Chapter 1. The elusive quest for regional convergence?

This chapter outlines trends in regional productivity growth and job creation (and destruction) over the past 15 years. Both convergence and divergence are evident across OECD countries and this chapter highlights the trade-offs that countries and regions face in terms of inequality, growth and job creation. A particular focus in this chapter is on economic trends before and since the global 2007-08 crisis and why some regions might have been more strongly affected than others.

Chapter synopsis

Economic integration and global trade have created great opportunities to improve lives for many people and in many regions. Average income levels in the OECD have continuously risen over the last 20 years and only the global crisis that began in 2007-08 put the economic expansion to a (brief) halt. Disparities in terms of per capita GDP and in labour productivity have declined, driven by a catching up of countries and regions with the lowest income levels.

But not all people and all regions have benefited. In many countries the gap between the region(s) with the highest labour productivity and other regions has widened between 2000 and 2014. This growing divide is not a result of the global 2007-08 crisis, though the crisis revealed unsustainable growth models that some regions followed. Even 7-8 years after the onset of the crisis its marks are still evident across OECD regions. By 2015, real per capita GDP in 135 out of 350 large (TL2) OECD regions remained below 2007-08 levels. Most of the regions that are still struggling with the aftermath of the crisis are located in Europe, with rapid recovery concentrated in Germany and in Europe's east, as well as in the northern regions of Scandinavia.

Inequalities often persist over long periods of time. In 14 out of 19 European countries with at least 5 NUTS 2 regions, the most productive region was the same in all years between 1995 and 2014. Regions with large cities and those rich in natural resources are the most productive in the OECD. But the potential to "catch up" is present in all types of region and many have found ways to narrow the gap to their country's frontier. Across OECD countries regional productivity growth follows mainly two models: countries where regions' catching up drives overall productivity growth and countries where the most productive region dominates and the economic strength becomes increasingly concentrated.

Combining dynamic growth of the most productive "frontier" regions with catching up of those that are lagging behind proves a challenge. The regional frontier is, on average, less dynamic in countries where "catching up" was predominant than in countries where the most productive region(s) were pulling away. The lack of catching up comes at a cost. Per capita GDP inequality, measured by the Gini coefficient remained stable across regions in countries where regions managed to "catch up" to their country's frontier in terms of labour productivity. In contrast inequality increased in countries where the frontier regions kept pulling away from other regions.

Raising productivity is not only essential to curtail growing economic disparities it is also essential to sustain individual well-being. Sustainable wage growth, and thereby growth in living standards, requires that productivity keeps pace with wage increases. As ageing becomes increasingly pervasive, regions need to find ways to compensate for a declining workforce to ensure prosperity does not decline. But even in regions with growing productivity, inclusive gains from growth are by no means automatic and a key policy challenge remains to ensure a fair distribution of the benefits created by economic growth. While in boom periods between 1980 and 2014 more than 40% of OECD regions combined productivity and employment growth, about the same percentage of regions experienced productivity growth at the expense of employment growth in the recessions that followed.

The quest for regional convergence

Countries undertake tremendous effort and often spend considerable resources in trying to balance aggregate economic development and supporting growth in all regions. But divides are often entrenched. It seems that the "quest for convergence", i.e. the catching up of lesser performing regions to a national or global frontier, seems ever elusive.[1] The challenge is not unique to a single country. The United States face a growing "great divide" that opens between innovative, educated and growing metro areas on the one hand and those struggling to keep up on the other.[2] In Europe, countries have faced a reversal of convergence in the wake of the 2007-08 global crisis, with regions that were able, before the crisis, to narrow their gap to the European average before falling back again. Across the OECD, trends are pointing to a growing divide between well-performing and lagging regions.

Notwithstanding the existence of economic cycles, economic theory would suggest that in the long term regions that are lagging behind their peers have the capacity to "catch up" to those leading regions.[3] Lagging regions' lower levels of economic output are often associated with structural deficits, such as insufficient basic infrastructure, transport connectivity or low skill levels in the workforce. But the gap to leading regions also constitutes a possible advantage, deemed "the advantage of backwardness" in many economic textbooks. In less-developed regions, capital investment, skill development and the adoption of technologies from more advanced regions all offer significant growth and catching-up potential.

But in reality there is often little evidence for an advantage of backwardness in lagging regions. For example, Île-de-France, the region containing the metropolitan area of Paris, experienced faster economic growth than all other French mainland regions. This success widened an already substantial gap between the region and the rest of the country. Île-de-France produced 53% more GDP per inhabitant than the second richest region in 2000 and this gap has grown to 66% over the last 15 years. In part, gaps are due to differences in local economic assets and economic forces.[4] A region located in a central position surrounded by large markets or close to a large city will find it easier to attract business and residents. A remote rural region that is rich in (coveted) natural resources will be better off than a region without such resources. Often these assets, which contribute to economic development, are tied to a place and hard to create or change through policy.

However, even factors than can be affected by policy are often hard to disassociate from the place where they are located. A top-tier university operates in a specific city (or even neighbourhood), a successful technology cluster develops in a certain place, and the location of major transport infrastructure, e.g. ports or airports, also changes rarely. Some of these place-specific factors contribute to virtuous cycles. The investment of a high-tech company in a research campus might incentivise other firms to locate complementary research facilities in the area, creating demand for high-skilled jobs, which, in turn, results in demand for personal services, high quality housing and local amenities and an incentive for firms and local governments to invest. Whether major investments can create and sustain development without initial impetus or complementary policies is less clear.[5] Even with virtuous cycles, progress is often slow and dependent on past success.

As local growth potential depends on local assets and can follow virtuous cycles, inequalities are not expected to completely disappear. However, when disparities become entrenched or worsen it is sometimes symptomatic of regions failing to leverage their

"advantage of backwardness". The OECD Regional Outlook 2016 (OECD, 2016[1]) highlights the growing disparity in labour productivity within countries as a key policy challenge, as the most productive regions are pulling further away from other regions. This is worrying as growth in productivity is essential for economic growth, improving living standards and increasing well-being.[6]

Gaps between OECD countries are narrowing, but they persist across regions

Closing interregional gaps is a key policy objective in many countries. Often policies focus on economic convergence, i.e. the reduction in the gap between more prosperous regions and those lagging behind in terms of per capita income (typically measured by gross domestic product, GDP). Examples include the European Union (EU)'s Regional "Cohesion Policy", Korea's aim for "balanced economic development" or Turkey's efforts to reduce regional and rural-urban disparities.[7] Support is typically provided to regions that are lagging behind the more prosperous parts of a country (or the EU), helping them to develop a better socio-economic foundation, improve competitiveness or attract investment.

Economic convergence is often not the sole focus of regional policy. Increasingly, wider concepts, such as well-being, are at the fore of convergence considerations. For example, the goals of the Europe 2020 Strategy cover a wide range of social, innovation and environmental goals that are supported through European Cohesion Policy.[8] Similarly, in the Region of Southern Denmark, a comprehensive set of well-being indicators has been developed that aim to enhance the "good life" of people in the region. This initiative also supports its multi-year Regional Growth and Development Strategy and guides policy decisions.[9]

Overall economic inequality declined, but within-country inequality did not follow

Inequality across European regions in terms of per capita GDP has declined since the mid-1990s.[10] Inequality, measured by the Theil Index, followed a steady downward trend from 1995 until the 2007-08 crisis (Box 1.1). Since the crisis, inequality remained fairly constant until 2015, the last year with available data. The positive trend towards greater cohesion masks significant diversity among regional growth paths within countries.

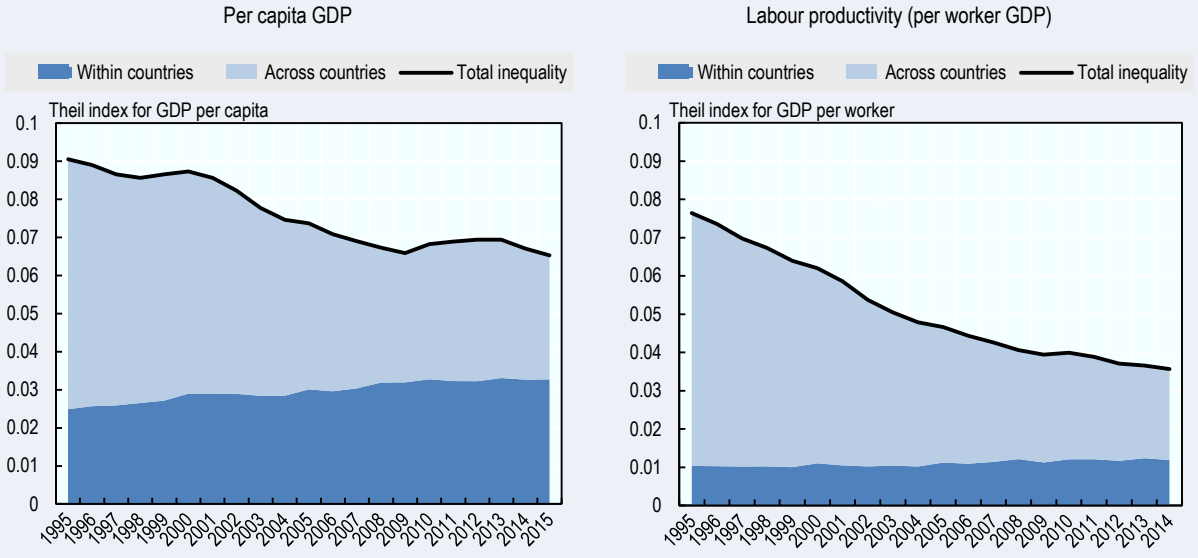
Disparities within countries have remained large in many countries and have even grown in some. The overall decline in inequality in terms of per capita GDP since 1995, as measured by the Theil Index, was purely driven by declining inequality across countries. Inequality within countries, i.e. inequality between their regions, even increased over the 1995-2015 period (Box 1.1). The pattern is not only evident for Europe, but across the OECD (OECD, 2016[1]). For OECD regions, however, the decline in overall inequality was slower than in Europe and the contribution of inequality across countries to total inequality remains larger than the contribution from interregional inequality within countries.[11]

Box 1.1. Regional disparities are declining across countries but not within them

Since 1995, inequality between European regions, as measured by the Theil index, has declined by about one third (Figure 1.1). In 1995, nearly 75% of total inequality in Europe in terms of per capita GDP came from differing levels of income among EU countries. Regional disparities within countries contributed only about 25%. By 2007, faster growth in countries with lower per capita income had reduced the gap with other European countries. This led to a decline in inequality across countries. In fact, inequality between countries was cut in half. Over the same period, inequality within countries rose by about 20%. These opposing trends mean that since the 2007-08 crisis about 50% of inequality in Europe has been due to disparities across regions within the individual countries.

Labour productivity (measured as GDP per worker) mimics the change in per capita GDP inequality (Figure 1.1). A decline in disparities between countries is met with persistent inequality within countries, albeit the contribution of cross-country differences to inequality remains larger than within-country productivity differences. Unlike inequality in terms of per capita GDP, productivity continued its convergence trend even through the 2007-08 crisis and the subsequent recession.

Figure 1.1. In Europe, inequality across regions is now as high as inequality across countries



Note: Data refers to regional GDP per capita expressed in constant 2010 USD PPP. Data for the period 1995-99 represent estimates based on SNA93. Data for 2000-2015 and for large (TL2) regions in 21 countries: Austria, Belgium, Bulgaria, Czech Republic, Germany, Denmark, Spain, Finland, France, United Kingdom, Greece, Hungary, Ireland, Italy, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia and Sweden. Countries with only one TL2 region are excluded: Estonia, Malta, Lithuania, Luxembourg and Latvia. Due to a break in series for Irish GDP in 2015, 2014 data have been used for 2015.
Source: Calculations based on OECD Regional Statistics [Database].

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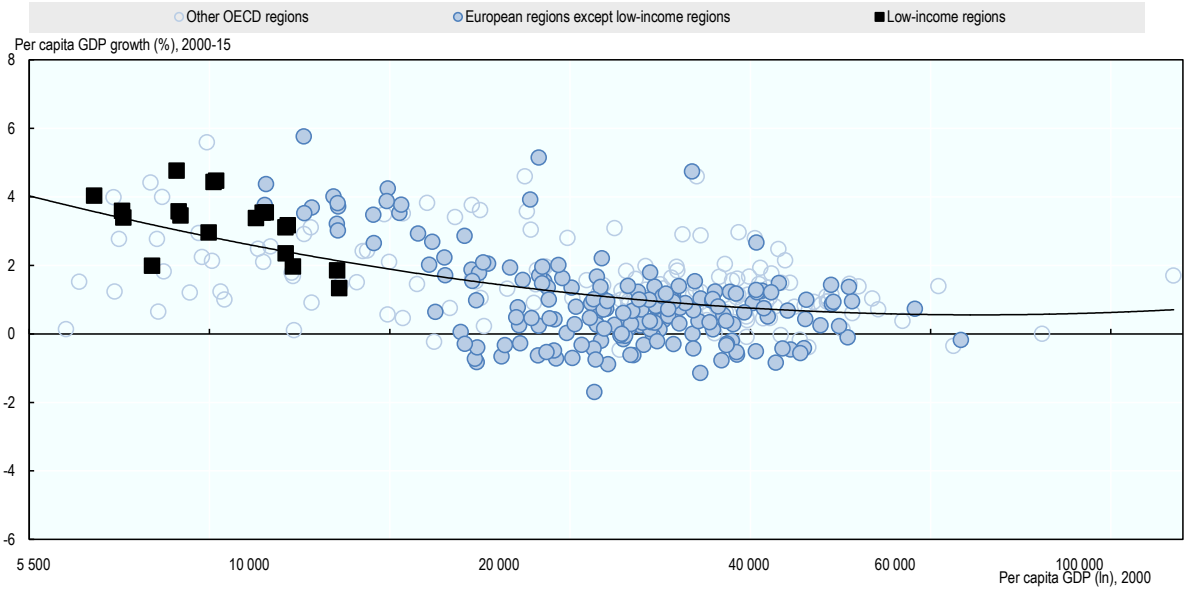
"Low-income" regions leverage their growth potential

The decline in overall inequality is driven by a catching up of countries and regions with the lowest income levels. For 363 large (TL2) OECD regions and comparable regions in Bulgaria and Romania, growth over the 2000-15 period was negatively associated with initial income. Over the 2000-15 period, regions with the lowest income levels at the beginning of the period were able to capitalise on their "advantage of backwardness" (Figure 1.2).[12] Per capita GDP in regions in Bulgaria, Hungary, Poland, the Slovak Republic or Romania grew in excess of 3% per year, in many cases even reaching annual average growth rates of around 4%. To put this into perspective, at a growth rate of 4% the per capita output of a region doubles in less than 20 years. Within the OECD, Chilean and some Mexican regions were able to match similarly high growth rates over the same period.

Figure 1.2. Convergence is driven by the poorest "low-income" regions

Per capita GDP and per capita GDP growth, 2000-15



Note: Data refers to regional GDP per capita expressed in constant 2010 USD PPP. Data for 2000-15 and for 363 large (TL2) regions in 30 countries (AU, AT, BE, CA, CL, CZ, DK, FI, FR, DE, EL, HU, IE, IT, JP, KR, ME, NL, NZ, NO, PL, PT, SK, SI, ES, SE, UK, US, BG, RO). Low-income regions are EU regions with less than 50% of EU-average per capita GDP in 2000 (full list in Annex Table 1.A.1).
Source: Calculations based on OECD Regional Statistics [Database].

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Some European regions seem to fall into a "middle income trap"

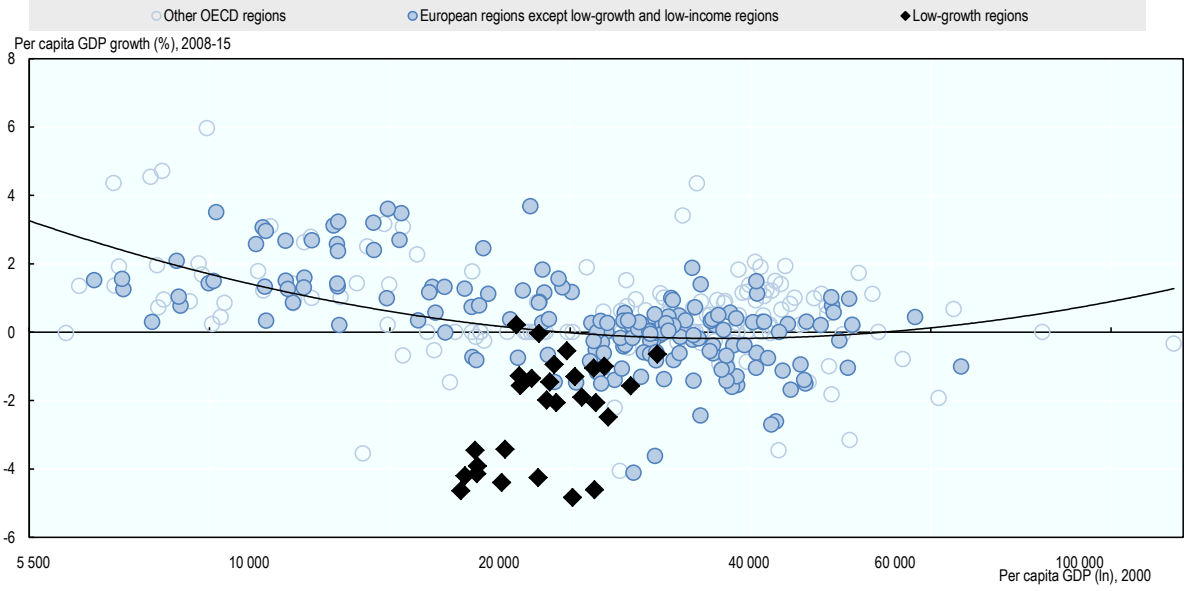
Convergence is rarely a smooth process. It often includes prolonged periods of low growth. In development economics, the idea of a "middle income trap" has been proposed as growth slowdowns seem to follow the successful transition of many low- to middle-income countries.[13] In Europe and the OECD, convergence was driven by rapid growth before the 2007-08 crisis. During the pre-crisis period, growth was not limited to the regions with the lowest per capita GDP levels, but also sustained by many regions with intermediate income levels, (e.g. by Greek or Spanish regions). But many of the

OECD's "middle" income regions, with per capita GDP above USD 20 000 in 2010 prices and purchasing power parities, have stagnated or even declined since the 2007-08 crisis (Figure 1.3).

The regional middle income trap is partly driven by slow growth in some countries that fall into the middle income range within the OECD. For Europe, these are mainly "low-growth" regions in the south of Europe.[14] Another reason is the lack of catching up within countries. In Italy and Spain, for example, the negative correlation between growth and initial level of per capita GDP – indicating the catching up of less affluent regions to the more prosperous ones – turns positive for the 2008-15 period. This means that less-developed regions in these countries were not only unable to narrow the gap, but they even lost ground against more affluent parts of the country.

Figure 1.3. A middle income trap ensnared "low-growth" regions after the 2007-08 crisis

Per capita GDP and per capita GDP growth, 2008-15



Note: Notes: Data refers to regional GDP per capita expressed in constant 2010 USD PPP. Data for 2008-15 and for 363 large (TL2) regions in 30 countries (AU, AT, BE, CA, CL, CZ, DK, FI, FR, DE, EL, HU, IE, IT, JP, KR, ME, NL, NZ, NO, PL, PT, SK, SI, ES, SE, UK, US, BG, RO). Low-growth regions are EU regions with less than 90% of the EU-average per capita GDP in 2000 (less-developed and transition regions) that grew less than the EU-average over the 2000-13 period (full list in Annex Table 1.A.1).
Source: Calculations based on OECD Regional Statistics [Database].

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Not all gaps will close, but persistent and growing differences raise concerns

Differences in prosperity of regions and places within a country have always been a reality. Prague was the most productive region in the Czech Republic in the 1990s and remains the most productive region in 2014, as does Stockholm in Sweden. In 14 out of 19 European countries with at least 5 NUTS 2 regions, the most productive region was the same in all years between 1995 and 2014.[15] These differences are unlikely to completely disappear. As already mentioned, regions have different endowments in

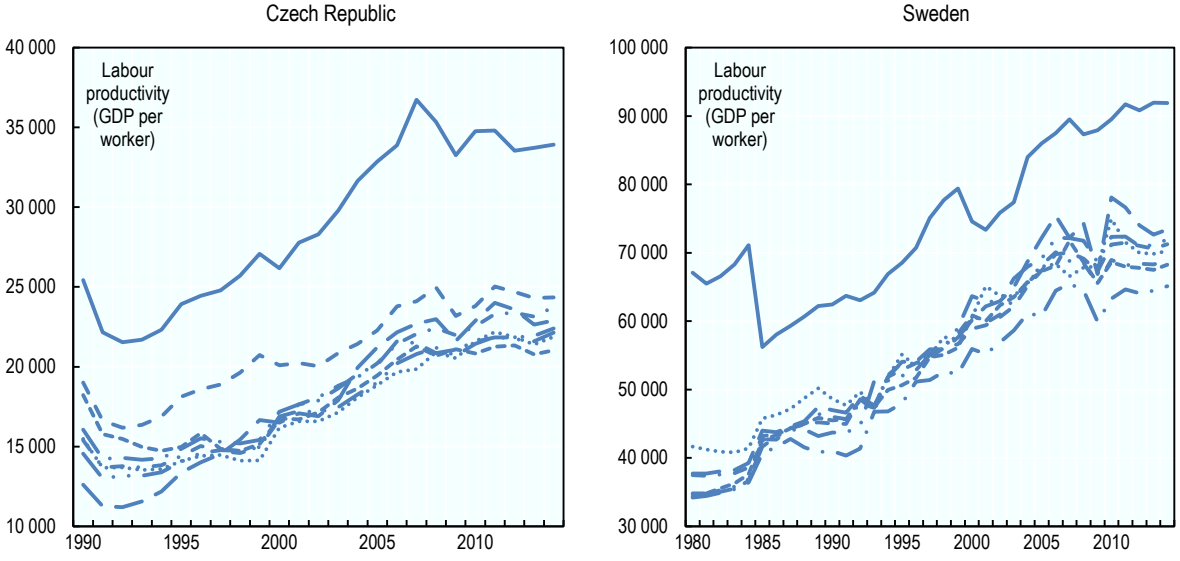
factors that support growth, as well as different types of economic activity. For example, knowledge-intensive services are often concentrated in large cities.

The underlying factors and regional assets that matter most in supporting growth can change over time. Proximity of suppliers and producers was a major factor in firm location choices until transport costs declined. Resources that were highly valued 30 years ago are not the same as those most sought after today. In addition, decisions made by individuals and policy makers sometimes affect growth drivers. Where to move, where to start a new business or where to invest are conscious decisions that are greatly affected by the policy environment in a region.

Gaps are therefore not set in stone, change can occur and new frontier regions can emerge. Even without complete "catching up", gaps between the most productive region and the rest of the country can narrow. Whereas Stockholm produced about 40% more output per worker in the 1990s than other parts of the country, progress in other regions has cut the lead to about 30%. The Czech Republic experienced the opposite trend with the productivity gap between Prague and the rest of the country growing from about 110% in the 1990s to more than 150% since 2010 (Figure 1.4).

Figure 1.4. The most productive "frontier" region often remains at the top over time

Labour productivity in TL2 regions (per worker GDP in EUR at 2005 prices)



Source: Calculations based on Cambridge Econometrics (2017) European Regional Database [Database].

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The challenge when economic inequalities become entrenched is that they become self-perpetuating. Income levels, employment and wealth are lower in the north of the United Kingdom than in the south (McCann, 2016[2]). In the United States, the returns to education, divorce rates, crime rates and even life expectancy are growing further apart between dynamic and growing metro areas and those that are losing ground.[16] A strategy that relies on budgetary transfers from better-performing regions to others will not address the root cause of the problem. Without narrowing the economic gaps, especially productivity gaps, it is unlikely that living standards can be sustainably raised.

Catching up is possible, but is often a long-term effort

Bavaria in Germany is one of the regions that successfully narrowed the gap to Germany's most productive "frontier" regions over the 2000-14 period. Productivity in the region grew faster than in Hamburg and Hesse.[17] The strong position of Bavaria today is in stark contrast to the situation in the middle of the 20th century. Between 1950 and the mid-1980s, the Federal State was a net recipient of fiscal transfers from other parts of Western Germany that compensate for low tax revenues. By the mid-1990s, Bavaria's was providing a net contribution to the system of horizontal transfers (BMF, 2012[3]). Between 2000 and 2014 labour productivity in Bavaria grew at about three times the rate in Germany's frontier, but even if current trends continue it will take until 2030 for Bavaria to completely close the gap.[18]

These slow changes are a common feature. In the United States, the greater Los Angeles area and San Francisco Bay Area followed markedly different trends. In terms of median household income the Bay Area (San Jose, San Francisco and Oakland) was the most prosperous in the United States in the 1970s and has remained among the top-income regions. Conversely the southern Californian greater metro area around Los Angeles-Long Beach-Riverside, which started at the same level as the Bay Area in 1970, has experienced a continuous decline compared to its peer areas, and over time this gap has begun to widen at an increasingly fast pace. While the region was ranked 4th among US Metropolitan Statistical Areas in 1970, its position had dropped to 25th by 2009.[19]

Local assets differ and contribute to regional economic gaps

Productivity or income gaps reflect, in part, differences in local fundamental assets. Resource-rich or fertile soil, an accessible and protected bay, a central location within a country and even climatic conditions are all local advantages that can be turned into growth opportunities. They are geophysical advantages and are often slow to change and difficult to alter, at least positively. In the subfield of economic geography, these advantages are called "first nature" assets.[20]

Whether "first nature" assets constitute an advantage can also change over time. The importance of an accessible port may have waned over the centuries as land-based transport became cheaper and maritime freight transport required increasingly larger ports. Conversely, the demand for certain metals or minerals has risen as new technologies and production methods require different materials than were used in the past.[21] The value of "first nature" advantages is therefore something that has changed fundamentally over the years, changing the value of some assets or the costs associated with them. Innovation can play an important role in this context. In one example, hydraulic fracturing ("fracking") paved the way for the commercial exploitation of oil and gas reserves in areas where costs were previously too high.

Using natural resources can, however, come at significant costs and for different reasons. The depletion of natural resources results in a more finite opportunity to use them as an economic growth asset. The environmental and health impacts of fracking are still hotly debated; indeed, exploitation of natural resources sometimes comes with other costs. Even economically abundant natural resources can stifle growth. When resource extraction arises as a natural advantage for the area, development of other sectors is often limited. Wages and demand are driven by the productive resource-intensive industry, making it difficult for firms in other sectors to develop and to diversify the economy. The local economy remains, therefore, highly dependent on the extractive sector, the global

demand and supply of its main product and the (finite) availability of reserves in the region.

While some local assets are determined by nature, others depend on human actions

There are also regional disparities driven by "second nature" advantages, which are created through human intervention. People's choices of where to live and work, firm location decisions, or public policies typically contribute to these "second-nature" advantages. Not only policies that are set at the local level, but also country-wide "structural" policies (c.f. Chapter 4). The location of capital cities, selection of sites for academic institutions and the placement of large plants are choices favouring certain places over others. These choices are necessary. Separating an institution or a firm across space is usually costly at best and often unviable. Importantly, the cost associated with distributing activities is not only a direct cost associated with the split, e.g. through increased transport, communications and shipment costs between locations. A split can also result in the loss of benefits that come from formal and informal interactions that are facilitated by being located close to colleagues.

The benefit from concentrating activities derives, in part, from "positive economies of scale". As firms become larger they can sustain more specialised functions, e.g. a marketing department or a research and development team for new products or processes. Bulk purchases of raw materials and other inputs reduce the average price per unit. Firms can also share some administrative functions and utilisation of capital investment across a larger workforce, e.g. a server for the company network or human resource activities.

Usually the gains from positive economies of scale are limited, e.g. gains from specialisation are balanced by higher co-ordination costs. Similarly, the benefits of expanding production and serving a larger market may be outweighed by the increase in transportation costs.[22] The latter is evident, for example, among building material manufacturers. Transport costs constitute a major part of the total cost of their products, e.g. for concrete. The result is that most building materials are rarely shipped over long distances and the largest companies in the sector have thousands of production sites.[23]

Another benefit of concentrating activity in a specific place is external to the firm. As economic activity becomes embedded in an area, the interaction and links across firms and workers create mutual benefits. Co-location of suppliers and customers reduces transport costs and facilitates communication. A larger pool of workers in an area makes it easier for firms to find employees with the right skill set and for workers to find a job that suits them. More formal or incidental interaction in places that are denser and concentrated in terms of economic activity makes it easier for knowledge to be shared and spread. These "agglomeration benefits" create a virtuous circle, as more workers are attracted to the opportunities created by the firms in an area. Over time, it becomes more attractive for firms to locate there and vice versa (c.f. Chapter 2).

Regions with large metropolitan areas or resource-intensive economies are among the most productive in the OECD

Both first and second nature advantages can support high levels of labour productivity. In OECD countries, the most productive regions are mostly those with either a thriving extractive sector, e.g. Alberta in Canada or Antofagasta in Chile or a large (often capital) city.[24] For example, Greater London in the United Kingdom, Île-de-France that contains the Paris metropolitan area, or Istanbul in Turkey lead the productivity rankings in their

countries, as do Stockholm in Sweden and Prague in the Czech Republic. A caveat in these comparisons is that city regions are often "underbound", covering only part of the full economic area surrounding the city (Box 1.2). Even in comparisons based on a functional definition however, workers are more productive in larger urban areas.[25]

Box 1.2. Regional boundaries: Administrative or functional realities?

Administrative boundaries typically do not depict economic realities

A difficulty in comparing productivity at the regional level is that the administrative or statistical boundaries of a region do not necessarily coincide with the functional boundaries of the local economic area. This is particularly the case for regions that cover cities that are at the core of a metropolitan area. The region of Greater London, for example, covers only a small part of the London metropolitan area according to the EU-OECD definition. Conversely, the Île-de-France region is actually a good approximation of the metropolitan area of Paris. Economic activities located in the densely-populated core are typically also the most productive. Therefore, "underbounded" city regions tend to have higher productivity and per capita output levels than those that cover both the urban core and the whole commuting zone.

Functional boundaries to capture economic links

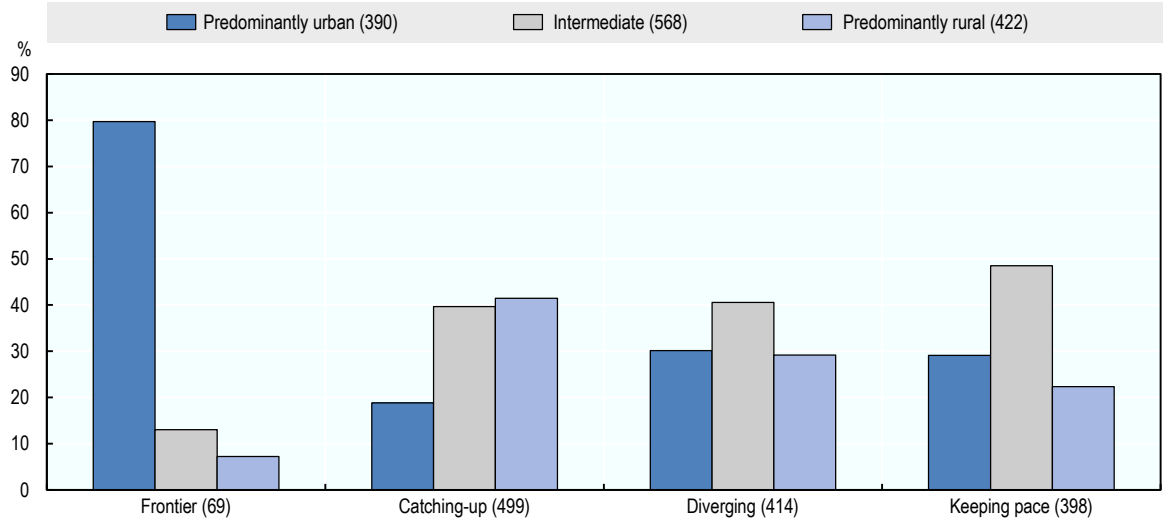
To overcome the limitations of non-comparable administrative boundaries, the EU-OECD definition for functional urban areas uses population in densely-populated and contiguous 1km² grid cells to determine the spatial delineation of urban centres with at least 50 000 inhabitants. These urban centres are then matched to small local administrative or statistical areas, such as municipalities or census tracts, which then allows urban centres and low-density areas to be connected via commuting flows to the urban centre. The resulting "functional urban areas" capture the daily reality of worker flows and include the dense urban centre as well as the linked less-densely populated commuting zone.

Source: OECD (2012) *Redefining "Urban": A New Way to Measure Metropolitan Areas*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264174108-en.

While larger cities and resource-rich regions are the most productive regions, all types of regions have some growth potential and most can find ways to narrow the gap with their country's frontier. Considering productivity growth in 1 380 small regions in OECD countries and beyond shows more intermediate and predominantly rural regions among those that managed to narrow the gap vis-à-vis the most productive region(s) in their country, rather than predominantly urban ones.[26] The potential for catching up is present in all types of regions, but the levers to unlock and sustain growth are quite distinct as economic models and local fundamental conditions differ significantly between regions.

Figure 1.5. Frontier regions tend to be urban, but catching up can happen anywhere

Distribution of type of regions in the frontier and among regions catching up, diverging and keeping pace



Note: Bars indicate the share of regions within each group that are predominantly urban, intermediate or predominantly rural. Numbers in parentheses indicate the number of small (TL3) regions in the group. Frontier regions are the most productive regions in a country in terms of GDP per worker (labour productivity) that account for at least 10% of total employment. Regions catching up to/diverging from the frontier are those in which labour productivity grew by 5% (over a normalised period of 15 years) more/less than in the frontier region(s) of the country over the relevant period, with regions "keeping pace" falling in that range. The period covered is 2000 to 2014. The 29 countries included are: Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Korea, Latvia, Luxembourg, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland and United Kingdom from OECD countries plus Bulgaria, Lithuania and Romania.
Source: Calculations based on OECD Regional Statistics [Database].

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Outmigration and ageing create challenges for all types of regions

Demographic shifts and people's decision to move can affect local fundamentals. An increase in the elderly – non-working age – population changes the local structure of supply and demand. Once retired workers start drawing on their pensions, they reduce their investments in capital and increase their consumption.[27] This affects wages and the cost of capital, but it also shifts the structure of demand. Local services such as health care or household services become more important as the local population ages. Even before retirement however, the decisions workers take as they age affect the regional economy. While older workers tend to be more experienced and therefore more productive, they also have less incentive to acquire new skills or knowledge. As the retirement age approaches, the period in which a worker can utilise their skills becomes incrementally shorter, which means the benefits of lifelong learning become increasingly limited.

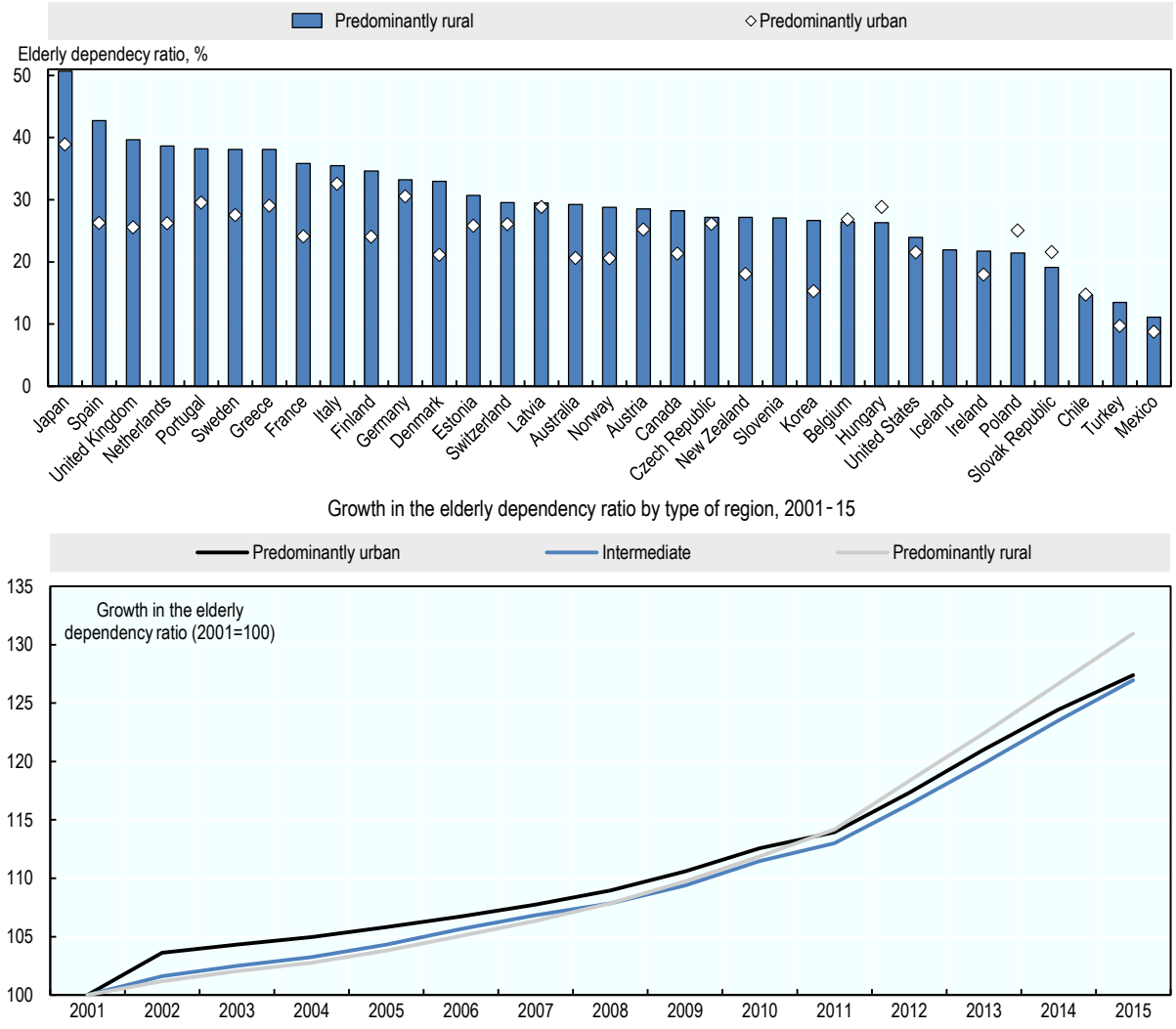
Population ageing limits future growth in OECD countries and regions

Ageing is pervasive in all types of regions in OECD countries. Elderly dependency ratios, i.e. the ratio between the resident population that is 65 years or older and those of working age (15-64), grew by more than 25% between 2001 and 2015. In addition, there

can be pressure for local economies resulting from low fertility rates and (out)migration trends. Such pressures tend to be stronger in predominantly rural regions (small regions, TL3). The difference in elderly dependency ratios between predominantly rural and predominantly urban regions exceeds 10 percentage points in nine countries, more than one-fourth of OECD countries (Figure 1.6).[28] While predominantly urban regions in Japan have to adapt to support nearly 4 elderly people for every 10 people of working age, it is more than 5 in predominantly rural regions of Japan. While elderly dependency rates in Japan exceed those in other OECD countries, many European countries and regions are coming close to Japanese dependency ratios. Predominantly rural regions in Spain, the United Kingdom, the Netherlands, Portugal, Sweden and Greece, the six countries following Japan, all have dependency rates of close to or even above 4 in 10.

Figure 1.6. Demographic pressures are unevenly distributed

Elderly dependency ratio by type of region and country, 2015



Note: Elderly dependency ratio defined as the ratio of 65+ year olds and the 15-64 year old population in a small (TL3) region. Data for countries (upper panel) refers to 2015 or closest year available with countries ranked the elderly dependency ratio in predominantly rural regions. In the lower panel, data on growth of the elderly dependency ratio depicts the the unweighted average of the elderly dependency by type of region.
Source: OECD Regional Statistics [Database]

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Ageing can lead to a shrinking local labour market and present a potential fiscal challenge for regions that will need to rely more on transfers than on collecting local taxes. Moreover, providing services for the elderly and young can place pressure on an already thin labour market in low-density areas. A focus on local support services means that workers move into sectors that tend to have low levels of productivity, reducing average productivity in the region, especially in low-density areas where economies of scale cannot be achieved (e.g. the number of home visits a doctor or nurse can manage is less in a rural environment with longer distances between patients than in an urban setting). With sufficient transport links, policies can try to address the supply of certain services by enhancing links between urban and rural areas, at least for those rural areas that are located close to cities.

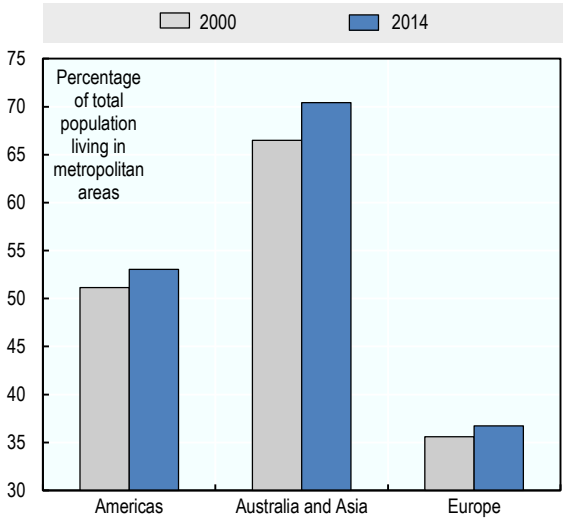
Outmigration amplifies the challenges for rural regions and smaller cities

At the regional level, the demographic shift is sometimes amplified by the outflow of young and more mobile workers towards different regions or even different countries. Moving is costly, both in terms of direct costs associated with moving one's home, but also in terms of non-pecuniary costs such as weakened local networks and family ties. Given the wide discrepancy in economic opportunities, mobility of workers is nonetheless often seen as too low. But outflows, in particular from lagging regions, are significant and even within regions many small towns and villages are losing population as people concentrate in and around (the main) cities.

Urbanisation is growing fastest outside of Europe.[29] Africa, Asia and the Americas are leading global trends towards greater urbanisation. In Europe, the urbanisation rate, i.e. the percentage of people in urban areas is fairly stable. But in Europe, as well as in other parts of the OECD, the importance of concentration of population in the largest cities – metropolitan areas with 500 000 or more inhabitants – is increasing (Figure 1.7). In Australia, Japan and Korea more than 70% of the total population lived in a metro area in 2014, an increase of 4 percentage points compared to 2000. In American and European OECD countries, the increase was more modest, about 2 percentage points in Canada, Chile, Mexico and the United States and slightly more than 1 percentage point in Europe.[30]

Figure 1.7. The move towards metropolitan areas

Percentage of total population in the OECD areas living in metropolitan areas with at least 500 000 inhabitants, 2000-14



Note: Population in metropolitan areas in the EU-OECD definition with at least 500 000 inhabitants in 2000. Countries included are CAN, CHL, MEX, USA (Americas); AUS, JPN, KOR (Australia and Asia); AUT, BEL, CHE, CZE, DEU, DNK, EST, ESP, FIN, FRA, GBR, HUN, IRL, ITA, NLD, NOR, POL, PRT, SVN, SVK, SWE (Europe)
Source: OECD Metropolitan areas [Database].

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The global 2007-08 crisis uncovered some unsustainable growth models

Nearly all regions grew in terms of per capita GDP during the first years of the new millennium. Until the 2007-08 crisis, only 4 out of 350 OECD regions (TL2) had experienced decline. Adding Romanian and Bulgarian regions, per capita GDP in half of the 364 regions grew by 16% or more between 2000 and 2007/08.[31] Between 2007/08 and 2015, the picture changed significantly. The median growth rate, i.e. the rate that 50% of the regions exceed and the other 50% do not reach, is just 4%. Economic prosperity in half of OECD regions seven or eight years after the initial shock was just barely above crisis levels (Figure 1.8Figure).

Many regions struggle to return to growth since the 2007-08 crisis, most of them in Europe

Before the crisis, 61% of the TL2 regions with above median growth rates were European regions, since the crisis these regions account for only 44%, well below the total percentage of European regions in the sample (59%). While regions in the Americas (Canada, Chile, Mexico and the United States) and Asia/Oceania (Australia, Korea, Japan and New Zealand) recorded slow growth as well, European regions were overrepresented.

This is particularly true when consistently low growth is considered. Nearly 80% of regions with below-median growth rate both before 2007 and after 2008 are European regions (lower left hand square of Figure 1.8).[32] These regions are predominantly regions in Europe's south. Regions in Italy, Portugal and parts of Spain, but also the Brussels

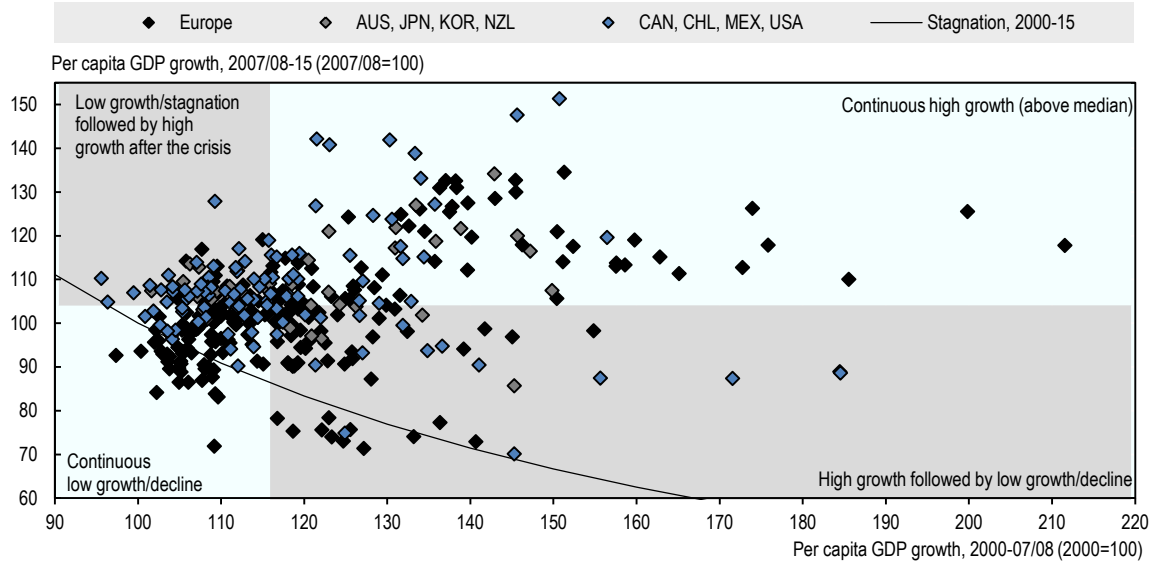
Region in Belgium and most French regions, except Île-de-France (Annex Figure 1.A.2). Outside of Europe they include regions like Colorado and Georgia in the United States or Chiapas and Quintana Roo in the south of Mexico.

Some "low-growth regions" have actually gone through a phase of rapid growth followed by rapid decline

The "middle income trap" in Europe has its root cause in persistently slow growth in some regions. But for others, the trap sprung as the 2007-08 crisis revealed that their growth models were not sustainable. Per capita GDP in these regions grew before the crisis, often by more than 2% per year. But following the initial shock, per capita output contracted rapidly. Over the full 2000-14 period, these regions appear to have stagnated, but what they experienced was a period of rapid expansion followed by an equally long period of contraction and stagnation (regions close to the solid black line in Figure 1.8). Andalusia in Spain and Central Macedonia in Greece exemplify the growth experience in these types of region (Figure 1.9).

Figure 1.8. Rapid growth before the 2007-08 crisis was not always sustainable

Per capita GDP growth before and since the 2007-08 crisis



Note: Real per capita GDP growth in large (TL2) regions from 2000 (or closest year available) to 2007-08 (lower value) and from 2007-08 (higher value) to 2015 or closest year available. Shaded quadrants depict the above/below median value growth (median for 2000-07/08: 115.9; 2007/08-15: 104.1). The solid black line indicates the growth rates that led to stagnation between 2000 and 2015, i.e. the decline after the 2007-08 crisis offsets the growth from before the crisis. Europe includes European OECD regions, as well as Bulgarian and Romanian regions.
Source: Calculations based on OECD Regional Statistics [Database]

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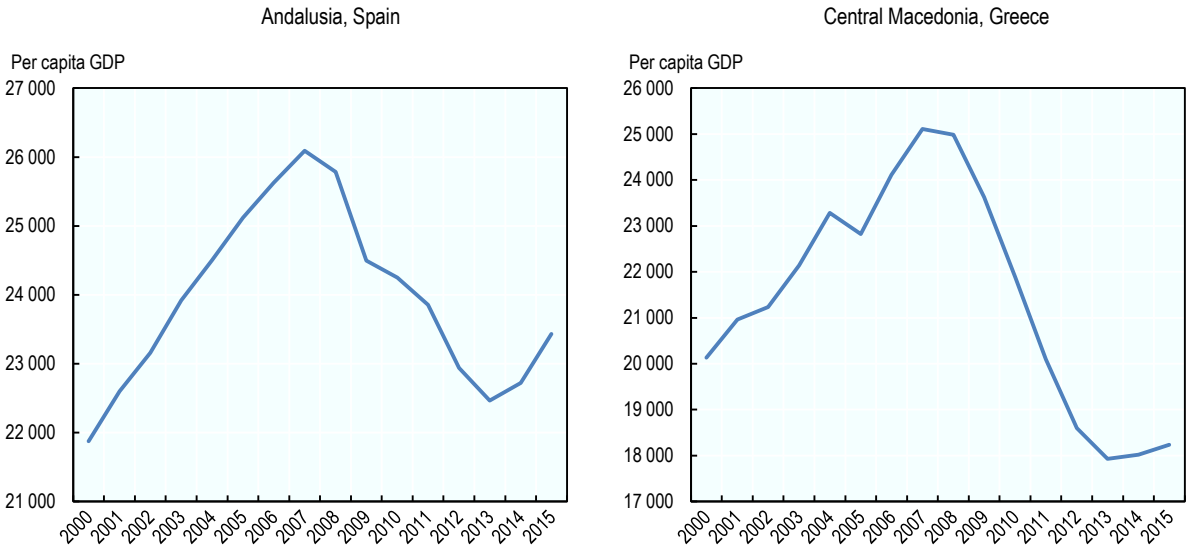
Figure 1.9. Seven year cycles of growth and decline in Andalusia (Spain) and Central Macedonia (Greece)



Note: Data refers to national and regional GDP per capita expressed in constant 2010 USD PPP.
Source: OECD (forthcoming) Reigniting growth in Andalusia (Spain): a case study; OECD (forthcoming) Reigniting growth in Central Macedonia (Greece): a case study; and OECD Regional Statistics [Database]

StatLink http://dx.doi.org/10.1787/888933707665

Most Greek and many Spanish regions followed similar growth paths as those of Central Macedonia and Andalusia, but rapid growth that was not sustained after the 2007-08 crisis was not limited to the two countries. All Finnish regions experienced a brief recovery after the initial shock of the 2007-08 crisis, but continued to contract after 2011. Central Hungary grew by more than 40% before the crisis and has stagnated since, with per capita GDP increasing by less than 4% between 2007-08 and 2015. Both the east and the west of Slovenia followed similar trends, as did Ireland's Border, Midland and Western regions and the archipelagos Madeira and Azores in Portugal. Outside of Europe, several rural and resource-intensive economies, such as Alberta in Canada, Antofagasta in Chile, Campeche in Mexico or the Taranaki regions in New Zealand, joined the group of regions that declined after rapid pre-crisis expansion.

Growth returned quickly in parts of Europe and the OECD

Some regions were barely affected by the crisis and others emerged from the crisis with fresh growth momentum. Polish regions avoided a recession, although growth has slowed since the 2007-08 crisis. The four large (TL2) regions in the Slovak Republic experienced a drop in per capita GDP in 2009, but returned to growth right after. Not all regions in Europe's east, however, were as quick to return to pre-crisis levels. Central Hungary, the West region in Romania, Central Bohemia and Moravia-Silesia in the Czech Republic, as well as Bulgaria's regions, grew at about median rates, but were a far cry from their robust pre-crisis growth rates. Outside of Europe the picture is more diverse. Korean regions retained solid growth between 2007-08 and 2015, albeit with a high dispersion. The growth rate in Chungcheong, the fastest growing region in Korea was, at 34%, double that of the slowest growing regions, the Capital Region (Seoul) and Gyeongnam Region. Most Chilean regions continued to support the country's course towards

economic convergence and some of the US states managed to recover from the crisis and grow by 10% or more between 2007-08 and 2015.[33]

No single factor is likely to explain success or failure in returning to growth

The diversity in growth paths of successful and struggling regions suggests that different factors contributed to regions' economic success – or the lack thereof. Resource-intensive economies had mixed growth paths, some regions lagging far behind their country's most prosperous and productive regions were able to narrow the gap, others fell further behind, and regions with large cities tended to perform well in some countries, but less so in others.

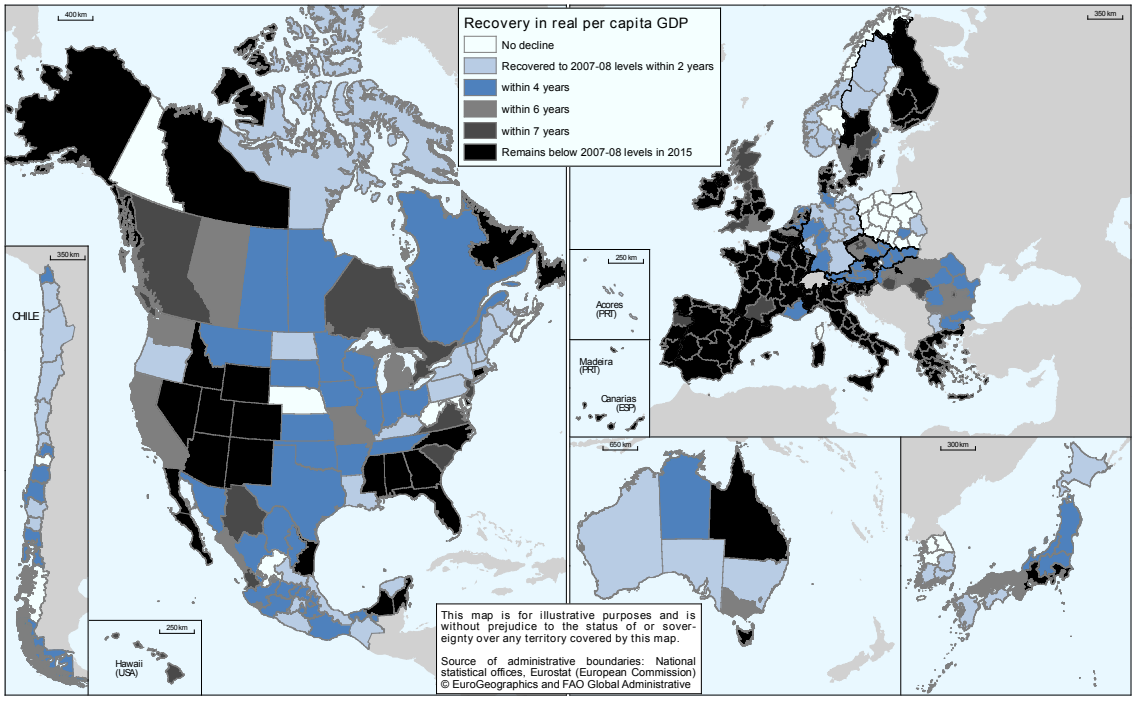
Combined, the pattern suggests that there are drivers that are specific to the regions and those that are common across all regions in the country (see also Chapter 2). The experience of Greek regions, those in Spain, Portugal or Ireland cannot be considered independent of the overall framework set by the structural policies in their country, the measures targeted towards fiscal consolidation in the aftermath of the euro area crisis or the macroeconomic trends that followed the introduction of a common currency in Europe.

The global 2007-08 crisis and the euro area crisis left their mark on Europe's regions

Despite the positive experience of many regions, a large percentage of regions have not recovered to pre-crisis levels of economic prosperity. By 2015, real per capita GDP in 135 out of 350 large (TL2) OECD regions remained below 2007-08 levels. Most of the regions that are still struggling with the aftermath of the crisis are located in Europe, with rapid recovery concentrated in Germany and in Europe's east, as well as in the northern regions of Scandinavia (Figure 1.10).

The lack of full recovery is not just concentrated in Europe. Outside of Europe, regions that have failed to recoup lost growth are diverse and include regions that are economically more advanced within their countries, e.g. Queensland in Australia, regions with important export-oriented sectors, such as Baja California in Mexico, or with strong tourism sectors, such as Nevada in the United States, resource-rich regions, such as Canada's Northwest Territories, Campeche in Mexico, or Alaska in the United States, as well as regions that have the lowest levels of economic development, e.g. Tasmania in Australia, or Alabama and Mississippi in the United States.

Figure 1.10. Real per capita GDP has started to recover, but many regions remain below pre−crisis levels



Note: The year refers to the first year that per capita GDP recovered to at least 2007-08 levels after the recession that was triggered by the 2007-08 crisis. Light grey areas indicate missing data.
Source: Calculations based on OECD Regional Statistics [Database].

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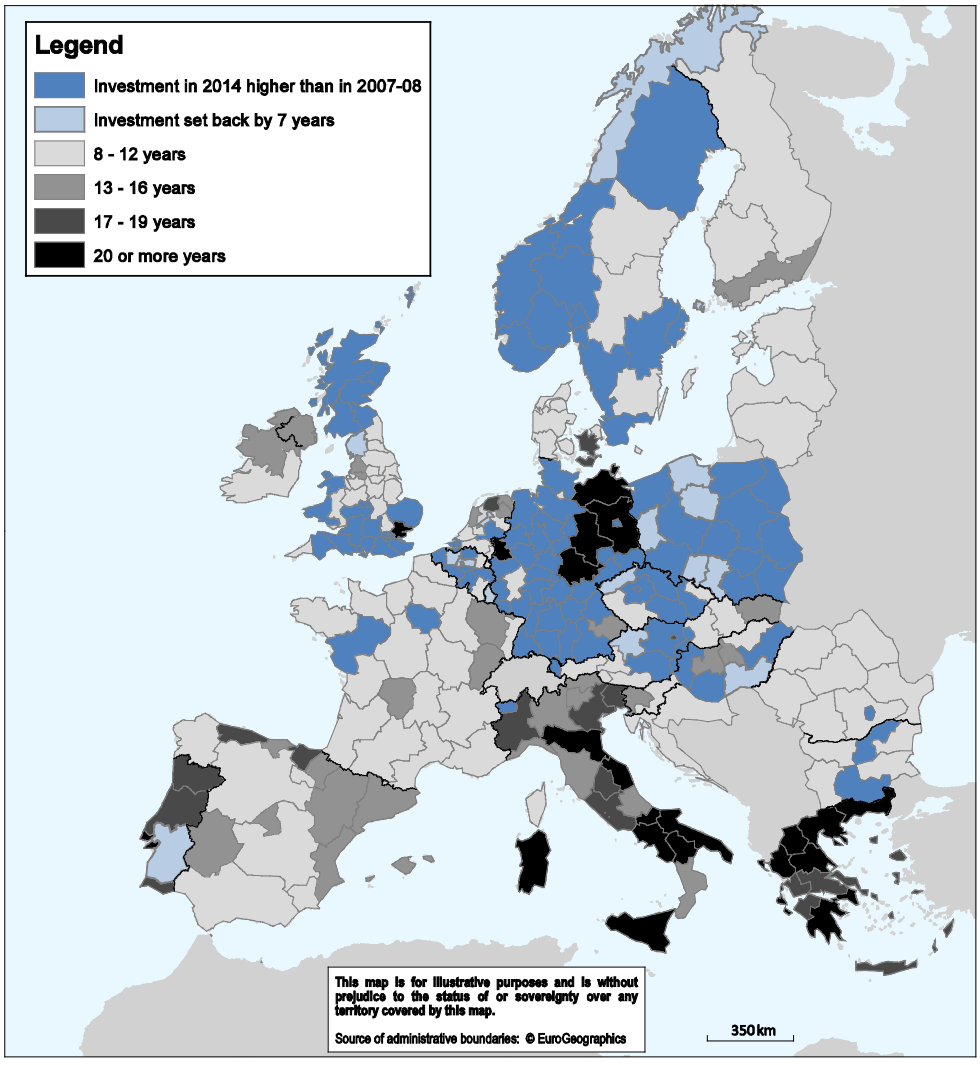
Investment remains low in many parts of Europe

Real per capita GDP is not the only economic indicator that has not returned to pre-crisis levels, capital investment, for example, exceeded pre-crisis levels in only about one-third of 253 European regions (NUTS 2) in 2014.[34] In some regions, the situation was even more dramatic. In more than 20% of the regions, investment in 2014 was below levels seen in the 1990s. Real gross fixed capital formation, measured in constant 2005 prices, was at levels that had been surpassed in the mid-1990s in most Greek and southern Italian regions. This slack performance was not confined to Europe's south. In 2014, investment levels in Dutch, Finnish or French regions, as well as parts of northern England – among others – trailed those in the early 2000s. Germany's eastern regions are notable as they seem to be as strongly affected by the crisis as Europe's south. Unlike other regions, investment followed a general downward trend in most of eastern Germany between 1994 and 2007.

Figure 1.11. Investment was set back by more than a decade in many regions

Gross fixed capital formation in 2014 measured in constant 2005 EUR compared to GFCF in previous years



Note: Regions in dark blue had higher levels of GFCF in 2014 than in 2007 or 2008. Light blue regions had levels in 2014 that were lower than in 2007 or 2008, but higher than in previous years. The grey hues and year bands indicate the number of years that had higher investment than that of 2014.
Source: Calculations based on Cambridge Econometrics (2017) European Regional Database [Database].

StatLink http://dx.doi.org/10.1787/888933707703

Private investment in OECD countries declined drastically in the wake of the 2007-08 crisis, with public investment falling from 2010 onwards. For private investment, year-on-year growth started to rebound in 2014, but public investment has continued its decline. Falling public investment is not only due to limits on overall public expenditures. As a percentage of total government expenditure, public investment declined from around 9.0-9.5% in the decade preceding the 2007-08 crisis to just 7.7% in 2014. While better governance, improvements in institutional quality and capacity to leverage private investment can improve the efficiency and effectiveness of public investment, the continued decline raises the concern of increasing underinvestment.[35] With capital

accumulation as one of the key drivers of growth,[36] a prolonged slowdown in investment raises the spectre of protracted stagnation and regions becoming permanently stuck in a "middle income trap".

Economic growth and, in some cases, productivity may suffer if there are investments for which the social return would easily outweigh the risk, but which are not undertaken by private investors. Such missing investment can result from the fact that benefits from investments can accrue not only to the investing firm, but also to other firms and residents. If the investing firm is unable to internalise this positive externality, e.g. by charging other firms for these benefits, the private returns to the firm from an investment might be insufficient and it decides to forego the investment. Typically, such cases occur if investments create substantial network effects or large spillovers. In order to overcome the co-ordination problem associated with such investments, public involvement is needed (Box 1.3).

Box 1.3. Public investment

The assumption that all returns from physical and human capital benefit only the firm that paid for the investment or the worker who undertook the training is unrealistic. Investing in transport infrastructure or the creation of a public university can create major benefits for the local economy. For some firms, benefits from these public investments can be huge: for instance, farmers or manufacturing firms can reap significant direct benefits from the development of transport infrastructure, as they can ship their products more cheaply, reach a larger market and can also import more easily inputs for their production process. The total value of agricultural land in the United States at the end of the expansion of the railway network in the late 19th century would have been 60% less without the expansion (Donaldson and Hornbeck, 2016[4]). Other firms may benefit less from such public investment, and even among manufacturers the gains from new infrastructure usually vary.

Total benefits of major investments can easily outweigh their costs, yet these projects are not undertaken by the private sector. This arises typically if there is a large number of beneficiaries and co-ordinating them or capture the value the investment creates for them is difficult. The role of the public sector is therefore crucial in areas where investment can create significant public benefits such as major transport infrastructure and other areas. Research and innovation in one firm can create positive spillovers for other firms in the area. As new technology or products become available, firms can learn from the example and build on these innovations. This might benefit the initial innovating firm (e.g. through patent license fees), but many benefits may arise without directly rewarding the initial innovator. Such spillovers can be highly localised and not extend beyond regional or even local borders.

Within Silicon Valley, innovating firms in different technological fields operate in close proximity. They seem to cover small, distinct but overlapping technological zones. In general, knowledge spillovers, measured by the rate of patent citations, decline rapidly with distance. For the United States, the citation rate halves in postal codes that are located 25-30 kilometres away from the initial patent compared to postal codes in the direct vicinity (Kerr and Kominers, 2015[5]). The reason is that proximity supports two channels through which knowledge spreads. 1) Firms learn from the example and knowledge gained by others, and 2) inventors move between firms or even into newly created businesses, as documented by Matray (2014[6]) or the United States.

Sources: Donaldson and Hornbeck (2016[4]), Kerr and Kominers (2015[5]) and Matray (2014[6]).

Productivity growth is necessary for sustained improvements in living conditions

The economic wealth of a nation is determined by its resources, its physical capital and by its working population that combines resources and capital to produce goods and services. Labour productivity is the amount of goods and services a worker can produce given a set of resources and time and essential in determining the overall income in a country. Indeed, across OECD countries, a large part of the difference in per capita income is due to differences in labour productivity. This affects workers directly, as the increasing dispersion in average wages is associated with growing differences in wages paid by more and those paid by less productive firms.[37] Labour productivity is not about using more time or effort, it is not about "working harder": Instead it is about making the best use of the available resources, it is about "working smarter".

Raising productivity is not only essential for overall economic growth, it also determines individual well-being. Sustainable wage growth, and thereby growth in living standards, requires that productivity keep pace with wage increases. The willingness (and capacity) of a firm to compensate their workers depends – to a large degree – on their productivity.[38] Of course, inclusive gains from growth are by no means automatic and a key policy challenge remains to ensure a fair distribution of the benefits created by economic growth.[39]

As pressures from an ageing workforce mount and efficiency gains are required to limit the strain on natural resources and the environment, higher productivity growth is becoming increasingly essential to sustain public budgets and to help regions escape the "middle income trap".

Employment and productivity growth are often difficult to reconcile

Different measures can lead to labour productivity growth. In firms, investment in training and new skill acquisition can make workers more effective or efficient, new processes or new ways of working in teams can raise the productivity of the workforce or new machinery or tools can reduce the time and effort workers have to spend for a given output. Productivity growth is "labour saving", i.e. fewer workers or fewer hours are required to produce the same amount of output. But productivity increases are not necessarily associated with job losses. If increased productivity leads to lower prices and increased demand for the product, firms and regional employment might expand along with increasing demand.

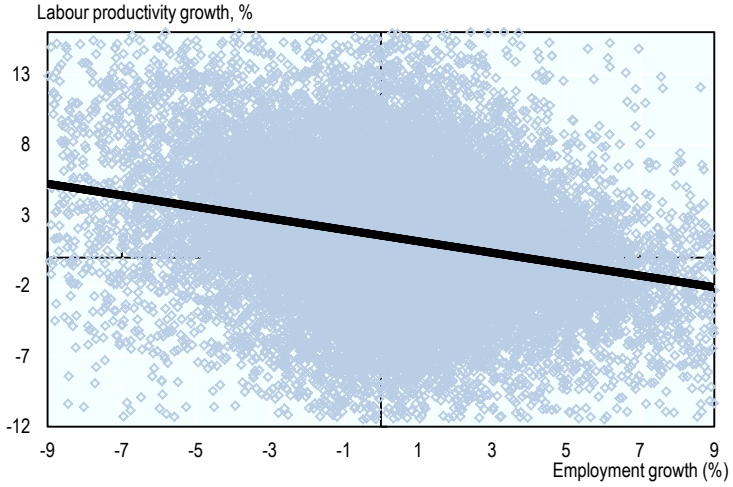
Another channel that increases productivity is to abandon the least productive activities, or to terminate the least productive jobs. If the economy is booming and demand is high, even firms with relatively low levels of productivity can find a niche and operate profitably. But if the economy slows down, the pressure for less productive firms to improve their productivity rises. If they fail to do so, they face the choice between accruing losses and closing down. This might affect the firm in aggregate or just certain parts of the business or certain jobs.[40] Firms might cut the parts of their business that are less productive and focus on their core activities. At the regional level, this also means that some firms will cease to operate and some people will lose their jobs. But since it is the least productive firms and jobs, this can result in increased regional productivity; although some people might be worse off, at least in the short term.

The relationship between employment and productivity growth in Europe is indeed negative in the aggregate. In regions with higher productivity growth, employment is expanding, on average, more slowly or sometimes not at all (Figure 1.12). The negative

relationship between productivity and employment growth has been fairly stable since the 1980s. No matter what year is selected, employment and productivity growth are negatively associated. But beyond the average, the data show massive dispersion of growth experiences, with many regions showing that productivity growth does not have to be combined with job losses.

Figure 1.12. Productivity grows, on average, faster in regions that experienced job losses

Year-on-year growth in labour productivity (real per worker GDP) and employment in Europe's small (NUTS3) regions, 1981-2014



Note: Each diamond corresponds to the year-on-year growth rate in labour productivity (per worker GDP in EUR at constant 2005 prices) and employment in small (NUTS 3) regions in Europe. Extreme observations (bottom and top percentile) are excluded. Trend lines depict the linear fit in the indicated year.
Source: Calculations based on Cambridge Econometrics (2017).

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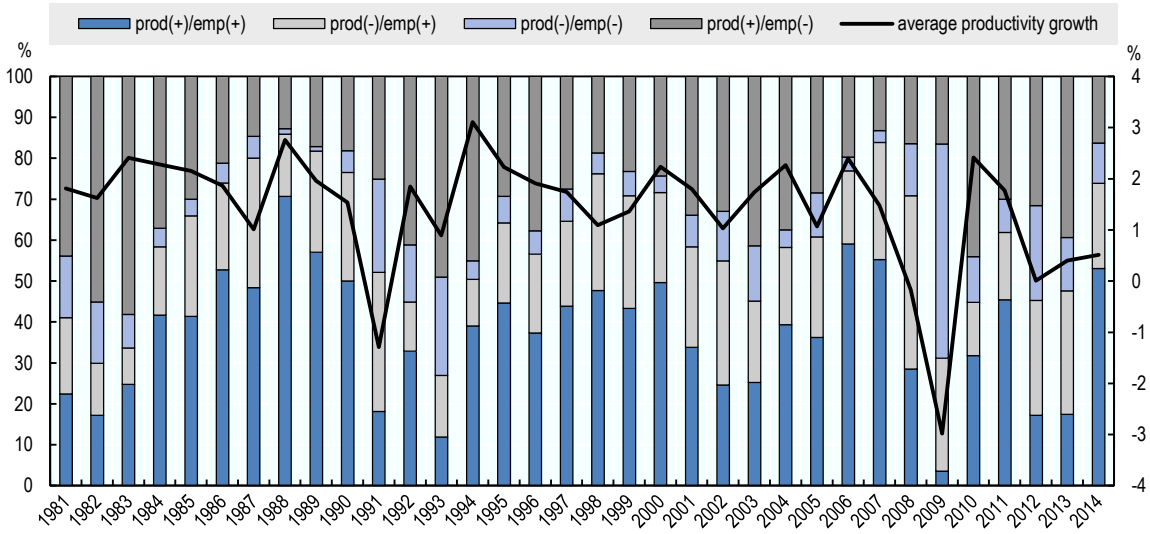
Some regions manage to create a win-win of productivity and employment growth

A large percentage of regions manage to combine productivity and employment growth, with the share of successful regions depending on the business cycle. In the years of economic expansion, the percentage of European regions (NUTS 3) that combined productivity and employment growth exceeded 40% in the late-1980s, late-1990s and mid-2000s. Conversely, employment declined in more than 40% of Europe's regions that experienced productivity growth after the recession of the early-1980s, early-1990s, early-2000s and the global crisis of 2007-08 (Figure 1.13).[41]

The adjustments during recession years are economically and socially costly. Often they follow after periods when an increasing number of regions saw an increase in employment at the cost of reducing average productivity in the region. These jobs might be associated with flourishing sales in more productive sectors and indicate growing demand for local services, to take just one example, but they might also indicate growing inertia in the reallocation of capital and jobs from less to more productive firms.[42]

Figure 1.13. Many regions combine employment and productivity growth

Percentage of small (NUTS3) European regions with positive/negative year-on-year employment and labour productivity growth



Note: Small (NUTS 3) regions in Europe are classified based on positive/negative year-on-year growth rates in labour productivity (per worker GDP in EUR at constant 2005 prices) and employment. Average productivity growth is the unweighted average across regions.
Source: Calculations based on Cambridge Econometrics (2017).

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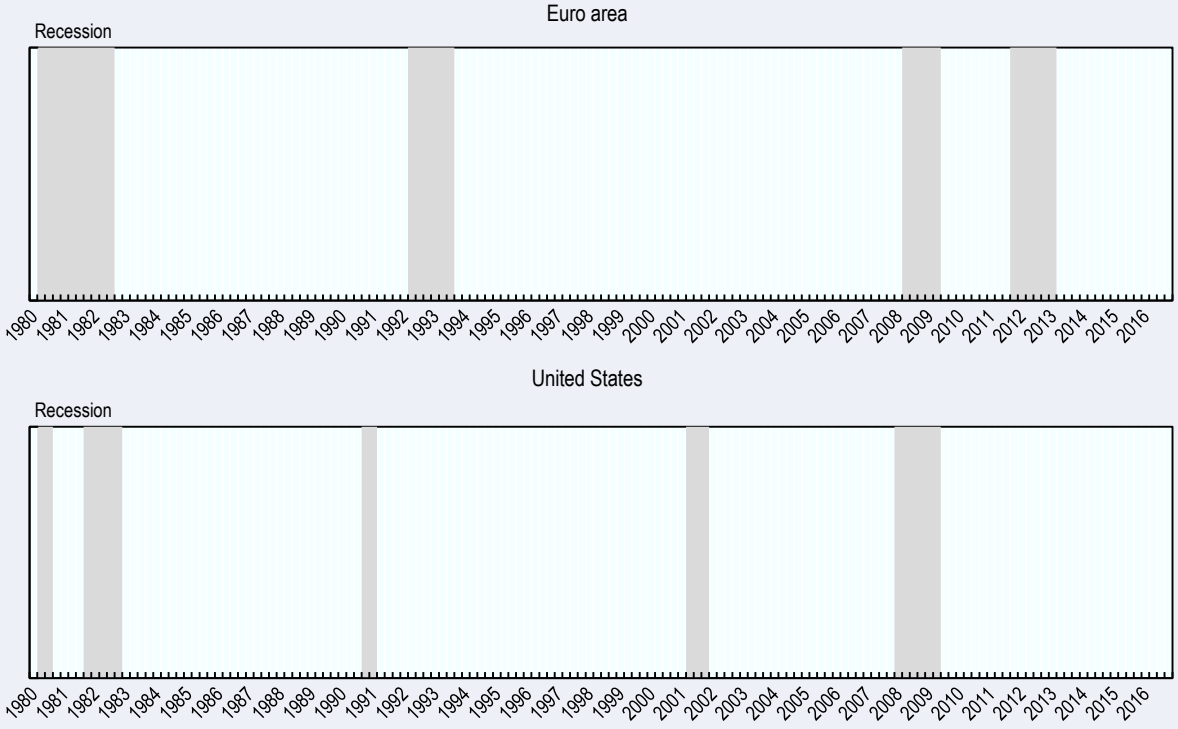
Box 1.4. Business cycles in the euro area and the United States

The euro area and the United States followed similar business cycles. The recession at the beginning of the 1980s was followed by an expansion until the early 1990s. The subsequent recession (Figure 1.14) came later to Europe than in the United States, but lasted longer. The recession following the burst of the dot-com bubble in the early 2000s affected parts of the euro area (e.g. Germany and France), but was less evident at the aggregate level. The global financial crisis of 2007-08 led to lasting recessions both in the euro area and the United States. In Europe, the short-lived recovery was followed by the sovereign debt crisis that kept many European economies in recession for several consecutive years.

Figure 1.14. Quarters of recession in the United States and the euro area



Note: Quarters of recession are indicated in grey. Recessions are shown from the quarter following the peak through the quarter of the trough (i.e. the peak is not included in the recession shading, but the trough is).
Sources: CEPR, *Euro Area Business Cycle Dating Committee*, http://cepr.org/content/euro-area-business-cycle-dating-committee (accessed 30 October 2017) and NBER, *US Business Cycle Expansions and Contractions*, www.nber.org/cycles.html (accessed 30 October 2017).

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The employment benefits of productivity growth are rarely immediate

Taking a long-term view, both productivity and employment tend to increase as the wealth and prosperity of countries grow. But creating employment benefits through productivity growth is not automatic.[43] Investment in physical and human capital can help

harness the potential for employment creation and overcome the short-term trade-off between productivity and employment growth.[44] As the capital stock deepens the productivity of additional hires increases as well. Similarly, an increase in worker skills raises their productivity and therefore employability in the more productive environment.

How quickly benefits materialise depends on the ability of the local economy to adjust. Capital locked in underperforming firms may have accumulated over years and barriers to its reallocation can hinder productivity growth. Recent research suggests that insolvency regimes that reduce barriers to corporate restructuring and the personal cost incurred by entrepreneurs and equity holders associated with firm failure may reduce the capital that is sunk in firms that fail to create profits large enough to cover the cost of their capital.[45] Internal restructuring and an expansion of incumbent firms, but perhaps more importantly expedient ways of entering and exiting the market, are the channels through which better insolvency regimes result in the reduction of sunk capital.

Setting framework conditions that favour the creation of new firms and the capacity of fast-growing firms to leverage their growth spurt can be particularly promising. Young firms tend to contribute disproportionately to employment growth (Criscuolo, Gal and Menon, 2014[7]) and among the young it is the small fraction of high-growth firms that drives growth (Calvino, Criscuolo and Menon, 2015[8]). In the United States, half of the productivity benefits from shifts in employment from less to more productive firms are driven by firms that are less than 10 years old, among these firms, 40% of the effect is through the expansion of employment in young high growth firms. The contribution is quite large given that firms that are less than 10 years old account for only 19% of total employment (Haltiwanger et al., 2017[9]).

Structural adjustment following the 2007-08 crisis was followed by job growth

A positive long-term outlook is little comfort for workers that find themselves without a job. Whether and how rapidly productivity growth can be leveraged for employment creation in subsequent periods varies between years (Box 1.5). Empirical estimates based on 30 years of data for European TL3 regions that take initial regional conditions and country and time aggregate effects into account, show that productivity growth in the previous year has little or no impact on job creation during boom periods.[46] In contrast, in the periods that followed the two major recessions in Europe, employment growth was, on average, higher in regions where productivity grew more. But the positive stimulus differs between the recession of the 1990s and recent global 2007-08 and euro area crises.

The major structural adjustments in the aftermath of the recent global financial and euro area crises seem to have ultimately created employment growth momentum through productivity growth in Europe. In regions where productivity grew more, jobs were created in the following year, while regions that experienced productivity decline were also struggling in terms of employment (Box 1.5). This positive stimulus is 3-5 times stronger than it was in the 1980s and 1990s. An increase in productivity by 10 percentage points in the previous year is associated with 1 percentage point higher employment growth in the current year for the period between 2009 and 2015 in OECD regions and 0.7 percentage points in European regions (until 2014). Productivity decline in the same order of magnitude is, however, associated with 0.7 and 0.4 percentage points lower employment growth, respectively.

A possible explanation for the strong positive effect in recent years is that, in the run-up to the 2007-08 crisis, investment in some European countries seems to have favoured less productive over more productive firms.[47] The inertia created by a build-up of

misallocated capital might have been corrected by the crisis and the reforms that followed.[48] The impact of the Great Recession following the 2007-08 crisis on job creation differs also in the United States. The "cleansing" effect of a recession normally forces less productive firms to close up shop and employment is subsequently reallocated from less to more productive firms. This pattern was less marked during the Great Recession as employment creation – in particular among young firms – was relatively slow compared to prior recessions.[49]

Box 1.5. Productivity growth, productivity decline and employment

More jobs are created in more productive regions and those with higher population growth

Employment grows, on average, faster in more productive regions in a country. Taking into account 1) current population growth, 2) a measure of (potential) supply of workers, and 3) the employment rate as a proxy for the "slack" in the local labour market, the estimate suggests that for each 10% difference in labour productivity between two regions in a country, employment growth is between 0.1 and 0.2 percentage points higher in the more productive region. The estimated impact is stable and highly statistically significant across different time periods considered (Table 1.1).

Given the productivity divides in some countries, expected differential in employment growth can be substantial. Labour productivity in Italy's most productive province, the city of Milan, was more than 40% higher than in the region of southern Italy's largest city, Naples. This difference implies that employment is expected to grow by more than half of a percentage point faster in Milan than in Naples.

The impact is further amplified as more productive regions also have higher population growth. Population growth, in turn, translates into employment growth at a rate of about 1 to 2, i.e. a 1% increase in the population in a region is associated with roughly half of a percent increase in employment. This holds for EU and OECD countries.

Productivity growth is followed by job growth, but only after the 2007-08 crisis

Productivity growth is often associated with a decline in employment. Using data for the last 30 years, productivity and employment growth are, at least on average, negatively correlated. This means that regions where productivity grew faster were growing slower or even declining in total employment. But this contemporaneous pattern might miss the adjustment in the sectors and firms that can generate subsequent employment growth.

Data from the early 1980s onwards shows little evidence of an employment boost following productivity growth in the previous period. To the contrary, the period between the early 1980s and the new millennium shows a positive impact of productivity decline on employment growth (I and IV in Table 1.1). A 10 percentage point decline in productivity in the previous year is associated with 0.5 percentage point higher employment growth in the current year for the pre-2000 period. A further breakdown shows that this relationship is driven by developments in the 1980s and early 1990s and disappears as the 1992-93

recession hit.

Unlike before the 1992-93 recession, there seems to be no association between productivity growth and job growth before the 2007-08 crisis (II and V in Table 1.1). The adjustments, which are evident in the data, followed the massive shock to the labour market that took place through the crisis years and beyond. Those regions where productivity have grown since 2009 have, on average, also created more jobs, whereas regions that experienced productivity decline were also declining in terms of employment (VI and VII in Table 1.1).

Table 1.1. Employment dynamics in NUTS 3/TL3 regions

Multivariate regressions with employment growth in year t as the dependent variable

	(I)	(II)	(II)	(IV)	(V)	(VI)	(VII)
ln(Productivity in t-1)	0.02***	0.02***	0.02***	0.01***	0.02***	0.02***	0.01***
	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.003)
Productivity growth	0.01	0.00	0.05***	0.02*	-0.00	0.07***	0.10***
(t-1)	(0.004)	(0.009)	(0.008)	(0.008)	(0.013)	(0.013)	(0.016)
Productivity decline				-0.05***	0.02	0.04*	0.07***
(t-1)				(0.011)	(0.021)	(0.014)	(0.015)
Population growth	0.45***	0.44***	0.27***	0.42***	0.44***	0.28***	0.41***
(t)	(0.018)	(0.048)	(0.035)	(0.022)	(0.048)	(0.035)	(0.047)
Employment rate	-0.02***	-0.02***	-0.01***	-0.02***	-0.02***	-0.01***	-0.00***
(t-2)	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)	(0.002)	(0.000)
Observations	35 912	8 415	7 310	17 675	8 415	7 310	6 050
Regions (NUTS 3/TL3)	1 332	1 318	1 314	1 311	1 318	1 314	1 276
R^2	0.190	0.203	0.312	0.224	0.203	0.312	0.310
Years	1983-2014	2000-2006	2009-2014	1983-1999	2000-2006	2009-2014	2009-2015
Fixed Effects	country; year	country; year	country; year	country; year	country; year	country; year	country; year
Area	EU	EU	EU	EU	EU	EU	OECD

Note: Population refers to the total resident population in the region, employment to total employment at place of work, the employment rate is the ratio of the two variables and (labour) productivity is the ratio of total GDP in EUR at constant 2005 prices. Growth rates are calculated as the difference in the natural logarithm between the indicated year and the year prior (e.g. employment growth in t for t= 2010 is calculated as ln(employment in 2010) – ln(employment in year 2009). In specifications IV-VII, productivity growth is separated into positive (growth) and negative (decline) values allowing for a different impact of prior productivity growth and decline on employment growth. The data covers small regions (TL3 in the OECD classification, NUTS3 in the EU classification). Countries included in the EU sample are BE, BG, CZ, DE, DK, EE, EL, ES, FI, FR, HR, HU, IE, IT, LT, LU, LV, MT, NL, PL, PT, RO, SE, SI, SK, UK, The OECD sample excludes BG, NO, RO and includes CH, LU, KR, NZ in that list.
Source: Calculations based on OECD Regional Statistics [Database] and Cambridge Econometrics (2017) European Regional Database [Database].

Regional productivity growth in OECD countries mainly follows two models: catching up or concentration

The impact of regional productivity catching-up on the aggregate productivity of countries can be illustrated by the contribution of each region to the aggregate GDP growth rate, as well as the regional contribution to the growth rate of national productivity. The regional contribution to GDP growth is straightforward; it is simply the growth rate between *t* and *t-1* of each region multiplied by the share of that region in the national GDP in the period *t-1*. The contribution to aggregate productivity is more complicated because labour productivity is a ratio. In this study, a counterfactual calculation has been used instead. It corresponds to the theoretical aggregate productivity without a given region. If, under this counterfactual, the aggregate productivity is higher than national average that means that a given region contributes negatively to the aggregate growth rate, and vice-versa.[50]

From this perspective, two types of countries emerge (Bachtler et al., 2017[10]). The first category (Type-I) comprises countries such as Austria, Germany, Czech Republic, Spain, Italy, Poland, Portugal or Romania.[51] Frontier regions have typically big contributions to GDP growth because they are large, but in these countries they have much smaller or even negative contributions to aggregate productivity growth. Most of the productivity performance of these countries is therefore the result of lagging regions' efforts to catch up to the frontier regions. Put differently, the frontier regions sustain high productivity levels, but productivity growth dynamics occur elsewhere in the country. Regional policy favouring the productivity performance of lagging regions acts as an important driver of a country-wide growth strategy. Interestingly, the convergence of lagging regions in a country may also depend on the interaction with frontier regions. For example, the growth of rural regions close to cities tends to be much higher than the growth of remote rural regions (OECD, 2016[1]).

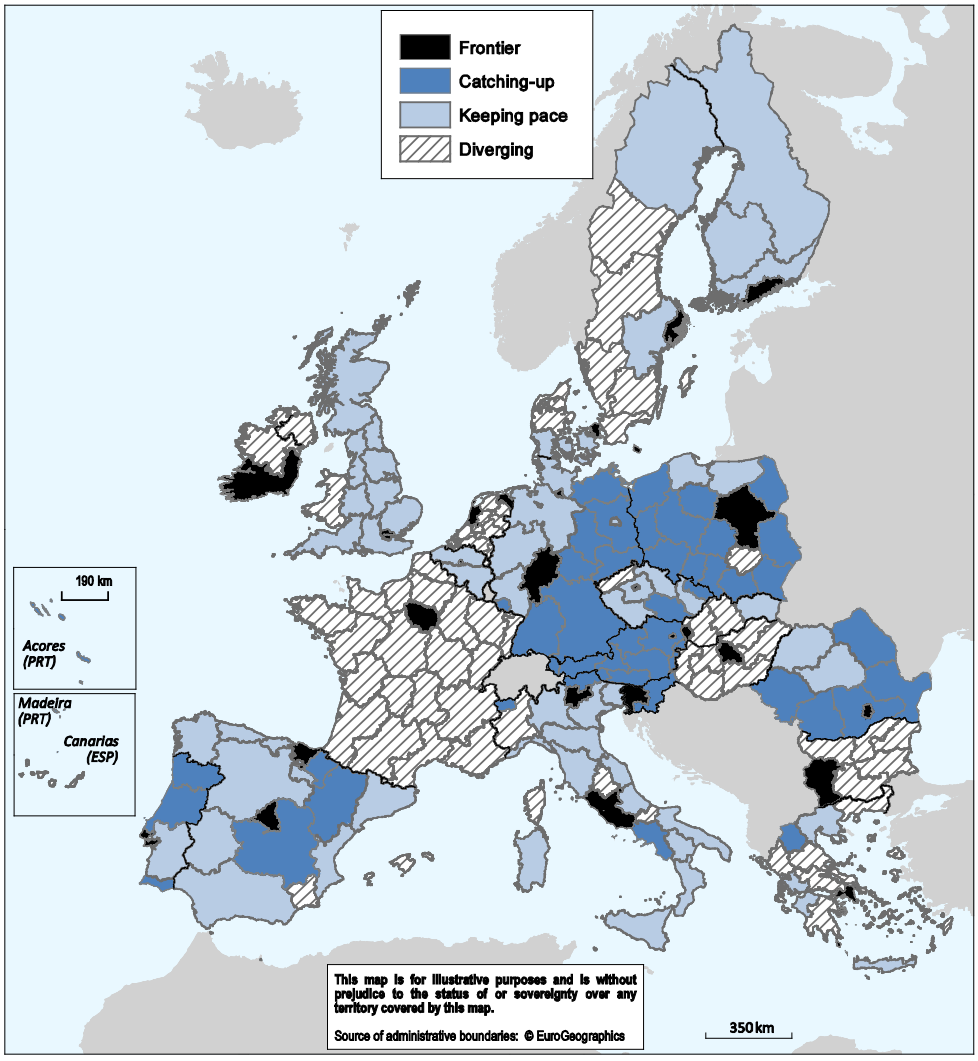
The second category (Type-II) includes countries such as Bulgaria, Denmark, France, United Kingdom, Greece, Hungary, Netherlands, Slovak Republic or Sweden. In these countries, both GDP growth and aggregate productivity growth are dominated by the frontier regions. This means that most of the growth dynamics are concentrated at the frontier, with limited effects from the catching-up process. Often, these frontier regions correspond to the largest city in the country, where agglomeration effects are maximised. Such a strong territorial asymmetry may signal a potential for productivity catching-up at the regional level that has not yet materialised or could be further mobilised.

The composition of each group accounts for the diversity of countries in Europe: developed economies, low-income and low-growth countries. These two patterns of regional dynamics are strikingly contrasted in the EU (Figure 1.15). There seems to be little middle ground as most countries see their growth either driven by their frontier or by a catching up of less productive regions.

In the Type-I countries, there are several regions converging to the country frontier, which contribute significantly to the aggregate productivity (e.g. Germany or Poland). In the Type-II countries, most of regions are diverging or maintaining large gaps vis-à-vis the frontier (e.g. France or the United Kingdom). Therefore, the aggregate productivity is mainly determined by the performance of the frontier (Figure 1.15).[52]

Figure 1.15. Productivity dynamics at the regional level in the EU

Classification of TL2 regions, 2000-14



Note: Catching-up/diverging regions grew by at least 5 percentage points in 14 years more/less than their national frontier over the 2000-14 period. The frontier is defined as the aggregation of regions with the highest GDP per worker and representing 10% of national employment.
Source: Calculations based on OECD Regional Statistics [Database].

StatLink http://dx.doi.org/10.1787/888933707779

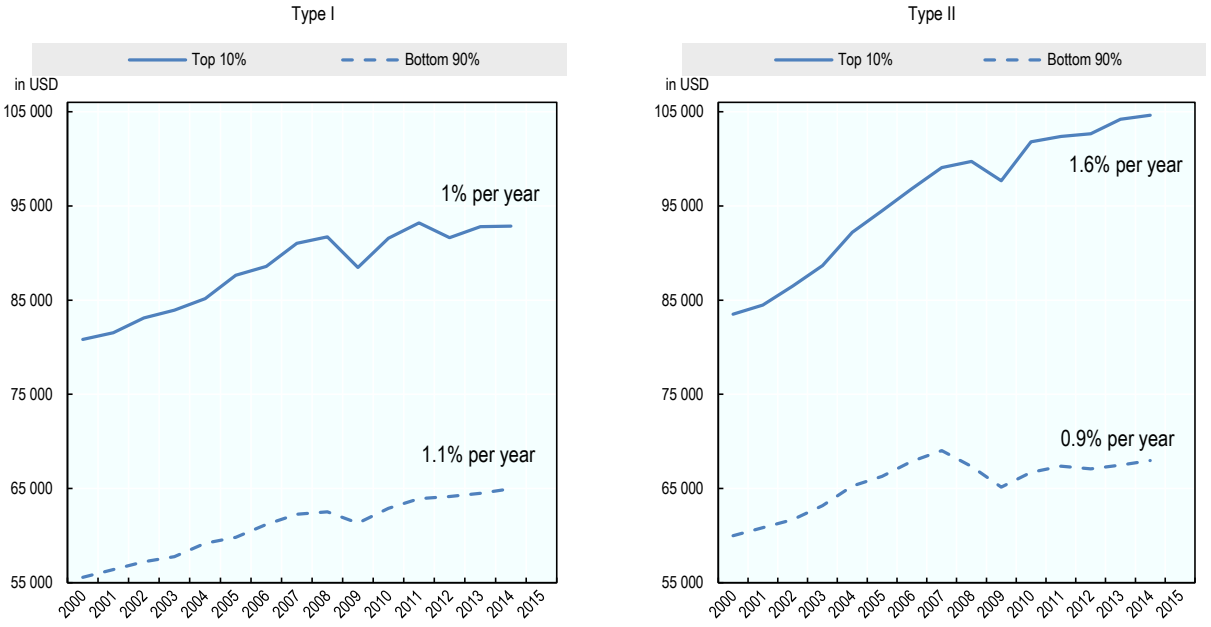
There may be certain trade-offs between being concentrated or more dispersed when it comes to generating aggregate productivity. As shown in Figure 1.16, the regional frontier in Type-I countries is less dynamic than in Type-II. The former grew, on average, at a rate of 1% per year during the period 2000-14, while the latter increased at an annual growth rate of 1.6%. As the lagging regions in type-I countries grew on average at a rate of 1.1% per year, this implies a slow convergence process. In Type-II, the lagging regions have grown only at 0.9% per year, implying that most regions are diverging.

All of the above suggests that there may be untapped potential to increase country-wide productivity by improving the performance of regions. This is the main argument

underpinning the case for regional policy. Indeed, governments should not only address regional disparities on the basis of territorial equity objectives alone, but also as a way of increasing aggregate productivity growth. In this way, regional policy can be considered an integral part of the structural policy package targeted to enhance growth potential of countries as a whole.

Figure 1.16. The challenge of combining dynamic growth and catching up

Annual average labour productivity (per worker GDP in USD at constant prices and PPPs of 2010) in small (TL3) regions



Note: Type I countries are those with strong regional catching-up dynamics in terms of labour productivity across regions, while Type II countries experienced divergence of most regions and the productivity advantage in the most productive "frontier" regions increased. Type I countries are AUT, CZE, DEU, ESP, ITA, POL, PRT, and ROU; Type II countries are BGR, DNK, FIN, FRA, GBR, GRC, HUN, NLD, SVK, and SWE.
Source: Calculations based on OECD Regional Statistics [Database].

StatLink http://dx.doi.org/10.1787/888933707798

Inaction comes at the price of growing inequality and a "geography of discontent"

The repercussions of letting regions fall behind can be severe. Inequality is rising and transfers cannot substitute for true opportunities. Across the OECD, a "geography of discontent" has been emerging, expressing itself in dissatisfaction with global trends, diversity and established policies. General discontent with the status quo, particularly the downsides of open and globalised economies are dominating the public discussion and people's perceptions, rather than the tremendous benefits they create. When people feel they are being left behind, these open and globalised economies become difficult to sustain.

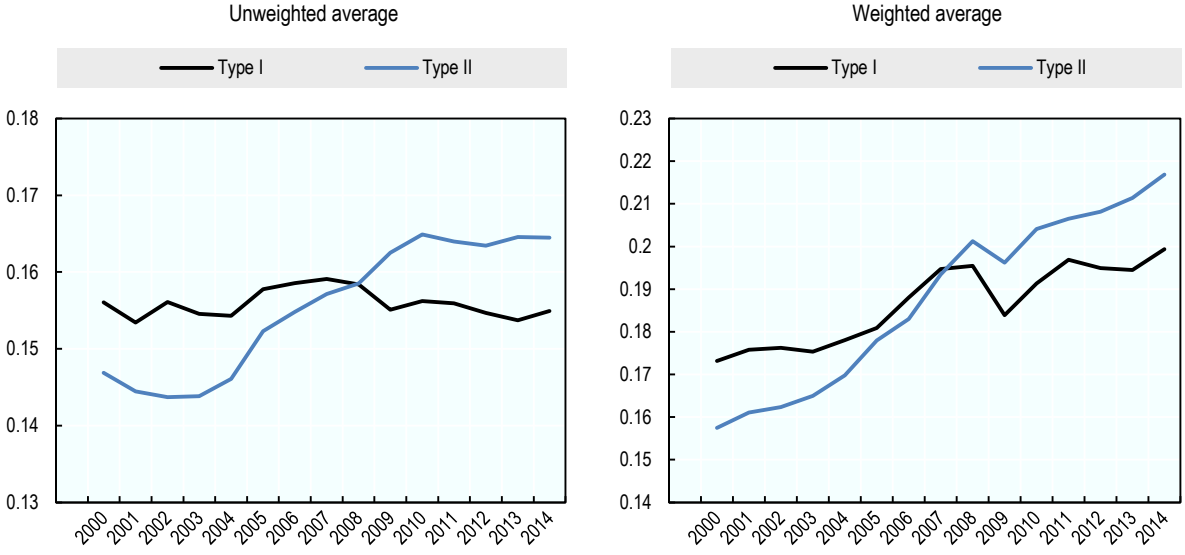
Many dividing lines can be drawn with respect to discontent in OECD countries. Commentators highlight different attitudes and ways to express discontent for the young and the old, those with high or low levels of education, the employed and the unemployed

or the well-off and the poor. What is striking is that there is usually a clear spatial dimension to the discontent. This "geography of discontent" highlights that building resilient regions that can adapt to the challenges and opportunities created by globalisation and industrial transition is not only an economic prerogative, but necessary to ensure social cohesion.

A growing divide in countries that seize opportunities is no foregone conclusion, historically catching-up in both fast- and slow-growing countries has kept inter-regional inequalities in check. In contrast, countries where the economy became increasingly concentrated over the 2000-14 period also saw inequality rise (Figure 1.17). Per capita GDP inequality, measured by the Gini coefficient remained stable across regions in countries where regions managed to "catch up" to their country's frontier in terms of labour productivity. In contrast, inequality increased in countries where the frontier regions kept pulling away from other regions. Inequality between more and less populous TL3 regions amplifies the overall trend. Weighted inequality grew continuously and faster than unweighted inequality indicating an increasing gap between more populous TL3 regions and smaller ones throughout the 2000-14 period. This implies that more populous regions were more likely to have either relatively high or relatively low levels of income.

Figure 1.17. Inequalities grow when regions fail to catch up

Per capita GDP inequality (Gini coefficient) in TL3 regions, 2000-14



Note: Type I countries are those with strong regional catching-up dynamics in terms of labour productivity across regions, while Type II countries experienced divergence of most regions and the productivity advantage in the most productive "frontier" regions increased. Type I countries are AUT, CZE, DEU, ESP, ITA, POL, PRT, and ROU; Type II countries are BGR, DNK, FIN, FRA, GBR, GRC, HUN, NLD, SVK, and SWE. Per capita GDP inequality with GDP measured in USD at constant 2010 prices and purchasing power parities. The simple average assigns the same weight to each region; the weighted average gives more weight to more populous regions.
Source: Calculations based on OECD Regional Statistics [Database].

StatLink http://dx.doi.org/10.1787/888933707817

There are no quick fixes to a growing geography of discontent. But raising the productivity of the workforce is a crucial long-term goal. It is necessary to ensure that living standards can be maintained given that in an ageing society dependency rates are likely to further increase in the future. A focus on individual regions might have growth benefits in some countries, but it risks missing growth opportunities that arise in all types of regions. Leveraging this potential is often more difficult, there is no "one-size-fits-all" strategy for regional development. Policies should not aim to retain people in certain regions, sectors or firms if there is no growth potential and might even support them to move to seek better opportunities. But there should also not be the conception of a "flat world", where all regions are equal. The difficult balance is to not lock people in places through continuous subsidies, but rather give them a chance to grow where they are.

Leveraging growth potential requires constant efforts, e.g. through continuous investment in worker skills. Globalisation and technological progress require new and evolving skill sets and ensuring that workers are ready for future jobs is essential. Productivity is directly linked to material living conditions as it raises workers' wages and ensures that their jobs are not only here today, but remain tomorrow.

Notes

1. Borrowing from William Easterly's (2001[29]) famous "The Elusive Quest for Growth".
2. Moretti (Moretti, 2012[18]) documents the "great divide".
3. In the short term, boom periods are often followed by slow growth or even recession. The euro area has gone through five cycles in which high growth was followed by periods of low growth since the 1970s. Recessions, i.e. periods of economic decline, were part of all five cycles. Centre for Economic Policy Research: Euro Area Business Cycle Dating Committee, available at http://cepr.org/content/euro-area-business-cycle-dating-committee (accessed 19 June 2017).
4. See e.g. McCann (2016[2]) for a UK-centric discussion.
5. E.g. the OECD Regional Outlook 2014 (OECD, 2014[45]) argues that complementary investment is required to leverage the growth potential of infrastructure investments. Duranton (2011[30]) warns against an excessive focus on policies that aim to affect productivity directly and suggests to focus on reducing costs of agglomeration and attracting workers.
6. In Paul Krugman's words: "[p]roductivity isn't everything, but in the long run it is almost everything. A country's ability to improve its standard of living over time depends almost entirely on its ability to raise its output per worker" (Krugman, 1995, p. 11[21]).
7. See the OECD Regional Outlook country pages (OECD, 2016[1]) for Korea and Turkey and http://ec.europa.eu/regional_policy/en/policy/what/territorial-cohesion/ (accessed 18 October 2017).
8. The five targets are focused on employment, research and development, climate change and energy sustainability, education and fighting poverty and exclusion. http://ec.europa.eu/regional_policy/en/policy/what/investment-policy/ (accessed 14 November 2017).
9. See OECD (2014[47]) on how to integrate well-being indicators in policy making, including additional examples and OECD (2016[42]) for a focus on the Danish example.

10. See also European Commission (2017[27]) for evidence of declining disparities along different dimensions.

11. In addition to growing economic gaps, the disparity in the social fabric has widened in many countries as well. The gap between the region with the highest percentage of post-secondary education and the region with the lowest percentage increased in most OECD countries between 2000 and 2014 (OECD, 2016[46]).

12. "Low-income" regions in Europe are defined as part of the EU Lagging Regions Initiative as those with less than 50% of EU-average per capita GDP in 2000 (European Commission, 2017[11]).

13. See e.g. Gill and Kharas (2015[24]) for a critical discussion.

14. "Low-growth" regions in Europe are defined by the EU Lagging Regions Initiative as those regions with less than 90% of EU-average per capita GDP in 2000 and less than EU-average per capita GDP growth over the 2000-13 period (European Commission, 2017[11]).

15. Calculations based on Cambridge Econometrics (2017) European Regional Database [Database]. Countries where the most productive region did not change are Austria, Bulgaria, Czech Republic, Germany, Denmark, Finland, France, Hungary, Norway, Poland, Portugal, Romania, Sweden and the United Kingdom. Change occurred in Belgium, Greece, Spain, Italy and the Netherlands.

16. The great divide documented by (Moretti, 2012[18])

17. See OECD (2016[1]) and Lembcke and Maguire (2017[19]).

18. Calculations based on OECD Regional Statistics [Database]. Bavaria's labour productivity (measured in gross value added per capita) grew by 0.84% annually over the 2000-14 period, Hamburg and Hesse combined grew at 0.28%. In 2014, labour productivity was USD 77 000 at constant 2010 prices and purchasing power parities for Bavaria and USD 83 700 for Hamburg and Hesse (combined).

19. See Storper et al. (2015[14]) for a comparison of the development since the 1970s in the two combined metropolitan statistical areas.

20. Following Cronon (1991[32]), see the foreword of Combes, Mayer and Thisse (2008[33]) for further delineation between "first nature" and "second nature" in Economic Geography.

21. As an example, see Angerer et al. (2009[38]) for a projection of demand for raw materials that is expected to arise from future innovations.

22. The trade-off between economies of scale and transport costs is at the core of models that follow "New Economic Geography" theory (Fujita, Krugman and Venables, 1999[25]). When scale economies are not limited, "natural" monopolies emerge and single producers dominate the market.

23. Examples are CRH PLC, which employs 87 000 people in about 3 800 locations www.crh.com/our-group (accessed 15 November 2017) and HeidelbergCement, which employs around 60 000 people in more than 3 000 locations www.heidelbergcement.com/en/company (accessed 15 November 2017).

24. The most productive "frontier" regions are those regions with the highest values of per worker GDP in a country that account for at least 10% of total employment (OECD, 2016[1]).

25. See Ahrend et al. (2017[39]) for evidence for five OECD countries.

26. Predominantly rural areas are those with at least 50% of the population living in low-density areas (grid cells in Europe, local units, e.g. municipalities in non-European OECD countries), intermediate areas have 20-50% of their population in low-density grid cells in Europe and 15-50% in local units in non-European OECD countries (OECD, 2016[49]).

27. See Lee (2016[20]) for a macroeconomic view on the economics of ageing societies.

28. Excludes countries without predominantly rural TL3 regions.

29. See OECD (2015[48]) and The State of European Cities 2016 (European Commission and UN-HABITAT, 2016[43]) for recent estimates on global urbanisation trends.

30. For Europe, total urbanisation actually declined between 1990 and 2015 (European Commission, 2016[28]). The flow into metropolitan areas is therefore not only a shift from rural to urban areas, but also from smaller to larger urban agglomerations.

31. The onset of the crisis occurred at different points in time in different countries and regions. Consequently, the analysis considers the larger of the two values for per capita GDP in 2007 and 2008 as the peak of the growth period and the lower of the two values as the starting point for its development since the crisis.

32. See also Annex Figure 1.A.1, which zooms into the left panel of the figure and shows the regions' TL2 codes.

33. North Dakota is the notable exception, with per capita GDP growth of more than 45% both before and since the crisis, most likely driven by the natural resource boom in the state.

34. NUTS 1 regions where data for NUTS 2 regions was not available.

35. This argument is echoed by OECD (2016[1]) and European Commission (2017[27]). The absence of EU cohesion policy during the 2007-08 crisis in particular might have created even bigger investment shortfalls in many parts of Europe.

36. See e.g. Young (1995[12]), who highlights the key role of factor accumulation (labour participation, skills and capital) in explaining successful growth in East Asian countries.

37. See (OECD, 2015[44]) for details.

38. Basic economic models of wage setting find that firms pay wages equal to the value marginal product of a worker, i.e. the value of the additional output produced by the worker's efforts. In more elaborate models (e.g. Equilibrium Search and Matching Framework) productivity still determines part of the wage, but another part depends on the shared benefit (the economic rent) that is created for the firm as a job is filled. See Mortensen and Pissarides (1994[17]) and Burdett and Mortensen (1998[35]) for the seminal models in this literature.

39. See e.g. OECD (2016[16]) for a discussion on how to boost productivity and simultaneously reduce inequalities.

40. An extreme view was propagated by Jack Welch (2005[13]), dubbed "manager of the century" by Fortune Magazine (1999[34]), who famously promoted a "differentiation" strategy that ranked employee performance and argued that termination of the bottom-10% performers was the only way for companies to go forward.

41. Baily, Bartelsman and Haltiwanger (1996[37]) document a similar variation in US manufacturing firms that managed to combine productivity and employment growth and those that did not. They find that manufacturing plants that increased both employment and productivity contributed almost as much to overall productivity growth in the 1980s as those that increased productivity while reducing employment.

42. Adalet McGowan, Andrews and Millot (Adalet McGowan, Andrews and Millot, 2017[40]) document a large and rising percentage of firms that struggle to meet their interest payments, which is partly linked to prevailing insolvency regimes that limit restructuring and reallocation of capital and labour towards more productive firms (Adalet McGowan, Andrews and Millot, 2017[41]).

43. See e.g. Boulhol and Turner (2009[36]) for a model that also considers heterogeneous labour and that shows the importance of taking the local demographic structure into account when assessing the productivity-employment relationship.

44. Gordon (1997[22]) outlines the argument that capital investment and divestment create a dynamic path that leads to unemployment reduction after an initial structural shock to the economy…a shock that results in higher growth in productivity and unemployment.

45. Cross-country evidence for OECD countries based on a policy indicators on insolvency regimes constructed based on a recent OECD questionnaire to member countries (Adalet McGowan, Andrews and Millot, 2017[41]).

46. See Dew-Becker and Gordon (2012[31]), who discuss why the impetus from deregulation and improved labour market flexibility in Europe seems to not have led to productivity and employment growth between the mid-1990s and the onset of the global crisis.

47. Misallocation seems to be prevalent in parts of Europe and likely contributed to low growth before the crisis. Researchers have proposed several explanations for the increase in misallocation. Gopinath et al. (2017[23]) suggest that the trends towards capital misallocation in Europe's south arise from financial friction. As interest rates were declining and investment opportunities were opening up, firms that had higher net worth – and therefore collateral – were able to invest more than firms with low net worth. But firms with high net worth were not necessarily more productive, which led to an imbalance in investment and lower returns. For Portugal, Reis (2013[15]) stresses the role of an underdeveloped domestic credit market that favoured lending in less-productive non-tradable sectors.

48. Whether this has fully materialised is not clear. At least one study fails to find evidence for improved allocation of capital in Spain (Gopinath et al., 2017[23]). Taking the dispersion of return on capital as a measure of misallocation – the idea being that the wider the spread in returns the more room exists for better allocation of capital – the authors find that misallocation accelerated in Spain between 2008 and 2012.

49. See Foster, Grim and Haltiwanger (2016[26]) for details.

50. For more details see OECD (2016[1]).

51. For the individual country productivity profiles, the reader can refer to the country pages of the OECD regional Outlook 2016 (OECD, 2016[1]).

52. See Bachtler et al. (2017[10]) for more detail.

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Annex 1.A. Low-growth and low-income regions in Europe

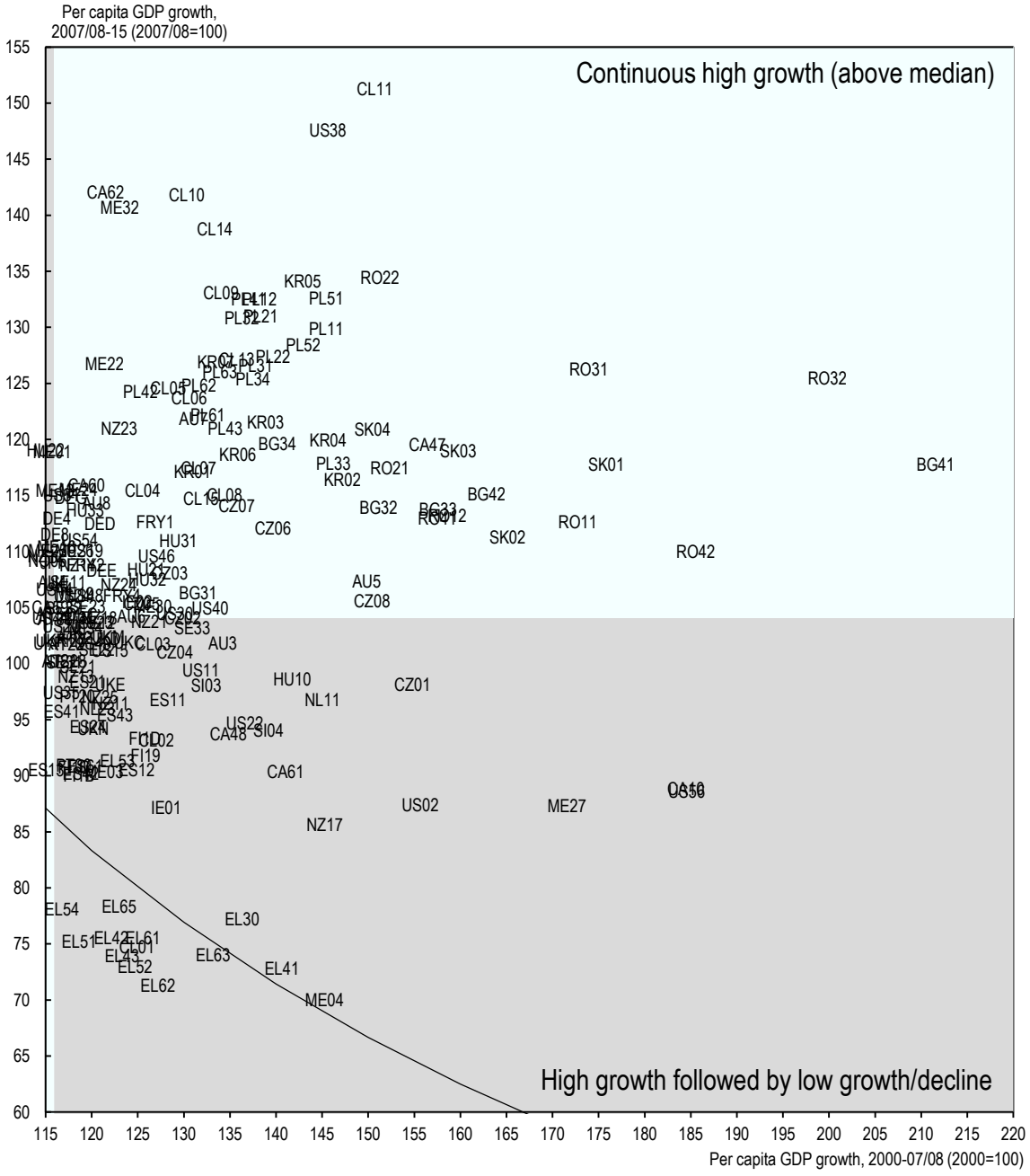
Annex Table 1.A.1. Classification of European low-growth and low-income regions

Low-growth regions		Low-income regions	
NUTS 3	Name	NUTS 3	Name
ES42	Castilla-La Mancha	BG31	Severozapaden
ES61	Andalucía	BG32	Severen tsentralen
ES62	Región de Murcia	BG33	Severoiztochen
ES64	Ciudad Autónoma de Melilla	BG34	Yugoiztochen
ES70	Canarias	BG42	Yuzhen tsentralen
GR11	Anatoliki Makedonia, Thraki	HU23	Dél-Dunántúl
GR12	Kentriki Makedonia	HU31	Észak-Magyarország
GR13	Dytiki Makedonia	HU32	Észak-Alföld
GR14	Thessalia	HU33	Dél-Alföld
GR21	Ipeiros	PL31	Lubelskie
GR22	Ionia Nisia	PL32	Podkarpackie
GR23	Dytiki Ellada	PL33	Świętokrzyskie
GR24	Sterea Ellada	PL34	Podlaskie
GR25	Peloponnisos	PL62	Warmińsko-Mazurskie
GR41	Voreio Aigaio	RO11	Nord-Vest
GR43	Kriti	RO21	Nord-Est
ITF1	Abruzzo	RO22	Sud-Est
ITF2	Molise	RO31	Sud - Muntenia
ITF3	Campania	RO41	Sud-Vest Oltenia
ITF4	Puglia		
ITF5	Basilicata		
ITF6	Calabria		
ITG1	Sicilia		
ITG2	Sardegna		
PT11	Norte		
PT15	Algarve		
PT16	Centro (PT)		
PT18	Alentejo		

Source: European Commision (2017[11]).

Annex Figure 1.A.1. For some regions the 2007-08 crisis halted growth only briefly, others entered prolonged decline

Per capita GDP growth before/since the 2007 08 crisis in regions with above median growth before the crisis

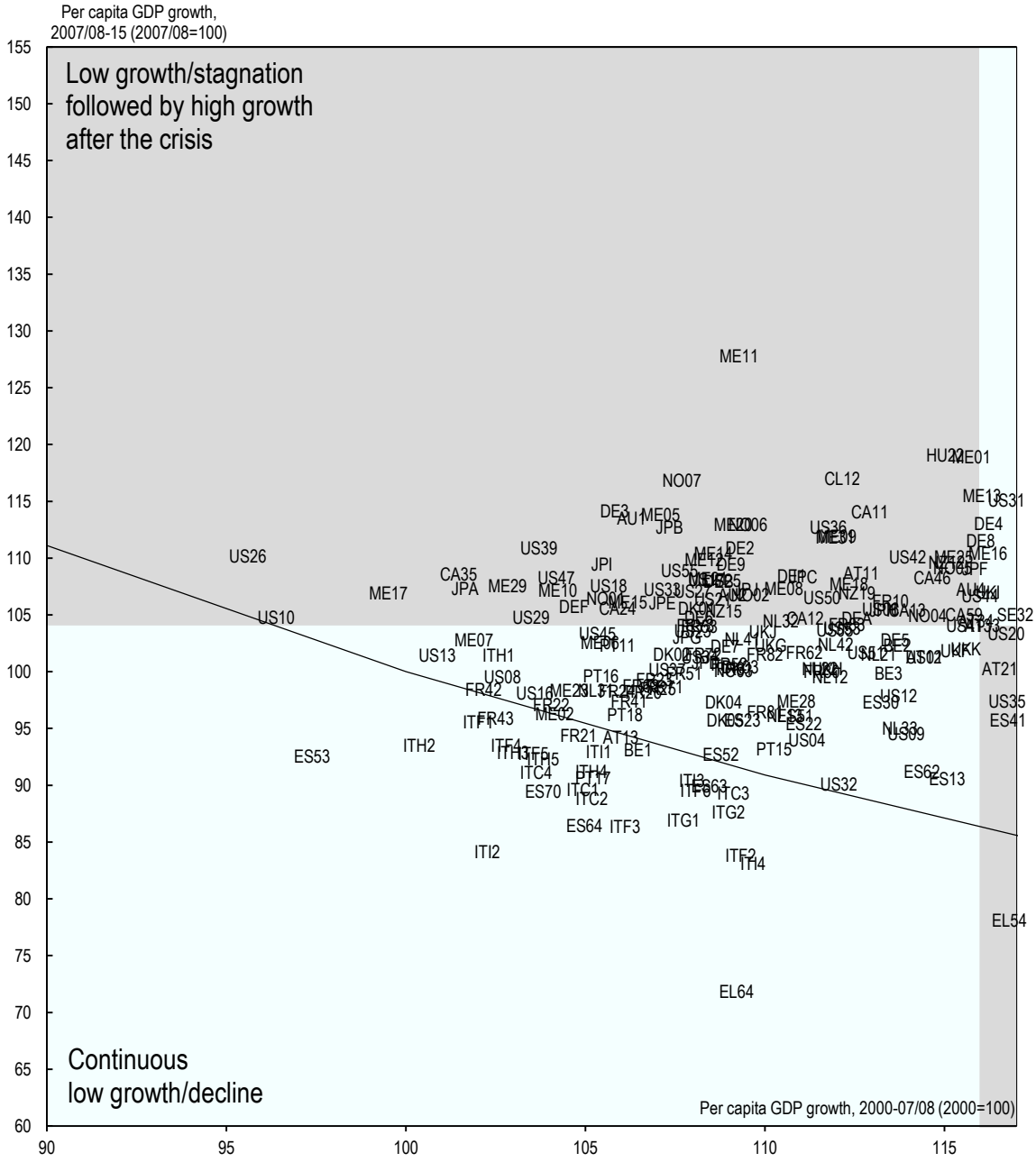


Note: Real per capita GDP growth in large (TL2) regions from 2000 (or closest year available) to 2007-08 (lower value) and from 2007-08 (higher value) to 2015 or closest year available. Shaded quadrants depict the above/below median value growth (median for 2000-07/08: 115.9; 2007/08-15: 104.1). The solid black line indicates the growth rates that lead to stagnation between 2000 and 2015, i.e. the decline after the 2007-08 crisis offsets the growth from before the crisis.

Source: Calculations based on OECD Regional Statistics [Database]

Annex Figure 1.A.2. Growth in many regions stagnated even before the 2007-08 crisis

Per capita GDP growth before/since the 2007-08 crisis in regions with below median growth before the crisis



Note: Real per capita GDP growth in large (TL2) regions from 2000 (or closest year available) to 2007-08 (lower value) and from 2007-08 (higher value) to 2015 or closest year available. Shaded quadrants depict the above/below median value growth (median for 2000-07/08: 115.9; 2007/08-15: 104.1). The solid black line indicates the growth rates that lead to stagnation between 2000 and 2015, i.e. the decline after the 2007-08 crisis offsets the growth from before the crisis.

Source: Calculations based on OECD Regional Statistics [Database]