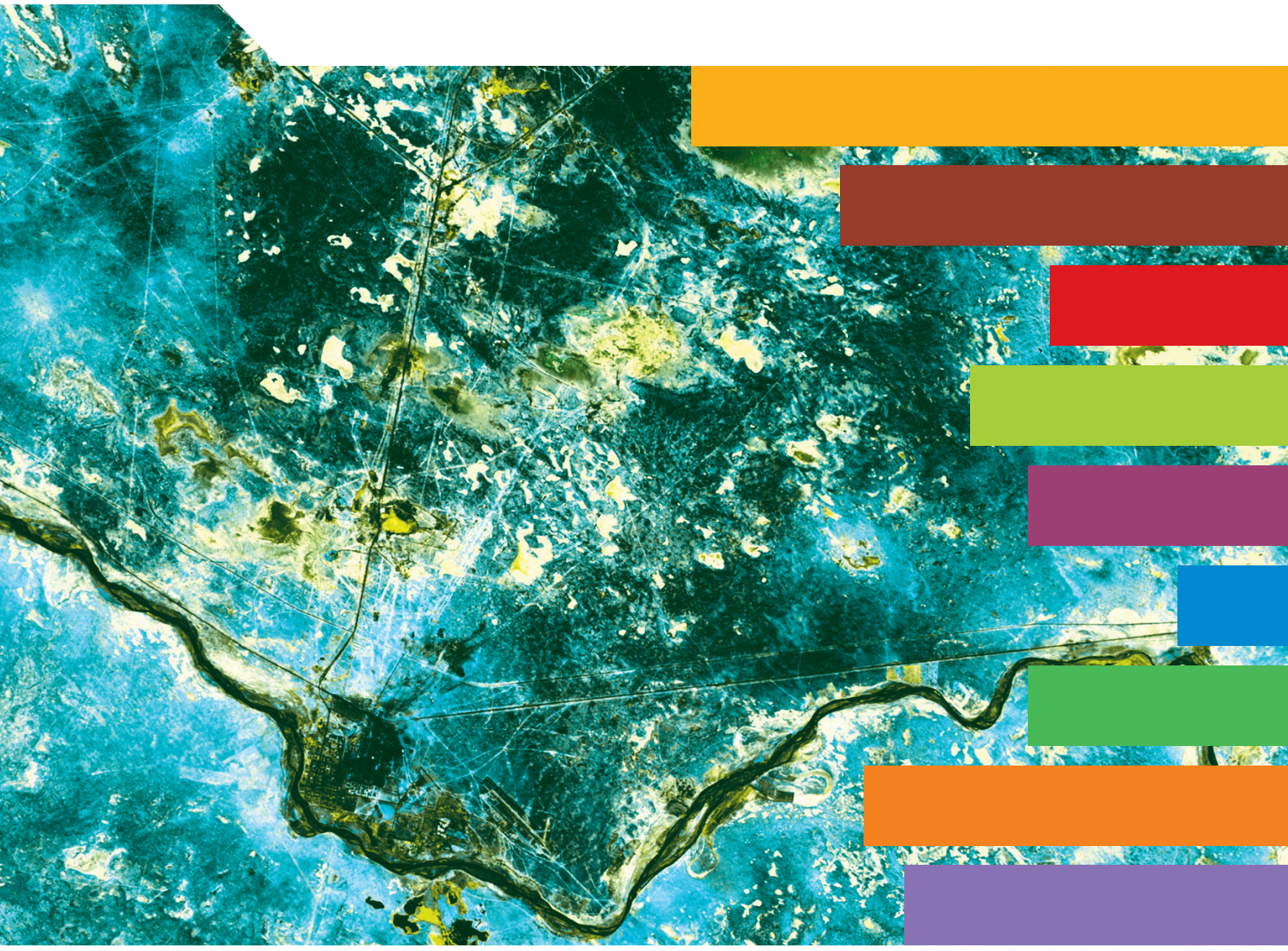
# OECD Regions at a Glance 2013



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# OECD Regions at a Glance 2013

**Please cite this publication as:**
OECD (2013), *OECD Regions at a Glance 2013*: OECD Publishing.
*http://dx.doi.org/10.1787/reg_glance-2013-en*

ISBN 978-92-64-20431-7 (print)
ISBN 978-92-64-12172-0 (PDF)
ISBN 978-92-64-20250-4 (HTML)

OECD Regions at a Glance:
ISSN 1999-0049 (print)
ISSN 1999-0057 (online)

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# *Foreword*

*This publication provides evidence on how regions and cities contribute to the national growth and well-being of societies. It does so by providing region-by-region indicators on a wide range of policy fields to examine trends, highlighting the persistence of regional disparities, identifying areas that either are outperforming or lagging behind in their country, and offering indications as to how a region's contribution to aggregate development could be increased.*

*The report is organised into five chapters plus statistical annexes. A methodological chapter,* Measuring regional economies in OECD countries, *introduces the reader to the way OECD subnational information has developed across a range of topics and different territorial levels. It also sets out a statistical agenda to better respond to the increasing demands of sound local statistics to inform both the political debate and communities wanting to better understand the quality of life of the places they live in.*

*Chapter 1 is devoted to the special topic of metropolitan areas. It provides a first-time comparative analysis of the economic competitiveness and labour market trends, environmental sustainability and administrative organisation of the 275 OECD metropolitan areas. The analysis relies on a common definition of urban areas in OECD countries, consisting of densely populated urban cores and their less-populated surrounding territories linked to the urban cores by a high level of commuting.*

*Chapter 2 illustrates the regional contribution to national growth, highlights factors driving the competitive edge of regions and shows how these factors are distributed within countries. Chapter 3, a novelty of this edition, presents an overview of subnational finance and recent trends in public investment and debt of subnational governments. Chapter 4 looks at regional disparities on social inclusion and access to services, providing new measures of quality of life in regions to encompass a rich definition of development and well-being. Chapter 5 provides measures of environmental sustainability in regions. Chapters draw both on the latest comparable data and on past trends; they also include an analysis of the impact of the economic crisis on regions and cities.*

*The main messages of this publication and a profile of regional development in each of the 34 OECD countries are also delivered with interactive graphs and maps at* http://rag.oecd.org.

OECD Regions at a Glance 2013 *is the joint work of staff of the Regional Development Policy Division in the Directorate for Public Governance and Territorial Development under the direction of Joaquim Oliveira Martins. It has greatly benefited from comments and guidance from the Delegates of the OECD Working Party on Territorial Indicators (WPTI).*

*This report was edited by Monica Brezzi and prepared by Monica Brezzi and Daniel Sanchez-Serra (Chapter 1), Eric Gonnard (Chapter 2), Isabelle Chatry and Claudia Hulbert (Chapter 3), Vicente Ruiz (Chapter 4) and Johannes Weber (Chapter 5). Editorial assistance was provided by Kate Lancaster and Therese Walsh. Erin Byrne and Gemma Nellies prepared the report for publication.*

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# *Editorial: Local lessons from a global crisis*

The economic crisis has been both deep and wide. More than five years since the implosion of the global financial system, the economic recovery remains fragile and the effects of the crisis continue to be felt across virtually all OECD countries, especially when it comes to employment, and in particular, the increasingly high levels of youth unemployment.

Much has been said about the ripple effects of economic hardship across national borders, and the urgency of a co-ordinated global response. Indeed, comparative macroeconomic analysis and international co-operation in policy making are as vital as ever. But what can we learn by zooming in closer to understand the consequences of the current economic situation at the regional and municipal level? How can we identify successful policy responses already underway and replicate them in other regions, both within the same country, and ultimately around the world?

## All jobs are local

*Regions at a Glance 2013*, in its comprehensive analysis of local and regional data, reveals that a disproportionately high percentage of a country's unemployment is typically found in a limited number of regions. In 10 OECD countries, more than 40% of the increase in unemployment over the past five years was concentrated in just one region. In many countries, regional disparities in youth unemployment grew even wider. This is of particular concern in Greece, Italy, Mexico, Poland, Portugal, the Slovak Republic and Spain, where in some regions the youth unemployment rate now exceeds 40%. Addressing the specific labour market conditions of these regions and responding with policies that incorporate local solutions could greatly benefit national recovery.

## Do more with less, invest smarter

In a majority of countries, public investment was cut back in order to reduce budget deficits and preserve current expenditure on welfare, health and education. A lasting recovery may happen only with a new infusion of public and private investment; and subnational governments in OECD countries have a role to play since they are responsible for over 60% of public investment. But it is essential that we wisely target the remaining investment expenditures in ways that restore growth and preserve societal well-being. Subnational governments must not pursue these policies alone – the whole public sector should take the same view and have a co-ordinated response.

The crisis has reinforced the need to accompany economy-wide policies with differentiated approaches that better respond to the needs and more fully exploit the potential of individual regions. National governments, which face the challenge of "doing more with less", can help in this process by mobilising a new range of actors, regions, cities, the private sector and civil society. For such a mobilisation to work, however, it is crucial that objectives, institutional incentives and responses are co-ordinated across national, regional and local governments.

## Urban engines

For the first time, we can now offer a comprehensive analysis of the performance of urban areas in OECD countries, looking at cities of different sizes, as well as the connections between people and jobs. Better understanding how cities function offers a unique opportunity to identify solutions for the problems faced by individual cities, with the benefits of better policies ultimately spread into other territories.

Metropolitan areas are the prime engine of growth. More than 50% of economic growth and job creation in the OECD area occurred in the 275 metropolitan areas (with a population larger than 500 000). Nevertheless, inadequate policies and planning can exacerbate inequalities within and across metropolitan areas. The resilience of cities to economic shocks varies widely within and across OECD countries. And now, in 45% of metropolitan areas the unemployment rate is higher than that of the respective country.

Administrative fragmentation across different levels of governments and agencies in the same metropolitan area can hinder appropriate responses. While metropolitan areas are important units for public policy, their economic and social boundaries don't generally match administrative borders. In most cases, a very large number of local and regional governments have a hand in policy making in the same city, usually with fragmented or overlapping responsibilities. For example, in the Paris metropolitan area there are more than 1 300 local governments, almost 1 000 in Seoul, 540 in Chicago and more than 400 in Prague. Ensuring the efficiency and equity of services delivery, effective policy co-ordination and distribution of wealth in the city can become very challenging when policy making depends on such a large number of government actors.

It is therefore necessary for metropolitan areas around the world to search for the most efficient administrative structure and partnerships that allow them to address these challenges and stay close to their residents. They cannot achieve these objectives without the co-operation of all level of governments, *in primis* the national government.

By zooming in on the subnational level, *Regions at* a Glance *2013* offers a unique view of how the global crisis – and hopefully the beginnings of the recovery – has been experienced where citizens live and work. We are confident that this publication can be useful to policy makers not only in individual regions, but indeed those connecting the economic dots globally.

Ultimately, the choice is not between local or national, urban or rural, bottom-up or top-down policies. Instead, policy makers must understand how to find appropriate individual responses and co-ordinate among the different government levels in order to share and intelligently apply best practices.

Rolf Alter

Director, Public Governance
and Territorial Development Directorate, OECD

# Executive summary

Regions are at the forefront of governments' efforts to boost growth, improve well-being and tackle inequalities, but the economic crisis has increased the gap in GDP per capita between leading and lagging regions in half of the OECD countries. The largest increase in the gap between the best 10% performing regions and the bottom 10% of regions, more than 8 percentage points, occurred in Denmark, Ireland and Slovak Republic. Where regional disparities were reduced, this was due to the decline of the richest regions rather than a catching up of the poorest regions, except for China and India. In three-quarters of the countries studied, the GDP per capita in the best 10% performing regions decreased between 2008 and 2010, with the highest decrease (12%) observed in Canada and Estonia.

Regional, local and other subnational governments (SNG) accounted for 40% of public spending in the OECD area in 2012, although figures for different countries vary widely depending on the degree of federalism, regional decentralisation and financial autonomy. SNG are responsible for 72% of direct public investment in the OECD area, and often more in federal countries (Belgium, Canada, Germany, Switzerland and United States) where the total combines investments by the federated states and from local government.

Cities of all sizes, in particular large cities, are key contributors to national performance. The 275 metropolitan areas in OECD countries contributed to more than half of the GDP of the OECD area in the period 2000-10. However, the economic crisis has had a large impact on the labour market also in metropolitan areas. As a result, the unemployment rate in 45% of the OECD metropolitan areas was higher than the national average in 2012.

While metropolitan areas are important units for public policy, their economic and social boundaries do not generally match administrative borders. In most cases, a very large number of local and regional governments have a hand in policy making in the same city, calling for a good alignment of objectives across the different institutions.

Although economic growth and other measures of success vary widely among regions, and even within a single country, OECD research shows that underperforming regions can become competitive given the right mix of policies and if efforts are co-ordinated across all levels of government.

*Key findings*

## Regions contribute to growth and well-being

- On average, 39% of overall employment growth and 42% of GDP growth in OECD countries in the last decade were accounted for by just 10% of regions.
- Due to the economic crisis, most regions have experienced a decline in GDP per capita since 2008. On average, rural regions have experienced a lower decrease than urban regions, although the former seem to have more difficulty in creating jobs during an economic downturn.

- OECD regions characterised by high employment rates also show a higher share of part-time employment, and rates of part-time work have grown over the past few years. Who works part time is influenced not only by regional demographics, but also by regulations and by access to certain family services such as child-care facilities.
- In around 26% of OECD regions, less than 50% of women were employed in 2011. Regional disadvantages in female employment are the highest in Israel, Italy, the Slovak Republic, Spain, Turkey and the United States.
- Youth unemployment is of particular concern in Greece, Italy, Mexico, Poland, Portugal, the Slovak Republic and Spain where some regions display a youth unemployment rate over 40%. Addressing the specific labour market conditions of these regions and responding with policies tailored to the local situation could greatly help national recovery.
- While life expectancy has increased and infant mortality has decreased in all OECD countries over the past 30 years, significant differences for both are still found among regions in Spain, Australia, Mexico, United States and Portugal, while Canada and the Slovak Republic still show differences in infant mortality rates across regions.
- Between 2005 and 2008, $CO_2$ emissions per capita dropped in most OECD countries, particularly in Canada and, for non-OECD countries, in Brazil.

## A need to work together and to do more with less

- Spending by OECD subnational governments accounted for 17% of GDP, 40% of all public expenditure and 72% of direct public investment in 2012.
- Tax revenues provide, on average, 45% of subnational government revenues in the OECD area, while transfers from central and supranational governments provide about 38% of revenues.
- At end-2012, the general government gross debt in the OECD area (30 countries) was 113% of GDP, while subnational government debt was 22% of GDP.
- Between 2007 and 2012, subnational government direct investment per capita contracted sharply in the OECD area (about -7%), reflecting cuts made to reduce budget deficits and to preserve expenditure on welfare, health or education. During the same period, subnational gross debt per capita grew by 14%, corresponding to an increase of around 1 000 USD per capita.
- When it comes to budgeting and expenditure decisions, all levels of government must work together, co-ordinating objectives and policy responses across national, regional and local governments.

## Metropolitan areas as engines for growth, sustainable development and social inclusion

- Seventy per cent of the OECD population live in cities of different sizes, and the metropolitan areas alone account for 50% of OECD population.
- In 16 OECD countries, 65% of all patents were granted in metropolitan areas in 2008.
- The crisis has had an impact on metropolitan areas: the unemployment rate in the metropolitan areas rose more in the last four years than in the previous decade in 26 out of the 28 OECD countries considered.
- Urban sprawl is increasing faster than population growth in many metropolitan areas.
- Metropolitan areas are large consumers of energy and producers of $CO_2$. However, in half of the OECD countries, $CO_2$ emissions per capita in the metropolitan areas are lower than in less densely populated regions.

# *Reader's guide*

## The organising framework

*Regions at a Glance 2013* addresses two questions:

- What progress have OECD regions made towards more sustainable development, compared to the past and compared with other regions?
- Which factors drive the competitive edge of regions, and what local resources could be better mobilised to increase national growth and people's well-being?

Addressing the first question can reveal the variety of regional economic structures and performance through the development and analysis of a broad range of indicators. Given the multidimensionality of regional development, it is necessary to find sound information comparable across countries on economic, social and environmental outcomes.

Answering the second question can inform the design of effective strategies to improve the contribution of regions to aggregate performance and can suggest policy interventions unlocking complementarities among efficiency, equity and environmental sustainability. Clearly, this second question is more challenging to answer, and regional statistics can provide only a partial assessment of the effects of policies. The publication *Regional Outlook 2014* integrates the statistics presented in this *Regions at a Glance* with analysis of institutional and policy determinants, going deeper into the assessment of causality links and policy evaluation.

The framework of *Regions at a Glance 2013* is organised along two dimensions. The first dimension reflects the OECD mission to encourage stronger, fairer and cleaner economies. The three chapters – "Regions as drivers for national competitiveness", "Inclusion and equal access to quality services in regions", and "Environmental sustainability in regions" – present indicators showcasing the key role of regions to strengthen these three interconnected pillars of socio-economic development. Similarly, even if containing a limited selection of indicators, Chapter 1 provides internationally comparable figures on the competitiveness, social inclusion and environmental sustainability of metropolitan areas.

The second dimension highlights three perspectives to measure regional economies in countries: the distribution of resources over space, the persistence of regional disparities over time, and the links between different regional characteristics and outcomes. More precisely:

- Distribution of resources over space is computed by looking at how much of a certain national variable is concentrated in a small number of regions and how much these regions contribute to the national change of that variable.
- Regional disparities are measured by the difference between the maximum and the minimum regional values in a country (regional range) or by the Gini index, which gives an indication of inequality among all regions.

- Links between common characteristics and outcomes are measured through correlations among different outcomes (for example, employment creation during the economic crisis, population outflows, etc.) and structural variables.

The following matrix provides some examples of indicators in *Regions at a Glance 2013* organised along the following dimensions: competitiveness, inclusion, and sustainability in the three columns and concentration of resources, persistence of disparities, and characteristics of regions in the rows.

| | Regions as drivers for national competitiveness | Inclusion and equal access to quality services in regions | Environmental sustainability in regions |
|---|---|---|---|
| Concentration of resources and contribution to growth | Regional contribution to national economic growth | Concentration of elderly population in regions | Concentration of environmental patents in regions |
| Regional disparities and mobilisation of unused resources | Regional disparities in tertiary education | Gini index of regional household income | Regional range of carbon emissions per capita |
| Characteristics of regions on common outcomes | Regional patterns of co-patenting | Regional youth unemployment | Growth of urban land in OECD regions |

The allocation of indicators to one or another cell is not always straightforward, as objectives may overlap or complementarities arise. For example, regional data on ageing populations provide information both on the competitiveness of regions in terms of future production and on social inclusion in terms of provision of specific services. Similarly, regional patent activities in green technologies measure the capacity of governments and industry to create new business values and, at the same time, proxy investment made to meet environmental improvements.

## Choice of indicators

*OECD Regions at a Glance 2013* includes 35 indicators selected from the *OECD Regional Database*. What appears is a larger selection of subnational statistics that refer to economic structure and competitiveness compared to subnational indicators of social inclusion and environmental conditions. However, a continuous attempt to improve the international comparison of regional conditions of equity and environmental sustainability is made and this edition presents six indicators available at the subnational level for the first time.

The 14 indicators referring to the metropolitan areas (Chapter 1) are presented for the first time and are estimated values computed with different techniques as specified in Annex C.

The indicators on revenues, expenditure, investment and debt of subnational governments are derived from the General Government Data of the System of the National Accounts.

## Geographic areas utilised

This publication features data from regions within each of the 34 OECD member countries and, when available, from Brazil, China, Colombia, India, the Russian Federation and South Africa. Regions are classified on two territorial levels reflecting the administrative organisation of countries. OECD large (TL2) regions represent the first administrative tier of subnational government; for example, the Aquitaine region in France. OECD small (TL3) regions are contained in a TL2 region. For example, the TL2 region of Aquitaine encompasses five TL3 regions: Dordogne, Gironde, Landes, Lot-et-Garonne

and Pyrénées-Atlantiques. Labour-market indicators in Canada are presented for groups of TL3 regions, labelled as non-official grids (NOG).

TL3 regions have been classified as predominantly urban (PU), intermediate (IN), predominantly rural close to a city (PRC), and predominantly rural remote (PRR). Due to lack of information on the road network, the predominantly rural regions (PR) in Australia, Chile and Korea have not been classified whether remote or close to a city.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

The data in Chapter 1 refer to the metropolitan areas (MA). Metropolitan areas are defined as the functional urban areas (FUA) with a population above 500 000. Functional urban areas have been identified in 29 OECD countries; the missing ones are Australia, Iceland, Israel, New Zealand and Turkey. The FUA of Luxembourg has a population below 500 000.

The data of Chapter 3 refer to subnational governments, as classified according to the General Government Data of the *OECD National Accounts*. Subnational governments are defined as the sum of states (relevant only for countries having a federal or quasi-federal system of government) and local (regional and local) governments.

Annex A includes details on the territorial grids of each country.

| | |
|---|---|
| Australia (TL2): | TL2 regions of Australia |
| Australia (TL3): | TL3 regions of Australia |
| TL2: | Territorial level 2 |
| TL3: | Territorial level 3 |
| NOG: | Non-official grid |
| PR: | Predominantly rural (region) |
| PRC: | Predominantly rural (region) close to a city |
| PRR: | Predominantly rural remote (region) |
| PU: | Predominantly urban (region) |
| IN: | Intermediate (region) |
| FUA: | Functional urban areas |
| MA: | Metropolitan area (functional urban area with a population of more than 500 000) |
| SNG: | Subnational government |

## Calculation of international means

For many indicators, an OECD total and an average are presented.

| | |
|---|---|
| OECD#: | The sum of all the OECD regions where regional data are available (# number of countries included in the sum). |
| Total # countries: | The sum of all regions where regional data are available, including OECD and non-OECD countries. |
| OECD# average: | The weighted mean of the OECD regional values (# number of countries included in the average). |
| OECD# country average: | The unweighted mean of the country values (# number of countries included in the average). |

## Further resources

The website *http://rag.oecd.org* conveys the main messages of this publication by topic (jobs, health, population, innovation, etc.) using *data stories* to see the effects of local differences on national performance and individual welfare. The different topics are visualised through interactive graphs and maps with a short comment. Users can also find the *Regional eXplorer* and the *Metropolitan eXplorer* at this website, where users can select from all the indicators included in the *OECD Regional* and *Metropolitan Areas Databases* and display them in different linked dynamic views such as maps, time trends, histograms, pie charts and scatter plots. The website also provides access to the data underlying the indicators and to the OECD publications on regional and local statistics.

Finally, the website also includes country profiles for each of the 34 OECD countries on the main indicators presented in this publication so as to compare each country with the OECD area average or with another country.

The cut-off date for data included in the publication was July 2013. Due to the time lag of subnational statistics, the last available year is generally 2012 for demographic, labour market and subnational finance data; 2010 for regional GDP, innovation statistics and social statistics.

## Acronyms and abbreviations

| | |
|---|---|
| **COFOG** | Classification of the Functions of Government |
| **$CO_2$** | Carbon dioxide |
| **GDP** | Gross domestic product |
| **KIS** | Knowledge-intensive services |
| **LFS** | Labour force survey |
| **NEET** | Adults neither employed nor in education or in training |
| **PCT** | Patent Cooperation Treaty |
| **$PM_{10}$** | Particulate matter (concentration of fine particles in the air) |
| **PPP** | Purchasing power parity |
| **R&D** | Research and development |

# Measuring regional economies in OECD countries

## What do regional data tell us?

Traditionally, regional policy analysis has used data collected for *administrative* regions, that is, the regional boundaries as organised by governments. Such data can provide sound evidence on the contribution of regions to national performance as well as on the persistence of disparities within a country. They show, for example, that during the past 15 years, more than 30% of growth in GDP, employment and population within the OECD is attributable to a small number of regions.

They also show that the economic crisis has widened inequalities across regions within countries. Whereas in France and the United States, for example, metropolitan areas have managed to maintain an advantage in terms of GDP and employment creation compared to the rest of the country, metropolitan areas in Japan or Italy are struggling, due to an ageing labour force or high youth unemployment.

Data on administrative regions can also help us to understand the role of subnational governments in policy planning and public service delivery. OECD subnational governments were responsible for more than 40% of public expenditure and two-thirds of direct public investment in 2012, allocated mainly to economic affairs, education and housing.

## A new way to think about regions and urban areas

At the same time, the places where people live, work and socialise may have little formal relationship to the administrative boundaries around them: a person may inhabit one city or region but go to work in another and, on the weekends, practice a sport in a third, for example. Regions interact through a broad set of linkages such as job mobility, production systems, collaboration among firms, for example. These often cross local and regional administrative boundaries. The analysis, therefore, should take into consideration the geography most relevant for the policy question, whether this geography reflects the *administrative* boundaries of a region or instead reflects an economic or social area of influence known as the *functional* region.

Functional regions are well-suited for analysing how geography plays a part in production, productivity growth, the organisation of urban labour markets, and the interactions between urban and rural areas. This notion can better guide the way national and city governments plan infrastructure, transportation, housing, schools, and space for culture and recreation. In summary, functional regions can trigger a change in the way policies are planned and implemented, better integrating them and adapting them to the local needs.

### Box 1. **Defining functional regions and functional urban areas**

**Functional regions** are geographic areas defined by their economic and social integration rather than by traditional administrative boundaries. A functional region is a self-contained economic unit according to the functional criteria chosen (for example, commuting, water service, or a school district, etc.).

**Functional urban areas** are here defined as densely populated municipalities (urban cores) and adjacent municipalities with high levels of commuting towards the densely populated urban cores (hinterland). Functional urban areas can extend across administrative boundaries, reflecting the economic geography of where people actually live and work. A minimum threshold for the population size of the functional urban areas is set at 50 000.

**Metropolitan areas** are here defined as functional urban areas with a population above 500 000 people. There are 275 metropolitan areas in the 29 OECD countries examined; of these, 77 have a population greater than 1.5 million.

**Regions** are classified by the OECD on two territorial levels reflecting the administrative organisation of countries. **OECD large (TL2) regions** represent the first administrative tier of subnational government. For example, the Ontario region in Canada. **OECD small (TL3) regions** are contained in a TL2 region. For example, the TL2 region of Aquitaine in France encompasses five TL3 regions: Dordogne, Gironde, Landes, Lot-et-Garonne and Pyrénées-Atlantiques. In most cases, TL3 regions correspond to administrative regions, with the exception of those in Australia, Canada, Germany and the United States.

*Note:* See Annex A for details on the various definitions.

## Better data for better policy making

Regional and local data are increasingly available from a variety of sources: surveys, geo-coded data, administrative records, big data, and data produced by users. The range of techniques to integrate and analyse these different sources has also changed the supply of data on different geographical scales, with the potential for dramatically improving both the quantity and timeliness of local information.

The integration of data sources can help governments to better understand interactions among economic, social and environmental changes at the local level. In addition, a rich set of information at different geographical levels responds not only to policy makers' needs but also to people's desire to better understand the area they live in to make decisions, voice their interests, and participate in democratic life. Meeting these expectations will help governments to receive feedback, restore trust and, ultimately, improve the efficacy of their actions.

However, while countries have started to make use of the various sources to produce and analyse data at different geographic levels, significant methodological constraints still exist, making it a challenge to produce sound, internationally comparable statistics linked to a location. These constraints include both the varying availability of public data across OECD countries and the different standards used by National Statistical Offices in defining certain variables. Such constraints are even larger in non-OECD countries, where – at the same time – the production and usability of geo-coded information could be one solution to improve statistical evidence for different policy uses. The trade-off between sound methodological estimations and international comparability should be always considered, as the latter depends on the commonly available information.

In response to these challenges, the OECD has been working to:

- Improve the analysis of different regions by looking beyond administrative boundaries.
- Establish an agreed common methodology for identifying functional regions in a comparative way across countries, starting with the definition of functional urban areas in OECD countries. Develop a socio-economic and environmental database for the OECD metropolitan areas.
- Improve available information on economic competitiveness and quality of life in different territories within and across OECD countries by broadening the range of measures to include well-being and societal progress, and by integrating official statistics with other sources of data.

## Why a special focus on metropolitan areas?

Almost half of the population in OECD countries live in metropolitan areas. These 275 metropolitan areas contribute to more than 50% of OECD GDP and account for 60% of patents in the OECD area. By 2050, 6 billion people worldwide are expected to live in cities, a consequence of the continuous expansion of mega-cities in emerging economies and the coming together of people and business in urban centres of different scales in other parts of the world. Even in OECD countries where urbanisation is already high, many metropolitan areas keep growing, and the distribution of people and activities over space continues to change. Such changes may, for example, take the form of evolution from a *monocentric* urban area to a more *polycentric* system of integrated urban centres and sub-centres. Evidence shows that different forms of organisation of people and production over space may have important implication for the overall performance of a country (Brezzi and Veneri, 2013).

Regional policies need to better account for the fact that urbanisation can take many forms and to recognise that these forms have an impact on the type and pace of urban development. The ways people in cities have access to education and jobs, decent housing and efficient transportation, as well as enjoy a safe and sustainable environment, will in turn have a strong impact on national and global prosperity. Moreover, reduced transport and communication costs will continue to make urban areas increasingly interconnected. It is important to better understand the functioning and efficiency of these connections since they represent key links between urbanisation and productivity growth, and they can lead to important changes in how and where production takes place. Key goals of regional policies, such as increased social cohesion, depend critically on how urban areas grow and on how they interact among themselves and with their surrounding areas.

This 2013 edition of *Regions at a Glance* presents, for the first time, a new section on the socio-economic, environmental and demographic performance of metropolitan areas in OECD countries. It uses the *OECD Metropolitan Database*, which provides a harmonised base for examining cities beyond administrative boundaries and includes estimates of socio-economic indicators (gross domestic product, employment and unemployment) and environmental assets (land use, air quality and green spaces) in metropolitan areas.

## Overview of the OECD methodology for examining functional urban areas

The OECD, in collaboration with the European Commission and Eurostat, has developed a methodology for defining urban areas as functional economic places in a consistent way across countries. Using population density and travel-to-work flows as key information, urban areas emerge as characterised by densely inhabited "urban cores" and less-populated municipalities whose labour market is highly integrated with the cores (OECD 2012).[1]

The methodology consists of three main steps:

1. Identification of contiguous densely inhabited urban cores.
2. Identification of interconnected urban cores that are part of the same functional area.
3. Definition of the outlying area or hinterland of the functional urban area, linked by commuting flows to the urban cores.

First, population grid data at 1 km² are used to define urban cores, ignoring administrative boundaries. An urban core is made up of contiguous municipalities that have more than 50% of their populations living within "high density" cells. This use of population grid data to identify urban cores compensates for the fact that traditional administrative units are unevenly sized and vary greatly within and between countries.

The second step of the procedure allows the identification of urban cores that are not contiguous but belong to the same functional urban area. Two urban cores are considered part of the same polycentric functional urban area if more than 15% of the population of any of the cores commutes to work in the other core. In countries where commuting distances are steadily increasing, large urban areas are developing in a polycentric way, hosting highly densely inhabited cores that are physically separated but economically integrated. This is, for example, the case in London, whose increased connectivity among different urban centres has resulted from the combined effect of infrastructural improvements and re-organisation of production activities (firms keeping their administrative headquarters in the central core and relocating production facilities to well-connected agglomerations outside the central core).

The final step of the methodology defines the hinterland of the functional urban area as the surrounding municipalities linked to the urban cores by the commuting of their workforce. Any municipality that has at least 15% of its employed residents working in a certain urban core is considered part of the same functional urban area.

Applying this methodology to 29 OECD countries,[2] a total of 1 179 functional urban areas have been identified where two-thirds of the OECD population lives. Metropolitan areas are defined as the 275 functional urban areas with a population larger than 500 000 people.

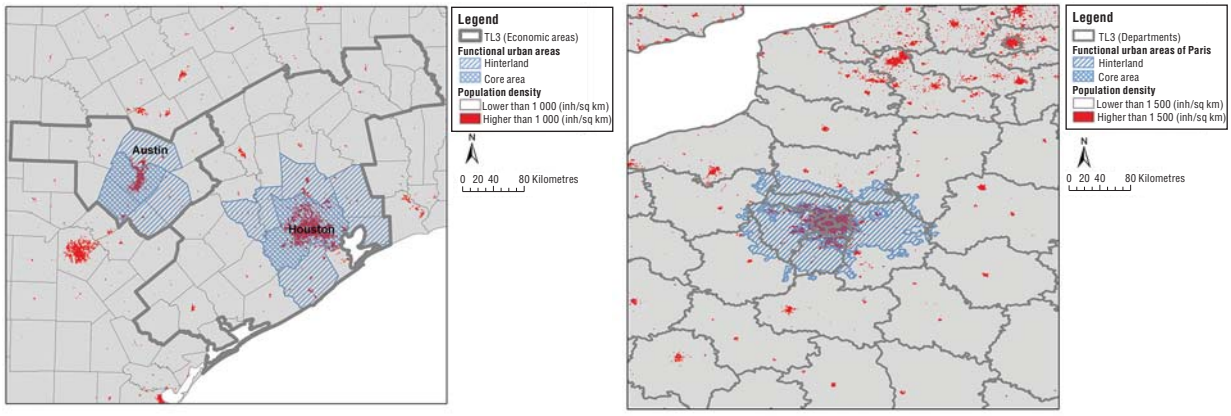
This procedure for delimiting functional urban areas is relatively easy in terms of data inputs needed (though this may still be challenging in many non-OECD countries). The improvement and finalisation of new subnational data has required – and will continue to require – a high level of co-operation between the OECD, National Statistical Offices and EC-Eurostat in order to agree on standards, harmonisation, production and the dissemination of small administrative units.

The novelty of the OECD approach to functional urban areas is to create a methodology that can be applied across the whole OECD, thus increasing comparability across countries, unlike definitions and methodologies created within individual countries, which have been internally focused.[3] In order to establish this cross-country methodology, common thresholds and similar geographical units across countries were defined. These units and thresholds may not correspond to the ones chosen in the national definitions. Therefore, the resulting functional urban areas may differ from the ones derived from national definitions; as well the OECD functional urban delimitation may not capture all the local factors and dynamics in the way national definitions do.

This methodology has clear advantages over the use of administrative regions to identify urban areas:

- It captures a city's socio-economic area of influence. In the past, using small (TL3) regions as territorial units of analysis has led to identifying urban areas either too large (including areas outside the economic influence of central cores) or too small (excluding areas strongly connected with the urban core), and thus hindering international comparisons. Houston (United States) and Paris (France) illustrate that the actual population distribution within administrative boundaries may be very different (Figure 1).
- Since the methodology establishes urban areas from the bottom up by aggregating densely populated small areas, it identifies all of a country's urban systems with a population of at least 50 000, thus enabling analysis of urban areas of different sizes, including small and medium-sized urban areas.
- It enables the identification of polycentric urban areas, with physically separate "cores" belonging to the same larger functional urban area. This better illustrates the economic and geographic organisation of urban areas and the linkages between such places.
- It allows the analysis of different patterns of urban development of the cores and surrounding municipalities ("hinterlands") of each urban area.
- It provides a sound analytical base to examine governance challenges and the economic development of functional urban areas.

Figure 1. **Urban and non-urban population density, as mapped onto functional and administrative boundaries: Houston and Paris**




*Note:* These maps are for illustrative purposes and are without prejudice to the status of or sovereignty over any territory covered by these maps.
*Source:* OECD calculations based on population density as disaggregated with Corine Land Cover, Joint Research Centre for the European Environmental Agency.

## Increasing the availability of subnational statistics

The estimated variables for the metropolitan areas presented in *Regions at a Glance 2013* are derived by integrating different sources of data, making use of GIS and adjusting existing regional data to non-administrative boundaries. Two types of methods to obtain estimates at the desired geographical level are applied, both requiring the use of GIS tools to disaggregate socio-economic data. These techniques are increasingly used

today, especially in the field of environmental indicators and for other issues that are particularly attached to the geography of a territory (Nordhaus et al., 2006; Milego and Ramos, 2006; Doll et al., 2000).

The first method makes use of satellite datasets (global layers) at different resolutions, but which are always smaller than the considered regions. The statistics for one region are obtained by superimposing the source data onto regional boundaries. In these cases, the regional value is either the sum or a weighted average of the values observed in the source data within the (approximated) area delimited by the regional boundaries. This method has been applied, for example, to estimate the amount of green space, the share of built-up areas and the changes in land use in metropolitan areas (Piacentini and Rosina, 2012). The integration of geographical information and population data allows a better understanding of urban forms and urbanisation processes. In many OECD metropolitan areas, the pace of growth of the built-up areas has been faster than population growth in the last ten years, and in more than 30% of them this has resulted in an increase in the built-up area "available" to inhabitants, a phenomenon known as urban sprawl.

The second method makes use of GIS tools to adjust or downscale data, available only for larger geographies, to regularly spaced "grids" by using additional data inputs that capture how the phenomenon of interest is distributed across space (Goldring et al., 2005; Milego and Ramos, 2006; OECD, 2012; Panek et al., 2007). Thanks to this method we have estimated, for example, the GDP values, employment, unemployment and the carbon emissions of metropolitan areas using the corresponding values for small (TL3) regions.[4]

We opted for GIS-based methodologies to estimate not only environmental, but also socio-economic indicators (GDP and labour market), because these methods are less dependent on the type of information available in the different countries and, therefore, they enable a good comparability of results among metropolitan areas in different countries. This choice, however, has the disadvantages of lack of precision for some estimates and difficulty to obtain comparable measures over time of environmental variables so as to monitor improvements induced by targeted policies and behavioural changes. Specific data products enabling comparison of data over time need to be produced, and, as well, international standards for the production of indicators from remote sensing observation could be developed.

Geographical data combined with socio-economic statistics can also be used to increase the available information for administrative regions. For example, this publication presents measures of air quality and share of forests in large (TL2) and small (TL3) regions to compensate for the lack of international standards for statistics of environmental conditions in regions. More generally, the OECD is working to connect information about the people, the society and the economy of a location with the aim of broadening the measures of well-being and societal progress in regions.

## Future directions for the study of regional economies

Although the OECD has taken important first steps in defining functional regions and urban areas and in establishing a methodology for reliable cross-country comparisons, there remains much to be done and many possible directions for future work. These include examining: the various kinds of interactions that cause functional areas to develop and the way these interactions are governed; the development of well-being metrics linked to where people live and how policies are implemented; and a common framework to connect socio-economic statistics to geographical information at different scales.

### *Functional regions beyond urban areas*

A significant portion of the OECD population still lives outside the commuting sphere of large cities, in territories where commuting within a larger rural region is even more important. For this reason, a possible future step consists in identifying functional regions in non-urban territories, using methodologies not built around an urban core. Canada, for example, is working on a methodology that identifies self-contained labour markets by aggregating municipalities that are linked in terms of commuting flows. Similar methodologies have been applied in other countries such as Italy (Istat, 2005), Australia (ABS, 2011) and the United Kingdom (Coombes, 2009).

Functional regions result from changes in the behaviours of individuals and firms, as well as changes in mobility, economic prosperity, and information and communication technology. Their boundaries are generally identified with the labour market shed, measured in terms of daily commuting. However, depending on the relevant interactions between rural and urban areas, and on the policy issue under consideration, there are different possible delineations of functional regions. For example, the provision of health services and the consequent organisation of hospitals may have a different geography than that of a labour market; or in the case of environmental policy, the appropriate functional geographies might depend on the location of natural resources and on the extent to which a certain place is part of the externalities that they may generate.

Functional regions may not coincide with administrative or political regions and generally linkages across different areas need to be governed beyond administrative boundaries. Mechanisms of co-ordination among different but interdependent local authorities and other potential public and private actors can help improve regional prosperity and people's well-being. Depending on the economic, institutional and cultural conditions in each territory, different governance approaches for territorial co-operation at a functional region level have been identified (OECD, 2013).

### *Broadening measures of well-being in regions*

Across and within regions, there can be significant differences in the access to basic and advanced services such as transport, water and sanitation, education, health, and ICT, affecting the opportunities available to people. Quality of services is another dimension for measurement at the subnational level. Such measures should be citizen-focused since their judgment on the performance and quality of services offered can help improve the match between services provided by governments and the actual needs of people. Evidence shows that trust in local governments is affected by the availability and quality of public services and whether citizens perceive the access to services to be fair. In this respect, a possible future development consists in combining the location of infrastructure and services with their characteristics and with citizens' appraisal of the quality of services to better track the contribution they are making towards improving people's well-being.

Reliable statistics that include a broad definition of development and quality of life in different regions could be developed. OECD governments, engaged today in structural reforms, need this information to increase job opportunities and fiscal sustainability, address inequalities and environmental challenges, and regain citizens' trust. The current OECD project *How's Life in your Region?* aims to advance work on measuring well-being and progress at the subnational level by providing a common framework for measurement and compiling a set of subnational well-being indicators for different types of regions. Preliminary results published in this 2013 edition of *Regions at a Glance* show large regional disparities in life expectancy, employment opportunities for women, youth unemployment

and security even within the same country. Future work will move towards guidelines on how countries and regions can use well-being metrics to help define policy actions, monitor policy implementation, and better assess the interactions among different economic and non-economic dimensions of regional development.

### *Towards common guidelines to improve comparability of statistics by location*

Finally, a common approach to connect socio-economic information to a location would dramatically improve the internal and international comparability of statistics at different geographical scales. National Statistical Offices and international initiatives (UN Economic and Social Council, 2012) have started to put in place data production that integrates statistical and geospatial information. A possible future development could consist in contributing to the development of common guidelines for such an integration of information and provide tools to improve the usability of statistics at different geographical scales.

## *Notes*

1. The methodology uses small administrative units as building blocks for analysis, generally the smallest administrative unit for which national commuting data are available. For all European countries these are municipalities, corresponding to LAU2 in Eurostat terminology (with the exception of Portugal, where LAU1 have been used).
2. The methodology has not been applied to the following countries: Australia, Iceland, Israel, New Zealand and Turkey.
3. Some OECD countries have adopted a definition for their own metropolitan areas or urban systems that looks beyond the administrative approach. For example, Canada (Statistics Canada, 2002) and United States (U.S. Office of Management and Budget, 2000) use a functional approach similar to the one adopted here, to identify metropolitan areas. Several independent research institutions and National Statistical Offices have identified metropolitan regions in Italy, Spain, Mexico and the United Kingdom based on the functional approach.
4. See Annex C for a detailed description of the method to adjust variables at metropolitan level.

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# 1. SPECIAL FOCUS ON METROPOLITAN AREAS

Urban population in OECD countries

Urbanisation and urban forms

Economic competitiveness of metropolitan areas

Labour productivity and employment in metropolitan areas

Impact of the crisis on unemployment in metropolitan areas

Patent activity in metropolitan areas

Environmental sustainability in metropolitan areas

Administrative organisation of metropolitan areas

*The data presented in this chapter refer to the functional urban areas and metropolitan areas identified in 29 OECD countries. The functional urban areas are defined as densely populated municipalities (urban cores) and adjacent municipalities with high levels of commuting towards the densely populated urban cores (hinterlands). The metropolitan areas are functional urban areas with a population above 500 000.*

# Urban population in OECD countries

The world is urbanising with 70% of the world's population expected to live in urban areas by 2050 (UN, 2009). Today, two-thirds of the OECD population live in urban areas, according to the OECD-EC definition.

By adopting an economic concept, functional urban areas have been identified beyond their administrative boundaries in 29 OECD countries. They are characterised by densely populated urban cores and hinterlands with high levels of commuting towards the urban cores. The share of national population in functional urban areas ranges from 87% in Korea to less than 40% in Slovenia and the Slovak Republic (Figure 1.1).

Among the 1 179 OECD functional urban areas, 77 have more than 1.5 million people, 198 between 500 000 and 1.5 million people, 406 between 200 000 and 500 000 people, and 498 are small functional urban areas with a population below 200 000 and above 50 000 people.

Countries with similar shares of urban population may concentrate population in a few large urban areas or instead distribute in a *polycentric* system, with many, relatively small, urban areas. For example, around 70% of the national population lives in functional urban areas in Chile and the Netherlands, but 70% of the urban population in Chile lives in cities larger than 500 000 population, while in the Netherlands this percentage is 50 (Figure 1.2). The share of urban population living in relatively small urban areas is higher in European countries than in North America or Asia (Figure 1.2).

In the last twelve years, the population of the hinterlands has been growing at a faster rate than the population of the core; sub-urbanisation is observed in the hinterlands of large metropolitan areas (with more than 1.5 million people), where the population grew at a rate of 1.6% a year (Figure 1.3).

Urbanisation in OECD countries has continued in the past decade, reinforcing the trend of OECD populations towards becoming increasingly concentrated in urban areas of different sizes (Figures 1.4 and 1.5).

### *Definition*

Functional urban areas are defined in 29 OECD countries according to a harmonised methodology that identifies all the urban areas in a country with more than 50 000 people.

The functional urban areas are defined as densely populated municipalities (urban cores) and adjacent municipalities with high levels of commuting towards the densely populated urban cores (hinterland). Functional urban areas can extend across administrative boundaries, reflecting the economic geography of where people actually live and work.

The urban population in a country is given by the national population residing in functional urban areas.

Metropolitan areas refer to the functional urban areas with populations above 500 000 people.

## Source

OECD (2013), "Metropolitan areas", *OECD Regional Statistics* (database), *http://dx.doi.org/10.1787/data-00531-en*.

*UN Population Database* (2009) *http://esa.un.org/wup2009/unup/*.

See Annexes A and B for data sources and country-related metadata.

## Reference years and territorial level

2000-12; functional urban areas.

The functional urban areas have not been identified in Australia, Iceland, Israel, New Zealand and Turkey.

## Further information

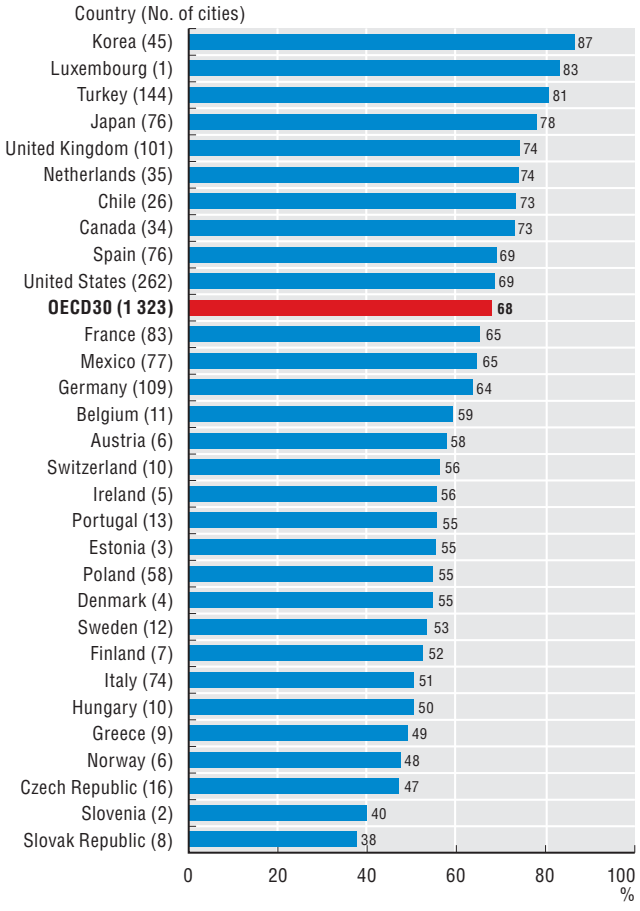
OECD (2012), *Redefining "Urban": A New Way to Measure Metropolitan Areas*, OECD Publishing, *http://dx.doi.org/10.1787/9789264174108-en*.

Interactive graphs and maps: *http://rag.oecd.org*.

## Figure notes

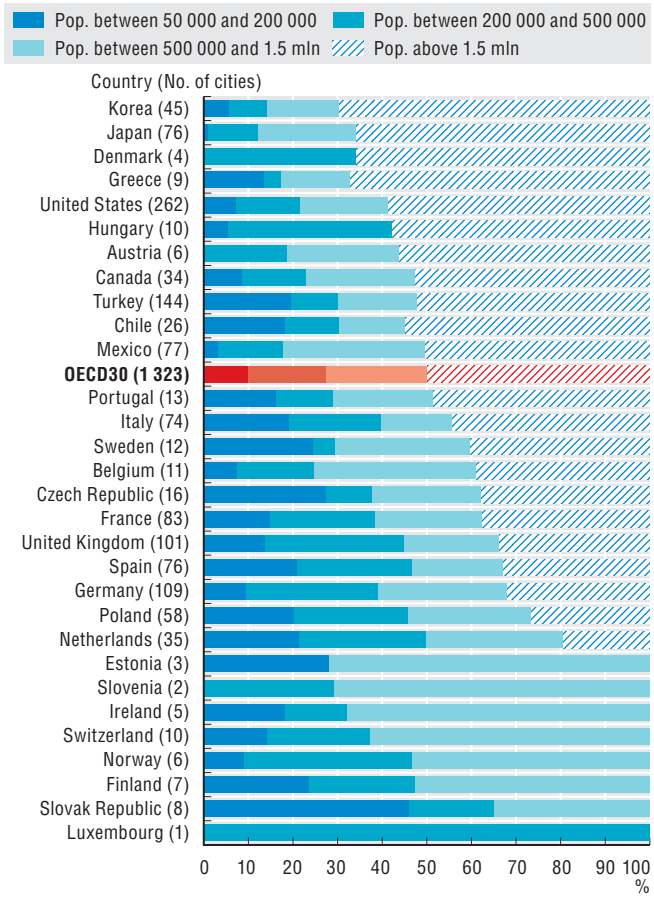
1.1-1.2: Turkey is included with values referring to the national definition of 144 urban areas; comparability with other countries is, therefore, limited.

### 1.1. Per cent of national population in urban areas, 2012




StatLink http://dx.doi.org/10.1787/888932912734

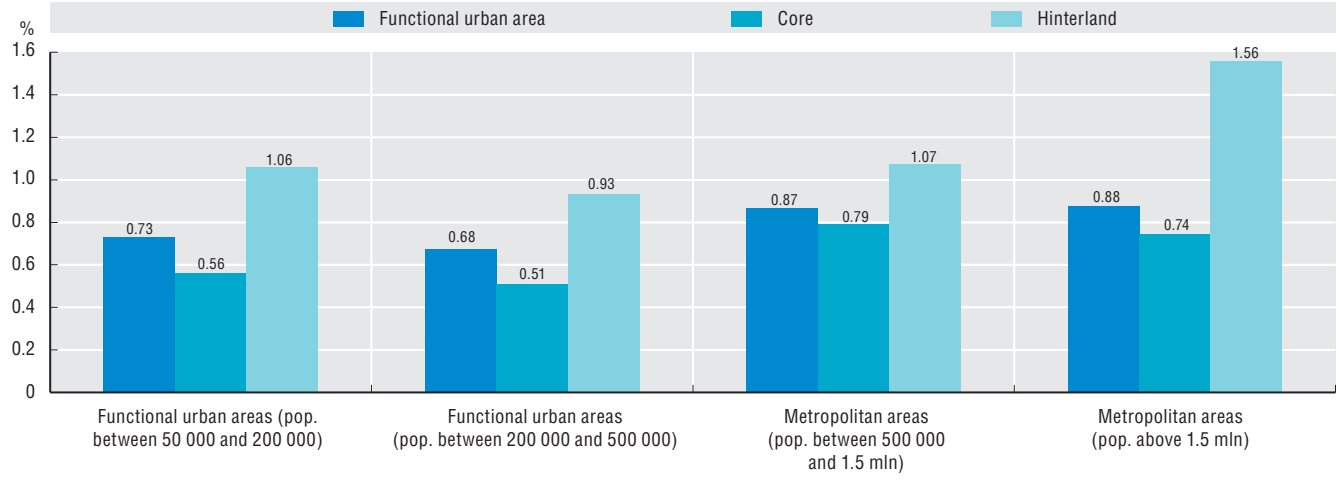
### 1.2. Distribution of population by population size of urban area, 2012




StatLink http://dx.doi.org/10.1787/888932912753

### 1.3. Population growth by population size of urban area and core/hinterland

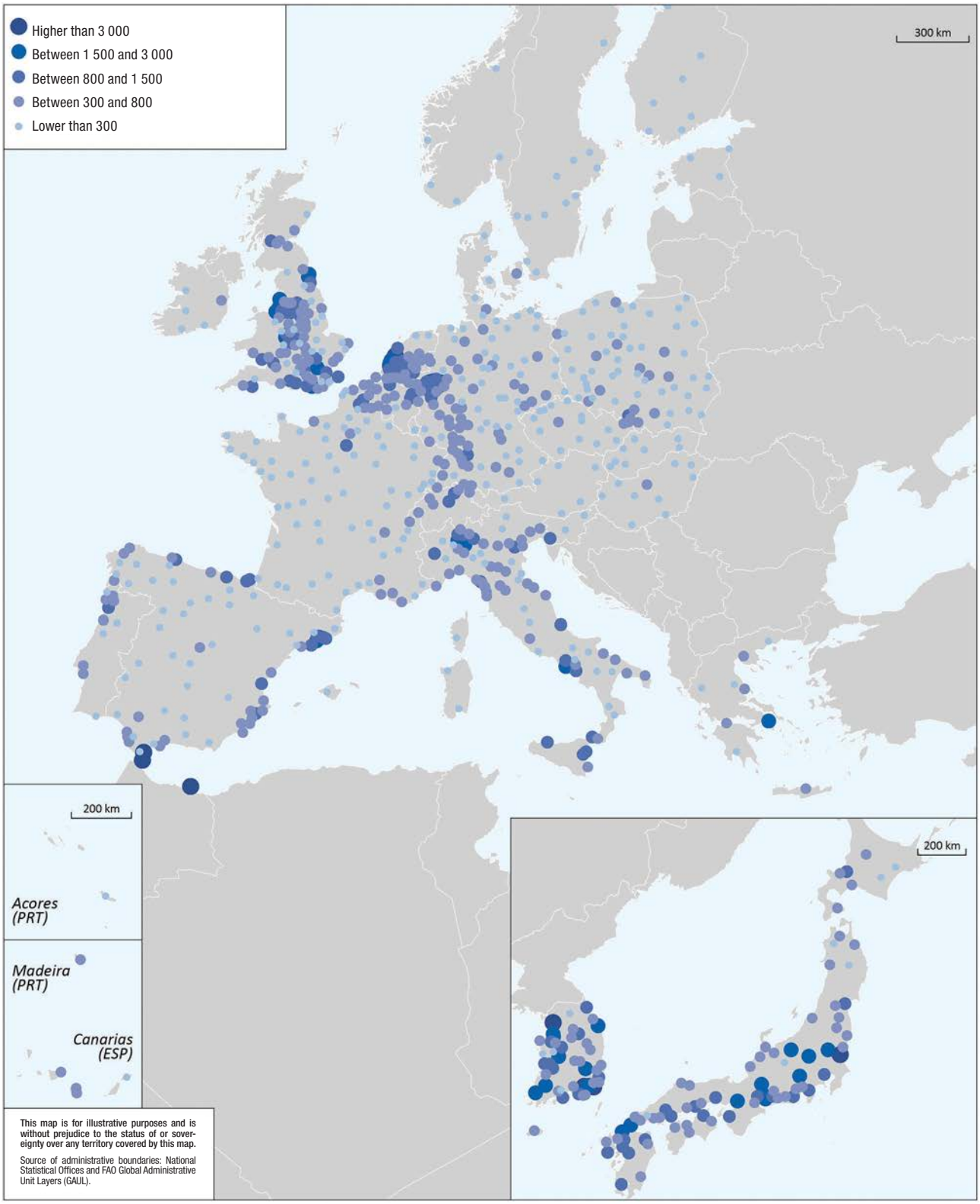
*Average yearly growth rates 2000-12*




StatLink http://dx.doi.org/10.1787/888932912772

### 1.4. Population density in urban areas: Asia, Europe and Oceania, 2012

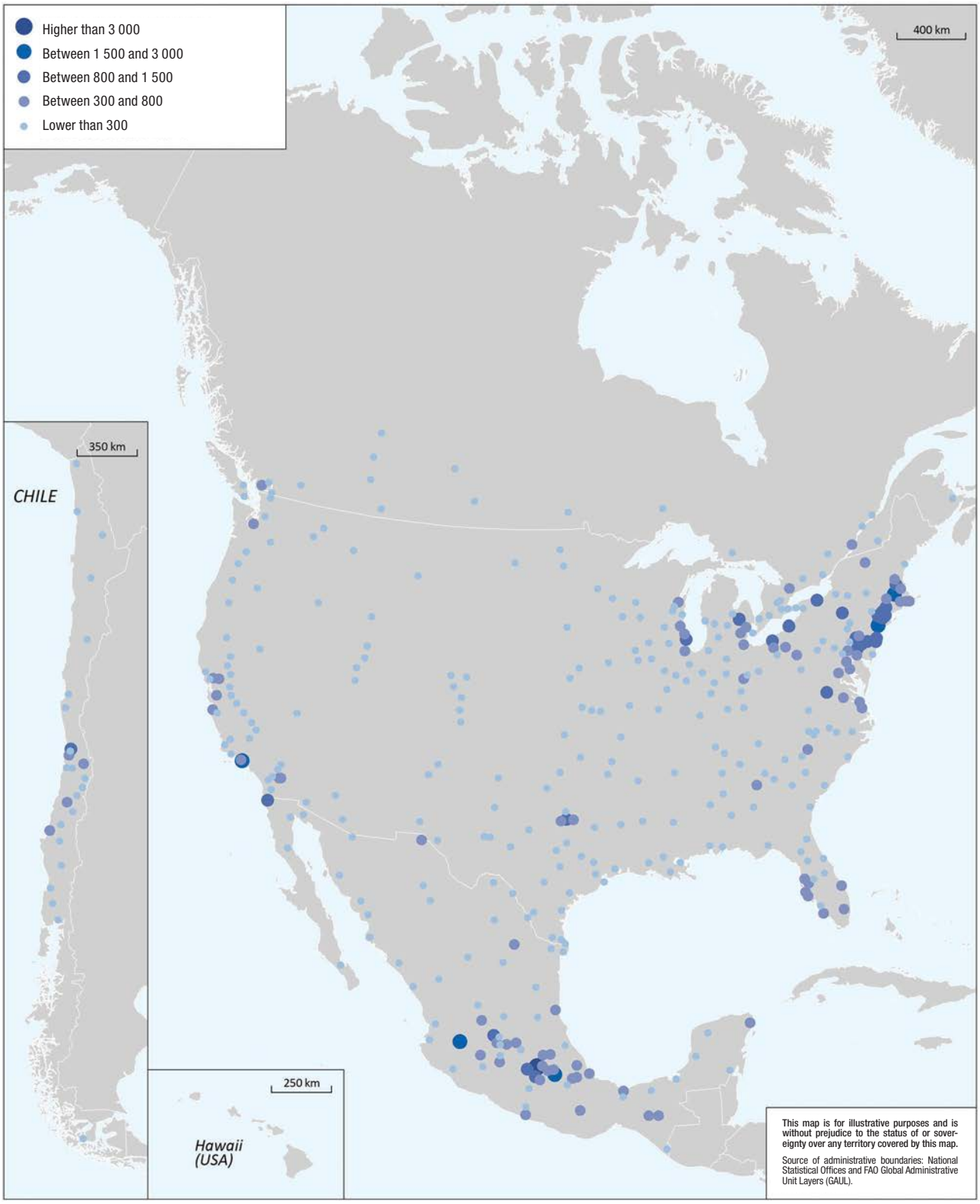
*Inhabitants per square kilometre*




StatLink http://dx.doi.org/10.1787/888932915299

## 1.5. Population density in urban areas: Americas, 2012

*Inhabitants per square kilometre*




StatLink http://dx.doi.org/10.1787/888932915318

# Urbanisation and urban forms

The 275 metropolitan areas in OECD countries accounted for 48% of OECD population, 56% of the total gross domestic product (GDP) and 49% of employment in 2010. The concentration of population and GDP ranges from 70% in Japan to less than 30% in the Slovak Republic (Figure 1.6).

The population in metropolitan areas grew at an average annual rate of 0.9% in the period 2000-2012 (compared to the 0.6% annual growth of the OECD population). Many metropolitan areas in Japan and Germany, as well as a few in Korea and the United States, display negative population growth (Figures 1.9 and 1.10).

As a result of the different patterns of urbanisation, population density can be very different in metropolitan areas of the same size. In Denver (United States) and Daegu (Korea), each of which has a population of around 2.5 million, population density was 160 and 2 250 people per $km^2$, respectively. Or, metropolitan areas of different sizes can display similar urban density, like Tokyo (Japan) and Naples (Italy), where Tokyo's population is 10 times larger than that of Naples (Figure 1.7).

### *Definition*

Metropolitan areas are defined as the functional urban areas (FUA) with population above 500 000.

The functional urban areas are defined as densely populated municipalities (urban cores) and adjacent municipalities with high levels of commuting towards the densely populated urban cores (hinterland). Functional urban areas can extend across administrative boundaries, reflecting the economic geography of where people actually live and work.

Population density is the ratio between total population and the total land area in a metropolitan area.

The urban sprawl index measures the growth in build-up area over time adjusted for the growth in population. When the population changes, the index measures the increase in the built-up area over time relative to a benchmark where the built-up area would have increased in line with population growth. The index is equal to zero when both population and the built-up area are stable over time. It is larger (smaller) than zero when the growth of the built-up area is greater (smaller) than the growth of population, i.e. the density of the metropolitan area has decreased (increased). See Annex C for details.

The form and the quality of urbanisation processes are of concern for policy makers. This is particularly important when the expansion of land for urban uses (residential and commercial buildings, major roads and railways) threatens the quality of the landscape or bio-diversity.

In the past decade, many metropolitan areas have continued increasing their built-up areas, at a pace even faster than population growth. Urban sprawl, here measured as the percentage change in the built-up area "available" per person, was 1% on average in the OECD metropolitan areas between 2000-06. The metropolitan areas in Estonia, Portugal, Ireland and Japan show the highest sprawl among OECD countries (Figure 1.8). However, it should be noted that United States metropolitan areas displayed values of the sprawl index higher than these countries before 2000. Differences in the sprawl index among metropolitan areas in a country can be large. For example, the sprawl index in Las Palmas (Spain) was 11% compared to the average Spanish value of 4%.

## Source

OECD (2013), "Metropolitan areas", *OECD Regional Statistics* (database), *http://dx.doi.org/10.1787/data-00531-en*.

See Annexes A and B for data sources and country-related metadata.

See Annex C for details on definitions and data estimations.

## Reference years and territorial level

2010, population, employment and GDP. 2000-06, urban sprawl; metropolitan areas.

The functional urban areas have not been identified in Australia, Iceland, Israel, New Zealand and Turkey. The FUA of Luxembourg does not appear in the figures since it has a population below 500 000 inhabitants.

## Further information

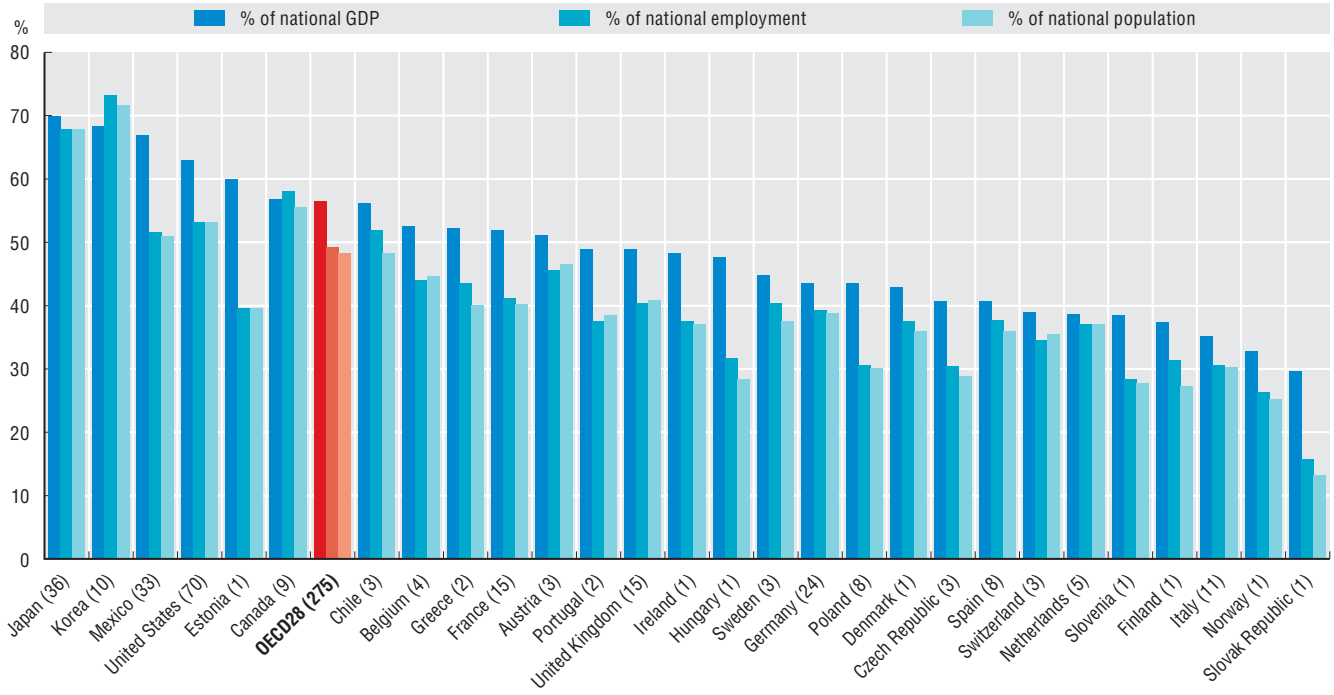
OECD (2012), *Redefining "Urban": A New Way to Measure Metropolitan Areas*, OECD Publishing, *http://dx.doi.org/10.1787/9789264174108-en*.

Interactive graphs and maps: *http://rag.oecd.org*.

## Figure notes

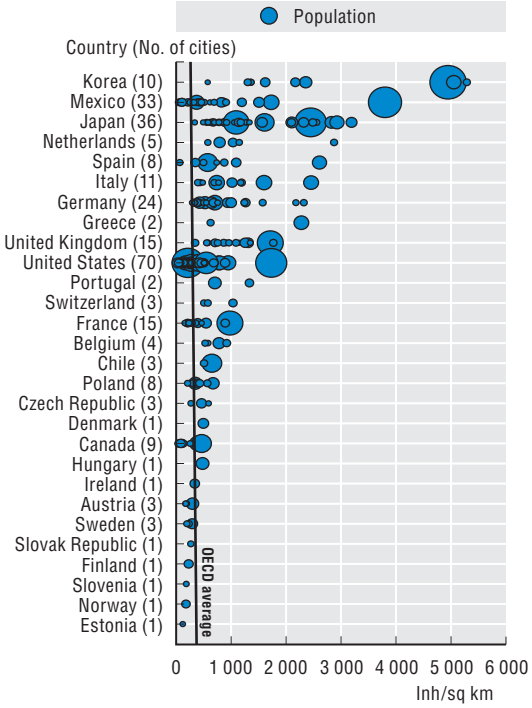
1.8: Period used for the calculation 2000-06 with the exception of Japanese urban land 1997-2006, and United States urban land 2002-06. Canada, Chile, Korea and Mexico are not included due to lack of data on urban land for two points in time.

### 1.6. Concentration of population, GDP and employment in OECD metropolitan areas, 2010



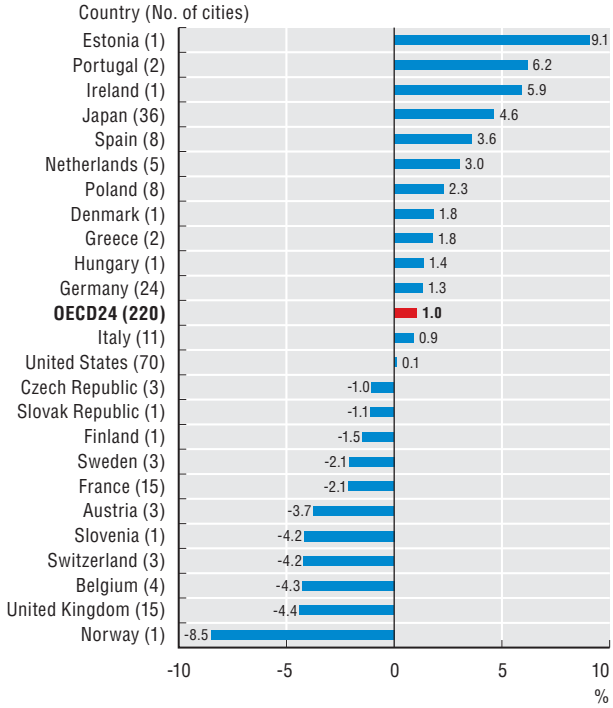

StatLink http://dx.doi.org/10.1787/888932912791

### 1.7. Population density and population size of metropolitan areas, 2012




StatLink http://dx.doi.org/10.1787/888932912810

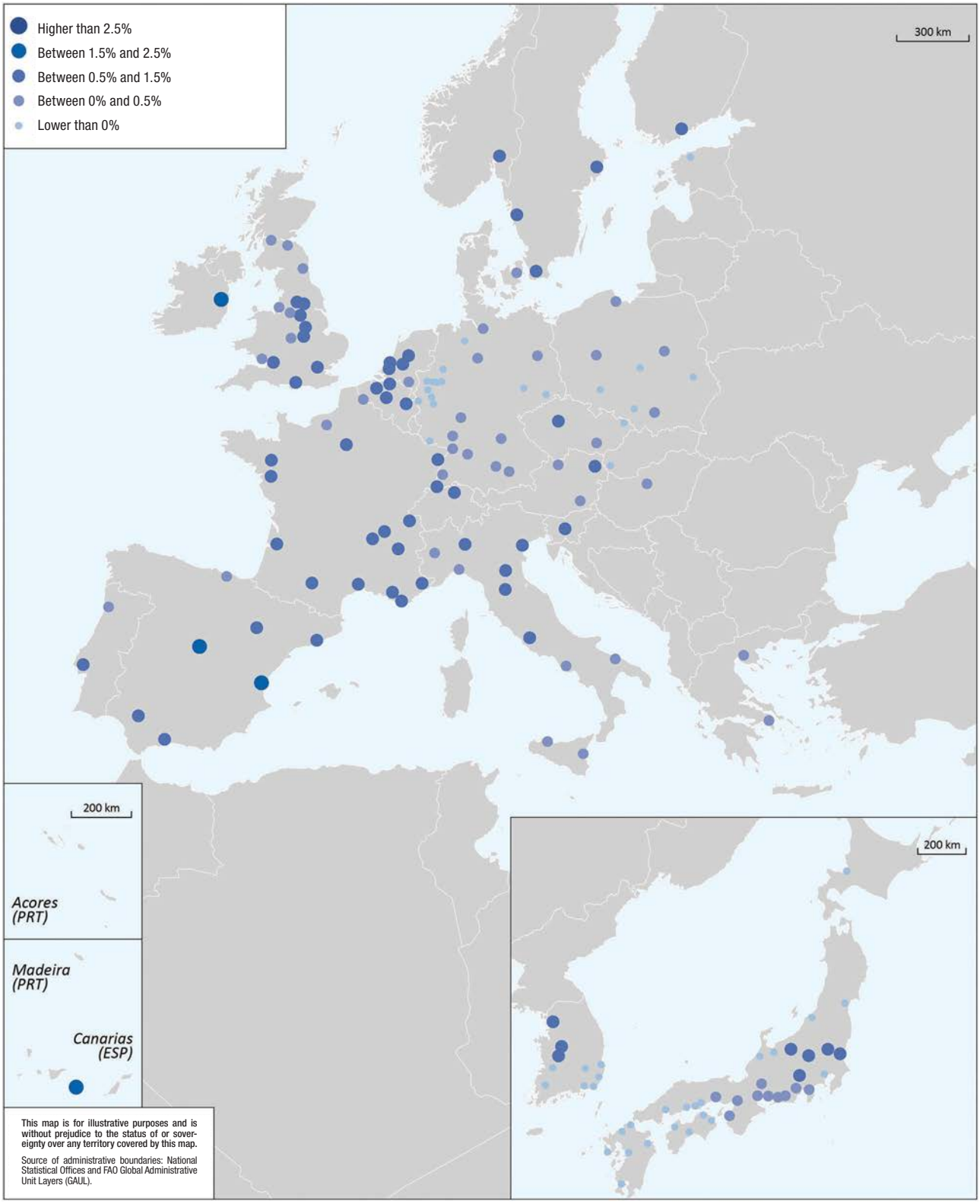
### 1.8. Urban sprawl index in OECD metropolitan areas, average by country, 2000-06




StatLink http://dx.doi.org/10.1787/888932912829

## 1.9. Metropolitan population growth: Asia, Europe and Oceania, 2000-12

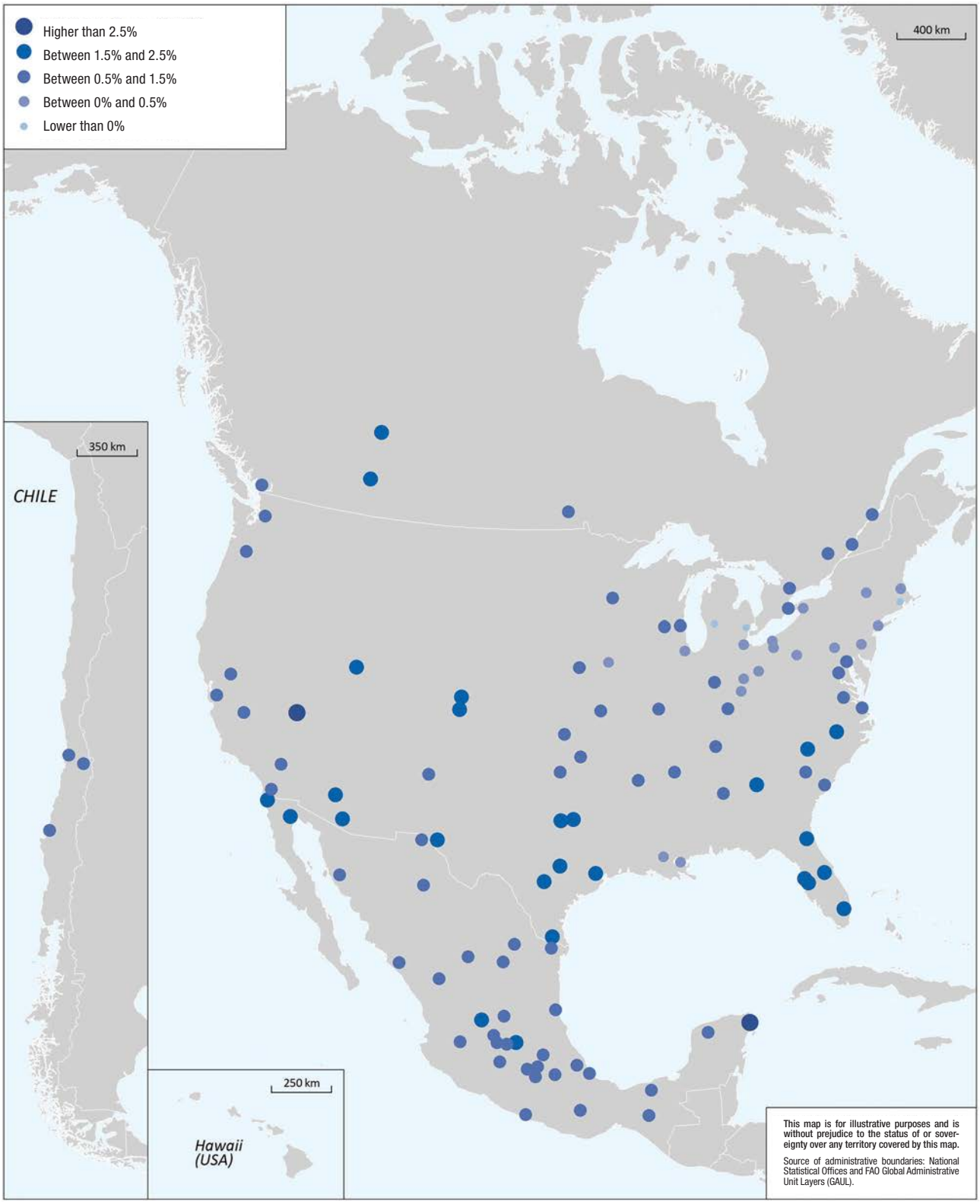
*Average annual growth rate, metropolitan areas*




StatLink http://dx.doi.org/10.1787/888932915337

## 1.10. Metropolitan population growth: Americas, 2000-12

*Average annual growth rate, metropolitan areas*




StatLink http://dx.doi.org/10.1787/888932915242

# Economic competitiveness of metropolitan areas

The 275 OECD metropolitan areas (with populations of at least 500 000) contributed on average to over half of the total OECD growth over the period 2000-10.

The aggregate GDP growth of metropolitan areas in the period 2000-10, appeared for a large part due to a small number of large metropolitan areas. Indeed, nine metropolitan areas (3.5% of the total) contributed to one-third of the GDP metropolitan growth in the OECD area, while the accumulated contribution of the remaining metropolitan areas was around two-thirds. Seoul-Incheon, New York, Tokyo and London recorded the highest contribution to the GDP growth in the OECD area (Figure 1.11).

The role of metropolitan areas for the national GDP growth can be quite different across OECD countries. Metropolitan areas in Greece, Japan, France and Hungary accounted for more than 70% of the national growth in the period 2000-10. In contrast, in the Netherlands and the Slovak Republic, metropolitan areas accounted for less than 40% of the national growth (Figure 1.12).

### *Definition*

The metropolitan areas are defined as the functional urban areas (FUA) with population above 500 000.

The functional urban areas are defined as densely populated municipalities (urban cores) and adjacent municipalities with high levels of commuting towards the densely populated urban cores (hinterland). Functional urban areas can extend across administrative boundaries, reflecting the economic geography of where people actually live and work.

GDP is the standard measure of the value of the production activity (goods and services) or resident producer units. Values of the GDP in the metropolitan areas are estimated by adjusting the GDP values of TL2 regions (see Annex C).

To make comparisons over time and across countries, GDP is expressed at constant prices (year 2005) and converted into USD purchasing power parities (PPPs) to express each country's GDP in a common currency.

GDP per capita is the ratio between GDP and population in a metropolitan area.

The national capital metropolitan areas in Greece, Chile and Portugal were responsible alone for more than 80% of the GDP growth of metropolitan areas. On the other hand, a larger number of metropolitan areas contributed significantly to the national growth in the United States, Canada, Mexico and Germany (Figure 1.12).

While the overall economic performance of metropolitan areas was strong in the period 2000-10, some areas are growing fast while others are stagnant or shrinking (Figures 1.14 and 1.15).

Metropolitan areas tend to be wealthier than the rest of the economy. The GDP per capita gap between the metropolitan areas and the rest of the economy in the OECD area was around 40% in 2010. Such a GDP gap is higher in Europe and Americas than in Asia (Figure 1.13).

## Source

OECD (2013), "Metropolitan areas", *OECD Regional Statistics* (database), *http://dx.doi.org/10.1787/data-00531-en*.

See Annexes A and B for data sources and country-related metadata.

See Annex C for details on definitions and data estimations.

## Reference years and territorial level

2000-10; metropolitan areas.

The functional urban areas have not been identified in Australia, Iceland, Israel, New Zealand and Turkey. The FUA of Luxembourg does not appear in the figures since it has a population below 500 000 inhabitants.

## Further information

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

Interactive graphs and maps: *http://rag.oecd.org*.

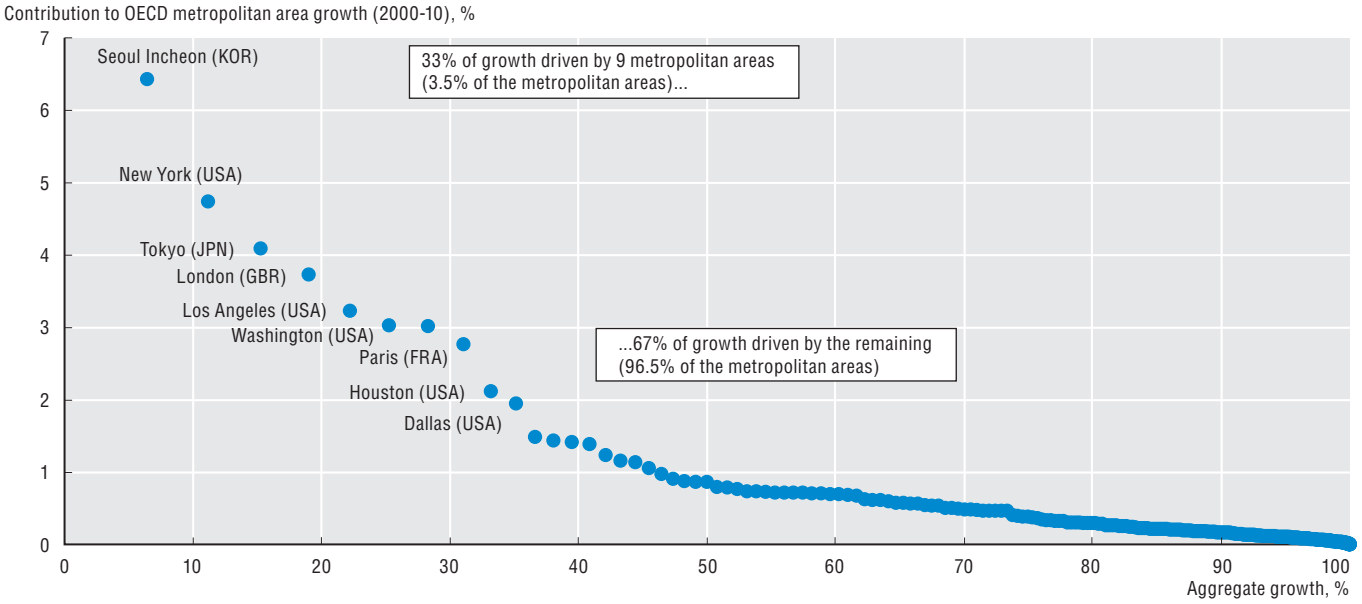
## Figure notes

1.11-1.13: GDP values in metropolitan areas are estimates based on GDP data at TL3 level.

1.12: Share of average national growth accounted by metropolitan areas.

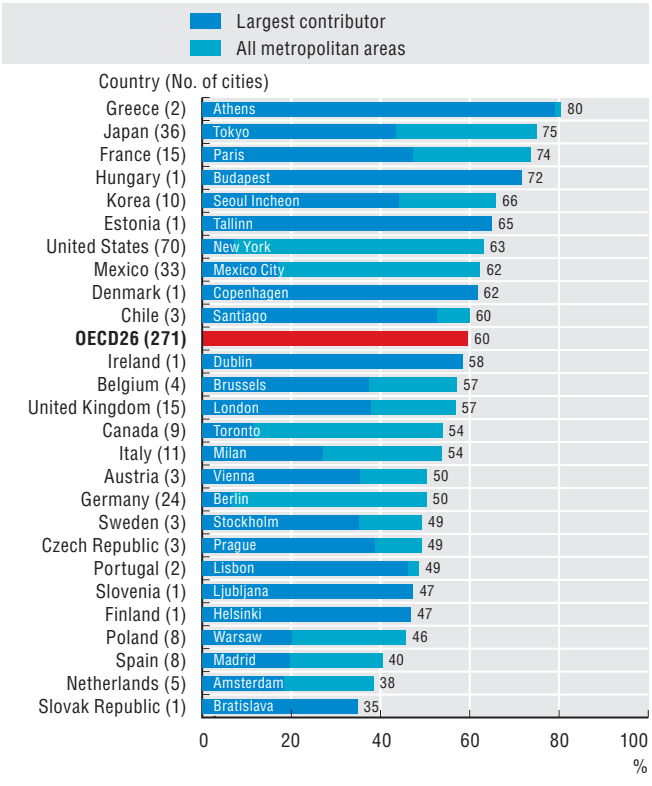
1.11-1.12: Norway and Switzerland are excluded for lack of data on comparable years.

### 1.11. Contribution of metropolitan areas to OECD aggregate growth, 2000-10



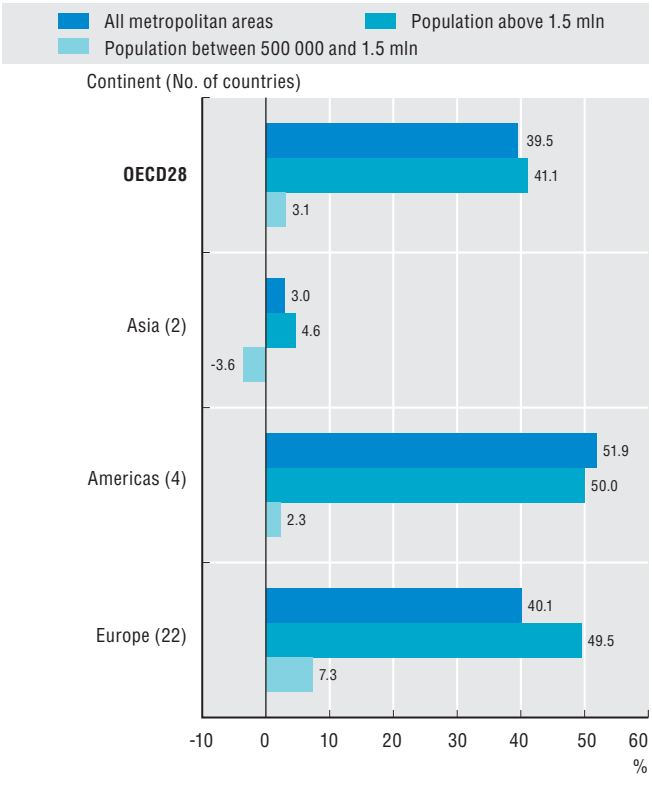

StatLink http://dx.doi.org/10.1787/888932912848

### 1.12. Per cent of national GDP growth contributed by the metropolitan areas 2000-10




StatLink http://dx.doi.org/10.1787/888932912867

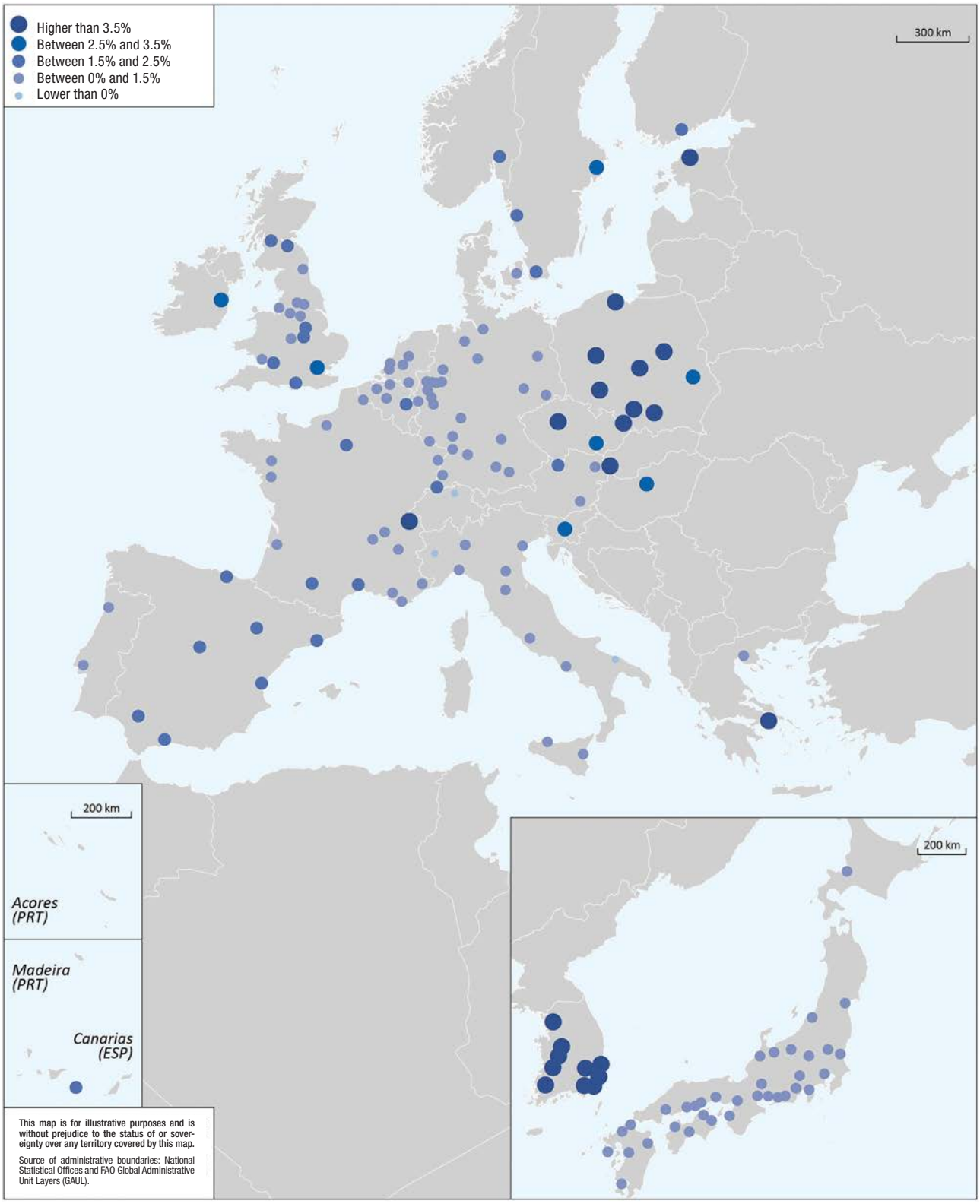
### 1.13. GDP per capita gap between metropolitan areas and the rest of the economy, 2010




StatLink http://dx.doi.org/10.1787/888932912886

## 1.14. Metropolitan GDP growth: Asia, Europe and Oceania, 2000-10

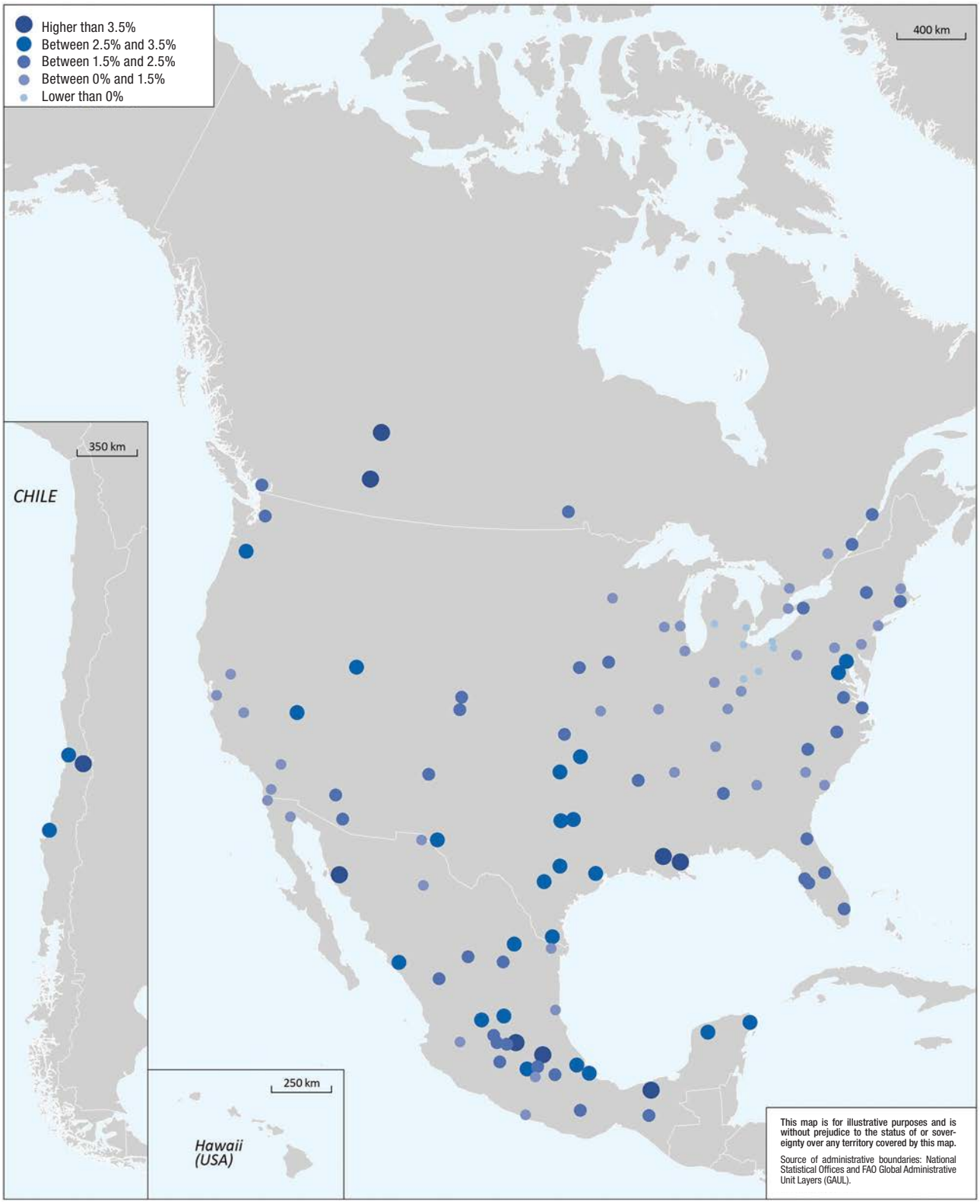
*Average annual growth rate (constant 2005 USD PPP), metropolitan areas*




StatLink http://dx.doi.org/10.1787/888932915261

## 1.15. Metropolitan GDP growth: Americas, 2000-10

*Average annual growth rate (constant 2000 USD PPP), metropolitan areas*




StatLink http://dx.doi.org/10.1787/888932915280

# Labour productivity and employment in metropolitan areas

Metropolitan areas drive national employment creation in many countries. On average, half of overall employment creation in 22 OECD countries between 2000 and 2012 was accounted for by 232 metropolitan areas. The metropolitan contribution to national employment growth was particularly high in Korea and Canada (more than 70%), while metropolitan areas in the Slovak Republic and Italy contributed to less than 35% of national employment growth (Figure 1.16).

Differences in employment growth can be large even among metropolitan areas of the same country. In Mexico, Japan, the United States and Poland, the differences in employment growth among metropolitan areas in each country were as large as 3% in the period 2000-2012 (Figure 1.17).

Metropolitan areas tend to be more productive than other regions due to a larger pool of workers (particularly skilled workers), better infrastructure and connections among firms, factors usually referred as "agglomeration benefits". Among the 20 best performers in productivity growth in the period 2000-10 there were relatively small metropolitan areas, such as Bratislava in the Slovak Republic; fast-growing areas, such as Prague in the Czech Republic; and metropolitan areas that have gained the most in population, such as Centro in Mexico and Poznan in Poland (Figure 1.18).

While the metropolitan area of Centro in Mexico displays the highest productivity growth, many other Mexican metropolitan areas were among the cities with the largest decline in productivity, together with metropolitan areas in France and Italy (Figure 1.19).

### *Definition*

The metropolitan areas are defined as the functional urban areas (FUA) with population above 500 000.

The functional urban areas are defined as densely populated municipalities (urban cores) and adjacent municipalities with high levels of commuting towards the densely populated urban cores (hinterland). Functional urban areas can extend across administrative boundaries, reflecting the economic geography of where people actually live and work.

Employed persons are all persons who during the reference week worked at least one hour for pay or profit, or were temporarily absent from such work.

Values of employed and unemployed in the metropolitan areas are estimated by adjusting the corresponding values of TL2 regions (see Annex C).

Labour productivity is measured as the ratio between GDP and total employment in metropolitan areas.

## Source

OECD (2013), "Metropolitan areas", *OECD Regional Statistics* (database), *http://dx.doi.org/10.1787/data-00531-en*.

See Annexes A and B for data sources and country-related metadata.

See Annex C for details on definitions and data estimations.

## Reference years and territorial level

2000-12; labour productivity 2000-10; metropolitan areas.

The functional urban areas have not been identified in Australia, Iceland, Israel, New Zealand and Turkey. The FUA of Luxembourg does not appear in the figures since it has a population below 500 000 inhabitants.

## Further information

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

Interactive graphs and maps *http://rag.oecd.org*.

## Figure notes

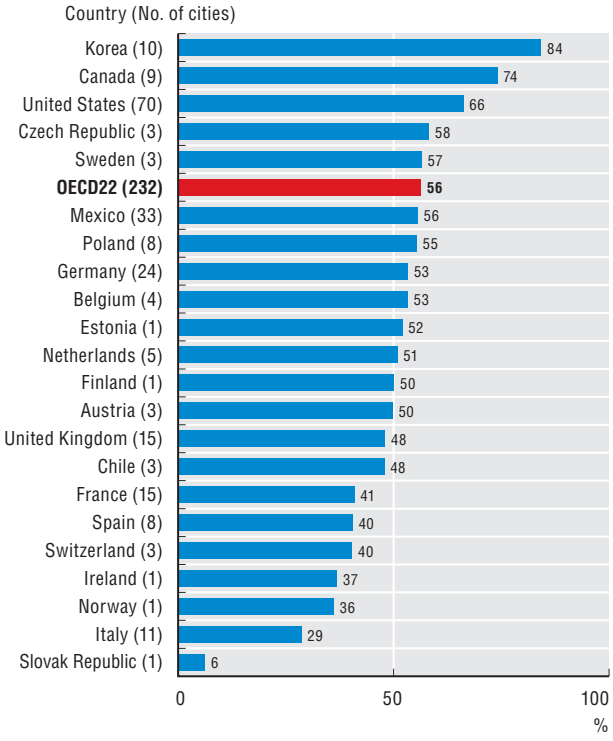
1.16-1.19: Employment values in metropolitan areas are estimates based on employment data at TL2 level (Annex C).

Available years: Switzerland 2001-12; Finland 2000-11; Mexico 2000-11.

1.16: Only countries with average positive growth of employment over 2000-12 are included. For this reason Denmark, Greece, Japan and Portugal are excluded. Hungary and Slovenia are excluded because the employment creation in the metropolitan areas was on average higher than the respective country averages.

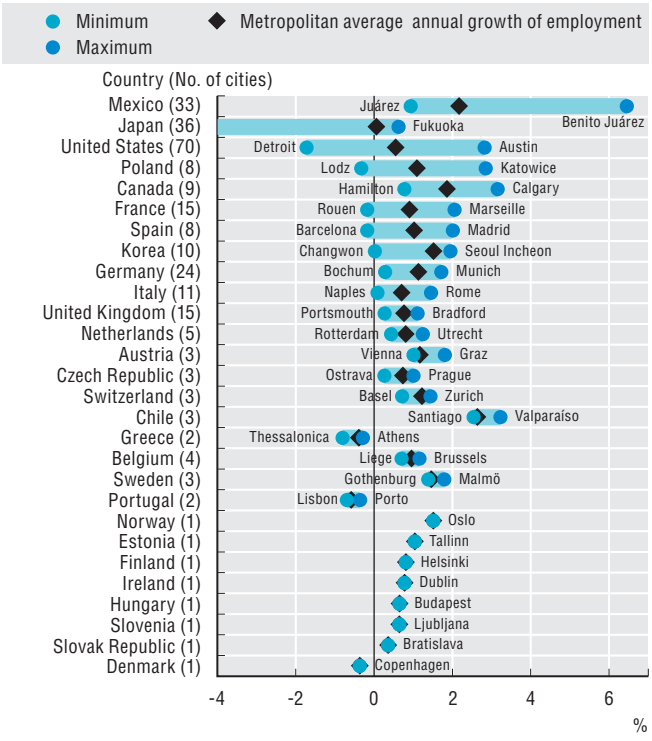
1.18-1.19: Denmark, Norway and Switzerland are excluded for lack of data on comparable years.

### 1.16. Per cent of national employment creation by metropolitan areas, 2000-12




StatLink http://dx.doi.org/10.1787/888932912905

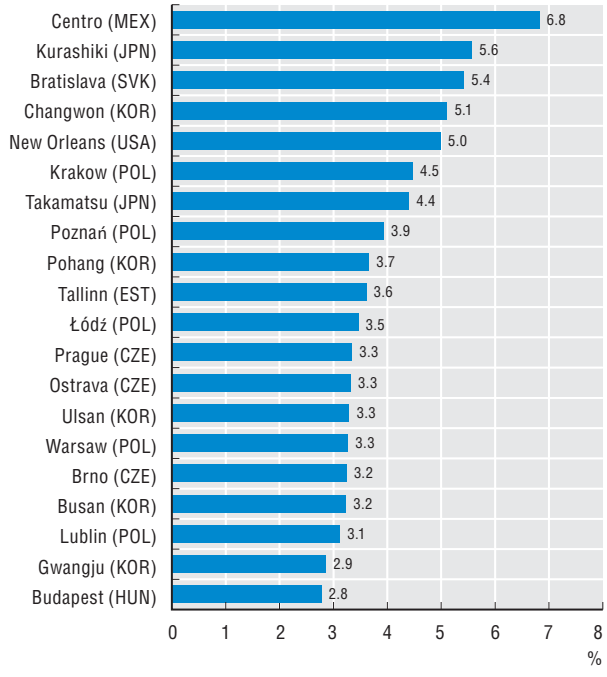
### 1.17. Countries ranked by size of difference in metropolitan annual employment growth, 2000-12




StatLink http://dx.doi.org/10.1787/888932912924

### 1.18. Top 20 metropolitan areas for labour productivity growth, 2000-10

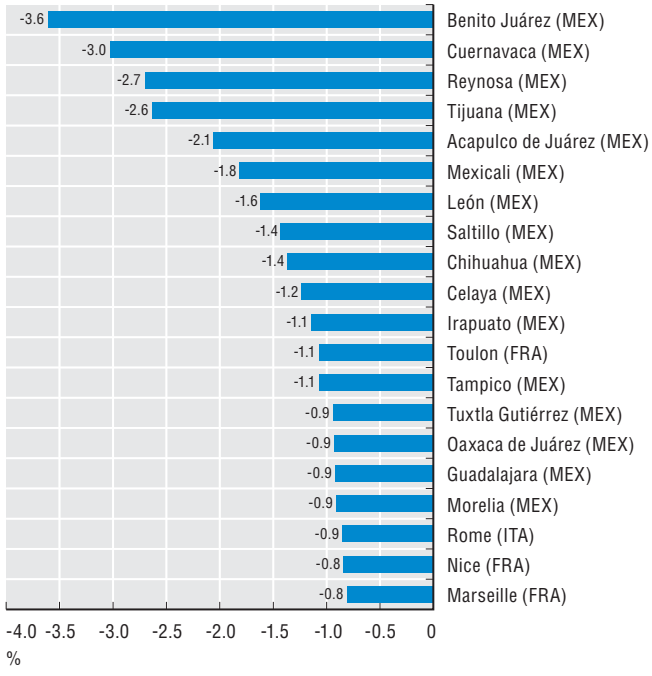
*Average annual growth rate*




StatLink http://dx.doi.org/10.1787/888932912943

### 1.19. Bottom 20 metropolitan areas for labour productivity growth, 2000-10

*Average annual growth rate*




StatLink http://dx.doi.org/10.1787/888932912962

# Impact of the crisis on unemployment in metropolitan areas

In many countries, the difficult labour market conditions resulting from the economic crisis have been persistent also in metropolitan areas. The unemployment rate in metropolitan areas rose more in the period 2008-2012 than it did in the previous 8 years in 26 of the 28 OECD countries (Figure 1.20). In Athens and Thessaloniki (the two metropolitan areas of Greece), the unemployment rate increased on average 5 percentage points annually between 2008 and 2012, reaching 25% of unemployed in 2012 (Figure 1.20).

In 2012 the unemployment rate in 45% of the OECD metropolitan areas was above that of the respective country. Differences in unemployment rates among metropolitan areas of the same country were the largest in Spain, Italy and France (Figure 1.21).

The metropolitan areas with the largest increase in the unemployment rate in each country in the period 2008-12 were Athens (Greece), Seville (Spain), Lisbon (Portugal) and Dublin (Ireland), where unemployment rates rose more than 2 percentage points annually (Figure 1.22). The unemployment rate in these metropolitan areas was no less than 14% in 2012. On the other hand, metropolitan areas in Germany, Chile, Korea and Norway have managed to create or maintain employment during the economic crisis. For example, in Oslo (Norway) and Seoul (Korea), annual increases of the unemployment rate were below 0.1 percentage points on average during 2008-2012 (Figure 1.22).

### *Definition*

The metropolitan areas are defined as the functional urban areas (FUA) with population above 500 000.

The functional urban areas are defined as densely populated municipalities (urban cores) and adjacent municipalities with high levels of commuting towards the densely populated urban cores (hinterland). Functional urban areas can extend across administrative boundaries, reflecting the economic geography of where people actually live and work.

Unemployed persons are defined as those who are without work, who are available for work and have taken active steps to find work in the last four weeks.

Values of employed and unemployed in the metropolitan areas are estimated by adjusting the corresponding values of TL2 regions (see Annex C).

The unemployment rate is defined as the ratio between unemployed persons and labour force, where the latter is composed of unemployed and employed persons.

## Source

OECD (2013), "Metropolitan areas", *OECD Regional Statistics* (database), *http://dx.doi.org/10.1787/data-00531-en*.

See Annexes A and B for data sources and country-related metadata.

See Annex C for details on definitions and data estimations.

## Reference years and territorial level

2000-12; metropolitan areas.

The functional urban areas have not been identified in Australia, Iceland, Israel, New Zealand and Turkey. The FUA of Luxembourg does not appear in the figures since it has a population below 500 000 inhabitants.

## Further information

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

Interactive graphs and maps: *http://rag.oecd.org*.

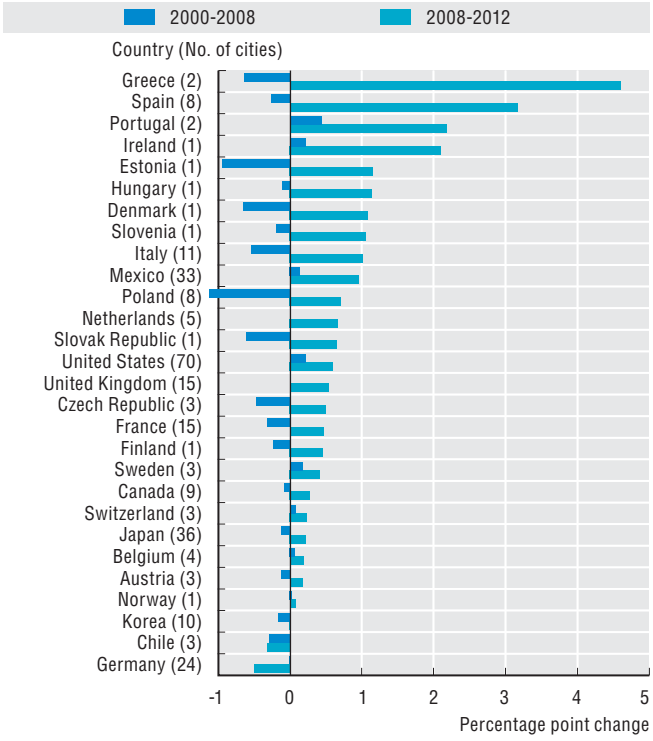
## Figure notes

1.20-1.22: Unemployment values in metropolitan areas are estimates based on unemployment data at TL2 level. (Annex C).

Available years: Switzerland 2001-12; Mexico 2000-12; Finland and Japan 2000-11.

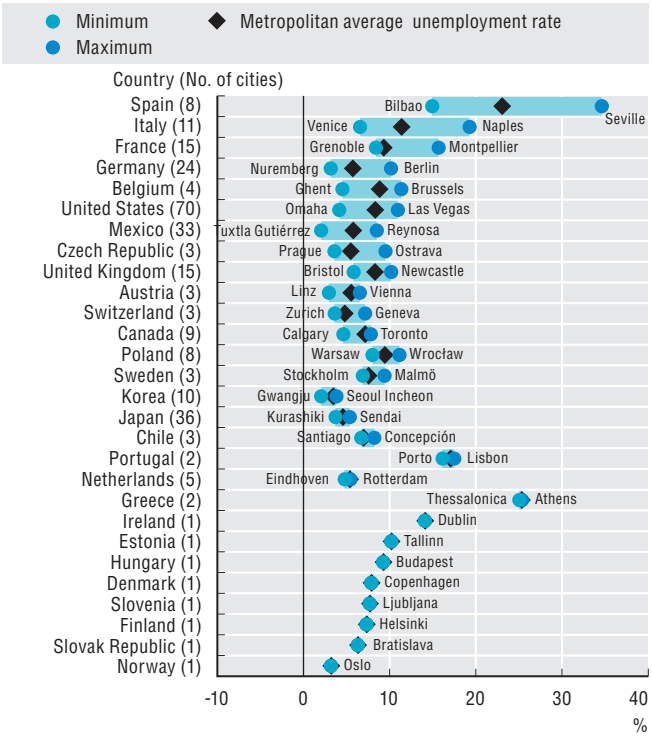
1.22: Chile and Germany are not included in the graph since the unemployment rates of the metropolitan areas have decreased during the period 2008-12.

### 1.20. Annual average change in unemployment rate of metropolitan areas, by country



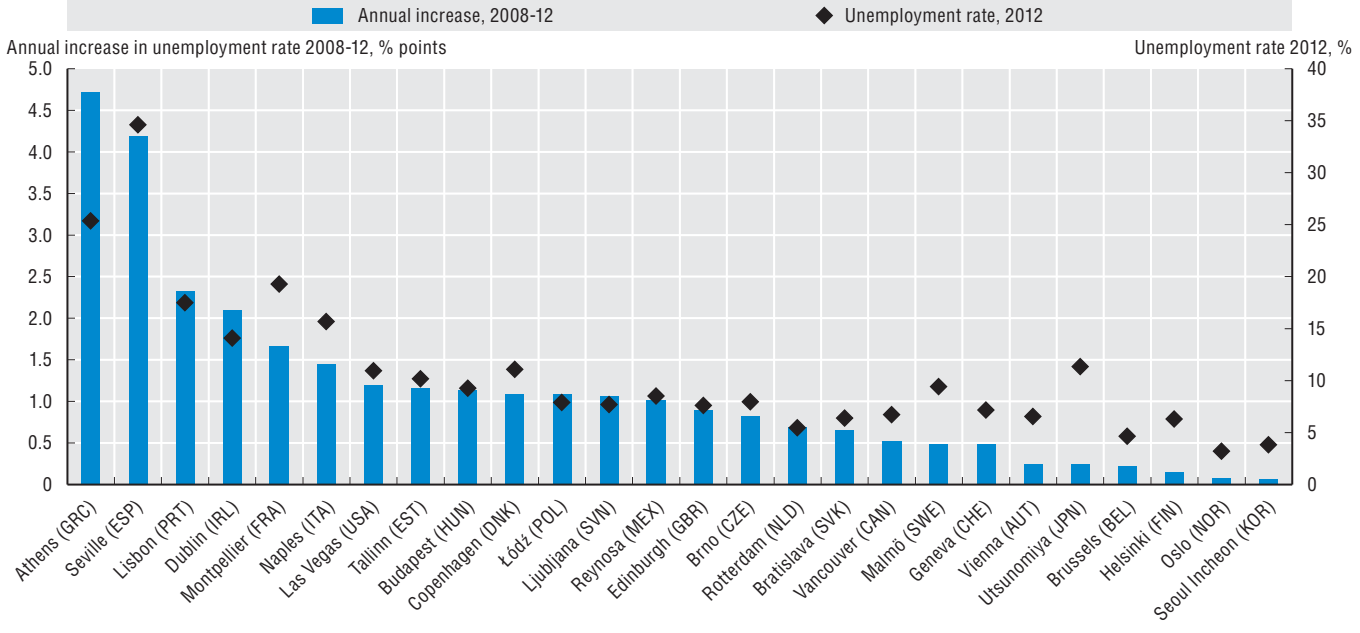

StatLink http://dx.doi.org/10.1787/888932912981

### 1.21. Countries ranked by size of difference in metropolitan unemployment rate, 2012




StatLink http://dx.doi.org/10.1787/888932913000

### 1.22. Metropolitan area with largest increase in unemployment rate during 2008-12 (average yearly) and its unemployment rate in 2012, by country




StatLink http://dx.doi.org/10.1787/888932913019

# Patent activity in metropolitan areas

Innovation is highly concentrated in a few countries, and metropolitan areas are usually the places where most innovation activities take place. Agglomeration forces determine an environment with a large proportion of specialised workers, firms and capital, where ideas are easily exchanged and can lead to the creation of new goods and production processes. In 2008, 65% of all patent applications of the 16 OECD countries where data are available were granted in metropolitan areas (Figure 1.23). The concentration of patents in metropolitan areas is high in top patenting countries such as Japan and the United States but also in France, the Netherlands, Spain and Denmark. On the other side, Finland, Norway and Italy displayed a lower share of patents granted by metropolitan areas, signalling innovation activities outside the capital areas of Helsinki (e.g. in Pirkanmaa and Pohjois-Pohjanmaa) and Oslo (e.g. in Rogaland, Hodaland and Sor-Trondelag) as well in medium-sized cities in northeast Italy.

On aggregate, around 5% of OECD metropolitan areas accounted for around 45% of total metropolitan patent applications in 2008; the next 10% metropolitan areas contributed roughly to 25%; while the remaining 85% accounted for only 30% of the total metropolitan patents. San Francisco was the metropolitan area with the highest number of patents: 9 000 patent applications in one year; followed by Tokyo and Osaka, each with more than 4 000 patent applications (Figure 1.24).

Patent intensity – the number of patents per million inhabitants – is the highest in the metropolitan areas in Sweden, the Netherlands, Denmark and Finland (Figure 1.25).

Eindhoven in the Netherlands was the metropolitan area with the highest patent intensity in 2008, around 2 200 patents per million inhabitants, followed by San Diego and San Francisco (United States), each with more than 700 patents per million population (Figure 1.26).

### *Definition*

The metropolitan areas are defined as the functional urban areas with population above 500 000.

The functional urban areas are defined as densely populated municipalities (urban cores) and adjacent municipalities with high levels of commuting towards the densely populated urban cores (hinterland). Functional urban areas can extend across administrative boundaries, reflecting the economic geography of where people actually live and work.

A patent is an exclusive right granted for an invention, which is a product or a process with industrial applicability that provides, in general, a new way of doing something, or offers a new technical solution to a problem ("inventive step"). A patent provides protection for the invention to the owner of the patent. The protection is granted for a limited period, generally 20 years.

Data refer overall to patent applications made under the Patent Co-operation Treaty (PCT).

Patent documents report the inventors (where the invention takes place), as well as the applicants (owners), along with their addresses and country of residence. Patent counts are based on the inventor's region of residence and fractional counts.

The patent intensity is the ratio between the number of patent applications and the metropolitan area's population.

### Source

OECD (2013), "Metropolitan areas", *OECD Regional Statistics* (database), *http://dx.doi.org/10.1787/data-00531-en*.

See Annexes A and B for data sources and country-related metadata.

OECD *Patent Statistics (database)*, *http://dx.doi.org/10.1787/patent-data-en*.

### Reference years and territorial level

2008; metropolitan areas.

The functional urban areas have not been identified in Australia, Iceland, Israel, New Zealand and Turkey. The FUA of Luxembourg does not appear in the figures since it has a population below 500 000 inhabitants.

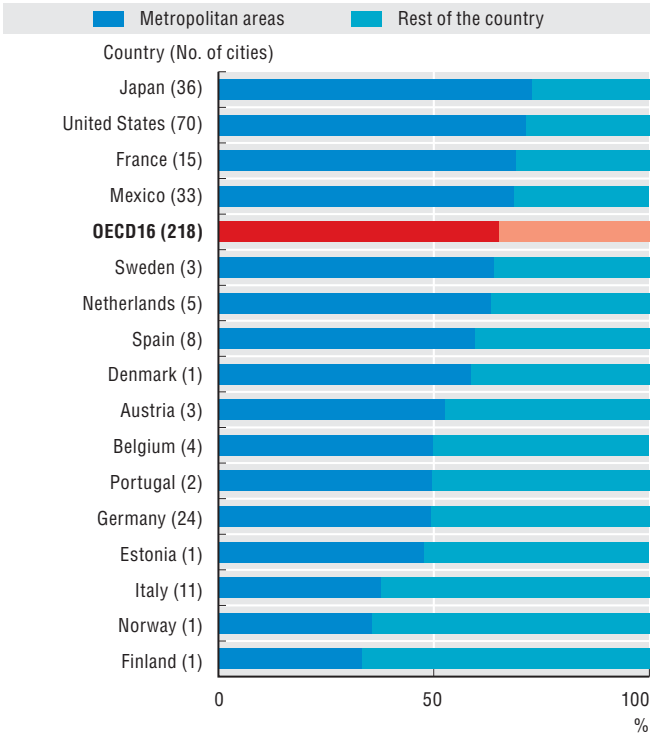
Data on patent activity in metropolitan areas are available only for 16 OECD countries.

### Further information

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

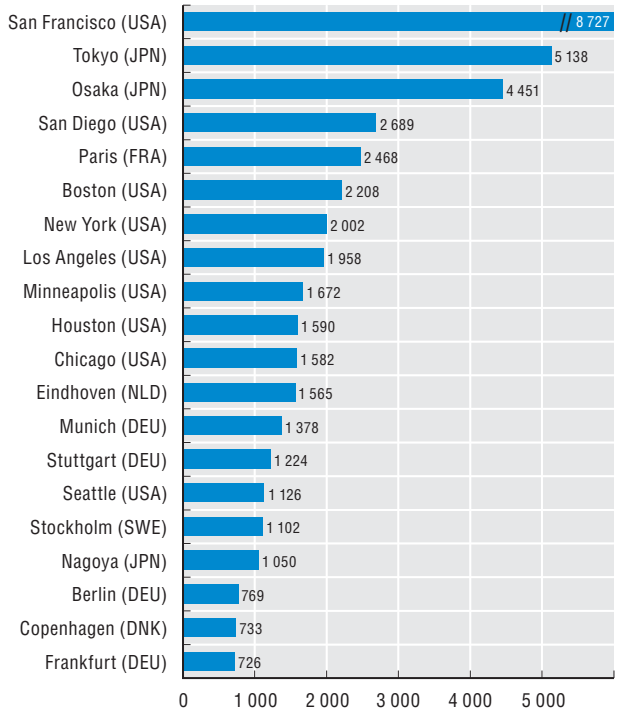
Interactive graphs and maps: *http://rag.oecd.org*.

### 1.23. Per cent of patent applications in metropolitan areas and the rest of the country, 2008




StatLink http://dx.doi.org/10.1787/888932913038

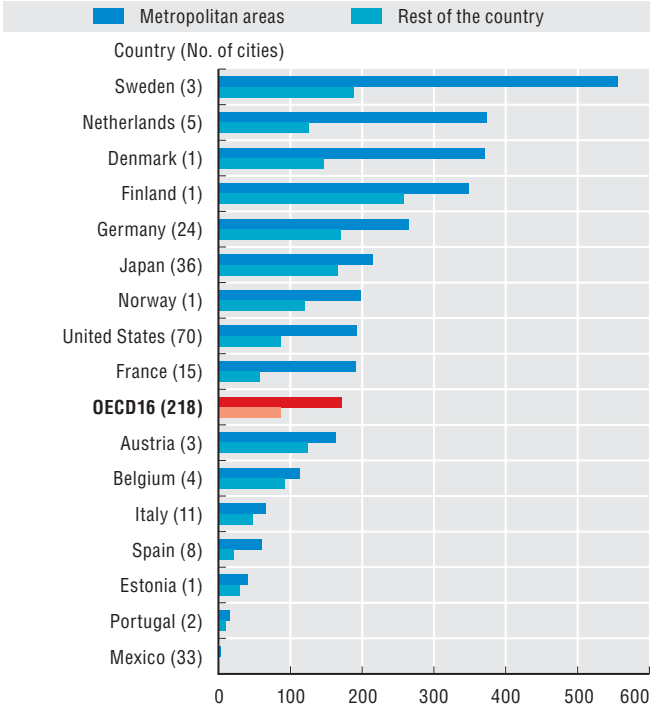
### 1.24. Top 20 metropolitan areas by patent applications, 2008




StatLink http://dx.doi.org/10.1787/888932913057

### 1.25. Patent intensity in metropolitan areas and the rest of the country, 2008

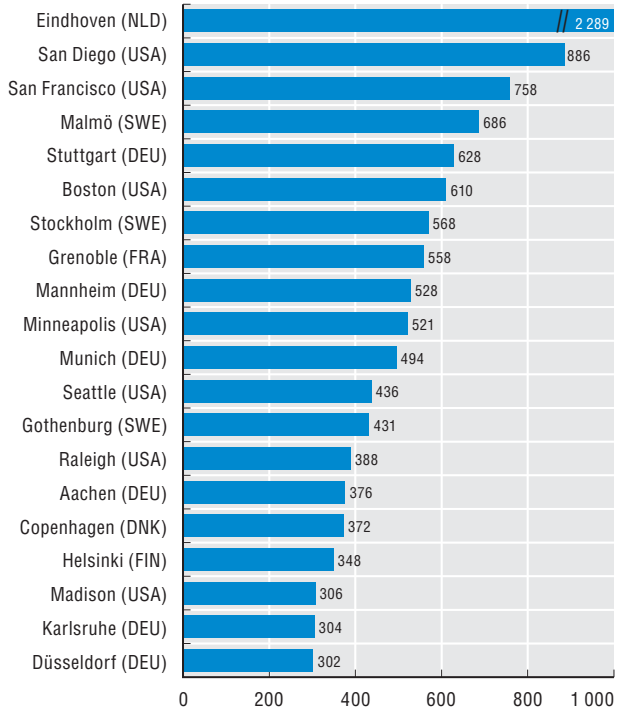
*Patent applications per million inhabitants*




StatLink http://dx.doi.org/10.1787/888932913076

### 1.26. Top 20 metropolitan areas for patent intensity, 2008

*Patent applications per million inhabitants*




StatLink http://dx.doi.org/10.1787/888932913095

# Environmental sustainability in metropolitan areas

Green areas such as parks and natural vegetation contribute to reducing pollution, improving the health and quality of life of residents, and making metropolitan areas more attractive to residents and tourists.

International comparable measures of green areas can be derived by overlapping satellite-based measures of land cover with the metropolitan boundaries. According to these estimates, North American cities such as Edmonton, Des Moines and Madison are the metropolitan areas with the largest share of green area per person (higher than 5 000 square metres per person). Juares, Bari, Anjo and Athens, on the other hand, recorded the lowest estimates of green areas, i.e. below the minimum level of 9 square metres per person recommended by the World Health Organization (Figure 1.27).

While metropolitan areas are considered large consumers of energy and producers of carbon dioxide ($CO_2$), high differences are observable among cities both within and across countries. The metropolitan areas with the highest levels of emissions per capita are found in Canada, Korea and the United States. Within countries, the highest differences in $CO_2$ emissions per capita in metropolitan areas are observed in Mexico, Italy, Korea and France (Figure 1.28). Metropolitan areas can also be more energy efficient than the rest of the country. Evidence shows that the $CO_2$ emissions per capita in the metropolitan areas are lower than in less densely populated regions in half of the OECD countries, where data are available (Figure 1.28).

Source of $CO_2$ emissions depends on many factors, including urban form. For the United States, the high levels of $CO_2$ from the transport sector are the result of a continuous sprawl of cities and the intensive use of private vehicles to commute (Figure 1.29). On the other hand, in European cities, which account on average for lower levels of $CO_2$ emissions per capita, the share of $CO_2$ emissions coming from the energy production sector is relatively larger than the share of emissions coming from the transport sector (Figure 1.29).

### *Definition*

The metropolitan areas are defined as the functional urban areas (FUA) with population above 500 000.

The functional urban areas are defined as densely populated municipalities (urban cores) and adjacent municipalities with high levels of commuting towards the densely populated urban cores (hinterland). Functional urban areas can extend across administrative boundaries, reflecting the economic geography of where people actually live and work.

Carbon dioxide ($CO_2$) emissions in metropolitan areas are estimated by adjusting national emission data with population grid data and infrastructure location. They include emissions from all sources with the exception of air transport, international aviation and shipping.

$CO_2$ emissions from transport include road and non-road transportation.

Green areas are defined as the land in metropolitan areas covered by vegetation, croplands, forests, shrub lands and grasslands.

$CO_2$ emissions and green areas in metropolitan areas are estimates based on global satellite datasets (Annex C).

## Source

OECD (2013), "Metropolitan areas", *OECD Regional Statistics* (database), *http://dx.doi.org/10.1787/data-00531-en*.

MODIS MCD12Q1 for green areas in 2008.

$CO_2$ emissions: EDCAR spatial emission datasets, JRC, *http://edgar.jrc.ec.europa.eu*.

See Annexes A and B for data sources and country-related metadata.

See Annex C for details on definitions and data estimations.

## Reference years and territorial level

2008; metropolitan areas.

The functional urban areas have not been identified in Australia, Iceland, Israel, New Zealand and Turkey. The FUA of Luxembourg does not appear in the figures since it has a population below 500 000 inhabitants.

## Further information

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

Piacentini, M. and K. Rosina (2012), "Measuring the Environmental Performance of Metropolitan Areas with Geographic Information Sources", *OECD Regional Development Working Papers*, No. 2012/05, OECD Publishing, *http://dx.doi.org/10.1787/5k9b9ltv87jf-en*.

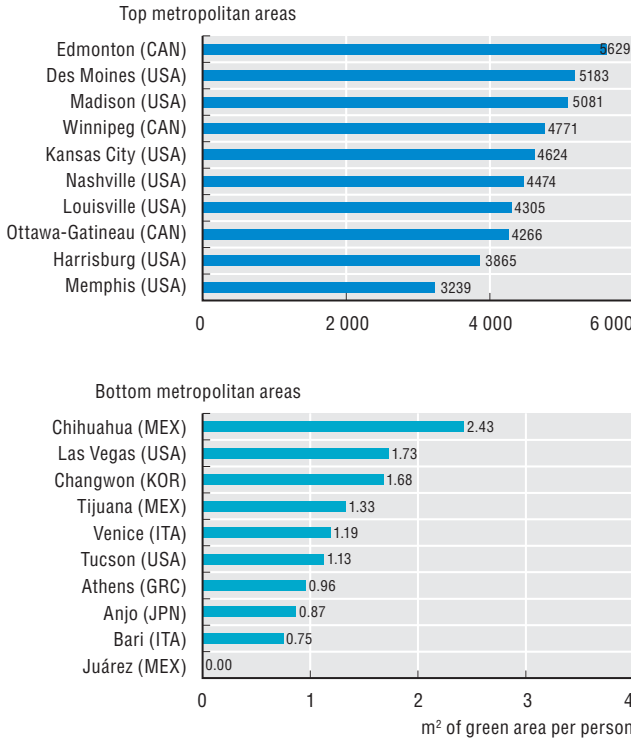
Interactive graphs and maps: *http://rag.oecd.org*.

## Figure notes

1.27: Green areas are estimates based on land cover databases (Annex C).

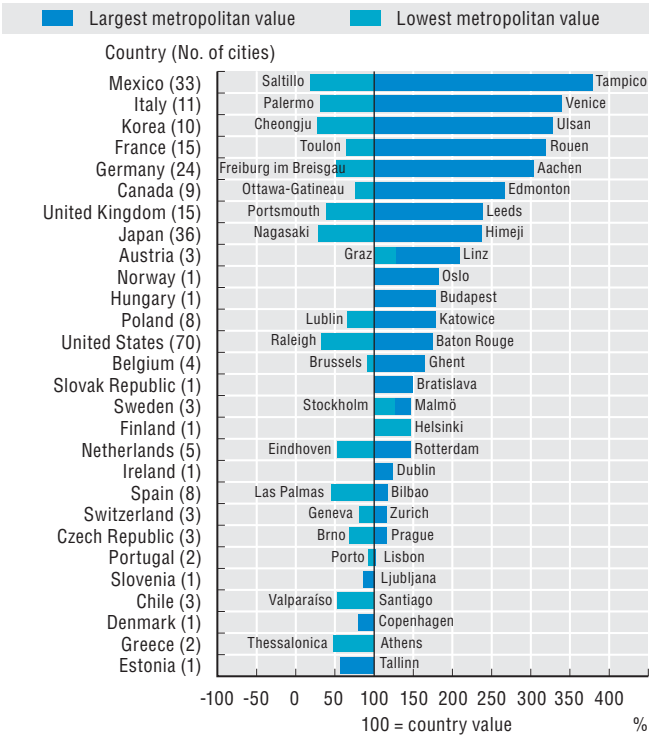
1.28-1.29: $CO_2$ emissions in metropolitan areas are estimates based on global satellite datasets (Annex C).

### 1.27. Top and bottom 10 metropolitan areas by share of green area per person, 2008



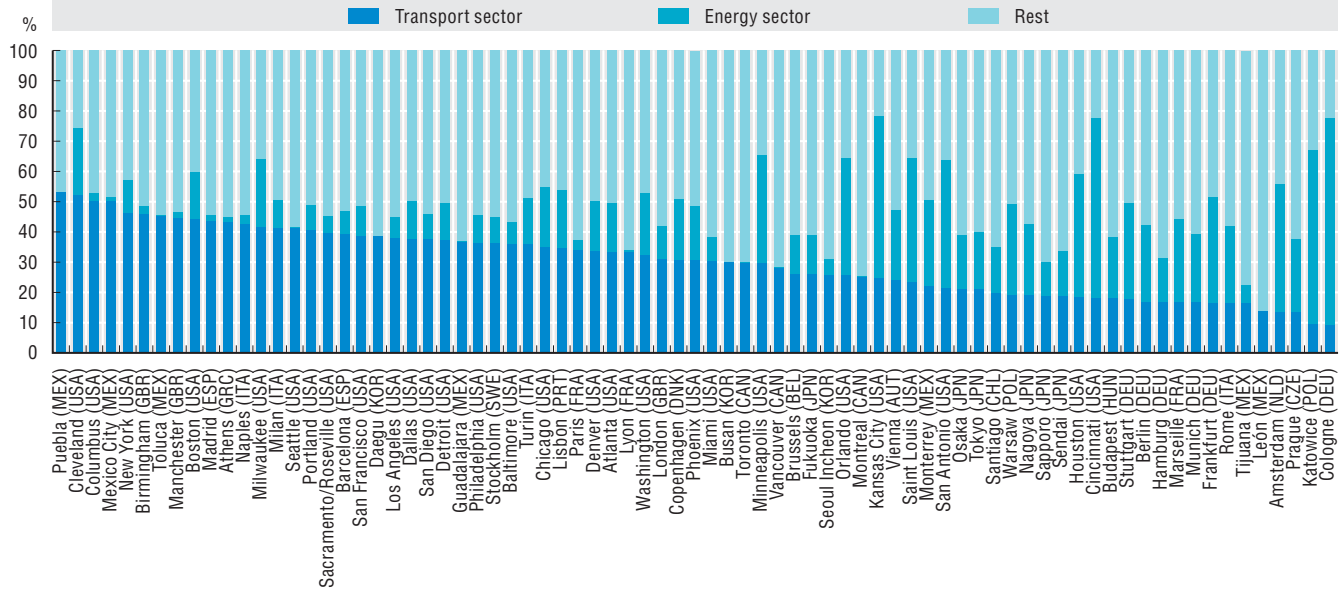

StatLink http://dx.doi.org/10.1787/888932913114

### 1.28. Metropolitan areas range in $CO_2$ emissions per capita, 2008 (country value = 100)




StatLink http://dx.doi.org/10.1787/888932913133

### 1.29. Share of $CO_2$ emissions from transport and energy sector in the metropolitan areas with more than 1.5 million people, 2008




StatLink http://dx.doi.org/10.1787/888932913152

# Administrative organisation of metropolitan areas

Metropolitan areas are continuously changing their spatial organisation, reflecting the evolution of economy and society. These changes affect the quality of life, the demand for transport infrastructure, and the global environmental footprint of urbanisation, among other factors. Regional, metropolitan and local governments' decisions depend critically on the physical structure of the city. On average, 80% of the OECD urban population lives in the cores of metropolitan areas and only 20% in the hinterlands, but in a few European countries the share of population in urban cores is below 50% (Figure 1.30). While most of the metropolitan areas have grown with contiguous urban cores, 30 metropolitan areas show a polycentric structure with more than one urban core.

Metropolitan areas are important units for public policy. However, their boundaries do not generally match the administrative ones. The number of local governments inside the boundaries of a metropolitan area gives an indication of possible challenges for efficient and equitable service delivery, policy co-ordination, and distribution of wealth in a city, among others. The average population size by local government in metropolitan areas ranges from 4 000 people in the Czech Republic to over 200 000 in Ireland, the United Kingdom and Mexico (Figure 1.31).

### *Definition*

The metropolitan areas are defined as the functional urban areas (FUA) with population above 500 000.

The functional urban areas are defined as densely populated municipalities (urban cores) and adjacent municipalities with high levels of commuting towards the densely populated urban cores (hinterland). Functional urban areas can extend across administrative boundaries, reflecting the economic geography of where people actually live and work.

The number of local governments in a metropolitan area are identified as:

- only one local level of government, notably the lowest tier.
- only general-purpose local governments, the specific function governments are excluded (for example school districts, health agencies, etc.).

Annex B includes the list of local governments by country.

The administrative fragmentation is defined as the ratio between the number of local governments and the population in a metropolitan area.

The number of local governments per 100 000 people – a measure of administrative fragmentation of the metropolitan area – varies from around 25 in the Czech Republic to less than 0.5 in Ireland and the United Kingdom (Figure 1.32). While on average the number of local governments increases for larger metropolitan areas, the territorial organisation of countries has an important impact: for cities of similar population size the territorial fragmentation can be as different as 33 local governments per 100 000 population in Strasbourg (France) to 6 in Cheongju (Korea) and 0.9 in El Paso (United States).

Rouen (France) and Brno (Czech Republic) are the OECD metropolitan areas with the highest administrative fragmentation, 49 and 38 local governments per 100 000 inhabitants, respectively (Figure 1.33).

## Source

OECD (2013), "Metropolitan areas", *OECD Regional Statistics* (database), *http://dx.doi.org/10.1787/data-00531-en*.

See Annexes A and B for data sources and country-related metadata.

## Reference years and territorial level

2012; metropolitan areas.

The functional urban areas have not been identified in Australia, Iceland, Israel, New Zealand and Turkey. The FUA of Luxembourg does not appear in the figures since it has a population below 500 000.

## Further information

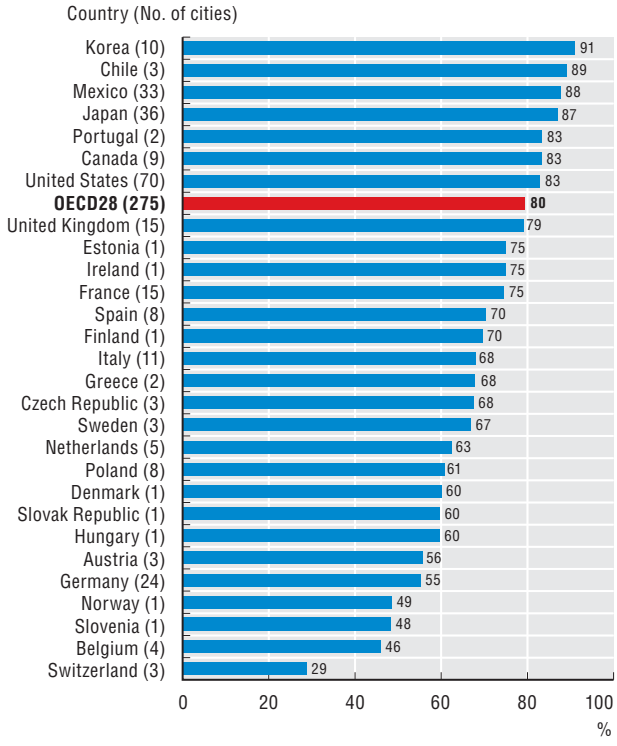
OECD (2012), *Redefining "Urban": A New Way to Measure Metropolitan Areas*, OECD Publishing. *http://dx.doi.org/10.1787/9789264174108-en*.

Interactive graphs and maps: *http://rag.oecd.org*.

## Figure notes

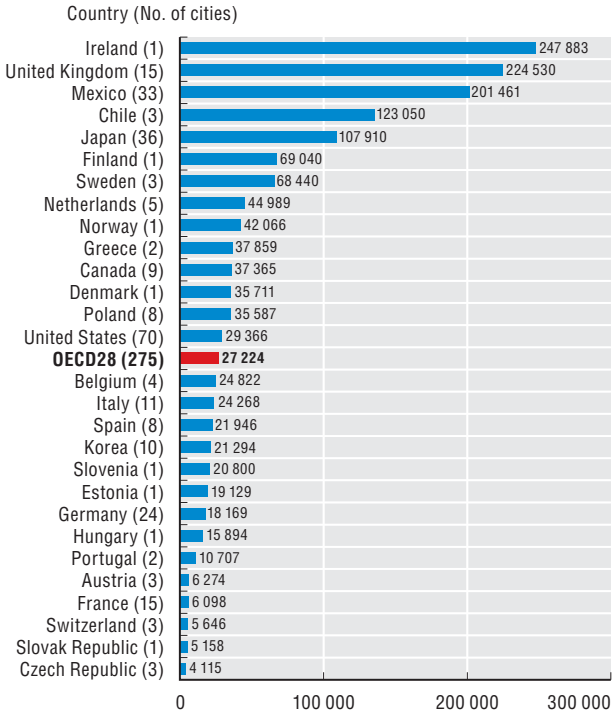
1.30-1.33: The number of local governments refers to circa 2001. (Annex B).

### 1.30. Per cent of metropolitan area population in the urban core, 2012




StatLink http://dx.doi.org/10.1787/888932913171

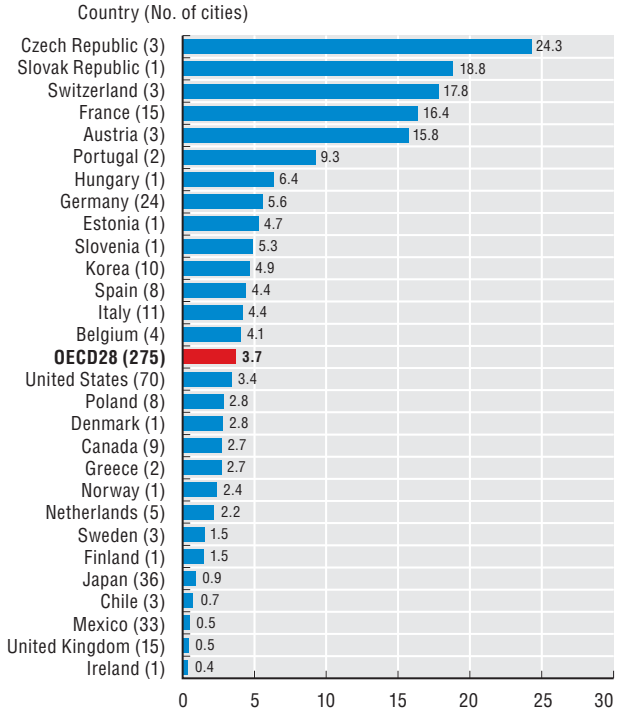
### 1.31. Average population size per local government in metropolitan areas, 2012




StatLink http://dx.doi.org/10.1787/888932913190

### 1.32. Administrative fragmentation of metropolitan areas, 2012

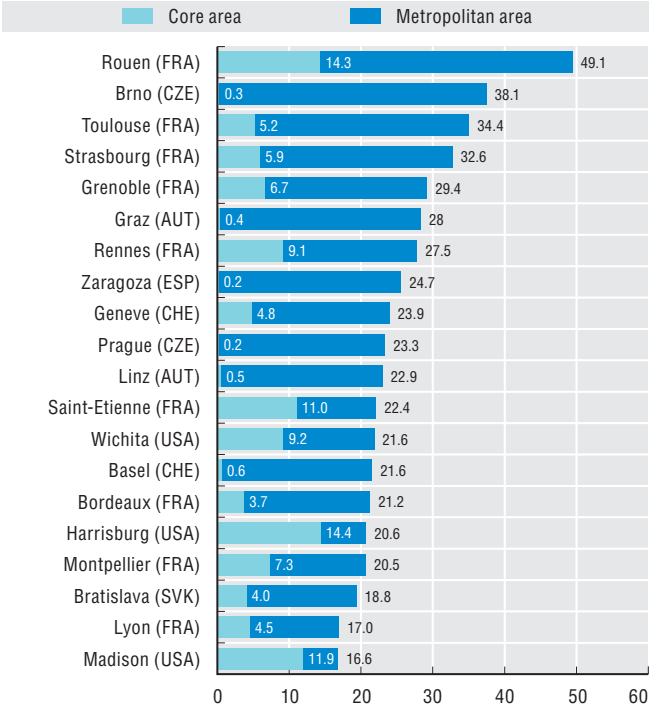
*Number of local governments per 100 000 population*




StatLink http://dx.doi.org/10.1787/888932913209

### 1.33. Top 20 administratively fragmented metropolitan areas, 2012

*Number of local governments per 100 000 population*




StatLink http://dx.doi.org/10.1787/888932913228

# 2. REGIONS AS DRIVERS OF NATIONAL COMPETITIVENESS

Distribution of population and regional typology

Regional contribution to population change

Regional contribution to national GDP growth

Regional contribution to change in employment

Impact of the crisis on regional economic performance

Labour productivity and GDP per capita growth in regions

Regional specialisation and productivity growth across sectors

Regional economic disparities

Regional disparities in tertiary education

Research and development expenditures in regions

Patents in regions and by sectors

Regional patterns of co-patenting

Impact of scientific publications in regions

*The data in this chapter refer to regions in OECD and non OECD countries. Regions are classified on two territorial levels reflecting the administrative organisation of countries. Large (TL2) regions represent the first administrative tier of subnational government. Small (TL3) regions are contained in a TL2 region.*

# Distribution of population and regional typology

The geographic distribution of population is explained by differences in climatic and environmental conditions that discourage human settlement in some areas and favour population concentration around a few urban centres. This pattern is reinforced by the increased availability of economic opportunities and wider availability of services stemming from urbanisation itself.

In 2012, almost half of the total OECD population (48%) lived in predominantly urban regions, which accounted for 6% of the total area. More than 60% of the population lived in predominantly urban regions in the Netherlands, Belgium, the United Kingdom and Korea (Figure 2.1).

Predominantly rural regions accounted for one-fourth of total population and more than 80% of land area. In Ireland, Finland, Norway and Slovenia, the share of the national population in rural regions was two times higher than the OECD average (Figure 2.1).

Rural regions in North America, European countries, and in Japan have been further classified as either close to a large urban centre or remote. Over the 25 OECD countries with rural regions, only in Estonia, Norway, Greece, Portugal Switzerland and Canada does more than half of the rural population live in remote rural regions (Figure 2.2).

### *Definition*

OECD has established a regional typology to take into account geographical differences and enable meaningful comparisons between regions belonging to the same type. Regions have been classified as *predominantly rural, intermediate and predominantly urban* on the basis of the percentage of population living in local rural units (see Annex A for the detailed methodology).

This typology has been refined by introducing a criterion of distance (driving time) to large urban centres. Thus a predominantly rural region is classified as *predominantly rural remote* region (PRR) if a certain percentage of the regional population needs more than a fixed time to reach a large urban centre; otherwise, the rural region is classified as *predominantly rural close to a city* (PRC). The extended typology has been applied to North America, Europe and Japan (see Annex A for the detailed methodology).

Population is unevenly distributed among regions within OECD countries. In 2012, 10% of regions accounted for 40% of the total population in OECD countries (Figures 2.3).

The concentration of population was highest in Australia, Canada, Iceland and Chile, where more than half of the population lived in 10% of the regions with the largest population (Figure 2.3).

The regional population density varies from below 5 people per $km^2$ in some regions in Australia, Canada, Chile, Iceland, Mexico and the United States to above 1 000 people per $km^2$ in some predominantly urban regions in Europe, Canada, Japan, Korea and Mexico (Figures 2.4-2.7).

## Source

OECD (2013), *OECD Regional Statistics* (database), *http://dx.doi.org/10.1787/region-data-en*.

See Annex B for data source and country-related metadata.

## Reference years and territorial level

1995-2012; TL3.

Australia 1995-2011; Mexico 1995-2010.

TL2 regions in Brazil, China, Colombia, India, indonesia, the Russian Federation and South Africa.

## Further information

OECD (2009), *Regional Typology: Updated Statistics*, *www.oecd.org/gov/regional-policy/42392595.pdf*.

Brezzi, M., L. Dijkstra and V. Ruiz (2011), "OECD Extended Regional Typology: The Economic Performance of Remote Rural Regions", *OECD Regional Development Working Papers*, No. 2011/06, OECD Publishing, *http://dx.doi.org/10.1787/5kg6z83tw7f4-en*.

Eurostat Regional Yearbook (2010), Publications Office of the European Union, Luxembourg. The EU has created a variant of the OECD typology using the population grid (Chapter 15).

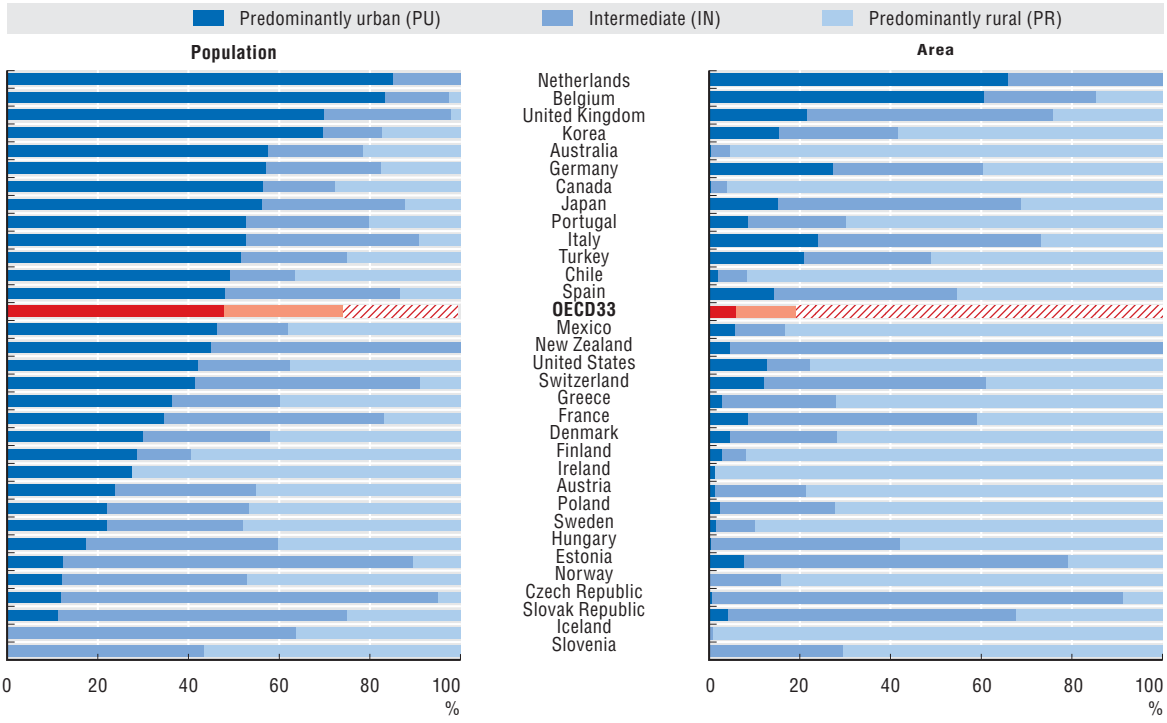
Interactive graphs and maps: *http://rag.oecd.org*.

## Figure notes

2.2: The extended typology is applied only to countries in Europe, North America and Japan.

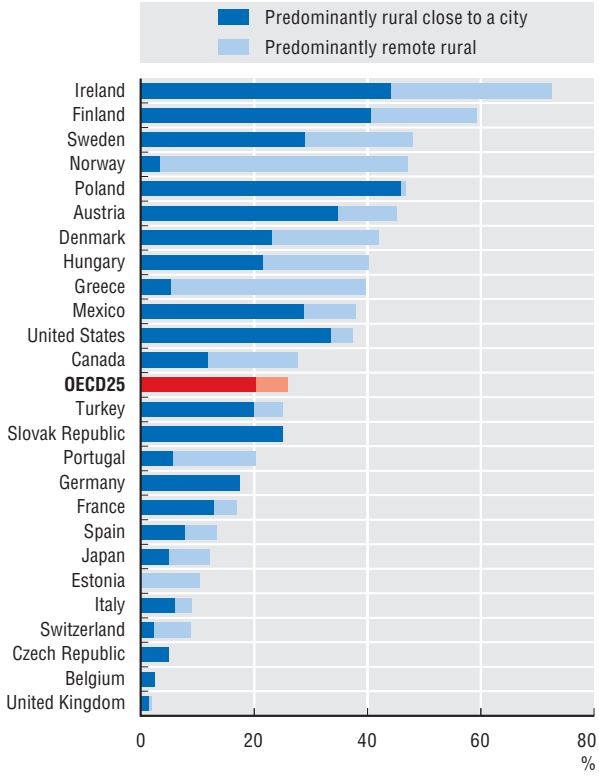
Information on data for Israel: *http://dx.doi.org/10.1787/888932315602*.

## 2.1. Distribution of population and area by type of region, 2012



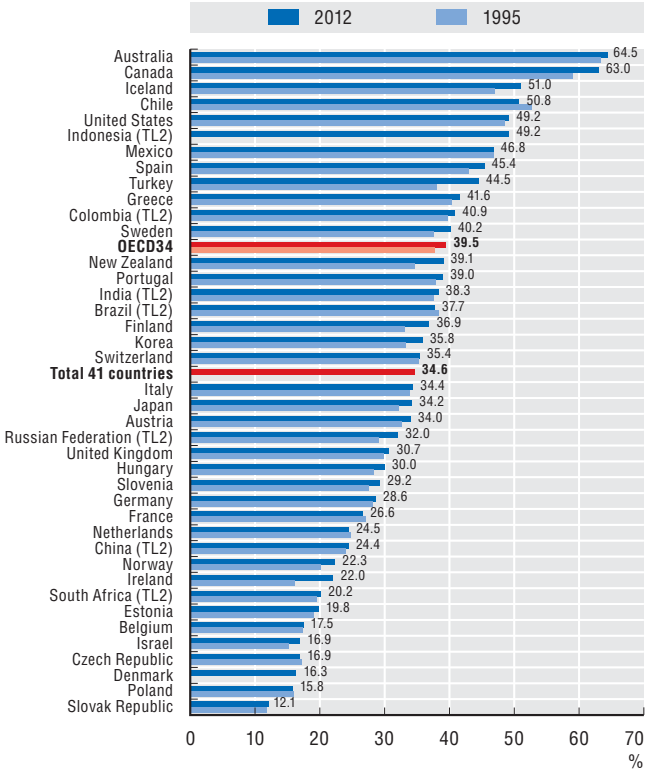

StatLink http://dx.doi.org/10.1787/888932913247

## 2.2. Per cent of national population in predominantly rural regions, 2012




StatLink http://dx.doi.org/10.1787/888932913266

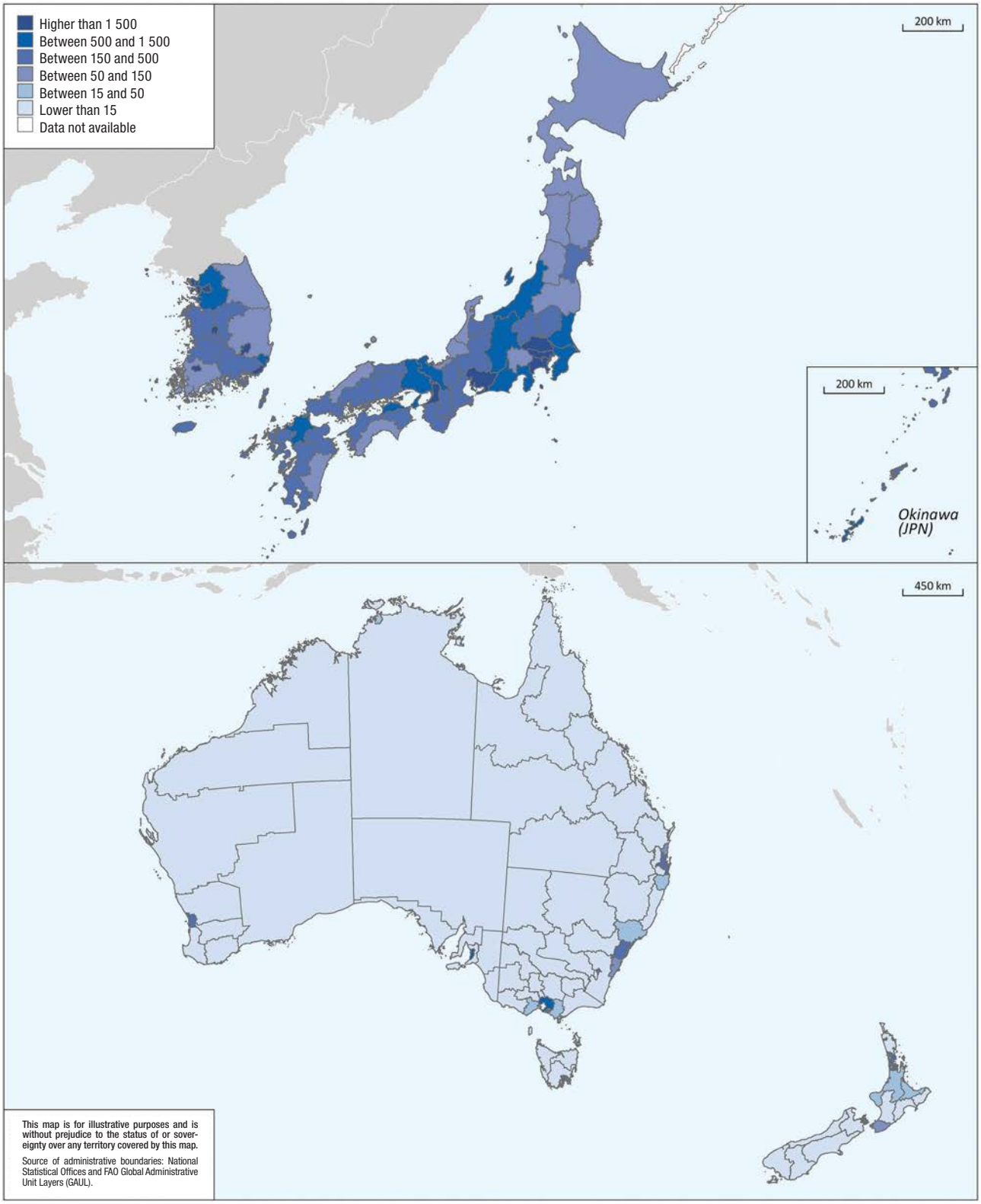
## 2.3. Population concentration by top 10% of TL3 regions with the largest population, 1995 and 2012




StatLink http://dx.doi.org/10.1787/888932913285

## 2.4. Regional population density: Asia and Oceania, 2012

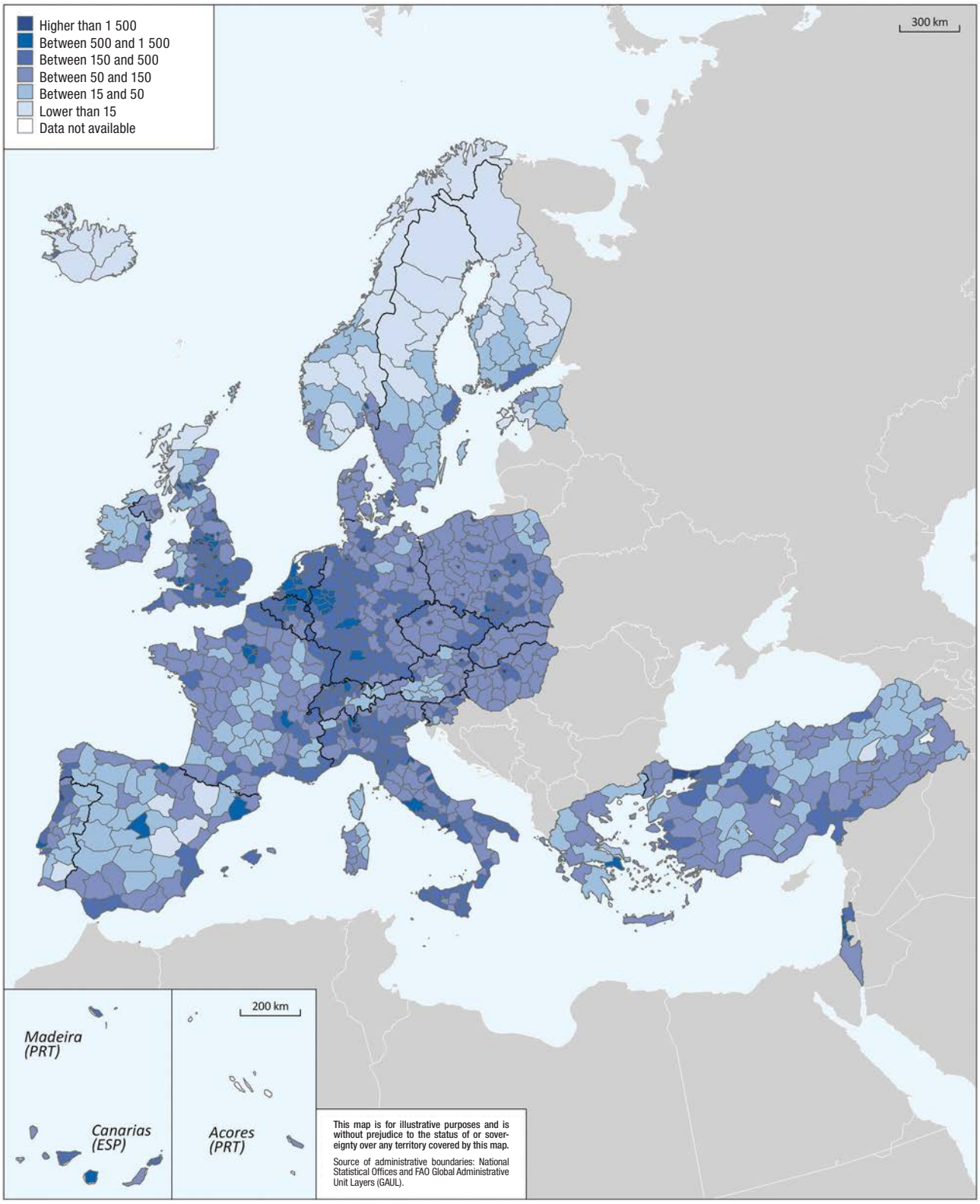
*Inhabitants per square kilometre, TL3 regions*




StatLink http://dx.doi.org/10.1787/888932915546

## 2.5. Regional population density: Europe, 2012

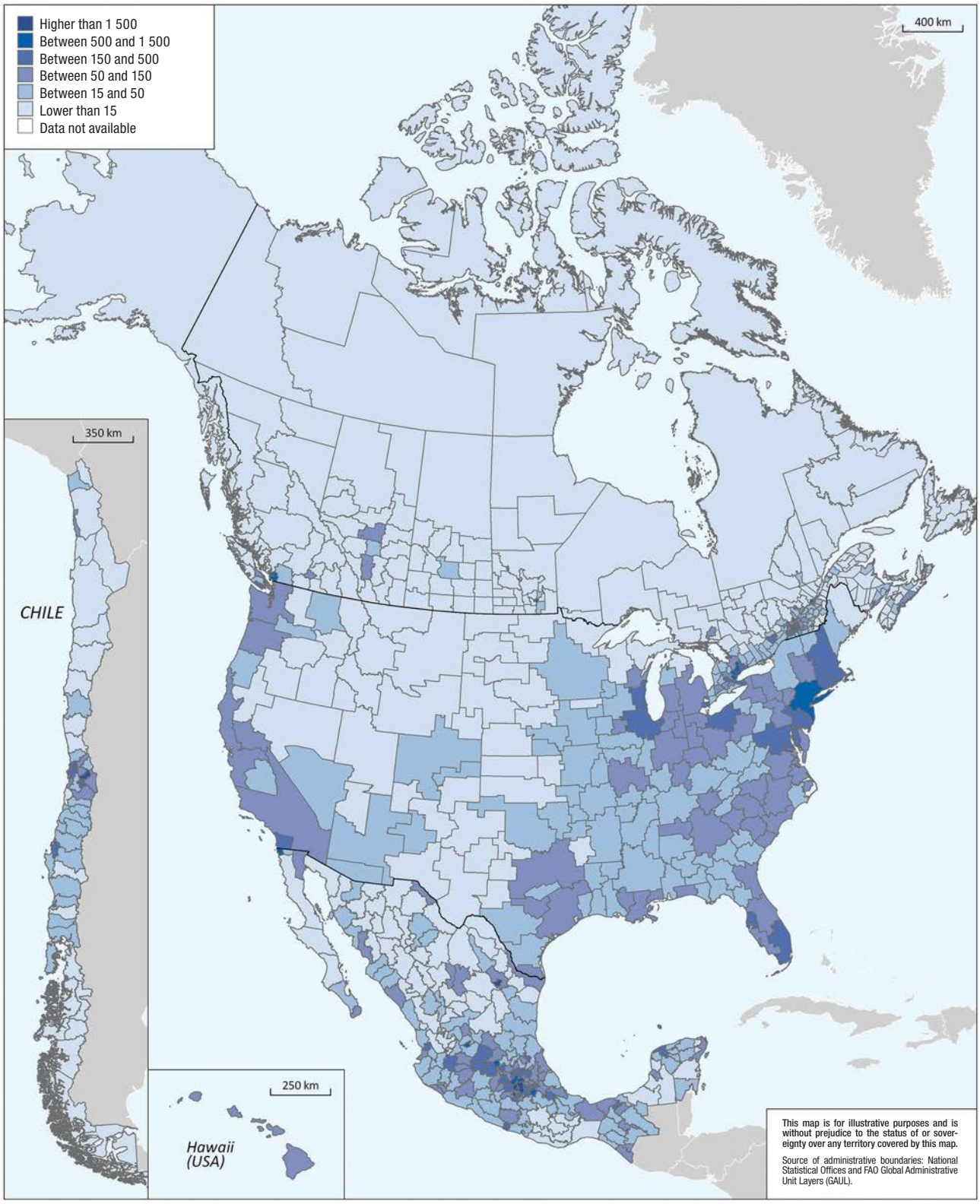
*Inhabitants per square kilometre, TL3 regions*




StatLink http://dx.doi.org/10.1787/888932915603

## 2.6. Regional population density: Americas, 2012

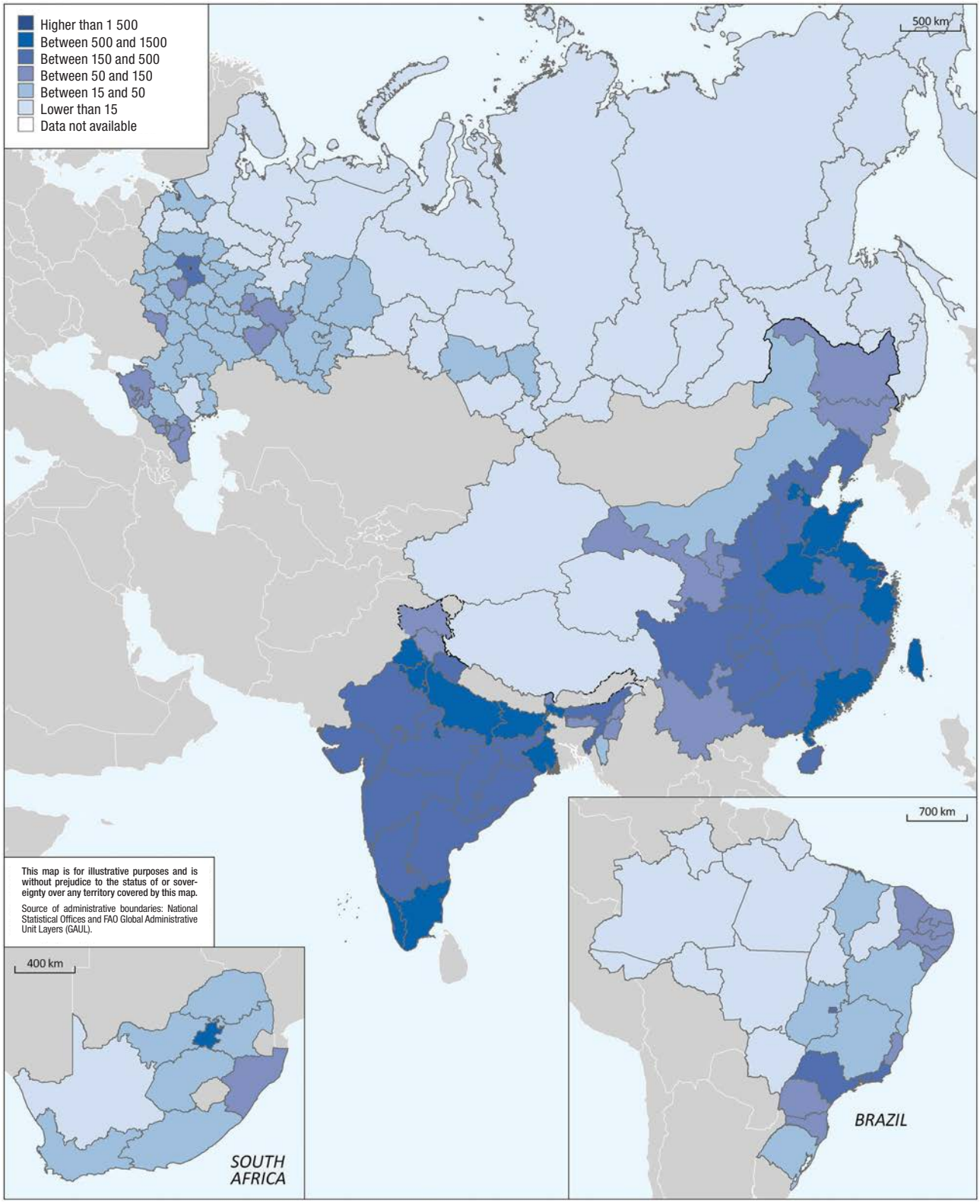
*Inhabitants per square kilometre, TL3 regions*




StatLink http://dx.doi.org/10.1787/888932915622

## 2.7. Regional population density: Emerging economies, 2012

*Inhabitants per square kilometre, TL2 regions*




StatLink http://dx.doi.org/10.1787/888932915641

# Regional contribution to population change

During the past 20 years, the population in OECD countries grew on average 0.6% per year, reaching 1.2 billion in 2012. According to the OECD classification of small regions (TL3), regional population ranges from about 450 inhabitants in Balance ACT (Australia) to more than 23 million in the region of New York-Newark-Bridgeport (United States).

Over the same time period, population growth in emerging economies (Brazil, China, India, the Russian Federation and South Africa) was 0.9% yearly. The largest TL2 region, the State of Uttar Pradesh in India, exceeded 204 million people in 2012.

In OECD countries, almost 60% of population growth is accounted for by just 10% of regions which represent one-third of the OECD population. The regional contribution to population growth is particularly concentrated in Canada, Japan, Finland and Korea. Among emerging economies, the concentration of population in a few regions is the highest in the Russian Federation (Figure 2.8).

The share of the population living in predominantly urban regions increased in 23 OECD countries and significantly in Ireland, Turkey, New Zealand, Canada and Finland (more than three percentage points) in the past 17 years. Among the countries which decreased the share of urban population, in Hungary and Estonia intermediate regions have increased their share of population in recent years, while in the United States, Chile and Poland rural regions have gained in population shares (Figure 2.9).

In many countries, predominantly rural remote regions displayed a net decrease of population, or smaller population growth, than any other type of region. This was not the case in Ireland and Switzerland where the annual population growth in remote rural regions was higher than that in rural regions close to a city in the period 1995-2012 (Figure 2.10).

The share of population in predominantly urban regions exceeded 40% in Brazil and South Africa in 2010. Around 115 million people moved to predominantly urban regions in China in the period 2000-10 (Figure 2.11).

### *Definition*

OECD has classified regions within each member country to facilitate comparability at the same territorial level. The classification is based on two territorial levels: the higher level (TL2) consists of 363 larger regions and the lower level (TL3) consists of 1 802 smaller regions. These 2 levels are used as a framework for implementing regional policies in most countries.

In Brazil, Colombia, China, India and the Russian Federation only TL2 large regions have been identified.

## Source

OECD (2013), *OECD Regional Statistics* (database), *http://dx.doi.org/10.1787/region-data-en*.

See Annexes A and B for definition, data sources and country-related metadata.

## Reference years and territorial level

1995-2012; TL3.

TL2 regions in Israel, Brazil, China, Colombia, India, the Russian Federation and South Africa.

## Further information

OECD regional grids, *www.oecd.org/gov/regional/statisticsindicators*.

Interactive maps and graphs: *http://rag.oecd.org*.

## Figure notes

2.8 to 2.10: Latest available year 2011 for Australia, China, and South Africa; 2010 for Mexico and Indonesia. First available year 1996 for Australia and Canada; 1998 for China; 2001 for India; 2002 for Slovak Republic. Denmark is not included for lack of time series.

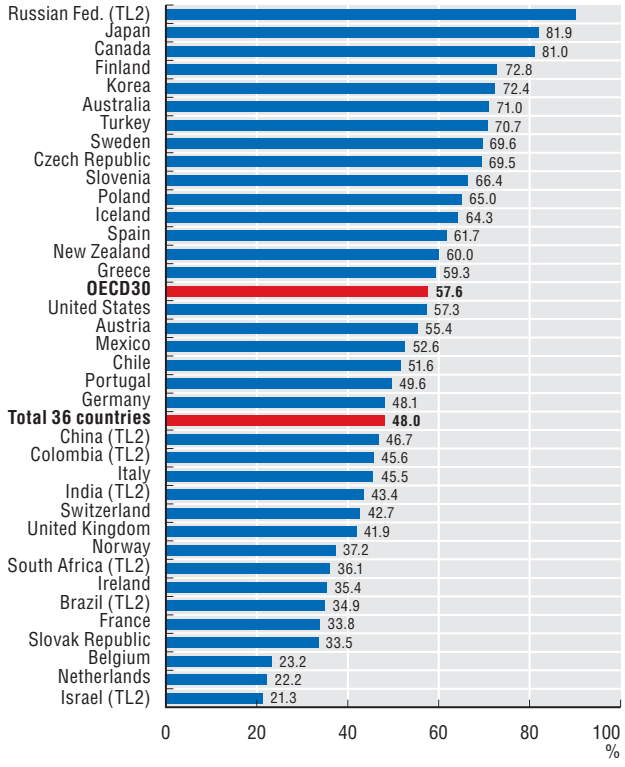
2.8: Estonia and Hungary are not included because of average decrease in population between 1995 and 2012.

2.9: No predominantly urban regions in Iceland and Slovenia.

2.11: The OECD typology is here applied to Brazil, South Africa and China (elaborations of the Chinese Academy of Social Science, based on Census data 2010). For lack of data on population and area in small communities, the national definition is used for India that distinguishes only between rural and urban population (Ministry of Statistics and Program Implementation of India).

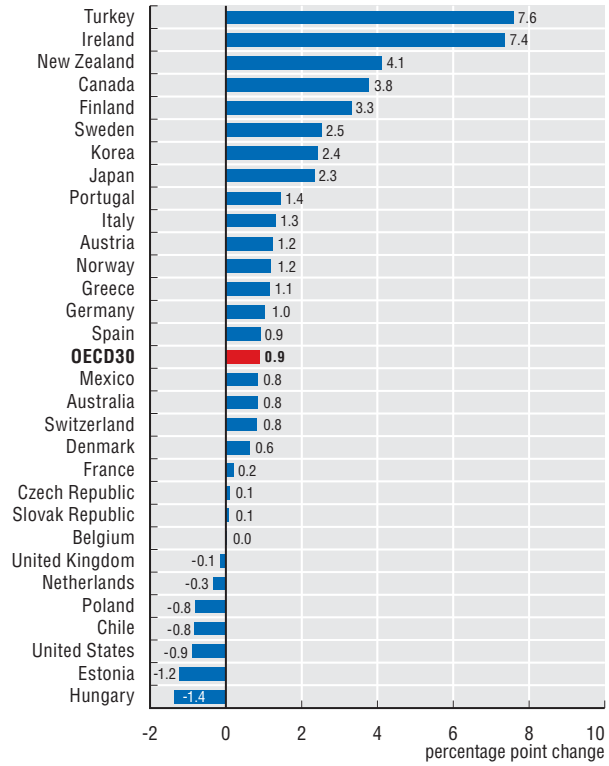
Information on data for Israel: *http://dx.doi.org/10.1787/888932315602*.

### 2.8. Per cent of the national population growth by top 10% TL3 regions ranked by regional increase, 1995-2012



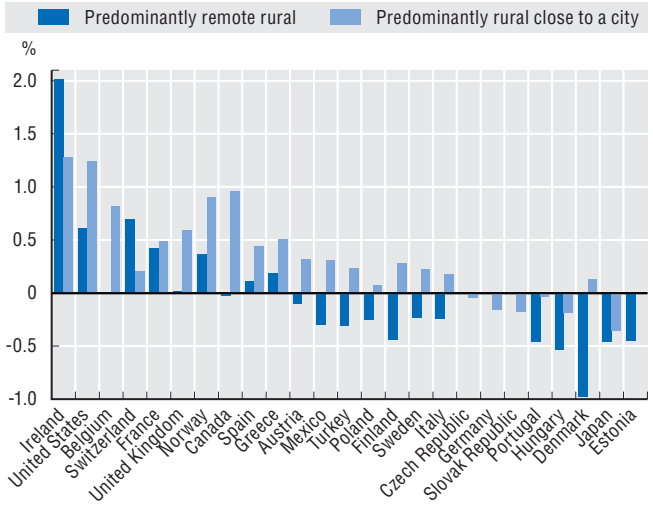

StatLink http://dx.doi.org/10.1787/888932913304

### 2.9. Percentage point change of population living in predominantly urban regions, 1995-2012



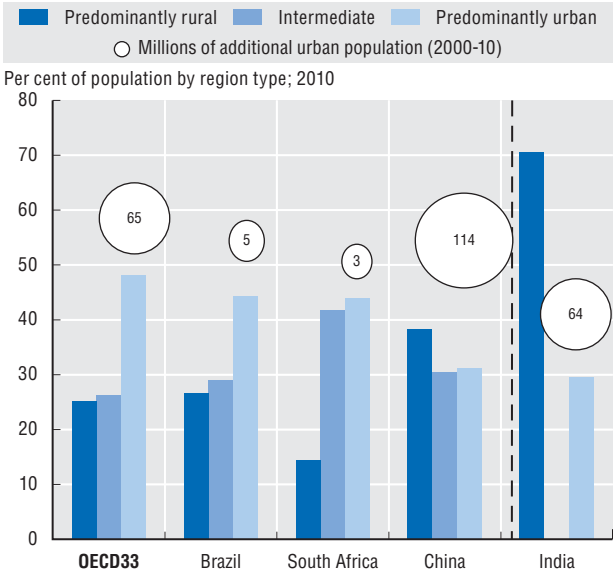

StatLink http://dx.doi.org/10.1787/888932913323

### 2.10. Annual growth rate of population by type of region, 1995-2012




StatLink http://dx.doi.org/10.1787/888932913342

### 2.11. Population by type of region, 2010 and new urban population, 2000-10: OECD and emerging economies




StatLink http://dx.doi.org/10.1787/888932913361

# Regional contribution to national GDP growth

Local factors matter in achieving sustained national growth. In fact, 10% of OECD regions were responsible for 38% of OECD gross domestic product (GDP) in 2010. In Greece, the 10% of regions with the highest output contributed half or more of the national GDP. On the other hand, GDP in Denmark, Belgium, the Slovak Republic and the Netherlands was more evenly distributed among regions, with the 10% of regions with the highest output accounting for no more than 25% of total GDP. Similarly, in Colombia, the Russian Federation and Brazil, the contribution to national GDP was regionally very concentrated (Figure 2.12).

Predominantly urban regions attract the largest share of economic activity. In 2010, almost 60% of total GDP in OECD countries was produced in urban regions, and more than 75% of national GDP in Belgium, the Netherlands and the United Kingdom. The difference in concentration between GDP share and population share is particularly high in Hungary, the Slovak Republic, Turkey and Ireland with a difference of more than 15 percentage points. Predominantly rural areas contributed 14% to overall GDP, even though in Ireland and Finland the GDP produced by rural regions was over more than half of national GDP (Figure 2.13).

Over the period 1995-2010, OECD GDP growth appeared for a large part due to a small number of large regions. However, the largest share still comes from the accumulated contribution of many small regions. Around 3% of regions contributed to one-third of aggregate growth of the OECD area, while the accumulated contribution of the remaining regions was around two-thirds.

On average, the top 10% of regions were responsible for 42% of OECD growth. At country level, the regional contribution to growth was very concentrated in Greece, Hungary, Finland, Chile, Sweden, Japan, and the United Kingdom, where the 10% of regions with highest GDP increase were responsible for more than half of the national growth in 1995-2010 (Figure 2.14).

Over the recent period, the economic recession has increased the concentration of GDP growth in fewer regions.

During the period 1995-2010 the median value of the yearly GDP growth rate was 1.9% among OECD regions. Differences in regional GDP growth rates between the best and the worst performing regions were the largest in Mexico, with more than 8 percentage points of difference. In Korea, Poland and Germany, regional differences were smaller but still considerable (above 6 percentage points). The Russian Federation, China and India displayed larger regional difference in growth rates compared to OECD countries (Figure 2.15).

Wide differences in regional growth are not always associated with faster national growth. Ireland, Estonia and the Slovak Republic displayed a national growth rate more than double the OECD average and have limited regional differences (Figure 2.15).

### *Definition*

GDP is the standard measure of the value of the production activity (goods and services) of resident producer units. Regional GDP is measured according to the definition of the System of National Accounts (SNA). To make comparisons over time and across countries, it is expressed in constant prices (year 2005), using the OECD deflator and then converted into USD purchasing power parities (PPPs) to express each country's GDP in a common currency.

## Source

OECD (2013), *OECD Regional Statistics* (database), *http://dx.doi.org/10.1787/region-data-en*.

OECD deflator and purchasing power parities, *National Accounts (database), http://stats.oecd.org/*.

See Annex B for data sources and country-related metadata.

## Reference years and territorial level

1995-2010; TL3.

Australia, Canada, Chile, Mexico, and the United States TL2 regions.

Brazil, China, Colombia, India, Russian Federation and South Africa TL2 regions.

Regional GDP is not available for Iceland and Israel.

Turkey is excluded for lack of regional GDP after 2001.

## Further information

Interactive graphs and maps: *http://rag.oecd.org*.

## Figure notes

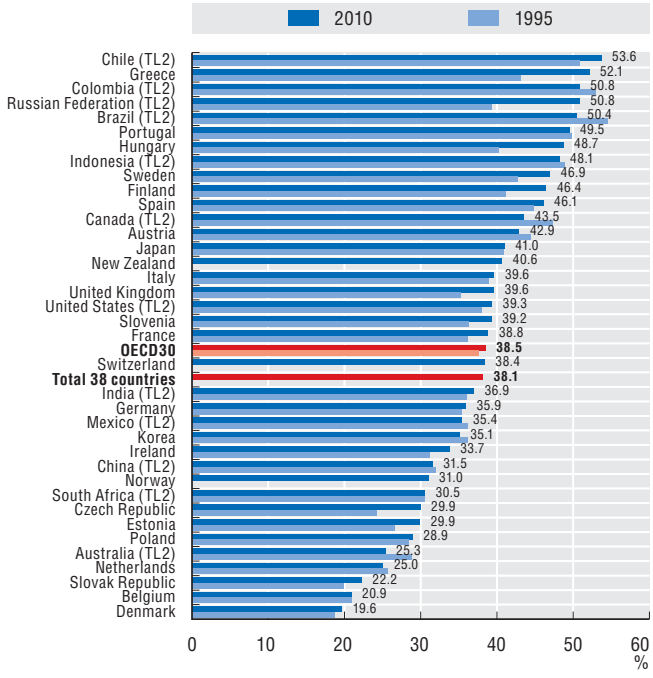
2.12-2.15: Available years: Chile and Russian Federation 1996-2010; Mexico 2003-10; Poland 1999-2010. China, India and Indonesia 2004-10.

2.13: Only countries where GDP is available for TL3 regions.

2.14-2.17: New Zealand, Norway and Switzerland are excluded for lack of data on comparable years.

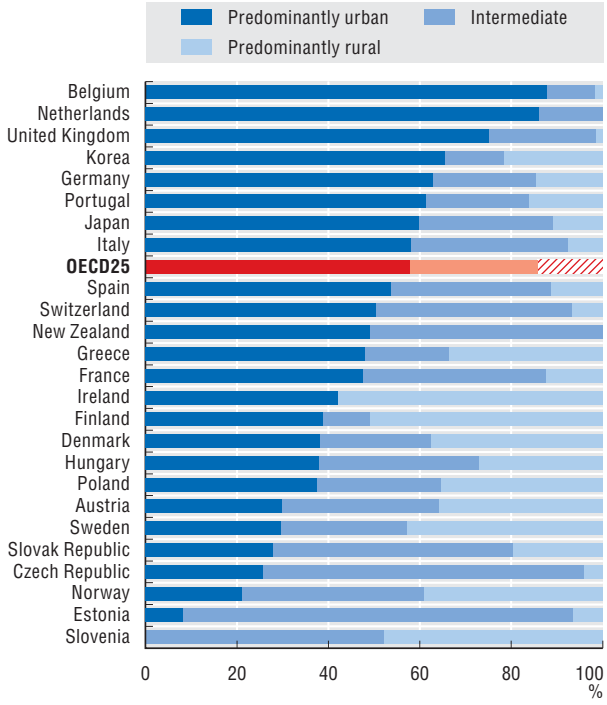
Information on data for Israel: *http://dx.doi.org/10.1787/888932315602*.

## 2.12. National GDP concentration by top 10% of TL3 regions with the largest GDP, 1995 and 2010



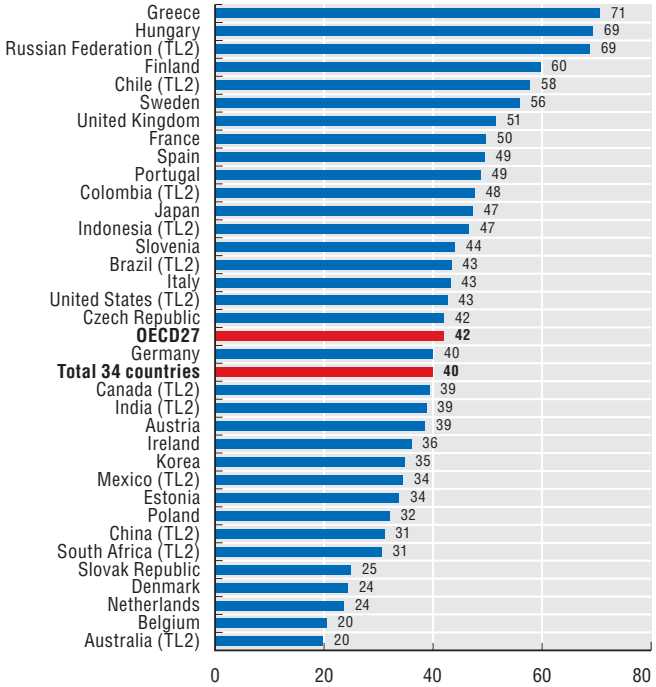

StatLink http://dx.doi.org/10.1787/888932913380

## 2.13. Distribution of GDP by type of regions (TL3), 2010



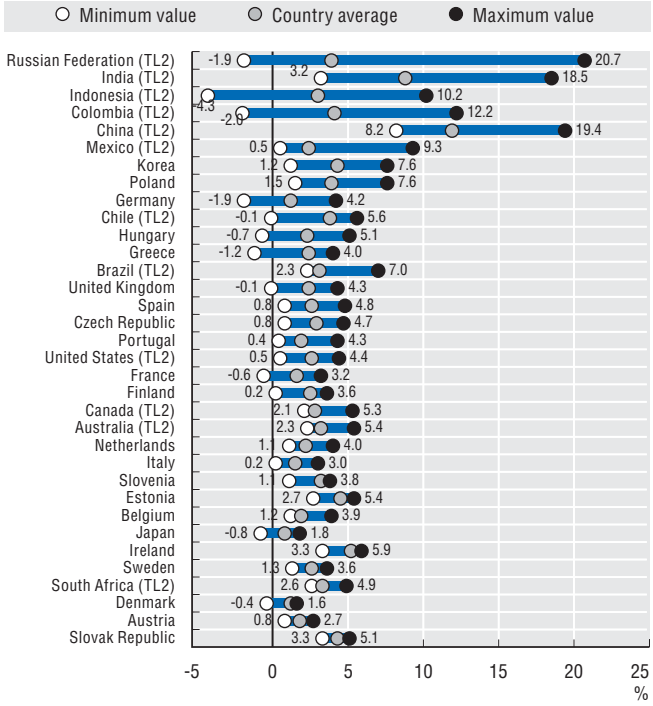

StatLink http://dx.doi.org/10.1787/888932913399

## 2.14. Per cent of national GDP growth by top 10% TL3 regions, ranked by regional increase, 1995-2010




StatLink http://dx.doi.org/10.1787/888932913418

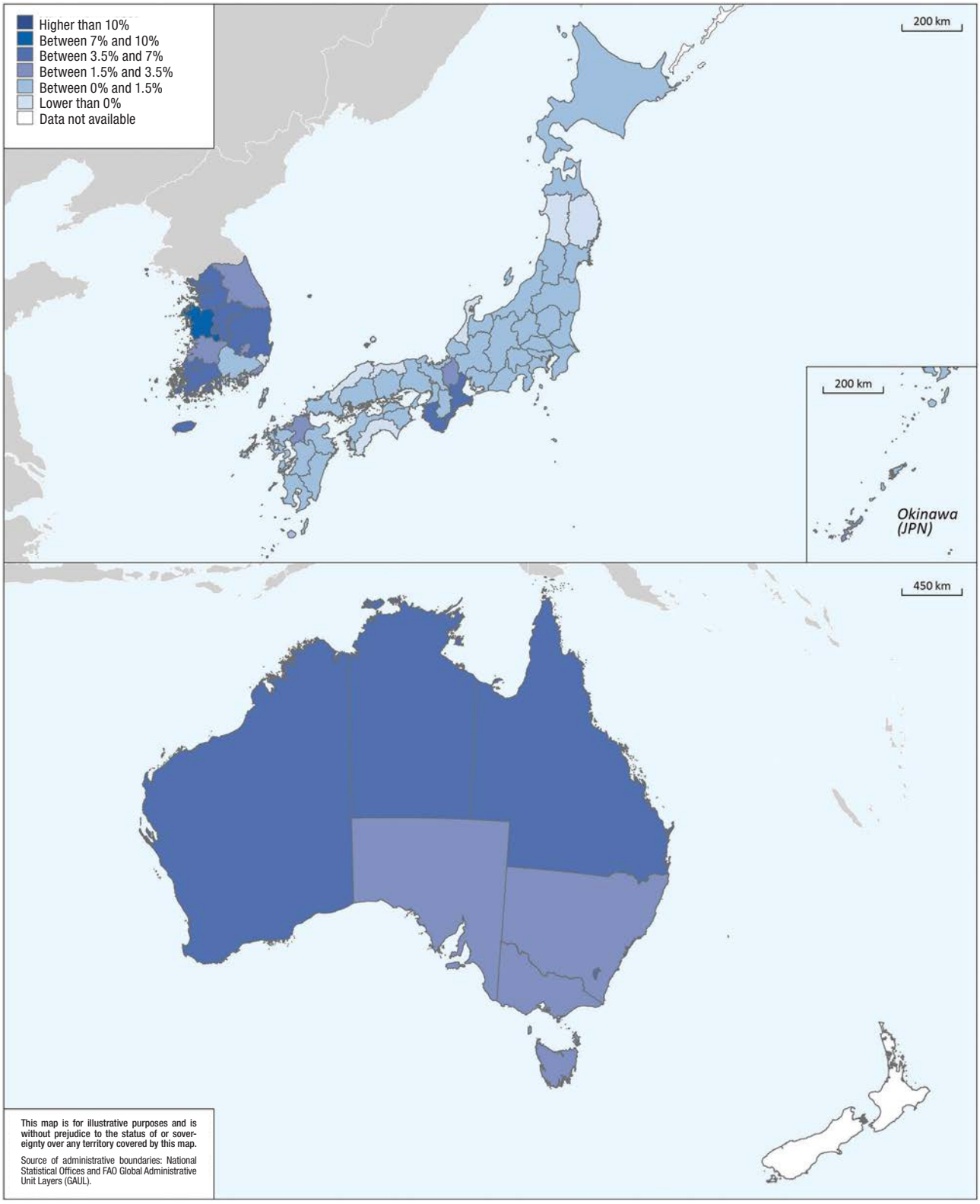
## 2.15. Countries ranked by size of difference in TL3 regional annual GDP growth rates, 1995-2010




StatLink http://dx.doi.org/10.1787/888932913437

## 2.16. Regional GDP growth: Asia and Oceania, 1995-2010

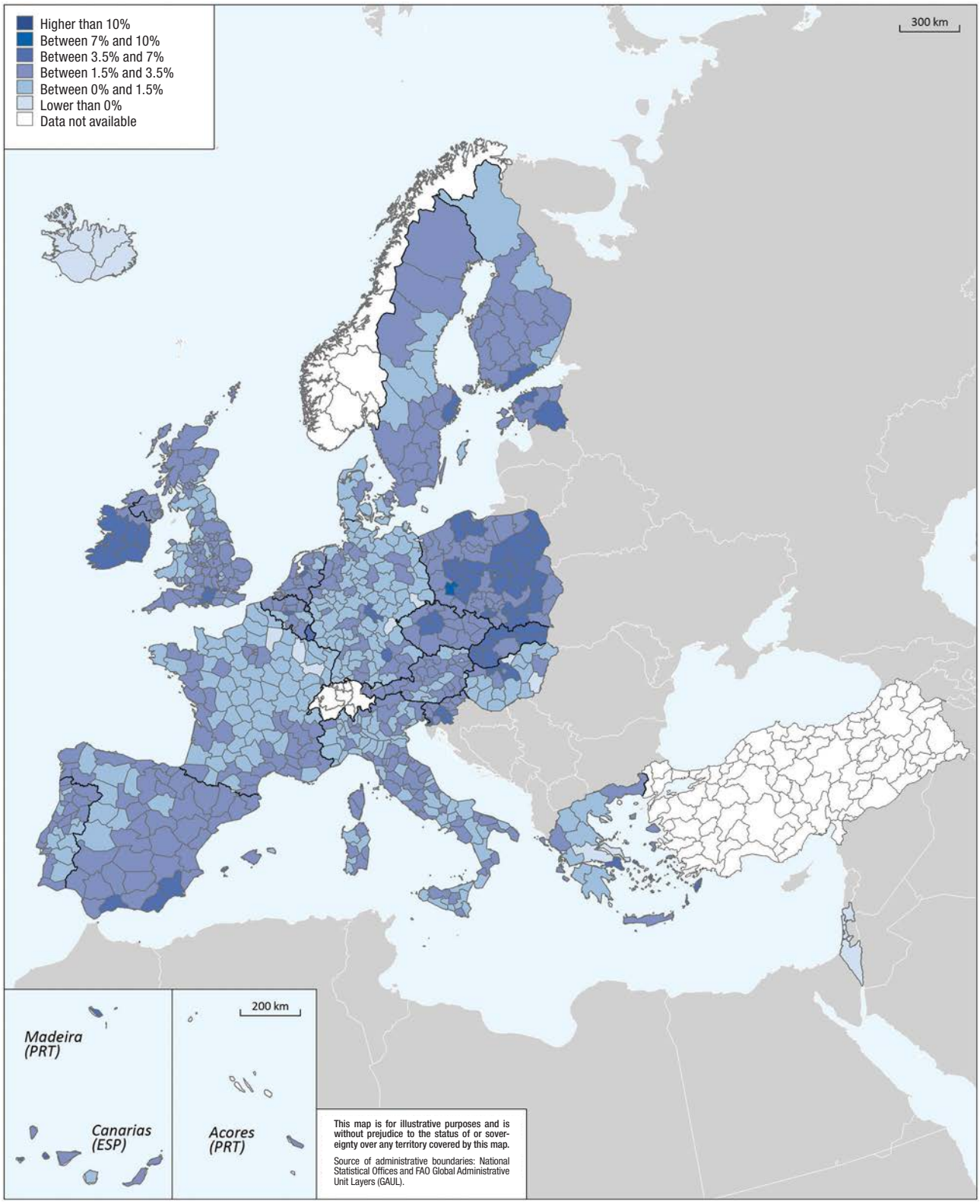
*Average annual growth rate [constant 2005 USD (PPP)], TL3 regions*




StatLink http://dx.doi.org/10.1787/888932915356

## 2.17. Regional GDP growth: Europe, 1995-2010

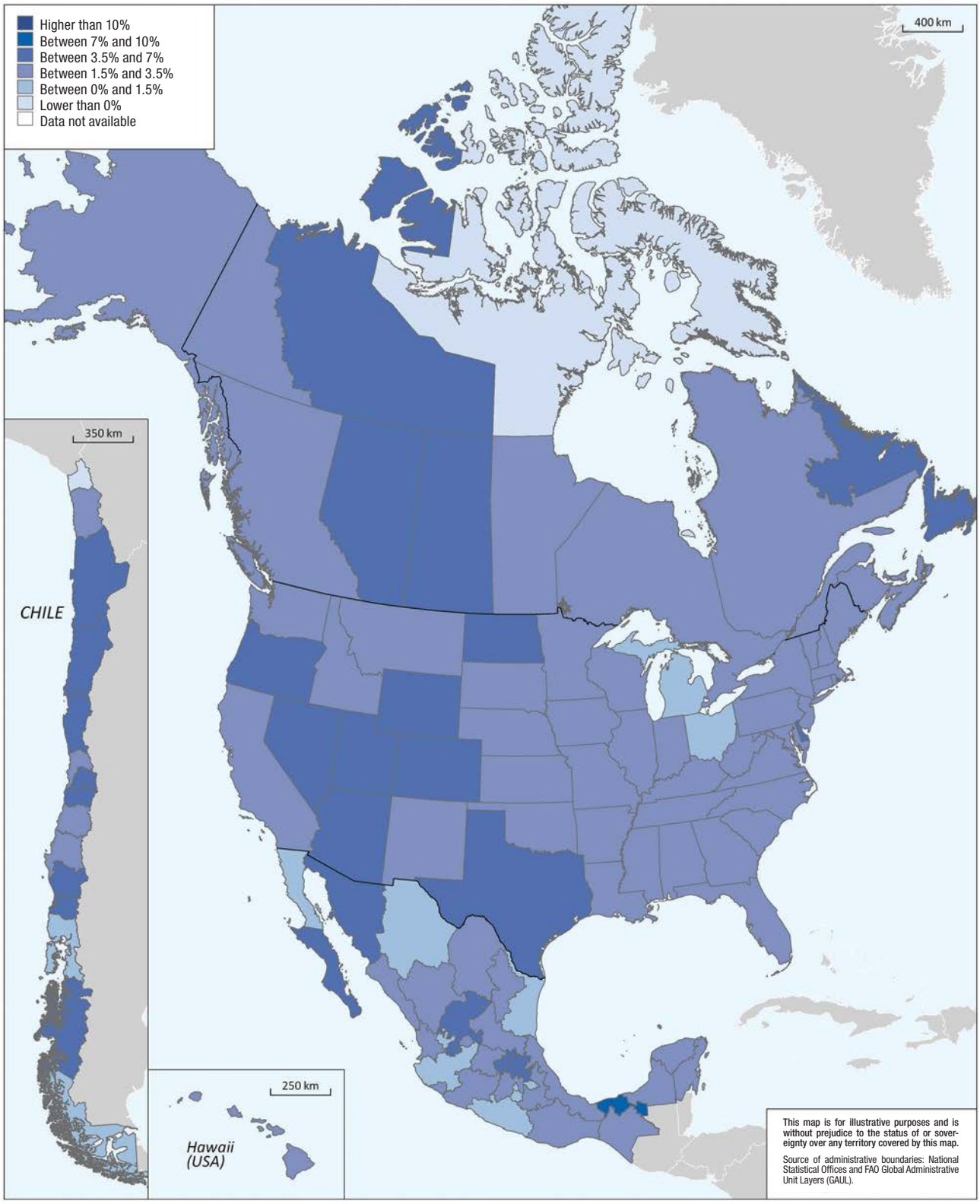
*Average annual growth rate [constant 2005 USD (PPP)], TL3 regions*




StatLink http://dx.doi.org/10.1787/888932915375

## 2.18. Regional GDP growth: Americas, 1995-2010

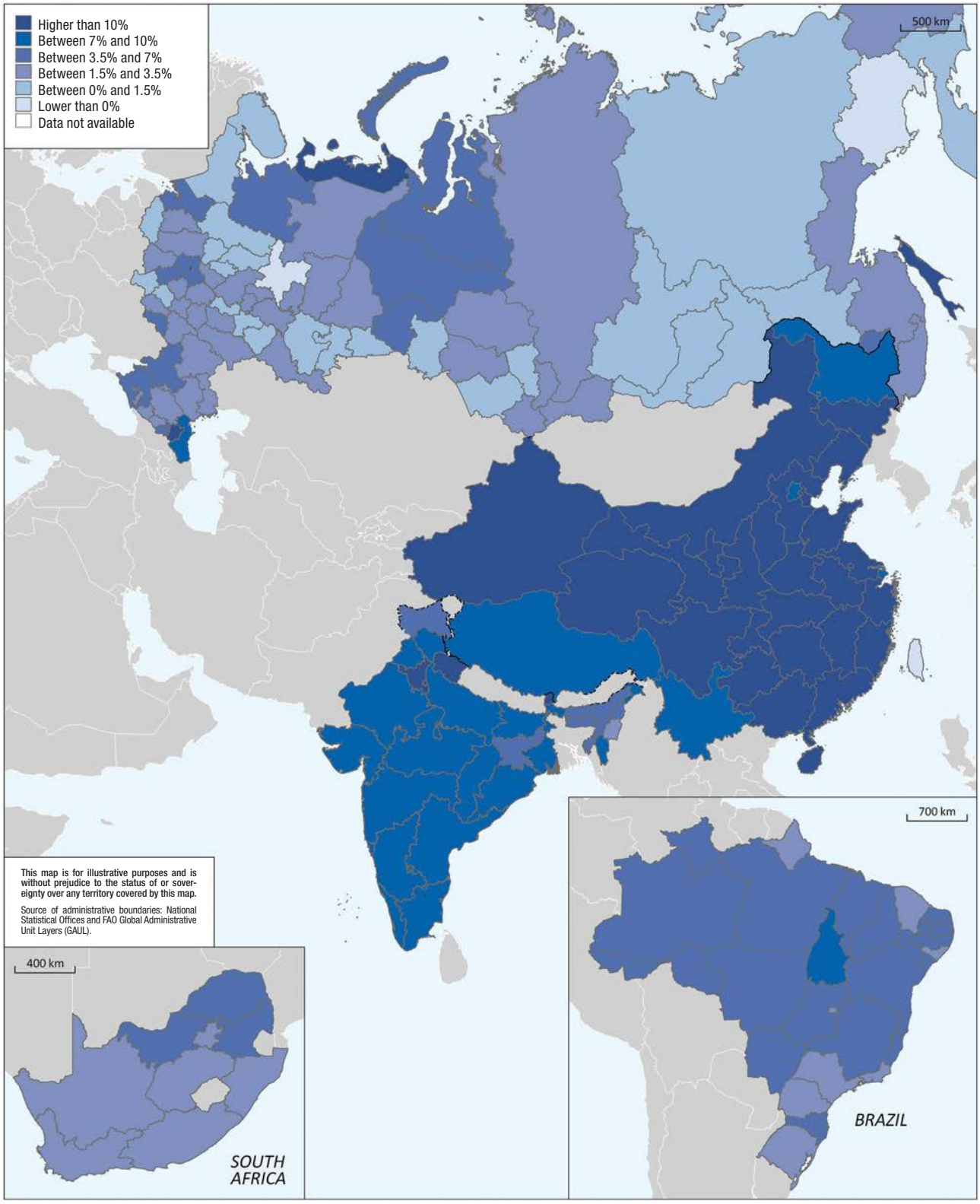
*Average annual growth rate [constant 2005 USD (PPP)], TL2 regions*




StatLink http://dx.doi.org/10.1787/888932915394

## 2.19. Regional GDP growth: Emerging economies, 1995-2010

*Average annual growth rate [constant 2005 USD (PPP)], TL2 regions*




StatLink http://dx.doi.org/10.1787/888932915413

# Regional contribution to change in employment

During 1999-2012, differences in annual employment growth rates across OECD countries were as large as 3.5 percentage points, ranging from -0.5% in Greece to 3% in Chile (Figure 2.20).

Over the same period, differences in regional employment growth rates across regions were above 3 percentage points in almost half of the countries. Among the OECD countries, the widest differences in regional employment growth rates are found in Mexico, Canada and the United States, and, among the emerging economies, in the Russian Federation (Figure 2.21).

Relatively few regions led national employment creation: on average, 39% of the overall employment growth in OECD countries between 1999 and 2012 was accounted for by just 10% of regions. The regional contribution to national employment creation was particularly pronounced in certain countries. In Hungary, the United States (among OECD countries), the Russian Federation and South Africa, more than 50% of employment growth was spurred by 10% of regions (Figure 2.22).

In the most recent years, following the economic crisis of 2008, fewer regions concentrated most of the employment creation, while the employment losses became more regionally dispersed as more regions experienced net losses in employment than in the previous years.

### *Definition*

Employed persons are all persons who during the reference week worked at least 1 hour for pay or profit, or were temporarily absent from such work. Family workers are included.

The regional concentration of employment creation increased in half of the 28 countries, resulting in higher differences in total employment among regions within a country, particularly in the Czech Republic, Hungary, Poland and Slovenia (Figure 2.22).

## Source

OECD (2013), *OECD Regional Statistics* (database), *http://dx.doi.org/10.1787/region-data-en*.

See Annex B for data sources and country-related metadata.

## Reference years and territorial level

1999-2012; TL2.

Chile: regions of Los Lagos and Tarapacá include Los Rios and Arica y Parina, respectively.

## Further information

Interactive graphs and maps: *http://rag.oecd.org*.

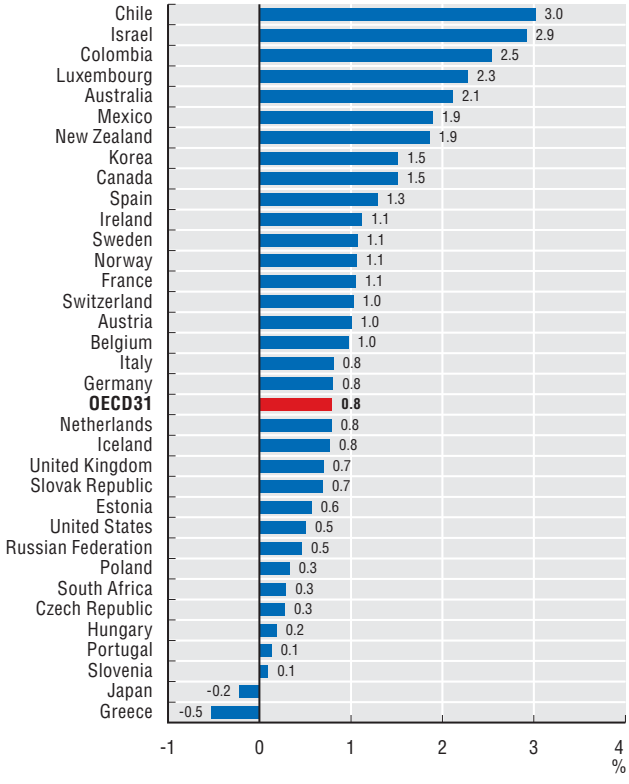
## Figure notes

2.20 to 2.22: Denmark, Finland and Turkey are excluded for lack of data on comparable years. First available year: Slovenia, Switzerland and Colombia 2001. Last available year 2009 for South Africa, 2010 for the Russian Federation, 2011 for Israel, Japan and Mexico. Portugal 1999-2010.

2.22: Greece and Japan are excluded due to a decrease in employment over the period 1999-2012.

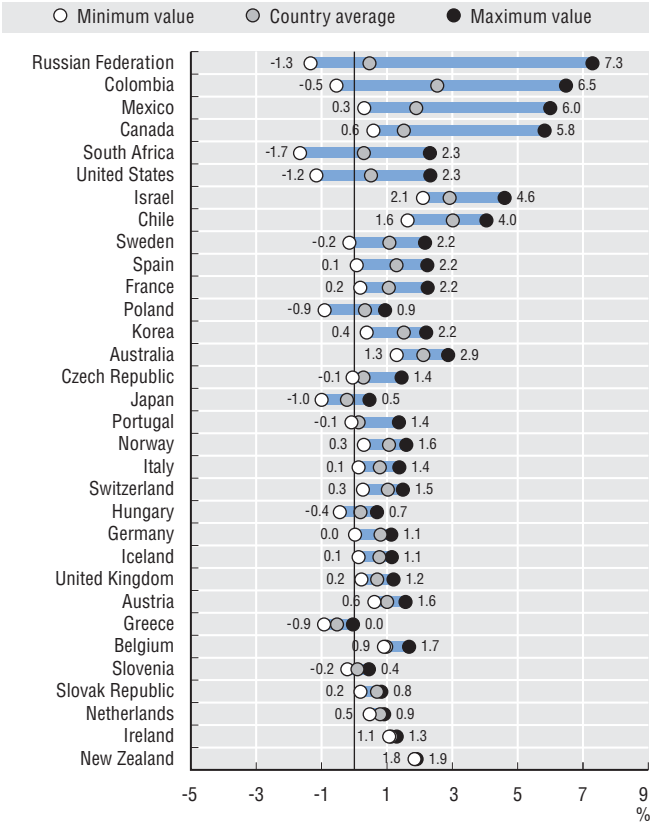
Information on data for Israel: *http://dx.doi.org/10.1787/888932315602*.

## 2.20. Average annual growth rate in national employment, 1999-2012



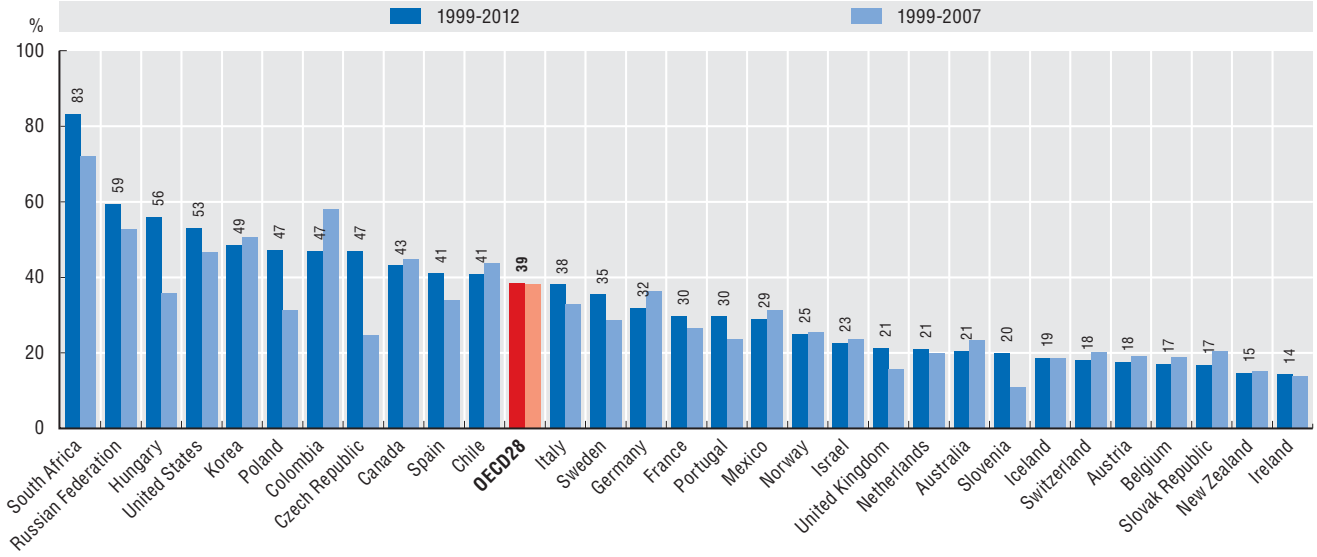

StatLink http://dx.doi.org/10.1787/888932913456

## 2.21. Countries ranked by size of difference in regional annual employment growth, 1999-2012




StatLink http://dx.doi.org/10.1787/888932913475

## 2.22. Per cent of national employment increase by top 10% of regions, ranked by regional increase, 1999-2012 and 1999-2007




StatLink http://dx.doi.org/10.1787/888932913494

# Impact of the crisis on regional economic performance

The economic crisis has increased the gap in GDP per capita between leading and lagging regions in half of the OECD countries (Figure 2.23). The highest increase in the gap between the best 10% performing regions and the bottom 10% regions, more than 8 percentage points, occurred in Ireland, Slovak Republic and Denmark. However, two patterns are observed. In Ireland, the increase of regional inequalities was due to a faster worsening of the poorest regions compared to richest ones. In the Slovak Republic and Denmark, both the poorest regions got worse off and the richest regions got better (Figure 2.23).

Where regional disparities reduced, this was due to the decline of the richest regions rather than a catching up of the poorest regions, with the exception of China and India. In three-quarters of the countries, the GDP per capita in the best 10% performing regions decreased between 2008 and 2010, with the highest decrease of 12% observed in Canada and Estonia (Figure 2.23).

The median GDP per capita growth rate of OECD regions was 2.1% in the period 1995-2007 and declined to -1.4% in the period 2008-10. All typologies of regions experienced on average a decline in GDP per capita. Predominantly rural regions experienced a lower decrease than predominantly urban regions (-0.2% compared to -0.6% decrease per year) during the economic crisis. However, almost 70% of predominantly rural (PR) regions had a GDP per capita below the OECD average in 2008, as compared with only 32% of predominantly urban (PU) regions and 57% of intermediate (IN) regions (Figure 2.24).

### *Definition*

GDP is the standard measure of the value of the production activity goods and services) of resident producer units. Regional GDP is measured according to the definition of the System of National Accounts (SNA). To make comparisons over time and across countries, it is expressed at constant prices (year 2005), using the OECD deflator and then it is converted into USD purchasing power parities (PPPs) to express each country's GDP in a common currency.

GDP per capita is calculated by dividing the GDP of a country or a region by its population.

Employed persons are all persons who during the reference week worked at least 1 hour for pay or profit, or were temporarily absent from such work. Family workers are included.

The job gaps in a region are estimated as the increase in employment required in 2012 to restore the ratio of employment and working age population to the 2007 value. The country's employment is computed as sum of regional values.

The economic recession has had a differentiated impact on the loss of jobs within OECD countries. A simple way to quantify the impact of the crisis on the employment situation of different regions is to measure how many jobs it would be necessary to generate in order to return to the employment rate before the crisis. For example, in the United States 7.6 million jobs would be necessary to return to the employment rate of 2007, in which around 1.3 million employed would be needed in California (Figure 2.25). In countries where the effects across regions have been more diverse, half or more of the employment gap could be filled by bringing back just one region to the employment rate before the crisis (this is the case in Ireland, New Zealand, France, Estonia, the Netherlands, Canada, and the Slovak Republic).

All typologies of regions experienced on average a decline in employment. However, predominantly rural regions appear to have experienced difficulty in creating jobs in 2008-2011, displaying on average an employment change of -0.9% (this value is -0.8% in intermediate regions and -0.3% in urban regions) (Figure 2.26).

## Source

OECD (2013), *OECD Regional Statistics* (database), *http://dx.doi.org/10.1787/region-data-en*.

OECD deflator and purchasing power parities, *National Accounts* (database), *http://stats.oecd.org/*.

See Annex B for data sources and country-related metadata.

## Reference years and territorial level

GDP 2008-10; TL3.

Australia, Canada, Chile, Mexico and United States only TL2.

Regional GDP is not available for Iceland and Israel.

Turkey is excluded for lack of regional GDP after 2001.

Employment 2007-12; TL3.

Australia, Chile, Iceland, Portugal, Switzerland and Turkey only TL2.

Canada non-official grids.

## Further information

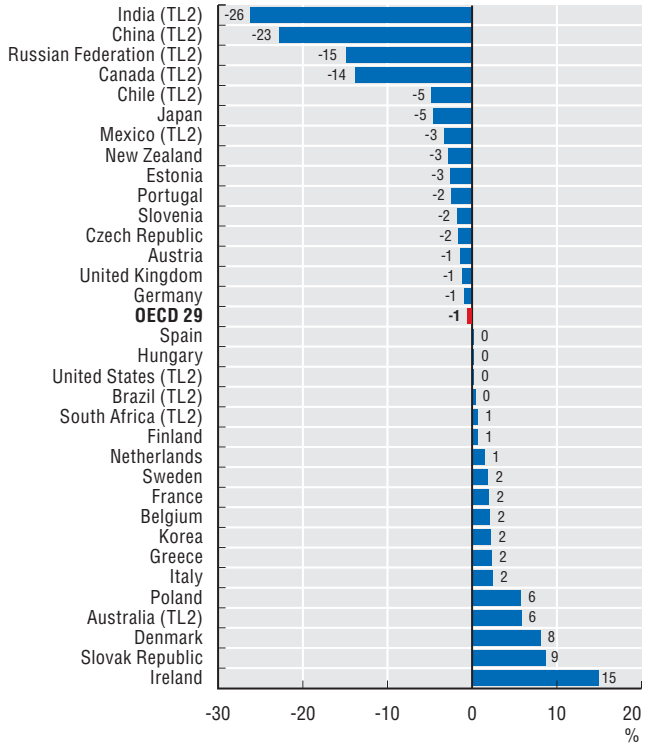
OECD (2013), *OECD Employment Outlook 2013*, OECD Publishing, *http://dx.doi.org/10.1787/empl_outlook-2013-en*.

## Figure notes

2.23-2.24: Data for Norway is not used since it is related to GVA for the period 2008-10.

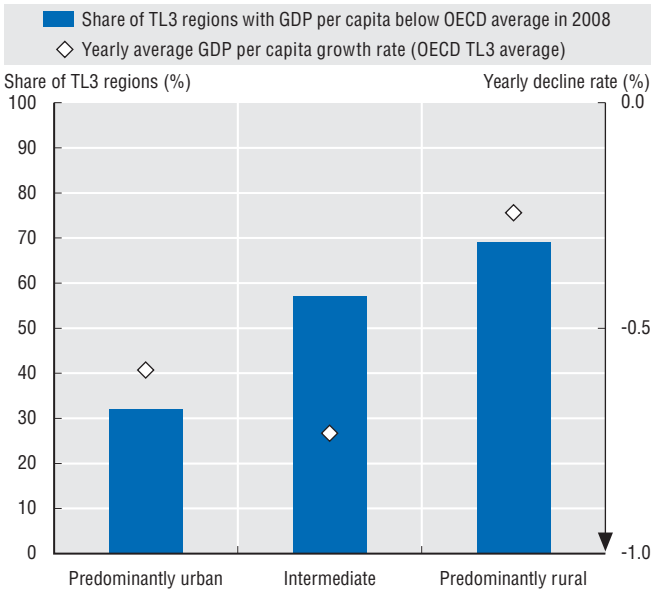
2.25: Only countries with negative employment change on average 2008-12 are included.

### 2.23. Percentage change in the ratio between GDP per capita of the 10% richest and 10% poorest regions, 2008-10



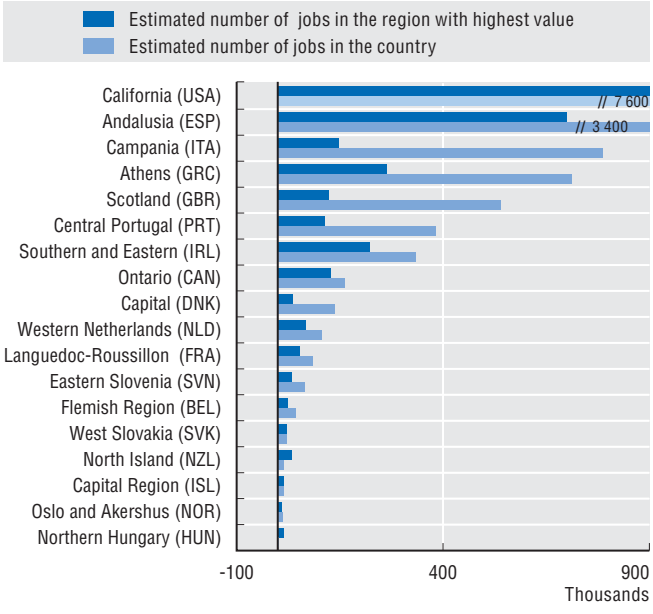

StatLink http://dx.doi.org/10.1787/888932913513

### 2.24. Per cent of TL3 regions with GDP per capita below OECD average in 2008 and GDP decrease in 2008-10, by type of region



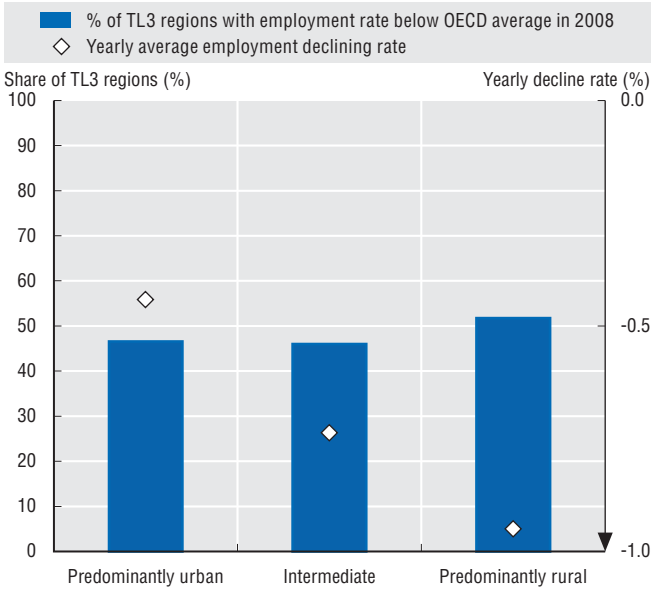

StatLink http://dx.doi.org/10.1787/888932913532

### 2.25. Estimated number of jobs needed to restore in 2012 the 2007 employment rate: Highest TL2 region and country average




StatLink http://dx.doi.org/10.1787/888932913551

### 2.26. Per cent of TL3 regions with employment rate below OECD average in 2008 and yearly employment change in 2008-2011, by type of region




StatLink http://dx.doi.org/10.1787/888932913570

# Labour productivity and GDP per capita growth in regions

Labour productivity growth is considered a key indicator to assess regional competitiveness and an essential driver of change in living standards. Regional living conditions are raised by continued gains in labour productivity, along with an increase in labour utilisation. In fact, only economies that manage to simultaneously sustain employment and productivity growth will increase their gross domestic product (GDP) per capita and maintain it in the long run.

Growth in regional GDP per capita is broken down into the contribution of labour productivity growth (here measured as GDP per worker) and changes in labour utilisation (measured as the ratio between employment at place of work and population).

Among the 20 OECD regions with the highest GDP per capita growth rate during 2000-10, labour productivity growth is a major determinant compared to changes in labour utilisation (Figure 2.27). In 17 of the 20 regions, labour productivity growth accounted for 70% or more of the rise in GDP per capita. Only the region of Lodzkie (Poland) has an increase of the rate of labour utilisation higher than the growth in labour productivity (Figure 2.27).

### *Definition*

GDP is the standard measure of the value of the production activity (goods and services) of resident producer units. Regional GDP is measured according to the definition of the System of National Accounts (SNA). To make comparisons over time and across countries, it is expressed at constant prices (year 2005), using the OECD deflator and then it is converted into USD purchasing power parities (PPPs) to express each country's GDP in a common currency.

Regional labour productivity is here measured as the ratio of constant GDP in 2005 prices, to total employment where the latter is measured at place of work.

Labour utilisation is here measured as the ratio between the total employment at place of work and regional population.

In the decomposition of change in regional GDP per capita, changes in labour utilisation may partially depend on labour mobility if there is commuting on a substantial scale in the region.

Both bad performances in labour productivity and in labour utilisation are, instead, the cause of the regional decline in GDP per capita (Figure 2.28). The 20 regions with the highest decline in GDP per capita rate during 2000-10 were essentially concentrated in four countries: Italy, France, Spain and the United States (Figure 2.28). In the Spanish regions (Balearic and Canary Islands) and some of the U.S. states (Georgia, South Carolina and Ohio), the growth in labour productivity was offset by the sharp decline in labour utilisation. On the other hand, the nine Italian regions, the four regions in France and Michigan (United States) have seen a decrease in their productivity while labour utilisation stagnated (Figure 2.28).

Differences in labour productivity growth among regions are invariably the result of multiple national and local factors, including labour market policies and institutions as well as innovation and the adoption of new technologies. As such, differences in labour productivity growth among OECD regions are larger than among OECD countries (Figures 2.29 and 2.30).

## Source

OECD (2013), *OECD Regional Statistics* (database), *http://dx.doi.org/10.1787/region-data-en*.

See Annex B for data sources and country-related metadata.

## Reference years and territorial level

2000-10; TL2.

Switzerland, Denmark, Finland, Mexico, Spain and Turkey are not included for lack of regional data on comparable years.

Regional GDP is not available for Iceland and Israel.

## Further information

OECD (2013), *Economic Policy Reforms 2013: Going for Growth*, OECD Publishing, *http://dx.doi.org/10.1787/growth-2013-en*

OECD Compendium of Productivity Indicators *www.oecd.org/statistics/productivity*.

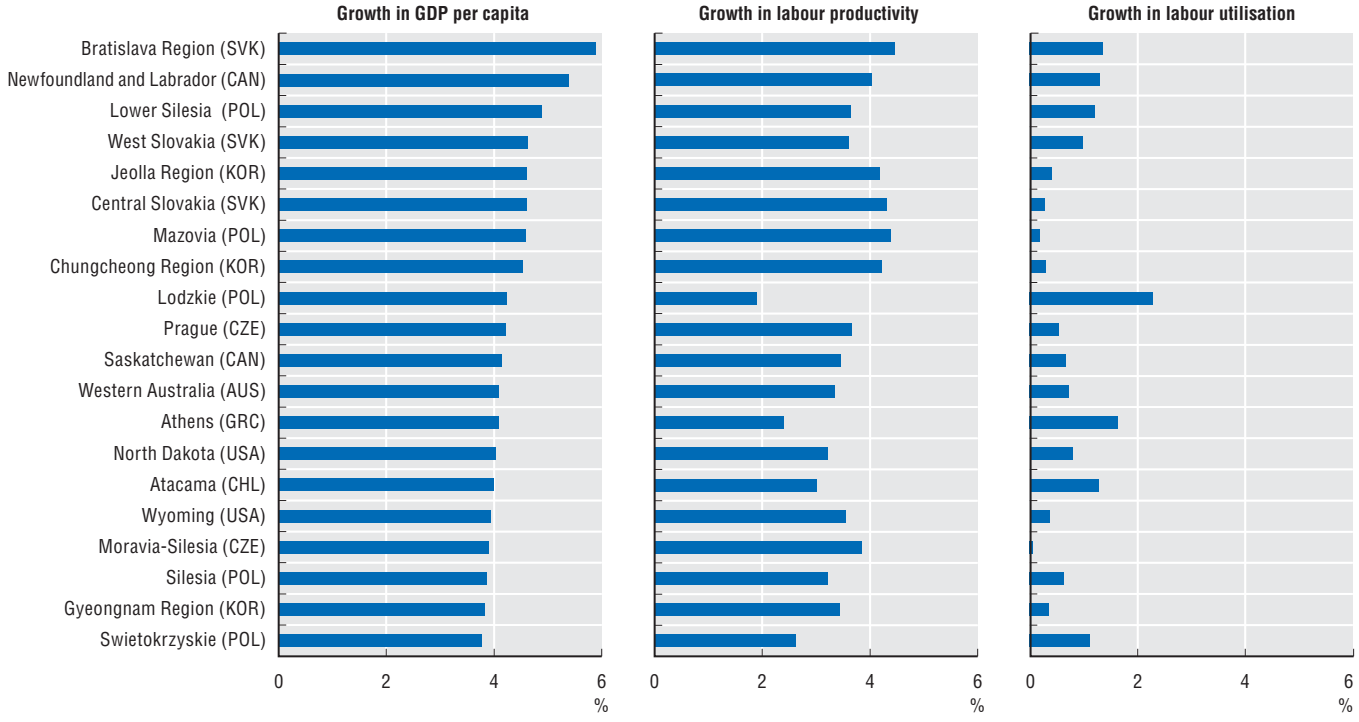
Interactive graphs and maps *http://rag.oecd.org*

## Figure notes

2.27: First available year for Korea: 2004.

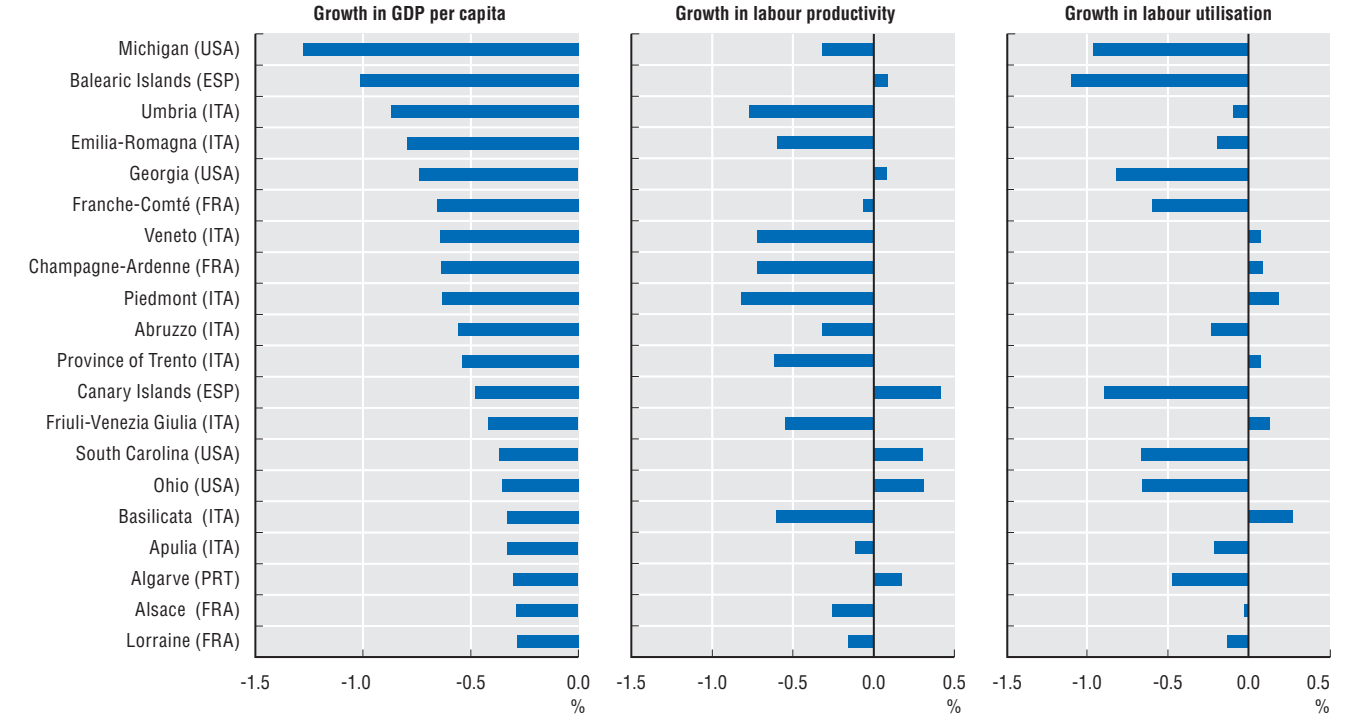
2.27-2.29: New Zealand, Norway and Switzerland are excluded for lack of data on comparable years.

### 2.27. Contribution of labour productivity and labour utilisation to GDP per capita: Top 20 TL2 regions, ranked by GDP per capita growth rate, 2000-10




StatLink http://dx.doi.org/10.1787/888932913589

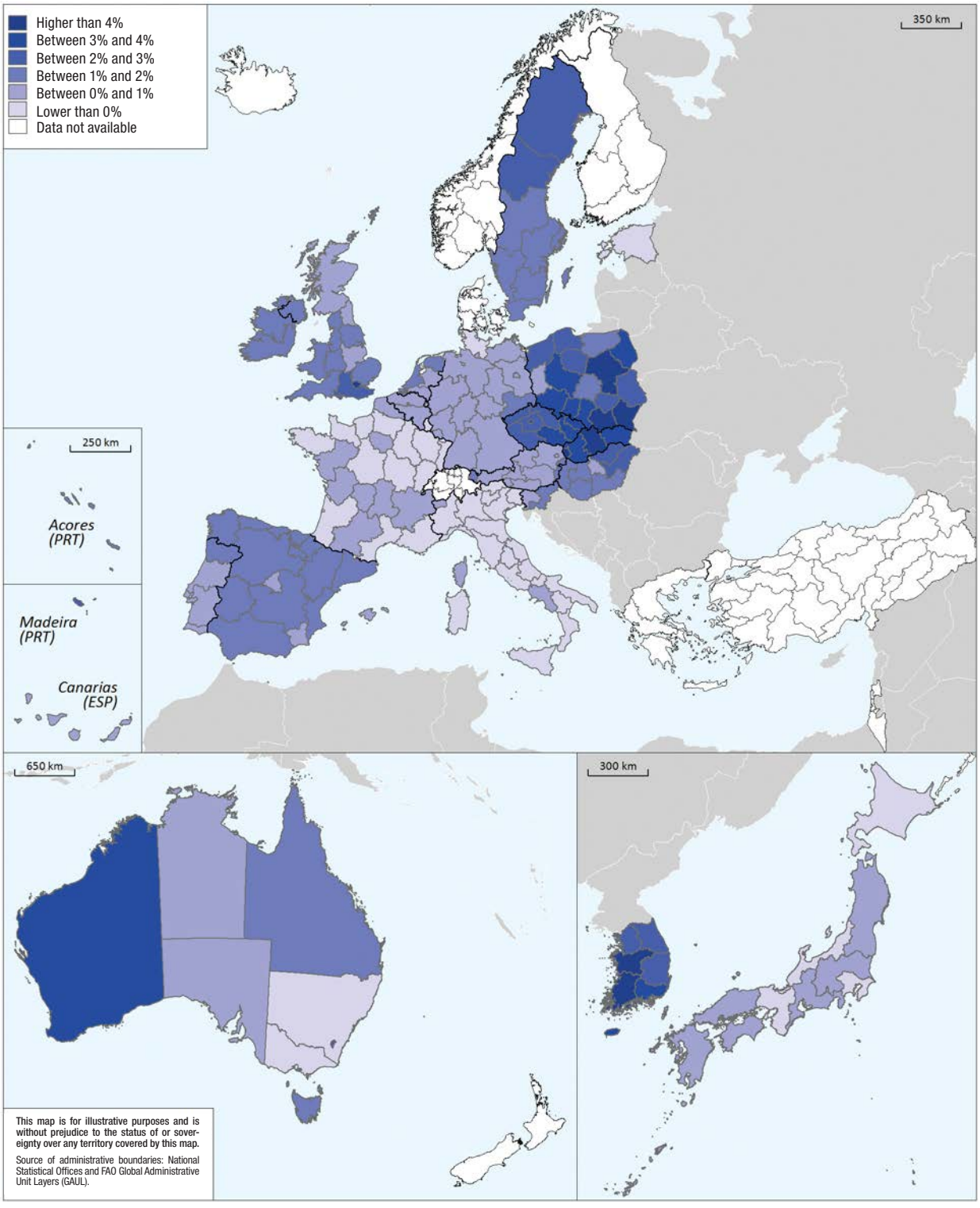
### 2.28. Contribution of labour productivity and labour utilisation to GDP per capita: Bottom 20 regions, ranked by GDP per capita growth rate, 2000-10




StatLink http://dx.doi.org/10.1787/888932913608

## 2.29. Annual growth of regional productivity: Asia, Europe and Oceania, 2000-10

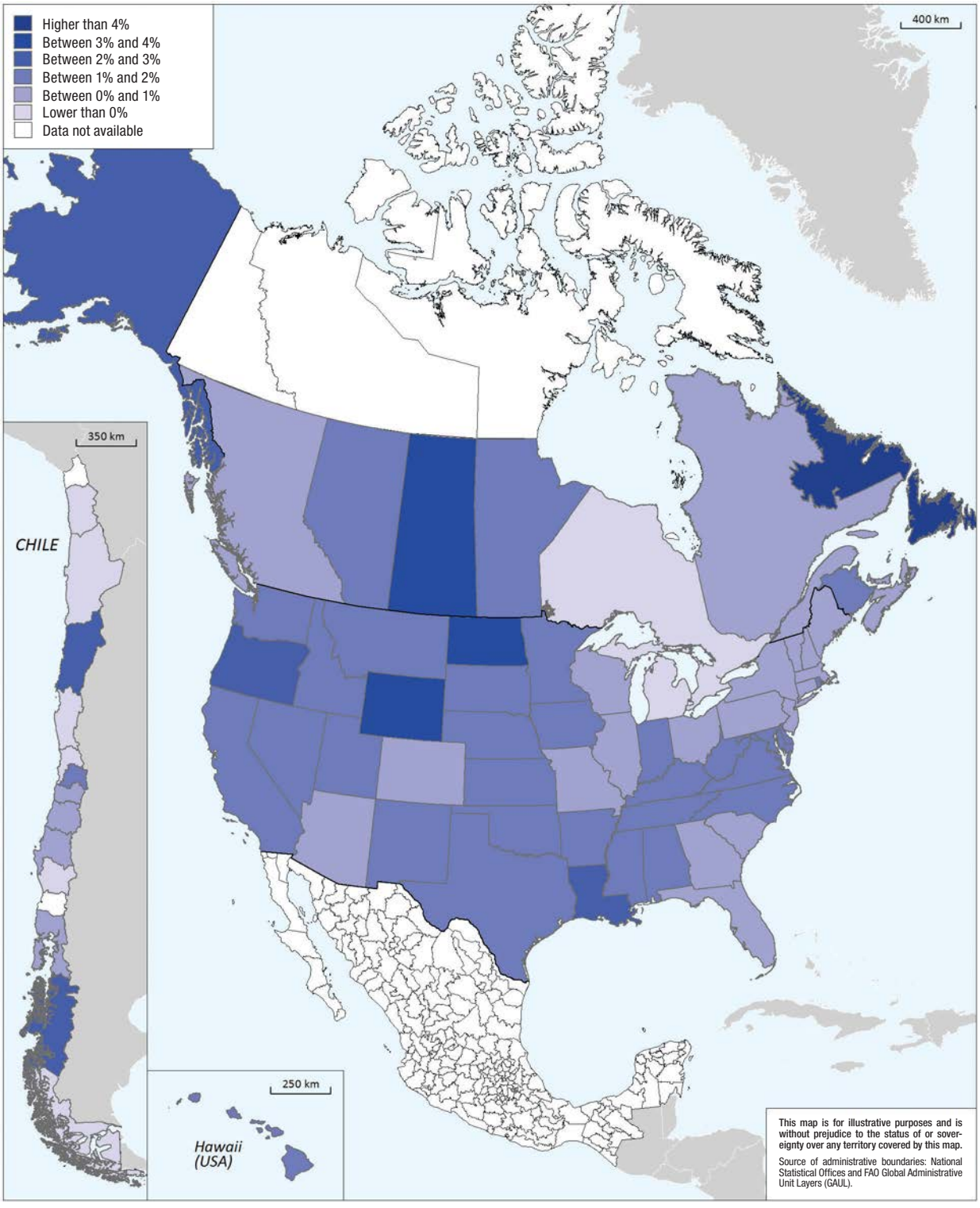
*Growth in regional GDP per worker in constant 2005 USD (PPP), TL2 regions*




StatLink http://dx.doi.org/10.1787/888932915432

## 2.30. Annual growth of regional productivity: Americas, 2000-10

*Growth in regional GDP per worker in constant 2005 USD (PPP), TL2 regions*




StatLink http://dx.doi.org/10.1787/888932915451

# Regional specialisation and productivity growth across sectors

While deeply rooted in local history, geography, institutions and social capital, the production structure of regions keeps evolving over time as a result of both macroeconomic changes and economic policies at the national or subnational level.

The primary sector (agriculture, fishing and forestry) is still an important employer in many regions. The countries with the largest employment shares in the primary sector are Turkey, Poland, Greece and Portugal. All these countries display a large inter-regional variation in agricultural employment, with a few regions still highly specialised in primary activities. One such highly specialised region is Agri in Turkey where 60% of the labour force is employed in the primary sector (Figure 2.31). Most countries have large differences in the shares of employment in mining, manufacturing and utilities (electricity, gas and water). Five countries in Eastern Europe – the Czech Republic, the Slovak Republic, Hungary, Slovenia and Poland – had markedly higher shares of employment in these industries in 2010. The region of Bursa in Turkey has a high specialisation in these industries with more than 35% of the employment, as well as the Central Transdanubia in Hungary (Figure 2.31). The industry of construction shows regional "outliers" where the share of service jobs is much above the national average, like the Aosta Valley (Italy) and Algarve in Portugal.

Both as a result of redistribution of employment shares and of actual capacity increases, productivity dynamics have been markedly different across agriculture, manufacturing and service activities. Differences in productivity changes have also been marked within countries, contributing largely to regional convergence or divergence. In the agricultural industry, the productivity growth between 2000 and 2010 in advanced regions (those with GDP per capita above the national average in 2000) has been significantly higher than in regions lagging behind (GDP per capita below national average in 2000) in the Czech Republic and the United Kingdom. Regions lagging behind performed significantly better in the agricultural activity than advanced regions in Slovak Republic and Finland. In the manufacturing industry, the productivity growth in regions lagging behind was higher than or similar to that of advanced regions in Ireland, the United States, Australia, Greece, Korea, Poland, Portugal and Slovenia. The productivity growth of lagging regions in Belgium and Austria was less than half that of the advanced regions, resulting in an increased productivity gap among regions in 2010. The lower dynamism is apparent in construction, both for advanced regions and for those lagging behind. Only in Portugal was the productivity growth in lagging regions higher than in advanced regions (Figure 2.32). Labour productivity in Greece and Ireland has dramatically decreased over the period, particularly during the crisis (2008-10) when productivity declined by more than 25% by year and for both categories of regions.

### *Definition*

Industries are defined according to the International Standard Industrial Classification (ISIC) Rev.4. Industry size is defined by the total number of employed in that industry. Regional data on gross value added (GVA) and employment are available aggregated in ten sectors (see Annex B).

Productivity by industry is defined as the GVA in the sector divided by the number of employees in the industry in the region. It is expressed in average yearly growth rates over available years.

## Source

OECD (2013), *OECD Regional Statistics* (database), *http://dx.doi.org/10.1787/region-data-en*.

See Annex B for data sources and country-related metadata.

## Reference years and territorial level

2000-10; TL2.

Data in ISIC Rev.4 are not available for Canada, Chile, Japan, Mexico, Norway, New Zealand, Switzerland and Turkey. Branch accounts are not available for Iceland and Israel.

## Further information

Interactive graphs and maps: *http://rag.oecd.org*.

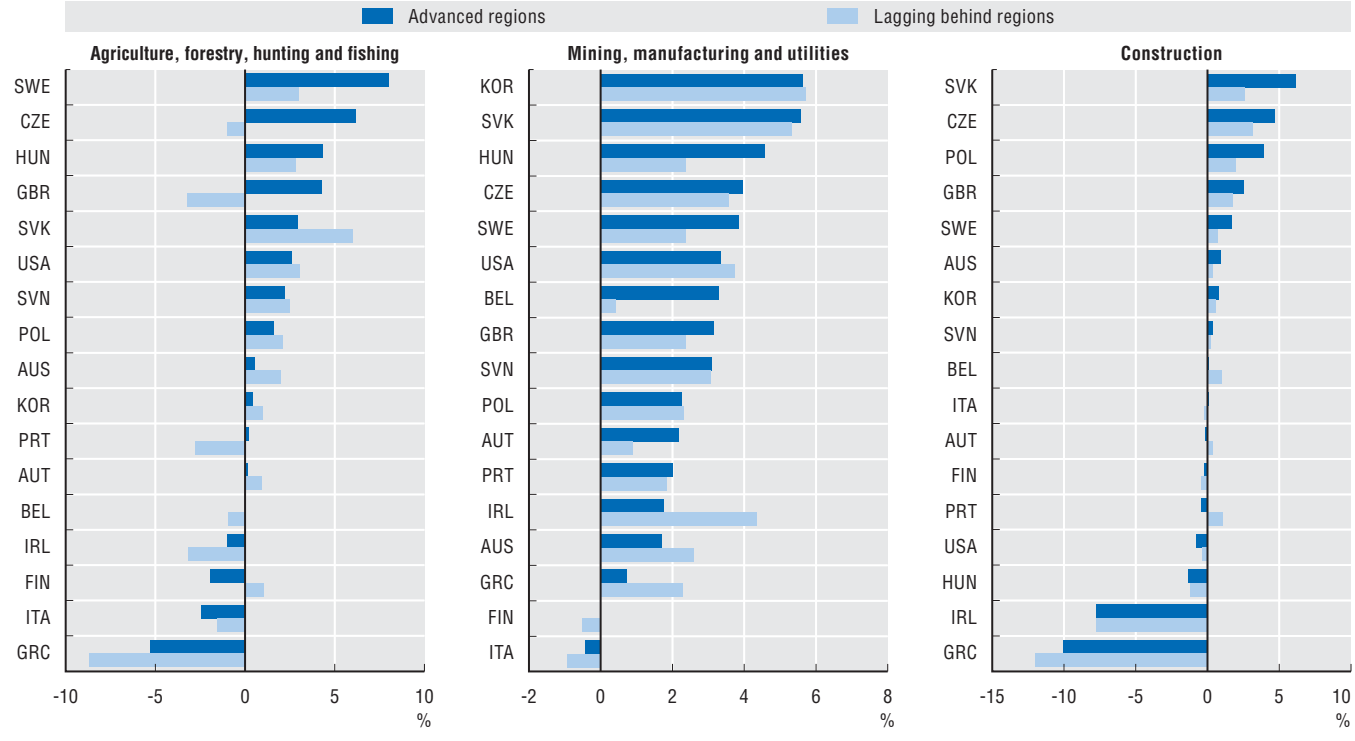
## Figure notes

2.32: Advanced (lagging behind) regions are defined as those with GDP per capita in 2000 above (below) national average GDP per capita. Data for Japan are not used due to changes in industrial classifications over the period. Available years: Belgium and Poland 2004-10, Greece 2005-10. France, Germany, the Netherlands and Spain are not included due to lack of data over a comparable period.

## 2.31. TL2 regional range of employment share (as a % of regional total employment) in selected industries, 2010


StatLink http://dx.doi.org/10.1787/888932913627

## 2.32. Annual rate of productivity growth in selected industries in 2000-10, by regional economic performance in 2000, TL2




StatLink http://dx.doi.org/10.1787/888932913646

# Regional economic disparities

Regional differences in gross domestic product (GDP) per capita within countries are often larger than among OECD countries. According to the Gini index, the emerging economies – Indonesia, the Russian Federation, Colombia and Brazil – displayed the greatest disparity in GDP per capita in 2010, with Chile, Mexico, the Slovak Republic and Turkey among the OECD countries (Figure 2.33).

From 1995 to 2010 regional disparities increased in 20 out of 33 countries considered. Significant increases can be found in the Czech Republic, Hungary, Australia, Sweden and Estonia (Figure 2.33).

Economic output differences are largely attributed to disparities in productivity and in the utilisation of the available labour force. Regional differences in labour productivity, here measured by the range in regional GDP per worker, were markedly high in the United Kingdom, Chile, Mexico, Switzerland, Korea and Poland, where some regions displayed productivity twice as high as the national value (five times as high for the Inner London West), and some other regions had values less than half the national value (Figure 2.34).

### *Definition*

GDP is the standard measure of the value of the production activity (goods and services) of resident producer units. Regional GDP is measured according to the definition of the System of National Accounts (SNA). To make comparisons over time and across countries, it is expressed at constant prices (year 2005), using the OECD deflator and then it is converted into USD purchasing power parities PPPs) to express each country's GDP in a common currency.

GDP per capita is calculated by dividing the GDP of a country or a region by its population.

GDP per worker is measured as the ratio of constant GDP in 2005 prices, to total employment where the latter is measured at place of work. This means that productivity and GDP per capita trends may diverge in regions if there is commuting on a substantial scale.

The Gini index is a measure of inequality among all regions of a given country (see Annex C for the formula). The index takes on values between 0 and 1, with zero interpreted as no disparity. It assigns equal weight to each region regardless of its size; therefore differences in the values of the index among countries may be partially due to differences in the average size of regions in each country.

The Gini index is a measure of inequality which assigns equal weight to each region of a country regardless of its population size. The number of people living in regions with low GDP per capita (under the national median) can provide an indication of the different economic implications of disparities within a country. For example, while the regional disparities as measured by the Gini index in GDP per capita are of the same magnitude in Chile and Mexico, the percentage of the national population living in regions with low GDP per capita varies from more than half of the population in Mexico to around 30% in Chile (Figure 2.35).

## Source

OECD (2013), *OECD Regional Statistics* (database), *http://dx.doi.org/10.1787/region-data-en*.

OECD deflator and purchasing power parities, *National Accounts* (database), *http://stats.oecd.org/*.

See Annex B for data sources and country-related metadata.

## Reference years and territorial level

1995-2010; TL3.

Australia, Canada, Chile, Mexico and the United States TL2 regions.

Brazil, China, India, the Russian Federation and South Africa TL2 regions.

Regional GDP is not available for Iceland and Israel.

Regional GVA for Norway in 2010.

Turkey is excluded for lack of regional GDP after 2001.

## Further information

Interactive graphs and maps: *http://rag.oecd.org*.

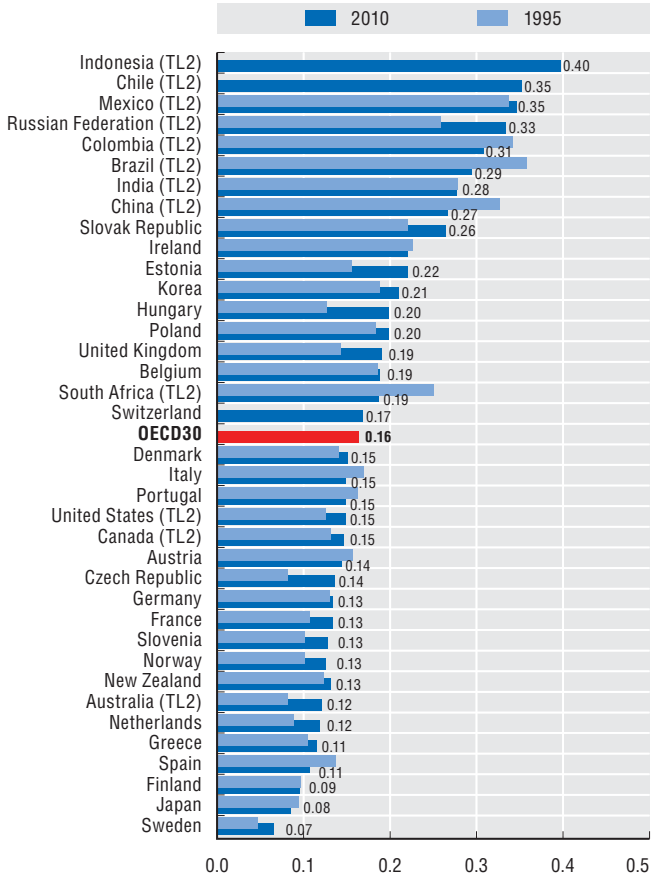
## Figure notes

2.33: First available years: 1996 for Canada, Chile, and Estonia; 1997 Norway and Spain; 1999 Poland; 2000 New Zealand; 2001 Slovak Republic; 2003 Mexico; 2005 China and India; 2005 Denmark, 2008 Switzerland. Last available year 2009 for Brazil, Japan, and South Africa.

Regional differences in GDP per capita may also depend on the level of commuting from/to a region.

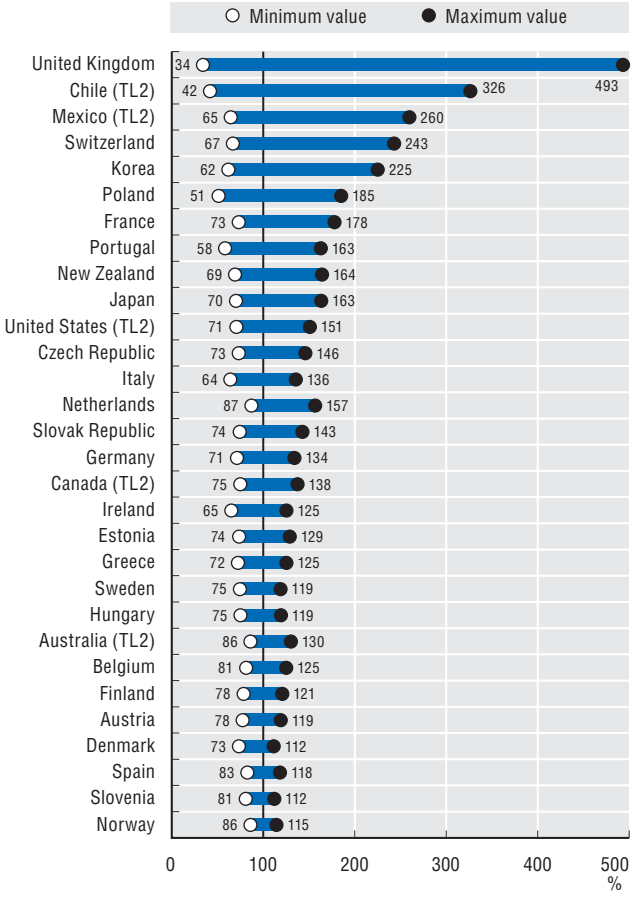
2.35: Brazil, Canada, Chile, China, Colombia, India, Mexico, Russian Federation and United States TL2 regions. Australia is not included due to the limited international comparability of the indicator in the presence of mining activity in sparsely populated regions.

### 2.33. Gini index of inequality of GDP per capita across TL3 regions, 1995 and 2010



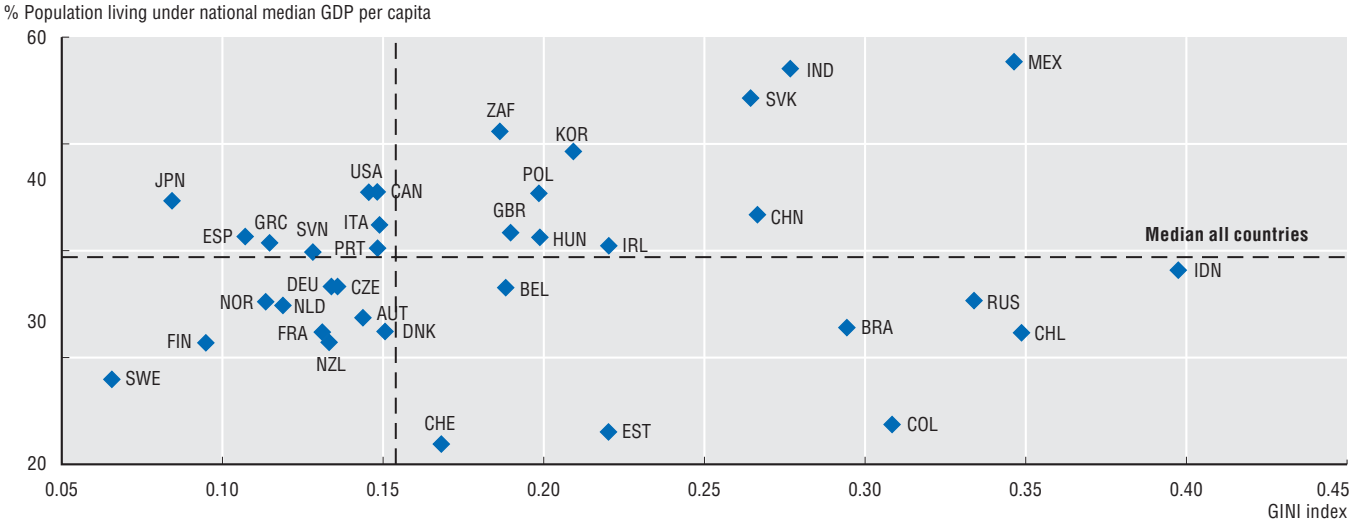

StatLink http://dx.doi.org/10.1787/888932913665

### 2.34. Range in TL3 regional GDP per worker (as a % of national average), 2010




StatLink http://dx.doi.org/10.1787/888932913684

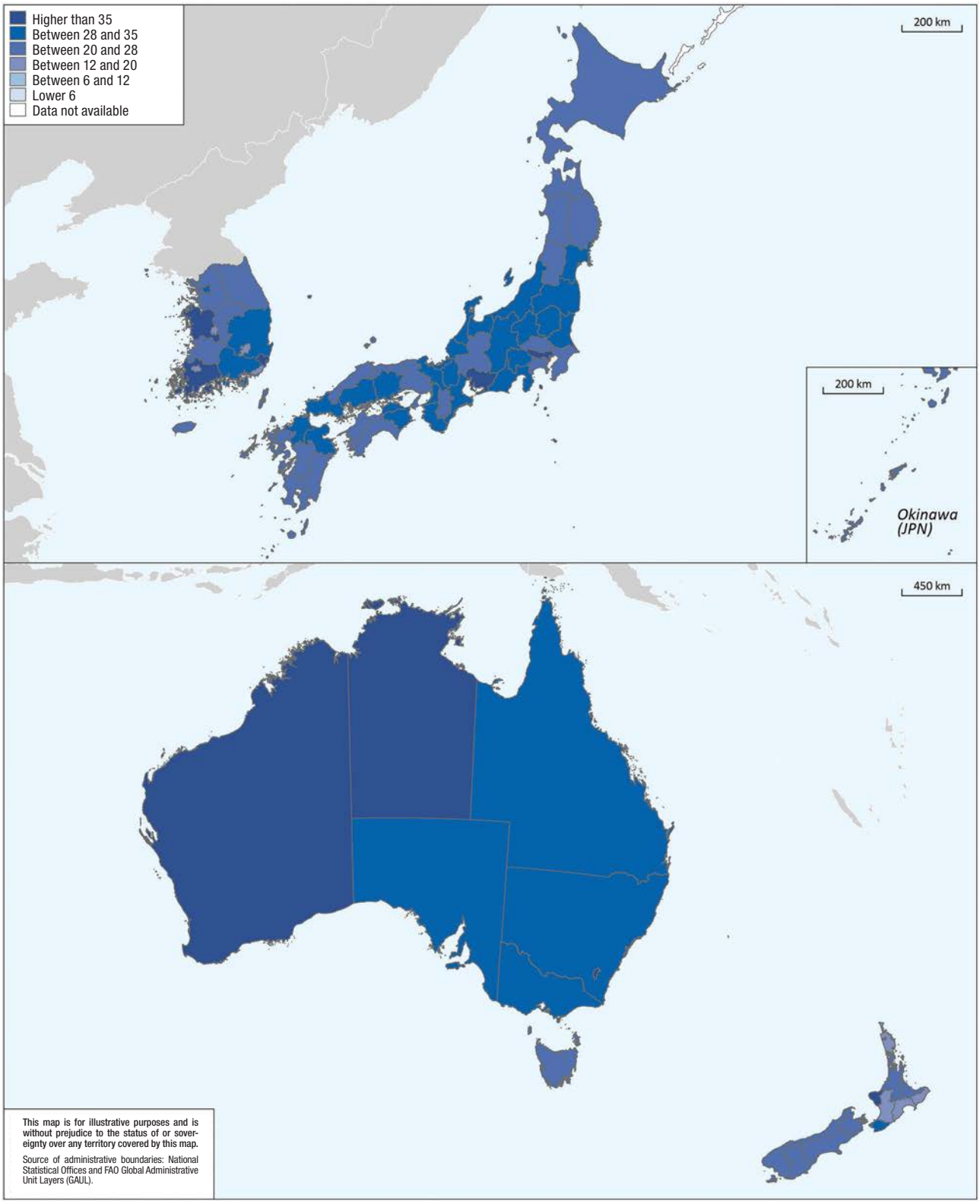
### 2.35. Gini index of inequality of GDP per capita across TL3 regions and per cent of population in regions with GDP per capita under national median, 2010




StatLink http://dx.doi.org/10.1787/888932913703

## 2.36. Regional GDP per capita: Asia and Oceania, 2010

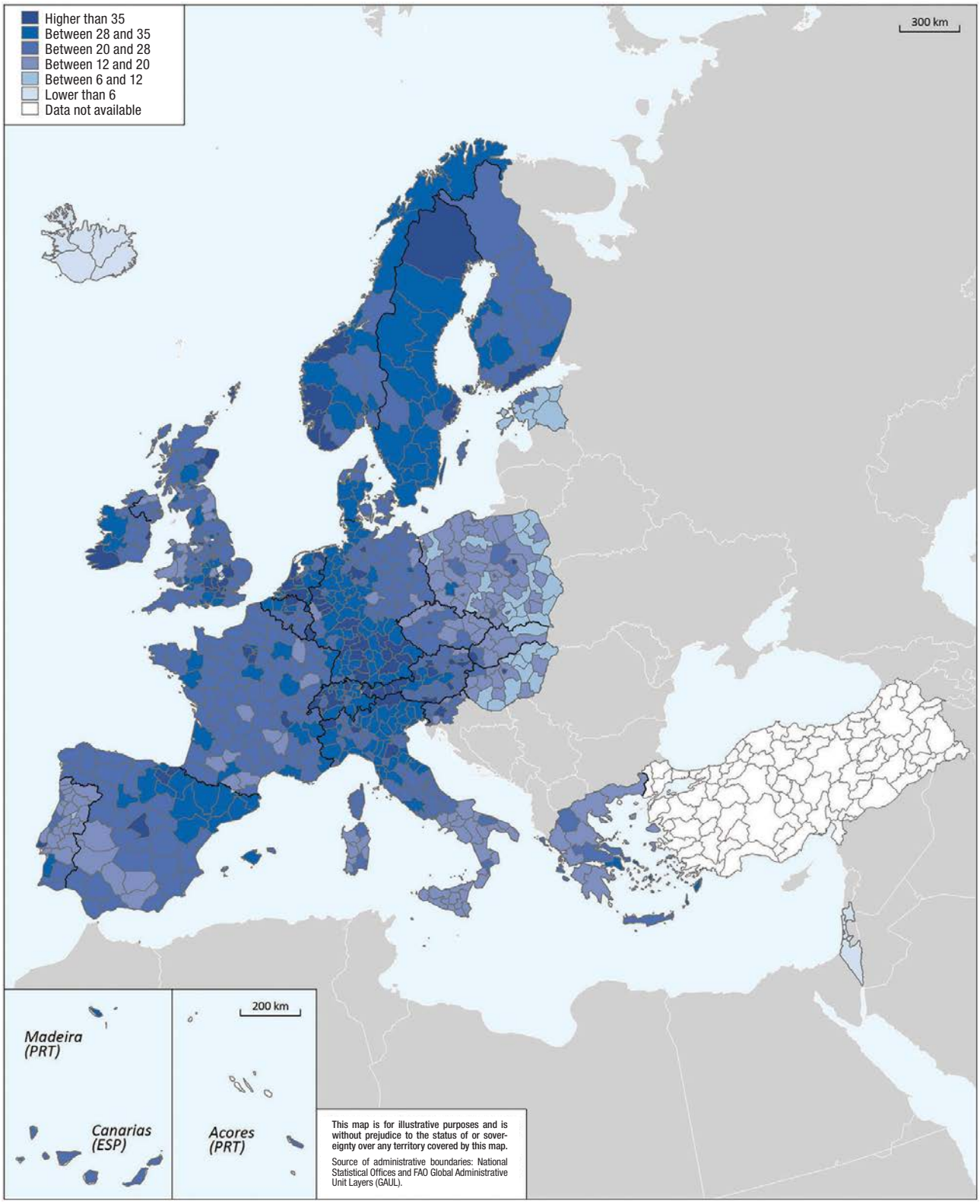
*Constant 2005 USD (PPP) in thousands, TL3 regions*




StatLink http://dx.doi.org/10.1787/888932915470

## 2.37. Regional GDP per capita: Europe, 2010

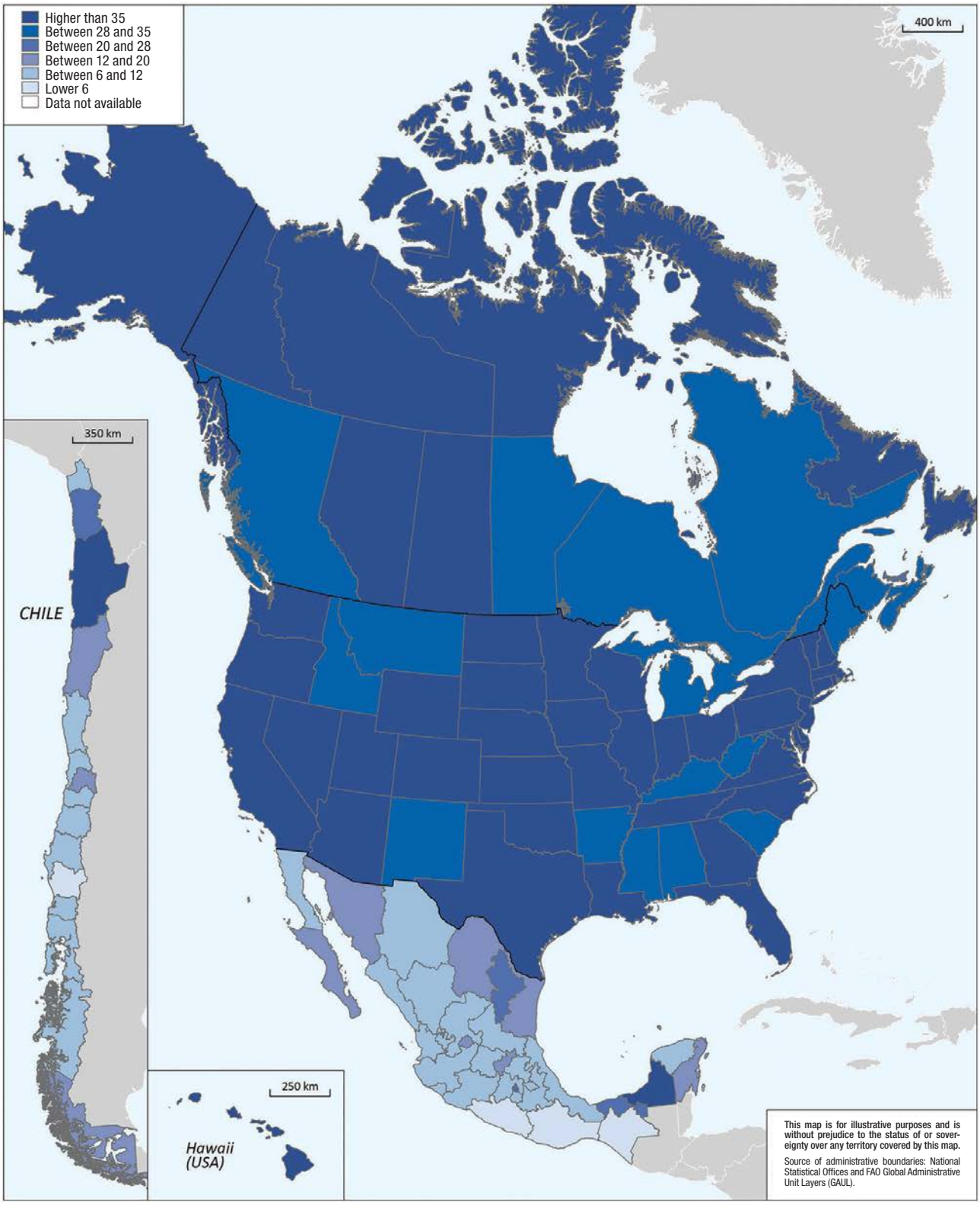
*Constant 2005 USD (PPP) in thousands, TL3 regions*




StatLink http://dx.doi.org/10.1787/888932915489

## 2.38. Regional GDP per capita: Americas, 2010

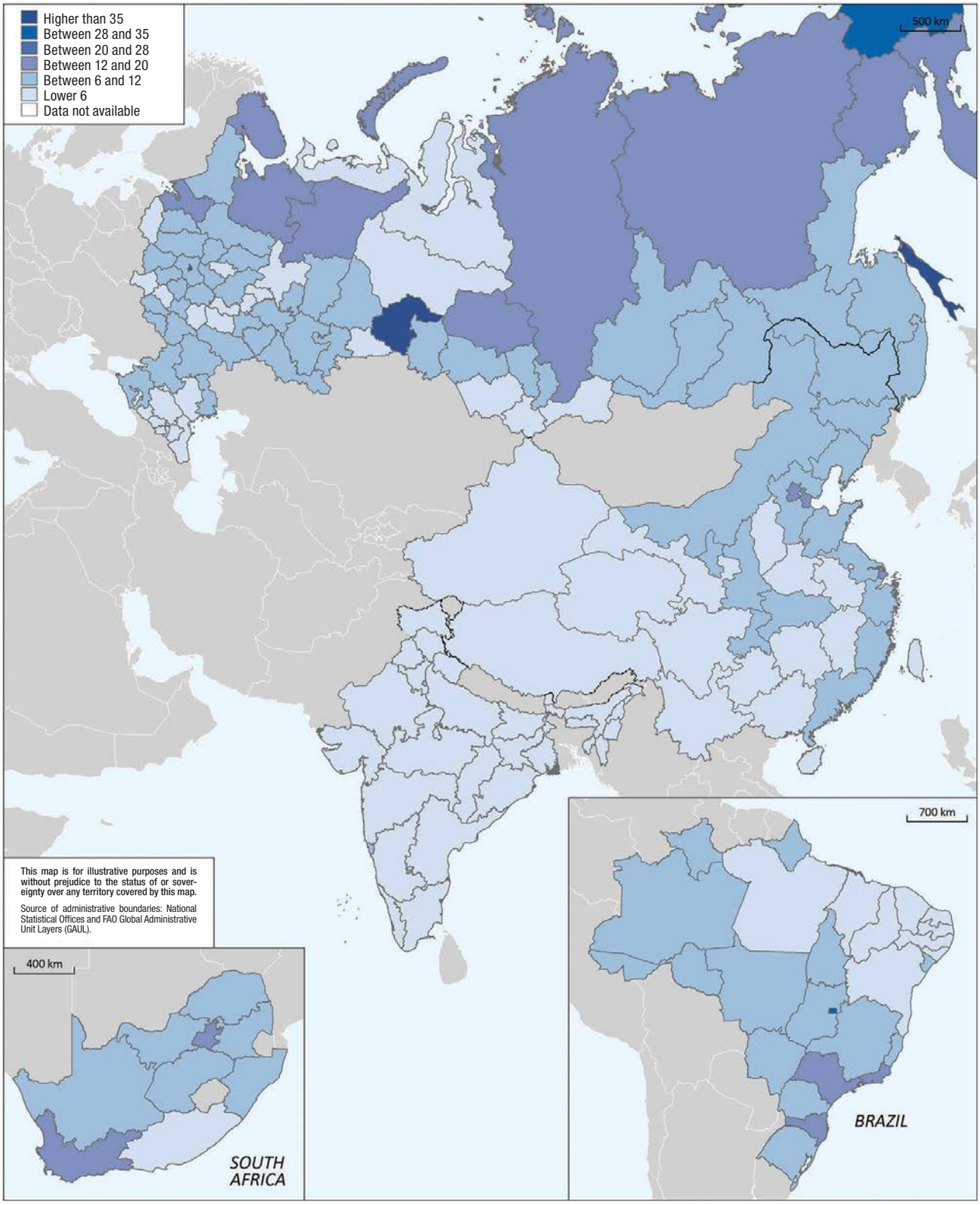
*Constant 2005 USD (PPP) in thousands, TL2 regions*




StatLink http://dx.doi.org/10.1787/888932915508

## 2.39. Regional GDP per capita: Emerging economies, 2010

*Constant 2005 USD (PPP) in thousands, TL2 regions*




StatLink http://dx.doi.org/10.1787/888932915527

# Regional disparities in tertiary education

The quality of human capital is central to increasing productivity, as the ability to generate and make use of innovation depends, among other factors, on the skill level of the labour force. The proportion of the labour force with tertiary education is a common proxy for a region's capacity to produce and absorb innovation.

OECD countries show large differences in the tertiary educational attainment of their labour force. In Israel more than half of the workforce has completed tertiary education, while in Austria, the Czech Republic, the Slovak Republic and Turkey the percentage is below 20. Differences among countries also hide large internal disparities, particularly in the United States, Spain, the Czech Republic and Turkey (Figure 2.40).

Concentration of a skilled labour force is also a major issue in countries with less regional dispersion. Regional differences are due to one populated region with a high share of skilled labour force and almost all the other regions below the country average as found, for example, in the Slovak Republic, Norway, Greece, Denmark, Finland, Austria and Portugal (Figure 2.40).

The capital region is generally the region with the highest share of people with tertiary education (Figure 2.41). Jerusalem in Israel is the OECD region with the highest percentage of skilled labour force (56%), followed by Greater London in the United Kingdom, the District of Columbia in the United States and the Basque Country in Spain.

### *Definition*

The labour force with advanced educational qualifications is defined as the labour force aged 15 and over that has completed tertiary educational programmes. Tertiary education includes both university qualifications and advanced professional programmes (ISCED 5 and 6).

## Source

OECD (2013), *OECD Regional Statistics* (database), *http://dx.doi.org/10.1787/region-data-en*.

See Annex B for data sources and country-related metadata.

## Reference years and territorial level

2012; TL2.

Data for Iceland and Japan are not available at the TL2 regional level.

## Further information

OECD (2011), *Regions and Innovation Policy*, OECD Reviews of Regional Innovation, OECD Publishing, *http://dx.doi.org/10.1787/9789264097803-en*.

OECD (2013), *Education at a Glance 2013*: OECD Indicators, OECD Publishing, *http://dx.doi.org/10.1787/eag-2013-en*.

Interactive graphs and maps: *http://rag.oecd.org*.

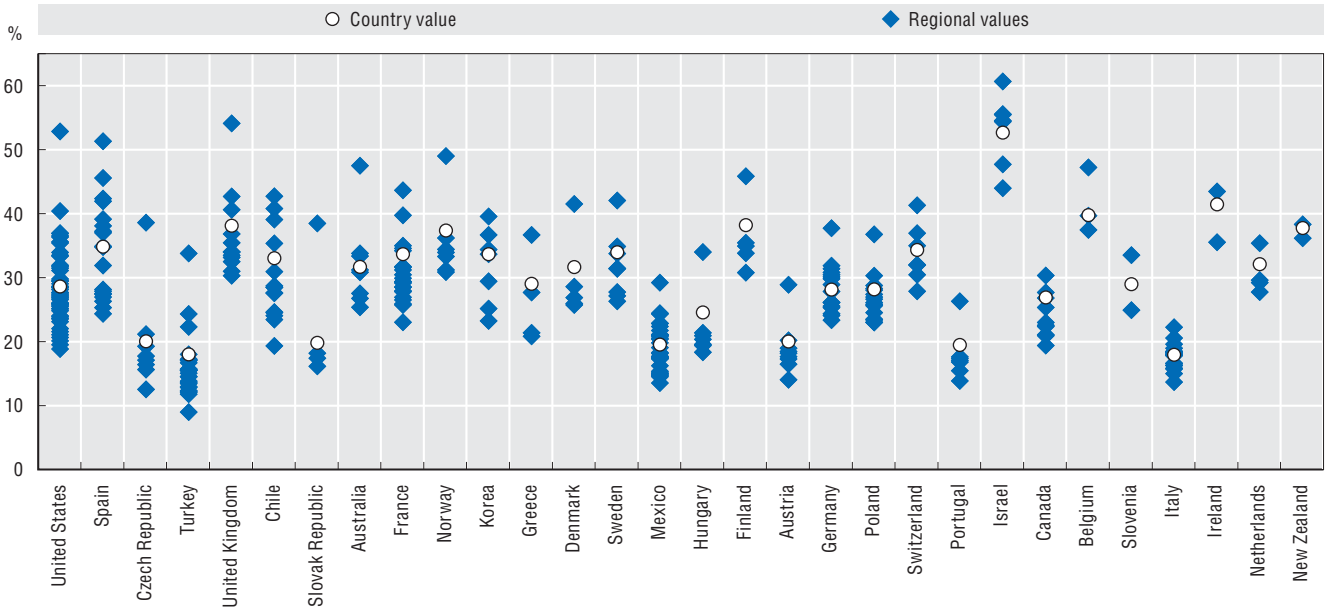
## Figure notes

2.40-2.41: Available years: Israel 2005; Australia, Portugal and Italy 2011, Greece 2006; Slovenia 2008.

2.40: Each observation (dot) represents a TL2 region.

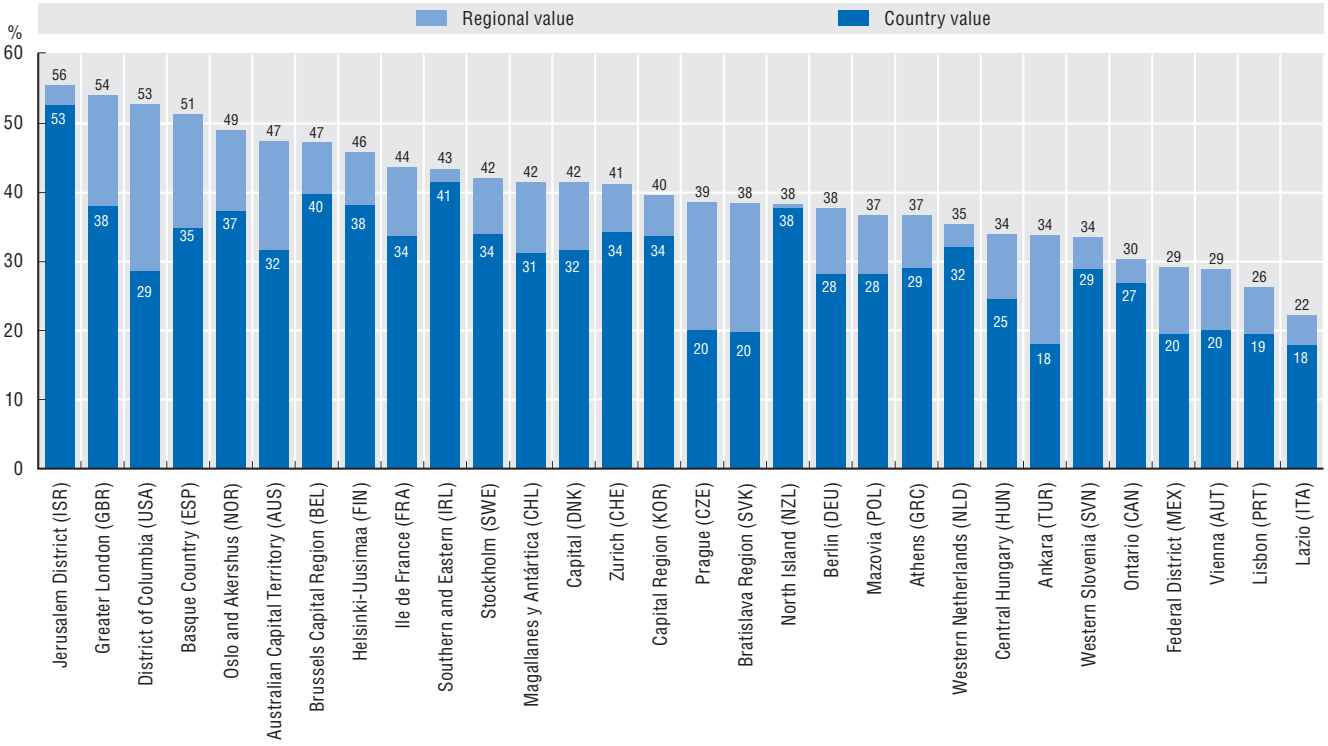
Information on data for Israel: *http://dx.doi.org/10.1787/888932315602*.

**2.40. Range of labour force with tertiary educational attainment in TL2 regions, ranked by regional range, 2012**




StatLink http://dx.doi.org/10.1787/888932913722

**2.41. Top TL2 region within each country with the highest percentage of labour force with tertiary educational attainment compared to their country average, 2012**




StatLink http://dx.doi.org/10.1787/888932913741

# Research and development expenditures in regions

Expenditures and personnel employed in research and development (R&D) are common proxies to measure a region's investment in innovation.

Expenditure in R&D is highly concentrated in a limited number of regions, and is also due to different R&D efforts in different economic sectors. In 2010, one-third of total R&D expenditure of 26 OECD countries was performed by just 10% of regions. Large regional concentration of R&D is found both in countries with high R&D intensity (the ratio between R&D and GDP) such as France, Canada, Korea and the United States, and in countries with low R&D expenditure such as Poland, Spain and Hungary (Figure 2.42). Therefore, within country dispersion in regional R&D efforts is not a positive or negative feature per se; it needs to be evaluated along with aggregate national performance and the specificity of the country in question.

In 2010, R&D intensity was, on average, 2% in the OECD area, ranging from 4% in Finland to less than 0.5% in Chile. Within country differences in R&D intensity were larger than among countries in almost one-third of the countries (Figure 2.43). The United States, Korea, Denmark and France show the largest regional disparities in R&D intensity across TL2 regions. The regions with the highest R&D intensity are in most of the countries' urban regions hosting the capital city (Figure 2.43).

Regional differences in the share of employment in R&D were the largest in the Czech Republic, Denmark and Austria where, in the regions of Prague, Hovedstaden and Vienna, respectively, there were more than 40 persons per 1 000 employed in R&D in 2010, two times higher than the country average (Figure 2.44).

In 2010, R&D performed by the business sector was around 60% of the total R&D in the OECD area. The largest differences with the respective country average are found in the regions of Nordwestschweiz (Switzerland), Eastern (United Kingdom) and Washington, D.C. (United States) (Figure 2.45).

Around 40% of the regions display R&D expenditure intensity and share of business expenditure higher than the OECD median regional values. These regions are in North-central Europe and along the coasts in Canada and the United States (Figures 2.46-2.47).

### *Definition*

According to the *Frascati Manual*, 2002, R&D is a "creative work undertaken on a systematic basis in order to increase the stock of knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications".

Gross domestic expenditure on R&D (GERD) is the total intramural expenditure on R&D performed in the region or country during a given period. Intramural expenditures are all expenditures for R&D performed within a statistical unit or sector of the economy during a specific period, whatever the source of funds (see *Frascati Manual* sections 6.2, 6.6 and 6.7.1).

Gross domestic expenditure on R&D is disaggregated in four sectors: business enterprise (BERD), government, higher education and private non-profit.

R&D personnel includes all persons employed directly in R&D activities such as researchers and those providing direct services such as R&D managers, administrators, and clerical staff. Data are expressed in headcounts.

R&D intensity is defined as the ratio between R&D expenditure and GDP.

In the maps, a regional R&D intensity is defined as strong (weak) if it is above (below) the OECD median; the share of business R&D expenditure is labelled as private (public) if it is above (below) the OECD median share.

## Source

OECD (2013), *OECD Regional Statistics* (database), *http://dx.doi.org/10.1787/region-data-en*.

See Annex B for data sources and country-related metadata.

## Reference years and territorial level

2010, TL2.

No regional data for Iceland, Japan, Mexico, New Zealand and Turkey. Switzerland only BERD; in addition, R&D personnel data are not available for Israel, Australia and the United States.

## Further information

OECD (2011), *Regions and Innovation Policy*, OECD Reviews of Regional Innovation, OECD Publishing, *http://dx.doi.org/10.1787/9789264097803-en*.

OECD (2002), *Frascati Manual 2002: Proposed Standard Practice for Surveys on Research and Experimental Development*, The Measurement of Scientific and Technological Activities, OECD Publishing, *http://dx.doi.org/10.1787/9789264199040-en*.

OECD Main Science and Technology Indicators: *www.oecd.org/sti/msti*.

Interactive graphs and maps: *http://rag.oecd.org*.

## Figure notes

2.42-2.43: 2009 France, Austria, Germany, Denmark, Sweden, United Kingdom, Australia, Netherlands and Belgium; 2011 Czech Republic and Slovak Republic; 2005 Greece; 2008 Israel.

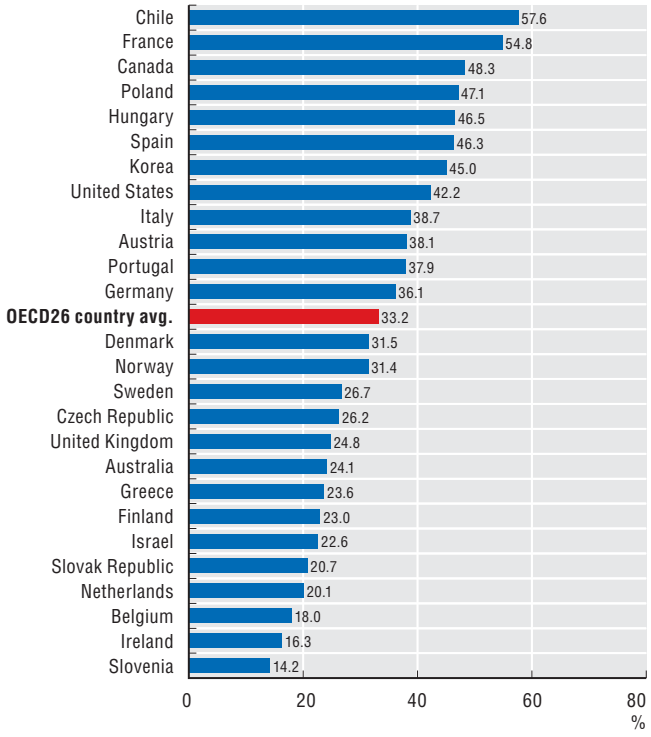
2.44: 2009 Austria, Germany, Denmark, Sweden, United Kingdom, Netherlands and Belgium; 2011 Slovak Republic and Czech Republic; 2001 France; 2005 Greece.

2.45: The Finland region of Etelä-Suomi refers to Etelä-Suomi and Helsinki-Uusimaa.

2.46-2.47: Regions are classified as strong (weak) if their R&D intensity is above (below) the OECD median value; and private (public) if the share of BERD on total R&D expenditure is above (below) the OECD median value.

Information on data for Israel: *http://dx.doi.org/10.1787/888932315602*.

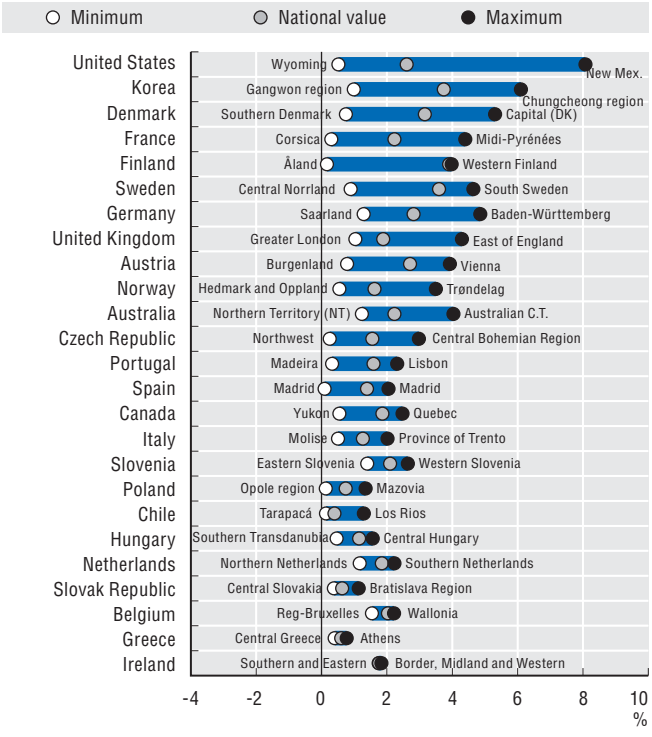
### 2.42. National R&D expenditure concentration by top 10% TL2 regions with largest R&D expenditure, 2010




StatLink http://dx.doi.org/10.1787/888932913760

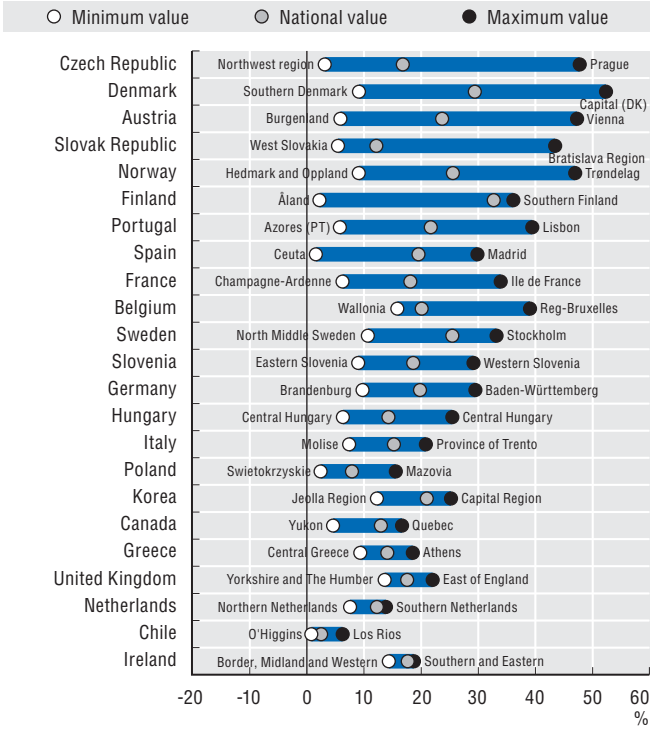
### 2.43. Range of TL2 regional R&D intensity, 2010

*R&D expenditure over GDP, %*




StatLink http://dx.doi.org/10.1787/888932913779

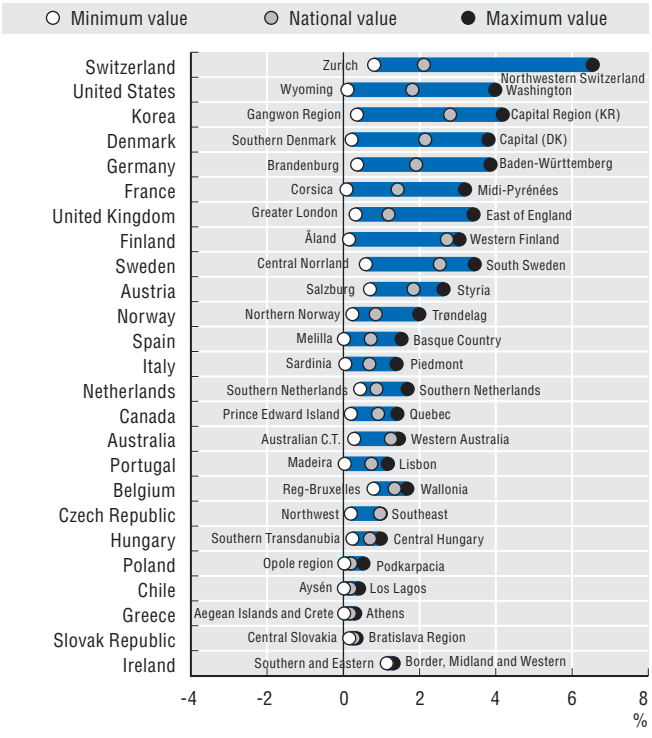
### 2.44. Range of TL2 regional R&D personnel per 1 000 employees, 2010




StatLink http://dx.doi.org/10.1787/888932913798

### 2.45. Range of TL2 regional business R&D intensity, 2010

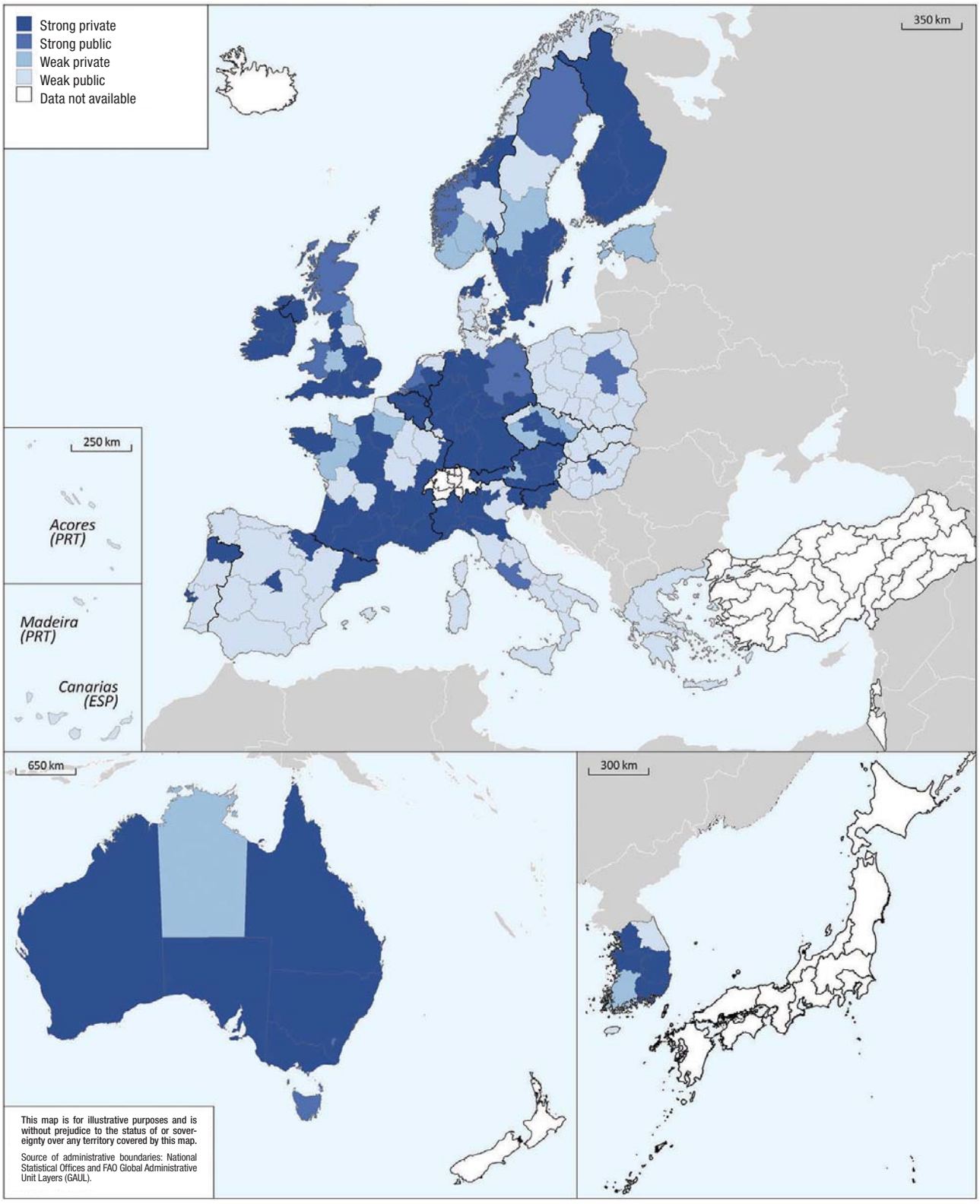
*Business R&D expenditure over GDP, %*




StatLink http://dx.doi.org/10.1787/888932913817

## 2.46. Regional R&D intensity and share of business R&D: Asia, Europe and Oceania

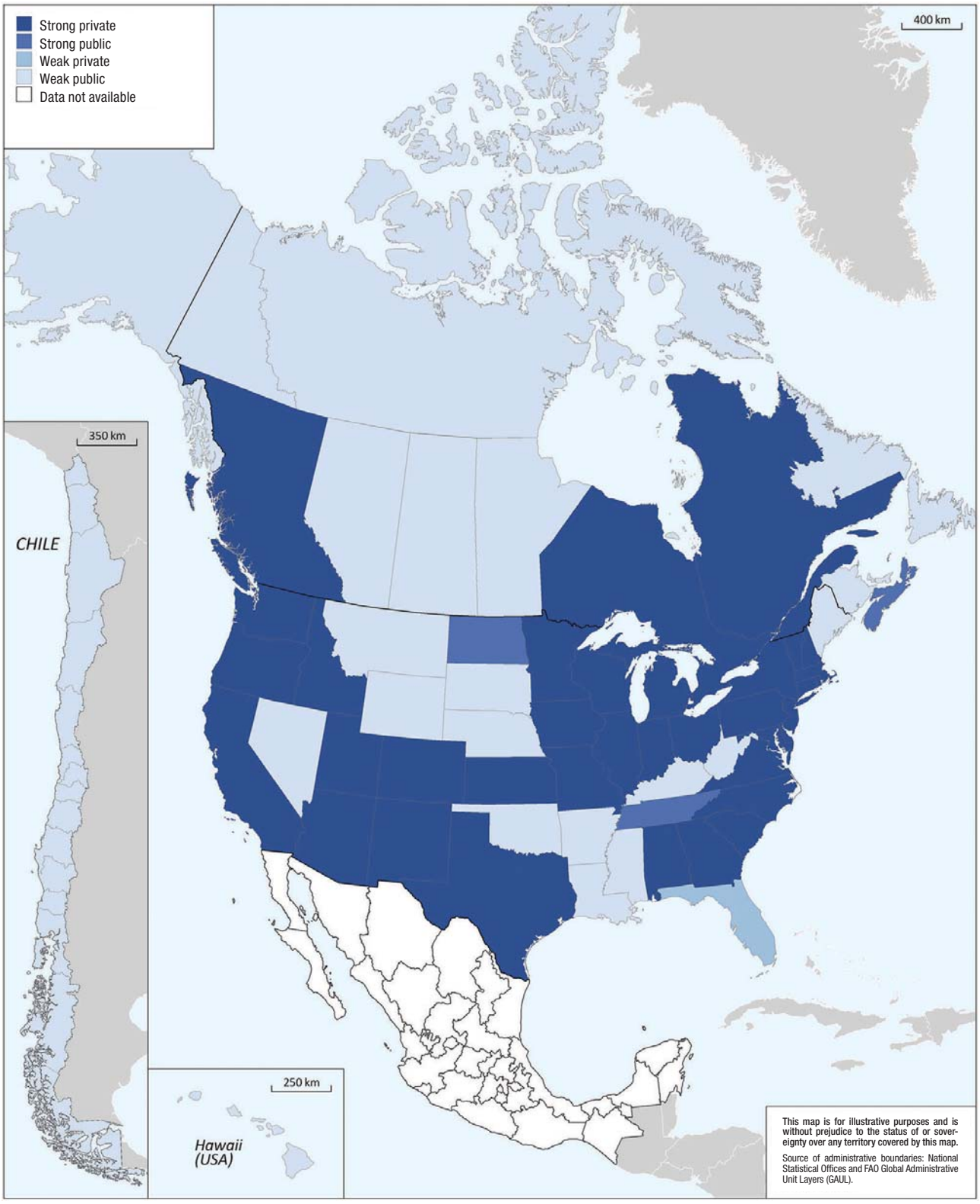
*TL2 regions, 2010*




StatLink http://dx.doi.org/10.1787/888932915565

## 2.47. Regional R&D intensity and share of business R&D: Americas

*TL2 regions, 2010*




StatLink http://dx.doi.org/10.1787/888932915584

# Patents in regions and by sectors

Patent application is an indicator of inventive activity and the analysis of regional patenting helps assess the spatial distribution of innovation. Patents are one of the mechanisms used to appropriate the results of investments in intangibles. They are a good proxy of innovation efforts; however, patenting activity is strongly associated with sectoral patterns, since some economic sectors (i.e. pharmaceuticals and electronics) tend to show higher patenting trends due to the type of innovative activity than other sectors (i.e. textiles or other low-tech sectors).

Patent applications are concentrated in few countries, with 60% of the worldwide patents located in the United States, Japan and Germany. This concentration is also observed at regional level. In 2010, almost 60% of all patent applications in OECD countries were recorded by 10% of regions (Figure 2.48). The geographic concentration of patents is related both to the different input needed for patent generation (e.g. investments, infrastructure, human capital) and to the sectoral concentration of industries.

Among the leading countries in patents per million inhabitants, regional disparities are the highest in the Netherlands, the United Kingdom and Korea because of a single top performing region. Switzerland, Denmark, Sweden and Germany have relatively more regions patenting. Regional variation is generally low in the countries with a limited number of patents (Figure 2.49).

More than two-thirds of the patent applications are generated in a limited number of technologies: information and communications technology (ICT), health, biotechnology and environmental-related technologies. Some regions show a marked specialisation: Guangdong (China), Western Finland (Finland), the Capital Region of Korea and Southern-Kanto (Japan) produce more than 70% of their patents in the ICT sector. In the period 2008-10, California (United States) and Southern-Kanto represent, each, more than 10% of all patents recorded in ICT. The Northwestern region of Switzerland produces the majority of the patents in the health – pharmaceutical and medical – field, whereas for the environmental-related technologies, the most specialised regions are Baden-Württemberg (Germany) and Upper Austria with one-third of their patents classified in this field (Figure 2.50).

### *Definition*

A patent is an exclusive right granted for an invention, which is a product or a process with industrial applicability that provides, in general, a new way of doing something, or offers a new technical solution to a problem ("inventive step"). A patent provides protection for the invention to the owner of the patent. The protection is granted for a limited period, generally 20 years.

Data refer overall patent applications to Patent Cooperation Treaty (PCT) applications.

Patent documents report the inventors (where the invention takes place), as well as the applicants (owners), along with their addresses and country of residence. Patent counts are based on the inventor's region of residence and fractional counts. If on the patent document are registered two or more inventors, the patent is classified as a co-patent.

Patent intensity is defined as the number of patent applications per million population in a region.

Patents are coded according to classes of the International Patent Classification (IPC) system, and can be aggregated into technology fields such as information and communication technologies (ICT), health, biotechnology and environmental-related technologies.

### Source

OECD (2013), *OECD Regional Statistics* (database), *http://dx.doi.org/10.1787/region-data-en*.

*OECD REGPAT Database*: *http://dotstat/wbos/*.

See Annex B for data sources and country-related metadata.

### Reference years and territorial level

2008-10 average;

TL3 regions; TL2 regions for Brazil, China, India, South Africa.

### Further information

OECD (2009), *Patent Statistics Manual*, OECD Publishing, *http://dx.doi.org./10.1787/9789264056442-en*.

Interactive graphs and maps: *http://rag.oecd.org*.

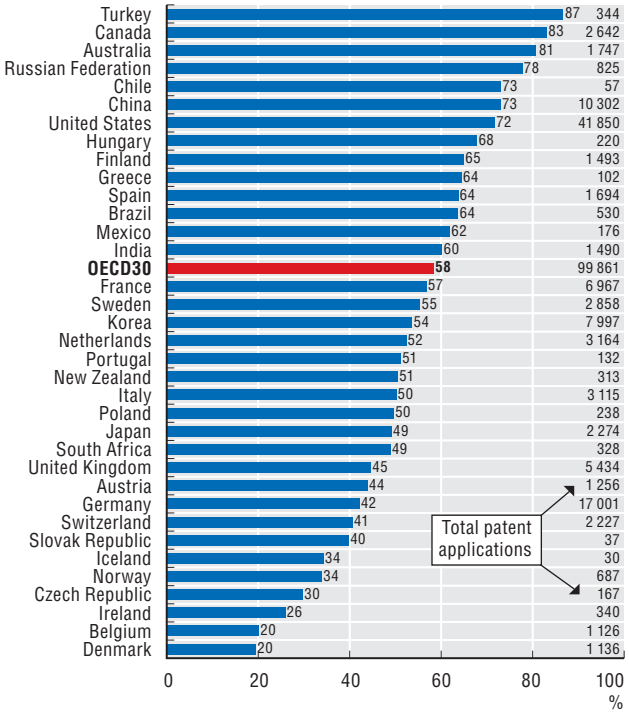
### Figure notes

2.48-2.49: Data not regionalised for Estonia, Luxembourg, Israel and Slovenia. The total number of applications by country is the result of the sum of the data that has been successfully regionalised to TL3 regions.

2.50: TL2 regions.

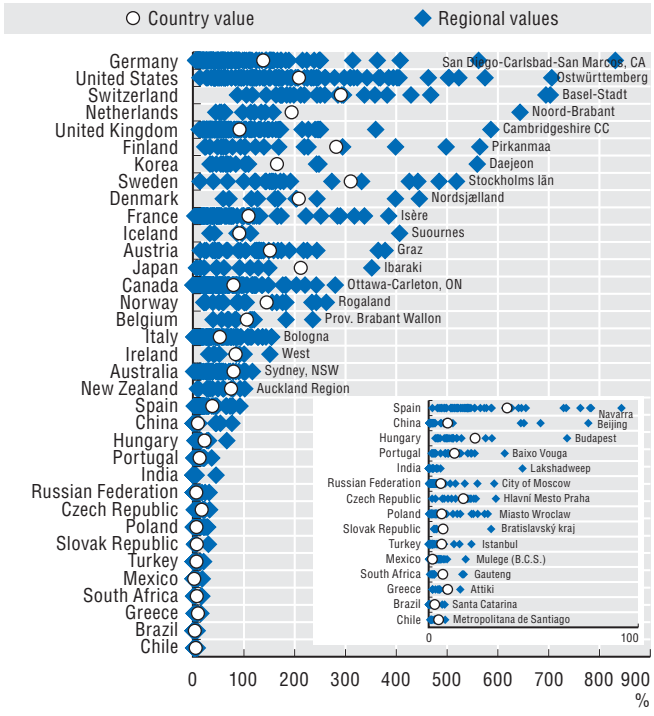
Information on data for Israel: *http://dx.doi.org/10.1787/888932315602*.

### 2.48. National patent concentration by top 10% of TL3 regions, ranked by number of patents, average 2008-10



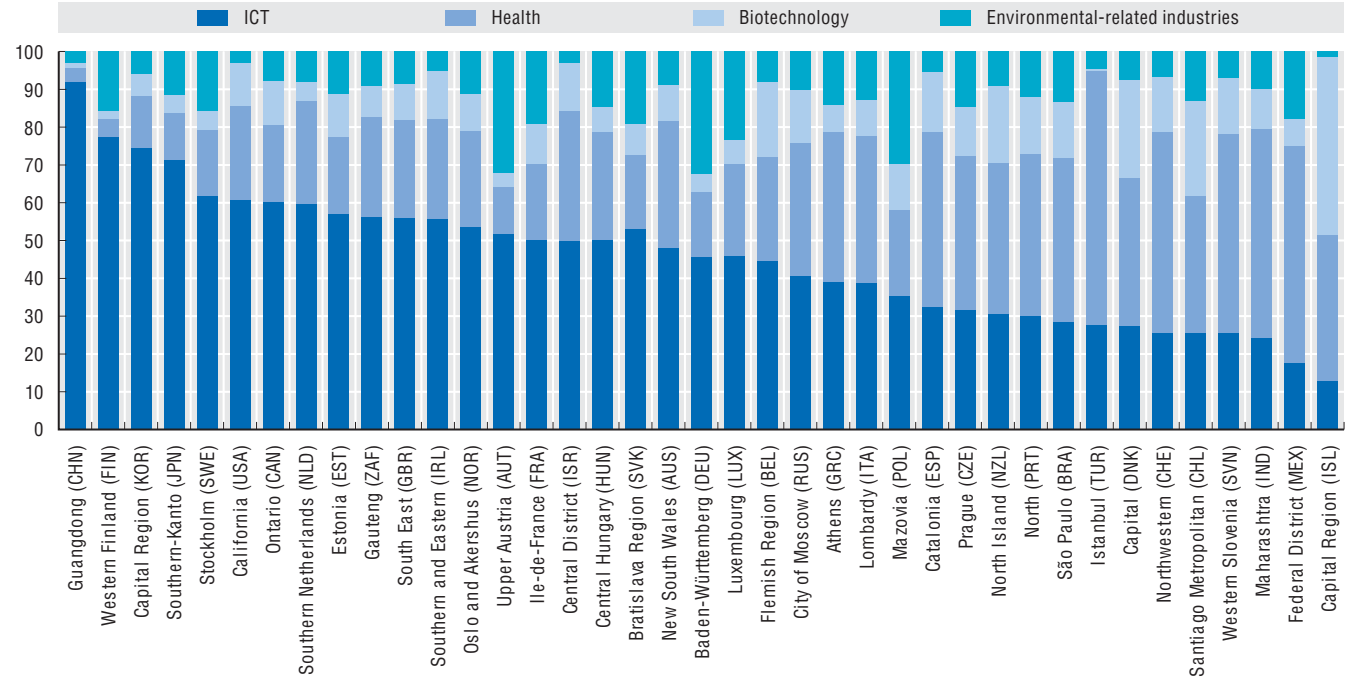

StatLink http://dx.doi.org/10.1787/888932913836

### 2.49. Range in TL3 regional patent intensity, average 2008-10




StatLink http://dx.doi.org/10.1787/888932913855

### 2.50. Share of patent applications by selected technology in TL2 regions with highest concentration by country, 2008-10




StatLink http://dx.doi.org/10.1787/888932913874

# Regional patterns of co-patenting

The percentage of regional patent applications with co-inventors from another region, whether or not they belong to the same country, is an indicator of co-operation activity in innovation between the two regions.

More than 70% of patents in OECD countries are applied for by two or more inventors. The share of co-patenting on the total Patent Co-operation Treaty (PCT) applications can be high for patenting leader countries (such as Japan and the United States), small economies (such as Iceland and Estonia) and emerging economies (India) (Figure 2.51).

The propensity to co-patent with co-inventors from the same TL3 region (average 49%) is higher than with co-inventor(s) from other regions in the same country (average 34%) and from foreign regions (average 17%). Japan, Spain and New Zealand show the highest propensity to co-patent within the same region. Korea, Japan, the United States and Germany co-patent internally and show the lowest propensity to co-patent outside national borders. By contrast, the Slovak Republic, Mexico, Greece and Turkey – which have a low level of patenting activities – seem more oriented toward international co-operation than national (Figure 2.52).

Among the 40 regions with the highest number of patent applications, different patterns of collaboration emerge. Top patenting regions such as the Flemish region (Belgium), Ontario (Canada), East of England (United Kingdom), and Western Netherlands display a high share of collaborations and are relatively more connected with other foreign hubs. The top ranking regions in Asian countries show a lower propensity to collaborate in patenting in general and with foreign regions, exceptions being Shanghai and Beijing. States in the United States show a relatively low share of international collaboration but with an increase in their share compared to 1995-97 values (Figure 2.53).

### *Definition*

A patent is an exclusive right granted for an invention, which is a product or a process with industrial applicability that provides, in general, a new way of doing something or offers a new technical solution to a problem ("inventive step"). A patent provides protection for the invention to the owner of the patent. The protection is granted for a limited period, generally 20 years.

Data refer to overall patent applications to Patent Co-operation Treaty (PCT) applications.

Patent documents report the inventors (where the invention takes place), as well as the applicants (owners), along with their addresses and country of residence. Patent counts are based on the inventor's region of residence and fractional counts. If two or more inventors are registered on the patent document, the patent is classified as a co-patent.

The number of foreign co-inventors is defined as the number of co-inventors that reside/work in a TL region outside national borders.

## Source

OECD (2013), *OECD Regional Statistics* (database), *http://dx.doi.org/10.1787/region-data-en*.

See Annex B for data source and country-related metadata.

## Reference years and territorial level

2008-10 average.

TL3 regions, TL2 regions for Brazil, China, India and South Africa.

## Further information

OECD (2009), *Patent Statistics Manual*, OECD Publishing, *http://dx.doi.org./10.1787/9789264056442-en*.

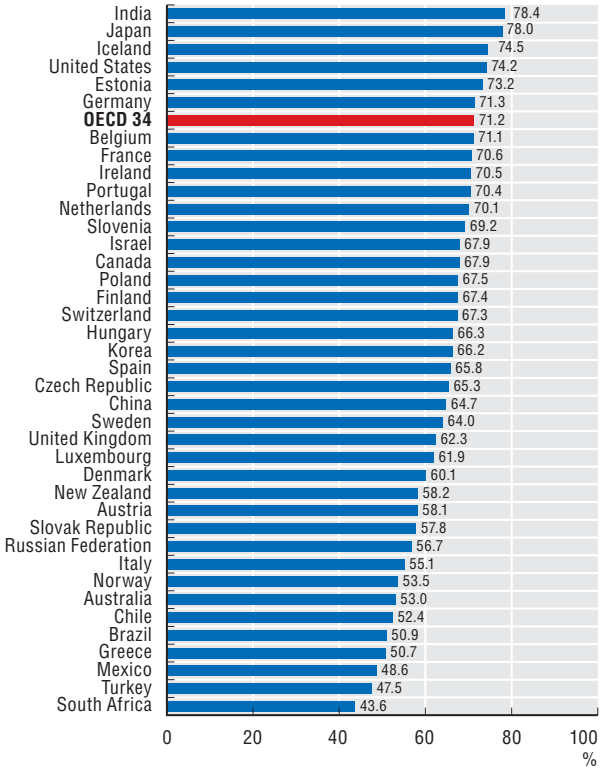
Interactive graphs and maps: *http://rag.oecd.org*.

## Figure notes

2.53: TL2 regions; 2008-10 average increase or decrease compared to 1995-97 average. The X Y axes are centred to the median among regions.

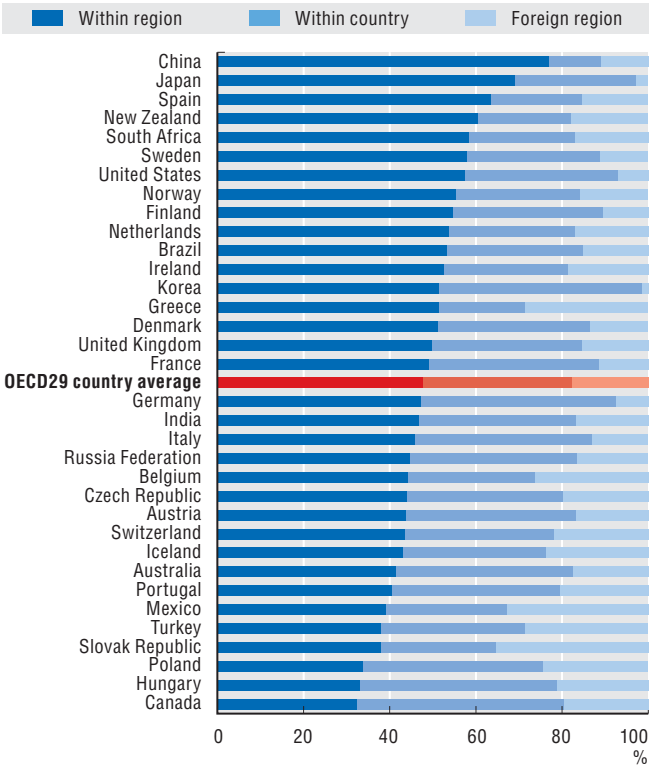
Information on data for Israel: *http://dx.doi.org/10.1787/888932315602*.

### 2.51. Patent applications with co-inventors as a % of patents, average 2008-10



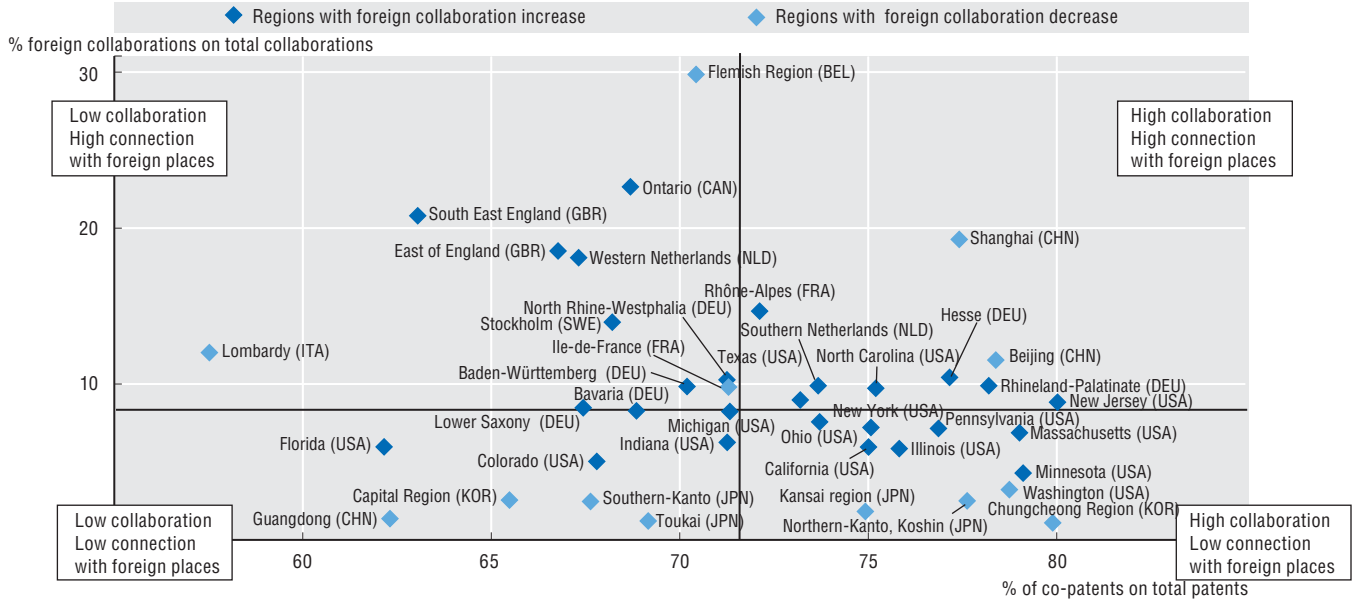

StatLink http://dx.doi.org/10.1787/888932913893

### 2.52. Share of co-patents by location of partners, TL3 regions, average 2008-10




StatLink http://dx.doi.org/10.1787/888932913912

### 2.53. Per cent of co-patents (X axis) and foreign collaborations (Y axis) in the top 40 regions with the highest patent applications, 2008-10 and compared to their values in 1995-97




StatLink http://dx.doi.org/10.1787/888932913931

# Impact of scientific publications in regions

Scientific publications and the analysis of citations across regions are commonly used as indicators of the progress of science in countries and possible collaborations among researchers in different regions. Worldwide scientific publications are concentrated in a few countries. The top five countries, United States, China, United Kingdom, Germany and Japan, account for almost 60% of the publications in 2010. When considering the number of publications per capita, Switzerland and the Scandinavian countries rank among the highest ones (Figure 2.54). Scientific publications show high regional disparities, with in general, one or two regions leading the production as is the case for the regions of Inner London West (United Kingdom) and Basel-Stadt (Switzerland) (Figure 2.54).

The 40 regions with the highest number of publications (corresponding to 2% of the regions where data are available) accounted for more than one-third of the publications in 2010. Almost half of these top publishing regions are in the United States (Table 2.55). Chinese regions, however, have experienced the highest growth in the number of publications in the period 2000-10, with an annual average growth rate of 28% compared to an average 0.3% rate in the other top regions.

The quality of scientific production can be further analysed with the share of publication that has appeared in the top quartile journals. More than 80% of the publications of the United States regions of San Diego-Carlsbad-San Marcos and Boston-Worcester-Manchester appeared in top journals (Table 2.55). The impact of publications is evaluated through the number of citations they receive (the so called citation impact). In Table 2.55, the normalised impact by region is relative to the average of the 40 top regions. In 2010, the United States region of San Jose-San Francisco-Oakland had a normalised citation impact of 1.4, which means that the publications produced in this region were cited 40% more than the average publication.

### *Definition*

The *OECD Scopus Database* contains records on worldwide publications and citations. Scopus covers documents where the author is identical to the researcher in charge of the presented findings. Serial documents (journals, trade journals, book series and conference materials) with ISSNs (International Standard Serial Numbers) are collected in the *Scopus Database*.

The *regionalisation* of the *Scopus Database* consists in assigning addresses to TL3 regions, work done by the OECD Science, Technology and Industry Directorate. Not all records in the database can be successfully matched with a TL3 region, in general due to missing information or spelling errors. Nevertheless, the matching ratio is generally higher than 95%, except for Australia, Canada (lower than 90%) and Mexico (80%).

Following a common practice we define a *(citable) publication* as an article, review or conference paper included in the Scopus database.

The *number of publications produced in top quartile journals* refers to publications appearing in the most cited (top quartile) journals.

The *number of citations* is defined as the number of times the publication was cited by other articles included in the Scopus database.

The *normalised citation impact* is defined as the ratio between the quotient of citations (number of citations divided by the number of publications) in a region and the quotient of citations for the 40 regions with the highest number of publications worldwide. It measures the relative performance of a region.

## Source

OECD calculations, based on Scopus custom data, Elsevier, version 5.2012, June 2013.

## Reference years and territorial level

2010; TL3

TL2 regions in Brazil, China, India, the Russian Federation and South Africa.

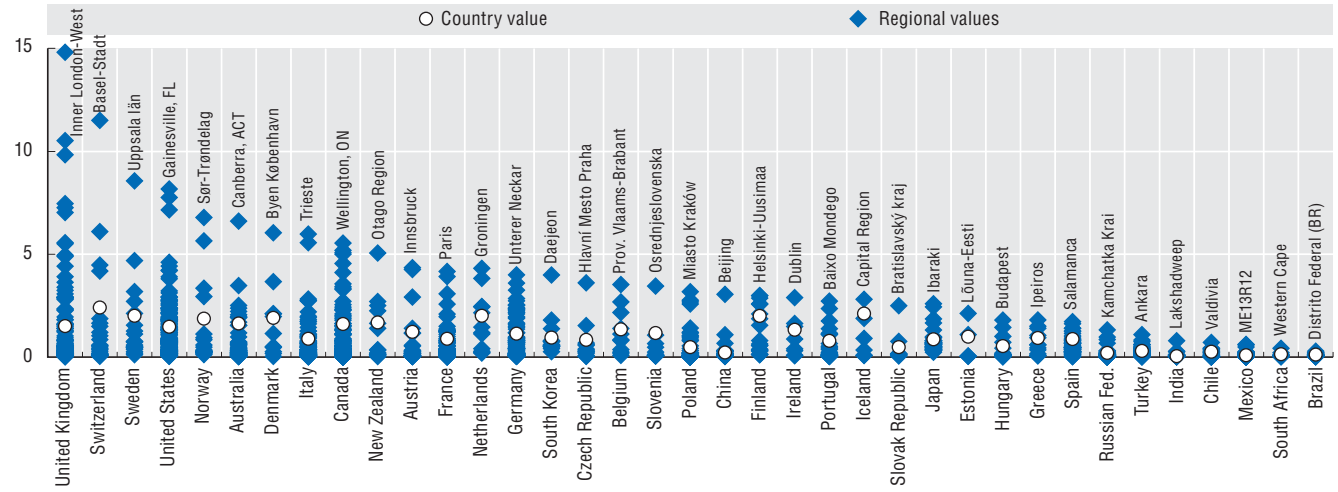
## Further information

OECD (2013) STI Scoreboard. Science, Technology and Industry Scoreboard 2013, Innovation for Growth, *http://www.oecd-ilibrary.org/citeas/10.1787/sti_scoreboard-2013-en*.

## Figure notes

Information on data for Israel:
*http://dx.doi.org/10.1787/888932315602*.

### 2.54. Range in TL3 regional scientific publications per thousand population, highest region and country average, 2010




StatLink http://dx.doi.org/10.1787/888932913950

### 2.55. Scientific production and scientific impact in the 40 TL3 regions with the highest number of citable publications, 2010

| | No. of citable publications in top quartile journal | No. of citable publications per 1 000 population | Publication annual average growth 2010/2000 (%) | Share of publication in top quartile journal (%) | Normalised citation impact |
|---|---|---|---|---|---|
| (US) Boston-Worcester-Manchester – MA-NH | 26 812 | 3.23 | 2 | 79 | 1.32 |
| (CN) Beijing | 25 479 | 1.30 | 22 | 64 | 0.59 |
| (US) Washington-Baltimore-N.Virginia – DC-MD-VA-WV | 24 171 | 2.40 | 0 | 78 | 1.16 |
| (US) New York-Newark-Bridgeport – NY-NJ-CT-PA | 22 004 | 0.95 | -2 | 75 | 1.15 |
| (US) San Jose-San Francisco-Oakland – CA | 19 169 | 1.95 | 1 | 80 | 1.40 |
| (US) Los Angeles-Long Beach-Riverside – CA | 16 664 | 0.84 | 1 | 77 | 1.15 |
| (JP) Tokyo | 13 404 | 1.02 | -2 | 74 | 0.75 |
| (UK) Inner London – West | 12 529 | 11.15 | 0 | 72 | 1.06 |
| (CN) Shanghai | 11 838 | 0.51 | 23 | 69 | 0.63 |
| (KR) Seoul | 11 688 | 1.16 | 10 | 71 | 0.62 |
| (CN) Jiangsu | 10 051 | 0.13 | 40 | 60 | 0.53 |
| (US) Chicago-Naperville-Michigan City – IL-IN-WI | 9 836 | 0.94 | 0 | 76 | 1.13 |
| (US) Philadelphia-Camden-Vineland – PA-NJ-DE-MD | 9 387 | 1.33 | 0 | 73 | 1.08 |
| (US) Detroit-Warren-Flint – Mi | 9 087 | 1.33 | 1 | 74 | 0.98 |
| (US) Houston-Baytown-Huntsville – TX | 8 986 | 1.30 | 1 | 75 | 1.07 |
| (US) Rochester-Batavia-Seneca Falls – NY | 8 455 | 5.51 | 3 | 78 | 1.27 |
| (US) Raleigh-Durham-Cary – NC | 7 918 | 2.42 | 1 | 76 | 1.14 |
| (US) Atlanta-Sandy Springs-Gainesville – GA-AL | 7 387 | 0.99 | 1 | 73 | 1.04 |
| (US) Minneapolis-St. Paul-St. Cloud – MN-WI | 6 757 | 1.27 | 1 | 75 | 1.07 |
| (FR) Paris | 6 736 | 3.00 | -3 | 76 | 1.08 |
| (CA) Toronto | 6 731 | 2.48 | 4 | 72 | 1.04 |
| (US) San Diego-Carlsbad-San Marcos – CA | 6 473 | 2.09 | 0 | 81 | 1.28 |
| (US) Denver-Aurora-Boulder – CO | 6 377 | 1.54 | 0 | 76 | 1.06 |
| (NL) South-Netherlands | 6 334 | 1.81 | 2 | 78 | 1.13 |
| (ES) Madrid | 6 226 | 0.98 | 0 | 74 | 0.83 |
| (US) Seattle-Tacoma-Olympia – WA | 6 201 | 1.31 | 0 | 76 | 1.29 |
| (DE) Munich | 6 058 | 2.28 | -1 | 79 | 1.24 |
| (AU) Melbourne – VIC | 6 058 | 1.50 | 4 | 70 | 0.90 |
| (AU) Sydney – NSW | 6 057 | 1.33 | 3 | 66 | 0.79 |
| (CN) Guangdong | 5 966 | 0.06 | 42 | 65 | 0.62 |
| (CN) Zhejiang | 5 853 | 0.11 | 45 | 65 | 0.54 |
| (CN) Hubei | 5 763 | 0.10 | 36 | 63 | 0.54 |
| (JP) Osaka | 5 422 | 0.61 | -3 | 78 | 0.76 |
| (BR) São Paulo | 5 395 | 0.13 | 1 | 59 | 0.55 |
| (ES) Barcelona | 5 334 | 1.00 | 2 | 75 | 0.99 |
| (NL) North-Netherlands | 5 297 | 1.98 | 2 | 77 | 1.15 |
| (UK) Oxfordshire | 5 296 | 8.22 | 1 | 79 | 1.26 |
| (DE) Berlin | 5 204 | 1.51 | -1 | 74 | 0.95 |
| (IT) Rome | 5 166 | 1.24 | 0 | 75 | 0.94 |
| (US) Indianapolis-Anderson-Columbus – IN | 5 014 | 1.46 | 1 | 71 | 0.97 |

StatLink http://dx.doi.org/10.1787/888932915926

# 3. SUBNATIONAL FINANCE AND INVESTMENT FOR REGIONAL DEVELOPMENT

Subnational finance

Subnational public investment

Subnational public debt

Impact of the crisis on subnational investment and debt

*The data of Chapters 3 refer to the level of governments classified as subnational according to the General Government data of the OECD National Accounts. Subnational governments are defined as the sum of states (relevant only for countries having a federal or quasi-federal system of government) and local (regional and local) governments.*

## Subnational finance

Subnational governments (SNG) represent a large share of public spending in most OECD countries. In 2012, SNG expenditure accounted for 17% of GDP and 40% of public spending in the OECD area.

These two figures mask a wide variety of national situations. SNG spending responsibilities may vary according to whether the country is federal or unitary, its size and territorial organisation, the level of decentralisation and the responsibilities of subnational governments over certain sectors. Some countries, such as Canada, Denmark and Switzerland, stand out for the high level of subnational expenditure, while in Greece, New Zealand and Turkey, SNG have more limited competencies (Figure 3.1).

On average, education is the largest spending item for SNG. It represents almost 27% of subnational expenditure in the OECD area and above 36% in Iceland, Slovenia, Estonia and the Slovak Republic. Health is the second highest budget line (18% in the OECD area) and accounts for 47% of subnational government expenditure in Italy. Other large SNG budget items include economic affairs, general public services (both 14%) and social protection (12%) (Figure 3.2).

Tax revenues provide on average 45% of SNG revenues in the OECD area. This share exceeds 60% in Sweden, Spain and Iceland but accounts for less than 10% in the Netherlands, Greece and Mexico. Transfers from central and supranational governments represent the second main source of SNG revenues (38%) (Figure 3.3).

The autonomy of SNG on expenditures and revenues varies from one country to another. It may be steered by central governments or restricted by regulatory and budgetary standards; as such, spending and revenue indicators may not reflect the degree of autonomy in finance decisions of subnational governments.

### *Definition*

General government data at country level are derived from the OECD National Accounts harmonised according to the System of National Accounts (SNA93).

The subnational government (SNG) is here defined as the sum of the two subsectors of the general government data:

- Federated government ("states") and related public entities, relevant only for countries having a federal or quasi-federal system of government (S.1312);
- Local government; i.e. regional and local governments and related public entities (S.1313).

The data are not consolidated between the two subsectors.

Total public expenditure comprises current expenditure and capital expenditure (capital transfers + gross capital formation and acquisitions less disposals of non-financial non-produced assets).

Expenditure of general government by economic function follows the ten functions defined in the Classification of the Functions of Government (COFOG): General public services, Defence, Public order and safety, Economic affairs, Environmental protection, Housing and community amenities, Health, Recreation, Culture and religion, Education, Social protection.

Revenue of general government comprises tax revenues (own-source and shared tax revenue), transfers (grants and subsidies), tariffs and fees, property income, and social contributions.

### Source

OECD *National Accounts Statistics* (database), *http://dx.doi.org/10.1787/na-data-en*.

OECD (2013), *OECD Regional Statistics* (database), *http://dx.doi.org/10.1787/region-data-en*.

See Annex B for data sources and country-related metadata.

### Reference years and territorial level

2012; National Economic Accounts; levels of government.

2010 Canada and New Zealand; 2011 Australia, Japan, Korea, Israel, Mexico, Switzerland, Turkey and the United States. Data are not available for Chile.

COFOG data are not available for Australia, Canada, Chile, Japan, Mexico, New Zealand and Turkey.

### Further information

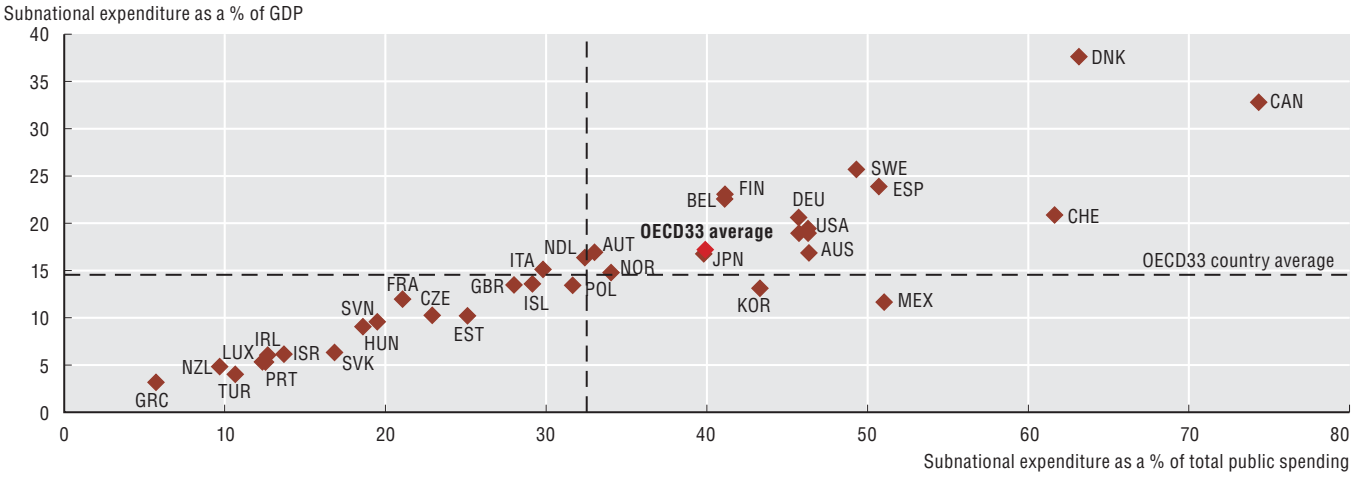
OECD/Korea Institute of Public Finance (2012), *Institutional and Financial Relations across Levels of Government*, OECD Fiscal Federalism Studies, OECD Publishing, *http://dx.doi.org/10.1787/9789264167001-en*.

### Figure notes

3.1-3.3: OECD figures: both weighted (OECD average) and unweighted (OECD country) averages are shown.

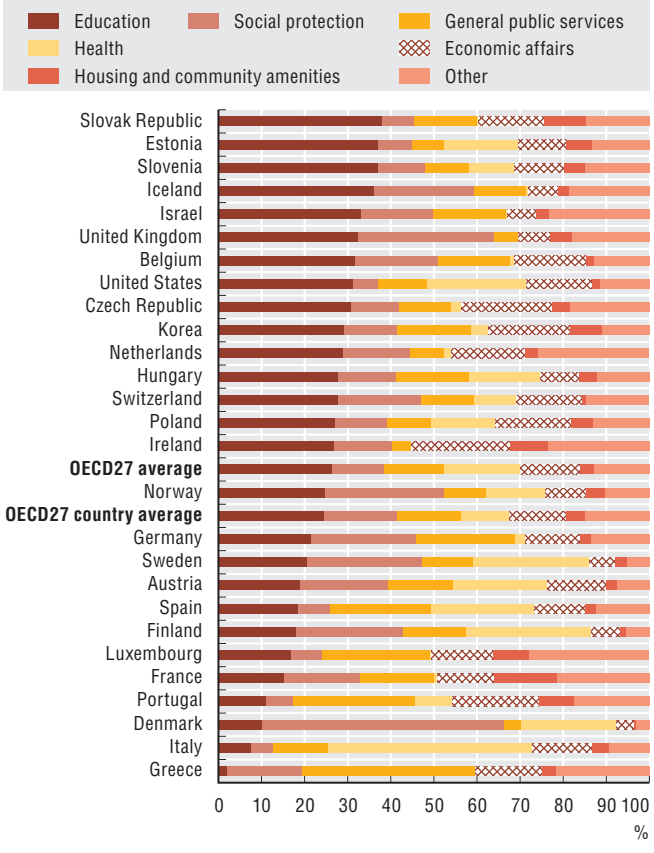
Information on data for Israel: *http://dx.doi.org/10.1787/888932315602*.

### 3.1. Subnational government expenditure as a % of total public expenditure and as a % of GDP, 2012



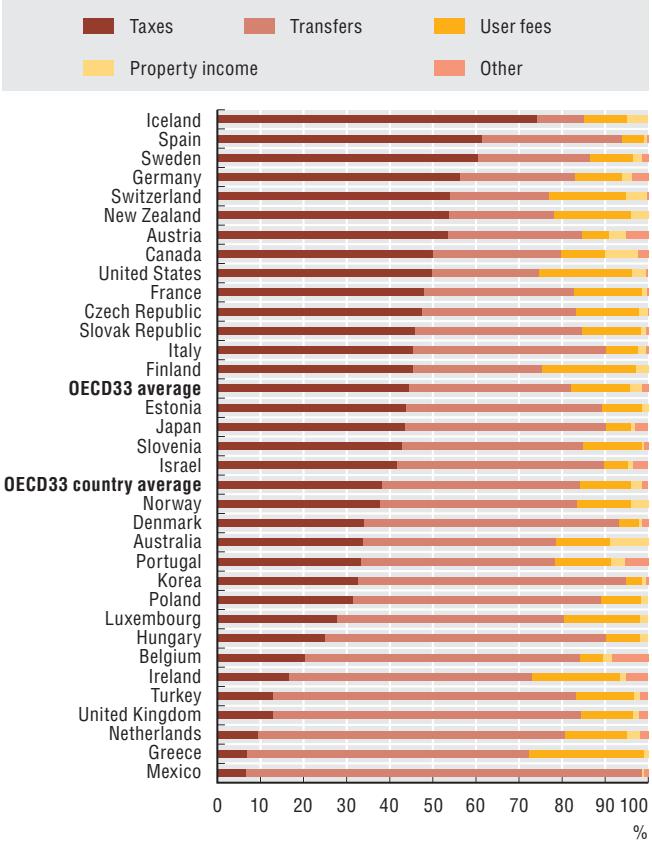

StatLink http://dx.doi.org/10.1787/888932913969

### 3.2. Breakdown of subnational government expenditure by economic function, 2011




StatLink http://dx.doi.org/10.1787/888932913988

### 3.3. Categories of subnational government revenue, 2012




StatLink http://dx.doi.org/10.1787/888932914007

# Subnational public investment

Subnational governments (SNG) have a key role in public investment: SNG direct public investment represented 2% of GDP in the OECD area in 2012 (the direct public investment by all levels of government was around 2.7% of OECD GDP). This share is above 3% in Canada and Korea and less than 1% of GDP in Greece, Austria, Portugal, Iceland and the Slovak Republic (Figure 3.4).

On average, SNG direct public investment accounted for 11.2% of subnational expenditure in the OECD area in 2012. This value ranges from less than 5% in Spain (compared to 13% before 2008), Denmark and Austria to more than 20% in Ireland, Korea, Luxembourg and New Zealand. This ratio is generally higher in the least-decentralised countries where SNGs are key investors, implementing major national investment projects, but have a small role in managing public services (Figure 3.5).

Moreover, 72% of direct public investment in the OECD area is carried out by SNG (62% when calculated as an unweighted average across countries). This ratio tends to be higher in federal countries (in Canada, Belgium, United States, Germany and Switzerland) where it combines investments by the federated states and from local government. However, in some unitary countries such as Japan and France, local government investments also represent a major part of public investment (Figure 3.5).

In 2011, 37% of SNG direct investment in the OECD area was allocated to economic affairs (transport, communications, economic development, energy, construction, etc.) but over 50% in Greece, Austria, Portugal and Poland. Almost one-quarter of SNG direct investment was made in education (48% in the United Kingdom) and 12% in housing and community amenities (around one-third in France, Ireland and the Slovak Republic). Healthcare accounted for 27% of SNG direct investment in Denmark, 23% in Sweden, 18% in Estonia and 17% in Finland. Lastly, the environment (waste, collection and treatment of wastewater, environmental protection, etc.) mobilised more than 20% of local investment in the Czech Republic, Hungary and the Netherlands (Figure 3.6).

### *Definition*

General government data at country level are derived from the OECD National Accounts harmonised according to the System of National Accounts (SNA93).

The subnational government (SNG) is here defined as the sum of the two subsectors of the general government data:

- Federated government ("states") and related public entities, relevant only for countries having a federal or quasi-federal system of government (S.1312);
- Local government; i.e. regional and local governments and related public entities (S.1313).

The data are not consolidated between the two subsectors.

Public investment is here defined as the sum of:

- direct investment = gross capital formation and acquisitions, less disposals of non-financial non-produced assets during a given period; and
- indirect investment = capital transfers; i.e. investment grants and subsidies in cash or in kind made by subnational governments to other institutional units.

## Source

OECD *National Accounts Statistics* (database), *http://dx.doi.org/10.1787/na-data-en*.

OECD (2013), *OECD Regional Statistics* (database), *http://dx.doi.org/10.1787/region-data-en*.

See Annex B for data sources and country-related metadata.

## Reference years and territorial level

2012 National economic accounts; levels of government.

2010 Canada and New Zealand; 2011 Australia, Japan, Korea, Israel, Mexico, Switzerland, Turkey and the United States; no data for Chile.

## Further information

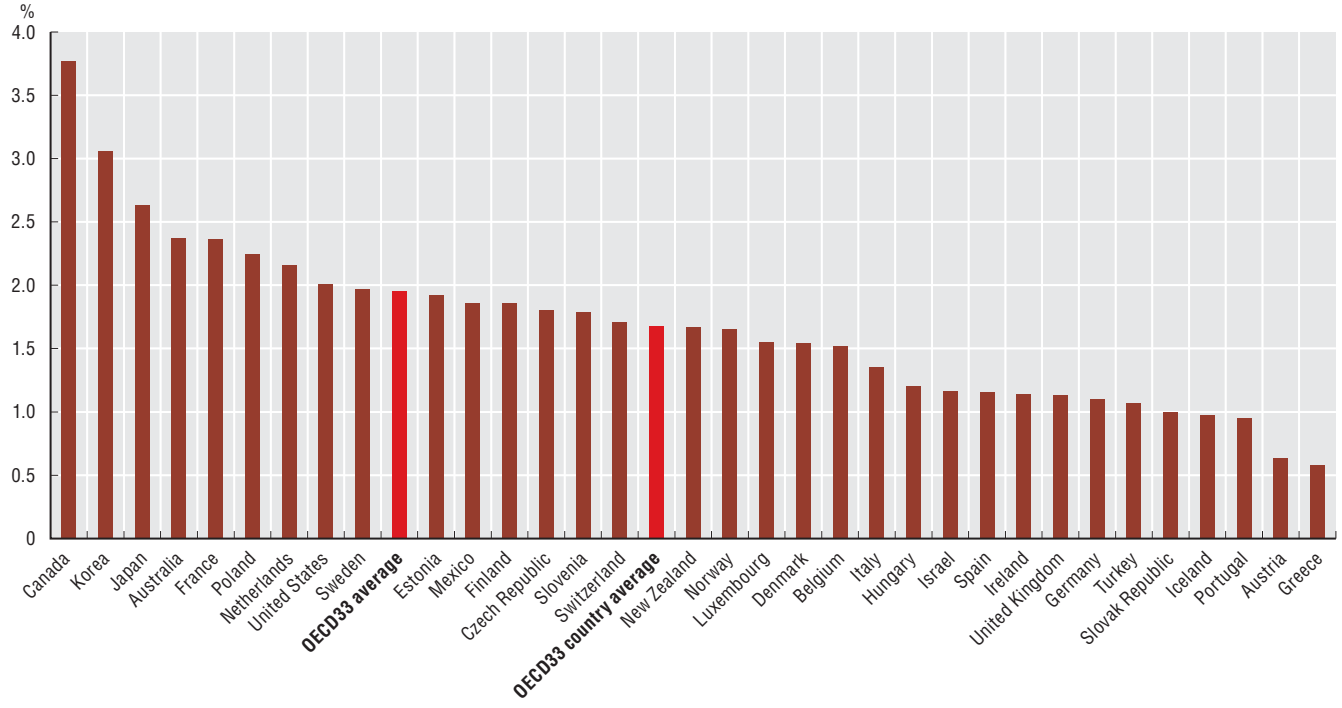
OECD (2013), *Investing Together: Working Effectively across Levels of Government*, OECD Publishing, *http://dx.doi.org/10.1787/9789264197022-en*.

## Figure notes

3.4-3.5: OECD figures: both weighted (OECD average) and unweighted (OECD country) averages are shown.

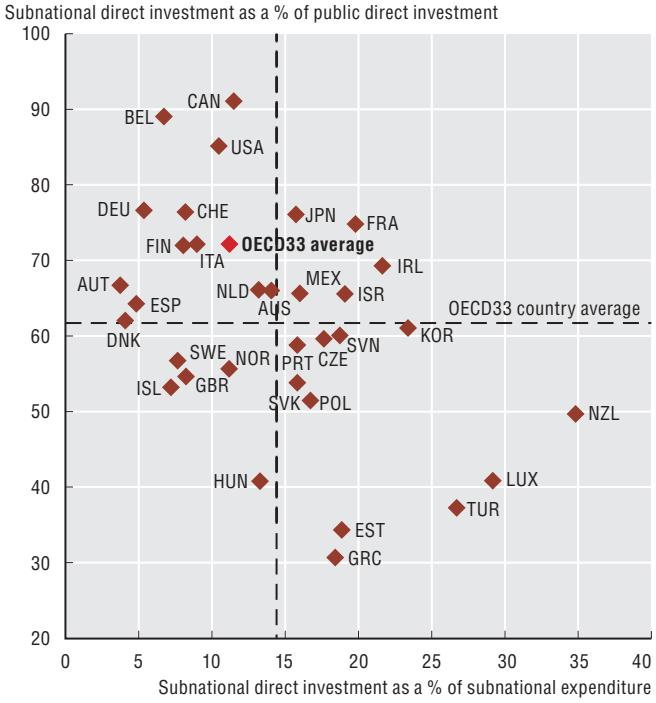
Information on data for Israel: *http://dx.doi.org/10.1787/888932315602*.

### 3.4. Subnational government public direct investment as a percentage of GDP, 2012



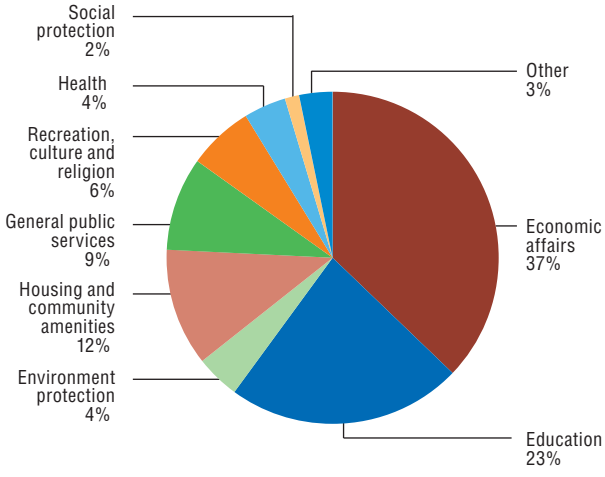

StatLink http://dx.doi.org/10.1787/888932914026

### 3.5. Subnational governments' investment as a percentage of subnational total expenditure and public investment, 2012




StatLink http://dx.doi.org/10.1787/888932914045

### 3.6. Breakdown of subnational governments' investment by economic function, 2011




StatLink http://dx.doi.org/10.1787/888932914064

## Subnational public debt

The financial and economic crisis led to a strong deterioration in both general government deficits and debt in most OECD countries. Falling revenues (due to the decline in economic activity and tax reductions designed to stimulate the economy) coincided with sharp increases in government spending (social transfers, stimulus measures or support for financial institutions).

At end of 2012, the general government gross debt in the OECD area (30 countries) represented 113% of GDP, and more than 140% of GDP in Japan, Greece and Italy (Figure 3.7).

On average in the OECD area, subnational government (SNG) debt accounted for 22% of GDP. SNG debt is unevenly distributed among OECD countries. At the state level (in federal or quasi-federal countries) debt varies from 6% of GDP in Austria to 21% in Spain, 27% in Germany and 52% in Canada. At the local level, it ranges from less than 2% in Greece to 38% in Japan (Figure 3.7).

The relatively small share of local government debt is driven by legal restrictions to local borrowing. In a majority of countries, local governments can borrow only for the long term to finance investment ("golden rule"). Moreover, local borrowing is generally governed by strict prudential rules defined by central or state governments.

Large differences among local governments are observed. For example, 4 out of the 17 autonomous communities in Spain and 2 out of the 10 provinces in Canada hold around three-quarters of the State's debt. Similarly, 3 out of the 16 Länder in Germany accounted for almost half of regional government debt in 2012.

SNG debt per capita varies greatly, ranging from 340 USD in Korea to 18 250 USD in the canadian provinces (Figure 3.8).

SNG fiscal balance reached -3.5% of SNG revenues in 2012 in the OECD area. SNG debt, defined here as "Maastricht debt" (i.e. resulting mainly from borrowing), represented 107% of SNG revenues. In Germany, Spain (autonomous communities), Canada (provinces) and the United States, SNG deficits exceed 5% of revenues while debt is above 100% of revenues (Figure 3.9).

### *Definition*

The general government gross debt definition here used is based on the System of National Accounts (SNA). It includes the sum of the following liabilities: currency and deposits (AF.2); securities other than shares (AF.33); loans (AF.4); insurance technical reserves (AF.6); other accounts payable (AF.7). Some liabilities such as shares, equity and financial derivatives are not included in this definition. According to the SNA, most debt instruments are valued at market prices.

These data are not always comparable across countries due to different definitions or treatment of debt components (e.g. pensions) or valuation (market vs. nominal prices).

The general government comprises: central government, states (relevant only for countries having a federal or quasi-federal system of government), local government and social security funds. Subnational government (SNG) is here defined as the sum of the two subsectors states and local governments.

The SNA definition of gross debt differs from the one applied under the Maastricht Protocol. The "Maastricht debt" excludes not only financial derivatives, shares and other equity, but also insurance technical reserves and other accounts payable. It corresponds roughly to borrowing. The debt according to the Maastricht definition is valued at nominal prices and not at market prices.

Fiscal balance is the difference between government revenues and expenditure. A fiscal deficit occurs when, in a given year, a government spends more than it receives in revenues. A government runs a surplus, instead, when revenues exceed expenditures.

### Source

OECD *National Accounts Statistics* (database), *http://dx.doi.org/10.1787/na-data-en*.

### Reference years and territorial level

2012; National Economic Accounts: levels of government.

2010 Switzerland; 2011 Canada, Iceland, Israel and Japan.

No data for Chile, New Zealand, Mexico and Turkey.

Data are consolidated except for Japan, Korea and the United States.

### Figure notes

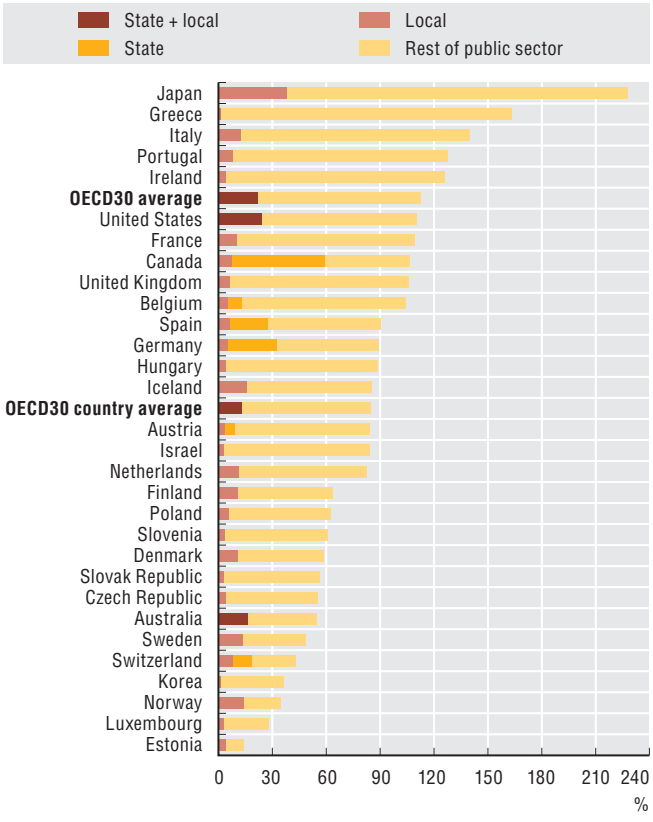
3.7-3.9: Data in federal countries are split between states (S) and local (L) levels (except for the United States and Australia).

OECD figures: both weighted (OECD average) and unweighted (OECD country) averages are shown.

3.9: Debt is defined according to the Maastricht protocol.

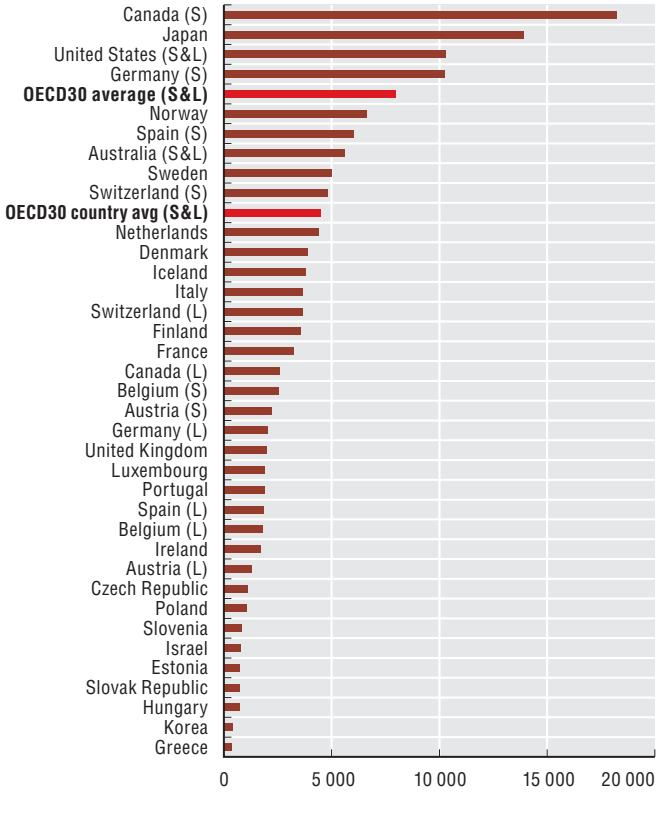
Information on data for Israel:
*http://dx.doi.org/10.1787/888932315602*.

### 3.7. General government gross debt (as a % of GDP) and breakdown by levels of government, 2012




StatLink http://dx.doi.org/10.1787/888932914083

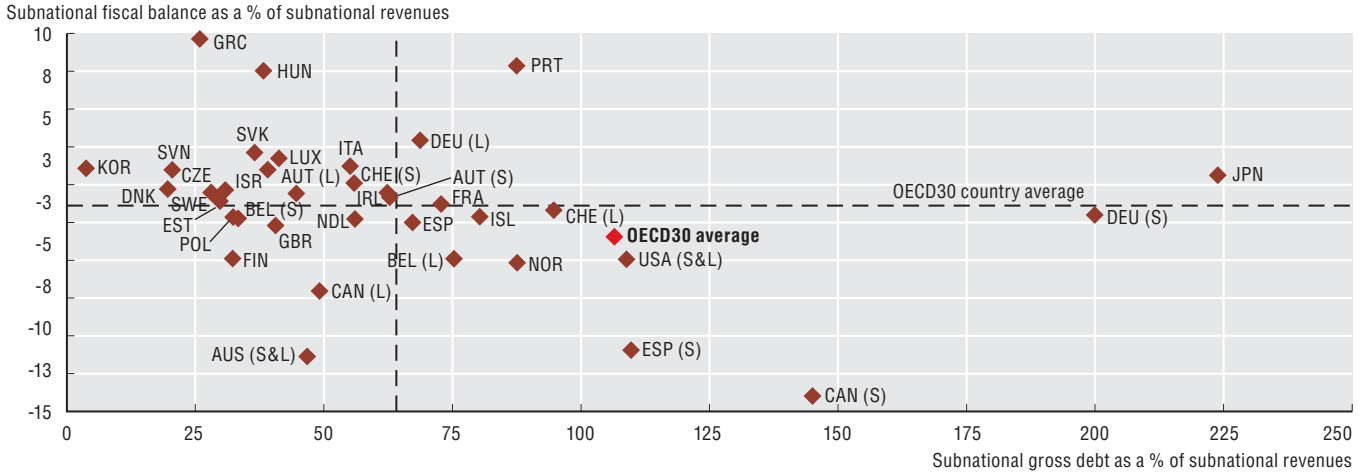
### 3.8. Subnational government gross debt, 2012, constant 2005 USD per capita




StatLink http://dx.doi.org/10.1787/888932914102

### 3.9. Subnational gross debt and fiscal balance as % of subnational revenue, 2012

*Maastricht debt definition*




StatLink http://dx.doi.org/10.1787/888932914121

# Impact of the crisis on subnational investment and debt

In a great number of countries, subnational government (SNG) direct investment was particularly robust in the early years of the global financial crisis due to the involvement of SNG in stimulus plans and strong support from national governments. However, the deepening of the social and economic crisis as well as the adoption from 2010 onwards of national and local budget consolidation measures in response to the public finance crisis put severe strain on subnational governments' finance. It ultimately led to a strong decline in investments across OECD countries. Between 2007 and 2012, SNG direct investment per capita contracted sharply in the OECD area (-7% in real terms between 2007-2012 and -15% in the three most recent years), in particular in Ireland, Iceland, Spain, Italy and Portugal (Figure 3.10).

In a majority of countries, public investment was cut back in order to reduce SNG budget deficits and preserve current expenditure on welfare, health or education (in other words, it was used as a budgetary adjustment variable). If this drop in investment were to continue, it could have negative long-term consequences for national economic growth and societal well-being. It could also threaten SNG assets, whose values could be eroded by a long-term disinvestment.

### *Definition*

Public investment is here defined as the sum of:

- direct investment = gross capital formation and acquisitions, less disposals of non-financial non-produced assets during a given period; and
- indirect investment = capital transfers; i.e. investment grants and subsidies in cash or in kind made by subnational governments to other institutional units.

The general government gross debt definition here used is based on the System of National Accounts (SNA). It includes the sum of the following liabilities: currency and deposits (AF.2); securities other than shares (AF.33); loans (AF.4); insurance technical reserves (AF.6); and other accounts payable (AF.7). Some liabilities such as shares, equity and financial derivatives are not included in this definition. According to the SNA, most debt instruments are valued at market prices.

These data are not always comparable across countries due to different definitions or treatment of debt components (e.g. pensions) or valuation (market vs. nominal prices).

However, not all OECD countries followed this trend. In the past five years, SNG investment increased in several countries, in particular in Canada, Sweden Denmark and Finland (Figure 3.10).

During the same period 2007-2012, subnational gross debt per capita in the OECD area grew by 14%, corresponding to an increase of around 1 000 USD per capita (Figure 3.11). The gross debt increased to 3 500 USD per capita in the Spanish Autonomous Communities (the state level of government), a value twice as high as five years before. Subnational governments in Australia, Belgium (S), Austria (S), Poland, Portugal, Korea and Slovenia increased their debt by 70% relative to 2007 levels. Only in Switzerland, the United States and Israel, did subnational government debt decrease on average during the period 2007-2012 (Figure 3.11).

## Source

*OECD National Accounts Statistics* (database), *http://dx.doi.org/10.1787/na-data-en*.

OECD (2013), *OECD Regional Statistics* (database), *http://dx.doi.org/10.1787/region-data-en*.

See Annex B for data sources and country related metadata.

## Reference years and territorial level

2007-12; National economic accounts: levels of government

For public investment, latest year: 2010 Canada and New Zealand; 2011 Australia, Japan, Korea, Israel, Mexico, Switzerland, Turkey and the United States; No data for Chile.

For gross debt, latest year: 2011 Israel, Canada, Japan and Iceland; 2010 Switzerland.

No data for Chile, New Zealand, Mexico and Turkey.

Data are consolidated except for Japan, Korea and the United States.

## Further information

OECD (2013), *Investing Together: Working Effectively across Levels of Government*, OECD Publishing, *http://dx.doi.org/10.1787/9789264197022-en*.

## Figure notes

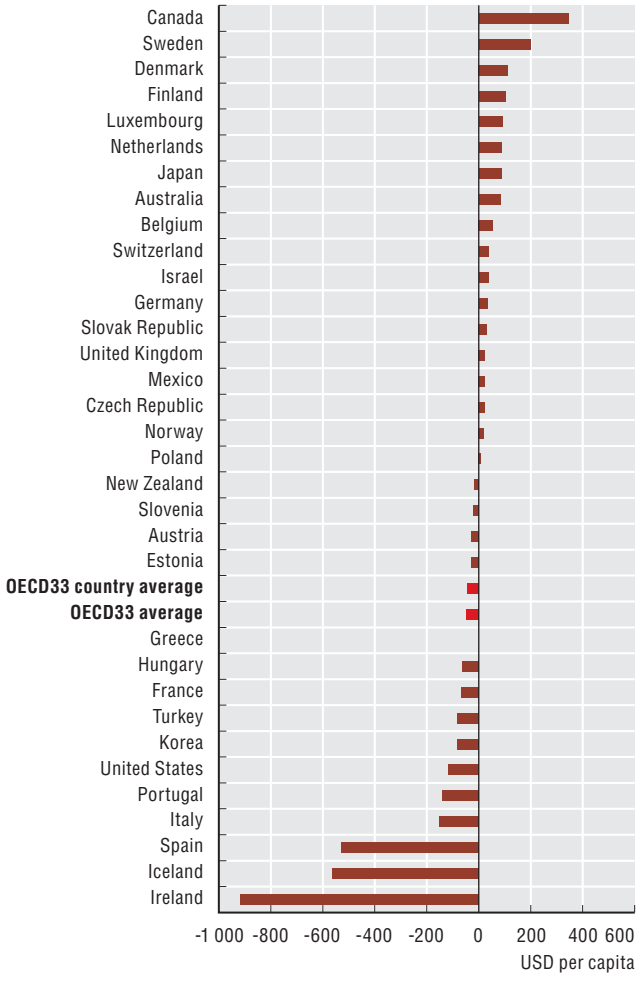
3.11: Data in federal countries are split between States (S) and Local (L) levels (except for Australia and the United States).

OECD figures: both weighted (OECD average) and unweight (OECD country) averages are shown.

Information on data for Israel: *http://dx.doi.org/10.1787/888932315602*.

### 3.10. Difference in subnational direct investment between 2012 and 2007

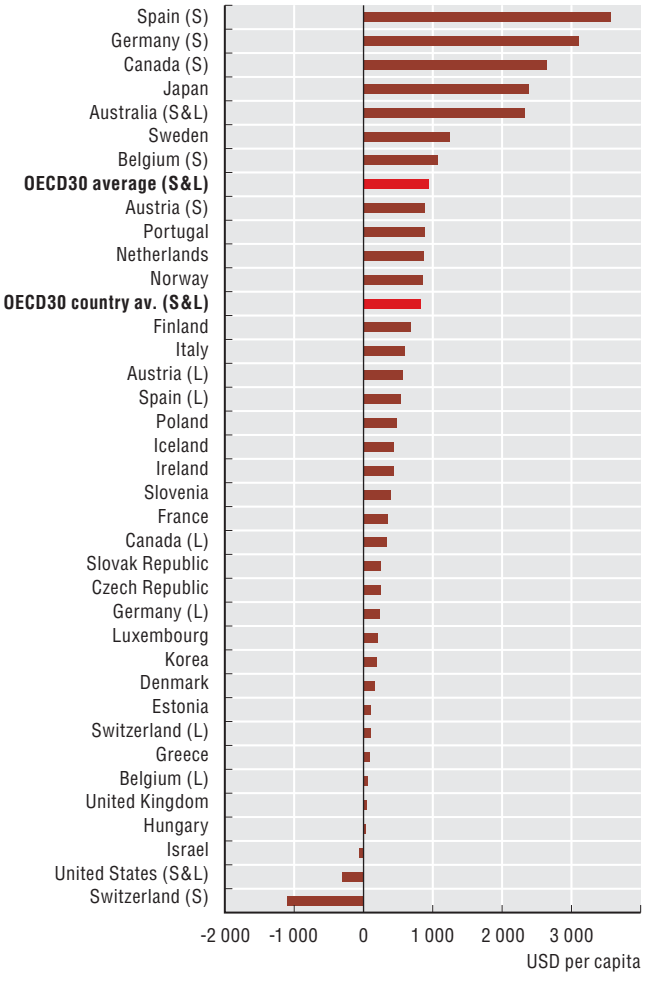
*USD 2005 per capita*




StatLink http://dx.doi.org/10.1787/888932914140

### 3.11. Difference in subnational government gross debt, between 2012 and 2007

*USD 2005 per capita*




StatLink http://dx.doi.org/10.1787/888932914159

# 4. INCLUSION AND EQUAL ACCESS TO QUALITY SERVICES IN REGIONS

Regional disparities in household income

Concentration of the elderly and children in regions

Population mobility among regions

Regional disparities in unemployment and youth unemployment

Impact of the crisis on regional unemployment

Gender differences in employment opportunities

Part-time employment in regions

Regional access to education

Regional access to health

Health status of population in regions

Safety in regions

*The data in this chapter refer to regions in OECD and non OECD countries. Regions are classified on two territorial levels reflecting the administrative organisation of countries. Large (TL2) regions represent the first administrative tier of subnational government. Small (TL3) regions are contained in a TL2 region.*

# Regional disparities in household income

The disposable income of households can be seen as the maximum amount that a household can afford to spend on consumption goods or services without having to reduce its financial or non-financial assets or by increasing its liabilities. As such, it is a better indicator of the material well-being of citizens than gross domestic product (GDP) per inhabitant. Regions where net commuter flows are high may display a very high GDP per capita which does not translate into a correspondingly high income for their inhabitants.

Disparities in regional income per capita within countries are generally smaller than GDP per capita. Still, in 2009 the per capita income in the District of Colombia (United States) was twice as high as the country median income, and, in the bottom income state, Idaho, per capita income was roughly equivalent to the income of the median American in 1995. Similarly, in Chile, the Slovak Republic, Israel, Australia, Poland, Spain and the United Kingdom, inhabitants in the top income region were more than 30% richer than the median citizen (Figure 4.1).

Between 1995 and 2009, household income growth occurred with large regional variation both in countries displaying high income growth rates, such as Chile and the United States, and in countries with limited income growth, such as Hungary and Germany (Figure 4.2).

While the regional range measures the distance between the richest and the poorest regions in a country, the Gini index of household disposable income provides a measure of disparities among all regions. According to this index, the Slovak Republic, Israel, Chile, and Italy were the OECD countries with the highest regional inequalities in 2009. Large increases in regional disparities between 1995 and 2009 are observed in the Czech Republic, the Netherlands, and Greece. In contrast, for the same period of time, regional disparities have decreased the most in Hungary, Chile and Israel (Figure 4.3).

A comparison between the regional household disposable income and the primary income (income generated primarily by market transactions) provides a measure of the public transfers to households. Current transfers to households significantly reduce the difference between the highest and lowest regional values; increases in the relative income level of regions (ratio between disposable income and primary income larger than 1), are found mostly in West Virginia, Mississippi, Kentucky (United States); Centro and Alentejo (Portugal); and Lubelskie (Poland) (Figures 4.4-4.5).

### *Definition*

The primary income of private households is defined as the income generated directly from market transactions; i.e. the purchase and sale of factors of production and goods. These include in particular the compensation of employees. Private households can also receive income on assets (interest, dividends and rents) and from operating surplus and self-employment. Interest and rents payable are recorded as negative items for households.

The disposable income of private households is derived from the balance of primary income by adding all current transfers from the government, except social transfers in kind, and subtracting current transfers from the households such as income taxes, regular taxes on wealth, regular inter-household cash transfers and social contributions.

Regional disposable household income is expressed in USD purchasing power parities (PPP) at constant prices (year 2005).

The Gini index is a measure of inequality among all regions of a given country (see Annex C for the formula). The index takes on values between 0 and 1, with zero interpreted as no disparity.

The ratio between regional disposable and primary income gives an indication of the amount of public transfers to households. When the ratio is higher than 1, it means that the net current transfers to households are positive.

### Source

OECD (2013), *OECD Regional Statistics* (database), *http://dx.doi.org/10.1787/region-data-en*.

OECD (2010), "Detailed National Accounts: Final consumption expenditure of households", *OECD National Accounts Statistics* (database). *http://dx.doi.org/10.1787/na-data-en*.

See Annex B for data sources and country-related metadata.

### Reference years and territorial level

1995-2009; TL2.

Regional data are not available in Finland, Iceland, Mexico, Switzerland, and Turkey.

In addition, no data on primary income for Chile, Japan and New Zealand.

### Further information

Interactive graphs and maps: *http://rag.oecd.org*.

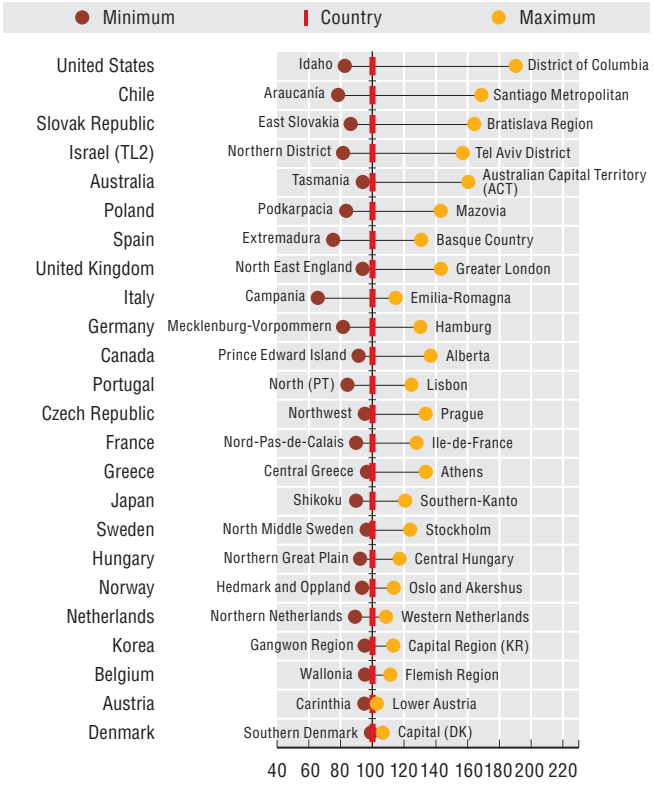
### Figure notes

4.1: As a percentage of country median disposable income per capita. Countries with fewer than three regions are excluded: Ireland, New Zealand and Slovenia.

4.1-4.3: First available year: Canada, Chile, the Slovak Republic, and Israel 1996; Spain and Hungary 2000; Japan and Korea 2001; Norway 2004; Denmark 2007. Last available year: Norway, 2007; Italy 2008.

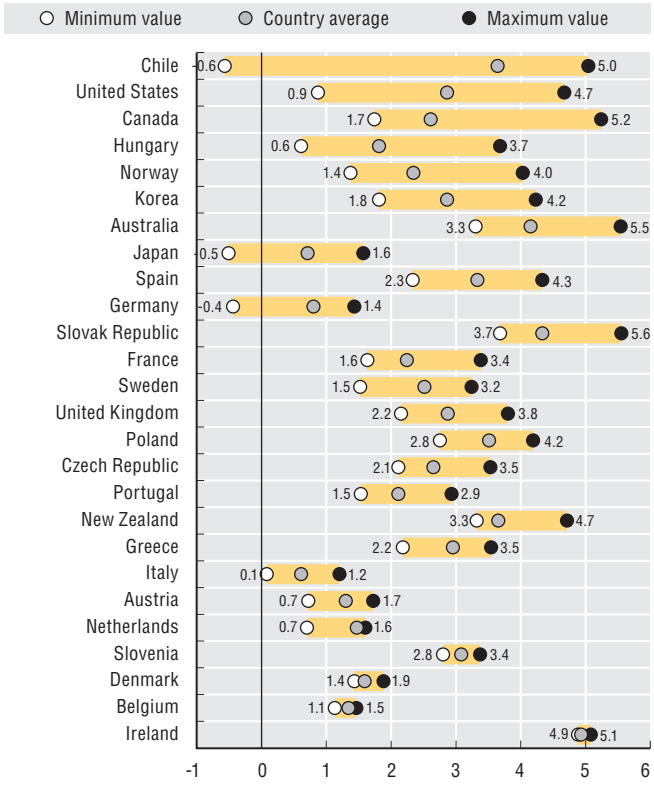
Information on data for Israel: *http://dx.doi.org/10.1787/888932315602*.

### 4.1. TL2 regional range in household income, as a % of income in the country's median region, 2010



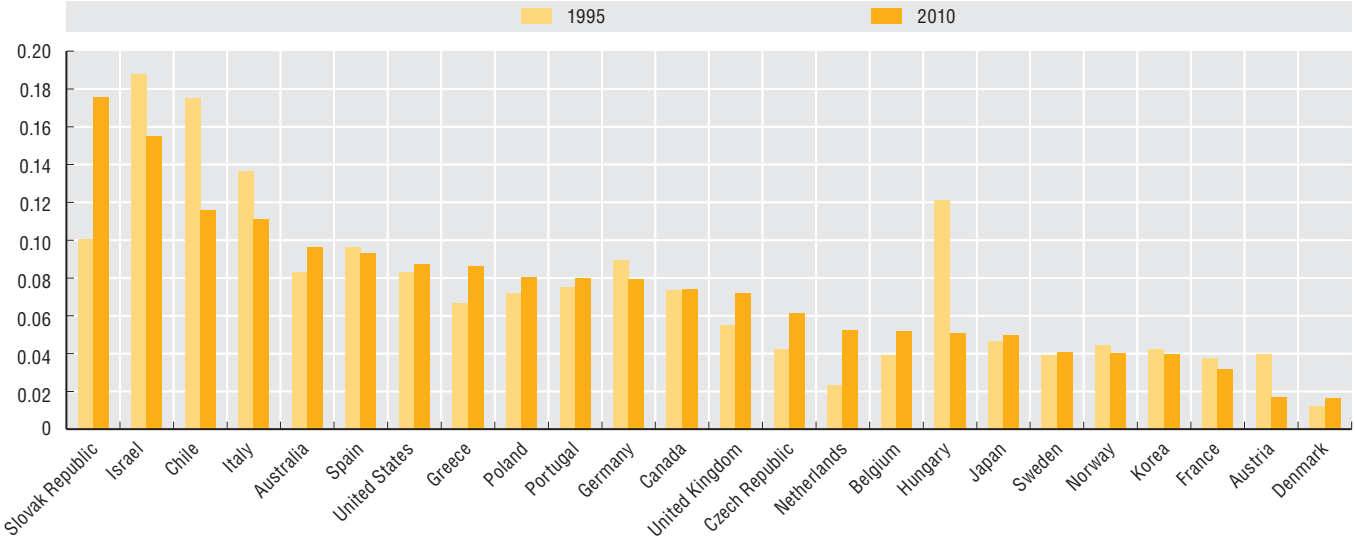

StatLink http://dx.doi.org/10.1787/888932914178

### 4.2. Annual TL2 regional household income growth, ranked by size of difference, 1995-2010




StatLink http://dx.doi.org/10.1787/888932914197

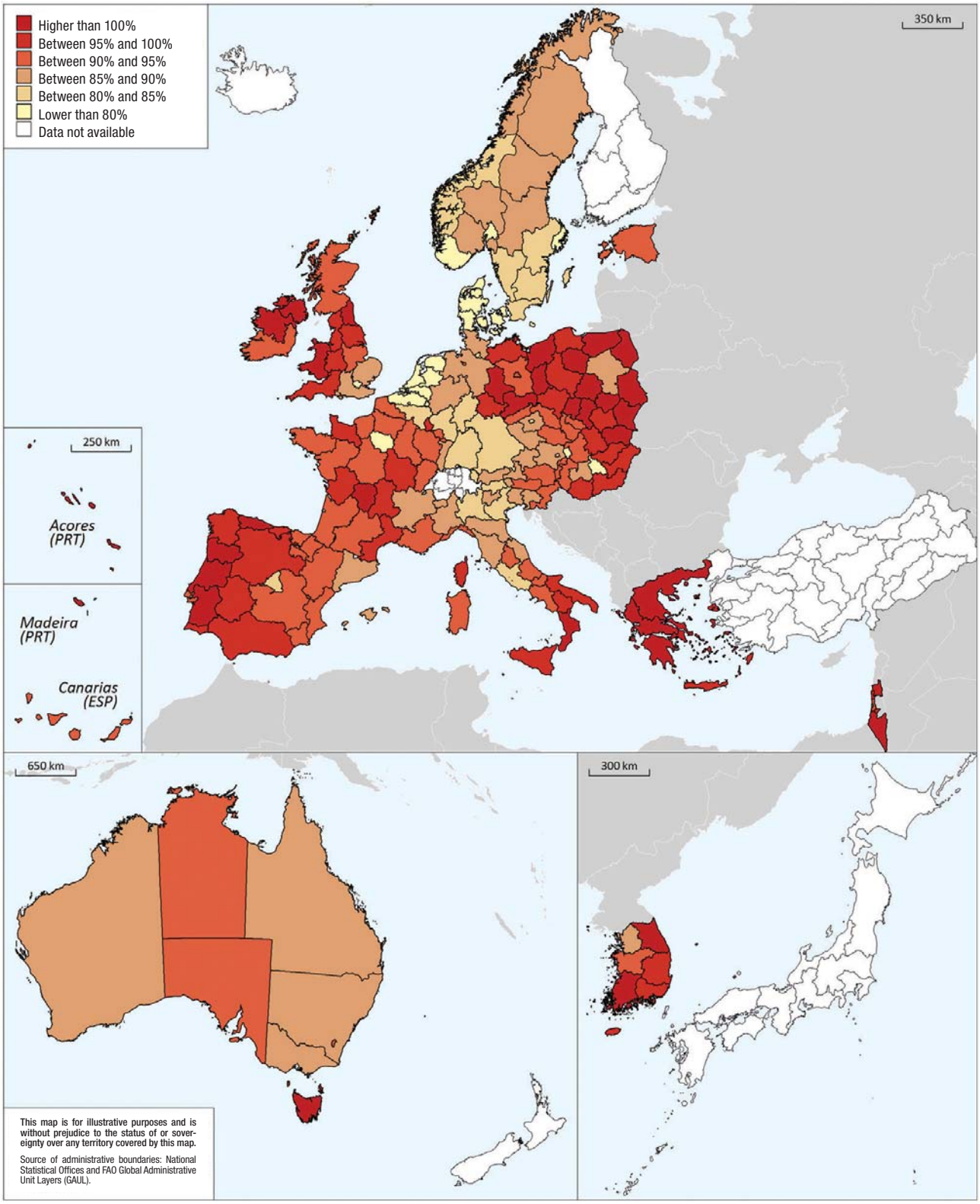
### 4.3. Gini index of TL2 regional disposable income, 1995 and 2010




StatLink http://dx.doi.org/10.1787/888932914216

## 4.4. Regional disposable income of private households as a % of primary income: Asia, Europe and Oceania, 2010

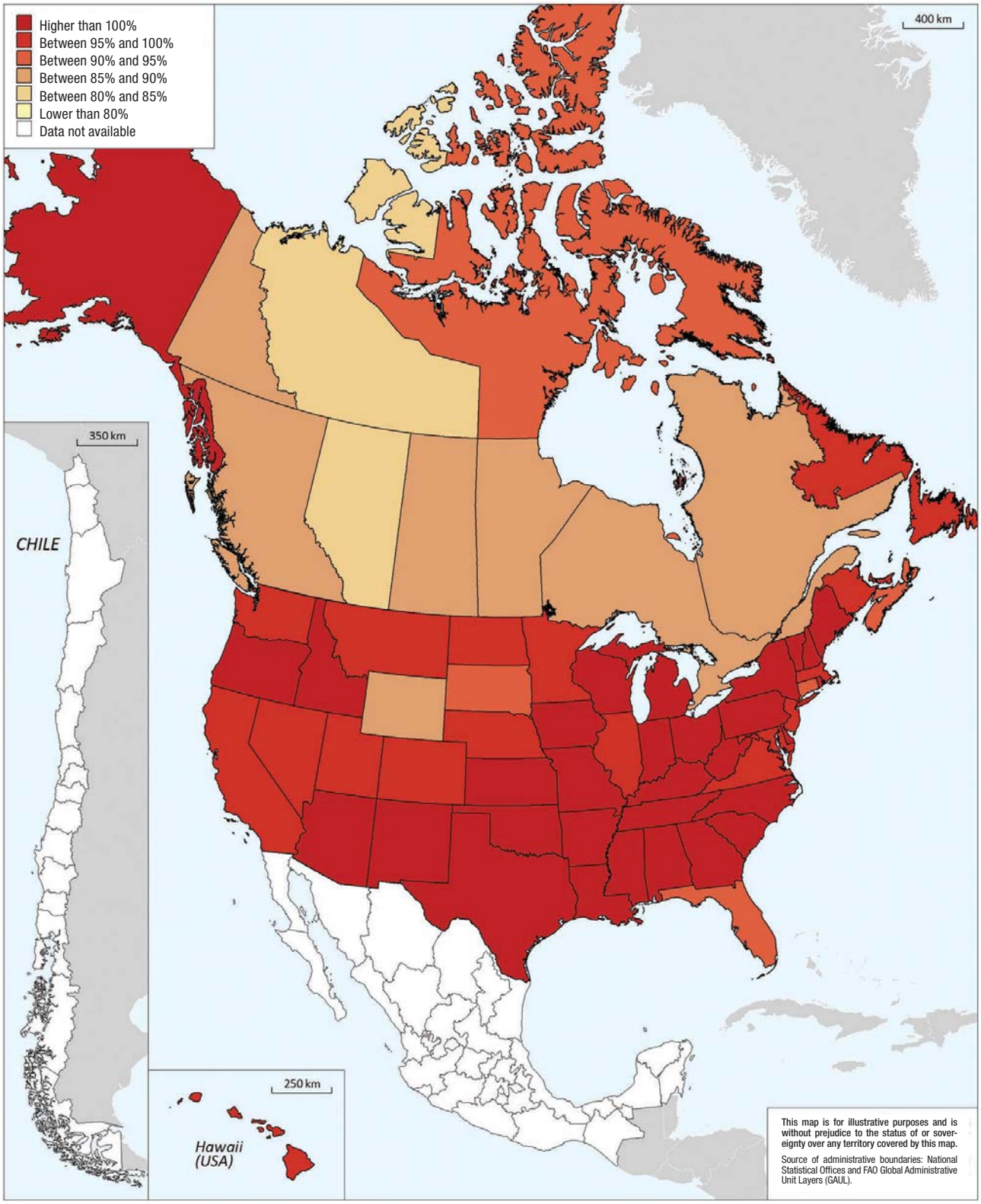
*TL2 regions*




StatLink http://dx.doi.org/10.1787/888932915736

## 4.5. Regional disposable income of private households as a % of primary income: Americas, 2010

*TL2 regions*




StatLink http://dx.doi.org/10.1787/888932915755

# Concentration of the elderly and children in regions

In most OECD countries, the population is ageing. Due to higher life expectancy and low fertility rates, the elderly population (those aged 65 years and over) accounted for 15% of the OECD population in 2012. The proportion of elderly population is remarkably lower in the emerging economies (Brazil, China, and South Africa), and in Mexico and Turkey (Figure 4.6).

On a yearly average, the elderly population in OECD countries has increased almost four times faster than the rest of the population between 1995 and 2012. In most countries, the process of ageing is rather uniform with some exceptions in Mexico, Brazil, the Russian Federation and Canada (Figure 4.7).

The ratio of the elderly to the working age population, i.e. the elderly dependency rate, is steadily growing in OECD countries. The elderly dependency rate gives an indication of the balance between the economically active and the retired population. In 2012, this ratio was around 23% in OECD countries, with substantial differences between countries (38% in Japan versus 10% in Mexico). Differences among regions within the same countries were also large. The higher the regional elderly dependency rate, the higher the challenges faced by regions in generating wealth and sufficient resources to provide for the needs of the population. Concerns may arise on the financial self-sufficiency of these regions to generate taxes to pay for these services (Figure 4.8).

### *Definition*

The regional elderly population is the regional population of 65 years of age and over.

The elderly dependency rate is defined as the ratio between the elderly population and the working age (15-64 years) population.

The child-to-woman ratio is defined as the ratio between the number of children aged 0-4 years and the number of females aged 15-49. This ratio is expressed for 1 000 women.

In 2012, the elderly dependency rate across OECD regions was generally higher in intermediate and rural regions than in urban ones. This general pattern was more pronounced in certain countries such as Portugal, Korea, Japan, France and the United Kingdom; while Belgium, the Czech Republic, Estonia, Hungary, Poland and the Slovak Republic were exceptions (Figure 4.8).

The child-to-woman ratio is a measure of fertility, and at regional level it may also reveal specific needs in health and personal services. In Mexico, Turkey, Canada, Israel, the Russian Federation and Chile, the range of the children-to-woman ratio among regions is high, notably due to regions with high fertility compared with the country average (Figure 4.9).

## Source

OECD (2013), *OECD Regional Statistics* (database), *http://dx.doi.org/10.1787/region-data-en*.

See Annexes A and B for definitions, data sources and country-related metadata.

## Reference years and territorial level

1995-2012; TL3.

TL2 regions in Brazil, China, the Russian Federation and South Africa.

## Further information

Territorial grids and regional typology (Annex A). *www.oecd.org/gov/regional/statisticsindicators* .

Interactive graphs and maps: *http://rag.oecd.org*.

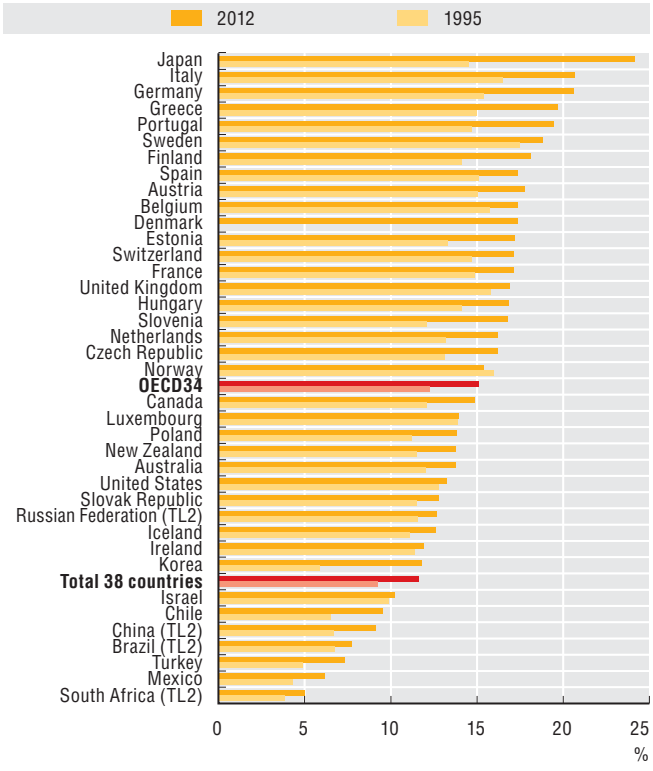
## Figure notes

4.6-4.9: Latest available year: 2011 for Australia, the United States, China and South Africa. First available year: Australia 1996, China 1998, Denmark 2008, the Slovak Republic 2012.

4.8: No rural regions in the Netherlands and New Zealand.

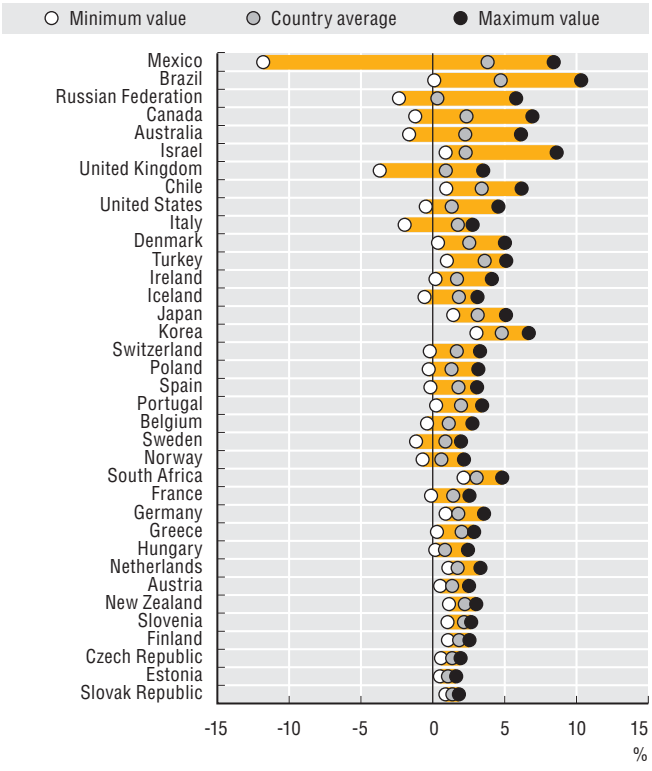
Information on data for Israel: *http://dx.doi.org/10.1787/888932315602*.

### 4.6. Elderly population as a % of the total population, 1995 and 2012



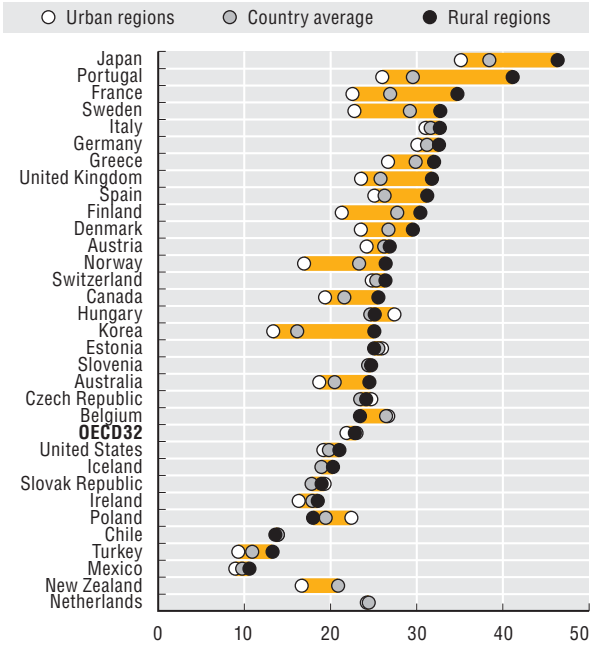

StatLink http://dx.doi.org/10.1787/888932914235

### 4.7. Yearly growth of regional elderly population, 1995-2012



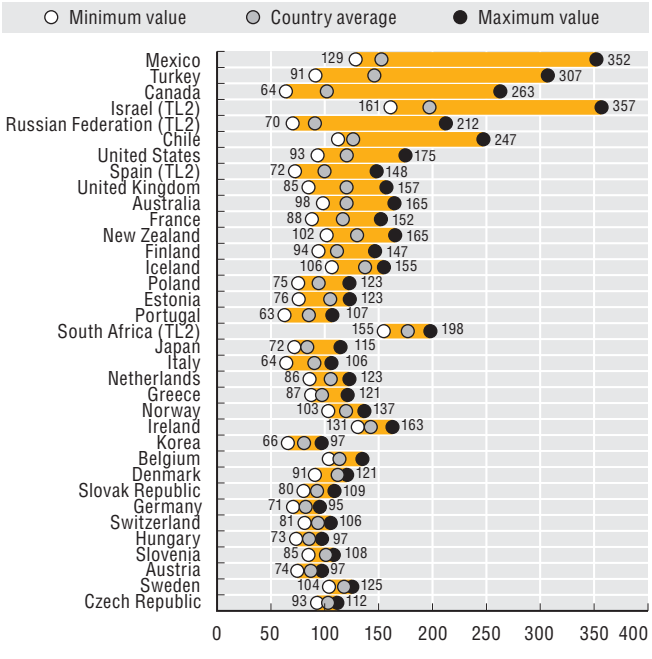

StatLink http://dx.doi.org/10.1787/888932914254

### 4.8. Elderly dependency rate for countries, predominantly urban and predominantly rural regions, 2012




StatLink http://dx.doi.org/10.1787/888932914273

### 4.9. Child-to-woman ratio ranked by size of TL3 regional difference, children per 1 000 women, 2012




StatLink http://dx.doi.org/10.1787/888932914292

# Population mobility among regions

Inter-regional mobility within countries is an important component of the change in the demographic structure and in the labour force supply.

In the 28 observed OECD countries, around 18 million people changed their region of residence annually in the period 2009-2011. This movement corresponded to 4% of total population in Hungary, less than 0.5% in the Slovak Republic and to 2% of the total population in the OECD area, around half the value of the international migration rate to OECD countries (Figure 4.10).

Regional migration does not affect all regions of a country equally: Voreio Aigaio (Greece) and Tekirdag (Turkey) were the TL3 regions with the highest positive net migration rate, 2.6% and 1.7% of the regional population, respectively. Yozgat (Turkey) and Luton (United Kingdom) were among the TL3 regions with the highest negative net migration rates and the Northwest Territories (Canada) for the TL2 regions (Figure 4.11).

On aggregate, the net migration rate in the predominantly urban regions of 25 OECD countries was of 4.5 people per 10 000 population in 2011 versus -2 and -8 in intermediate and rural regions, respectively. However, net migration rates were negative in urban regions in 10 countries, among which are Estonia, New Zealand, United Kingdom and Norway. On average rural regions were net recipients of regional migration in the United Kingdom, Greece, Portugal, Belgium and the United States (Figure 4.12).

Distance to markets and services seems to be a strong predictor of out-mobility: with the exception of Greece, Italy and Switzerland, remote rural regions – i.e. regions which are far in driving distance from urban agglomerations – show higher net negative flows than predominantly rural regions.

The mobility of young adults, which represents one-fifth of the total internal mobility for the observed 15 countries, is, on average, a migration from rural to urban regions where higher education facilities and more diverse job opportunities can be found. In Japan, the United Kingdom, Germany, Turkey and Switzerland, more than 80% of young migrants move to predominantly urban regions. Rural regions in Japan will bear the largest share of the future decline in population because of the already high incidence of an elderly population reinforced by out-migration of young people. In contrast, the youth migration flows towards Helsinki (Finland) and Stockholm (Sweden), even if still positive, decreased by half in the years following the economic crisis. The urban regions in the south of Italy have been losing their young population (negative net flows), even if the volume of outflows decreased in the period 1999-2011.

### *Definition*

Data refer to yearly flows of population from one TL3 region to another TL3 region (regional migration). Outflows are represented as the number of persons who left the region the previous year to reside in another region of the country, while inflows are represented as the number of new residents in the region coming from another region of the country.

The net migration flow is defined as the difference between inflows and outflows in a region. A negative net migration flow means that more migrants left the region than entered it.

Young migrants are those aged between 18 and 24.

## Source

OECD (2013), *OECD Regional Statistics* (database), *http://dx.doi.org/10.1787/region-data-en*.

See Annex B for data sources and country-related metadata.

## Reference years and territorial level

1999-2011; TL3.

TL2 regions in Australia and Canada.

Data for France and Ireland are not available at regional level.

Chile and Mexico data are not included since data refer only to total flows over a period of five years. Korea is not included since annual flows are given by the gross sum of monthly movements.

## Further information

Territorial grids and regional typology (Annex A).

Interactive graphs and maps: *http://rag.oecd.org*.

## Figure notes

4.10-4.12: Available years: Canada, Iceland, Norway and Sweden 2010-12; Germany, Netherlands and United tates 2008-10; Greece only 2001; New Zealand only 2006; United Kingdom 2006-08, data do not include Scotland and Northern Ireland.

4.11: Due to the recent natural disasters, the regions of Van (Turkey) and Fukushima (Japan) displayed the highest negative net flow of population.

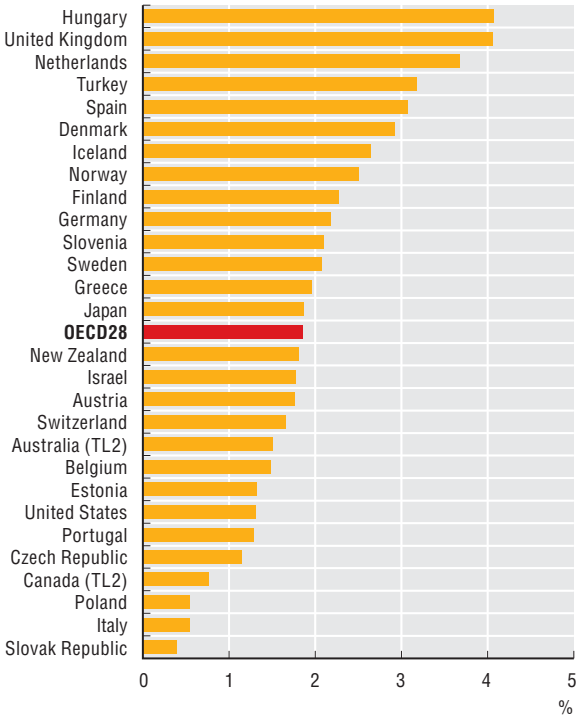
4.13: Last available years: Denmark and Netherlands 2007; United Kingdom 2008; Norway 2009; Germany 2010. First available years: Poland 2000; Portugal 2001; Austria and Netherlands 2002; Norway 2004; Denmark 2006. Japan available only 2010. United Kingdom data do not include Scotland and Northern Ireland.

Greece and Iceland do not have net positive flows in predominantly urban regions.

Information on data for Israel: *http://dx.doi.org/10.1787/888932315602*.

### 4.10. Annual regional migration rate, average 2009-2011

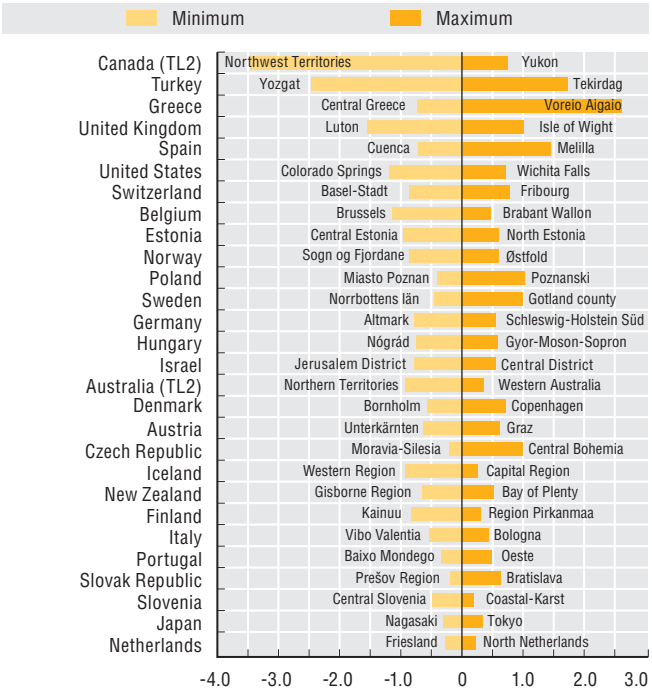
*Flows across TL3 regions, % of total population*




StatLink http://dx.doi.org/10.1787/888932914311

### 4.11. Maximum and minimum annual regional migration rate, average 2009-2011

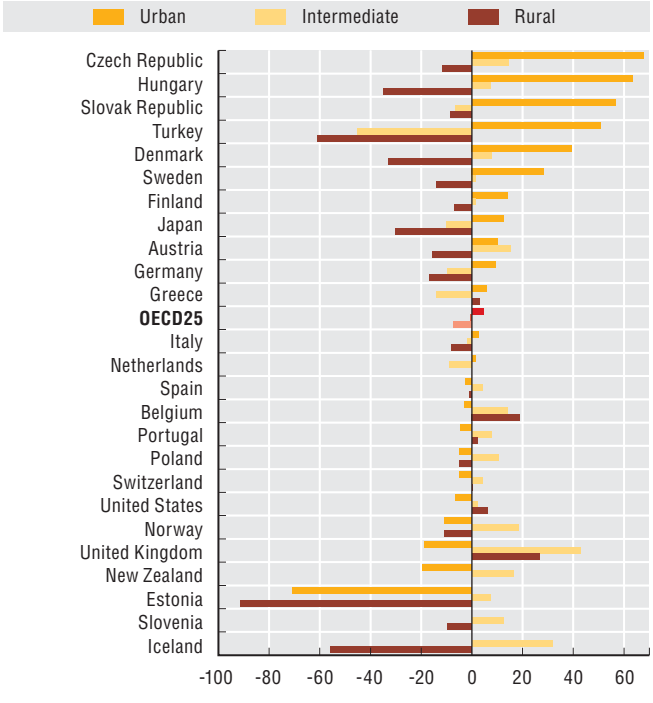
*Net flows across TL3 regions, % of total population*




StatLink http://dx.doi.org/10.1787/888932914330

### 4.12. Annual regional migration rate per typology of region, average 2009-2011

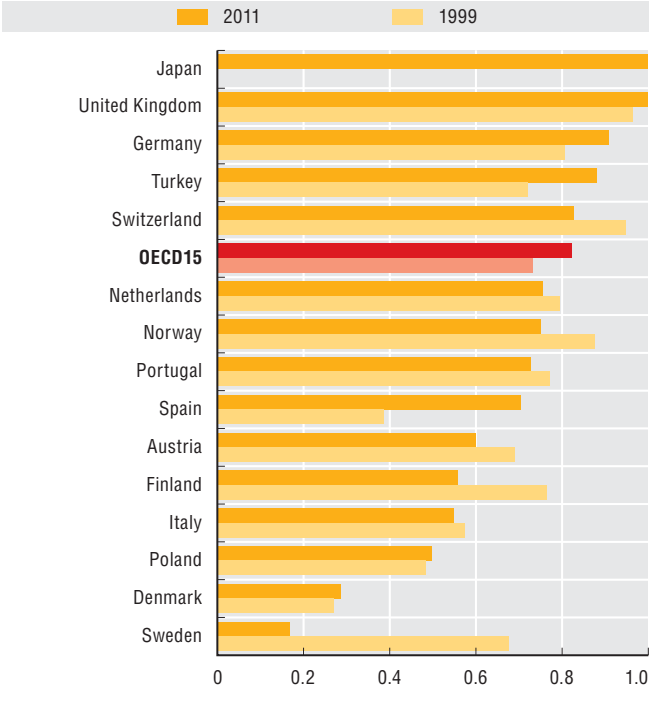
*Net flows across TL3 regions per 10 000 population*




StatLink http://dx.doi.org/10.1787/888932914349

### 4.13. Young immigrants in urban regions as a % of young immigrants in the country, 1999 and 2011

*Positive net flows of youth migration across TL3 regions*




StatLink http://dx.doi.org/10.1787/888932914368

# Regional disparities in unemployment and youth unemployment

Unemployment has soared in OECD countries in recent years, from 5.6% in 2007 to 8% in 2013. In 2012, regional differences in unemployment rates within OECD countries were almost two times higher (32 percentage points) than differences among OECD countries (18 percentage points).

Regional disparities in unemployment were already high before the economic crisis in countries such as the Slovak Republic, Finland, Italy and the Czech Republic (Figure 4.14).

Overall the economic downturn has aggravated problems of the most fragile regions. Among OECD countries in 2012 the largest regional disparities in unemployment rates were found in Spain, Italy, the Slovak Republic, Belgium and Canada (Figure 4.15).

Among the unemployed, the long-term unemployed (i.e. those who have been unemployed for 12 months or more) are of particular concern to policy makers because such individuals become increasingly unattractive to employers.

In 2011, in almost 50% of the regions considered, one out of three unemployed was out of the labour market for more than a year (Figure 4.16). Similarly, the long-term unemployment rate showed large regional variations not only in dual economies such as Italy, but also in the Slovak Republic, Spain, Belgium, Greece and Hungary.

### *Definition*

Unemployed persons are defined as those who are without work, are available for work, and have taken active steps to find work in the last four weeks.

The unemployment rate is defined as the ratio between unemployed persons and labour force, where the latter is composed of unemployed and employed persons.

The youth unemployment rate is defined as the ratio between unemployed persons aged between 15 and 24 and the labour force in the same age class.

The long-term unemployment rate is defined as the ratio of those unemployed for 12 months or more out of the total labour force.

The incidence of long-term unemployment is defined as the ratio between long-term unemployed and total unemployed.

The Gini index is a measure of inequality among all regions of a given country (see Annex C for the formula). The index takes on values between 0 and 1, with zero interpreted as no disparity. It assigns equal weight to each region regardless of its size; therefore, differences in the values of the index among countries may be partially due to differences in the average size of regions in each country.

Young people have been hit the hardest by the economic crisis. Youth unemployment in OECD countries increased from 12.2% in 2007 to over 16% in 2012. Moreover, disparities in youth unemployment within countries have been accentuated by the crisis (see next chapter).

Youth unemployment is of particular concern in Spain, Italy, Mexico, Greece, Poland, Portugal and the Slovak Republic, where regional differences are high and some regions display a youth unemployment rate over 40% (Figure 4.17). These regions in European countries display also higher than average early leavers from education and training, suggesting the need for specific policies to improve the employability of these people through training and apprenticeship.

## Source

OECD (2013), *OECD Regional Statistics* (database), *http://dx.doi.org/10.1787/region-data-en*.

See Annex B for data, source and country-related metadata.

## Reference years and territorial level

2008-12; TL2.
Last available year for regional long-term unemployment: 2011.
No regional data for youth unemployment in Iceland and Korea.
Australia is not included due to lack of data on comparable years.
No regional data for long-term unemployment in Iceland, Japan, Korea, Mexico and the United States.

## Further information

OECD (2010), *Off to a Good Start? Jobs for Youth*, OECD Publishing, *http://dx.doi.org/10.1787/9789264096127-en*.

Interactive graphs and maps: *http://rag.oecd.org*.

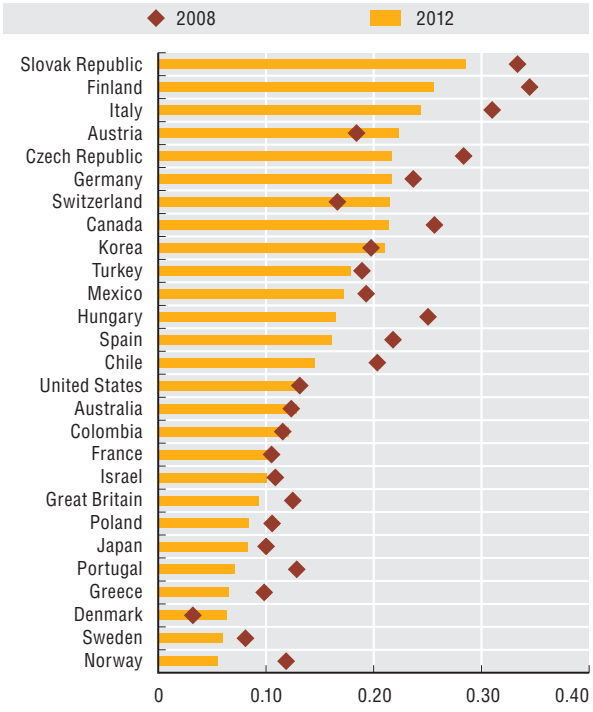
## Figure notes

4.14: Countries with fewer than four regions are excluded: Belgium, Estonia, Iceland, Ireland, Luxemburg, New Zealand and Slovenia. Portugal: Due to changes in the LFS data collection methodology, values from 2011 are not directly comparable with those from previous years.
Available years: Israel, Iceland, Japan, Mexico and Turkey 2008-11; Chile 2010-12.

4.15-4.17: Each observation (point) represents a TL2 region of the countries shown in the vertical axis.

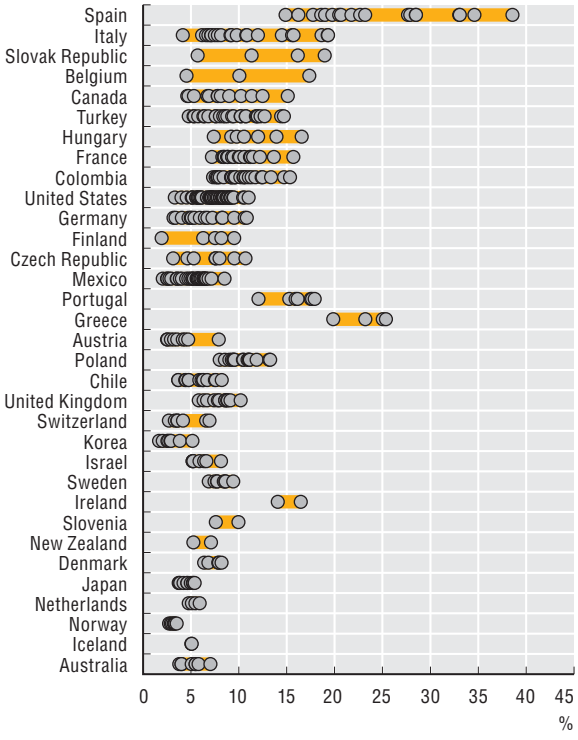
Information on data for Israel:
*http://dx.doi.org/10.1787/888932315602*.

### 4.14. Gini index of TL2 regional unemployment rates, 2008 and 2012



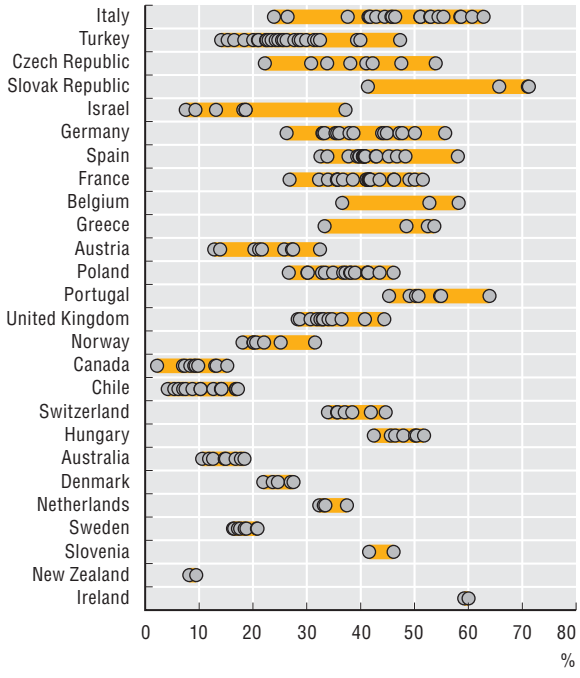

StatLink http://dx.doi.org/10.1787/888932914387

### 4.15. TL2 regional variation in the unemployment rate, 2012



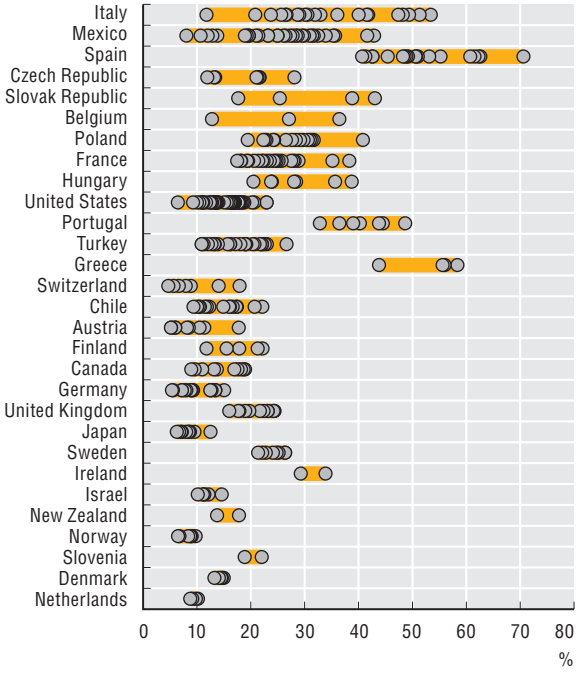

StatLink http://dx.doi.org/10.1787/888932914406

### 4.16. TL2 regional incidence of long-term unemployment as a % of total unemployment, 2011




StatLink http://dx.doi.org/10.1787/888932914425

### 4.17. TL2 regional variation in the youth unemployment rate, 2012




StatLink http://dx.doi.org/10.1787/888932914444

# Impact of the crisis on regional unemployment

The economic crisis has dramatically increased the level of unemployment in OECD countries, and youth unemployment has been particularly affected. In 2013, 8% of the OECD labour force was unemployed and the number of youths unemployed is nearly a third higher than in 2007.

The increase in the number of unemployed between 2008 and 2012 has been varied not only among countries but also within countries. More than 40% of the increased unemployment was concentrated in just one region in Korea, the Netherlands, Chile, Austria, Hungary, Japan, Greece and Canada (Figure 4.18). In some cases, the high contribution to the increase of national unemployment is due to the size of the region, for example Capital Region in Korea, while in other cases is due to the growth of unemployment in the region, for example Andalusia (Spain).

Significant differences in youth unemployment rates across regions are observed. According to the Gini index, Switzerland, Austria and the Slovak Republic were the countries with the largest regional disparities in youth unemployment rate in 2012.

### *Definition*

Unemployed persons are defined as those who are without work, who are available for work and have taken active steps to find work in the last four weeks.

The unemployment rate is defined as the ratio between unemployed persons and labour force, where the latter is composed of unemployed and employed persons.

The youth unemployment rate is defined as the ratio between unemployed persons aged between 15 and 24 and the labour force in the same age class.

The Gini index is a measure of inequality among all regions of a given country (see Annex C for the formula). The index takes on values between 0 and 1, with zero interpreted as no disparity. It assigns equal weight to each region regardless of its size; therefore differences in the values of the index among countries may be partially due to differences in the average size of regions in each country.

Regional disparities in youth unemployment were reduced in most countries between 2008 and 2012, with the exceptions of Switzerland, Austria, Germany and Chile (Figure 4.19).

Some of this reduction in the regional difference of youth unemployment is due to a worsening in the level of youth unemployment in regions which were relatively better off before the economic crisis. For example, the youth unemployment rate in the regions of Athens (Greece), Tamaulipas (Mexico), Madeira (Portugal) and Extremadura (Spain) has increased no less than 8 percentage points each year in the period 2008-2012. As a result, in 2012 the youth unemployment rates in these regions were 56%, 43%, 49% and 61%, respectively (Figure 4.20).

## Source

OECD (2013), *OECD Regional Statistics* (database), *http://dx.doi.org/10.1787/region-data-en*.

See Annex B for data sources and country-related metadata.

## Reference years and territorial level

2008-12; TL2.

No regional data for youth unemployment in Iceland and Korea. Australia in not included since youth unemployment is available only up to 2007.

## Further information

Interactive graphs and maps: *http://rag.oecd.org*.

## Figure notes

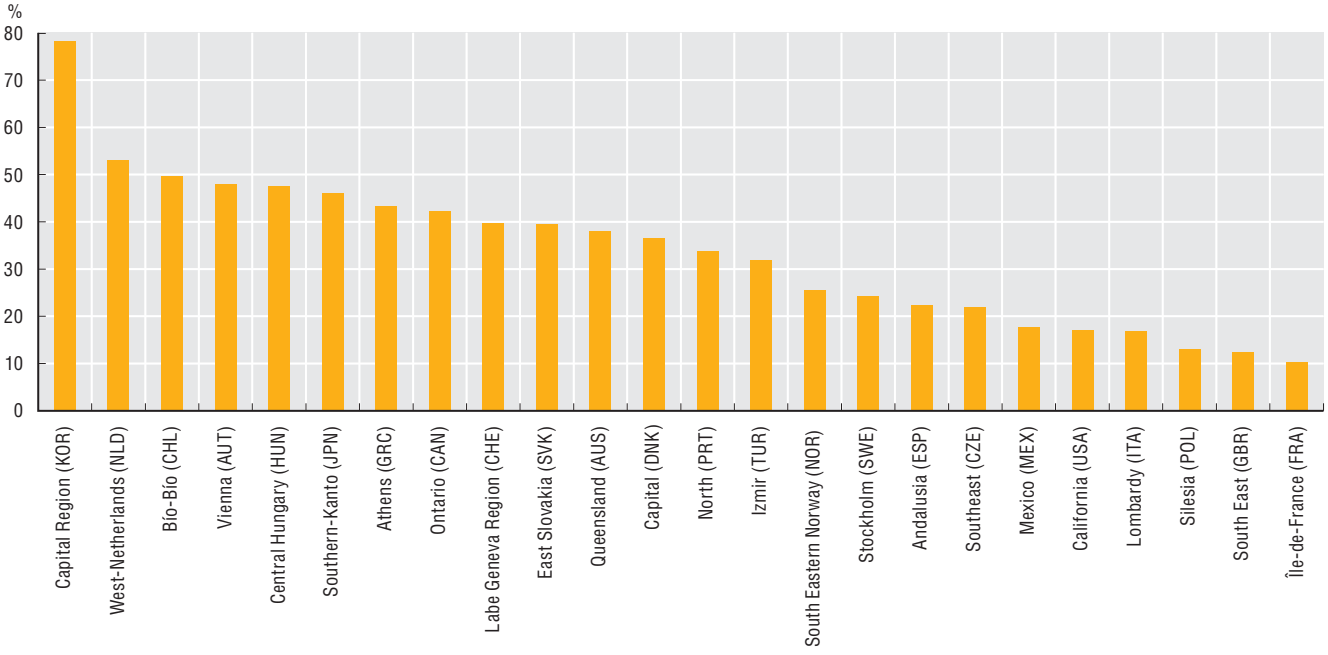
4.18: Only countries with at least four regions and positive increase of unemployed on average in 2008-12. Belgium, Estonia, Finland, Germany, Iceland, Ireland, Israel, Luxemburg, New Zealand and Slovenia are excluded.

4.19: Countries with fewer than four regions are excluded: Belgium, Estonia, Iceland, Ireland, Luxemburg, New Zealand and Slovenia.

4.20: Only countries with positive increase of youth unemployed on average in 2008-12. Chile, Germany, Israel and Turkey are excluded.

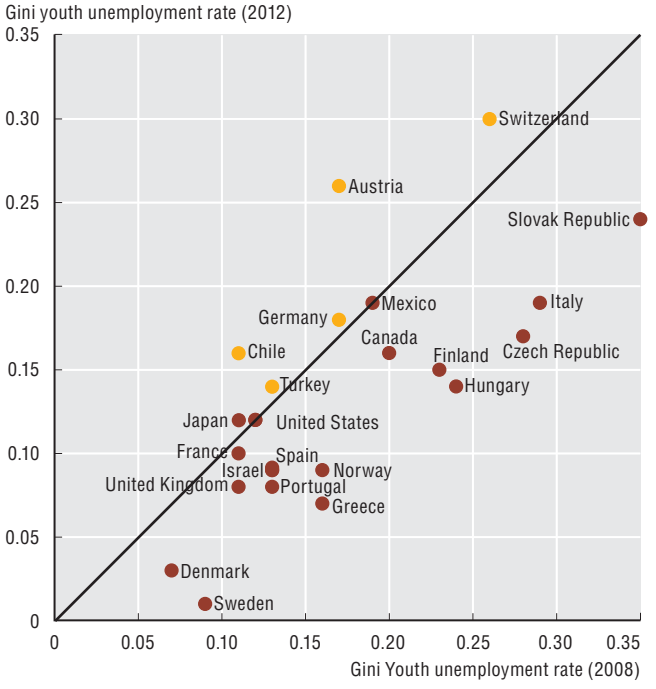
Information on data for Israel: *http://dx.doi.org/10.1787/888932315602*.

### 4.18. Regional (TL2) contribution to increase of national unemployment, 2008-2012, top region by country




StatLink http://dx.doi.org/10.1787/888932914463

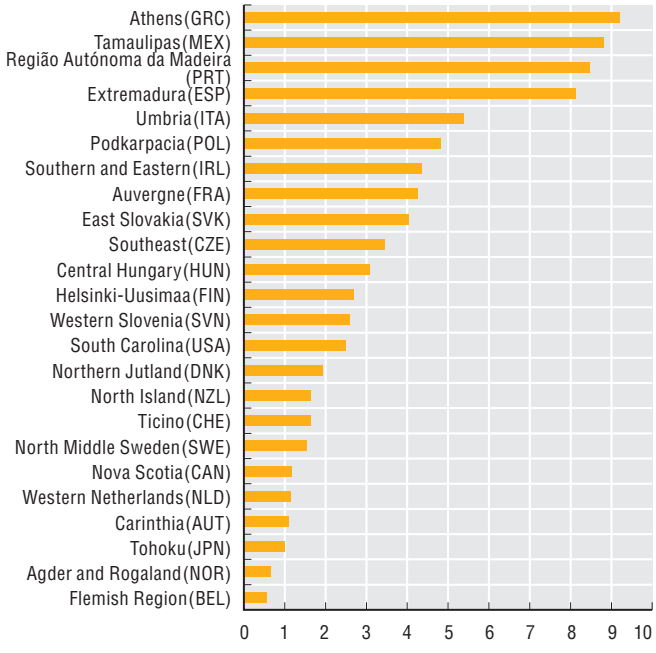
### 4.19. Gini index of TL2 regional youth unemployment rate, 2008 and 2012




StatLink http://dx.doi.org/10.1787/888932914482

### 4.20. Region (TL2) with largest increase in youth unemployment rate, 2008-2012, by country

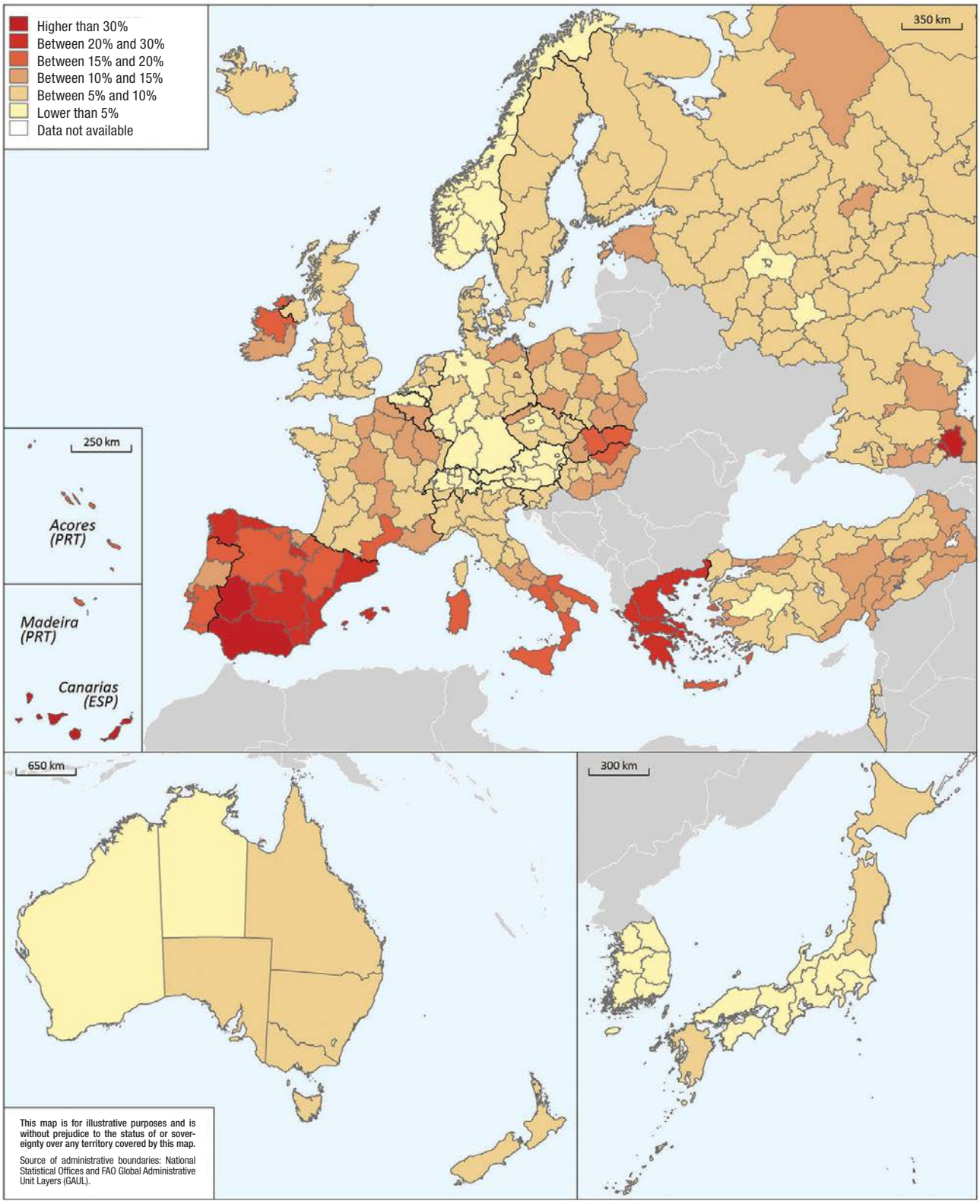
*Average annual youth unemployment rate change, percentage points*




StatLink http://dx.doi.org/10.1787/888932914501

## 4.21. Regional unemployment rates: Europe, Asia and Oceania, 2012

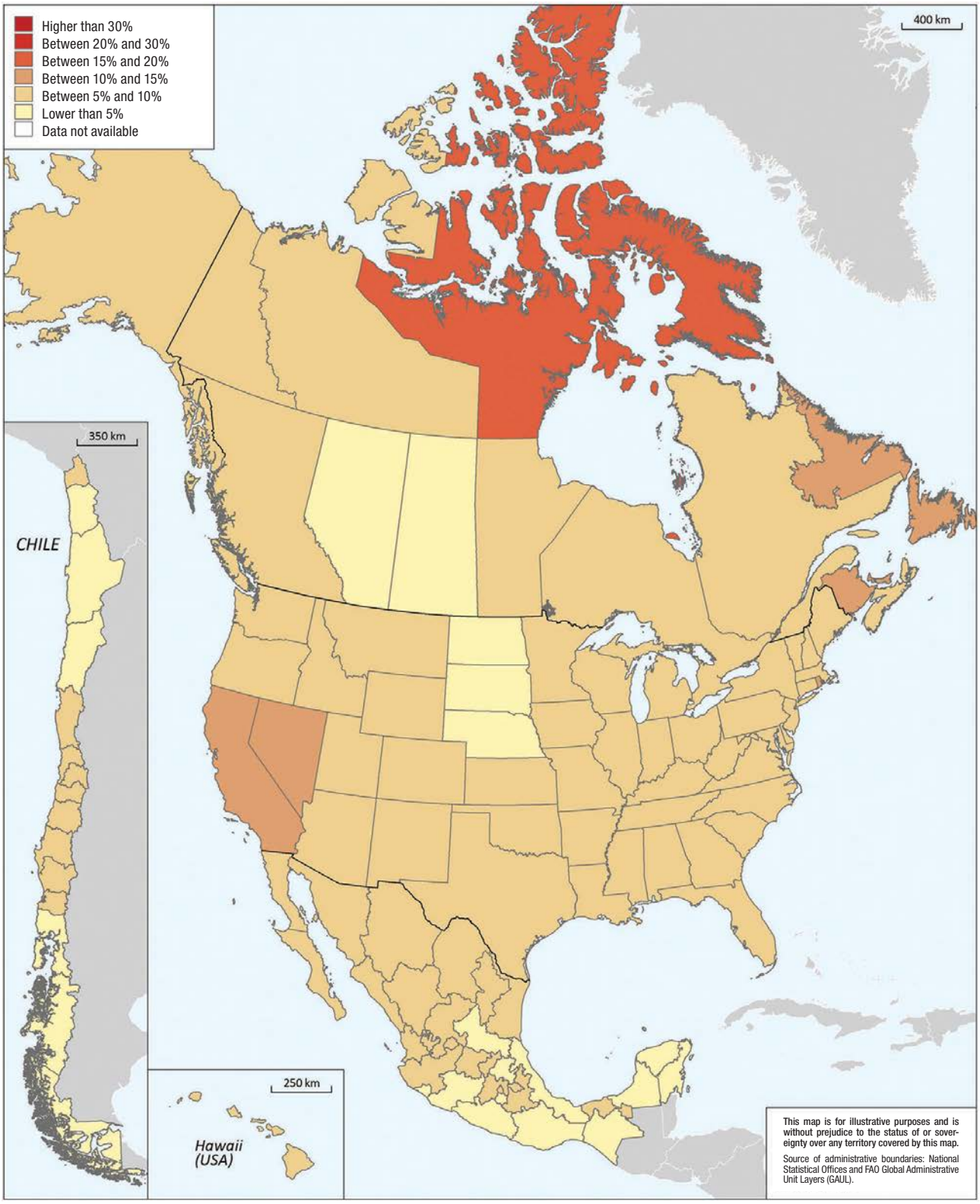
*TL2 regions*




StatLink http://dx.doi.org/10.1787/888932915660

## 4.22. Regional unemployment rates: Americas, 2012

*TL2 regions*




StatLink http://dx.doi.org/10.1787/888932915679

# Gender differences in employment opportunities

Regional disparities in participation rates, measured here by the Gini index, have generally decreased from 1999 to 2011 due to an increase in labour force participation in less advantaged regions (Figure 4.23). The Gini index showed the greatest decline in Ireland, thanks to an increase in labour force among the regions with relatively lower participation rates, but also due to a steep reduction of the labour force participation in Dublin. Countries like Canada, Greece and Turkey also show a significant decline in the Gini index between these two points in time. Regional inequalities in participation rates increased the most in Italy, Poland, and the Slovak Republic.

Despite the decrease in regional disparities regarding participation rates in most OECD countries, important differences in the access to labour markets are still present between men and women. About 69% of women in OECD regions were in the labour force, compared to 88% of men in 2011.

Regional differences in female participation rates were above 20 percentage points in Turkey, Italy, Israel, Poland and France (Figure 4.24). The largest difference in participation rates by gender are found in regions with different profiles. In countries like Mexico, Spain and Italy, the largest difference between male and female rates is found in Chiapas, Ceuta and Apulia, respectively, which are regions characterised by low GDP and income levels. However, in countries like the United Kingdom, Korea and Belgium, the capital regions are the regions where the participation rate of women is the lowest compared to that of men.

Broadening access to women in the labour market would require a mix of policies, including measures to reconcile family and work life. Regional differences in female participation rates suggest that the availability and use of services to reconcile family and work life are also quite diverse within countries.

The female employment rate has increased in OECD countries over the past decades, reaching 57% in 2011. However, in around 26% of OECD regions, less than one out of two women was employed in 2011. Regional disadvantages in female employment were the largest in Turkey, Italy, Spain, Israel, the United States and the Slovak Republic (Figure 4.25).

### *Definition*

The participation rate is the ratio of the labour force to the working age population. The labour force is defined as the sum of employed and unemployed people.

Employed people are all persons who, during the reference week, worked at least one hour for pay or profit or were temporarily absent from such work. Family workers are included.

The female employment rate is calculated as the ratio between female employment and female working-age population (aged 15-64 years).

The Gini index is a measure of inequality among all regions of a given country (see Annex C for the formula). The index takes on values between 0 and 1, with zero interpreted as no disparity. It assigns equal weight to each region regardless of its size; therefore differences in the values of the index among countries may be partially due to differences in the average size of regions in each country.

## Source

OECD (2013), *OECD Regional Statistics* (database), *http://dx.doi.org/10.1787/region-data-en*.

See Annex B for data sources and country-related metadata.

## Reference years and territorial level

1999-2011; TL3.

Australia, Canada, Chile, Israel, Mexico, Switzerland, and Turkey only at TL2.

Female participation rates and employment only at TL2.

## Further information

OECD (2012), *Closing the Gender Gap: Act Now*, OECD Publishing, *http://dx.doi.org/10.1787/9789264179370-en*.

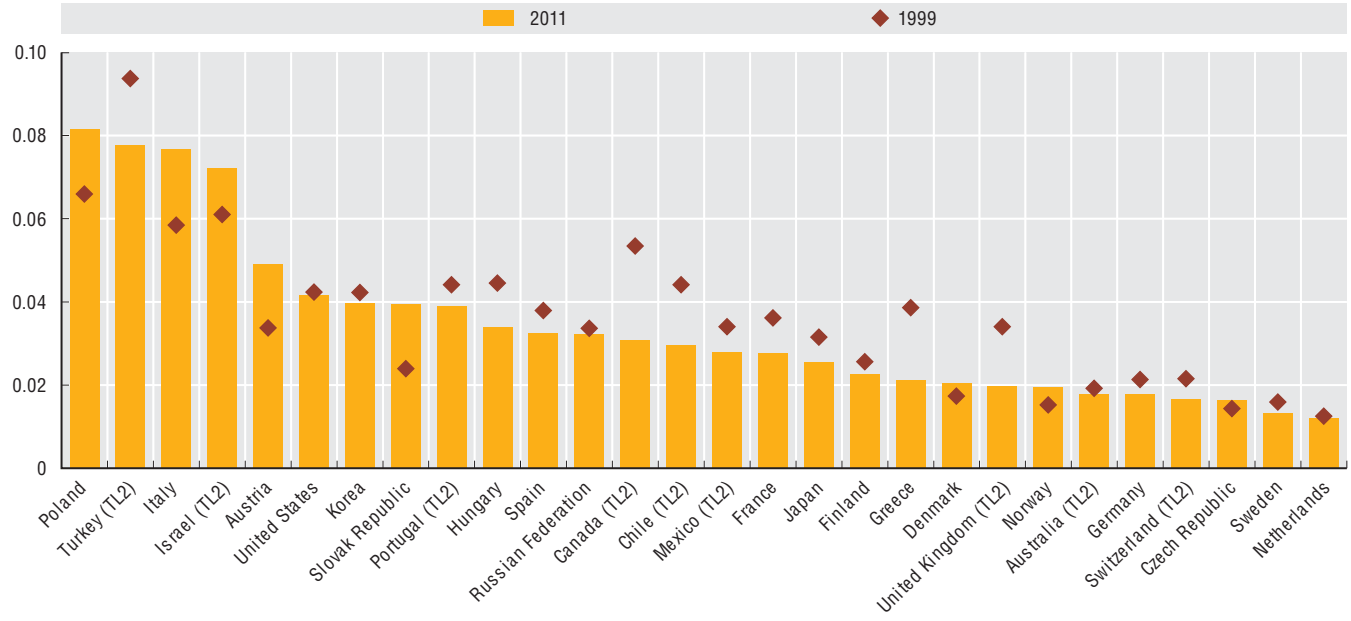
Interactive graphs and maps: *http://rag.oecd.org*.

## Figure notes

4.23: Countries with fewer than four regions are excluded: Belgium, Estonia, Iceland, Ireland, Luxemburg, New Zealand and Slovenia. Portugal: Due to changes in the LFS data collection methodology, values from 2011 are not directly comparable with those from previous years.

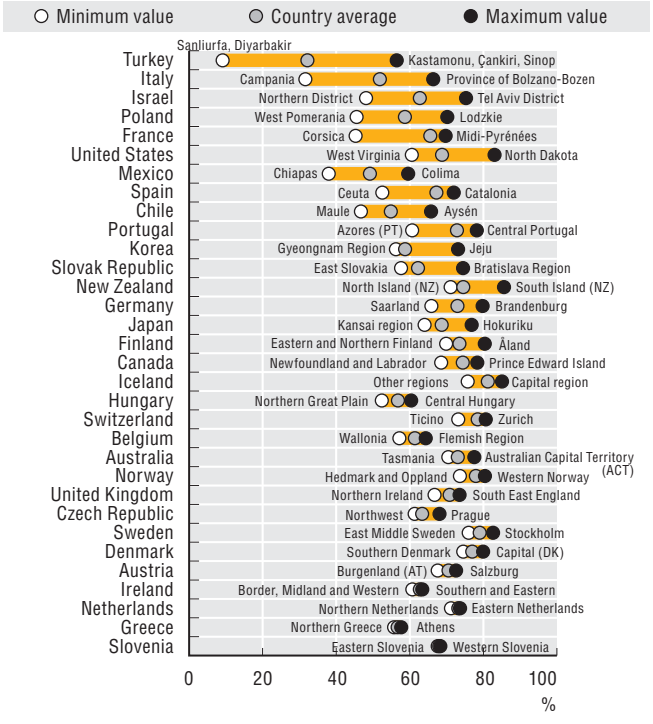
Information on data for Israel: *http://dx.doi.org/10.1787/888932315602*.

### 4.23. Gini index of TL3 regional participation rates, 1999 and 2011



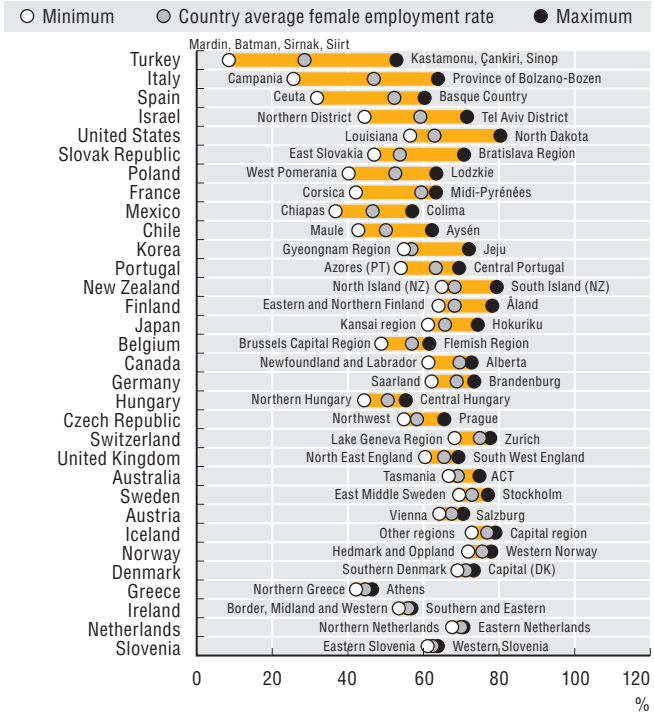

StatLink http://dx.doi.org/10.1787/888932914520

### 4.24. Countries ranked by size of difference in TL2 regional female participation rates, 2011




StatLink http://dx.doi.org/10.1787/888932914539

### 4.25. Countries ranked by size of difference in TL2 regional female employment rate, 2011




StatLink http://dx.doi.org/10.1787/888932914558

# Part-time employment in regions

Part-time employment has increased in many OECD countries during the past years (OECD, 2012). Depending on the institutional and economic context, part-time employment can have opposite effects on the well-being of the working population. On the one hand, part-time workers may suffer a penalty compared to their full-time counterparts in terms of job-security, training and promotion, and unemployment benefits. On the other hand, part-time employment can offer a better family-friendly working-time arrangement. In general, in the presence of the right incentives, part-time jobs seem to promote labour force participation and can be a relevant alternative to inactivity (OECD, 2010).

The incidence of part-time employment is not evenly distributed across OECD regions. Regions in the Netherlands and Switzerland show the highest shares of part-time employment across the OECD countries in the sample; while the regions with the lowest values of part-time employment incidence are found in Eastern European countries such as Poland, Hungary, the Slovak Republic and the Czech Republic (Figure 4.26). Large regional disparities can be found within countries like Chile and Australia, where the difference between the regions with highest and lowest shares of part-time employment can be as high as 18 percentage points. Despite the lack of a harmonised definition at regional level, this pattern is similar to the national incidence of part-time employment according to the OECD definition (OECD, 2012).

### *Definition*

The definition of part-time work varies considerably across OECD member countries. The OECD defines part-time working in terms of usual working hours fewer than 30 per week. However, for European TL2 regions, the distinction between full-time and part-time work is based on a spontaneous response by the respondent; except in the Netherlands, Iceland and Norway, where part-time is determined if the usual hours are fewer than 35 hours.

At regional level, a harmonised definition of part-time employment does not exist. Indeed, for some countries, the number of hours defining the number of part-time employees in a region differs from the OECD definition. This makes regional values differ from national estimates relying on a harmonised definition.

Incidence of part-time employment refers to the proportion of part-time employees with respect to the total number of employed persons in a region.

Employment rate is defined as the ratio between total employment (place of residence) and population in the class age 15-64.

The share of part-time employees among the working age population (15-64 years) seems to be associated with higher employment rates across OECD regions. Indeed, OECD regions characterised by high employment rates also show a higher share of part-time employment (Figure 4.27). Swiss regions have the highest rates of employment, and the second highest shares of part-time jobs with respect to the working-age population.

The composition of part-time employment is influenced not only by regional demographic characteristics but also by regulatory settings and access to certain family-oriented services such as child-care facilities. The latter in particular can contribute to increasing the participation of women in the workforce. In regions like Burgenland (Austria), Lorraine (France), and Province of Trento (Italy), women account for more than 80% of the total part-time employment, and female employment in these regions is close to the national value. Regions with small shares of women working part-time are Algarve (Portugal) and Los Lagos (Chile), where in both regions the share of women in part-time employment is lower than 50% (Figure 4.28).

## Source

OECD (2013), *OECD Regional Statistics* (database), *http://dx.doi.org/10.1787/region-data-en*.

See Annex B for data sources and country-related metadata.

## Reference years and territorial level

2012; TL2.

Australia, Italy, Norway and Switzerland, 2011.

No regional data are available for Iceland, Korea, Mexico, New Zealand, and the United States.

## Further information

OECD (2010), *OECD Employment Outlook 2010: Moving beyond the Jobs Crisis*, OECD Publishing, *http://dx.doi.org/10.1787/empl_outlook-2010-en*.

OECD (2012), "Incidence and composition of part-time employment", *OECD Employment Outlook 2012*, OECD Publishing, *http://dx.doi.org/10.1787/empl_outlook-2012-table74-en*.

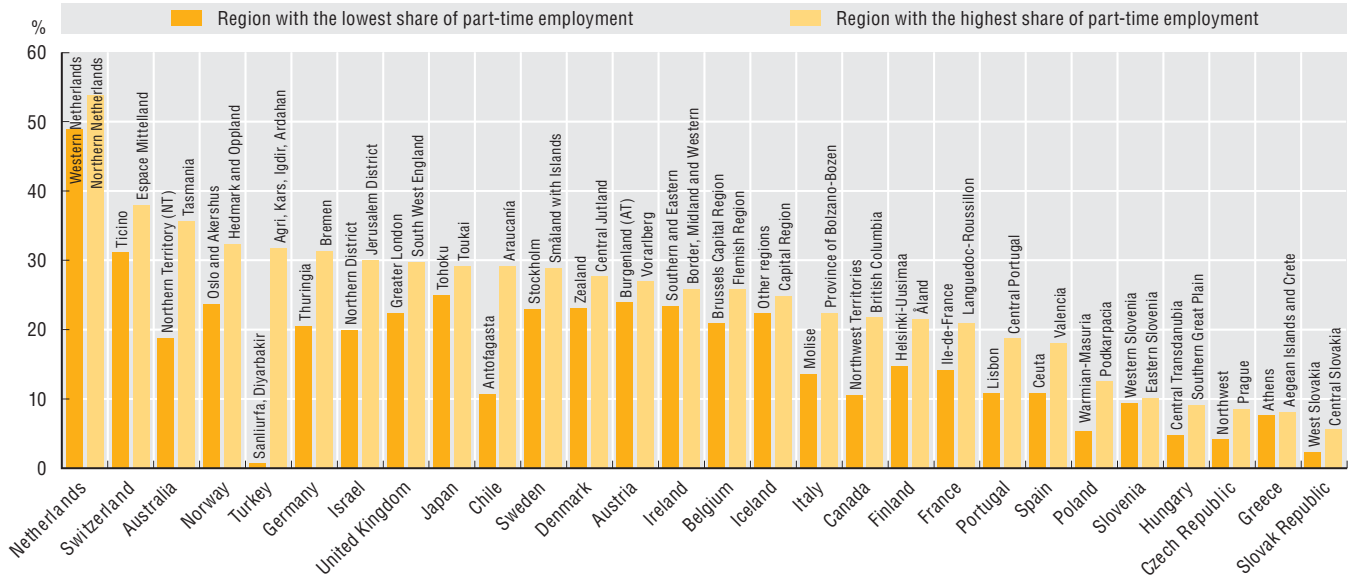
Interactive graphs and maps: *http://rag.oecd.org*.

## Figure notes

4.27: Each observation (point) represents a TL2 region.

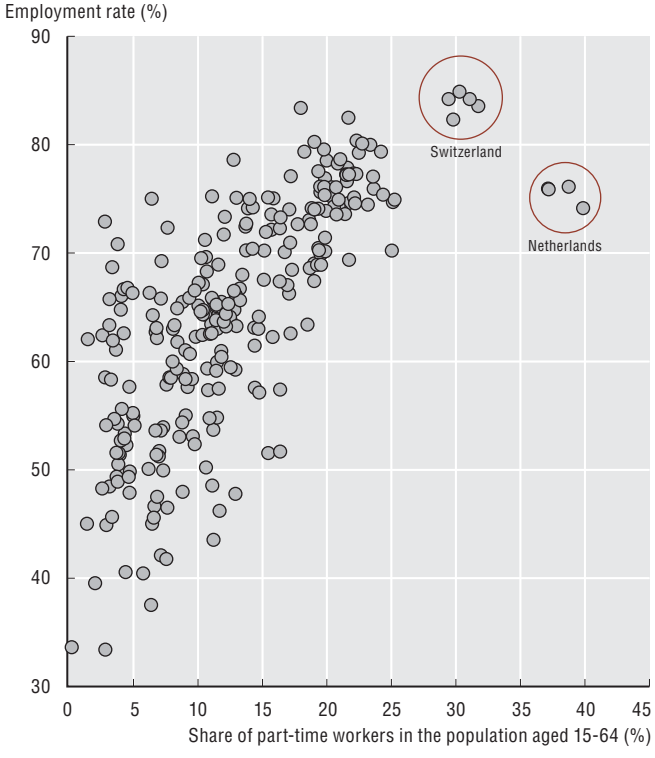
Information on data for Israel: *http://dx.doi.org/10.1787/888932315602*.

## 4.26. Disparities in regional part-time employment incidence, TL2 regions, 2012



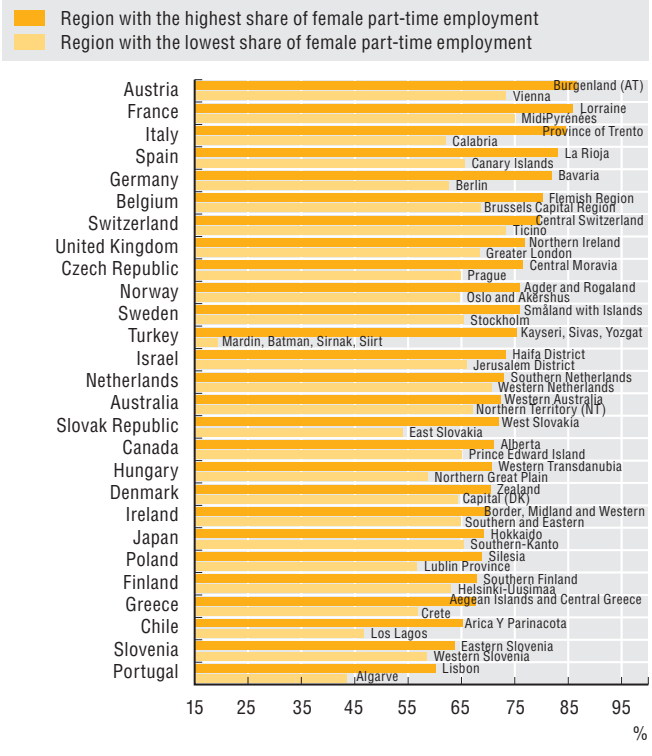

StatLink http://dx.doi.org/10.1787/888932914577

## 4.27. Share of regional part-time employment and employment rate, 2012




StatLink http://dx.doi.org/10.1787/888932914596

## 4.28. Gender composition of part-time employment: highest and lowest region, 2012




StatLink http://dx.doi.org/10.1787/888932914615

# Regional access to education

The quality of human capital is a key factor in the social and economic well-being of a region. Education provides individuals with knowledge and competencies to participate effectively in society and to break the cycle of disadvantage. Still, in 2012 one-fourth of the OECD population had only a basic education, and in most of the regions in Turkey, Mexico and Portugal, and in some regions in Australia and Spain, this proportion was as high as 50%.

Large regional differences in educational attainment within a country suggest disparity in access to education. Regional variations are generally found in countries with a high proportion of adults with only basic educational attainment. This is the case in Turkey, Mexico, Portugal, Spain and Chile. However, in Germany, Korea and the United States, the share of population with only basic education is lower than the OECD average, but regional differences are higher (Figure 4.29).

Completing upper secondary education dramatically reduces the unemployment rate among young people. Indeed, in the OECD area, the unemployment rate among individuals who did not complete upper secondary education is nearly three times higher than that of those who completed it, 13% and 5%, respectively (OECD, 2013a).

Whereas in Turkey and Mexico less than 40% of the labour force had at least an upper secondary education, this share was above 90% in the Czech Republic, Slovak Republic, Poland and Canada in 2012. Regional disparities in educational attainment persist also for higher levels of education; the highest are in Turkey, Spain, Mexico and Chile (Figure 4.30).

### *Definition*

The educational attainment rate is defined as the proportion of labour force with a certain level of education. The international standard classification for education (ISCED 97) is used to define the levels of education. Pre-primary, primary and lower secondary education comprises the 3 lowest ISCED levels: 0, 1 and 2. For simplicity, here it is referred as basic education (or lower secondary education). Upper secondary education includes ISCED levels 3-4, while tertiary education levels 5-6.

The indicator on young people neither in employment nor in education and training (NEET) corresponds to the population aged 18-24 that is neither employed nor involved in further education or training. Regional comparable values are available only for Europe.

The share of young adults (aged 18-24) who have not completed upper secondary education and are not enrolled in training, referred to as "NEET", was equal to 18.6% in 2011 in the OECD area and 13.2% in the European Union area. Opportunities within countries also seem to be very different. In Mardin (Turkey), Sicily (Italy), Central Greece and Ceuta (Spain), more than one-third of young people were neither employed nor in training (Figure 4.31).

Monitoring the outcomes of education in different regions can give insight on where and how to intervene. Countries that have undertaken the OECD PISA survey at the regional level show that regional disparities in learning can be large also in unitary educational systems. In the case of Italy, for example, the mathematics performance of the 15 years old students in Veneto is 93 score points higher than in Calabria, or the equivalent of two years of formal schooling. Large regional differences within countries, equivalent to more than one year of schooling also exist in Mexico, Spain, Canada, Australia and Brazil (Figure 4.32).

## Source

OECD (2013), *OECD Regional Statistics* (database), *http://dx.doi.org/10.1787/region-data-en*.

OECD (2013), *PISA 2012 Results: Excellence through Equity*, (Volume II), *http://dx.doi.org/10.1787/9789264201132-en*.

See Annex B for data sources and country-related metadata.

NEET – Eurostat Labour Force Survey

## Reference years and territorial level

2012; TL2.

Regional data for Iceland and Japan are not available.

## Further information

OECD (2013a), *Education at a Glance*, OECD Publishing, *http://dx.doi.org/10.1787/eag-2013-en*.

OECD (2013), *Employment Outlook 2013*, OECD Publishing, *http://dx.doi.org/10.1787/empl_outlook-2013-en*.

## Figure notes

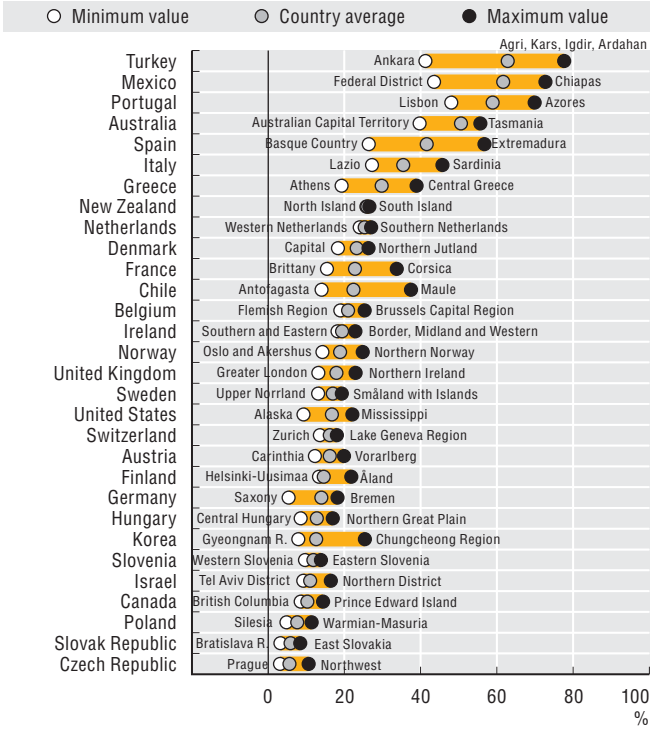
4.29-4.30: Countries ranked by average share of labour force with only basic education (or at least upper secondary education). Available years: Israel, Turkey and United States, 2011; Mexico, 2008; Korea, 2006; Australia, 2005.

4.31: Only European countries (Eurostat data). Range computed on available regional data.

4.32: The dark points represent the country mean mathematics performance in the OECD 2012 PISA assessment; the white points represent the regional score point for those countries where regional results are available. TL2 regions in Australia, Brazil, Canada, Italy, Mexico (no data for Michoacán, Oaxaca and Sonora) and Spain (no data for Canary Islands, Castile-la Mancha and Valencia all community). In United Kingdom regional data refer to England, Northern Ireland, Scotland and Wales. In United States the regional results are only for the states of Connecticut, Florida and Massachusetts.

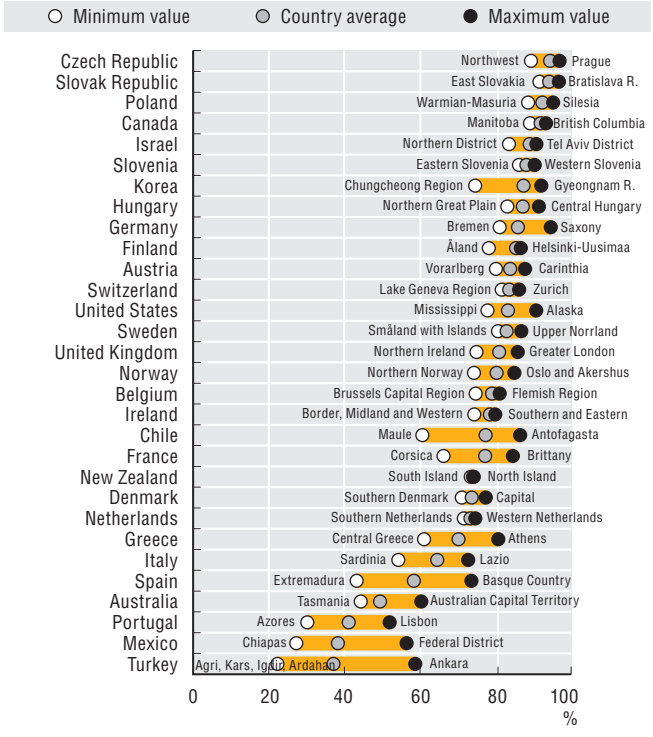
Information on data for Israel: *http://dx.doi.org/10.1787/888932315602*.

### 4.29. Range of labour force with only basic education, TL2 regions, 2012



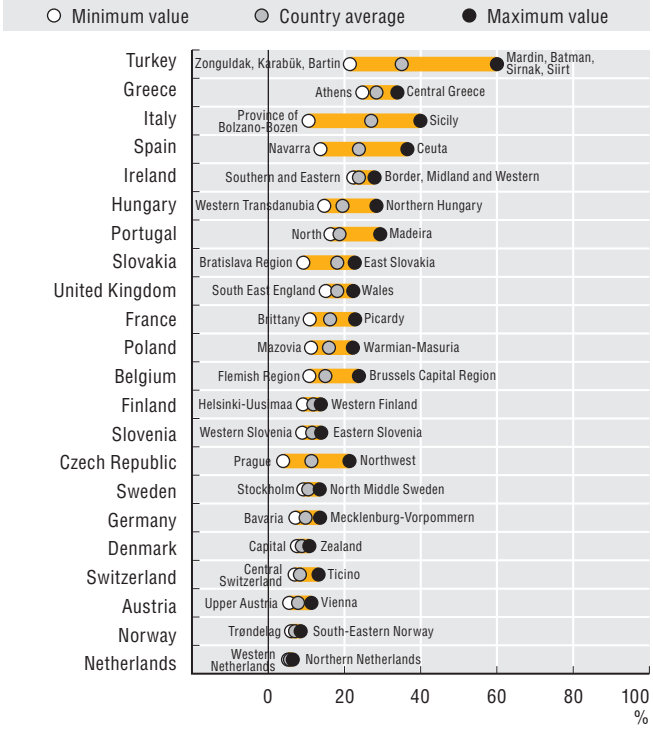

StatLink http://dx.doi.org/10.1787/888932914634

### 4.30. Range of labour force with at least upper secondary education, TL2 regions, 2012



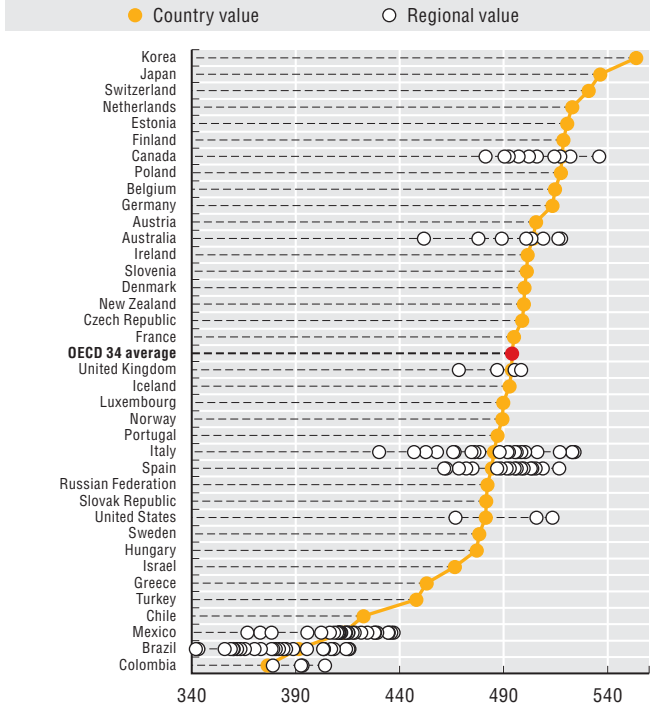

StatLink http://dx.doi.org/10.1787/888932914653

### 4.31. Range in TL2 regional per cent of young neither in employment nor in education or training, 2012




StatLink http://dx.doi.org/10.1787/888932914672

### 4.32. Mathematics performance, mean score points by country and regions, 2012




StatLink http://dx.doi.org/10.1787/888932914691

# Regional access to health

Ensuring adequate access to health services for all the population is an important policy objective in OECD countries. This requires among other things an adequate supply of doctors and hospital beds in regions.

The most important regional differences in the number of hospital beds per 10 000 inhabitants can be found in Mexico, the United States and Canada, where regions like Campeche (Mexico), District of Columbia (United States), and Newfoundland and Labrador (Canada) had a number of hospital beds per capita more than two times higher than their country value (Figure 4.33).

In 2010, the regional variation in the number of physicians per population, a common indicator to measure differences in access to health services, was the largest in the United States and Czech Republic, (driven mainly by the large number in the national capital regions, the District of Columbia and Prague, respectively), and Spain. In the United States, the District of Columbia had a physician density of 8.8 physicians per 1 000 inhabitants, more than three times the country average; the region of Prague displayed 7.5 physicians per 1 000 inhabitants, almost two times higher than the national average (Figure 4.34).

When data at lower geographical scale are available, a higher supply of physicians is observed in predominantly urban regions, where cities facilitate the provision of medical infrastructure and services. Moreover, in some countries, urban regions may not only offer higher remunerations than their rural counterparts, but they also host certain amenities that may attract skilled physicians. This may create a significant mismatch between supply and demand for health services in rural areas, leading to delayed treatment, larger distances travelled, and higher costs for care. Considering the increasing life expectancy in OECD countries, high costs of care can be a concern particularly for the elderly population (i.e. population aged 65 or more).

In Norway, the Slovak Republic and Greece, the number of physicians per elderly inhabitant in urban regions is more than 2.5 higher than in rural regions (Figure 4.35).

Results from the 2012 OECD Health System Characteristics Survey show that the uneven geographic distribution of doctors remains an important policy concern in nearly all OECD countries. OECD countries have used a range of policies to influence the choice of practice location of doctors. These include: education-related policies designed to select students from rural areas or to provide them with some incentives to work in underserved areas after graduation, financial incentives to doctors to work in these regions and policies regulating the choice of practice location for new doctors, among others.

### *Definition*

The number of physicians includes general practitioners and specialists actively practicing medicine during the year, in both public and private institutions.

The number of hospital beds includes beds in all hospitals, including general hospitals, mental health and substance abuse hospitals, and other specialty hospitals.

Physician density is defined as the ratio between the number of physicians and the population in a region.

## Source

OECD (2013), *OECD Regional Statistics* (database), *http://dx.doi.org/10.1787/region-data-en*.

See Annex B for data sources and country-related metadata.

## Reference years and territorial level

2010 hospital beds; 2011 physician density; TL2.

No regional data are available on hospital beds in Iceland, Finland, Korea, New Zealand and United Kingdom. Belgium, Mexico and the Netherlands 2008.

No regional data are available on physicians in Iceland and Ireland.

## Further information

Schoenstein, M. and T. Ono, (forthcoming), "Policies to foster a better geographic distribution of doctors", *OECD Health Working Papers*.

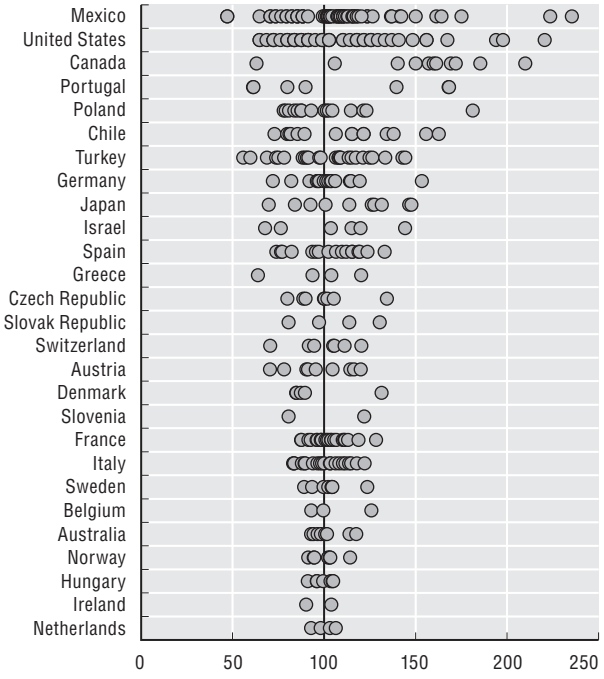
Interactive graphs and maps: *http://rag.oecd.org*.

## Figure notes

4.33-4.34: Each observation (point) represents a TL2 region of the countries shown in the vertical axis.

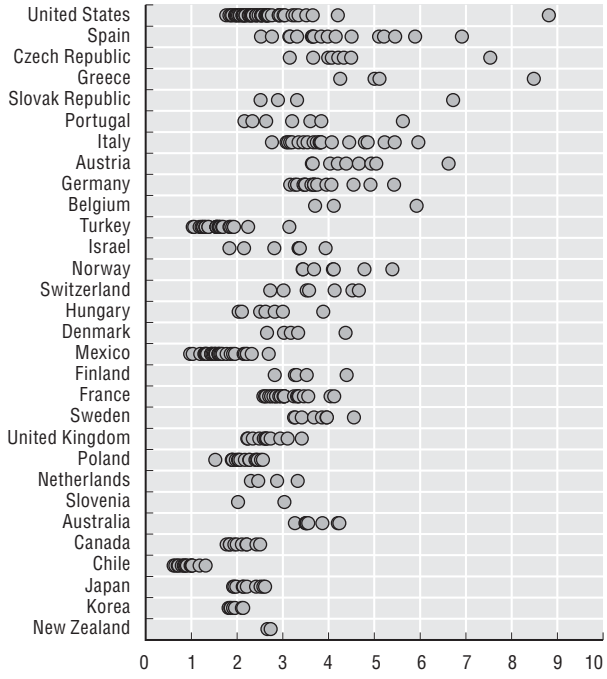
4.33: Regional values are expressed as a multiple of the country value.

### 4.33. Range in TL2 regional hospital beds per 10 000 inhabitants, 2010; Country value = 100



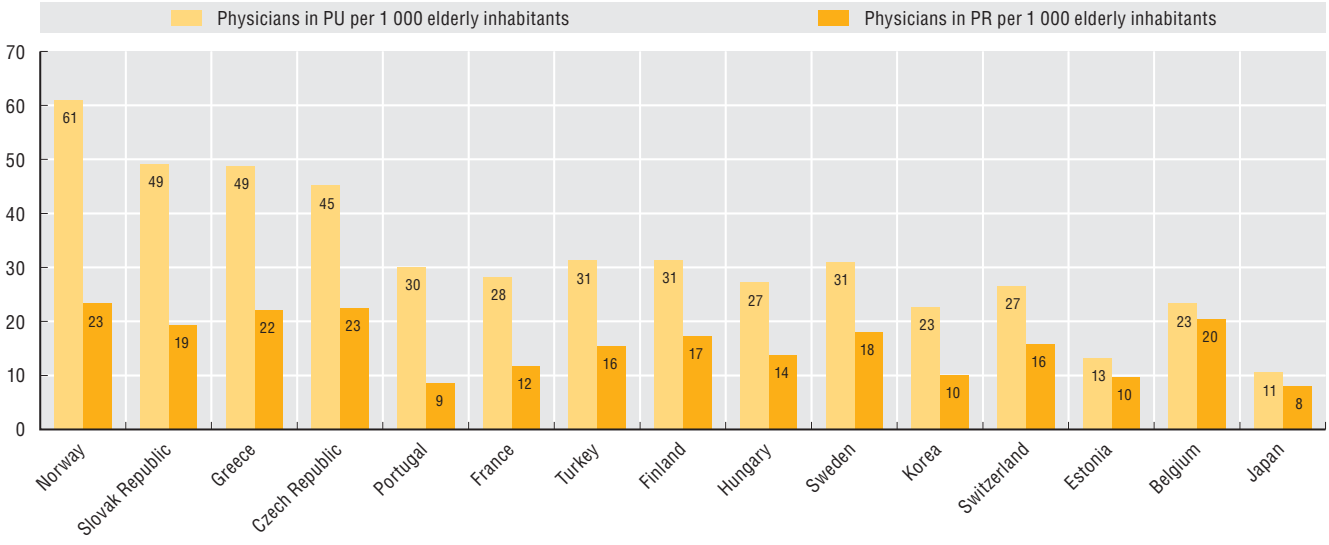

StatLink http://dx.doi.org/10.1787/888932914710

### 4.34. Range in TL2 regional physicians density (per 1 000 inhabitants), 2011




StatLink http://dx.doi.org/10.1787/888932914729

### 4.35. Physicians in TL3 predominantly urban and rural regions by 1 000 inhabitants aged 65 and over, 2011




StatLink http://dx.doi.org/10.1787/888932914748

# Health status of population in regions

Life expectancy at birth is the most frequently used measure of the health of the population. The difference in life expectancy among OECD regions is of almost 20 years, ranging from 68 years in Chihuahua (Mexico) to 84 years in Navarra (Spain). The regions enjoying the highest life expectancy at birth are concentrated in Spain, Italy, France, Switzerland and Japan. The regions with the lowest life expectancy are found in Mexico, Hungary and Poland (Figure 4.36).

Most OECD countries have achieved significant progress in reducing infant mortality rates over the past few decades although these rates still remain high in certain countries and regions. Across OECD regions, infant mortality rates seem to be higher in North America, partially due to differences in reporting practices (Figure 4.37). In 2010, Puebla (Mexico), Northwest Territories (Canada), and District of Columbia (United States) were the regions with the highest infant mortality rate across the OECD countries for which subnational data are available, having respectively 18.2, 15.5, and 11.2 infant deaths for every 1 000 live births. In contrast, countries like Japan, Slovenia and Belgium had some of the lowest regional infant mortality rates in the OECD. No region in these countries exceeded 3 infant deaths per 1 000 live births in 2010 (Figure 4.37).

Risk factors for health are complex and numerous. Among them, transport-related accidents have received particular attention in OECD countries during the last decades. Difference in traffic laws and rules, geographic characteristics, and even risk-taking behaviour may contribute to regional difference in the number of fatal accidents. North American countries seem also to have the biggest disparities in terms of fatal transport accidents due to remote rural regions with high distance travel (Figure 4.38).

### *Definition*

Life expectancy at birth measures the number of years a new born can expect to live, if death rates in each age group would stay the same during her or his lifetime.

Infant mortality rate is the number of deaths of children less than one year of age per 1 000 live births.

Transport-related mortality rate is the number of deaths attributed to transport accidents (in the groups V01-V99 of the International Classification of Diseases – ICD) per 100 000 inhabitants.

## Source

OECD (2013), *OECD Regional Statistics* (database), *http://dx.doi.org/10.1787/region-data-en*.

See Annex B for data sources and country-related metadata. United States: Life Expectancy, *Measure of America* 2010-11, *www.measureofamerica.org*.

## Reference years and territorial level

2010; TL2.

Canada and New Zealand 2006, Israel and United States, 2009.

Life expectancy: no regional data are available for Chile, Iceland, Korea and Turkey.

Infant mortality: no regional data are available for Belgium, Chile, Finland, Iceland, Korea, New Zealand and Turkey.

## Further information

BMJ (2012), "Influence of definition based versus pragmatic birth registration on international comparisons of perinatal and infant mortality: population based retrospective study", *http://dx.doi.org/10.1136/bmj.e746*.

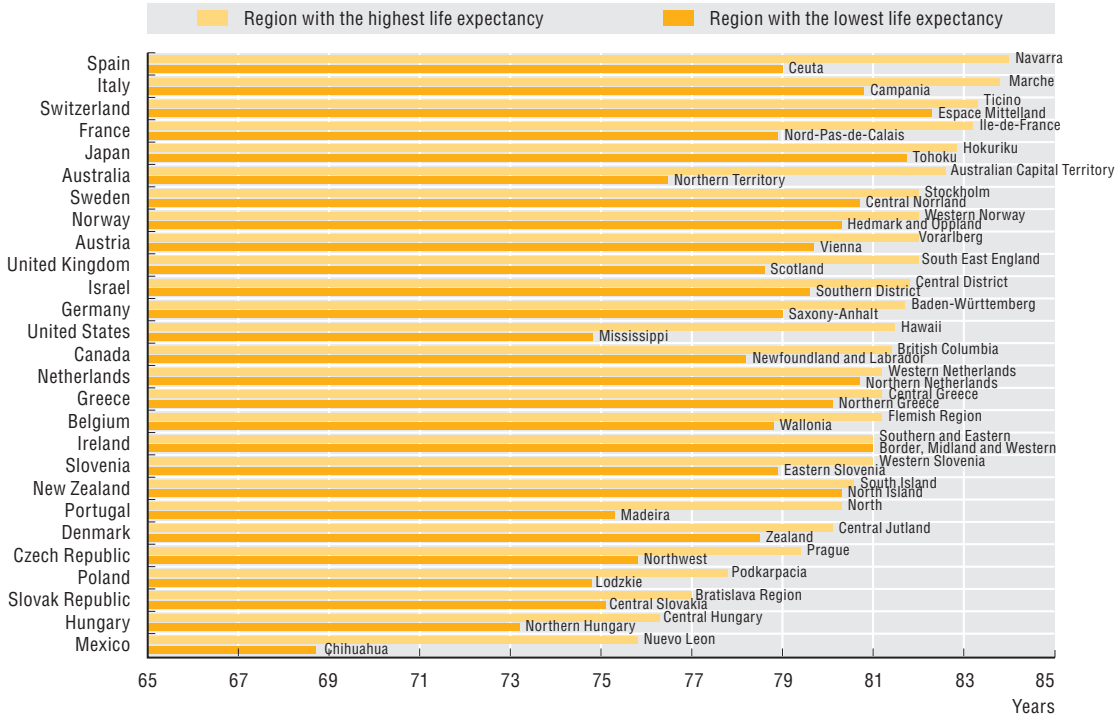
Interactive graphs and maps: *http://rag.oecd.org*.

## Figure notes

4.37: Higher rates in United States and Canada may be partly due to differences in reporting practices concerning newborns weighing less than 500g compare to other OECD countries, see BMJ (2012).

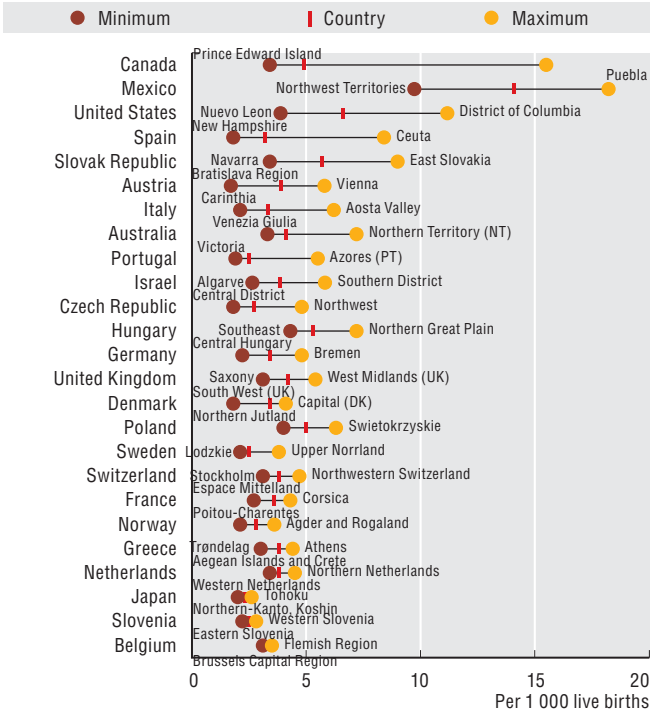
4.38: Each observation (point) represents a TL2 region of the countries shown in the vertical axis. Regional values are expressed as a multiple of the country value.

## 4.36. Maximum and minimum regional life expectancy at birth, 2010 (TL2)




StatLink http://dx.doi.org/10.1787/888932914767

## 4.37. Maximum and minimum regional values of infant mortality rates by country, 2010 (TL2)



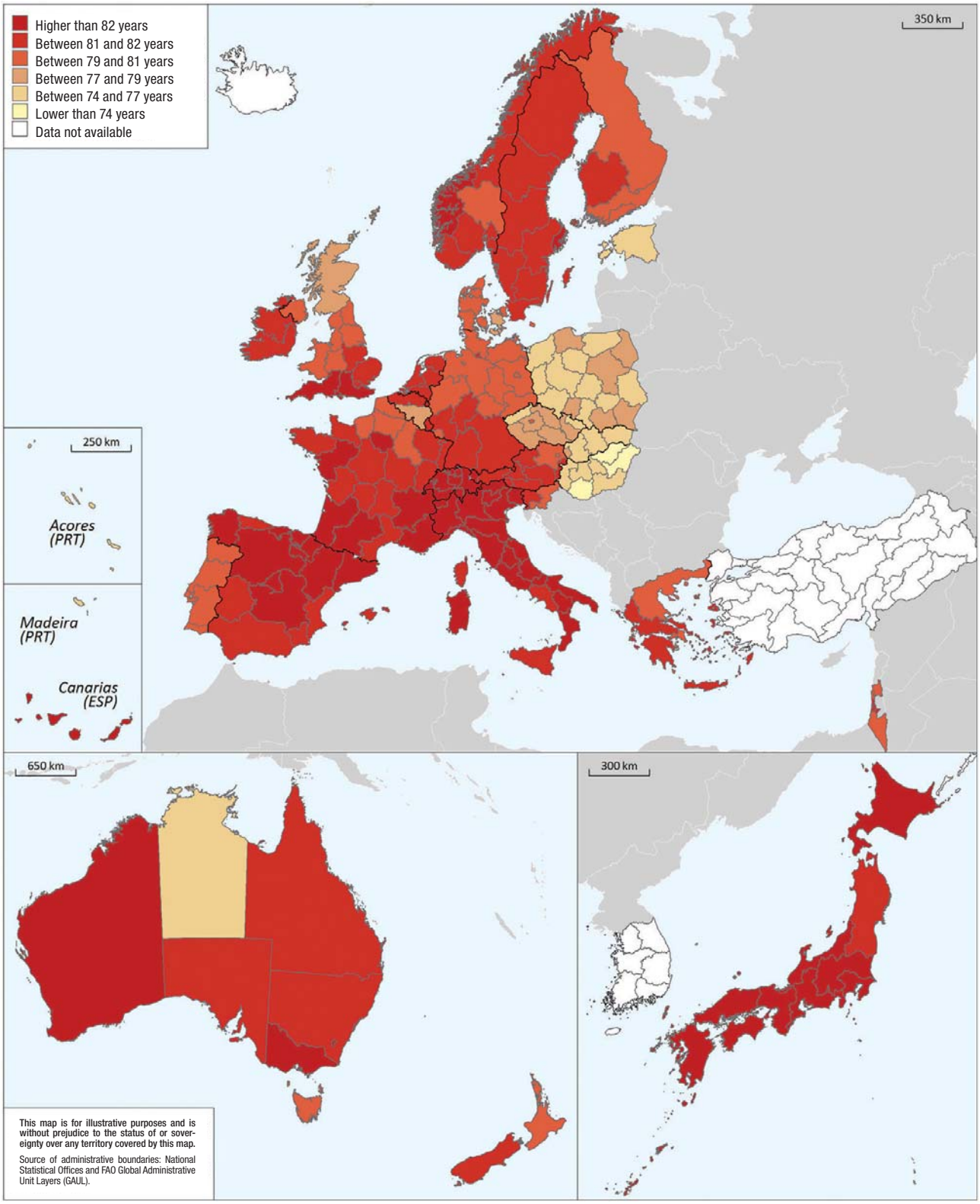

StatLink http://dx.doi.org/10.1787/888932914786

## 4.38. Range in regional mortality rates due to transport accidents, 2010 (TL2); Country value = 100


StatLink http://dx.doi.org/10.1787/888932914805

## 4.39. Life expectancy: Asia, Europe and Oceania, 2010

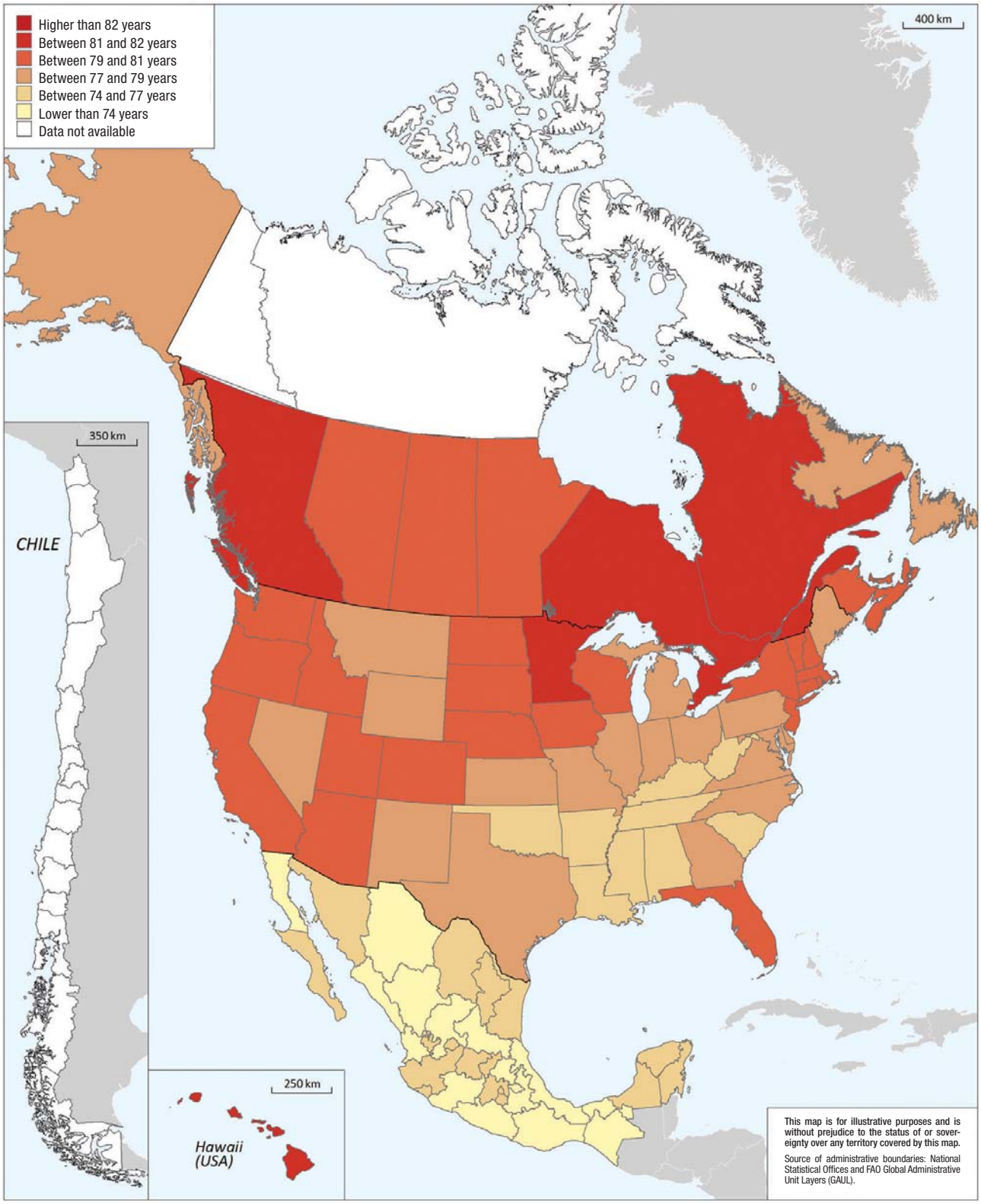
*TL2 regions*




StatLink http://dx.doi.org/10.1787/888932915698

## 4.40. Life expectancy: Americas, 2010

*TL2 regions*




StatLink http://dx.doi.org/10.1787/888932915717

# Safety in regions

Safety is a critical element of well-being. The list of criminal activities is long and highly contextual and the measurement of some of them is a daunting task. Despite the fact that criminal activities like murder and car theft do not account for the whole spectrum of crimes faced by society, they can provide some basis for international co-operation. Recent analysis shows that the underlying causes of crime differ not only across but within countries calling for policies that take into account the regional heterogeneity of causes (OECD, 2013).

The OECD country with the highest murder rates, as well as the highest regional variation, is Mexico. In 2010, the region of Chihuahua (Mexico) had more than 100 murders per 100 000 inhabitants, while the region Yucatan (Mexico) only had 1.8 murders per 100 000 inhabitants (Figure 4.41). A wide regional disparity in murder rates is also found in the Russian Federation, ranging from 5 to 60 murders per 100 000 inhabitants in Belgorod and Tyvar Republic, respectively. OECD countries with lower murder rates, but with significant regional disparities, are the United States and Chile. For these countries, this large variation is due to an outlier region with a very high rate: Washington, D.C. (United States) and Aysén (Chile) had murder rates at least three times higher than their country values (Figure 4.41).

The theft of private property, albeit to a lesser extent than the number of murders, has a negative effect on people's well-being. It reduces a household's wealth, increases the costs associated with robbery prevention, and increases people's perception of insecurity. Since this type of crime is commonly reported for insurances claims, it overcomes common issues of bias of statistics on property crimes due to different regional propensity to report the crime.

In 2010, the OECD countries showing the largest regional disparities for car theft were Spain, Mexico, the Slovak Republic and the United States (Figure 4.42). In these countries, regions like Ceuta (Spain), Chihuahua (Mexico), Bratislava (Slovak Republic) and the District of Columbia (United States) not only had the highest car theft rates in the country, but their rates were at least three times higher than the country value (Figure 4.42).

### *Definition*

Murder is the unlawful killing of a human being with malice aforethought, more explicitly intentional murder. Reported murders are the number of murders reported to the police. The murder rate is the number of reported murders per 100 000 inhabitants.

Motor vehicle theft is defined as the theft or attempted theft of a motor vehicle. A motor vehicle is a self-propelled vehicle that runs on land surfaces and not on rails.

## Source

OECD (2013), *OECD Regional Statistics* (database), *http://dx.doi.org/10.1787/region-data-en*.

See Annex B for data sources and country-related metadata.

## Reference years and territorial level

2011; TL2.

Murders: No regional data are available for Finland, Germany, Iceland and Slovenia. For lack of comparability regional data from Canada are not used.

## Further information

OECD/The Mexican Institute for Competitiveness (2013), *Strengthening Evidence-based Policy Making on Security and Justice in Mexico*, OECD Publishing, *http://dx.doi.org/10.1787/9789264190450-en*.

Interactive graphs and maps: *http://rag.oecd.org*.

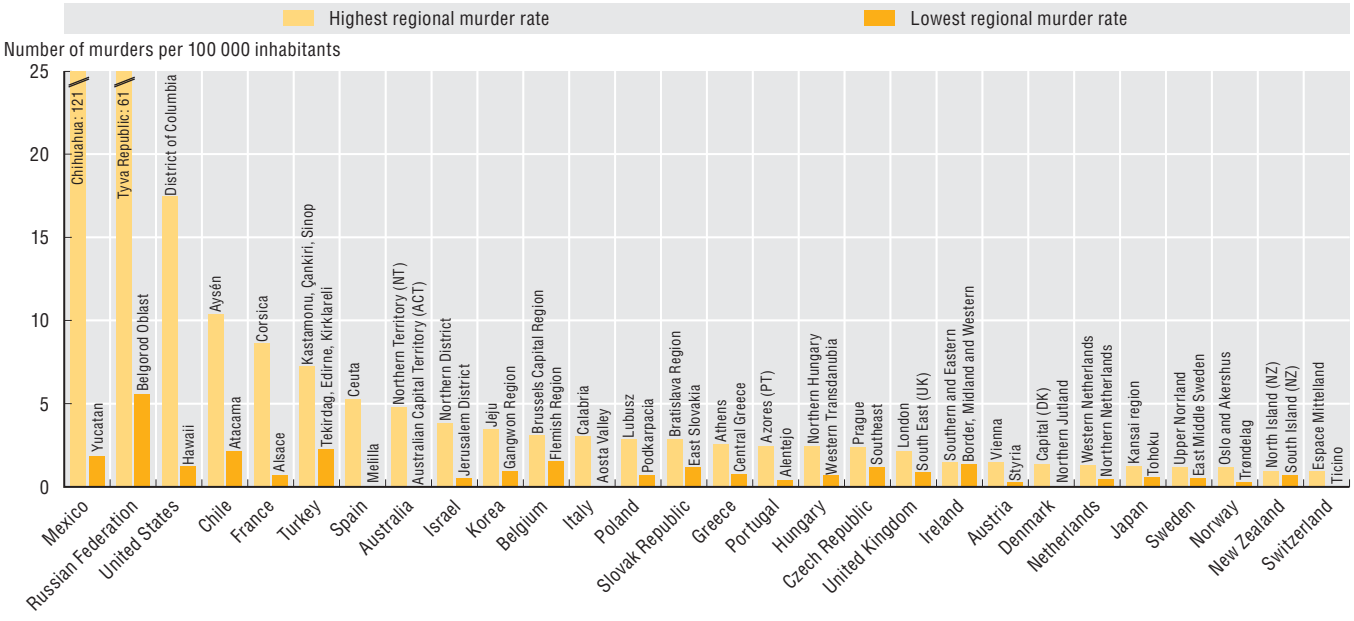
## Figure notes

4.41: 2009 data for Belgium, Greece, Netherlands; 2008 for Turkey and United Kingdom.

4.42: 2010 data for Belgium and Italy. Each observation (point) represents a TL2 region of the countries shown in the vertical axis. Regional values are expressed as a multiple of the country value.

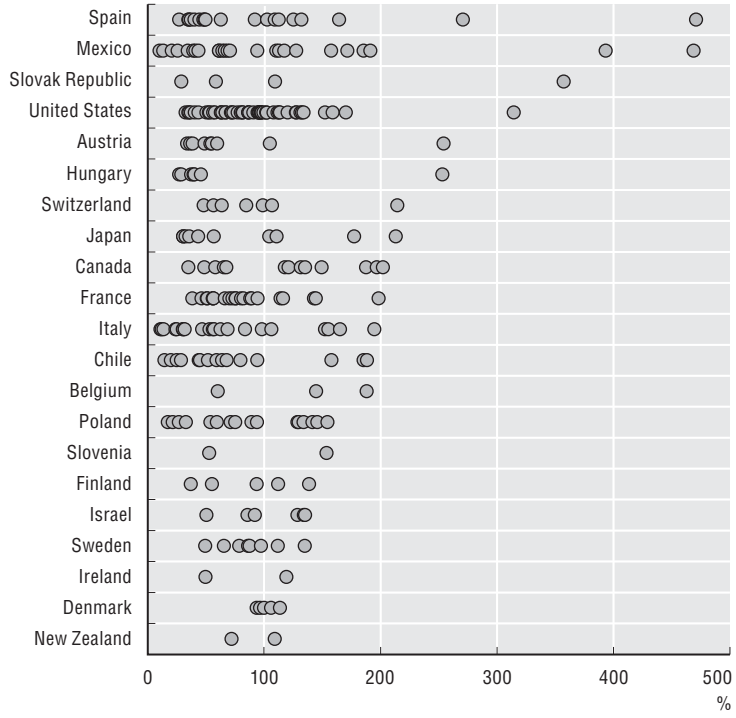
Information on data for Israel: *http://dx.doi.org/10.1787/888932315602*.

### 4.41. Maximum and minimum values of regional murders per 100 000 inhabitants, 2011 (TL2)




StatLink http://dx.doi.org/10.1787/888932914824

### 4.42. Range in regional car theft per 100 000 inhabitants, 2011 (TL2); country value = 100




StatLink http://dx.doi.org/10.1787/888932914843

# 5. ENVIRONMENTAL SUSTAINABILITY IN REGIONS

Air quality in regions

Carbon emissions in regions and by sector

Natural vegetation and the carbon footprint of regions

Municipal waste

Green patents in regions

*The data in this chapter refer to regions in OECD and non OECD countries. Regions are classified on two territorial levels reflecting the administrative organisation of countries. Large (TL2) regions represent the first administrative tier of subnational government. Small (TL3) regions are contained in a TL2 region.*

# Air quality in regions

Air quality has a major impact on health, the environment, and the overall well-being of people. Two indicators are used to monitor air quality: Concentrations of fine particles in the air (particulate matter PM), and nitrogen dioxide ($NO_2$). Both are considered by the World Health Organization (WHO) as major air pollutants with significant negative effects on respiratory and cardiovascular systems. Recent $PM_{10}$ data for Europe show that across Eastern European countries, as well as Belgium, Greece, the Netherlands and Italy, a large share of population is exposed to elevated values of particulate matter above an annual average concentration of 20 $\mu g/^3$. According to the WHO guidelines, the risk of adverse effects on health is very high above this threshold of annual average exposure (Figure 5.1).

$NO_2$ concentrations across all OECD countries were computed for 2011-12 since $PM_{10}$ data were not available on a global scale after the year 2006. An annual average exposure to $NO_2$ values above $10^9$ molec/$cm^2$ is considered elevated, and critical above $10^{15}$ molec/$cm^2$. Regional $NO_2$ emission ranges clearly show that for the most part OECD regions are not exposed to health-concerning levels of $NO_2$ (Figure 5.2).

### *Definition*

$PM_{10}$ are fine particles smaller than 10 micrometres that float in the air and access the respiratory system. $NO_2$ is one of the main sources of nitrate aerosols, which form an important fraction of $PM_{2.5}$, and of ozone when exposed to ultraviolet light. Main sources of PM and anthropogenic $NO_2$ emissions are fossil fuel based combustion processes.

$NO_2$ regional emissions are extracted from global monthly average $NO_2$ emission raster data based on 0.25 degree grid cell size. Monthly average $NO_2$ rasters for the months January 2011 to December 2012 have been assembled and the average values for the 24 month period have been calculated. For a detailed description of the method see Annex B.

However, annual average values are critically high in some regions, particularly large areas of eastern China as well as in some areas of Europe and North America.

The percentage of population that lives in regions with elevated and critical $NO_2$ concentration is relatively low (Figure 5.3). However, the values express average emissions within a two-year time frame in which emissions fluctuate and can reach concentrations significantly above the WHO threshold for shorter periods in time. Therefore, the share of population exposed to health-concerning $NO_2$ concentration can be considerably higher over a shorter time period.

With combustion processes from engines being a significant emitter of air pollutants, the number of cars on the road has a considerable impact on regional air quality, and fossil-fueled vehicle emissions directly impact the amount of $NO_2$ and particulate matter in the air. Significant regional differences between the lowest and the highest per capita car ownership exist in the United Kingdom, Austria, Turkey and Poland (Figure 5.4).

## Source

$NO_2$ emissions: Tropospheric Emission Monitoring Internet Service (TEMIS), *www.temis.nl/index.php*.

$PM_{10}$: European Environmental Agency (EEA), *www.eea.europa.eu/data-and-maps*.

Landscan 2009 for population estimates.

See Annex B for data sources and country-related metadata.

## Reference years and territorial level

$NO_2$ average 2011-12; TL3 for OECD countries, TL2 for Brazil, China, India, the Russian Federation and South Africa.

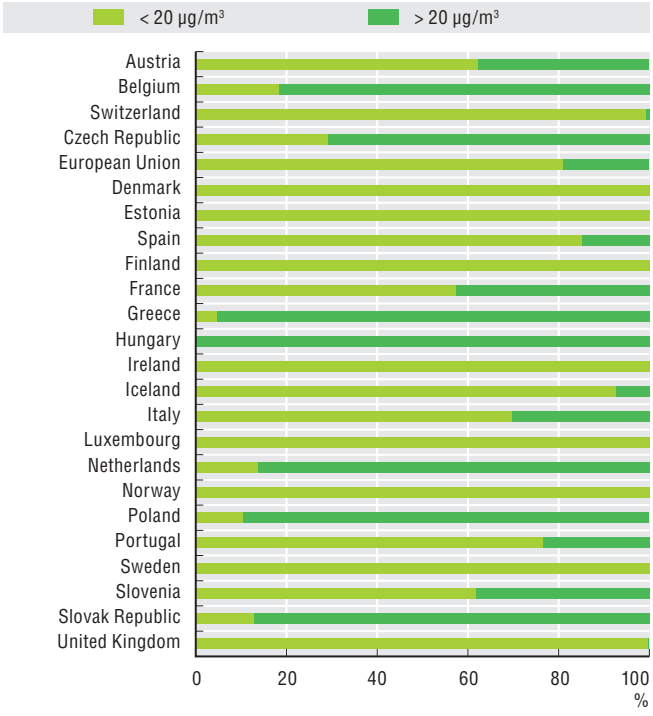
$PM_{10}$ 2010; TL3 European countries.

Number of cars 2011; TL3. for Australia, Austria, Canada, Chile, Greece, Japan, Netherlands and United States TL2.

## Figure notes

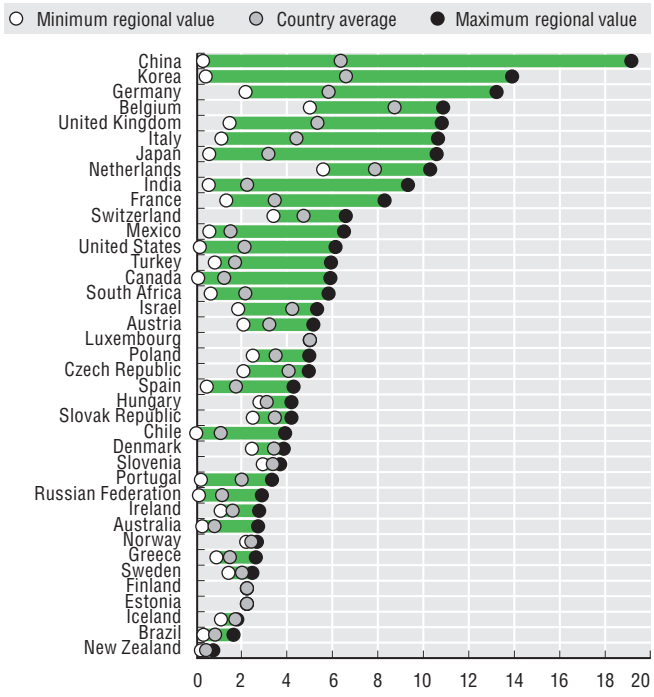
Information on data for Israel:
*http://dx.doi.org/10.1787/888932315602*.

### 5.1. Population exposure to fine air particulate matter ($PM_{10}$), 2010




StatLink http://dx.doi.org/10.1787/888932914862

### 5.2. TL3 range in $NO_2$ emissions ($10^n$ molec/$cm^2$), average 2011-12



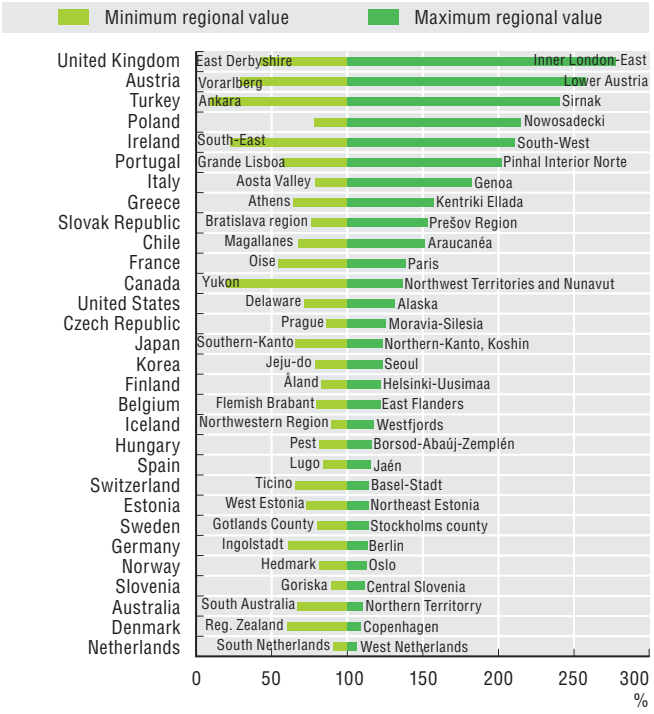

StatLink http://dx.doi.org/10.1787/888932914881

### 5.3. Population exposed to elevated and critical $NO_2$ emissions (molec/$cm^2$), 2011-12


StatLink http://dx.doi.org/10.1787/888932914900

### 5.4. Regional (TL3) range in cars per person, 2011

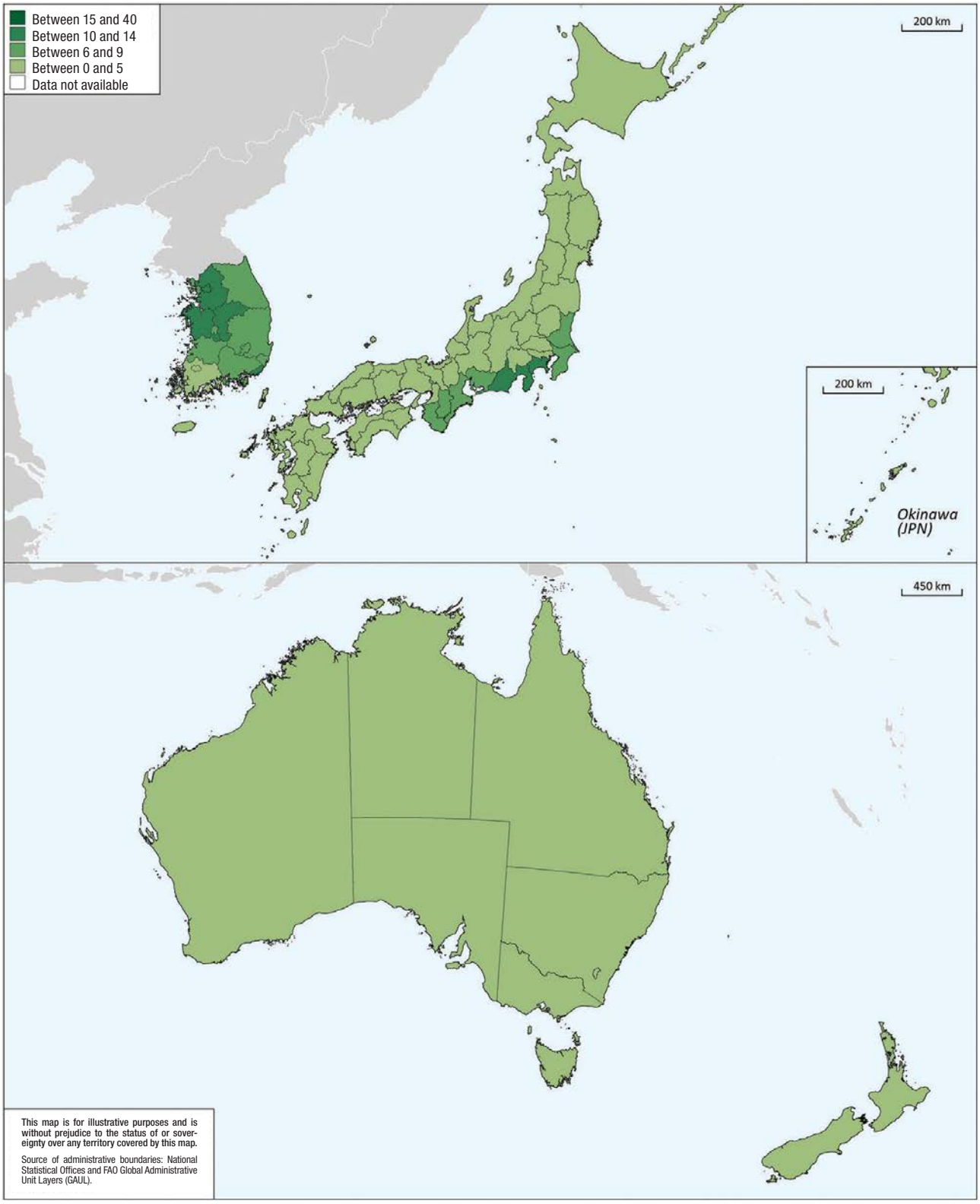
*Country average value = 100*




StatLink http://dx.doi.org/10.1787/888932914919

### 5.5. Regional range in $NO_2$ emissions: Asia and Oceania, 2011-12

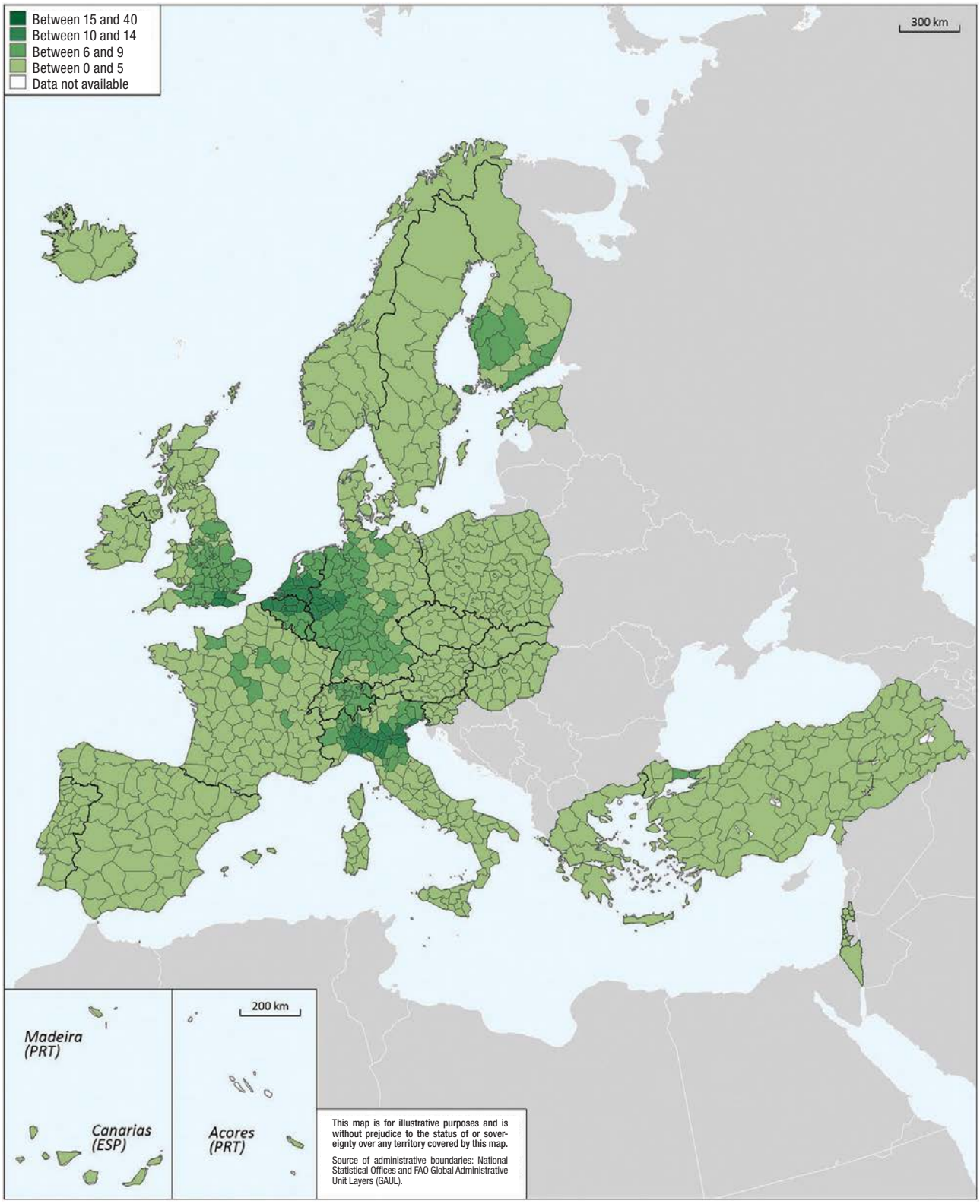
*TL3 regions, average ($10^x$molec/cm$^2$)*




StatLink http://dx.doi.org/10.1787/888932915850

## 5.6. Regional range in $NO_2$ emissions: Europe, 2011-12

*TL3 regions, average ($10^x$ molec/$cm^2$)*




StatLink http://dx.doi.org/10.1787/888932915869

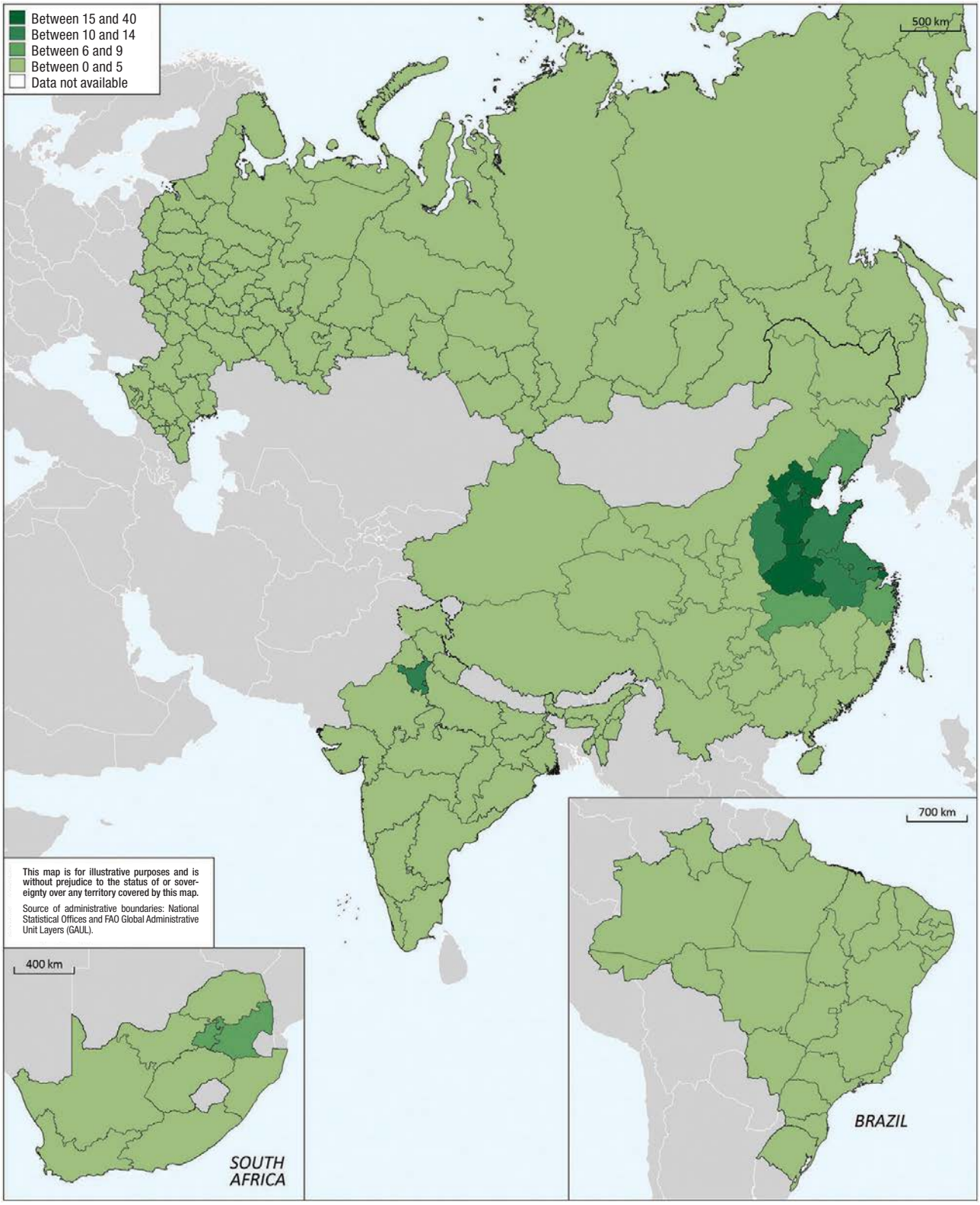
## 5.7. Regional range in $NO_2$ emissions: Americas, 2011-12

*TL3 regions, average ($10^x$ molec/$cm^2$)*


StatLink http://dx.doi.org/10.1787/888932915888

## 5.8. Regional range in $NO_2$ emissions: Emerging economies, 2011-12

*TL2 regions, average ($10^x$ molec/$cm^2$)*




StatLink http://dx.doi.org/10.1787/888932915907

# Carbon emissions in regions and by sector

Carbon dioxide ($CO_2$) is the primary greenhouse gas emitted through human activities. While $CO_2$ occurs naturally in the atmosphere and is part of the earth's carbon cycle – the exchange of carbon between the atmosphere, oceans, soil, plants, and animals – human activities alter the carbon cycle by adding additional $CO_2$ into the atmosphere and at the same time influence the ability of natural carbon sinks, such as forests and oceans, to remove $CO_2$ from it. Despite the fact that $CO_2$ emissions come from a variety of natural sources, man-made emissions have accounted for the majority of the $CO_2$ increase in the atmosphere since the beginning of the industrialisation.

Wide ranges in $CO_2$ emissions per capita exist among regions within OECD countries. The highest values of $CO_2$ per capita were registered in some regions of Australia, Canada, Chile, Greece, New Zealand and the United States, and, among non-OECD countries, the Russian Federation (Figure 5.9). Regional $CO_2$ emissions reached values as high as 550 tonnes per capita in Canada, and as low as 4.6 tonnes per capita in India. Part of these differences can be explained by the presence of greenhouse gas in low densely populated regions.

Compared to 2005, average per capita $CO_2$ emissions decreased in almost all OECD countries in 2008, particularly in Canada, and, for non-OECD countries, in Brazil.

Levels of gross domestic product (GDP) tend to be positively correlated with $CO_2$ emissions since industrial production and other anthropogenic sources of $CO_2$, such as fossil fuel-based transportation and electricity production, tend to be higher in economically thriving regions. However, the carbon intensity of a region, i.e. the ratio of regional GDP and regional $CO_2$, shows large regional differences, suggesting room for improvements (Figure 5.10). $CO_2$ efficiency of production increased across most OECD countries between 2005 and 2008.

The sectoral configuration of regional economies differs across OECD countries, and service sector based economies tend to be less carbon intensive. This highlights the need to better understand the mechanisms that drive $CO_2$ efficiencies, understanding the source of emissions by sector in different regions. The energy sector represents at least half of the total $CO_2$ emissions in most of the countries (Figure 5.11). In many countries, the concentration of $CO_2$ emissions by energy in a few regions is due to the fact that these regions produce electricity for the whole country. The share of $CO_2$ emissions from transport exceeds 50% in about half of the regions with the highest share of $CO_2$ emissions from transport (Figure 5.12).

### *Definition*

Carbon dioxide ($CO_2$) emissions in regions are estimated by adjusting national emission data with population grid data and infrastructure location. They include emissions from all sources with the exception of air transport, international aviation and shipping.

$CO_2$ emissions from transport include road and non-road transportation.

GDP/$CO_2$ is a measurement of the carbon intensity of production at the regional level.

## Source

$CO_2$ emissions: EDGAR spatial emission datasets, JRC, *http://edgar.jrc.ec.europa.eu/*.

See Annex B for data sources and country-related metadata.

See Annex C for details on data estimation.

## Reference years and territorial level

2008; TL3 for OECD countries; TL2 for Brazil, China, India, the Russian Federation, and South Africa.

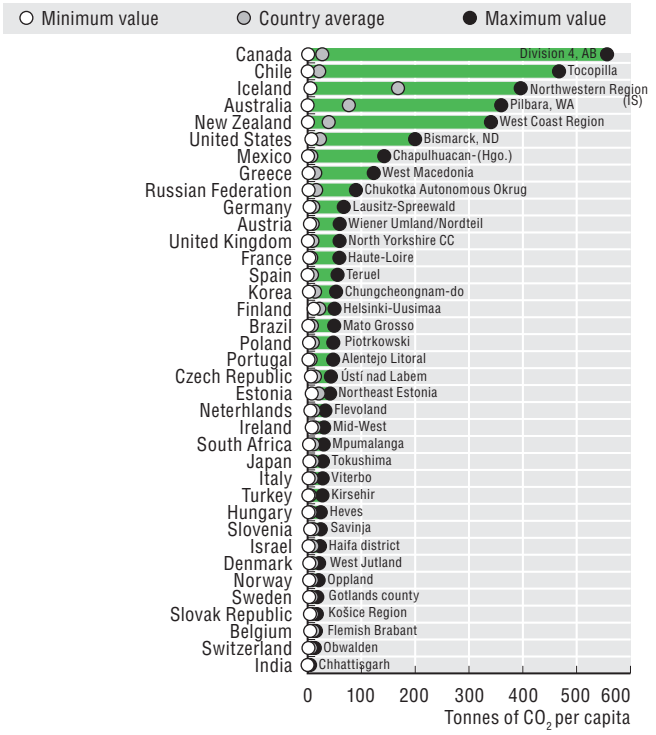
## Further information

Piacentini, M. and K. Rosina (2012), "Measuring the Environmental Performance of Metropolitan Areas with Geographic Information Sources", *OECD Regional Development Working Papers*, No. 2012/05, OECD Publishing, *http://dx.doi.org/10.1787/5k9b9ltv87jf-en*.

## Figure notes

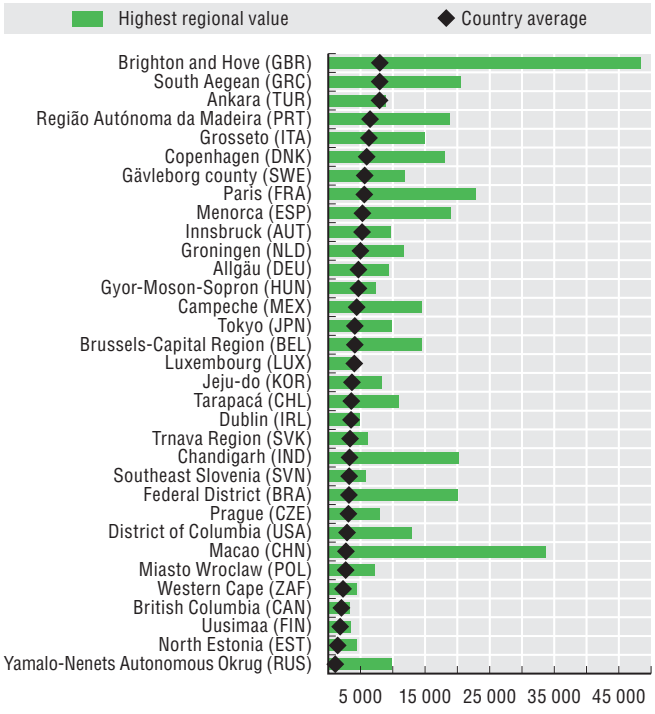
Information on data for Israel: *http://dx.doi.org/10.1787/888932315602*.

### 5.9. TL3 regional range in $CO_2$ emissions per capita, 2008



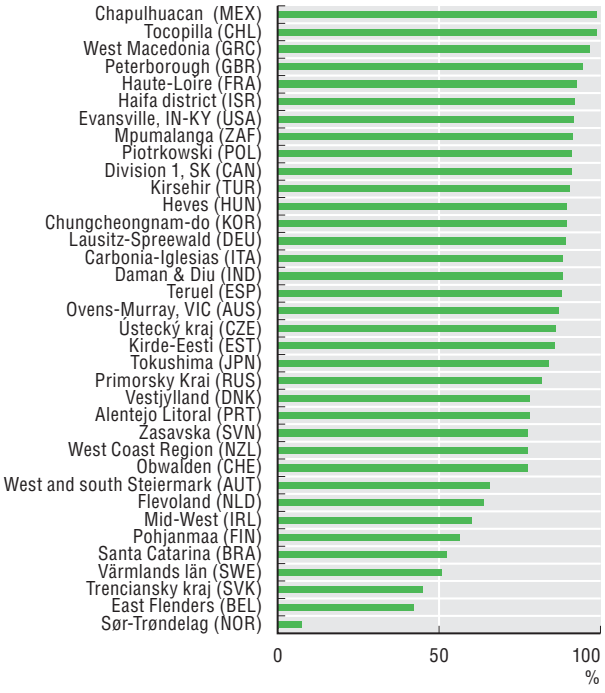

StatLink http://dx.doi.org/10.1787/888932914938

### 5.10. TL3 region with the highest GDP to $CO_2$ ratio and country average, 2008



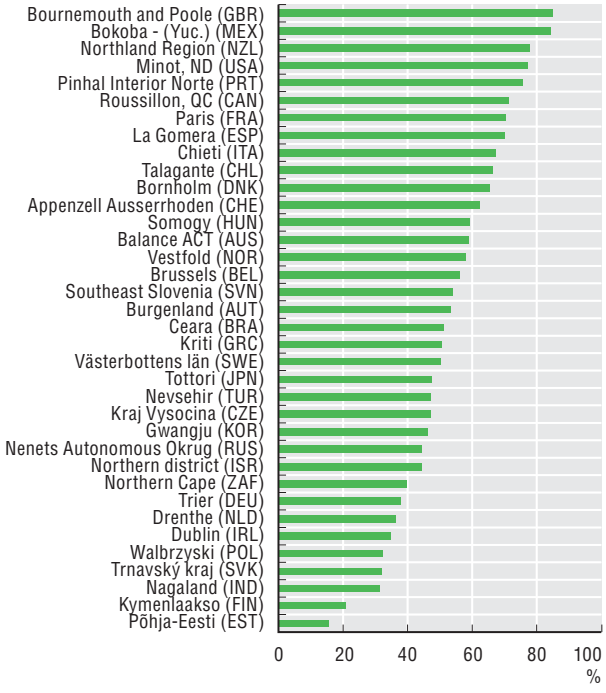

StatLink http://dx.doi.org/10.1787/888932914957

### 5.11. Share of $CO_2$ emissions from the energy sector, highest regional (TL3) value by country, 2008




StatLink http://dx.doi.org/10.1787/888932914976

### 5.12. Share of $CO_2$ emissions from the transport sector, highest regional (TL3) value by country, 2008




StatLink http://dx.doi.org/10.1787/888932914995

# Natural vegetation and the carbon footprint of regions

Reducing carbon emissions from anthropogenic sources such as industrial production and fossil-fueled transportation is paramount in the pursuit to reduce carbon footprints and tackle the challenge of global climate change. At the same time, natural vegetation and its ability to absorb carbon dioxide ($CO_2$) are central components in the mitigation of greenhouse gases. This natural process of $CO_2$ *sequestration* is the result of photosynthesis; hence, a region's potential to absorb carbon from the atmosphere is linked to its exposure to sunlight, precipitation and green leaf biomass.

Positive regional Net Ecosystem Productivity (NEP) indicates the regional potential to capture carbon from the atmosphere (sequestration), thanks to the presence of forests. Negative regional values indicate that carbon sequestration is outweighed by carbon release from the soil (Figure 5.13).

Central to interpreting these data is the fact that a region's carbon sink capacity is not static and varies over time as climate conditions change as well as the amount of green leaf biomass. And, while carbon sequestration capacity plays an important role in the discussion on global climate change, it is itself influenced by climate conditions in the first place. With temperature and precipitation influencing the amount of $CO_2$ released from the soil, and the level of photosynthesis driving the amount of $CO_2$ that can be sequestered from the atmosphere, evaluating an ecosystem's carbon sink potential is a complex task.

### *Definition*

Carbon sinks are natural reservoirs such as forests and other green leaf vegetation and oceans that capture carbon from the atmosphere.

Net Ecosystem Productivity (NEP) measures the net balance of carbon stored by the green leaf vegetation through the production of biomass, subtracting the amount of $CO_2$ release from the soil. It is expressed in grammes of carbon/$m^2$/year. Positive regional NEP values indicate that carbon is being captured from the atmosphere, suggesting the presence of forests that help reduce the amount of carbon in the air. The share of urban land converted from agriculture (forest or other vegetation) is defined as the difference in the land classified as urban in 2008 and the land classified as agriculture (forest or other vegetation) in 2000, divided by the total land in 2000.

The area covered by vegetation is defined as the land classified as agriculture, forest or other non-forest vegetation.

Countries in the southern hemisphere as well as those situated in lower latitudes of the northern hemisphere are the ones most subject to large regional variations in carbon sequestration (Figure 5.13).

Converting natural land to land for urban uses adds pressure on the potential to sequester carbon from the atmosphere, particularly when converting from green leaf biomass such as forests. Preserving natural landscapes remains a central cornerstone in greenhouse gas mitigation. Across the OECD, urban land conversion from agricultural land accounted for the largest share, followed by forests. In Austria, Finland, Slovenia, Sweden and the United States, the share of forest within the overall land conversion was relatively high or even higher than the share of agricultural land (Figure 5.14).

Across the OECD, the share of regional land covered by vegetation shows comparable maximum values for most countries, but large differences exist in countries' average coverage. Generally higher percentages can be found in countries of the northern latitudes, which on average also show higher values in NEP (Figure 5.15).

## Source

NEP NASA-CASA model predictions 2006-2011, *http://geo.arc.nasa.gov/sge/casa/cquestwebsite/*.

Land covered by vegetation: MODIS Land Cover data 2008.

Urban land converted: Corine Land Cover EU23; Japan National Land Service Information Data; NLCD for the United States.

See Annex B for data sources and country-related metadata.

See Annex C for details on data estimation.

## Reference years and territorial level

NEP: average 2006-2011; land covered by vegetation: 2008.

TL3 for OECD countries and TL2 for Brazil, China, India, the Russian Federation and South Africa.

## Further information

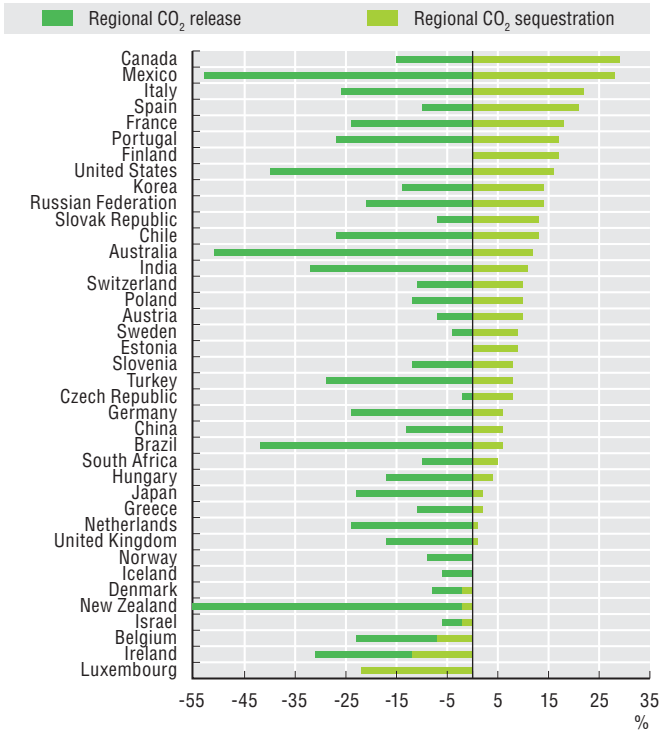
Piacentini, M. and K. Rosina (2012), "Measuring the Environmental Performance of Metropolitan Areas with Geographic Information Sources", *OECD Regional Development Working Papers*, No. 2012/05, OECD Publishing, *http://dx.doi.org/10.1787/5k9b9ltv87jf-en*.

## Figure notes

5.14: Data available only for Europe, Japan and the United States.

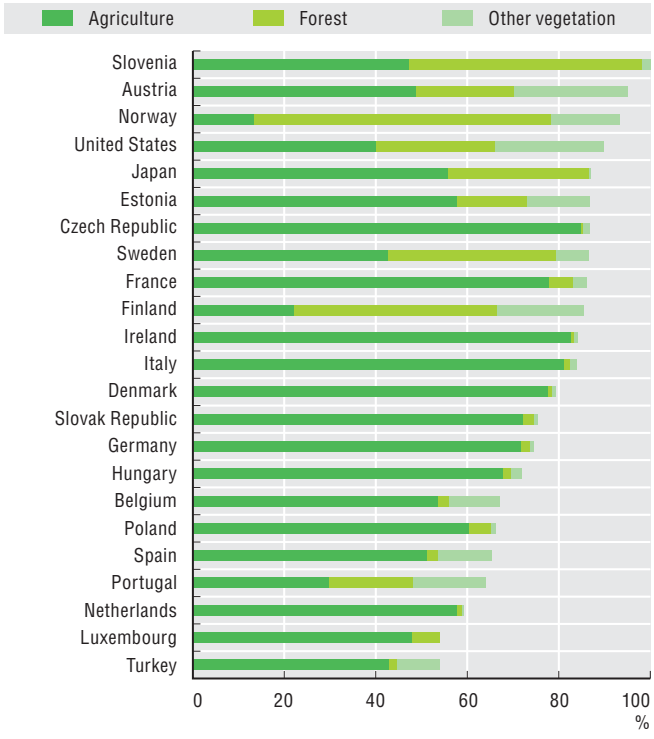
Information on data for Israel: *http://dx.doi.org/10.1787/888932315602*.

### 5.13. Regional (TL3) range in $CO_2$ sequestration and release, NEP ($g/m^2$) average 2006-11



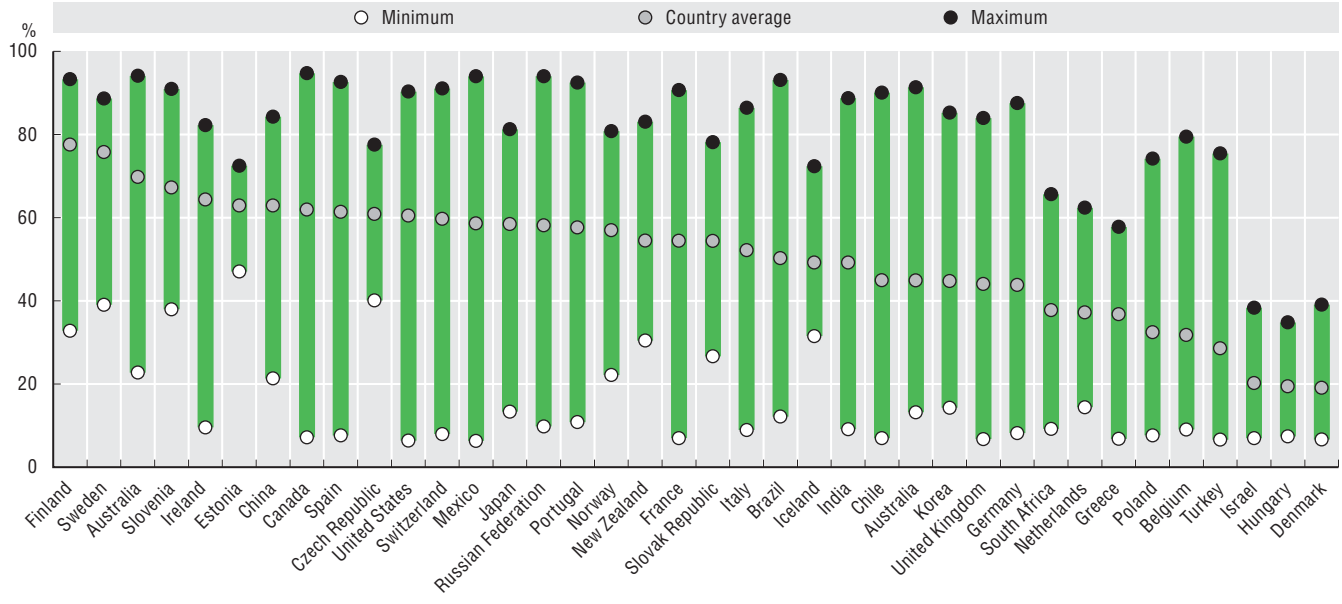

StatLink http://dx.doi.org/10.1787/888932915014

### 5.14. Share of urban land converted from agriculture, forest and other vegetation, 2000-06




StatLink http://dx.doi.org/10.1787/888932915033

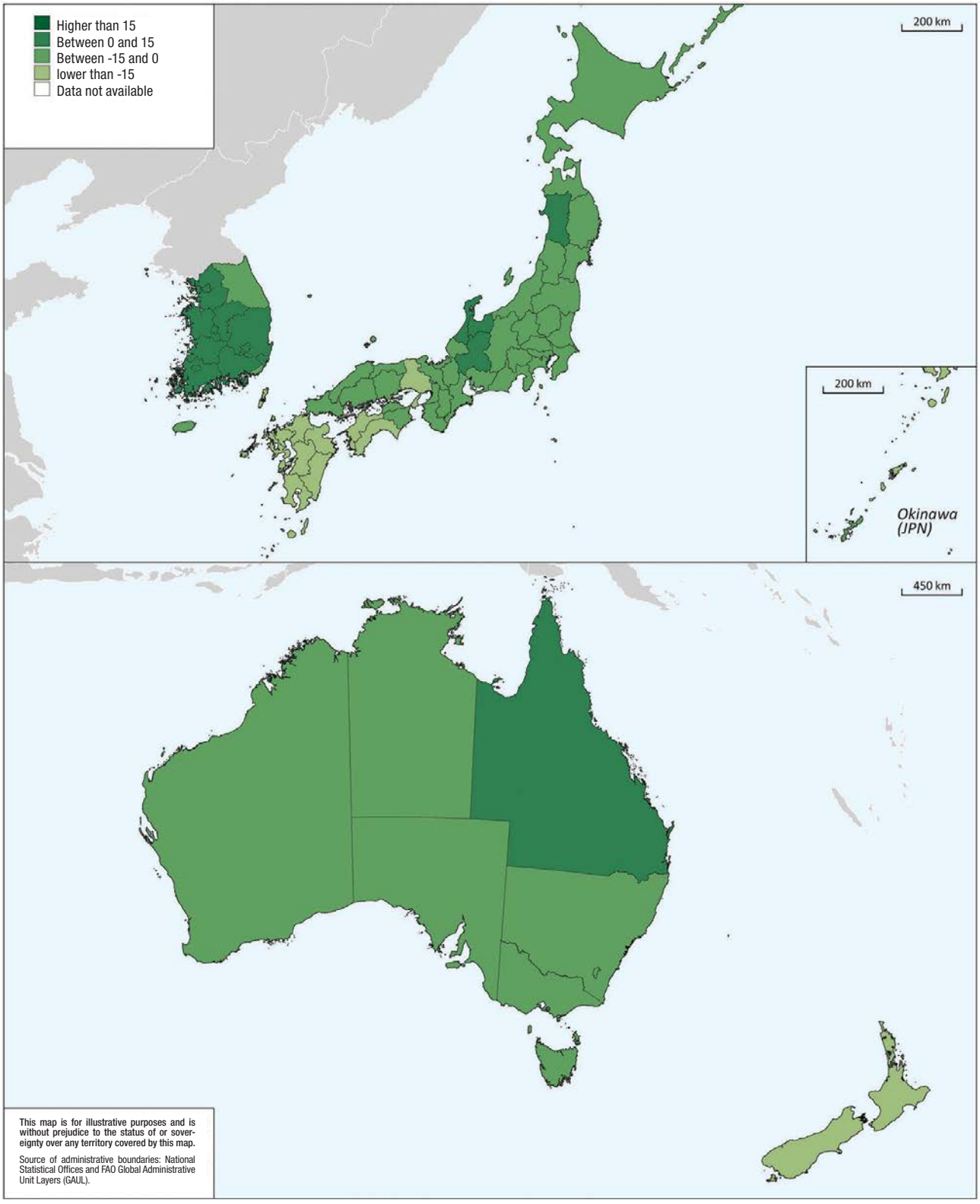
### 5.15. Per cent of TL3 regional land covered by vegetation, 2008




StatLink http://dx.doi.org/10.1787/888932915052

## 5.16. Regional $CO_2$ sequestration (or release): Asia and Oceania, 2006-2011

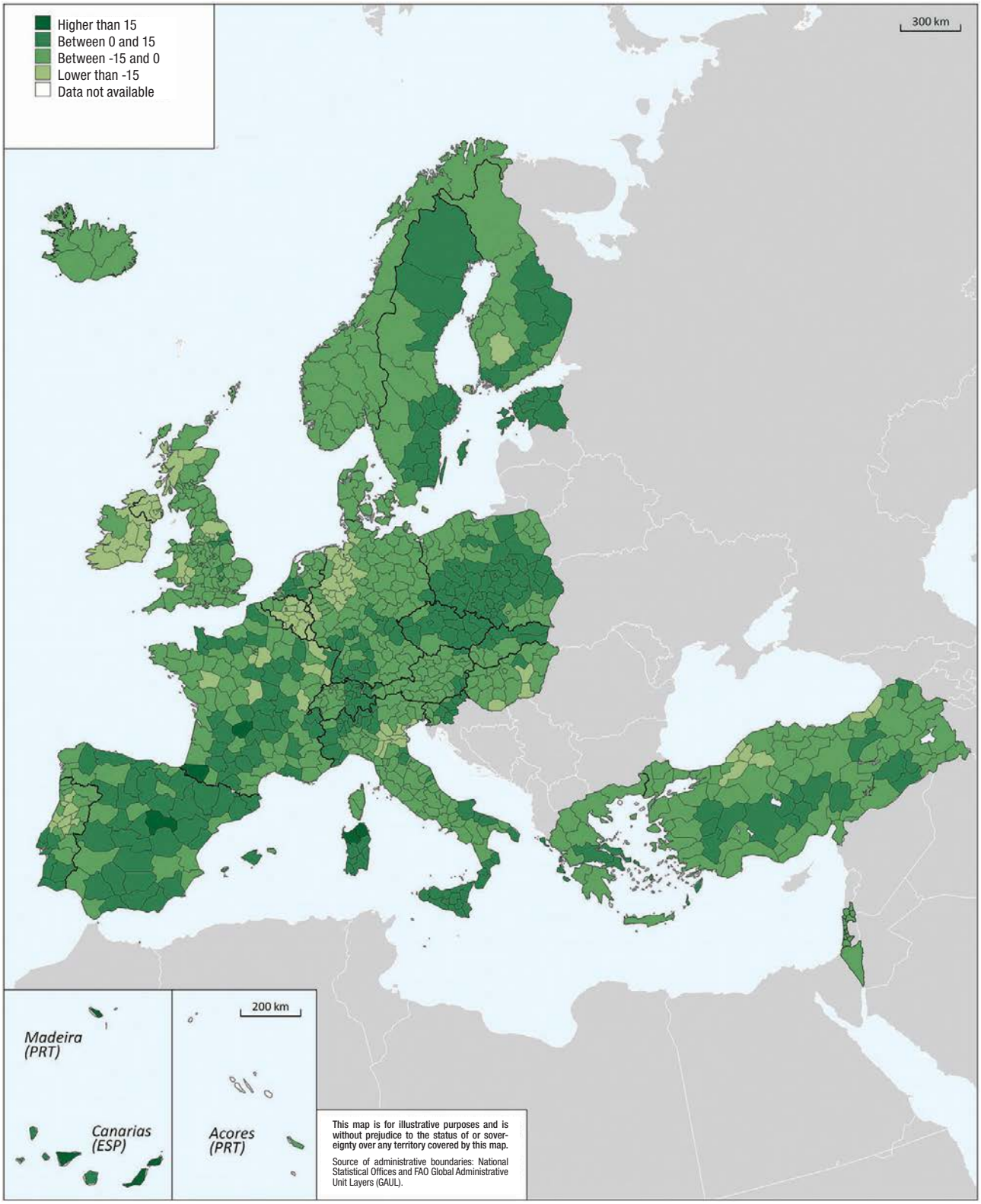
*TL3 regions, NEP average ($g/m^2$)*




StatLink http://dx.doi.org/10.1787/888932915774

## 5.17. Regional $CO_2$ sequestration (or release): Europe, 2006-2011

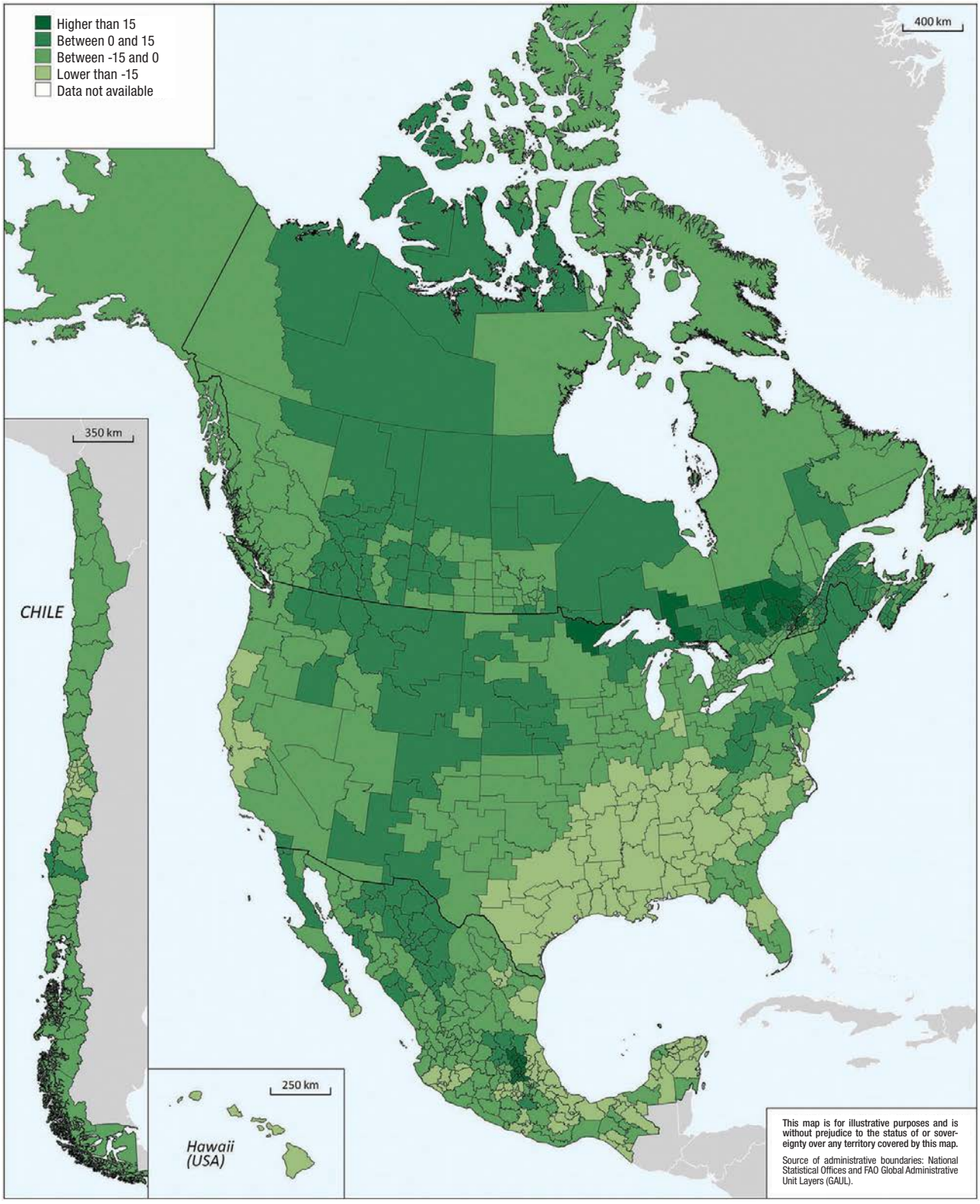
*TL3 regions, average NEP ($g/m^2$)*




StatLink http://dx.doi.org/10.1787/888932915793

## 5.18. Regional $CO_2$ sequestration (or release): Americas, 2006-2011

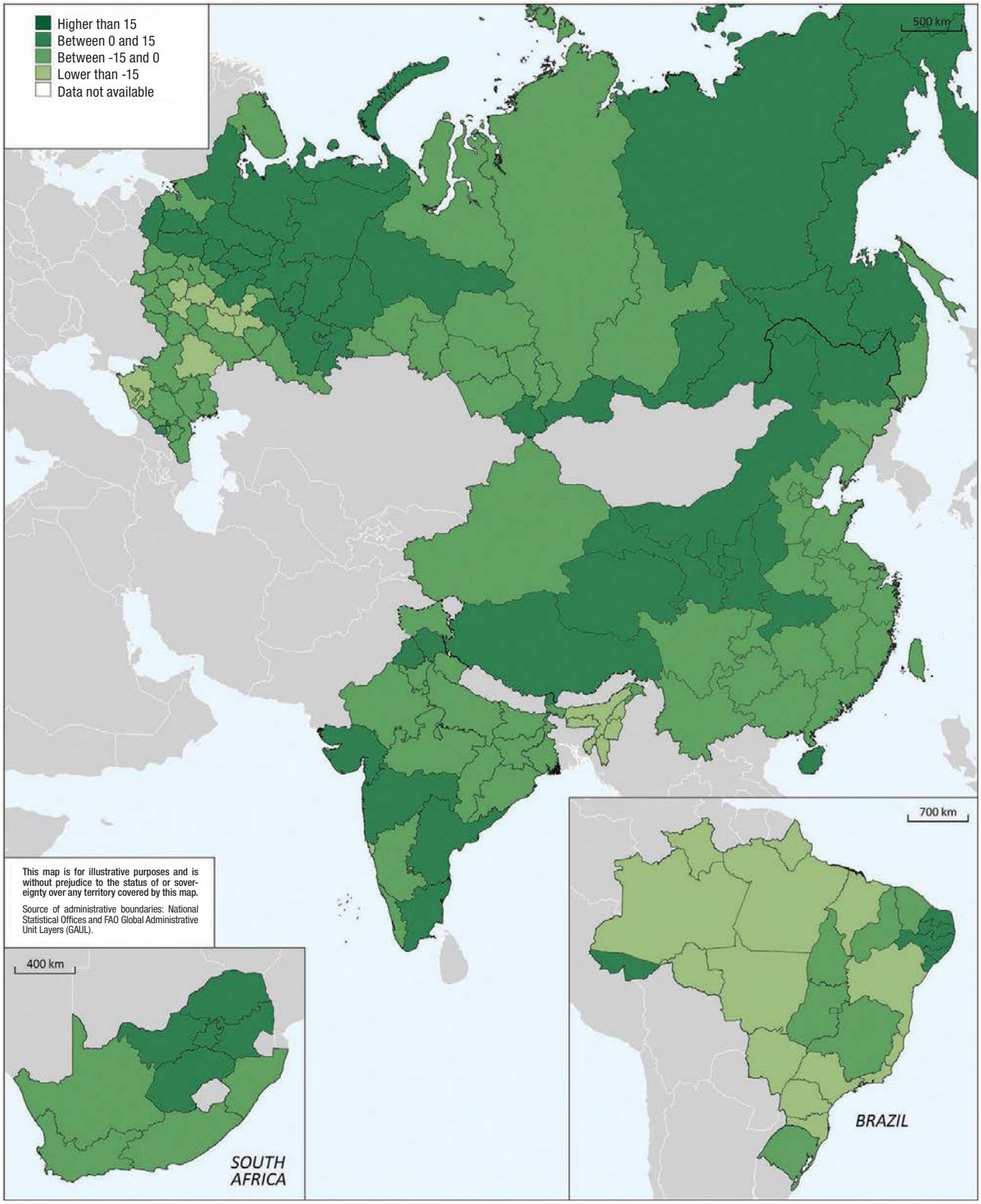
*TL3 regions, NEP average ($g/m^2$)*




StatLink http://dx.doi.org/10.1787/888932915812

## 5.19. Regional $CO_2$ sequestration (or release): Emerging economies, 2006-2011

*TL2 regions, average NEP ($g/m^2$)*




StatLink http://dx.doi.org/10.1787/888932915831

# Municipal waste

Efficient waste management plays an important role for public and environmental health. It prevents the formation of greenhouse gas emissions such as methane and other toxic gases that form through the degradation of organic waste in landfills, and particularly in warmer climates, effective waste management reduces the risk of spreading diseases. While inefficient waste management has negative impacts on landscapes and watercourses, other environmental concerns result from the fact that some disposal items are made from limited resources. Hence, re-using such items reduces the pressure on natural resources and increases resource efficiency. In addition, waste disposal has an important economic implication for local governments which are usually responsible for its management.

In 2010, OECD country municipal waste production varied from 300 kg per capita in Estonia to 750 kg per capita in the United States (Figure 5.20). At national level, per capita waste decreased in about half of the OECD countries between 1995 and 2010, particularly in Estonia, New Zealand, Norway and Slovenia. Despite the use of different methodologies in accounting for national waste, which could influence the comparison of national data, the strong decreases in some countries indicate overall improvements in waste management practices.

Large differences also exist in generated waste per capita within the same country (Figure 5.21). The largest regional differences are found in Sweden, where per capita waste disposal is as low as 18% of the national average in the region of Stockholm and as high as 250% of the national average in the region of Central Norrland.

Regional waste generation can be affected to some degree by the industrial production of consumer commodities that are consumed outside the region where the waste gets charged. However, effective waste management can have a positive impact on reducing the total amount of generated total waste, as shown for example in Germany where the waste produced in the region of Berlin was only 35.2% of the country's average value in 2010 (Figure 5.21).

Different municipal waste management practices, individual consumer behaviours, and different standards for the packaging of consumer commodities all influence variations in regional per capita waste values. Data on regional recycling rates supports this assumption. For the few countries where regional recycling rates are available, the large regional variations within a country can be explained by different waste management practices and behaviour. In Sweden these values range from 15.3% to 83.6% of total waste recycled, while strikingly not less than 80% of total waste gets recycled in Austrian regions (Figure 5.22).

### *Definition*

Municipal waste is generally defined as the total waste collected by or on behalf of municipalities. It includes waste from households, commerce, institutions and small businesses, and yard and garden. The definition excludes municipal waste from construction and demolition and municipal sewage.

Recycling rates are calculated as the percentage of municipal waste that undergoes material or other forms of recycling (including composting).

## Source

National data: *OECD Environmental Statistics* (database), *http://dx.doi.org/10.1787/env-data-en*.

OECD (2013), *OECD Regional Statistics* (database), *http://dx.doi.org/10.1787/region-data-en*.

See Annex B for data sources and country-related metadata. The sum of collected regional data on waste does not always match the OECD national data.

## Reference years and territorial level

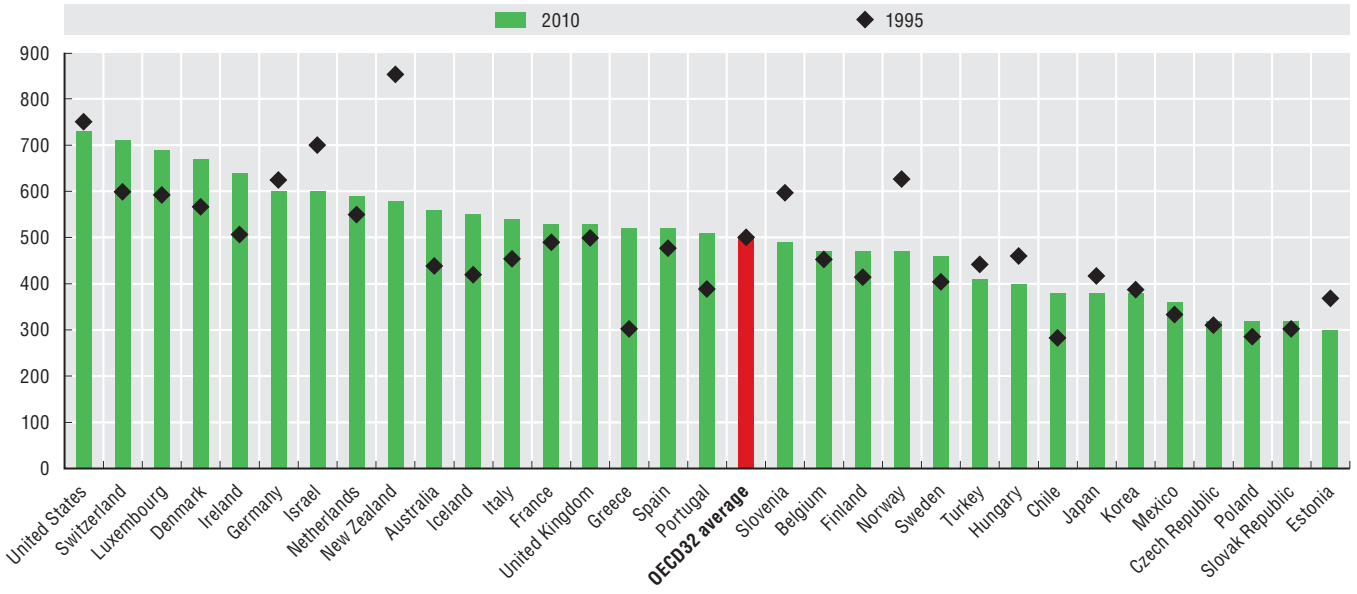
2010; TL2.

No regional data are available for Australia, Belgium, Chile, Denmark, Finland, Greece, Iceland, Ireland, Switzerland and United States.

## Figure notes

5.21: Each observation (point) represents a TL2 region of the countries shown in the vertical axis. Regional values are expressed as a percentage of the country value.

## 5.20. Municipal waste (kg per capita), 1995 and 2010

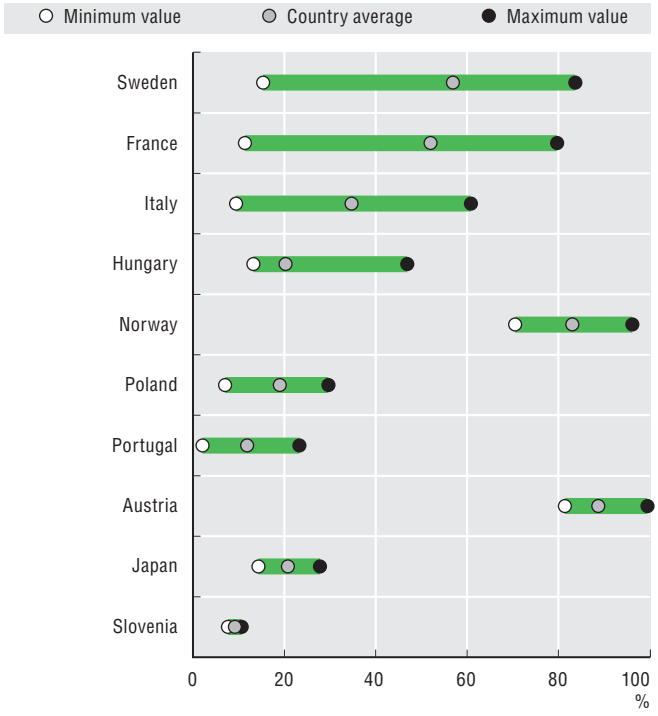



StatLink http://dx.doi.org/10.1787/888932915071

## 5.21. Range in regional municipal waste per capita, TL2, 2010; country average value = 100


StatLink http://dx.doi.org/10.1787/888932915090

## 5.22. Regional range in municipal waste recycled (including composting), TL2, 2010




StatLink http://dx.doi.org/10.1787/888932915109

# Green patents in regions

Innovation in environmentally related technologies contributes to environmental sustainability and green growth. The patenting activity of regions in environmental technology provides a measure of the efforts and pace of innovation. Japan and the United States display the top performing regions in number of patents in new sectors such as environmental technologies, biotechnologies and nanotechnologies. Patenting activity in environmental technologies is more recent than in biotechnologies and has developed at a faster pace in comparison to nanotechnologies, whose level of activity has not increased substantially in the past ten years. Among the top performing regions in environmental patenting are Japanese regions such as Aichi and Tokyo, which have emerged more recently (Figure 5.23).

### *Definition*

A patent is an exclusive right granted for an invention, which is a product or a process with industrial applicability that provides, in general, a new way of doing something or offers a new technical solution to a problem ("inventive step"). A patent provides protection for the invention to the owner of the patent. The protection is granted for a limited period, generally 20 years.

Data refer to overall patent applications to Patent Cooperation Treaty (PCT) applications.

Patent documents report the inventors (where the invention takes place), as well as the applicants (owners), along with their addresses and country of residence. Patent counts are based on the inventor's region of residence and fractional counts. If two or more inventors are registered on the patent document, the patent is classified as a co-patent.

The OECD project on Environmental Policy and Technological Innovation (EPTI) proposes a classification of environmental technologies. The term "environmental technology" is intended to be a reflection of the public consensus on the utility of certain technological approaches in reducing environmental impacts as compared to available alternatives. Hence, by definition, the notion of which technologies are considered "environmental" evolves over time.

The index of revealed technological advantage is defined as the region's share (over national value) of patents in a particular technology field divided by the region's share (over national value) in all patents fields. The index is equal to zero when the region holds no patents in a given sector; is equal to 1 when the region's share in the sector equals its share in all fields (no specialisation); and above 1 when a positive specialisation of the region is observed within its country.

The index of revealed technological advantage provides an indication of the relative specialisation of a region in patenting activity within selected technological domains. Values of the index higher than one indicate a specialisation of the region. Among the 20 top environmental patenting regions in 2008-10, Aichi (Japan) and Stuttgart (Germany) have the highest specialisation. Saitama and Ibaraki (Japan) and Stockholm (Sweden) increased their specialisation in environmental patenting in the past ten years; in contrast, the Korean regions of Daejeon, Seoul and Gyeonggi-do decreased their specialisation compared to 1995-97 (Figure 5.24).

Environmentally related industries are the result of the aggregation of several domains inventoried by the OECD Environmental Policy and Technological Innovation (EPTI) project. Stuttgart (Germany), Aichi and Satama (Japan), and Yvelines (France) record the majority of their environmental patents in transport impact mitigation, whereas the Noord-Brabant region in the Netherlands has 75% of the environmental applications recorded in energy efficiency in building and lighting (Figure 5.25).

## Source

*OECD REGPAT Database*, *www.oecd.org/sti/inno/oecdpatentdatabases.htm*.

For classifications of environmental-related technologies: *www.oecd.org/env/consumption-innovation/indicator.htm*.

See Annex B data sources and country-related metadata.

See Annex C for formulas.

## Reference years and territorial level

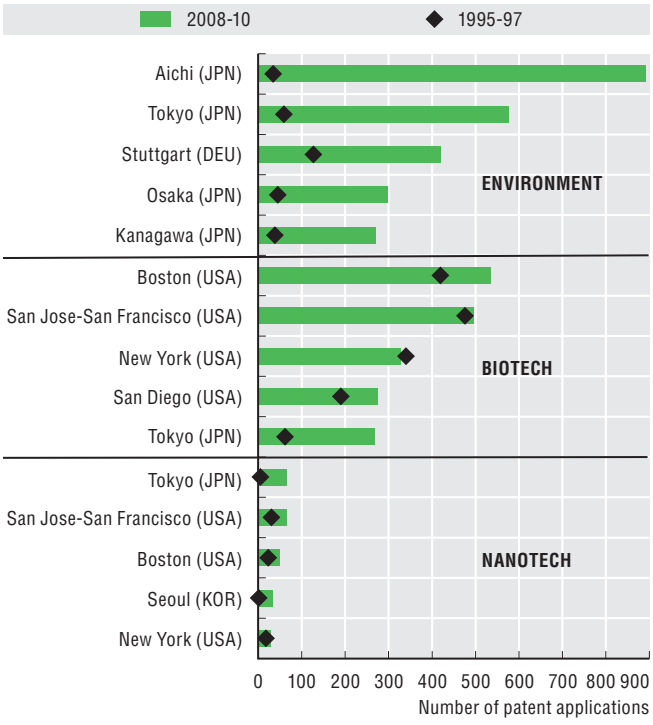
1995-97 and 2008-10 averages; TL3.

## Further information

OECD (2009), *Patent Statistics Manual*, OECD Publishing, *http://dx.doi.org./10.1787/9789264056442-en*.

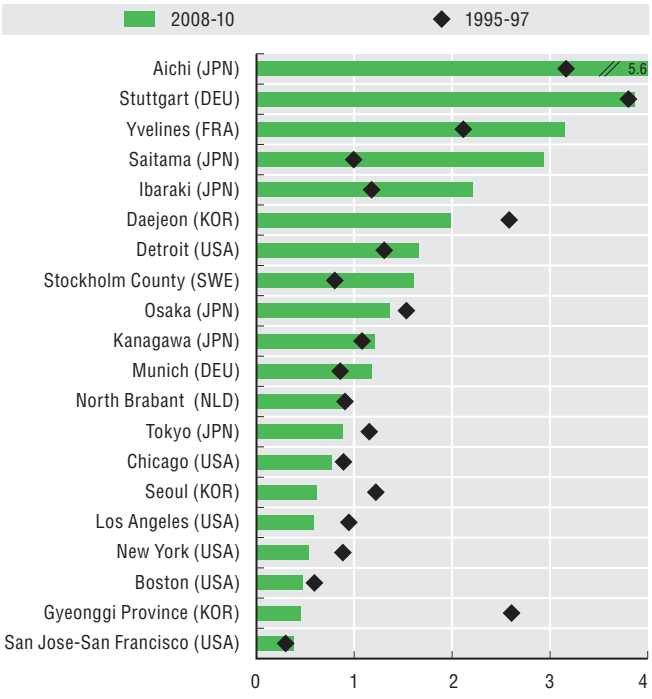
Interactive graphs and maps: *http://rag.oecd.org*.

### 5.23. Patents in environmental, biotech, and nanotech of the top five patenting TL3 regions, average 2008-10 and 1995-97



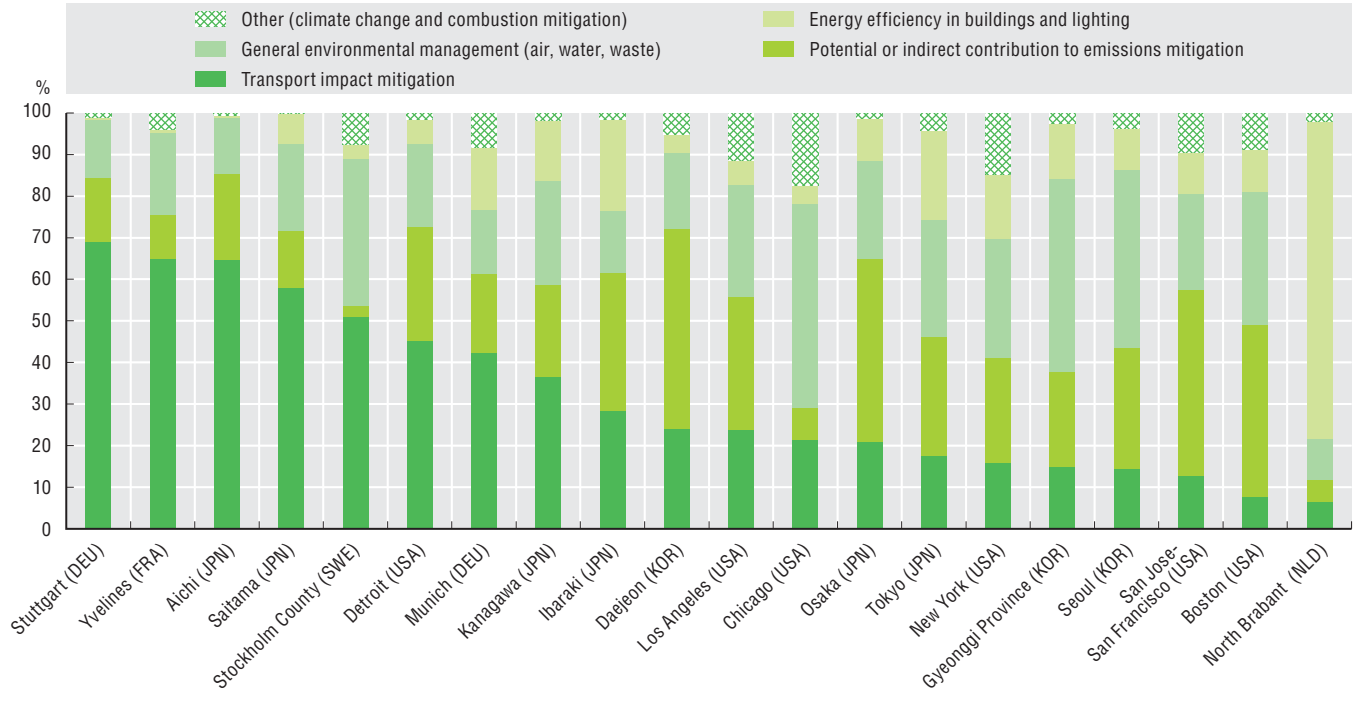

StatLink http://dx.doi.org/10.1787/888932915128

### 5.24. Environmental Revealed Technology Advantage index in the top 20 environment patenting TL3 regions, 2008-10 and 1995-97




StatLink http://dx.doi.org/10.1787/888932915147

### 5.25. Patents in environmental related industries in the top 20 environment patenting TL3 regions, share by type of technology, average 2008-10




StatLink http://dx.doi.org/10.1787/888932915166

# ANNEX A

# *Defining regions and functional urban areas*

## Territorial grids

In any analytical study conducted at subnational levels, the choice of the territorial unit is of prime importance. To address this issue, the OECD has classified two levels of geographic units within each member country (Table A.1). The higher level (Territorial level 2 [TL2]) consists of 363 larger regions while the lower level (Territorial level 3 [TL3]) is composed of 1 802 smaller regions. All the territorial units are defined within national borders, and each TL3 region is contained in one TL2 region. In most cases TL3 regions correspond to administrative regions, with the exception of Australia, Canada, Germany and the United States.

This classification – which, for European countries, is largely consistent with the Eurostat classification – facilitates greater comparability of geographic units at the same territorial level. Indeed, these two levels, which are officially established and relatively stable in all member countries, are used as a framework for implementing regional policies in most countries. Statistics published in *Regions at a Glance 2013* reflect the latest version of NUTS classification, the NUTS 2010. However, at the time of the publication, not all data are available within the new classification; in this case, the secretariat made estimates of missing values in time series. The implementation of the new classification has an impact both at TL2 and TL3 levels for Finland, Italy and the United Kingdom. Modification of NUTS-3 regions for Germany and the Netherlands does not change TL3 regions.

Due to limited data availability, labour market indicators in Canada are presented for groups of TL3 regions. Since these groups are not part of the OECD official territorial grids, for the sake of simplicity they are labelled as non-official grids (NOGs) in this publication and compared with TL3 for the other countries (Table A.1).

The OECD has started to extend the regional classification to new member countries and selected emerging economies. More precisely, TL2 regions have been identified and statistics collected in Chile, Estonia, Israel and Slovenia (new OECD members); Brazil, Colombia, the Russian Federation, India, China and South Africa. The TL3 classification is now available only for Chile, Estonia and Slovenia (Table A.2).

The regional distribution of population within and across countries is quite varied, as summarised in Table A.3.

## Regional typology

A second important issue for the analysis of subnational economies concerns the different "geography" of each geographic unit. For instance, in the United Kingdom one

could question the relevance of comparing the highly urbanised area of London to the rural region of the Shetland Islands, despite the fact that both regions belong at the same territorial level. To take account of these differences, the OECD has established a regional typology according to which TL3 regions have been classified as predominantly urban (PU), predominantly rural (PR) and intermediate (IN). This typology, based on settlement patterns calculated on the percentage of population living in rural communities, enables meaningful comparisons between regions belonging to the same type and level (Table A.4 and Figures A.1 to A.4). The OECD regional typology is based on three criteria. The first criterion identifies rural communities according to population density. A community is defined as rural if its population density is below 150 inhabitants per $km^2$ (500 inhabitants for Japan and Korea to account for the fact that the national population density exceeds 300 inhabitants per $km^2$). The second criterion classifies regions according to the percentage of population living in rural communities. Thus, a TL3 region is classified as:

- Predominantly rural (rural or PR), if more than 50% of its population lives in rural communities.
- Predominantly urban (urban or PU), if less than 15% of the population lives in rural communities.
- Intermediate (IN), if the share of population living in rural communities is between 15% and 50%.

The third criterion is based on the size of the urban centres. Accordingly:

- A region that would be classified as rural on the basis of the general rule is classified as intermediate if it has a urban centre of more than 200 000 inhabitants (500 000 for Japan) representing no less than 25% of the regional population.
- A region that would be classified as intermediate on the basis of the general rule is classified as predominantly urban if it has an urban centre of more than 500 000 inhabitants (1 million for Japan) representing no less than 25% of the regional population.

The typology is calculated only for the lower territorial level (TL3). The dimension of TL2 regions is too large to allow for a categorisation into predominantly urban, intermediate or predominantly rural. For analytical purposes the percentage of population living in PU, IN, and PR is calculated for TL2 regions summing the population of TL3 regions by regional typology. For example the TL2 regions of Rhone-Alpes in France has 23% of its population living in TL3 regions classified as PU, 68% of its population living in TL3 regions classified as IN and 9% of its population living in TL3 regions classified as PR.

## Extended regional typology

An extended regional typology has been adopted to distinguish between rural regions that are located close to larger urban centres and those that are not. The result is a four-fold classification of TL3 regions into: predominantly urban (PU), intermediate regions (IN), predominantly rural regions close to a city (PRC) and predominantly rural remote regions (PRR) (Figure A.1). The distance from urban centres is measured by the driving time necessary to a certain share of the regional population to reach a large urban centre (with a population of at least 50 000 people). The classification of TL3 regions in Europe, Japan and North America according to the extended typology is presented in Figures A.2, A.3 and A.4.

Due to lack of information on the road network and service areas, the extended typology has not been yet applied to Australia, Chile and Korea.

## OECD functional urban areas

The OECD in collaboration with the EU (Eurostat and EC-DG Regional and Urban Policy) has developed a harmonised definition of urban areas as functional economic units, consisting of highly densely populated municipalities (urban cores) as well as any adjacent municipalities with high degree of economic integration with the urban cores, measured by travel-to-work flows. This definition overcomes previous limitations for international comparability linked to administrative boundaries. The definition is applied to 29 OECD countries (with exception of Australia, Iceland, Israel, New Zealand and Turkey), and it identifies 1 179 urban areas of different size, ranging from 50 000 inhabitants in Calera (Chile) to over 34 million in Tokyo (Japan) (Table A.5).

The methodology consists of three main steps (Figure A.5). The first step identifies urban cores: gridded population data are used to define urbanised areas or "urban high-density clusters" over the national territory, ignoring administrative borders within countries. An urban core consists of a high-density cluster of contiguous grid cells of 1 $km^2$ with a density of at least 1 500 inhabitants per $km^2$ and the filled gaps.* A lower threshold of 1 000 people per $km^2$ is applied to Canada and the United States, where several metropolitan areas develop in a less compact manner. Small clusters (hosting less than 50 000 people in Europe, United States, Chile and Canada, 100 000 people in Japan, Korea and Mexico) are dropped. A municipality is defined as being part of an urban core if at least 50% of the population of the municipality lives within the urban cluster.

The second step connects non-contiguous urban cores that belong to the same functional urban area: two urban cores are considered belonging to the same (polycentric) urban area if more than 15% of the population of any of the cores commutes to work in the other core.

The final step of the methodology consists in delineating the hinterland of the functional urban area. Any municipality that has at least 15% of its employed residents working in a certain urban core is considered part of the functional urban area. Municipalities surrounded by a single functional urban area are included, and non-contiguous municipalities are dropped.

The functional urban areas with more than 500 000 population are defined metropolitan areas. Data in Chapter 1 refer to the 275 metropolitan areas identified in 29 OECD countries.

* Gaps in the high-density cluster are filled using the majority rule iteratively. The majority rule means that if at least five out of the eight cells surrounding a cell belong to the same high-density cluster it will be added. This is repeated until no more cells are added.

## Table A.1. **Territorial grid of OECD member countries**

| | Territorial level 2 | Non-official grid (NOG) | Territorial level 3 |
|---|---|---|---|
| Australia | States/territories (8) | – | Statistical divisions (60) |
| Austria | Bundesländer (9) | – | Gruppen von Politischen Bezirken (35) |
| Belgium | Régions (3) | – | Provinces (11) |
| Canada | Provinces and territories (13) | LFS, Economic areas (71) | Census divisions (288) |
| Chile | Regions (15) | | Provincias (54) |
| Czech Republic | Oblasti (8) | – | Kraje (14) |
| Denmark | Regioner (5) | – | Landsdeler (11) |
| Estonia | Region (1) | – | Groups of maakond (5) |
| Finland | Suuralueet (5) | – | Maakunnat (19) |
| France | Régions (22) | – | Départements (96) |
| Germany | Länder (16) | – | Spatial planning regions (96) |
| Greece | Groups of development regions (4) | – | Development regions (13) |
| Hungary | Planning statistical regions (7) | – | Counties + Budapest (20) |
| Iceland | Regions (2) | – | Landsvaedi (8) |
| Ireland | Groups of regional authority regions (2) | – | Regional authority regions (8) |
| Israel | Districts (6) | – | |
| Italy | Regioni (21) | – | Province (110) |
| Japan | Groups of prefectures (10) | – | Prefectures (47) |
| Korea | Regions (7) | – | Special city, metropolitan area and province (16) |
| Luxembourg | State (1) | – | State (1) |
| Mexico | Estados (32) | – | Grupos de municipios (209) |
| Netherlands | Landsdelen (4) | – | Provinces (12) |
| New Zealand | Groups of regional councils (2) | – | Regional councils (14) |
| Norway | Landsdeler (7) | – | Fylker (19) |
| Poland | Vojewodztwa (16) | – | Podregiony (66) |
| Portugal | Comissaoes de coordenaçao e desenvolvimento regional + regioes autonomas (7) | – | Grupos de municipios (30) |
| Slovak Republic | Zoskupenia krajov (4) | – | Kraj (8) |
| Slovenia | Kohezijske regije (2) | – | Statisti ne regije (12) |
| Spain | Comunidades autonomas (19) | – | Provincias (59) |
| Sweden | Riksomraden (8) | – | Län (21) |
| Switzerland | Grandes regions (7) | – | Cantons (26) |
| Turkey | Regions (26) | – | Provinces (81) |
| United Kingdom | Government office regions + counties (12) | – | Upper tier authorities or groups of lower tier authorities or groups of unitary authorities or LECs or groups of districts (139) |
| United States | States (51) | - | Economic areas (179) |

## Table A.2. **Territorial grid of selected emerging economies**

| | Territorial level 2 | Territorial level 3 |
|---|---|---|
| Brazil | Estados + districto federal (27) | Mesoregiao (17) |
| China | Provinces; special administrative region of Hong Kong, special administrative region of Macao and Chinese Taipei (33) | |
| Colombia | Departamentos (32) and Capital District | |
| India | States and union territories (35) | |
| Russian Federation | Oblast or okrug (83) | |
| South Africa | Provinces (9) | |

## Table A.3. **Smallest and largest regional population and population density by country**

| | | Number of TL3 regions | Region with the highest | | Region with the lowest | | Number of TL2 regions | Region with the highest | | Region with the lowest | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Population | Density | Population | Density | | Population | Density | Population | Density |
| AUS | Australia | 60 | 4 605 913 | 659.6 | 448 | 0.0 | 8 | 7 290 345 | 159.5 | 234 836 | 0.2 |
| AUT | Austria | 35 | 1 731 236 | 4 377.3 | 20 832 | 20.6 | 9 | 1 731 236 | 4 377.3 | 286 215 | 57.1 |
| BEL | Belgium | 11 | 1 791 024 | 7 201.5 | 276 154 | 62.2 | 3 | 6 372 575 | 7 201.5 | 1 159 448 | 212.0 |
| CAN | Canada | 288 | 2 791 140 | 4 429.0 | 1 123 | 0.01 | 13 | 13 505 900 | 25.8 | 33 697 | 0.02 |
| CHL | Chile | 54 | 5 084 038 | 2 504.1 | 2 444 | 0.1 | 15 | 7 007 620 | 454.9 | 106 885 | 1.0 |
| CZE | Czech Republic | 14 | 1 279 345 | 2 558.0 | 303 165 | 66.1 | 8 | 1 678 250 | 2 558.0 | 1 131 191 | 70.8 |
| DNK | Denmark | 11 | 839 710 | 4 216.2 | 41 406 | 59.6 | 5 | 1 714 589 | 673.4 | 579 996 | 73.7 |
| EST | Estonia | 5 | 529 898 | 122.3 | 139 214 | 14.4 | 1 | 1 339 662 | 30.8 | 1 339 662 | 30.8 |
| FIN | Finland | 19 | 1 549 058 | 170.3 | 28 354 | 2.0 | 5 | 1 549 058 | 170.3 | 28 354 | 6.4 |
| FRA | France | 96 | 2 584 126 | 21 521.0 | 78 535 | 15.2 | 22 | 11 914 812 | 991.9 | 316 578 | 36.5 |
| DEU | Germany | 96 | 3 501 872 | 3 944.9 | 208 620 | 44.2 | 16 | 17 841 956 | 3 944.9 | 661 301 | 70.5 |
| GRC | Greece | 13 | 4 109 074 | 1 079.6 | 198 978 | 31.5 | 4 | 4 109 074 | 1 079.6 | 1 126 201 | 46.3 |
| HUN | Hungary | 20 | 1 740 041 | 3 313.7 | 198 933 | 52.3 | 7 | 2 985 089 | 431.6 | 933 873 | 65.9 |
| ISL | Iceland | 8 | 203 594 | 195.3 | 6 955 | 0.5 | 2 | 203 594 | 195.3 | 115 981 | 1.1 |
| IRL | Ireland | 8 | 1 262 568 | 1 376.8 | 286 168 | 32.2 | 2 | 3 346 268 | 92.2 | 1 236 501 | 38.5 |
| ISR | Israel | – | – | – | – | – | 6 | 1 894 400 | 7 529.1 | 926 700 | 79.1 |
| ITA | Italy | 110 | 4 233 933 | 2 649.2 | 57 989 | 31.4 | 21 | 9 992 548 | 438.3 | 128 672 | 39.7 |
| JPN | Japan | 47 | 13 230 000 | 6 908.6 | 582 000 | 65.4 | 10 | 35 704 000 | 2 723.0 | 3 932 000 | 65.4 |
| KOR | Korea | 16 | 11 936 855 | 16 475.4 | 558 702 | 90.7 | 7 | 24 706 024 | 2 110.7 | 558 702 | 90.7 |
| LUX | Luxembourg | 1 | 524 853 | 203.0 | 524 853 | 203.0 | 1 | 524 853 | 203.0 | 524 853 | 203.0 |
| MEX | Mexico | 209 | 8 360 233 | 7 525.0 | 9 167 | 0.8 | 32 | 15 175 862 | 5 964.3 | 637 026 | 8.6 |
| NLD | Netherlands | 12 | 3 552 407 | 1 262.1 | 381 407 | 185.8 | 4 | 7 880 753 | 910.2 | 1 718 896 | 206.7 |
| NZL | New Zealand | 14 | 1 507 600 | 336.9 | 32 900 | 1.4 | 2 | 3 394 000 | 29.8 | 1 038 500 | 6.9 |
| NOR | Norway | 19 | 613 285 | 1 436.3 | 73 787 | 1.6 | 7 | 1 169 539 | 231.7 | 379 938 | 4.4 |
| POL | Poland | 66 | 1 708 491 | 3 304.6 | 278 627 | 44.7 | 16 | 5 285 604 | 375.1 | 1 013 950 | 59.5 |
| PRT | Portugal | 30 | 2 044 636 | 1 577.2 | 40 308 | 14.7 | 7 | 3 679 416 | 940.7 | 247 066 | 23.9 |
| SVK | Slovak Republic | 8 | 815 806 | 295.5 | 555 509 | 69.8 | 4 | 1 839 259 | 295.5 | 606 537 | 83.0 |
| SVN | Slovenia | 12 | 536 484 | 210.7 | 43 926 | 36.5 | 2 | 1 084 296 | 121.0 | 971 200 | 89.5 |
| ESP | Spain | 59 | 6 387 824 | 5 701.7 | 10 560 | 9.0 | 19 | 8 286 382 | 5 701.7 | 76 403 | 26.0 |
| SWE | Sweden | 21 | 2 091 473 | 320.8 | 57 308 | 2.5 | 8 | 2 091 473 | 320.8 | 368 454 | 3.3 |
| CHE | Switzerland | 26 | 1 392 396 | 5 033.9 | 15 743 | 27.2 | 7 | 1 770 429 | 838.3 | 336 943 | 98.5 |
| TUR | Turkey | 81 | 13 624 240 | 2 622.0 | 76 724 | 11.4 | 26 | 13 624 240 | 2 622.0 | 739 997 | 26.4 |
| GBR | United Kingdom | 139 | 2 082 098 | 10 353.5 | 20 212 | 7.1 | 12 | 8 665 938 | 5 175.4 | 1 814 842 | 67.6 |
| USA | United States | 179 | 23 438892 | 608.0 | 81 140 | 0.5 | 51 | 38 041 430 | 3 976.9 | 576 412 | 0.5 |

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## Table A.4. **Percentage of national population living in predominantly urban, intermediate and predominantly rural regions (TL3) and number of regions classified as such in each country**

| | Percentage of population (2012) | | | Number of regions (TL3) | | |
|---|---|---|---|---|---|---|
| | Rural (%) | Intermediate (%) | Urban (%) | Rural | Intermediate | Urban |
| Australia | 21.3 | 21.0 | 57.7 | 41 | 13 | 6 |
| Australia (NOG) | - | - | - | 6 | 7 | 17 |
| Austria | 45.1 | 31.0 | 23.9 | 25 | 8 | 2 |
| Belgium | 2.5 | 14.2 | 83.3 | 1 | 2 | 8 |
| Canada | 27.6 | 16.0 | 56.4 | 223 | 35 | 30 |
| Chile | 36.4 | 14.5 | 49.1 | 41 | 7 | 6 |
| Czech Republic | 4.9 | 83.3 | 11.8 | 1 | 12 | 1 |
| Denmark | 42.0 | 28.0 | 30.0 | 5 | 3 | 3 |
| Estonia | 10.4 | 77.2 | 12.4 | 1 | 3 | 1 |
| Finland | 59.3 | 12.0 | 28.7 | 16 | 2 | 1 |
| France | 17.0 | 48.3 | 34.7 | 36 | 46 | 14 |
| Germany | 17.5 | 25.4 | 57.1 | 31 | 30 | 35 |
| Greece | 39.8 | 23.8 | 36.4 | 10 | 2 | 1 |
| Hungary | 40.1 | 42.4 | 17.5 | 11 | 8 | 1 |
| Iceland | 36.2 | 63.8 | 0.0 | 7 | 1 | |
| Ireland | 72.4 | 0.0 | 27.6 | 7 | | 1 |
| Italy | 9.1 | 38.1 | 52.8 | 23 | 52 | 35 |
| Japan | 12.1 | 31.5 | 56.3 | 13 | 22 | 12 |
| Korea | 17.2 | 13.2 | 69.6 | 5 | 3 | 8 |
| Luxembourg | 100.0 | | | | 1 | |
| Mexico | 38.0 | 15.7 | 46.3 | 145 | 30 | 34 |
| Netherlands | 0.0 | 14.9 | 85.1 | 0 | 5 | 7 |
| New Zealand | 0.0 | 54.9 | 45.1 | 0 | 12 | 2 |
| Norway | 47.1 | 40.6 | 12.3 | 13 | 5 | 1 |
| Poland | 46.7 | 31.2 | 22.1 | 34 | 20 | 12 |
| Portugal | 20.3 | 26.9 | 52.8 | 15 | 8 | 7 |
| Slovak Republic | 25.0 | 63.8 | 11.2 | 2 | 5 | 1 |
| Slovenia | 56.4 | 43.6 | 0.0 | 8 | 4 | |
| Spain | 13.4 | 38.5 | 48.1 | 22 | 25 | 12 |
| Sweden | 48.0 | 30.0 | 22.1 | 18 | 2 | 1 |
| Switzerland | 8.9 | 49.6 | 41.5 | 7 | 12 | 7 |
| Turkey | 25.0 | 23.4 | 51.6 | 45 | 23 | 13 |
| United Kingdom | 2.0 | 28.0 | 70.0 | 11 | 41 | 87 |
| United States | 37.7 | 20.3 | 42.1 | 132 | 21 | 26 |

StatLink http://dx.doi.org/10.1787/888932915964

Figure A.1. **Methodology to define the extended regional typology**

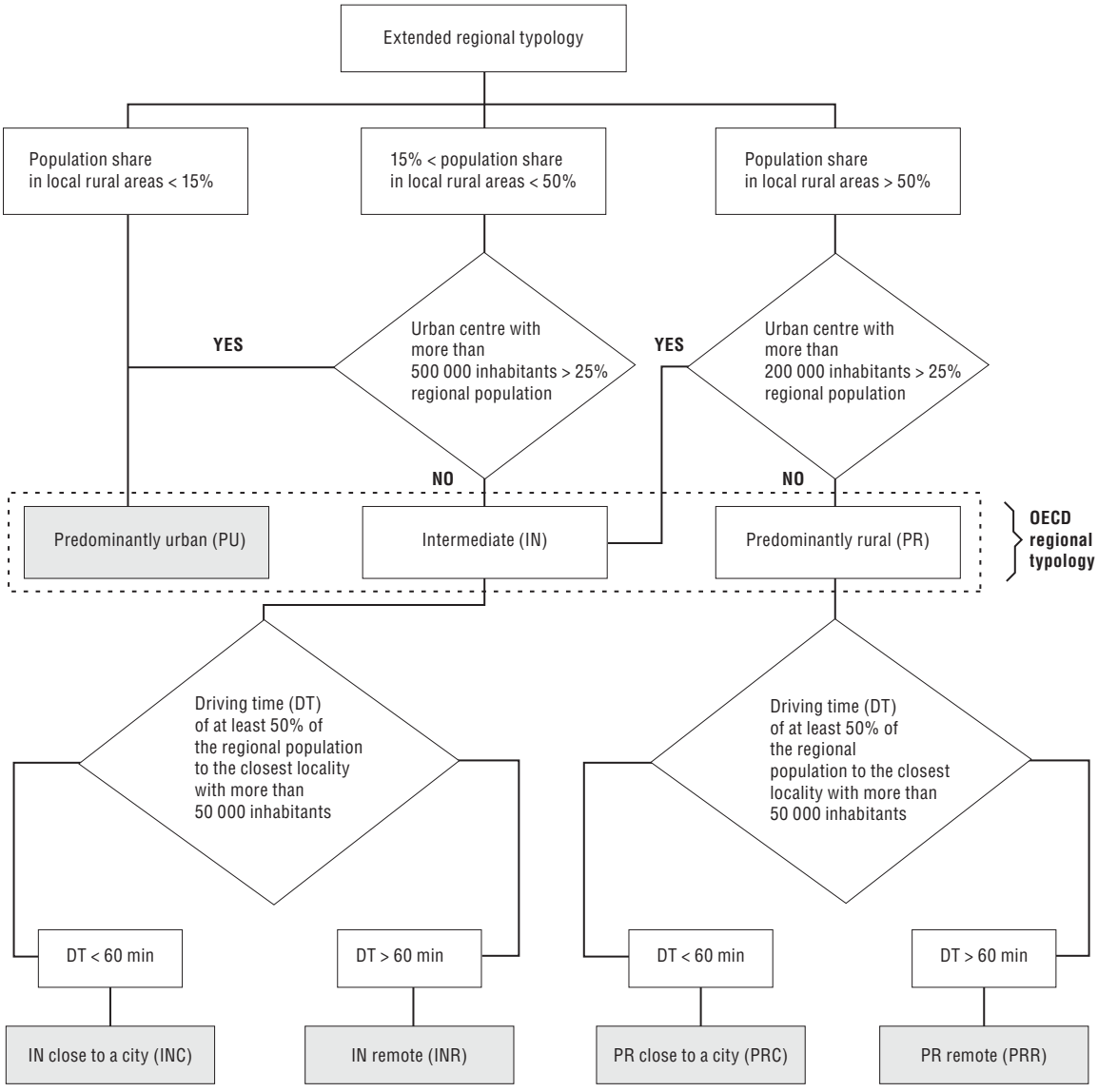
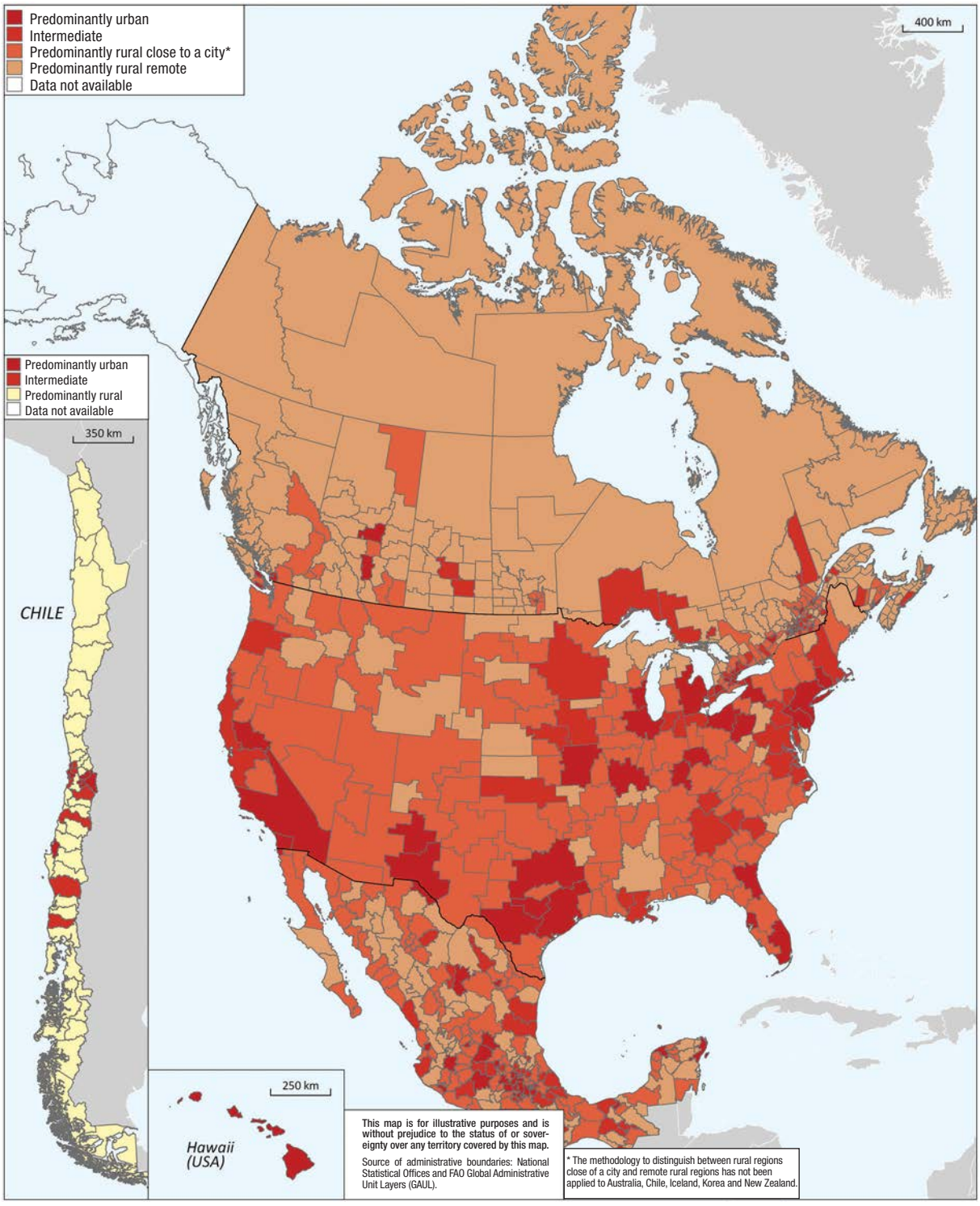
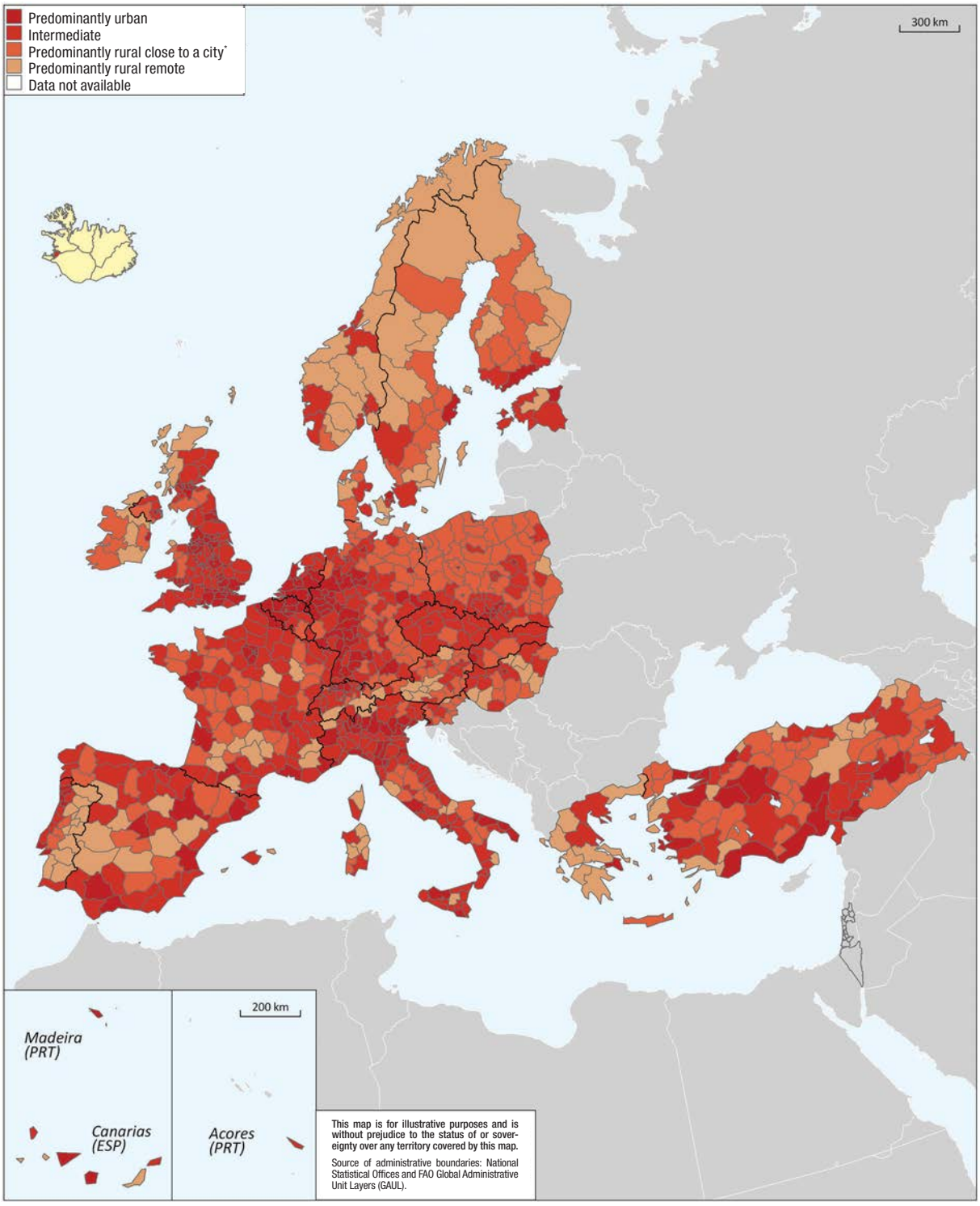


Figure A.2. **Extended regional typology: Americas (TL3)**



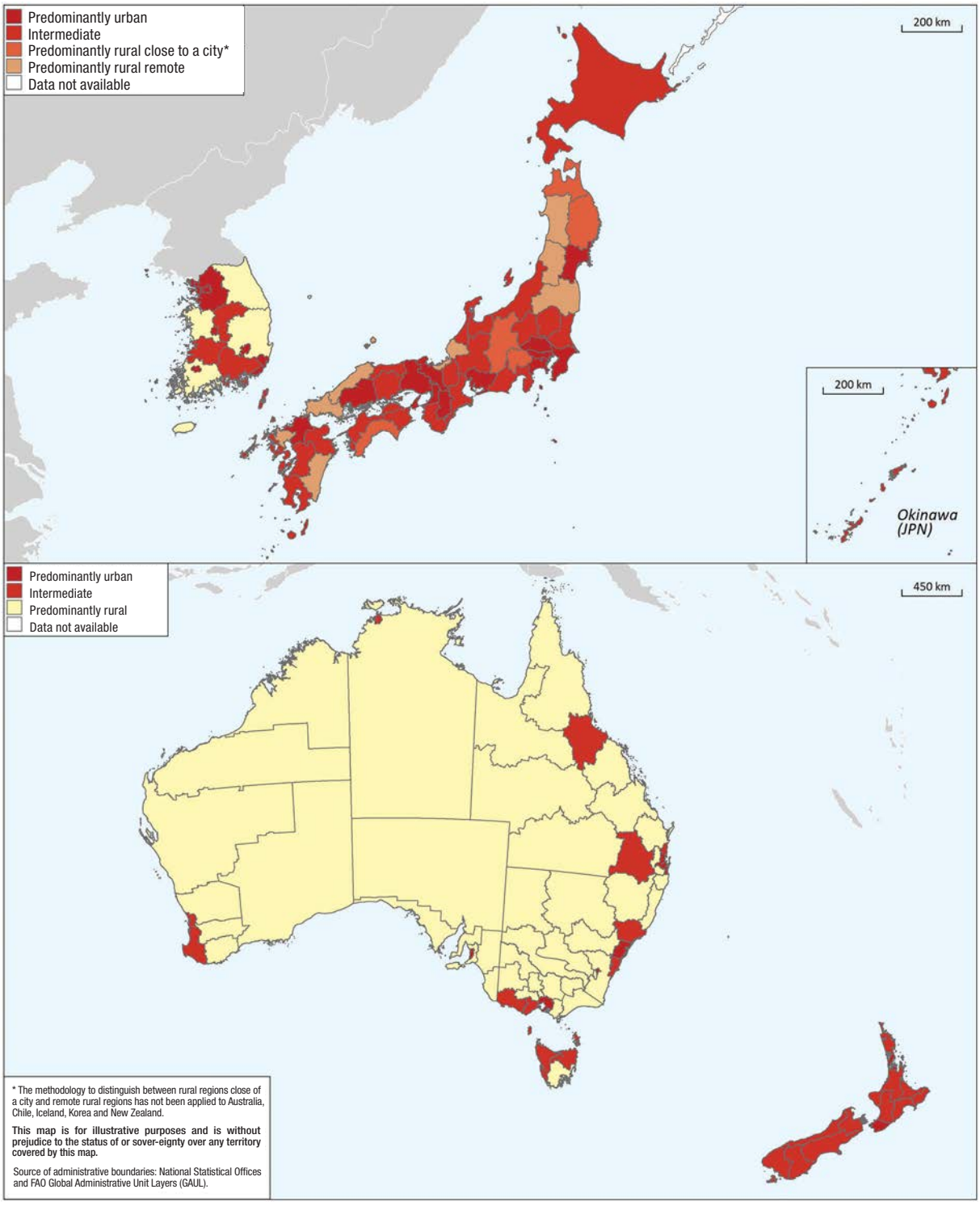

StatLink http://dx.doi.org/10.1787/888932915185

Figure A.3. **Extended regional typology: Europe (TL3)**



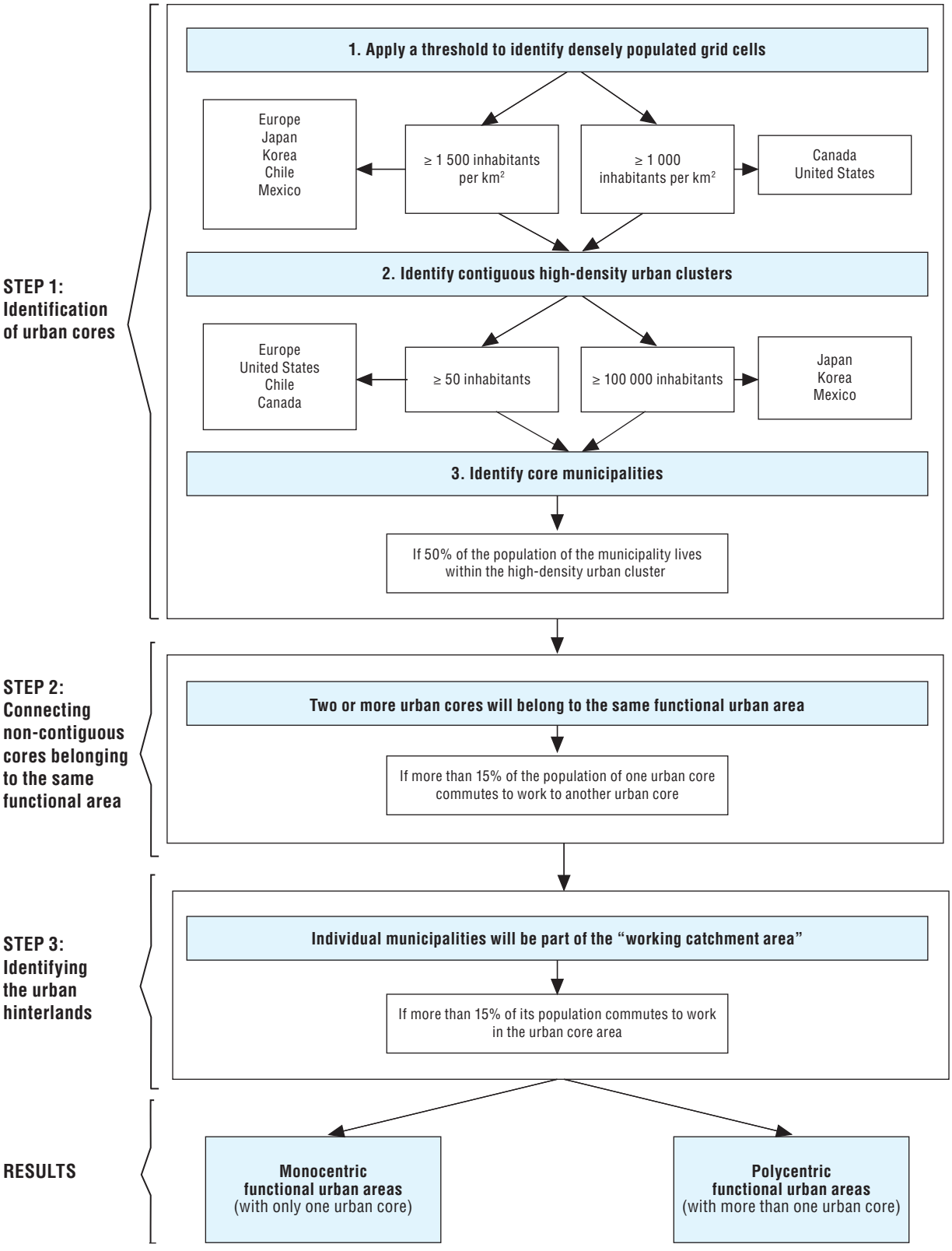

StatLink http://dx.doi.org/10.1787/888932915204

Figure A.4. **Extented regional typology: Asia and Oceania (TL3)**




StatLink http://dx.doi.org/10.1787/888932915223

Figure A.5. **Methodology to define the functional urban areas**



## Table A.5. **Number of functional urban areas and share of national population in urban areas**

| | FUA with population between 50 000 and 200 000 | | FUA with population between 200 000 and 500 000 | | FUA with population between 500 000 and 1.5 million | | FUA with population above 1.5 million | |
|---|---|---|---|---|---|---|---|---|
| | Number | % of national population | Number | % of national population | Number | % of national population | Number | % of national population |
| Austria | – | – | 3 | 10.59 | 2 | 14.14 | 1 | 30.37 |
| Belgium | 3 | 4.61 | 4 | 10.63 | 3 | 21.63 | 1 | 22.00 |
| Canada | 15 | 6.21 | 10 | 10.37 | 6 | 16.66 | 3 | 35.69 |
| Chile | 17 | 14.16 | 5 | 9.56 | 2 | 10.79 | 1 | 37.66 |
| Czech Republic | 11 | 13.11 | 2 | 4.80 | 2 | 11.74 | 1 | 16.49 |
| Denmark | 0 | 0.00 | 3 | 18.53 | – | – | 1 | 35.63 |
| Estonia | 2 | 15.79 | – | – | 1 | 39.12 | – | – |
| Finland | 4 | 11.98 | 2 | 12.09 | 1 | 26.08 | – | – |
| France | 39 | 9.50 | 29 | 15.18 | 12 | 15.09 | 3 | 23.67 |
| Germany | 36 | 6.32 | 49 | 19.21 | 18 | 18.47 | 6 | 19.56 |
| Greece | 6 | 6.93 | 1 | 1.95 | 1 | 8.62 | 1 | 33.42 |
| Hungary | 2 | 2.78 | 7 | 18.70 | – | – | 1 | 27.47 |
| Italy | 42 | 9.91 | 21 | 10.53 | 7 | 8.38 | 4 | 22.42 |
| Japan | 6 | 0.76 | 34 | 9.02 | 30 | 16.96 | 6 | 48.58 |
| Korea | 22 | 5.07 | 12 | 7.45 | 7 | 13.62 | 3 | 55.43 |
| Luxembourg | – | – | 1 | 87.01 | – | – | – | – |
| Mexico | 19 | 2.81 | 30 | 9.51 | 24 | 19.14 | 4 | 25.61 |
| Netherlands | 19 | 15.91 | 11 | 20.95 | 4 | 22.00 | 1 | 13.47 |
| Norway | 2 | 4.19 | 3 | 16.90 | 1 | 23.66 | – | – |
| Poland | 34 | 11.29 | 16 | 13.91 | 6 | 15.17 | 2 | 14.62 |
| Portugal | 8 | 8.64 | 3 | 6.87 | 1 | 12.27 | 1 | 25.44 |
| Slovak Republic | 6 | 17.10 | 1 | 6.83 | 1 | 12.82 | – | – |
| Slovenia | 0 | 0.00 | 1 | 11.59 | 1 | 26.66 | – | – |
| Spain | 45 | 13.22 | 22 | 17.37 | 6 | 13.76 | 2 | 21.46 |
| Sweden | 8 | 13.54 | 1 | 2.52 | 2 | 16.08 | 1 | 20.60 |
| Switzerland | 4 | 8.15 | 3 | 13.32 | 3 | 34.80 | – | – |
| United Kingdom | 42 | 10.21 | 45 | 23.72 | 11 | 14.74 | 3 | 23.71 |
| United States | 103 | 4.72 | 89 | 10.03 | 39 | 12.10 | 28 | 39.20 |

StatLink http://dx.doi.org/10.1787/888932915983

# ANNEX B

# *Sources and data description*

## User guide: List of variables



The tables refer to the years and territorial levels used in this publication.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

## Area

| | Source |
|---|---|
| EU21 countries[1] | Eurostat: General and regional statistics, demographic statistics, population and area |
| Australia | Australian Bureau of Statistics (ABS), summing up SLAs |
| Canada | Statistics Canada, *www.12.statcan.ca/english/census01/products/standard/popdwell/Table-CD-P.cfm?PR=10&T=2&SR=1&S=1&O=A* |
| Iceland | Statistics Iceland |
| Israel | Central Bureau of Statistics – Statistical Abstract of Israel. |
| Japan | Statistical Office, Area by Configuration, Gradient and Prefecture, *www.stat.go.jp/English/data/nenkan/1431%1e01.htm* |
| Korea | Korea National Statistical Office |
| Mexico | Mexican Statistical Office (INEGI) |
| New Zealand | Statistics New Zealand, data come from the report "Water Physical Stock Account 1995 – 2005". *www.stats.govt.nz/analytical-reports/water-physical-stock-account-1995-2005.htm* |
| Norway | Statistics Norway, StatBank table: 01402: Area of land and fresh water (km²), (M) (2005-07) |
| Switzerland | Office fédéral de la statistique, ESPOP, RFP |
| Turkey | Eurostat: General and regional statistics, demographic statistics, population and area |
| United States | Census Bureau, *www.census.gov/population/www/censusdata/density.html* |
| Brazil | Instituto Brasileiro de Geografia e Estadística (IBGE) |
| China | National Bureau of Statistics of China |
| India | Statistics India (Indiastat) |
| Russian Federation | Federal State Statistics Service of the Russian Federation |
| South Africa | Statistics South Africa |

1. EU21 countries : Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden and the United Kingdom.

## $CO_2$ emissions

| | Source | Years | Territorial level |
|---|---|---|---|
| All countries | European Commission, Joint Research Centre (JRC)/Netherlands Environmental Assessment Agency (PBL). *Emission Database for Global Atmospheric Research* (EDGAR), release version 4.1, *http://edgar.jrc.ec.europa.eu*, 2010 | 2008 | 2, 3 and metropolitan areas |

*EDGAR Database* contains country emission values by compound and sector of origin geographically allocated to grid maps with 0.1°resolution based on data such as location of energy and manufacturing facilities, road networks, shipping routes, human and animal population density and agricultural land use.
To estimate $CO_2$ emissions for regions and metropolitan areas, multiple datasets representing different sources of $CO_2$ were combined (ground transport, fuel production, industry combustion, agriculture, etc.; air transport and international navigation were excluded). See Annex C for details on the estimation.

## Concentration of $PM_{10}$ particles

| | Source | Years | Territorial level |
|---|---|---|---|
| EU25[1] | European Environmental Agency (EEA), *www.eea.europa.eu/data-and-maps* | 2010 | 2, 3 and metropolitan areas |

By interpolating ground station measurements of $PM_{10}$ across Europe and overlaying a LandScan (2009) population distribution grid, the average exposure of population to these health-threatening particles was estimated. $PM_{10}$ is defined as particles smaller than 10 and greater than 2.5 micrometres in diameter and can be of both artificial and natural origin.
1. EU25 includes: Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom.

## Concentration of $NO_2$

| | Source | Years | Territorial level |
|---|---|---|---|
| All countries | Tropospheric Emission Monitoring Internet Service (TEMIS), *www.temis.nl/index.php* | 2011-12 | 3 |

TEMIS provides the Dutch OMI $NO_2$ (DOMINO) data product v2.0. The DOMINO data contains geo-located $NO_2$ columns (in units of molec/$cm^2$). In addition to vertical $NO_2$ columns, the product contains intermediate results, such as the result of the spectral fit, fitting diagnostics, assimilated stratospheric $NO_2$ columns, the averaging kernel, cloud information, and error estimates. By combining global monthly average nitrogen dioxide ($NO_2$) concentration for the period of January 2011 to December 2012, and overlying a population distribution grid (LandScan 2009) the average exposure of population to $NO_2$ has been calculated.

## Employment and gross value added by industry (ISIC rev. 4)

| | Source | Years | Territorial level |
|---|---|---|---|
| EU21 countries[1] | Eurostat, regional economic accounts, branch accounts, employment | 2000-10 | 2 |
| Australia[2] | Australian Bureau of Statistics, LFS, Table 6291.0.55.003 | 2000-10 | 2 |
| Canada | - | - | - |
| Chile | - | - | - |
| Iceland | - | - | - |
| Israel | - | - | - |
| Japan | - | - | - |
| Korea | Korean National Statistical Office – KOSIS Census on basic characteristics of establishments | 2004-10 | 2 |
| Mexico | - | - | - |
| New Zealand | Eurostat, regional economic accounts, branch accounts, employment | 2008-10 | 2 |
| Norway | - | - | - |
| Switzerland | - | - | - |
| Turkey | - | - | - |
| United States | Bureau of Economic Analysis | 2000-10 | 2 |

1. EU21 countries: Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden and the United Kingdom.
   1.1. Data availability: 2004-10 for Belgium and Poland, 2005-10 for Greece, 2007-10 for France, 2008-10 for Germany, the Netherlands and Spain.
2. Australia: Data are derived from ANZSIC and do not match the ISIC classification.

## Employment at place of work

| | Source | Years | Territorial level |
|---|---|---|---|
| EU21 countries[1] | Eurostat, regional economic accounts, branch accounts, employment | 2000-10 | 2 |
| Australia[3] | Australian Bureau of Statistics, LFS, Table: 6291.0.55.003 | 2000-09 | 2 |
| Canada | Statistics Canada, Census, employed labour force by place of work | 2000-10 | 2 |
| Chile | INE Chile | 1990-10 | 2 |
| Iceland[2] | - | - | - |
| Israel | Central Bureau of Statistics – LFS. | 2000-10 | 2 |
| Japan | Statistical Office. Table 6-7-b Establishments and Employees by Major Industry Groups and Prefecture – Employees | 2001, 2006, 2009 | 2 |
| Korea | Korean National Statistical Office | 2004-10 | 2 |
| Mexico | INEGI, LFS (national survey of occupation and employment) | 2004-09 | 2 |
| New Zealand | Statistics New Zealand, LEED, Annual, Table 3.5: Length of Continuous Job Tenure | 2000-07 | 2 |
| Norway | Statistics Norway, employees 16-64 years by region of work, by region, and period | 2001, 2005-10 | 2 |
| Switzerland | Swiss Federal Statistical Office | 2008-10 | 2 |
| Turkey | Turkish Statistical Institute (TurkStat), Census | 2002, 2006-09 | 2 |
| United States | Bureau of Labour Statistics, State and area employment (sm series) | 2000-09 | 2 |
| Brazil | Instituto Brasileiro de Geografia e Estadística (IBGE) | 2000-10 | 2 |
| China[2] | - | - | - |
| Colombia[2] | - | - | - |
| India[2] | - | - | - |
| Russian Federation | Federal State Statistics Service of the Russian Federation | 2005, 2008 | 2 |
| South Africa | Statistics South Africa | 1995-2009 | 2 |

1. EU21 countries: Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden and the United Kingdom.
   1.1. Available year: Netherlands 2001-10.
2. China, Colombia, Iceland and India: Data are not available at the regional level.
3. Australia: employment data related to place of residency taken as a proxy for employment at place of work.

## Gross domestic product

| | Source | Years | Territorial level |
|---|---|---|---|
| EU21 countries[1, 3] | Eurostat, regional economic accounts | 1995-2010 | 2, 3 and metropolitan areas |
| Australia | Australian Bureau of Statistics, 5220.0, gross state product, figures based on fiscal year (July-June) | 1995-2010 | 2 |
| Canada[3] | Statistics Canada, provincial economic accounts | 1995-2010 | 2 and metropolitan areas |
| Chile[2, 3] | Banco central de Chile, Cunetas nacionales de Chile | 1995-2010 | 2 and metropolitan areas |
| Iceland[4] | | - | - |
| Israel[4] | | - | - |
| Japan[3] | Economic and Social Research Institute, Cabinet Office, data are based on fiscal year (April-March) | 1995-2010 | 2, 3 and metropolitan areas |
| Korea[3] | Korean National Statistical Office | 1990-2010 | 2, 3 and metropolitan areas |
| Mexico[3] | INEGI, System of national accounts of Mexico | 1995-2010 | 2 and metropolitan areas |
| New Zealand | Statistics New Zealand | 2008-10 | 2,3 |
| Norway[3] | Norwegian Regional Accounts | 1995-2007 | 2, 3 and metropolitan areas |
| Switzerland[3] | Swiss Federal Statistical Office, Statweb | 2008-10 | 2, 3 and metropolitan areas |
| Turkey | Turkish Statistical Institute (TurkStat), no data available after 2001 | - | 2 |
| United States[3] | Bureau of Economic Analysis | 1995-2010 | 2 and metropolitan areas |
| Brazil | Instituto Brasileiro de Geografia e Estadística (IBGE) | 1995-2010 | 2 |
| China | National Bureau of Statistics of China | 2004-10 | 2 |
| Colombia | Departamento Administrativo Nacional de Estadistica | 2001-10 | 2 |
| India | Statistics India (Indiastat) | 2004-10 | 2 |
| Russian Federation | Federal State Statistics Service of the Russian Federation | 1996-2010 | 2 |
| South Africa | Statistics South Africa | 1995-2009 | 2 |

1. EU21 countries: Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden and the United Kingdom.
   1.1. Estonia available years 1996-2010.
   1.2. Missing data in 1995 due to the change in NUTS-2010 classification have been estimated by the OECD Secretariat for Italian TL3 regions of Bari, Barletta Trani, Milan, Monza Brianza, Ascoli Piceno and Fermo, and for the UK regions of Calderdale and Kirklees, Wakefield, Bedford, Dudley, Sandwell, Walsall, Wolverhampton, West and North Northamptonshire, Cheshire East West and Chester.
2. Chile: to allow comparison across time, from 1995 to 2010 Tarapacá includes Arica Y Parinacota, and Los Lagos includes Los Rios. Data are not available in two regions. A regional deflator has been used for labour productivity growth.
3. GDP estimates of metropolitan areas are derived from the regional data. The methodology is described in the Annex C.
4. Iceland and Israel: Data not available at the regional level.

## Infant mortality

| | Source | Years | Territorial level |
|---|---|---|---|
| EU23 countries[1] | Eurostat, Regional Demographic Statistics | 2010 | 2 |
| Australia | Australian Bureau of Statistics; Table 3302.0 | 2010 | 2 |
| Canada | Statistics Canada; CANSIM, Table 10-0504. | 2009 | 2 |
| Chile[5] | - | - | - |
| Iceland[5] | - | - | - |
| Israel | Central Bureau of Statistics (CBS) | 2008 | 2 |
| Japan[4] | Statistics Bureau, MIC | 2005 | 2 |
| Korea[5] | - | - | - |
| Mexico[2] | National Institute of Statistics and Geography (INEGI) | 2010 | 2 |
| New Zealand[5] | - | - | 2 |
| Turkey[5] | - | - | - |
| United States[3] | National Center for Health Statistics | 2008 | 2 |

1. EU23 refers to Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Ireland, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovenia, Slovak Republic, Spain, Sweden, Switzerland, United Kingdom (except Northern Ireland).
   1.1. No regional data available in Belgium and Finland.
2. 2007-10: CONAPO, population estimates 1990-2010, *www.conapo.gob.mx*; 2011-13: CONAPO, population forecast 2010-50, *www.conapo.gob.mx*.
3. US: Centers for Disease Control and Prevention, National Center for Health Statistics, VitalStat,. *www.cdc.gov/nchs/vitalstats.htm*.
4. Korea: TL2 rates computed using information at TL3 level.
5. Chile, Iceland, Korea, New Zealand and Turkey: Data not available at the regional level.

## Labour force, employment at place of residency by gender and unemployment

| | Source | Years | Territorial level |
|---|---|---|---|
| EU21 countries[1, 5] | Eurostat, regional labour force market statistics, LFS | 1999-2011 | 2, 3 and metropolitan areas |
| Australia[2] | Australian Bureau of Statistics, LFS, Table 6291.0.55.001 | 1999-2011 | 2 |
| Canada[3, 5] | Statistics Canada, LFS, CANSIM Table 282-0055 | 1999-2011 | NOG and metropolitan areas |
| Chile[5] | INE Chile | 1999-2011 | 2 and metropolitan areas |
| Iceland | Statistics Iceland | 1999-2011 | 2 |
| Israel | Central Bureau of Statistics – LFS | 1999-2011 | 2 |
| Japan[5] | Statistics Bureau, MIC | 1999-2011 | 3 and metropolitan areas |
| Korea[5] | Korean National Statistical Office | 1999-2011 | 3 and metropolitan areas |
| Mexico[5] | INEGI, LFS (national survey of occupation and employment) | 2000-09 | 2 and metropolitan areas |
| New Zealand[4] | Statistics New Zealand, LFS | 1999-2011 | 3 |
| Norway[5] | Statistics Norway, Statbank Table 05613 | 1999-2011 | 3 and metropolitan areas |
| Switzerland[5] | Swiss Federal Statistical Office | 2001-09 | 3 and metropolitan areas |
| Turkey | Turkish Statistical Institute, Turkstat Household Labour Survey | 2004-11 | 2 |
| United States[5] | Bureau of Labour Statistics, labour force data by county | 1999-2011 | 2 and metropolitan areas |
| Brazil | Instituto Brasileiro de Geografia e Estadística (IBGE) | 2004-08 | 2 |
| China | - | - | - |
| Colombia | Departamento Administrativo Nacional de Estadistica | 2001-11 | 2 |
| India | - | - | - |
| Russian Federation | Federal State Statistics Service of the Russian Federation | 2000-08 | 2 |
| South Africa | Statistics South Africa | 1999-2009 | 2 |

Data for employment by gender are available only at TL2 level.

1. EU21 countries: Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden and the United Kingdom.
   1.1. Due to break in series in labour force statistics, reference years are: 1999-2010 for Portugal (TL2 regions), 2007-2011 for Denmark.
   1.2. TL2 regions for Denmark, France, Italy, Poland, Portugal, Sweden and United Kingdom.
2. Australia: Data are based on the Labour Force Dissemination Regions as defined by the Australian Bureau of Statistics.
3. Canada: Data are based on a grouping of TL3 regions according to the Economic Regions as defined in the *Guide to the Labour Force Survey,* Statistics Canada 2006, (Ottawa: Statistics Canada, catalogue no. 71-543, *www.statcan.ca/bsolc/english/bsolc?catno = 71-543-G*).
4. New Zealand: For regions NZ015-NZ016 and NZ021-NZ022 data are aggregated in the LFS dissemination regions. Data for the merged regions have been estimated on the basis of population share.
5. For the metropolitan areas only labour force, total employment and total unemployment are derived from the regional values. The methodology is described in Annex C. Portugal values for metropolitan areas are derived from estimates of labour force statistics at TL3 level produced by Eurostat for the period 2000-07.

## Labour force by educational attainment

| | Source | Years | Territorial level |
|---|---|---|---|
| EU23 countries[1] | Eurostat, Labour Force Survey, regional education statistics | 2012 | 2 |
| Australia[2] | Australian Bureaus of Statistics, Table 6227.0 Education and Work, LFS | 2005 | 2 |
| Canada[3] | Statistics Canada, CANSIM (database), Table 282-0004 – Labour Force Survey Estimates (LFS), by educational attainment, gender and age group, annual | 2012 | 2 |
| Chile[4] | INE Chile, New National Employment Survey | 2012 | 2 |
| Iceland[7] | - | - | - |
| Israel | Central Bureau of Statistics Israel | 2011 | 2 |
| Japan[7] | - | - | - |
| Korea[2] | KOSIS, Economically Active Population Survey | 2006 | 2 |
| Mexico[4] | INEGI, National Population and Housing Censuses | 2008 | 2 |
| New Zealand | Statistics New Zealand, Household Labour Force Survey | 2012 | 2 |
| Turkey[5] | TURKSTAT, Household Labour Force Survey Revised Results | 2011 | 2 |
| United States[6] | Census Bureau, American Community Survey (ACS), 1-year estimates, Table S1501 | 2011 | 2 |

1. EU23 refers to Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Ireland, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovenia, Slovak Republic, Spain, Sweden, Switzerland, United Kingdom (except Northern Ireland).
   1.1. Data refer to the labour force aged 15 and over.
2. Australia and Korea: Data refer to total labour force.
3. Canada: Data refer to the labour force aged 15 and over. Tertiary education includes those who attained at least an university bachelor's degree.
4. Chile and Mexico: Data refer to the population aged 15 and over.
5. Turkey: Illiterate people are included in the ISCED 0-2.
6. United States: Data refer to the population aged 18 and over.
7. Iceland and Japan: Data are not available at regional level.

## Land cover and changes

| | Source | Years | Territorial level |
|---|---|---|---|
| All countries[1] | MODIS Land Cover Type (MCD12Q1) product distributed by the Land Processes Distributed Active Archive Center (LP DAAC), located at the US Geological Survey (USGS) Earth Resources Observation and Science (EROS) Center (*lpdaac.usgs.gov*).<br>MODIS 500m Map of Global Urban Extent, SAGE at University of Wisconsin-Madison, *www.sage.wisc.edu/mapsdatamodels.html*.<br>Schneider, A., M. Friedl and D. Potere (2009), "A new map of global urban extent from MODIS data", *Environmental Research Letters*, Vol. 4, article 044003.<br>Schneider, A., M. Friedl and D. Potere (2010), "Monitoring urban areas globally using MODIS 500m data: New methods and datasets based on urban eco-regions", *Remote Sensing of Environment*, Vol. 114, p. 1733-1746. | 2008 | 2, 3 |
| EU23 countries[1, 2, 3] | Corine land cover | 2000-06 | 2, 3 and metropolitan areas |
| Japan[3] | Japan National Land Service Information Data | 1997-2006 | 2, 3 and metropolitan areas |
| United States[3] | National Land Cover Dataset (NLCD) versions 2001 and 2006 | 2000-06 | 2, 3 and metropolitan areas |

A new classification to calculate the statistics for regions and metropolitan areas is derived from the different sources. It consists of six newly defined classes: 1) Water (lakes, river, lagoons, etc.); 2) Agriculture (annual crops, rice fields, orchards, pastures, etc.); 3) Forest (coniferous, broad-leaved, mixed, etc.); 4) Other non-forest; natural vegetation (natural grasslands, shrub lands, sparsely vegetated areas, etc.); 5) Urban (residential, industrial, major transportation, green urban areas, etc.); 6) Other (bare lands, wetlands, glaciers).
When considering land cover, the source of data is MODIS for all countries. Class 2 (agriculture), 3 (forest) and 4 (other natural vegetation) are considered together as one class (vegetation) in the chapter referring to vegetation in regions. For the metropolitan areas the urban class refers circa to year 2001-02. For the metropolitan areas, green areas are computed as residual of built-up areas.
When considering changes in land cover the three dataset for Europe, Japan and United States are used reclassified in the six classes.
See Annex C for a description of the estimation techniques.

1. Data are derived from medium spatial resolution satellite imagery and should be taken as rough estimates.
2. EU23 refers to Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Ireland, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovenia, Slovak Republic, Spain, Sweden, Switzerland and the United Kingdom (except Northern Ireland).
3. Dataset with changes in land use are available only for EU23, Japan and the United States from three different sources.

## Life expectancy, total and by gender

| | Source | Years | Territorial level |
|---|---|---|---|
| EU23[1] | Eurostat, Regional Demographic Statistics | 2010 | 2 |
| Australia | Australian Bureau of Statistics, Table 3302.0 | 2010 | 2 |
| Canada[2] | Statistics Canada; CANSIM, Table 102-0511 | 2006 | 2 |
| Chile[8] | - | - | - |
| Iceland[8] | - | - | - |
| Israel[7] | Central Bureau of Statistics (CBS) | 2005-09 | 2 |
| Japan[6] | Statistics Bureau, MIC | 2005 | 2 |
| Korea[8] | - | - | - |
| Mexico[3] | National Institute of Statistics and Geography (INEGI) | 2010 | 2 |
| New Zealand[4] | Statistics New Zealand, Table DRL001AA | 2006 | 2 |
| Turkey[8] | - | - | - |
| United States[5] | Institute for Health Metrics and Evaluation (IHME) | 2009 | 2 |

1. EU23 refers to Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Ireland, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovenia, Slovak Republic, Spain, Sweden, Switzerland, United Kingdom (except Northern Ireland).
2. Canada: Rates used in this table for the calculation of life expectancy are calculated with data that exclude: births to mothers not resident in Canada, births to mothers resident in Canada, province or territory of residence unknown, deaths of non-residents of Canada, deaths of residents of Canada whose province or territory of residence was unknown and deaths for which age or gender of descendent was unknown. Rates used in this table for the calculation of life expectancy are based on data tabulated by place of residence. Life expectancy for the Yukon, the Northwest Territories and Nunavut should be interpreted with caution due to small underlying counts.
3. Mexico: 2007-10: CONAPO, population estimates 1990-2010, *www.conapo.gob.mx*; 2011-13: CONAPO, population forecast 2010-50, *www.conapo.gob.mx*.
4. New Zealand: Life expectancy data presented for each year is based on registered deaths in the three years centred on that year. For example, life expectancy data presented for 1996 is based on deaths registered in 1995-97. New Zealand life expectancy from abridged life tables. This may differ to data from complete life tables.
5. US: Institute for Health Metrics and Evaluation (IHME), United States Adult Life Expectancy by State and County 1987-2009, Seattle, United States: Institute for Health Metrics and Evaluation (IHME), 2012.
6. Japan: TL2 data computed as the average value of TL3 regions.
7. Data for Israel refers to the period 2005-09.
8. Chile, Iceland, Korea, and Turkey: Data not available at the regional level.

## Local governments in metropolitan areas

| | Source | Years | Territorial level |
|---|---|---|---|
| Australia[3] | - | - | - |
| Austria | EUROSTAT, Gemeinden (LAU2) | 2001 | Metropolitan areas |
| Belgium | EUROSTAT, Gemeenten/Communes (LAU2) | 2001 | Metropolitan areas |
| Canada | Statistics Canada (Statcan), Census Subdivisions (towns, villages, etc.) (CSD) | 2006 | Metropolitan areas |
| Chile | Instituto Nacional de Estadísticas (INE) Chile, Comunas | 2002 | Metropolitan areas |
| Czech Republic | EUROSTAT, Obce (LAU2) | 2001 | Metropolitan areas |
| Denmark | EUROSTAT, Sogne (LAU2) | 2001 | Metropolitan areas |
| Estonia | EUROSTAT, Vald, linn (LAU2) | 2000 | Metropolitan areas |
| Finland | EUROSTAT, Kunnat / Kommuner (LAU2) | 2000 | Metropolitan areas |
| France | EUROSTAT, Communes (LAU2) | 1999 | Metropolitan areas |
| Germany | EUROSTAT, Gemeinden (LAU2) | 2001 | Metropolitan areas |
| Greece | EUROSTAT, Demotiko diamerisma/Koinotiko diamerisma (LAU2) | 2001 | Metropolitan areas |
| Hungary | EUROSTAT, Települések (LAU2) | 2001 | Metropolitan areas |
| Iceland[3] | - | - | - |
| Ireland | EUROSTAT, Local governments (LAU1) | 2001 | Metropolitan areas |
| Israel[3] | - | - | - |
| Italy | EUROSTAT, Comuni (LAU2) | 2001 | Metropolitan areas |
| Japan | National Land Numerical Information Service of Japan, Shi (city), Machi or Cho (town) and Mura or Son (village) | 2006 | Metropolitan areas |
| Korea | Korean Statistical Information Service (KOSIS), Eup, Myeon, Dong' | 2009 | Metropolitan areas |
| Luxembourg | EUROSTAT, Communes (LAU2) | 2001 | Metropolitan areas |
| Mexico | Instituto Nacional de Estadística y Geografía (INEGI), Municipios | 2010 | Metropolitan areas |
| Netherlands | EUROSTAT, Gemeenten (LAU2) | 2001 | Metropolitan areas |
| New Zealand[3] | - | - | - |
| Norway | EUROSTAT. Municipalities (LAU2) | 2001 | Metropolitan areas |
| Poland | EUROSTAT, Gminy (LAU2) | 2002 | Metropolitan areas |
| Portugal | EUROSTAT, Freguesias (LAU2) | 2001 | Metropolitan areas |
| Slovak Republic | EUROSTAT, Obce (LAU2) | 2001 | Metropolitan areas |
| Slovenia | EUROSTAT, Obèine (LAU2) | 2002 | Metropolitan areas |
| Spain | EUROSTAT, Municipios (LAU2) | 2001 | Metropolitan areas |
| Sweden | EUROSTAT, Kommuner (LAU2) | 2000 | Metropolitan areas |
| Switzerland | EUROSTAT, Municipalities (LAU2) | 2000 | Metropolitan areas |
| Turkey[3] | - | - | - |
| United Kingdom[1] | UK Office of National Statistics, County Councils. | 2001 | Metropolitan areas |
| United States[2] | U.S. Census Bureau (2002) Census of Governments, Municipalities or Townships. | 2000 | Metropolitan areas |

The local governments used in this report were identified on the basis of the following criteria:
Have only one level of local government per country, notably the lowest tier (even if more than one level of government may have relevant responsibilities over the same territory.
Identify only general-purpose local governments, excluding the specific function governments (for example, school district, health agencies, etc.).

1. United Kingdom: For those areas where the County Councils were abolished the local authority (either a Metropolitan District Council or a Unitary District Council) is used. For London, the Borough Councils are used.
2. United States: In the geographic areas where municipalities or townships do not represent a general purpose government, the county governments were considered.
3. No functional urban areas were identified in Australia, Iceland, Israel, New Zealand and Turkey.

## Long-term unemployment

| | Source | Years | Territorial level |
|---|---|---|---|
| EU21 countries[1] | Eurostat, regional labour market statistics, regional unemployment | 2011 | 2 |
| Australia | Australian Bureau of Statistics, LFS | 2011 | 2 |
| Canada[2] | Statistics Canada, LFS | 2011 | 2 |
| Chile | National Institute of Statistics, INE | 2011 | 2 |
| Iceland[3] | - | - | - |
| Israel | Central Bureau of Statistics – LFS | 2011 | 2 |
| Japan[3] | - | - | - |
| Korea[3] | - | - | - |
| Mexico[3] | - | - | - |
| New Zealand | Statistics New Zealand, Household Labour Force Survey | 2011 | 2 |
| Norway | Statistics Norway | 2011 | 2 |
| Switzerland | OECD Regional Questionnaire; information provided by the delegate of the Working Party on Territorial Indicators (WPTI) | 2011 | 2 |
| Turkey | Turkish Statistical Institute, LFS | 2011 | 2 |
| United States[3] | - | - | - |

Long-term unemployed are those who declare to have been out of work and looking for a job in the last 12 months.

1. EU21 countries: Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden and the United Kingdom.
2. Canada: Data are not available for the regions Yukon Territory, Nunavut and Northwest Territories.
3. Iceland, Japan, Korea, Mexico, and United States: Data are not available at regional level.

## Mortality rates due to transport accidents

| | Source | Years | Territorial level |
|---|---|---|---|
| EU21 countries[1] | Eurostat, regional health statistics | 2010 | 2 |
| Australia[2] | - | - | - |
| Canada | Statistics Canada; CANSIM, Table 102-0552 | 2009 | 2 |
| Chile[2] | - | - | - |
| Iceland[2] | - | - | |
| Israel[2] | - | - | - |
| Japan[2] | - | - | - |
| Korea[2] | - | - | - |
| Mexico | National Statistical Institute, INEGI | 2008 | 2 |
| New Zealand[2] | - | - | - |
| Norway | Eurostat, regional health statistics | 2010 | 2 |
| Switzerland | Eurostat, regional health statistics | 2010 | 2 |
| Turkey | Turkish Statistical Institute, TURKSTATS | 2010 | 2 |
| United States | U.S. National Highway Traffic Safety Administration | 2009 | 2 |

1. EU21 countries: Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden and the United Kingdom. Data for the Czech Republic refer to 2008. No data available for the Italian regions of Province of Bolzano-Bozen, Province of Trento, Veneto, Friuli-Venezia Giulia, Emilia – Romagna, Tuscany, Umbria, Marche and Lazio. No data available for Belgium, Denmark, Finland, Greece, Netherlands, and United Kingdom.
2. Australia, Chile, Iceland, Israel, Japan, Korea, and New Zealand: data not available at the regional level.

## Motor vehicle theft

| | Source | Years | Territorial level |
|---|---|---|---|
| Australia[8] | - | - | - |
| Austria | OECD Regional Questionnaire; information provided by the delegate of the Working Party on Territorial Indicators (WPTI) | 2011 | 2 |
| Belgium | OECD Regional Questionnaire; information provided by the delegate of the Working Party on Territorial Indicators (WPTI) | 2010 | 2 |
| Canada[1] | Statistics Canada, CANSIM database, Table 252-0051 | 2011 | 2 |
| Chile[2] | Under-secretariat of Crime Prevention, Ministry of Interior and Public Safety | 2011 | 2 |
| Czech Republic[8] | - | - | - |
| Germany[8] | - | - | - |
| Denmark | Statistic Denmark, STRAF11 | 2011 | 2 |
| Estonia[8] | - | - | - |
| Finland | Statistics Finland, justice statistics | 2011 | 2 |
| France[3] | INSEE, Etat 4001 annuel, DCPJ | 2011 | 2 |
| Greece[8] | - | - | - |
| Hungary | OECD Regional Questionnaire; information provided by the delegate of the Working Party on Territorial Indicators (WPTI) | 2011 | 2 |
| Ireland | CSO, StatBank Ireland, Table CJQ02 | 2011 | 2 |
| Iceland[8] | - | - | - |
| Israel | OECD Regional Questionnaire; information provided by the delegate of the Working Party on Territorial Indicators (WPTI) | 2011 | 2 |
| Italy | National Statistical Institute, ISTAT | 2010 | 2 |
| Japan | National Police Agency, Publications of the Police Policy Research Center: Crime in Japan in 2010 | 2011 | 2 |
| Korea[8] | - | - | - |
| Luxembourg[8] | - | - | - |
| Mexico[4] | National Statistical Institute, INEGI | 2010 | 2 |
| New Zealand[5] | New Zealand Police | 2011 | 2 |
| Netherlands[8] | - | - | - |
| Norway[8] | - | - | - |
| Poland | National Police Headquarters | 2011 | 2 |
| Portugal[8] | - | - | - |
| Slovak Republic[6] | Ministry of Interior of the Slovak Republic | 2011 | 2 |
| Slovenia | OECD Regional Questionnaire; information provided by the delegate of the Working Party on Territorial Indicators (WPTI) | 2011 | 2 |
| Spain | OECD Regional Questionnaire; information provided by the delegate of the Working Party on Territorial Indicators (WPTI) | 2011 | 2 |
| Sweden | Swedish National Council for Crime Prevention (Brå). | 2011 | 2 |
| Switzerland[7] | OECD Regional Questionnaire; information provided by the delegate of the Working Party on Territorial Indicators (WPTI) | 2011 | 2 |
| Turkey[8] | - | - | - |
| United Kingdom[8] | - | - | - |
| United States | Federal Bureau of Investigation, Crime in the United States, Table 4, by Region, Geographic Division and State, 2010 – 11 | 2011 | 2 |

1. Canada: Total theft of motor vehicle, actual incidents.
2. Chile: Data based on crimes known by police (called "casos policiales" in Spanish). Does not include attempted motor vehicle theft.
3. France: Data includes car theft (index 35), theft of motor vehicles with two wheels (index 36) and theft of vehicles with cargo (index 34). Some motor vehicle thefts are recorded by the corresponding national authorities (such as central offices) of the police and gendarmerie. These thefts are not registered in a particular TL3 region, thus the national total does not fully correspond to the sum of the TL3 regions.
4. Mexico: National Census 2012 State Law Enforcement. As part of the implementation of the National Census of Law Enforcement 2011 and 2012, the figure provided for 2010 and 2011 corresponds to the data of the relevant offenses, registered preliminary inquiries initiated by the Public Prosecutor of the Common Jurisdiction in each of the federal states.
5. New Zealand: The number of offences police recorded for theft or unlawful taking of a motor vehicle. This includes instances where a vehicle is taken for a joy ride and later recovered, as well as instances where vehicles are taken permanently.
6. Slovak Republic: Since 2005, data on NUTS1 level need not to be equal to the sum of NUTS2 level data because NUTS1 data also includes regionally unspecified offences recorded by railway police, military police, corps of prison and court guard, and customs director.
7. Switzerland: From 2009, police statistics on crime have been revised and are thus not comparable to the old police statistics; this translates into a break in series between 2008 and 2009.
8. Australia, Czech Republic, Germany, Estonia, Greece, Iceland, Korea, Luxembourg, Netherlands, Norway, Portugal, Turkey and United Kingdom: Data not available at the regional level.

## Municipal waste and recycled waste

| | Source | Years | Territorial level |
|---|---|---|---|
| All countries[1, 2] | *OECD Regional Database*<br>Regional municipal data were provided by the individual member countries through the annual OECD regional data questionnaire. | 2010 | 2 |

National data: OECD Environmental Statistics.

1. Australia, Belgium, Chile, Denmark, Finland, Greece, Iceland, Ireland, Switzerland and United States: Data on municipal waste not available at the regional level.
2. Recycled waste: Data at the regional level are available only in Austria, France, Hungary, Italy, Japan, Norway, Poland, Portugal, Slovenia and Sweden.

## Net ecosystem productivity

| | Source | Years | Territorial level |
|---|---|---|---|
| All countries | Climate scenario $CO_2$ fluxes from the NASA-CASA model predictions 2006-2011, *http://geo.arc.nasa.gov/sge/casa/cquestwebsite*.<br>Potter, C. et. al. (2012), "Terrestrial Ecosystem Carbon Fluxes Predicted from MODIS Satellite Data and Large-Scale Disturbance Modelling", *International Journal for Geo Science*, *http://dx.doi.org/10.4236/ijg.2012*. | 2006-11 | 2, 3 |

Net ecosystem production (NEP) quantifies the net amount of atmospheric carbon fixed by plants through biomass accumulation and released from the soil. The net ecosystem production is a significant factor lowering the $CO_2$ concentration in the atmosphere. The measure of net ecosystem productivity used is based on the improved MOD17 collection (improvements over the global MODIS NEP algorithm) produced by Potter et al. and colleagues at the Biospheric Branch at NASA's Ames Research Centre.

## Number of cars

| | Source | Years | Territorial level |
|---|---|---|---|
| Australia[8] | - | - | - |
| Austria | Statistics Austria | 2011 | 2 |
| Belgium | Eurostat Regional Transport Statistics | 2011 | 3 |
| Canada[1] | Statistics Canada, CANSIM database, Table 405-00042 – Road motor vehicles, registrations | 2011 | 2 |
| Chile[8] | - | - | - |
| Czech Republic[2] | Czech Statistical Office and the Motor Vehicle Registry of the Ministry of Interior of the Czech Republic | 2011 | 3 |
| Denmark[3] | Eurostat, regional transport statistics | 2011 | 3 |
| Finland | Statistics Finland, transport and tourism statistics | 2011 | 3 |
| France[4] | MEDDTL (CGDD/SOeS), Fichier central des automobiles | 2010 | 3 |
| Estonia[8] | - | - | - |
| Germany[5] | Federal Motor Transport Authority, Spatial Monitoring System of the BBSR | 2011 | 3 |
| Greece | Eurostat regional transport statistics | 2011 | 2 |
| Hungary | Central office for administrative and electronic public services | 2011 | 3 |
| Iceland | Iceland road traffic directorate (*www.us.is/umferdarstofa*), private vehicles | 2011 | 3 |
| Ireland | Department of Transport, Tourism & Sport, Irish Bulletin of Vehicle and Driver Statistics, Table 5a. | 2011 | 3 |
| Israel | The data are based on the Vehicles File that is received from the Licencing Department in the Ministry of Transport | 2010 | 3 |
| Italy | Automobile club d'Italia | 2011 | 3 |
| Japan | Ministry of Land, Infrastructure and Transport | 2011 | 2 |
| Korea | Ministry of Land, Transport and Maritime Affairs | - | - |
| Luxembourg[8] | - | - | - |
| Mexico[8] | - | - | - |
| Netherlands | Eurostat Regional Transport Statistics | 2011 | 2 |
| New Zealand[8] | - | - | - |
| Norway | Statistics Norway | 2011 | 3 |
| Poland | Central Vehicle Register kept by the Ministry of the Interior | 2011 | 3 |
| Portugal[6] | Vehicle registration offices | 2011 | 3 |
| Slovak Republic | Ministry of Transport, Construction and Regional Development | 2011 | 3 |
| Slovenia | Statistical Office of the Republic of Slovenia, SI-STAT Data Portal, road vehicles at the end of the year (31.12.) by type of vehicle and statistical region, Slovenia, annually | 2011 | 3 |
| Spain | Govierno de España, Ministerio del Interior, Direción General de Tráfico, Parque de vehículos por provincias y tipos | 2010 | 3 |
| Sweden | Trafikanalys Sweden | 2011 | 3 |
| Switzerland | Statistique des véhicules routiers | 2011 | 3 |
| Turkey | Eurostat, regional transportation stastistics | 2011 | 3 |
| United Kingdom | United Kingdom Ministerial Department for Transport Statistics | 2011 | 3 |
| United States[7] | Federal Highway Administration, State Motor-Vehicle Registrations | 2010 | 2 |
| Russian Federation | Russian Interior Ministry | | 2 |

1. Canada: Vehicles weighing less than 4 500 kilogrammes.
2. Czech Republic: Years 2007-10.
3. Denmark: Includes passenger cars for private use, for taxis and for rental.
4. France: Private vehicles less than 15 years old.
5. Germany: Private cars only.
6. Portugal: New light passenger vehicles sold and registered (flow indicator). It includes road motor vehicles, other than motorcycle, sintended for the carriage of passengers and designed to seat no more than 9 persons (including the driver). Sales of vehicles are attributed to municipalities according to the owner´s place of residence.
7. US: Private and commercial automobiles (including taxis).
8. Australia, Chile, Estonia, Luxembourg, Mexico, New Zealand: data not available at regional level.

## Number of murders

| | Source | Years | Territorial level |
|---|---|---|---|
| Australia | Australian Bureau of Statistics, ABS 4510.0 – Recorded Crime – Victims, Australia | 2011 | 2 |
| Austria | Austria Home Office, Crime Statistics | 2011 | 2 |
| Belgium | OECD Regional Questionnaire; information provided by the delegate of the Working Party on Territorial Indicators (WPTI) | 2009 | 2 |
| Canada[12] | - | - | - |
| Chile[1] | Under-secretariat of Crime Prevention, Ministry of Interior and Public Safety | 2011 | 2 |
| Czech Republic | Czech Statistical Office; Police of the Czech Republic | 2011 | 2 |
| Denmark[2] | Statistics Denmark | 2011 | 2 |
| Finland[12] | - | - | - |
| France | INSEE, data sent by the delegate | 2011 | 2 |
| Estonia[3] | OECD Regional Questionnaire; information provided by the delegate of the Working Party on Territorial Indicators (WPTI) | 2011 | 2 |
| Germany[12] | - | - | - |
| Greece | OECD Regional Questionnaire; information provided by the delegate of the Working Party on Territorial Indicators (WPTI) | 2009 | 2 |
| Hungary | Ministry of Justice, Chief Prosecutor's Department | 2011 | 2 |
| Iceland[12] | - | - | - |
| Ireland | CSO, StatBank Ireland, Table CJQ02: Recorded Crime Offences by Garda Region | 2011 | 2 |
| Israel | OECD Regional Questionnaire; information provided by the delegate of the Working Party on Territorial Indicators (WPTI) | 2011 | 2 |
| Italy[3,4] | National Statistical Institute, ISTAT | 2011 | 2 |
| Japan | National Police Agency | 2011 | 2 |
| Korea | OECD Regional Questionnaire; information provided by the delegate of the Working Party on Territorial Indicators (WPTI) | 2011 | 2 |
| Luxembourg | Rapports d'activités 2000-2011 de la Police Grand-Ducale | 2011 | 2 |
| Mexico[5] | National Statistical Institute, INEGI | 2011 | 2 |
| Netherlands | Statistics Netherlands (CBS)-STATLINE | 2009 | 2 |
| New Zealand | New Zealand Police | 2011 | 2 |
| Norway[6] | Directorate of the Police of Norway | 2011 | 2 |
| Poland[7] | National Police Headquarters | 2011 | 2 |
| Portugal[8] | Ministry of Justice – Directorate-General for Justice Policy | 2011 | 2 |
| Russian Federation | OECD Regional Questionnaire | 2009 | 2 |
| Slovak Republic[9] | Ministry of Interior of the Slovak Republic | 2011 | 2 |
| Slovenia[12] | - | - | - |
| Spain | OECD Regional Questionnaire; information provided by the delegate of the Working Party on Territorial Indicators (WPTI) | 2011 | 2 |
| Sweden | Swedish National Council for Crime Prevention (Brå). | 2011 | 2 |
| Switzerland[10] | OECD Regional Questionnaire; information provided by the delegate of the Working Party on Territorial Indicators (WPTI) | 2011 | 2 |
| Turkey | Turkish Statistical Institute | 2008 | 2 |
| United Kingdom | OECD Regional Questionnaire; information provided by the delegate of the Working Party on Territorial Indicators (WPTI) | 2008 | 2 |
| United States | Federal Bureau of Investigation, Crime in the United States, Table 4 | 2011 | 2 |
| Russian Federation[11] | Federal State Statistics Service (Rosstat) | 2009 | 2 |

1. Figures are people who have been victims of murder. Data based on crimes known by one police force (Carabineros de Chile)
2. Reported criminal offences
3. In some cases, the exact location of the crime is unknown and is attributed to regions arbitrarily resulting in a discrepancy between the total at regional level and that at provincial or national level.
4. Data on international reported murders and vehicles thefts are available only for 103 provinces; data are missing for four of Sardinia's provinces.
5. National Census 2012 State Law Enforcement. As part of the implementation of the National Census of Law Enforcement 2011 and 2012, the figure provided for 2010 and 2011 corresponds to the data of the relevant offenses, registered preliminary inquiries initiated by the Public Prosecutor of the Common Jurisdiction in each of the federal states.
6. The number of murders in 2011 does not include the terror attack in Oslo and Utøya (Buskerud), with 77 victims.
7. Data have been revised. They include ascertained crimes from the category of homicide and infanticide in any form.
8. Murders account for surveys of the judicial police coming out with proposed charges for the crime of murder consummated.
9. Since 2005, data on NUTS1 level need not be equal to the sum of NUTS2 level data because NUTS1 data also include regionally unspecified offences recorded by railway police, military police, corps of prison and court guard, and customs director.
10. From 2009, police statistics on crime have been revised and are thus not comparable to the old police statistics; this translates into a break in series between 2008 and 2009.
11. Data include the number of reported murders and attempted murders.
12. Canada, Finland, Germany, Iceland and Slovenia: Data not available at the regional level.

## Number of hospital beds

| | Source | Years | Territorial level |
|---|---|---|---|
| EU21 countries[1] | Eurostat, regional health statistics | 2011 | 2 |
| Australia[2] | AIHW 2011, Australian Hospital Statistics 2009-10, Health Services Series No. 40. Cat. No. HSE 107, Canberra: AIHW | 2011 | 2 |
| Canada[3] | Canadian MIS Database (CMDB), CIHI | 2011 | 2 |
| Chile | Department of Health Statistics and Information, Ministry of Health | 2011 | 2 |
| Iceland[7] | - | - | - |
| Israel | Ministry of Health, Department of Health Information | 2011 | 2 |
| Japan | Statistics Bureau, MIC | 2010 | 2 |
| Korea[7] | - | - | - |
| Mexico[4] | Ministry of Health, Directorate General for Health Information, Statistical Information Bulletin, Vol I, 2000-06. | 2010 | 2 |
| New Zealand[7] | - | - | - |
| Norway | Eurostat, regional health statistics | 2010 | 2 |
| Switzerland | OECD Regional Questionnaire; information provided by the delegate of the Working Party on Territorial Indicators (WPTI) | 2011 | 2 |
| Turkey[5] | General Directorate of Curative Services under the Ministry of Health | 2011 | 2 |
| United States[6] | National Center for Health Statistics, United States, 2011: Special Feature on Socioeconomic Status and Health, Hyattsville, MD. 2012 | 2005 | 2 |

1. EU21 countries: Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden and the United Kingdom. Data for Belgium, Germany, France, Ireland, Italy, Norway, Poland refer to 2010. No regional data are available in Finland and the United Kingdom.
2. The average number of available beds presented here may differ from the counts published elsewhere. For example counts based on numbers of beds on a specified date may differ from the average number of available beds over the reporting period. Comparability of bed numbers can be affected by the range and type of patients treated by a hospital (casemix), with, for example, different proportions of beds being available for special and more general purposes. Public and private hospital bed numbers are based on different definitions (see Appendix 1: *www.aihw.gov.au/publication-detail/?id=10737418863*).
3. These figures represent the beds and cribs available and staffed to provide hospital services to inpatients/residents at the required type and level of service on 1 April 2010. Bassinets set up outside the nursery and used for infants other than newborns are included. These figures reflect beds and cribs staffed and in operation for the provision of hospital services only; beds of residential care facilities that are integrated with hospital facilities are not included. The beds and cribs staffed and in operation are divided into the following seven groups of functional centres: Intensive Care, Obstetrics, Paediatrics, Psychiatric, Rehabilitation, Long-term Care, and Other Acute. Other Acute includes services provided within medical nursing functional centres, surgical nursing functional centres, combined medical/surgical nursing functional centres and all other acute nursing inpatient functional centres. Data from Quebec and Nunavut is unavailable at this time.
4. Data include only beds from State hospitals.
5. Hospitals of other public institutions and local governmental offices are covered. Figures may show certain variance due to hospital mergers and closures. MoD hospitals are not covered. Data for TL2 regions were computed using TL3 values.
6. Data refer only to community hospitals. Community hospitals are non-federal short-term general and special hospitals whose facilities and services are available to the public. Original data expressed as beds by 1 000 population; number of beds computed using population data from the *OECD Regional Database*.
7. Iceland, Korea and New Zealand: Data not available at the regional level.

## Number of physicians

| | Source | Years | Territorial level |
|---|---|---|---|
| EU21 countries[1] | Eurostat, regional health statistics | 2011 | 2, 3 |
| Australia[2] | AIHW, Medical Labour Force Survey | 2011 | 2 |
| Canada[3] | Canadian Institute of Health Information (CIHI) | 2011 | 2 |
| Chile | Department of Health Statistics and Information (DEIS), Ministry of Health (Minsal) | 2011 | 2 |
| Iceland[5] | - | - | - |
| Israel | Central Bureau of Statistic (CBS) | 2011 | 2 |
| Japan | Statistics and Information Department, Minister's Secretariat, Ministry of Health, Labour and Welfare | 2010 | 2, 3 |
| Korea | Korea National Statistical Office | 2011 | 2, 3 |
| Mexico | Ministry of Health | 2008 | 2 |
| New Zealand | Medical Council, The New Zealand Medical Force in 2010 | 2010 | 2 |
| Norway | Eurostat, regional health statistics | 2010 | 2, 3 |
| Switzerland | FSO, Federal Statistical Office, Neuchâtel; Swiss Medical Association (FMH), Bern; Medical Statistics of Physicians, yearly census | 2011 | 2, 3 |
| Turkey | National Statistics Agency, TURKSTAT | 2011 | 2 |
| United States[4] | American Medical Association | 2010 | 2 |

1. EU21 countries: Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden and the United Kingdom.
   1.1. No regional data available in Ireland.
   1.2. TL3 values are available in Belgium, Czech Republic, Estonia, Finland, France, Greece, Hungary, Portugal, Slovak Republic and Sweden.
2. Australia: The data refer to the number of employed medical practitioners, including clinicians and non-clinicians.
3. Canada: Includes physicians in clinical and/or non-clinical practice. Excludes residents and unlicensed physicians who requested that their information not be published as of 31 December 2005, *http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=AR_14_E*.
4. United States: Excludes doctors of osteopathy, and physicians with addresses unknown and who are inactive. Includes all physicians not classified according to activity status.
5. Iceland: Data not available at the regional level.

## Part-time employment

| | Source | Years | Territorial level |
|---|---|---|---|
| EU21 countries[1] | Eurostat, regional labour market statistics | 2012 | 2 |
| Australia[4] | Australian Bureau of Statistics, 6291.0.55.001 Labour Force | 2011 | 2 |
| Canada | Statistics Canada, CANSIM database, Table 282-0002 | 2011 | 2 |
| Chile | OECD Regional Questionnaire; information provided by the delegate of the Working Party on Territorial Indicators (WPTI) | 2011 | 2 |
| Iceland[2] | - | - | - |
| Israel | OECD Regional Questionnaire; information provided by the delegate of the Working Party on Territorial Indicators (WPTI) | 2011 | 2 |
| Japan | OECD Regional Questionnaire; information provided by the delegate of the Working Party on Territorial Indicators (WPTI) | 2011 | 2 |
| Korea[2] | - | - | - |
| Mexico[2] | - | - | - |
| New Zealand[2] | - | - | - |
| Norway | Eurostat, regional labour market statistics | 2011 | 2 |
| Switzerland | Eurostat, regional labour market statistics | 2011 | - |
| Turkey[3] | TURKSTAT, Household Labour Force Survey Revised Results | 2011 | 2 |
| United States[2] | - | - | - |

The definition of part-time work varies considerably across OECD member countries. The OECD defines part-time working in terms of usual working hours fewer than 30 per week. At regional level there does not exist a harmonised definition of part-time employment. Indeed, for some countries, the number of hours defining the number of part-time employees in a region differs from the OECD definition. This results in regional values differ in from national estimates relying on a harmonised definition.

1. EU21 countries: Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden and the United Kingdom. However, for European TL2 regions, the distinction between full-time and part-time work is based on a spontaneous response by the respondent; except in the Netherlands, Iceland and Norway where part-time is determined if the usual hours are fewer than 35.
   1.1. Data for Italy refer to 2011.
2. Iceland, Korea, Mexico, New Zealand, Turkey and United States: Data not available at the regional level.
3. Total figures may not be exact due to the rounding of the numbers. Sample size is too small for reliable estimates for figures less than two thousand persons in each cell. Full time/part time distinction is made by the usual hours worked in the main job using the 30 hour threshold.
4. Australia: part-time employment refers to labour working less than 35 hours per week..

## PCT patents applications

| | Source | Years | Territorial level |
|---|---|---|---|
| All countries[1, 2, 3] | *OECD REGPAT Database* | 1995-2010 | 2 and 3 |
| OECD16[1, 2, 4] | *OECD REGPAT Database* | 2008 | Metropolitan areas |

1. The *OECD REGPAT Database* presents patent data that have been linked to regions according to the addresses of the applicants and inventors. For more information on the database, see: *www.oecd.org/dataoecd/22/19/40794372.pdf*.
2. A patent is generally granted by a national patent office or by a regional office that does the work for a number of countries, such as the European Patent Office and the African Regional Intellectual Property organisation. Under such regional systems, an applicant requests protection for the invention in one or more countries, and each country decides as to whether to offer patent protection within its borders. In this publication the patent data comes from the WIPO-administered Patent Co-operation Treaty (PCT) which provides for the filing of a single international patent application which has the same effect as national applications filed in the designated countries. An applicant seeking protection may file one application and request protection in as many signatory states as needed. More info on PCT can be found here: *www.wipo.int/export/sites/www/pct/en/basic_facts/faqs_about_the_pct.pdf*.
3. Patent counts are provided for selected technology areas such as information and communication technology (ICT), biotechnology, nanotechnology and for technologies related to the environment. For more information, see *www.oecd.org/dataoecd/5/19/37569377.pdf*. For classifications of environmental-related technologies see *www.oecd.org/env/consumption-innovation/indicator.htm*.
4. OECD (16) refers to Denmark, France, Norway, Belgium, United States, Germany, Spain, Sweden, Netherlands, Italy, Austria, Portugal, Finland, Mexico, Japan and Estonia. Only for these 16 countries it was possible to link the addresses of the applicants and inventors to the zip codes of municipalities belonging to the metropolitan area.

## Population: Total, by age and gender

| | Source | Years | Territorial level |
|---|---|---|---|
| Australia | Australian Bureau of Statistics, Table 3235.0, ASGC 2011 classification, estimated resident population on 30 June. | 1996-2011 | 3 |
| Austria | Statistics Austria, population statistics at the beginning of the year | 1995-2012 | 3 |
| Belgium | Statistics Belgium, FPS Economie | 1995-2012 | 3 |
| Canada | Statistics Canada, CANSIM Table 051-0036, estimates of population | 1996-2012 | 3 |
| Chile | INE, Chile, population projection and estimates by sex and age | 1995-2012 | 2 |
| Czech Republic[1] | Czech Statistical Office, preliminary data for 2012 | 1995-2012 | 3 |
| Denmark | Statistics Denmark, Statbank (FOLK1), population at the beginning of the year | 2008-12 | 3 |
| Estonia | Statistics Estonia, Statistical database – Table PO022: population by gender, age and county, 1 January | 1995-2012 | 3 |
| Finland | Statistics Finland, population statistics as of 1 January. | 1995-2012 | 3 |
| France | INSEE, Local population estimates, preliminary data for 2012 | 1995-2012 | 3 |
| Germany[1] | Regional statistics Germany, Spatial Monitoring System of the BBSR | 1995-2012 | 3 |
| Greece | Eurostat, regional demographic statistics | 1995-2012 | 3 |
| Hungary | KSH, Hungarian Statistical Office, 1995-2000 data are based on the 1990 Census, 2001-12 data are based on the Census conducted 1 February 2001. | 1995-2012 | 3 |
| Iceland[1] | Statistics Iceland; before 1998, population by municipalities, gender and age 1 December; 1998-2010: population by municipalities, gender and age 1 January –Current municipalities (Table MAN02001); 2011-13: urban nuclei and zip codes dataset, population by gender and age 1 January. | 1995-2012 | 3 |
| Ireland | Central Statistics Office, Ireland, StatBank Ireland, population estimates: PEA07 Estimated Population (Persons in April) by Age Group, Gender, Regional Authority Area | 1995-2012 | 3 |
| Israel | Central Bureau of Statistics- Statistical Abstract of Israel | 1996-2012 | 2 |
| Italy | ISTAT, Intercensal population estimates | 1995-2009 | 3 |
| Japan | Statistics Bureau, MIC, current population estimates on 1 October | 1995-2012 | 3 |
| Korea | Korean National Statistical Office | 1995-2012 | 3 |
| Luxembourg | Eurostat, regional demographic statistics | 1995-2012 | 3 |
| Mexico | INEGI, Census of population | 2000, 2005, 2010 | 3 |
| Netherlands | Eurostat, regional demographic statistics | 1995-2012 | 3 |
| New Zealand | Statistics New Zealand, estimated resident population nr 30 June 2012 based on boundaries on 1 January 2013 | 1995-2012 | 3 |
| Norway | Statistics Norway, Statbank | 1995-2012 | 3 |
| Poland[1] | Central Statistical Office, Poland | 1995-2012 | 3 |
| Portugal[1] | Statistics Portugal (INE), Demographic Statistics, Estimates of Resident Population | 1995-2012 | 3 |
| Slovak Republic[1] | Statistical Office of the Slovak Republic, regional database RegDat | 2002-12 | 3 |
| Slovenia | Statistical Office of the Republic of Slovenia, SI-STAT data portal | 1995-2012 | 3 |
| Spain | National Statistics Institute (INE) | 1995-2012 | 3 |
| Sweden[1] | Statistics Sweden | 1995-2012 | 3 |
| Switzerland[1] | Swiss Federal Statistical Office, Statweb | 1995-2012 | 3 |
| Turkey | Turkish Statistical Institute (TurkStat), mid-year population estimates, 2000 data based on Census of 22 October, 2000; 2008-2012 data are based on the Address Based Population Registration System | 1995-2012 | 3 |
| United Kingdom | National Statistical Office, population estimates | 1995-2012 | 3 |
| United States | US Census Bureau, Population Estimates Program | 1995-2012 | 3 |
| Brazil | Instituto Brasileiro de Geografia e Estadística (IBGE) | 1995-2012 | 2 |
| China | National Bureau of Statistics of China | 1998-2011 | 2 |
| Colombia | Departamento Administrativo Nacional de Estadistica. estimation of population 1985-2005 and projection of population 2005-2020 by department, 30 June. | 1995-2012 | 2 |
| India | Statistics India (Indiastat), mid-year population estimates | 2001-12 | 2 |
| Russian Federation | Federal State Statistics Service of the Russian Federation (Rosstat) | 1995-2012 | 2 |
| South Africa | Statistics South Africa, Table P0302 – mid-year population estimate | 1995-2011 | 2 |

1. Czech Republic, Germany, Iceland, Poland, Portugal, Slovak Republic, Sweden and Switzerland: population as of 31 December, restated to 1 January the following year by the OECD Secretariat.

## Population in functional urban areas

| | Source | Years | Territorial level |
|---|---|---|---|
| Australia[1] | - | - | - |
| Austria | Statistics Austria | 2001-12 | Functional urban areas |
| Belgium | Statistics Belgium | 2001-12 | Functional urban areas |
| Canada | Statistics Canada, Census Canada | 2000-12 | Functional urban areas |
| Chile | INE Chile | 2000-12 | Functional urban areas |
| Czech Republic | Czech Statistical Office | 2000-12 | Functional urban areas |
| Denmark | Statistics Denmark | 2000-12 | Functional urban areas |
| Estonia | Statistics Estonia, population database | 2000-12 | Functional urban areas |
| Finland | Statistics Finland | 2000-12 | Functional urban areas |
| France | INSEE, Demographic Census | 2000-12 | Functional urban areas |
| Germany | Regionaldatenbank Deutschland | 2000-12 | Functional urban areas |
| Greece | National Statistical Service of Greece | 2000-12 | Functional urban areas |
| Hungary | Hungarian Central Statistical Office | 2000-12 | Functional urban areas |
| Iceland[1] | - | - | - |
| Ireland | Central Statistics Office of Ireland | 2000-12 | Functional urban areas |
| Israel[1] | - | - | - |
| Italy | ISTAT, Demography in Figures | 2000-12 | Functional urban areas |
| Japan | Statistical Office, population and household data | 2000-12 | Functional urban areas |
| Korea | Korea National Statistical Office | 2000-12 | Functional urban areas |
| Luxembourg | STATEC – Statistical Portal | 2000-12 | Functional urban areas |
| Mexico | INEGI, Demographic Census | 2000-12 | Functional urban areas |
| Netherlands | Statistics Netherlands | 2001-12 | |
| New Zealand[1] | - | - | - |
| Norway | Statistics Norway | 2000-12 | Functional urban areas |
| Poland | Central Statistical Office of Poland | 2000-12 | Functional urban areas |
| Portugal | INE, Demographic Census | 2000-12 | Functional urban areas |
| Slovak Republic | Statistical Office of the Slovak Republic | 2000-12 | Functional urban areas |
| Slovenia | Statistical Office of the Republic of Slovenia | 2000-12 | Functional urban areas |
| Spain | INE, Demographic Census | 2000-12 | Functional urban areas |
| Sweden | Statistics Sweden | 2000-12 | Functional urban areas |
| Switzerland | Swiss Federal Statistics Office | 2000-12 | Functional urban areas |
| Turkey[1] | - | - | - |
| United Kingdom | Office for National Statistics | 2000-12 | Functional urban areas |
| United States | U.S. Census Bureau | 2000-12 | Functional urban areas |

1. The functional urban areas have not been identified in Australia, Iceland, Israel, New Zealand and Turkey. The population in functional urban areas is computed for the two Census years (circa 2000 and 2011) and estimated for the years between the Census.

## Population mobility among regions

| | Source | Years | Territorial level |
|---|---|---|---|
| Australia[1] | Australian Bureau of Statistics, Migration, Table 3412.0 | 1999-2011 | 2 |
| Austria | Statistics Austria, Migration statistics | 2002-11 | 3 |
| Belgium | FPS Economie/Statistics Belgium | 2011 | 3 |
| Canada | Statistics Canada, CANSIM Table 051-0012 | 2010-12 | 2 |
| Chile[6] | - | - | - |
| Czech Republic | Czech Central Population Register Regional Yearbooks | 2003-11 | 3 |
| Denmark | Statistics Denmark, StatBank, Table FLY66 | 2006-11 | 3 |
| Estonia | Estonian Ministry of the Interior, Regional Development Department | 2004-11 | 3 |
| Finland | Statistics Finland | 1999-2011 | 3 |
| France[6] | - | - | - |
| Germany | Spatial Monitoring System of the BBSR | 1999-2010 | 3 |
| Greece | | 2001 | 3 |
| Hungary | KSH Hungarian Statistical Office | 1999-2011 | 3 |
| Iceland | Statistics Iceland; internal migration between regions | 2010-12 | 3 |
| Ireland[6] | - | - | - |
| Israel | Central Bureau of Statistics | 2010-11 | 2 |
| Italy | ISTAT | 1999-2011 | 3 |
| Japan | Statistics Japan E-STAT, migrants by prefecture | 1999-2011 | 3 |
| Korea[6] | - | - | - |
| Mexico[6] | - | - | - |
| Netherlands | Statistics Netherlands on Statline | 2002-10 | 3 |
| New Zealand[2] | Statistics New Zealand | 2006 | 3 |
| Norway | Statistics Norway, Statbank, Table 01222, Population Change | 2008-12 | 3 |
| Poland | Statistics Poland, Regional Databank | 1999-2011 | 3 |
| Portugal[3] | Statistics Portugal (INE) | 2001-11 | 3 |
| Slovak Republic | National Statistics Reg-Dat database | 2001-11 | 3 |
| Slovenia | Statistical Office of the Republic of Slovenia, SI-STAT data portal | 1999-2011 | 3 |
| Spain | National Statistics Institute (INE) | 1999-2011 | 3 |
| Sweden | Statistics Sweden Population Registers | 1999-2012 | 3 |
| Switzerland | Swiss Federal Statistical Office | 1999-2011 | 3 |
| Turkey | Ministry of Development of Turkey, Monitoring, Evaluation and Analysis Department | 2009-11 | 3 |
| United Kingdom[4] | National Statistical Office, Population Estimates | 2006-08 | 3 |
| United States[5] | IRS Individual Master File system | 2008-10 | 3 |

Data refer to domestic migration: inflows and outflows of population from one region to another region of the same country. They do not include international immigration and outmigration.

1. Australia: Data are an aggregation of quarterly ABS estimates of migration flows, for the six states and two main territories.
2. New Zealand: OECD annualised estimates based on numbers of internal migrants who were usually resident in a different New Zealand region five years earlier.
3. Portugal: Data based on 2001 and 2011 Census micro-data. Data for 2001 refer to flows between 31 December 1999 and 12 March 2001 and data for 2011 refer to flows between 31 December 2009 and 12 March 2011.
4. United Kingdom: Data do not include Scotland and Northern Ireland.
5. United States: Secretariat's computation of inflows and outflows at TL3 level by aggregating county-to-county bilateral migration data from the IRS Individual Master File system, based on tax filing units, *www.irs.gov/uac/SOI-Tax-Stats-County-to-County-Migration-Data-Files*.
6. France and Ireland data not available at regional level. Chile, Korea and Mexico regional data are not included for lack of comparability with the other countries.

## Primary and disposable income of households

| | Source | Years | Territorial level |
|---|---|---|---|
| EU21 countries[1] | Eurostat, household income statistics, primary and disposable income | 1995-2009 | 2 |
| Australia | Australian Bureau of Statistics, Household Income Account and Per Capita, cat. 5220.0 | 1995-2010 | 2 |
| Canada | Statistics Canada, CANSIM, Table 384-0012 | 1996-2010 | 2 |
| Chile[3] | National Socio-economic Survey (CASEN) | 1996; 1998; 2000; 2003; 2006; 2009 | 2 |
| Iceland[2] | - | - | - |
| Israel | Central Bureau of Statistics, Income Survey. | 1996-2010 | 2 |
| Japan[3] | Statistics Bureau of Japan | 2001-10 | - |
| Korea | OECD Regional Questionnaire; information provided by the delegate of the Working Party on Territorial Indicators (WPTI) | 2001-10 | |
| Mexico[2] | | | |
| New Zealand[3] | Statistics New Zealand, household income by region | 1998-2010 | 2 |
| Norway | Statistics Norway | 2004-10 | 2 |
| Switzerland[2] | - | - | - |
| Turkey[2] | | | |
| United States | Bureau of Economic Analysis, CA30 – regional economic profiles, and CA35 – personal current transfer receipts | 1995-2010 | 2 |

The primary income of private households is defined as the income generated directly from market transactions, i.e. the purchase and sale of factors of production and goods. These include in particular the compensation of employees. Private households can also receive income on assets (interest, dividends and rents) and from operating surplus and self-employment. Interest and rents payable are recorded as negative items for households.

The disposable income of private households is derived from the balance of primary income by adding all current transfers from the government, except social transfers in kind and subtracting current transfers from the households such as income taxes, regular taxes on wealth, regular inter-household cash transfers and social contributions.

The disposable income of households does not take into account social transfer in kind to households. A preferable measure of material condition of households at regional level could be the adjusted disposable income which additionally reallocates income from government and non-profit institutions serving the households, through expenditure on individual goods and services such as health, education and social housing (in-kind expenditure). Inter-regional disparities of adjusted household income could shed a light on possible areas of social exclusion, material deprivation and lack of access to essential services.

1. EU21 countries: Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden and the United Kingdom.
   1.1. Denmark: 2000-09; Hungary: 2000-09; Spain: 1995-1999 (data not available for the regions Ceuta and Melilla); Slovak Republic: 1996-2009.
   1.2. Data are not available at regional level for Finland.
2. Iceland, Mexico, Switzerland, and Turkey: Data are not available at the regional level.
3. Chile, Japan and New Zealand: Primary income of households are not available at the regional level.

## Research and development (R&D) expenditure

| | Source | Years | Territorial level |
|---|---|---|---|
| EU21[1] | Eurostat, regional science and technology statistics, R&D expenditures and personnel, Total intramural R&D expenditure (GERD) by sector of performance and region. | 2010 | 2 |
| Australia | Australian Bureau of Statistics<br>8104.0 – Research and Experimental Development, Businesses, Australia, 2010-11<br>8109.0 – Research and Experimental Development, Government and Private Non-Profit Organisations, Australia, 2008-09<br>8111.0 – Research and Experimental Development, Higher Education Organisations, Australia, 2010 | 2009 | 2 |
| Canada | Statistics Canada, CANSIM database,<br>Table 358-0001 – Gross domestic expenditures on research and development, by performer sector | 2010 | 2 |
| Chile | Instituto Nacional de Estadísticas (INE) Chile,<br>Survey of Expenditure and Personnel in R&D | 2010 | 2 |
| Iceland[2] | - | - | - |
| Israel | Central Bureau of Statistics. | 2008 | 2 |
| Japan[2] | - | - | - |
| Korea | Korea Institute of Science and Technology Evaluation and Planning (KISTEP) | 2010 | 2 |
| Mexico[2] | - | - | - |
| New Zealand[2] | - | - | - |
| Norway | Eurostat, regional science and technology statistics, R&D expenditures and personnel, Total intramural R&D expenditure (GERD) by sector of performance and region | 2010 | 2 |
| Switzerland[3] | Eurostat, regional science and technology statistics, R&D expenditures and personnel, Total intramural R&D expenditure (GERD) by sector of performance and region | 2008 | 2 |
| Turkey[2] | - | - | - |
| United States[4] | National Science Foundation, National Center for Science and Engineering Statistics. 2012. National Patterns of R&D Resources: 2009 data update, NSF 12-321, Arlington, VA., *www.nsf.gov/statistics/nsf12321/* | 2010 | 2 |

Gross Domestic Expenditure on R&D (GERD) is the total intramural expenditure on R&D performed in the region or country during a given period. GERD is disaggregated in four sectors: business enterprise, government, higher education and private and non-profit. The Business Enterprise sector is comprehensive of all firms, organisations and institutions whose primary activity is the market production of goods or services (other than higher education) for sale to the general public at an economically significant price. It also includes the private non-profit institutions mainly serving the above mentioned firms, organisations and institutions (See *Frascati Manual* section 3.4). The government sector is comprehensive of all departments, offices and other bodies which furnish, but normally do not sell to the community, those common services, other than higher education, which cannot otherwise be conveniently and economically provided, as well as those that administer the state and the economic and social policy of the community. (Public enterprises are included in the business enterprise sector). It also includes non-profit institutions controlled and mainly financed by government, but not administered by the higher education sector (see *Frascati Manual* section 3.5). The higher education sector is comprehensive of all universities, colleges of technology and other institutions of post-secondary education, whatever their source of finance or legal status. It also includes all research institutes, experimental stations and clinics operating under the direct control of or administered by or associated with higher education institutions (see *Frascati Manual* section 3.7). The private non-profit sector is comprehensive of non-market, private non-profit institutions serving households (i.e. the general public) and private individuals or households (see *Frascati Manual* section 3.6).

1. EU21 countries : Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, and the United Kingdom.
   1.1. 2009 data for France, Austria, Germany, Denmark, Sweden, United Kingdom, Netherlands and Belgium; 2011 data for Czech Republic and Slovak Republic, 2005 data for Greece.
2. Iceland, Japan, Mexico, New Zealand and Turkey: Data not available at the regional level.
3. Switzerland: Values only for business R&D expenditure.
4. United States: The sum of the R&D expenditure by state differs from U.S. total reported elsewhere for four reasons: (1) some R&D expenditure cannot be allocated to the state's expenditure; (2) non-federal sources of other non-profit R&D expenditures could not be allocated by state; (3) state-level U&C data have not been adjusted to eliminate double counting of funds passed through from one academic institution to another; and (4) state-level R&D data are not converted from fiscal years to calendar years.

## Research and development (R&D) personnel (headcounts)

| | Source | Years | Territorial level |
|---|---|---|---|
| EU21[1] | Eurostat, total R&D personnel by sectors of performance (employment) and region | 2007 | 2 |
| Australia[3] | - | - | - |
| Canada[2] | Statistics Canada, CANSIM database<br>Table 358-0160 provincial distribution of personnel engaged in research and development, by performing sector and occupational category | 2010 | 2 |
| Chile[3] | Instituto Nacional de Estadísticas (INE) Chile,<br>Survey of Expenditure and Personnel in R&D | 2010 | 2 |
| Iceland[3] | - | - | - |
| Israel[3] | - | - | - |
| Japan[3] | - | - | - |
| Korea[3] | Korea Institute of Science and Technology Evaluation and Planning (KISTEP) | 2010 | 2 |
| Mexico[3] | - | - | - |
| New Zealand[3] | - | - | - |
| Norway[3] | Eurostat, total R&D personnel by sectors of performance (employment) and region | 2010 | 2 |
| Switzerland[3] | - | - | - |
| Turkey[3] | - | - | - |
| United States[3] | - | - | - |

1. EU21: Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, and the United Kingdom.
   1.1. 2001 for France, 2009 data for Austria, Germany, Denmark, Sweden, United Kingdom, Netherlands and Belgium; 2011 data for Czech Republic and Slovak Republic, 2005 data for Greece
2. Canada: Data are expressed in full-time equivalent.
3. Australia, Iceland, Israel, Japan, Mexico, New Zealand, Switzerland, Turkey and United States: Data not available at the regional level.

## Scientific publications and citations

| | Source | Years | Territorial level |
|---|---|---|---|
| OECD countries[1] | *OECD Scopus Custom Data*, Elsevier version 5.2012 | 2000-10 | 2 and 3 |

1. The *OECD Scopus Database* presents publication data that have been linked to regions according to the address of the institution to which the author is affiliated.

## Subnational expenditure, revenue, investment and debt

| | Source | Years | Territorial level |
|---|---|---|---|
| All countries[1, 2, 3, 4, 5] | *OECD National Accounts* | 2007-12 | - |

1. Data refer to the subnational government finance data included in the *OECD National Accounts* harmonised according to the System of National Accounts (SNA93), see *www.oecd.org/std/na/*. Subnational government is defined as the sum of the two subsectors of the general government data: Federated government and related public entities (S.1312); and local government and related public entities (S.1313).
2. Total public expenditure comprises:
   Current expenditure: intermediate consumption + compensation of employees + subsidies + current transfers + financial interest + taxes + social benefits and social transfers in kind + adjustment for the net equity of households in pension funds reserves;
   Capital expenditure: capital transfers + gross capital formation and acquisitions less disposals of non-financial non-produced assets.
3. Total public revenue comprises:

Tax revenue: Taxes on production and imports, current taxes on income, wealth, etc. and capital taxes. Tax revenue include both own-source tax revenue (or "autonomous") and tax revenue shared between central and subnational governments.

Grants and subsidies: current and capital transfers and subsidies.

Tariffs and fees: total sales (market output and output for own final use) and payments for non-market output.

Property income.

Social contributions.

4. Public investment is given by the sum of direct investment (gross fixed capital formation and acquisitions, less disposals of non-financial non produced assets during a given period) and indirect investment (capital transfers). Fixed assets are tangible or intangible assets produced as outputs from production processes that are used repeatedly, or continuously, for more than one year. This covers in particular machinery and equipment, vehicles, dwelling, buildings and some intangible fixed assets, such as mineral exploration, computer software and entertainment, literary or artistic originals intended to be used for more than one year. Gross fixed capital formation consists of both positive and negative values.
5. The General Government Gross Debt definition includes the sum of the following liabilities: currency and deposits (AF.2); securities other than shares (AF.33); loans (AF.4); insurance technical reserves (AF.6); other accounts payable (AF.7). Some liabilities such as shares, equity and financial derivatives are not included in this definition. According to the SNA, most debt instruments are valued at market prices. Data on gross debt are not always comparable across countries due to different definitions or treatment of debt components (e.g. pensions) or valuation (market vs. nominal prices). The SNA definition of gross debt differs from the one applied under the Maastricht Protocol. The "Maastricht debt" excludes not only financial derivatives, shares and other equity, but also insurance technical reserves and other accounts payable. It corresponds roughly to borrowing. The debt according to the Maastricht definition is valued at nominal prices and not at market prices.

## Young people neither in employment nor in education or training (NEET)

| | Source | Years | Territorial level |
|---|---|---|---|
| EU21[1] | Eurostat, Labour Force Survey statistics | 2012 | 2 |

The indicator on **young people neither in employment nor in education and training (NEET)** corresponds to the percentage of the population 18-24 who is not employed and not involved in further education or training. The numerator of the indicator refers to persons who meet the following two conditions: (a) they are not employed (i.e. unemployed or inactive according to the International Labour Organisation definition) and (b) they have not received any education or training in the four weeks preceding the survey. The denominator in the total population consists of the same age group and gender, excluding the respondents who have not answered the question "participation to regular education and training". *http://appsso.eurostat.ec.europa.eu/nui/*.

1. EU21 countries: Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden and the United Kingdom.

## Youth unemployment

| | Source | Reference population | Years | Territorial level |
|---|---|---|---|---|
| EU21[1] | Eurostat, regional labour market statistics, unemployment | 15-24 | 2011 | 2 |
| Australia | Australian Bureau of Statistics, youth unemployment, Cat. 4102.0 | 15-24 | 2007 | 2 |
| Canada[2] | Statistics Canada, CANSIM Table 109-5304 | 15-24 | 2011 | 2 |
| Chile | National Institute of Statistics, INE | 15-24 | 2011 | 2 |
| Iceland[3] | - | - | - | - |
| Israel | Central Bureau of Statistics, LFS | 15-24 | 2011 | 2 |
| Japan | Statistics Bureau, MIC | 15-24 | 2011 | 2 |
| Korea[3] | - | - | - | - |
| Mexico | National Institute of Statistics, INEGI, Employment and Occupation National Survey | 15-24 | 2011 | 2 |
| New Zealand | Statistics New Zealand, Household Labour Force Survey | 15-24 | 2011 | 2 |
| Norway | Statistics Norway, employees 16-64 years by region of work, by region, and period | 15-24 | 2011 | 2 |
| Switzerland | OECD Regional Questionnaire; information provided by the delegate of the Working Party on Territorial Indicators (WPTI) | 15-24 | 2011 | 2 |
| Turkey | Turkish Statistical Institute, LFS | 15-24 | 2011 | 2 |
| United States | Bureau of Labour Statistics, Local Area Unemployment Statistics | 15-24 | 2011 | 2 |

1. EU21 countries: Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden and the United Kingdom.
2. Canada: Data are not available for the regions Yukon Territory, Nunavut and Northwest Territories.
3. Iceland and Korea: Data are not available at regional level.

# ANNEX C

# *Indexes and estimation techniques*

## Environmental revealed technological advantage index

*Definition:* The index of revealed technological advantage is defined as:

$$RTA_i = \frac{P_{ij}/P_j}{P_i/P}$$

Where $P_{ij}$ is the number of patents in the technology field $i$ in region $j$, $P_j$ is total number of patents in region $j$, $P_i$ is the national patents in technology field $i$, and P is the total national patents of all fields

*Interpretation:* The index of revealed technological advantage is defined as the region's share (over national value) of patents in a particular technology field divided by the region's share (over national value) in all patents fields. The index is equal to zero when the region holds no patents in a given technological field; is equal to 1 when the region's share in the technological field equals its share in all fields (no specialisation); and above 1 when a positive specialisation of the region is observed within its country.

## Gini index

*Definition:* Regional disparities are measured by an unweighted Gini index. The index is defined as:

$$GINI = \frac{2}{N-1}\sum_{i=1}^{N-1}\left|F_i - Q_i\right|$$

where $N$ is the number of regions, $F_i = \frac{i}{N}$, $Q_i = \frac{\sum_{j=1}^{i} y_j}{\sum_{i=1}^{n} y_i}$ and $y_i$ is the value of variable y (e.g. GDP per capita, unemployment rate, etc.) in region $j$ when ranked from low ($y_i$) to high ($y_N$) among all regions within a country.

The index ranges between 0 (perfect equality: $y$ is the same in all regions) and 1 (perfect inequality: $y$ is nil in all regions except one).

*Interpretation*: The index assigns equal weight to each region regardless of its size; therefore differences in the values of the index among countries may be partially due to differences in the average size of regions in each country. Only countries with more than four regions are included in the computation of the Gini index

## Specialisation index

*Definition:* Specialisation is measured according to the Balassa-Hoover index, which measures the ratio between the weight of an industry in a region and the weight of the same industry in the country:

$$BH_i = \frac{Y_{ij}/Y_j}{Y_i/Y}$$

where $Y_{ij}$ is total employment of industry $i$ in region $j$, $Y_j$ is total employment in region $j$ of all industries, $Y_i$ is the national employment in industry $i$, and $Y$ is the total national employment of all industries. A value of the index above 1 shows specialisation in an industry and a value below 1 shows lack of specialisation.

*Interpretation*: The value of the specialisation index decreases with the level of aggregation of industries. Therefore, the specialisation index based on a 1-digit industry (e.g. manufacturing) would underestimate the degree of specialisation in all 2-digit industries belonging to it (e.g. textile, chemistry, etc.).

## Urban sprawl index

*Definition:* The index measures the evolution of sprawl over time in a metropolitan area:

$$SI_i = \frac{\left[ urb_{i,t+n} - \left( urb_{i,t} * \left( \frac{pop_{i,t+n}}{pop_{i,t}} \right) \right) \right]}{urb_{i,t}} * 100$$

where $i$ refers to a particular metropolitan area; $t$ refers to the initial year; $t+n$ refers to the final year; *urb* refers to the built-up area in square kilometres; *pop* refers to the total population of the metropolitan area. The built-up area (or urbanised land) is computed as the land within the boundaries of the metropolitan area covered by private and commercial buildings, infrastructure and major transportation infrastructure.

*Interpretation:* The urban sprawl index measures the growth in built-up area adjusted for the growth in population. When the population is stable, the urban sprawl index is basically the growth of built-up area. When the population changes, the index measures the increase in the built-up area relative to a benchmark where the built-up area would have increased in line with population growth. The urban sprawl index is equal to zero when both population and built-up area are stable over time. It is bigger (lower) than zero when the growth of built-up area is greater (smaller) than the growth of population, i.e. the density of the metropolitan area has decreased (increased). Similarly, the index could be computed to compare the sprawl for a given year over a set of metropolitan areas.

## Computation of typologies of land cover and changes in land cover

To measure the different uses of land and its changes with respect to small portions of territory, data from the earth's surface collected through remote sensing and geographic information systems are used. Despite recent progress in earth observation, remote sensing and techniques for processing large datasets, there is not a unique global dataset recording land cover change. The sources of data are the following: MODIS (Moderate Resolution Imaging Spectroradiometer) Land Cover Data to measure land cover in one year (2008) for all countries. Corine Land Cover for Europe (developed by the European Environmental Agency and the European Space Agency), the Japan National Land Information, and the National Land Cover Database for the United States are used to capture land cover in different years

and therefore measure changes in land uses. For Canada, Chile, Korea and Mexico, it was not possible to measure changes in land uses.

These land cover datasets, however, differ in many aspects such as the spatial resolution (though they all get down to 0.5 km cell size) classification systems, and the definitions of land cover classes; therefore, it was necessary to reclassify the typologies of land cover in order to produce the same classes regardless of the source dataset. The final classification used to calculate the statistics for regions and metropolitan areas consists of six classes:

1. Water (lakes, river, lagoons, etc.).
2. Agriculture (annual crops, rice fields, orchards, pastures etc.).
3. Forest (coniferous, broad-leaved, mixed, etc.).
4. Non-forest natural vegetation (natural grasslands, shrub lands, sparsely vegetated areas, etc.).
5. Urbanised area (residential and industrial buildings, major transportation, land for urban uses, etc.).
6. Other (bare lands, wetlands, glaciers).

For regions in other countries than the EU, United States and Japan, the MODIS Land Cover product was used to estimate the proportion of urban (class 13 in IGBP classification) and forest land (classes 1-5 in IGBP classification). The MODIS Land Cover is released each year, and 2008 data were used for estimation. The urban class refers to 2001-02 MODIS data since updated estimates of urban land are still not available for later years. For Europe, Japan and the United States, it was possible to compute also the change in urbanised land, agricultural land and forested land. Changes are expressed as net rates: for example, the rate of change of urban area is calculated as the amount of land converted to urban land cover minus the urban land converted to other classes, as a fraction of the urban land in the starting year.

Once the six classes of land cover are defined, a raster was produced with each cell being classified according to one of the six classes; by superimposing the layer of regional boundaries, we can compute the percentage of regional area covered by forest or the percentage of urbanised area in a metropolitan area, etc.

## Methodology to adjust GDP, total employed and unemployed at metropolitan level

The proposed methodology uses as data inputs the values of GDP in TL2 or TL3 regions and the distribution of population on a small grid (1 $km^2$ cell). It is composed of four main steps, each of which is carried out using GIS software:

- Take the GDP at TL3 level and intersecting with the population grid obtained by the dataset LandScan 2000.
- Attribute each 1 $km^2$ cell a GDP value by weighing for the population in each cell.
- Intersect the layer of GDP in each cell with the boundaries of metropolitan areas. Cells that are not entirely included in one metropolitan area can be aggregated proportionally to the share of their area that falls within each metropolitan area (proportional calculation criteria) or, alternatively, by using a maximum area criterion.
- Calculate the sum of cells' GDP values belonging to each metropolitan area.

An improved method would be to use employment data rather than population in step 2. For example, the United Kingdom Office for National Statistics provides income

estimates at ward level downscaling the regional values through various variables including household size, employment status, proportion of the ward population claiming social benefits, and proportion of tax payers in each of the tax bands, etc. A similar method is used by the U.S. Bureau of Economic Analysis to estimate the GDP for U.S. Metropolitan Statistical Areas. The Federal Statistical Office of Switzerland used CLC-Data-Classes urban continuous fabric, urban discontinuous fabric and industrial or commercial units for all neighbouring countries by calibrating with other data to estimate data for jobs in grid cells. However these types of data input are not available in most OECD countries; therefore a simpler solution was adopted.

A similar technique is applied to estimate employment and unemployment in metropolitan areas. Due to the lack of labour market data in TL3 regions, employment and unemployment in metropolitan areas are derived from TL2 regions. As such, caution should be taken in comparing these values at metropolitan level.

It has to be noted that the estimates of GDP, employment and unemployment in the metropolitan areas do not adhere to international standards; the comparability among countries relies on the use of the same methodology applied to areas defined with the same criteria.

## Methodology to disaggregate $CO_2$ emissions at regional level and metropolitan areas

Generally, emission data are available at country level from the Intergovernmental Panel on Climate Change (IPCC). To facilitate estimation of the emission levels for geographic areas like OECD regions or metropolitan areas, the EDGAR global emission database, developed by the Joint Research Centre of the European Commission, was used. The EDGAR database version 4.1 provides country emission levels separately by each compound and sector of origin (e.g. $CO_2$ emission from fuel production) allocated (disaggregated) to gridded maps on the basis of spatial data such as location of energy and manufacturing facilities, road networks, shipping routes, human and animal population density and agricultural land use. The spatial resolution of the grid is 0.1 by 0.1 degrees and the gridded estimates are currently available for the years 2000-08.

The methodology employed essentially sums the EDGAR estimated values for the 0.1 by 0.1 degrees grids over the relevant boundaries of the regions or metropolitan areas. The raster of total $CO_2$ emissions were averaged over a three-year period to smooth out potential extreme values that might occur in the yearly data.

The emissions from the energy sector include public electricity, heat production and other energy industries; while the emissions from transport include road, rail and ground transportation.

While these estimates have the advantage of using a common methodology for all metropolitan areas, they are based on sectoral energy use and GHG at the national level and population and/or sectoral shares at the local level. As a result, they cannot capture changes in energy use or GHG emissions due to local policies. They also cannot capture the eco-efficiency of cities, as the estimation assumes that all sectors use energy or produce GHG at the same rate in the entire country. The absence of a global protocol for quantifying GHG emissions attributable to urban areas limits the international comparability and it should be taken into account when using these estimates.

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OECD PUBLISHING, 2, rue André-Pascal, 75775 PARIS CEDEX 16
(04 2013 09 1 P) ISBN 978-92-64-20431-7 – No. 60917 2013

# OECD Regions at a Glance 2013

This fifth edition of *OECD Regions at a Glance* shows how regions and cities contribute to national growth and the well-being of societies. It updates its regular set of region-by-region indicators, examining a wide range of policies and trends and identifying those regions that are outperforming or lagging behind in their country. The report covers all 34 OECD member countries and, where data are available, Brazil, China, Colombia, India, the Russian Federation and South Africa.

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**Contents**



**Further reading**

*OECD Regional Outlook 2014* (forthcoming)
*Redefining Urban: A New Way to Measure Metropolitan Areas* (2012)

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**ISBN 978-92-64-20431-7**
**04 2013 09 1 P**