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PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL
COMMITTEE AND THE COMMITTEE OF THE REGIONS**

on the 8th Cohesion Report: Cohesion in Europe towards 2050

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CHAPTER 2. A SMARTER EUROPE – PART 1

- After the financial and economic crisis years and its aftermath, the EU economy is growing again, with growth being particularly high in low-income countries.
- 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 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 was less 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.

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CHAPTER 2. A SMARTER EUROPE – PART 1

Regional economic convergence¹ has stopped in the EU and divergence could become a threat to economic progress (Iammarino et. al., 2017) at a time when globalisation poses new challenges to economic cohesion. While 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, 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 to cities.

2.1 RECENT TRENDS IN CONVERGENCE AND DIVERGENCE BETWEEN EU MEMBER STATES AND REGIONS

In 2019, over one in four people in the EU (29%) lived in a NUTS 2 region with GDP per head below 75% of the EU average in PPS terms², most of them in eastern Member States³, Greece, Portugal, Spain, and southern Italy as well as in the outermost regions⁴ (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 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% a 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 States⁵, 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

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

² 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.

³ Eastern Member States are those in central and eastern Europe, which have joined the EU since 2004.

⁴ The EU includes nine Outermost Regions: Guadeloupe, La Réunion, Mayotte, Guyane, Martinique, Saint-Martin (France), Madeira and Açores (Portugal) and Canarias (Spain).

⁵ See the Lexicon section for the list of less developed and moderately developed Member States.

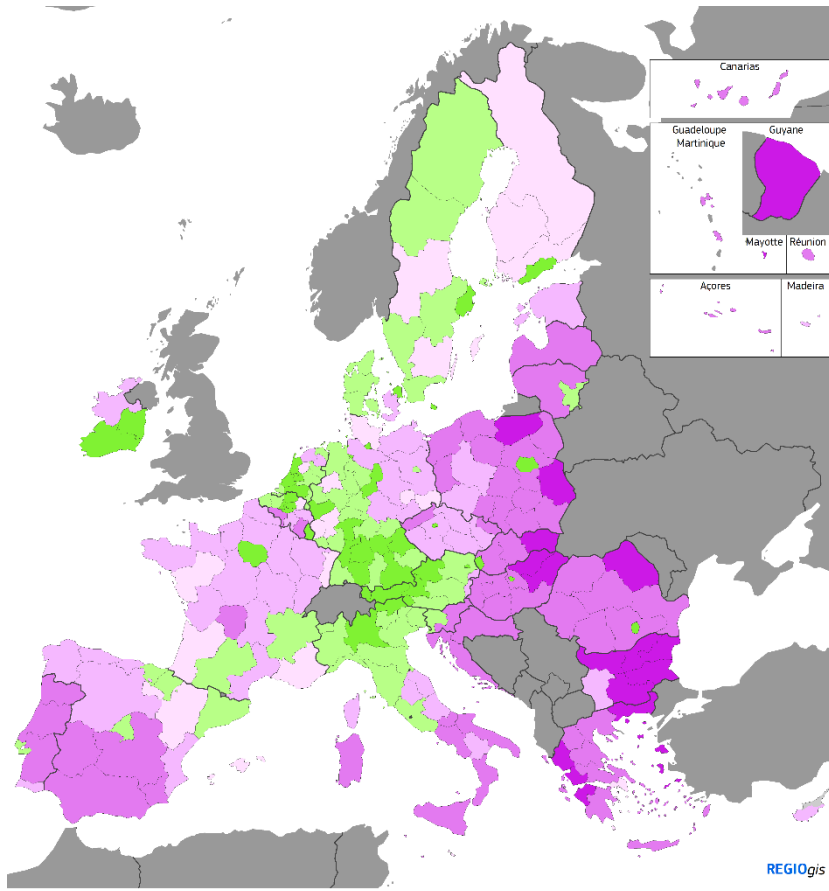
up was not uniform across the country but was driven by the capital city region. Regions in southern Italy, however, did not follow this pattern of catching-up. They already experienced negative growth in the 2000s even though their GDP per head was well below the EU average.

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% a year. The crisis led to many of the less developed and transition regions growing more slowly (or shrinking faster) 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 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, more than a quarter of the EU population live in a region where by 2019 real GDP per head 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.

Map 2-1 GDP per head (PPS), 2019



GDP per head (PPS), 2019

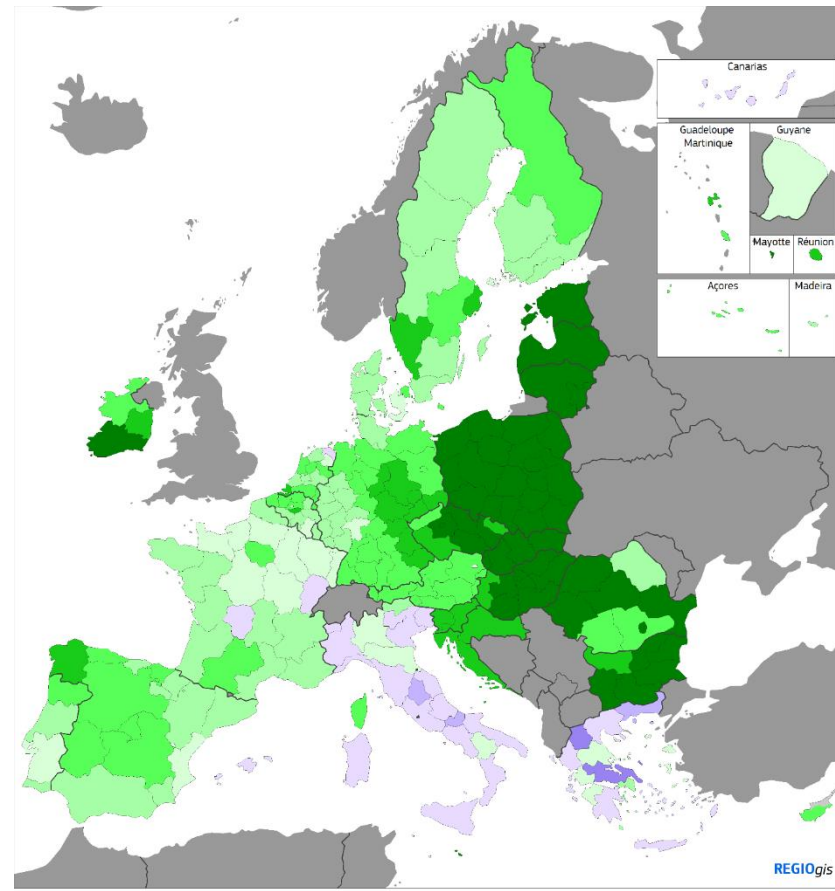
- Index, EU-27 = 100
- < 50
 - 50 - 75
 - 75 - 90
 - 90 - 100
 - 100 - 125
 - >= 125

Source: Eurostat (nama_10r_2gdp)

0 500 Km

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Map 2-2 Growth of GDP per head, 2001-2019



Growth of GDP/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 in real terms between 2001-2019, main sub-periods

Growth of GDP per head between 2001-2019, main periods

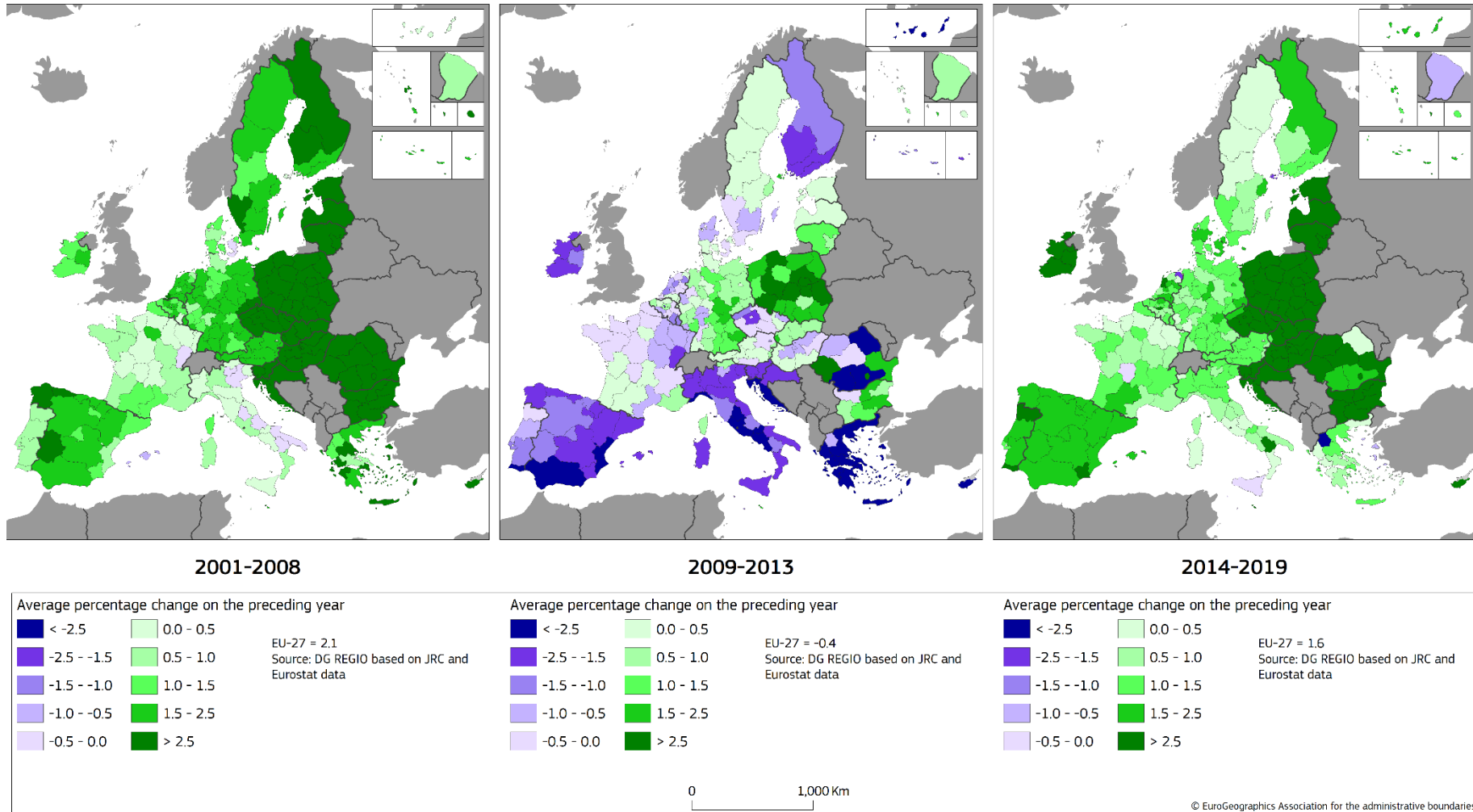
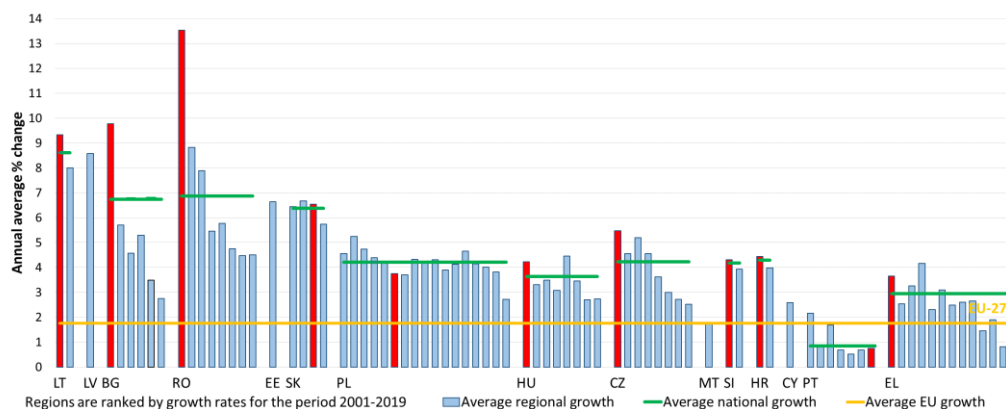


Figure 2-1: Growth rates of GDP per head in regions in less developed and moderately developed Member States, 2001-2008

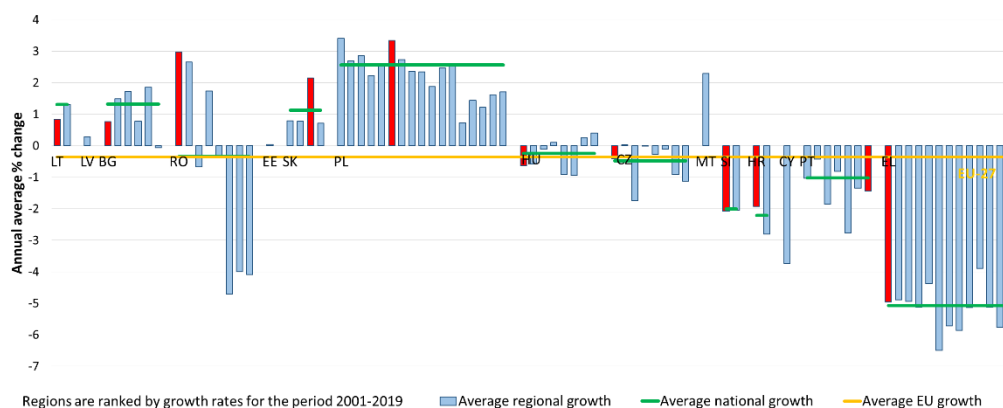


Note: Regions are ranked by the growth rate of GDP per head over the period 2001-2019;

Capital city regions are indicated in red

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

Figure 2-2: Growth rates of GDP per head in regions in less developed and moderately developed Member States, 2009-2013

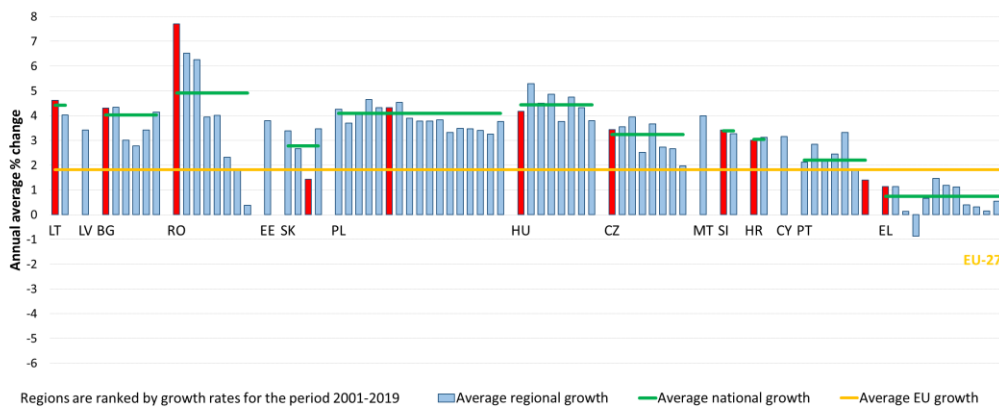


Note: Regions are ranked by the growth rate of GDP per head over the period 2001-2019;

Capital city regions are indicated in red.

Source: ARDECO and Eurostat, DG REGIO calculations

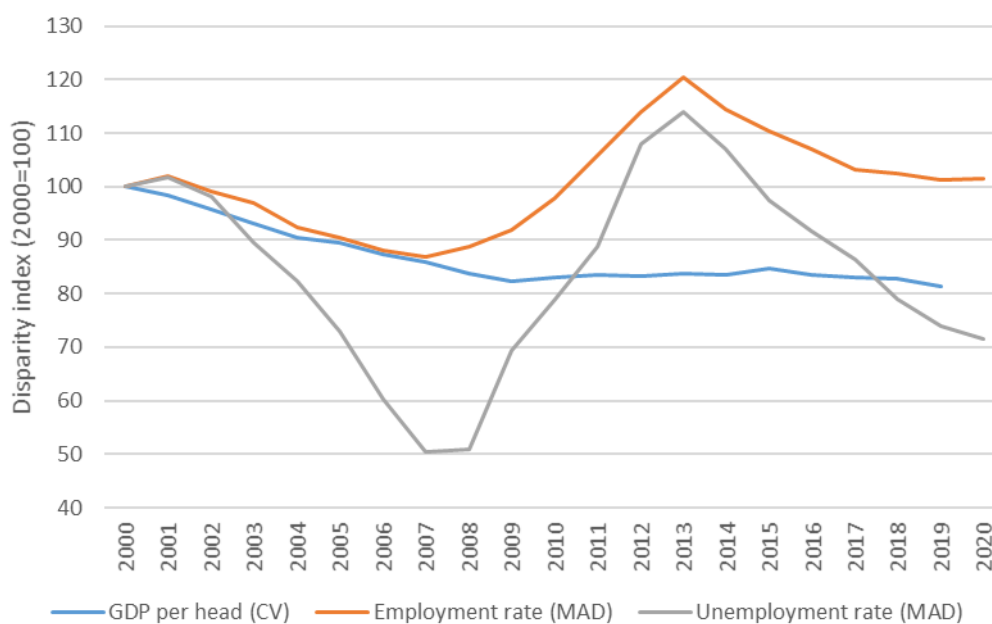
Figure 2-3: Growth rates of GDP per head in regions in less developed and moderately developed Member States, 2014-2019



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

Prior to the 2007-2008 crisis, disparities in GDP per head in the EU were shrinking⁶, 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.

Figure 2-4: Regional disparities between NUTS-2 regions in the EU, 2000-2020



⁶ The coefficient of variation, weighted by total regional population, fell by 12% during 2001-2008

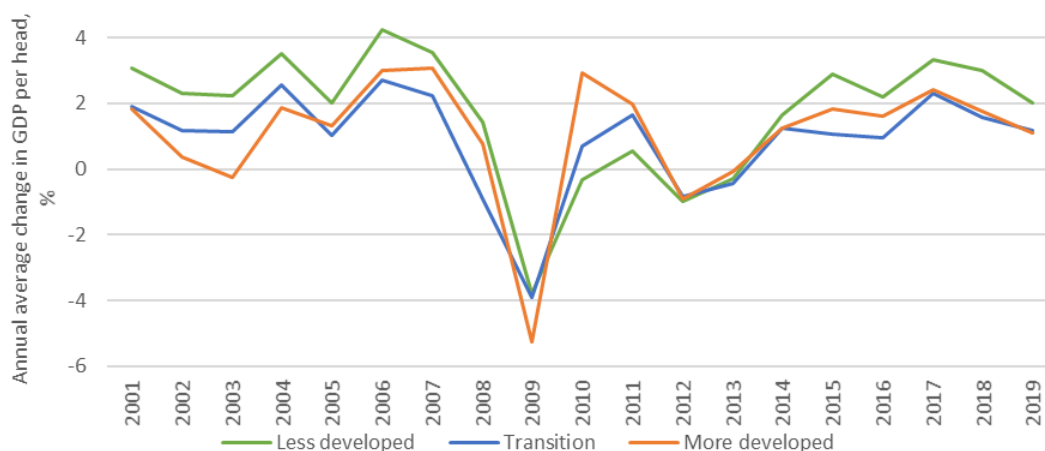
Note: Disparities are measured by the coefficient of variation (CV) and the mean absolute deviation (MAD). Both are weighted by the population in each region. The analysis is based on the NUTS2 level but regions which are part of the same metropolitan area are combined.
Source: Eurostat [nama_10r_2gdp, reg_lmk], DG REGIO calculations.

Regional disparities in employment and unemployment rates⁷ also narrowed from 2000 up to the financial crisis when they widened to reach a new peak in 2013. After then, they 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 diverging away from the EU average (Section 2.3 below examines on 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).

Figure 2-5: Growth of GDP per head in real terms by level of development, 2001-2019

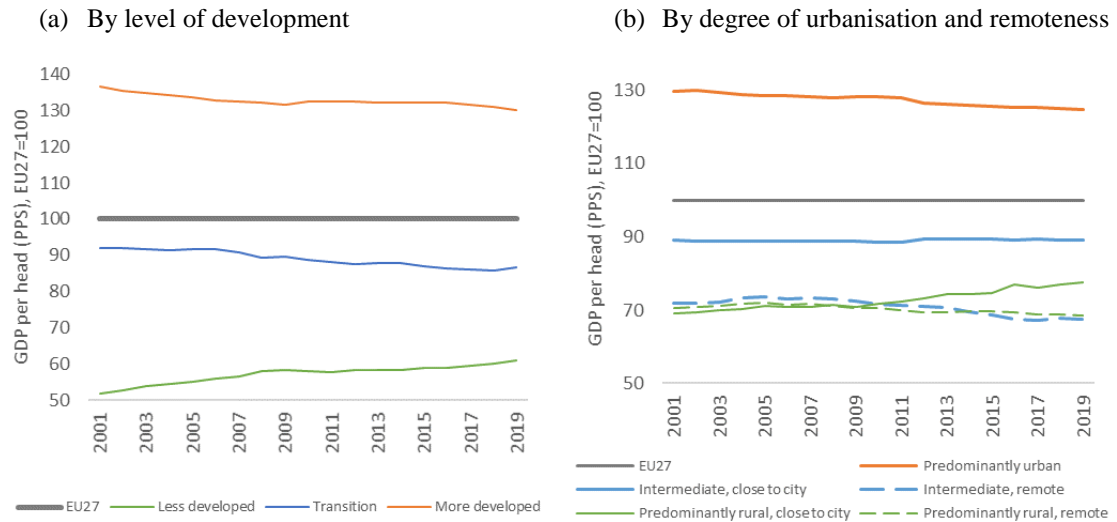


Source: ARDECO and Eurostat, ARDECO, DG REGIO calculations

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, however, not hold for remote rural regions where GDP per head slightly decreased relative to the EU. Remote intermediate regions also diverged from the EU average over this period.

⁷ As measured by the mean absolute deviation weighted by total regional population.

Figure 2-6: Changes in GDP per head (PPS), 2000-2019



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

The growing interdependence of the world’s economies has had a highly differentiated impact on EU regions⁸. While 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).

⁸ European Commission (2017)

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 lowest GDP per head in the EU. GDP per head is also low in Guyane (45% of the EU average) and Reunion (68%). The low GDP per head in these three regions is primarily linked to low employment rates and, in the case of Guyane and Mayotte, also to low productivity per worker. Productivity is also low in Madeira and Açores. The share of working-age in 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), 2019	Productivity (GDP per worker), 2019	Employment rate (% of total population aged 20-64), 2019	Working age population (% aged 20-64 in total population), 2019
EU-27	31,278	72,057	73.1	59.4
Canarias	22,928	57,071	61.4	65.4
Guadeloupe ⁽ⁱ⁾	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 (2019)	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

Source: Eurostat [nama_10r_2gdp, lfst_r_lfe2emprrt_custom_1270645], DG REGIO calculations.

⁽ⁱ⁾ The outermost region of Saint-Martin is included in the NUTS2 region of Guadeloupe.

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

A recent study (Annoni et al., 2019) 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 EU27 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:

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 (LeSage and Fischer, 2008). 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 development (Annoni and Catalina-Rubianes, 2016; Pike et al., 2017). 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.

Table 2-2: Summary of direct and spill-over effects

	North-western regions		Southern and eastern regions	
	Direct	Spill-over	Direct	Spill-over
GDP growth	Not applicable		Not applicable	
Initial GDP per head				
Public and private investment				
Population growth				
Quality of institutions				
Lower secondary education				
Higher education and training				
Technological readiness				
Business sophistication				

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

2.2 PRODUCTIVITY IN LESS DEVELOPED MEMBER STATES IS CATCHING-UP

2.2.1 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% employment in these regions was in agriculture, three times more than in transition regions and 8 times more than in more developed ones. Around 21% of employment was in industry, 6 percentage points (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 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 work force 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% a 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 region, 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.

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 in less developed regions.

Table 2-3: Employment and GVA by NACE sector and category of region, % shares in 2018 and changes, 2001-2018

	Employment				GVA			
	Less Developed	Transition	More Developed	EU-27	Less Developed	Transition	More Developed	EU-27
<i>Share in 2018 (%)</i>								
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	26.3	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

2.2.1 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 2-2). The increase was largely associated with productivity growth⁹, and to a lesser extent with employment growth. 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 working-age population, so that growth of GDP per head growth 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 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% a year in real terms, with productivity growing by 1.2% a year and an increase in the employment rate adding another 0.4% a 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% a year. Employment also declined (by 0.5% a 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.

Decomposing growth in GDP per head

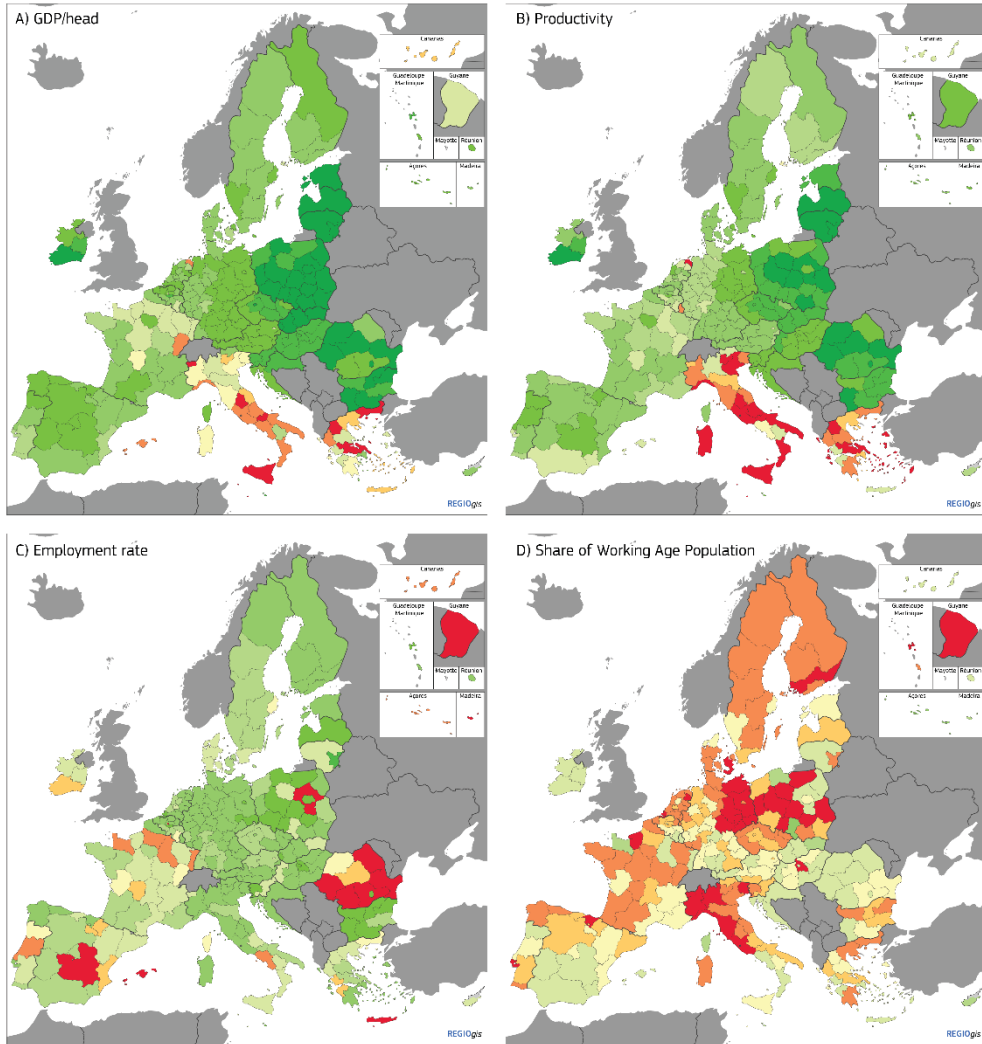
Growth in GDP per head can be broken down into three main components: changes in productivity (GDP per person employed), changes in the employment rate (employment relative to population of working age) and changes in the share of working age population in the total. Accordingly, the following identity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

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

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

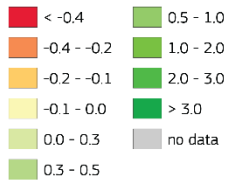
⁹ Note that this productivity growth, as being measured by GDP per person employed, does not reflect the decrease in the average hours worked per person employed during this period.

Map 2-4: Growth of GDP per head, productivity, the employment rate and working-age population, 2001-2019



Decomposition of annual average change in GDP per head, 2001-2019

Average percentage change on the preceding year



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

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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 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.

Table 2-4: Decomposition of annual average change in GDP per head, 2001-2019 and sub-periods

<i>Average % change on the preceding year</i>	GDP/head	Productivity	Employment rate*	Share of working-age population
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

*Workplace-based employment divided by population aged 20-64

Less developed regions exclude Mayotte

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

2.2.2 Capital metropolitan regions perform better than other regions

In 2019, metropolitan (metro) regions accounted for 59% of 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 metropolitan regions also outperformed non-metropolitan 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. 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.

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](http://ec.europa.eu/eurostat/statistics-explained/index.php/Territorial_typologies_for_European_cities_and_metropolitan_regions)

Table 2-5: Changes in GDP per head, productivity and employment per head by type of region, 2001–2019

<i>Average % change on the preceding year</i>	GDP per head	Productivity	Employment relative to population*
Eastern MS			
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 MS			
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 MS			
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

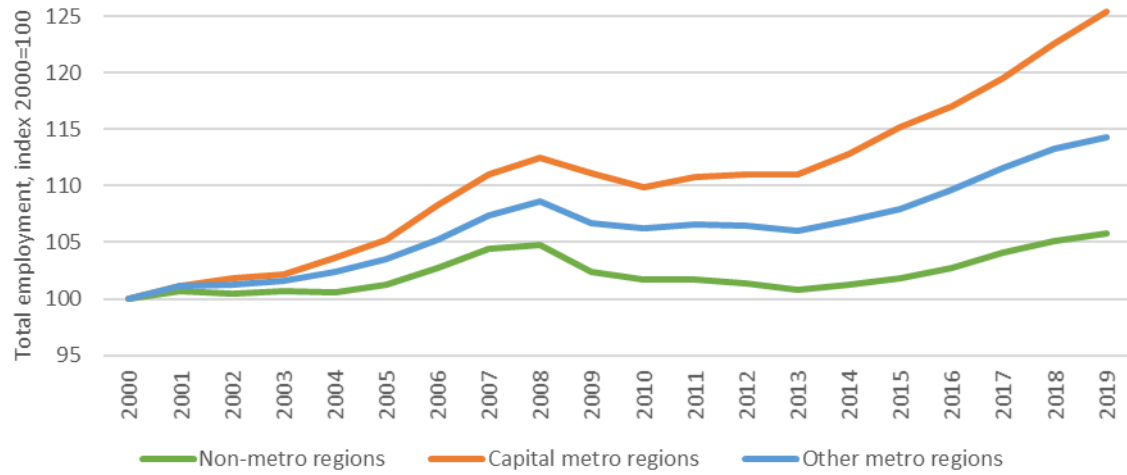
* This combines the employment rate and working-age population as a share of the total

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

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 following 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.

Figure 2-7: Evolution of total employment (number employed) in metro and non-metro regions, 2000-2019, (index 2000=100)



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

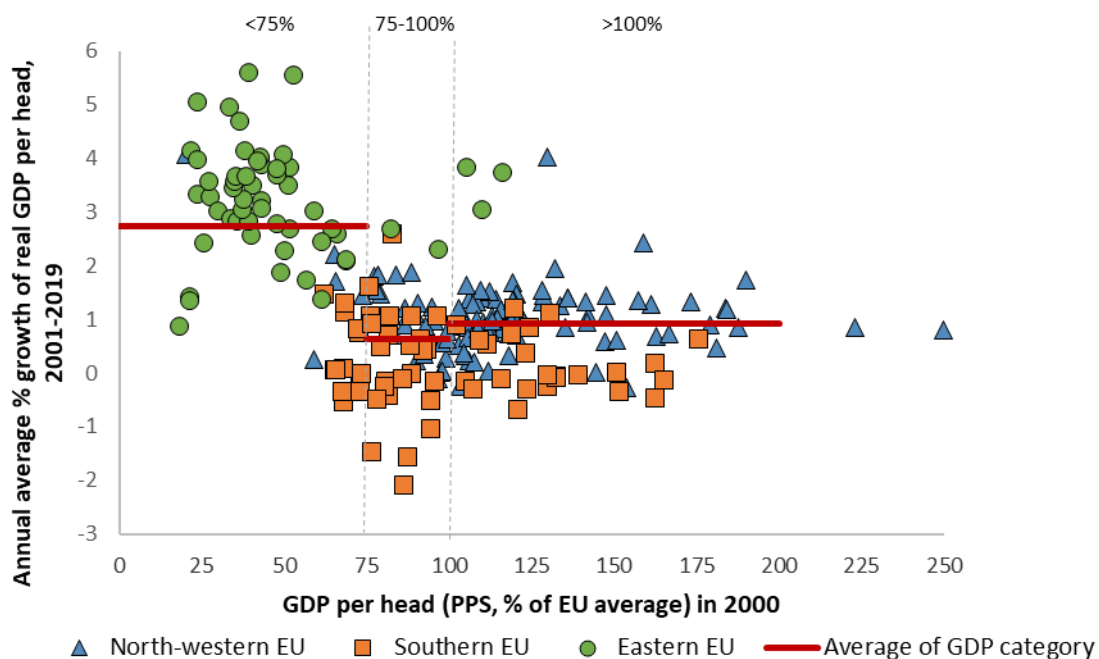
2.3 DEVELOPMENT TRAPS¹⁰ AND RELATED RISKS FOR EUROPEAN REGIONS

2.3.1 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 GDP¹¹, 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).

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

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.

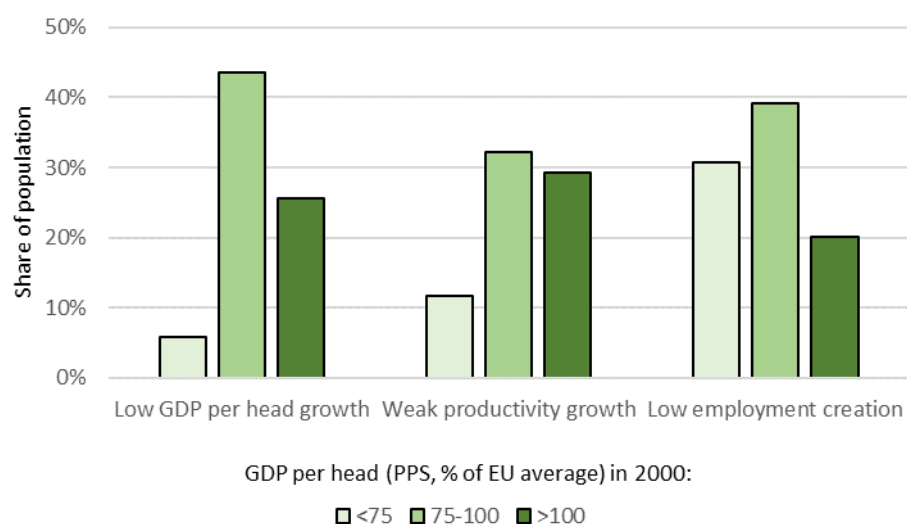
¹⁰ Prof. Simona, Prof. Andrés Rodríguez-Pose, and Prof. Michael Storper contributed substantially to the content of this section.

¹¹ 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 growth labels are therefore not used in this section.

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 low¹² 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% 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.

Figure 2-9: Share of population living in regions which experienced very low growth in GDP per head, productivity and employment, 2001-2019, by initial level of GDP per head (index, 2000=100)



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 calculations

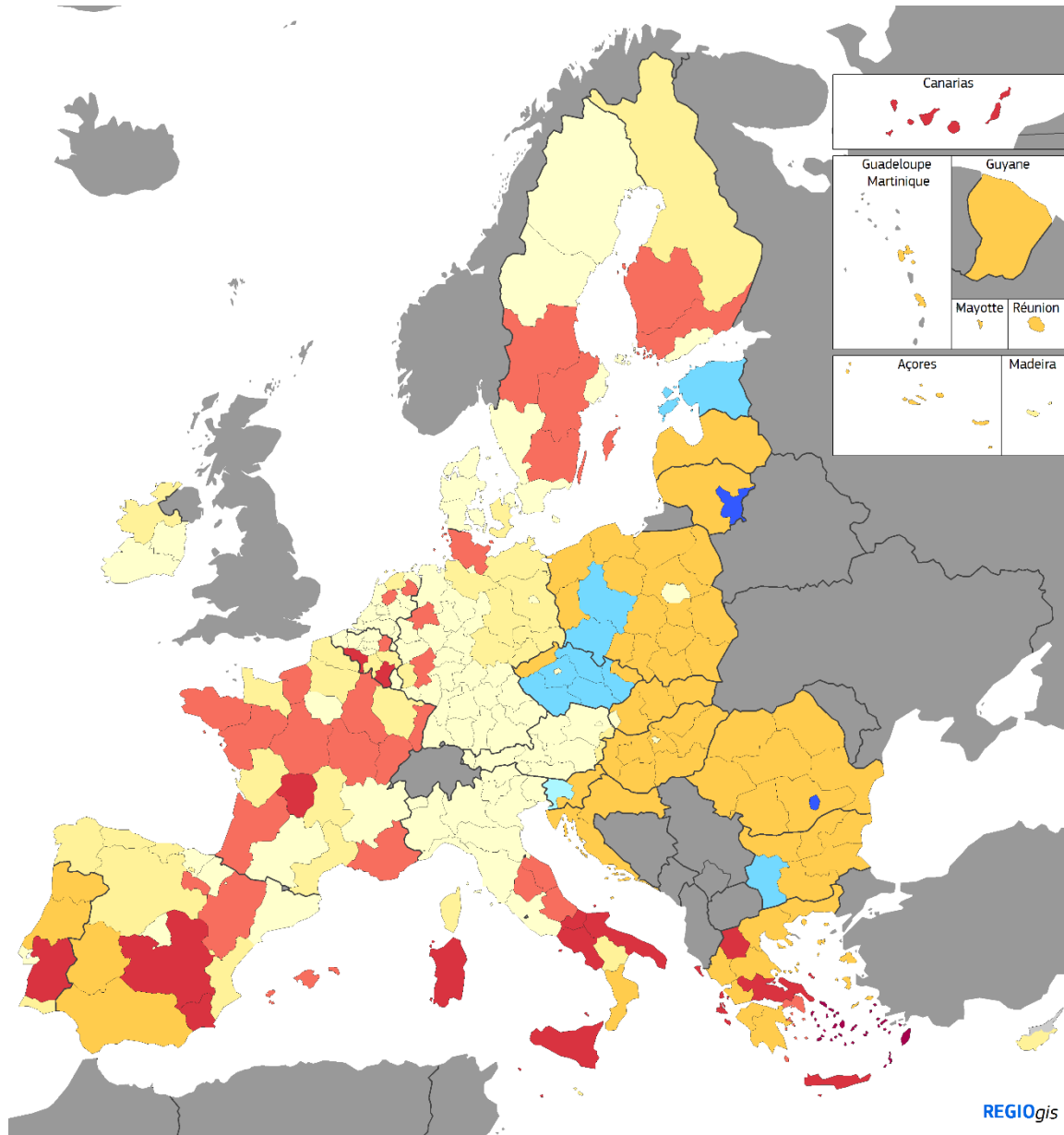
Since 2000, an increasing number of regions have experienced stagnating economic development after reaching a level of GDP per head of 75-100% of the EU average (Map 2-5). As this group has grown larger over time, transition out of it has become rarer. Indeed only one region (Zahodna Slovenija) out of a total of 53 regions in the middle category in 2000 managed to achieve above-average GDP per head by 2019.¹³ On the other hand, in 18 of these regions,

¹² 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).

¹³ 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 a larger than average share of industry in GVA, higher than average R&D expenditure relative to GDP and a larger than average share of working-age population with tertiary education. Institutional quality, however, remains below the EU average.

mainly in the southern EU, GDP per head fell below 75% of the EU average, implying divergence and increasing disparities.

Map 2-5: Transition of NUTS 2 regions between development categories, 2000- 2019



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	Orange	Light Blue	Dark Blue
75-100	Red	Yellow	Cyan
>= 100	Dark Red	Light Orange	Light Yellow

Source: DG REGIO based on Eurostat data (nama_10r_3gdp)



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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 low-cost of capital and labour, and 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 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).

2.3.2 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.

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

The methodology developed by Iammarino et al. (2020) to assess whether a 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 population.

For each of these three variables, the growth rate of the region over the 5-year period preceding the year in question is compared to three benchmarks:

- the growth rate in the region itself over the 5 years preceding this 5-year period
- the growth rate over the 5-year period in its Member State
- the average growth rate in the EU over this period.

This results in 9 comparisons (or 6 for Member States with only one NUTS 2 region).

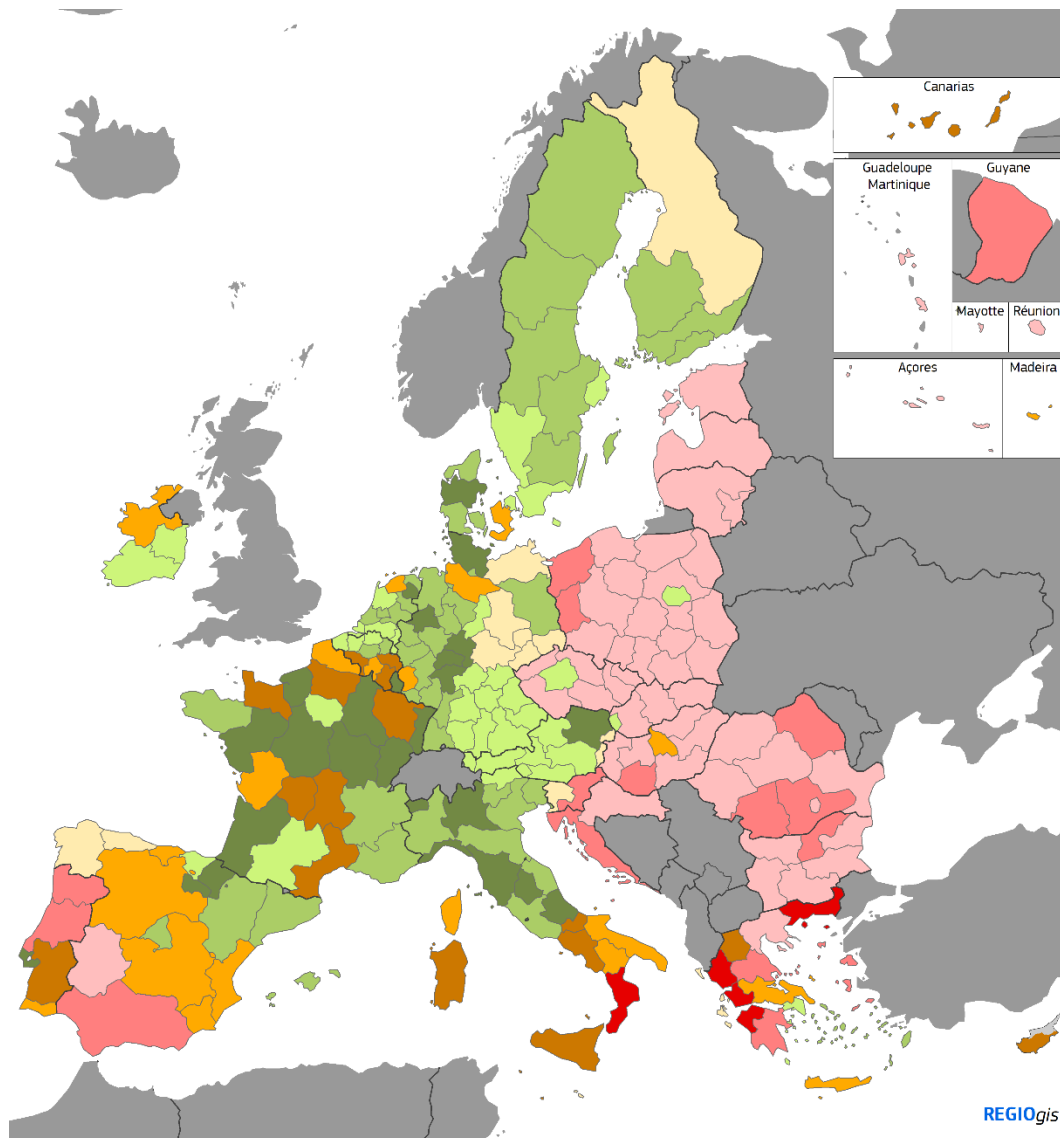
Based on these comparisons, various risk indicators are calculated. The indicator used in this report is calculated as follows. For each of the nine comparisons, if the recent growth rate in the region is lower than the benchmark, the region receives a score of one; if not, a score of zero. The risk of the region falling into a development trap in the year in question is given by the average score over the 9 (or 6) 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.

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, and so include regions at different levels of initial development. Accordingly, three types of development-trapped region can be identified in terms of their GDP per head in 2000.

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

Map 2-6: Number of years in a development trap during 2001-2019 by level of GDP per head in 2000



GDP/head level (2000) and number of years in a development trap

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

0 500 Km

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Source: ARDECO, DG-REGIO

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.

Table 2-6: Socio-economic characteristics of development trapped regions and other regions by level of GDP per head

	Is the region development trapped?	GDP per head (PPS) in 2000, index			
		< 75%	75 - 100%	>100%	All
Share of Industry in GVA, %**	Yes	10.5	13.4	19.4	17.7
	No	25.7	19.7	20.8	21.3
R&D, % of GDP***	Yes	0.73	1.29	1.76	1.60
	No	0.93	1.36	2.67	2.30
Share of tertiary education, %* ¹	Yes	19.5	25.1	29.3	27.5
	No	26.3	31.3	36.9	32.7
Institutional quality (EQI index)***	Yes	-1.71	-0.29	0.31	-0.08
	No	-0.71	0.11	0.76	0.11
Share of total population by level of GDP per head, %***		26.2	17.9	55.9	100.0
Share of population trapped per level of GDP per head, %***		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

The differing characteristics of the regions suggest different approaches to avoiding being development-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 work force. In all regions, the chances could be improved by increasing the share of 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 not benefit areas that are left behind, leading to a growing geography of discontent.¹⁴

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.

¹⁴ 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.