The geography of income inequalities in OECD countries – Evidence from national register data

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Abstract

Existing cross-country research on geographic inequalities in living standards mostly uses GDP/capita as a measure of regional and local economic development. One reason is the lack of granular data on household incomes that would arguably be a better proxy of living standards. This paper studies geographic inequalities in household and individual incomes across OECD countries based on administrative data for 19 OECD countries. It provides evidence on trends in local median income levels and local income inequality at TL3/NUTS3 and local level. A particular focus lies on trends in urban-rural disparities in incomes and inequality following the OECD metropolitan/non-metropolitan typology. The analysis documents substantial regional disparities in median income levels and inequality. Municipal-level analysis naturally yields somewhat larger inequalities, however usually reflecting a few outliers, i.e. municipalities with very high income or inequality levels. Among countries for which time series data are available, a majority have experienced income convergence, i.e. a decline in regional median income disparities, since the mid-2000s or so. This seems to reflect – at least in part – more sluggish income growth in (high-income) metropolitan than in (lower-income) non-metropolitan small regions. Similarly, municipalities that are part of functional urban areas have on average experienced slower income growth than those outside of functional urban areas. Drawing on the results from this analysis, the paper discusses some policy options to monitor, manage, and mitigate regional income inequalities in OECD countries with a focus on labour market and social policies.

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1. Introduction

1. The level and distribution of household incomes, earnings and wealth can vary substantially within countries – across regions, municipalities and neighbourhoods, and between urban and rural areas. Those geographic dimensions are essential for understanding inequalities in people's living standards and economic opportunities. To some extent, geographic disparities arise naturally as people and economic activity tend to concentrate in space. But when they get too large and persist over long time, geographic inequalities can undermine inclusive growth and sustained well-being by excluding people from job opportunities, preventing them from accessing good-quality public infrastructure and by limiting their geographic mobility.

2. Regional disparities – and notably the situation in lagging and economically declining regions – have been receiving growing public attention in many OECD countries. They have become a source of increasingly visible public discontent and a driver of political polarisation (OECD, 2019[1]). In a seminal article, Rodríguez-Pose (2018[2]) observes a revolt of so-called "places that don't matter" in areas marked by persistent poverty, economic decay and a lack of opportunities, causing a "wave of political populism with strong territorial, rather than social foundations". Follow-up research on the "Geography of EU Discontent" showed that local economic and industrial decline, combined with lower employment and a less educated workforce, were key drivers of differences in the anti-EU vote across electoral districts (Dijkstra, Poelman and Rodríguez-Pose, 2019[3]). In the United Kingdom, where geographic inequalities are large in OECD comparison, the previous Government published a comprehensive programme to "level up" the country and address geographic inequalities in opportunities, economic performance and living standards (Department for Levelling Up, Housing & Communities, 2022[4]).

3. The COVID-19 crisis further accentuated geographic inequalities in living conditions and access to services, and may move the issue even up higher on the policy agendas. While the scope of the crisis has been truly global, its impact on people's lives and livelihoods has often depended on regional and local factors, including sectoral composition, work force structure and the age distribution. Also people's vulnerability to the virus has depended on the characteristics of the communities they lived in, with higher levels of vulnerability among socially deprived communities (Nicodemo et al., 2020[5]).

4. Despite the topic's high policy relevance, international evidence on geographic disparities in incomes and social outcomes at a granular level remains scarce for lack of suitable data. Household surveys, as the main sources of internationally comparable data on living conditions, are in most countries designed primarily to provide estimates at national level, with the scope for analysis of regional and local outcomes being limited by small sample sizes. Both the OECD and Eurostat therefore systematically collect data on the levels and inequality of household incomes only for large regions, i.e at TL2/NUTS2 level (Eurostat, 2022[6]; OECD, 2022[7]).[1] The majority of research on geographic inequalities to date has used GDP per capita as an income measure that is widely available for most countries at granular level and over long time periods, see the literature on the relationship of regional disparities with fiscal decentralisation (Ezcurra and Pascual, 2008[8]; Lessmann, 2009[9]), political decentralisation (Rodriguez-Pose and Ezcurra, 2009[10]), governance quality (Ezcurra and Rodríguez-Pose, 2014[11]; Kyriacou, Muinelo-Gallo and Roca-Sagalés, 2015[12]; 2016[13]) and internal conflict (Lessmann, 2016[14]).

5. Existing cross-country studies of geographic inequalities in household incomes have mainly drawn on international survey data from the EU-SILC and its predecessor the ECHP, which means that the scope

[1] The OECD classifies regions on two territorial levels reflecting the administrative organisation of countries (OECD, 2020[98]). For European countries this classification is largely consistent with the Eurostat NUTS 2016. Large (TL2) regions represent the first administrative tier of sub-national government, for example, Provinces in Canada, the *Régions* in France, and States in the United States. Small (TL3) regions correspond to lower-tier administrative regions, exception for Australia, Canada, and the United States.

for producing geographic breakdowns has been rather limited. A series of earlier studies, and those looking at longer time trends, have mainly analysed incomes at the highly aggregated NUTS1 level (Jesuit, Rainwater and Smeeding, 2003[15]; Förster, Jesuit and Smeeding, 2005[16]; Ezcurra, Pascual and Rapún, 2007[17]; Hoffmeister, 2009[18]; Castells-Quintana, Ramos and Royuela, 2015[19]) or focused on a small number of countries for which data for large (TL2) regions have been available for longer (Longford et al., 2012[20]). More recently, studies have exploited growing sample sizes and better regional information to estimate income statistics across large (TL2) regions for a larger number of countries (Ayala, Martín-Román and Vicente, 2020[21]) and to assess the precision and reliability of these estimates (Verma et al., 2017[22]; Benedetti, Crescenzi and Laureti, 2020[23]). In an earlier data collection effort, the OECD compiled a range of indicators on household incomes and poverty for large (TL2) regions across 28 OECD countries, mainly from survey data, which were analysed by Piacentini (2014[24]).[2]

6. For a small, but growing, number of OECD countries, country-specific studies exist that exploit administrative records to analyse geographic income inequalities at more granular level.[3] Several authors have used data from the U.S. Internal Revenue Service to present geographic breakdowns. Most notably, Chetty et al. (2014[25]) studied the incomes of over 40 million parents and their children to study intergenerational mobility across different areas of the United States during a 30-year period. Sommeiller and Price (2015[26]) provide evidence on the top-1% income shares at state level over nearly a century. In Europe, administrative data have been used to study income inequality across Italian provinces between 2000 and 2011 (Acciari and Mocetti, 2013[27]) and across French *départements*, again over an entire century (Bonnet, d'Albis and Sotura, 2021[28]). One of the rare pieces of cross-country evidence on income distributions at more granular level comes from another earlier OECD study, which uses micro-aggregated administrative data to assess income inequalities within metropolitan areas (Boulant, Brezzi and Veneri, 2016[29]).

7. This brief overview illustrates the gap in international evidence on income inequalities at geographically granular level. Register-based data, notably from tax records, can help fill this gap, by providing population-level income information with accurate geographic identifiers.[4] The main challenges for exploiting such data to study economic inequalities are that access is often restricted for confidentiality reasons, and that these data are not standardised across countries.

8. This paper summarises results from a project that aims to shed light on income inequalities within and across geographic regions in OECD and EU countries using results from administrative records. It is the outcome of a major data collection effort that has permitted compiling data on the level and distribution of household or individual incomes at regional or local level for 19 OECD countries. For 18 countries, indicators on income levels and inequality are currently available at the level of small (TL3) regions. In most cases, these data cover several years, often the period since the early- or mid-2000s until usually 2019 or 2020. For ten countries, income indicators have been collected at local, i.e. municipal, level.[5] This

[2] Such survey-based data have also been used in studies on the relationship between regional income and educational inequalities (Tselios, 2008[102]; Rodríguez-Pose and Tselios, 2009[108]), and regional inequalities and economic growth (Ezcurra, 2007[110]; 2009[105]; Rodríguez-Pose and Tselios, 2008[109]; Royuela, Veneri and Ramos, 2018[101]; Panzera and Postiglione, 2021[103]).

[3] For a few, mainly non-European countries, there also exist studies of geographic income inequalities using data from large surveys, including the Chilean CASEN (Paredes, Iturra and Lufin, 2014[41]), the Canadian Census (Breau and Saillant, 2016[95]; Marchand, Dubé and Breau, 2020[104]), the U.S. Census (Partridge, 2005[107]; Moller, Alderson and Nielsen, 2009[106]) and the U.S. American Communities Survey (Florida and Mellander, 2014[96]).

[4] For a discussion of the potential and limitations of using tax micro-data for policy analysis, see also (Kennedy, 2019[99]).

[5] Spain is the only country for which currently only local-level data are available.

is, to the authors' knowledge, the first study compiling results on regional and local income levels and distributions for such a large number of countries.

9. The following main findings have emerged from the analysis of income levels and inequalities across small (TL3) regions and municipalities:

- ***Income levels show substantial geographic variation in some countries.*** Across small (TL3) regions, median incomes in the highest- and lowest-income regions differ by a factor of only 1.2 to 1.3 in some of the Nordic countries (Finland, Norway and Sweden), but 1.6 and 1.7 in Latvia and Japan. In Canada, with its nearly 300 small regions, regional income variation is much greater than that at a factor of 4.3. Income levels naturally vary much more across the typically much larger number of municipalities, but this largely reflects a few outlier municipalities with (typically) very high incomes. Median incomes across municipalities differ by around a factor of two in Denmark, Finland, Portugal and Sweden, and by a factor of four in Spain. However, high-income municipalities – i.e. those at the 90th percentile when ranking all municipalities by median income – have a median income only around 20% higher than the median municipality (40% higher for Spain).
- ***Regional disparities in income levels show no uniform trend over time***, but regional median incomes have converged over the last decade or so in most countries with available data. This finding somewhat contrasts with trends in regional GDP per capita, as a different measure of economic development, which *diverged* in slightly more than half of all countries.
- ***Income inequality shows somewhat greater geographic variation than income levels.*** Gini indices, which measure income inequalities between households, vary in most countries by a factor of around 1.2 to 1.9 between the most and least unequal small (TL3) region. Across municipalities, the distribution in the level of inequality is often heavily skewed: in most countries, inequality levels between highly unequal and comparatively egalitarian municipalities – i.e. those at the 90th and 10th percentile when ranked by the municipal Gini coefficient – vary by less than a factor of 1.3. However, the most unequal municipality is often about twice as unequal as the least unequal municipality.
- ***Cross-regional income differences still account only for a very small fraction of overall, national-level income inequalities***. Instead, inequality *across households within the same small region* account for at least 95% of national-level inequalities across a small set of countries studied.
- ***Metropolitan regions tend to combine a high median income with high inequality.*** Across 17 countries on average, over 75% of regions with a very large city are in the top quartile of regions by median income and level of inequality. Over the last decade or so, metropolitan regions have experienced weaker median income growth than non-metropolitan regions and a stronger rise in inequality. Municipalities in functional urban areas, and particularly those in *large* functional urban areas, have higher median incomes and are more unequal than other municipalities.
- ***Besides incomes, also people's access to essential services can differ substantially within countries.*** Exploratory calculations indicate that in the Netherlands – a densely populated country with excellent transport infrastructure – most people live at a road distance of at most ten kilometres from the closest public employment service. However, people's average distance from a public employment service differs by a factor of up to 5.5 across small (TL3) Dutch regions.

10. The remainder of this paper is structured as follows: Section 2. sets the scene by providing an overview of the geographic disparities in economic development across OECD countries drawing on more widely available data on GDP per capita. Section 3. gives an overview of the national administrative data used in the empirical analysis, highlights their potential and limitations, and discusses some methodological questions. Section 4. presents the results on regional disparities in income levels and inequalities, and their time trends, providing results for both small (TL3) regions and municipalities. Section 5. presents some first evidence stemming from an exploratory research module on geographic disparities

in access to essential services. Section 6. offers a first short discussion of policies to manage and mitigate geographic inequalities, looking at measures to boost productivity in lagging regions, provide quality job opportunities in regional labour markets, and ensure access to quality public services everywhere.[6] Section 7. concludes by highlighting a few main lessons for the upcoming work on the topic and by giving an outlook onto the next project phase.

2. Geographic disparities in economic development

11. Economic development is crucial for people's well-being today and for future generations. Although well-being is multi-dimensional and goes beyond material conditions (OECD, 2014[30]), economic development is fundamental for well-being in other important areas, such as health, education, housing and income. Highly developed regions tend to have more resources and better means to ensure higher incomes for people – for example, by providing better-quality jobs, better access to public services, and more comprehensive social protection. In international comparisons, GDP per capita has been widely used as the main – if imperfect – proxy for economic development.

12. Economic activity – as measured by GDP per capita – is highly unequal across small (TL3) regions within OECD countries. In 2019, within the same country, the top 20% highest-income regions – or more precisely, the small regions with highest GDP per capita that together represent 20% of the national population, had on average 2.5 times the GDP per capita of the 20% lowest-income of regions (OECD, forthcoming[31]). Across OECD countries, economic development gaps between the top and bottom 20% of regions are highest in Ireland, Türkiye, Hungary and Poland, where highest-income regions have three times or more the GDP per capita of the lowest-income regions.

13. Regional economic disparities across small regions have increased during the past 15 years across the OECD as a whole. The coefficient of variation of regional GDP per capita, calculated as the standard deviation as a percentage of the mean, increased by 8% between 2004 and 2019, on average, for a sample of 29 OECD countries with available data. These regional disparities in GDP per capita give a first hint at the differences in incomes and living standards treated in the main part of this paper. However, they may be larger than disparities in household incomes, notably if economic activity of large, multi-plant firms is attributed to the headquarters' region ("headquarter bias").

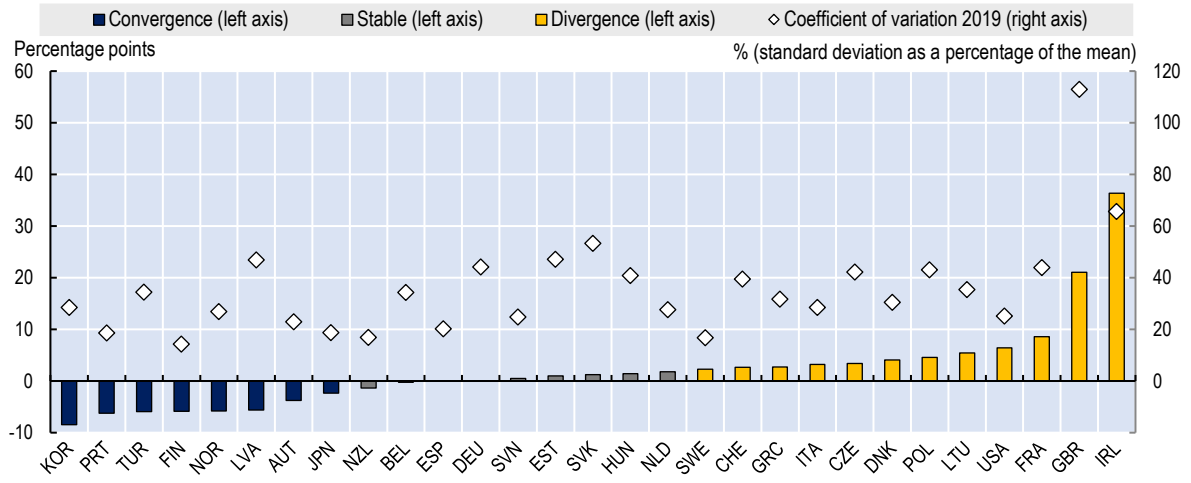
14. However, regional economic disparities have evolved quite differently across countries (Figure 1). Close to half of OECD countries (12 out of 29) have experienced regional divergence in GDP per capita over the latest 15 years, i.e. an increase in the coefficient of variation of small regions' GDP per capita of at least two percentage points. Economic divergence across small regions has been strongest in the United States, France, the United Kingdom and Ireland, with increases in the coefficient of variation ranging from 6 to 36 percentage points. On the other side of the spectrum, only about one-in-four (8 out of 29) OECD countries show a convergence pattern, i.e. a decrease in the coefficient of variation of small regions' GDP per capita of at least two percentage points, particularly Korea, Portugal, Türkiye, Finland and Norway.[7]

[6] A discussion on the role of labour market institutions, redistributive policy, and fiscal equivalisation is still missing and will be added in a future revision of the report.

[7] Recent monitoring of regional convergence in the European Union documents that the less developed regions have been converging in GDP per capita towards the EU average through growth in productivity and employment. However, also here the pattern is uneven, with less developed regions in the EU's eastern member states catching up, but regions in the southern member states failing to do so. The catch-up process in eastern Europe was mainly driven by the dynamic capital regions (Eurofound, 2021[113]; European Commission, 2021[112]).

Figure 1. Regional inequalities in economic activity have increased in about half of OECD countries with available data

Change in the coefficient of variation of GDP per capita across small (TL3) regions, 2004-19 (left axis) and coefficient of variation in 2019 (right axis), OECD countries with available data



Note: The coefficient of variation is the standard deviation of small regions' GDP per capita as a percentage of the mean. Unweighted averages based on 1 621 small regions (TL3) from 29 OECD countries.
Source: OECD calculations based on the OECD Regional Statistics database (OECD, 2022[7]).

15. Different degrees in the access to agglomerations for people, firms, and services provide a powerful interpretation of regional economic disparities. The OECD classification of small regions distinguishes regions according to their access to agglomerations based on data about the share of the regional population living within or near (up to a one-hour drive from) a metropolitan area (see Box 1). In OECD countries, metropolitan regions or regions with easy access to metropolitan areas tend to have higher GDP per capita than other regions. Regions far from metropolitan areas (including both regions with/near a small-medium city, and remote regions) had an average GDP per capita of USD 33 000 (2015 PPP) in 2019, a level 15% lower than in regions close to a metropolitan area and 38% lower than in metropolitan regions.

16. The gap in GDP per capita between metropolitan areas and other parts of the country has been widening in most countries, reinforcing already existing disparities in economic development. Some metropolitan regions, particularly large ones, have experienced very strong growth; regions near metropolitan areas have been the only ones that kept pace for most of the period 2010-19 (OECD, 2020[32]). This may partly be the result of the latter borrowing "agglomeration economies" from the former thanks to the creation of strong economic, social and environmental linkages between those areas, for example through the development of transport networks that allow for new flows of people, goods and services (Garcilazo and Oliveira Martins, 2021[33]).

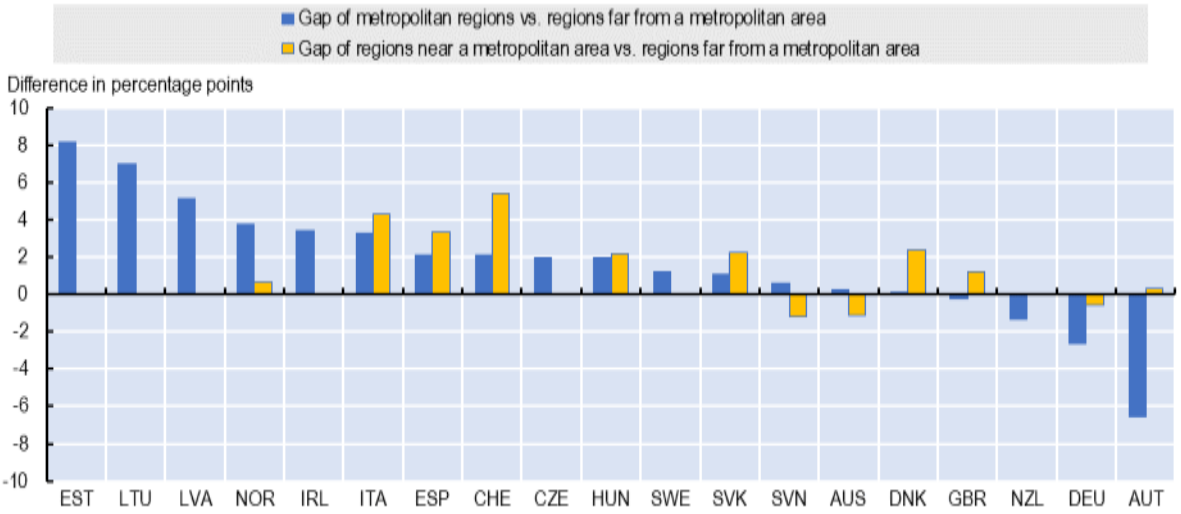
17. More economic opportunities in regions with or close to metropolitan areas, relative to regions farther away, translate into better job outcomes for residents. In 2019, based on 20 OECD countries with available data, employment rates in regions with or near metropolitan areas were close to 72%, four percentage points more than in regions far from metropolitan areas, on average. Overall, in two-in-three countries, employment rates were higher in regions with or close to metropolitan areas than in other regions (Figure 2).[8] Similarly, regions with more accessibility to metropolitan places experienced the lowest

[8] This also reflects a greater share of seniors in regions that are far from metropolitan areas.

unemployment rates. While remote regions and regions with/near a small-medium city had unemployment rates around the 8%, regions close to metropolitan areas displayed unemployment rates around the 5%.

Figure 2. Regions with or near metropolitan areas benefit from better employment outcomes

Geographic gaps in employment rates by type of TL3 region, 2019



Note: Employment rates (weighted) are based on 985 small (TL3) regions from 20 OECD countries.
Source: OECD calculations based on the OECD Regional Statistics database (OECD, 2022[7]).

18. Inequalities in regional economic activity are likely to keep increasing because of long-term demographic trends, such as depopulation and ageing, which tend to hit stronger in remote regions. Agglomerations, i.e. the concentration of people and firms, fuel economic activity. Regions that experience long-term depopulation are therefore more likely to struggle to catch up with economically more active regions. In the last 20 years, only metropolitan regions have experienced a significant increase in population of around 15% – twice as large the increase in population in non-metropolitan regions. In addition, while only around 16% of metropolitan regions have experienced decreasing population, at least 30% of regions far from metropolitan areas have been facing depopulation in the last two decades.

19. Population ageing can further exacerbate inequalities in economic activity across regions mainly through its effect on the local labour supply, and it has been highly unequal across regions. In some regions in Japan, Spain and Germany, the over-65 year-olds already represent more than 30% of the population, while they account for less than 10% in many regions of Mexico, Canada and Chile. The elderly share can also vary significantly by type of region within the same country, and population ageing has been affecting remote regions more severely than other regions. In 2018, elderly dependency rates (i.e. elderly population as a % of the working age population) were around 31% in non-metropolitan regions of OECD countries, three percentage points higher than in metropolitan areas (OECD, 2020[34]).

20. The COVID-19 crisis has had very unequal health and economic impacts across places, but the verdict about its overall effect on interregional inequalities is still out. In the short term, interregional inequalities may have decreased or stabilised if the most productive regions – typically metropolitan areas – turn out to have been most affected. However, the medium- and longer-term impact will largely depend on regions' and cities' capacity to adapt to the "new normal".

21. Interregional inequalities could further rise if new opportunities form digitalisation and remote working are primarily leveraged by the already most productive regions. One decisive factor will be the occupational and skill structure of the local economy, because it determines the extent to which jobs are

amenable to remote working. In 2018, the share of jobs amenable to remote working was more than 12 percentage points higher in cities compared to rural areas (OECD, 2020[35]). Beyond occupational characteristics, actual uptake of remote working practices requires a certain level of digital infrastructure, and cities in OECD countries are also more prepared than other regions in terms of high-quality internet (OECD, 2020[34]). This was illustrated during the pandemic: while the share of employees practicing teleworking doubled across all types of regions on average (from 6% to 12%), teleworking tripled across cities (going from 6% to 18%) (OECD, forthcoming[31]). The net effect on interregional inequalities will consequently depend on how lagging regions integrate in the "new normal" and use the crisis as an opportunity to implement recovery plans that tackle longstanding inequalities, sustainability and resilience issues preventing their growth potential.

3. Data sources and methodology

22. The analysis presented in this paper is the outcome of a major data collection effort that has permitted compiling, up to now, income data at granular geographic level for 19 OECD countries (see the overview in Table 1). For 18 countries – i.e. all countries covered in the analysis except for Spain – indicators on income levels and inequality are available at the level of small (TL3) regions. In most cases, these data cover several years, often the period since the early- or mid-2000s until usually 2019 or 2020. For ten countries, additional income indicators have been collected at municipal level, i.e. for Local Area Units (LAUs). The results presented in this paper are based on tabulations prepared by the national data providers, in most cases upon the OECD Secretariat's request; for five countries (Finland, Portugal, Spain, Sweden, and Switzerland), the Secretariat used pre-existing results available on the national providers' webpages. Administrative data, primarily tax records, served as main original data sources. Results for Canada come from the Canadian Census, those for the Czech Republic and Latvia are based on the EU-SILC, which for these countries has a sufficiently large sample size.

23. This section provides a short discussion of the data sources and methodology used in this paper. It presents some of the advantages and limitations of using administrative data to study geographic income inequalities; provides a quick discussion of the main indicators used in this paper to measure regional and local income levels and inequalities; and introduces the different territorial levels and classifications.

3.1. Administrative income data – advantages and limitations

24. Compared to more standard survey data, the record-based data used in this paper have several features that make them well suited for analysing geographic income inequalities:

- ***Large number of observations and granular geographic information:*** In most countries, the data cover the universe of income tax papers – individuals or larger tax units.[9] Since they also contain information on taxpayers' correspondence address or registered location of residence, permit accurately describing income distributions at very granular geographic level.
- ***Timeliness and long observation periods:*** The most recent data currently available are usually for 2019 or 2020, in a few cases already for 2021. Observation periods differ across countries, but for half of all countries (Australia, Austria, Belgium, the Czech Republic, Finland, Hungary, Latvia, Norway, Slovenia and Switzerland) data cover the period of a decade or longer. This allows studying cross-regional convergence and divergence in incomes.

[9] Data for Finland are based on a sample of approximately 10 000 households for whom register-based income information are combined with survey data on household characteristics.

- ***High accuracy:*** Unlike survey-based income data, income data from tax records do not suffer from sample selection, attrition, or non-response. The quality of the reported income information should therefore generally be very high.

25. However, the data also come with limitations and drawbacks for studying income distributions. These usually reflect features of the national tax systems and administrations. In particular:

- The ***observation unit*** varies across countries and is usually not consistent with the household definition used in standard survey-based inequality statistics. In the Belgian, Czech and Norwegian data, for example, households are defined as all people sharing the same residence, with the additional requirement in the Norwegian data that people have common housekeeping. In the Slovak Republic, data refer to the family regardless of living arrangements. In Denmark and the Slovak Republic, households are defined such that they consist of at most two adults. In a few countries (Australia, Austria, Hungary, Italy and Slovenia) the tax records of spouses cannot easily be matched, and information on the number of children in the household is not readily available. Here, the analysis is carried out at the individual level.
- The ***reference population*** also varies across countries depending on the data structure. Income statistics have been calculated across all households in Colombia, the Czech Republic, Latvia and the Slovak Republic. Norway and Sweden restrict the data to households with an adult or non-student household head; in Switzerland, households without any registered source of income are excluded. In a few countries, the reference population is much narrower: in Hungary, Italy and Slovenia the income statistics have been calculated only across individuals with positive employment income. People who are not in gainful employment, including most seniors, are not represented in the data.
- The ***income sources*** covered: for most countries, the data permit approximating total household income, i.e. they include information on income from employment and self-employment, capital, and the main social transfers. Capital income typically includes rent, dividends, and realised capital gains where those are taxable. However, this is not always the case. Australian data, for example, do not include self-employment income and non-assessable (tax-exempt) income components; in the data for Belgium, capital income is only included if the withholding tax has not been deducted at the source; the Luxembourg data do not include any capital income. Meanwhile, income data for Denmark and Finland also include imputed rent. Data on incomes from social transfers usually include insurance-based transfers (such as unemployment and sickness benefits), universal non-contributory benefits (such as child benefits) and means-tested transfers (housing support, social assistance), but for some countries the coverage is partial. The Portuguese, for example, include only pension benefits. The data for Hungary, Italy and Slovenia do not capture social transfers.
- Information on ***taxes and contributions paid***: data for most countries include information on the taxes paid on employment and capital income, as well as on social-insurance contributions. For some countries, however, the coverage is again partial. In Belgium, for example, data are net of employee and employer social-security contributions, while for Switzerland they refer to incomes before taxes but after deduction of various tax allowances.[10] The Danish and Finnish data are also net of municipal taxes.
- Some ***methodological differences***: household-level income data have usually been equivalised to adjust for household size, either by dividing by the square root of the household size or through the modified OECD scale. Sweden applied a national equivalence scale. The Portuguese household income data have not been corrected for household size.

[10] The incomes observed in the data (referred to as *Reineinkommen*) are about 25-30% lower than the full gross incomes according to calculations by the national authority (Eidg. Steuerverwaltung, 2013[111]; 2017[97]).

3.2. Measures of income levels and inequality

26. The differences and limitations of national administrative data sources just described have to be borne in mind when interpreting the income statistics presented in this paper. In particular, not in all cases can the results be interpreted as giving estimates of the distribution of disposable incomes. This certainly applies for Hungary, Italy and Slovenia, where the reported income statistics refer to individual employment incomes, and for Belgium and Switzerland, where they are based on taxable rather than disposable income. For some other countries, the results do not capture the full extent of redistribution because certain taxes or some social benefits are not accounted for. As a result, the empirical analysis presented in this paper may suggest higher levels of regional inequality – and possibly greater cross-regional income differences – than would be obtained from household survey data, if such data were available at equally granular level.

27. One should therefore also not use the numbers presented in this paper for cross-country comparisons of income levels or inequality. Indeed, the national-level results from administrative data used in this paper differ – in some cases substantially – from the standard, mostly survey-based, income inequality indicators published in the OECD Income Distribution Database (IDD, OECD (2020[36])): only for four countries (the Czech Republic, Finland, Latvia and Norway) the national-level Gini index for disposable household income obtained from the administrative data approximately matches the Gini published in the IDD – in all of those cases with a deviation of about one Gini point. The deviation is around three to five Gini points for four further countries (Canada, Denmark, Japan and Sweden), and still much larger than this for Portugal and the Slovak Republic. For the remaining countries the results presented in this paper are by construction not comparable to IDD statistics, because they have been calculated across the distribution of individuals rather than households and/or not over disposable incomes.

28. This discussion in this paper therefore focuses on *within*- rather than on *cross*-country differences, and largely refrains from making cross-comparisons. All figures in this paper rank countries in alphabetical order; statistics of individual incomes, gross household incomes and individual employment incomes are shown separately from those calculated over disposable household incomes. Moreover, for all countries, the regional and local income level and inequality shown in this paper are not given in absolute terms but *expressed relative to the national values*. Specifically, to describe geographic disparities in income levels, this paper gives the region or municipality with the highest and lowest median income, those at the 75th and 25th percentiles of the distribution across regions or municipalities, and – in case of the municipal-level statistics – the 90th and 10th percentiles. All of these values are expressed *relative to the countrywide median*. A similar approach is used for describing disparities in income inequality across regions. The analysis of convergence or divergence in median incomes over time tracks the coefficient of variation across regional / municipal medians.

29. A further aspect to keep in mind is that all regional income statistics presented in this paper are nominal, i.e. that they do not account for geographic differences in the cost of living, and notably housing. Indeed, the reported disparities in median incomes across regions, and notably between metropolitan and non-metropolitan regions, are likely larger than the corresponding differences in living standards to the extent that that the costs of living are higher in higher-income regions. However, the same point applies also when interpreting the income disparities described by *national* income distributions, which of course also do not make any adjustments for the overrepresentation of high- or low-income households in specific regions with higher or lower living costs.

Table 1. Overview of data sources

Income definition	Country	Observation period	Territorial level		Equivalisation	Income components	Data provider	Weblink (*where available*)
			TL3	LAU				
Household disposable income	Canada	2011, 2016	X		Square root	Income from employment, self-employment, social benefits, private transfers	Statistics Canada	
	Czech Republic	2005-21	X		Modified OECD scale	Income from employment, self-employment, capital,	Czech Statistical Office	
	Denmark	2010-19	X	X	Square root	Income from employment, self-employment, capital (incl. imputed rent), social benefits, private transfers	Statistics Denmark	https://www.statbank.dk/statbank5a/SelectVarVal/Define.asp?MainTable=INDKF101&PLanguage=1&PXSId=0&wsid=cftree
	Finland	1995-2020	X	X	Modified OECD scale	Income from employment, self-employment, capital (incl. imputed rent), private transfers	Statistics Finland	https://pxnet2.stat.fi/PXWeb/pxweb/en/StatFin/StatFin__tul__tjt__asuntokuntien/statfin_tjt_pxt_127m.px/
	Japan	2019	X		Square root	Income from employment, self-employment, capital, social benefits	Statistics Bureau, Ministry of Internal Affairs and Communications	
	Latvia	2005-20	X		Modified OECD scale	Income from employment, self-employment, capital, social benefits	Central Statistics Bureau of Latvia	
	Luxembourg	2016-20	X	X	Modified OECD scale	Income from employment, self-employment, social benefits	Ministry for Social Security	
	Norway	2006-19	X	X	Modified OECD scale	Income from employment, self-employment, capital, social benefits	Statistics Norway	https://www.ssb.no/en/statbank/table/09114/
	Portugal	2015-19	X	X	Not equivalised	Income from employment, self-employment, capital, social benefits (pensions)	Statistics Portugal	https://www.ine.pt/xportal/xmain?xpid=INE&xpgid=ine_indicadores&indOcorrCod=0009942&contexto=bd&selTab=tab2
	Slovak Republic	2016-17	X		Square root	Income from employment, self-employment, capital, social benefits	Institute for Financial Policy, Ministry of Finance	
	Spain	2015-19		X	Modified OECD scale	Income from employment, self-employment, capital, social benefits	Spanish Statistical Office	https://www.ine.es/en/experimental/atlas/experimental_atlas_en.htm
	Sweden	2011-20	X	X	National scale assigning a weight of 1 to	Income from employment, self-employment, capital, social benefits	Statistics Sweden	https://www.statistikdatabasen.scb.se/pxweb/en/ssd/START__HE__HE0110__HE0110F/Tab1DispInkN/

					the household head, 0.51 to the spouse/partner, 0.6 to each additional adult, 0.52 to the first child and 0.42 to additional children			
Individual disposable income	Australia	2002-19	X		n/a	Income from employment, capital, and taxable social benefits	Australian Taxation Office, Tax Policy Research Team	https://alife-research.app/
	Austria	2008-18	X	X	n/a	Income from employment, self-employment, capital, social benefits	Statistics Austria	
Household gross income	Belgium	2005-2018	X	X	Square root	Income from employment, self-employment, certain types of capital, after employee social security contributions, professional expenses and deductible expenses	Statbel	
	Colombia	2021	X		Divided by number of household members	Income from employment, self-employment, capital, social benefits	National Administrative Department of Statistics	
	Switzerland	2001-18	X	X	Modified OECD scale	Income before taxes from all taxable sources after deduction of tax allowances (e.g. for professional expenditures, insurance contributions, child tax allowances)	Federal Tax Administration	https://www.estv.admin.ch/estv/de/home/allgemein/steuerstatistiken/fachinformationen/steuerstatistiken/direkte-bundessteuer.html
Individual employment income	Hungary	2009-20	X		n/a	Gross employment income	Ministry of Finance	
	Italy	2007, 2018	X		n/a	Gross employment income	Ministry of Economy and Finance	
	Slovenia	2008-20	X		n/a	Gross employment income	Statistical Office of the Republic of Slovenia	

Note: TL3 refers to small regions, LAU to its constituting Local Administrative Units, i.e. municipalities. n/a = not applicable.

3.3. Territorial levels and classifications

30. To assess and describe geographic income disparities across OECD countries, this paper builds on different classifications for sub-national entities developed by the OECD's Centre for Entrepreneurship, SMEs, Regions and Cities (CFE). The paper provides statistical results at two levels:

- *Small (TL3) regions*: Regions within OECD countries are classified at two territorial levels reflecting countries' administrative organisation. The 2 296 small (TL3) regions correspond to lower-tier administrative regions (except in Australia, Canada and the United States). They are usually nested in the 433 large (TL2) regions, which represent the first administrative tier of subnational government (except in the United States). For European countries, the small (TL3) regions correspond to the NUTS3 regions. Across the countries covered in this paper, the number of TL3s varies from six in Latvia to 293 in Canada, and lies typically between 10 and 50.
- *Local Administrative Units (LAUs) / municipalities*: For European Union countries, Eurostat maintains a system of LAUs – countries' municipalities and communes with administrative policy implementation capacity – that form the building blocks of NUTS regions. The countries covered in this paper typically consist of 100 to 2 000 municipalities each, though there are over 8 000 municipalities in Spain. Thus far, this project has collected municipal-level data only for European countries, though it may be possible to further extend data collection to collect comparable data also for non-European OECD countries.

31. The two main territorial classifications used in this paper – small (TL3) regions and LAUs – can be characterised as urban or rural by qualifying their access to metropolitan areas, or "Functional Urban Areas" (FUAs). These FUAs have been identified by the OECD based on an internationally harmonised definition of urban areas with a population of at least 50 000 inhabitants, see Box 1 and (OECD, 2012[37]). FUAs are made up of LAUs as their building blocks. The entirety, a part or no part of a small (TL3) region may belong to a FUA, and a single FUA may span several small (TL3s) regions.

32. Using this definition, small (TL3) regions are classified "metropolitan" if the majority of the population lives in a FUA of above 250 000 inhabitants or else as "non-metropolitan". Among metropolitan small regions, a further two-way distinction can be made between large metropolitan regions (those with a FUA of at least 1.5 million inhabitants) and other metropolitan regions. Non-metropolitan regions are subdivided three-way into regions where the population has access – within a 60-minute drive – to a large FUA, to a small/medium FUA, or else as remote regions.[11] Municipalities, as the building blocks of FUAs, can be characterised based on whether, or not, they are part of a FUA.

[11] The methodology classifies regions based on the population's access to metropolitan areas rather than just based on population density. For example, metropolitan small (TL3) regions have more than 50% of their population living in a FUA of at least 250 000 inhabitants. In remote regions, 50% of the population does not have access to any FUA within a 60-minute drive.

Box 1. Functional urban areas and the classification of small regions by access to metropolitan areas

Functional urban areas

Functional urban areas (FUAs) are a harmonised definition of urban areas as "functional economic units" developed by the OECD in collaboration with the EU (Eurostat and EC-DG REGIO). This definition addresses the limitations of previously existing taxonomies that were based on administrative boundaries. The methodology identifies highly densely populated municipalities, which are referred to as "urban cores", as well as any adjacent municipalities with a high degree of social and economic integration with the urban core ("commuting zones"). It is based on 1 km² population grid data. A minimum population threshold of around 50 000 is used to define a FUA, and around 2 000 FUAs have been identified across the OECD. On average around 66% of people in OECD countries live in FUAs, with the population shares ranging from less than 40% in the Slovak Republic to almost 90% in Luxembourg.

Classification of small regions

The OECD metropolitan/non-metropolitan typology for small (TL3) regions helps to assess differences in socio-economic trends in regions, both within and across countries. It controls for the presence or absence of FUAs, and the extent to which the latter are accessible by the population living in each region. According to such typology, small regions are classified as "metropolitan" if more than half of their population lives in a FUA of at least 250 000 inhabitants and as "non-metropolitan" otherwise.

The binary metropolitan/non-metropolitan distinction can be further broken down into five categories: Among metropolitan regions, some are described as "large metropolitan regions" namely if the FUA that accounts for more than half of the regional population has over 1.5 million inhabitants. Non-metropolitan regions are subdivided into three types based on the size of the FUA that is most accessible to the regional population: i) *with access to a metropolitan area*, if at least half of the regional population can reach an FUA of at least 250 000 inhabitants within a 60-minute car ride; ii) *with access to a small/medium city*, if at least half of the regional population can reach an FUA between 50 000 and 250 000 inhabitants within a 60-minute car ride; and iii) *remote*, if reaching the closest FUA by car takes more than 60 minutes for more than half of the regional population.

Sources: OECD (2020), OECD Regions and Cities at a Glance 2020, OECD Publishing, Paris, https://doi.org/10.1787/959d5ba0-en; Fadic et al. (2019), "Classifying small (TL3) regions based on metropolitan population, low density and remoteness", OECD Regional Development Working Papers, No. 2019/06, OECD Publishing, https://doi.org/10.1787/b902cc00-en. OECD (2012), Redefining "Urban": A New Way to Measure Metropolitan Areas, OECD Publishing, https://doi.org/10.1787/9789264174108-en.

4. Geographic income disparities – levels and trends

33. The regional differences in GDP per capita presented in Section 2. have provided a first picture of the magnitude and persistence of economic disparities across space in OECD countries. Differences in access to metropolitan areas and in demographic trends tend to reflect such economic disparities. But while GDP per capita remains a standard indicator to assess differences in economic performance, evidence suggests that this metric only poorly captures disparities household incomes across different geographies (OECD, 2014[30]). GDP per capita – as an average – also cannot say anything about the *distribution* of incomes within a region. This underlines the importance of studying income disparities across space using household microdata.

34. This section presents results on the geographic disparities in median incomes and in income inequality across 19 countries. It starts by focusing on income disparities *across territories*, presenting evidence on the distribution of median incomes across small (TL3) regions and municipalities, and changes in these disparities over time. It then looks at disparities *within territories*, summarising geographic differences in income inequality across households within small (TL3) regions and municipalities. The last part of this section provides evidence on the interplay of geographic income disparities and the degree of urbanisation.

4.1. Disparities in income levels across territories

Median incomes vary substantially across small regions

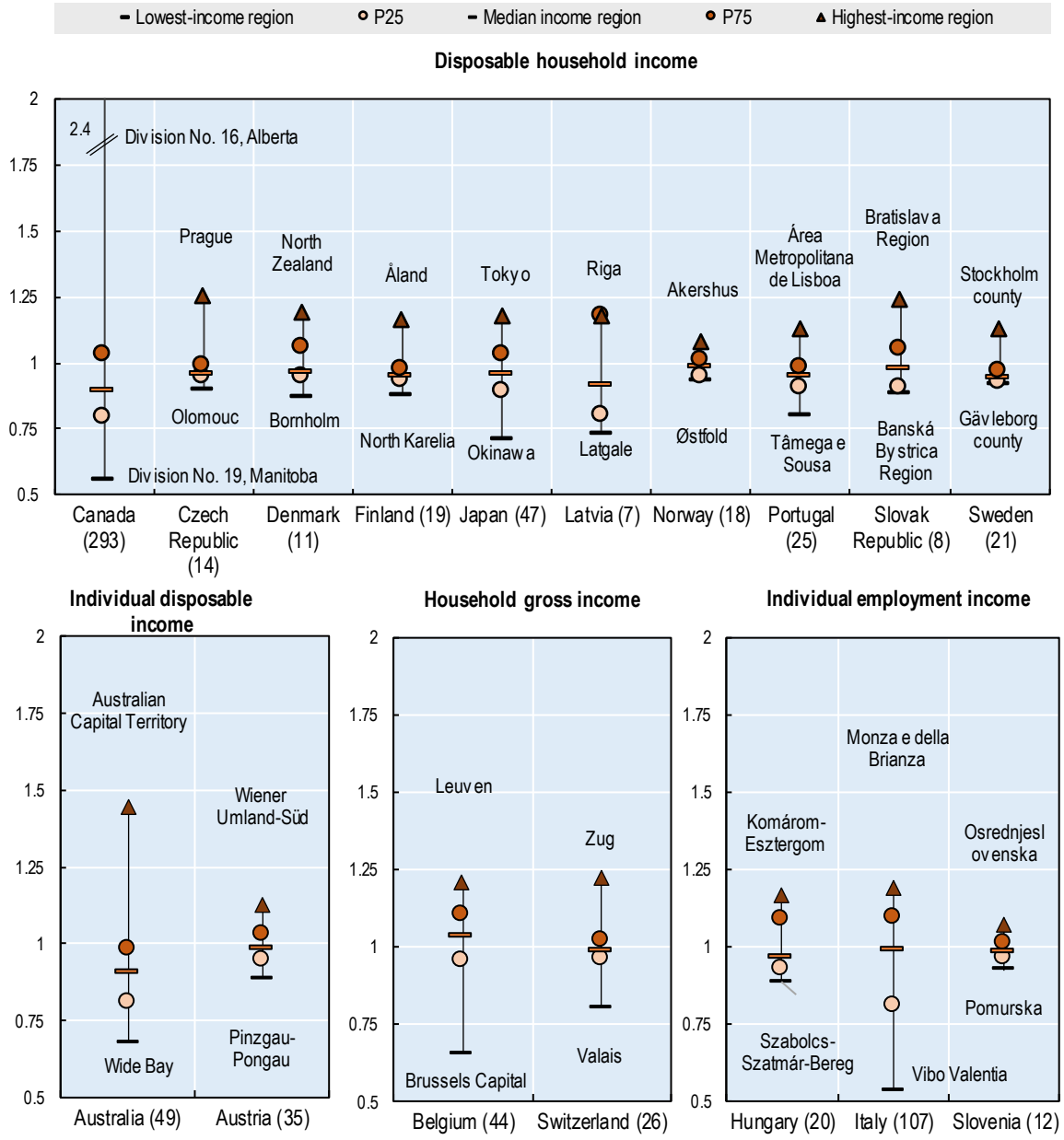
35. Median incomes can vary substantially across small (TL3) regions in a country suggesting large regional differences in living standards (Figure 3, top). In the countries for which disposable household income data are available,

- ***Incomes in the highest-income regions are generally up to around 25% higher than the national median.*** The highest relative income levels are measured for the Prague region in the Czech Republic, the Bratislava region in the Slovak Republic (both 25% above the national median) and the Danish region of North Zealand situated north of Copenhagen at the border to Sweden (19% above the national median). Variation is lowest in Norway, where the highest-income Akershus region, close to Oslo, has a median income only 8% higher than the national median. Top-to-median income variation is an order of magnitude higher than that in Canada, a country that counts almost 300 TL3 regions: Canada's highest-income region, situated in the Province of Alberta rich in mineral deposits, boasts nearly twice the income of the median region.
- ***Incomes in the lowest-income regions are generally up to 30% lower than the national median***. The lowest relative income levels are measured in Japan for the Okinawa region, a distant, small and sparsely populated island (29% below the national median), for Latvia's easternmost Latgale region (26% below the national median), and for the Alto Tâmega region in northern Portugal (19% below the national median). Results again stand out for Canada, where a region in the Province of Manitoba has little more than half of the national median income.
- ***Income disparities between the highest- and lowest-income regions can be large, but most regions have more similar income levels.*** The ratio in median incomes between the highest- and lowest-income regions vary from 1.2 and 1.3 in some of the Nordic countries (Norway, Sweden and Finland) to around 1.6 and 1.7 in Latvia and Japan. It is much higher again in Canada, at 4.3. However, in many countries these high ratios reflect a few outlier regions with unusually high or low incomes. The ratio of regional median incomes for regions at the 25th and 75th percentile of the cross-regional distribution is usually below 1.2 (it is 1.5 in Latvia). Even in Canada, the inter-quartile ratio is only 1.3.

36. The number of small (TL3) regions in a country, perhaps surprisingly, does not appear to be a strong determinant of measured regional income disparities. For example, Latvia, with its seven small (TL3) regions, has approximately the same regional median income ratio as Japan with its 47 small (TL3) regions. Indeed, the correlation between countries' regional median income ratio and the number of small (TL3) regions is relatively weak, at 0.3. The big exception is once more Canada, with its 293 TL3 regions and a very high median income ratio.

Figure 3. Disparities in income levels across small regions can be large

Regional median incomes for high- and low-income regions, expressed relative to the national median income, small (TL3) regions, 2020 or latest year



Note: "P25" and "P75" give the relative median incomes for the regions at the 25th and 75th percentile of the regional income distribution. Number of small (TL3) regions listed in brackets behind the country name. Luxembourg only consists of a single small (TL3) region, which is why no results are reported. No results at TL3-level are available for Spain.
Source: OECD calculations using statistics drawn from national administrative data, see Table 1.

37. Results for countries with different income measures – while not directly comparable – are often of a similar magnitude. In Austria, where data on *individual* disposable incomes are available, the income ratio between the highest- and lowest-income regions is 1.3 (Figure 3, bottom-left panel). In Switzerland, where data cover *gross* household incomes and therefore largely fail to account for redistribution through

taxes and transfers, the regional income ratio is 1.6 (bottom-centre panel). In Slovenia and Hungary, where data are for *individual employment* income, the ratios between the highest and lowest income region are 1.2 and 1.3 (bottom-right panel). By contrast, data for Australia, Belgium and Italy give much larger measured regional income differences with regional income ratios of over two. These may indeed be indicative of large regional disparities, e.g. across Australian regions or between Italy's north and south, though data on regional GDP per capita do not suggest that cross-regional disparities in Italy are particularly large (Figure 1).[12] Other factors are that data on *gross* incomes do not account for redistribution through taxes and benefits (for Belgium and Italy) and that they may reflect regional differences in employment (for Italy, where data cover employment incomes). Low measured household incomes in Belgium's Brussels Capital region may also reflect that national tax data do not include international civil servants.

38. Countries' capital regions are strongly represented among regions with very high – but also very low – incomes. In about half of all countries (Australia, the Czech Republic, Japan, Latvia, Portugal, the Slovak Republic, Slovenia and Sweden) the highest-income region is the capital region, and in another four it is one of the regions in close geographic proximity to it (Wiener Umland-Nord in Austria, Leuven in Belgium, North Zealand in Denmark, and Akershus in Norway). By contrast, Belgium's capital region (Arr. Brussels Capital) is the lowest-income region. This highlights the importance of looking beyond small (TL3) regions towards larger functional urban areas (see Box 1) and to the local level when analysing inequalities.

39. Regional disparities in household (or individual) incomes are generally smaller than disparities in GDP per capita, implying that incomes tend to cluster less strongly than economic activity. Statistics from the OECD Territorial Database (OECD, 2022[7]) show that regions with the highest economic output have a GDP per capita around 30-120% higher than national GDP per capita (Figure A A.1 in the Annex). In the economically weakest regions, GDP per capita is around 30-60% below the national average. This implies top-to-bottom ratios in regional GDP per capita of around two to four. One reason for the much larger regional disparities in GDP per capita compared to incomes is that a country's highest-productivity industries and firms often cluster in a few metropolitan areas (see Section 2.). Households with different income levels do not show the same strong segregation. Another reason may be that taxes and transfers somewhat redistribute household incomes from higher- to lower-regions.

Income disparities across municipalities are naturally much greater, but determined by a few outliers

40. Municipalities, or Local Administrative Units (LAUs), are naturally much more heterogeneous than the small regions they are nested in. This also shows in the cross-municipal variation in income levels: Variation in countries' municipal median incomes is around 1.5 times greater than across countries' small regions. Across countries with available data on disposable incomes, incomes in the highest-income municipalities are up to 65% higher than in the median municipality, while incomes in the lowest-income municipalities are up to 25% lower than for the median (Figure 4, top panel). The resulting income ratios between the highest- and lowest-income municipalities usually vary between 1.6 and 2; Spain, with its over 8 000 municipalities, has an income ratio of 4.

41. However, much more so than for small regions, those high relative income ratios are driven by a few municipalities with very high or low incomes. In most countries, the income ratio between municipalities at the 75th and 25th percentile of the municipal median income distribution (P25/P75 ratio) is below 1.15; even in Spain it reaches only 1.3. This interquartile ratio is comparable to that observed for TL3 regions in Figure 3. The ratio between municipalities at the 90th and 10th percentile is around 1.3, reaching 1.7 in

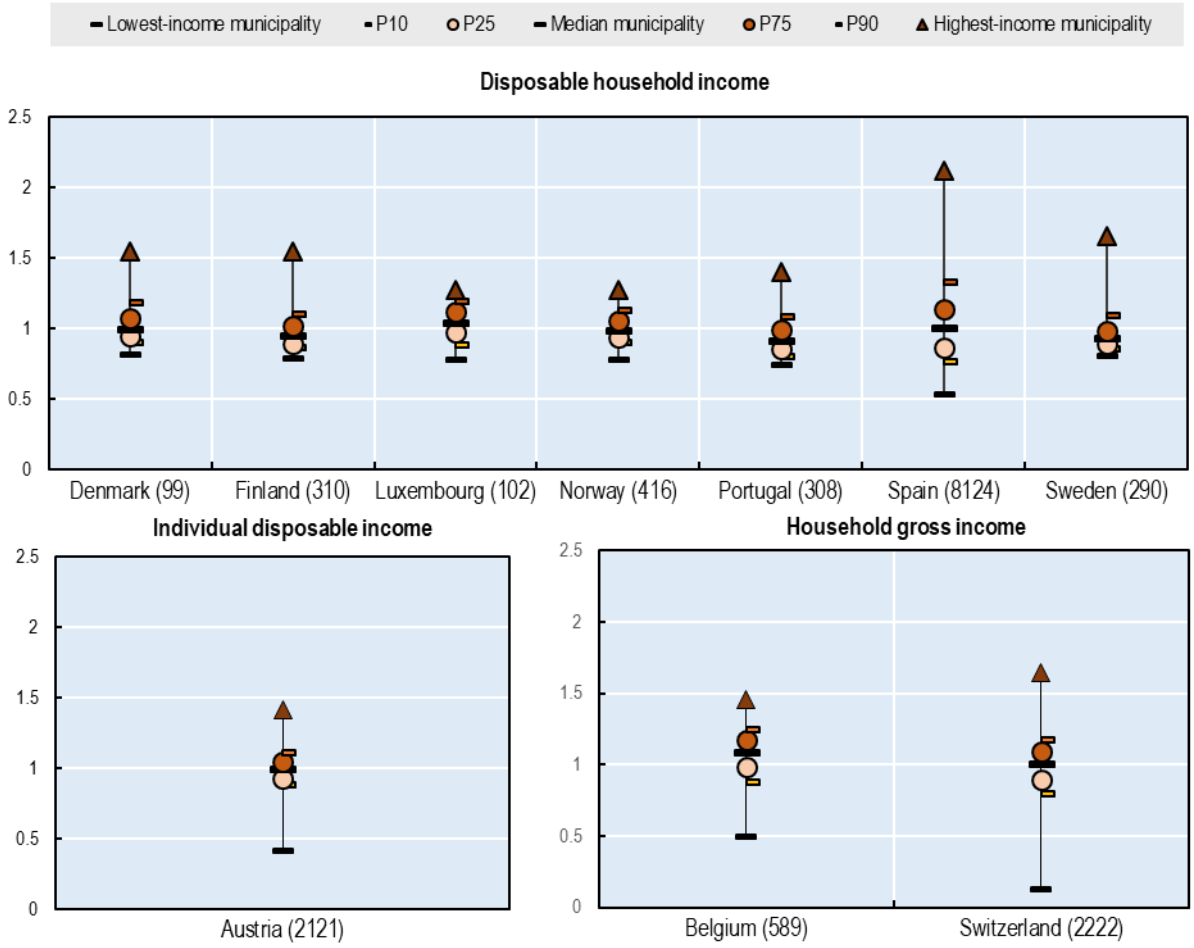
[12] Regional values on GDP per capita are not available for Australia.

Spain. Median incomes in the municipalities at the 90th percentile typically only surpass the median income in the median municipalities by 10% to 20%.

42. Top-bottom income ratios are of a broadly similar scale for countries with different income measures in Austria and Belgium, with income ratios of 3.4 and 2.9 (Figure 4, bottom panels). They are much larger than that in Switzerland, at 13. Here, Bellwald municipality, a mountainous area close to the Italian border, has a median gross household income that is 87% lower than the national median value while the municipality of Kilchberg, outside of Zurich, has a median gross income 65% higher than the national median. Again, these values give gross median incomes, i.e. they are before redistribution through taxes and transfers.

Figure 4. Median incomes across most municipalities are relatively similar, but there are some clear outliers

Municipal median incomes for high- and low-income regions, expressed relative to the national median income, Local Administrative Units (LAUs), 2020 or latest year



Note: “P10”, "P25", "P75" and “P90”give the income Gini for the regions at the 10th, 25th, 75th and 90th percentile of the distribution of regional inequality. Medians expressed relative to the national value. Number of LAUs listed in brackets behind the country name.
Source: OECD calculations using statistics drawn from national tax record data, see Table 1.

4.2. Disparities in within-territory income inequality

Regional disparities in income inequality are of similar magnitude as regional disparities in income levels

43. Levels of income inequality across households within a region, as measured by regional Gini indices, also differ substantially across the small (TL3) regions, if anything even somewhat more than regional median incomes. Across countries with available data on inequalities in disposable household incomes (Figure 5, top):

- ***Income inequality in the most unequal region is usually around 10-30% higher than across the country as a whole***. Only in Portugal and Latvia, the most unequal region is only little more unequal than the whole country. In all countries, income inequality is highest in the capital region, except for Canada, the Czech Republic and Japan.
- ***Income inequality in the least unequal region is usually around 10-20% lower than in the country as a whole.*** In most countries, at least three-quarters of small (TL3) regions are less unequal than the country as a whole, as indicated by the P75 value.
- ***The ratio of income inequality between the most and least unequal regions varies from 1.2 to 1.9***. In other words, regional income inequality varies by about as much as regional income *levels*, though regional disparities in income inequality *within a given country* tend to be much larger than the differences in inequality *across countries* (*not shown*). As for income levels, regional inequality ratios tend to be driven by a few outlier regions. In most countries, at least half of all regions have very similar levels of income inequality, with P75-P25 ratios of below 1.1.

As disparities in income *levels*, disparities in income inequality are not systematically greater in countries with a larger number of small (TL3) regions (correlation of -0.05).

44. Again, results for countries with other income measures are broadly in line. The ratio of income inequality between the most and least unequal region is relatively low for individual disposable household incomes in Australia and Austria (1.2), and again higher for gross employment incomes in Belgium (1.7) and Switzerland (1.6) that do not account for redistribution through taxes and transfers. Disparities in the inequality of gross employment income are in line with those for disposable household income in Hungary, Italy and Slovenia (all 1.3).

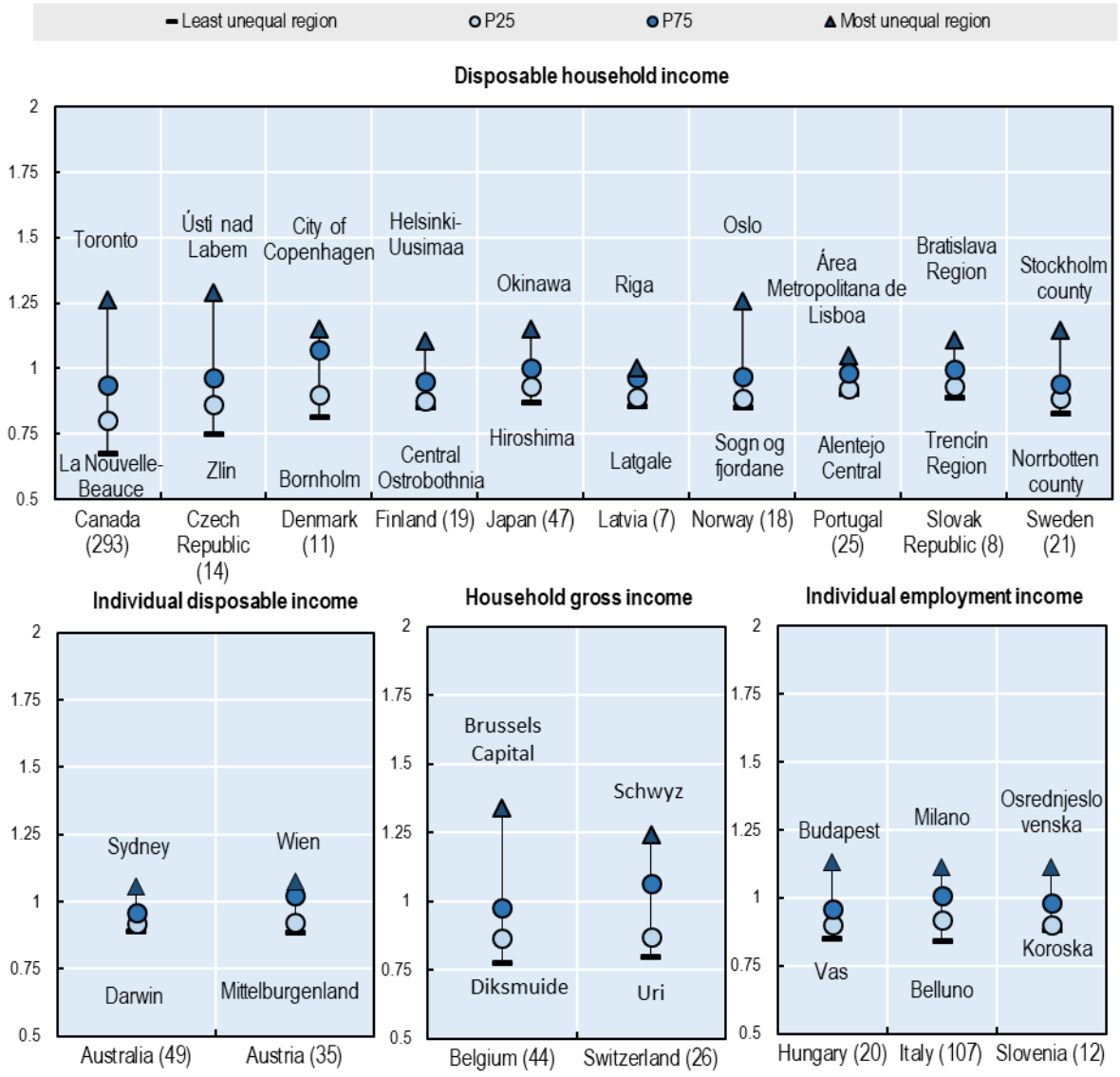
… but a few municipalities in each country are much more unequal than the others

45. The pattern of large cross-municipal variation, caused by a few outliers, observed for income levels applies even more so for the distribution of Gini Indices across municipalities in each country (Figure 6). Income inequality in the most unequal region is usually around 20-60% higher than across the country as a whole; an exception is Smedjebacken municipality in Sweden, with a Gini Index 160% higher than the national median. However, these outliers may to some extent just reflect the small size of some of these municipalities: according to Statistics Sweden data, Smedjebacken had about 7 000 inhabitants at the end of 2020. Income inequality in the least unequal region is usually around 20% to 30% lower than in the country as a whole. This translates into top-bottom median income ratios across municipalities between 1.5 and 2.2, with a value of 3.5 in Sweden. Income inequality ratios are not systematically higher in countries with a greater number of municipalities (correlation of 0.06).

46. Even more so than for median incomes, the relatively high cross-municipal variation in income inequality is caused by a few municipalities that are very unequal. Again, the P75-P25 ratio is typically below 1.15, which corresponds to a variation of around 2-4 Gini points. The P90-P10 ratio is typically below 1.3 giving clear indication that municipal ratios in Ginis are particularly strongly driven by a few municipalities with very high Ginis at the higher end. Even municipalities with Ginis at the 90th percentile barely reach the national value.

Figure 5. Income inequality varies substantially across regions and is often highest in the capital region

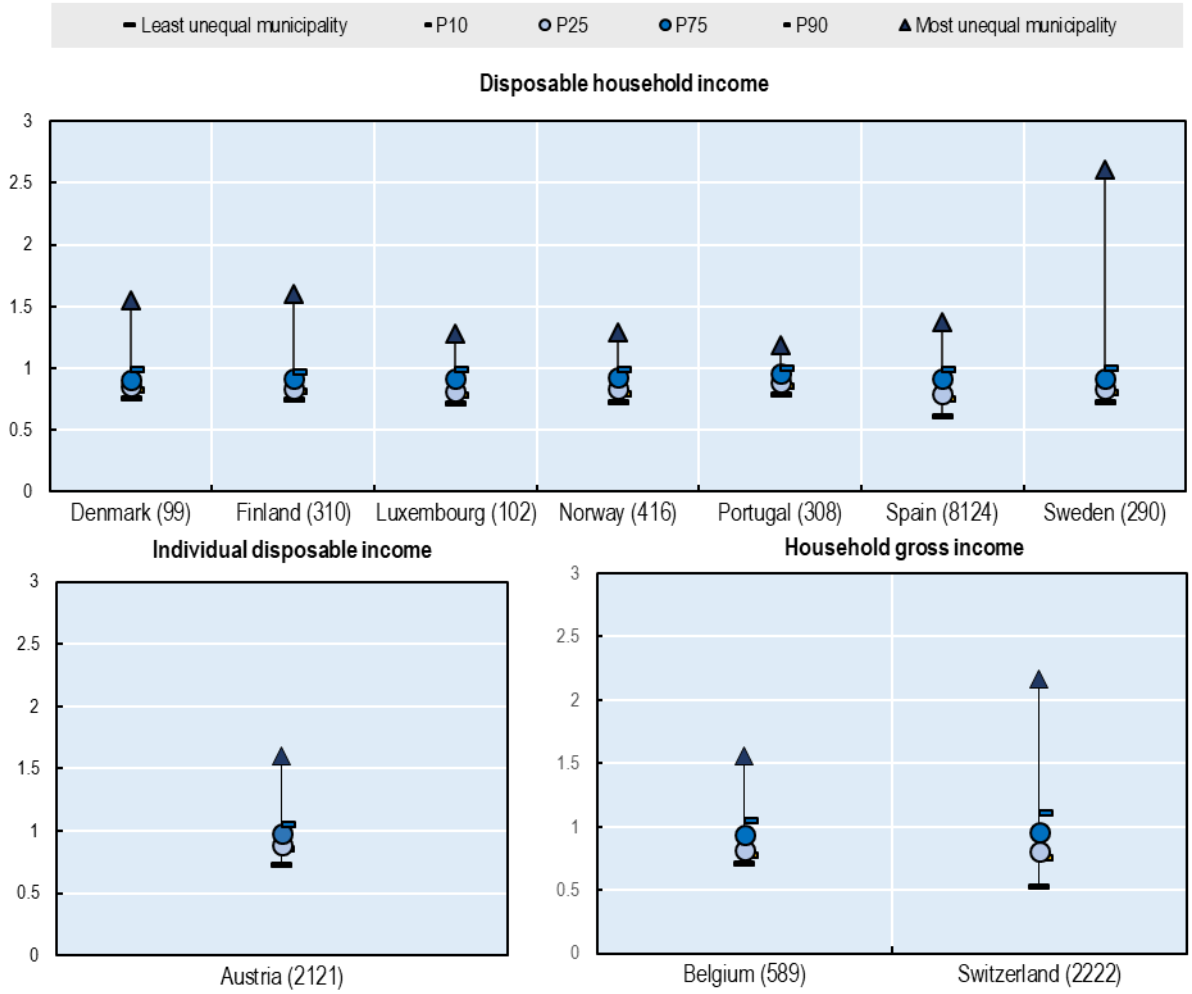
Regional income Gini for high- and low-inequality regions expressed relative to the national Gini, small (TL3) regions, 2020 or latest year



Note: "P25" and "P75" give the income Gini for the regions at the 25th and 75th percentile of the distribution of regional inequality. Ginis expressed relative to the national value. Number of TL3 regions listed in brackets behind the country name. Luxembourg only consists of a single small (TL3) region, which is why no results are reported. No results at TL3-level are available for Spain.
Source: OECD calculations using statistics drawn from national tax record data, see Table 1.

Figure 6. A few municipalities have very unequal income distributions

Municipal income Ginis for high- and low-inequality regions expressed relative to the national Gini, Local Administrative Units (LAUs), 2020 or latest year



Note: "P10", "P25", "P75" and "P90" give the income Gini for the regions at the 10th, 25th, 75th and 90th percentile of the distribution of regional inequality. Ginis expressed relative to the national value. Number of LAUs listed in brackets behind the country name.
Source: OECD calculations using statistics drawn from national tax record data, see Table 1.

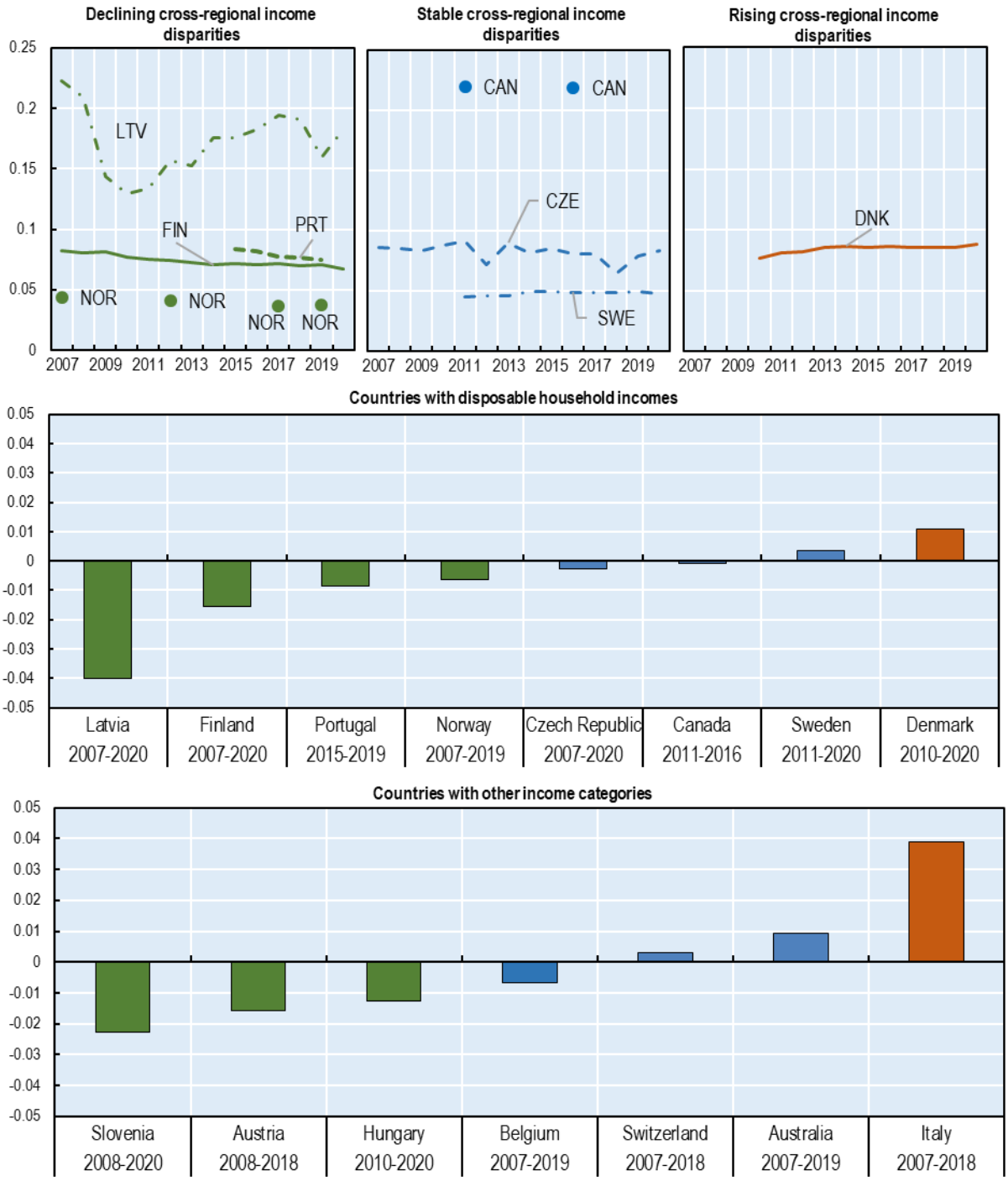
4.3. Trends in the regional disparities of income levels and inequality

Regional income levels appear to have rather converged over the last decade…

47. Disparities in cross-regional income levels do not show a uniform trend over time across countries with available data, but, if anything, median income levels appear to have converged across countries. In four out of the eight countries with time series data on regional disposable household incomes (Finland, Latvia, Norway and Portugal), cross-regional disparities in the median income, measured as in Figure 1 by the coefficient of variation, have declined by more than 10% over the last decade or so (Figure 7). Only in one country (Denmark) cross-regional income disparities have significantly increased, while in three (Canada, the Czech Republic, and Sweden) they have remained largely stable. This trend holds also when including countries for which data are available only for other income definitions, with a decline in cross-regional income differences in Austria, Hungary and Slovenia, and a significant increase in Italy.

Figure 7. Disparities in regional median incomes show no uniform trend, but have declined over time in most countries studied

Time trend in the coefficient of variation in median disposable household incomes across small (TL3) regions, by country, 2007-20 (or latest year)



Note: The coefficient of variation is given by the standard deviation of median income across small (TL3) regions divided by the mean regional median income, see Section 2. . Structural break for Finland in 2011.
Source: OECD calculations using statistics drawn from national tax record data, see Table 1.

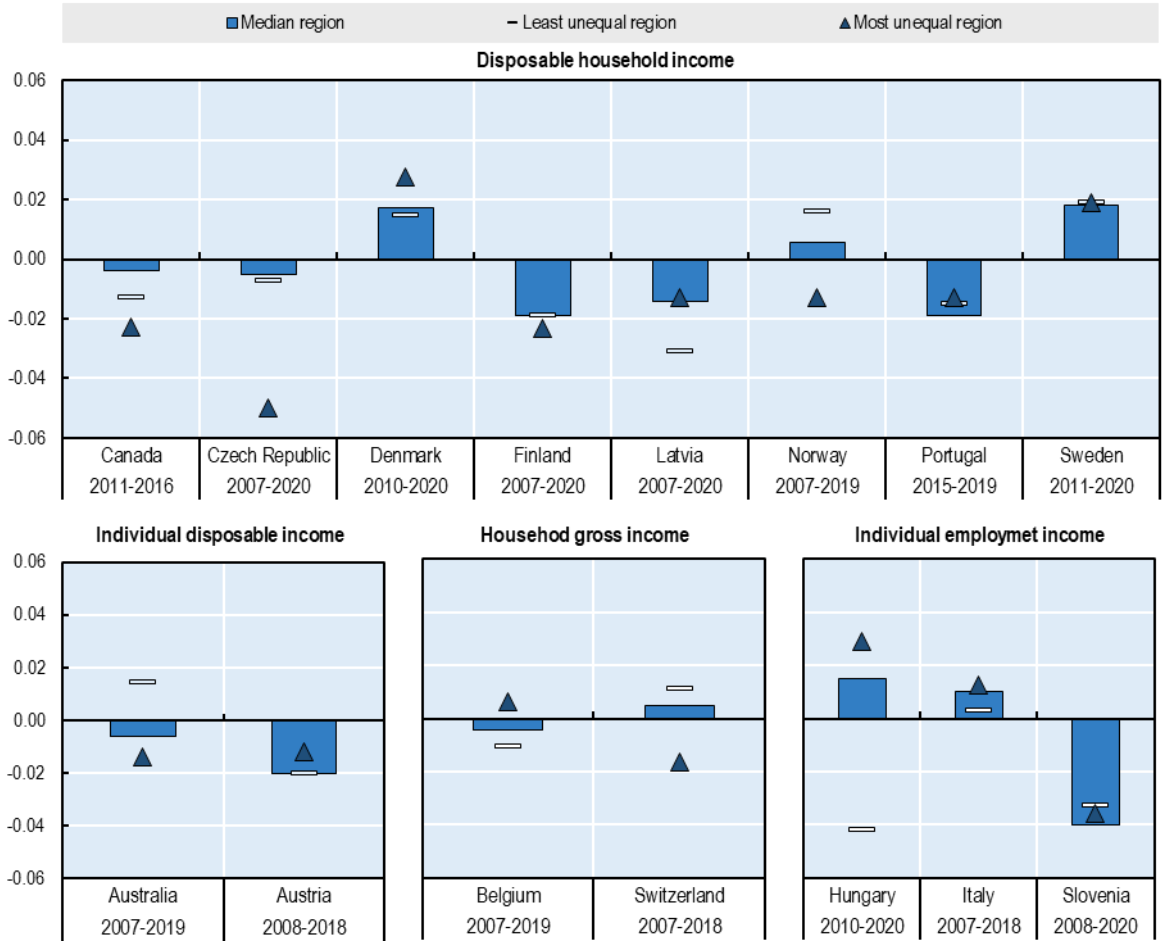
48. These trends are largely consistent with those for cross-regional disparities in GDP per capita for the European countries with available data. As regional disparities in household incomes, also GDP per capita converged over the same periods in Austria, Finland, Hungary, Latvia, and Portugal and diverged in Denmark and Italy. For the Czech Republic, both results point to relative stability. Only for Belgium, Slovenia, and Switzerland the trends do not coincide.

… and within-region levels of income inequality have declined

49. Income inequality across households within small (TL3) regions has declined over the last decade or so in most countries for which longer time series data are available. Income inequality in the median region, i.e. the region in the middle of the distribution when ranking regions by their Gini Index, has declined in ten out of 15 countries (Figure 8). In nearly all of these ten countries, inequality also declined in the most and least unequal regions, suggesting a broad decline in within-regional inequality across regions. Six countries experienced an increase in within-regional income inequality in the median region; Denmark and Sweden saw the most pronounced increases in inequality for the median region, as well as increases for the most and least unequal regions.

Figure 8. Within-regional income inequality has declined in most countries

Change in the Gini index for the median, least unequal and most unequal small (TL3) region, from 2007 or later to 2020 (or latest year)



Note: Time changes are calculated for the earliest and latest years as displayed see Table 1 with the exceptions of Australia, Belgium, the Czech Republic, Finland, Norway and Switzerland, where the earliest year was adjusted to 2007. Japan and the Slovak Republic are not included because of an insufficient number of data years.
Source: OECD calculations using statistics drawn from national tax record data, see Table 1.

4.4. Urban-rural differences in income disparities

50. One way of further describing cross-territorial disparities in income levels and inequality and of better understanding what characterises territories with very high or low median incomes or Gini indices is to classify them by their degree of urbanity. As observed earlier, the capital region is often both a country's highest-income region as well as its most unequal region. This hints at a relationship between regional incomes and the degree of urbanity. A way of more systematically studying this relationship is by classifying small (TL3) regions along the OECD's metropolitan/non-metropolitan typology. Specifically, recall from Section 3. that this typology indicates the presence, or absence, of a FUA in a region, or the extent to which a FUA is accessible by the region's population: small (TL3) regions are considered as "metropolitan" if half of their population or more lives in a FUA of at least 250 000 inhabitants, and as "non-metropolitan" otherwise (see Box 1, Fadic et al. (2019[38]) and OECD (2020[34])).

Incomes in metropolitan regions tend to be higher and more unequally distributed

51. And indeed, income levels tend to be higher in metropolitan than in non-metropolitan small (TL3) regions. Averaged across all 17 countries with available data, metropolitan regions are strongly overrepresented in the top quartile of regions sorted by median income and underrepresented in the other three quartiles (Figure 9, top-left panel). In turn, non-metropolitan regions are slightly overrepresented in the bottom two quartiles and underrepresented in the quartile of regions with the highest median incomes. These patterns generally hold across countries, with some exceptions for gross household incomes in Belgium and Switzerland, and in some Central and Eastern European countries, particularly the Slovak Republic and Slovenia.

52. The relationship becomes even more striking when further breaking down regions by the *type* of metropolitan and non-metropolitan area (Figure 9, bottom-left panel). Particularly regions with very large cities, with above 1.5 million inhabitants, are heavily overrepresented among high-income regions, making up 79% of them, while remote regions and regions near a small city account for only 9% and 16% of high-income regions. A breakdown by country, shown in Annex Figure A A.2, illustrates that countries' highest-income regions are in most cases metropolitan, while the lowest-income regions are nearly all non-metropolitan. In every country apart from Switzerland, the median metropolitan region has a higher income than the median non-metropolitan region.

53. Incomes also tend to be more unequally distributed in metropolitan than in non-metropolitan small (TL3) regions. Indeed, to a very similar extent as for income levels, metropolitan regions are overrepresented in the top quartile of regions with the highest regional Gini index and underrepresented in the other three quartiles (Figure 9, top-right panel). The only exceptions are Canada and to a smaller extent the Czech Republic and Denmark.

54. However, both regional median incomes and Gini indices generally vary greatly *within the groups* of metropolitan and non-metropolitan regions.

Figure 9. Incomes in metropolitan small regions tend to be higher and more unequally distributed

Percentages of small (TL3) regions by access to metropolitan area against quartiles of income and inequality levels of all regions, average across 17 OECD countries, 2020 or latest year

Distribution of median incomes by degree of urbanisation

		Regions with the lowest median income -Q1	Q2	Q3	Regions with the highest median income -Q4	Total
All regions		25	25	25	25	100
Metropolitan regions		14	15	16	56	100
Non-metropolitan regions		27	31	25	18	100
		Regions with the lowest median income -Q1	Q2	Q3	Regions with the highest median income -Q4	Total
All regions		25	25	25	25	100
Metropolitan regions	Very large city	6	6	10	79	100
	Large city	16	16	19	49	100
Non-metropolitan regions	Near a large city	19	21	27	32	100
	Near a small city	21	32	32	16	100
	Remote	36	33	22	9	100

Distribution of Ginis by degree of urbanisation

		Regions with the lowest Gini - Q1	Q2	Q3	Regions with the highest Gini - Q4	Total
All regions		25	25	25	25	100
Metropolitan regions		9	12	21	58	100
Non-metropolitan regions		28	28	25	13	100
		Regions with the lowest Gini - Q1	Q2	Q3	Regions with the highest Gini - Q4	Total
All regions		25	25	25	25	100
Metropolitan regions	Very large city	8	7	10	75	100
	Large city	10	14	26	50	100
Non-metropolitan regions	Near a large city	26	31	17	26	100
	Near a small city	22	30	32	17	100
	Remote	35	28	30	13	100

Note: The cells give row percentages, averaged across 17 OECD countries with available data at TL3 level for the latest years as displayed in see Table 1. Darker shading signal larger divergence from the proportional column value (25) with orange signalling underrepresentation and blue overrepresentation in the quartile.
Source: OECD calculations using statistics drawn from national tax record data, see Table 1. Classification of small regions by access to metropolitan areas as outlined in Section 3. .

Metropolitan regions have somewhat lost ground relative to non-metropolitan regions in income levels, while having become relatively more unequal

55. Meanwhile, metropolitan regions have experienced less favourable income dynamics than non-metropolitan regions. Averaged across 15 countries, metropolitan regions – i.e. those with large and very large cities – are somewhat overrepresented in the bottom quarter of regions when sorted by relative median income growth over the last one-and-a-half decades (see Figure 10, top-left panel). Non-metropolitan regions – particularly regions near a large city, but also remote regions – are overrepresented in the top quartile of regions with the most favourable income dynamics. These results are consistent with an overall convergence of income levels between regions confirming the results of the previous sections. At the same time, metropolitan regions, and particularly regions with very large cities, have become relatively more unequal: nearly half of regions with very large cities are in the quartile of regions with the greatest relative increases in the Gini Index.

Figure 10. Metropolitan regions have somewhat lost ground relative to non-metropolitan regions in income levels, and they have become relatively more unequal

Percentages of small (TL3) regions by access to metropolitan area and quartiles of income and inequality trends of all regions, average across 15 OECD countries, between 2007 and 2020 (or closest available)

Distribution of median income dynamics by degree of urbanisation

		Regions with the least favourable income dynamics -Q1	Q2	Q3	Regions with the most favourable income dynamics -Q4	Total
All regions		25	25	25	25	100
Metropolitan regions		39	19	26	16	100
Non-metropolitan regions		20	26	22	33	100

		Regions with the least favourable income dynamics -Q1	Q2	Q3	Regions with the most favourable income dynamics -Q4	Total
All regions		25	25	25	25	100
Metropolitan regions	Very large city	37	17	26	20	100
	Large city	36	22	26	17	100
Non-metropolitan regions	Near a large city	19	27	28	26	100
	Near a small city	25	25	20	30	100
	Remote	28	21	14	37	100

Distribution of changes in Ginis by degree of urbanisation

		Regions with the lowest increase (or fall) in the Gini -Q1	Q2	Q3	Regions with the highest increase in the Gini -Q4	Total
All regions		25	25	25	25	100
Metropolitan regions		17	30	16	37	100
Non-metropolitan regions		27	24	25	25	100

		Regions with the lowest increase (or fall) in the Gini -Q1	Q2	Q3	Regions with the highest increase in the Gini -Q4	Total
All regions		25	25	25	25	100
Metropolitan regions	Very large city	8	29	17	47	100
	Large city	20	33	16	31	100
Non-metropolitan regions	Near a large city	34	19	27	20	100
	Near a small city	25	24	28	23	100
	Remote	15	27	23	34	100

Note: The cells give row percentages, averaged across 15 OECD countries with available data. Darker shades signal larger divergence from the proportional column value (25) with orange signalling underrepresentation while blue overrepresentation in the quarter. Time changes are calculated for the earliest and latest years as displayed in see Table 1. with the exceptions of Australia, Belgium, the Czech Republic, Finland, Norway and Switzerland, where the earliest year was adjusted to 2007. Japan and the Slovak Republic was not included due to insufficient data years.

Source: OECD calculations using statistics drawn from national tax record data, see Table 1. Classification of small regions by access to metropolitan areas as outlined in Section 3.

Municipalities that are part of functional urban areas have higher incomes and are more unequal, but the disparities with other municipalities have declined over time

56. As highlighted earlier, even small (TL3) regions may harbour substantial income heterogeneity. This may be true, for example, for metropolitan regions that include an FUA – i.e. an urban core and the surrounding municipalities – but also parts outside the FUA (see again **Error! Reference source not found.** for Austria). It can therefore be useful to further "zoom in" and carry out analysis of the relationship between incomes and the degree of urbanity at municipal level.

57. A simple way of doing so it to classify municipalities by whether they are part of a FUA, and of what size. For example, it is possible to distinguish:

- Municipalities belonging to metropolitan and large metropolitan FUAs (population between 250 000 and 1.5 million, or above 1.5 million);

- Municipalities belonging to small or medium-sized FUAs (population of 50 000 to 100 000, or 100 000 to 250 000), and
- Municipalities that are not part of a FUA.

58. A breakdown of municipalities with different median incomes and levels of inequality across these three groups shows a clear relation between municipal incomes and the degree of urbanity (Figure 11):

- ***Municipalities in metropolitan FUAs are characterised, on average, by high median incomes and high inequality***. They are overrepresented in the top quartiles of municipalities ranked by both median incomes and their Gini index.
- ***Municipalities in small and medium-sized FUAs have incomes around the median and vary in inequality levels.*** They are overrepresented in the second and particularly in the third median income quartile – i.e. municipalities with a median income above the median municipality, but below those at the top – and somewhat overrepresented among municipalities with highest levels of inequality. Only relatively few municipalities belong to this category.
- ***Municipalities outside of any FUA tend to have lower median incomes and lower inequality.*** They are somewhat overrepresented in the bottom two quarters of the distributions that rank municipalities by median income and their level of inequality.

Figure 11. Municipalities that are part of metropolitan functional urban areas have high median incomes and are more unequal

Percentages of local administrative units (LAUs) by access to functional urban areas (FUAs) and median income and inequality levels, average across nine OECD countries, 2020 (or latest year),

Distribution of medians by degree of urbanisation

	Regions with the lowest median income -Q1	Q2	Q3	Regions with the highest median income -Q4	Total
Total	25	25	25	25	100
Not FUA	31	29	26	15	100
Small and medium sized FUA	18	28	34	21	100
Metropolitan FUA	8	13	22	57	100

Distribution of Ginis by degree of urbanisation

	Regions with the lowest Gini -Q1	Q2	Q3	Regions with the highest Gini - Q4	Total
Total	25	25	25	25	100
Not FUA	27	27	25	21	100
Small and medium sized FUA	25	22	23	29	100
Metropolitan FUA	16	22	27	36	100

Note: The cells give row percentages, averaged across nine OECD countries with available data. Darker shading signals larger divergence from the proportional column value (25) with orange signalling underrepresentation while blue overrepresentation in the quartile. Luxembourg is not included because all municipalities have the same level of urbanisation.
Source: OECD calculations using statistics drawn from national tax record data, see Table 1.

59. However, there are clear signs of convergence, as already observed for small (TL3) regions (Figure 12): municipalities in FUAs, whether metropolitan or small / medium-sized, are overrepresented among municipalities with less favourable income dynamics and a lower increase, or decline, in income inequality. Meanwhile, municipalities outside of FUAs were overrepresented among municipalities with more favourable income developments.

Figure 12. Municipalities in FUAs are overrepresented among municipalities with lower relative income growth and where inequality declined relative to other municipalities

Percentages of local administrative units (LAUs) by access to functional urban areas (FUAs) and median income and inequality dynamics, 9 OECD countries, 2007 to 2020 (or closest available)

Distribution of median income dynamics by degree of urbanisation

	Regions with the least favourable income dynamics - Q1	Q2	Q3	Regions with the most favourable income dynamics - Q4	Total
Total	25	25	25	25	100
Not FUA	22	25	27	26	100
Small and medium sized FUA	31	35	22	12	100
Metropolitan FUA	38	25	18	19	100

Distribution of changes in Ginis by degree of urbanisation

	Regions with the lowest increase (or fall) in the Gini -Q1	Q2	Q3	Regions with the highest increase in the Gini -Q4	Total
Total	25	25	25	25	100
Not FUA	26	24	25	25	100
Small and medium sized FUA	25	41	21	13	100
Metropolitan FUA	26	29	24	21	100

Note: The cells give row percentages, averaged across nine OECD countries with available data. Stronger shades signal larger divergence from the proportional column value (25) with orange signalling underrepresentation while blue overrepresentation in the quarter. Time dynamics are calculated for the earliest and latest years as displayed in Table 1 with the exceptions of Belgium, Finland, Norway and Switzerland, where the earliest year was adjusted to 2007. Luxembourg was excluded as all municipalities belong to the same degree of urbanisation level.
Source: OECD calculations using statistics drawn from national tax record data, see Table 1.

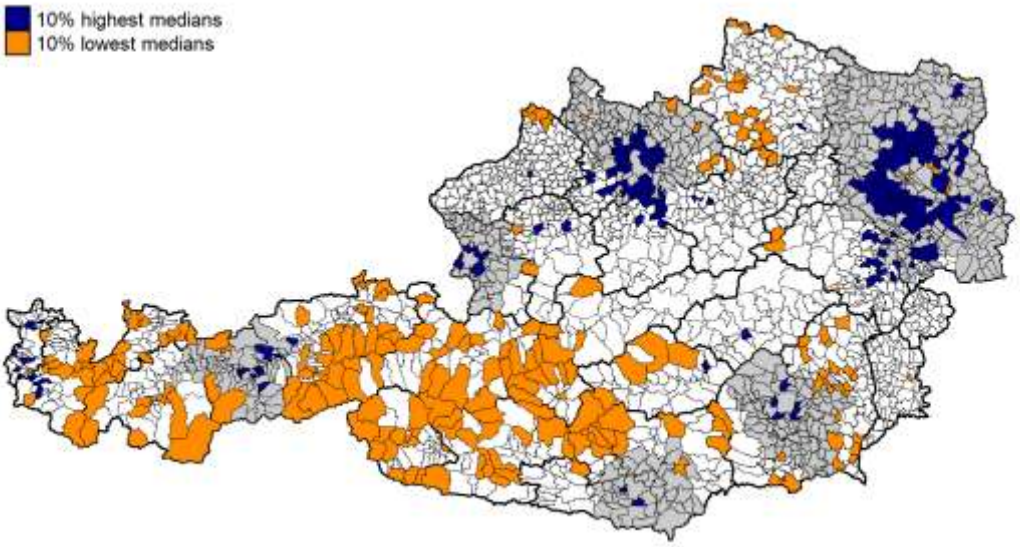
60. A perhaps more intuitive way of graphically representing those types of results is to plot these municipalities on a map. Figure 13 and Figure 14 show maps of Austria, in which the 10% of municipalities with the highest and lowest income levels, and change in income levels, are marked in blue and orange. Three quarters of municipalities in Austria that are in the highest decile of median incomes are part of one of the six FUAs. These municipalities tend to be located around the city centres, in the affluent suburbs, while the city centres have lower median incomes. Municipalities in FUAs are also overrepresented among municipalities with the least favourable income *development* over the past one and a half decade. Particularly municipalities in the very centres of FUAs experienced some of the slowest income growth. They also tend to be among the most unequal decile in the country (*not shown*).

61. The reasons behind these trends require further investigation. They likely reflect the transition of city centres from residential neighbourhoods to centres of business activity, with housing disappearing to be replaced by office space. This points to an important difference between geographic disparities in household income and GDP/capita: many of the most productive workers in an urban area may work in the economically dynamic city centre but live in the affluent suburbs and commute to work, or work remotely. For Austria, these patterns coincided with regional and municipal income convergence more broadly, as shown on Figure 7.

62. Similar analysis for other countries with municipal-income data yields similarities but also differences in patterns. In nearly all countries, with the exception of Switzerland, the largest FUA hosts a large share of the highest-income municipalities, and in all cases some of them are located in close proximity to – but outside – the main city centre. Also in a few other major international FUAs, the city centres have few or no top-income municipalities, namely in Brussels, Copenhagen, Luxembourg and Zurich. By contrast, the city centres of Helsinki, Lisbon, Madrid, Oslo and Stockholm include many top-income municipalities. Similarly, all of these cities, with the exception of Stockholm, included municipalities with very low median income growth.

Figure 13. In Austria, the highest income municipalities are located mostly in functional urban areas, typically just outside the city centres

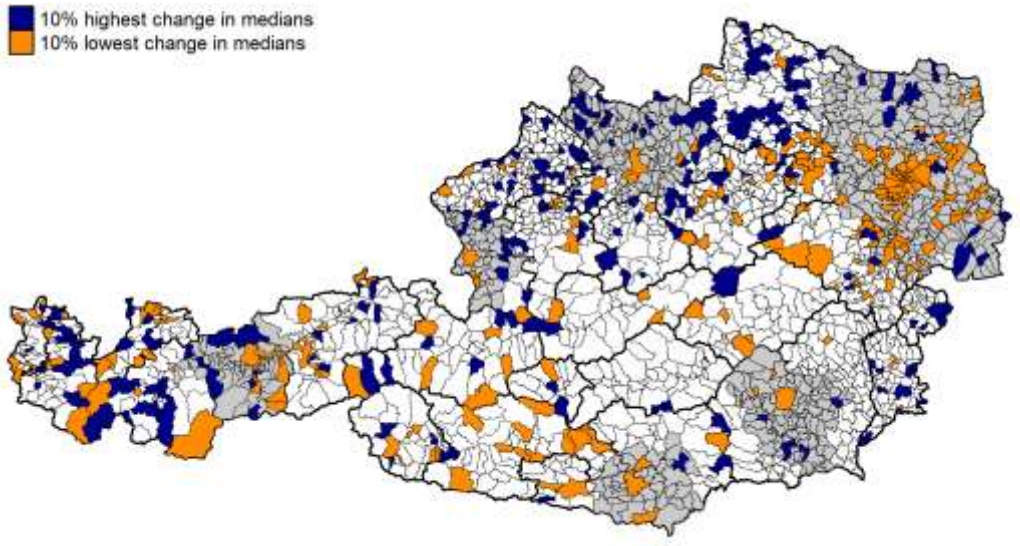
Municipalities with the highest and lowest 10% of median incomes in Austria, Local Administrative Units (LAUs), 2018



Note: Dark grey shading signals Functional Urban Areas.
Source: OECD calculations using statistics drawn from national tax record data, see in Table 1

Figure 14. Municipalities in the centre of FUAs experienced the lowest income growth over the past decade

Municipalities with the most and least favourable change in median incomes in Austria, 2010-18



Note: Dark grey shading signals Functional Urban Areas.
Source: OECD calculations using statistics drawn from national tax record data, see in Table 1.

4.5. The contribution of regional income inequalities to overall income inequality

63. In light of the substantial cross-regional disparities in income levels and inequalities documented in this paper so far, an interesting question is how much these regional income inequalities contribute to *overall* income inequality. Indeed, one strand of the existing empirical work on geographic inequalities has been concerned with quantifying the regional component of aggregate inequality. The standard approach has been to decompose overall inequality – usually measured by an inequality index of the general entropy family, such as the Theil Index or the Mean Logarithmic Deviation – into a *between*-region and a *within*-region component.

Existing research suggests that between-regional inequalities are comparatively small

64. Empirical studies that have decomposed inequality by geographic location have usually concluded that the *between*-group component is relatively small compared to the *within*-group component. In an early survey of the spatial decomposition literature, Shorrocks and Wan (2005[39]), for example, find that, averaged over a large number of studies, about 12% of overall inequality can attributed to between-group variation. Novotný (2007[40]) reaches a similar conclusion. However, only very few of the papers surveyed look at household incomes, for lack of suitable data. Many relate national income inequality to regional GDP per capita; others look at inequalities in consumption or earnings. In one of the few exceptions, Paredes, Iturra and Lufin (2014[41]) use Chilean household income data from CASEN for a three-way decomposition of inequalities into the between-regional, between-provincial, between-and within-county level.[13]

A three-way nested Theil decomposition of income inequalities

65. This paper applies a three-way Theil composition, similar to the one carried out by Paredes, Iturra and Lufin (2014[41]), and applies it to the register-based income data described in Section 3. . Specifically, the Theil Index is constructed as

$$T_i = \sum_R \sum_u \sum_r \sum_i \left(\frac{y_{Ruri}}{Y}\right) ln\left(\frac{y_{Ruri}/Y}{n_{Ruri}/N}\right),$$

where y_{Ruri} is the income of household (or individual) *i,* located in a small (TL3) region *r*, classified along the urban-rural spectrum into one of five groups *u*, inside a large (TL2) region *R*.[14] The ratios y_{Ruri}/Y and n_{Ruri}/N give the income and population shares for household *i* relative the national total income *Y* and total population *N*.

66. This overall Theil Index decomposes into

$$T_i = T_{Wr} + T_{Br} + T_{Bu} + T_{BR},$$

where T_{Wr} is the *within*-small-region component*,* and T_{Br}, T_{Bu}, and T_{BR} are the *between* components across small regions, along the urban-rural classification, and across large regions. Here, the *within*-small-region component T_{Wr} is calculated as the (income-weighted) sum of the Theil indices across households in each of the small regions. The *between* components are the (income-weighted) Theil indices of total income nested in the higher-up region, see 7. Annex A for further details.

[13] Earlier OECD work (2018[100]) has used a simple Theil decomposition to document the decline in *between*- relative to *within*-country inequalities in GDP per capita at TL2 level.

[14] Here, the analysis distinguishes the five degrees of urbanisation developed by Fadic et al. (2019[38]), as described in Box 1: i) metropolitan regions with a FUA of at least 1.5 million inhabitants; ii) metropolitan regions with a FUA of 250 000 to 1.5 million inhabitants; iii) non-metropolitan regions with access to a FUA; iv) non-metropolitan regions without access only to a small or medium city; and v) remote regions.

67. The decomposition was carried out for six countries (Austria, Belgium, Canada, Hungary, Italy, and the Slovak Republic), for which the national authorities were able to provide the required Theil indices for each small (TL3) region from the microdata.[15] To the authors' knowledge, this is the first time that a standard Theil decomposition is applied to study income inequalities simultaneously along a nested regional and urban-rural dimension.

Regional differences account only for a very small fraction of overall income inequalities

68. The Theil decomposition confirms that cross-regional inequalities account for only a very small fraction of overall income inequalities, i.e. that country-level inequalities in household incomes primarily reflect inequalities occurring within small (TL3) regions (Table 2). In all six countries studied, the *within*-small-region component (T_{Wr}, reported in column III) accounts for more than 95% of overall income inequality (T_i, reported in column II). In Austria, its share is higher than 99%. Intuitively, the within-regional income inequalities (as summarised by the Gini indices shown in Figure 5) are a much more important determinant of overall income inequality than inequalities in income levels across regions (as summarised by the medians shown in Figure 3).

Table 2. The *within*-small-region component accounts for the bulk of total income inequality

Results from a Theil decomposition of income inequality, by country, 2018/19 or latest year

	National level (T_i)	*Within* small regions (T_{Wr})	*Between* small regions (T_{Br})	*Between* degrees of urbanisation nested in each large region (T_{Bu})	*Between* large regions (T_{BR})
Austria	0.345	0.343	0.001	0.001	0.001
Belgium	0.252	0.246	0.001	0.001	0.004
Canada	0.248	0.237	0.004	0.003	0.011
Hungary	0.379	0.366	0.001	0.000	0.012
Italy	0.376	0.362	0.001	0.002	0.010
Slovak Republic	0.245	0.234	0.001	0.000	0.010

Note: The national-level Theil (T_i) has been constructed as the sum of the *within* and *between* components, and slightly deviates from the figure calculated directly from the microdata because of rounding.
Source: OECD calculations using statistics drawn from national tax record data, see in Table 1.

69. Of the between-regional components, variation in income levels between large (TL2) regions (T_{BR}, column VI) is greater than along the urban-rural dimension in each large region (T_{Bu}, column V) or than between the small (TL3) regions within a large region that share the same degree of urbanisation (T_{Wr}, column IV). However, this will largely reflect the relatively small number of small regions (and hence the low disparities in the degree of urbanisation) within each large region. Austria, for example, has nine large regions (the Federal *Länder*), which consist, on average, of fewer than four small regions each. The three between-regional components are largest for Canada with its 13 large (TL2) and 293 small (TL3) regions.

70. One reason for the small contribution of between-regional variation to overall inequalities is that even small (TL3) regions are still relatively large and heterogeneous, as illustrated in the analysis of income variation across LAUs.

[15] Theil indices at the municipal (LAU) level have not yet been systematically collected as part of this project.

5. Regional disparities in access to essential services – first exploratory results

71. Geographic differences in living standards go much beyond the disparities in income that are the focus of this paper. Essential public and private services are an important complement to incomes, and their availability and quality matters greatly for well-being, economic opportunities and social inclusion. Indeed, in a number of OECD countries population groups living in economically lagging or declining regions recently expressed publicly, and in some cases quite vocally, discontent with their economic and social situation. This dissatisfaction was often also fuelled by a – perceived or real – deterioration in the access to essential goods and services: public transport, digital infrastructure, quality education and training opportunities, care services, amenities and leisure opportunities, and other services essential for a good-quality life. This highlights the importance of looking beyond income disparities in trying to understand the geography of people's economic and social opportunities and outcomes.

72. This section provides first exploratory results from an analysis of geographic disparities in people's access – or more precisely: proximity – to essential services using the example of public employment services (PES) in the Netherlands. It serves as a "proof on concept" for a more comprehensive analysis of the same issue that will consider a broader range of services for a large number of OECD countries in the upcoming phase of the geographic inequalities project.

73. The exploratory analysis presented in this Section relies on the following data sources:

- Eurostat's Geographic Information System of the COmission (GISCO) for information on national and regional borders;
- OpenStreetMap (OSM)[16] for data on road networks and the location of PES centres, which were cross-validated against national data from administration sources;
- The Global Human Settlement Layer (GHSL) published by the European Commission in 2019 (Florczyk A.J., 2019[42]) for a population grid with data on the distribution and density of the global population in 1km-by-1km cells.

Geographic proximity is measured as the driving distance from people's residence – or again more precisely: the grid point where their home is located – to the nearest PES centre.

74. The results can be visualised as maps for small (TL3) regions – see Figure 15 for the region of *Groot-Amsterdam* – or at national level – see Figure 16 for the Netherlands as a whole. On those maps, the colour-coded circles indicate road distances with, for example, a dark green dot representing a 0-2 km distance to the closest PES centre for residents living in this cell.[17] Cells not connected to PES centres via the main road network, notably on islands or in remote rural areas, are displayed as grey. Uninhabited population grid cells are displayed in white. The calculations take into account that the closest public employment centre might be in a different small (TL3) region by including a "buffer-zone" of 50 km around each region. Using these cell-specific results, aggregate statistics on people's proximity to services can easily be obtained by simply weighing cell-specific distances by the share of people living in each grid cell. This means that distance measures for cells with a higher population receive a greater weight.

75. Noting that results are highly tentative at this point and should be considered for illustration only, analysis for the Dutch metropolitan small region of *Groot-Amsterdam*, situated in the Province of North Holland with about 1.4 million inhabitants, gives very short distances to the next PES centre (Figure 15). The majority of grid cells on the map are 2-10 km away from the next centre, with a substantial number – particularly in the centre of Amsterdam (i.e. Amsterdam municipality) – being even closer. Some grid

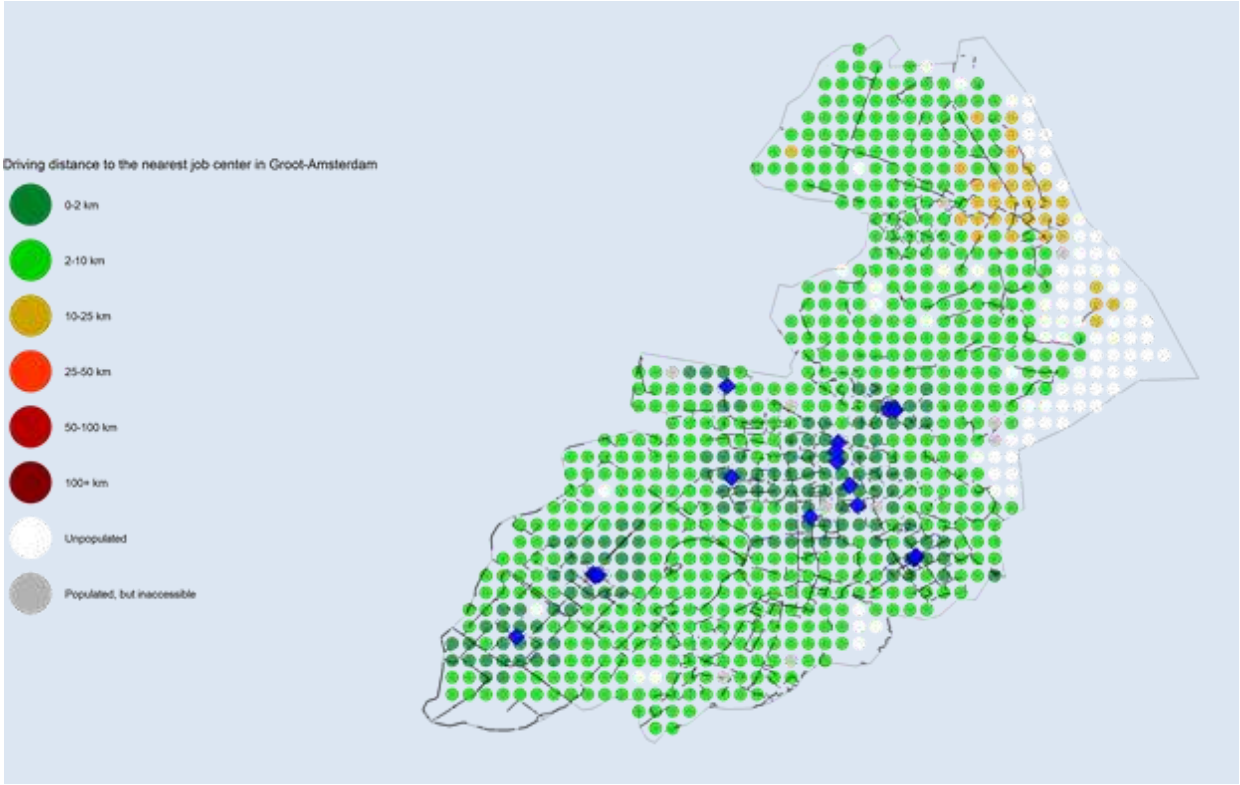
[16] OSM is a free, collaborative mapping project built by a user base of eight million people around the world and released under an open-content license.

[17] Road distances have been calculated from the mid-point of each 1km-by-1km grid cell.

points in the northeast of the region, in the municipalities Edam-Volendam and Waterland, are located at more than 10 km road distance from the closest PES. Only very few cells are shaded in grey, indicating that they are not connected to a PES via a main road.[18] The white dots on the eastern border of the map indicate the Markermeer lake.

Figure 15. In the Dutch region of *Groot-Amsterdam* most population grid cells are located not far from the closest public employment centre

Map of the small (TL3) region of Groot-Amsterdam broken down into 1km-by-1km grid cells, colour-coded for their geographic distance to the closest PES centre



Note: Public employment centres are displayed as blue diamonds. Black lines within the regional boundaries show the network of thirteen major road types taken into consideration for calculating road distances. Minor roads, such as walking paths or driveways, are not accounted for.
Source: OECD calculations.

76. These numbers imply that most people in *Groot-Amsterdam* live very close to the next PES. Combining the grid road distances in Figure 15 with information on population density gives an average distance to a PES for the population living in Groot-Amsterdam of 5.4 km; more than half of all people in the region, 59%, live within 2-10km from a PES.

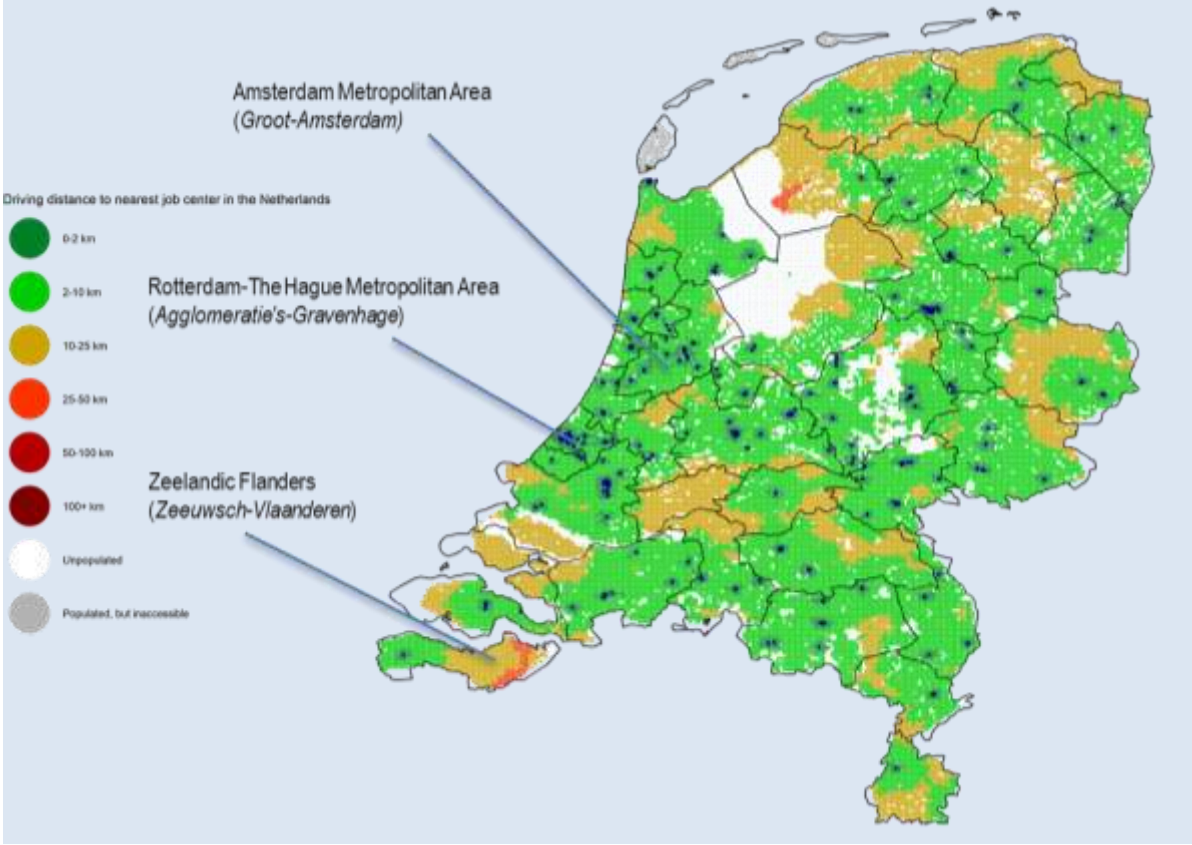
77. Extended to the Netherlands as a whole, with its 40 TL3 regions, the analysis shows that disparities in the proximity to essential services exist even in a country with high population density and a very tight road network. Most of the map shown in Figure 16 is coloured in the light green of grid points for a 2-10 km distance, indicating very close proximity to a PES. Some large light-brown patches characterise distances of 10-25 km. In two small regions, Zeelandic Flanders in the southwest and Southwest Friesland in the

[18] The analysis current does not account for certain types of smaller roads, including food paths. This also implies that the distance for a person moving by bike may well be shorter.

north, patches exist that indicate distances above 25 km. All large Dutch islands do not have road access to a PES and are coloured in grey.

Figure 16. Only very few places in the Netherlands are located further than 25 km away from the closest public employment service centre

Map of the Netherlands broken down into 1km-by-1km grid cells, colour-coded for their geographic distance to the closest PES centre



Note: Public employment centres are displayed as blue diamonds. Black lines within the regional boundaries show the network of thirteen major roads, which were taken into consideration for calculating road distances. The calculations do not account for very small roads such as walking paths or driveways.
Source: OECD calculations.

78. For the population living in Dutch small (TL3) regions this implies disparities in the average distance from a PES of up to a factor of 5.5. Distances to the next PES are shortest, on average, for people living in the Rotterdam-The Hague Metropolitan Area (*Agglomeratie's-Gravenhage*), at only 2.8 km; two-thirds of all people, 69%, live within 0-2 km to a PES. Meanwhile, in Zeelandic Flanders (*Zeeuwsch-Vlaanderen*), the average population-weighted distance to a PES is 15.4 km; only 2% of the population live within 0-2km to the closest PES. There is a clear divide in ease of access between metropolitan and non-metropolitan regions. Four of the five small (TL3) regions with the shortest average distances are metropolitan, while all of the regions with the longest average distances to a PES are non-metropolitan (Table 3). On average in metropolitan regions the average distance is 6 km, while in non-metropolitan regions it is 9 km.

79. Of course, these numbers are overall indicative of a very tight PES network, particularly in a country with such excellent public transport as the Netherlands. During the COVID-19 pandemic, many

OECD countries have also further invested in digital employment support services hence reducing the importance of physical proximity to a PES for many jobseekers (OECD, 2020[43]).

Table 3. Regions with the shortest average distances tend to be metropolitan in the Netherlands

Top and bottom five TL3 regions based on average distance to a Public Employment Service

Rank	TL3 regions	Average distance to jobcentre	Distribution of regional population by distance to job centre				% of national population living in the region	Metropolitan region
			0-2km	2-10km	10-25km	25-50km		
1	Agglomeratie 's-Gravenhage	2.8	69%	31%	0%	0%	6%	Yes
2	Zaanstreek	3.9	55%	45%	0%	0%	1%	Yes
3	Agglomeratie Haarlem	4.4	48%	52%	0%	0%	1%	Yes
4	Agglomeratie Leiden en Bollenstreek	4.8	34%	66%	0%	0%	2%	No
5	IJmond	4.8	31%	68%	1%	0%	1%	Yes
36	Noord-Drenthe	11.6	0%	26%	74%	0%	1%	No
37	Delfzijl en omgeving	14.0	0%	2%	98%	0%	0%	No
38	Zuidwest-Friesland	14.3	7%	32%	56%	5%	1%	No
39	Zuidoost-Zuid-Holland	15.3	0%	16%	84%	0%	2%	No
40	Zeeuwsch-Vlaanderen	15.4	2%	19%	61%	18%	1%	No

Note: Blue bars reflect regional average distance to jobcentre, while green shading colour reflects share of population belonging to the distance bracket darker shades signalling larger share of population.
Source: OECD calculations.

6. Policies to manage and mitigate regional income inequalities

80. Geographic income inequalities have various dimensions and drivers: as seen in Section 4. , income levels and inequality can differ largely across regions in a country, between metropolitan and non-metropolitan areas, *among* metropolitan areas, and between municipalities *within* metropolitan areas. They reflect disparities in productivity and wages resulting from differences in economic structure, the supply of skilled labour, physical capital and potentially natural resources and public infrastructure, as well as history legacy given strong path dependency of spatial distributions. They may also relate to the local availability of certain amenities, and are affected by labour market institutions, and redistribution through taxes and benefits.

81. Such geographic inequalities partly reflect the geographic concentration of economic activity and people and need not necessarily be bad. Urban areas that host high-skilled workers in knowledge-intensive industries may produce agglomeration benefits that increase productivity and incomes, promote innovation and boost economic growth. Since the cost of living, and notably of housing, can vary substantially across regions, measured (nominal) income differences overstate disparities in living standards. And incomes are also only one aspect of well-being: for example, some people may be happy to forego some of the higher income they can earn in a city in exchange for the benefits of living in the countryside.

82. However, too large regional income differences are inefficient and undermine social cohesion and political stability. They create inequalities of opportunity and are an obstacle to social mobility if people in certain areas do not have access to a good-quality education, job opportunities, and other essential public services. This may be the case particularly if people are not geographically mobile. At a more aggregate level, large regional inequalities – or rapid changes in relative regional income levels – may undermine political stability, social cohesion, and economic growth.

83. Stark regional inequalities can also provide challenges for providing people with adequate public infrastructure and services. On the one hand, economically dynamic regions, and notably urban areas, may have troubles to expand infrastructure to cater for the large numbers of people they attract. The consequence may be shortages in affordable quality housing and congestion problems (OECD, 2015[44]).

This creates a challenge particularly for cities' lower-skilled workers, who may work in more precarious jobs and struggle with high cities' living costs, long commutes and air pollution problems. On the other hand, economically less dynamic regions that lose their most productive workers are having to deal with the challenges of a shrinking and ageing population – such as skill shortages and mismatch, declining purchasing power, and difficulties in sustaining public services in light of low population density – which may then be a catalyst to further outmigration of higher-skilled workers and their families (OECD, 2014[45]; 2020[32]).

84. Addressing those challenges is far from trivial. Effectively reducing geographic inequalities and boosting productivity and incomes in less dynamic regions usually requires a comprehensive set of solutions touching on various policy areas. Investments in productive capital, research and development, as well as in people's skills are needed to boost job creation and increase productivity; good-quality public infrastructure and services, including leisure activities, are key to attract and retain productive employers and provide desirable living conditions for skilled workers and their families. The types of measures needed will depend largely on local economic, socio-demographic and geographic circumstances and differ from place to place. Complementarities between interventions are large, and the timing and sequencing matters: for example, regions will only manage to develop high-value-added industries if they can offer employers a skilled workforce. But good job opportunities alone will not be enough to attract and retain skilled workers and their families – access to good-quality and affordable public services, notably housing, child care, schooling, and health care, equally matter. Interaction effects across regions need to be taken into account: an intervention that addresses a given challenge in one region, say expanding the affordable housing stock and improving transport infrastructure in a rapidly growing metropolitan area – may have unintended consequences elsewhere – e.g. a further loss of skilled workers in less dynamic non-metropolitan area nearby. And in some cases, the investments required to stabilise relative incomes in economically lagging regions may be so large that they may not represent good use of the available resources.

85. This section provides a first short overview and discussion of some of the policy options to manage regional income inequalities where they cause challenges for people's well-being and the working of markets and governments, and to mitigate them where they have become so large that they undermine equality of opportunity and economic growth. It looks primarily at policies to address income inequalities across regions, and between urban and rural areas, rather than at the local level. The discussion considers policy options in three areas: i) boosting productivity and resilience in lagging regions; ii) providing quality job opportunities in regional labour markets; and iii) ensuring access to quality public services everywhere. An additional section on widely sharing the gains of economic prosperity, covering the role of labour market institutions, redistributive policy, and fiscal equivalisation is still missing and will be added in a future revision of the paper.

6.1. Boosting productivity and resilience in lagging regions

86. Productivity growth is the main source of sustainable increases in incomes and well-being in the long run. Highly productive regions and cities tend to offer better jobs that translate into better wages and incomes for households. These places are also more likely to generate the tax revenues necessary to finance public infrastructure and services such as health, education, transport and social support (OECD, 2020[46]; Tsvetkova et al., 2020[47]). As people and economic activities concentrate in space, interregional inequalities in productivity arise. While some levels of inequality are natural, very high inequalities often indicate that places are left behind, offering little opportunity for people and firms in those places. Stark economic disparities can also lead to political polarisation and discontent with the political and economic systems (Dijkstra, Poelman and Rodríguez-Pose, 2019[3]), which can undermine democracies (Axelrod, Daymude and Forrest, 2021[48]), and pose threats to multilateralism and global trade (e.g. through the introduction of large-scale tariffs) (OECD, 2020[34]).

87. From 2000 to 2020, productivity has been growing faster in "frontier" regions, i.e. regions that were already the most productive at the beginning of the period, than in the majority of regions. This has led to larger productivity gaps across certain regions within the same country, especially between frontier and "lagging" regions (i.e. low-productivity regions growing at a significantly lower rate than the frontier). With annual productivity growth of 1.3% in frontier regions compared to 1.1% in lagging regions in the past 20 years, the labour productivity gap between frontier and lagging regions has passed from 36% to 41%.[19]

88. Regions with low productivity levels and growth might not be exploiting their full potential nor making the most of new opportunities arising from megatrends such as globalisation, digitalisation and the green transition. Low regional productivity levels and growth are often associated with structural deficits such as lack of basic public infrastructure and transport connectivity. As a consequence, lower productivity regions also offer fewer labour market opportunities for their workers. Tackling those deficits is important to enhancing regional productivity, promoting a more inclusive regional development, and boosting wages and incomes (OECD, 2018[49]).

Improving regional integration in international trade and global value chains

89. Regions' integration in international trade can be an important driver of productivity and economic growth. Operating in global markets exposes regions to practices of the global productivity frontier and makes them less constrained by country-specific limitations (e.g. technological, financial, and related to market size) or equilibria (e.g. when frontier regions already dominate the local markets). Nevertheless, to make the most of international trade, regions need to develop key tradable sectors, invest in infrastructure that supports trade, and strategically integrate in supply chains (OECD, 2018[49]).

90. Among the most prominent features of catching-up regions is that a large share of their gross value added (GVA) and employment comes from tradable sectors, especially tradable services, manufacturing and resource extraction. An advantage of tradable sectors is that they can enhance productivity in all types of regions – i.e. predominantly urban or rural – although tradable subsectors and mechanism at place might vary depending on the type of area (OECD, 2016[50]).

91. The integration of regions in global value chains (GVC) can also create benefits in terms of productivity, although not all places might benefit. Across the OECD, regions with higher GVC integration tend to have higher GDP per capita (OECD, 2018[49]). However, this relationship does not hold across all type of places – as some regions with low GVC integration have shown to have either very low or very high productivity levels. While the case of low productivity regions is due to a weak tradable sector, the case of high productive regions is generally associated with a strong service sector (which tends to be the case for regions with large cities).

92. Not all types of GVC integration might yield the same benefits. The greater the value-added produced in a region – which might depend on the positioning within the GVC – the higher the benefits in terms of productivity. For example, integrating the middle of a GVC through labour intensive (low-skilled) manufacturing would yield little value added and thus, low productivity and low wages, even though it can create jobs. While job creation is desirable in contexts of high unemployment, low-skilled manufacturing jobs are likely to stay in the region only if wages remain relatively low. For those reasons, policy makers should seek to engage in high-value activities within the GVC, which are typically concentrated at the

[19] This trend is in contrast with productivity differences across countries, which have narrowed over the same period. It is also worth noting that even if on average interregional productivity differences are widening, 40% of regions are catching up with the frontier. Convergence across countries and examples of "catching-up" regions (i.e. regions growing at a faster pace than the frontier) suggest that, with the proper conditions and policies in place, lagging regions can reduce their productivity gap with the other regions.

beginning (e.g. research and development activities) and at the end (branding and services related to the final product) of the production chain (OECD, 2018[49]).

93. While integration to global markets has been a driver of regional economic prosperity in recent decades, the disruption of global value chains due to the COVID-19 pandemic and Russia's war against Ukraine have highlighted the vulnerability that can arise from a strong reliance on international trade and high exposure to changing macroeconomic conditions. Nevertheless, those vulnerabilities might only be short termed as regions open to international trade – and overall to multi-lateral cooperation – are also the ones that can recover the fastest from such shocks (e.g. in the case of the COVID-19 pandemic, by getting access to medical equipment and even vaccines from international suppliers) (OECD, 2020[34]).

94. Many remote regions have been among the "losers" of globalisation due to their exposure to low-cost competition from developing countries. That type of exposure, even if concentrated in low value-added manufacturing activities within the GVC, can represent the loss of jobs and livelihoods for people and, in some cases, the decline of regional economies and local communities. For those reasons, remote regions should avoid low-cost standardised production and transition to more differentiated types of production. Focusing on unique qualities of assets, resources or products, while considering local strengths and challenges to find growth opportunities, requires a truly place-based approach (Garcilazo and Oliveira Martins, 2021[33]; OECD, 2018[49]).

95. Two promising domains to support the productivity potential of remote regions are digitalisation and the green transition. Digitalisation is creating new ways to increase well-being in remote areas (e.g. e-learning and e-health), and it has the potential to enable some economic activities in a remote way. Remote regions can leverage digitalisation to create new forms of remote services (Garcilazo and Oliveira Martins, 2021[33]) and to attract people that can work remotely. The green transition is also offering new development opportunities for remote regions, which are leading the per capita production of electricity from renewable sources (OECD, 2021[51]; 2020[34]), and host natural resources, biodiversity and ecosystem services essential for sustainability. Main areas of investment for climate action in rural areas include fostering renewable sources, promoting sustainable land management and higher valorisation of ecosystem services, and accelerating the circular and bio-economy (OECD, 2021[52]).

Investing in transport infrastructure

96. To enhance productivity in lagging regions, policies should support the proper functioning of cities and their agglomeration economies. Agglomeration economies are the benefits that arise when people and firms co-locate (Porter, 1998[53]). Through agglomeration economies, firms and workers are more productive in larger and denser areas than they would be in smaller and less dense areas. Firms have access to larger markets to sell their goods and services (which can generate economies of scale and potential to grow). Workers and firms are more likely to find better matches in terms of skills required for the job (efficiency gains). Innovation diffusion, technological spill-overs, and intermediate input linkages are also more likely to emerge due to proximity of people, firms and workers (OECD, 2020[46]; 2018[49]).

97. Transport infrastructure allows regions and cities to leverage agglomeration economies by expanding the pool of workers (increased commuting zone) that firms can reach, which generates better firm-worker matches and decreases the risk of out-migration. Intra-urban and suburban transport infrastructure can also connect workers in low-density areas into the local labour markets of the closest cities and metropolitan areas (OECD, 2020[54]).

98. Efficient public transport systems make cities both more sustainable and more productive. Good transport networks increase people's accessibility to services and amenities, such as childcare, which for many people is a precondition to join the labour force. Good transport connections also reduce commuting times, which improves both work-life balance and productivity. OECD work has shown that labour productivity and public transport performance are positively correlated. On average, the labour productivity of the metropolitan areas with the highest public transport performance, including Helsinki, London and

Oslo, is 33% higher than in areas where public transport performance is low (OECD, 2020[34]). Overall, efficient, safe and reliable urban transport makes cities more inclusive and liveable. Well-functioning cities attract more firms, investments, high-skilled workers and entrepreneurs, including in tradable sectors, research and development (R&D), and high-tech manufacturing. All this generates a more dynamic urban economy, with high firm and job churning, which translates into higher productivity (OECD, 2018[49]; 2017[55]).

99. Transport infrastructure can expand the benefits of well-functioning cities, beyond their administrative boundaries, to other low-density areas. Cities and metropolitan areas can serve as hubs for trade and services for surrounding regions. Beyond giving access to larger markets, which provides workers and firms in low-density places with more opportunities, cities and metropolitan areas also provide connections to educational and research institutions, which are key for skills development as well as for R&D activities. They also serve as a link to financial institutions, which are essential for entrepreneurship, firm growth and public infrastructure investment. Indeed, beyond population density, closeness to cities and metropolitan areas matters for productivity. In OECD countries, regions closer to metropolitan areas have grown faster, in GDP per capita, than regions farther away (OECD, 2016[50]; 2018[49]; 2020[34]).

100. By facilitating the transport of goods and people, and accessibility to services and amenities, between rural and metropolitan areas, inter-regional transport networks allow the integration of rural areas into regional, national and global value chains, and can improve the overall social cohesion in the region and the country (Cosar and Demir, 2016[56]; Ahrend and Schumann, 2014[57]).

101. Developing transport infrastructure that maximises the accessibility of opportunities for people and firms requires to account for functional relationships across space. An example of a tool that promote planning at the functional scale is the concept of functional urban areas (FUAs, see Box 1), which delineate metropolitan areas' boundaries through labour market interactions between cities and their surroundings. FUAs go beyond administrative boundaries of individual municipalities to consider areas that in practice are closely interlinked and operate in an integrated way. In particular, FUAs take into account where people live and work (Dijkstra, Poelman and Veneri, 2019[58]) and thus the real transport needs of the people and workers living in the metropolitan area. By adopting a functional urban approach, policy makers can tailor transport needs to the diversity of urban scales.

102. Similarly, to realise the full potential of rural-urban interlinkages through inter-regional transport infrastructure, policy makers need to take into account the diversity of rural areas. Accessibility to metropolitan areas (through distances or driving times) is a powerful determinant of the "agglomeration economies" that rural areas can borrow from urban areas (Fadic et al., 2019[38]), and thus of the productivity growth potential that governments can leverage through better transport infrastructure.

103. Overall, if implemented strategically, transport infrastructure can help all types of regions and cities to integrate global networks of trade and knowledge diffusion. High-quality roads, railroads, ports and air transport are essential for international trade. Effective transport infrastructure reduces the costs of trade, which can further incentivise firms to invest, particularly in tradable sectors. New international trade opportunities generate productivity gains not only in regions with a high share of exporting firms, but also in regions that are integrated in the GVC of the exported products (OECD, 2020[54]).

104. Nevertheless, when planning transport infrastructure, policy makers should always take into account the specific economic structure of the region, as well as other relevant social, geographical and contextual factors, including the economic characteristics of neighbouring regions (OECD, 2020[54]). For example, investing in transport infrastructure in a depressed region without a "fertile" economic structure could paradoxically create economic desertification if neighbouring regions become more attractive, and increase competition, thanks to the new transport connectivity.

Strengthening multi-level governance and capacity of subnational governments

105. In the past three decades, many OECD countries have been moving towards a new paradigm of regional development policy that is more integrated across policy areas and uses place-based approaches to tackle productivity, well-being, resilience, and sustainability challenges. This is in contrast with an approach that focuses exclusively on transfers and subsidies to low-performing regions. The latter approach can in fact generate regional dependency and high costs for public budgets, as missed growth opportunities become missed tax revenues. Promoting the full productive potential of every region can maximise both regional well-being and overall country growth, and is likely to yield economies that are more resilient to external shocks (OECD, 2012[59]).

106. Compared to place-blind policy, adopting a policy approach that targets each individual place at the right scale and accounts for its specific features and needs requires more work for decision makers along the whole policy cycle, including on planning, managing and implementation. Place-based policies require tailored strategies (for every region and city in the country) that are difficult to manage without the active involvement of subnational governments. Regional and local governments (and the different stakeholders located within their jurisdictions) are thus crucial to efficiently integrate relevant contextual knowledge into the design and implementation of place-based policies. This has two main implications, the first is that regional and local governments need to have a certain level of managing capacity. This is not always the case, as quality of institutions and capacity varies widely across levels of government. The second is that central governments need to coordinate with regional and local governments (vertical coordination). In the case of metropolitan areas, municipalities also need to cooperate among themselves through metropolitan governance bodies or other coordinating mechanisms (horizontal coordination) (Garcilazo and Oliveira Martins, 2021[33]; OECD, 2020[46]).

107. For successful place-based policies, regional and local governments – who are responsible for around 60% of public investment in OECD countries – might also require certain levels of decentralisation, particularly in terms of fiscal, financial and investment autonomy. Since capacity is not homogeneous across regional and city governments, decentralisation might be better applied in an asymmetric way, meaning that the levels of autonomy are matched with the levels of capacity of the subnational government (OECD, 2019[60]).

6.2. Providing quality job opportunities in regional labour markets

108. Geographic inequalities in the number and quality of jobs available are an important determinant of broader regional inequalities through their effects on productivity, earnings and incomes. In places where quality job opportunities are rare, workers and young people have lower incentives to invest in their human capital and to increase labour market participation (OECD, 2020[32]). Meanwhile, businesses who lack qualified staff are unlikely to innovate and create good-quality employment. Wages and productivity are low, and higher-skilled workers and innovative employers have an incentive to move to economically more dynamic areas leaving behind a low-skilled workforce and high unemployment.

109. Regional differences in labour market outcomes across OECD regions are large and remarkably persistent. In over half of OECD countries, unemployment rates between the best- and worst-performing large (TL2) regions differ by a factor of two or more. In 15 OECD countries, the region with the highest unemployment rate in 2018 also had the highest unemployment rate ten years earlier, in 2008. Disparities in job quality across regions are also a concern. Non-standard forms of work, for example, are more common in regions with a lower-educated workforce, higher unemployment, and a smaller share of gross value added in tradable sectors (OECD, 2018[61]).

110. And job opportunities have become more unequally distributed across regions over the past two decades. In 20 out of 27 OECD countries with available data, employment has become more concentrated since the 2000s (OECD, 2020[62]). Metropolitan regions with a higher concentration of knowledge-intensive

industries created a large share of job opportunities, while regions traditionally relying on resource extraction or manufacturing saw job opportunities vanish (Gbohoui, Lam and Lledo, 2019[63]). Particularly high-skilled employment has become regionally more concentrated, notably in the capital regions. The structural transformations affecting OECD economies and labour markets – such as demographic change, automation, and the green transition – all have a strong geographic dimension and may end up amplifying regional imbalances. Indeed, predictions through 2030 suggest that net job growth in Europe and the United States will be concentrated in a few urban areas (OECD, 2020[62]).

Addressing skill mismatches in regional labour markets

111. Regional skill gaps and mismatches act as a brake on economic performance by discouraging investment and hampering necessary structural transformation, reducing opportunities for localised learning and knowledge diffusion, and undermining competitiveness (Morris, Vanino and Corradini, 2019[64]; Brun-Schammé and Rey, 2021[65]). While policy can help overcome skill gaps and boost productivity by enhancing workforce skill levels overall, this alone will likely not be enough to address regional skill imbalances (Barca, McCann and Rodríguez-Pose, 2012[66]; OECD, 2019[67]). The reason is that also labour mobility increases as skill levels rise, improving overall productivity but limiting benefits for lower-productivity regions.

112. Providing workers with training in place-sensitive skills, which are relevant in the local context, can be one solution. For example, while the demand for basic digital skills will likely grow in all places, demand for more specialised skills, be it hairdressers or assistant chefs, may be more regionally concentrated. In Hungary, an alliance of NGOs established the network of Open Learning Centres that deliver free and short (20-30 hour) learning courses in smaller towns with limited adult learning opportunities. Employers and local government representatives are consulted when determining the available training programmes to make sure training is relevant in the local context (OECD, 2020[68]). However, in addition to training workers, employers need to create the corresponding job opportunities to make sure that qualified workers can be retained and that their skills are put to good use.

113. Good-quality information on regional skill needs is the first step to steer investment towards in-demand skills. Many countries lack integrated, forward-looking skill management systems that could help anticipate future skill needs. Skill forecasting at the regional level can be effective particularly if it brings together local stakeholders such as industry organisations, and education and training providers, with national and regional authorities. In Sweden, employers can report their skill needs and work with education providers and public authorities to adapt vocational education programmes on regional skills platforms (CEDEFOP, 2017[69]). Regional governments usually chair the platforms, but all actors contribute in coming up with tools and activities needed to improve local dialogue, co-ordination, and knowledge accumulation (Swedish Agency for Economic and Regional Growth, 2016[70]). Skill anticipation however should also fit into a national framework to prevent fragmentation. For this purpose, France commissioned a government think-tank, *France Stratégie,* to improve the coherence of regional skill assessment exercises studies (OECD, 2019[71]). Since 2015, the Employment and Skills Network (*Réseau Emplois Compétences*) brings together stakeholder representatives, including from the regions to develop guidelines for actors on the ground (France Stratégie, 2021[72]).

114. In a context of rapidly transforming labour markets, workers with skills that are becoming outdated or obsolete require early support. Demographic trends, coupled with changes in industry structure through digitalisation and automation, will likely bring about major swings in the skills supplied and demanded in local labour markets. In the past, some regions that underwent such heavy structural change experienced high numbers of layoffs with long-lasting negative consequences (OECD, 2018[61]). Helping workers affected by structural transformation avoid unemployment is better for their employment prospects, earnings trajectories and human capital development, and it is less costly for the public budget than providing support after dismissal (Quintini and Venn, 2013[73]). Still, across the OECD, at-risk workers are

less likely to participate in training or to use guidance services than other workers (OECD, 2021[74]). One effective solution for identifying workers with potentially outdated skills can be to target specific groups of workers, for example at firms or in sectors facing declining demand or high risk of automation. The Swedish Job Security Councils provide workers at risk of collective dismissals a dedicated coach and a range of personalised services, including guidance and advice, training, financial support and business start-up support. Councils are financed through an employer levy of 0.3% and are run by social partners based on sectoral or cross-sectoral collective agreements (OECD, 2019[71]). In light of the profound and rapid structural changes facing OECD and EU labour markets and societies as they adapt to climate change and undergo a green transformation, planning and reskilling should start for the most heavily affected regions, notably those that derive a large share of their income from agriculture, tourism, resource extraction and "brown" energy (OECD, 2020[32]).

Connecting workers with jobs by helping them move locations or telework

115. Strengthening labour mobility by helping and incentivising workers to move to where quality jobs are created can increase incomes and reduce skill imbalances, but it also amplifies some regional inequalities. Across OECD countries large and persistent inequalities are partly the results of the declining incentives for interregional labour mobility, especially for poor households in lagging regions (Gbohoui, Lam and Lledo, 2019[63]). At the same time, there is emerging evidence that regional inequalities are negatively related to labour mobility (Causa and Pichelmann, 2020[75]). Policies that increase labour mobility therefore have the potential to address skill imbalances, improve labour market outcomes and boost productivity and incomes.

116. Ensuring access to good-quality affordable housing for workers who want to move location can be an important part of the solution. Moving locations is often costly and risky for workers as prices are typically higher where job opportunities are more plentiful (Green, 2020[76]). Since expanding the stock of affordable housing, as the first-best solution, is slow and costly, improving access to social housing can be a more practical alternative in the short run. In addition to slowly increasing the availability of social housing by building or buying homes, reallocating the existing stock can yield immediate results. Some countries introduced periodic eligibility reviews to make sure people transition out of social housing when their economic situation improves. In France, New Zealand and the Slovak Republic, eligibility of social housing residents is re-assessed typically every three years. (OECD, 2020[77]) However, such measures can be difficult to implement. When New Zealand introduced regular tenancy reviews, exemptions were subsequently broadened such that fewer than 20% of social tenants ultimately had to undergo a tenancy review (OECD, 2019[78]). Criteria to determine social housing eligibility could also be better used to provide help for those willing to relocate as many programmes are only available for residents. For example, eligibility for municipal housing in Vienna requires local residency for three years. The UK government passed, in 2015, the Right to Move guarantee, which removed residency or queuing requirements for social housing units if prospective tenants move to take up employment or an apprenticeship. Local authorities are since required to offer a minimum of 1% of their housing stock to people moving for work under the Right to Move scheme (OECD, 2020[77]).

117. Active employment support can increase labour mobility by promoting job matches and helping cover workers' direct costs of relocation. Public Employment Services (PES) can help employers to find suitable candidates in other parts of the country and encourage workers to take up matching offers. In some cases, the barrier for workers to look for jobs elsewhere can simply be lack of knowledge, networks or confidence. PES can help to establish these connections and reduce the immediate financial costs of moving or commuting. An impact evaluation of Latvian active labour market policies by the OECD identified an effective programme enhancing mobility (OECD, 2019[79]). The Latvian PES offers support with taking up job offers, including subsidized employment, or attending training at distant locations. Jobseekers who receive a job or training offer more than 15 kilometres away are eligible for temporary support of up to EUR 150 per month to cover transport or accommodation costs. Between 2013 and 2017, more than 9 000

workers benefited of this support, a third of them under the youth guarantee. Evaluations show good results: receiving mobility support had positive employment and earnings effects including for training participation. This may also reflect higher motivation of workers who travel further, but potentially better matching effects. In practice, workers' ability to take up a distant job offer will of course depend also on factors such as their family situation or on whether they own a private vehicle or depend on public transport.

118. Even where labour mobility effectively reduces skill imbalances, it may come with other downsides. In many cases, metropolitan areas offer workers higher-productivity jobs and better wages and incomes. While workers moving to those areas may experience a rise in productivity and incomes, such a move may contribute to *widening* regional inequalities. Moreover, there appear to be limits to labour mobility, as people rarely seem to be keen to move locations for work. On average across almost 30 OECD countries with available data, only 9% of residential moves were for job-related reasons, much fewer than for housing- or family-related reasons (41% and 34%). Particularly lower-skilled works tend to be less geographically mobile (Causa and Pichelmann, 2020[75]), possibly because it is less attractive to change location for a job that is low-paid or less secure. People who do relocate tend to move to similar communities rather than to necessarily seek out large cities or highly dynamic regions (OECD, 2020[62]).

119. The spread of teleworking practices has the potential to relieve pressure from job-rich but congested cities while supporting quality job creation outside of traditional high-growth regions. Indeed, cities and capital regions tend to have a higher share of jobs amenable to teleworking (OECD, 2020[62]). As some of these jobs become entirely remote, and others are performed via hybrid modes, workers in these jobs may choose to leave costly urban areas, at least for part of the time, for suburbs or outer areas. Rural communities can take advantage of this to attract new residents, provided they can offer the needed digital and transport infrastructure. Also female employment in non-metropolitan areas could benefit from an increased number of remote service jobs. Many large employers, particularly in the tech sector, have already announced plans to significantly expand teleworking over the long term, or even permanently (OECD, 2021[80]). Also universities may decide to expand online learning more permanently, in which case fewer young people may move to urban centres to obtain higher education (OECD, 2019[79]).

120. National and regional governments have an important role to play in facilitating and promoting telework, notably by providing an effective legal framework and incentives for the provision of state-of-the-art digital infrastructure, and affordable digital services, also outside of metropolitan areas (OECD, 2021[80]). They can also help overcome legal and cultural barriers to remote working by promoting a "right to telework" and by communicating benefits and guidelines to best deal with remote work. Already before the COVID-19 pandemic, the Japanese Ministry of Economy, Trade and Industry launched the 2018 Telework Days campaign to encourage businesses to promote teleworking, and introduced a National Teleworking Day. Investing in digital skills of people and businesses is also key. This includes training in use of ICT technologies and capacity building of software and ICT maintenance services in rural locations. Small towns and rural areas could increase their attractiveness for people working remotely by investing in the creation of co-working spaces as they are common in urban areas. The Rural Innovation Initiative in the United States seeks to assist rural regions interested in building local workspaces for remote workers, as well as creating digital skills training programmes to give residents the skills to take on remote jobs or to start their own companies (OECD, 2020[32]). Public employers could lead by example by allowing for remote working and digitalising public services.

6.3. Ensuring access to quality public services everywhere

121. Access to quality public[20] services is an important determinant of people's well-being, economic performance and equality of opportunity (OECD, 2015[81]; OECD, 2018[82]; Llena-Nozal, Martin and Murtin,

[20] The term public services is used here to describe services that are key to public welfare. Some of those services may be provided privately through for-profit businesses or non-profit organisations, e.g. private hospitals, health care

2019[83]). Good-quality education and training positively affects local productivity, labour market outcomes and people's health. Adequate health care is essential for people's well-being and boosts productivity by raising the return to education and labour market participation. Particularly investments in child health and well-being and in maternal health have large, long-lasting benefits, and can help reduce inequalities of opportunity. And as many OECD societies are rapidly ageing, the provision of services for the elderly, notably health and long-term care and adequate housing, have been gaining importance for the well-being of a growing share of the population (OECD, 2020[84]). Since informal care for the frail and elderly – like social services more broadly – are often mainly provided by women, they are also an important determinant of female labour force participation and thereby incomes. Ensuring the adequate provision of public services that are accessible to all is an important government responsibility, and regional and local government often have a central role to play (Iammarino, Rodriguez-Pose and Storper, 2018[85]).

122. However, geographic inequalities in incomes often coincide – and interact – with disparities in people's access to essential public services. People living in rural areas can face difficulties in accessing essential services, because many such services are easier and cheaper to provide where population density is high (OECD, 2021[86]). This may reflect high fixed costs associated with delivering certain services – e.g. operating a hospital – as well as the costs of bridging geographic distances in service delivery. Declining population density in many rural areas has further reduced the potential for economies of scale in service delivery. In many countries, cost-cutting pressure and the drive for greater efficiency have led to the closure of rural hospitals and the consolidation of rural schools (OECD, 2020[32]). Attracting and retaining highly skilled professionals poses an additional challenge. In some places, this has led to vicious circles, because good-quality services, including child care facilities and schools, are an important determinant of a region's attractiveness, notably young families (OECD, 2021[86]).

123. Service access can also differ within metropolitan areas. This is true particularly in places where income inequality – and consequently often the variation in house prices and neighbourhood quality – is high (Reardon and Bischoff, 2011[87]). Residents of homogeneous higher-income communities may be able to pool resources and arrange the provision of high-quality public services, while more disadvantaged communities lack necessary means to invest in the development and upkeep of key infrastructure and to attract skilled professionals (Glasmeier, 2018[88]). The resulting variation in service provision can be large: alone across the 20 Parisian *arrondissements*, for example, the density of general practitioners varies by a factor of 4, from 0.8 to 3.2 per 1 000 inhabitants (OECD, 2016[89]).

Digital, mobile and integrated service delivery

124. The digitalisation of service delivery has an enormous potential to simplify service access and improve coverage in such fields as healthcare and employment support (OECD, 2021[86]; 2020[32]). In particular, the expansion of web-based support, including telemedicine and online job platforms, can improve service access for populations in rural areas and reduce geographic disparities in service provision. However, there are also limits to the applicability of digitalised services. While teleconsultations may facilitate access to certain types of primary care, they are not sufficient where physical examinations are required. In addition, socially disadvantaged population groups and elderly people may be less comfortable with web-based service provision or lack the required IT equipment. Despite positive evaluation results, regulation, fragmentation of platforms and the lack of digital skills still hamper the spread of digital social and health services. At the start of the COVID-19 pandemic, France loosened the regulations authorising patients to be reimbursed for teleconsultations with doctors regardless of previous

or long-term care centres or childcare institutions. This short subsection discusses some challenges and potential policy solutions for providing access to social and health services. Other essential public services include access to education and training, public transport, digital infrastructure, culture and other amenities.

contact. Germany implemented a series of measures to support the integration of medical apps and improve infrastructure.

125. Mobile services can be another way of delivering services in rural areas in a cost-effective way. Mobile clinics and testing facilities that make scheduled visits to rural and remote communities can bridge gaps in service provision even for relatively immobile populations, including the elderly (OECD, 2021[86]). Such services can also help overcome shortages of skilled professionals as service providers can exploit the scale economies of larger hubs, driving out into rural areas only periodically. PES have been using mobile outreach services to provide employment support, including career guidance. This can help improve outreach notably to jobseekers with weaker links to the labour market or their broader community, including low-skilled adults and the long-term unemployed.

126. Better integrating service delivery, notably by offering different types of related services in a single location, can help broaden access, reduce costs and improve outcomes for underserved communities. In France, a network of over 1 000 Public Service Houses (*Maisons de Service au Public)* initiative delivers public services in low-density or isolated territories through one-stop-shops, lowing fixed costs and staff needs for the different services. Their offer ranges from postal services, public transport ticketing, energy utilities, unemployment insurance and welfare services (OECD, 2021[86]). In Japan, the *Small Stations* initiative creates basic service hubs to help sustain rural communities around small, multi-functional cores. Their offer includes administrative services, health care and shopping opportunities – transport networks are arranged to facilitate access to the population of the surrounding rural areas (OECD, 2016[90]). Norway integrated, from 2006, its employment and social service delivery, creating a network of one-stop NAV offices that provide users with employment, income, social and housing support, and often other municipal services (OECD, 2018[91]). Delivering different services under the same roof can be particularly beneficial where vulnerable population groups are geographically concentrated. In Finland, municipalities have streamlined service delivery to immigrants in communities with a high share of foreign-born population in multi-service centres, with good results. In these centres, PES collaborate with municipal services to help foreign-born jobseekers find employment or help them enrol in education (OECD, 2020[92]).

Creating good-quality care jobs and attracting skilled professionals

127. Improving the appeal of care professions, and attracting skilled workers into these professions, will be essential to ensure good access to public services across territories. Many OECD countries have been experiencing larger staff shortages in the care sector that have created obstacles to service access and undermined quality in certain places, a challenge that will intensify in the coming years. The low attractiveness of care professions have made it difficult to attract and retain skilled care professionals. Meanwhile, labour demand has been increasing as the share of elderly people is growing and as child care participation rates rise (OECD, 2019[93]; OECD, 2020[84]). Rural areas have been particularly affected. On the one hand, job creation in the care sector is less geographically concentrated than, for example, in technical or business occupations, with many jobs being created outside of metropolitan areas (OECD, 2020[62]). On the other hand, working in rural regions can be less attractive particularly for highly qualified professionals from professional or personal perspective (OECD, 2016[89]). Several EU member states have reported acute shortages of medical practitioners in rural regions and in Australia the unequal distribution of professionals between metropolitan and rural/remote areas is one of the biggest workforce challenges (OECD, 2020[32]).

128. The primary focus when addressing this challenge must clearly lie on attracting, and retaining, more qualified staff in care professions more broadly. This will require first and foremost improving the attractiveness and working conditions in these professions, including working hours, pay, job security and access to training. Better coverage of care professionals through collective agreements can improve worker bargaining power and raise job quality, as the example of long-term care workers in the Netherlands shows (OECD, 2021[94]). Evidence from France and the United States suggests that wage increases in

long-term care are indeed associated with greater recruitment of workers and lower turnover (OECD, 2020[84]). Since the public sector is often the largest employer of care professionals, meaningful progress in this area may require increases in public social expenditures.

129. Specific support for workers interested in moving into the care sector can also be part of the solution, for example in form of career guidance and training. Japan has sponsored basic training programmes for new students and experienced workers willing to return to the field. These initiatives were associated with an increase in the number of long-term care workers of around 20% between 2011 and 2015. In the Netherlands, regional agencies ran campaigns to improve the public image of long-term care, providing students with short lectures and training sessions on regional labour market needs. In Portugal municipalities supported regional employers' organisations, educators and care providers in creating local programmes that promote a positive image of the long-term care workforce.

130. Additional incentives – financial or otherwise – can then help encourage professionals to take up work in underserved locations (OECD, 2016[89]). This can take the form of special scholarships for obtaining certain qualifications and could be combined with return-of-service obligations, one-off payments for those moving to underserved areas and to support their installation, or recurrent bonuses. In Australia, a country where the issue is particularly acute, the Workforce Incentive Program, implemented in early 2020, provides targeted financial incentives to doctors and general practitioners to encourage service delivery in rural and remote areas. Financial incentives are linked to both the level of remoteness and the years of service provided. In the most remote areas, doctors are eligible for an annual payment of up to AUD 60 000, about EUR 40 000. But relocation packages can go beyond direct financial incentives and include rewards through better career prospects and skill development. (OECD, 2021[86]) The French Ministry of Health and Social Affairs launched the Health Territory Pact to promote the recruitment and retention of doctors in underserved areas. This pact includes a wide mix of measures including financial incentives, the creation of new multidisciplinary medical homes allowing physicians and other health professionals to work in the same location, the promotion of telemedicine and a sharing of responsibilities with other local health care providers.

131. Places have to offer more than employment opportunities to attract and retain skilled workforce. Attractiveness is broadly defined as the factors that people generally value about their local neighbourhood, town or city. These not only include social services, but cultural activities, parks as well as good-quality open spaces and a vibrant community life (OECD, 2021[80]). Enhancing regional attractiveness hence requires an integrated and long-term approach to improving services, local infrastructure and amenities, housing choices and opportunities for social participation. Northern Japan intends to attract self-employed urban workers. Using a grant from the Ministry of Internal Affairs, Shari City has spent about four million Japanese Yen to transform its legal affairs office into a teleworking space with rooms for telecommuters. In 2018, more than 20 companies sent employees to work in Shari. Teleworkers can use the facility's free Wi-Fi and teleconferencing system to link up with their corporate headquarters in Tokyo and elsewhere. Shari is located only a 30-minute drive from the Utoro hot springs area offering a wide range of outdoors activities and emphasizes its proximity to nature in order to attract more remote workers.

7. Conclusions and next steps

132. This paper summarises results from the first two years of the geographic income inequalities project, which has so far compiled administrative data on median incomes and inequality at regional and/or local level for 19 OECD countries.

133. The data analysis has documented substantial regional disparities in median income levels and inequality. While the disparities are naturally larger at municipal than at regional level, high local-level variation usually reflects a few outliers, i.e. municipalities with very high income or inequality levels. These

regional differences partly reflect urban-rural disparities across regions: metropolitan small regions are strongly overrepresented in the top quartile of regions with the highest median incomes and levels of inequality. Similarly, municipalities in functional urban areas, particularly in large ones, have high median incomes and are often very unequal. However, the analysis also documented considerable disparities *among* metropolitan (and non-metropolitan) small regions.

134. Time series data on regional income disparities points to regional convergence in median incomes, though these results rely on a smaller number of countries. Among countries for which time series data are available, a majority have experienced a decline in median income disparities across small regions. This seems to reflect – at least in part – more sluggish income growth in (high-income) metropolitan than in (lower-income) non-metropolitan small regions. Similarly, municipalities that are part of functional urban areas have on average experienced slower income growth than those outside of functional urban areas. A similar convergence pattern can be observed for inequality levels. In a majority of countries, income inequality within small regions has declined, and metropolitan regions have experienced a stronger decline relative to non-metropolitan regions. By contrast, local-level results point to a relative *increase* in inequality for municipalities in functional urban areas – an aspect that may deserve further analysis.

135. Overall, this work has highlighted the enormous potential of exploiting administrative income data for studying income inequalities at regional and local level. However, a limitation to keep in mind is that these register-based data are much less suited for cross-country comparisons of income levels or inequalities than survey data because of differences in the data structure, income sources covered, and reference populations.

136. Several elements of the analysis presented in this paper call for additional analysis and discussion, some which will make it into future revisions of this paper. This concerns notably:

- ***further analysis and discussion of the relationship between the measured geographic disparities in incomes and inequalities in GDP per capita;***
- ***the importance of geographic differences in consumer prices,*** including the cost of housing, as a potential mitigator of regional income disparities. Some exploratory work on this topic has already been carried out using available U.S. regional price data.
- ***the role of taxes and transfers in mitigating cross-regional inequalities***, which could still be studied using available, but so far unexploited, administrative micro-data for Estonia, France or the Netherlands.
- ***a more comprehensive and detailed discussion of policies to manage or mitigate regional inequalities,*** notably on the role of labour market institutions, redistributive policy, and fiscal equivalisation.

137. Future versions of this paper will also include results for additional countries for which suitable microdata existing, including Colombia, Chile, Estonia, France and the Netherlands.

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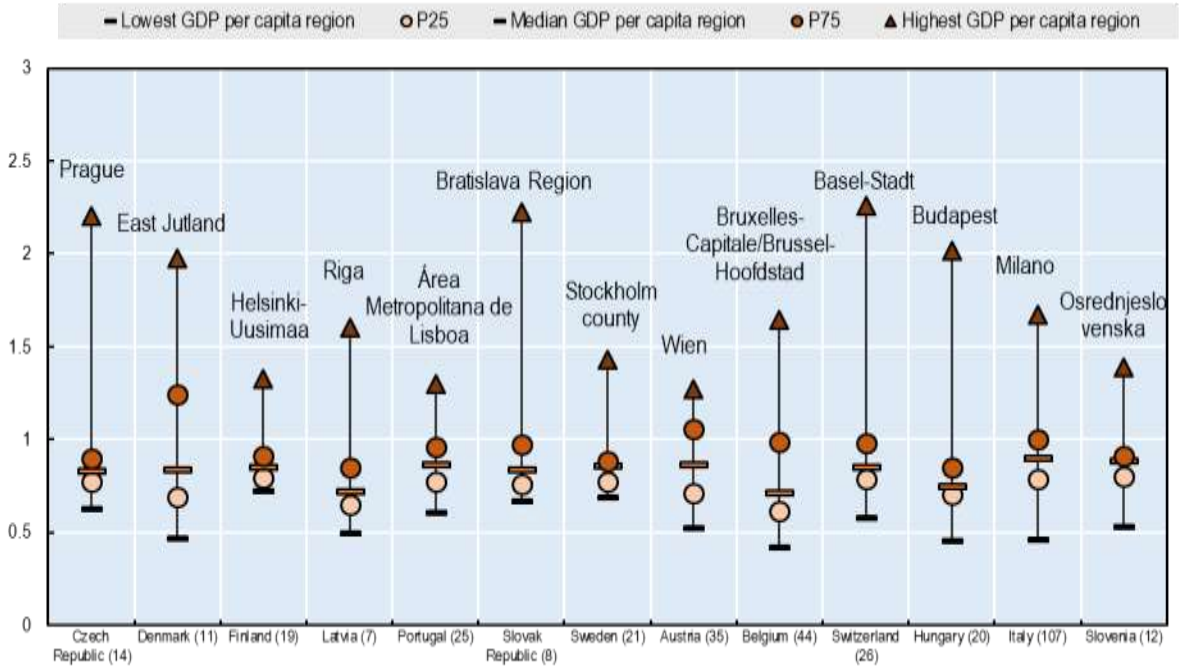
Annex A. Additional statistics on regional inequalities

Figure A A.1. Regional variation in GDP per capita in countries with available data

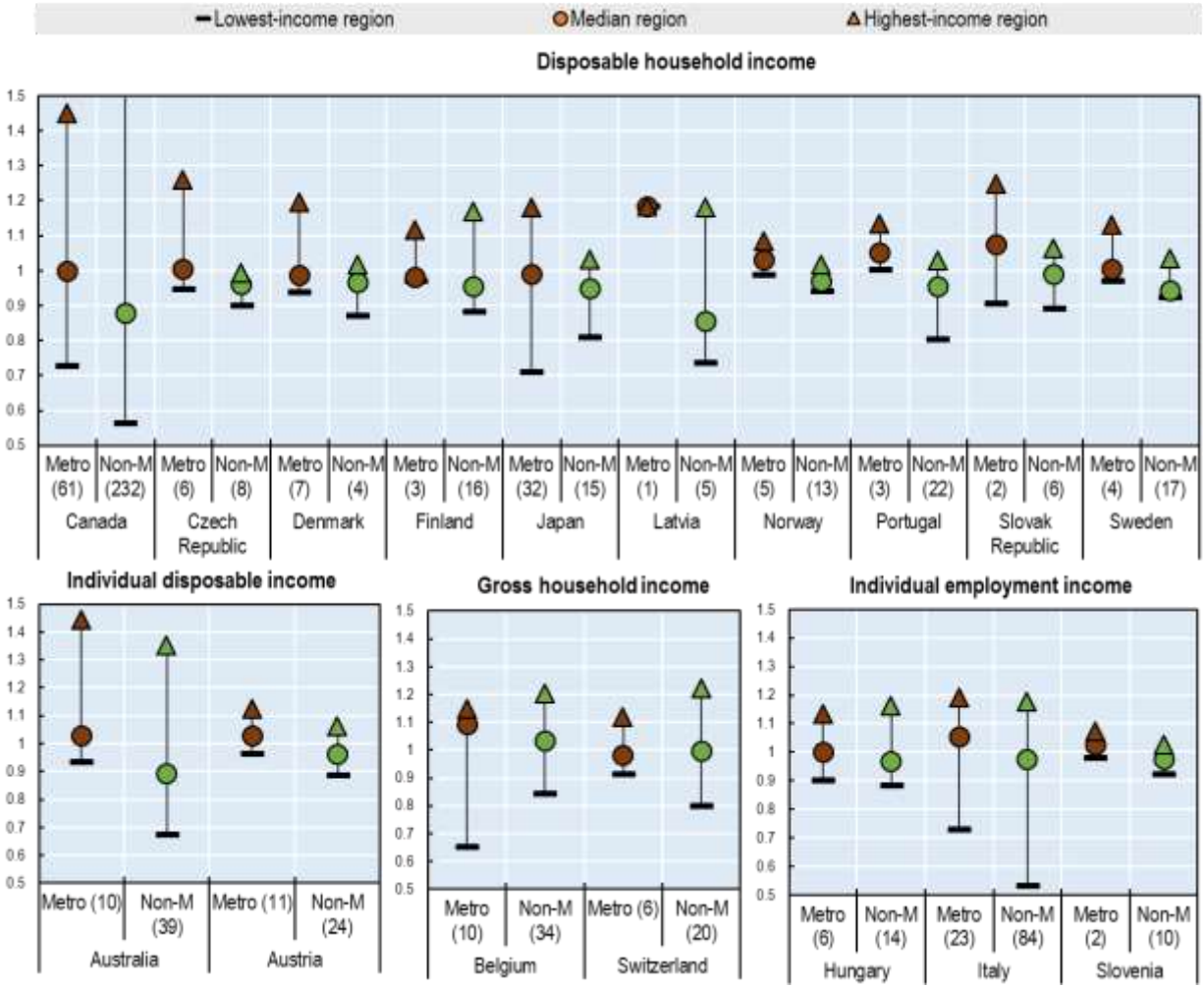
Regional GDP per capita expressed relative to the national GDP per capita value, small (TL3) regions, years matching the latest income data



Note: Years match the latest year of income data as described in Table 1 except for Finland and Latvia (both 2019 instead of 2020)
Source: OECD Territorial Database.

Figure A A.2. Decomposition of small (TL3) region's median incomes by access to metropolitan area

Regional median incomes for high- and low-income regions, small (TL3) regions divided into metropolitan and non-metropolitan regions, 2018/19 or latest year



Note: "P25" and "P75" give the median income for the regions at the 25th and 75th percentile of the distribution of regional inequality. Breakdown follows OECD's metropolitan, non-metropolitan typology, Number of TL3 regions listed in brackets behind the country name.
Source: OECD calculations using statistics drawn from national tax record data, see in Table 1.

Annex B. Technical details of the Theil decomposition

138. Following the derivations in Paredes, Iturra and Lufin (2014, p. 776[41])[21], the four components of the Theil Index in Section 4.5. , $T_i = T_{Wr} + T_{Br} + T_{Bu} + T_{BR}$, can be spelled out as follows: the *within*-small-region component, T_{Wr}, is given as

$$T_{Wr} = \sum_R \sum_u \sum_r \left(\frac{Y_{Rur}}{Y}\right) T_{Rr},$$

where T_{Rr} is the Theil Index measuring *within*-small-region income inequality for region *r* in large region *R*, given as

$$T_{Rr} = \sum_i \left(\frac{y_{Ruri}}{Y_{Rur}}\right) ln\left(\frac{y_{Ruri}/Y_{Rur}}{n_{Ruri}/N_{Rur}}\right).$$

This indicator needs to be calculated from the micro data.

139. The *between*-small-region component, T_{Br}, and along the urban-rural spectrum, T_{Bu}, are calculated as

$$T_{Br} = \sum_R \sum_u \left(\frac{Y_{Ru}}{Y}\right) T_{rR}$$

and

$$T_{Bu} = \sum_R \left(\frac{Y_R}{Y}\right) T_{uR},$$

where, T_{rR} is the Theil Index measuring income inequality across small regions *r* in large region *R*, and T_{rR} measures income inequality along the urban-rural classification *u* in large region *R*. The *between* component across large regions, T_{BR}, is given as

$$T_{BR} = \sum_R \left(\frac{Y_R}{Y}\right) ln\left(\frac{Y_R/Y}{n_R/N}\right).$$

All of those three *between* components can be calculated using only data on the total incomes and population shares of the respective nested regional units.

[21] The derivations in Paredes, Iturra and Lufin (2014[41]) contain a few errors that have been corrected here.