to fewer births. If the older generation is substantially larger than the younger generation, as in the case of the EU, the number of women of child-bearing age will decline as time goes on. The population aged 0–29 is smaller than that aged 30–59 in virtually all EU regions (Map 6.4). In regions in northern Spain and eastern Germany, the population aged 0–29 is at least 40% smaller than that aged 30–59. This suggests that the natural change in population will become increasingly negative in these regions and the share of the population aged 65 and older will grow rapidly as compared with other EU regions.

Several of the Irish, French (including all the French outermost regions) and Nordic regions have a population aged 0–29 that is less than 10% smaller than those aged 30–59, which means they are likely to experience a slower reduction in population than in the regions with larger generation gaps.

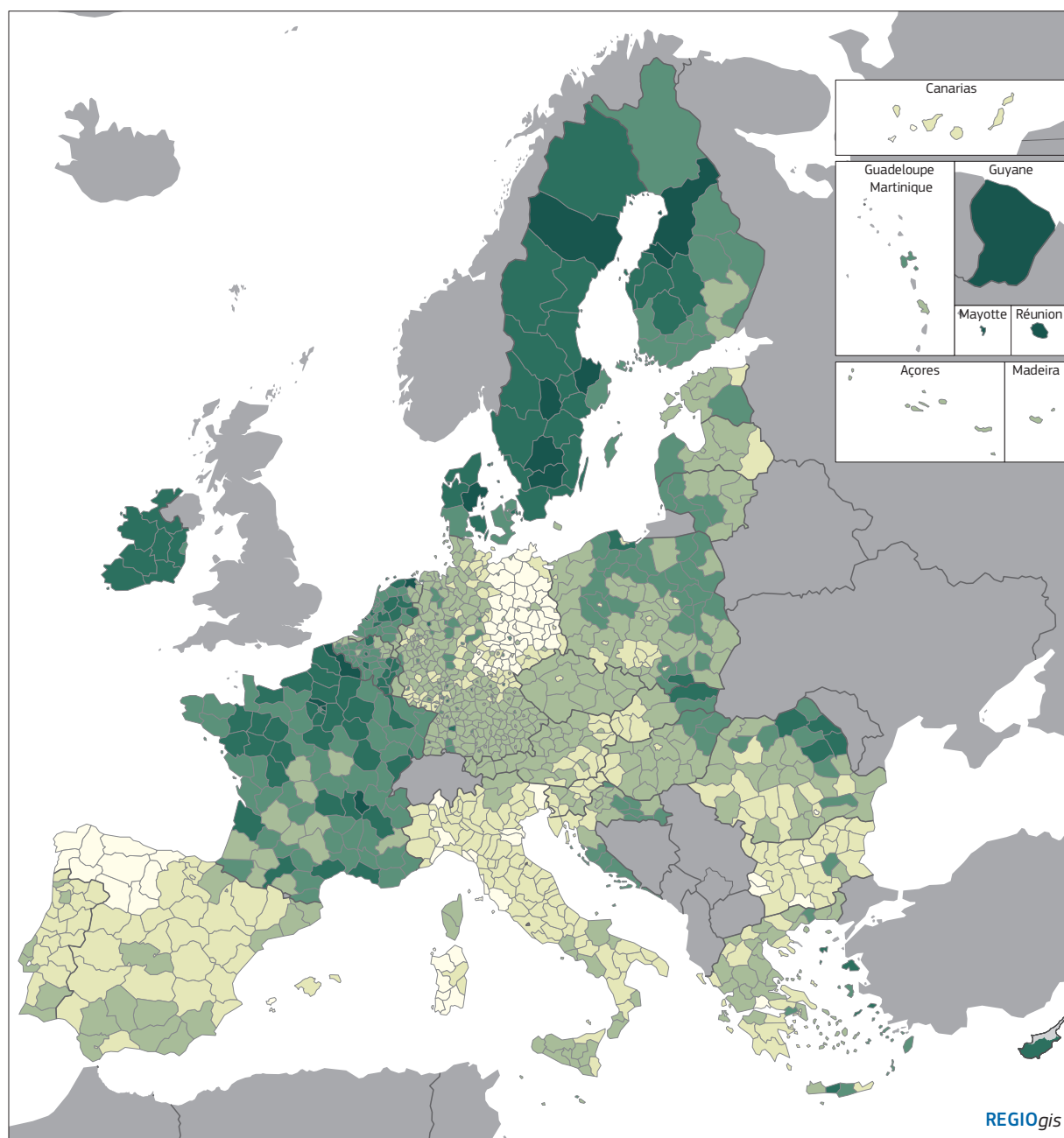
Individual EU regions differ in one fundamental way from the EU as a whole. The age structure of the overall EU population can only be changed by migration from and to the rest of the world, while the age structure of

Figure 6.8 Population pyramid in the EU, 2020–2040

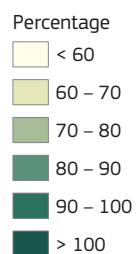


Source: Eurostat [proj_19np].

⁵ Population born outside the EU-28 living in the EU-27 in 2020.



Map 6.4 Population aged 0–29 relative to population aged 30–59, 2020



Source: Eurostat (proj_19rp3).

0 500 km

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an EU region is also affected by movements from and to other regions within the EU. The likelihood of these movements and their direction depend on people's ages. People aged 20–39 are more likely to move to an urban region and to leave a rural region. People aged 40–64 and 65 or over tend to leave urban regions and move to intermediate or rural regions. This means that urban regions may grow by less than the present age structure suggests, because older people move out and rural regions will shrink by less as older people move in.

1.6 Older population is likely to grow, younger age groups to shrink

As EU population growth continues to slow down and the population starts shrinking as projected,

some age groups will continue to grow (Map 6.5). For example, virtually all EU regions will experience an increase in the population aged 65 and over. Only in a few regions in Bulgaria, Greece, Portugal and Romania is this age group projected to decline. In contrast, in many regions in Austria, Ireland, the Netherlands, Poland, Spain and Slovakia this age group is projected to grow by more than 25% over the next decade. This is likely to lead to an increase in the demand for healthcare in these regions, which will have to adapt their infrastructure and services to make them more accessible to people with limited mobility, and increase the capacity of healthcare services.

The working-age population (defined as those aged 20–64) is projected to shrink by 4% over the next decade. This is likely to affect most regions, with

Box 6.1 A recent OECD report highlighted that demographic change can widen territorial disparities in access to services¹

Population decline directly affects the provision of public services by shrinking the pool of potential users, which may force some facilities to close and increase the distance to services for the remaining users. School networks in many EU Member States face constant pressure to adapt to a declining number of pupils in rural areas. Smaller classes and fewer pupils per teacher in rural schools translate into higher costs: the report estimates that the difference in cost per student between cities and sparsely populated rural areas in Europe is about €650 and €681 (respectively) per primary and secondary school child.

To remain efficient and equitable, school networks have to find scale economies wherever they can, while ensuring access to high-quality education for all children. School consolidation, school clusters and networks can improve education quality while saving resources. The report estimates that children in sparsely populated rural areas have to travel on average 4–5 times the distance that those in cities have to. This implies that some schools may continue to operate under capacity to ensure adequate access, especially for children who cannot travel far independently.

Providing healthcare services outside cities requires a delicate balance between accessibility and cost-efficiency. Countries may have service locations that are close or are cost-efficient, but no country can offer both short distances and low costs for these services.

Adapting to demographic change requires concentrating the provision of some services, such as maternity and obstetrics, that will face reduced demand in many countries, and expanding and dispersing the provision of services related to ageing, such as cardiology, especially in rural areas. By 2035, the number of cardiology service locations per user in the EU is expected to increase on average by 20%, with the highest expected increases in Slovenia (88%), Ireland (71%) and Denmark (64%). In turn, the number of maternity and obstetrics service locations is expected to fall by 4%, with the largest reductions in Latvia (67%), Slovakia (56%) and Lithuania (44%). Investment will have to keep pace with these changing demands to avoid the over- and under-provision of services, while ensuring sufficient proximity to care.

1 OECD (2021b).

Map 6.5 Change in population by age group, during the years 2020-2029

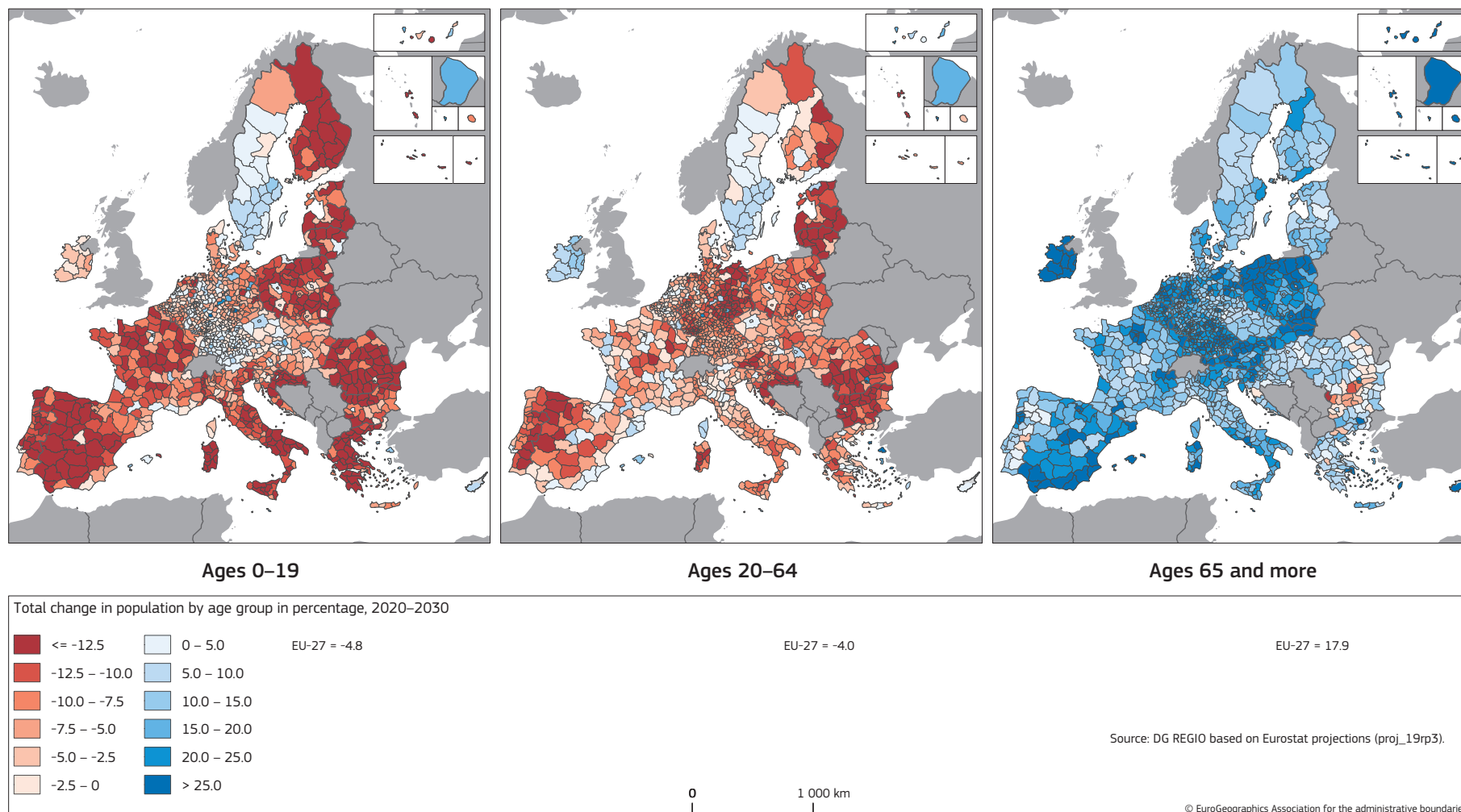


Table 6.4 Demographic change in the outermost regions, 2010-2030

	Natural population change	Net- migration	Total population change	Total population change	Share of population 0–19	Share of population 20–64	Share of population 65+	Change in population aged 0–19	Change in population aged 20–64	Change in population aged 65+
	2010–2019		2020–2029		1/1/2020			Between 1/1/2020 and 1/1/2030		
	Average annual change per 1000 residents				% of total population			Total change (%)		
EU-27	-0.3	2.2	1.9	0.3	20	59	21	-4.8	-4.0	18
Martinique	2.6	-11.1	-8.8	-8.8	22	56	23	-20	-20	30
Guadeloupe	4.5	-12.9	-8.4	-8.2	24	55	20	-19	-17	30
Região Autónoma da Madeira	-2.3	-2.5	-4.7	-3.7	19	64	17	-19	-7.4	28
Região Autónoma dos Açores	0.1	-1.8	-1.7	-2.6	22	63	15	-14	-6.6	31
La Réunion	11.7	-6.6	4.3	2.1	30	57	13	-7.8	-4.1	52
Guyane	26.6	-1.0	25.4	20.9	42	52	6	17	17	88
Canarias	0.8	8.5	9.3	9.6	18	65	17	-6.3	5.9	42
Mayotte	33.7	3.0	37.4	26.8	54	43	3	20	31	102

Mayotte change during years 2014-2019 and Guadeloupe 2013-2019

Source: Eurostat demo_r_gind3 and proj_19rp3.

Box 6.2 Demographic developments in EU outermost regions

The EU has nine outermost regions (grouped into eight NUTS 2 regions), with a total population of 5 million¹. They are geographically remote from the continent, in the Caribbean, Macaronesia and the Indian Ocean. These regions can be grouped according to the main demographic trends.

1. Outermost regions with a reduction in population

Portuguese Açores and Madeira, and French Guadeloupe and Martinique, all experienced a reduction in population over the past decade (Table 6.4). Reductions were substantial in the two French regions, because a very high net outward migration offset positive natural change. In the Portuguese regions, reductions were more moderate due to net outward migration and low or negative natural change. Population reductions are projected to continue between 2020 and 2030. The age structure of the population in these regions is similar to the EU, the only significant exception being a smaller share of the older population in the Portuguese regions. Projections indicate that the reduction in the young population (aged 0–19) will be much faster; the reduction in the working-age population (aged 20–65) will also be faster, while the older population (aged 65 and over) will grow faster.

2. Outermost regions with a growing population and net outward migration

Guyane's population grew rapidly between 2010 and 2020 due to a very high natural change and only

limited net outward migration. La Réunion's population grew more slowly due to high natural change, but tempered by a substantial net outward migration. Projections indicate that its population is likely to continue growing, but at a slightly slower pace. Both regions have a much higher share of young people than the EU as a whole and a much smaller share of older people. The young and working-age population is projected to shrink in La Réunion and to keep growing in Guyane. The older population is projected to nearly double in Guyane and increase by 50% in La Réunion.

3. Region with a growing population and net inward migration

The population of Canarias increased over the past decade primarily due to net inward migration, while the population of Mayotte grew the fastest due to the highest natural population change. The age structure of the population in the Canarias is similar to that of the entire EU; whereas that of Mayotte is radically different, with more than half the population aged 0–19 and only 3% aged 65 and over. Projections indicate that Canarias will see a reduction in its young population, but its working-age and especially older population is likely to continue to grow. In Mayotte, all age groups are projected to grow, but its small older population is likely to grow fastest, doubling between 2020 and 2030.

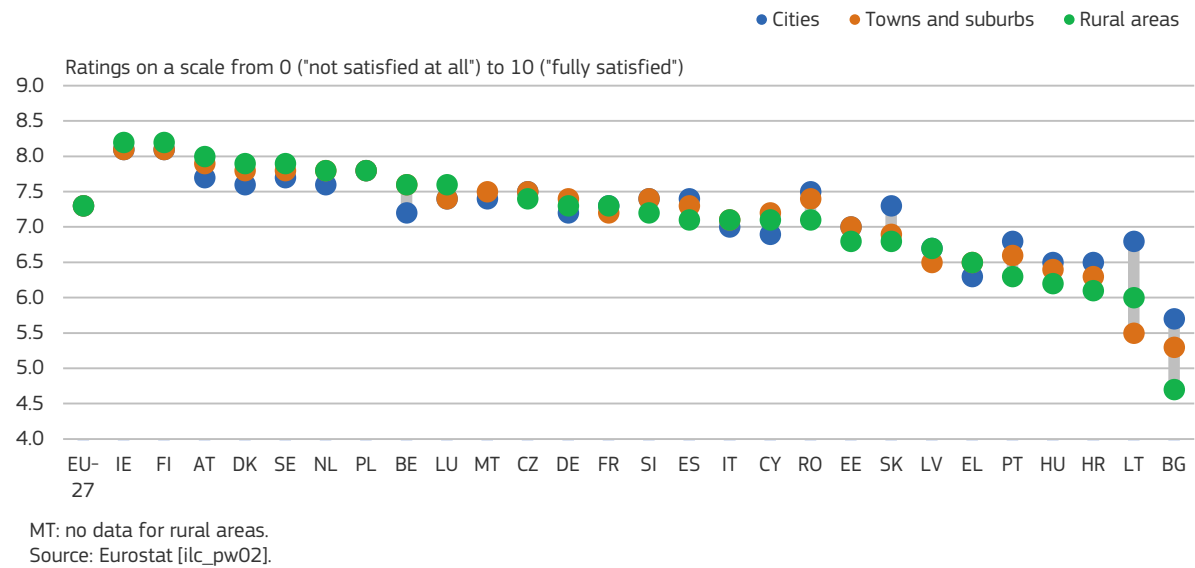
1 The nine outermost regions (Saint-Martin is part of the NUTS 2 region of Guadeloupe) are governed by the provisions of the Treaties and form an integral part of the EU.

some facing reductions of over 10%. This could lead to labour market shortages. It may force companies to choose between investing more in labour-saving and labour-augmenting technologies or foregoing potential growth.

The 0–19 age group is projected to experience a slightly bigger reduction in the EU (of 5%), with many southern and eastern regions facing reductions of over 10%. By contrast, the number of young people is projected to grow in Cyprus, Malta and several regions in Germany and Sweden.

Large reductions in the number of young people are likely to lead to a reduction in the number of schools, which may lead to longer distances to the closest school — especially in rural areas where distances are already relatively long.

Figure 6.9 Overall life satisfaction by degree of urbanisation, 2018



2. People are equally satisfied with life in cities, towns and suburbs, and rural areas

Overall life satisfaction in the EU is identical in cities, towns and suburbs, and rural areas. On a scale from 0 to 10, the average score was 7.3 in 2018 in each of these areas. In the eight Member States

with a national score of 7.5 or higher, people in rural areas were as satisfied as those living in cities or more than satisfied. In contrast, in five of the six Member States with the lowest national scores, people in rural areas were less satisfied than those in cities. This suggests that in Member States with high life satisfaction, rural areas tend to perform better than cities; while in Member States with a low life satisfaction, rural areas tend to perform worse (Figure 6.9).

Figure 6.10 Average rating of job satisfaction by degree of urbanisation, 2018

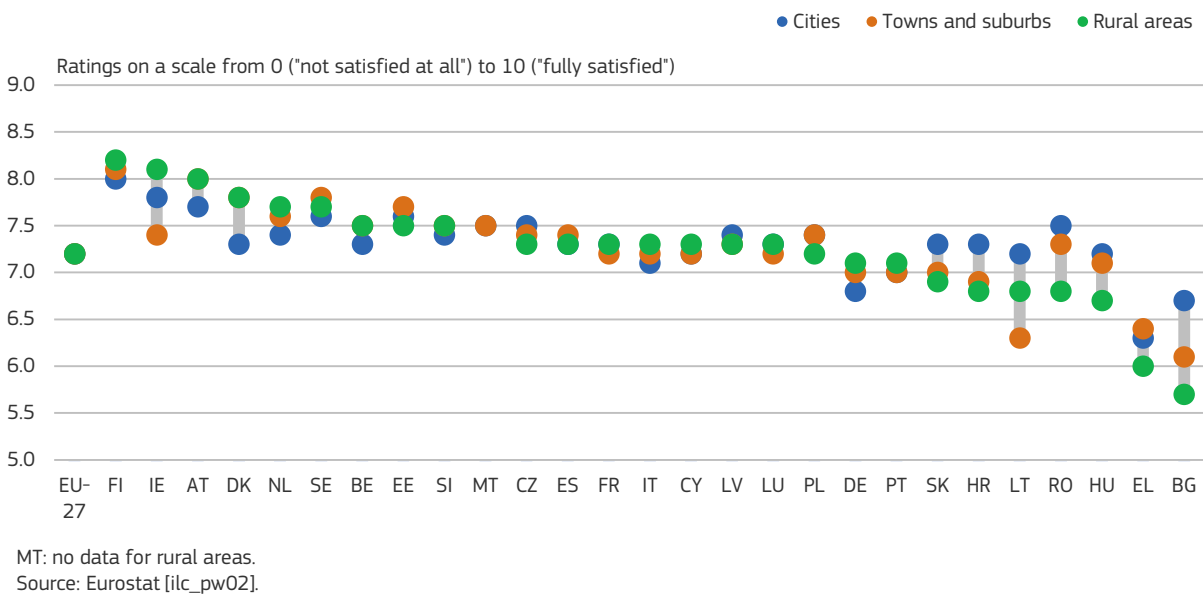
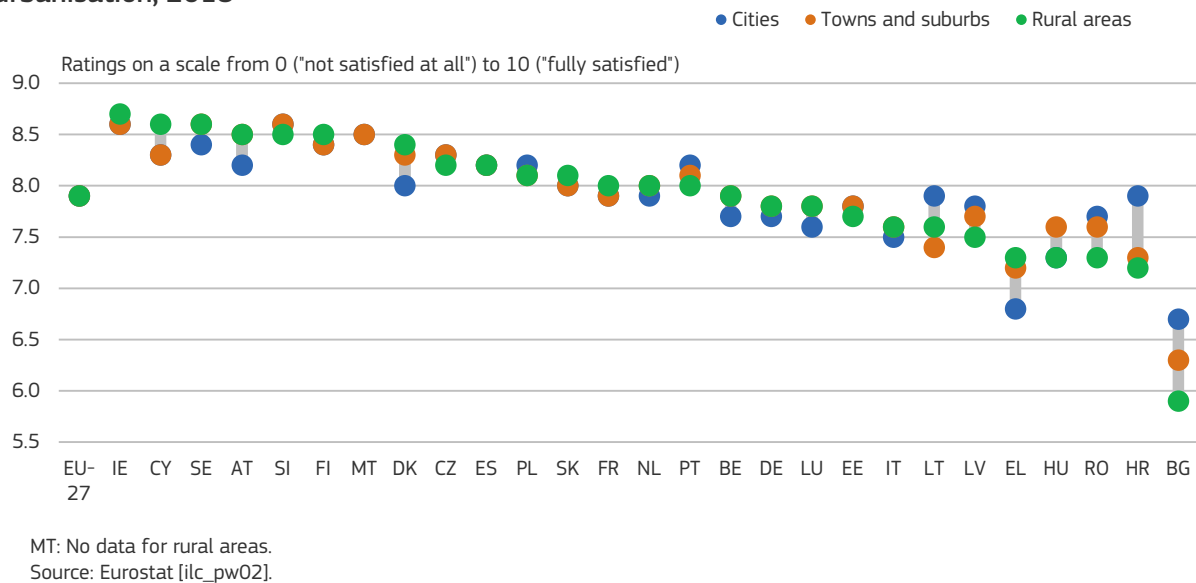
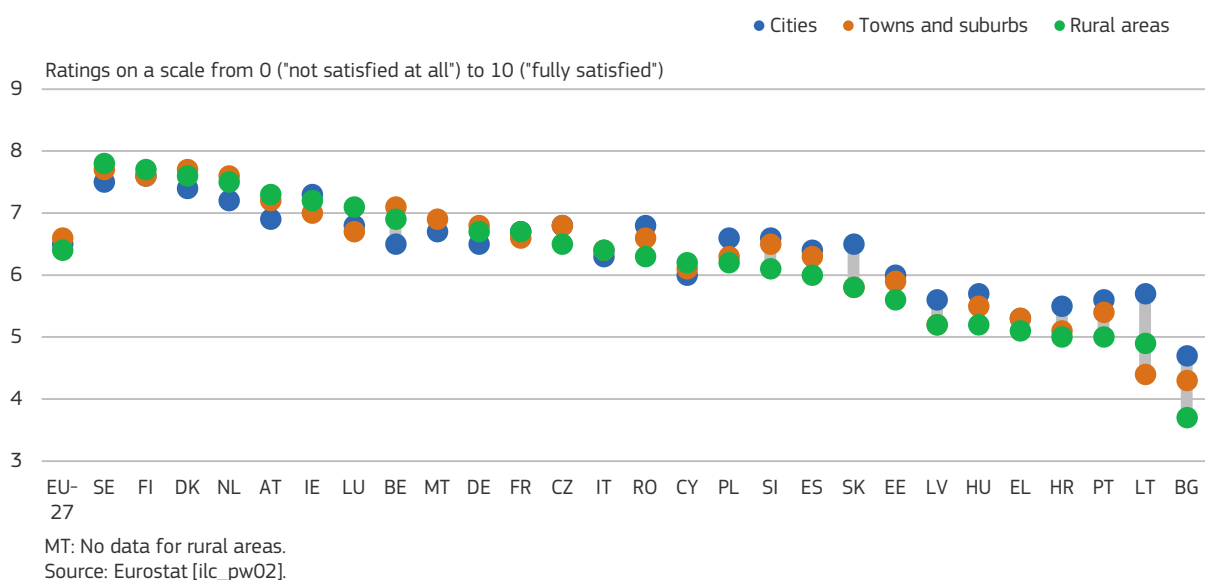


Figure 6.11 Average rating of satisfaction with personal relationships by degree of urbanisation, 2018

There is also a geographic pattern. In all the north-western Member States, people in rural areas were more satisfied with their lives than those in cities. In all eastern Member States, people in cities were more satisfied than those in rural areas — with the exception of Poland, where they were equally satisfied. In the southern Member States, the situation was mixed, with lower satisfaction in rural areas in Spain and Portugal, but higher satisfaction in cities in Greece and Italy.

Job satisfaction (Figure 6.10) and satisfaction with personal relationships (Figure 6.11) are identical at the EU level in cities, towns and suburbs, and rural areas; and there are only minor differences in respect of people's satisfaction with their financial situation (Figure 6.12), with towns and suburbs scoring highest (6.6), followed by cities (6.5) and then rural areas (6.4).

Figure 6.12 Average rating of satisfaction with financial situation by degree of urbanisation,

For all three indicators, the same geographic pattern emerges. People in rural areas in the north-western EU are more satisfied than those living in cities, those in rural areas in the eastern EU are less satisfied (with very few exceptions), and the situation in the southern Member States is mixed.

2.1 Income is higher in cities, but so are property prices

Income differs substantially between Member States and by degree of urbanisation. The lowest income is in rural areas in Romania (just over €6 000 in purchasing power standards — PPS — terms) and the highest in Luxembourg (€39 000 in PPS terms). Unlike satisfaction with the financial situation (Figure 6.12), income is higher in cities than in rural areas in almost all Member States. The income gaps are largest in the eastern EU, and especially in Romania and Bulgaria, where rural incomes are almost half those in cities (Figure 6.13).

Although there is some relationship between income and satisfaction with households' financial situation, it is far from uniform. The link between income and satisfaction is strongest in rural areas (with an R^2 of 61%). It is slightly less close in towns and suburbs (53%), and it is relatively weak

in cities (36%). Higher housing costs in cities could explain why higher incomes do not lead to higher satisfaction. For example, the average price per square metre of housing sold in 2018 was 82% higher in urban regions across the EU than in rural ones (€2 254 in the latter and €1 238 in the former, according to data for 20 Member States (JRC). Moreover, between 2012 and 2018 the price per square metre increased by €417 in urban regions but by only €183 in rural ones, highlighting the pressure on urban real estate.

2.2 Rural residents need to travel further to reach services

In rural areas, settlements tend to be smaller and the population more dispersed. This means that for services that require a certain volume of custom or number of users to be viable, rural residents may often have to travel longer distances. Rural areas can be split into three categories.

1. Villages with a population of between 500 and 5 000 inhabitants.
2. Dispersed rural areas, with a population density between 50 and 300 people per square km.

Figure 6.13 Mean equivalised net household income by degree of urbanisation, 2019

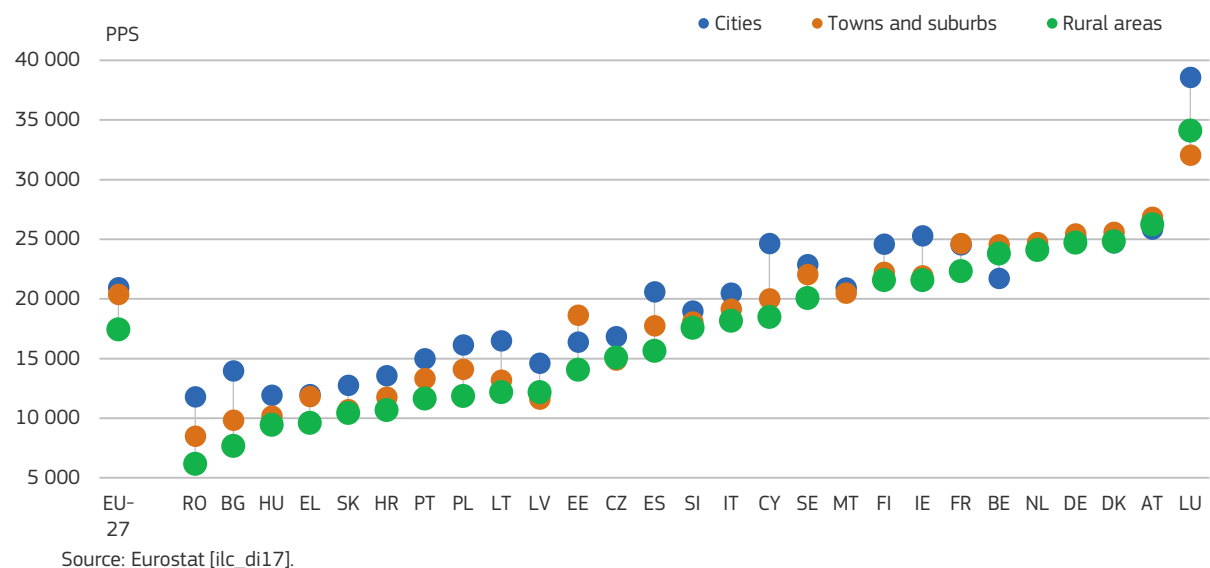
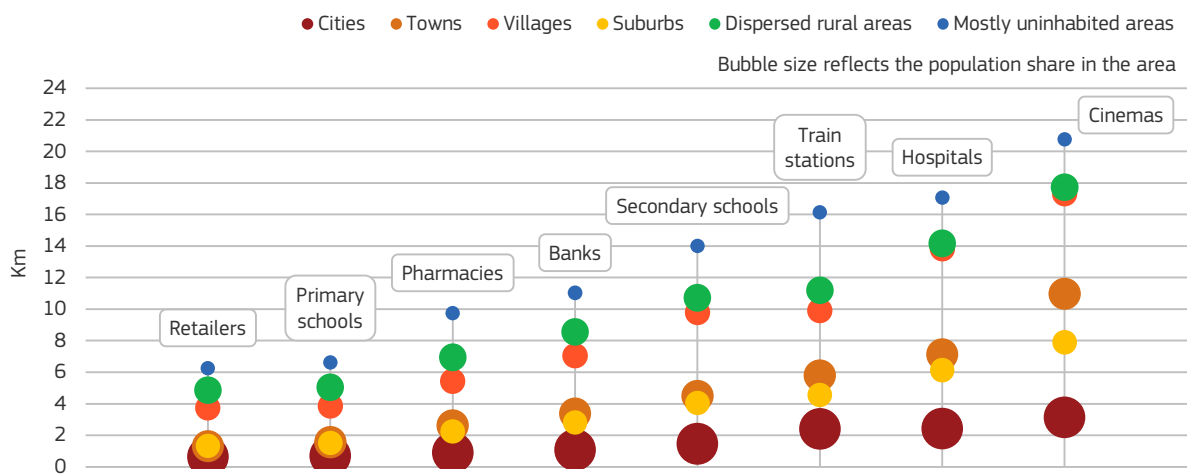


Figure 6.14 Average road distance to the nearest service location in the EU by degree of urbanisation, 2018



Source: Eurostat (hospitals), DG REGIO (stations) and ESPON Inner peripheries (other services), JRC-GEOSTAT for population and JRC calculations.

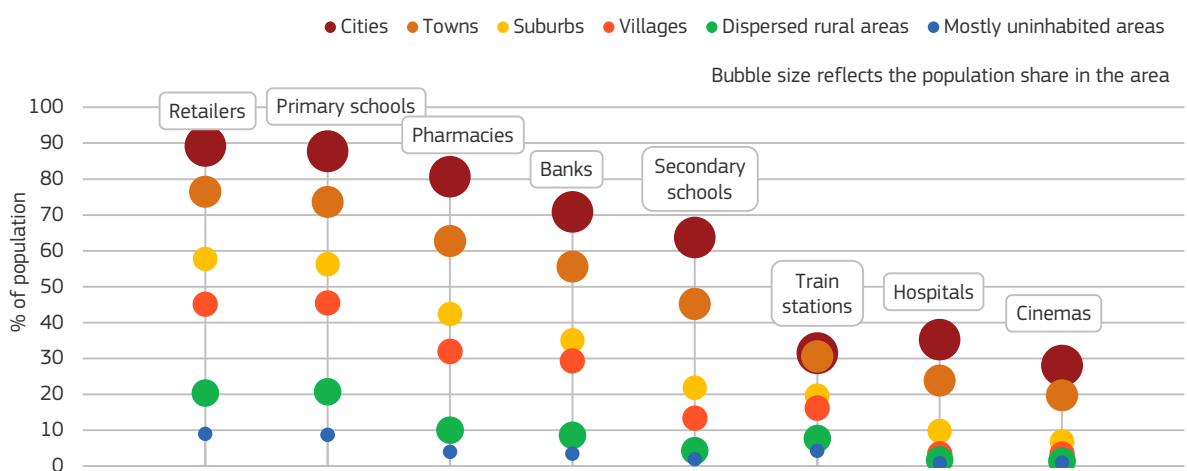
3. Mostly uninhabited areas, with a population density below 50 people per square km.

These three rural classes have a clear impact on the distance by road to the nearest service location. Services are on average located closer to villages and more distantly in dispersed rural areas. Mostly uninhabited areas consistently have the longest distance to the nearest location (Figure 6.14). In cities, even relatively small ones, the average dis-

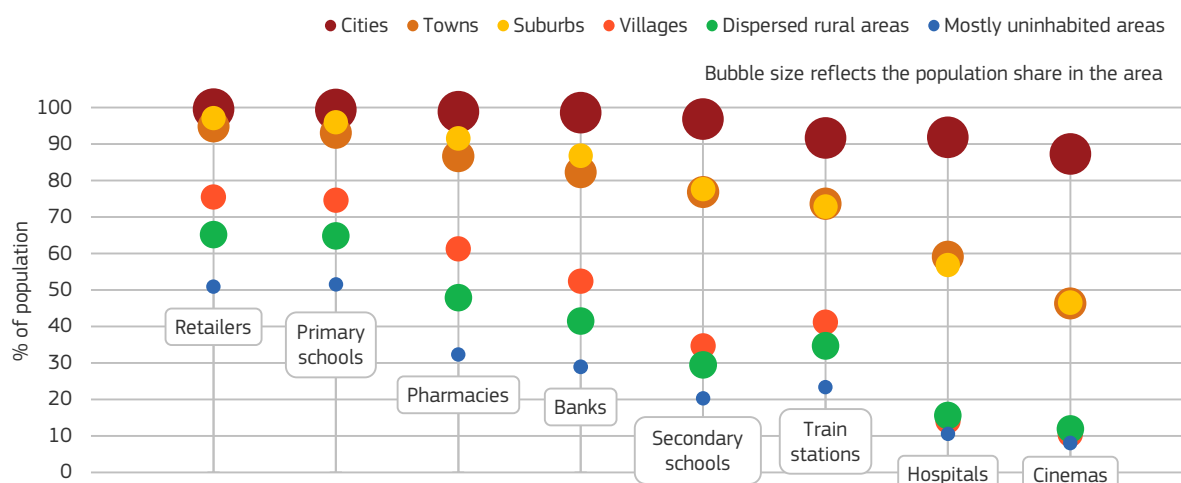
tance to most service locations is less than 1 or 2 kilometres.

The share of the population that could reach the nearest service location by walking or cycling, both involving zero carbon emissions, differs widely by degree of urbanisation (Figure 6.15). The nearest retailer is within walking distance (1.25 km) for 90% of city populations, compared with 75% of those living in towns, 45% of those in villages and

Figure 6.15 Population within walking distance of the nearest service location in the EU by degree urbanisation, 2018



Source: Eurostat (hospitals), DG REGIO (stations) and ESPON Inner peripheries (other services), JRC-GEOSTAT for population and JRC calculations.

Figure 6.16 Population within cycling distance of the nearest service location in the EU by degree urbanisation, 2018

Source: Eurostat (hospitals), DG REGIO (stations) and ESPON Inner peripheries (other services), JRC-GEOSTAT for population and JRC calculations.

10% of those in mostly uninhabited areas. The more specialised the service or the greater number of potential clients needed, the less likely it becomes that someone can walk to the service. For example, only 65% of city populations live within walking distance of a secondary school and just 2% of people living in mostly uninhabited areas.

The population within cycling distance (5 km) of the nearest service location is far larger. In cities, between 90% and 100% of the population are able to cycle to the nearest location of each type of service (Figure 6.16). The extent of the advantage of cycling over walking (in terms of the additional proportion of the population that can reach their nearest service location) differs according to the service concerned and by degree of urbanisation. In rural areas the advantage is most pronounced for less specialised services such as retail shops and primary schools, whereas in towns and cities it is largest for the more specialised services such as secondary schools and hospitals. In suburbs, cycling increases the share of the population that can reach all types of service by 40 pp or more.

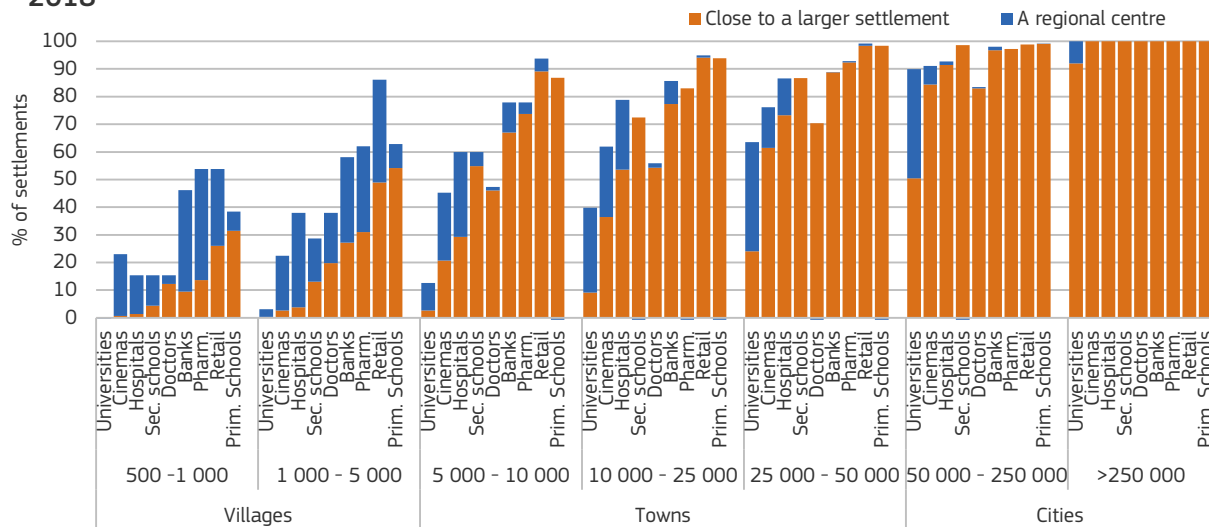
The choice of walking or cycling to a particular destination does not only depend on the distance involved, but also on the quality and state of the infrastructure, the safety of roads, the weather, pollution, the presence of steep inclines

and a person's health, among many other factors. Nevertheless, the population within walking or cycling distance of the nearest service location provides an indication of where many people might be able to shift to a zero-carbon mode of travel for these trips, and where this not really a viable option. These figures suggest that in cities, towns and suburbs, cycling allows people to reach all these services within a reasonable amount of time. In rural areas, however, almost all residents need a car or public transport to reach more specialised services. Accordingly, rural residents are likely to drive longer distances and be more vulnerable to increases in the cost of car use.

2.3 Regional centres have more services

The presence of a service in a settlement depends on its population size and on whether it is a regional centre⁶. In general, larger settlements are more likely to have a range of services than smaller ones. For example, all cities with at least 250 000 inhabitants in the EU have a hospital, a secondary school and a cinema (Figure 6.17), whereas many towns and villages lack these services. Regional centres, or the largest settlement within a 45-min-

6 A regional centre is defined as being the largest settlement within a 45-minute car drive.

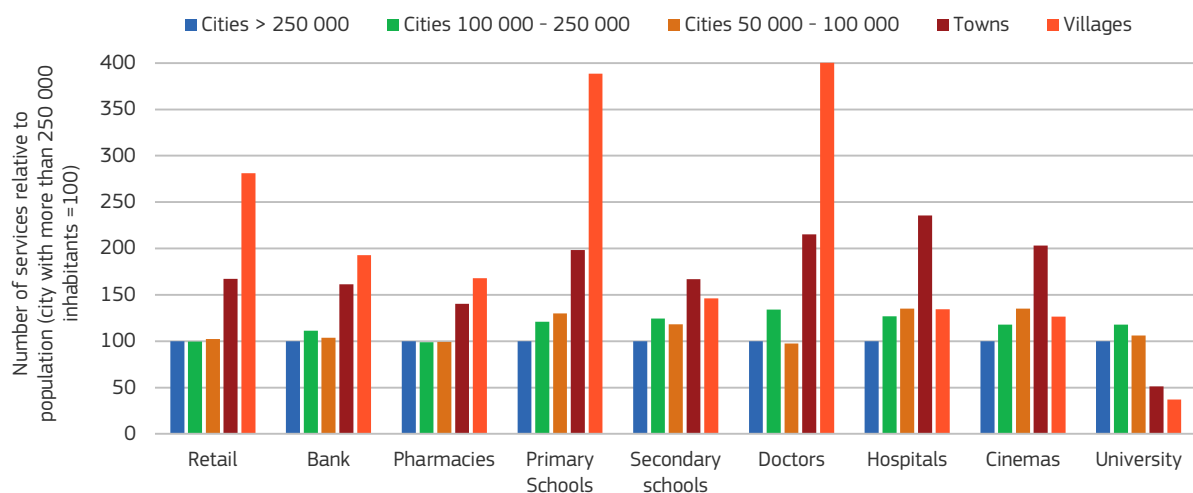
Figure 6.17 Services in regional centres and other settlements by size class in the EU, 2018

Source: Eurostat (hospitals), DG REGIO (stations) and ESPON Inner peripheries (other services), JRC-GEOSTAT for population and JRC calculations.

ute drive, are more likely to have certain services than other settlements of the same size. For example, a small town surrounded by villages has more services than a small town close to a big city, because it provides services for its rural surroundings. Smaller settlements that are not regional centres, because they are close to a larger settlement, are less likely to have a range of services, because they are available in the larger settlement.

For example, only 50% of the cities with between 50 000 and 250 000 inhabitants have a university, whereas 90% of the regional centres of this size have one. The smaller the settlement, the bigger the impact of being a regional centre. Towns, and especially villages, are far more likely to have a particular service if they are also a regional centre. For example, 60% of the towns with 5 000 to 10 000 inhabitants that are regional centres have a hospital, whereas only 30% of the towns close

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Figure 6.18 Services relative to population in cities, towns and villages in the EU, 2018

Source: Eurostat (hospitals), DG REGIO (stations) and ESPON Inner peripheries (other services), JRC-GEOSTAT for population and JRC calculations.

to a larger settlement do. Villages that are regional centres are far more likely to have a doctor, a pharmacy, a bank, a secondary school, a hospital or a cinema than others.

Compared with large cities, the number of services relative to population is typically larger in smaller cities, and especially in towns and villages. This implies that people living in the surrounding rural areas come to these places for these services. For example, the number of doctors relative to the population is twice as large in towns, and four times larger in villages, than in large cities (Figure 6.18). This does not mean that people in towns and villages are more in need of doctors, but that many of the patients of the doctors live in the surrounding areas.

Relative to population, towns and villages have more shops, banks, schools, pharmacies, doctors, hospitals and cinemas than large cities do. This highlights the fact that towns and villages play an important role as service centres and that the services there serve a wider population. Universities require a large population to draw their students from. As a result they are primarily based in large towns and cities. However, the significant number of universities in small cities relative to population

underlines the fact that their students come from a much wider area.

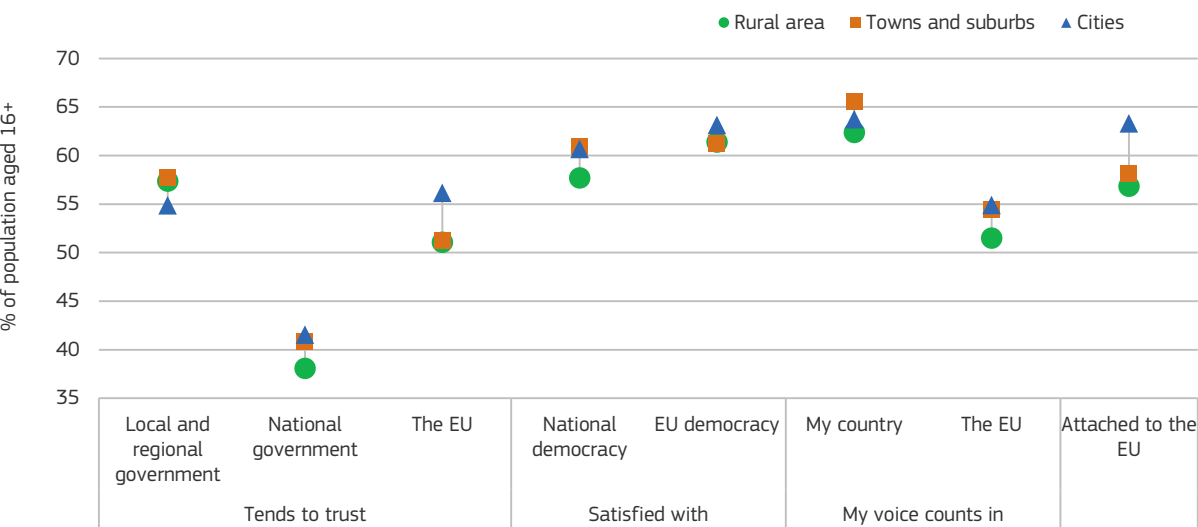
Regional centres can play an important economic and social role. They could become focal points for future investment and economic development as well as reducing the distances rural residents need to travel to access services of general economic interest.

3. Rural residents are less likely to trust the EU

Rural residents are less supportive of the EU than city residents. Rural residents are less likely to trust the EU or to be satisfied with the EU (Figure 6.19). This rural discontent is not directed at the EU only, but it is more pronounced than towards national or sub-national institutions. The gap between city and rural residents in terms of trust in their national government is smaller than for trust in the EU. Trust in local and regional government, however, is higher in rural areas than cities, suggesting that rural residents are less likely to trust higher levels of government than those living in cities.

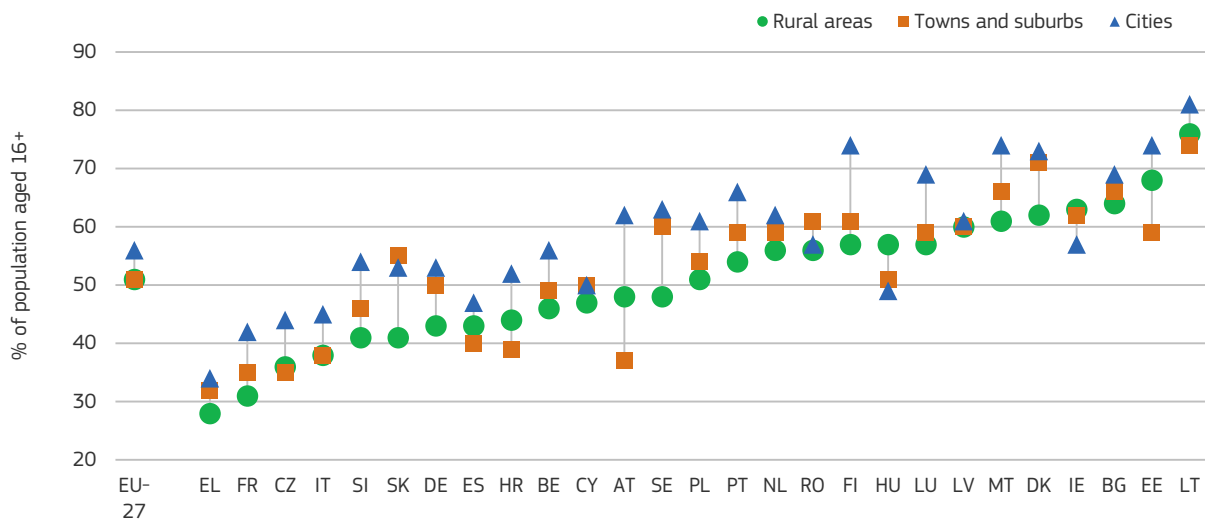
Although trust in the EU has increased over time (see Chapter 7), the urban-rural divide has re-

Figure 6.19 The urban-rural political divide in the EU, 2019



Source: Eurobarometer.

Figure 6.20 People who tend to trust the EU by degree of urbanisation, 2019



Source: Eurobarometer.

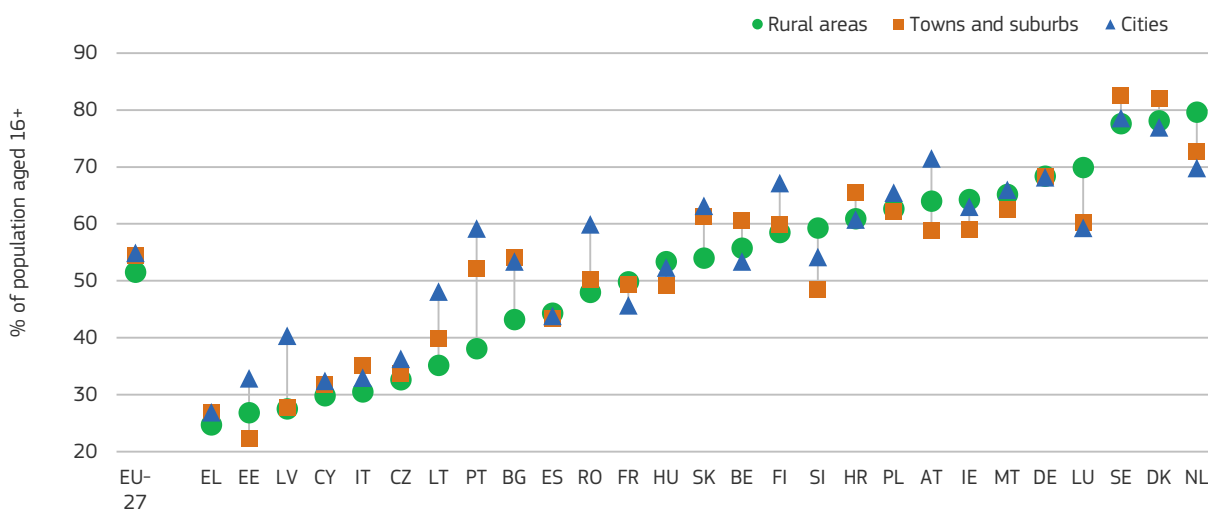
mained unchanged. On average, 56% of city residents in 2019 tended to trust the EU compared with 51% of rural residents. In 2015–2016, these figures were both 9 pp lower, so the gap remained unchanged.

Satisfaction with national and EU democracy is lower in rural areas than in cities, with a marginally wider gap in respect of national democracy (3 pp as against 2 pp). Rural residents are less likely to

think that their voice counts in their Member State or the EU, with a wider gap in respect of the EU (3 pp as against 1 pp). Fewer rural residents say that they are attached to the EU than city residents (6 pp less), though many more living in both types of area are attached to their Member State or local area (93% as against 90%).

This gap in trust in the EU between cities and rural areas is evident in almost all Member States

Figure 6.21 People who agree their voice counts in the EU by degree of urbanisation, 2019



Source: Eurobarometer.

(Figure 6.20), the only two exceptions being Hungary and Ireland. This is in contrast to satisfaction indicators, which are higher in rural areas than cities in north-western Member States and several southern Member States. In half the Member States, the gap in trust is 10 pp or more, with the largest gaps in Finland, Sweden and Austria.

In the majority of Member States, as in the EU as a whole, rural residents are less likely to agree that their voice counts in the EU than those living in cities, the difference being over 10pp in Bulgaria, Romania, Latvia, Lithuania and Portugal (Figure 6.21).

A lack of trust, a conviction that your voice does not count, and a frustration with democracy are all factors that can reduce voter turnout at elections and polarise the vote.



Chapter 7

Better governance

- The level of trust in national and local government across the EU has increased over the past few years, including over the COVID-19 pandemic period, with local government trusted more than national.
- According to the World Justice Project, rule-of-law standards are generally high in the EU, with eight Member States ranked among the top 10 in the world, but performance varies across Member States.
- People's perception of the quality of public services has been relatively consistent over the past decade, with the north-western part of the EU performing better than the southern and eastern regions but with significant regional differences in some Member States.
- Corruption remains a concern for Europeans. Although people's perception of it varies widely between Member States and regions, most Europeans think they can make a difference in combating corruption even where it is perceived to be most widespread.
- Public procurement procedures which involve only a single bidder or no calls for bids at all are potentially exposed to corruption. Whereas the overall share of single-bidder calls has increased in the EU over recent years, though not everywhere, procurement made with no calls has declined almost universally.
- Policy reforms have made the EU more business-friendly over recent years, as shown by the World Bank's 'ease of doing business' assessment. The situation in cities within the same Member State, however, can differ markedly and it is rare for any one city to excel in all aspects of doing business.
- Over half of the EU adult population used the internet to interact with public authorities in 2020, but there are considerable differences between and within Member States. In some regions, it is still the case that over 30% of people have never used a computer in their lives.

Chapter 7

Better governance

Public governance is the process of making and implementing government decisions¹. Good governance requires well functioning institutions and transparent procedures. Governments with high-quality institutions, high levels of accountability and low levels of corruption tend to be better at providing public goods and services and creating a favourable environment for economic growth and social development². Conversely, governments with low-quality institutions tend to have a wide range of economic and social problems, lower levels of economic development, wider income inequality, a worse environmental situation and less electoral accountability. Recent worldwide studies have found that countries where corruption is high also tend to have fewer women in politics, poorer health performance, and lower levels of subjective well-being among the population³.

To work well, institutions need high levels of administrative capacity that in turn enhance the effectiveness and transparency of public spending, including of EU funds (see Box 7.1). This chapter examines the most recently published indicators for the EU on the quality of public institutions at the national and sub-national level.

1. Monitoring and benchmarking the quality of institutions

1.1 Trust in national and local government: recent trends

Transparency and accountability are two key pre-requisites for high-quality governance. Open government policy-making and trust in public institutions reinforce each other. Open policy-making increases public satisfaction, fosters accountability and people's understanding of the processes involved, leading to increased trust in government. At the same time, trust is instrumental for active public involvement in policy-making⁴.

Overall in the EU, trust in both national and local government has increased since 2013, but remains lower in national than in local government. According to the latest figures, for 2021, just over half of the population (56%) trust their local government, and fewer (38%) trust their national government (Figure 7.1). Trust in national government is lower than in local government in all Member States. In France, the proportion trusting national government was over 30 pp less in most years. Except in Belgium and Austria, however, the proportion was higher in 2021 than in 2013 in all Member States, though the extent of the increase and the level in 2021 vary widely (Figure 7.1, top). The level of trust in national (and local) government has been consistently higher in Luxembourg than elsewhere, followed by the Nordic Member States. The level in Greece in both 2013 and 2017 was among the lowest in the EU, with only 10% of people trusting their national government, though the proportion has risen to a third since. In Croatia, Slovenia, Bulgaria and Spain, trust in national government remains very low, though it has increased since 2013.

1 'Governance' in this chapter only covers public authorities.

2 See Kaufmann et al. (1999); Charron and Lapuente (2013); Rodríguez-Pose and Garcilazo (2015); Annoni and Catalina Rubianes (2016); Pike et al. (2017).

3 On health, see Holmberg and Rothstein (2011); on women in politics, Swamy et al. (2001); and on well-being Samanni and Holmberg (2010) and Helliwell and Huang (2008).

4 OECD (2017).

Box 7.1 Good governance and administrative capacity¹

A fundamental factor of good governance is good administrative capacity. This is defined as the ability of authorities to efficiently implement the policies they are responsible for. A high level of administrative capacity at all governance levels is important for managing and spending public funds effectively, is increasingly recognised as a key condition for ensuring investment performs well, and contributes to the achievement of cohesion policy objectives, especially in low-income and low-growth regions.

A recent study² makes four sets of recommendations to strengthen administrative capacity and improve the use of technical assistance in the 2021–2027 programming period:

1. developing capacity-building roadmaps encompassing a broad range of activities, including support for human resources and organisational advice on systems and tools;
2. supporting the entire ecosystem for managing and spending the funds, including implementing bodies, delivery agents and beneficiaries;

3. developing flexible learning strategies for capacity-building to respond quickly to changing circumstances; and

4. ensuring coherent management of capacity-building at EU level.

To facilitate the implementation of these recommendations in 2021–2027, capacity-building to implement EU funds is financed by Member States' technical assistance. The new Regulation on common provisions is intended to simplify and enable the strategic use of such assistance to develop administrative capacity as a long-term objective.

Beyond cohesion policy, administrative reforms and capacity-building can also be funded by the newly established recovery and resilience facility and the technical support instrument, aimed at supporting sustainable economic and social convergence, resilience and recovery in response to the COVID-19 pandemic.

1 Source: European Commission (2020m).

2 European Policies Research Centre (2020).

Notable features of trust in local government are: the consistently high levels of trust in Germany (75% in 2021); the large increases in Ireland and Spain since 2013 (28 pp and 26 pp respectively); and the low levels in Greece, Italy and Croatia, despite some increase in each case (Figure 7.1, bottom).

2. International indicators of the quality of institutions

2.1 The Worldwide Governance Indicators

A wealth of measures of 'good governance' have been developed over recent years. The World Bank in particular has established a measure of the quality of institutions through the Worldwide Governance Indicators (WGI), published for over

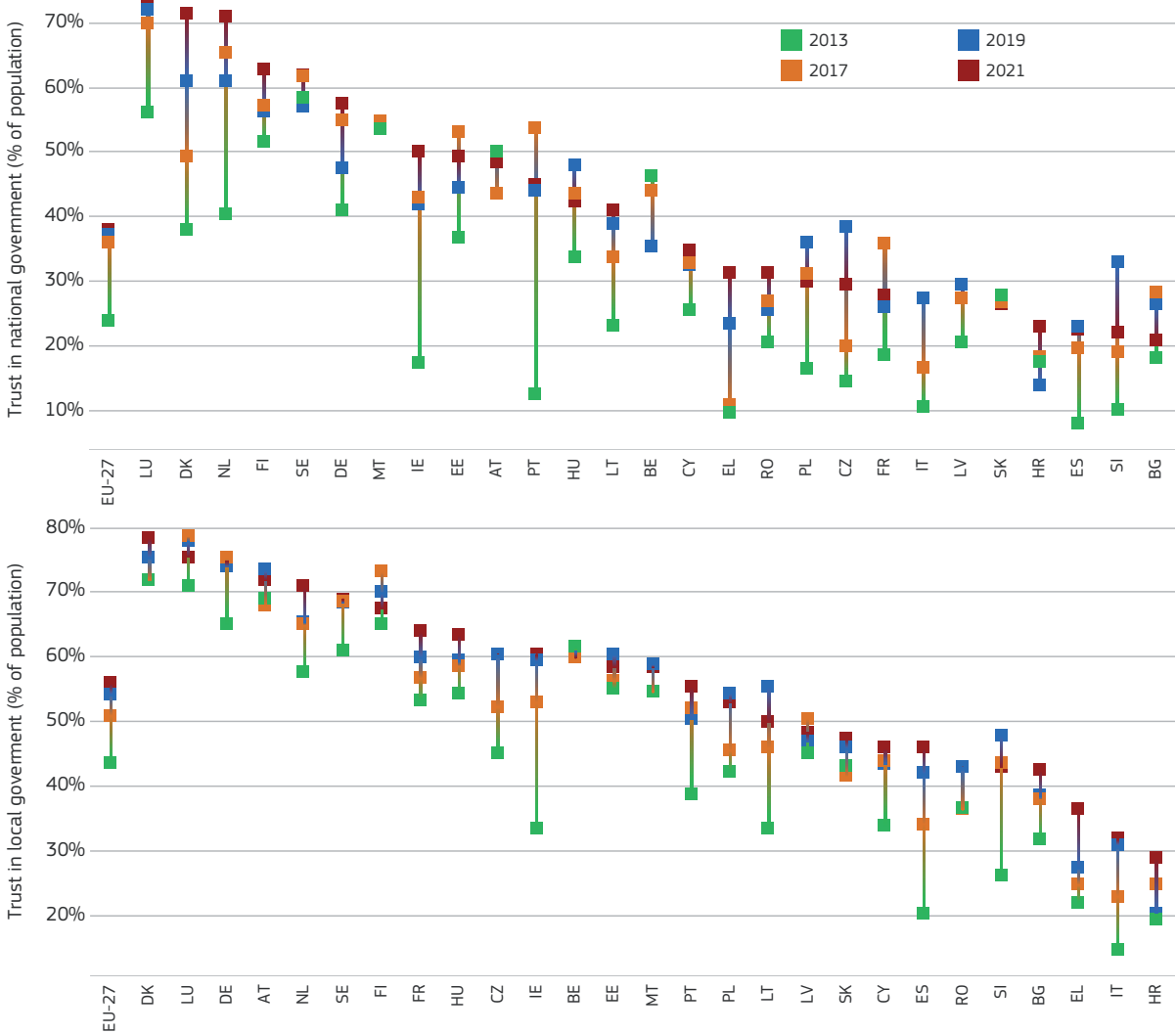
200 countries since 1996⁵. Aggregate indicators have been developed for six dimensions of governance: voice and accountability; political stability and absence of violence/terrorism; government effectiveness; regulatory quality; rule of law; and control of corruption⁶.

Nordic Member States, together with the Netherlands, Luxembourg, Germany, Austria, Ireland, Estonia and Belgium, are above the EU average on the five WGI dimensions considered

5 <https://databank.worldbank.org/source/worldwide-governance-indicators>.

6 The six dimensions of governance included in the WGIs are described by aggregate indicators based on over 30 individual data sources produced by a variety of survey institutes, think-tanks, non-governmental organisations, international organisations, and private sector firms. A statistical model is used to construct a weighted average of the data from each source for each country. The composite measures of governance generated by the statistical model have a mean of zero (standard deviation = 1) and run from approximately -2.5 to 2.5, with higher values corresponding to better governance.

Figure 7.1 Trust in national (top) and local government (bottom), 2013-2021



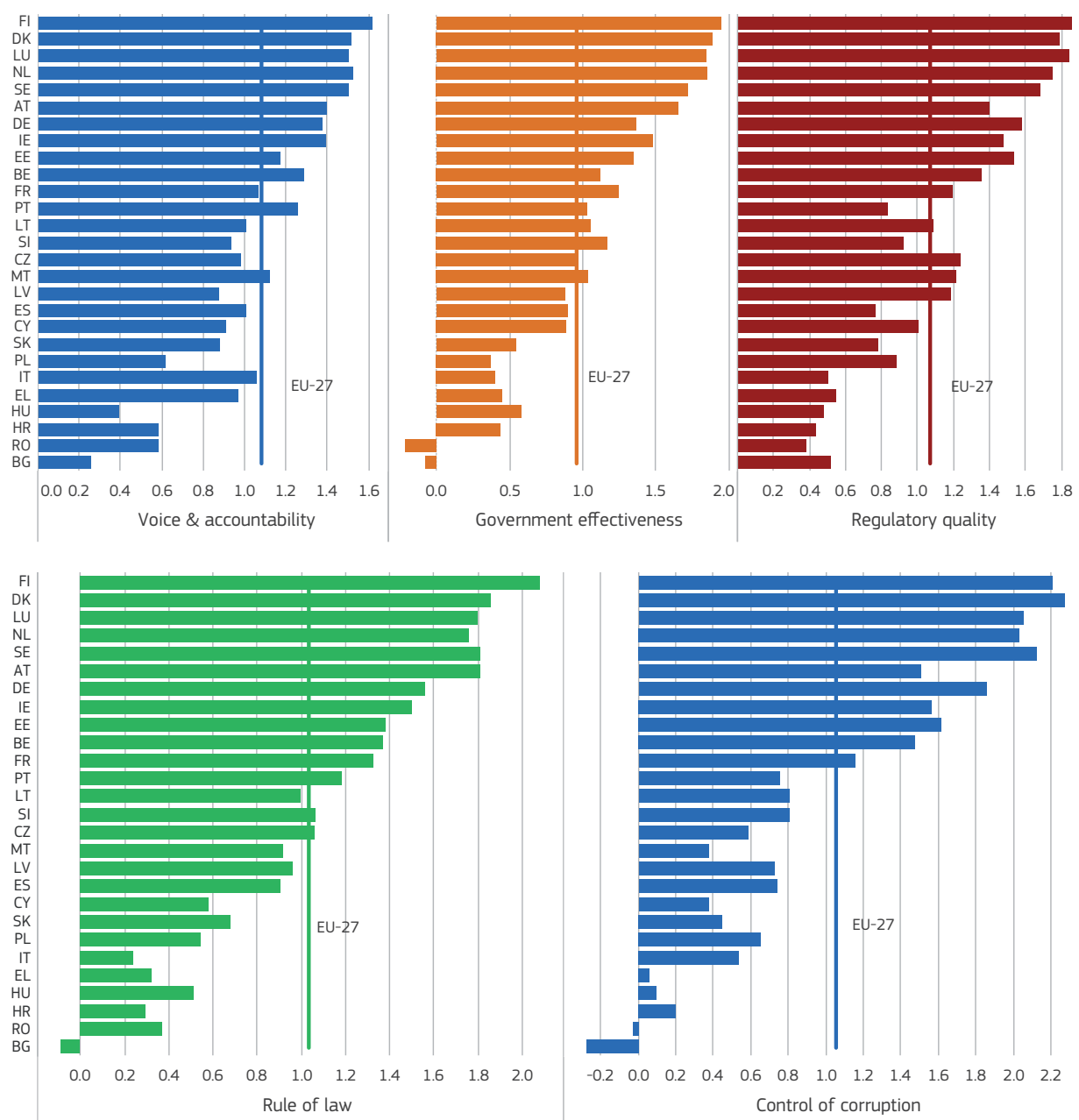
Countries ordered by 2021 values.
Source: Standard Eurobarometer (EB), average of spring-summer and autumn-winter waves by year: EB79 and EB80 for 2013; EB87 and EB88 for 2017; EB91 and EB92 for 2019; EB93 and EB94 for 2021.

here (i.e. excluding political stability and absence of violence/terrorism, which is less relevant in the EU context). Romania, Bulgaria, Hungary, Croatia, Greece, Italy, Spain, Cyprus, Poland and Slovakia are below the EU average on all five indicators (Figure 7.2). The control of corruption indicator varies most between Member States. This is based on perceptions of the extent to which public power is exercised for private gain and includes both petty and grand forms of corruption, as well as the level of ‘state capture’ by elites and private interests.

2.2 The World Justice Project’s Rule of Law Index

The rule of law is an integral part of the democratic identity of the EU and an essential element for its functioning. Although the EU is recognised as having high rule-of-law standards, promoting and upholding these standards requires constant monitoring.

Figure 7.2 Country performance on Five World Governance Indicator dimensions, 2020



The vertical line indicates the EU average, weighted by Member State population, for each dimension. Scores range from -2.5 (weak performance) to 2.5 (strong performance). The average across all countries worldwide is 0 for each dimension. EU Member States in almost all cases score above the worldwide average. Countries are ordered from best to worst according to their average score across the five dimensions.

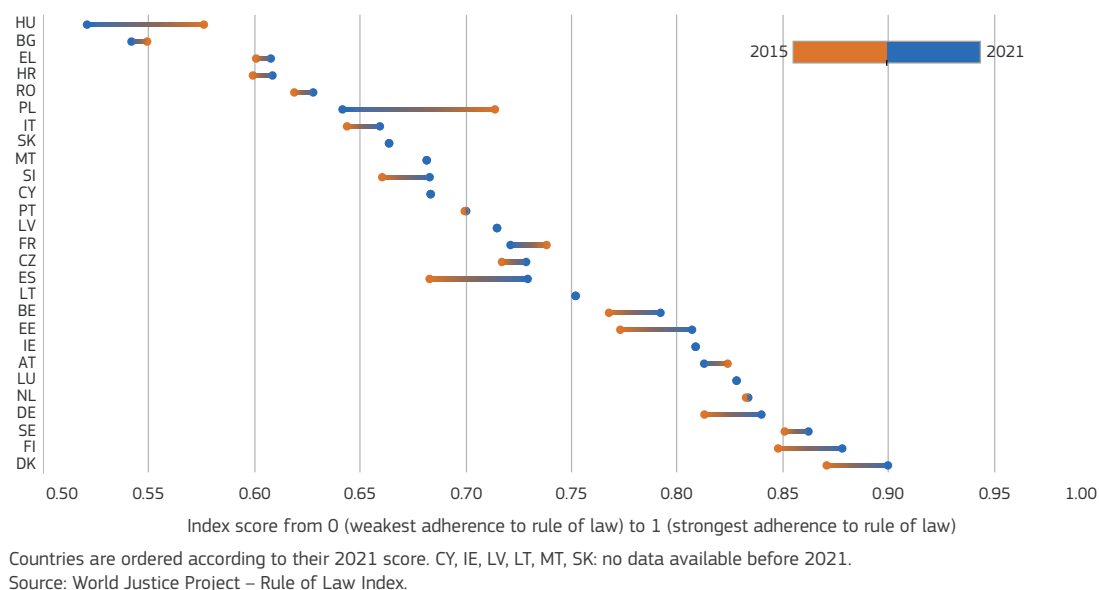
Source: World Bank Worldwide Governance Indicators.

The World Justice Project (WJP) produces a Rule of Law Index⁷, which is the first attempt to systematically quantify and monitor the rule of law around the world over time. The index is an aggregate in-

dicator measuring the extent to which countries adhere to the rule of law in practice. The 2021 edition of the index covers 139 countries and jurisdictions and, for the first time, the entire territory of the EU. The index measures country adherence to the rule of law by looking at policy outcomes, such as whether people have access to courts and

⁷ <https://worldjusticeproject.org/our-work/research-and-data/wjp-rule-law-index-2021>

Figure 7.3 Rule of Law Index score (World Justice Project), 2015 and 2021



whether crime is effectively controlled. The index's construction relies on national surveys of households and experts to measure how the rule of law is experienced and perceived. It includes eight components describing the multi-faceted concept of rule of law: 1. constraints on government powers; 2. absence of corruption; 3. open government; 4. fundamental rights; 5. order and security; 6. regulatory enforcement; 7. civil justice; and 8. criminal justice⁸.

According to the 2021 results, all the EU Member States score above 50% of the maximum ideal score of 1, indicating that rule-of-law standards are overall good relative to countries in the rest of the world (Figure 7.3). According to the latest figures, the EU is home to three of the four highest-scoring countries in the world, Denmark (in 1st place), Finland (3rd) and Sweden (4th), and there are another five Member States in the top 10 — Germany (5th), the Netherlands (6th), Luxembourg (8th), Austria (9th) and Ireland (10th). The weakest EU Member States in terms of the index are Greece (ranked 48 out of 139 worldwide), Bulgaria (62) and Hungary (69). According to the index, almost all the Member States for which a time se-

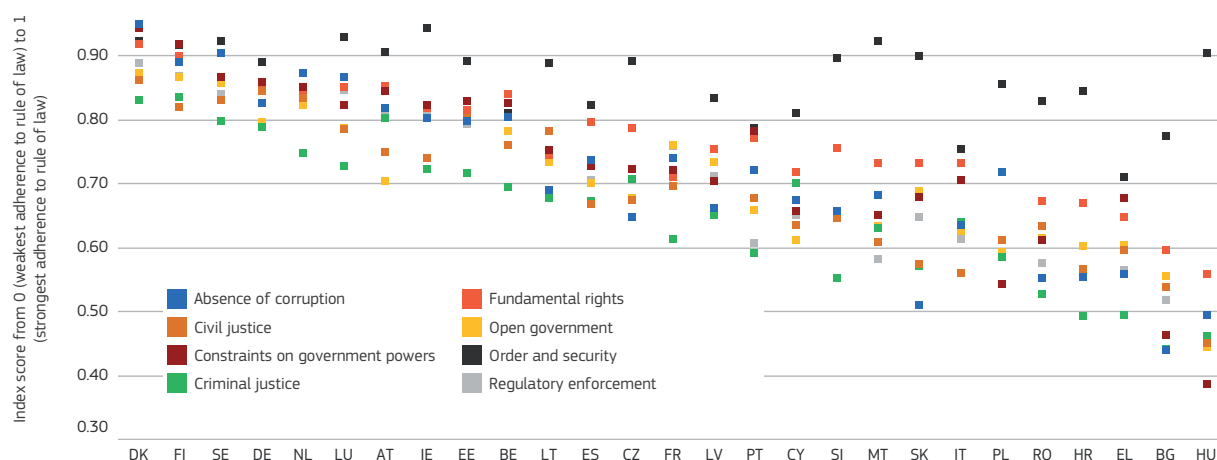
ries is available have slightly improved their rule of law since 2015⁹, with the exception of Austria, Bulgaria, France and (most especially) Hungary and Poland, whose score fell by 8 pp over these six years.

The 'constraints on government powers' component measures, for example, whether government powers are limited by the legislature, the judiciary or independent auditing and whether government officials are sanctioned for misconduct. Hungary scores 0.39 on this measure, the lowest score in the EU on this and any other component (Figure 7.4). Its score on 'order and security', however, is considerably higher (0.90) and in line with the other EU Member States. The performance of Croatia also varies a lot, from 0.49 on 'criminal justice' (which measures whether the criminal investigation system is timely, impartial and free of corruption) to 0.85 on 'order and security'. Slovenia, Malta, Slovakia, Poland, Romania and Bulgaria also show variable performance across the components, with differences between the highest and the lowest scores of over 30 points. In general, Member States scoring highest on the overall index have a relatively similar performance across the different components, whereas performance

⁸ Indicators included in the Rule of Law Index are normalised using the min-max method with a base year of 2015. The overall score is computed as the unweighted average of the eight component scores. All the scores are on a 0 (worst) to 1 (best) scale.

⁹ Comparisons are made with 2015 as the reference year, as (according to the methodological notes on the Rule of Law Index by the WJP) scores are not strictly comparable before then.

Figure 7.4 2021 Rule of Law Index component scores



Countries are ordered according to their overall Rule of Law score.

Source: World Justice Project — Rule of Law Index.

tends to vary more for Member States with relatively low overall scores.

It is interesting to note that the highest scores for most EU Member States are on 'order and security', which measures whether crime is effectively controlled, people are protected from armed conflict and terrorism, and violence is not used to gain redress for personal grievances. This shows that the EU is a relatively safe place to live.

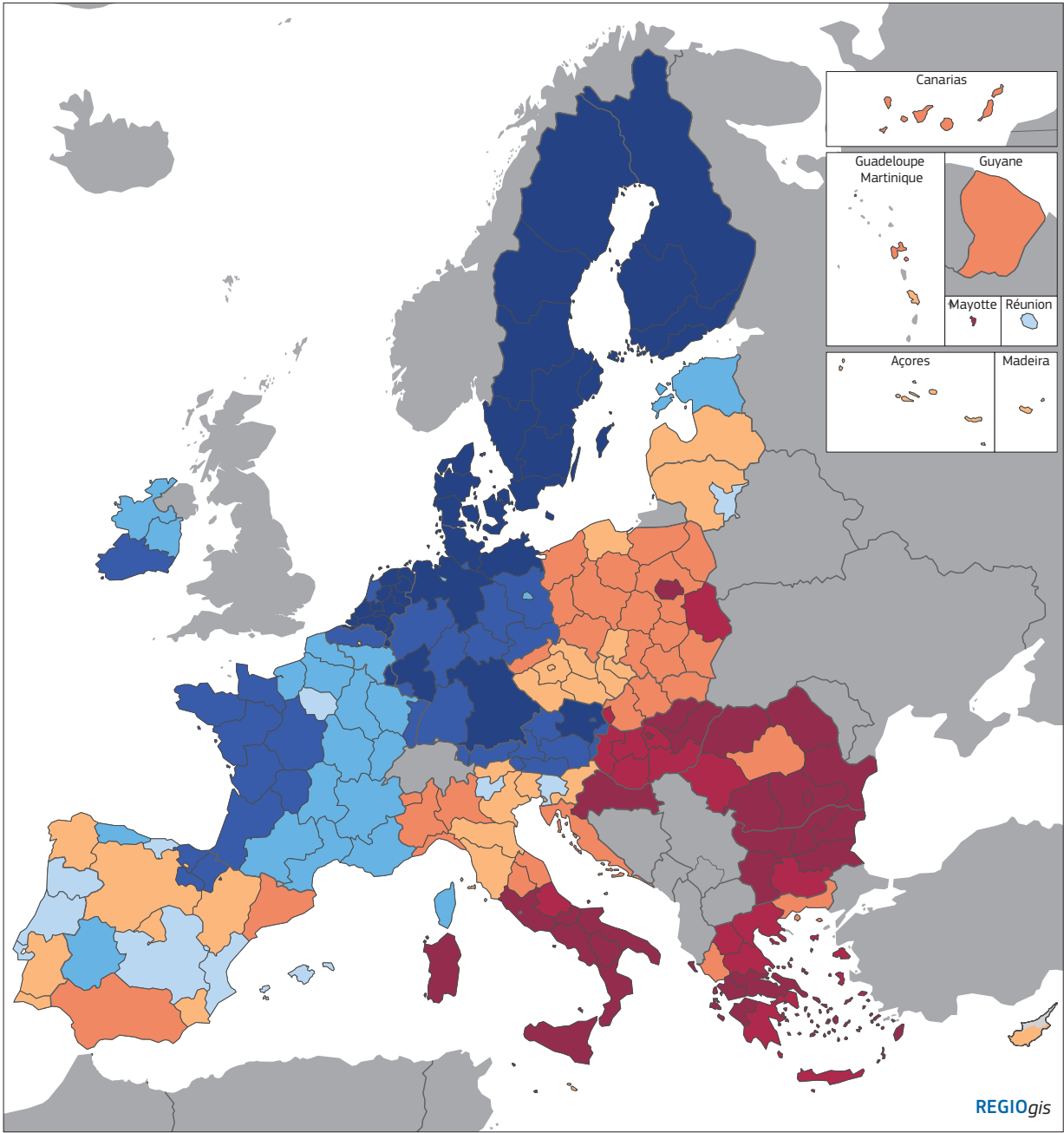
It should also be noted that, since 2020, the European Commission has established the European Rule of Law Mechanism to stimulate inter-institutional co-operation and encourage all EU institutions to engage in dialogue on the issue. The Rule of law annual reports are at the basis of this new process and are intended to be a preventive tool. They are based on in-depth, country-specific qualitative assessments of different aspects of the rule of law in EU Member States and, as such, provide a different, complementary analysis to that of the WJP Rule of Law Index.

2.3 The European Quality of Government Index

Over the past two decades, a surge of research has been devoted to assessing the quality of institutions across, and more recently within, countries, focusing on corruption, the impartial application of the rule of law and the effectiveness of public bureaucracy. The European Quality of Government Index (EQI) has been published four times since 2010 at the regional level¹⁰ and has had a wide impact on research on economic geography, entrepreneurship and innovation in EU regions. Based on a survey at regional level together with national estimates from the Worldwide Governance Indicators, the EQI measures three comparable aspects of the quality of government in EU regions.

The EQI survey questions are based on a conceptual framework in which the quality of government is considered as a broad, multi-dimensional concept involving impartial and high-quality service delivery and low corruption. Questions are aimed at capturing people's perceptions and experience of corruption, and the extent to which they rate public services as impartial and of good quality in their region of residence. The focus is on policy areas that are most often managed at the sub-national level, such as education, healthcare

¹⁰ Charron et al. (2019 and 2021).



Map 7.1 European Quality of Government Index, 2021

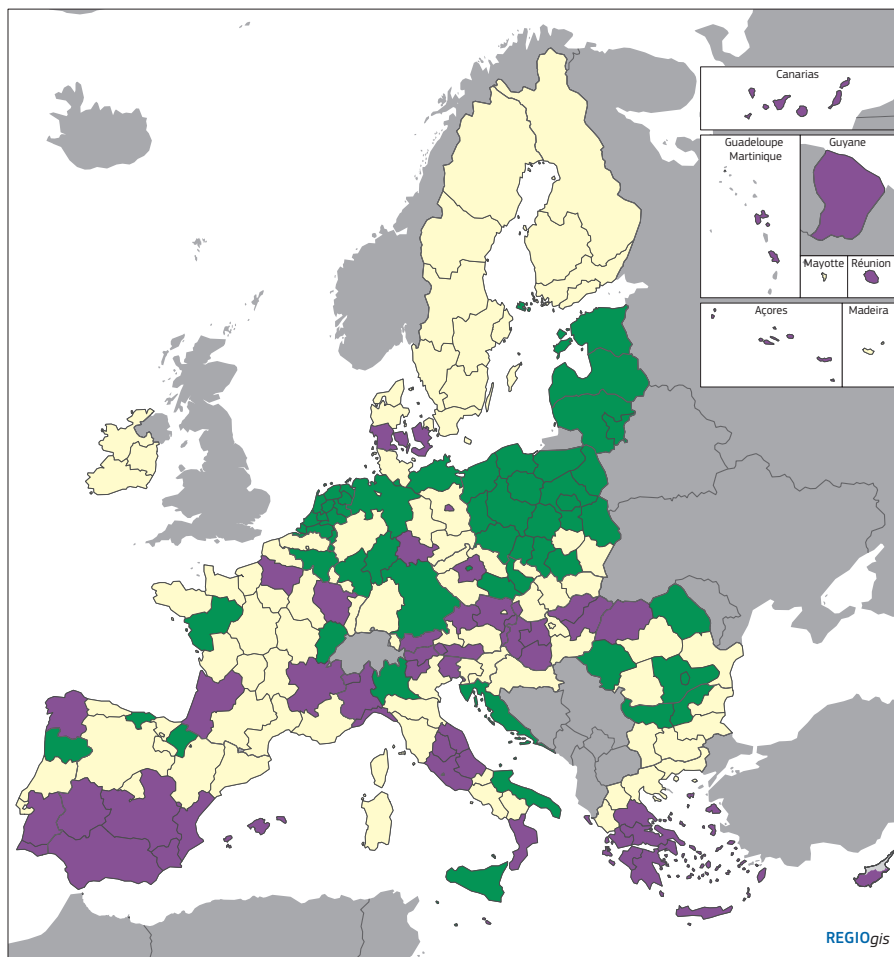
Standard deviation, range from poor quality (negative) to high quality (positive)

- | | |
|-------------|-----------|
| < -1.2 | 0 – 0.3 |
| -1.2 – -0.9 | 0.3 – 0.7 |
| -0.9 – -0.5 | 0.7 – 1.1 |
| -0.5 – 0 | > 1.1 |

Scores are expressed in z-scores; the EU average is therefore equal to 0.
Positive (negative) values reflect higher (lower) quality of government than the EU average.
All Member States at the NUTS 2 level.
Source: The Quality of Government Institute, University of Gothenburg.

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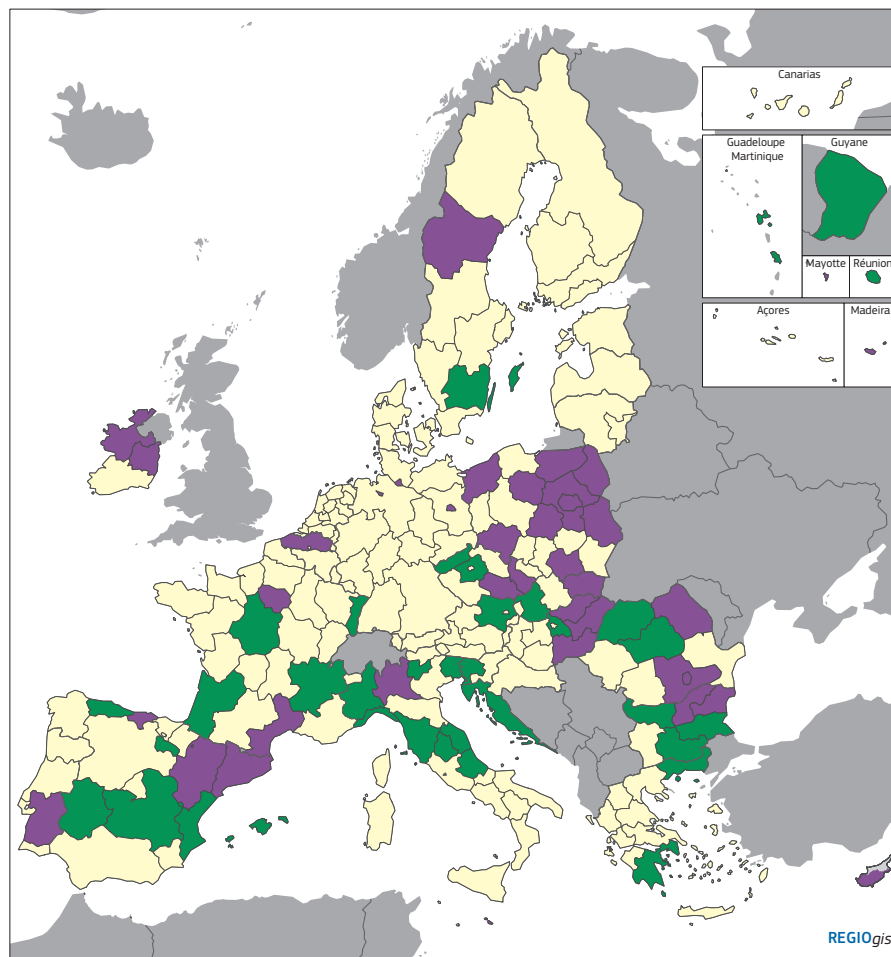
Map 7.2 Change in the European Quality of Government Index, 2010–2017

- Deterioration
- Stability
- Improvement

Source: The quality of Government Institute, University of Gothenburg.

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Map 7.3 Change in the European Quality of Government Index, 2017–2021

- Deterioration
- Stability
- Improvement

Regions where scores increased (decreased) by more than 0.25 standard deviations in the period are shown on green (purple).
Source: DG REGIO based on data by the Quality of Government Institute, University of Gothenburg.

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Table 7.1 Average EQI scores by category of region, all years (EU average = 0)

Region category	2010	2013	2017	2021
Less developed	-0.90	-0.84	-0.83	-0.88
Transition	0.42	0.30	0.27	0.36
More developed	0.58	0.62	0.64	0.62

Source: DG REGIO calculations based on data from the Quality of Government Institute, University of Gothenburg.

and law enforcement. The questions are centred on three core domains of the EQI — ‘corruption’, ‘quality’ and ‘impartiality’ — in respect of the services concerned. The EQI is the first measure to enable governance in EU regions within and across Member States to be compared¹¹.

The 2021 picture is rather consistent with previous editions of the EQI, with the north-western area performing better than the southern and eastern part of the EU (Map 7.1). There are significant regional differences in some Member States — in Italy, Spain, Belgium, Ireland, Poland, France (including its overseas regions) and Slovenia, in particular — but very little in others, in the Nordic Member States especially.

Over the period 2010–2017 (Map 7.2), there were significant improvements in the quality of government in the Baltic Member States, most of Poland and Germany, the Netherlands, Croatia and some regions in Romania and Bulgaria. By contrast, there was a deterioration between 2010 and 2017 in Austria, Hungary, southern Greece, Cyprus, the southern part of Spain and some regions in Portugal and Italy. Between 2017 and 2021, however, the index stabilised in the Baltic Member States (Map 7.3)¹² and worsened in most Polish regions, especially in the east of the country. The same is the case in the eastern part of Romania, where the capital city region of Bucuresti-Ilfov had the lowest score in the EU in 2021. On the other hand, there was some improvement in the index

over this period in the south of Spain, southern Germany, southern Greece and the southern and central parts of Italy.

On average, less developed regions score significantly below the EU average in all the years of the EQI. The average EQI is higher for transition and more developed regions but with more variability (Table 7.1).

3. Corruption

Corruption hampers a government’s ability to foster economic growth and improve people’s well-being¹³. No Member State is free from corruption but the extent varies greatly across the EU. Moreover, in some EU Member States people’s perception of corruption in their national government varies quite substantially within the country, such as in Hungary, Italy and Portugal (Map 7.4).

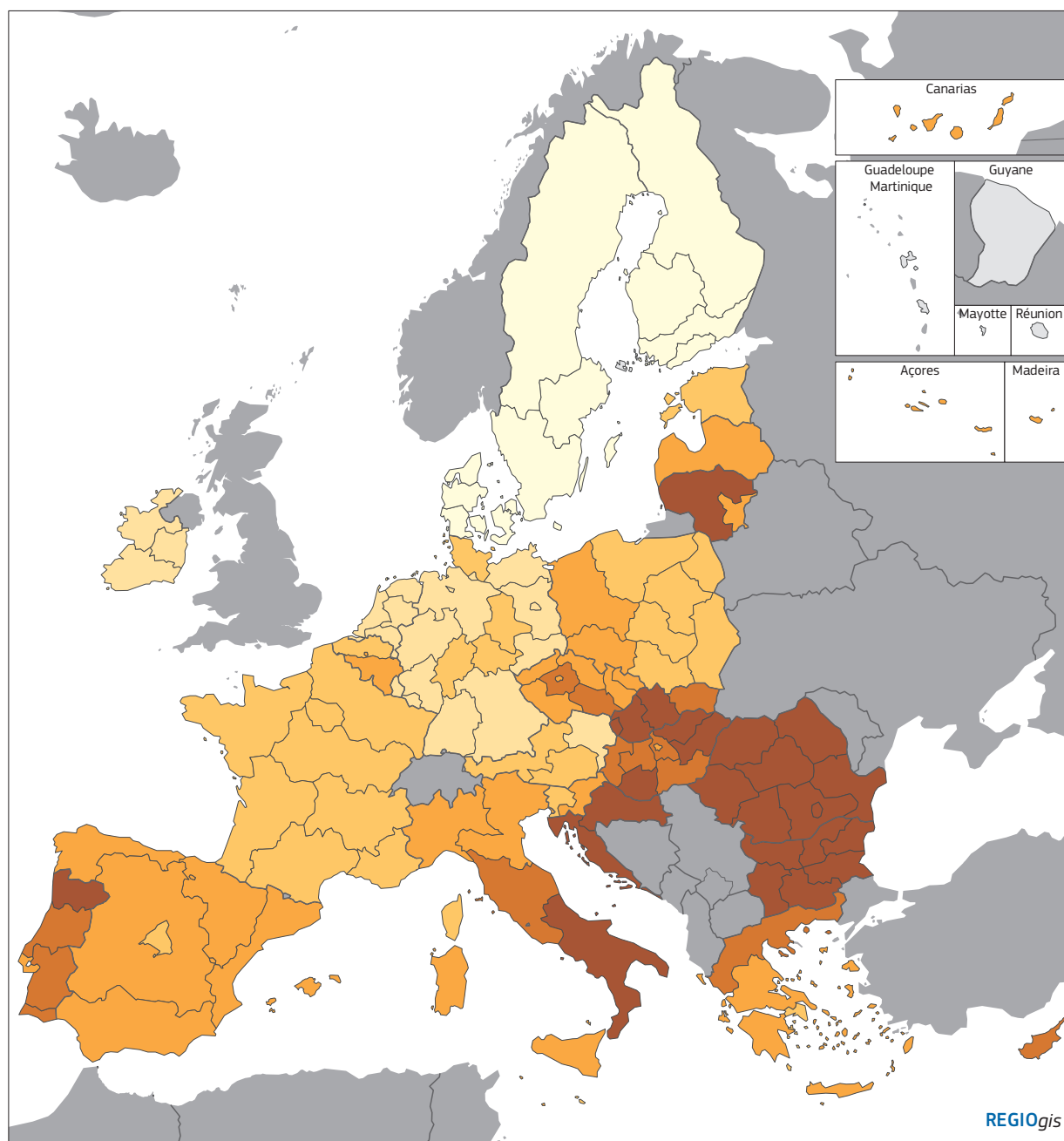
In 2019, 28% of people surveyed in the EU reported being somehow personally affected by corruption in their daily lives (Figure 7.5, top), the proportion being marginally higher than in 2013. In seven Member States (Romania, Cyprus, Spain, Portugal, Greece, Croatia and Malta), over half of respondents reported being affected, with the largest increases from 2013 (of around 30 pp or more) being in Portugal and Malta. By contrast, in the Nordic Member States, Germany, Luxembourg and the Netherlands, fewer than 10% of respondents reported being personally affected by corruption in 2019, much the same as in 2013.

The public healthcare system is the most frequently mentioned by those reporting being affected by

11 The EQI scores are computed as simple, equally weighted averages of normalised survey scores. The normalisation used is a z-score, which is a measurement of the relationship of the regional score to the EU average, in terms of standard deviations from the mean. If a z-score is 1, it indicates that the data point’s score is one standard deviation above the EU average. Positive values show higher than the EU mean score; negative values are lower than the EU mean score.

12 Because of changes in the NUTS 2 classification in Ireland and Lithuania, regional values for these Member States in 2021 are compared with national ones in previous editions.

13 See for example Pak Hung Mo (2001).



Map 7.4 Perception of corruption in national government, 2019

% Yes

- ≤ 25.0
- 25.1 – 50.0
- 50.1 – 75.0
- 75.1 – 85.0
- 85.1 – 90.0
- > 90.0
- no data

Percentages are based on all respondents excluding don't know and refused to answer.

Question: Is corruption widespread throughout the government in your country?

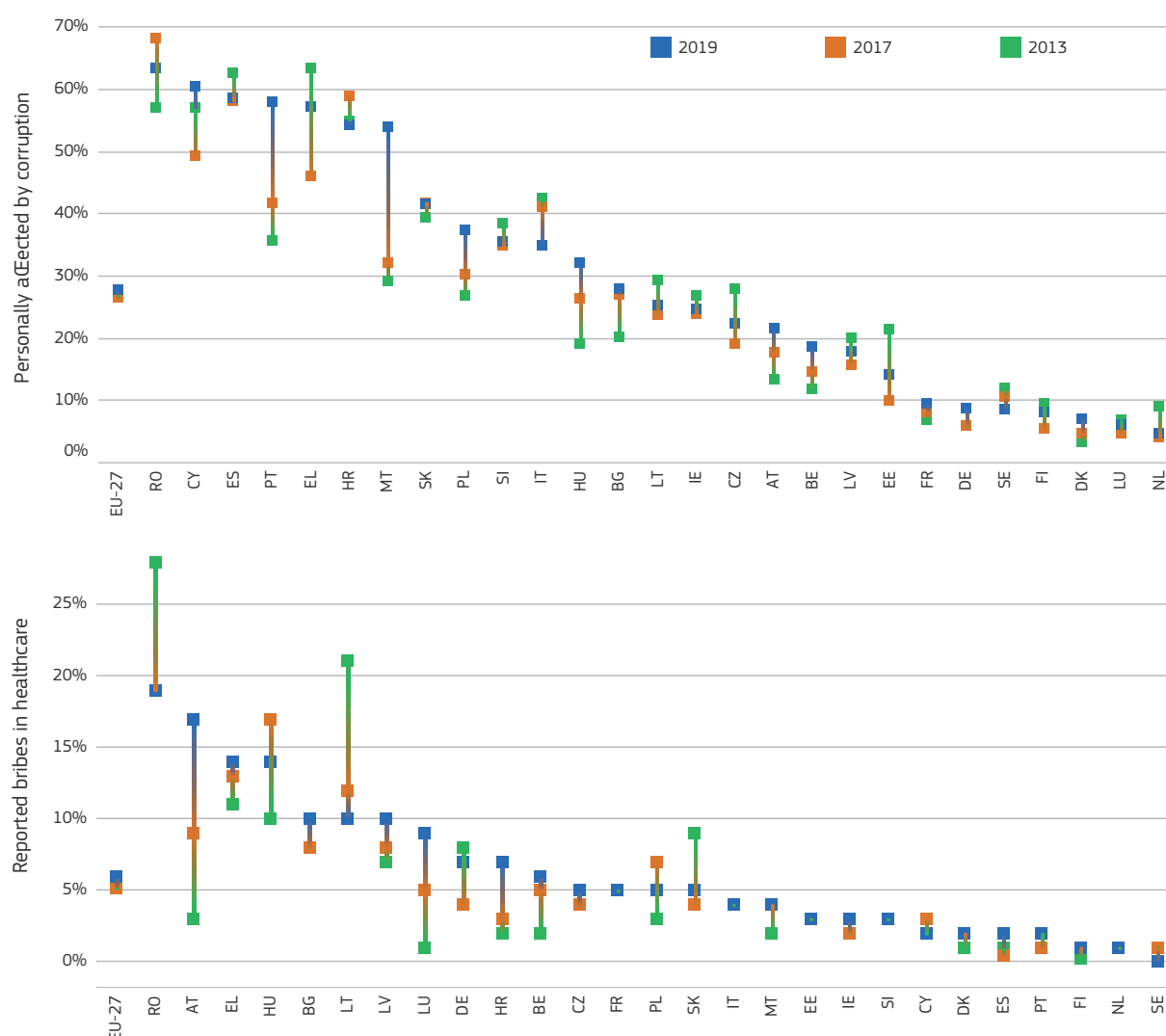
NUTS 2 for all the countries except for AT, BE, FR, DE, EL, IT, NL, PL, ES, SE, that are at the NUTS 1 level.

Source: Gallup, ad-hoc regional EU survey, 2020).

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Figure 7.5 Personal experience of corruption in people's daily lives (top) and in healthcare (bottom), 2013–2019



Change from 2013. Countries ordered by 2019 values.

Source: Special Eurobarometer on corruption: EB396 2013; EB470 2017; EB502 2019.

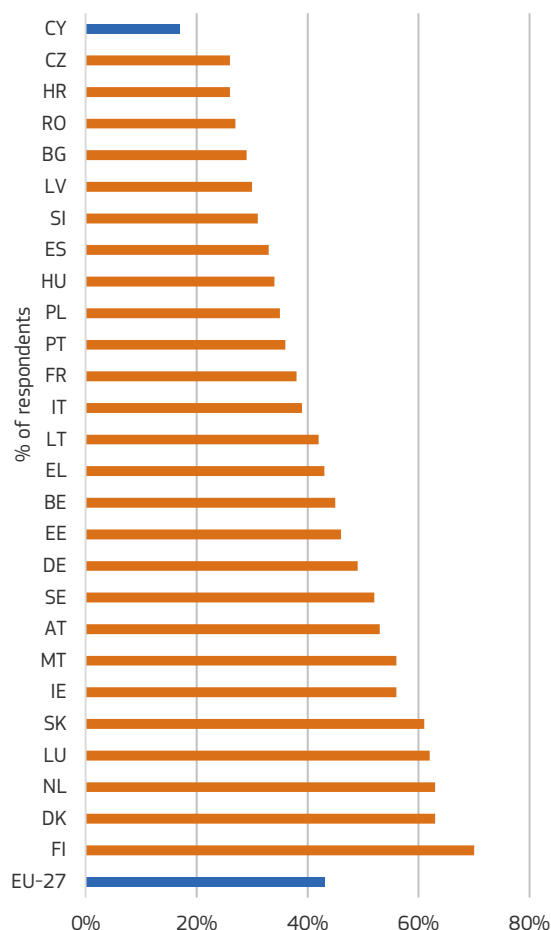
corruption in 2019¹⁴. On average in the EU, around 6% of respondents who had contact with a public healthcare practitioner or hospital within the previous 12 months reported they had to give an extra payment, gift or donation, the proportion changing very little from 2013 (Figure 7.5, bottom). The differences between Member States, however, were marked. In Romania, the proportion was 20% in 2019, the largest in the EU, though this was down from a third since 2013. The proportion also fell

markedly over the period in Lithuania, from 21% to 10%. By contrast, in Austria and Luxembourg there was a sharp increase in the proportion of those reporting having to make a payment, from 3% to 17% in Austria and from 1% to 9% in Luxembourg.

According to 2021 data, on average in the EU 43% of people think that their national government is doing well in tackling corruption, compared with a slightly higher percentage — 49% — thinking that their government is doing a bad job (Transparency International global corruption barometer for the

¹⁴ European Commission (2020d). The exact question asked is: "Apart from official fees did you have to give an extra payment or a valuable gift to a nurse or a doctor, or make a donation to the hospital?"

Figure 7.6 People thinking that their national government is handling very or fairly well the fighting against corruption, 2021



Source: Transparency International Global Corruption Barometer.

EU in 2021¹⁵). Fewer than 30% of the people interviewed were satisfied about their government's action against corruption in Cyprus, Czechia, Croatia, Romania and Bulgaria, whereas a majority of respondents were satisfied in the Nordic Member States, Luxembourg, Austria, Malta, Ireland, Slovakia and the Netherlands (Figure 7.6).

People's engagement can make a big difference in the fight against corruption. Strengthening the role of the general public can help to improve institutional accountability and transparency, and therefore overall governance. For example, allowing the

public to make comments on the services received and publishing them can prove a strong incentive for institutions to provide efficient and impartial services. The majority of people (62%) in 2020 believed they could make a difference in the fight against corruption (Map 7.5). The proportion was particularly large in Member States with a high perception of corruption among the population — specifically in Romania, Portugal, Greece and Italy, where 75% of survey respondents agreed they could play a role in combating corruption.

4. Public procurement: high standards to safeguard the public interest

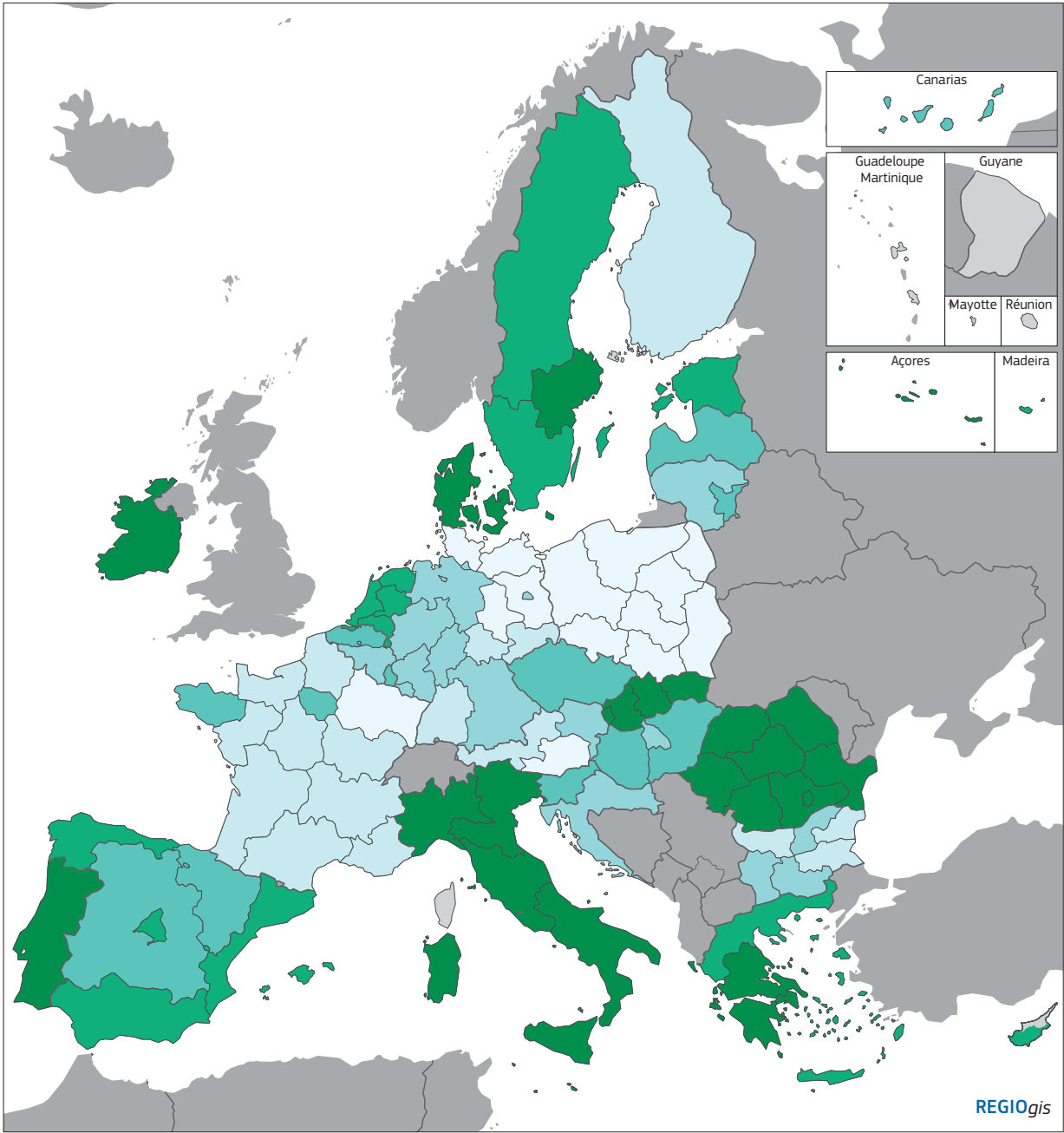
Public procurement, which amounts to 14% of EU GDP¹⁶, is one of the government activities most vulnerable to corruption¹⁷. The volume of transactions, the financial interests at stake, the complexity of the process, the close interaction between public officials and businesses, and the many stakeholders involved in public procurement increase significantly the risk of corruption and the potential incentives to engage in corrupt practices.

EU legislation contains a minimum set of harmonised public procurement rules designed to ensure a level playing field for businesses and to prevent corruption. The single market scoreboard contains 12 indicators to monitor how Member States perform each year in this regard. The proportion of single-bidder contracts, understood as those awarded on the basis of a single tenderer's offer, is an important indicator of public procurement standards, since such contracts imply the absence of competition in public purchasing. Having more bidders is usually better, as this means public buyers have more options, and can get better value for money. In 2019, almost all EU Member States saw an increase in the proportion of single bidding compared with three years earlier,

16 The EU Single Market Scoreboard webpage, reporting period 2019: https://single-market-scoreboard.ec.europa.eu/policy_areas/public-procurement_en.

17 OECD (2016).

15 <https://www.transparency.org/en>



Map 7.5 People who agree that citizens can make a difference in the fight against corruption, 2020

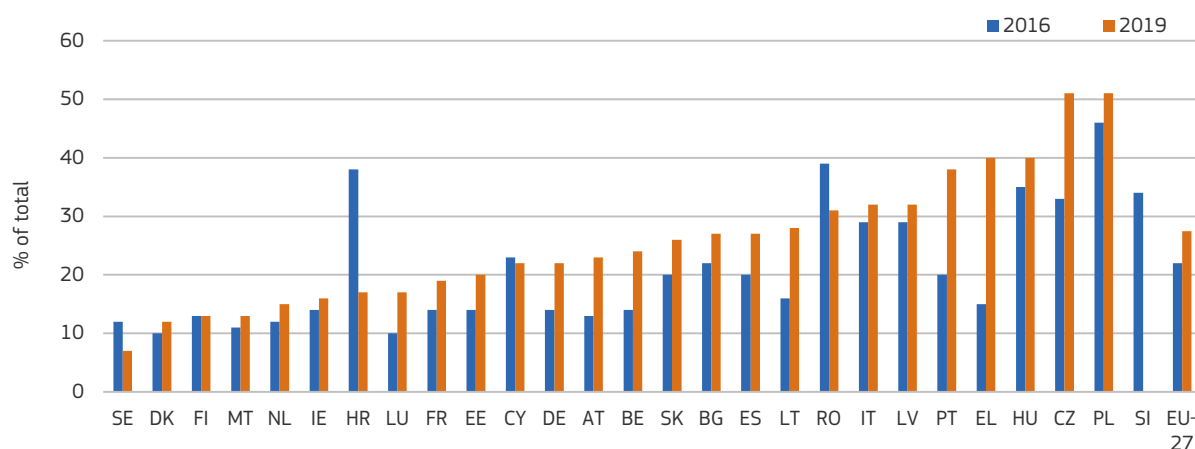
- % Agree
- 17 – 48
 - 48 – 53
 - 53 – 58
 - 58 – 68
 - 68 – 76
 - 76 – 92

Source: Transparency International Global Corruption Barometer 2020.

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Figure 7.7 Public contracts awarded where there was just a single bidder*, 2016 and 2019

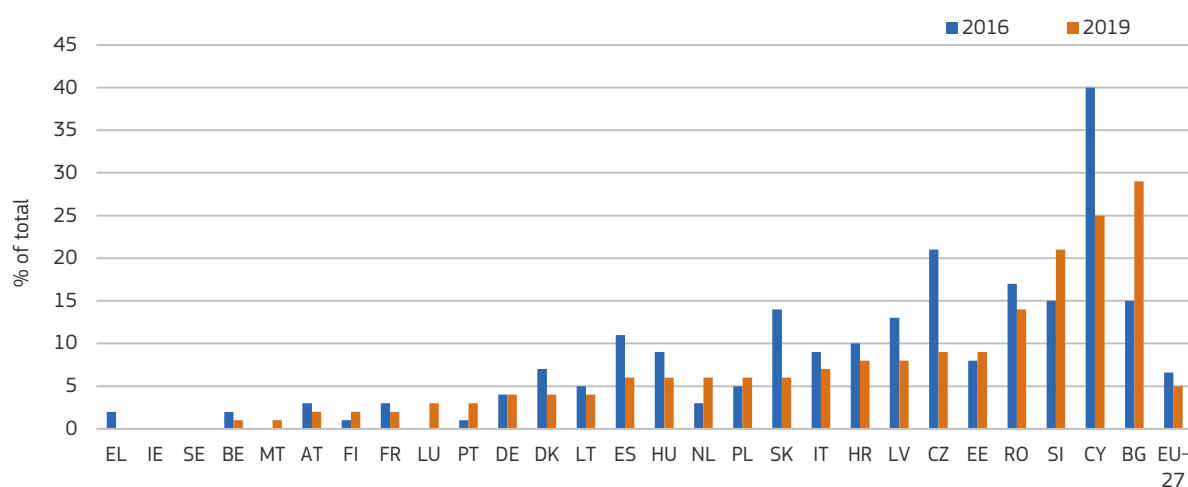


* Excluding framework agreements which have different reporting patterns.

Member States ordered by the share in 2019. EU values computed as population-weighted averages of national values. SI: no data for 2019.

Source: The EU Single Market Scoreboard.

Figure 7.8 Public contracts awarded without call for tender, 2016 and 2019



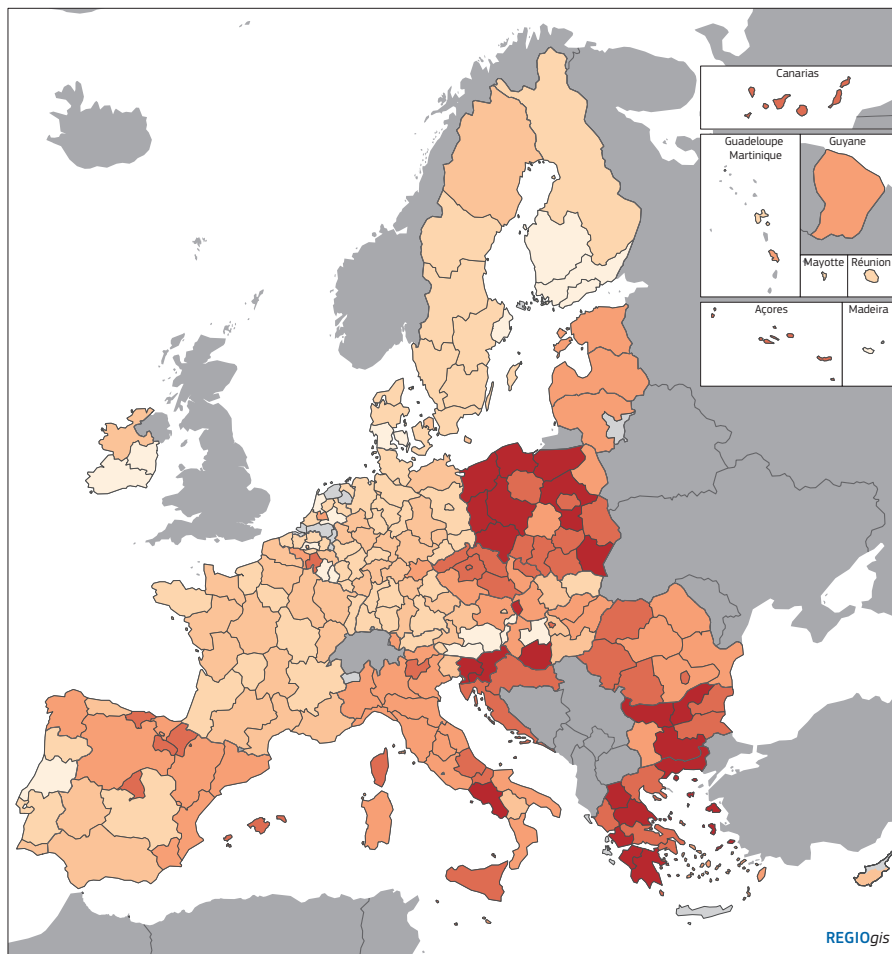
Member States ordered by the proportion in 2019. EU values computed as population-weighted averages of national values.

Source: The EU Single Market Scoreboard.

especially Greece (+25 pp), Portugal and Czechia (+18 pp) (Figure 7.7). The only exceptions were Croatia, where the proportion of single-bidder contracts more than halved between 2016 and 2019, Sweden (-5 pp) and Cyprus (with a marginal decrease of 1 pp).

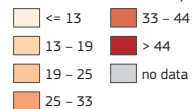
The proportion of contracts awarded without any call for tender at all is an even stronger indicator. Calling for tenders before starting procurement ne-

gotiations is good practice as it makes the bidder selection process more transparent and increases competition, generally leading to better value for money. Between 2016 and 2019 the proportion of such contracts declined in most EU Member States (Figure 7.8), and by over 10 pp in Czechia and Cyprus (though it still remained among the largest in the EU). Bulgaria was the main exception, with the proportion of untendered contracts increasing



Map 7.6 Public procurement with a single bidder, average 2018–2020

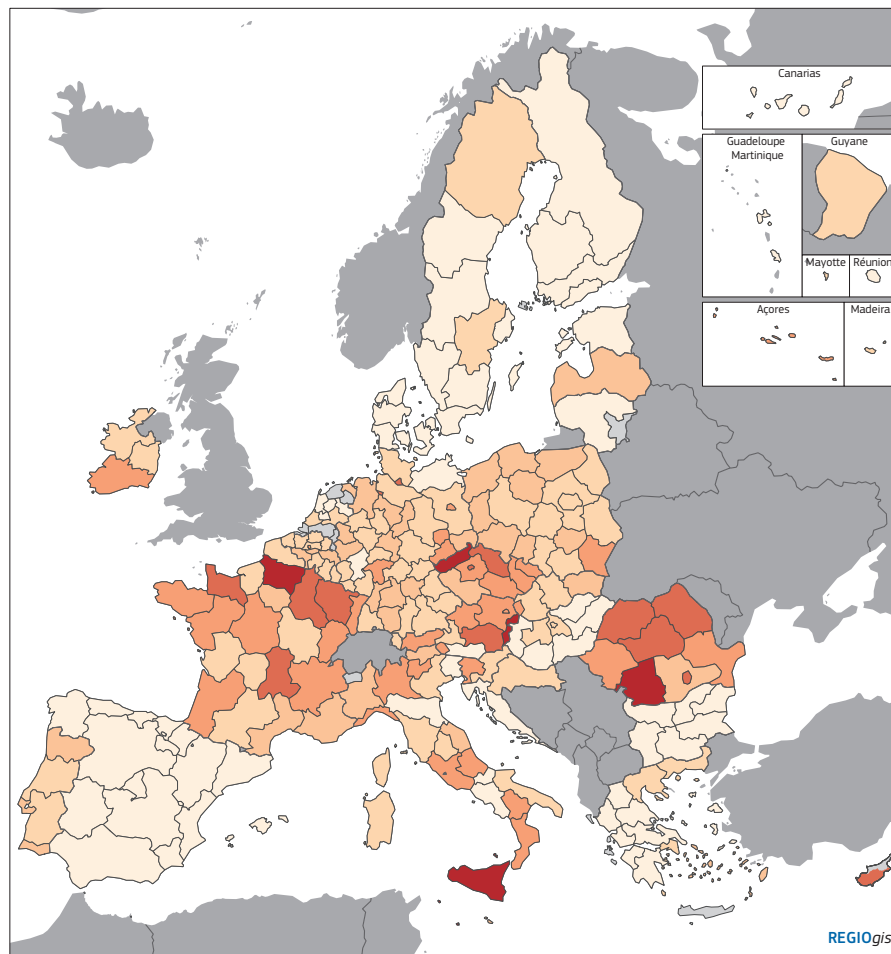
% of contracts awarded by regional authorities



Source: DG REGIO based on EU Tenders Electronic Daily; Fazekas & Kocsis (2017).

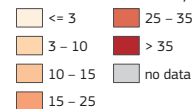
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Map 7.7 Public procurement without call for tender, average 2018–2020

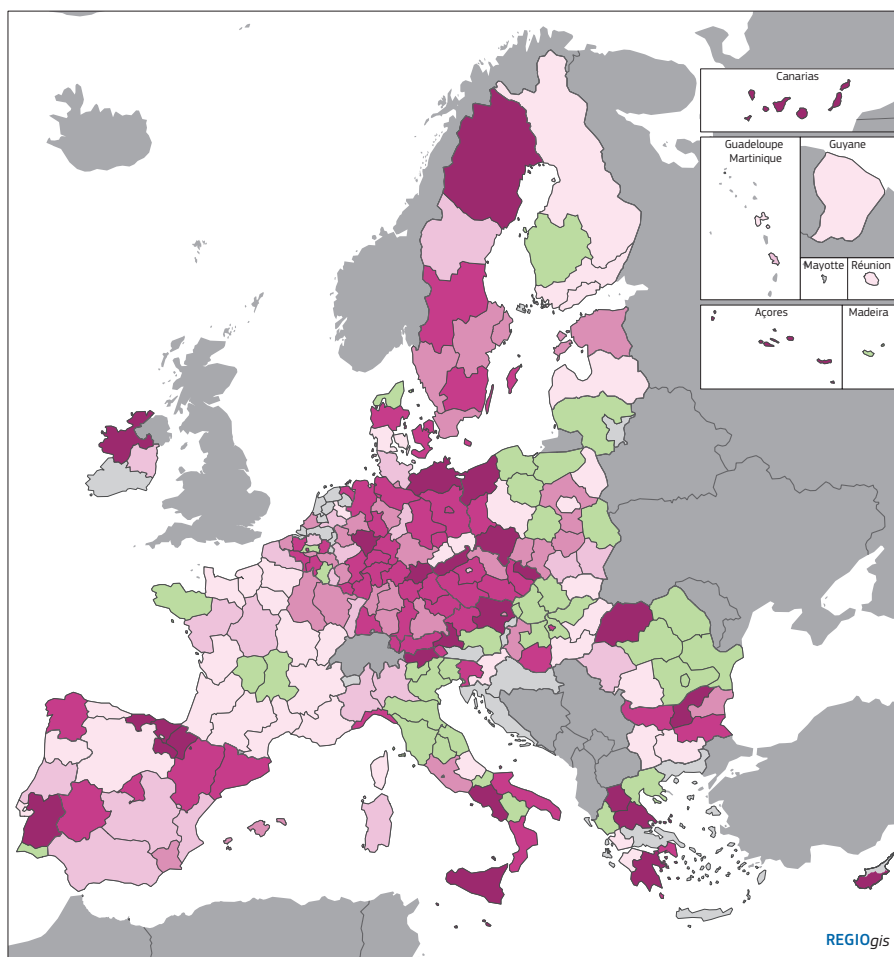
% of contracts awarded by regional authorities



Source: DG REGIO based on EU Tenders Electronic Daily; Fazekas & Kocsis (2017).

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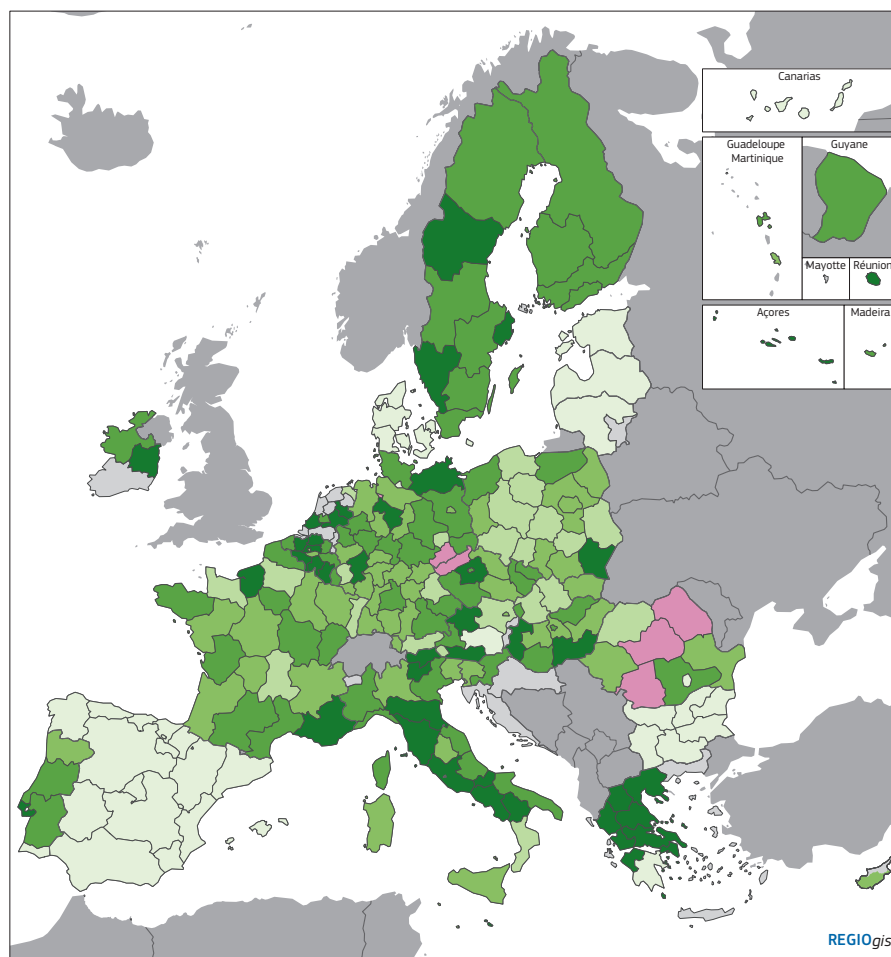


Map 7.8 Change in share of single bidders between 2011–2013 and 2018–2020

Percentage points change

- <= 0
- 0 – 3.5
- 3.5 – 6.5
- 6.5 – 9.5
- 9.5 – 15
- > 15
- no data

Change in share of contracts awarded by regional authorities.
Source: DG REGIO based on EU Tenders Electronic Daily; Fazekas & Kocsis (2017).



Map 7.9 Change in share of contracts without call for tender between 2011–2013 and 2018–2020

Percentage point change

- <= -35
- 35 – -25
- 25 – -13
- 13 – -5
- 5 – 0
- > 0
- no data

Change in share of contracts awarded by regional authorities.
Source: DG REGIO based on EU Tenders Electronic Daily; Fazekas & Kocsis (2017).

from 15% to 29%, though there was also a sizeable increase in Slovenia.

The Government Transparency Institute database provides a picture of public tenders published in the Tenders Electronic Daily (TED) journal at the regional level¹⁸. The database includes only public tenders conforming to certain criteria; for example, tenders published by regional authorities or regional agencies¹⁹. Single-bidder contracts, which tend to provide lower value for money, are most common in the north-western part of Poland and some regions in Bulgaria as well as in Slovenia (Map 7.6). The proportion of single-bidder contracts increased in the majority of EU regions between 2011–2013 and 2018–2020, but declined in Lithuania, most of Romania, part of Poland, Hungary, Slovakia and a few other regions across the EU (Map 7.8).

The proportion of regional and local authority contracts awarded without a call for tender was relatively high in 2018–2020 in central and southern parts of the EU, plus Romania. In the Sud-Vest region of Romania, Oltenia and Severozápad in Czechia, and Picardie in France, this proportion was over 40% (Map 7.7). Between 2011–2013 and 2018–2020, the proportion went down in most regions, though it increased in central Romania, Severozápad (Czechia) and two German regions, Bremen and Chemnitz (Map 7.9).

5. An efficient and agile business environment is a key asset

One of the adverse effects of inefficient institutions is a regulatory environment that burdens domestic firms and adversely affects entrepreneurship. Poor-quality institutions hamper the creation of new businesses and may lead to entrepreneurs seeking opportunities abroad or giving up altogether.

The ease of doing business index, published until 2020 by the World Bank, assesses areas of business regulation in the largest business city in each of 190 countries across the world. It helps to monitor and compare the quality of the business environment and, in addition, assesses a sub-set of business regulation areas within selected countries, including 14 EU Member States²⁰. The overall ease of doing business score is the average of the indicators for the different areas, each indicator showing the distance of each country from the best performing country in the area concerned²¹.

Over recent years, policy reforms have made the EU more business-friendly. Since 2016, most Member States have improved their business environment (Figure 7.9). The Nordic Member States (Denmark is ranked fourth worldwide) and the Baltic States, together with Ireland, Germany and Austria, were assessed as having the most friendly business environments in the EU in 2020. Malta, Greece, Luxembourg²² and Bulgaria scored the lowest, though in all of them except Bulgaria the score had improved over the preceding four years.

A closer look shows that EU Member States differ significantly across the various business regulation areas. For example, in 2020, to meet government requirements for starting a business, an entrepreneur in Poland had to pay fees equivalent to 12% of the average national income per head, and complete five administrative procedures that took 37 business days altogether. By contrast, an entrepreneur in Estonia paid 1% of national income per head and had to spend only 3.5 business days completing three procedures.

18 Fazekas and Czibik (2021).

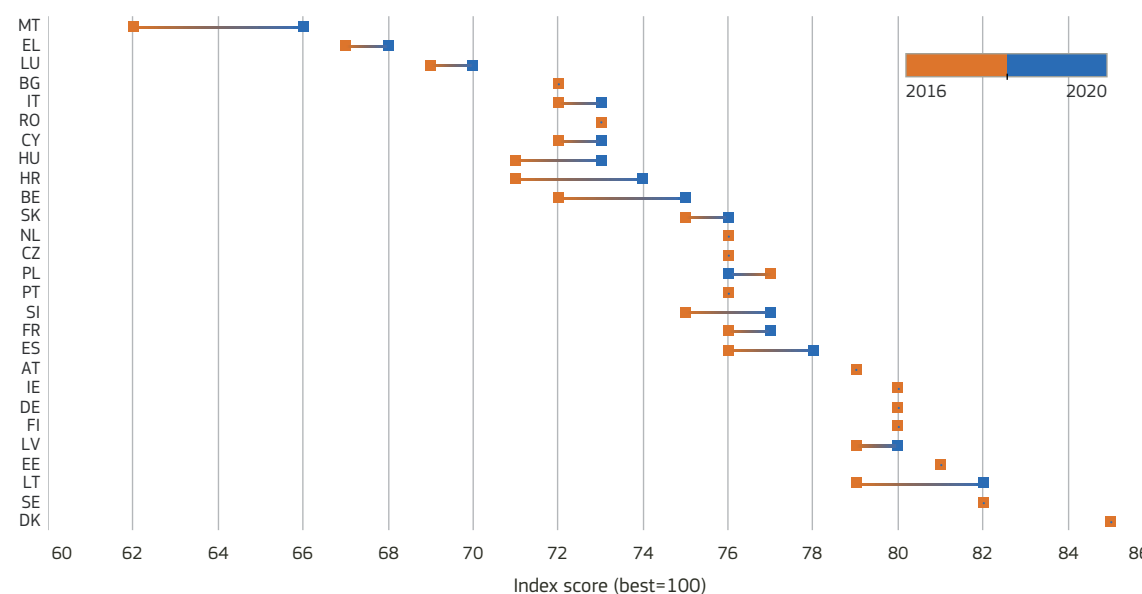
19 The trends at the regional level do not always match those observed by the EU Single Market Scoreboard, as the share of regional contracts with respect to the total number of contracts (regional, national and European) varies greatly among Member States, from 4% in Malta to 78% in Sweden (average over the period 2018–2020).

20 The 14 covered since 2015 are Austria, Bulgaria, Croatia, Czechia, Greece, Hungary, Ireland, Italy, the Netherlands, Poland, Portugal, Romania, Slovakia and Spain.

21 For each area and each country/city, the computation of the ease of doing business score involves two steps. In the first step, each individual indicator (y) is normalised using a linear transformation ($\text{worst} - y / (\text{worst} - \text{best})$), where the highest score represents the historical best regulatory performance on the indicator. In the second step, the scores obtained for individual indicators are aggregated through simple, equal weighting, averaging into one score.

22 The low score of Luxembourg is due to its very low score on the getting credit indicator (15/100) and medium scores on resolving insolvency (46/100) and protecting minority investors (54/100).

Figure 7.9 Ease of doing business score (best=100), 2016 and 2020



For some countries, the 2016 may hide the 2020 value.

Countries ordered by their 2020 score. Where only one score is indicated, there was no change between the two years.

Source: World Bank Doing Business reports, 2016 and 2020.

The sub-national Doing Business reports assesses a sub-set of the national indicators which are most likely to vary within a country. They reveal substantial differences between cities, despite them operating within the same national legal and regulatory framework. The most recent national surveys were carried out in three waves: Croatia, Czechia, Portugal and Slovakia in 2018; Greece, Ireland and Italy in 2020; and Austria, Belgium and the Netherlands in 2021. Two indicators — starting a business, and dealing with construction permits — are considered below²³.

Among the 10 Member States, starting a company is easiest and quickest in Greece, with requirements being much the same in all the cities examined. It takes longest in Austria, Czechia, Slovakia and Zagreb, the Croatian capital, at over three weeks (Figure 7.10), and it is also more costly than the EU average. Zagreb is the only city of those covered in Croatia where the online business registration system, which provides a single access point for company start-ups, is not used to its full

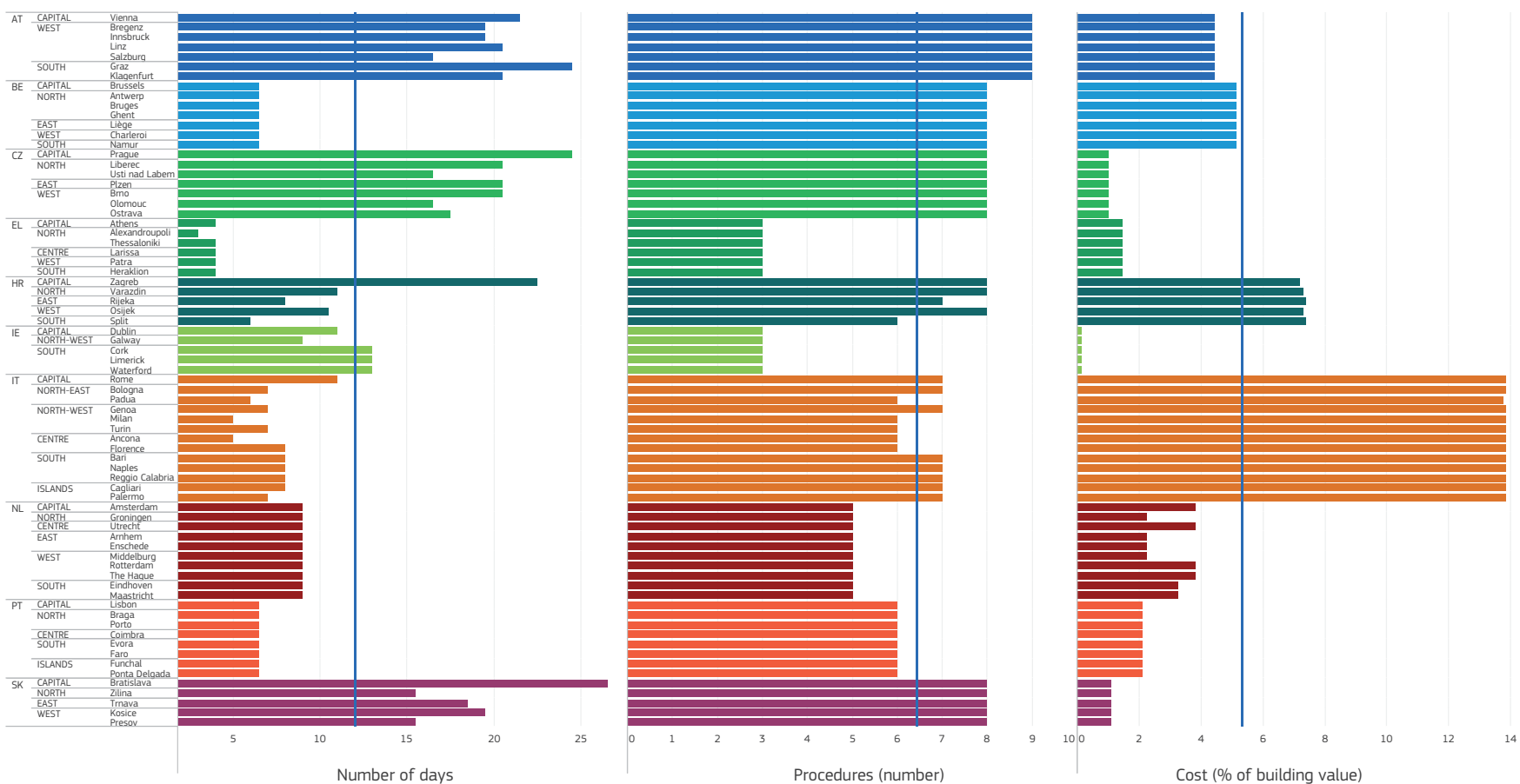
potential²⁴. All the cities covered in Austria, Czechia and Slovakia perform poorly in terms of both duration and number of administrative procedures, but the process is relatively cheap, costing only around 1% of national income per head in Czechia and Slovakia and 4.5% in Austria. In the Netherlands, Portugal and Greece, the duration, number of procedures and cost are well below the EU average. The procedure is also relatively quick in Italian cities, Rome being the city where it takes the longest, 11 days, but this is still slightly below the EU average. Although the number of procedures in Italian cities is similar to the EU average, the cost is higher than anywhere else, at 14% of national income per head, almost three times the EU average.

Effective construction regulations matter for public safety, but also for the health of the construction industry and the economy as a whole. In 2019, the industry accounted for 5.5% of EU gross value added and for around 6.5% of employment. The time, complexity and cost of obtaining a construction permit (here for a warehouse) varies markedly between cities, even in the same Member State (Figure 7.11). A major reason is the differing length of time taken to obtain an excavation permit, a

23 'Starting a business' covers the procedures, time, cost and minimum paid-up capital needed to start a limited liability company, and 'dealing with construction permits' covers the procedures, time and cost required to complete all the formalities for building a warehouse, and the quality control and safety mechanisms involved in obtaining a construction permit.

24 World Bank (2018, 2020 and 2021).

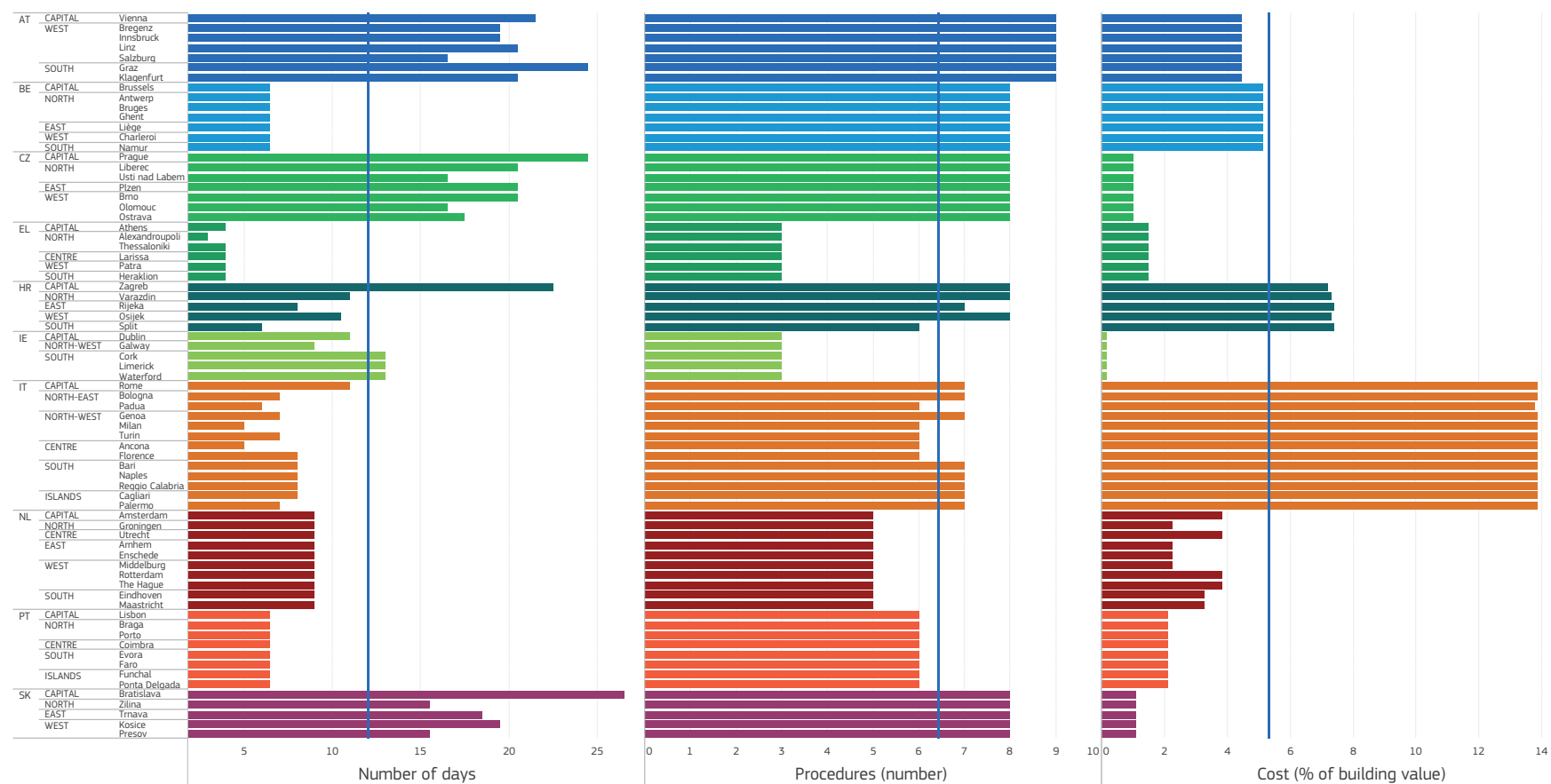
Figure 7.10 Sub-national differences in starting a company 2018/2021



The vertical blue lines indicate the EU average for 2020 based on national data, computed as the population-weighted average of 2020 country values, which relate to the capital city.

Source: DG REGIO calculations based on the World Bank sub-national Doing Business reports, years: 2021 (AT, BE and NL); 2020 (EL, IE and IT); and 2018 (HR, CZ, PT and SK) .

Figure 7.11 Sub-national differences in dealing with construction permits, 2018/2021



The vertical blue lines indicate the EU average, computed as the population-weighted average of 2020 country values, which relate to the capital city.

Source: DG REGIO calculations based on the World Bank sub-national Doing Business reports – years: 2021 (AT, BE and NL); 2020 (EL, IE and IT); and 2018 (HR, CZ, PT and SK) .

process that can be shortened by improving electronic permit systems. Getting a construction permit is quickest in Cagliari and Milan in Italy, and Varazdin in Croatia. By contrast, it takes much longer than the EU average (of 170 days) in the southern Italian cities, apart from Cagliari, and in all the Slovakian and Czech cities covered. In these cases, requesting a permit involves a large number of pre-construction approvals, especially in Czechia. In both here and Slovakia, the length of the process stands in contrast to the low cost of obtaining the permit, at only 0.3% of the value of the building concerned in all the cities. The average cost of construction permits is well above the EU average in Croatia, Dublin and some Italian cities, Milan being the most expensive at almost 18% of the building value or over seven times the EU average. Nevertheless, in Italy, starting a business became quicker and easier between 2013 and 2020 in all the cities covered by the survey, and the cost was reduced in all except Bari (see Box 7.2).

6. e-Government as a means of increasing transparency and accountability

Public authorities can increase their efficiency and improve their relationship with the public through e-government, which is the use of technology to improve and facilitate government services, for example to request birth certificates or submit tax declarations online. Wider and easier access to public services ultimately increases their transparency and accountability, while reducing red tape and corruption. For some time ICT has offered a range of tools to meet the needs of e-government, and in 2020 over half of people in the EU aged 16–74 (57%) used the internet to interact with public authorities. Although there were considerable differences in usage between Member States, inter-regional differences were, in most cases, small (Map 7.10a). In the Nordic Member States, the Netherlands and Estonia, 80% or more of people used the internet to interact with public authorities; and in most French regions, apart from Corse and the outermost regions, this was true for over 70% of the survey respondents. By contrast,

the share was less than 20% in southern Italy and in Romania (except for the capital region where it was around 30%)²⁵. The share of internet users of government services was also small in the rest of Italy and most parts of Bulgaria, and the increase since 2013 was marginal (Map 7.10b).

Low usage of e-government services is likely to be linked to lack of internet access and/or low levels of technological readiness, which is a feature of some regions in the EU. In particular, in 2020 over 30% of people in the south-east of Romania reported that they did not have any access to the internet, whether by mobile phone, computer or other device²⁶. A third of people in southern Italy, western Croatia and most regions in Romania and Bulgaria reported never having used a computer in their lives (Map 7.10c). Being able to use at least one of devices such as a computer, laptop, tablet, mobile or smartphone is a necessary skill to be able to benefit from e-government services. The development of the information society is critical for creating the necessary conditions for a modern, competitive economy and strengthening economic resilience.

How can more people be encouraged to use the internet to interact with public authorities? Increasing e-government usage can be seen as a virtuous circle: if most government services can be readily accessed online, more people will be inclined to use them; and if public demand is high, authorities will be pushed to develop better digital services. The yearly e-government benchmark reports give an insight into the availability and usability of public e-services in the EU²⁷. They indicate how Member States perform in four key e-government areas:

1. user-centricity, which indicates the availability and usability of public e-services;
2. transparency, which indicates the intelligibility of government operations, service-provision procedures and the level of control users have over their personal data;

25 NUTS 2 level data for Italy and France relate to 2019.

26 Gallup World Poll ad hoc 2020 regional survey.

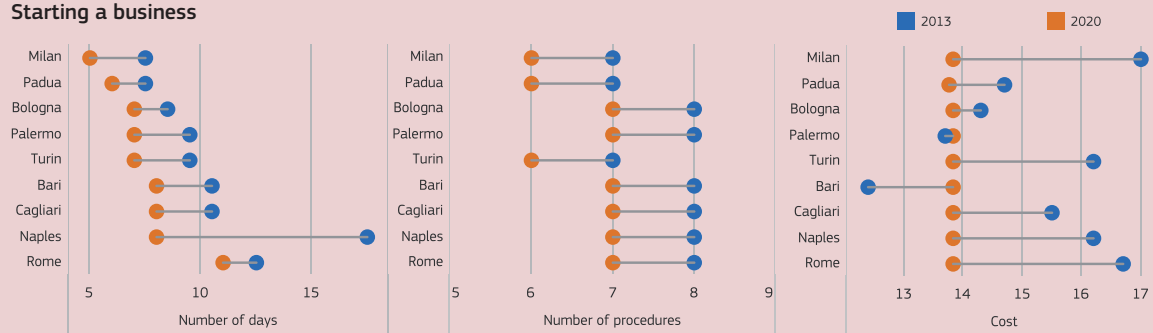
27 Van der Linden et al. (2020).

Box 7.2 Comparison of the two Italian sub-national doing business surveys

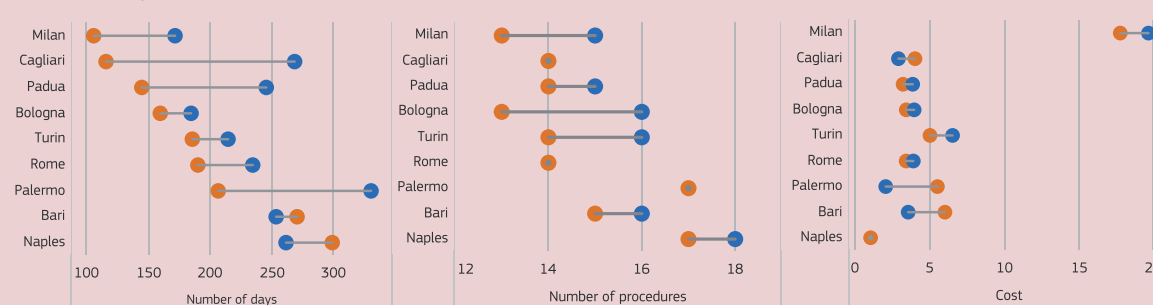
Two surveys at the subnational level — 2013 and 2020 — are available for Italy, allowing for a time comparison of the performance of Italian cities (Figure 7.12). Starting a business became quicker and easier in all the cities investigated by the survey, while the cost was reduced as well in all of them except Bari. For example, in Naples, starting a business took 18 days in 2013 but only 7.5 days in 2020, the number of procedures was reduced from 8 to 7 and the cost by 15%. The cost of dealing with construction permits declined over the past years in Milan. This cost also declined over these 7 years in Turin, though from a much lower level, and marginally in Padua, Bologna and Rome, but it increased in Palermo, Bari and, if only slightly, in Cagliari. On the other hand, the time taken to obtain a construction permit shortened between 2013 and 2020 in all the Italian cities covered, apart from Naples and Rome, and the number of procedures involved declined in all of them.

Figure 7.12 Two Italian sub-national Doing Business surveys, 2013 and 2020

Starting a business



Construction permits



For each indicator — starting a business (top) and dealing with construction permits (bottom) —, cities are ordered by the number of days required in 2020. Only cities covered by both surveys are included.

Source: World Bank Subnational Doing Business, Italy, 2013 and 2020 reports.

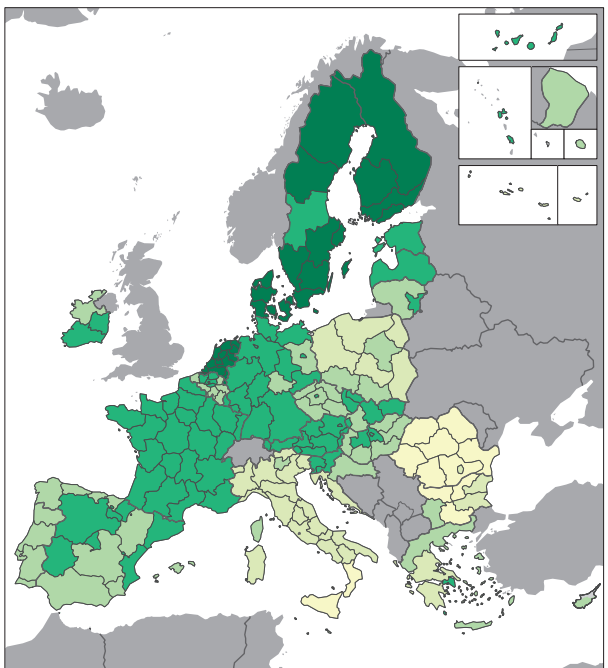
3. cross-border mobility, which indicates the availability and usability of services for people and businesses located abroad; and
4. key enablers, which indicate the availability of five functions, such as e-ID cards.

The assessment in each area is based on responses to questions on the quality and quantity of e-government services provided. The average

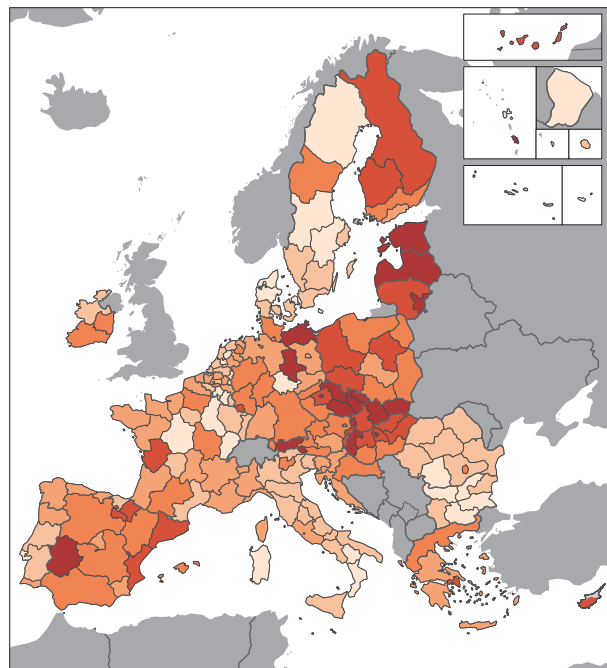
score over the four areas represents the overall e-government performance of a Member State, on a scale from 0%, the worst, to 100%, the best. Over the period 2016–2017 to 2018–2019²⁸, the provision of digital public services improved in all EU Member States, but at different rates (Figure 7.13).

28 For methodological reasons, the e-Government benchmark results are published as biennial averages: <https://op.europa.eu/en/publication-detail/-/publication/c0b-d38e3-f98e-11ea-b44f-01aa75ed71a>.

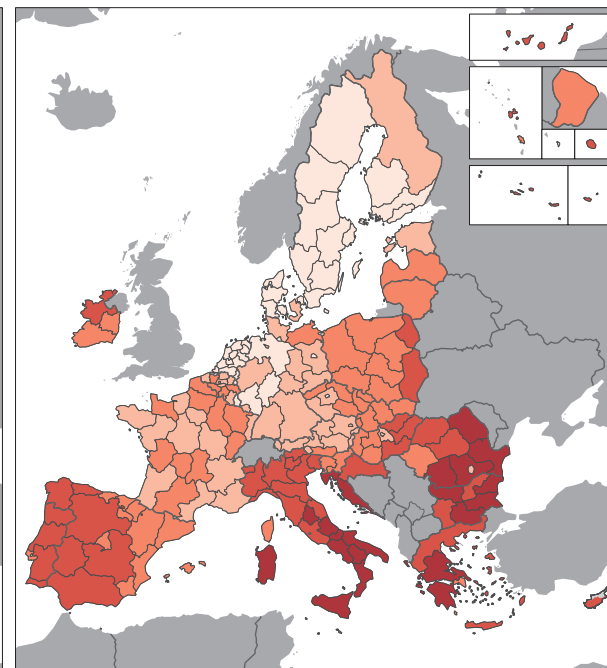
Map 7.10 Internet and computer use



(a) Proportion of people interacting with public authorities via the internet in the previous 12 months, 2020



(b) Change in the proportion of people interacting with public authorities via the internet, 2013–2020



(c) Proportion of people who have never used a computer, 2017

% of people aged 16–74

- <= 20
- 20 – 40
- 40 – 60
- 60 – 80
- > 80
- no data

EU-27 = 56
FR, IT: 2019
Source: DG REGIO based on Eurostat data (isoc_r_gov_i and isoc_ciegi_ac).

Percentage point change

- <= 5
- 5 – 10
- 10 – 15
- 15 – 20
- 20 – 25
- > 25
- no data

EU-27 = 14
FR: 2014–2019; FR (RUP): 2015–2019; IT: 2013–2019; SI: 2014–2020
Source: DG REGIO based on Eurostat data (isoc_r_gov_i and isoc_ciegi_ac).

% of people aged 16–74

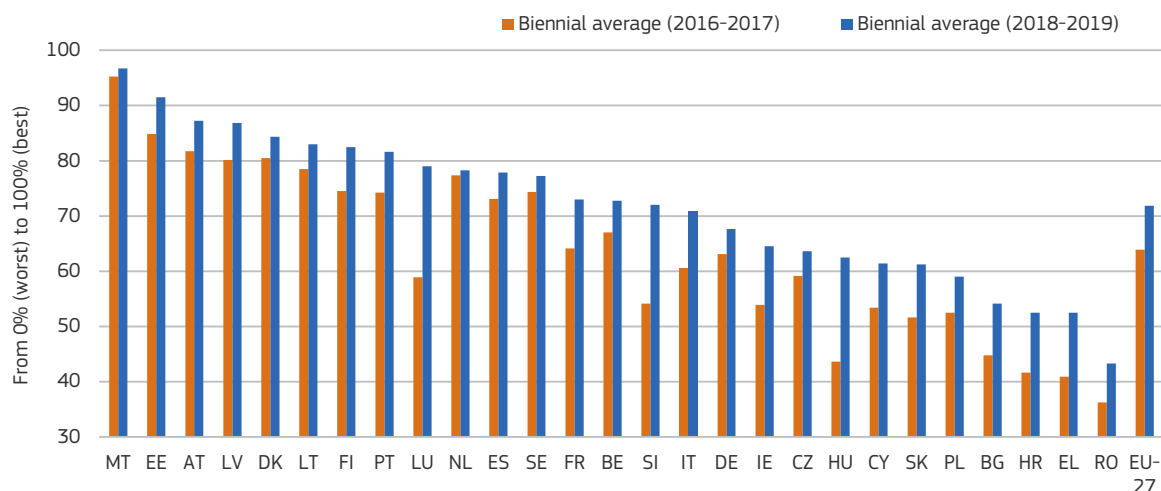
- <= 5
- 5 – 10
- 10 – 20
- 20 – 30
- > 30
- no data

EU-27 = 15.7
Source: DG REGIO based on Eurostat data (isoc_r_cux_i).

0 1 000 km

© EuroGeographics Association for the administrative boundaries

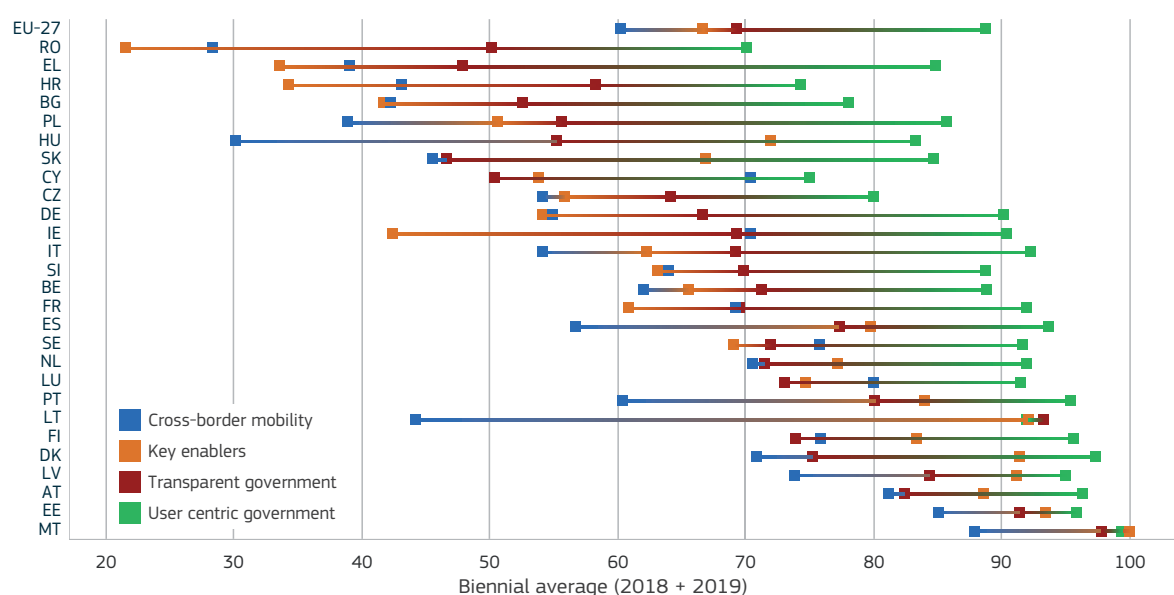
Figure 7.13 Overall e-Government country performance, 2016-17 and 2018-19



Benchmark computed as the average score over the four e-Government sets of indicators. Member States ordered from best to worst by the score in 2018-2019.

Source: e-Government benchmark report.

Figure 7.14 Country performance in e-Government areas, 2018-2019



Countries ordered from worst to best (reading from top) by their average performance across the four areas.

Malta remained the top performer, followed by Estonia, with a score above 90% in 2018–2019. In terms of the change in e-government performance, Croatia, Greece, Hungary, Ireland, Italy, Luxembourg and Slovenia all improved their score by more than 10 pp, especially Luxembourg (from 59% to 79%).

The overall e-government score shows the aggregate picture, but Member States perform dif-

ferently across the four areas (Figure 7.14) and the dispersion around the average score tends to widen as the country performance worsens. User-centricity improved in all Member States, implying that public services became more available online, more mobile-friendly and with more online support available. People living abroad generally struggle to access and use online services in their home country, as highlighted by the low scores on the cross-border mobility indicator, which is a weak

point for all EU Member States. A major bottleneck is the difficulty people abroad have in accessing services requiring authentication. In 2018–2019, only 9% of the services usually accessed by residents via a domestic electronic identity document — e-ID — could equally be accessed using a foreign national e-ID.

To improve cross-border inter-operability of national online identification systems, the European Commission has proposed a new regulation on digital identity. The European digital identity²⁹ will be available to EU citizens, residents, and businesses who want to identify themselves or provide confirmation of certain personal information. The 2030 Digital Compass sets out the milestones towards fully reaping the benefits of a digital EU, including improving e-government. In particular, by 2030, all key public services should be available online, all citizens should have access to electronic medical records, and 80% of the population should be able to use electronic identification.

²⁹ https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/european-digital-identity_en



Chapter 8

National investments and cohesion

- In the 2014–2020 programming period, cohesion policy funding made a major contribution to sustaining public investment in the EU in the context of fiscal consolidation following the economic and financial crisis; this was especially so in cohesion countries.
- Although EU Member States in many cases have significant nationally financed policies to tackle regional disparities, cohesion policy is the main source of financing for regional development policies in less developed Member States.
- Public investment, whether from the EU or national sources, is essential for regional development, especially when it triggers additional private investment to reinforce the process.
- Policies that shift economic activity into higher-value-added sectors and improve productivity and competitiveness, together with investment in human capital, transport infrastructure and improved governance, seem most effective in reducing regional disparities.
- Public finances improved steadily across the EU from the aftermath of the financial crisis of 2008–2009 up until 2019. However, the restrictions imposed to control the COVID-19 pandemic necessitated extraordinary policy measures to counter the economic downturn it induced and to safeguard jobs, worsening the budget balance in all Member States.
- At the onset of the COVID-19 crisis, public investment in the EU was lower than before the financial crisis of 2008–2009, particularly in many cohesion countries, raising concerns about the effect on their long-term growth potential and convergence towards GDP per head in the rest of the EU.
- Regional and local authorities executed almost a third of total general government expenditure and the majority of public investment in the EU (58% in 2019), though there were marked differences between Member States.
- Regional and local autonomy indicators suggest that spending and investment decisions are more centralised in cohesion countries than in the rest of the EU. Although the difference narrowed between 1990 and 2010, it has widened again over the past decade.

Chapter 8

National investments and cohesion

This chapter examines nationally financed policies to tackle territorial disparities in a sub-set of Member States. It then overviews national and sub-national public finances across the EU, focusing on government expenditure and investment trends over recent years and the differences between Member States.

Section 8.2 starts by indicating the importance of cohesion policy in supporting public investment, especially in the less developed parts of the EU. It then presents the results of a study that analyses nationally financed policies to tackle territorial disparities, which complement cohesion policy interventions.

Section 8.3 examines national public finances. It overviews trends in general government budget balances and debt, expenditure and revenue, focusing on developments in public investment and the functional categories of spending, including the apparent effects of the COVID-19 pandemic and the response to this.

Section 8.4 focuses on sub-national public finances and examines expenditure and investment undertaken by state, regional and local government authorities in relation to the differing levels of decentralisation which exist across the EU.

Section 8.5 finally provides a summary of the main conclusions.

1. Cohesion policy, investment and national policies addressing territorial disparities

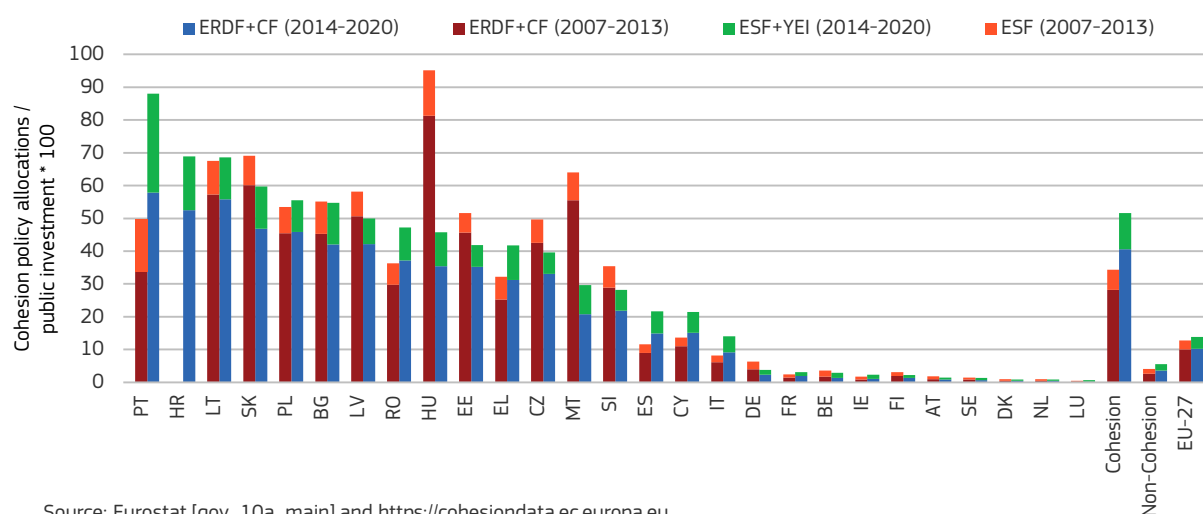
1.1 Cohesion policy and government capital investment

Cohesion policy is the EU's main investment policy, providing funding equivalent to 14% of government capital investment (from both national and EU sources) in the EU-27 over the period 2014–2020. Although not all cohesion policy funding goes to capital investment, particularly as regards the European Social Fund (ESF) and the Youth Employment Initiative (YEI), the figure gives a rough indication of the importance of cohesion policy for Member States, especially the less developed ones. In non-cohesion countries, the figure was lower (just under 6%), but in cohesion countries it was over 50%. The importance of cohesion policy increased between the 2007–2013 and the 2014–2020 programming periods, with most of the increase occurring in cohesion countries (Figure 8.1)¹.

Restricting the comparison to the ERDF and Cohesion Fund (CF), money from which mainly goes to financing investment, gives a more realistic view of the weight of cohesion policy in funding government investment in Member States — though some ERDF money goes to financing businesses rather than public investment. This shows that the ERDF and CF in 2014–2020 accounted for around 10% of the total public investment carried out across the EU. The ERDF and CF jointly allocated a level of financing equivalent to about 3.6% of total public investment in non-cohesion countries and 40.6% in cohesion countries, up 1 pp from the previous period for the former, and up more than 12 pp for the latter.

¹ Note that, unless otherwise specified, the cut-off date for the Eurostat data used in this chapter was 30 November 2021.

Figure 8.1 Cohesion policy funding relative to government investment in Member States in the 2007–2013 and 2014–2020 periods



These figures suggest that cohesion policy has made a major contribution to sustaining public investment in the EU after it was reduced in the aftermath of the Great Recession of 2008–2009 and the sovereign debt crisis of 2011 (between 2008 and 2012, public investment declined by 20% in cohesion countries and by 9% in non-cohesion countries).

1.2 National policies addressing territorial disparities

A study carried out by the European Commission in 2019² analysed policies entirely financed by national resources to tackle territorial disparities in 11 Member States — all, except Italy and Spain, cohesion countries³. Around 60 measures were identified, involving a range of policy instruments targeted at different aspects of development, such as urbanisation, connectivity, labour force skills, mobility, trade, innovation, and the business environment. The most common types of measure were direct support to business development and

innovation, transport infrastructure projects, and tax incentive schemes to support trade and improve the business environment.

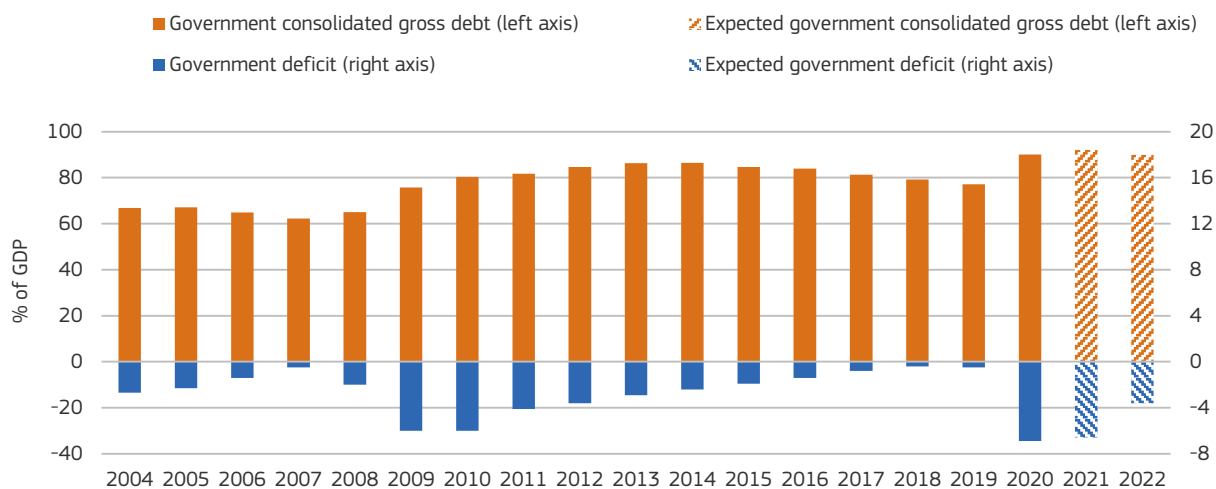
The vast majority of the nationally financed policies concerned have an explicit spatial focus, targeting regions with particular economic problems, such as high unemployment. Most measures, however, are designed and implemented at national level, with limited involvement of regional authorities. This is especially the case in Member States where sub-national authorities execute only a small share of public expenditure (as in Bulgaria, Croatia, Hungary, Portugal, Romania and Slovenia).

In the Member States covered, cohesion policy is by far the main source of financing for territorial policies. Only Romania and Italy have a significant budget for national policies for regional development, and even then only equivalent to slightly over a third of the total funding available to cohesion policy programmes. In the other Member States covered, the corresponding figure is below 10%.

There are two main ways in which nationally funded measures complement the European Structural and Investment Funds (ESIF). They either provide additional funding in national priority areas where cohesion policy funding is considered insufficient,

² European Commission (2019d). It was carried out by a consortium of Prognos AG (lead), Politecnico di Milano and Technopolis Group SPRL. It was based on a combined analysis of statistical data, case studies and stakeholder interviews.

³ The other nine Member States were Bulgaria, Croatia, Czechia, Hungary, Poland, Portugal, Romania, Slovakia and Slovenia.

Figure 8.2 General government balance and debt, EU-27, 2004-2022

Source: Eurostat [gov_10dd_edpt1] for 2004-2020, and European Commission's 2021 Autumn Economic Forecast for 2021-2022.

or they support activities that are not eligible for EU funding⁴.

The study shows that policies to improve productivity in general and to shift the structure of economic activity away from low-value-added sectors appear to be effective in reducing regional disparities. Investment in human capital, in transport infrastructure, and in building up administrative capacity and skills to improve governance is found to be an essential part of measures aimed at bringing about such a shift.

2. Developments of national public finances

2.1 Public finances improved steadily until 2019, but the COVID-19 crisis reversed the trend

The seventh Cohesion Report⁵ described a significant improvement in Member State public financ-

es in the years following the Great Recession of 2008-2009 and the sovereign debt crisis of 2011. Gradual fiscal consolidation, aided by economic recovery from 2015, was responsible for this. However, this trend was reversed abruptly in 2020 because of the COVID-19 pandemic and the measures taken in response to it (Figure 8.2).

After peaking at 6% of GDP in 2009 and 2010, the government deficit in the EU-27 fell to 2.4% in 2014 and further to 0.5% in 2019, the same level as in 2007. In 2020, the deficit increased sharply to 6.9% of GDP, as a consequence of both the extraordinary fiscal measures taken by Member States in response to the economic downturn induced by the pandemic and the automatic stabilisers it triggered⁶. The deficit is estimated to decline slightly to 6.6% in 2021 and is expected to fall further to 3.6% in 2022⁷.

A similar counter-cyclical pattern is evident for public debt. The government consolidated gross debt of the EU-27 rose from 62.2% of GDP in 2007 to 86.5% in 2014 before falling gradually to 77.2% in 2019. In 2020 it increased markedly

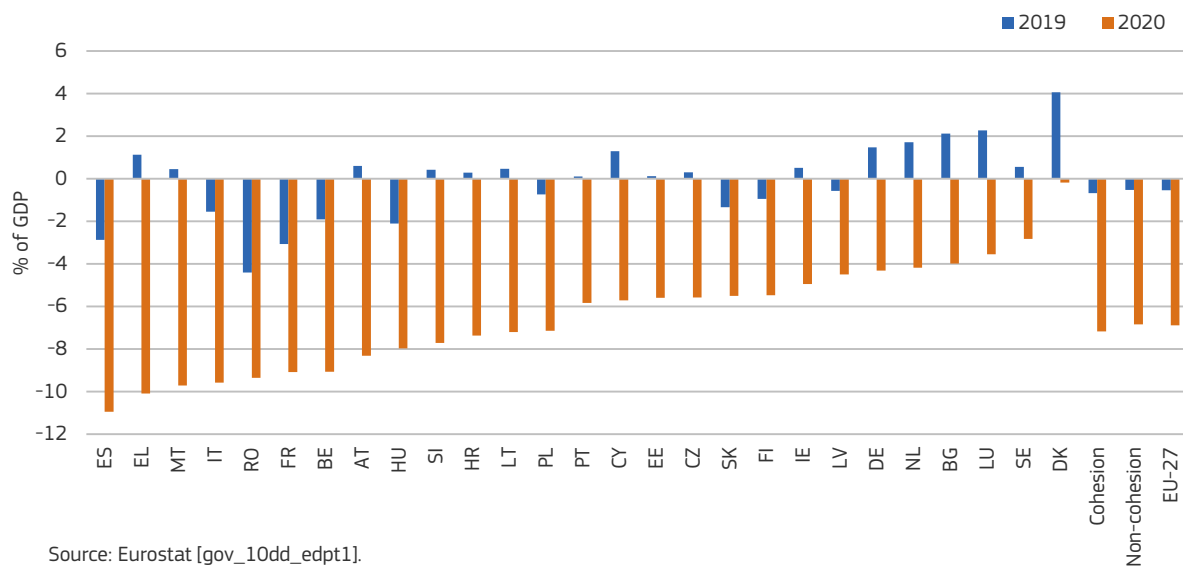
4 The study also found that effective implementation of territorial cohesion policies at both national and regional level is frequently undermined by a lack of adequate monitoring systems, or by a failure to use the systems that do exist.

5 European Commission (2017b).

6 Automatic stabilisers are features of the fiscal system which result in reduced tax revenue and increased public spending in an economic downturn without discretionary government action.

7 European Commission (2021k).

Figure 8.3 General government balance, 2019 and 2020



to 90.1% and is estimated to reach a new high in 2021, before declining again in 2022.

The general government balances of EU Member States in 2019 and 2020 reflected the changes in public finances induced by the pandemic (Figure 8.3).

In 2019, there were 17 Member States with a fiscal surplus, and only France and Romania had a deficit greater than 3% of GDP. In 2020, all EU Member States had a deficit, which was above 3% of GDP in 25 of the 27 cases, with Spain (11%) and Greece (10.1%) having the largest. The outlook for the budget balance in cohesion countries does not appear to be substantially different from that in non-cohesion ones, suggesting that the stage of economic development did not determine the scale of fiscal response to the pandemic.

The effect of the pandemic is equally evident in public debt levels. In seven Member States (Greece, Italy, Portugal, Spain, Cyprus, France and Belgium), public debt was over 100% of GDP in 2020 as compared with only three Member States (Greece, Italy and Portugal) in 2019 (Figure 8.4). The debt level was highest in the southern EU Member States (144% of GDP) and lowest in the eastern EU (53%). In 17 Member States public debt increased by more than 10 pp in 2020; and in

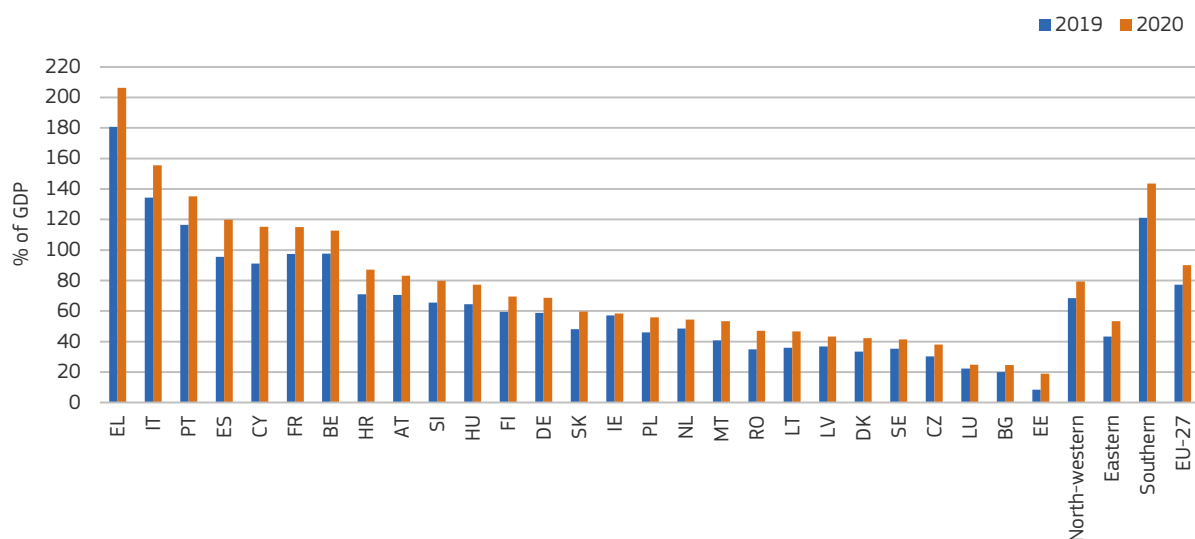
four of these (Greece, Spain, Cyprus and Italy) by over 20 pp.

2.2 Government expenditure peaked in 2020 as a consequence of the COVID-19 crisis

The widening of the fiscal deficit in 2020 was largely due to a sharp increase in government expenditure relative to GDP, whereas the revenue-to-GDP ratio remained broadly unchanged⁸. In the previous economic crisis in 2009 and 2010, government expenditure in the EU-27 rose to just over 50% of GDP. It declined to 46.5% of GDP in 2018 and 2019, but then increased to 53.1% in 2020 due to the combined effect of a reduction in GDP and an increase in expenditure in absolute terms (Figure 8.5). The swift rise in public expenditure occurred in all Member States, although it varied considerably in scale, ranging from an increase of 3.2 pp in Ireland to over 10 pp in Greece and Spain.

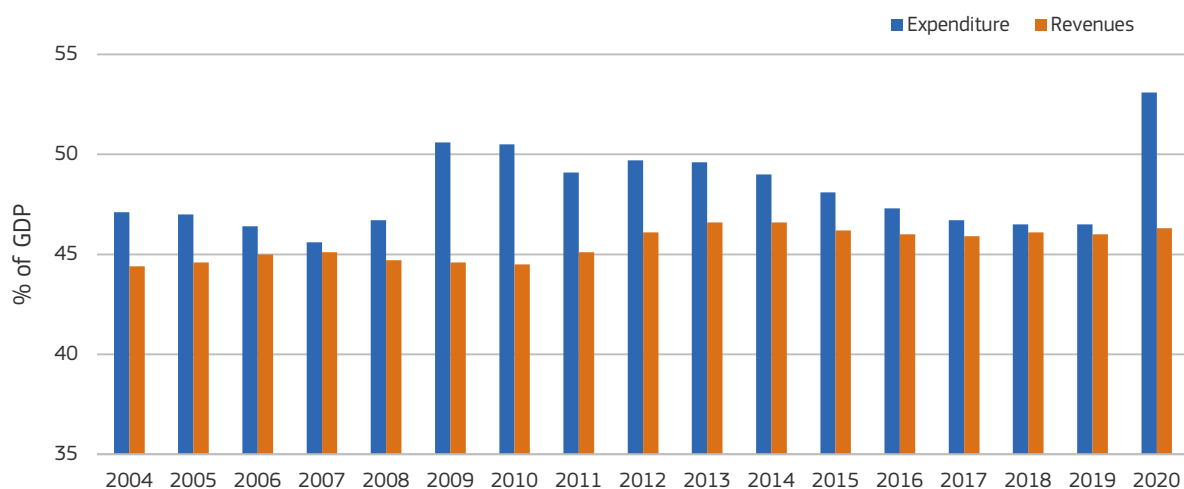
⁸ In general during a downturn, revenue in absolute terms tends to decline in line with GDP, resulting in its ratio to GDP remaining unchanged. By contrast, government expenditure in absolute terms tends to increase, because of the greater social and other support needed, which accordingly adds to the expenditure-to-GDP ratio, already pushed up by the reduction in economic output. See: Mourre et al. (2019).

Figure 8.4 General government debt, 2019 and 2020



Source: Eurostat [gov_10dd_edpt1].

Figure 8.5 General government expenditure and revenue, EU-27, 2004-2020



Source: Eurostat [gov_10a_main].

As the pandemic emergency comes under control and the economic situation improves, a progressive reduction in expenditure relative to GDP is expected, as a result of both the withdrawal of the extraordinary measures put in place to contain the spread of the pandemic and the rebound in GDP (see Box 8.1 for a review of the effects of public expenditure and expansionary fiscal policy in general during the recent recessions).

Turning to the composition of public spending by function and its evolution over time (see Box 8.2 for a description of the breakdown in government expenditure by function), it is notable that social protection expenditure accounts for the largest share in the EU-27 (Figure 8.6). In 2019 (the latest year for which complete data are available), it amounted to over 40% of total spending and just over 19% of GDP, almost 2 pp more than in 2007 (immediately before the Great Recession).

Box 8.1 The effects of government expenditure on growth during recessions

Calculating the impact of public expenditure on economic activity in the short-to-medium term involves estimating the ‘fiscal multiplier’, first conceived by John Maynard Keynes and defined as the change in output resulting from a given change in government expenditure, taxes or a combination of the two. The Great Recession of 2008–2009 sparked renewed interest in estimating the size of this multiplier. Interest was revived further by the recent pandemic-induced recession, the policy response and possible future developments.

Estimates of the multiplier vary over time and between economies, and depend on the type of model applied and the assumptions incorporated in it¹. In broad terms, the size of the multiplier seems to be affected by factors such as the presence of financial frictions, the credibility of the policy action concerned and its permanent or temporary nature, the composition of public spending, the presence or absence of market rigidities, the size of automatic stabilisers, the type of monetary policy in force, the degree of openness of the economy, and the exchange rate regime².

Most recent models suggest that the multiplier may be larger in periods of economic downturn than during economic expansion — as high as 2.5, compared with 0.6³. This is also corroborated by several empirical studies⁴.

This would imply not only that an expansionary fiscal policy is more effective in stimulating growth during a recession than previously thought, but also that fiscal consolidation at such times entails bigger downward pressure on economic activity. Furthermore, recent research highlights the importance of negative cross-border spill-over effects from fiscal consolidation through trade linkages, which re-

inforce the negative impact of fiscal tightening on output⁵.

Both in 2008 and 2020, at the onset of the Great Recession and the COVID-19 crisis respectively, fiscal policy in the EU turned markedly expansionary, with public deficits increasing sharply in order to stimulate growth. In the years following the Great Recession, in the presence of a still depressed economy during the European sovereign debt crisis (from 2010 onwards), the fiscal policy stance in the EU reverted to being contractionary. Research suggests that this reduced output not only in the short term but also in the medium term, effectively prolonging and deepening the crisis⁶.

In the face of a sudden downturn, such as the one experienced as a consequence of the COVID-19 pandemic, an increase in public spending can have a significant effect on economic activity. This is particularly true in situations where the monetary policy stance is already expansionary (as it has been in the euro area since the Great Recession, and in particular from mid-2014 onwards), and therefore there is limited room for counteracting the crisis through further relaxing the policy.

In this context, in 2020, in reaction to the COVID-19 pandemic-induced recession, the EU and national governments injected a substantial amount of public resources into the economy, driving up public spending to historically high levels, and generating a large government deficit. In 2021, with the continued activation of the general escape clause, Member States could provide targeted and temporary fiscal support, while safeguarding fiscal sustainability in the medium term. As the pandemic emergency comes under control, they should gradually shift from a protective emergency response to measures that facilitate reallocation of resources and support the recovery. When economic conditions allow, fiscal policies should be aimed at restoring prudent medium-term fiscal positions and ensuring debt sustainability, while enhancing investment.

1 See for instance: Perotti (2005); Blanchard and Perotti (2002); Beetsma et al. (2008); Barro and Redlick (2011); Beetsma and Giuliodori (2011).

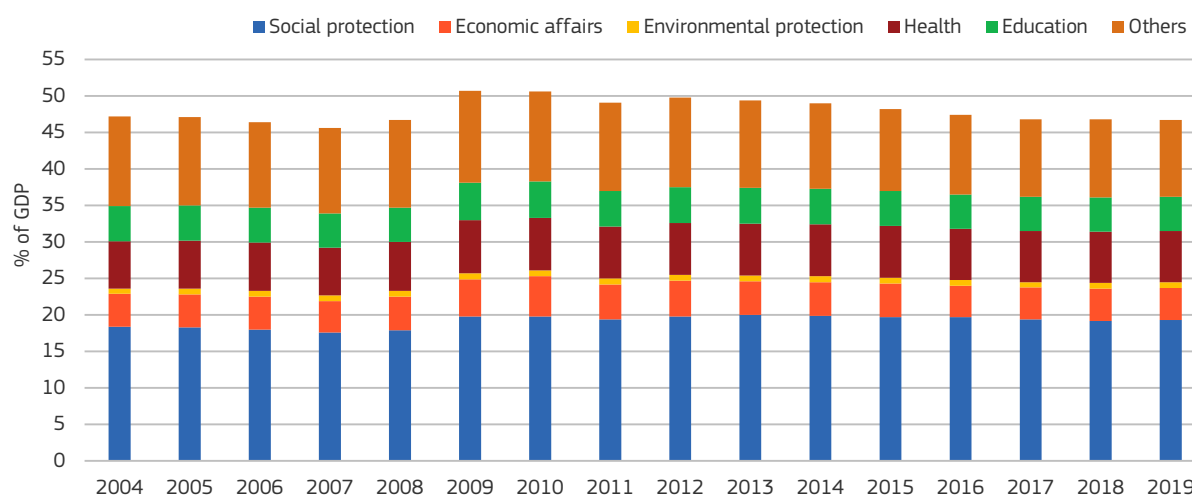
2 European Commission (2012).

3 Auerbach and Gorodnichenko (2013).

4 See for instance: Corsetti et al. (2012); Auerbach and Gorodnichenko (2012); Baum et al. (2012).

5 See for instance: Goujard (2017); Poghosyan (2020).

6 DeLong et al. (2012); Fatás and Summers (2018); Fatás (2019); Gechert et al. (2019).

Figure 8.6 General government expenditure in selected policy areas, EU-27, 2004–2019

Source: Eurostat [gov_10a_exp].

The pandemic has undoubtedly led to an increase in social protection expenditure, but by how much remains to be seen.

Expenditure on economic affairs (including investment in transport and communications, in particular) remained relatively unchanged between 2007 and 2019, at just over 4% of GDP. The same was true of expenditure on education (just under 5% of GDP in 2019), and environmental protection (just under 1% of GDP throughout the period). By con-

trast, expenditure on health increased from around 6.5% in 2007 to 7% in 2019.

Government expenditure can also be divided into current and capital expenditure. The former includes compensation of employees (wages and salaries), current transfers (such as social benefits) and interest payments on public debt. Capital expenditure mainly consists of gross fixed capital formation, or investment, though also capital transfers, primarily to support businesses.

Box 8.2 The Classification of Functions of Government (COFOG)

The Classification of Functions of Government (COFOG) was developed by the OECD and is applied to government expenditure and the net acquisition of non-financial assets (outlays). The Eurostat COFOG guide describes in detail the contents of each functional category¹.

There is a three-level classification with 10 'divisions' at the top level, each of which is broken down into six to nine groups, which in turn are partly sub-divided further into 'classes'.

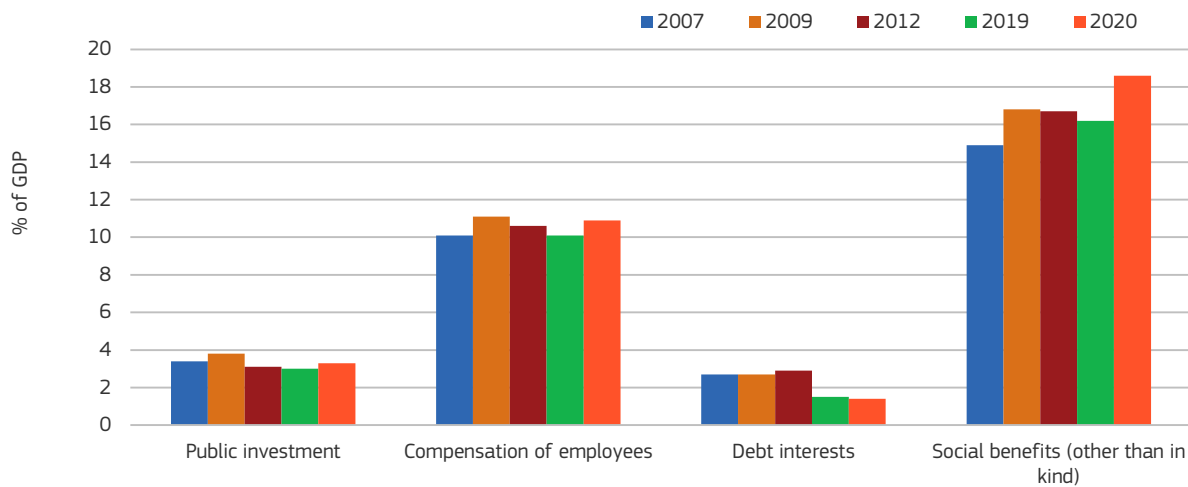
In this report, the 10 top-level divisions are regrouped into the following six categories: economic affairs (COFOG division 04); environmental protec-

tion (05); health (07); education (09); social protection (10); and 'other' — comprising general public services (01); defence (02); public order and safety (03); housing and community amenities (06); and recreation, culture and religion (08).

In addition, in some of the analysis, the COFOG economic affairs division is sub-divided into the following seven categories: agriculture, forestry, fishing and hunting (COFOG group 04.2); fuel and energy (04.3); mining, manufacturing and construction (04.4); transport (04.5); communication (04.6); R&D economic affairs (04.8); and 'other' — comprising general economic, commercial and labour affairs (04.1); other industries (04.7); and economic affairs not elsewhere classified (04.9).

1 Eurostat (2019).

Figure 8.7 Selected categories of general government expenditure, EU-27, 2007, 2009, 2012, 2019 and 2020



Source: Eurostat [gov_10a_main].

Between 2007 and 2019, three main changes in the composition of expenditure occurred (Figure 8.7). First, spending on debt interest almost halved relative to GDP, mainly due to low interest rates but also to the reduction in government debt, and it declined even further in 2020. Second, expenditure on social benefits increased by 1.3 pp as a share of GDP, and rose by over 2.4 pp in 2020 reflecting the effects of the pandemic. Third, by contrast, government investment declined by 0.4 pp relative to GDP. In 2020 public investment rose again, and the expectation is that it will continue to increase, at least in the short term, both in real terms and relative to GDP.

2.3 Public investment evolved unevenly across Member States, and it has not recovered yet from the financial crisis of 2008–2009

There is a consensus in the economic literature that efficient regulation, an effective and well functioning public administration, and well targeted public investment are all essential for the functioning of modern economies by providing critical infrastructure and public services, ensuring respect for the rule of law and enforcing property rights. Services such as healthcare and education and the related infrastructure and facilities, as well as investment

in transport, environmental protection and support for R&D, are important for sustainable and inclusive growth over the long term. All of these are likely to experience either a socially inequitable allocation of resources or significant underspending if left to market forces.

Public investment has a particularly important role in growth, as it contributes to increasing and renovating the stock of fixed assets (such as buildings, infrastructure and facilities to deliver services) that will affect the trajectory of economic development, and growth prospects, over the long term.

Public investment can act as an important stimulus to the economy during a period of recession, when the private sector is reluctant to invest. It also can have significant cross-border effects on growth, with trade linkages in the single market spreading economic gains across the EU economy. A reduction in public investment is, therefore, a cause for concern. Cohesion policy funding increases public investment in Member States, especially less developed ones that may have less fiscal space for expenditure, in compliance with the principle of additionality (see Box 8.3). It is, accordingly, an important lever for post-crisis economic rebalancing and recovery.

Box 8.3 The principle of additionality in European Structural and Investment Funds

Definition

The ESIF regulations for 2014–2020 stipulate that the support they provide should be additional to, and not replace, public or equivalent structural expenditure by Member States (i.e. nationally funded government gross capital formation or investment). Over the entire programming period, therefore, Member States need to maintain a level of public or equivalent structural expenditure at least equal to the reference level set in the partnership agreement at the beginning of the period. Going forward, this also holds true for the new generation of cohesion policy funds for 2021–2027.

Member States subject to verification in 2014–2020

The regulations also stipulate that the verification of the additionality principle shall only take place in those Member States in which less developed regions cover at least 15% of the total population, because of the scale of the financial resources allocated to them. In Member States in which less developed regions cover at least 65% of the total population, the verification is to take place at national level. In those where they cover more than 15% and less than 65%, it is to take place at regional level — meaning that it is focused on the regions receiving most support.

In the period 2014–2020, 11 Member States were subject to additionality verification at national level (Bulgaria, Czechia, Estonia, Croatia, Latvia, Lithuania, Hungary, Poland, Portugal, Romania and Slovakia) and three Member States at regional level (Greece, Italy and Slovenia).

Verification process

The verification of the additionality principle takes place at three different times over the 2014–2020 funding cycle: (i) at the time of submission of the Partnership Agreement (ex ante verification); (ii) in 2018 (mid-term verification); and (iii) in 2022 (ex post verification).

The planned profile of public structural expenditure needs to be included in the Partnership Agreements. Once approved, the figures concerned are taken as

the reference level of expenditure to be maintained over the 2014–2020 period. In sum, the verification procedure consists of comparing the average level of gross fixed capital formation as a percentage of GDP, as reported in the Stability and Convergence programmes submitted as part of the European Semester, with the reference levels reported in the Partnership Agreements (where verification occurs at the regional level, the level of gross fixed capital formation in the less developed regions is used). A Member State is deemed to have complied with the principle of additionality if the annual average structural expenditure is equal to or higher than the reference level.

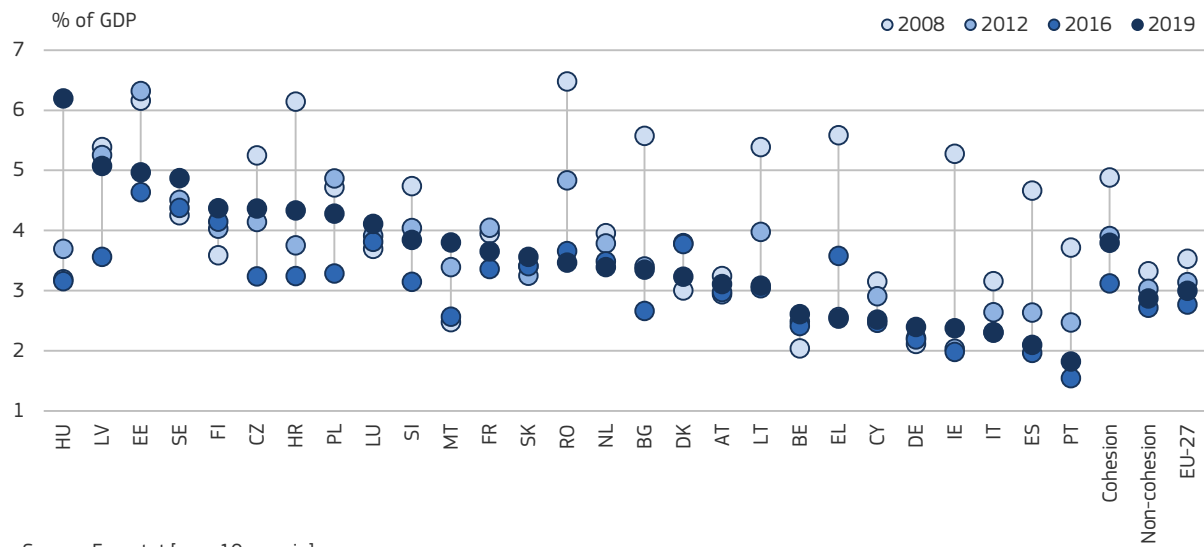
The mid-term verification is purely for monitoring purposes; no financial corrections are foreseen at this stage should non-compliance with the additionality principle be detected. Member States that are found not to comply are invited by the European Commission to step up public investment in order to comply ex post. The Commission can also revise the reference level of public structural expenditure in the Partnership Agreement, in consultation with the Member State concerned, if the economic situation has changed significantly from that estimated at the time of adoption of the Partnership Agreement.

In case of non-compliance ex post, the Commission can decide to implement a financial correction, which must not exceed 5% of the funding originally allocated to the less developed regions concerned for the programming period.

State of play

Mid-term verification of the additionality principle for the period 2014–2020 took place between 2018 and 2019. At the end of the process, Bulgaria, Italy and Romania were deemed not to be compliant. As a consequence, in autumn 2019, the Commission informed the respective authorities that they would have to increase public investment to reach the levels needed. The ex post verification in 2022 will take account of any significant changes in the economic situation since the mid-term verification, including as a result of the COVID-19 pandemic-induced recession and the public policy responses.

Figure 8.8 General government investment, 2008, 2012, 2016 and 2019



With the exception of 2009, which was the peak of efforts to moderate the economic downturn, there was a general decline in public investment relative to GDP over the period 2008 to 2019 (Figure 8.8). This suggests that public investment never recovered from the 2008–2009 financial crisis, giving cause for concern about the consequences that depressed levels of investment might have on growth over the medium and longer term. The pandemic may well have reduced public investment further.

Public investment declined more over the 2008–2019 period in cohesion countries (from 4.9% of GDP to 3.8%) than in non-cohesion countries (from 3.3% to 2.9%). This implies that Member States most in need of the investment are the ones reducing it most, with potential adverse consequences for the pace and sustainability of their convergence towards the EU average level of GDP per head.

In geographical terms, the largest decline in public investment was in the southern Member States (by 1.7 pp relative to GDP), followed by the eastern Member States (0.7 pp); whereas there was less change in north-western ones, except for Ireland. In Greece, Romania and Ireland, the decline was about 3 pp; in Spain, Lithuania and Bulgaria, over 2 pp. The high level of public debt may have

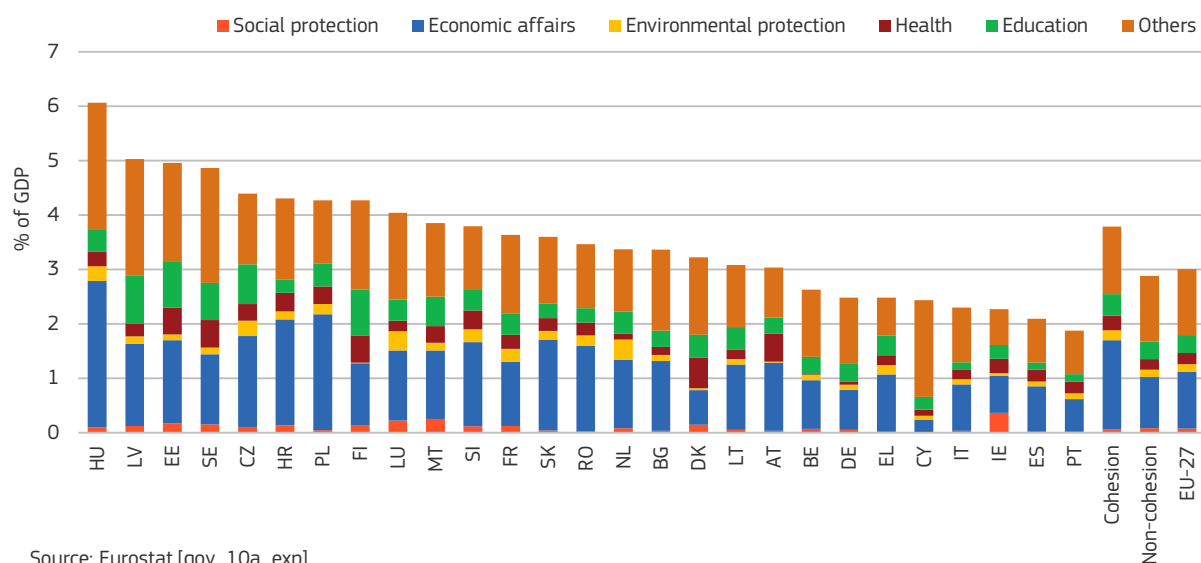
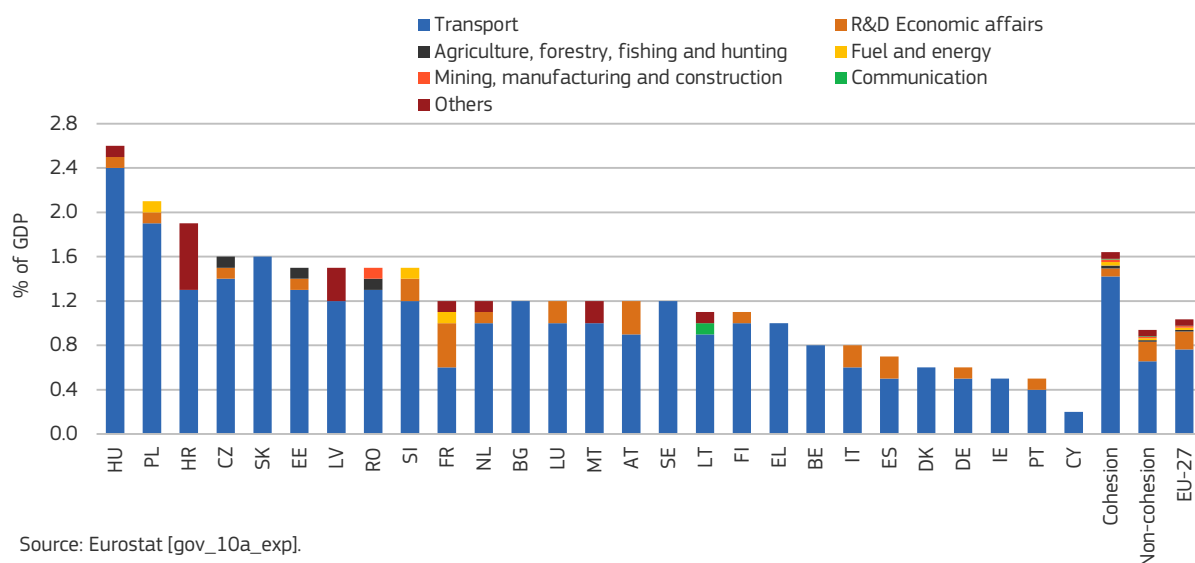
contributed to constraining public investment in Greece and Spain, but in the other Member States listed debt was considerably lower.

A third of total government investment in the EU goes to the COFOG category of economic affairs (covering energy, transport and communications in particular), which alone amounted to 1% of GDP in 2019 (Figure 8.9). In cohesion Member States, the figure was significantly larger — 1.6% of GDP, though varying from 2.7% of GDP in Hungary to just 0.2% in Cyprus.

Within the economic affairs category, a large part of the investment goes to transport, amounting to 0.8% of GDP in 2019 in the EU; and in all Member States it was the largest area of investment in the category, ranging from 2.4% of GDP in Hungary to 0.2% in Cyprus (Figure 8.10).

In cohesion countries, transport investment accounted for just under 1.4% of GDP, twice the figure in non-cohesion ones, reflecting ongoing construction of transport networks, which should support economic development and convergence.

Public investment in R&D is an important growth-enabling factor and the second largest component of investment in the economic affairs category in the EU-27, at just under 0.2% of GDP in 2019. The

Figure 8.9 General government investment in selected policy areas, 2019**Figure 8.10 General government investment in selected areas in the economic affairs category, 2019**

largest expenditure was in France (0.4% of GDP), followed by Austria (0.3%).

In contrast to investment in transport, non-cohesion countries invested almost twice as much of their GDP in R&D as cohesion ones (0.2% as against 0.1%). The relatively low level of investment could be detrimental to their innovation capacity and their ability to sustain growth in the medium and long term.

3. Sub-national public finance and decentralisation

3.1 Sub-national governments implement a large share of public expenditure, but with marked differences across the EU

This section focuses on government expenditure

and revenue at the sub-national level (i.e. by regional and local authorities, and state governments in federal Member States) and the changes that have occurred in recent years, including in relation to the COVID-19 pandemic.

When considering sub-national finances, it is important to note that the figures for public investment or other expenditure carried out by sub-national government authorities, and for the revenue they collect, include the amounts channelled through them by other general government sub-sectors, namely the central government. The authorities concerned may be responsible for managing spending or collecting revenue but may have limited autonomy over the underlying policy, investment or taxation decisions. A separate section below assesses the extent of autonomy which regional and local authorities have.

Similar to the trends observed for government finances as a whole, the expenditure executed by or channelled through sub-national authorities in the EU behaves in a counter-cyclical way relative to GDP and tends to increase as the latter falls. Apart from the recession years, sub-national public spending appears to have been relatively stable over the period 2004–2019 at 15–16% of GDP (Figure 8.11). It increased sharply, however, in 2020, jumping by 1.6 pp relative to GDP as an immediate consequence of the pandemic. All Member States, except Hungary, experienced a rise, and it was particularly pronounced in Spain (over 3 pp relative to GDP), Germany and Belgium (over 2 pp) between 2019 and 2020.

Sub-national revenue was equally stable over the period 2009–2019 at around 9–10% of GDP, a much lower level than expenditure, a difference that was reduced at least partially by transfers from the central government. The overall revenue trend showed a slight increase since the years immediately preceding the Great Recession. This may reflect a small increase in the decentralisation of revenue-collection, a possible increase in fiscal autonomy of sub-national authorities, or an increase in the tasks delegated to them.

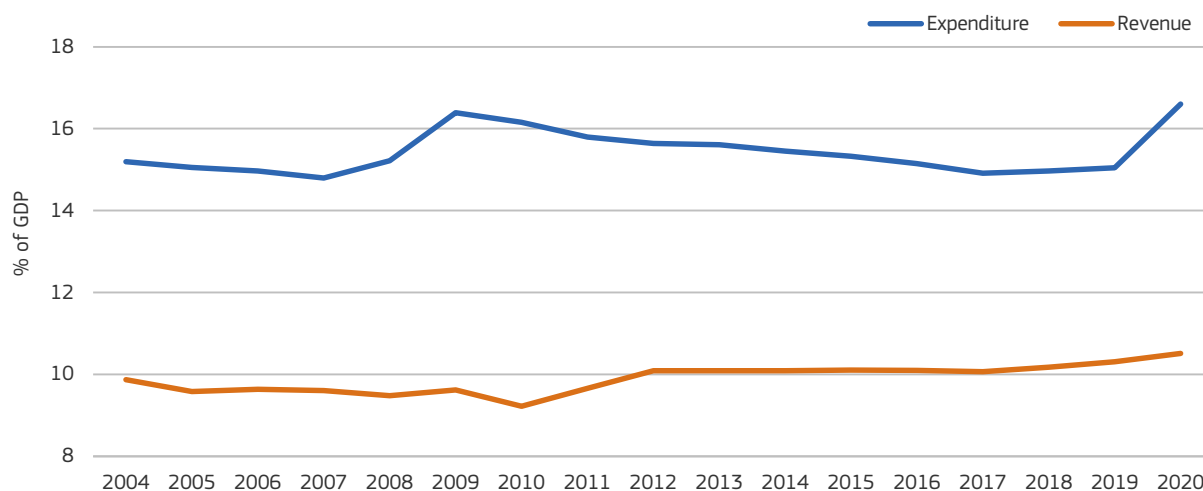
A significant proportion of public expenditure is executed by sub-national authorities across the EU (Figure 8.12). In the EU-27, in 2019, it was around one third (32%) and it was broadly unchanged over the preceding 11 years.

There were, however, considerable variations between Member States, reflecting differences in the institutional setting. The proportion of expenditure executed by sub-national authorities was largest in federal Member States (Austria, Belgium and Germany) and in Member States where government is highly decentralised (Spain, Denmark, Finland and Sweden). In Denmark, 65% of expenditure was executed by sub-national authorities in 2019, while it was over 50% in Sweden and over 40% in Spain, Belgium, Finland and Germany. By contrast, in Cyprus and Malta sub-national authorities executed less than 5% of expenditure; and in Greece, Ireland and Luxembourg only about 10% or less.

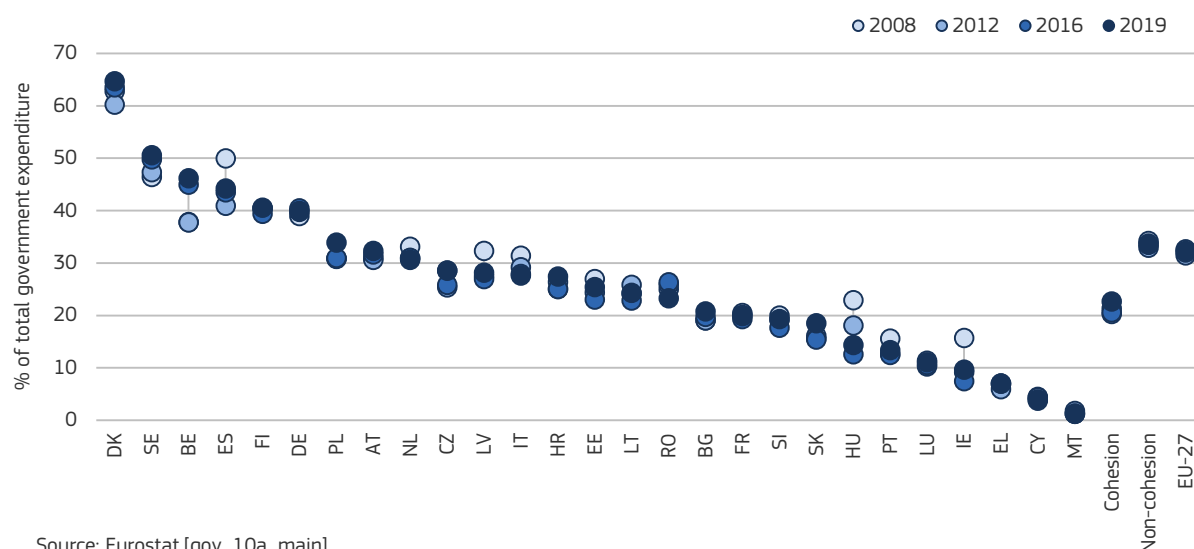
Although the proportion of expenditure executed by sub-national authorities has been relatively stable over time in most Member States, there are some exceptions. Between 2008 and 2019, the proportion increased by more than 8 pp in Belgium, more than 4 pp in Sweden and more than 3 pp in Poland; whereas it fell by more than 2 pp in seven Member States — including by more than 8 pp in Hungary and 6 pp in Ireland. More recently, between 2016 and 2019, it increased by around 3 pp in Poland, Czechia and Slovakia; and it fell by over 3 pp in Romania, the only Member State where it declined significantly over this period.

Overall, there tends to be markedly less decentralisation of expenditure in cohesion countries than non-cohesion ones (the share of sub-national expenditure being 23% in the former in 2019 as against 34% in the latter). However, there are signs of a possible increase in decentralisation, with the proportion of sub-national expenditure in cohesion countries rising by 2.1 pp in the three years up to 2019 (as against a rise of just 0.2 pp in non-cohesion ones).

The expenditure of sub-national authorities is concentrated in particular policy areas. In the EU as

Figure 8.11 Sub-national government expenditure and revenue, EU-27, 2004-2020

Source: Eurostat [gov_10a_main].

Figure 8.12 Sub-national government expenditure, 2008, 2012, 2016 and 2019

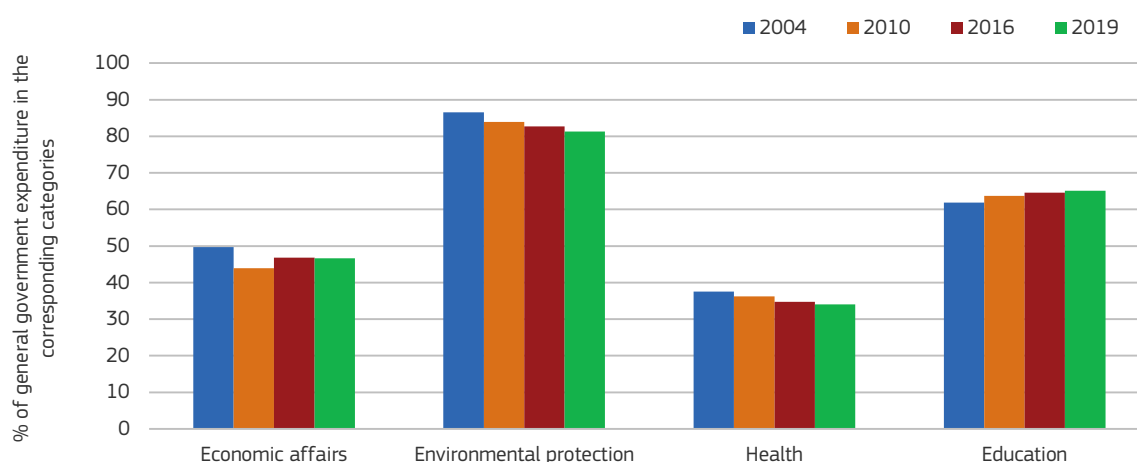
Source: Eurostat [gov_10a_main].

a whole, in 2019, almost 50% went to education, health, environmental protection and economic affairs (predominantly transport) compared with 36% in the case of total government expenditure⁹. There were again significant variations between Member States. In Estonia, Lithuania, Croatia,

Czechia, Slovenia and Italy, over 65% of sub-national expenditure went to the areas listed above, whereas relatively little did so in Malta and Cyprus.

In 2019, sub-national authorities executed over 80% of public spending on environmental protection, and over 65% of education expenditure, as well as 47% of spending on economic affairs, and over a third of expenditure on healthcare (Figure 8.13).

⁹ Note that, in the COFOG classification used in the analysis, transfers of a general nature between government sub-sectors are included within general public services (division 01) included under the 'other' category.

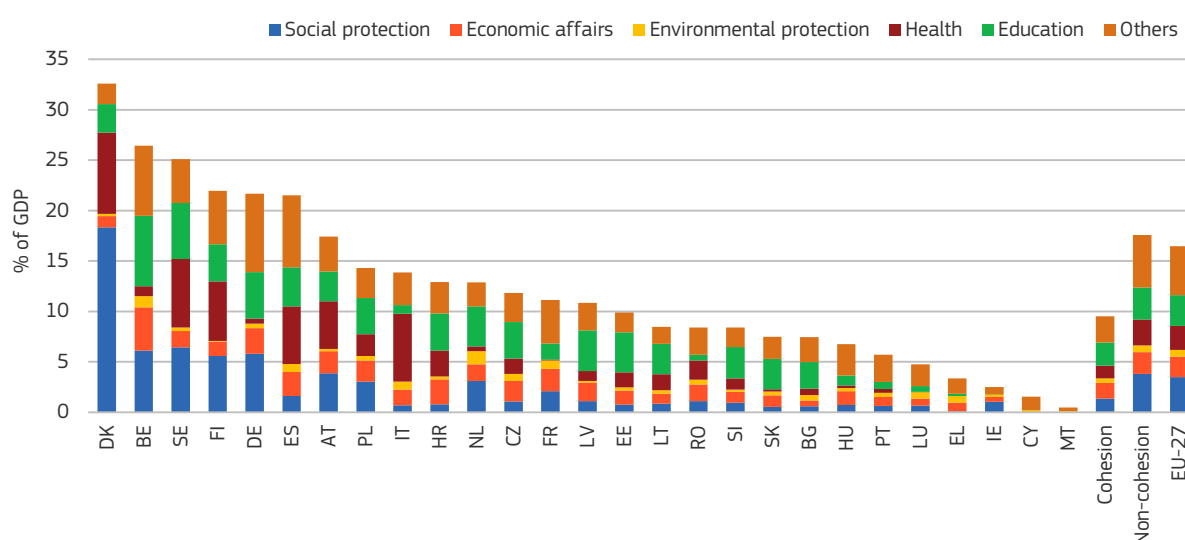
Figure 8.13 Sub-national government expenditure in selected policy areas, EU-27, 2004, 2010, 2016 and 2019

Source: Eurostat [gov_10a_exp].

In some Member States, public expenditure in these areas is almost entirely executed by sub-national authorities. In particular, over 90% of expenditure on environmental protection occurred at the sub-national level in 2019 in Italy, the Netherlands, Spain and Lithuania, over 90% of spending on healthcare in Italy, Denmark, Sweden and Spain, and over 90% of education expenditure in Belgium, Germany and Spain.

Between 2004 and 2019, sub-national expenditure on environmental protection and healthcare declined as a share of total public spending in these areas, though the total increased as a share of GDP, indicating more expenditure being carried out by the central government. At the same time, however, the sub-national share of expenditure on education increased by over 3 pp.

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Figure 8.14 Sub-national government expenditure in selected policy areas, 2019

Source: Eurostat [gov_10a_exp].

As at the overall level, social protection was the largest area of expenditure executed by or channelled through sub-national authorities in the EU-27 in 2019, at 3.5% of GDP, followed by education (3%), healthcare and economic affairs (each just over 2%). Expenditure on environmental protection amounted to just 0.6% of GDP (Figure 8.14).

There was again considerable variation between Member States. Overall, the expenditure executed by sub-national authorities was over 8 pp lower relative to GDP in cohesion countries (9.5%) than in non-cohesion ones (17.6%). Spending in all areas was lower in the former, especially on social protection (2.4 pp lower), healthcare (1.3 pp lower) and education (0.9 pp lower).

In individual Member States, sub-national expenditure on social protection ranged from over 18% of GDP in Denmark, and close to 6% in Sweden, Belgium, Finland and Germany, to only around 1% or below in 16 Member States (including zero in Malta and Cyprus). Education expenditure by sub-national authorities was close to 7% of GDP in Belgium, and 4% or above in Sweden, Germany, Latvia, the Netherlands, Estonia and Spain; but it was well below 1% in Hungary, Italy, Portugal, Luxembourg, Romania, Greece and Ireland, and again zero in Cyprus and Malta. Healthcare expend-

iture was around 6% of GDP in Denmark, Sweden, Italy, Finland and Spain; but it was well below 1% in Bulgaria, Germany, the Netherlands, Portugal, Hungary, Slovakia, France and Luxembourg — and zero in Ireland, Greece, Cyprus and Malta. These variations reflect both the differing responsibilities of sub-national authorities for spending in different areas and differing structures of governance.

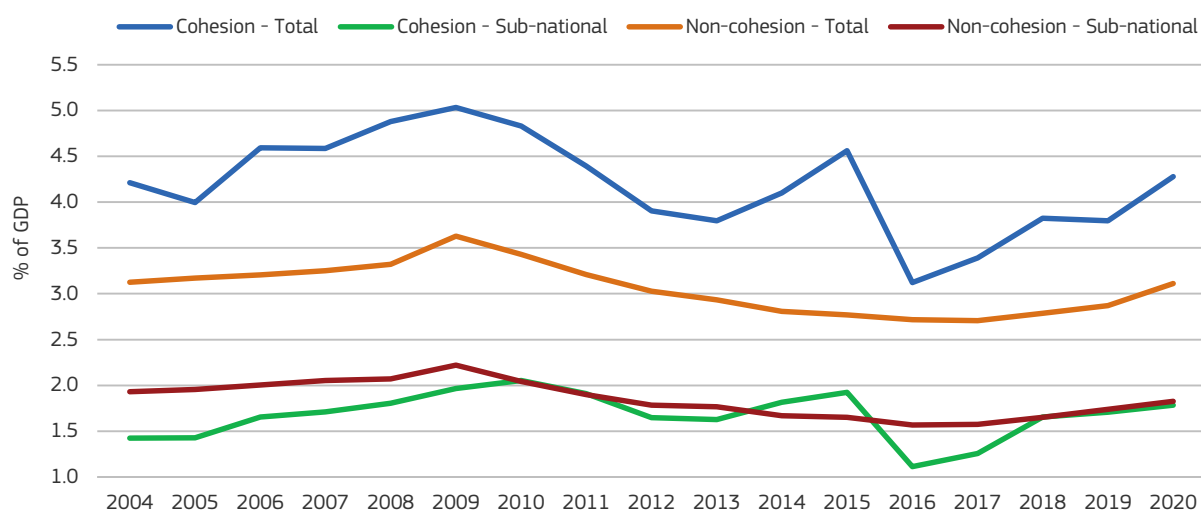
3.2 Sub-national governments undertake the majority of public investment

Sub-national authorities have a major role in carrying out public investment. In 2019, their spending on investment (gross fixed capital formation) was 1.7% of GDP in the EU-27, or 58% of total public investment (Figure 8.15).

Although investment spending by sub-national authorities has generally varied pro-cyclically in relation to GDP, declining during economic downturns as in the case of overall government investment, the variation has been more pronounced in cohesion countries than in non-cohesion ones.

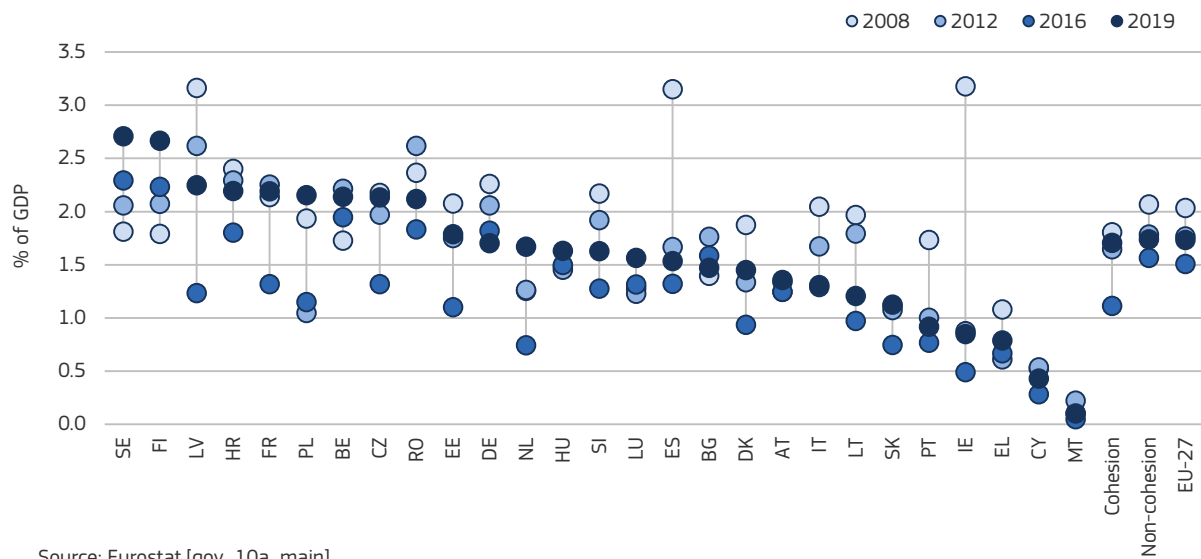
Sub-national expenditure on investment was approximately the same relative to GDP in both co-

Figure 8.15 Sub-national and general government investment, 2004-2020



Source: Eurostat [gov_10a_main].

Figure 8.16 Sub-national government investment, 2008, 2012, 2016 and 2019



hesion and non-cohesion countries in the three years 2018–2020, increasing in the former back to the same level as in 2004 and in the latter remaining slightly below that level. At the same time, the sub-national share of public investment was much smaller in cohesion countries, though the difference progressively narrowed, by almost a half, between 2004 and 2020.

In 2019, public investment carried out by sub-national authorities was particularly high relative to GDP in Sweden and Finland (just under 3% in both); it was over 2% in seven other Member States (Latvia, Croatia, France, Poland, Belgium, Czechia and Romania), but below 1% in Portugal, Ireland, Greece, Cyprus and Malta. In general, Member States with relatively low sub-national investment levels also had low total expenditure at the sub-national level (Figure 8.16).

In 16 Member States, sub-national public investment was lower relative to GDP in 2019 than in 2008; most notably in Ireland (2.3 pp lower) and Spain (1.6 pp lower), and to only a slightly lesser extent in Latvia, Portugal and Lithuania. It was higher in 2019 in 11 Member States, especially in Sweden and Finland. Box 8.4 reports the results of a pilot project on regional (NUTS 2) public investment.

3.3 Regional and local autonomy

As emphasised above, the amount of expenditure undertaken by sub-national authorities and the amount of revenue collected is not necessarily a reflection of their autonomy in policy-making. Regional and local autonomy is an important factor in promoting place-based policies.

Two indicators, derived from the Regional Authority Index (RAI) and the Local Autonomy Index (LAI), provide a better gauge of this by measuring the extent of regional and local ‘self-rule’¹⁰. The indicators, one for regional authorities and one for local, cover five dimensions: institutional autonomy; policy autonomy; fiscal autonomy; borrowing autonomy; and representation or organisational au-

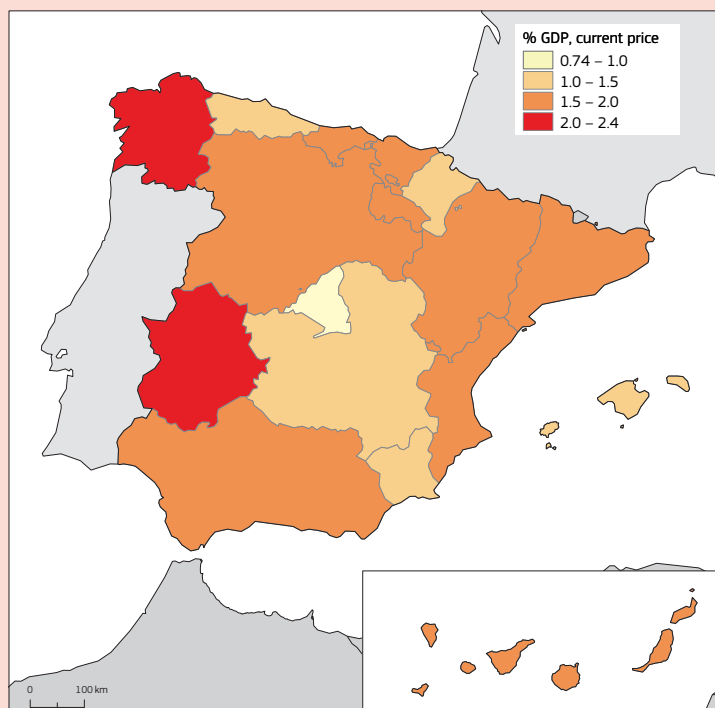
¹⁰ The RAI measures the extent of self-rule and shared rule exercised by regional government authorities in their countries (Hooghe et al. [eds], 2016); the LAI measures the extent of self-rule and interactive rule exercised by local authorities (Ladner et al., 2015). Both indexes are based on expert judgement. The indicators used in this section reflect only the self-rule components of the RAI and LAI.

Box 8.4 Measuring regional public investment: a pilot project

Public investment plays a key role in reducing regional disparities. It is essential to the smooth functioning of modern economies by providing essential public infrastructure and public services. These will not be supplied by the private sector and they are key factors in long-term growth. Transport infrastructure, for example, is almost entirely financed through public investment. Public investment includes support to R&D and innovation, which are important engines of growth. Public investment is also needed to address challenges linked to climate change, demographic change, urbanisation and digitalisation. Overall, public investment shapes people's choices about where to live and work, influences the nature and location of private investment, and affects the quality of life.

Public investment can help less developed regions catch up. These regions typically lag behind in terms of basic infrastructure, R&D and innovation performance, capacity to mitigate the impact of climate change, and capacity to attract private investment. As a result, measuring regional public investment is crucial to supporting territorial development policies, such as cohesion policy. That is why a Eurostat pilot project was launched in 2020 to test the feasibility of collecting those data. The overall aim is to agree on a harmonised methodology and produce annual data on public investment per NUTS 2 region.

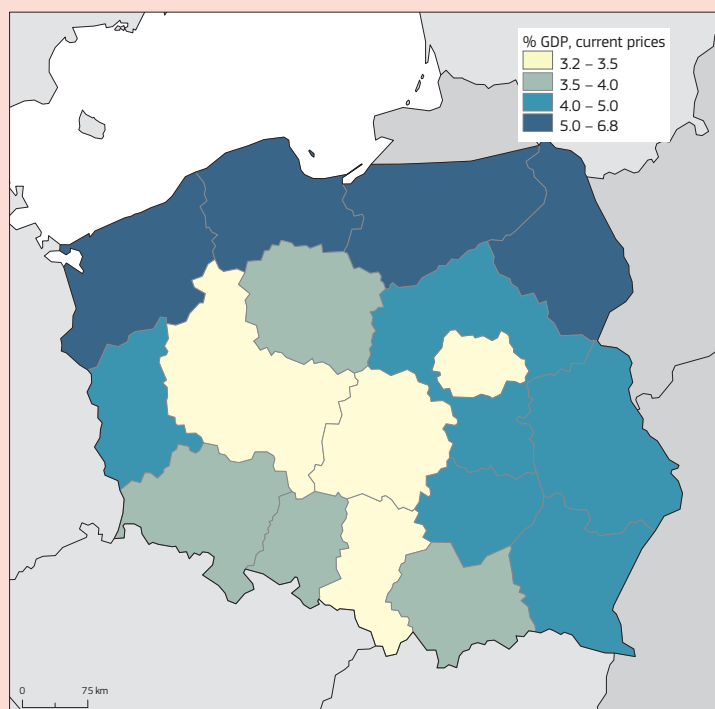
As part of this project, a regional breakdown of public investment (gross fixed capital formation) by regional and local government, but not central government, was collected for Spain (Map 8.1). These figures show that public investment by these two levels of government varied widely from one region to another. It was lowest (at 0.7% of GDP) in the capital region



Map 8.1 Gross fixed capital formation by state and local government authorities in Spain, average 2014–2017

Source: Eurostat pilot project on regional public investments and Eurostat data (nama_10r_2gdp).

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Map 8.2 General government gross fixed capital formation in Poland, average 2016–2018

Source: Eurostat pilot project on regional public investments and Eurostat data (nama_10r_2gdp).

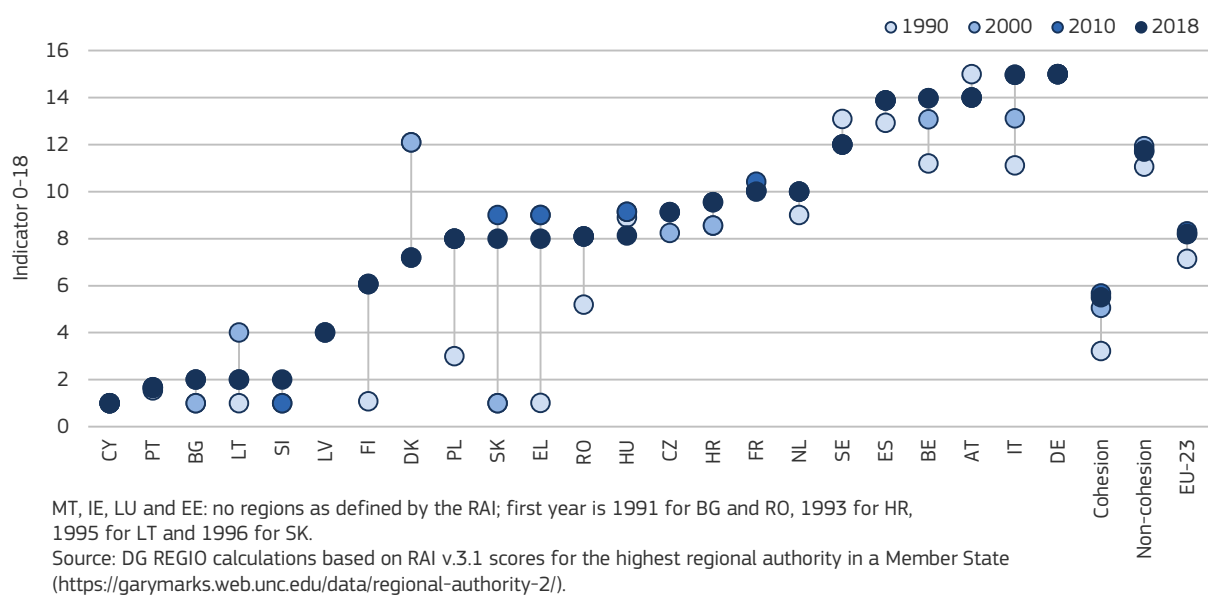
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of Madrid, and highest in the less developed region of Extremadura (at 2.4%). The transition regions in north-eastern Spain tended to have relatively high investment levels, whereas some of the less developed regions in the centre and south of the country exhibited below-average values.

For Poland (Map 8.2), a regional breakdown of public investment by all levels of government is avail-

able. Public investment varied between 6.8% of GDP in the north-east region of Warmińsko-Mazurskie and 3.2% in the Warszawa capital region. In general, public investment as a share of GDP was markedly higher in less developed regions than in more developed ones, but with some nuances; for instance, less developed regions in the south-east of Poland had less public investment than comparatively more advanced regions in the north-west.

Figure 8.17 Regional self-rule indicator, 1990, 2000, 2010 and 2018



tonomy¹¹. A specific indicator for metro regions is calculated separately (see Box 8.5).

In the 23 EU Member States with regions as defined in the regional self-rule indicator (see note to Figure 8.17), the level of regional autonomy has increased on average over the past three decades, with most of the increase occurring between 1990 and 2000.

Between 1990 and 2018, the indicator increased in 14 Member States, with Lithuania, Slovakia and Greece showing some reduction over the past decade after increasing earlier. The indicator remained broadly unchanged in five Member States (Cyprus, Portugal and Latvia at relatively low levels, and France and Germany at high levels) and declined in the remaining four, with small reductions in Sweden, Austria and Hungary between 2000 and 2010 and a more marked decline in Denmark.

¹¹ Institutional autonomy is the extent to which a regional or local government authority is formally autonomous with respect to higher levels of government; policy autonomy relates to the range of policies (or functions) for which regional or local authorities are responsible; fiscal autonomy is the extent to which they can independently levy taxes; borrowing autonomy is the extent to which they can borrow; representation relates to the extent to which regions have an independent legislature and executive, and organisational autonomy, in the case of local authorities, is the extent to which they are free to decide about their own organisation and electoral system. Each indicator assumes values ranging from 0 to 18.

The Member States with most regional autonomy were the federal Member States (Austria, Belgium and Germany), together with the highly devolved states of Spain and Italy (all of which scored 14 or 15 out of 18 on the indicator). At the other end of the scale were the unitary states of Cyprus, Portugal, Bulgaria, Lithuania and Slovenia (with a score of just 1 or 2 out of 18), with Latvia having

Box 8.5 Self-rule authority in metro regions

The regional self-rule indicator, which measures the authority exercised by a regional government over those who live there, is calculated separately for metro regions in the EU. This throws further light on the multi-level government architecture of EU Member States, in addition to the conventional categories of regional and local authorities already described in this section.

For the purposes of calculating the self-rule indicator, a metro region is defined as a contiguous, general-purpose jurisdiction that combines a city (or cities) and their surrounding municipalities to deal with issues stemming from 'conurbanisation' (i.e. the fact that several towns tend to merge with the suburbs of a central city to form an extended urban area). A region is coded as metropolitan if it meets the following criteria: (i) it exists between the local level of government and the national level; (ii) it has a population of at least 150 000; and (iii) the jurisdiction is codified in law¹. Note that this definition differs from the one used by Eurostat for metro regions².

The indicator presented in Figure 8.18 is an aggregate measure of the scores obtained by the metro region authorities for the following aspects: institutional depth, policy scope, fiscal autonomy, borrowing autonomy, and representation.

The number of individual metro regions (e.g. the capital city of Wien in Austria) and metro regional categories (e.g. *Stadtstaaten* in Germany, comprising the cities of Berlin, Bremen and Hamburg) has increased over time. In 1990, there were only 12 such administrative entities in only five Member States (in Austria, Belgium, Germany, France and Hungary), whereas in 2018, the latest year for which data are available, there were 23 in 15 Member States, comprising: (i) capital city regions in Austria, Belgium, Germany, Croatia, Czechia, France, Portugal, Romania, Slovakia and Slovenia; (ii) large metro areas in Germany, Spain, Italy and Portugal; and (iii) regional categories each with several individual cities in Germany, France, Hungary, Ireland and Poland. Most of the increase in number occurred between 1990 and 2000, when metro regions were introduced in a number of eastern and southern Member States.

Together with long standing examples of metro regions established in Austria, Belgium, France and Germany, there are some relatively short-lived ones. For instance, the Greater Copenhagen Authority (*Hovedstadens Udviklingsråd*) in Denmark (2000–2006), the 'plusregio's' in the Netherlands (2006–2015) and the union of 11 municipalities that formed the capital city of Warsawa ('miasta stołecznego Warszawy') in Poland (1994–2002) were all discontinued, though in some cases (e.g. in Warsawa) the municipalities concerned were merged afterwards. This illustrates the differing strengths of political commitment to this type of entity and how this may change over time. Although a number of metro regions have been abolished altogether, in some cases they have been replaced by different entities and forms of co-operation between local authorities, as in the case of the metro area of Barcelona (*Àrea Metropolitana de Barcelona*), which replaced the former *Entidad Municipal Metropolitana de Barcelona* with increased autonomy.

The metro regions established most recently are Zaragoza in Spain in 2018, the metro city ('*città metropolitana*') category in Italy in 2015, the 'city' and 'city and county councils' categories in Ireland in 2014, and the 'métropole' category in France in 2010.

In terms of the degree of administrative autonomy, as measured by the self-rule indicator, there is generally not much variation over time for individual entities once they have been established. However, some increase in autonomy seems to have occurred for the *Région de Bruxelles-Capitale* / *Brussel Hoofdstedelijk Gewest* in Belgium, the two Portuguese metro areas, the French '*communautés urbaines*', and the *Grad Zagreb* region in Croatia. The only case of an appreciable decline in autonomy occurring is the urban counties (*Megyei jogú városok*) in Hungary.

In 2018, the self-rule indicator showed the highest scores in metro regions located in the federal states of Germany (with the city-states of Berlin, Bremen and Hamburg scoring 15 out of 18, in line with the score for conventional regions), Austria (with Vienna scoring 14, again as for conventional regions) and Belgium (with *Bruxelles/Brussel* scoring 13, slightly lower than the average for conventional regions).

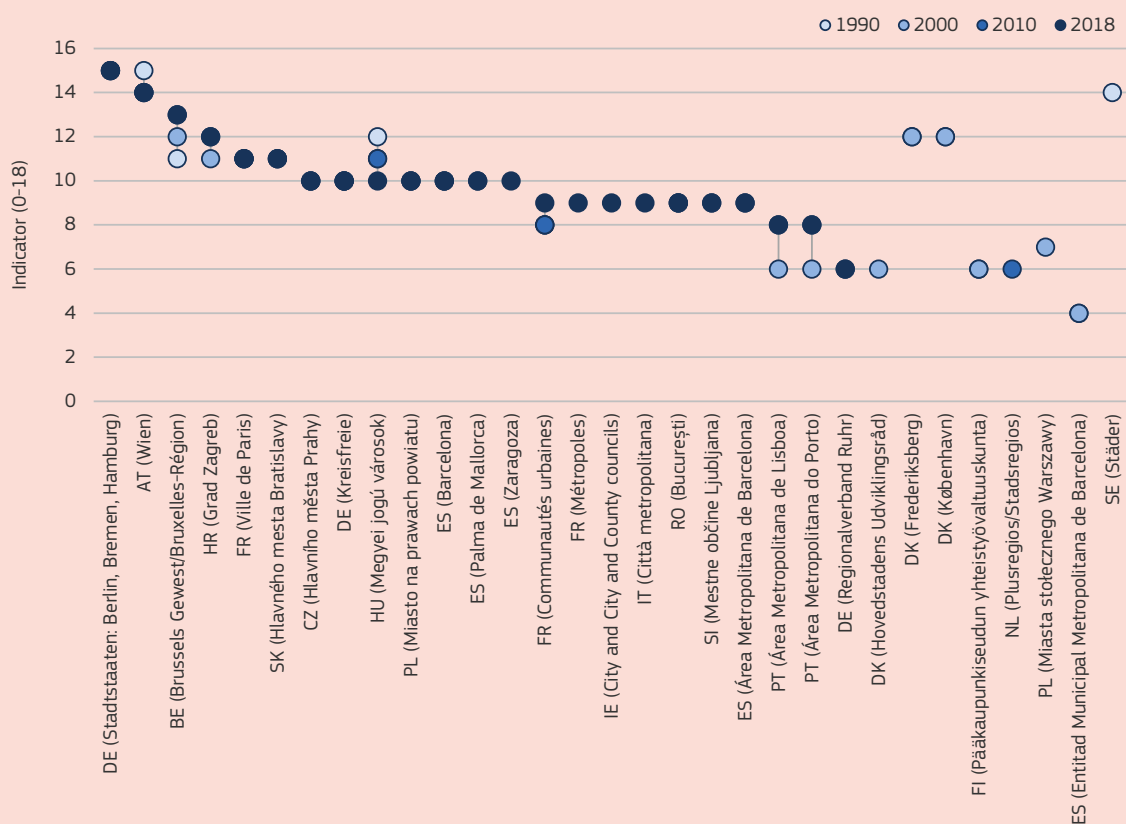
1 Hooghe et al. (eds) (2016).

2 See Chapter 2 of this report.

The next highest scores were for capital city regions in Croatia, France and Slovakia (all more than for conventional regions in the respective Member States). By contrast, the association of cities and districts in the Ruhr region in Germany scored only 6 out of 18 in terms of autonomy, and the two Portuguese metro areas of Lisbon and Porto only slightly more (8 out of 18), with most other metro regions having scores of 9 or 10.

The level of autonomy of metro regions as compared with conventional ones is especially high in Slovenia and Portugal, where they have scores of almost 7 points more than the latter, which have relatively low scores. In some cases, however, metro regions have a lower level of autonomy than conventional ones, as in Italy and Spain, and partly in Germany.

Figure 8.18 Metro regions self-rule indicator, 1990, 2000, 2010 and 2018



Source: DG REGIO calculations based on RAI v.3.1 scores for metro regions (<https://garmarks.web.unc.edu/data/regional-authority-2/>).

a slightly higher level of regional autonomy (with a score of 4).

Decentralisation helps to support integrated place-based policies, which are particularly important in large Member States with significant internal disparities. Cohesion countries, to some extent reflecting their generally smaller size, have on average a much lower level of regional autonomy than non-cohesion ones (their average score was 6 out

of 18 in 2018, as against 11.5 for the latter). The difference narrowed between 1990 and 2010, but widened slightly from then until 2018.

Relating the regional self-rule scores to population size shows that the Member States with larger regions on average tend to have a higher level of regional autonomy (Figure 8.19). Seven of the eight Member States with a regional self-rule score of more than 10 have regions with average

Figure 8.19 Population size of regional authorities and regional self-rule indicator, 2018-2019

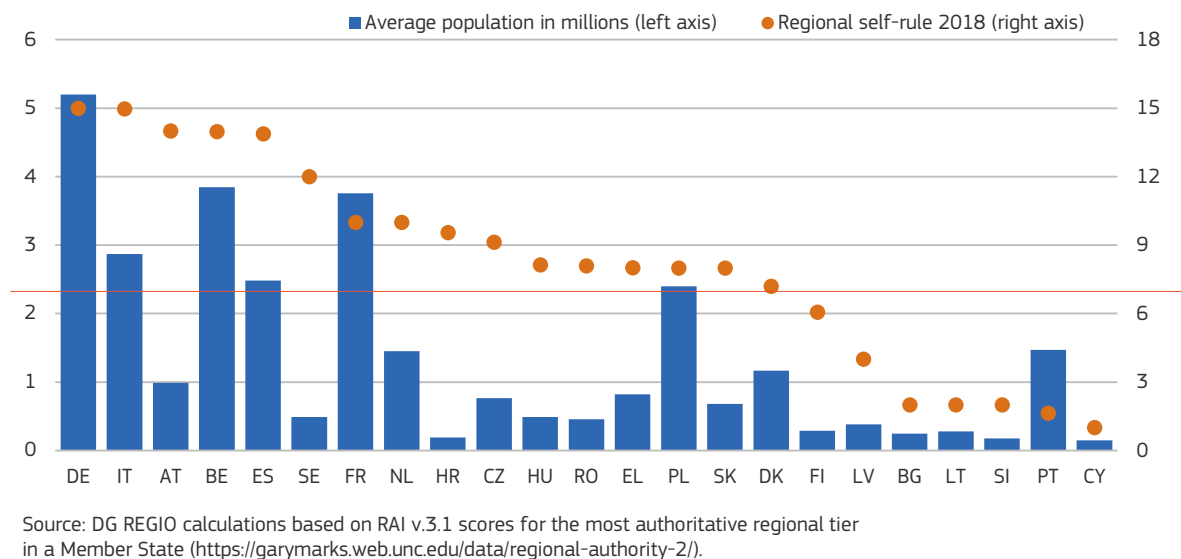
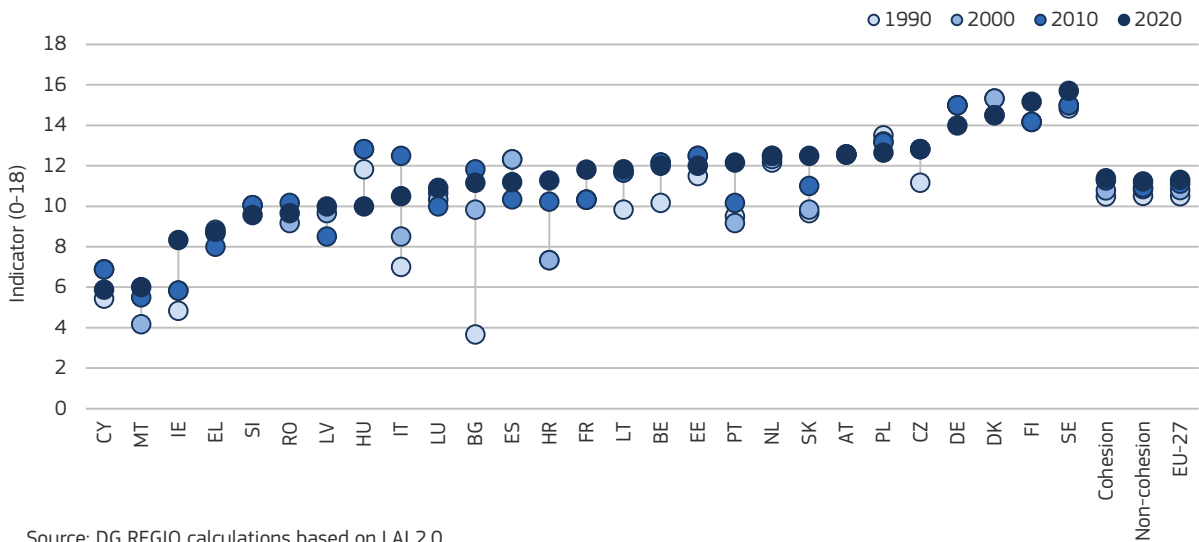


Figure 8.20 Local self-rule indicator, 1990, 2000, 2010 and 2020



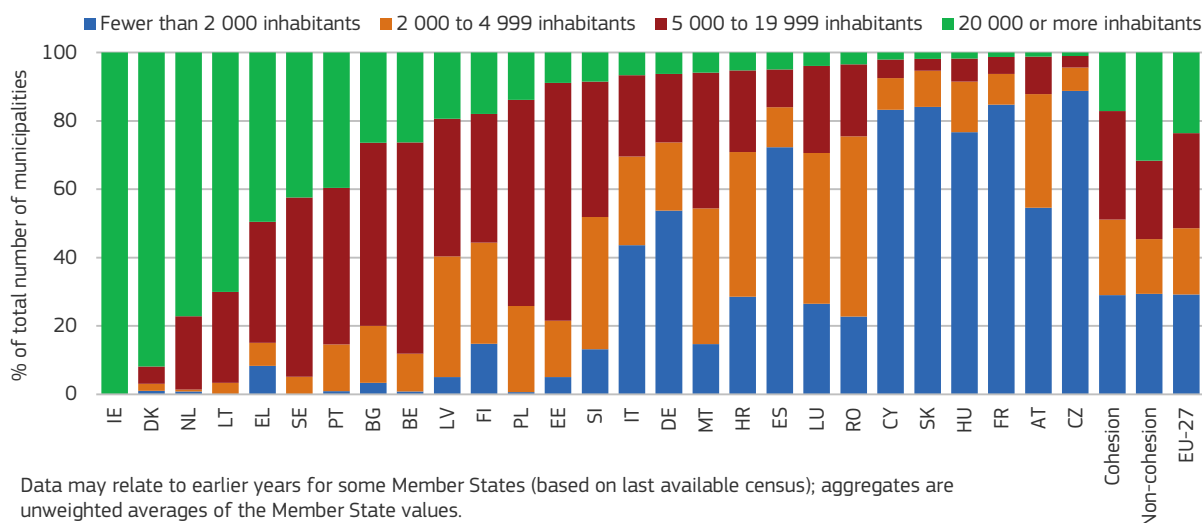
populations of over one million. In contrast, six of the seven Member States with the lowest regional self-rule scores (lower than 6) have regions with an average population of less than 400 000.

North-western and southern Member States tend to have large regions (2.1 million inhabitants on average in the former; 1.6 million in the latter) with a relatively high level of administrative autonomy (with an average score of 11 in the former

and 8 in the latter). By contrast, eastern Member States tend to have smaller regions (0.6 million on average) with moderate or low administrative autonomy (with an average score of 6, and with all Member States having a score below 10).

As regards local self-rule, the indicator shows that the degree of autonomy in the EU at this level on average increased steadily, if moderately, between 1990 and 2020 (Figure 8.20). An increase

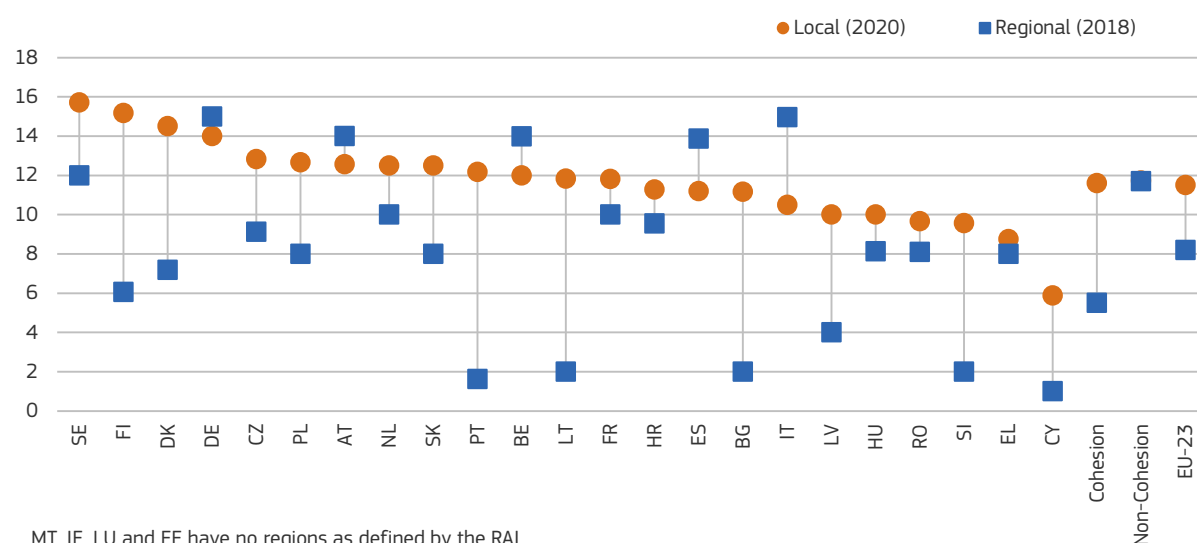
Figure 8.21 Municipalities by population size class, 2018



occurred in the majority of Member States (16 of the 27). It remained broadly unchanged in Cyprus, Greece, Luxembourg, Austria and the Netherlands, while it declined slightly in Denmark, Poland and Slovenia, and more markedly in Hungary, Spain and Germany. In five of the 16 Member States in which it increased over the period, however, it fell over the 10 years 2010–2020, most especially in Italy, Bulgaria, Romania, Estonia and Belgium.

The Nordic Member States were ranked as having the highest level of local autonomy, with Sweden, Finland and Denmark having a score higher than 14 out of 18 in 2020, followed by Germany (with 14). At the opposite end of the scale, Cyprus, Malta, Ireland and Greece all had scores below 9, with Slovenia and Romania having scores only slightly above this. Contrary to the case of regional autonomy, cohesion countries are assessed as having a marginally higher level of local autonomy than

Figure 8.22 Regional and local self-rule indicator scores, 2018/2020



non-cohesion ones (with an average score of 11.4 as against 11.2), a difference which has existed since 2000.

The degree of local autonomy does not seem to be related to the size of a Member State, being relatively high in both large and small Member States. The same is true with respect to the size of local authorities within Member States (Figure 8.21). For example, all authorities in Ireland are in the largest size class, but they have, on average, much less autonomy than Danish ones, which are almost equally large on average. In general, smaller local authorities tend to have fewer resources and staff than larger ones, which may mean that the investment they carry out requires co-operation with neighbouring authorities and/or more support for capacity-building.

On average, local autonomy tends to be higher than regional autonomy (Figure 8.22). This is the true for both cohesion and non-cohesion countries. Regional autonomy, however, is much lower than at the local level in cohesion countries, reflecting the relatively weak nature of regional authorities. Local autonomy is assessed as being higher than at regional level in 18 Member States, particularly in Portugal, Bulgaria, Lithuania and Finland, and only slightly less so in Slovenia and Denmark. The five Member States where regional autonomy is higher than local have either a federal system of government (Germany, Austria and Belgium) or are highly devolved (Spain and Italy).

4. Conclusions

When compared with government capital investment, the importance of cohesion policy for the Member States, especially the less developed ones, has increased markedly during the last programming period. Although not all cohesion policy funding goes to public capital investment, the evidence suggests that, in the past decade, cohesion policy has effectively contributed to restoring and sustaining public investment levels in the EU after the reduction that occurred in the aftermath of the Great Recession of 2008–2009 and the sovereign debt crisis of 2011.

Case study evidence shows that EU Member States have several nationally mandated and exclusively nationally financed policies addressing regional disparities. Nevertheless, cohesion policy is by far the main source of financing for regional development policies. Although territorial in scope, most national policy measures tend to be designed and implemented by central governments, with limited involvement of regional authorities, whereas cohesion policy requires a partnership with regional and local government.

Public funding for investment, whether from the EU or national sources, is important for shaping regional development, especially when it triggers private investment. Policies to improve productivity and to shift economic activity away from low-value-added sectors, such as investment in human capital, transport infrastructure and improved governance, appear to be effective in reducing regional disparities.

Public finances in EU Member States improved steadily from the aftermath of the Great Recession in 2008–2009 up until 2019, but the onset of the COVID-19 pandemic and the economic downturn it induced required extraordinary policy measures, increasing the budget deficit in 2020 in all Member States.

At the onset of the COVID-19 crisis, public investment in the EU was still lower than before the financial crisis of 2008–2009, particularly in many cohesion countries, raising concerns about the consequences of the depressed levels of investment for economic convergence and longer-term development.

Sub-national authorities execute almost a third of total general government expenditure in the EU, with large differences between Member States. This difference, however, has been slowly narrowing over time, suggesting increasing decentralisation of responsibilities, at least for carrying out expenditure.

Sub-national authorities undertake a significant amount of public investment in the EU, around 58% of total public investment in 2019, again with

large differences between Member States. Sub-national authorities in cohesion and non-cohesion countries executed similar levels of public investment relative to GDP in the period preceding the COVID-19 crisis, though there were marked differences between Member States, reflecting differences in institutional settings.

Indicators of regional and local autonomy over spending and investment decisions show that this is significantly lower in cohesion countries than non-cohesion ones. Although the difference narrowed between 1990 and 2010, it has tended to widen again over the past decade.



Chapter 9

The impact of cohesion policy

- EU funding for cohesion policy over the 2014–2020 period averaged €112 per year per person in the EU, and close to €400 per year in some of the least developed regions.
- Between 2014 and 2020, cohesion policy supported over 1.4 million enterprises. Projects selected indicate that this number could rise to over 2 million by the end of the programming period.
- Evaluations show that the support to enterprises produced tangible results. In Czechia, for example, 90% of the companies supported by the ‘knowledge transfer partnerships’ programme have introduced product or process innovations.
- By the end of 2020, 11.3 million people had benefited from the flood-protection measures co-financed by cohesion policy in the 2014–2020 period. When all selected projects are completed, 24 million people overall should be better protected.
- Thanks to cohesion policy, 1 544 kilometres of railway lines had been laid or upgraded between 2014 and the end of 2020, and a further 3 500 kilometres will be by 2023, once the projects selected are completed.
- Investment in the construction of new roads and the upgrading of others has increased road safety and reduced the number of accidents — the latter by 54% in Poznań and 74% in Lublin in Poland, for example — while reducing journey times and air pollution in cities.
- Between 2014 and 2020, programmes helped 45.5 million participants to integrate into the labour market and receive education and training, and 5.4 million people had been helped to find a job.
- Over the same period, the healthcare facilities constructed or improved with the support of the ERDF, mainly in the central and eastern Member States, provided an improved service for 53.3 million people.
- Some 15.2 million square metres of open space had been created or rehabilitated between 2014 and 2020, and the completion of the projects selected would bring this up to 53.4 million.
- By the end of 2023, it is estimated that the investment financed by cohesion policy in the 2014–2020 period will have increased GDP in some of the least developed regions in Europe by up to 5%.
- Macro-economic model simulations show that in the long run all EU regions benefit from cohesion policy. Every €1 spent on cohesion policy in the 2014–2020 period is estimated to generate a return, 15 years after the end of the period, of €2.7 in the form of additional EU GDP.

Chapter 9

The impact of cohesion policy

1. Introduction

Cohesion policy is the EU's main source of investment in economic and social development across the Union. It is financed by three funds, the European Regional Development Fund (ERDF), the Cohesion Fund (CF) and the European Social Fund (ESF). The ERDF, the largest of the three, is allocated to regions (at the NUTS 2 level) on the basis of their GDP per head and other indicators such as the unemployment rate. Less developed regions (defined as those with GDP per head below 75% of the EU average) receive the most; transition regions (with a level between 75% and 90%¹ of the average) receive the next largest amount; and more developed regions — the remaining ones — receive the smallest amount (Map 9.1). In addition, some of the ERDF is also allocated to European transborder co-operation (Interreg), providing support to: border regions; large areas in the EU covering several Member States, such as the Danube or Baltic Sea regions; and regions in different Member States adopting a joint approach to tackling common issues.

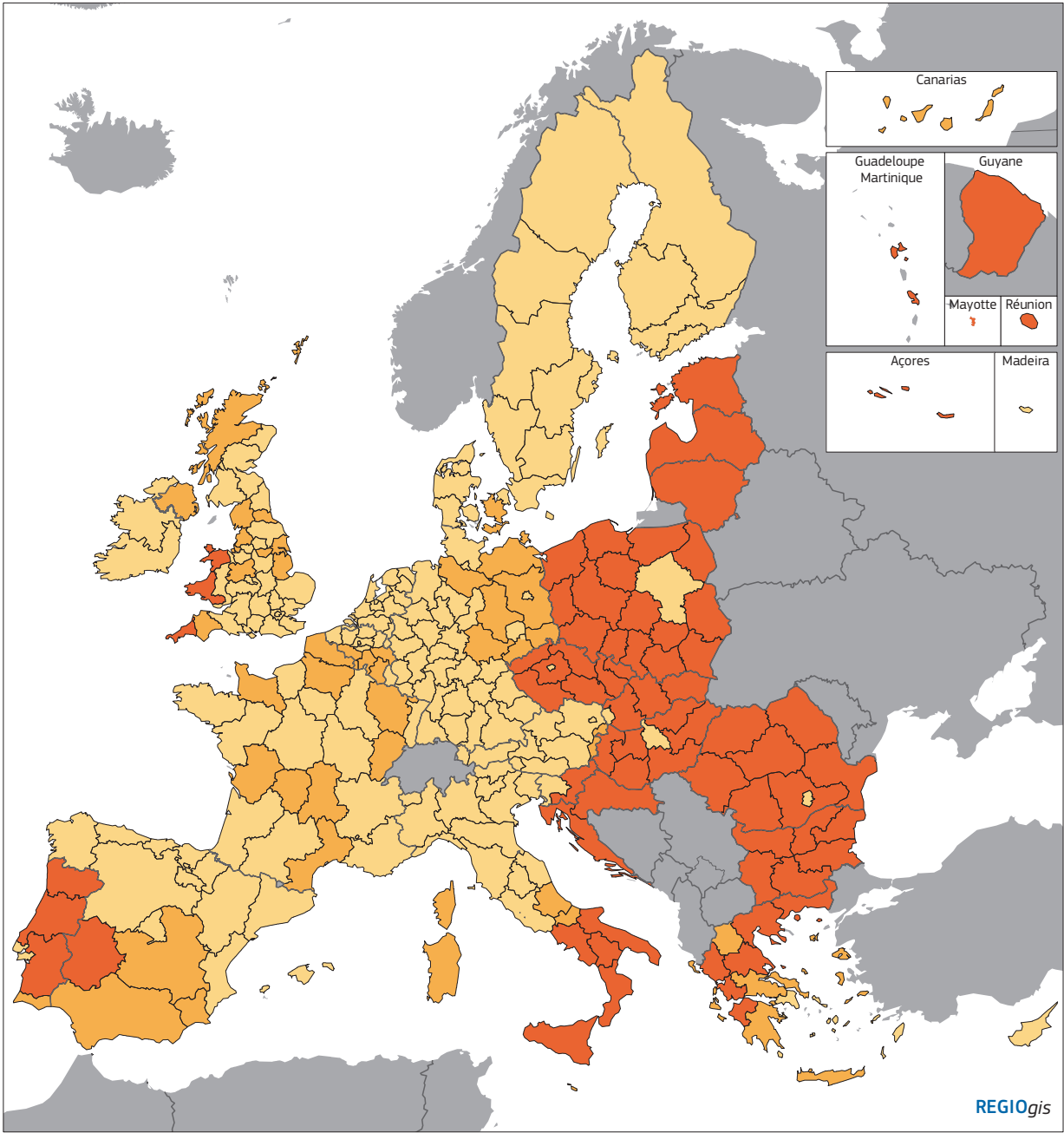
The CF, allocated at the national level, is restricted to Member States with gross national income (GNI) below 90% of the EU average, and is limited to financing investment in transport, environmental infrastructure and energy. The ESF, the main source of finance for investment in people, is also allocated at the national level to Member States, taking account of their population, unemployment and levels of education. This was supplemented in 2014–2020 by the Youth Employment Initiative (YEI), to provide support to young people under 25 not in employment, education or training (NEETs) living in regions where youth unemployment was over 25% in 2012.

In 2014–2020, the investment financed by the three funds was aimed at supporting 11 broad priorities, or thematic objectives:

- strengthening research, technological development and innovation (RTDI);
- enhancing access to, and the use and quality of, ICT;
- enhancing the competitiveness of SMEs;
- supporting the shift towards a low-carbon economy;
- promoting climate change adaptation, risk prevention and management;
- preserving and protecting the environment and promoting resource efficiency;
- promoting sustainable transport and removing bottlenecks in key network infrastructure;
- promoting sustainable and good-quality employment, and supporting labour mobility;
- promoting social inclusion, and combating poverty and discrimination;
- investing in education, training and vocational training for skills and lifelong learning; and
- enhancing the institutional capacity of public authorities, and efficient public administration.

The ERDF was targeted at the first seven objectives but also financed infrastructure investment in the other four. The first four objectives accounted for between 50% and 80% of total ERDF expenditure, depending on the level of regional development (more going on these objectives in the more developed regions). The ESF was concentrated on financing expenditure under the last four objectives, though it also supported (current) spending under the other seven. The outbreak of COVID-19, however, was followed quickly by two Commission coronavirus response investment initiatives (CRII

1 For the 2021–2027 programming period, transition regions are defined as those with a GDP per head between 75% and 100% of the EU average.



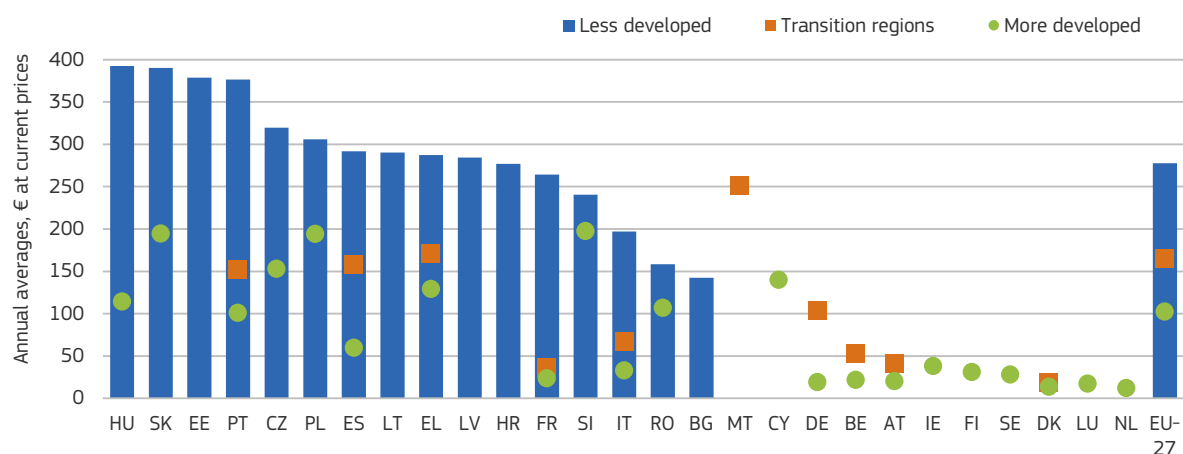
Map 9.1 Category of regions for cohesion policy (ERDF and ESF), 2014–2020

- Less developed regions
- Transition regions
- More developed regions

Source: DG REGIO.

0 500 km

© EuroGeographics Association for the administrative boundaries

Figure 9.1 Cohesion policy funding per head by type of region, 2014–2020

Cohesion policy funding includes the ERDF, CF, ESF and YEI. The Cohesion Fund is assumed to be allocated evenly across Member States in relation to population. The same is the case for the YEI and European Transnational Cooperation funding under the ERDF. Funding for interregional cooperation under the latter is excluded from the Figure. This was very small, amounting to much less than €1 per person on average. Countries are ordered in terms of the funding going to less developed regions relative to their population and then by the funding going to transition and more developed regions per head of population, according to which is the largest.

Funding going to the outermost regions, which is relevant for Spain, France and Portugal, is excluded, as is the funding going to the sparsely-populated northern regions, which is relevant for Finland and Sweden. In each case, this amounted to €33.6 per person living in these regions.

Source: DG REGIO calculations.

and CRII+) to allow governments substantial flexibility to divert unspent cohesion policy funding to finance pandemic-related expenditure, such as on medical equipment and support to jobs and businesses hit by the restrictions put in place to arrest the spread of the virus.

This chapter is divided into two parts. First, it sets out the monitoring and evaluation evidence on the results of cohesion policy funding for the 2014–2020 period, examining: the allocation of funding between broad investment objectives; the progress made in spending the funding allocated; the output and results so far achieved; and the findings from evaluations carried out up to now by Member States. Note that the expenditure financed under the 11 thematic objectives listed above is reorganised under the five policy objectives (POs) for 2021–2027, so as to enable the allocation of funding in the two periods to be directly compared².

Second, it considers the impact of funding over this period on GDP across EU regions using a macro-economic model to attempt to capture the full and wider effects, indirect as well as direct.

The chapter also includes a number of boxes on other EU initiatives and policies whose remit is close to cohesion policy, notably regional State aid, Horizon 2020, the Just Transition Fund (JTF), the Common Agricultural Policy and the Connecting Europe Facility (CEF).

2. Monitoring and evaluation evidence

Some €355 billion was allocated by the EU to cohesion policy for the 2014–2020 period, with national financing increasing this to €482 billion. Overall, EU funding for cohesion policy over this period amounted to an average each year of €112 for each person in the 27 Member States. The average, however, varied markedly between regions across the EU as well as between Member States.

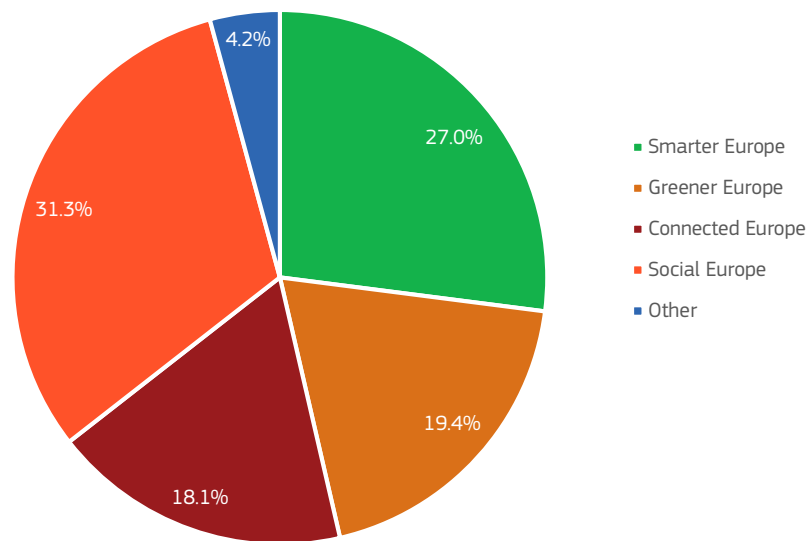
² European Commission (2021l) reports on implementation using the original 11 thematic objectives set for the ESIF in 2014–2020.

It was largest per head of population in less developed regions in Hungary and Slovakia, at around €390, and was just under €380 in both Estonia and less developed regions in Portugal (Figure 9.1). On the other hand, it was under €200 in Italy and around €150 in Romania and Bulgaria.

Funding per person in transition regions was around half or less of the average in less developed regions in most Member States, while also varying between Member States according to their level of GDP per head. Funding going to more developed regions was smaller again, though relatively large in relation to the population in the regions concerned in Slovakia, Poland and Slovenia. In each case, this was partly because of the amounts received from the CF, which are assumed to be the same per person in these regions as in less developed ones. As in the case of the funding going to the transition regions, the amount varied markedly between Member States, reflecting their relative levels of prosperity.

In terms of the kinds of investment financed, almost a third of EU funding went to the pursuit of the ‘social Europe’ objective in support of inclusion measures, and just over a quarter to ‘smart Europe’ in support of investment in R&D, innovation and competitiveness, while just under 20% went to both ‘green Europe’ and ‘connected Europe’ (Figure 9.2).

Figure 9.2 EU cohesion policy budget (2014–2020) by major objective



	2014–2020 EU allocations mapped to 2021–2027 policy objectives	EU planned amounts € million 31/12/2020	% of total cohesion budget	EU funding spent € million 31/12/2020	% of EU funding 31/12/2020
P01	Smarter Europe	95 903.2	27.0%	51 549.5	53.8%
P02	Greener Europe	68 662.0	19.4%	29 158.0	42.5%
P03	Connected Europe	64 106.8	18.1%	36 871.1	57.5%
P04	Social Europe	111 115.8	31.3%	59 598.1	53.6%
	Other	14 992.3	4%	7 228.5	48.2%
	Cohesion policy total	354 780.0	100.0%	184 405.2	52.0%
	Of which: P05 Europe closer to citizens	31 000.0		12 000.0	39.0%

The funding allocated to the 11 thematic objectives for 2014–2020 is approximately mapped to the five POs for 2021–2027. The ‘Europe closer to the citizens’ objective covers a number of integrated territorial measures included under various thematic objectives, and the funding involved can only be roughly estimated.

Source: Cohesion Open Data — <https://cohesiondata.ec.europa.eu/d/aesb-873i>.

The monitoring of cohesion policy expenditure was strengthened significantly in the 2014–2020 period compared with the previous one (2007–2013). More detailed, and more structured, financial data are available three times per year, together with a more complete set of common output indicators for the support provided by the ERDF, ESF and CF, and common result indicators for ESF support, showing the direct achievements of expenditure. Transparency and accountability have also been

improved by the regular publication of monitoring data on the ESIFunds Open Data Platform³.

When interpreting the financial data and common indicators, it is important to bear in mind the following.

- Expenditure financed by 2014–2020 funding can continue up to the end of 2023, so that, in many cases, projects or measures that the indicator values relate to were still ongoing at the end of 2020, implying that the outcomes that are so far evident give a very incomplete picture of the full achievements of the programmes concerned.
- Much of the ERDF and CF expenditure is on infrastructure projects and on measures, such as support for RTDI, which take time to produce their full effects. The output and monitoring indicators, as well as the evaluations carried out so far, therefore tend to understate the effects of the expenditure undertaken up to now, in many cases considerably.
- The focus here is on the long-term strategic priorities set before the COVID-19 response was implemented in 2020 and 2021 under the Coronavirus Response Investment initiatives (CRII and CRII+). The main reason for this is that full information on the reprogramming involved is not yet available⁴.
- The overview here does not cover the additional €50 billion for ‘next generation EU’ / REACT-EU⁵ which the EU made available during 2021. Implementation of the investment funded by this is still at an early stage⁶.

(The Commission presents annual reports to the EU institutions on the implementation of the 2014–2020 cohesion policy programmes under Article 53 of the Common Provisions Regulation. The 2021 report adopted in December 2021 and previous reports are available online⁷.)

While the financial data and common output and result indicators used to monitor expenditure cover the whole EU, the evaluation evidence on the 2014–2020 period comes so far from the evaluations commissioned by national and regional managing authorities in Member States. This evidence, therefore, relates to the measures or projects carried out in individual Member States or regions, or, in the case of Interreg programmes, in two or more Member States.

Accordingly, the evidence is inevitably specific to the Member States or regions concerned and cannot necessarily be assumed to apply elsewhere. Nevertheless, in many cases, much the same findings on the effects of the measures supported emerge from evaluations carried out in different contexts, so it is reasonable to consider them to be more generally applicable⁸.

Expenditure under each of the POs is considered in turn below, in each case examining:

- the extent to which the funding available for the 2014–2020 period has been spent up to now, what it has been spent on, and the immediate results according to the common indicators (for which data are reported annually for national and regional programmes); and
- typical evidence from the evaluations so far carried out in Member States on the effects of the expenditure concerned on POs.

³ Explore the 2014–2020 programmes using open data here: <https://cohesiondata.ec.europa.eu>.

⁴ The COVID-19 reprogramming decided to date is presented in detail on the cohesion policy coronavirus dashboard (<https://cohesiondata.ec.europa.eu/stories/s/CORONAVIRUS-DASHBOARD-COHESION-POLICY-RESPONSE/4e2z-pw8r>). See European Commission (2021n) for a first assessment of the initial implementation of the CRII/CRII+ measures.

⁵ Recovery assistance for cohesion and the territories of Europe.

⁶ The REACT-EU allocations decided can be tracked in detail on the REACT-EU dashboard (<https://cohesiondata.ec.europa.eu/stories/s/REACT-EU-Fostering-crisis-repair-and-resilience/26d9-dqzy>).

⁷ https://ec.europa.eu/regional_policy/en/policy/how/stages-step-by-step/strategic-report

⁸ It should be noted that a full EU-wide ex post evaluation of the 2014–2020 programmes will be carried out by the Commission by the end of 2024.

Box 9.1 Cohesion policy confronting the COVID crisis: a fast, flexible and effective response

When facing the socio-economic crisis caused by the COVID-19 pandemic, cohesion policy has been in the forefront of the EU response — responding, in particular, to the two main immediate effects of this unprecedented shock: (a) the major strain on the healthcare sector; and (b) the substantial liquidity risk to businesses, notably small businesses, forced to cease their activities — with millions of jobs at stake, together with an irreversible loss of skills and capacity.

In record time, the European institutions adopted two new regulations — the two CRILs — enlarging the eligibility of cohesion policy funds and increasing the flexibility offered to programming authorities. Over €20 billion was reallocated by the end of 2020 to secure vital personal protective equipment, ventilators and ambulances. Businesses were able to benefit from emergency grants and low-interest-rate loans, which allowed them to stay afloat during lockdowns. New employment measures, in particular short-time work arrangements, were put in place to make sure people did not find themselves without income from one day to another. In parallel, simplification measures have been promoted, easing audit procedures and relaxing reporting deadlines, enabling Member States to cope with the workload by first addressing the urgent needs of the community, while reporting on the achievements at a later stage.

To assist with dealing with the pressure on public budgets, Member States were allowed exceptionally to keep €7.6 billion in unspent cohesion policy funds in their national budgets and use it immediately for the worst affected sectors. A 100% EU co-financing rate for a larger share of projects has been introduced and, again exceptionally, it became possible to finance completed projects that directly helped to tackle the crisis. 188 cohesion policy programmes made use of this possibility, accelerating the absorption of funds by disbursing an additional €12.6 billion.

The recovery process has been further consolidated through the introduction of the REACT-EU initiative, which has been the first to mobilise resources under 'next generation EU'. Thanks to its high rate of pre-financing, Member States have already been able to start working on new projects to help medical institutions, business owners, employees and vulnerable people. This injection of EU funds will allow the resumption of projects previously halted in favour of emergency needs. Moreover, special attention has been given to green and digital priorities, which are essential for a smart, sustainable and resilient recovery, consistent with the EU's broader political agenda.

REACT-EU resources are designed to target the geographic areas and cities most affected by the impact of the COVID-19 pandemic, without being required to be broken down by category of region, hence increasing the speed and effectiveness of the recovery process.

Lessons from the crisis have also been drawn in the delivery mechanisms of cohesion policy for 2021–2027. In particular, the Commission has been empowered to take implementing decisions for limited periods of time, if unexpected adverse economic events occur. The adaptability of the policy has also been reinforced, including through the mid-term review, enabling Member States to accommodate new challenges and unexpected events. Lastly, the effectiveness of smart specialisation strategies has been strengthened, allowing Member States and regions to further diversify their economies and so reduce their vulnerability to shocks.

Overall, cohesion policy has proved to be agile and effective in adapting rapidly to the crisis, providing Member States, regions and cities with a comprehensive and tailored toolkit to address the uneven territorial social and economic effects of the pandemic.

2.1 PO1 Smarter Europe

Progress in investment and monitoring of key outputs

In 2014–2020, €96 billion of ERDF money for the period, or 27% of total cohesion policy funding, was devoted to ‘smarter Europe’ objectives, for support to RTDI, ICT and SME competitiveness. Up to the end of 2020, the funding for the projects selected for support amounted to around 114% of the total EU allocation (i.e. more than the sum available — reflecting a policy of allowing for the likelihood that at least some projects will not actually go ahead), while an estimated €52 billion of funding (54% of the total available) had been spent.

The common indicators give an indication of the immediate outputs from this expenditure as well as how these relate to the targets set. The indicators under the smarter Europe objective show that over 1.4 million enterprises received support up to the end of 2020, and that another 600 000 or so will receive support if the projects selected are completed (Table 9.1). They also show that 23 800 enterprises receiving support had introduced new products, and another 16 000 will do so by the end of 2023 if all projects selected are undertaken. They show, in addition, that the targets set could be reached or exceeded by the end

of 2023 in all cases, except for the population with access to broadband. In this latter case, support is concentrated in Spain, Italy and Poland, where progress in implementation has been relatively slow in aggregate and so the population given broadband access amounted to only 46% of the 2023 target by the end of 2020. However, the target will almost be reached if the projects selected for funding are completed.

Examples of thematic evaluation findings in Member States

Support for knowledge transfer, business innovation and co-operation between enterprises and research centres

Much of the support for research and innovation has been directed to increasing collaboration between companies, particularly SMEs, and universities and other research centres. This has been achieved through both the creation of new links and the expansion of existing ones. Successful examples of support leading to increased collaboration of this kind are evident across the EU, such as in Czechia where the measures financed greatly exceeded the targets for firms supported and cases of collaboration between companies and research centres. Some 70% of companies have launched further joint research initiatives after

Table 9.1 ‘Smarter Europe’ indicators: 2023 targets and achievements up to end-2020

	2023 target	Selected projects	Implemented, number and % of target
The number of enterprises cooperating with research institutes	63 500	78 000	44 800 (71%)
The number of enterprises introducing new products to the market	29 700	40 100	23 800 (80%)
The number of researchers benefiting from RTD infrastructure	85 400	112 300	44 800 (52%)
The number of enterprises receiving support	1 780 000	2 011 000	1 429 000 (80%)
The number of jobs created in the enterprises supported	361 900	451 700	238 300 (66%)
New enterprises supported	177 000	194 000	124 200 (70%)
Population with access to broadband	11 900 000	11 550 000	5 518 000 (46%)

Source: Cohesion Open Data — <https://cohesiondata.ec.europa.eu/d/aesb-873i>

support came to an end, demonstrating the long-term sustainability of the links established.

Such sustainability is also evident in respect of the Germany-Netherlands Interreg operational programme (OP), where support has led to the creation and development of cross-border technology transfer networks; as well as in Austria, where measures supporting investment in technology and R&D in SMEs have resulted in increased knowledge transfer, and have strengthened the innovation environment. In addition, in Nordrhein-Westfalen in Germany, the support provided has led to a deepening of existing collaboration between enterprises and research centres and to the creation of new networks, which, as a consequence, has helped to increase the capacity of firms to enter new markets.

Direct support for R&D and innovation has boosted the capacity of enterprises to develop new products and processes across the EU. In Dolnośląskie in Poland, for example, the measures financed have increased R&D activities in SMEs, as well as strengthening employee competences and, in Śląskie, increasing the scale of operations, employment and profitability. In Germany, measures funded by the Sachsen OP led to new products and services being introduced by SMEs and existing products being improved, which, in turn, increased turnover and employment. In Czechia, 90% of the companies supported by the knowledge transfer partnerships programme have introduced product or process innovations. In Czechia, too, the financing provided to increase the availability of infrastructure for enterprises (the real estate programme) has enabled recipients to expand production, to innovate and to enlarge the number of products.

In many cases, support for RTDI has focused on furthering the pursuit of smart specialisation strategies and on helping to develop a more innovative and competitive economy. This is the case, for example, in Wielkopolskie in Poland, where such support has helped to eliminate barriers to innovation, especially by increasing investment outlays and reducing the costs involved; while in Portugal, Valencia in Spain and Puglia in Italy, the companies

supported have increased exports and their participation in international markets.

Evidence from evaluations carried out on the 2007–2013 programmes, which have had longer to produce their effects, confirm these positive findings. In Latvia, for example, support for research institutes helped to improve co-operation with industry and to increase the active participation of researchers in international projects. A similar increase occurred in Poland as a result of the support provided under the innovative economy OP.

SME competitiveness

The support from the ERDF for R&D and innovation has the ultimate objective of increasing competitiveness and so the growth potential of regions and firms. Indeed, in the case of SMEs, the funding concerned often has the dual aim of increasing their capacity to innovate and of strengthening their competitiveness, especially in international markets. This applies to the support going to companies in Portugal, Valencia and Puglia, mentioned above, where the investment financed has achieved both aims.

In Portugal, the support that was provided under the 2007–2013 programme led to growth in both national and international markets, while in Puglia the measures financed in this earlier period resulted in a significant growth of exports.

In Poland, the more general support to SMEs for investment provided by the 16 regional OPs has led to an increase in productivity and exports, but has also helped to increase output and employment. Similarly, in Piemonte in Italy support for the development of innovation poles over the 2010–2015 period led to increased value added, productivity and employment, especially in manufacturing. In Thüringen in Germany, the start-up fund and the growth fund created for SMEs in their first years have enabled firms to access additional capital, led to an increase in their competitiveness, and improved their access to new markets. In addition, the ‘Thuringia invest’ programme, designed

Box 9.2 State aid in support of regional development

Aim and scope of regional State aid

The Treaty on the Functioning of the European Union (Articles 107(3)a and 107(3)c) provides for specific cases where State aid is considered compatible with competition in the internal market. Specifically, State aid must be exclusively aimed at promoting the economic development of outermost regions and areas where the standard of living is abnormally low or where there is serious under-employment, or at facilitating the development of particular economic areas in the EU where aid does not significantly affect competition. These types of State aid are known as regional aid, regional aid schemes needing to form an integral part of a regional development strategy with clearly defined objectives.

For aid to be compatible with competition in the internal market, its adverse effects in terms of distorting competition and affecting trade between Member States must be limited and must not outweigh the positive effects to an extent that would be contrary to the common interest. The primary objective of State aid control in respect of regional aid is to ensure that aid for regional development and territorial cohesion does not adversely affect trading conditions between Member States to an undue extent.

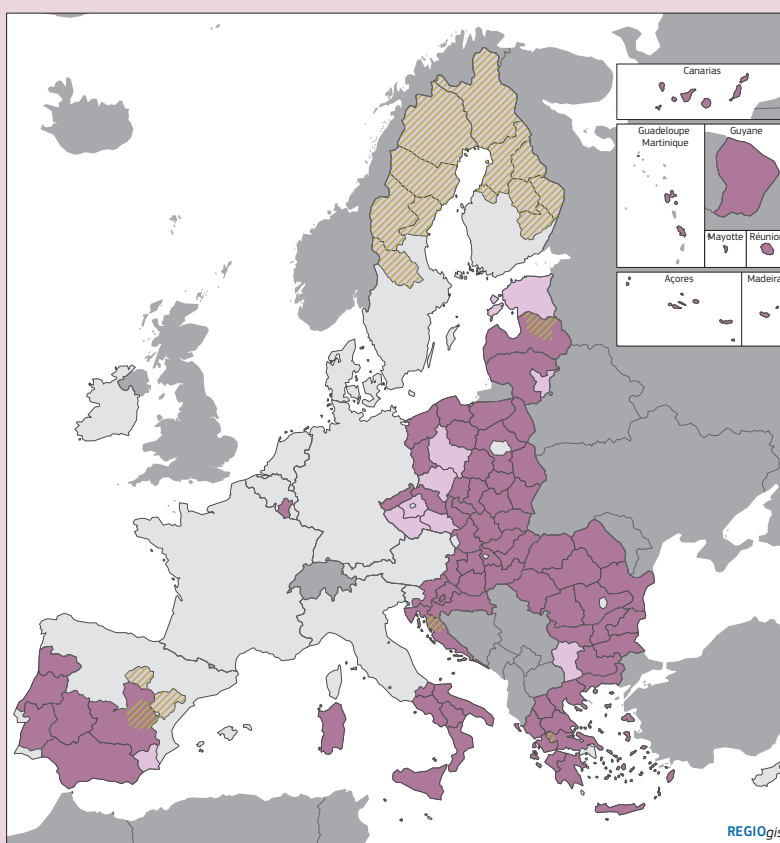
As a general principle, Member States must notify regional aid to the European Commission, with the exception of measures that fulfil the conditions laid down in the General Block Exemption Regulation (GBER) for regional investment aid. The European Commission then assesses the aid notified according to the principles set out in the guidelines on regional State aid¹. These were

issued as part of an ongoing review of competition rules to ensure they are fit for an evolving market environment.

Types of area for regional aid

In accordance with the prescriptions of the Treaty on the Functioning of the European Union, the annexes to the guidelines identify two types of area that qualify as a target for regional aid in the period 2021–2027 (Map 9.2):

- 'a' areas — which include the outermost regions, and NUTS 2 regions where GDP per head in purchasing power standards (PPS) is 75% of the EU-27 average or less (based



Map 9.2 Regional State aid areas, 2022–2027

Categories of areas

■ 'a' areas

■ predefined 'c' areas

/// sparsely populated areas

Source: Commission Communication on guidelines on regional State aid, 19/04/2021.

0 500 km

© EuroGeographics Association for the administrative boundaries

1 European Commission (2021m).

on the average of Eurostat regional data for 2016–2018); and

- predefined ‘c’ areas — which include NUTS 2 regions formerly designated as ‘a’ areas in 2017–2020, and sparsely populated areas (i.e. NUTS 2 regions with fewer than eight inhabitants per square km or NUTS 3 regions with fewer than 12.5 inhabitants per square km (based on Eurostat data on population density for 2018).

There is another category of ‘c’ areas, which is regions that a Member State may at its own discretion designate as being in need of support, though it has to demonstrate that they fulfil certain socio-economic criteria (these are known as non-predefined ‘c’ areas). In this respect, the guidelines state that the criteria used by Member States for designating ‘c’ areas should reflect the range of situations in which granting regional aid may be justified. The criteria should, therefore, relate to the socio-economic, geographical or structural problems likely to be encountered in ‘c’ areas, and should provide sufficient safeguards that granting regional State aid will not

affect trading conditions to an extent contrary to the common interest.

The overall maximum coverage of ‘a’ and ‘c’ areas is set at 48% of the EU-27 population in 2018.

For the period 2022–2027, eligible ‘a’ areas are mostly concentrated in eastern Member States and regions in southern Europe; predefined ‘c’ areas are mostly in the northernmost parts of Sweden and Finland and in central Spain (where they coincide with sparsely populated regions) and in some eastern Member States.

In response to the economic disturbance created by the COVID-19 pandemic, the European Commission has put in place targeted instruments, such as the Temporary Framework for State aid measures. The pandemic may have more long-lasting effects in certain areas than in others, though at this point in time it is too early to predict its long-term impact and to identify which areas will be particularly affected. The Commission, therefore, plans a mid-term review of the regional aid maps in 2023, which will take into account the latest available statistics.

to strengthen the competitiveness of SMEs, has accelerated their investment and/or led to larger projects being undertaken in 75% of cases.

In Estonia, too, there is evidence of the beneficial effects of the 2007–2013 programme in the form of the creation of a large number of start-ups in knowledge-intensive service sectors, with an increase in the number employed, the return on sales, and value added per employee in the companies supported.

ICT development

Cohesion policy funding for digitalisation has led to the development of ICT products and services, including e-government ones by public authorities. For example, in Mazowieckie in Poland the implementation of the e-services supported has led to uptake of 68% by residents and 72% by businesses in the region. This in turn has increased the transparency of public sector activities and

people’s awareness of them, as well as helping to reduce the extent of digital exclusion among older people. This continued the support provided to ICT in the earlier period when, in Podkarpackie, financing from the ERDF helped to construct 59 kilometres of broadband network and 206 km of local-area networks, and to modernise a further 240 km, mainly in rural areas.

Other examples of the effects of funding for ICT in the 2007–2013 period are, in Latvia, an improvement in the overall efficiency of the public administration through digitalisation and a reduction in the administrative burden on individuals and businesses; and, in Prague, the expansion of public broadband and e-government services, which has similarly led to the city’s administration becoming more efficient.

2.2 PO2 Greener Europe

Progress in investment and monitoring of key outputs

Total EU funding of €68 billion from the ERDF and CF was devoted to 'greener Europe' objectives in 2014–2020, targeting: increases in energy efficiency and renewable energy; improvements in environmental infrastructure; the development of the circular economy; mitigation of, and adaptation to, climate change; risk prevention; biodiversity; and clean urban transport. The funding represents 19% of the total available under cohesion policy for the period.

At the end of 2020, funding for projects selected under these objectives exceeded the EU financing available by around 112 %, while an estimated €29 billion (42% of the total EU amount allocated) had been spent on investment projects.

Investment in sustainable energy was supported in the period in nearly all Member States, while that on environmental infrastructure (to improve water supply, wastewater treatment and waste management) and on risk prevention is concentrated mainly in developing Member States in eastern Europe and less developed and transition regions in southern Europe. Investment in clean urban transport (on metro lines and tramways) is supported in only a small number of Member States. The common indicators reported relate to the same groups of Member States and regions.

The indicators show, for example, that 11.3 million people had benefited from the flood-protection measures supported by the end of 2020, 41% of the target for 2023, and that overall 42 million would benefit if the projects selected were all completed (implying that the projects still to be completed cover, on average, a much larger number of people than those already undertaken) (Table 9.2).

The indicators also show that, for many of them, outcomes at the end of 2020 were very much lower than the targets set (only 21% of the target in the case of the reduction in GHG emissions). This, in part, reflects the relatively slow implementation

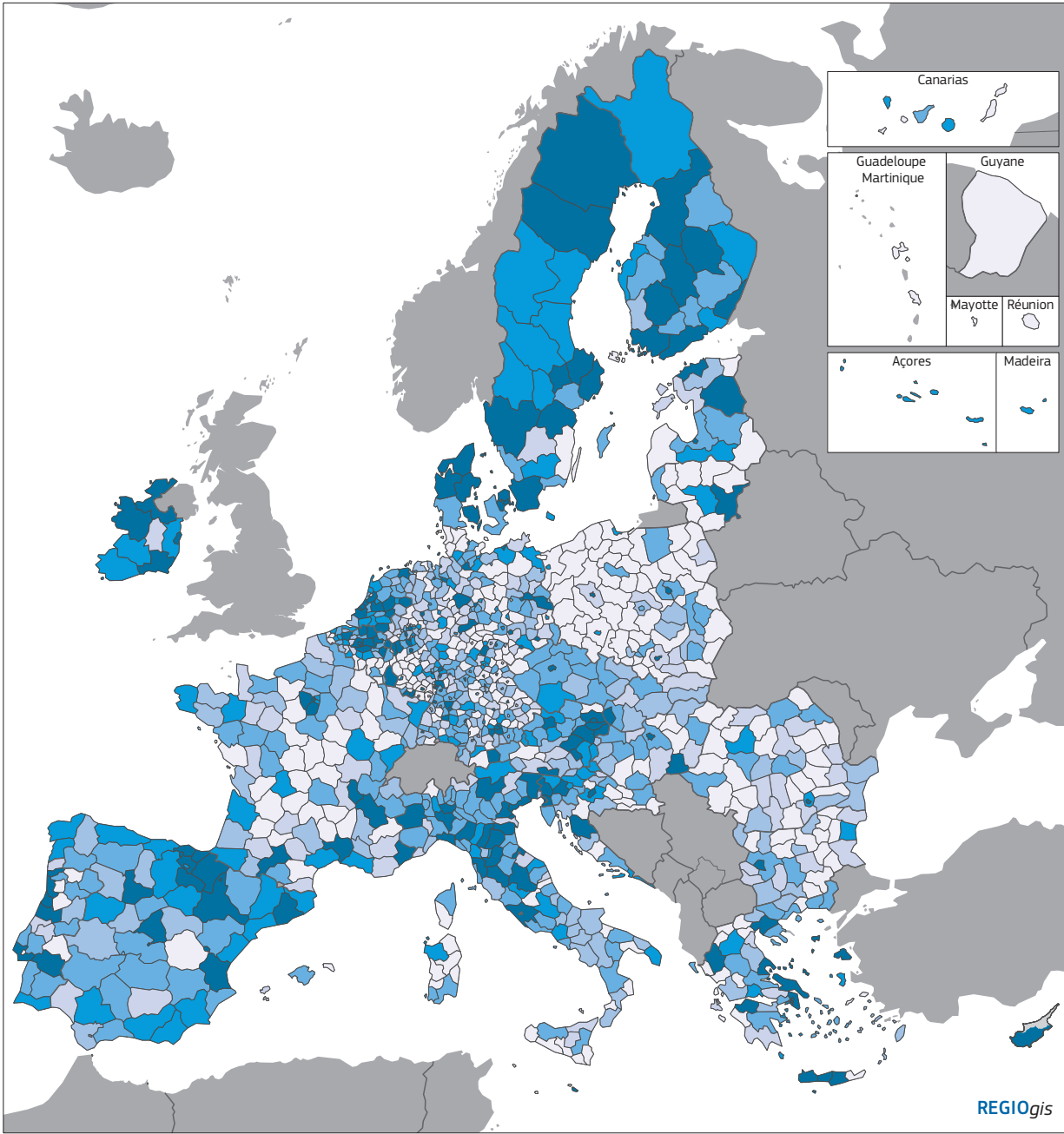
Box 9.3 The 'Horizon 2020' EU R&D framework programme

'Horizon Europe' is the EU's main funding programme for research and innovation, with a budget of €95.5 billion for the period 2021–2027. It is the successor to Horizon 2020' (2014–2020), which had a budget of nearly €80 billion. The objective of both programmes is to support research excellence wherever it takes place via EU-wide calls for research proposals. The programmes do not use predetermined national envelopes or otherwise differentiate their allocation of funding by regional group or territory. Funding is far from being evenly distributed across EU Member States and regions (Map 9.3) and is generally in line with their expenditure on R&D. However, the 'Widening participation and spreading excellence' activities under Horizon Europe, with funding nearly three times greater than the equivalent support under horizon 2020, should help to build research and innovation capacity in the Member States lagging behind.

The main recipient regions from Horizon 2020 tended to be those in the north-west of Europe where capital cities (Paris, Brussels) or major universities are located, whereas regions in the east of the EU received much lower levels of funding. Germany and France, on average, received less funding per inhabitant than other Member States in the north-west, but some of the regions in these Member States are among the largest recipients.

of projects, as implied by the relatively low rate of expenditure, but it also reflects the fact that the projects concerned predominantly consist of investment in infrastructure that takes several years to plan and several further years to carry out. It is only when the construction is completed and the infrastructure is operational that outcomes are reflected in the indicators.

Two other factors might also play a role. The issue of the capacity of the environmental bodies concerned to secure funds, and to manage and implement multi-annual investment, has been raised in evaluations for previous periods. More technically, some of the green indicators were be-



Map 9.3 Horizon 2020 funding by NUTS 3 region, 2014–2020



Table 9.2 ‘Greener Europe’ indicators: 2023 targets and achievements up to end-2020

	2023 target	Selected projects	Implemented, number and % of target
Number of households with improved energy consumption classification	600 000	663 000	359 400 (60%)
Decrease in annual primary energy consumption of public buildings (gigawatt hours)	6 480	7 069	1 892 (29%)
Renewables: additional capacity of renewable energy production (megawatts)	6 618	7 404	2 734 (41%)
Estimated annual decrease of greenhouse gasses (million tonnes CO ₂ equivalent)	20.8	23.4	4.4 (21%)
Total length of new or improved tram and metro lines (km)	478	542	137 (29%)
Population benefiting from flood protection measures	27 700 000	42 000 000	11 300 000 (41%)
Additional population served by improved water supply	14 900 000	19 500 000	3 500 000 (24%)
Additional population served by improved wastewater treatment	600 000	663 000	359 400 (60%)

Source: Cohesion Open Data <https://cohesiondata.ec.europa.eu/d/aesb-873i>.

ing widely used for the first time in 2014–2020, which might mean there are delays in reporting on them (learning effects). The experience at the end of 2007–2013 was that significant achievements were reported for comparable indicators in the last two years of expenditure on projects (2014 and 2015). Indeed, the figures for projects selected suggest that, if these are completed, the targets set for 2023 will be met for four of the environmental indicators. However, for the indicator on reductions in GHG emissions, the two on energy efficiency and the one on renewables, there is a risk that outcomes will fall short of targets, though substantial achievements are still likely.

Evaluation findings

Promoting energy efficiency and the use of renewable sources, and reducing GHG emissions

In 2014–2020, support for the shift towards a low-carbon economy in the EU focused on energy production from renewables, and on improving energy efficiency in enterprises and in public and private buildings. Although it is clear that in many Member States significant expenditure was allocated to

projects of these kinds, evidence on the impact of the measures concerned is limited as yet, because projects are still underway and results take time to materialise.

For example, in Nordrhein-Westfalen, the focus of investment support was on the development of new renewable technologies, which means that the results in terms of the energy sources used are so far relatively limited and visible only in the medium-to-long term. Indeed, in many German Länder, the global visible effects are limited because of an emphasis on the use of the ERDF to finance innovative projects. This is, for example, the case in Bayern, where such an emphasis almost inevitably means that tangible outcomes in terms of energy use or improvements in efficiency are not yet evident. In addition, in a number of cases, funding went to increasing energy efficiency in SMEs, and although there is evaluation evidence that this has been effective in the firms concerned (such as for instance in Rheinland-Pfalz), the global visible effects are limited because of the small size of firm supported.

Promoting energy efficiency and the use of renewable sources was also one of the objectives of many Interreg programmes. Under the Germany-

Box 9.4 Just Transition Fund

The JTF, as part of the Just Transition Mechanism (JTM), is one of the EU's key instruments set up to respond to the effects of the transition towards climate neutrality by 2050. Reaching this objective will require a transformation of both society and the economy. Some Member States and regions, however, are likely to be more affected than others, and the JTM is crucial to avoiding regional disparities increasing further and to ensuring that no one is left behind. It is composed of three pillars: 1) the JTF; 2) a dedicated just transition scheme under InvestEU, designed to pull in private investment; and 3) a public sector loan facility to leverage additional public investment, in co-operation with the European Investment Bank.

The JTF is implemented under shared management and is incorporated in cohesion policy. Though it does not contribute per se to the transition towards climate neutrality, the objective of it is to alleviate the socio-economic costs resulting from this. Although all Member States could benefit from the JTF, support is focused on regions that are most likely to be affected by the transition, notably those that still rely heavily on mining and extraction activities (especially coal, lignite, peat and oil shale) and on GHG-intensive industries. Some of these activities will need to be phased out or transformed to be more sustainable, and the JTF will be crucial in helping to diversify the local economies and alleviate the adverse effect on employment.

The fund is endowed with €17.5 billion (at 2018 prices), of which €7.5 billion will be financed from the EU budget for 2021–2027 and €10 billion from the European recovery instrument within the Next-GenerationEU plan, the latter being made available from 2021 to 2023.

In addition, Member States may, on a voluntary basis, transfer resources from their national allocations under the ERDF and the ESF+ to the JTF, provided

that the total amount transferred does not exceed three times the JTF allocation. Spending from the EU budget will be supplemented by national co-financing according to cohesion policy rules. Overall, therefore, the fund is expected to mobilise around €55 billion of financing for investment.

The JTF will support productive investment in SMEs and the creation of new firms. It may also support investment in areas such as RTDI, environmental rehabilitation, clean energy, upskilling of workers, job-search assistance and the active inclusion of job-seekers, as well as the transformation of existing carbon-intensive installations where this investment leads to substantial cuts in emissions and to job protection.

The governance of the JTF, and more generally the JTM, is built on the Territorial Just Transition Plans (TJTJs) that Member States need to prepare in co-operation with relevant stakeholders and the European Commission. The plans are intended to identify eligible areas, corresponding to NUTS 3 regions or parts of them, which are affected most by the transition. The plans detail, for each area, an assessment of the needs and socio-economic challenges linked to the conversion or closure of activities involving high GHG intensity, and the adaptation needed to the resulting changes in the labour market.

The preparation of the TJTJs is being guided by the analysis carried out by European Commission in the 2020 country reports, assessing the situation in the areas expected to be the most affected. The Commission is also channelling support to Member States for the preparation of the TJTJs, and a Just Transition Platform has been created to provide technical assistance and advice to help ensure that the best use is made of the JTM. In addition, each pillar of the JTM provides assistance for preparing operations that are eligible.

Netherlands Interreg OP, for example, pilot projects were undertaken to reduce CO₂ emissions, and this has helped raise awareness of the opportunities for transborder co-operation as regards product and process innovation.

Promoting sustainable multimodal urban mobility

Support from cohesion policy programmes across the EU in 2014–2020 went to the development or improvement of transport systems in cities to make them more environmentally friendly, accessible and safe. In Poland, for example, EU-funded investment in public transport projects helped to improve traffic flow and road safety in cities, as well as the connections between different modes of transport, while reducing air pollution. The evaluation of a new tramway in Florence, for example, found that it has strengthened the attractiveness of the city as a business centre and, by speeding up journey times, has made it more possible for people to commute from the peripheral areas served to the centre. By the same token, it has reduced the use of private cars and increased that of public transport.

Similarly, in the 2007–2013 period, ERDF support helped to create a more sustainable and integrated urban environment in Prague by improving barrier-free access to the metro system, improving bus and metro services and constructing a network of cycle paths, while in Hungary investment in intelligent transport systems helped to improve environmental sustainability.

Supporting adaptation to climate change and preventing disasters

In a number of Member States, support for investment has been focused on strengthening resilience to natural disasters and improving systems for managing the risks involved. In Romania, projects funded have helped to improve the monitoring of severe weather events and so to limit floods, reduce the damage from these and provide appropriate emergency equipment. In the Polish region

of Świętokrzyski, funding has helped to develop a disaster recovery system and improve the volunteer fire brigade.

Funding was also allocated to this broad area under many Interreg programmes. In particular, joint measures for managing climate change were implemented under the Italy-France (Maritime) programme, and the joint risk-management projects undertaken under the Czechia-Poland programme increased the capacity of the authorities concerned to tackle crises and emergency situations.

Preserving and protecting the environment

In several Member States funding also went to projects to protect and preserve the natural heritage, which, along with supporting the cultural heritage, have helped to boost tourism, such as in the Polish region of Malopolskie. At the same time, many projects with a similar aim were financed by Interreg. These have helped to: create a new environmental management system in the Northern Periphery and Arctic area; protect cross-border ecosystems through developing green infrastructure in the Italy-France Interreg (Maritime) area; and boost the development of the circular economy through the more efficient use of natural resources under the France-Belgium-Netherlands-UK programme.

In the 2007–2013 period, too, there are many examples of the support provided improving the environment, such as: in Slovakia and Lithuania, where investment helped to improve air quality; in Estonia, where investment in modernising the water supply network gave 454 000 people access to clean drinking water; in Friuli Venezia Giulia in Italy, where support led to an increase in the accessibility of natural areas and improved the conservation of flora and fauna; and in Romania, where support for environmental investment increased the attractiveness of the country as a tourist destination.

2.3 P03 Connected Europe

Progress in investment and monitoring of key outputs

Financing of €64 billion from the ERDF and CF was allocated to the 'Connected Europe' objectives in 2014–2020, targeting improvements in rail and road networks and other strategic transport goals. This represented 18% of total cohesion policy funding for the period.

By the end of 2020, projects selected in pursuit of these objectives exceeded the EU funding available by around 14 %, while an estimated €37 billion of such funding (58% of the total available) had been spent on investment.

The investment concerned was mainly in the less developed Member States (those in receipt of the CF) and in less developed and transition regions elsewhere. The indicators show that just under 2 400 km of new roads had been constructed by the end of 2020, most of them on the TEN-T, and another 6 000 km had been upgraded (Table 9.3). In both cases, this amounts to around two thirds of the targets set for 2023, while the completion of the projects selected would mean the lengths of road concerned exceeding the targets substantially.

On the other hand, the output of projects for upgrading the rail network up to the end of 2020, both those on the TEN-T and others, was well

below the 2023 target, which is more typical of large-scale multi-annual infrastructure investment, which usually needs a significant amount of time to be completed (as in the case of green investment, above). However, in this case, the figures for projects selected suggest that the targets will not be achieved, which continues a long-term tendency evident in earlier periods for rail projects to experience more difficulty in being completed than road projects.

Evaluation findings

Support for enhancing mobility

Support for improving mobility in 2014–2020 was centred mainly on developing road and rail networks. This was particularly the case in Poland, where evaluations have verified that the objectives of the investment involved have largely been achieved. The construction of new roads and the upgrading of others have, therefore, improved road safety, reduced the number of accidents (in Poznań by 54% and in Lublin by 74%, for instance), increased average vehicle speeds and shortened journey times, as well as reducing road noise and air pollution in cities. Investment in railways has also increased the capacity of the network, speeded up journey times and improved the connections between major cities and between the main economic centres. As a result, it has led to increased

Table 9.3 'Connected Europe' indicators: 2023 targets and achievements up to end-2020

	2023 target	Selected projects	Implemented, number and % of target
Total length of reconstructed or upgraded railway line (km)	5 260	4 590	1 540 (29%)
of which TEN-T	3 640	3 051	1 080 (30%)
Total length of newly built roads (km)	3 727	5 078	2 382 (64%)
of which TEN-T	2 500	3 530	1 680 (67%)
Total length of reconstructed or upgraded roads (km)	11 220	15 390	6 036 (54%)
of which TEN-T	870	918	727 (84%)

Source: Cohesion Open Data — <https://cohesiondata.ec.europa.eu/d/aesb-873i>

Box 9.5 The Connecting Europe Facility

The CEF is an important funding instrument for EU transport policy, complementing the ESIF by supporting cross-border projects and those to remove bottlenecks or build missing links on sections of European transport, energy and digital networks.

Over the 2014–2020 period, CEF funding amounted to €22.6 billion, divided roughly equally between the cohesion countries and other Member States, funding averaging €95 per inhabitant in the former, almost three times more than in the latter (€33) (Figure 9.3). In both groups, the bulk of funding went to rail transport. In the non-cohesion countries, the funding for air and inland shipping was more than in the cohesion countries.

In 2021–2027, the CEF will continue to fund major transport projects as well as digital and energy ones.

- It will have an overall budget of €33.71 billion (at current prices), €25.81 billion going to transport, including €11.29 billion for cohesion countries.
- For transport, it will help networks to become more interconnected, multimodal and safe by investing in the development and modernisation of railway, road, inland waterway and maritime infrastructure.
- Priority will be given to further developing the TEN-T, focusing on missing links and cross-border projects with an EU added value. €1.56 billion will go to financing major rail projects between cohesion countries.

Figure 9.3 Connecting Europe Facility funding for cohesion and other countries by transport mode, 2014-2020



Source: INEA, DG REGIO calculations.

use of the railways, though the quality of service still needs to be improved to attract more people.

As in the case of environmental infrastructure, transport projects typically extend over lengthy periods of time and many span two or even more programming periods. Moreover, since they tend to be part of networks, forming perhaps a section of a motorway or railway line, it is often the case that their effects cannot be fully assessed until other sections have been completed and the network as a whole is fully operational, which can take many years.

A number of evaluations of support for transport investment have, therefore, extended over the 2007–2013 period as well as the 2014–2020 one. In Estonia, the investment in railways undertaken in the two periods has improved the quality of rail travel, reduced journey times and led to the increased use of trains, expanding passenger numbers. The same is the case in Wales, where 70 stations in the East Wales and Valleys regions were improved through ERDF support over the two periods.

Evaluations carried out in the 2014–2020 period on the effects of investment in the previous period show similar effects. They indicate a reduced number of road accidents in Poland and fewer traffic bottlenecks, from investment in new motorways; and improved safety and reduced journey times in Latvia and Spain, from the construction of new roads and upgrading of existing ones. In Latvia, too, the modernisation of the rail network financed from EU funds made trains more competitive for both passenger and freight transport, increasing their use for both; while in Spain modernisation and general improvements led to significantly reduced travel times, especially on high-speed train routes, and to increased passenger numbers.

2.4 P04 Social Europe

Progress in investment and monitoring of key outputs

Total funding of €111 billion, mainly from the ESF and YEI but also from the ERDF (for infrastructure and equipment), was devoted to ‘social Europe’ objectives targeting support for employment and labour market integration, education and training and social inclusion. Funding represents 31% of the overall cohesion policy budget for 2014–2020.

By the end of 2020, EU funding for the projects selected under social Europe was 1% more than the amount available, while an estimated €60 billion, or 54% of the EU allocation, had been spent on the projects concerned.

The common indicators cover all EU Member States in respect of the ESF, and the 20 Member States for the YEI where this applies⁹. They show that up to the end of 2020:

- there were 45.5 million participants in the programmes supported, including nearly 17.3 million who were unemployed and 17.2 million who were inactive (in the sense of not actively seeking employment)¹⁰;
- 5.4 million participants in EU-funded schemes had found a job;
- 48% of participants had a low level of education (only up to compulsory schooling or less); 15% were migrants, had a foreign background, or were from ethnic minorities; and
- overall there were slightly more women (53%) than men among participants.

⁹ The common indicators under ‘social Europe’ come from two separate monitoring systems, which differ because of the different projects and measures supported, though both sets of indicators show what has been funded and the immediate outcomes. For the Member States in which YEI applied, see: <https://cohesion-data.ec.europa.eu/funds/yEI>.

¹⁰ It should be noted that this number relates to individual ‘participations’ rather than individual people, in the sense that any person can have participated in a number of programmes.

Three common indicators — one relating to investment in improving health services, one to investment in childcare and education facilities, and one to investment in tourist and cultural infrastructure — are used to track the outcomes of ERDF support for social Europe objectives (Table 9.4). The investment concerned in health and education is mainly undertaken in less developed and transition regions in eastern and southern Member States, though the indicator for investment in education is dominated by Italy. Support for investment in tourist and cultural sites is more widely spread and the indicator covers 17 Member States, with six (Poland, Italy, Spain, Portugal, France and Hungary) predominating.

Up to the end of 2020, the health service facilities constructed covered 53.3 million people, already 80% of the target for 2023; and if projects selected for funding go ahead, some 88.9 million will be covered by improved services, well above the target. Investment in childcare and education infrastructure had already improved or increased capacity for 19.8 million children or students by the end of 2020, well above the target; and if the projects selected are completed, this will increase to over 25 million. The outcome of investment in tourist and cultural sites is more modest in relation to the target, with an increase in visitor numbers to the sites concerned of 25.4 million by end-2020, only 40% of the target for 2023. In this case, however, the dramatic effect of the COVID-19 pandemic might well see visitor numbers fall short of the target.

Indeed, the pandemic has already had a massive effect on tourism and visits to cultural sites, and

put a significant strain on healthcare facilities. There has been a large net increase in planned allocations to health services, but it is not yet clear to what extent the response to the pandemic has also led to the investment originally planned for strategic improvements in the capacity of the services being diverted away to cope with the increased numbers requiring care.

Evaluation findings

Support for the employability of the non-employed

A large proportion of ESF financing in 2014–2020 went to helping people, especially young people, to find work — the measures funded often being combined into a tailor-made support package and taking the form of training programmes, traineeships and work experience. A number of evaluations find that the chances of a person being employed are increased significantly by participation in such measures. In Italy, for example, traineeships supported in Marche increased employment rates among participants by 13–15 pp 12 months after the traineeship ending, compared with a control group of non-participants. The same is true of voucher schemes in Piemonte where, 16 months after using them, 41% of participants were in employment as against 30% for the control group.

Similarly, in Germany, support for measures to help integrate the non-employed into the labour market, especially the long-term unemployed, led to 43% of participants being in employment 15 months afterwards at the end of 2019, 10 pp more

Table 9.4 Social infrastructure indicators: 2023 targets and achievements up to end-2020

	2023 target	Selected projects	Implemented, number and % of target
Population covered by improved health services	66 470 000	88 880 000	53 307 000 (80%)
Capacity of supported childcare or education infrastructure (students)	17 800 000	25 333 000	19 757 000 (111%)
Increase in expected number of visits to supported sites (cultural, natural heritage and attractions)	64 000 000	69 950 000	25 360 000 (40%)

Source: Cohesion Open Data — <https://cohesiondata.ec.europa.eu/d/aesb-873i>

than for non-participants. In Poland, measures targeted at young people are found to have increased the chances of the long-term unemployed, people with low education and those from villages and rural areas, finding a job.

The funding provided in Poland also helped participants to improve their entrepreneurial skills, 14% of them starting their own business within six months of receiving training. Other successful examples of ESF measures leading to the creation of new businesses are in Śląskie in Poland, where support was found to be crucial to the establishment of new start-ups and to their chances of survival (it is estimated that without support 45% start-ups would not have been established), and also in Piemonte in Italy, where new businesses supported had a 10 pp higher probability of being in operation four years after being formed than non-supported ones.

Support for the adaptation of employees and enterprises to change

ESF financing has also gone to improving the skills of those already in work, as well as of entrepreneurs, so that they are able to adapt better to changing market conditions. In Sachsen-Anhalt in Germany, the training that was funded improved the labour market situation of employees, 48% of participants performing an activity requiring more qualifications afterwards and over a third being given more responsibilities. In Thüringen, the support given to SMEs to recruit skilled workers from abroad led to firms being able to employ more of them.

Support for active inclusion

The ESF was also targeted at helping the vulnerable and disadvantaged to find work. In Asturias, in Spain, the Integrated Activation Pathways scheme was found not only to increase the chances of vulnerable people finding a job but also to reduce markedly their risk of suffering a mental disorder (this being cut by around 45% after participation in the scheme). In Toscana in Italy, measures tailored

to the needs of people with disabilities and other disadvantaged groups led, between October 2018 and November 2019, to 20% of recipients having a job one year after receiving support.

Support for healthcare infrastructure and services

In many of the less developed Member States, a significant part of ESF financing went to support health services, and this was complemented in some cases by ERDF investment in buildings and equipment. A number of evaluations found that the projects concerned increased access to healthcare and improved its quality. In Lithuania, for example, the projects funded were found to have helped to reduce mortality from cardiovascular diseases and the suicide rate.

Support for good-quality education

Measures to improve the quality of education and increase access to schooling were included in many ESF programmes, especially in less developed Member States and regions. In Thüringen in Germany, measures supporting the active participation of young people in learning were found to have reduced early school-leaving and improved the integration of migrants, as well as attitudes towards school. The training of teachers also facilitated the development of new methods of communication and conflict resolution.

In Lithuania, where support was targeted at higher education, it led to universities becoming more internationalised, with foreign students accounting for 8% of the total, and around 1 600 domestic students spending part of their studies abroad.

Support for transition from education to work

EU funding was also directed at improving the links between education and the labour market, to ensure closer correspondence between teaching, qualifications and employer needs. Measures to strengthen vocational education in Podlaskie

Box 9.6 The Common Agricultural Policy

About 8.8 million people worked in agriculture in 2019, which corresponds to just under 5% of total employment in the Union. While employment in agriculture is generally less than 3% in the most developed EU Member States, it remains a big employer in others, particularly in Romania, where it accounts for almost 1 person in every 4 employed (23% in agriculture, hunting and related service activities in 2019).

Within the EU, the farming sector operates under the Common Agricultural Policy (CAP). The objectives of the CAP in the 2014–2020 period (which has been extended to cover 2021 and 2022) are to support farmers and improve agricultural productivity, to ensure a stable supply of affordable food and a reasonable living for farmers, and to keep the rural economy alive by promoting jobs in farming, agri-food industries and associated sectors. The CAP includes the following measures:

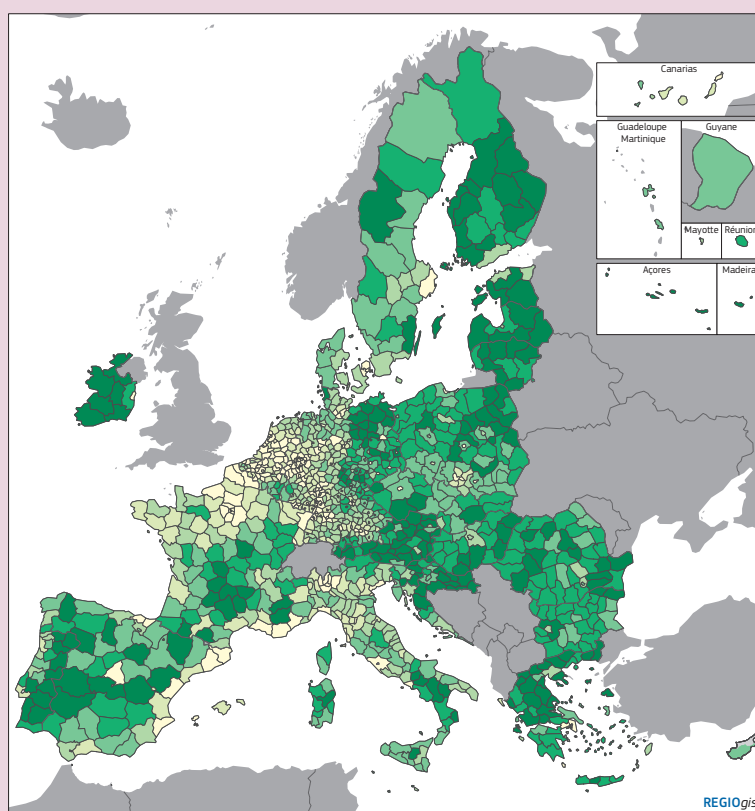
- income support through direct payments to ensure income stability;
- market measures to deal with difficult market situations such as a sudden drop in demand due to a health scare, or a fall in prices as a result of a temporary oversupply on the market; and
- rural development measures to address the specific needs and challenges facing rural areas.

The CAP is financed through two funds which are part of the EU budget:

- the European Agricultural Guarantee Fund (EAGF) provides direct support and finances market measures — referred to as the first pillar of the CAP; and
- the European Agricultural Fund for Rural Development (EAFRD) finances rural development support — referred to as the second pillar of the CAP.

The EAFRD is aimed at: improving the competitiveness of agriculture; encouraging sustainable management of natural resources and action in response to climate change; and achieving a balanced territorial development of rural economies and communities¹.

1 In 2014–2020, the EAFRD was part of the five ESIF, which are aimed at financing investment in sustainable economic development in the EU. Since the CAP reform is to be in place by 2023, the EAFRD will not be governed by the Common Provisions Regulation for 2021–2027, though certain provisions will still apply.



Map 9.4 CAP EAFRD expenditure by NUTS 3 region, 2007–2020

Annual average aid intensity (EUR/inhabitant)

- <= 5
- 5 – 10
- 10 – 20
- 20 – 35
- 35 – 60
- > 60

EU-27 = 24

Source: DG REGIO based on DG AGRI and Eurostat data.

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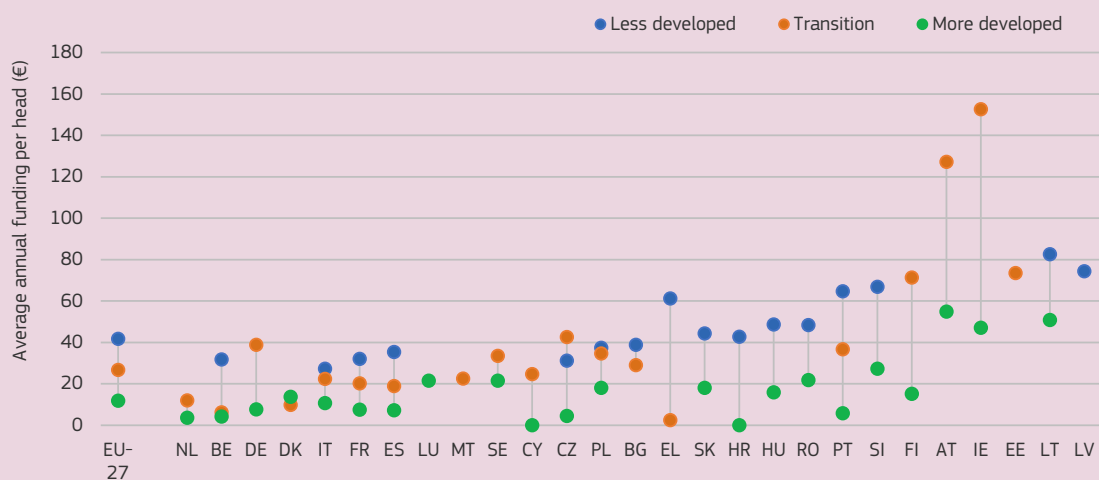
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It helps rural areas in the EU to respond to a wide range of challenges and opportunities that face them in terms of economic, environmental and social development.

The main beneficiaries of the EAFRD are located in the east and south of the EU, though also in Ireland and some regions of France, Finland and Sweden (Map 9.4).

In general, aid intensity under the EAFRD is higher in less developed regions (averaging €42 per inhabitant each year between 2007 and 2020) than in transition regions (€27 per inhabitant) and more developed regions (€12) (Figure 9.4). Aid intensity under the first pillar of the CAP is much higher, and it is highest in transition regions (€119 per inhabitant), followed by less developed regions (€103) and more developed regions (€52) (Figure 9.5).

Figure 9.4 EAFRD average aid intensity, 2007-2020



Source: DG AGRI, Eurostat and DG REGIO calculations.

Figure 9.5 CAP average aid intensity, 2007-2020



Source: DG AGRI, Eurostat and DG REGIO calculations.

(in Poland) helped students to choose suitable courses, increased co-operation of vocational education and training (VET) schools with employers, and improved teachers' competences in advising on career choices. In Mecklenburg-Vorpommern in Germany, measures to facilitate the transition from education into work involved local entrepreneurs identifying suitable companies for visits and work placement, so helping students discover whether occupations fitted their skill-sets and interests.

In Marche (in Italy) the technical training courses that were supported increased the chances of participants being in employment 12 months afterwards, especially women. In Piemonte too, participation in the VET courses receiving ESF support led to a higher probability of being in work afterwards (up to 20 pp higher than for non-participants).

Support for culture and sustainable tourism

In addition to providing labour market support, significant cohesion policy funding also went into preserving cultural sites and encouraging sustainable tourism. Evaluations have identified a number of instances where support produced positive results. These include investment in safeguarding the archaeological site at Pompei and improving accessibility, which helped to increase visitors by 62% between 2012 and 2019, directly adding some 1.9 million to their number. They also include investment in natural and cultural assets in Świętokrzyskie, which has led to the creation of an integrated network of tourist sites in the region.

Projects to preserve cultural sites and strengthen the cultural heritage have been important in furthering cross-border co-operation too, such as under the Bayern-Czechia Interreg programme and under the Estonia-Latvia programme.

2.5 P05 Europe closer to citizens

Progress in investment and monitoring of key outputs

Unlike the other POs, 'Europe closer to citizens' cannot easily be matched to the thematic objective classification used for the 2014–2020 period. Nevertheless, investment in community-led local development (CLLD), support for integrated territorial investment (ITI) and other territorial measures relating to urban regeneration in particular, which form a large part of this PO and which were funded under various thematic objectives, can be tracked.

Overall EU support amounting to €31 billion from the ERDF, ESF and CF is estimated to have been devoted to the Europe closer to citizens PO for the period — just under 10% of the overall cohesion policy budget.

At the end of 2020, projects selected under this objective entailed EU funding of €27.5 billion, 11% less than the amount allocated, while an estimated €12 billion, 39% of the allocation, had been spent on investment. This is less than in the case of the other POs, reflecting the fact that much of the investment concerned involves mobilisation of local communities and/or the formulation of development plans involving a number of different sectors or aspects, which tend to increase the time needed for carrying it out.

The common indicators show that 15.2 million square metres of open space had been created or rehabilitated through the investment undertaken up to end-2020; and that if the projects selected are completed and deliver what they plan, this will be increased to 53.4 million by the end of 2023 (Table 9.5). They also show that, although the buildings constructed or renovated in the urban areas supported amounted to only 30% of the target in terms of the space involved, the target will be exceeded if the projects selected are completed.

Evaluation findings

Support for urban development and regeneration

A deliberate effort was made in the 2014–2020 programming period both to involve local communities in the design and implementation of measures to develop and regenerate urban areas, and to make them more socially inclusive. At the same time, a conscious attempt was made to ensure that the measures concerned were properly integrated into a development strategy which took explicit account of the interaction between measures and the potential complementarity, and reinforcing nature, of their effects. Two cross-cutting instruments were created as part of these efforts: CLLD and ITI. Because of the nature of the investment concerned and the long timescale over which their results are likely to become visible, there is limited evidence so far on their effects. Nevertheless, a number of evaluations have indicated that they have been implemented successfully in many places across the EU.

For example, in Poland, local development strategies in Podlaskie were found to have been formulated with the close involvement of local people and organisations, and that many who had not previously applied for EU funding had submitted projects for CLLD funding, with a focus on how their projected results would further the overall strategy. In Świętokrzyskie, the ITI approach to policy-making in respect of investment in natural and cultural assets was found to have worked efficiently and effectively and to have helped increase the attractiveness of the areas concerned, reduc-

ing the pace of the decline in biodiversity and increasing the opportunities for tourism.

In the Netherlands, the ITI approach in Amsterdam, the Hague, Rotterdam and Utrecht has led to the closer integration of social with economic aspects of policies and increased co-operation between municipalities, schools and companies; while in Bretagne it has helped to improve co-operation between the regional council and local people and organisations on the ground.

Evaluations carried out in 2014–2020 of the effects of integrated urban development strategies financed by the ERDF in the 2007–2013 period also show positive results. In Lubelskie, again in Poland, the regeneration projects funded increased the attractiveness of the areas redeveloped as places to live, work and invest. In Romania, the investment financed helped to improve public spaces, stimulate economic and social activity, reduce traffic congestion and increase traffic safety, raise visitor numbers, revitalise cultural life, and develop new social services.

Support for cross-border co-operation at local level

In a number of cases, the measures funded led to increased co-operation between local bodies in different Member States and wider involvement of local people in decision-making, so laying the basis for more inclusive and effective policies.

Under the Bayern–Czechia Interreg programme, for example, the projects supported led to increased institutional co-operation and networking across

Table 9.5 ‘Europe closer to citizens’ indicators: 2023 targets and achievements up to end-2020

	2023 target	Selected projects	Implemented, number and % of target
Population living in areas with integrated urban development strategies	42 695 000	44 714 000	25 279 000 (59%)
Open space created or rehabilitated in urban areas (sq. metres)	39 910 000	53 427 000	15 221 000 (39%)
Public or commercial buildings built or renovated in urban areas (sq. metres)	2 403 000	3 075 000	716 000 (30%)

Source: Cohesion Open Data — <https://cohesiondata.ec.europa.eu/d/aesb-873i>

the border at the local level. The same is true of measures financed under the Czechia-Poland Interreg programme, which also increased long-term co-operation between local bodies on the two sides of the border.

3. Interreg

The sections above include the Interreg programmes financed under the European transnational co-operation objective, under which funding was also allocated to the 11 thematic objectives which cohesion policy was aimed at pursuing. In total, some €10.1 billion went to Interreg over the 2014–2020 period, around two thirds going to regional cross-border programmes, the rest going to transnational and inter-regional programmes (Map 9.5).

The indicators for the expenditure funded under the Interreg programmes show that in many cases the targets to be achieved by 2023 had already been reached by the end of 2020, which suggests perhaps that these could have been set at a more ambitious level (Table 9.6). Almost 25 000 enterprises had, therefore, received support to co-operate with firms in neighbouring Member States, substantially above the 2023 target, while over 11 000 research institutes had similarly been involved in cross-border co-operation (around five times the target) and over twice as many young people had participated in cross-border youth

schemes as targeted. On the other hand, only around half the target number of people had participated in cross-border labour mobility measures — though given that there are another three years to go before expenditure needs to be completed, the target remains in reach.

4. Macro-economic impact of funding

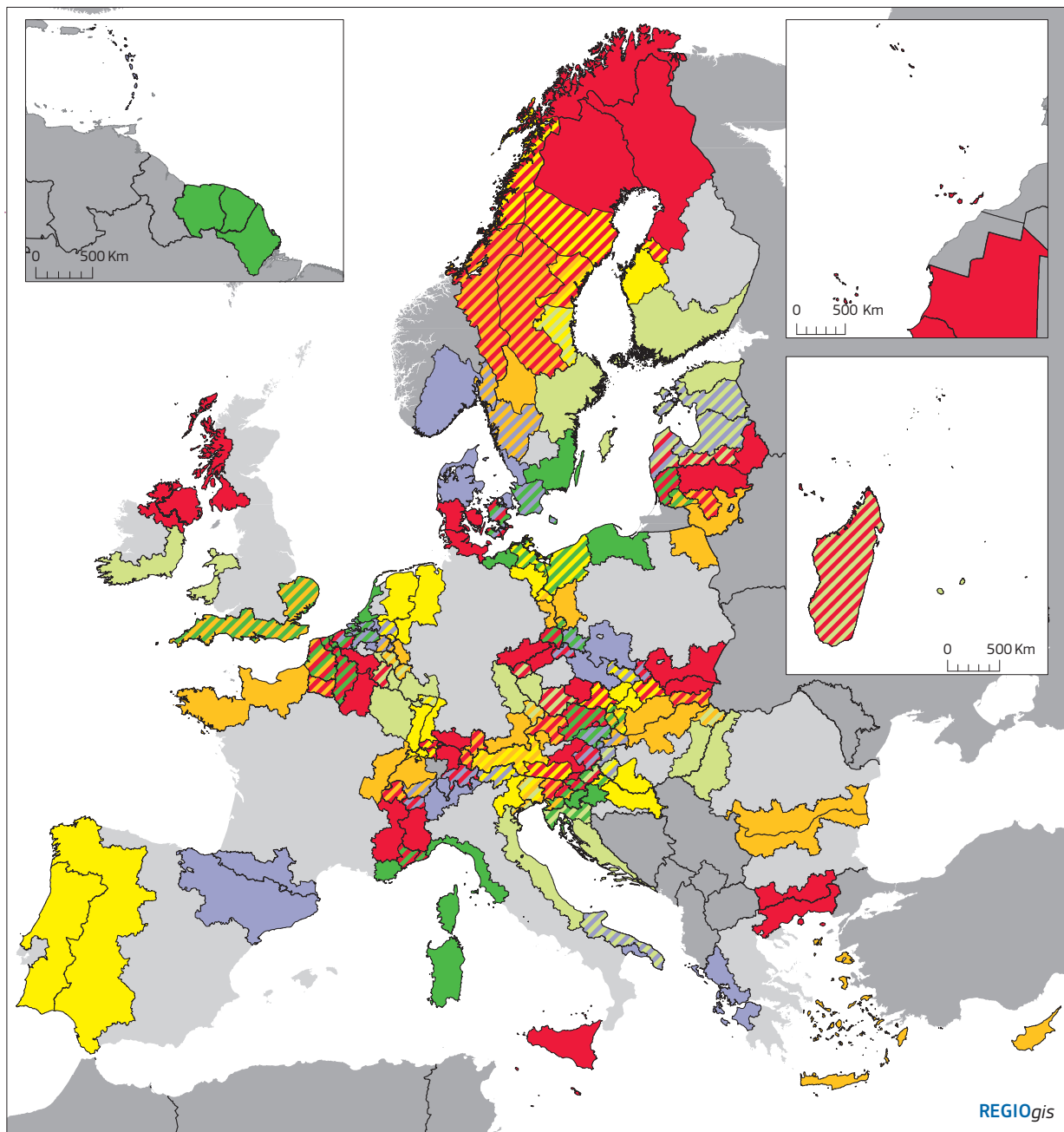
Assessing the impact of cohesion policy at macro-economic level is particularly challenging. Monitoring data obtained from the programmes generally concern the output or, at best, the outcome of the interventions but they cannot provide information on their net overall impact on the economy. The programmes produce many direct, but also indirect, economic effects that are difficult to estimate, not least because of the interaction between them.

For instance, output and employment may increase in the SMEs supported, but at the same time they may decrease elsewhere, due to the firms assisted becoming more competitive than others and taking market shares away from them. In net terms, therefore, there may be little overall increase in output, or at least one which is much smaller than the direct effects indicate. Cohesion policy also generates important spill-over effects and externalities outside the economies in which the investment takes place. For example, invest-

Table 9.6 Interreg indicators: 2023 targets and achievements up to end-2019

	Target value (number)	Implemented values (number)	Implemented relative to target (%)
Firms engaged in R&D cross-border co-operation	10 319	24 879	241
Research Institutes involved in cross-border cooperation	2 265	11 206	495
Participants in cross-border labour mobility measures	194 080	132 629	68
Participants in cross-border labour and training programmes	65 740	108 282	165
Participants in cross-border inclusion measures	31 900	15 771	49
Participants in cross-border youth schemes	62 761	147 535	235

Source: Cohesion Open Data <https://cohesiondata.ec.europa.eu/d/aesb-873i>



Map 9.5 ERDF Cross-border cooperation programmes, NUTS 3 regions, 2014–2020

This map shows the areas of the cross-border programmes co-financed by the ERDF. Each programme area is shown with a specific colour. Hatched areas are part of two or more programme areas simultaneously.

Source: DG REGIO.

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ment implemented in the main recipient Member States boosts local demand, which is partly met by exports from other Member States — notably from the more developed Member States, which therefore indirectly benefit from the policy. Equally, the projects funded may require equipment or other inputs produced in the latter Member States, which adds to their exports and so to GDP.

In the recipient Member State, cohesion policy funding generates short-term (mostly demand-side) and long-term (supply-side) effects. Whereas the former principally emerge during the implementation of the programmes, the latter are likely to build up progressively over time and last long after the expenditure involved has come to an end.

At the same time, cohesion policy must be financed, and the cost involved (in terms of the taxes or other charges levied) also needs to be taken into account when assessing the overall impact of the policy.

Macro-economic models can take explicit account of the above issues in a consistent and comprehensive way, and so are well suited to assessing the global impact of cohesion policy. In the following, a model developed by the European Commission's Joint Research Centre (JRC) in collaboration with DG REGIO (RHOMOLO¹¹) is used to assess the impact of the 2014–2020 programmes on the economies of the NUTS 2 regions across the EU.

4.1 2014–2020 cohesion policy programmes

In the past few decades, funding for cohesion policy has been the second largest item in the EU budget, accounting for around a third of the MFF. For the 2014–2020 period, it amounted to €355 billion (at current prices), as indicated above. This corresponds to around 0.3% of EU GDP, but

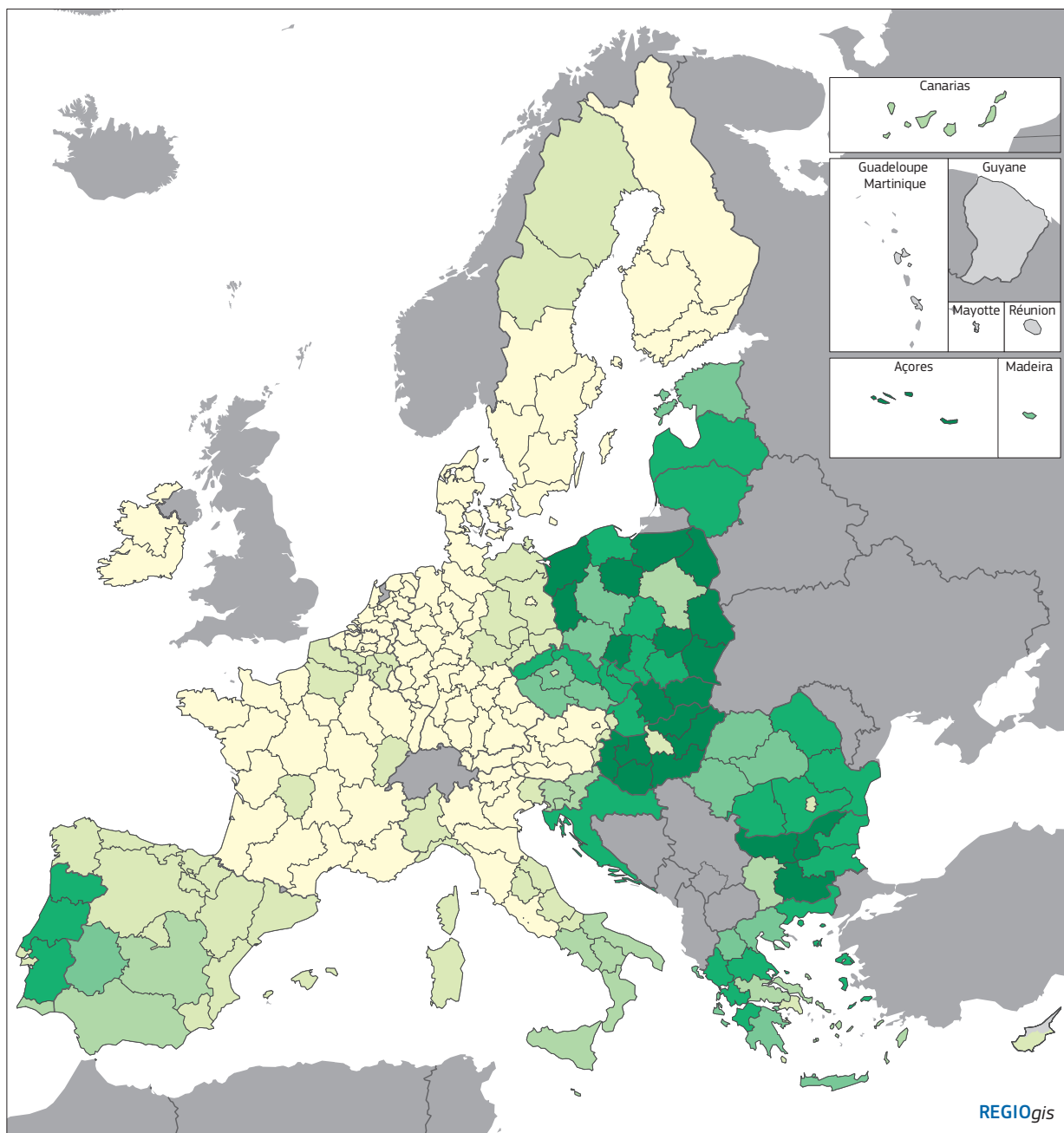
in some of the main recipient Member States and regions the figure is very much higher, financing a substantial part of public investment (as noted in Chapter 8 above).

Funding mainly goes to the less developed regions and Member States. In some Member States, it represents more than 2% of GDP per year on average in the period, the highest being 2.5% in Croatia. For some less developed regions, such as in Região Autónoma dos Açores in Portugal or Észak-Alföld in Hungary, the funding provided is even larger, amounting to over 3.5% of GDP per year on average (Map 9.6).

Cohesion policy investment is concentrated on key areas of intervention for fostering growth and development. For the purpose of the present analysis, cohesion policy funding is regrouped into six areas, as follows.

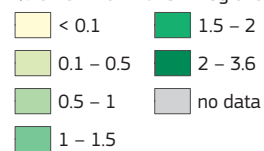
- **Investment in transport infrastructure** (TRNSP), which generates demand-side effects in the short run in the form of the purchase of goods and services required to build the infrastructure. On the supply side, it reduces transport costs and stimulates trade flows.
- **Investment in other infrastructure** (in telecommunications, energy, environmental, health and social infrastructure — INFR), which is modelled as public investment when it affects business operations, or as government consumption otherwise. The former generates supply-side effects, since it tends to reduce the cost of production or facilitates increases in productivity, whereas the latter only produces short-term demand-side effects.
- **Investment in human capital** (in education and vocational training and active labour market policies — HC), which are assumed to increase government current expenditure in the short run. On the supply side, some of this investment is assumed to increase labour productivity through education and training, while the other part (active labour market policies especially) is assumed to increase labour supply.

11 RHOMOLO is a dynamic spatial computable general equilibrium (CGE) model. Its purpose is to enable the analysis of investment and structural reform scenarios. Its economic foundations are based on the well established literature on general equilibrium models. RHOMOLO has featured in numerous articles contributing to this literature (see for instance Lecca et al., 2020, and Di Pietro et al., 2020).



Map 9.6 Cohesion policy allocation, 2014–2020

% of GDP of NUTS 2 regions (yearly average)



Source: DG REGIO.

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- **Investment in R&D** (support to RTDI, establishment of networks and partnerships between businesses and research centres — RTD), which is assumed to stimulate private investment leading to an increase in total factor productivity (TFP).
- **Aid to the private sector** (support to SMEs, provision of credit, funding to improve tourist and cultural sites, facilities and activities — AIS), which is assumed to increase private investment through a reduction in the cost of capital, but without any TFP effects¹².
- **Technical assistance** (support for administrative capacity-building, monitoring and evaluation — TA), which is modelled as an increase in public current expenditure on goods and services, with no supply-side effects.

The distribution of funding across the areas of interventions varies from one region to another, reflecting the policy mix resulting from the programme design. In general, the share of funding allocated to transport and other infrastructure is larger in the less developed regions and Member States, while the most developed ones devote a larger share to support of R&D, aid to the private sector and investment in human capital. For instance, in Romania over 62% of funding is allocated to investment in transport and other infrastructure, whereas in the Netherlands only 12% goes to this and 82% is allocated to RTD and human capital (Table 9.7).

4.2. Impact of 2014–2020 cohesion policy

The model simulations suggest that cohesion policy in 2014–2020 had an increasingly positive effect on EU GDP over the period of expenditure, reaching a peak in 2021 when GDP is estimated to be 0.4% higher than it would be without it (Figure 9.6). The estimated impact continues to be substantial long after the end of the implementa-

tion period¹³ because of the supply-side effects. In the medium and long run, increases in productivity and in stocks of private and public capital, as well as reductions in transport costs, continue stimulating economic activity and GDP. Even 30 years after the initial investment, GDP is still estimated to be 0.2% higher than it would be if the investment had not taken place.

The estimated impact of the policy shows wide regional variations both at the end of the implementation period (Map 9.7) and in the longer term (Map 9.8, which shows the estimated effects 20 years after the programmes come to an end). This reflects differences in the scale of funding regions received, the fact that the policy mix varies markedly from one region to another (even within the same Member State), and the features of the regional economies themselves — including how they are placed to benefit from spill-over effects (which also affect the magnitude of the policy impact).

During the implementation period, the impact is mainly the result of demand-side effects from increased investment and consumption, whereas after the programmes come to an end the impact comes solely from the supply-side effects on labour and total productivity, reductions in transport costs, and the increased private and public capital stocks.

In the short run, the impact of the policy is largest in the main recipient regions (i.e. in those in eastern Europe, Portugal and the south of Spain). By the end of the implementation period, GDP in Croatia, Latvia and Lithuania is, respectively, some 5%, 4% and 3% higher than in a scenario without cohesion policy. At the regional level, the impact of the policy is highest at more than 5% in the Hungarian regions of Észak-Alföld and Dél-Alföld and the Portuguese Região Autónoma dos Açores. There are also significant differences between regions within Member States, such as in Hungary (where the estimated impact on GDP ranges from 1.1% to 5%), in Poland (from 1.5% to 3.9%), in

12 Some categories of intervention classified as AIS are considered as public consumption, as they are not likely to affect investment decisions.

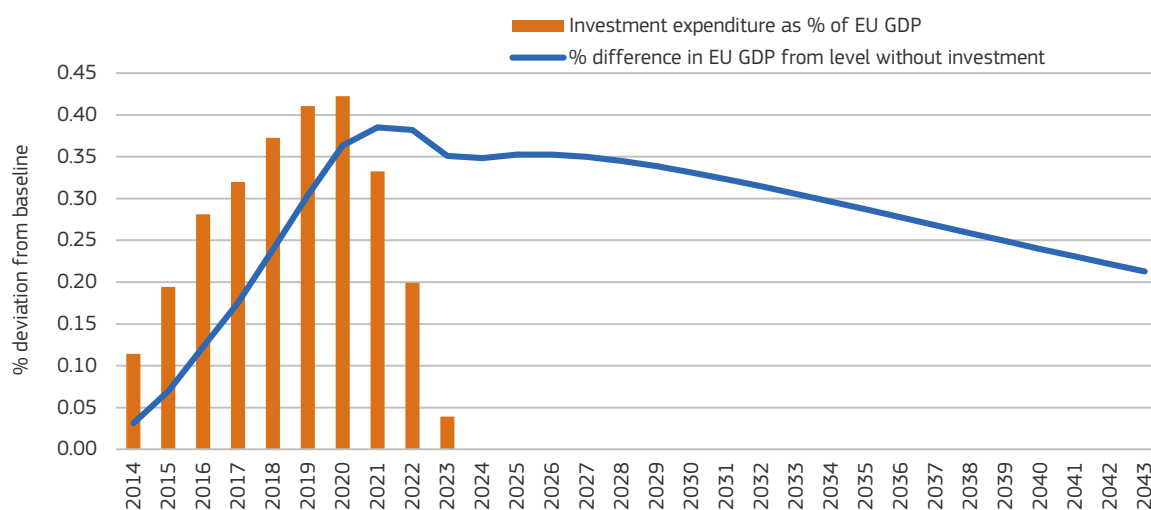
13 The N+3 rule allows funds to be used up to three years after they have been committed, which implies that the period during which programmes are actually implemented runs from 2014 to 2023.

Table 9.7 Cohesion policy allocation by area of intervention, 2014–2020

% of total	RTD	AIS	TRNSP	INFR	HC	TA	Total
AT	26.3	15.2	4.2	16.0	34.0	4.4	100
BE	20.1	8.3	4.2	17.2	47.1	3.1	100
BG	11.3	7.0	24.9	33.6	19.5	3.7	100
CY	9.1	12.8	14.8	36.1	24.0	3.2	100
CZ	16.6	3.3	27.9	31.4	16.8	3.9	100
DE	27.4	7.0	3.2	20.3	38.5	3.6	100
DK	41.2	0.5	2.3	6.2	45.0	4.7	100
EE	22.9	6.7	15.3	35.7	16.5	3.0	100
EL	7.8	15.7	16.9	30.0	26.0	3.6	100
ES	16.1	10.9	9.6	30.5	31.1	1.9	100
FI	39.5	13.3	2.7	5.6	35.3	3.5	100
FR	19.5	6.1	4.3	23.0	43.3	3.8	100
HR	9.1	16.0	15.1	37.6	18.1	4.0	100
HU	10.4	15.0	17.6	33.4	22.2	1.6	100
IE	6.8	2.0	0.9	39.4	48.7	2.1	100
IT	12.4	15.4	10.1	24.7	34.0	3.3	100
LT	17.1	3.0	15.4	42.9	18.5	3.1	100
LU	9.8	0.1	4.2	9.0	74.6	2.3	100
LV	14.7	6.5	27.8	33.1	15.5	2.4	100
MT	9.1	7.0	16.6	45.6	18.8	2.8	100
NL	39.7	1.7	0.5	11.6	42.2	4.3	100
PL	14.1	4.2	35.8	26.8	15.8	3.3	100
PT	19.9	12.3	7.5	22.8	34.8	2.7	100
RO	4.8	8.7	29.6	32.7	20.9	3.3	100
SE	31.6	8.4	5.7	10.2	39.8	4.3	100
SI	23.7	4.3	12.2	32.5	23.3	4.0	100
SK	9.8	7.8	27.2	32.4	18.8	4.1	100
EU-27	14.7	8.9	19.8	28.3	25.1	3.2	100

Source: DG REGIO

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Figure 9.6 Impact of cohesion policy investment, 2014–2020, on EU GDP, 2014–2043

Source: RHOMOLO.

Romania (from 1.8% to 2.9%) and in Portugal (from 0.6% to 5.2%).

The impact is less, and in some cases negative, in the more developed regions, reflecting the small amount of funding received relative to GDP and the fact that they are responsible for financing a large share of the investment concerned. However, in the longer run the impact becomes positive everywhere. After the end of the implementation period, there is no longer any expenditure, and so no longer any taxes or charges to levy to fund this, but the positive supply-side effects continue.

The policy also gives rise to large spatial spill-over effects, in the sense that the investment undertaken in one region has an impact on other regions as well, notably through trade flows. These effects tend to be larger for small open economies with narrow industrial and R&D bases, where many goods and services critical for the implementation of cohesion policy programmes — and their economic development — are not produced domestically but need to be imported. The policy helps to accelerate development in these economies, which leads to higher levels of imports of a wide range of goods and services from their more advanced trading partners, which accordingly tends to increase their GDP¹⁴.

Two major points emerge from the model simulations.

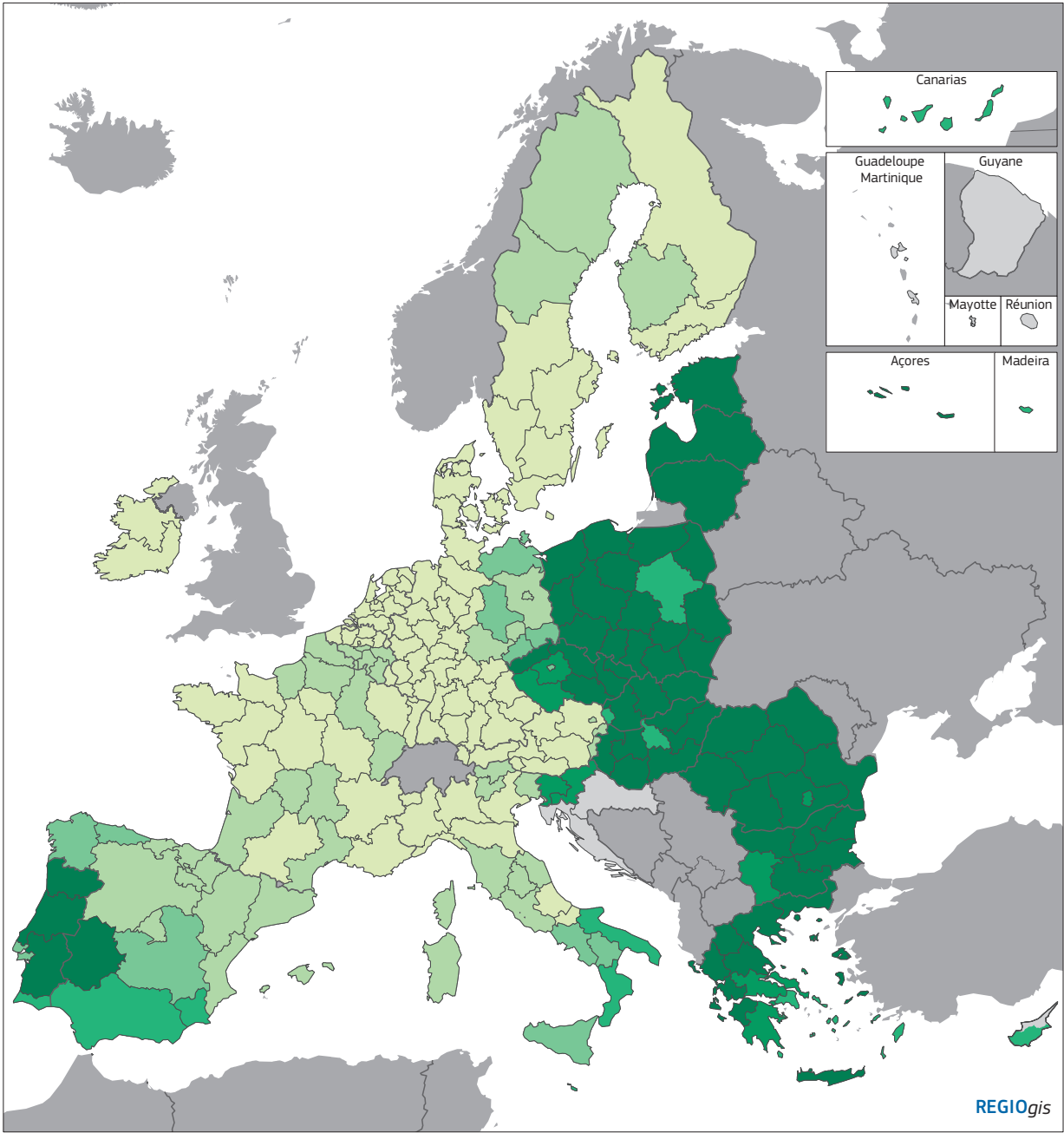
- Overall, the impact of cohesion policy on GDP in EU regions is negatively correlated, if only weakly, with their level of GDP per head (correlation coefficient -0.15). This implies that cohesion policy tends to produce a disproportionately large effect in the less developed regions of the EU, in line with the policy's mandate to reduce regional disparities.

- In the long run, all regions in the EU benefit from the policy, which indicates that the policy gives rise to a positive-sum game, or win-win situation.

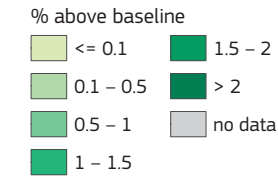
The policy, therefore, represents good value for money. The overall long-term impact on GDP of each €1 spent when all of the effects materialise is both positive and significant. The cumulative increase in EU GDP from the investments funded by cohesion policy is less than the cumulative amount of funding allocated to the policy in the short term (i.e. the benefits are estimated to be smaller than the costs). But after the programmes come to an end and there are no longer any costs being incurred, the benefits continue and begin to outweigh the costs, increasingly so as time goes on. It is estimated that 15 years after the end of the implementation period, each €1 spent on the policy will have generated €2.7 of additional GDP at EU level, which corresponds to a rate of return of around 4% per year¹⁵.

14 Monfort and Salotti (2021) analyse the spatial spill-overs generated by the 2007–2013 cohesion policy programmes, with a focus on those generated in the net beneficiaries and spilling over to the policy net contributors. They find that in the long run around 15% of the policy impact on EU GDP is due to international spill-over effects between Member States. On average in the more developed Member States (those not eligible for the CF) around 45% of the impact is due to the programmes implemented in the main beneficiaries.

15 The details of the model simulations can be found in Crucitti et al. (forthcoming).



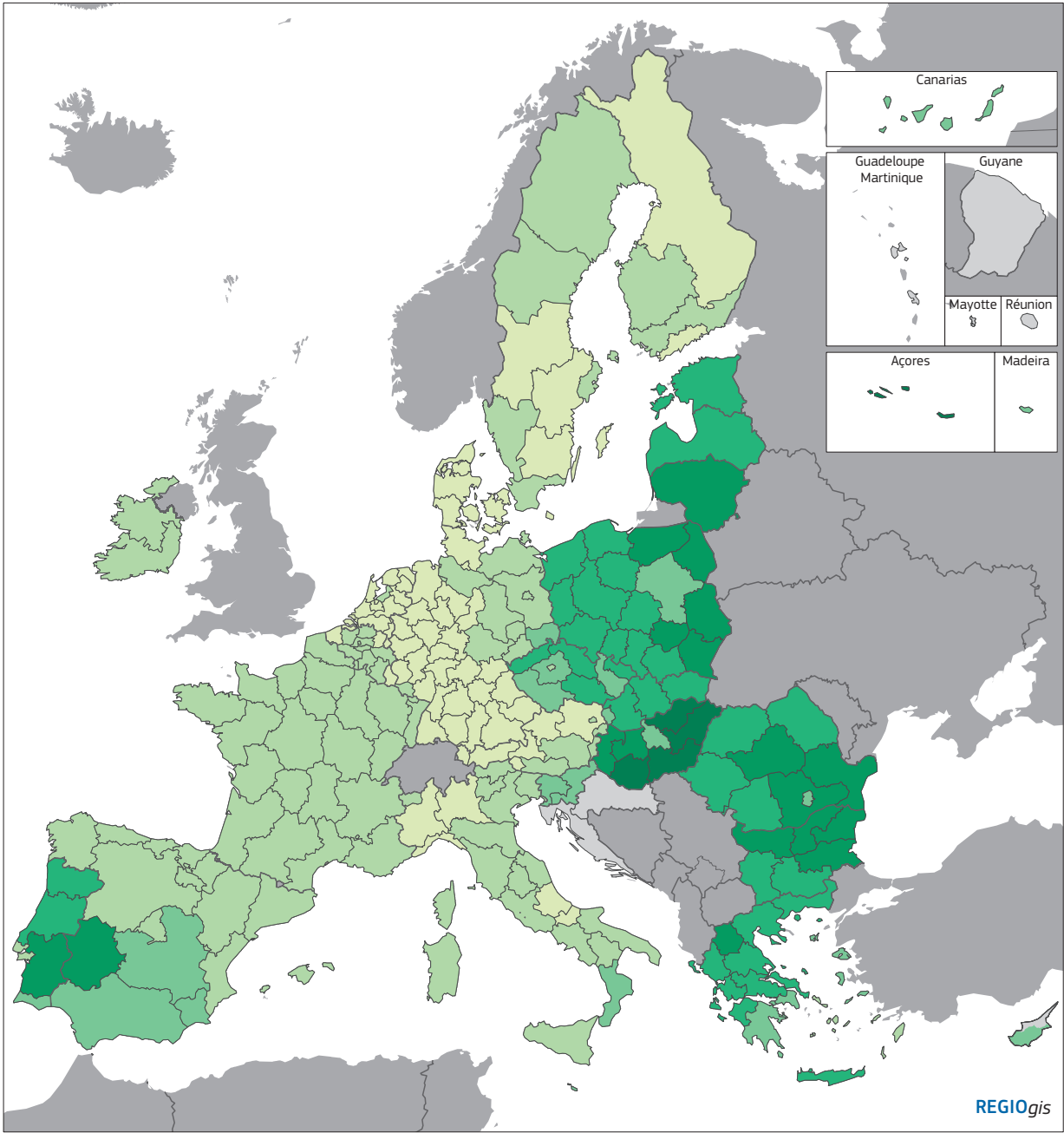
Map 9.7 Impact of the 2014–2020 cohesion policy programmes on GDP in 2023



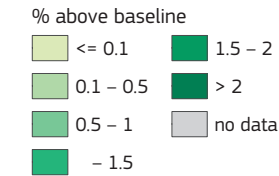
Source: RHOMOLO.



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Map 9.8 Impact of the 2014–2020 cohesion policy programmes on GDP in 2043



Source: RHOMOLO.



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