# Job Creation and Local Economic Development 2018

## PREPARING FOR THE FUTURE OF WORK

OECD

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**Please cite this publication as:**
OECD (2018), *Job Creation and Local Economic Development 2018: Preparing for the Future of Work*, OECD Publishing, Paris.
*https://doi.org/10.1787/9789264305342-en*

ISBN 978-92-64-30533-5 (print)
ISBN 978-92-64-30534-2 (pdf)

Annual: Job Creation and Local Economic Development
ISSN 2617-4960 (print)
ISSN 2617-4979 (online)

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# *Preface*

The nature of work is rapidly changing. Technological progress and automation represent an opportunity to boost labour productivity and create flexible working conditions that better suit worker needs in all places—from cities to rural areas. There are, however, mounting concerns about how many and what kinds of jobs will be available in the future. Another growing source of concern is whether the future of work will exacerbate inequalities between people and across places.

Indeed, the challenges and opportunities generated by greater use of technology in the workplace are not equally distributed across places. Within the same country, some regions will be more exposed than others to the risk of job automation because of their economic structure and the skills of their workers. Meanwhile, many new jobs will be created – the question is what types of jobs will become available and where.

These geographical differences have crucial implications for the design of policies to facilitate a smooth transition towards an increasingly automated and digitalised economy. How can national strategies adapt to local-specific challenges? How can local strategies support national efforts? Policy makers will be tasked with anticipating, facilitating and responding to change, taking into account the characteristics of workers, occupations and industry in various locations.

This third edition of *Job Creation and Local Economic Development* addresses these issues and concerns. Drawing on new occupational data at subnational level, it examines the geographical distribution of jobs at risk of automation and the rise of non-standard work within countries. Furthermore, it provides insights into the relationship between productivity and inclusion at subnational scale, offering policy guidance on how to help disadvantaged groups to succeed in the labour market. In this respect, local communities are well placed to work with business to understand their skills needs and implement policies that facilitate workers' adaptation to the changing nature of work.

I am confident that this report will serve as a guide for policy makers and practitioners to navigate the changes in labour markets and provide their constituencies with policies ready for the challenges and opportunities. It is a new tool in their toolkit for addressing some of the major changes of our times.

Lamia Kamal-Chaoui
Director
Centre for Entrepreneurship, SMEs, Regions and Cities, OECD

# *Foreword*

Four years since the first edition of *Job Creation and Local Economic Development,* the creation of better quality jobs remains a top concern among OECD countries. The first edition focused on how policy makers can set the framework for local job creation, while the second edition examined policies to boost skills development and entrepreneurship at the local level. This third edition looks ahead and examines the changing nature of work and the necessary steps to prepare workers for the future of work. It sheds light on widening spatial gaps within countries in terms of job creation and the education and skills of workers, as well as the need for more effective programmes to ensure labour market inclusion of vulnerable groups.

Drawing on new data on the occupation of workers, the report examines the geographical distribution of the risk of automation and whether jobs lost to automation are compensated by the creation of jobs in occupations at lower risk of automation. The same data are used to investigate the rise of non-standard work such as temporary employment, part-time employment and "false" self-employment. More flexible working conditions represent an opportunity to increase firm efficiency as well as worker well-being, but there is also a risk of decreasing job quality—and growing job insecurity. The report looks at the main determinants of temporary jobs at subnational scale, as well as changes in the "nature" of self-employment, in order to help policymakers devise evidence-based policies to address these concerns.

As technological progress and automation intensify, challenges for inclusion in particular places will become even more important to address. The report explores the nexus between productivity and inclusiveness at regional and city level, and then considers tailored policies and programmes that address the concern of particular disadvantaged groups, such as Indigenous People, and the under-utilised potential of the social economy to foster inclusion.

The second part of the report features individual country profiles, which provide an overview of regional labour markets in OECD countries and, among other data, an assessment of employment growth in terms of risk of automation.

This work is part of the Programme of Work the OECD Local Economic and Employment Development (LEED) Programme. The main findings of the report as well as an early version of the report were discussed at the 73rd session of the LEED Directing Committee meeting on 17-18 May 2018. The final report was approved by written procedure on 1st August 2018 [CFE/LEED(2018)5/REV1; CFE/LEED(2018)6/REV1; CFE/LEED(2018)7/REV1].

# *Acknowledgements*

This report was produced in the OECD Centre for Entrepreneurship, SMEs, Regions and Cities (CFE), led by Lamia Kamal-Chaoui, Director, and as part of the programme of work of the Local Economic and Employment Development (LEED) Programme.

The OECD would like to thank the delegates to the LEED Directing Committee for their guidance, input and feedback. Particular thanks go to the Directing Committee's steering group for this publication, which was composed by the following LEED delegates: Ann Van Den Cruyce (chair of the sub-group), Head of the Employment and Competences Division, Department of Work and Social Economy (Flanders, Belgium); Andrew Paterson, Deputy Director, Business and Local Growth Analysis, Department for Business, Energy and Industrial Strategy (UK); György Nagyházi, Councellor, Planning and Programming, Ministry of National Development (HUN); Herman Przemyslaw, Head of Unit, Department of Evaluation, Ministry of Development (POL); and Marcus Rigg, Advisor, Permanent Delegation of Australia to the OECD (AUS).

The report was co-ordinated by David Bartolini, Senior Economist, and prepared by Jonathan Barr, David Bartolini, David Halabisky, Beatriz Jambrina Canseco, Karen Maguire, Antonella Noya, and Abel Schumann. The work was supervised by Sylvain Giguère, Head of the Local Employment, Skills and Social Innovation Division (CFE), and Rudiger Ahrend, Head of the Economic Analysis, Statistics, and Multilevel Governance Section (CFE). Joaquim Oliveira Martins, Deputy Director, and Karen Maguire, Senior Counsellor, provided overall guidance and comments. Special thanks are also due to Lou Aisenberg, Stefano Barbieri and Lindsey Ricker who also drafted inputs to the report, and to Estefania Mujica Prado, who supported production of the country profiles. Janine Treves provided editorial support and Pilar Philip co-ordinated the publication process.

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# *Reader's guide*

This publication consists of two main parts. Part I contains three thematic chapters focusing on the regional and local dimension of job automation, non-standard work, and inclusion in labour markets.

Part II consists of 36 country profiles which provide an overview of regional and local labour markets as well as, for 21 of these countries, an analysis of jobs at risk of automation based on the methodology developed in chapter 1. Data are presented for members of the LEED Directing Committee and other OECD countries for which relevant data were available at date of publication. More detailed information about the methodology for the country profiles is available in the overview of the country profiles.

According to data availability for regional and local labour market indicators, the analysis in most of the chapters is conducted at the OECD Territorial Level 2 (TL2). Whenever possible also the OECD Territorial Level 3 (TL3) is considered.

Regions are classified by the OECD into two territorial levels that reflect the administrative organisation of countries. OECD's large regions (TL2) represent the first administrative tier of subnational government, such as the region of Veneto in Italy. OECD small (TL3) regions are contained within a TL2 region. For example, the TL2 region of Castilla-LaMancha in Spain encompasses five TL3 regions: Ciudad, Real, Guadalajara, Toledo and Albacete. In most cases, TL3 regions correspond to administrative regions, with the exception of Australia, Canada, Germany and the United States.

## Abbreviations and acronyms

| | |
|---|---|
| AFB | Away From Base mixed-mode program |
| AI | Artificial Intelligence |
| ASETS | Aboriginal Skills and Employment Training Strategy |
| CAHRD | Centre for Aboriginal Human Resources Development |
| CDP | Community Development Programme |
| CEDS | Comprehensive Economic Development Strategy |
| EESC | European Economic and Social Committee |
| EPI | Employment Parity Initiative |
| EQI | European Quality of government Index |
| ESUS | Solidarity Enterprise with Social Utility (Entreprise solidaire d'utilité sociale) |
| EU | European Union |
| GDP | Gross Domestic Value |
| GVA | Gross Value Added |
| IAS | Indigenous Advancement Strategy |
| ICI | Inclusiveness Composite Indicator |
| ILO | International Labour Organization |
| ISCED | International Standard Classification of Education |
| ISCO | International Standard Classification of Occupations |
| ISETS | Indigenous Skills and Employment Training Strategy |
| LEED | Local Economic and Employment Development |
| NAV | Norwegian Labour and Welfare Administration |
| NEET | Not in Education, Employment or Training |
| NGO | Non-Governmental Organization |
| NSW | Non-Standard Work |
| O*NET | Occupational Information Network |
| PCA | Principal Component Analysis |
| PES | Public Employment Services |
| PIAAC | Programme for the International Assessment of Adult Competencies |
| PRODACADIST | Distance Training Program for Workers (Programa de Capacitación a Distancia para Trabajadores) |
| SE | Social Enterprise |
| SEO | Social Economy Organisation |
| SNA | System of National Accounts |
| STAR | Danish Agency for Labour Market and Recruitment (Styrelsen for Arbejdsmarked og Rekruttering) |
| TL2 | Territorial Level 2 |
| TL3 | Territorial Level 3 |
| VDAB | Public Employment Service of Flanders (Belgium) |
| VTEC | Vocational Training and Employment Centres |
| WISE | Work Integration Social Enterprises |

# *Executive Summary*

Technological innovations such as automation and digitalisation drive productivity growth, increase revenues, generate new jobs and thus can contribute to better living standards. But will this new future of work bridge or increase divides among people? Which workers will be replaced by robots and artificial intelligence? How can workers adapt and take advantage of technology? And, how will these changes occur in different places?

This report shows that geography matters for the future of work. The risk of job automation is higher in some areas than others. Non-standard employment arrangements, facilitated by technology, also show striking differences within countries and they influence opportunities for access to quality employment. National policies aligned with actions by regional and local governments can help promote productivity-enhancing automation and digitalisation that does not come at the cost of less inclusion.

## The impact of automation on jobs will be uneven across OECD regions and local communities

The geographic distribution of occupations at high risk of automation varies over ninefold across regions in 21 OECD countries. While there are notable shares of jobs at some risk of automation in all regions, the share of jobs at high risk reaches nearly 40% in some regions (for example, West Slovakia) but can be as low as around 4% in others (region around Oslo). Within countries, the share of jobs at high risk of automation varies. Between the best and worst performing regions in Canada, that share differs by just 1 percentage point, but it reaches 12 percentage points in Spain.

The good news is that since 2011, most regions (60%) have been able to create more jobs at lower risk of automation than those jobs lost in high automation risk sectors. Regions with a lower share of jobs at risk of automation are those that have highly educated workers, a strong tradable services sector and are highly urbanised. Regions that already have low productivity growth and high unemployment are more likely to be further affected by automation in the future, thus exacerbating their underperformance traps. Policy makers are therefore faced with difficult trade-offs between the need to foster automation to increase productivity and the need to manage short or medium-term employment losses from automation.

The uneven impact of automation across regions can potentially widen inequalities in employment conditions across places. To address this divide, policy should consider both worker skills and firm upgrading. Training and reskilling programmes can target people in jobs at high risk of automation, such as food preparation assistants or truck drivers, among others. Engaging employers in skills development is important in identifying the set of skills required for the local labour market. Policies that facilitate the transition to new economic activities with higher value added, particularly in regions relying on high

automation risk sectors, are also essential. Creating a business environment conducive to investment in sustainable production processes supports these transitions.

## Non-standard work is also rising unevenly and precariously

Technological changes in the nature of work may also be contributing to the increases in temporary and part-time work in most OECD countries. Again, policies need to consider the within-country differences. For instance, in Greece the share of non-standard jobs grew by 7% in one region but declined by 11% in another from 2010-16.

Temporary work is more frequent among female, young, or low-educated workers, but the characteristics of the local economy are also determinant. For low-skilled workers, the likelihood of being employed with a temporary contract is higher in rural areas than in cities. Regions with a smaller tradable sector tend to employ more workers in temporary contracts. In other words, regions that are already worse off economically tend to see a larger share of jobs in non-standard forms.

While overall the proportion of workers who are self-employed has remained stable in recent years, the share of self-employed workers without employees continues to grow. One contributing factor is the increase in part-time self-employment—which occurred in 25 out of 31 OECD countries during the last decade. The regional differences in the share of jobs in self-employment can vary by 10 percentage points or more in several countries. The digitalisation of the economy, notably its "gig" features, has played a role here. It has contributed to precarious forms of self-employment, with less or no social security coverage. Policies combatting the negative implications of precarious self-employment as well those that improve the business environment locally are important.

## Yet productivity and inclusiveness can go hand-in-hand

While technology tends to increase labour productivity for many jobs, some groups may find themselves increasingly excluded from the labour market or stuck in unemployment, low-wage jobs or non-standard work. Policies to integrate disadvantaged groups – such as the long-term unemployed, people with disabilities, and migrants – will be critical for social cohesion and to address inequalities.

Among OECD regions, higher levels of productivity and higher rates of inclusion actually tend to go hand in hand. However, within the same country and for the same level of productivity, some regions appear to be more inclusive than others.

Around 30% of the OECD population is living in regions that have successfully improved both productivity and inclusion (defined as the labour force participation rate) since 2006. But around half of OECD residents are in regions where productivity growth was accompanied by less inclusion. European cities have overall been more effective than cities in the Americas in increasing both productivity and inclusion. Considering a wider range of employment, skill and income variables for a composite indicator of inclusion, similar regional trends are found.

Many areas of policy contribute to both productivity and inclusion, from labour to innovation to transport policy. The evidence reinforces the importance of locally tailored responses across policy areas. This report highlights that labour market inclusion of vulnerable communities and disadvantaged groups can be strengthened by providing pre-employment skills and training, involving the target group in programme design and

delivery, and embedding these efforts in community-led development. An example of policy efforts for Indigenous communities is examined.

The social economy can be a complementary pillar to these policies, because it frequently targets the employment of disadvantaged individuals. Supporting social enterprises through better framework regulations, access to mainstream financing (including guarantees), and tailored business support are some of the ways to boost the social economy. Social economy organisations further benefit from public sector support through public procurement, employment subsidies and longer-term funding cycles.

# Part I. Thematic chapters

# Chapter 1. The local dimension of job automation

*This chapter discusses job automation at the regional level and provides policy recommendations on how to respond to automation. It provides estimates for the risk of automation at the regional level and analyses the factors that are related to this risk. While a significant share of jobs is at risk of automation in all regions, the number varies strongly across countries as well as across regions within countries. Regions with a low share of jobs have a high share of workers with tertiary education, a strong service sector and a large share of urban population.*

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

**Box 1.1. Key messages**

**Disparities across local labour markets are increasing**

- Technological progress and globalisation have an uneven impact across local labour markets. Within the same country, some places are able to take advantage of new technologies and greater integration into global markets, thereby attracting firms and workers, while other areas struggle to grow.
- Disparities within countries have increased in terms of the number and quality of new jobs created, unemployment, as well as the educational attainment of the labour force. For example in Turkey, unemployment rates between the best and worst performing regions vary by more than 20 percentage points. Across the OECD, capital regions created 18.1% of all new jobs even though they make up roughly 1% of the number of all regions.
- Demographic disparities are also increasing. More than half of all OECD regions experienced a decline in working age population from 2010 to 2016. Urban areas continue to attract young and educated workers at the expense of rural areas.
- The increasing within-country disparities and the changing nature of work require a flexible and tailored policy response at the local level. Strong policy coordination and complementarities within the management and implementation of employment and skills policies can contribute to the creation of quality jobs.

**The uneven impact of automation**

- Some jobs are more at risk from automation than others. The geographic distribution of these jobs varies across the OECD. The share of jobs at risk of automation is highest in the West Slovakia region (39%) and lowest in the Oslo and Akershus region (4%) in Norway.
- The magnitude of differences across regions within a country varies, too. Whereas the difference in jobs at risk of automation between the best and worst performing region in Canada is just 1 percentage point, it is 12 percentage points in Spain.
- Regions with smaller risk of automation are characterised by a larger share of workers with tertiary education, a larger proportion of jobs in services, and are highly urbanised.
- From 2011 to 2016, just over half of OECD regions reduced the number of jobs at risk of automation; in the rest of OECD regions, the number of jobs at risk of automation has increased.
- The share of jobs in occupations with a high risk of automation is declining in most regions, whereas the share of jobs at low risk of automation is increasing. This indicates that automation is taking place and easily automatable jobs are being lost. However, in 60% of regions, job creation in occupations at low risk of automation outweighed job losses in occupations at high risk of automation between 2011 and 2016.

- Regions that currently have low productivity growth are likely to be more affected by automation. These regions also tend to have relatively high unemployment rates. This creates a dilemma for policy makers who have to balance the need to foster automation to increase productivity with the need to prevent short-term job losses from automation.
- To address the risk of automation at the regional and local level, training and education of the workforce is essential. However, complementary policies are needed, too. Firms should be encouraged to upgrade their production processes to reduce the risk of automation for a given occupation. Furthermore, the growth of economic sectors with a low risk of automation should be supported. To do this effectively, policy makers need to tailor policies to regional and local economic conditions.

## Introduction

Technological progress is rapidly changing the nature of work across the world. It creates new job opportunities and is benefitting consumers. It improves the quality of products while reducing their price and leads to new and innovative products. However, technological progress also threatens established business models and can lead to job losses because it allows the automation of tasks that previously had to be done by manual labour.

Automation has been occurring for centuries. The steam engine is a prominent early example of a technology that saved labour on a massive scale. This labour saving element of technological progress has historically led to fears of 'technological unemployment' (Keynes, 1930). Despite these fears, technological innovations have always given rise to new jobs that provided employment, while the productivity growth from automation has been the most important driver of rising living standards.

Yet, it would be wrong to argue that automation does not pose challenges. In particular, two issues stand out. First, the labour saving effects of automation can be sudden, whereas it might take considerable time until new jobs are created that replace the lost jobs. Second, the skill profiles of jobs that are lost due to automation and the skill profiles of the jobs that replace them are not necessarily the same. Thus, automation can lead to temporary, but possibly prolonged, increases in unemployment. Furthermore, the changing demand for workers with particular skills affects wage levels. It causes permanent gains or losses for some groups of workers

The consequences of sudden and large-scale automation have become the centre of attention in recent years because of new developments in the field of so-called artificial intelligence. New algorithms in combination with the increasing processing power of computers have made it possible for machines to take care of tasks that until now only humans could do. This has raised the spectre that specific functions, which have been impossible to automate until now, could be done by machines instead of people in the future. Importantly, this also affects high-skilled jobs that were in the past largely shielded from automation. While it is impossible to predict precisely how many jobs will be automated in coming years, this report shows that many jobs are threatened by automation.

The impact of automation on regional and local labour markets depends on the characteristics of the local economy; it is therefore asymmetric across places within countries. The geographic dimension of automation has important implications for policy makers trying to design policies that ensure the availability of good quality jobs. When faced with the choice between one-size-fits-all and place-based policies, a series of questions arise. First, as automation gains pace, will jobs disappear evenly across a country or will job losses be concentrated in just a few regions? Second, if job losses are unevenly distributed, what determines which regions will suffer from losses while others thrive? Third, what are the occupations where jobs will be lost or gained? And, finally, how can policies be adapted to meet the individual challenges that each region faces? The analysis conducted in this chapter will attempt to shed light on these questions.

Automation is a critical and perhaps the most important issue affecting labour markets in the near future. Yet, it is not the only change that will affect local employment. Other important trends such as demographic change, increasing international and domestic migration and developments related to international trade also have important implications for local labour markets. The full impact of automation can only be understood in the context of these developments. For example, automation may be considered much more of an opportunity in a place that has an aging population and faces a shortage of workers than in a place that has a high birth rate with many young people entering the labour market in search of jobs.

The chapter is structured as follows. To set the scene, it will start out by describing the most important of these overarching trends and how they affect local labour markets. Subsequently, the chapter will discuss automation within this broader context. It will discuss the implications of automation for different groups of regions. It will provide estimates on the share of jobs at risk of automation at the regional level and of the sectors that are affected by automation.

## Labour markets are changing across OECD countries

The financial crisis, which erupted in 2008, caused an exceptionally large drop in employment. In contrast to previous recessions, employment recovered only slowly (Figure 1.1) and employment levels only recently reached pre-crisis levels in many countries.

Average labour productivity growth has been in decline since the mid-2000s and labour productivity growth rates have fluctuated around 1% in recent years in major economies. The brief increase in productivity growth rates during the crisis in 2010 was the consequence of the drop in employment in 2009 and is not an indication of a structural change. The decline in labour productivity growth is a concern because labour productivity growth is the most important determinant of long-term economic growth. Without growing labour productivity, sustainable wage growth is impossible in the long term.

**Figure 1.1. Long-term trends in labour productivity growth and employment growth**

Employment and labour productivity (per hour worked), annual growth rates, G7 countries, 1971 - 2016, %


*Source*: Calculations based on OECD (2017), "GDP per capita and productivity growth", OECD Productivity.

StatLink https://doi.org/10.1787/888933824420

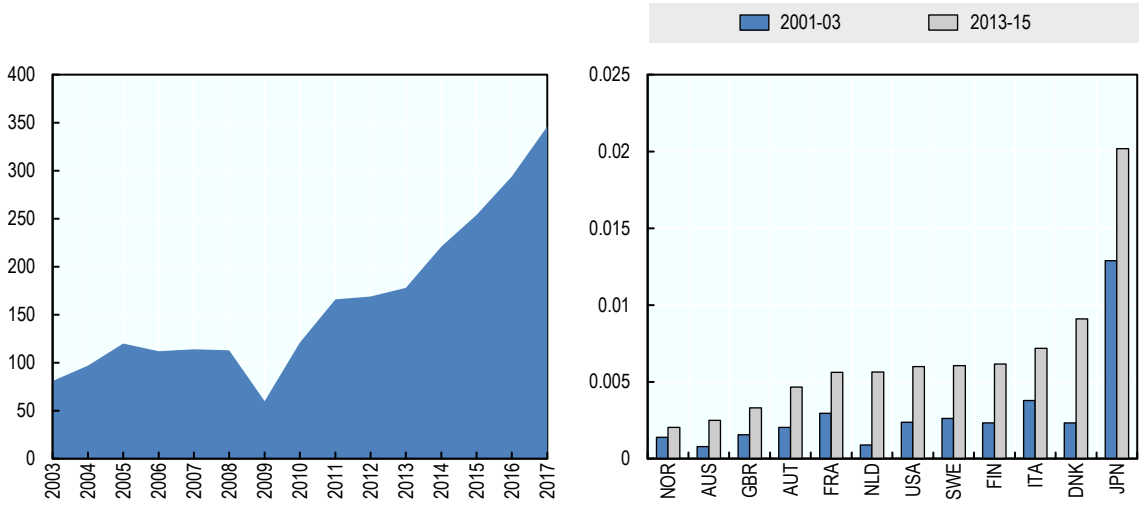
The decline in labour productivity has come despite an increase in digitalisation and automation. At the beginning of the century, 100 000 industrial robots were delivered each year across the world (World Robots, 2016). By 2016, the number of new industrial robots reached 300 000 annually (Figure 1.2, Panel A). This aggregate pattern is reflected in an increase in the use of robots in several OECD countries. In most OECD countries, the number of industrial robots per employee has doubled over the last 15 years (Figure 1.2, Panel B). Many economic models predict that increasing digitalisation and a growing use of industrial robots will lead to higher labour productivity growth. Why this is not the case is an important unresolved question in the economic debate.

Taken together, the slowdown in labour productivity growth and the increasing employment volatility point to the shifting nature of jobs. However, the way in which jobs will change is far from being universal. Some workers will benefit from new technology that makes their jobs more pleasant and leads to rising wages. Other workers will struggle to adapt to the new environment and will face job losses. Since prospective winners and losers are unevenly distributed within countries, some places will fare better than others.

**Figure 1.2. The use of industrial robots across the OECD**

Panel A. Worldwide annual supply of industrial robots (thousands)

Panel B. Number of robots per worker, all sectors, selected OECD countries




*Note*: In Panel A, 2017 figures are estimates. In Panel B, the initial period (in blue) refers to an average of the indicator between 2001 and 2003; the last period (in grey) refers to an average of the indicator between 2013 and 2015.
*Source*: IFR World Robotics 2017 and Calvino et al (2018), "A taxonomy of digital intensive sectors", OECD Science, Technology and Industry Working Papers, No. 2018/14, https://doi.org/10.1787/f404736a-en.

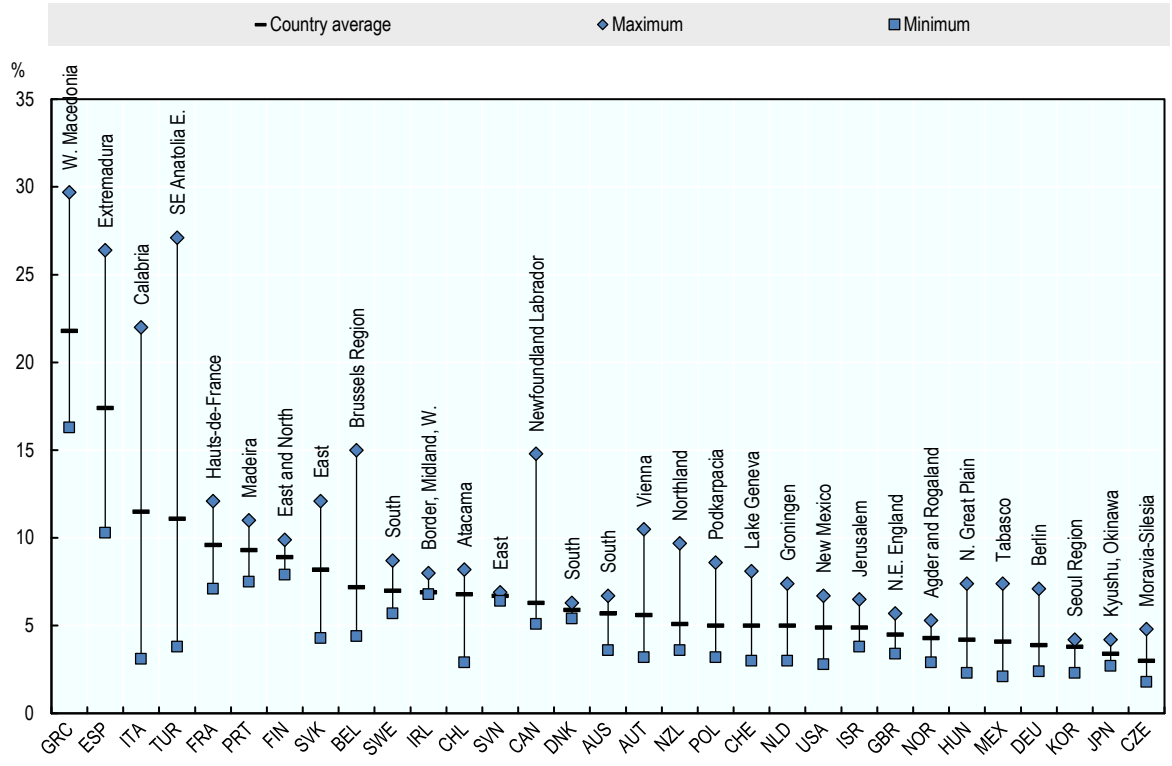
StatLink https://doi.org/10.1787/888933824439

### *Persistent and substantial differences in unemployment across regions within the same country*

Although national unemployment rates have mostly returned to the levels seen prior to the global financial crisis, large differences still remain within countries. National labour policies (e.g. training programmes, employment regulations, etc.) target people wherever they live and work, but job opportunities are not equally distributed across places. Regional disparities are largest in Turkey, Italy, Spain and Greece, where unemployment rates between the best and worst performing region vary by approximately 20 percentage points (Figure 1.3). In other countries, regional disparities are smaller but still around 5-10 percentage points. Naturally, smaller countries tend to have smaller regional disparities. However, some OECD countries prove that even large countries can have small inter-regional labour market disparities. For instance, Japan is the second largest OECD country by population, but has one of the smallest differences in unemployment rates between the best and worst performing regions.

**Figure 1.3. Large disparities in unemployment rate across OECD regions**

Unemployment rates, TL2 regions and country averages, 2017




*Note:* The top blue diamond represents the region with the highest unemployment rate, the bottom blue diamond corresponds to the region with the lowest unemployment rate in the country. The short horizontal bar is the national average. It is important to note that the figure reflects regional and not local disparities within countries. However, they can be interpreted as lower bounds for the variation across local labour markets, which is likely to be even higher than the variation shown in Figure 1.3 (see Box 1.3).
*Source*: Adapted from OECD (2018, forthcoming), Regions at a Glance 2018.

StatLink https://doi.org/10.1787/888933824458

**Box 1.2. The geographic scale of data used in this report**

Local labour markets vary in size and shape and often do not correspond to administrative boundaries. This makes it difficult to identify these markets and even more difficult to collect data for them. Even though various OECD member countries work on measuring local labour markets and on collecting data for them, internationally comparable data on local labour markets in particular, and on subnational regions in general, is still scarce.

The OECD collects subnational data at three geographic scales for regions that are designed to be internationally comparable in size. Data at a large regional scale is available at the so-called Territorial Level 2. TL2 regions typically have a population of several million inhabitants. Especially in larger OECD countries, they often correspond to the first level of subnational government. At a smaller regional scale, the OECD collects data at the Territorial Level 3 (TL3). TL3 regions, as defined by the OECD, typically cover several hundred thousand inhabitants. While TL3 regions were not designed to match local labour markets, many are suitable approximations of local labour markets. Lastly, the OECD collects data for metropolitan areas. Whereas TL2 and TL3 regions cover the entirety of a country, metropolitan areas cover only urban agglomerations with more than 500,000 inhabitants.

Generally, data availability is best for TL2 regions, followed by TL3 regions and lastly metropolitan areas. Whenever possible, this report uses data at the TL3 level to reflect its focus on local labour markets.

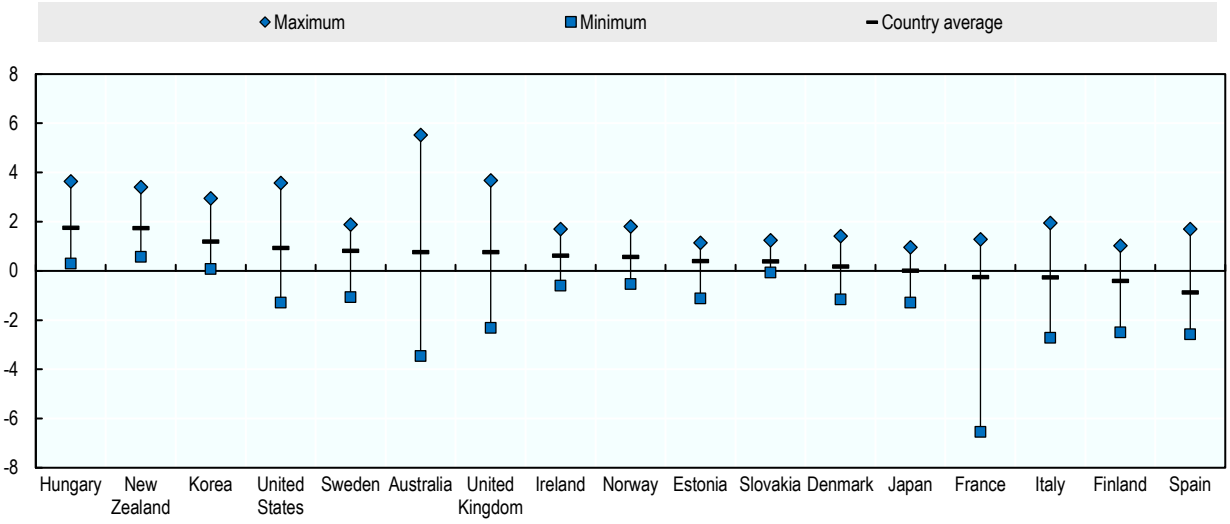
When data at the TL3 level is not available, the report uses TL2 data. In these instances, the data does not reflect local labour markets, but the regional variation that it reflects is indicative of the variation across local labour markets. For many analyses, the regional variation at the TL2 level within a country is a lower bound of the actual variation across local labour markets within the country. In these instances, the variation across local labour markets is at least as high as the variation across TL2 regions and most likely even higher.

Some places manage to take advantage of the changing economic environment. They attract firms and workers while others lag behind and struggle to grow. This is partly because of their existing industrial specialisation and the skills of the workforce that matches the needs of growing economic sectors. For example, many German regions that had a strong industrial base in the manufacturing of machinery managed to benefit from the rise of China's rapidly growing manufacturing sector by supplying the machines and tools for it. Other regions have advantages because of factors such as population density, geographical location or resource availability. Large cities for example are the preferred location for providers of knowledge-intensive services, which have become much more important compared with previous decades.

However, regional development is not a deterministic process that is driven by laws of nature. Even if some regions have more favourable conditions than others, the wide range of outcomes across regions with similar starting conditions shows that policy choices still play a crucial role in determining regional economic performance. Some regions manage to perform well despite difficult starting conditions, whereas others fail to capitalize on their initial advantages and fall behind.

**Figure 1.4. Small aggregate changes in employment growth mask larger changes at the local level**

Annual employment growth rate in TL3 regions, average over the period 2011-2016.




*Note*: Calculations refer to annual employment growth rates for the population aged 15 and older.
*Source*: OECD (2018), OECD Regional Statistics (database), http://dx.doi.org/10.1787/region-data-en.

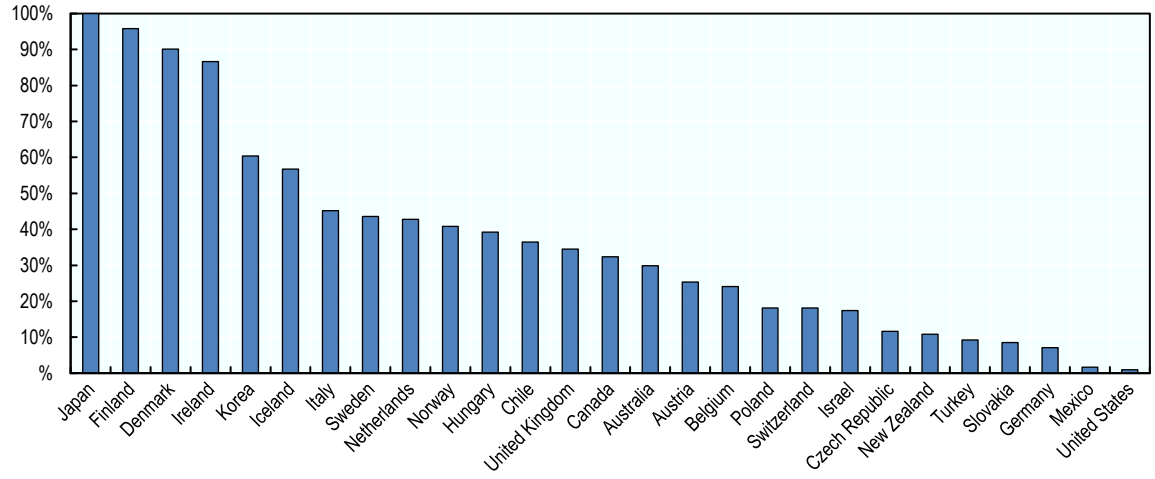
StatLink https://doi.org/10.1787/888933824477

These factors become apparent in the capacity of local economies to create jobs. In some countries, such as Spain, Australia or Italy, the average (aggregate) employment growth was close to zero over the 2011-16 period. Yet, some regions achieved substantial job creation, whereas others suffered significant declines. Figure 1.4 shows that there is often significant regional variation even in countries that see little change in aggregate employment at the national level.

Regional disparities in job creation are reflected in a more unequal distribution of jobs within countries. This implies that jobs are increasingly concentrated in just a few regions. Figure 1.5 shows that in many countries, capital regions were responsible for a substantial share of net job creation. Across the OECD, capital regions created 18.1% of all jobs even though they make up roughly 1% of the total number of regions. This phenomenon cannot be attributed to the global financial crisis that hit most OECD economies in 2007-08, as a similar trend is present also in the period leading up to the crisis.

**Figure 1.5. Job creation is largely concentrated in capital regions**

Share of net job creation in capital regions relative to total job creation, TL2 regions, 2006-2016 (%).




*Note*: Capital regions in Portugal, Spain and Slovenia lost jobs over the 2006-2016 period. Due to data availability, the values for Chile, Israel and Mexico cover the 2006-2014 period.
*Source*: Calculations based on OECD (2018), OECD Regional Statistics (database), http://dx.doi.org/10.1787/region-data-en.

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Globalisation had strong effects on labour markets in some sectors. The combined effects of greater integration into global value chains have accentuated the difference between firms and places that are able to compete globally and those that have struggled with this transition. For instance, in some regions the manufacturing sector benefited from increasing trade openness whereas it suffered in others. For example, regions in the Slovak Republic that have strong automotive clusters were among the beneficiaries of trade openness, whereas many regions across the OECD that had strong textile manufacturing lost out.

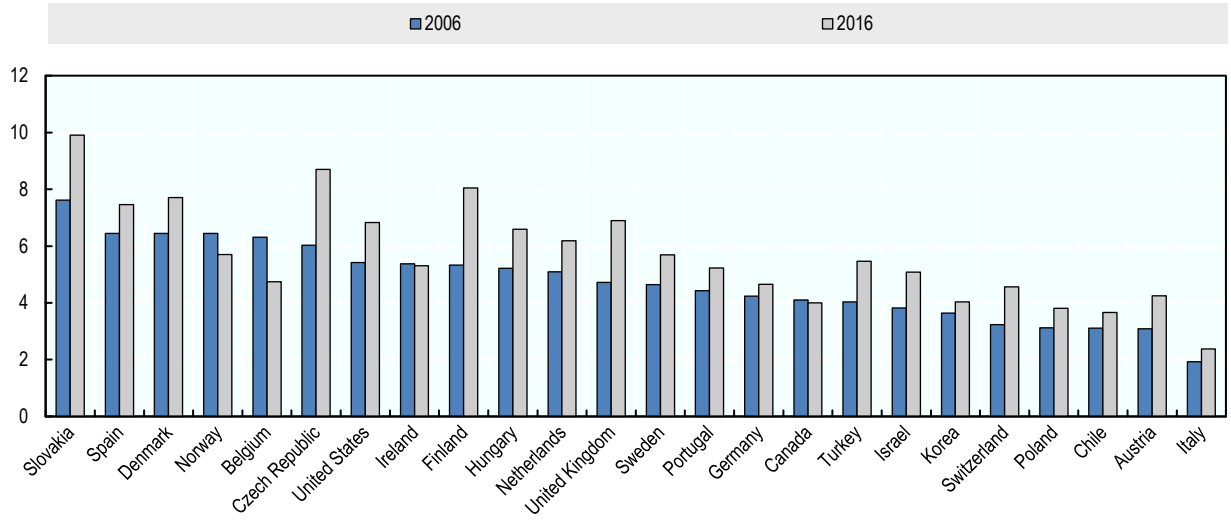
While globalisation had significant effects on some regions it is important not to overstate the impact of globalisation on regional and local disparities. In many cases, regional performance is influenced to a much greater extent by local, regional and national policy choices as well as by technological developments than by global competition.

### *The demographic composition of regions is changing*

Education levels in most regions have been increasing. Often the increase has been larger in absolute terms in regions that already had a high education level in 2006. This has led to a growing gap in terms of tertiary education attainment of the labour force between the top and bottom region within each country over the period 2006-2016 in most OECD countries. These results are in line with similar results from the previous edition of *Job Creation and Local Economic Development 2016* (OECD, 2016b), which also highlighted the increasing gap in the share of workers with tertiary education as one of the main challenges for local labour market policies. Figure 1.6 shows that the increasing absolute difference in education level has led to a growing standard deviation in educational attainment across regions.

**Figure 1.6. Within-country variation in education levels of workers is widening**

Standard deviation across TL2 regions in the share of tertiary-educated people in the labour force, 2006 and 2016.




*Note*: The graph shows the standard deviation of the share of tertiary educated people (ISCED 5-9) in the labour force across TL2 regions within the same country.
*Source*: Calculations based on OECD (2018), OECD Regional Statistics (database), http://dx.doi.org/10.1787/region-data-en.

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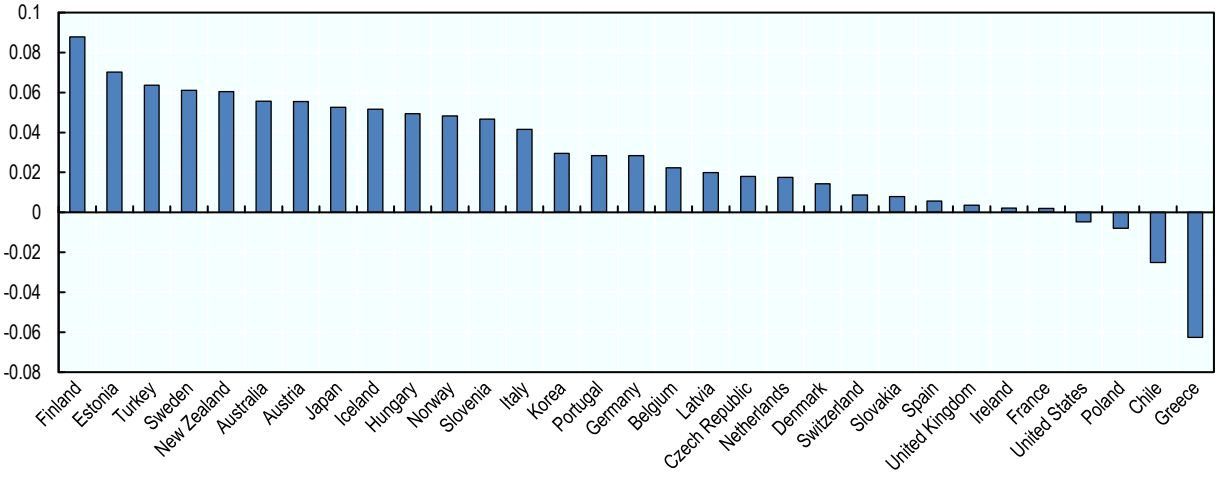
Population aging and intra-regional migration affect the availability of workers in the local economy. Population aging is a source of concern for most developed countries, and it can create significant challenges. Low birth rates and increasing life expectancy shifts the old-age dependency ratio, i.e. the ratio between people of working age and people at retirement age.

While only some OECD countries such as Japan are currently facing shrinking working age populations in aggregate, many individual regions are strongly affected by it. More than half of all TL3 regions experienced shrinking working age populations between 2010 and 2016. Often, such a decline is due to the outmigration of working age people from the region. If the local economy loses workers, especially young and well-educated ones, it may become difficult to promote economic growth. This phenomenon is not uniform across local economies; outflows of working age individuals tend to affect rural regions predominantly. Figure 1.7 shows that the disparities across regions in the number of working age population have increased since 2006.

**Figure 1.7. People of working age population are increasingly concentrated in certain regions**

Change in the regional disparity of working-age population among TL3 regions, selected OECD countries, 2006-16




*Note*: The chart shows the change in the coefficient of variation (see Box 1.2) in working age population (15-64) across TL3 regions within the same country between 2006 and 2016. The values for Turkey correspond to the period 2008-2016.
*Source*: Calculations based on OECD (2018), OECD Regional Statistics (database), http://dx.doi.org/10.1787/region-data-en.

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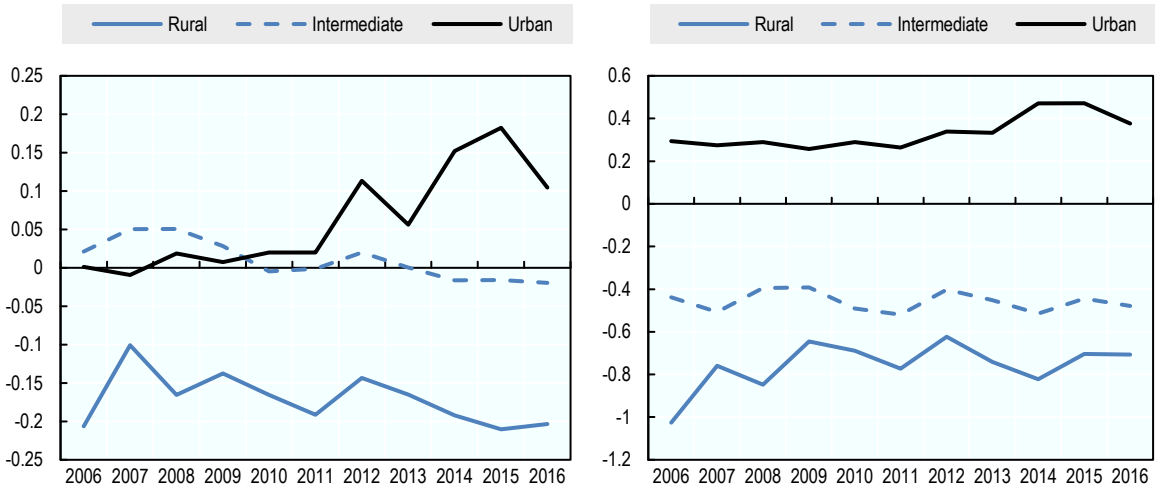
Figure 1.8 shows the average net population flows in urban, rural and intermediate regions. It is apparent that there are important systematic differences in net migration flows. Whereas urban regions record persistent inflows, intermediate regions have a roughly balanced migration balance and rural regions record persistent outflows. The trend of migration towards urban regions is even more striking among young people aged 15-29.

**Figure 1.8. Inter-regional migration flows between urban and rural regions**

Inter-regional net migration rate, TL3 regions in selected OECD countries, 2006-2016




*Note*: Panel A includes TL3 regions in Australia, Austria, Canada, Czech Republic, Denmark, Estonia, Finland, Hungary, Iceland, Japan, Korea, Norway, Poland, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom. Panel B includes TL3 regions in Australia, Canada, Czech Republic, Denmark, Finland, Hungary, Iceland, Korea, Poland, Sweden, Switzerland and Turkey.
*Source*: OECD (2018), OECD Regional Statistics (database), http://dx.doi.org/10.1787/region-data-en.

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## Automation is transforming labour markets

In the context of far-ranging changes to the socio-demographic composition of regions, technological progress and automation are shaping labour markets. They offer regions new opportunities, but can also increase the divergence in labour market outcomes within and across regions.

Automation is a source of productivity growth that increases prosperity and raises living standards. Without labour saving machinery, most people would still be engaged in basic manual tasks and economic output and living standards would have been drastically lower. To increase prosperity further, continued technological progress and automation is needed.

However, rapid automation may create losers. Workers whose jobs have been automated do not always have the skills that are being sought after in changing labour markets and struggle to find new jobs. Likewise, firms that do not keep pace with growing automation may become uncompetitive. Furthermore, automation can lead to growing inequality among people, both because it affects the income distribution across different groups of workers as well as between labour and capital more generally.

Concerns over automation have increased in recent years because of technological progress in so-called artificial intelligence. This has made it possible to automate tasks that could previously only be done by humans. One widely held view is that digital advances have been so great that they have affected workers' comparative advantage, vastly reducing the number of tasks to which human labour is required. Thus, digital

advances can potentially lead to the automation of a wide range of tasks that have, until now, been shielded from automation.

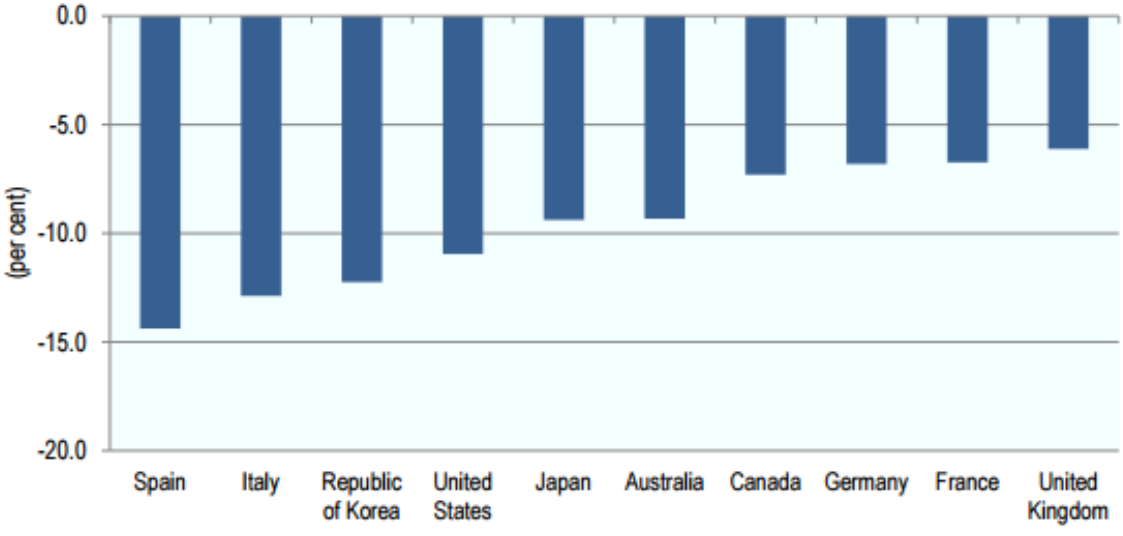
Freeman (2015) argues that the increasing substitutability of human labour with machine labour will exert severe downward pressure on wages. Since the costs of machines that can replace human labour are likely to decline, humans have to accept ever lower wages to compete for jobs. In the past, this effect was mitigated by the fact that many tasks could not be done by machines. However, this moderating factor will be much weaker in the future as machines become increasingly sophisticated. As a consequence, the labour share of total income could decline as most profits accrue to the owners of robots and algorithms.

A series of recent studies have found declining labour shares in many countries, developed and developing alike (Karabarbounis and Neiman, 2013; Piketty, 2013; Schwellnus, Kappeler and Pionnier, 2017). The labour share is the share of total national income that is paid in wages. Historically, it changes only slowly, but a continuous decline can be observed for the last few decades (Figure 1.9). Among the 10 countries for which long-term data exist, the labour share has declined from 65% in 1970 to 56% in 2014.

There are many possible explanations for the decline in the labour share. These may include changes in labour laws and in particular in collective wage bargaining and increasing trade openness. Furthermore, economic activity has been shifting to sectors that have typically a lower labour share. However, the decline in labour was at least partially due to greater automation over that time period (OECD, 2018a). Acemoglu and Restropo (2016) find that the expanding use of robots in the US is associated with a reduction both in wages and in the employment rate. This is particularly true in sectors with a higher concentration of occupations involving routine tasks, which are easier and cheaper to automate (Dao et al., 2017; Autor and Salomons, 2018).

**Figure 1.9. The share of wages within national income has declined**

Change in the adjusted labour share, selected OECD countries, 1970-2014

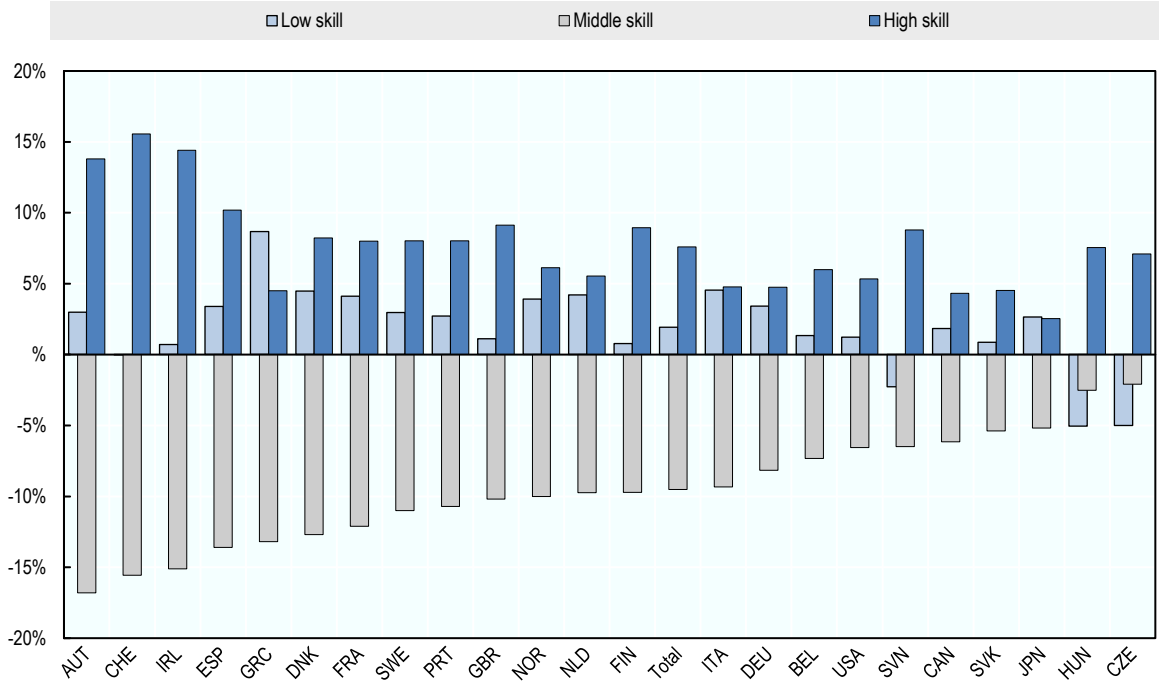



*Note*: Data for the Republic of Korea only includes the 1991-2014 period. In the case of Germany, prior to 1991 the adjusted labour income share refers to West Germany.
*Source*: ILO and OECD, *The Labour Share in G20 Economies* (ILO and OECD, 2015).

Beyond putting downward pressure on wages, automation also leads to a polarisation of required skills in the labour market (Autor, Katz and Kearney, 2006; Goos, Manning and Salomons, 2014; OECD, 2016a). Autor (2015) argues that a large proportion of middle-wage occupations, such as manufacturing or clerical jobs, are highly reliant on easily automatable routine tasks. Consequently, OECD countries have seen a decline in middle-wage, middle skill employment as a share of the workforce over the past two decades (Figure 1.10). In contrast, workers who complete non-routine tasks have increased their share of total employment. Typically, these jobs are either high-skilled (e.g. managerial positions) or low-skilled (e.g. basic services). Thus, both ends of the skill-distribution of jobs have increased while the middle has declined. Although jobs in low-skilled occupations have increased, they have borne the brunt of the falling labour share, raising important questions regarding patterns of future productivity, inequality and job quality (Autor and Dorn, 2013; Goos, Manning and Salomons, 2014). These issues are further discussed in Chapter 3.

**Figure 1.10. Change in the share of jobs by skill level**

Percentage point change in the share of total employment by type of skills, 1995-2015.




*Note*: High skill occupations include jobs classified under the ISCO-88 major groups 1, 2, and 3. Middle skilled occupations include jobs classified under the ISCO-88 major groups 4, 7, and 8. Low-skilled occupations include jobs classified under the ISCO-88 major groups 5 and 9. For more details refer to the OECD Employment Outlook 2017
*Source*: OECD Employment Outlook 2017 (OECD, 2017b).

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A major challenge for policy makers will be to help workers adapt their skills to a labour market in which ever more tasks can be completed by machines. Workers in occupations at high risk of automation already suffer from much higher rates of unemployment than their counterparts in low-risk jobs. They also make less money: Nedelkoska and Quitini (2018) find that a 10% increase in automation risk is associated with a drop of over 4% in

hourly earnings. But the challenges do not end there. Technological improvements are taking place rapidly. This suggests that the tasks that can be done only by humans may shift very quickly. In recent years, there have been increasing indications that even some jobs in high-skilled occupations could be at risk of automation. Thus, even high-skilled workers need to become more flexible in finding their comparative advantage relative to machines.

### *Automation has a regional dimension*

Previous waves of technological breakthroughs have shown that automation does not spread evenly across space. This is due to the fact that automatable tasks are more prevalent in certain occupations and sectors, and neither occupations nor sectors are evenly distributed within national borders. Thus, areas with a higher proportion of jobs relying on routine tasks are likely to experience more disruption, whereas places where more jobs require tacit skills will face lower levels of risk. Tacit skills are based on experience and intuition instead of formal rules. Thus, they are more difficult to replicate through mechanical processes or standard algorithms.

A recent study by Rahwan et al. (2018) highlights that regional specialisation affects the patterns of risk of automation among US metropolitan areas. In particular, between one-half and three-quarters of workers in metropolitan areas may face severe disruption in the near future. This risk decreases with the size of the city, in part because larger cities have a higher share of employment in occupations whose tasks are more resilient to automation (Rahwan et al., 2018).

Regional labour shocks caused by automation are likely to remain geographically concentrated. As technology penetrates an economy, a high proportion of low- or middle-skill workers in a given region may find themselves forced to transition into a different job over the next few years. In addition, while the jobs lost may be concentrated in a few regions, new jobs may well emerge in entirely different regions. Inter-regional migration is one way in which these regional labour market imbalances can be resolved within national borders. Migration patterns such as the one displayed in Figure 1.8 usually flow from regions with poor job prospects to regions with good job prospects. Workers who recently lost their job due to automation can find work by moving to a different part of the country where demand for labour is higher. Geographical mobility of labour thus increases the dynamism of an economy and helps to reduce spatial inequalities (Blanchard and Katz, 1992).

However, there are several factors limiting the effectiveness of inter-regional migration as an adjustment mechanism. First, while mobility can be an important structural adjustment mechanism in the long term, it is rarely a short-term solution. People may find themselves out of a job and struggle to find a new one; but they also have family obligations, friends, financial responsibilities, etc. that are tied to where they currently live in.

Second, geographical mobility is more restricted for low-skilled workers. This is due to the monetary and non-monetary fixed costs of moving that are proportionally higher relative to income gains from moving for workers with low incomes. The costs of moving are relatively similar for workers at all income levels. This includes monetary costs, for example related to transporting furniture as well as non-monetary costs, such as the effort required to find new friends. For high-income workers these costs are often outweighed by the financial gains of finding a new job rather than staying unemployed. However, for low-income workers the financial gains from moving are frequently not enough to make up for the costs. This is especially a problem in countries where house prices and rents are

elevated in economically successful areas and much of the financial gains from higher wages would be absorbed by higher housing costs.

Furthermore, in some countries mobility is limited by administrative hurdles, such as the fact that social insurance benefits sometimes cannot be transferred across regions within a country or professional licensing requirements that vary across regions. Typically, these problems occur primarily in federal countries, where the administrative responsibility for these areas falls to federal states.

Thus, even under the most optimistic assumptions, it is unlikely that labour market mobility can make up for the uneven impact of automation across local labour markets. Thus, public policy needs to respond to shocks at the local and regional level with targeted measures that take the concrete local impact from automation into account. The following section discusses how the impact of automation is distributed across regions. The policy implications that arise from the analysis are discussed at the end of this chapter.

### *How to measure the risk of automation*

The main challenge in the estimation of the number of jobs at risk of automation is the definition of which tasks are actually subject to automation. In recent years several studies have attempted to understand how the development of digital capabilities is likely to affect employment. Starting from a single question: "what is it that computers do – or what is it that people do with computers – that appears to increase demand for educated workers?" (Autor, Levy and Murnane, 2003, p. 1280), the topic has since been extended to tackle the broader issue of how computers complement or substitute for human skills in the workplace.

The most commonly cited study trying to measure of automation is Frey and Osborne (2013). The authors try to find out how susceptible jobs are to being automated through machine learning techniques. Building on expert judgements, the authors themselves use machine learning to identify occupations that can be automated and those that cannot. Jobs that require the following skills are considered to be safe from automation:

a. Tasks linked to *perception and manipulation*, especially if they require being involved in unstructured processes such as working in cramped workspaces.

b. Tasks that require *creativity*, such as artistic activities or coming up with original ideas.

c. Tasks that rely on *social intelligence*, such as being persuasive, negotiating aspects of a project or caring for others.

About 47% of US employment is at high risk of automation according to Frey and Osborne (2013). The authors also warn that "recent developments in machine learning will put a substantial share of employment, across a wide range of occupations, at risk in the near future" (Frey and Osborne, 2013). A summary of their methodological approach is provided in Box 1.4.

However, recent studies by the OECD that build on the methodology of Frey and Osborne (2013) - but use more detailed data - find that the risk of automation is considerably lower. Nedelkoska and Quintini (2018) find that only 14% of all jobs across the OECD are at a high risk of automation, while another 32% are likely to be affected by significant modifications. Arntz, Gregory and Zierahn (2016) even found, for a sample of 21 OECD countries, that only 9% of jobs are at high risk of automation.

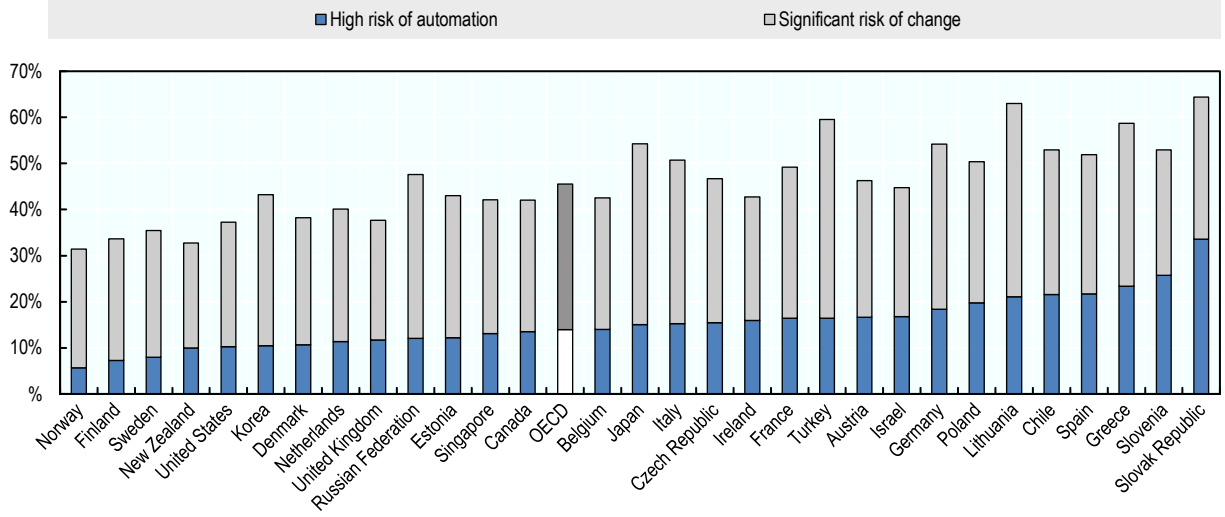
The diverging estimates are due to better occupational data used by the latter studies. Nedelkoska and Quintini (2018) use data from the OECD's PIAAC survey that has a more granular occupational classification than the data used by Frey and Osborne (2013). It also makes it possible to link tasks to occupations on the individual level. Based on this data, Nedelkoska and Quintini (2018) estimate that a larger share of jobs than previously assumed involve tasks that are difficult to automate.

The share of jobs at high risk of automation varies strongly across countries (see Figure 1.11). In line with the literature, a job is considered to be at high risk of automation if it has a 70% or higher probability of being automated. The percentage of jobs at high risk of automation ranges from 5.7% in Norway to 33.6% in the Slovak Republic. More generally, Northern Europe (the Scandinavian countries and the United Kingdom), North America (Canada and the United States) and New Zealand face relatively low levels of risk. At the other end of the distribution, Southern and Eastern Europe face a much higher risk of automation.

Contrary to what may be expected, these differences are not due to sectoral differences in the respective economies. Rather, they are due to the different organisation of jobs in those countries. Jobs in Southern and Eastern Europe are more likely to have automatable aspects than jobs of the same job family in the other countries (Nedelkoska and Quintini, 2018). For example, workers on an assembly line might only do a manual task that is at high risk of automation in one country. In another country, workers in the same occupation might also monitor an industrial robot and take care of quality control measures. In this case, jobs in the occupation in the second country are at much lower risk than in the first country.

**Figure 1.11. Jobs at risk of automation by country**

Percentage of jobs at significant and high risk of automation by country (%), 2013




*Note*: 'High risk of automation' refers to the share of workers whose jobs face a risk of automation of 70% or above. 'Significant risk of change' reflects the share of workers whose jobs have a 50-70% chance of being automated.
*Source*: Nedelkoska and Quintini (2018), "Automation, Skills Use and Training", *OECD Social, Employment and Migration Working Papers*, No. 202, (Nedelkoska and Quintini, 2018).

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Importantly, the methodology to estimate the risk of automation in an occupation can account for differences in the risk across countries but it cannot show how the risk of automation within an occupation changes over time. This introduces an important caveat. Countries or regions might respond to the threat of automation not only by shifting into economic sectors that have a lower risk of automation, but also by adapting the task profile of occupations so that they become less susceptible to automation. With the current methodology, it is impossible to capture the latter effect. Estimates that show how the number of jobs at risk of automation changes over time are based on how the number of jobs in different occupations changes over time. In other words, they show how regions gain or lose jobs in risky and less risky occupations.

**Box 1.3. Estimating the risk of automation in OECD countries**

Frey and Osborne (FO) estimated the number of occupations at high risk of automation in the United States, using a two-step methodology.

Firstly, they conducted a workshop with a group of experts in machine learning, whom they provided with a list of 70 occupations and their corresponding O*NET task descriptions.[1] They were then asked "Can the tasks of this job be sufficiently specified, conditional on the availability of big data, to be performed by state of the art computer-controlled equipment?" This allowed for the coding of each occupation either as automatable or non-automatable.

They then used a machine learning algorithm to find out more about the links between the coding to automate and the list of O*NET variables. They were able to identify those variables (and their associated bottlenecks) with higher prediction power (Table 1.1). High scores on these bottlenecks are likely to mean that an occupation is safe from automation. They could then compute a 'probability of computerisation' for each occupation in the US, leading to the aggregate estimate that 47% of US jobs have a probability of automation of more than 70%.

**Table 1.1. Bottlenecks to automation**

| Computerisation bottleneck | O*NET variable |
|---|---|
| Perception and Manipulation | Finger dexterity |
| | Manual dexterity |
| | Cramped workspace; awkward positions |
| Creative intelligence | Originality |
| | Fine arts |
| Social intelligence | Social perceptiveness |
| | Negotiation |
| | Persuasion |
| | Assisting and caring for others |

*Note:* Please refer to the reference below for further details on the definition of the automation bottlenecks.
*Source:* Frey and Osborne (2013), "The Future of Employment: How Susceptible are Jobs to Computerisation?," *Technological Forecasting and Social Change*, Vol. 114/C, (Frey and Osborne, 2013).

**Box 1.4. Estimating the risk of automation in OECD countries (2)**

The OECD built on this approach to calculate the risk of automation across 32 countries (Nedelkoska and Quintini, 2018). The analysis was based on individual level data from the OECD Survey of Adult Skills (PIAAC), which provides insight into the skill composition of each person's job as well as their skillset. The methodology used closely follows FO, with four exceptions: first, the training data in Nedelkoska and Quintini (NQ) is drawn from Canada in order to exploit this country's much larger sample in PIAAC; second, O*NET occupational data for FO's 70 original occupations had to be manually recoded into the International Standard Classification of Occupations (ISCO) to allow for the correspondence between countries; third, NQ use a logistic regression model to estimate the risk of automation for every occupation and country instead of FO's Gaussian process classifier; and lastly, equivalents had to be found in PIAAC to match FO's bottleneck variables.

While PIAAC does include variables that broadly address each of the three bottlenecks identified by FO, no perfect match exists for all variables within each bottleneck. Crucially, no questions in PIAAC could be identified to account for job elements related to "assisting and caring for others".[2] Given that this variable is related to occupations in health and social services that account for an important part of employment in most OECD economies, reported risks of automation based on this methodology are likely to be slightly overestimated.

**Table 1.2. Automation bottleneck correspondence**

| FO computerisation bottleneck | PIAAC variable |
|---|---|
| Perception and Manipulation | Finger dexterity |
| Creative intelligence | Problem solving (simple) |
| | Problem solving (complex) |
| Social intelligence | Teaching |
| | Advising |
| | Planning for others |
| | Communication |
| | Negotiation |
| | Influence |
| | Sales |

*Note:* Please refer to the source below for further details on the definition of the PIAAC variables.
*Source:* Nedelkoska and Quintini (2018), "Automation, Skills Use and Training", *OECD Social, Employment and Migration Working Papers*, No. 202, (Nedelkoska and Quintini, 2018).

Just as there are varying risks of automation within the same occupation across countries, it is likely that the risk of automation in an occupation can change significantly over time. National and subnational governments can influence this change. For example, regions might train workers to enable them to do a broader range of tasks within their occupation, which reduces the risk of automation. The estimates in this report cannot capture the effect of such a policy, because they assign a fixed risk of automation to each occupation. However, policies that reduce the risk of automation within an occupation are discussed at the end of the chapter.

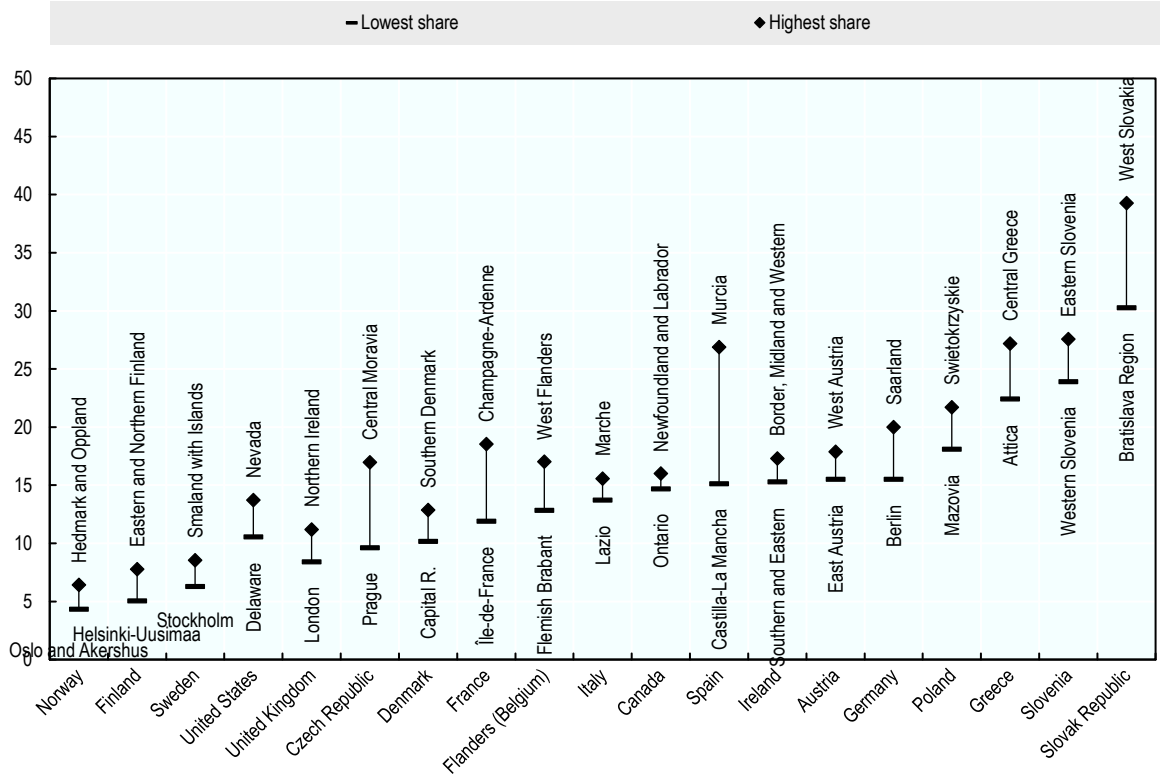
## The asymmetric risk of automation at the regional and local level

### *How high is the risk of automation at the local level?*

There are large within-country differences in the number of jobs at risk of automation. To produce subnational estimates, the results of Nedelkoska and Quintini (2018) are applied at the regional scale. For each region, the share of jobs at risk of automation is calculated using data on regional employment by occupation and the estimated probabilities of automation from Nedelkoska and Quintini (2018). As an approximation, the method assumes that jobs within the same job category have the same risk of automation across all regions of a country.

**Figure 1.12. Some countries have wide disparities in terms of risk of automation across regions**

Percentage of jobs at high risk of automation, highest and lowest performing TL2 regions, by country, 2016




*Note:* High risk of automation refers to the share of workers whose jobs face a risk of automation of 70% or above Data from Germany corresponds to the year 2013. Except for Flanders (Belgium), for which sub-regions are considered (corresponding to NUTS2 level of the European Classification).
*Source*: OECD calculations based on (Nedelkoska and Quintini, 2018) and national Labour Force Surveys (2016).

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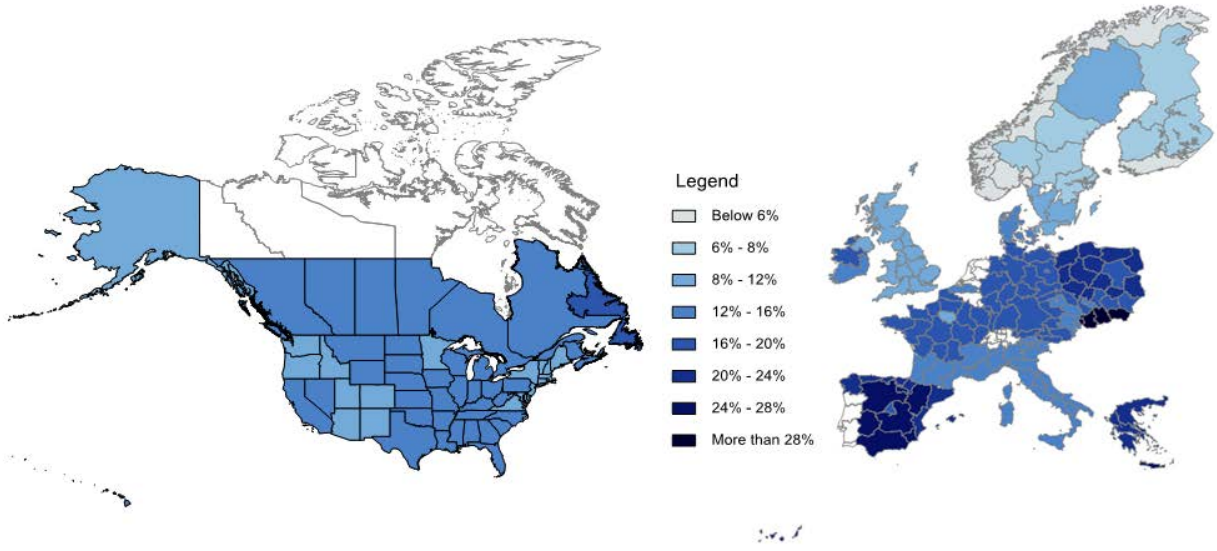
Figure 1.12 shows the regional disparities in the share of jobs at risk of automation. It displays the region with the highest and lowest share in each analysed country. A few countries, such as Spain, the Slovak Republic, the Czech Republic and France, display considerable differences in the share of jobs at high risk of automation. In Spain, the

country with the largest regional disparity, the difference between the region with the most and least risky job profile is roughly 12 percentage points. In contrast, other countries such as Austria, Canada and Italy show much smaller disparities in the risk of automation.

A map of the same numbers is presented in Figure 1.13. The share of jobs at high risk of automation is represented by the shading of each region.

**Figure 1.13. Share of jobs at risk of automation across selected North American and European TL2 regions, 2016**




*Note*: High risk of automation' refers to the share of workers whose jobs face a risk of automation of 70% or above. Data for Germany correspond to the year 2013.
*Source*: OECD calculations based on (Nedelkoska and Quintini, 2018) and national Labour Force Surveys (2016).

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### *Which sectors are at risk of automation?*

Some occupations have a particularly high risk of automation. Table 1.3 provides an overview of the occupations with the highest risk of automation and shows the total share of jobs in these occupations. Jobs in these occupations are more likely to be automated on a large scale than in any other occupations. Because of this, automation may prove more disruptive for individual workers - especially if automation occurs quickly and on a large scale - as affected workers will face significant competition from other laid-off workers. Indeed, they will have to compete with a large number of other workers with similar profiles and skill sets who are also looking for new jobs.

**Table 1.3. Top 5 occupations in terms of jobs at risk of automation**

| ISCO occupation group | ISCO occupation name | Share of jobs at high risk of automation, average across TL2 regions |
|---|---|---|
| 94 | Food Preparation Assistants | 0.6% |
| 83 | Drivers and Mobile Plant Operators | 3.5% |
| 93 | Labourers in Mining, Construction, Manufacturing and Transport | 2.2% |
| 81 | Stationary Plant and Machine Operators | 2.6% |
| 96 | Refuse Workers and Other Elementary Workers | 0.8% |
| | **TOTAL** | **9.7%** |

*Note*: The table shows the five occupations that have the highest risk of automation (in descending order) as well as their share of total employment, average across TL2 regions in the sample.
*Source*: OECD calculations based on Nedelkoska and Quintini (2018) and national Labour Force Surveys (2016).

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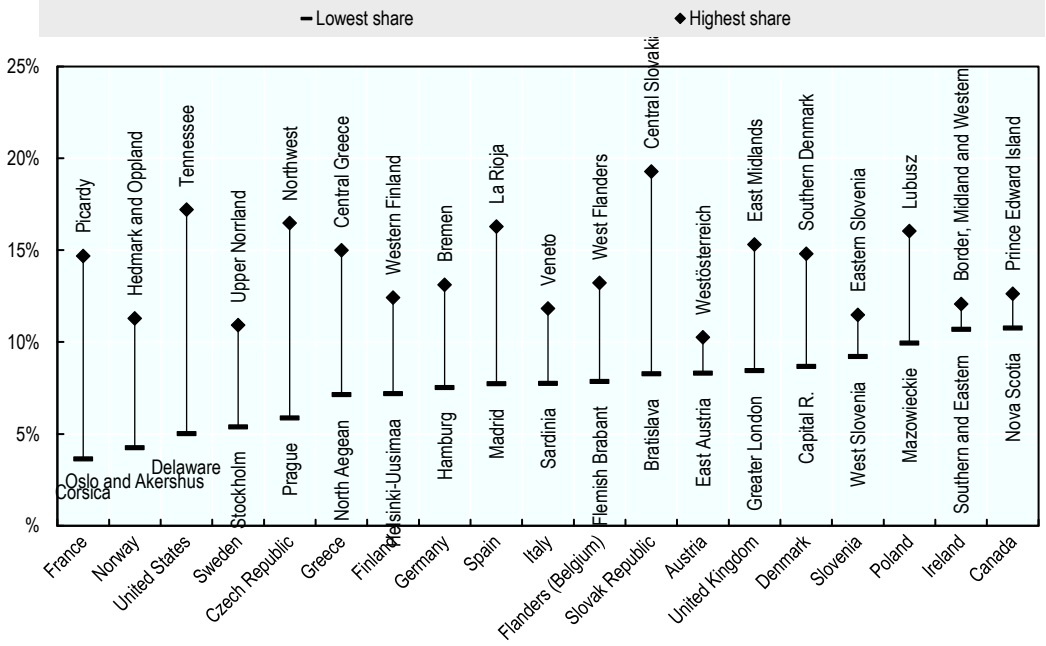
About 10% of workers across all regions are employed in the five "riskiest" occupations. Food preparation assistants, drivers and mobile plant operators, labourers in mining, construction, manufacturing and transport, machine operators, and refuse collectors face a particularly high risk of automation. As technology develops, their jobs are likely to be the first to suffer significant alterations. Targeted reskilling efforts should therefore be focused on these individuals and be implemented in areas where they live and work.

**Figure 1.14. Share of jobs in occupations that are highly susceptible to automation**

Percentage of jobs in the top five occupations in terms of risk of automation, TL2 regions with highest and lowest share, by country, 2016




*Note:* Data from Germany corresponds to the year 2013. Except for Flanders (Belgium), for which sub-regions are considered (corresponding to NUTS2 level of the European Classification).
*Source*: OECD calculations based on (Nedelkoska and Quintini, 2018) and national Labour Force Surveys (2016).

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The occupations most at risk are also highly concentrated in space. The earliest stages of automation will therefore be felt differently across different geographical locations. Figure 1.14 shows the share of jobs in the five abovementioned occupations in the region with the highest and lowest share in each country. Given the likely need to retrain workers in these occupations, policy makers should target regions where they make up a large percentage of overall jobs.

Furthermore, Figure 1.14 reveals an important pattern: Regions where the capital is located are frequently the regions that have the lowest share of jobs in the five riskiest occupations. Thus, large urban areas seem generally less at risk from automation. This is due to the concentration of service sector jobs in the urban economy, which are generally less exposed to automation than other occupations.

### *A regional classification based on job creation and risk of automation*

Creating jobs in occupations at high risk of automation merely defers the problem and increases the risk of higher future public expenditure to help displaced workers. Creating jobs is the aim of many employment and economic development programmes; it is increasingly important, however, to create good quality jobs. This involves several dimensions of the working activity: from salary, to security and environmental conditions of the workplace. An equally important element of job quality is the risk of automation in the near future. As workers lose their jobs, they will likely require unemployment support as well as expensive re-training in order to be able to re-enter the labour market. Consequently, early preparation for any future labour disruptions will be crucial for policy makers trying to implement inclusive growth policies.

Regions can be classified into four categories depending on whether they gain or lose jobs and whether the gains or losses occur in sectors with high or low risk of automation. Regions are classified according to whether they created jobs in the period 2011-2016, and further divided according to the type of occupation in which they created or shed employment (Table 1.4). This classification provides insights into the short-term and long-term employment situation of a region.

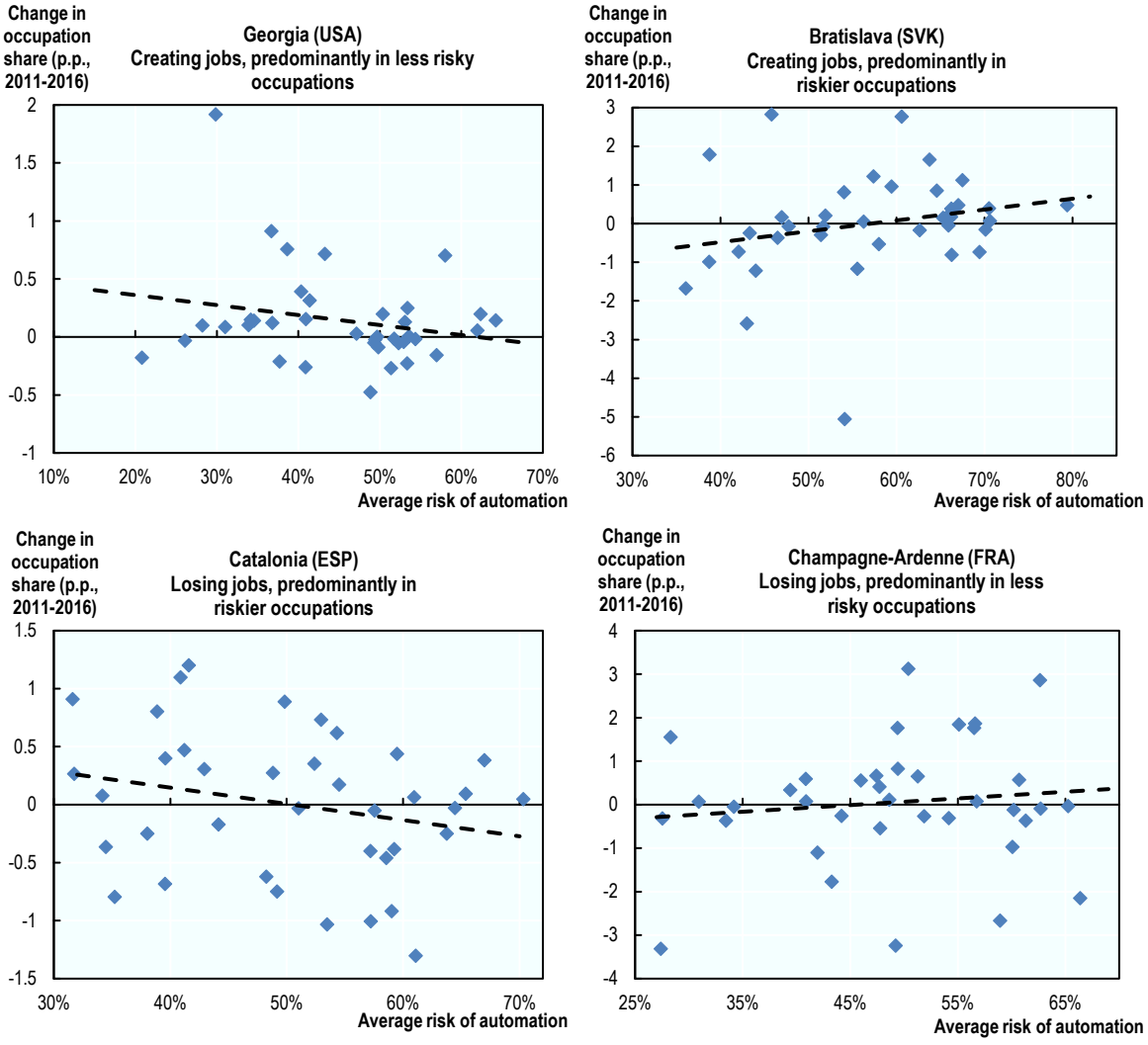
**Table 1.4. A new regional typology for employment creation in the face of technological disruption**

| Type | Description |
|---|---|
| A | Creating jobs, predominantly in less risky occupations |
| B | Creating jobs, predominantly in riskier occupations |
| C | Losing jobs, predominantly in riskier occupations |
| D | Losing jobs, predominantly in less risky occupations |

Regions that create jobs in occupations with a low risk of automation (Type A) improve their job situation in the short term and also reduce their long-term risk of unemployment from automation. In contrast, regions that create jobs in occupations at high risk of automation (Type B) improve their short-term job situation, but do so at the expense of moving towards a riskier job profile in the future. Regions that are losing jobs primarily in areas that are at high risk of automation (Type C) have the typical profile of regions in the process of undergoing a structural change caused by automation. While jobs are being lost to automation today, the risk of further job losses due to automation decreases. Lastly, regions that are losing jobs predominantly in occupations that are at low risk of automation (Type D) face the greatest challenge. They suffer current job losses combined with an increasing risk of further job losses in the future due to automation.

Plotting job creation in the period 2011-16 against the risk of automation by occupation makes it possible to break regions down into four categories. Figure 1.15 shows examples of a region in each category. Each dot represents an occupation, the position on the vertical axis indicates how many jobs were created or lost in the occupation and the position on the horizontal axis indicates the estimated risk of automation. The straight line indicates the estimated relationship between job creation and risk of automation. Its slope indicates whether more jobs have been created in occupations with high risk of automation or with low risk of automation. If the line is upward sloping, more jobs have been created in jobs with high risk of automation. If it is downward sloping, more jobs have been created in occupations with low risk of automation.

**Figure 1.15. Four types of regions, according to employment growth in occupations and their risk of automation**




*Note*: Each of the blue dots in the graphs corresponds to an occupation category under the European Union's ISCO (two-digit) classification. "Change in the occupation share (in percentage points, 2011-2016)" refers to the difference between 2011 and 2016 in the share of total employment that belongs to each occupation category.

*Source*: OECD calculations based on national Labour Force Surveys and Nedelkoska and Quintini (2018).

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Several regions managed to transition towards low-risk jobs in the period 2011-2016. Generally, a majority of regions in Europe have been creating new jobs after the financial crisis. Exceptions to this rule include some of the areas which were hit harder by the economic downturn: those in Southern European countries along with Slovenia and parts of France. In addition, in most countries, more than half of the regions have been shifting towards employment that is at lower risk of automation (Table 1.5).

For example, Georgia (United States) and Catalonia (Spain) in Figure 1.15 are two regions where a shift towards a less risky job profile occurred. In both regions jobs were created predominantly in occupations with a low risk of automation. In Georgia (United States), job creation across all occupations outnumbered job losses, which caused a net growth of jobs in the region. In contrast, Catalonia (Spain) lost more jobs in aggregate than it created.

In contrast, Bratislava in the Slovak Republic (upper right-hand panel in Figure 1.16) has been creating employment in occupations at high risk of automation. This is reflected in the fact that occupations with strong job growth lie predominantly on the right-hand side of the chart. An example of regions that face the most challenging situation is the case of Champagne-Ardenne in France. The region experienced a 6.5% decline in the number of jobs over the period 2011-2016. In addition, the jobs that were lost were predominantly at low risk of automation. Thus, the region has become more reliant on jobs that are more likely to be automated in the future.

**Table 1.5. Most regions have been creating jobs in lower risk occupations**

Number of TL2 regions per country (% of all regions within the country, 2011 - 2016)

| | A. Creating jobs, predominantly in less risky occupations | B. Creating jobs, predominantly in riskier occupations | C. Losing jobs, predominantly in riskier occupations | D. Losing jobs, predominantly in less risky occupations |
|---|---|---|---|---|
| Austria | 2 (66.7%) | - | 1 (33.3%) | - |
| Canada | 6 (60.0%) | 1 (10.0%) | 3 (30.0%) | - |
| Czech Republic | 8 (100.0%) | - | - | - |
| Denmark | 4 (80.0%) | 1 (20.0%) | - | - |
| Estonia | 1 (100.0%) | - | - | - |
| Finland | 2 (40.0%) | - | 3 (60.0%) | - |
| Flanders (Belgium) | 2 (40.0%) | 2 (40.0%) | 1 (20.0%) | - |
| France | 9 (40.9%) | 3 (13.6%) | 4 (18.2%) | 6 (27.3%) |
| Germany | 4(25%) | 5(31%) | 2(13%) | 5(31%) |
| Greece | 1 (7.7%) | - | 11 (84.6%) | 1 (7.7%) |
| Ireland | 2 (100.0%) | - | - | - |
| Italy | 6 (28.6%) | 3 (14.3%) | 6 (28.6%) | 6 (28.6%) |
| Lithuania | - | 1 (100.0%) | - | - |
| Norway | 7 (100.0%) | - | - | - |
| Poland | 12 (75.0%) | - | 4 (25.0%) | - |
| Slovak Republic | 1 (25.0%) | 3 (75.0%) | - | - |
| Slovenia | - | - | 2 (100.0%) | - |
| Spain | 4 (21.1%) | 3 (15.8%) | 9 (47.4%) | 3 (15.8%) |
| Sweden | 7 (87.5%) | - | 1 (12.5%) | - |
| United Kingdom | 11 (91.7%) | 1 (8.3%) | - | - |
| United States | 49 (96.1%) | 1 (1.2%) | 1 (1.2%) | - |

*Note*: Each cell reflects the number of regions of a country in the category. The percentage among all regions within the country is indicated in parenthesis. Except for Flanders (Belgium), for which sub-regions are considered (corresponding to NUTS2 level of the European Classification).
*Source*: OECD calculations based on EU Labour Force Survey and (Nedelkoska and Quintini, 2018).

Table 1.5 shows the number of regions that fall into each category by country. A few countries, such as the Czech Republic and Norway, managed to generate overall employment growth and shift towards less risky occupations in all regions. However, most countries experienced either a decline in employment or a move towards more risky jobs in some regions. Five countries had regions where both trends occurred in parallel, i.e. overall employment declined while the share of risky jobs increased.

### *Are jobs actually lost to automation?*

The main concern about automation is the risk of technological unemployment and increasing inequality across workers. Although the analysis in this chapter cannot establish the motivation for job creation or losses, it is reasonable to assume that a reduction of employment in occupations at high risk of automation is the consequence – direct or indirect – of increasing automation. Firms can directly substitute workers with machines. Alternatively, jobs might be indirectly lost because firms that do not automate are driven out of the market.

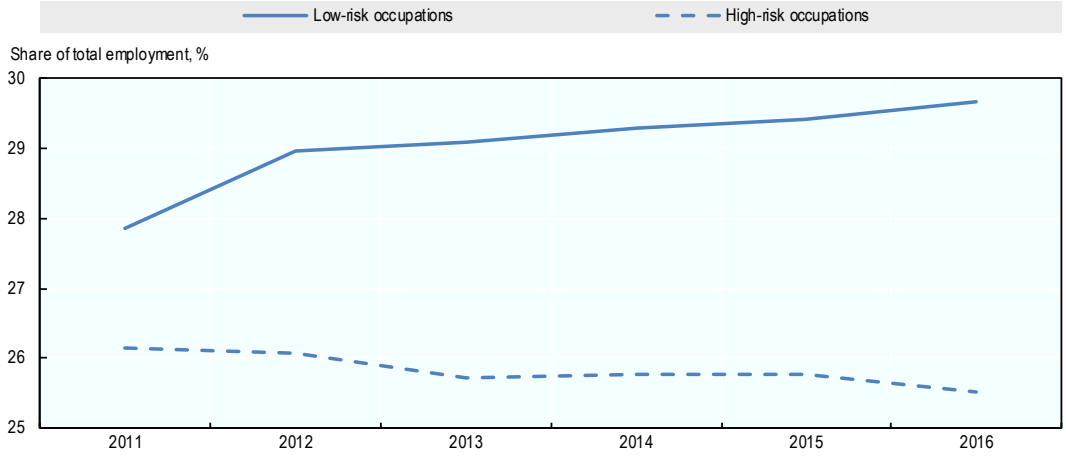
There are strong indications that jobs are actually being lost to automation in most OECD regions. The analysis conducted on the trend of employment over the period 2011-16

shows that 82% of regions in our sample (excluding Flanders for which we only have NUT2 regions) experienced a reduction in the share of jobs in occupations at high risk of automation relative to jobs in occupations at low risk of automation (Table 1.5). The empirical evidence also shows an increase in the occupations at low-risk of automation. In about 60% of TL2 regions in our sample the reduction of jobs in occupations at high risk of automation was compensated by a greater increase in the share of jobs at low risk of automation.

These findings provide some support to the optimistic view that automation creates opportunities, as jobs lost to automation are replaced by (potentially) better jobs in other occupations. Indeed, the average trends across OECD regions show an increasing share of employment in low-risk occupations and a decline in the share of employment in high-risk occupations (Figure 1.16).

**Figure 1.16. Employment is declining in occupations at high risk of automation**

Share of employment in low- and high-risk occupation, average across TL2 regions, 2011-16




*Note*: Low-risk occupations refer to the share of employment in the least risky 3 deciles of the distribution of occupations for each country; high-risk occupations refer to the share of employment in the 3 riskiest deciles of the distribution of occupations for each country; values are averaged across all regions in the sample. The sample consists of TL2 regions in the following countries: Austria, Canada, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Lithuania, Norway, Poland, Slovak Republic, Slovenia, Spain, Sweden, United Kingdom and the United States. Except for Flanders (Belgium), for which sub-regions are considered (corresponding to NUTS2 level of the European Classification)
*Source*: OECD elaborations based on data from National Labour Force Surveys.

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Still, in 10% of regions employment growth over the 2011-16 period was mainly driven by jobs in occupations at high risk of automation; and in about 9% of regions the decline of employment was driven by the loss of jobs in occupations at low risk of automation. In these regions, the risk of future job losses due to automation is growing.

As discussed at the end of this chapter, employment policies should target the specific challenge of each type of region. For instance, in regions that successfully manage the transition towards low-risk occupations, policies should focus on workers that are displaced in the process. Most probably not all workers that lost their jobs due to automation will be able to find jobs in other occupations. In contrast, in regions where no transition towards a lower risk of automation is occurring, policies should help firms to

shift towards jobs at lower risk of automation. This can reduce the future risk profile of regions and also lead to higher productivity growth.

### *Factors that explain the risk of automation at the regional level*

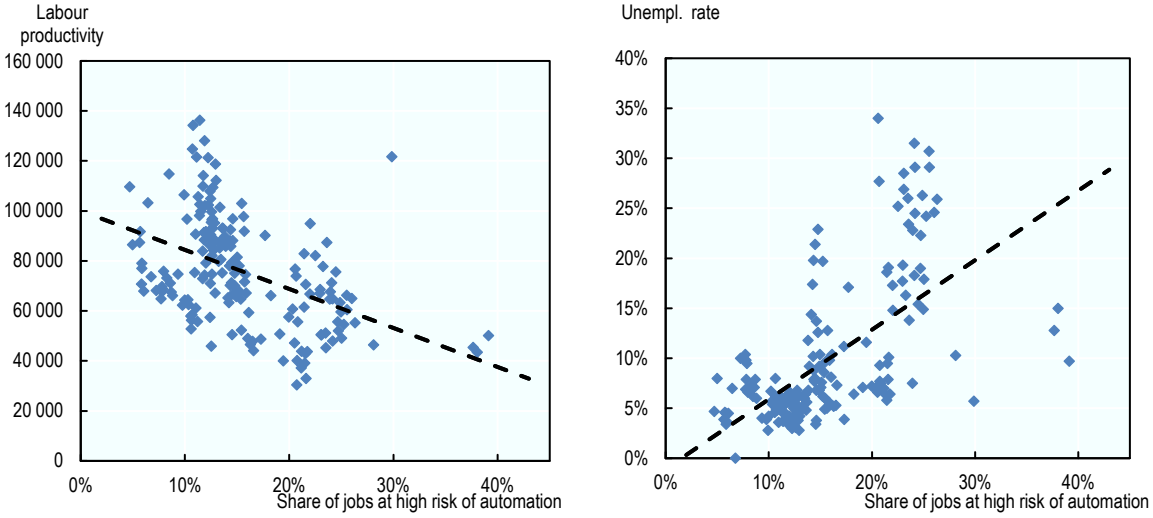
The uneven distribution of risks linked to automation raises the question of which kinds of regions will be most affected by it. Identifying the characteristics of these regions will help policymakers concerned with inclusive growth to target policy interventions to the most disadvantaged areas.

Highly automatable jobs are more likely to be concentrated in regions where productivity is low (see Figure 1.17). At least partially, this is because regions with low productivity make less use of advanced machines. Since automation tends to increase labour productivity, regions with low levels of productivity also tend to have low levels of automation. This implies that these regions have more potential for further automation and hence a higher risk of future job losses.

The challenge for low productivity regions is especially daunting because they often have high levels of unemployment in parallel with low productivity levels. These regions face a dilemma. One the one hand, they have to provide jobs in the short term. On the other hand, they also have to encourage efforts to increase labour productivity to ensure high employment levels and prosperity in the long term. In many cases, this requires increasing automation, which can harm employment in the short run. This pattern is also reflected in Figure 1.7, which shows that regions with higher unemployment levels have more jobs at risk of automation.

**Figure 1.17. Regions highly affected by automation display higher unemployment and lower productivity**

Labour productivity and unemployment rate in TL2 regions, 2015




*Note*: Data reported is from 2015 and corresponds to regions (TL2) in Canada, the Czech Republic, Denmark, Estonia, Greece, Spain, Finland, Ireland, Italy, Norway, Poland, Sweden, Slovenia, the Slovak Republic, the United Kingdom, and the United States. Labour productivity is defined as GVA per worker, PPP, constant prices, base 2010. Data from the District of Columbia in the United States stands at almost USD 300 000 per worker and has been excluded from the graph.
*Source*: OECD calculations based on national Labour Force Surveys and Nedelkoska and Quintini (2018).

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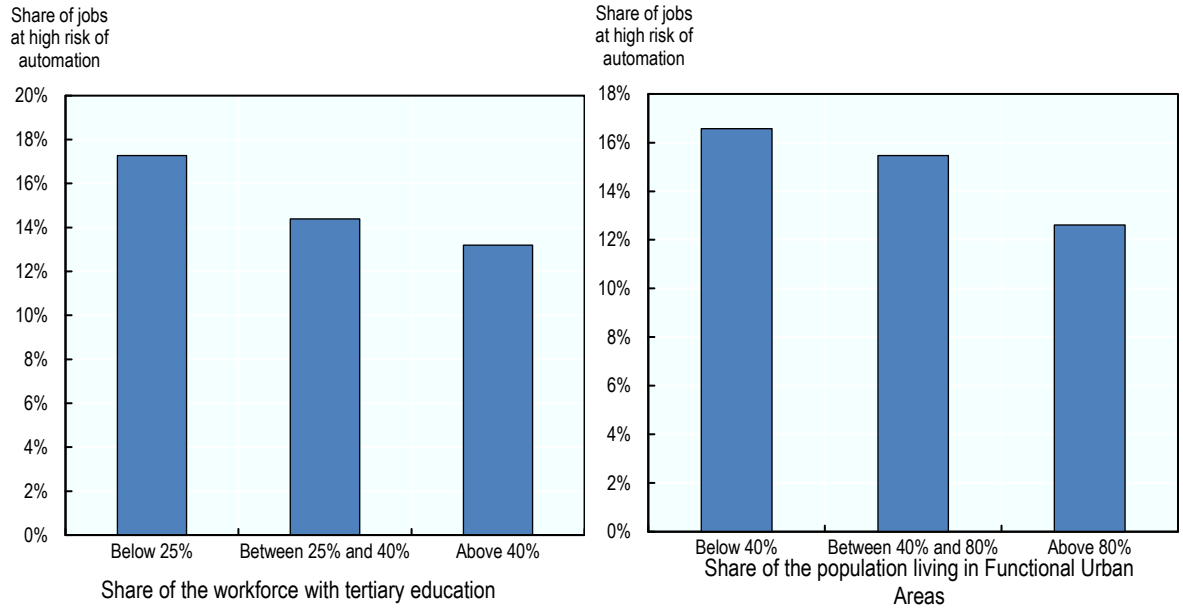
Places with highly educated workforces are less affected by automation. With some exceptions, the risk of automation decreases as educational attainment required for the job increases. Thus, it is no surprise that regions that have a highly educated workforce have a low share of jobs at risk of automation. Figure 1.18 shows the share of jobs at risk of automation for three types of regions; those with less than 25% of the workforce with tertiary education, those with between 25% and 40% of the workforce with tertiary education and those with more than 40% of the workforce with tertiary education. There is a negative relationship between the risk of automation and the share of workers with tertiary education. Regions that have the highest share of jobs at risk of automation also have the lowest share of workers with tertiary education. Reducing the risk of automation in those regions will therefore require efforts in training and education.

**Figure 1.18. Urban regions with a highly educated workforce have a lower risk of automation**

Average share of jobs at high risk of automation, by TL2 regions, 2016




*Note:* Data reported in the education chart corresponds to regions (TL2) in the Czech Republic, Germany, Denmark, Estonia, Greece, Spain, Ireland, Italy, Lithuania, Poland, Slovenia, the Slovak Republic and the United Kingdom.
*Source*: OECD calculations based on (Nedelkoska and Quintini, 2018) and national Labour Force Surveys.

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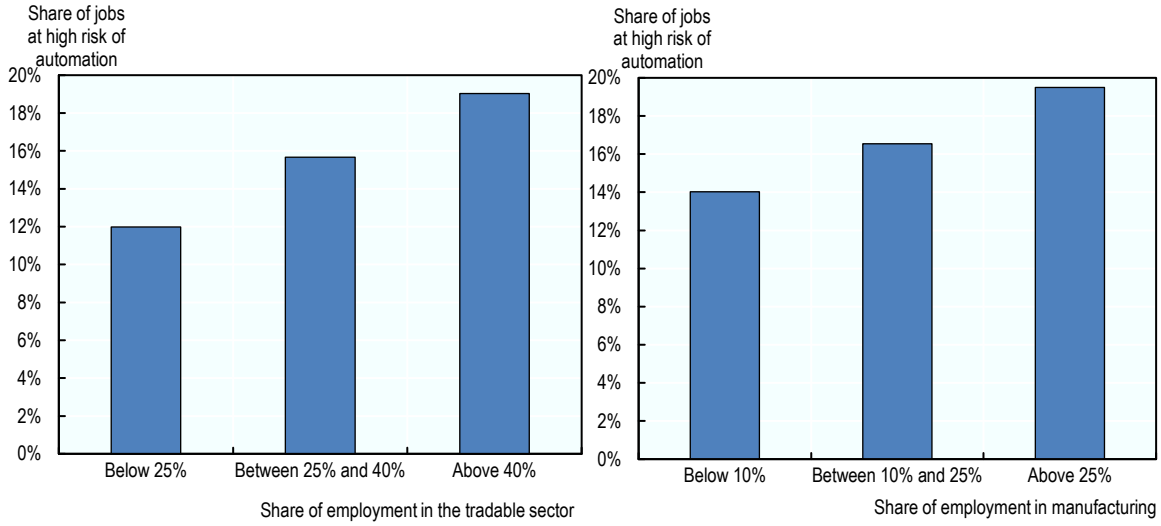
Rural economies are especially at risk of automation. Figure 1.18 shows that regions, which have a low share of the population living in urban areas, have a higher share of jobs at risk of automation. Rural economies have a lower share of service sector jobs that are better protected from automation. Smaller towns and rural areas are also more likely to be highly reliant on a handful of employers or on a single industry. While this does not necessarily increase the risk of automation in and of itself, it makes it more difficult to absorb displaced workers if one of the employers automates on a large scale.

**Figure 1.19. More employment in the tradable sector means more automatable jobs**

Average share of jobs at high risk of automation, by TL2 regions, 2016




*Note*: The tradable sector is defined by a selection of the 10 industries defined in the SNA 2008. They include: agriculture (A), industry (BCDE), information and communication (J), financial and insurance activities (K), and other services (RSTU). Data reported corresponds to regions (TL2) in Canada, the Czech Republic, Denmark, Estonia, Finland, Greece, Ireland, Italy, Norway, Poland, Slovenia, the Slovak Republic, Spain, Sweden, the United Kingdom and the United States.
*Source*: OECD calculations based on (Nedelkoska and Quintini, 2018) and national Labour Force Surveys.

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Overall, jobs in the tradable sector are more at risk of automation (Figure 1.19). This is mostly due to the fact that the tradable sector includes many economic sectors that have an especially high risk of automation, such as agriculture and manufacturing (Figure 1.19). Tradable services, which form a small but growing part of the tradable sector, are most likely at much lower risk of automation.

Again, this points to a dilemma for policy makers. On the one hand, strengthening the tradable sector is needed to foster sustained productivity growth. OECD (2018b) shows that the tradable sector has higher productivity growth rates and helps lagging regions to catch up with more productive ones. On the other hand, moving into the tradable sector also increases the risk of automation. Likely, this is because the potential for higher productivity growth in the tradable sector comes from greater opportunities for automation.

This dilemma can only be solved by taking two considerations into account. First, policy makers need to embrace automation insofar as it is an important mechanism to increase labour productivity and thus, an important source of long-term prosperity. Second, policy makers have to help their local workforce and businesses to deal with the potential downsides of automation. The following section will provide examples and recommendations on how they can do so.

## Policy response: how can regions deal with the challenges of automation?

### *Regions and cities should be at the forefront of local responses to the future of work*

#### *National labour market policies should be designed in a flexible manner to create bottom-up innovation*

The analysis in this chapter has highlighted the uneven impacts of automation across regions and its potential to exacerbate regional inequalities. For those places that are more vulnerable to structural changes, targeted efforts must be made to create an environment that is attractive to highly skilled people and firms. Local employment and training organisations play an important role in facilitating the adaptation of workers' skills to the changing needs of the economy but they require greater room for manoeuvre to respond to mega trends. It is therefore important that national policies provide mechanisms for cities and regions to take a leadership role in responding to the future of work.

Flexibility in the management of national policies can provide local actors, such as local employment services, vocation education and training organisations, as well as city and regional authorities, with the necessary tools to tailor programmes to their unique local labour market challenges. The need to target policies to specific groups of people is also recognised by other OECD contributions (OECD, 2018a). Flexibility encompasses the ability to make changes to national programme eligibility criteria, budget management, as well as accountability provisions. In general, awarding greater flexibility to local and regional stakeholders must be accompanied by guarantees regarding the accountability of decision-making and the efficiency of service delivery at the national level. In many cases, cities and regions can be viewed as "policy spaces" to test new ways of working and innovation approaches to address on-going labour market changes resulting from automation.

An example of a flexible approach to policy management can be found in the devolved skills system in the UK. The region of Leeds is revising its Employment and Skills Plan to take into account the changing work conditions and prospects in the local labour market. Recently, a key focus has been on developing an understanding of sectors and occupations within the local economy that are most susceptible to automation. With the input of leading employers and elected members of the local authority, the region is focusing on providing low-paid workers with access to high quality training opportunities to re-skill for jobs in new and emerging occupations.

In Denmark, the Regional Education Pool, introduced as part of employment reform in January 2015, aims to strengthen the skills of unemployed people, enabling them to adapt to changing labour market conditions. For instance, it provides subsidies to municipalities so that they can purchase short-term vocational training programmes to help unemployed individuals get back in the labour market. At the national level, the Agency for Labour Market and Recruitment (STAR) allocates funding to municipalities according to national criteria. Job centres within each municipality then actively allocate funds and manage the programme.

#### *Local ecosystems can nurture economic diversification in skills-related activities*

Across many OECD countries, there is renewed interest in industrial policies as a means of supporting and strengthening key sectors of the local economy (Warwick, 2013).

OECD work has shown that promoting activities in tradable sectors is key to boosting productivity and regional convergence (OECD, 2016c). However, this potential comes at the cost of a higher risk of automation. Thus, policy makers need to embrace the long-term benefits from a shift towards the tradable sector, while also addressing the risks related to automation that come from this shift.

In the context of the future of work, policies should therefore look *inside* the tradable sector and identify how to steer support towards occupations with tasks that are less vulnerable to automation. In practice, there may be benefits to be generated by focusing on clusters of expertise as well as regional strengths through a local skills ecosystem, which encompasses aspects of industrial policy.

A local skills ecosystem within a region can create a thicker labour market providing access to relevant specialised knowledge and skills. A local skills ecosystem is a cluster of firms working horizontally across a value chain with the education and training system to foster knowledge exchange and coordination. Local skills ecosystems can emerge organically and in some cases, government can play a role in providing incentives for their development. The establishment of a local skills ecosystem is often dependent on a strong anchor institution, such as a higher education or vocational education institution, strong local networks among stakeholders, as well as a catalyst for change (e.g. evidence suggesting that the region is likely to experience significant adjustment as a result of automation).

Public policies should promote diversification into activities that are closely related and connected to the existing skills base of the population. As communities respond to structural adjustments resulting from automation, there is evidence suggesting that the local network connecting industries with overlapping skill requirements is highly predictive of where firms are most likely to diversify economic activities. According to this research, diversification is found to be over 100 times more likely to occur into industries that have ties to a firm's core activity in terms of skills than into industries that do not (Neffke and Svensson Henning, 2009).

A good example of this diversification approach can be found in Akron, Ohio, which was the location of four major tyre companies in the 1990s. After experiencing a major economic decline in those activities, the city reinvented itself investing in polymer technology, establishing a National Polymer Innovation Centre, which has since been a new source of job creation in the city. This is an example of leveraging the existing skills base and local knowledge and applying it to new technology and production processes. Similarly, Manufacturing Extension Partnerships in the United States have also been successful in establishing local collaboration to work with manufacturers to develop new products, expand and diversify markets, adopt new technologies, and enhance value within local supply chains (National Institute of Standards and Technology , 2018).

"Smart Specialisation" strategies may be a useful policy instrument for concentrating local development activities in areas where there is a critical mass of knowledge and innovation potential. In Slovenia, the Smart Specialisation Strategy has been focused on creating "factories of the future" through investments to raise the level of automation, and robotics within the manufacturing sector (Slovenia Government Office for EU Cohesion Policy, 2015).

### *Target lifelong learning opportunities to those most vulnerable to automation*

#### *Low-skilled people require access to lifelong learning opportunities in order to remain relevant in a changing labour market*

The analysis conducted in this chapter underlines the importance of education and skills of the workforce in reducing the risk of automation. In an age of extensive automation and increasing use of artificial intelligence, it is critical to provide skills training (both work-based or classroom focused) and access to lifelong learning programmes so that workers' skills remain relevant in a rapidly evolving labour market. Individual Training Accounts (or Lifelong Learning Accounts) can help workers to manage disruption in the labour market. The overarching principle of these accounts is that workers use available funding at any point in their careers to invest in training – either to help them with career advancement or to adjust to a new job as a result of automation.

In Scotland (UK), the government has recently announced the launch of Individual Training Accounts to make it easier for job seekers and low paid workers to gain access to skill training, giving people up to GBP 200 per year for training and skills development. Another good example can be found in Singapore, which has established a programme to provide individuals with access to funding for lifelong learning and training (see Box 1.5).

Similarly, Spain has recently established a training plan for digital skills. This is mainly a subsidy (EUR 60 million in the 2018-19 period) for the acquisition and improvement of professional skills related to technological changes and digital transformation. The plan primarily targets employed people but is also open to unemployed people.

**Box 1.5. Individual Training Accounts in Singapore**

In Singapore, the Skills Future Programme provides Singaporeans with opportunities to develop their fullest potential throughout life, regardless of their starting points. Skills Future targets skills training to early and mid-career professionals, recognising that technology and globalisation are changing the nature of jobs at a rapid pace. As part of the programme, all Singaporeans aged 25 and above receive an opening credit of SD$ 500 to use towards lifelong learning and training. The programme also offers guidance on industry-relevant training programmes that focus on emerging skills such as: (i) data analytics, (ii) finance, (iii) tech-enabled services, (iv) digital media, (v) cyber security, (vi) entrepreneurship, (vii) advanced manufacturing, and (viii) urban solutions.

### *Encourage partnerships with employers to stimulate both the supply and demand of skills*

#### *Apprenticeship programmes can improve business-education connections and rebuild middle skill jobs*

OECD research has highlighted the importance of better engaging employers in skills development programmes to ensure that training programmes are well aligned with the skills needed by the local labour market. Several countries are currently promoting

apprenticeship programmes, which combine on-the-job as well as off-the-job training to smooth the school-to-work transition (OECD, 2017a). Apprenticeship programmes often lead to decent and good "middle class" jobs in occupations such as welding, plumbing, electricity and other repair type services. Many employers across the OECD continue to complain that these types of jobs remain unfilled.

Broadening the availability and accessibility of apprenticeships can fill potential shortages in "hands-on" occupations, which are less vulnerable to automation. It is important to avoid the promotion of apprenticeship programmes within occupations at serious risk of automation, such as food preparation assistants, truck drivers and mobile plant operators as well as machine operators.

At the local level, much can be done to coordinate outreach and market apprenticeship programmes to employers, especially SMEs, who often face unique barriers to participation. Local Apprenticeship Hubs in Manchester, United Kingdom have been successful in coordinating the range of government actors involved in delivering apprenticeship programmes (see Box 1.6) (OECD, 2017a).

**Box 1.6. Local apprenticeship hubs in the United Kingdom**

Local Apprenticeship Hubs provide a "one-stop" offer to local employers. In Manchester, United Kingdom, the number of young people participating in apprenticeship programmes has increased as a result of efforts undertaken by local stakeholders to "persuade" employers to participate in apprenticeship training.

The local apprenticeship hub model demonstrates how a decentralised approach to apprenticeship can be effective in bringing on board SMEs, which often face unique barriers to participating in training. In some cases, local employers require "hand holding" to participate in these types of training arrangements. This is clearly an area where the local level can play a strong role in facilitating stronger connections between businesses and the education system.

### *Boosting the demand for skills should be a clear policy priority to improve the quality of jobs*

Governments have addressed the issue of skills primarily from the supply side – namely, focusing on the need to improve the number of people with post-secondary and tertiary academic or vocational qualifications. However, there is an increasing recognition that policy makers must also promote the demand for skills. This involves understanding the nature of the skills demanded by employers and the optimal utilisation of those competences in the workplace (OECD/ILO, 2017). Stimulating the demand for skills should be a priority for those regions that have a number of occupations at low risk of automation but are not seeing sustained employment growth.

Public policies will need to find new ways of working with employers to move them into higher skilled and more productive economic activities. From the point of view of firms, better skills use in the workplace is typically associated with higher labour productivity. For example, the use of reading skills explains a considerable share (26%) of the variation in labour productivity across countries participating in the OECD Adult Skills survey (e.g. PIACC), after adjusting for average proficiency scores in literacy and numeracy. In

other words, how skills are used at work can have a major impact on productivity, even above and beyond that of proficiency (Quintini, 2014).

Local policies that aim to improve the use of skills in the workplace usually involve a mix of programmes focused on work organisation, job design, technology adaptation, innovation, employee-employer relations, human resource development practices and business product market strategies. Those regions whose primary economic activities are concentrated in the retail sector would also benefit from a greater focus on the demand for skills. In these regions, more must be done to work more closely with employers to look at how to maximise business performance and embed skills development into the company's business model. Vocational education and training institutions, sector councils, human resources consulting firms and other business associations are critical brokers at the local level who often have specialised expertise to help firms think over the long-term about their training activities.

### *Public policies can stimulate the development of networks among firms to encourage investment in skills training*

Creating or leveraging local employer networks can promote skills upgrading in the workplace. Employer's associations can also play a key role in fostering trust-based relationships between firms that stimulate knowledge-sharing and collaborative investment in training. Collaborative relationships across firms can foster innovative diffusion along a supply chain within a region with the added benefit of potentially linking firms along a production Global Value Chain, making a region less vulnerable to automation (OECD, 2018b). As an example, the POSCO Human Resource Development Consortium based in Gwangyang, Korea, facilitates joint connections between large firms and SMEs that are mostly situated within the same supply chain as suppliers or contractors of the larger firms. Through this consortium, SMEs are encouraged to increase investment in their own training programmes and to implement a Human Resources Development plan to create conditions for the long-term employment of workers (OECD/ILO, 2017).

In Ireland, Skillnets has been effective in actively supporting and working with businesses to address their current and future skills needs. The programme funds 65 training networks which operate locally, supporting over 14,000 companies and 50,000 trainees. Member companies actively participate in determining their own training needs and how, when and where training will be facilitated. Programmes are optimised to suit the needs of employed learners, through both formal and informal learning that spans further education and higher education provision (OECD, 2014).

## ***Embrace digital technologies to improve service delivery and regional development planning***

### *Digital technology can enable efficient job matching and training services*

In a number of OECD countries, online vacancy databases are the primary platform for filling jobs, complementing public employment service databases. In Germany, around 50% of all vacancies are reported to the public employment service (Arbeit, 2015). In many OECD countries, public employment services are now using online applications to enable workers and employers to connect in a more efficient manner. This technology can also be used to provide more robust and accessible labour market information to potential

workers on job opportunities available, expected wages, as well as the required education and training for employment.

Digitalisation and automation may provide opportunities to improve the implementation of local employment and training programmes where the Internet has become an increasingly important channel for service delivery. Online technologies can be used for standardised procedures such as initial registration and posting job vacancies, personalised interactions between public employment services (PES) staff and clients, casework counselling functions, and skills training and development.

**Box 1.7. Embracing digital technology to improve the service delivery of employment and training programmes in Sweden and Mexico**

In Sweden, a campaign has been launched by the public employment services to make people better at using digital services. The idea is that jobseekers and employers should be able to access the various services of the Swedish Public Employment Service (Arbetsförmedlingen) via Internet or a mobile phone without having to visit an unemployment office.

In Mexico, the Secretariat of Labour and Social Welfare has launched the Distance Training Program for Workers (PROCADIST), which offers online courses for training of workers who wish to acquire or improve their skills and increase their work productivity. It consists of a virtual interactive teaching and learning environment, managed on a technological platform, where courses can be taken by personal computer or a mobile device (tablet, cell phone, etc.). The programme has national coverage and promotes the training of workers through flexible and modular learning units.

### *Robust local labour market information can deliver real-time intelligence on future job demands*

Artificial Intelligence (AI) can help elaborate and analyse big data on workers skills and employment opportunities. Local labour market information and skills anticipation systems will be fundamental to guide individuals and workers in making well-informed career choices. At both the national and local level, employment and skills policies can respond to the future of work by better anticipating needs and preparing individuals with relevant competences that will be less vulnerable to automation.

Actions to develop real time labour market information can inform monitoring and evaluation mechanisms within the policy development cycle. Real time labour market information includes regular data on wages, job openings, hiring and salary trends, as well as information about employers who most frequently list job openings.

In Belgium, the Flemish public employment service (VDAB) has initiated structured dialogue with local governments and social partners to discuss labour market information with the goal of establishing stronger intelligence on current and future labour market needs. VDAB is engaging with educational institutions to develop study and career orientation tools that are shared with schools and students to prepare for future skill needs in the economy.

In the Czech Republic, the KOMPAS project is focused on building a comprehensive system of labour market anticipation, which aims to predict future qualification needs by taking into account the expected impacts of technological change. The outputs serve government actors as well as employers and training organisations, especially in setting up the education system and focusing on retraining courses, as part of career guidance and career counselling.

Latvia has recently introduced a labour market forecasting system to determine changes and trends across occupational groups and sectors. At the same time, the Latvian Ministry of Economy prepares a medium- and long-term forecast that focuses on future mismatches. This forecasting system contains regional information to identify which sectors are likely to experience job growth over the next 5-10 years.

## Conclusion

Automation has taken place for centuries. However, due to recent technological developments in the field of so-called artificial intelligence the pace of automation is likely to accelerate. Furthermore, technological progress changes the profile of jobs that can be automated. Whereas previously it was mostly low- and medium-skilled occupations that could be automated, new technological developments raise the possibility that even high-skilled occupations will be automated in the near future.

This chapter has shown that a large number of jobs are at risk of automation. However, there are important differences in how this risk is distributed across countries and regions. Across countries, the share of jobs at high risk of automation varies between 6% and 34%. Within countries, the differences can be considerable, too. The difference between regions within a country that have a high share of jobs at high risk of automation and those that have a low share is frequently more than 5 percentage points and sometimes more than 10 percentage points.

Regions with a similar share of jobs at risk of automation have certain characteristics in common. Regions that have a high share of urban population, of workers with tertiary education and of economic activity in the service sector generally have a lower share of jobs at risk of automation than other regions. Regions that have a high share of jobs at risk of automation often have lower levels of productivity and high unemployment. This creates a dilemma for policy makers. On the one hand, automation is needed to foster productivity growth, but on the other hand, automation also raises the spectre of further job losses in regions that already suffer from high unemployment.

Automation is not a process that takes place in isolation. It occurs during a time in which socio-economic disparities and differences in labour market outcomes across regions have been increasing. Policy makers need to take this broader picture into account when developing policies to respond to automation. While education and lifelong learning is an important component of any policy response to automation, it should not be the only element. Policy makers at regional and local levels also need to implement policies to help firms grow to foster the demand for jobs.

Finally, policy makers at all levels of governments need to target more than just the availability of jobs. The quality of jobs and the wages that they are paying are important determinants of social inclusion and well-being, too. The local and regional dimensions of these important aspects of labour markets will be discussed in the following chapters.

## Notes

[1] O*NET provides a set of 277 quantitative variables that serve as descriptions of the skill requirements for each of the 702 occupations in the US classification of occupations. O*NET was originally made up of labour market analysts, although it now also uses continuous surveys of workers and experts in order to keep track of changes in the nature of jobs.

[2] Nedelkoska and Quintini (2018) find that the variables that explain most of the variance in automatability are planning for others, selling, influencing, communicating and advising, respectively.

## References

Acemoglu, D. and P. Restrepo (2016), "The Race Between Machine and Man: Implications of Technology for Growth, Factor Shares and Employment", *NBER Working Paper Series*, No. 22252, National Bureau of Economic Research, Cambridge, MA, http://dx.doi.org/10.3386/w22252.

Arbeit, B. (2015), *Statistik Arbeitsmarktberichte,* https://statistik.arbeitsagentur.de/arbeitsmarktberichte

Arntz, M., T. Gregory and U. Zierahn (2016), "The Risk of Automation for Jobs in OECD Countries: A Comparative Analysis", *OECD Social, Employment and Migration Working Papers*, No. 189, OECD Publishing, Paris, http://dx.doi.org/10.1787/5jlz9h56dvq7-en.

Autor, D. (2015), "Why Are There Still So Many Jobs? The History and Future of Workplace Automation", *Journal of Economic Perspectives*, Vol. 29/3, pp. 3-30, http://dx.doi.org/10.1257/jep.29.3.3.

Autor, D. and D. Dorn (2013), "The Growth of Low-Skill Service Jobs and the Polarization of the US Labor Market", *American Economic Review*, Vol. 103/5, pp. 1553-1597, http://dx.doi.org/10.1257/aer.103.5.1553.

Autor, D., L. Katz and M. Kearney (2006), "The Polarization of the U.S Labor Market", *NBER Working Papers* 11986, http://dx.doi.org/10.3386/w11986.

Autor, D., F. Levy and R. Murnane (2003), "The Skill Content of Recent Technological Change: An Empirical Exploration", *The Quarterly Journal of Economics*, Vol. 118/4, pp. 1279-1333, http://dx.doi.org/10.1162/003355303322552801.

Autor, D. and A. Salomons (2018), "Is automation labor-displacing? Productivity growth, employment, and the labor share", *BPEA Conference Drafts*, https://www.brookings.edu/wp-content/uploads/2018/03/1_autorsalomons.pdf (accessed on 04 July 2018).

Blanchard, O. and L. Katz (1992), "Regional Evolutions", *Brookings Papers on Economic Activity*, Brookings Institution, https://scholar.harvard.edu/lkatz/publications/regional-evolutions (accessed on 19 March 2018).

Calvino, F. et al. (2018), "A taxonomy of digital intensive sectors", *OECD Science, Technology and Industry Working Papers*, 2018/14, OECD Publishing, Paris. http://dx.doi.org/10.1787/f404736a-en

Dao, M. et al. (2017), "Why Is Labor Receiving a Smaller Share of Global Income? Theory and Empirical Evidence", No. 17/169, International Monetary Fund, Washington D.C, https://www.imf.org/en/Publications/WP/Issues/2017/07/24/Why-Is-Labor-Receiving-a-Smaller-Share-of-Global-Income-Theory-and-Empirical-Evidence-45102 (accessed on 04 July 2018).

Freeman, R. (2015), "Who owns the robots rules the world", *IZA World of Labor*, http://dx.doi.org/10.15185/izawol.5.

Frey, C. and M. Osborne (2013), "The future of employment: How susceptible are jobs to computerisation?", *Technological Forecasting and Social Change*, Vol. 114/C, https://econpapers.repec.org/article/eeetefoso/v_3a114_3ay_3a2017_3ai_3ac_3ap_3a254-280.htm (accessed on 28 February 2018), pp. 254-280.

Goos, M., A. Manning and A. Salomons (2014), "Explaining job polarization: routine-biased technological change and offshoring", *American Economic Review*, Vol. 104/8, pp. 2509-2526, http://dx.doi.org/10.1257/aer.104.8.2509.

ILO and OECD (2015), *The Labour Share in G20 Economies*, https://www.oecd.org/g20/topics/employment-and-social-policy/The-Labour-Share-in-G20-Economies.pdf (accessed on 09 March 2018).

Karabarbounis, L. and B. Neiman (2013), *The Global Decline of the Labor Share*, National Bureau of Economic Research, Cambridge, MA, http://dx.doi.org/10.3386/w19136.

Keynes, J. (1930), "Economic Possibilities for Our Grandchildren", in *Essays in Persuasion*, Palgrave Macmillan UK, London, http://dx.doi.org/10.1007/978-1-349-59072-8_25.

National Institute of Standards and Technology (2018), *Manufacturing Extension Partnerships*, https://www.nist.gov/mep/about-nist-mep.

Nedelkoska, L. and G. Quintini (2018), "Automation, skills use and training", *OECD Social, Employment and Migration Working Papers*, No. 202, OECD Publishing, Paris, http://dx.doi.org/10.1787/2e2f4eea-en.

Neffke, F. and M. Svensson Henning (2009), Skill-relatedness and firm diversification, Philipps University Marburg, Department of Geography.

OECD (2018a), *OECD Employment Outlook 2018*, OECD Publishing, https://www.oecd-ilibrary.org/docserver/empl_outlook-2018-en.pdf?expires=1531304696&id=id&accname=ocid84004878&checksum=CDE55CB66AC595E526D532736CDAF950 (accessed on 11 July 2018).

OECD (2018b), *Productivity and Jobs in a Globalised World: (How) Can All Regions Benefit?,* OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264293137-en.

OECD (2017a), *Engaging Employers in Apprenticeship Opportunities*, OECD Publishing, Paris, https://www.oecd-ilibrary.org/docserver/9789264266681-en.pdf?expires=1525101239&id=id&accname=ocid84004878&checksum=C4317D43BB08BAFA7DD790C57274EAD9 (accessed on 30 April 2018).

OECD (2017b), *OECD Employment Outlook 2017*, OECD Publishing, Paris, http://dx.doi.org/10.1787/empl_outlook-2017-en.

OECD (2016a), *Automation and Independent Work in a Digital Economy*, Organisation for Economic Cooperation and Development, Paris, http://www.oecd.org/employment/future-of-work.htm (accessed on 04 July 2018).

OECD (2016b), *Job creation and local economic development 2016*, OECD Publishing, Paris, https://doi.org/10.1787/9789264261976-en.

OECD (2016c), *OECD Regional Outlook 2016: Productive Regions for Inclusive Societies*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264260245-en.

OECD (2014), *Employment and Skills Strategies in Ireland*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264207912-en.

OECD/ILO (2017), *Better Use of Skills in the Workplace: Why It Matters for Productivity and Local Jobs*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264281394-en.

Piketty, T. (2013), *Le capital au XXIe siècle*, Éditions du Seuil.

Quintini, G. (2014), "Skills at Work: How Skills and their Use Matter in the Labour Market", *OECD Social, Employment and Migration Working Papers*, No. 158, OECD Publishing, Paris, http://dx.doi.org/10.1787/5jz44fdfjm7j-en.

Rahwan, I. et al. (2018), "Small cities face greater impact from automation.", *Journal of the Royal Society, Interface*, Vol. 15/139, p. 20170946, http://dx.doi.org/10.1098/rsif.2017.0946.

Schwellnus, C., A. Kappeler and P. Pionnier (2017), "Decoupling of wages from productivity: Macro-level facts", *OECD Economics Department Working Papers*, No. 1373, OECD Publishing, Paris, http://dx.doi.org/10.1787/d4764493-en.

Slovenia Government Office for EU Cohesion Policy (2015), *Slovenia's Smart Specialisation Strategy*, http://www.svrk.gov.si/fileadmin/svrk.gov.si/pageuploads/Dokumenti_za_objavo_na_vstopni_strani/S4_document_2015_ENG.pdf.

Warwick, K. (2013), *Beyond Industrial Policy: Emerging Issues and New Trends*, OECD, https://doi.org/10.1787/5k4869clw0xp-en.

# Chapter 2. The geography of non-standard work

*This chapter provides an overview of the distribution of non-standard work across OECD TL2 regions. Non-standard work, defined as temporary, part-time, and self-employment, represents an opportunity to reach a more efficient use of resources, through flexible working conditions. Still, non-standard work can be challenging for some workers. Building on data from labour force surveys, this chapter provides estimates on the rise of temporary contracts, looking at both individual and regional characteristics. The chapter includes also a special focus on the Veneto region (Italy). The second part of the chapter looks at the changing nature of self-employment, which is becoming a sort of employment of last resort, providing statistics to support these trends in most OECD countries and a discussion of policies to contrast the increasing "false" self-employment – workers that have only one client and whose tasks are similar to dependent work.*

**Box 2.1. Key messages**

- Non-standard work (NSW), defined as temporary and part-time work, has been on the rise in most OECD countries over the period 1985-2016. There are however large regional differences within countries. For instance, in Greece the share of NSW on total jobs grew by 7% in Western Greece while declining by 11% in Epirus.
- Focusing on temporary work, the presence of a large pool of low-skilled workers (less than secondary education), and a high unemployment rate are associated with a large share of temporary work. By contrast, regions with a larger tradable sector tend to employ fewer workers in temporary contracts. These results are confirmed by the analysis of individual data from labour force surveys, which shows that temporary workers tend to be female, young, and have a low level of education. The territorial dimension is also important; for instance, for low-skilled workers the likelihood of being employed with a temporary contract is higher in rural areas than in cities.
- Employment trends confirm that the rise of temporary contracts is a long-term phenomenon, and that the economic recovery experienced by many regions in OECD countries in recent years is driven by the rise of temporary work.
- The share of self-employed workers in firms without employees has grown since the beginning of the century. This category is more likely to represent the employment of last resort for some workers and "false" self-employment – workers that have only one "client" whose tasks are similar to dependent work. In these cases, working conditions are worse than a "standard" dependent type of work, in terms of earnings and job security.
- Policies combatting false self-employment will also improve the overall quality of self-employment. At the same time, policies should continue to improve the business environment and increase the chances of success for entrepreneurs by offering entrepreneurship training, coaching and mentoring, business counselling, and improved access to start-up financing and entrepreneurship networks.

## Introduction

The nature of work has experienced significant changes over the past three decades. Population ageing, the progressive integration of women into the labour force as well as disruptions caused by globalisation and technological progress have all played a part in reshaping labour markets. Among these changes, one of the most distinct is an ongoing transition from the traditional open-ended, nine-to-five positions towards non-standard forms of work (Box 2.2).

Up until 1980, OECD countries featured mainly standardised working relationships. Progressively, employment legislation was loosened in countries where it had previously been strong, favouring the rise of more flexible working arrangements (OECD, 2011). Besides the regulatory framework, the growing use of non-standard work is being enabled by technological developments. On the one hand, consumers' preferences have

increasingly favoured customised services and just-in-time delivery. On the other, technological development has allowed firms to increase job flexibility and task outsourcing – be it to freelance contractors, temporary help agencies or others (Weil, 2014; Katz and Krueger, 2016).

More flexible working conditions represent an opportunity to increase efficiency. The OECD has been promoting reduction in restrictive employment legislation for many years. The introduction of more flexible forms of work can improve resource allocation, by reducing skills mismatches in the labour market, and increasing the participation rate. For instance, part-time work may improve work-life balance, thus allowing people to take up formal work without renouncing other family or social obligations. Similarly, temporary forms of work can be a stepping stone to stable employment for young people, who would otherwise be excluded from entering the labour market.

Still, non-standard work can be challenging for some workers. Flexible and more precarious forms of work may represent a way for firms to reduce labour costs, and, to the extent that they do not foster labour participation or career progression, these forms of work would reduce workers' welfare. In particular, non-standard workers are usually worse off in terms of job security and social protection, and tend to receive less training and face higher barriers to access employment programmes (OECD, 2015).

The geographical distribution of this phenomenon within countries has important consequences for policy. The opportunity and challenges that arise from non-standard work are more evident at the regional level. At the country level, the positive and negative outcomes of non-standard work may mask the challenges that non-standard work represents for some people and some regions, and at the same time downplay the opportunities for other regions. Differences in the skill and education of the local labour force and the economic structure shape different challenges for workers in different regions within a country. National policies are important to define the framework within which employers and employees operate, but the uneven distribution of working arrangements across regions requires a place-based approach with policies tailored to the specific challenges faced by workers in each region.

Non-standard work is conventionally defined by experts and international organisations as temporary, part-time, and self-employment. These are very different categories of work and considering them all together might be misleading. For this reason, after an introduction about the rise of temporary and part-time work across OECD countries, the chapter will focus on temporary work, investigating its determinants at the regional level. The analysis then looks at self-employment, which in most cases represents the natural expression of the willingness of people to start a business of their own, but examples abound of working relations undertaken as self-employed activity by former employees of the same company, in particular the category of self-employed without employees.

## The rise of non-standard work

Non-standard employment has been on an upward trend over the past 30 years in most OECD countries. Temporary contracts have become an ever more common resource in most OECD countries (Figure 2.1, Panel A). This is especially the case in Southern European countries and among younger workers (OECD, 2016c). Indeed, about a quarter of OECD workers under the age of 26 were in a fixed-term contract in 2016, compared to 17% in 1980. Meanwhile, the rate of part-time work has also been on the rise (Figure 2.1, Panel B). Although a large part of this trend corresponds to the entry of women into the

labour market, part-time employment has also increased amongst men. While 6% of males across OECD countries held a part-time contract in 1985, that percentage increased to 8.3% in 2016, with large differences between countries. Germany, for instance, increased the share of male part-time workers by eight times over the period 1985-2016.

**Box 2.2. Definition of non-standard forms of employment**

Non-standard work (NSW) arrangements are defined by what they are not: full-time dependent employment with a contract of indefinite duration – or what is generally considered the "standard" work arrangement. NSW therefore includes:

- Workers in fixed-term contracts
- Part-time workers
- The self-employed

While this definition may be considered problematic – as it lumps together precarious and non-precarious forms of work – the convention is followed by a large part of academic research as well as by international organisations. For this reason, this chapter adopts this definition.

An additional problem lies in the fact that the distinction between different forms of employment has become increasingly intricate. In particular, there is a growing grey area between self-employment and wage employment. The growing numbers of self-employed working for just one company represent a group on the border between two categories. While these blurred lines are at the heart of the current debate on the benefits and downsides of the gig economy, data that allows researchers to settle the debate is scarce.

Temporary jobs are defined as dependent employment of limited duration, including temporary work agency, casual, seasonal or on-call work.

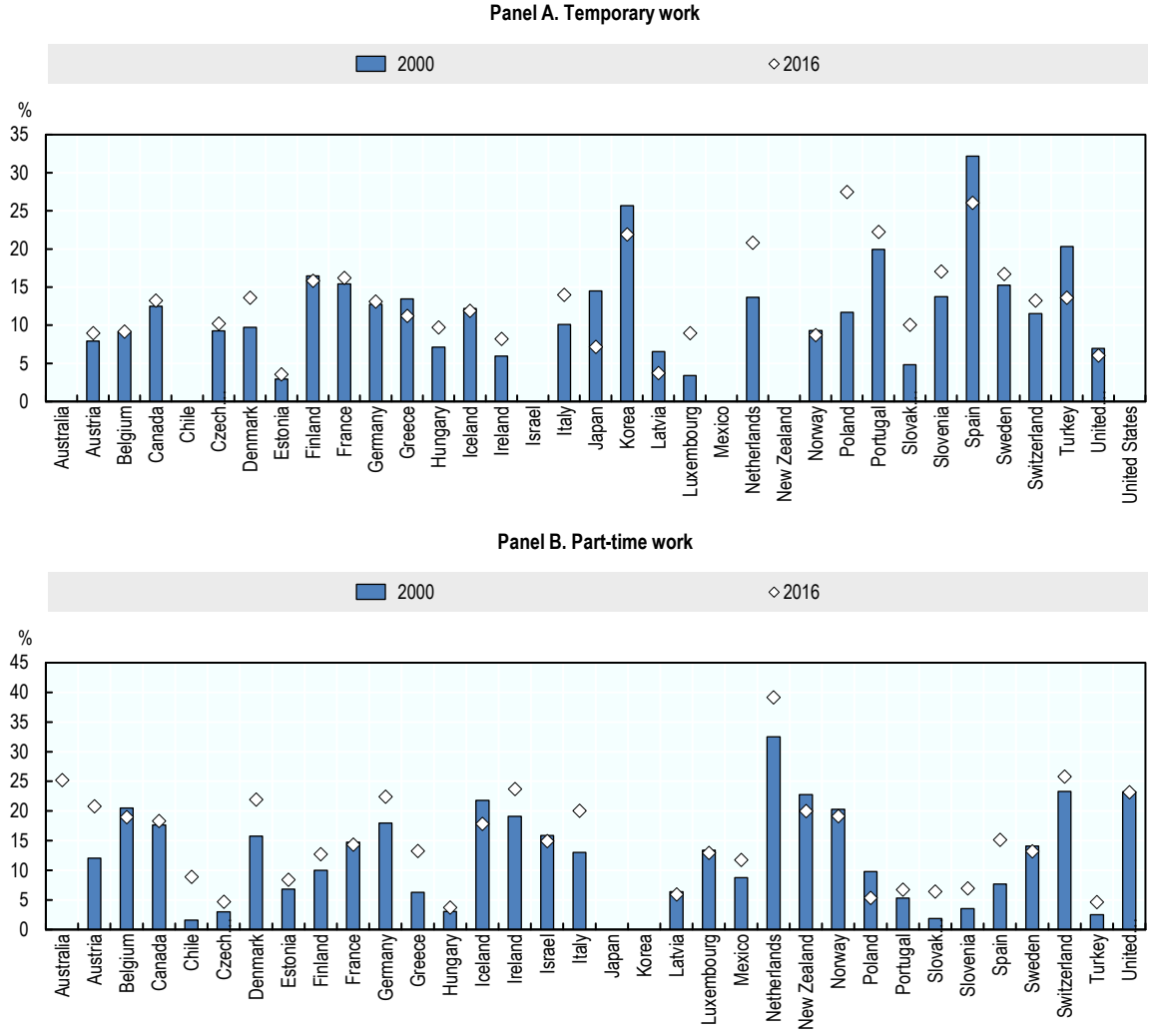
Part-time employees are classified based on their weekly working hours, namely working less than 30 hours per week. This may differ from national definitions which use different hour thresholds but allows comparability.

Finally, self-employment is a broad category that includes all non-dependent work.

*Source*: Adapted from OECD (2015b), "Non-standard work, job polarisation and inequality", in *In It Together: Why Less Inequality Benefits All*, OECD Publishing, Paris. http://dx.doi.org/10.1787/9789264235120-7-en.

**Figure 2.1. Non-standard employment trending upward long before the crisis**

Share of temporary and part-time work, OECD countries, %, 2010 and 2016




*Source*: OECD (2018), "Labour Market Statistics: Employment by permanency of the job & Full-time part-time employment - common definition: incidence", OECD Employment and Labour Market Statistics (database), http://dx.doi.org/10.1787/lfs-data-en.

StatLink https://doi.org/10.1787/888933824857

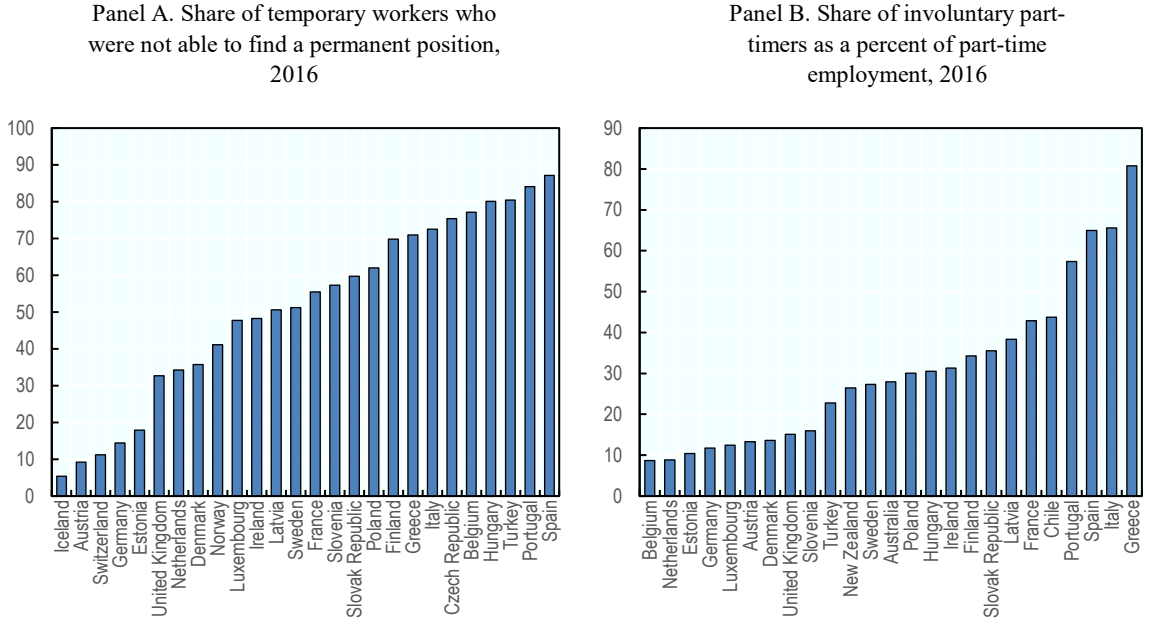
Non-standard work represents an opportunity for some workers. Indeed, flexible working conditions are a chance for many people who would otherwise be shunned from the labour market to find work. For instance, the possibility to better match work time with family care allows many people – most frequently women – to get a job. It also represents an opportunity for young people to take the first step into the labour market and gain experience that can then lead to other job opportunities.

For other workers, however, it can be associated with a deterioration of working conditions. Non-standard work may reduce employment stability, increasing income volatility, and it may hinder career prospects (Blanchard and Landier, 2002). Whether non-standard work is a privilege or a curse will largely depend on the individual's

personal situation. For workers whose skills are in high demand, flexibility represents an opportunity to maximise income opportunities, but for workers whose skills are commonplace, non-standard work would likely lead to a deterioration of working conditions.

For policymakers the main concern is whether the rise of non-standard work leads to a growing polarisation of labour markets between workers and across regions. Non-standard workers often have less access to training and career promotion opportunities. Wages for individuals in fixed-term contracts tend to be lower than those of their permanent counterparts; at the same time, their levels of work-related strain and job insecurity are higher (OECD, 2015). All these findings back popular concerns about in-work poverty and a potential duality in labour markets between those with a stable career and those jumping from one non-standard contract to the next (Blanchard, Jaumotte and Loungani, 2014; Weil, 2014).

**Figure 2.2. Involuntary non-standard work varies across countries**




*Source*: OECD (2018), "Labour Market Statistics: Involuntary part time workers: incidence", OECD Employment and Labour Market Statistics (database), http://dx.doi.org/10.1787/data-00308-en & Eurostat (2018), "Temporary employees by sex, age and main reason", Employment and Social Policy Indicators (database).

StatLink https://doi.org/10.1787/888933824876

Those findings also align with evidence that a large share of individuals in non-standard work, especially those in temporary contracts, would prefer a different kind of work arrangement. In over half of countries (mainly European) that participated in a survey on the quality of work, more than 40% of workers in temporary contracts are working under such arrangements because they were not able to find permanent employment (Figure 2.2A). The share is lower for part-time work, owing in part to the gender divide. Worker attitudes towards non-standard work vary across countries. Countries characterised by dual labour markets, such as Spain, Italy, Greece and Portugal register a larger degree of dissatisfaction for non-standard jobs because of the notable differences in

working conditions between workers in standard and non-standard employment. The former enjoy employment security, higher wages and have access to benefits and training. The latter face high turnover, job insecurity and lower wages; their career prospects are also hampered.

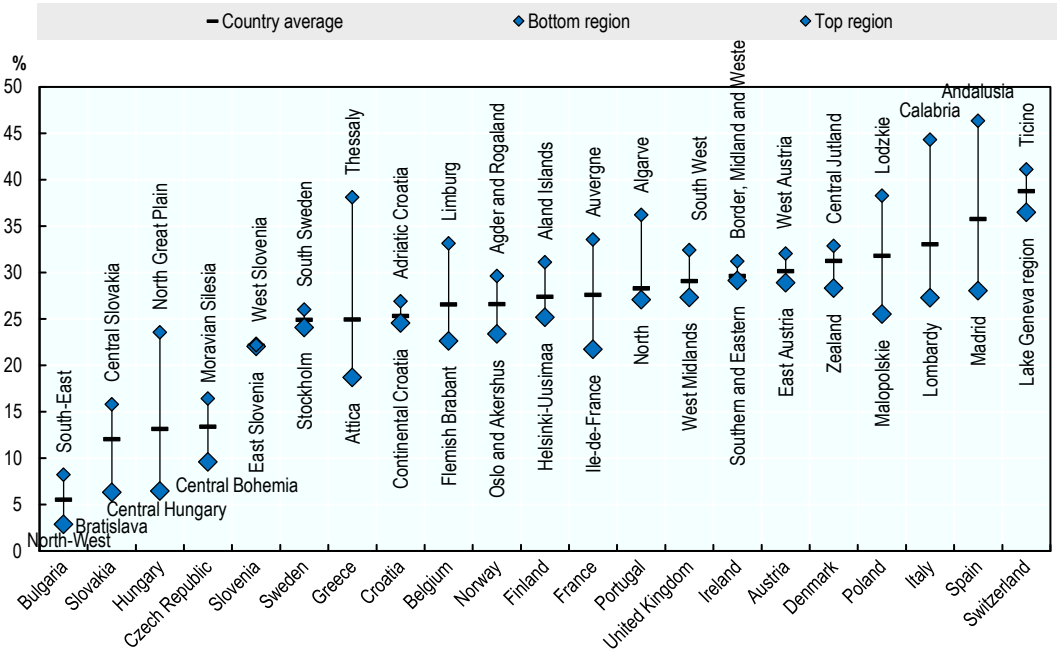
## Regional differences in non-standard work

The incidence of non-standard work is not uniform within countries. Differences in the rates of temporary and part-time work between OECD countries are well known and have received considerable attention in the literature. Their variation is often linked to the rigidity of labour legislation and other national-level institutional characteristics. Indeed, inflexible dismissal provisions, long judicial proceedings in case of lay-offs, affect employers' decisions to make use of non-standard contracts.

Yet, shares of non-standard work also differ substantially between regions in the same country (Figure 2.3). In countries like France, Belgium, Hungary, Italy, Spain or Greece the gap between regions exceeds 10 percentage points. For instance, in the region of Auvergne (France), the share of non-standard work was 33.6% of total employment in 2016, while in the region of Ile-de-France the share of non-standard work represented 21.7% of workers. Differences are large also in Spain, where the share of non-standard work in 2016 was 46.3% in Andalusia and a much lower 26% in the region of Madrid. This suggests that, while national regulations and institutions indeed set the framework that shapes labour relationships, they cannot account for all differences in labour market outcomes.

**Figure 2.3. Non-standard employment patterns are not uniform within countries**

Share of temporary and part-time contracts across TL2 regions, 2016




*Note*: Non-standard employment accounts for individuals in temporary contracts (both full- and part-time) as well as workers in a permanent part-time employment relationship.
*Source*: OECD calculations based on EU Labour Force Survey.

StatLink https://doi.org/10.1787/888933824895

Many of the factors that influence engagement in non-standard work and the quality of that working relationship play out at the local level. The ability of a worker to obtain his/her preferred type of work arrangement depends on two main elements: the cost associated with their replacement, and the flexibility with which employers are allowed to hire and fire workers. Both of these factors are affected by the national institutional framework, but there also exist other factors that explain differences within countries (see Table 2.1).

**Table 2.1. Factors influencing the incidence of non-standard work**

| | Factors | Geographical coverage |
|---|---|---|
| Ease of substitution of one worker for another | Labour demand | Local |
| | Labour supply | Local |
| Flexibility of hiring practices | Presence of unions | Local (sector- and occupation-dependent) |
| | Labour market regulations | National (but enforcement and coverage differ across space) |

*Source*: Adapted from Eichhorst and Marx (2015).

The ease with which employers are able to hire and fire workers depends on the country's regulatory framework. This is especially the case where workers can easily be replaced by others in the same local labour market. In such a circumstance, employers' incentives towards flexibility are only constrained by national regulation and the presence of unions. However, industrial relations vary across occupations and sectors, and therefore across the territory. For instance, in many countries, unions are stronger in the manufacturing and public sectors, while they are less present in certain parts of the service sector (Palier and Thelen, 2010). The result is a complex patchwork of labour-related factors that may lead to different levels of non-standard work within a single country.

The supply and demand of local labour are key for the evolution of non-standard contracts. Workers with more scarce skillsets have more bargaining power to obtain their preferred type of work arrangement. Looking at these patterns at the local level is likely to lead to different outcomes across places. In addition, the interplay between local labour supply and demand may stray from the low-skilled/high-skilled dichotomy traditionally proposed in policy frameworks. Rather, the general and specific skills dichotomy is important. Workers with general skills – whether high- or low-skilled – do not create any sunk costs linked to investments in education and training. The opposite is true of workers with skillsets that need to be developed within a firm – i.e. specific skills or institutional knowledge. This means that, to the extent that employers require these specific skillsets for their business to function, they should be willing to offer more stable working relationships and the rate of non-standard work in those firms should be lower (Autor, 2003).

## Temporary work

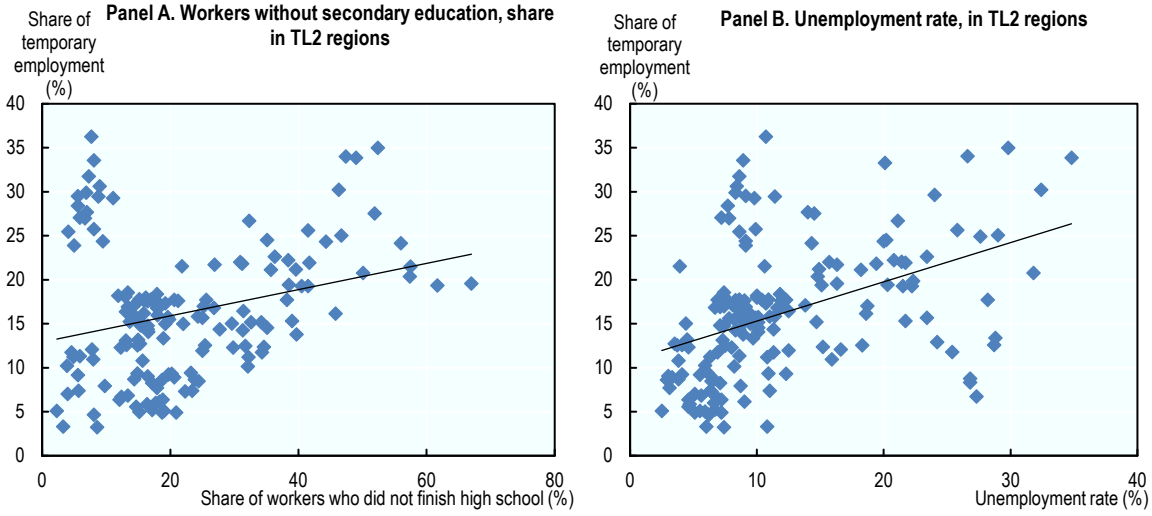
The analysis on the regional and individual patterns of non-standard work in this section focuses on the specific case of temporary contracts. This is because patterns in temporary and part-time work are very different; consequently, reporting the results on an aggregate measure of non-standard work would show misleading results. Moreover, there is a lack of data to distinguish between voluntary and involuntary working arrangements across workers within regions. This represents a crucial point for part-time work. Indeed, part-time work can also be (and often is) a voluntary choice of the employee, who benefits

from a more flexible working arrangement. By contrast, distinguishing between voluntary and involuntary working arrangements is less relevant for the analysis of temporary work.

### *Regional drivers of temporary working arrangements*

According to the framework outlined in the previous section (Table 2.1), some regional features are likely to affect the share of temporary contracts. The analysis looks at the education attainment of the regional workforce, the unemployment rate, as an indicator of idle workforce, and the regional economic structure, in particular the size of the tradable sector.

**Figure 2.4. The share of temporary jobs depends on workers' skillsets and the scarcity of those skills in the regional labour market, 2014**




*Note*: Data reported in Panel A correspond to regions (TL2) in Switzerland, the Czech Republic, Germany, Denmark, Estonia, Spain, Finland, France, Hungary, Ireland, Italy, Latvia, Norway, Poland, Portugal, Sweden, the Slovak Republic and the United Kingdom. Data reported in Panel B correspond to regions (TL2) in the same set of countries as well as Greece and Slovenia.
*Source*: OECD calculations based on OECD (2018), OECD Regional Statistics (database), http://dx.doi.org/10.1787/region-data-en.

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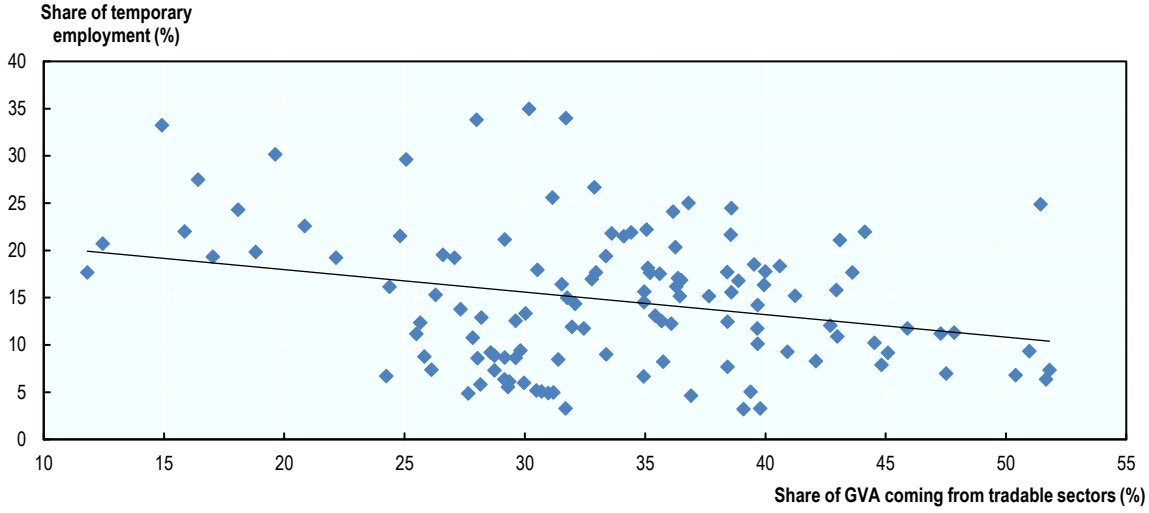
The educational attainment of the labour force is a good predictor of the incidence of temporary work. Regions where larger shares of the labour force did not finish secondary school show a higher incidence of temporary contracts (Figure 2.4, Panel A). This is probably related to the lower prevalence of specific skills in low-skilled jobs, which favours the ease of substitution of one worker for another. For instance, in 2014 more than half of workers in Extremadura (Spain) had no secondary education, to which corresponds a large share of temporary jobs (about 35%). By contrast, in the Basque Country, only 22% of jobs were temporary and just 27% of workers had less than a secondary education degree in 2014. The cross-country comparison shows that in regions with an even lower share of low-educated workers the share of temporary jobs is even lower. This is the case of Smaland in Sweden, which registered just 17% of temporary jobs and just 18% of workers with less than secondary education.

The regional rate of unemployment is strongly associated with the prevalence of temporary work in a given region (Figure 2.4, Panel B). Regional labour markets with higher unemployment rates should see more competition for jobs, reducing the bargaining power of individual workers. The presence of a large pool of idle workers hence reduces the incentive of firms to provide permanent contracts. For instance, in 2014 in Zurich region (Switzerland) the unemployment rate registered 3.7%, to which corresponded a share of temporary jobs equal to 12.5%. By contrast, in Apulia (Italy) the unemployment rate was 21.5% and the share of temporary jobs was about 20% of all jobs.

**Figure 2.5. A larger tradable sector means fewer temporary jobs**

Share of regional gross value added (GVA) from tradable sectors, TL2 regions, 2014




*Note:* The tradable sector is defined by a selection of the10 industries defined in the SNA 2008. They include: agriculture (A), industry (BCDE), information and communication (J), financial and insurance activities (K), and other services (RSTU). Data reported corresponds to regions (TL2) in Belgium, the Czech Republic, Denmark, Estonia, Finland, Greece, Hungary, Ireland, Italy, Latvia, Norway, Portugal, Slovenia, the Slovak Republic, Spain, Sweden and the United Kingdom.
*Source*: OECD elaboration based on OECD (2018), OECD Regional Statistics (database), http://dx.doi.org/10.1787/region-data-en and EU Labour Force Survey.

StatLink https://doi.org/10.1787/888933824933

Regions with a higher share of GVA from tradable sectors display a lower share of temporary jobs. The reason may lie in the use of workers with more specific skills in the tradable sector versus the non-tradable sector. Indeed, the tradable sector is mainly composed of manufacturing while the non-tradable sector is mainly services. This interpretation is supported also by the evidence that the relationship is even stronger with the subset of services that are tradable (mainly in the financial sector), where skills tend to be specific.

Besides, the characteristics of the regional economy, the incidence of temporary jobs also depends on individual factors. In particular, the analysis of individual data from the labour force surveys shows that being female and being young increases the probability of being in a temporary work arrangement of 1.5 and 0.3 percentage points, respectively. So does working in a firm with less than 10 employees (Table 2.A.1). This underlies the importance of flexible working relations in small firms that do not have the financial

capacity to absorb negative economic shocks. Using individual-level data from different countries' Labour Force Surveys, it is possible to have a better insight of the probability for a worker with specific characteristics of being employed in a temporary contract depending on the region he/she lives in. The empirical analysis shows that the tradable sector does reduce the likelihood of being employed with a temporary contract. After controlling for country and regional characteristics, working for a company in the tradable sector reduces the probability of being employed with a temporary contract by 2.4 percentage points. This corroborates evidence that regions with a larger tradable sector tend to have fewer workers in temporary jobs. By contrast, a worker in the service sector (not tradable services) has a 2.5 percentage point higher probability of being employed with a temporary contract. This is consistent with the possibility that workers in tradable industries (mainly manufacturing and the financial sector) may need more specific training than workers in the service sector, increasing the cost to find a replacement, which would force firms to offer permanent contracts.

Low skilled workers in rural areas are more likely to have a temporary contract than in cities. The share of temporary jobs in densely populated regions is the same as in low densely populated regions. Still, for some workers their location may determine whether they will end up with a temporary or a permanent job. In particular, the probability that a low-skilled worker living in a rural area will be engaged in temporary work is five percentage points higher than that of a similarly low-skilled worker living in cities. The probability is 3.8 percentage points higher than a worker with a tertiary education if he/she is located in a town; it rises to 5.3 percentage points if he/she is located in a suburb, and reaches 8.5 percentage points higher than a worker with tertiary education if he/she lives in a rural area. This result does not depend on the higher share of agricultural workers in rural areas, as those workers are excluded from the analysis because of the temporary nature of many agricultural activities (e.g., fruit harvesting).

### *The impact of temporary work on regional performance*

Regions with higher shares of temporary work are less likely to contribute to productivity growth. Some studies have attempted to link the incidence of non-standard work – particularly the use of fixed-term contracts and agency work – to the productivity performance of the firm. Findings suggest that temporary contracts initially reduce unit labour costs and therefore improve competitiveness, but beyond a certain point there is a loss of firm-specific human capital that negatively affects productivity (Kleinknecht, van Schaik and Zhou, 2014; Nielen and Schiersch, 2014). While there is currently a limited understanding of this issue at the regional level, simple correlations do suggest that regions with a higher share of temporary contracts exhibit lower levels of productivity (Figure 2.6, Panel A). A possible explanation lies in the relationship between productivity and the tradable sector. Indeed, regions with a small tradable sector would display both low productivity and a large share of temporary contracts.

Although there is no clear evidence that a larger share of temporary jobs reduces productivity, the analysis shows that temporary jobs and productivity are probably linked by the industrial structure of the regional economy: a larger tradable sector reduces the share of temporary contracts and increases labour productivity.

A higher share of temporary jobs results in lower inclusion at the regional level. The multidimensional level of inclusion is summarised by a composite indicator (ICI) that takes into account regional indicators of employment, unemployment, poverty and material deprivation (see Chapter 3 for a detailed description). Data from 2016 show that

regions with a larger share of temporary jobs tend to score low in terms of inclusion. This relationship could actually be driven by the strong correlation between temporary contracts and unemployment, which is one of the components of the inclusiveness indicator (ICI). Still, the result is quite important as it indicates that temporary contracts do not seem to favour inclusion into the (regional) labour market.

**Figure 2.6. Regions with a higher share of temporary jobs exhibit lower labour productivity and are less inclusive**


*Note*: Data reported in panel B correspond to regions (TL2) in the Czech Republic, Denmark, Estonia, Greece, Finland, Hungary, Italy, Latvia, the Netherlands, Norway, Poland, Portugal, Slovenia, the Slovak Republic, Spain, Sweden and the United Kingdom; labour productivity is defined as GVA in USD per worker, constant prices, constant PPP, base year 2010. Data reported in panel B correspond to regions (TL2) in Austria, the Czech Republic, Denmark, Estonia, Greece, Finland, Hungary, Ireland, Italy, Latvia, the Netherlands, Norway, Poland, Slovenia, the Slovak Republic, Spain, Sweden, and Switzerland. More information on the Inclusiveness Composite Indicator (ICI) is available in Chapter 3 and in the Annex.
*Source*: OECD calculations based on OECD (2018), OECD Regional Statistics (database), http://dx.doi.org/10.1787/region-data-en; Eurostat (2018) "Regional poverty and social exclusion statistics"; and EU Labour Force Survey.

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**Box 2.3. Sharpening the distinction between employment and false self-employment: the case of the Netherlands**

Since 2004, self-employed workers submit an Employment Relationship Declaration (VAR) to the Tax Service that describes their work status. Companies that hire the self-employed can then assume that the relation is not an employer-employee relationship. Consequently, the hiring company or individual does not have to pay any wages or cover the employee-insurance premiums for services purchased. This offers companies an incentive to work with the self-employed, especially since the self-employed person is held accountable for the accuracy of the VAR. However, this has led to an increase in false self-employment.

A second problem that has arisen is that the confusion surrounding VAR-certified workers has led to some occasional conflicting decisions from the tax and social insurance authorities (Westerveld, 2012).

To combat false self-employment, the government has adopted both short-term and long-term approaches. In the short term, one of the main actions has been to clarify the differences between employees and the self-employed by moving away from the VAR. As of April 2016, the Tax Authority now uses a model contract for the self-employed to help clarify their regulatory obligations and those of the company or individual hiring them. This also attempts to remove the incentives for setting up false self-employment arrangements by shifting to a joint-accountability approach where both the employer and employee are legally responsible and accountable.

In the longer term, the government is working to increase the attractiveness of hiring employees. Incentives have also been introduced for the self-employed to avoid false self-employment relationships, including the provision of access to a public pension (AOW), exemptions of pension savings in means-tested social assistance, improved access to sectoral training funds and voluntary insurance against sickness and/or disability.

Many of these measures are still being implemented so the scale and scope of their impact is unclear. However, in the longer term, the government is considering further changes to the tax and social security systems to remove differences in how the self-employed and employees are treated. For example, studies are underway to assess the effects of decreasing tax benefits for the self-employed vs. decreasing labour costs for employees, and increasing social security coverage for the self-employed vs. decreasing social security coverage for employees.

*Source*: (OECD/EU, 2017)

### *Employment trends in temporary work*

The financial crisis has accelerated the destruction of "standard" jobs, and the subsequent recovery has been mainly jobless or with temporary contracts. Although the global financial crisis reduced the share of workers in temporary employment, there exists a long-term underlying trend that points to an overall increasing reliance on those types of contracts (Jaimovich and Siu, 2012). Consequently, and given the potential connection between non-standard work, regional productivity and inclusiveness, this subsection focuses on the evolution of temporary employment over the period 2002-16.

The analysis at the regional level reveals a complex picture, with some regions contributing more than others to the rise of temporary work. The increase in the share of temporary work could be the consequence of an increasing number of jobs with temporary contracts but also a relatively smaller reduction of temporary contracts with respect to permanent jobs. Four scenarios emerge from the analysis (see Figure 2.7):

- Regions that are increasing employment but reducing the share of temporary workers; these regions are going against the general trends of a rising tide of non-standard work;
- Regions that are increasing employment and also the share of temporary workers; these regions are mainly creating temporary jobs, increasing the flexibility of their labour markets;
- Regions that are reducing employment and also the share of temporary workers; this is the case of regions that react to economic shocks by not renewing contracts to temporary workers;
- Regions that are reducing employment while increasing the share of temporary workers: this could be the case of regions with traditionally manufacturing sectors, with most "standard" employees, that are forces to restructure or close down their activity

The rise of temporary jobs represents a long-term trend that goes beyond the global financial crisis. A visual representation of the four scenarios provides a better understanding of the situation within each country. Three maps are presented: one for the period before the crisis, one over the global financial crisis, and a last graph that captures the recovery from the crisis (Figure 2.7). From the analysis of the trends in the different periods three takeaways emerge:

- The rise in temporary work preceded the Great Recession (Figure 2.7A). In the period before the financial crisis (2002-07), most economies were booming and people found it relatively easy to get a job, but there was also a widespread increase in the share of temporary work across more than half of European regions (55%).
- As the crisis hit, workers in temporary contracts were the first to be laid off (Figure 2.7B). Companies, faced with adverse economic conditions, logically chose to dismiss temporary workers. This led to a reduction of the share of temporary work in most regions (57% of out sample).
- The subsequent recovery (2012-16) is characterised by an increasing share of temporary contracts (Figure 2.7C). Only certain regions in Germany, Ireland and the United Kingdom seem to follow a different pattern, creating employment through more standard contracts. In the north of France, Portugal, and parts of Italy and Greece employment is dwindling, yet the relative share of temporary work is increasing.

In most cases, the share of temporary contracts is increasing in regions that are also underperforming in terms of labour productivity. This confirms the close link between performance and tradable sectors and temporary jobs and tradable sectors. Taken as a whole, it suggests that the increased flexibility provided by temporary contracts is not necessarily a driver of labour productivity at the regional level.

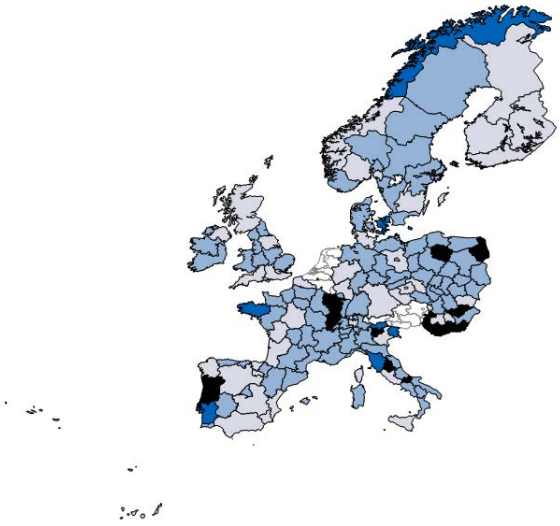
These results may also be driven by current rigidities in labour markets. In Italy, for instance, the labour market is characterised by an extreme duality between workers with

standard contracts and the rest of workers – this duality has been attenuated by a partial labour market reform (so called "Job Act") implemented in 2015. This strong duality hinders the possibility of workers to pass from temporary to permanent contracts, thus *de facto* reducing the role of temporary contracts as a first step on the employment ladder for young people. In this setting, firms have a choice to offer a permanent contract if their business is solid and profitable and there is a need to retain the worker, or a temporary contract if the business faces increasing uncertainty and low profitability. The former case is more likely to arise in regions with a strong tradable sector.

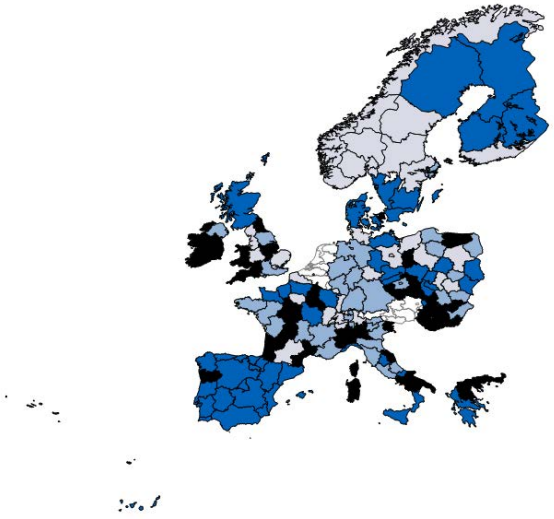
**Figure 2.7. Evolution of temporary employment across EU TL2 regions**

Variation of regional employment and variation of the share of temporary workers in the three periods

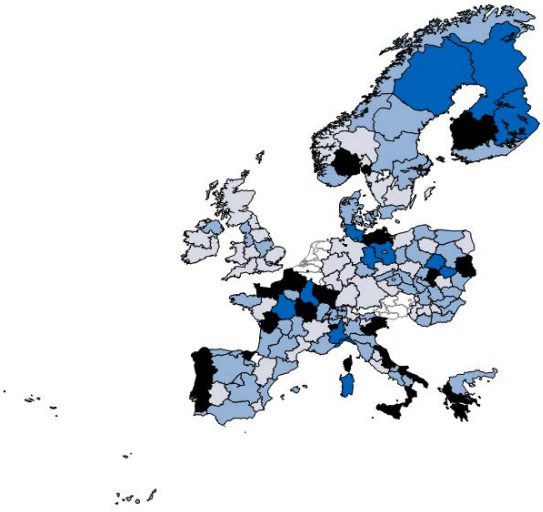
Panel A. Pre-crisis period: 2002-2007

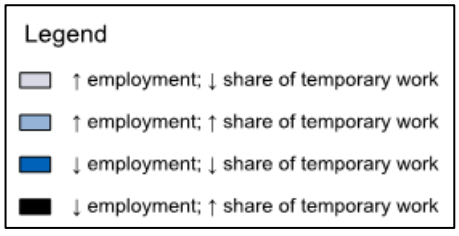


Panel B. Great Recession: 2007-2012



Panel C. Post-crisis period: 2012-2016





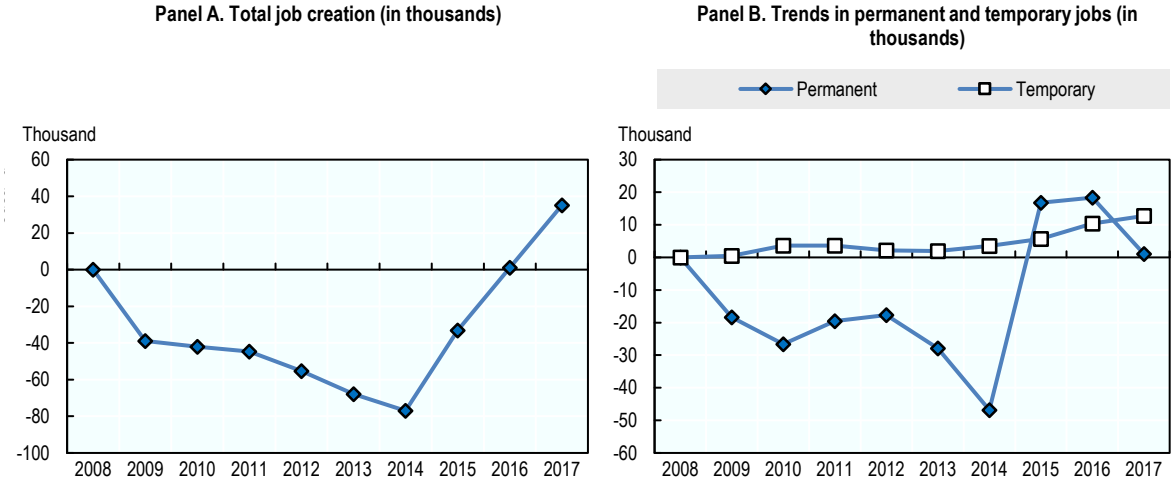

*Note*: Data availability was limited for some countries: Finland (2005-2016), Germany (2006-2013), Greece (2010-2016) and Slovenia (2010-2016). The maps show the evolution of temporary employment according to these restrictions. Data is missing for Austria, the Netherlands and Belgium (except Brussels – BE10).
*Source*: OECD calculations based on EU Labour Force Survey.

## Special focus: the region of Veneto, Italy[1]

The region of Veneto is located in the north of Italy. It is one of the largest (population of about 5 million people) and economically most dynamic regions in Italy. Like many regions in OECD countries, the local economy is undergoing a process of profound transformation.

In the region, employment has been picking up since 2014. After a period of recession and job losses started with the global financial crisis in 2008, the regional economy has started generating new jobs, with a slow but steady recovery to pre-crisis employment level (Figure 2.8). Still, although the number of jobs is similar their features are substantially different. Besides the creation of new types of jobs linked to digitalisation and the new economy (e.g., gig work), the working conditions of traditional jobs have changed markedly.

**Figure 2.8. Increasing trend in temporary work, Veneto, 2008-17**




*Source*: OECD calculations based on data from VLMIS database, Veneto Lavoro, Italy.

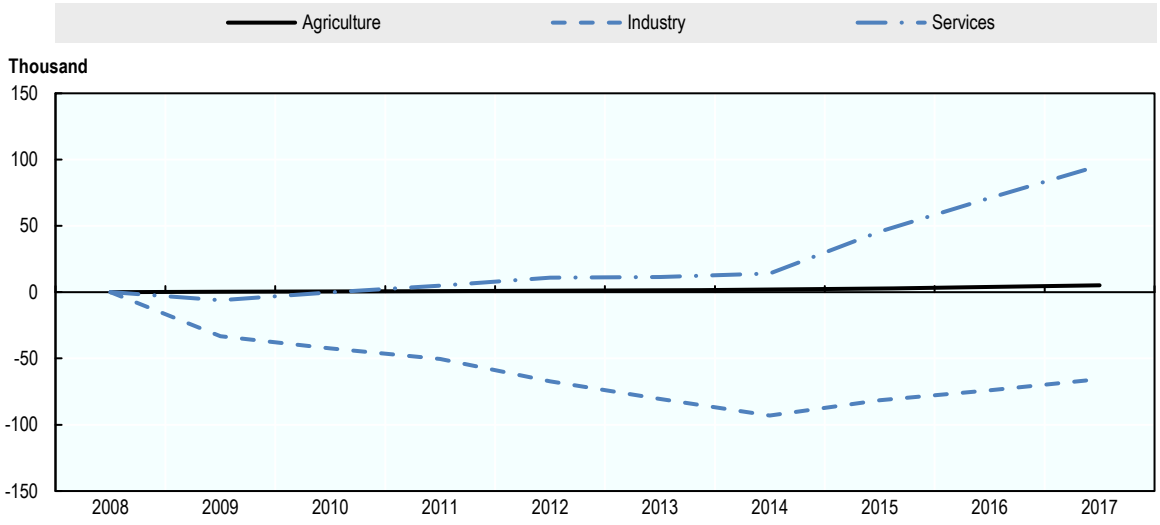
StatLink https://doi.org/10.1787/888933824971

The sharp increase in employment in 2014 was mainly due to the rise of permanent jobs – which benefitted from a programme of fiscal incentives for firms –, but as total employment continues to increase, permanent jobs reached a peak in 2016 (Figure 2.8, Panel B). This highlights the increasing importance of temporary jobs for the regional economy as a way to sustain employment. The share of traditional contracts is gradually eroding, although in 2017 standard contracts still represented 85% of jobs.

The regional economy has also undergone a structural change, with an expanding service sector and a shrinking manufacturing sector (Figure 2.9). For instance, many workers who lost their job in the manufacturing sector during the crisis have found jobs in the service sector.

**Figure 2.9. Employment in the service sector is replacing industry**

Employment growth, number of employees, 2008=0




*Source*: OECD calculations based on data from VLMIS database, Veneto Lavoro, Italy.

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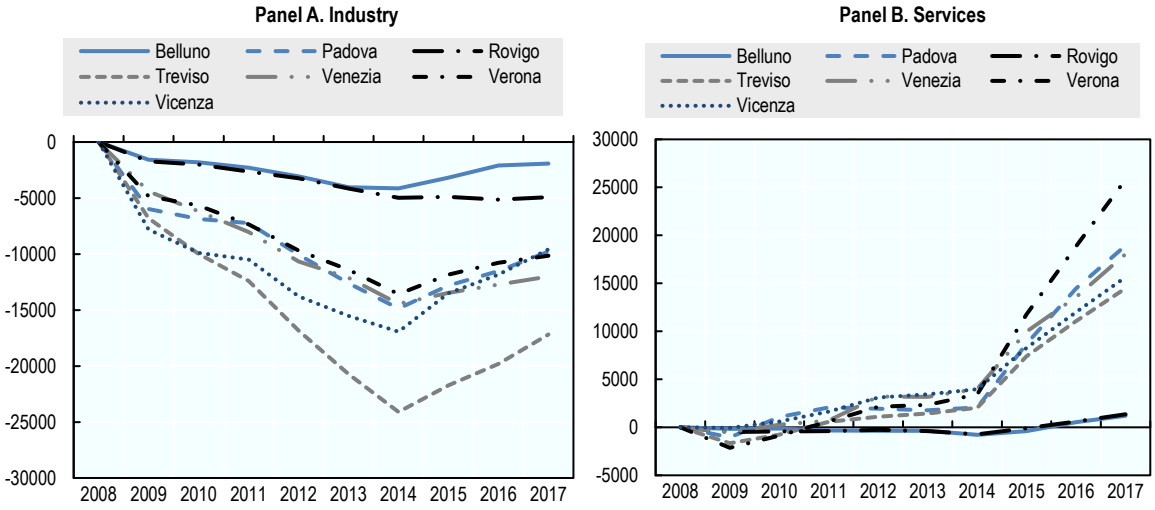
However, working conditions seems to have worsened. The increase in employment in the service sector over the period 2008-17 has coincided with an increase in part-time work, from 15% of male and 35% female workers employed with part-time contracts in 2008, to almost 50% of female and 25% for male workers in 2017. In most of the cases this is involuntary part-time. The Italian Labour Force Survey indicates that, in Veneto, up to 75% of male workers and 50% of female workers are involuntarily employed part-time. This means that most male workers would prefer to have a full-time job, but are constrained by labour market conditions to accept part-time jobs.

The increase in non-standard types of work, such as on-call jobs and temporary work paid with vouchers, could linked to the fact that companies increasingly need flexibility. However, the concentration of these contacts in just one sector lends some credibility to the view that companies mainly introduced these new forms of flexible work to help reduce labour costs.

Local labour markets within the region are experiencing common trends in employment, with the service sector gradually becoming more and more important in the local economy. Still, changes in the manufacturing sector are more acute in some sub-regions, and the growth of the service sector is mainly experienced in other sub-regions, namely, the metropolitan areas of Venice and Padua.

**Figure 2.10. Uneven employment trends across sub-regions in Veneto, Italy, 2008-17**

Employment by TL3 regions within Veneto, cumulative yearly balance, December 2008=0



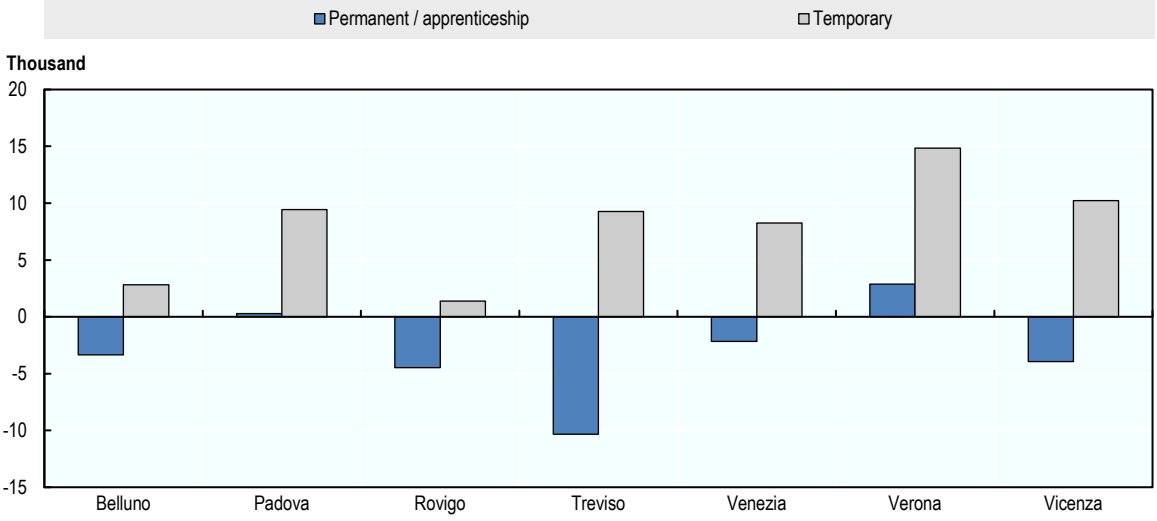

*Source*: OECD elaboration on data from VLMIS database, Veneto Lavoro, Italy.

StatLink https://doi.org/10.1787/888933825009

The biggest drop is in Treviso, which is a sub-region of Veneto that has one of that region's most important manufacturing sectors. This transition from industry to services coincides with a reduction of permanent jobs and an increase in temporary jobs (Figure 2.11). This has been particularly true in the sub-regions of Belluno, Treviso, and Vicenza, which traditionally have had substantial manufacturing sectors.

**Figure 2.11 Rising temporary jobs in all sub-regions in Veneto, Italy, 2008-17**

Aggregate change 2008-17, number of employees




*Source*: OECD elaboration based on data VLMIS database, Veneto Lavoro, Italy.

StatLink https://doi.org/10.1787/888933825028

The region of Veneto, during the period 2007-17, saw a drop in manufacturing employment during the global financial crisis and the subsequent great recession and a recovery, since 2014, characterised by a transition toward the service sector.

Overall, this common trend is particularly acute in the "manufacturing" sub-regions, where the economy is mainly driven by traditional manufacturing sectors, and where the increase in the service sector employment has mainly been driven by temporary and flexible forms of jobs.

## Self-employment

The third category of non-standard work is self-employed workers. This category covers a wide range of working arrangements, which have in common the autonomous nature of the work. The self-employed are a very heterogeneous group of workers and the nature and scale of their activities varies, as do their motivations and aspirations. While many self-employed workers pursue market opportunities, others are self-employed because they have been unable to secure dependent employment. This section is based on analysis contained in the report *The Missing Entrepreneurs 2017* (OECD/EU, 2017), which investigates the changing nature of self-employment and examines the implications of these trends on the quality of self-employment "work". It also discusses measures that policy makers can use to improve the quality of businesses that rely on the self-employed.

### *The role of self-employment*

The OECD defines the self-employed as those individuals who own and work in their own business, including unincorporated businesses and own-account workers. In population or labour force surveys, these individuals declare themselves to be "self-employed" (OECD, 2017a). A key characteristic of the self-employed is that they derive some form of economic benefit from their work, which typically includes wages, profits, in-kind benefits or family gains for those who work in family businesses. This sets the self-employed apart from those who undertake activities on a voluntary basis, which is excluded from the definition of self-employment.

Self-employment "jobs" are those "where the remuneration is directly dependent upon the profits (or the potential for profits) derived from the goods and services produced (where own consumption is considered to be part of profits). The incumbents make the operational decisions affecting the enterprise, or delegate such decisions while retaining responsibility for the welfare of the enterprise" (15th Conference of Labour Statisticians, January 1993). This definition therefore includes both unincorporated and incorporated businesses, and consequently diverges from the definitions commonly used in systems of National Accounts which typically classify self-employed owners of incorporated businesses and quasi-corporations as employees.

Implicit in this definition is that there are three core features which help to distinguish independent self-employment work from dependent employment:

1. greater control over how they work;
2. greater independence about which work they choose;
3. and bearing the risks involved in contracting their services.

In practice, statistical agencies consider a person to be self-employed when they are working in their own business, farm or professional practice rather than for an employer. In addition, the self-employed must meet at least one of the following conditions:

1. working for the purpose of earning profit;
2. spending time on the operation of a business; or
3. being in the process of setting up his/her business.

A number of factors complicate any attempt to define self-employment. First, there are a large number of terms used to describe the self-employed, including the solo self-employed, own-account workers, sole traders, freelancers, independent professionals ("I-pros"), contractors, portfolio workers and working proprietors in businesses with no employees, to name a few. The conflation of different categories is partly for data availability reasons and partly because it has become conventional to use these terms interchangeably. It is also increasingly difficult to define and differentiate between the various forms of self-employment and dependent employment.

The self-employed are not necessarily entrepreneurs, in the sense of business owners who act entrepreneurially in identifying and exploiting new products, processes or markets. Furthermore, many people who are self-employed would not consider themselves entrepreneurs or business owners, because self-employment is more a form of employment than a form of business ownership for them, and some types of self-employment, e.g. construction jobs, are not particularly entrepreneurial. The reasons for supporting these people are more about securing labour market attachment than promoting entrepreneurship. At the same time, although self-employed people do not necessarily act entrepreneurially in creating new products, processes and markets, they often do, particularly when they do not work alone but also have employees.

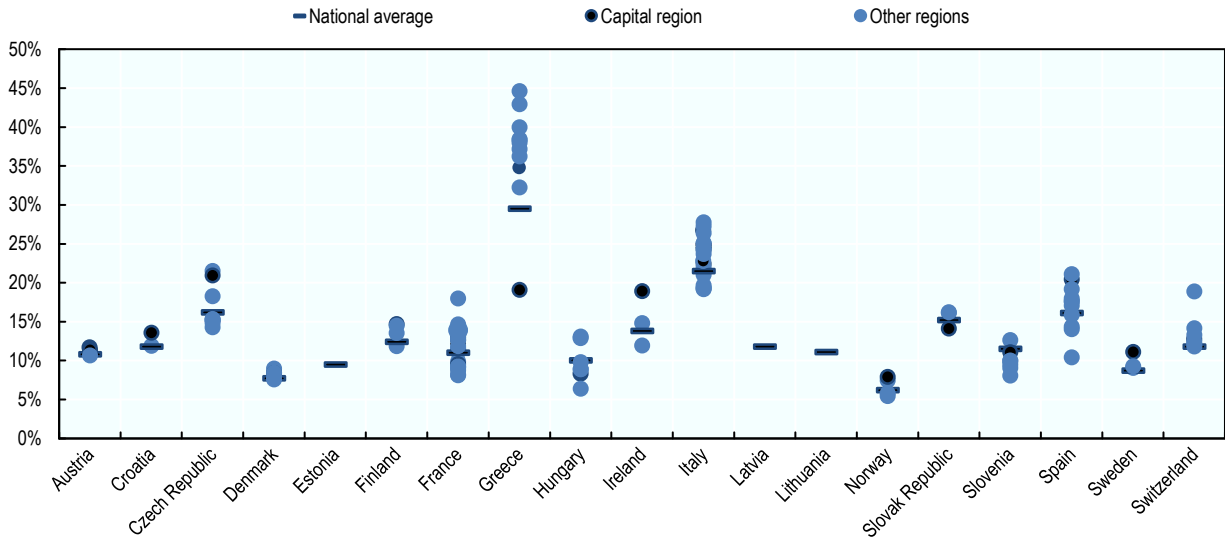
Approximately 10% of working women in OECD countries were self-employed in 2016, which was less than that of men (approximately 17%). Over the last ten years, the self-employment rates have been fairly constant for both men and women but the gap between the two has closed slightly. This was largely due to a slight decline in the proportion of men who were self-employed.

The proportion of workers who are self-employed varies across countries and regions. Among the OECD countries where data are available at the regional level, self-employment rates were the highest in Greece. Within Greece, there were three regions where the proportion of workers who were self-employed was 40% or greater: Eastern Macedonia, Thrace (45%); Peloponnese (43%); and the Ionian Islands (40%). The self-employed accounted for more than 30% of workers in all other regions except the capital region, where only 19% of workers were self-employed.

Overall the self-employment rate in the capital regions was equal to, or less than, the national average in nearly all other countries. This is likely due to a greater concentration of employment opportunities. However, self-employment rates were high in the capital regions in Norway, Slovenia, Sweden, and Switzerland. Key factors that determine the levels of self-employment include industrial structure, labour market regulations, market conditions, access to finance, knowledge creation and diffusion, entrepreneurial capabilities and culture (OECD, 2017a).

**Figure 2.12. Regional self-employment rates**

Percentage of total employment, in EU TL2 regions, 2016




*Source*: OECD calculations from EU Labour Force Surveys.

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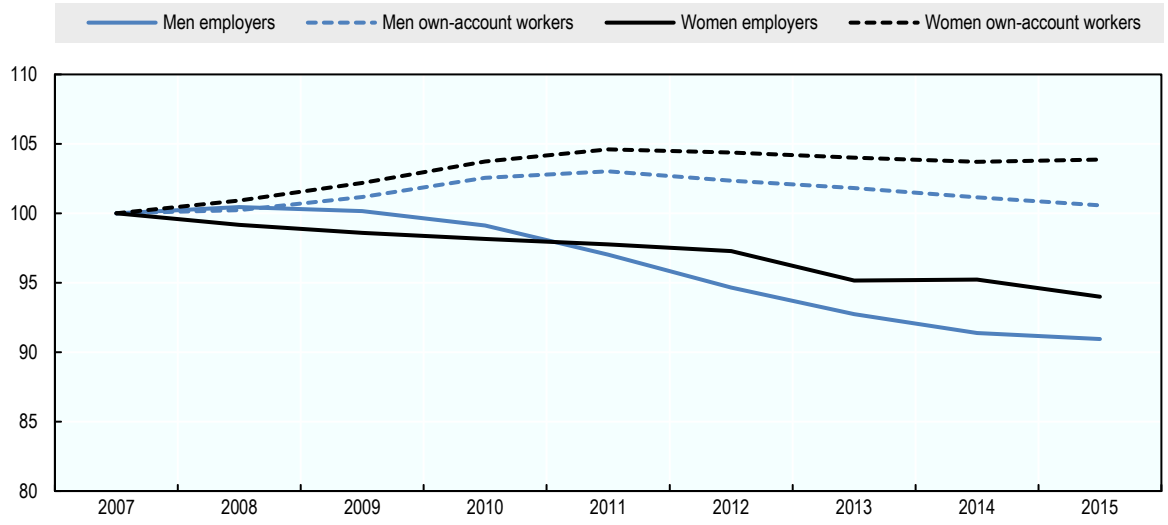
### *The changing nature of self-employment*

Although the proportion of workers who are self-employed has remained fairly constant at approximately 15% over the last decade, there have been several changes in the nature of self-employment in OECD countries.

First, there has been an increase in the proportion of self-employed workers without employees (Figure 2.13). Over the period 2007-15, the proportion of self-employed men and women without employees increased across OECD countries, while the share of those with employees has declined. This increasing share of *solo* self-employment is significant because, on average, these businesses tend to contribute less to productivity growth.

**Figure 2.13. Trends in the self-employment rate, OECD average, by category and gender**

Index, 2007=100, period 2007 to 2010




*Note*: Rate of self-employed employers by gender is calculated as the share of self-employed employers in the population of all employed by gender. Rate of self-employed own-account workers by gender is calculated as the share of self-employed own-account workers in the population of all employed by gender. To improve international comparability, the figures for Canada and the United States include both unincorporated and incorporated employers. Annual smoothed estimates have been computed using 3-year centred moving averages. For the first and last year of a country series, a 2-year moving average has been used.
*Source*: OECD (2017a), *Entrepreneurship at a Glance 2017*, OECD Publishing, Paris.

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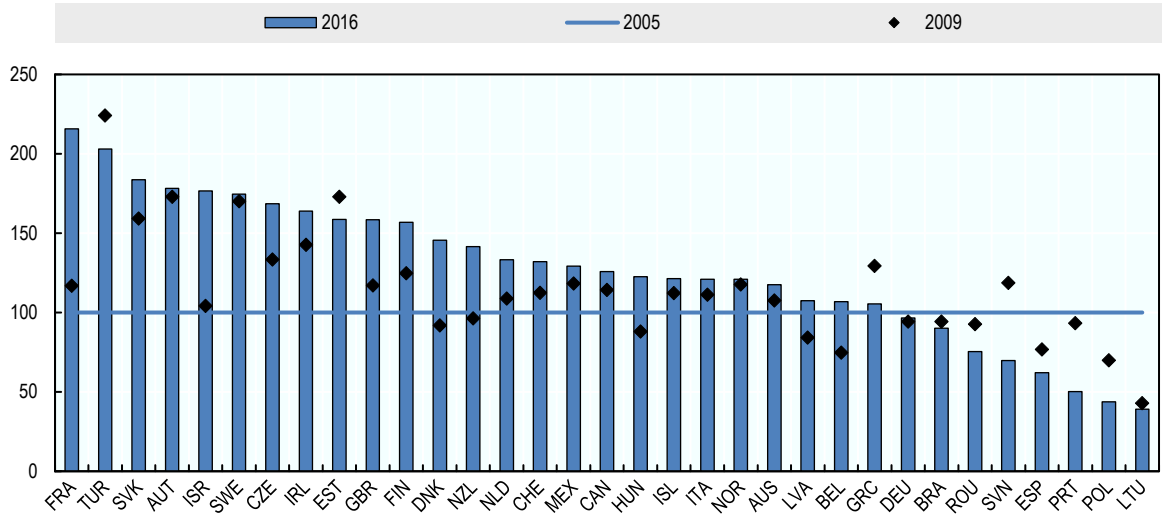
The growth in "solo" self-employment is due partly to the increase in part-time self-employment in the majority of OECD countries over the same period. Between 2005 and 2016, the number of part-time self-employment (i.e. self-employed people who usually work less than 30 hours per week) increased in 25 out of 33 countries where data are available (Figure 2.14). There are several reasons for this increase. Some research has found that an increase in the incidence of self-employment that is combined with other activities such as education or paid employment (Molenaar, 2016). Another important factor is that most OECD countries are streamlining regulatory and administrative procedures related to business creation. In France, for example, the number of part-time self-employed more than doubled over this period, which is largely due to the introduction of the *auto-entrepreneur* scheme in 2009 that provides tax incentives and reduced social security contributions for small-scale self-employment activities.

**Figure 2.14. Part-time self-employment on the rise in most OECD countries**

Index 2005 = 100




*Source*: OECD (2017b) Labour Market Statistics: Full-time part-time employment - common definition, OECD Employment and Labour Market Statistics (database).

StatLink https://doi.org/10.1787/888933825085

A second important self-employment trend in recent years has been the emergence of the digital economy. While it is difficult to estimate the number of self-employed workers who operate in the digital economy, it is widely believed that they account for a growing share of employment (OECD, 2016b). The emergence of the digital economy has created new markets, sectors and occupations, and some self-employed workers have harnessed these new opportunities and created high-value added work for themselves, e.g. freelancers, independent professionals. This type of self-employed worker is often engaged in creative, intellectual and service-oriented industries. Most do not employ others but instead work in collaborative arrangements that are increasingly facilitated through online platforms and mobile applications (e.g. Amazon Mechanical Turk). These workers are sometimes referred to as "I-pros" (Rapelli, 2012).

However, the digital economy also appears to have created some precarious forms of self-employment. A growing number of the self-employed work for only one client and have a work arrangement that is essentially the same as an employee, despite being registered as self-employed. This type of self-employment (i.e. "dependent" self-employment) is difficult to detect and assess, as it is usually undeclared to statistical, tax or relevant labour authorities. While some self-employed workers may prefer such a work arrangement, these workers tend to have none of the advantages of dependent employment (e.g. non-wage benefits), none of the advantages of self-employment (e.g. autonomy to determine tasks and workload), and yet they bear most of the disadvantages of self-employment (e.g. earnings volatility). A related category of dependent self-employment is "false" self-employment, where the end-user (i.e. the "employer") and the self-employed worker deliberately misclassify the work status to reduce tax and social security obligations (Box 2.3).

**Box 2.4. Dependent and "false" self-employment**

Dependent self-employment refers to work arrangements where the worker is formally self-employed yet works under conditions similar to those of dependent employees (Muehlberger, 2007; Eichhorst et al., 2013). These self-employed individuals typically have one single client, thereby lacking the range of clients considered to be an important feature of independent working (Jorens, 2008).

End-users in dependent self-employment relationships are motivated to use these types of workers to achieve numerical and financial flexibility, while maintaining a high degree of control over working practices, externalising risk and in some cases, avoiding legal and social security obligations (Muehlberger and Bertolini, 2008; Muehlberger and Pasqua, 2009; Eichhorst et al., 2013). This type of work is most frequently found in construction, transport, insurance, business services, architecture, and the creative industries (Eichhorst et al., 2013). Recent estimates in the European Union suggest that approximately 13% of the self-employed work in these types of arrangements, accounting for approximately 1% of employment in the European Union (Eurofound, 2017). However, another 31% of the self-employed are neither clearly dependent nor independent self-employment, suggesting that approximately 4% of employment in the European Union is in some form of "disguised" self-employment.

It is possible that some workers seek this type of work arrangement. Workers might choose to work on a dependent self-employed basis for tax and other reasons; while others might have limited job options and it would be better to describe them as involuntary self-employed (OECD/The European Commission, 2013).

Some cases of dependent self-employment can be considered "false" or "bogus" self-employment, which is where there is a deliberate attempt to misclassify a worker's status in order to evade labour laws or social insurance obligations (Roles and Stewart, 2012; Deakin, 2013). These "disguised employees" typically cannot refuse work, are managed by the end-user, use their own equipment, are integrated into the end-user's HR systems, cannot substitute another worker to perform their designated tasks and yet carry the financial risk for time spent not working or for work judged unsatisfactory by the end user.

Many of the types of work that are associated with the digital or collaborative economy can be considered "false" self-employment, as companies use online platforms to spread work across several independent contractors. This type of self-employment is a particular problem in the construction industry (Jorens, 2008) (Behling and Harvey, 2015) but also extends beyond into catering, social care, logistics and valet car services (Behling and Harvey, 2015; Smith et al., 2015).

This type of self-employment may suit some workers and increase labour market flexibility (Williams, 2013). However, such activities can have social welfare consequences because they reduce tax receipts and social security contributions. Since those working in false self-employment effectively save on these costs (as do their employers), one further disadvantage is that they can undercut workers and businesses in the formal economy, thereby threatening their livelihood (Muller, 2014). It also has costs for the false self-employed if they just work for one employer because they may gain none of the advantages of employment (e.g. holiday, maternity pay, access to training); gain few of the advantages of self-employment (e.g. task autonomy and

diversity); and incur all of its potential disadvantages (e.g. poor pay, stress, financial insecurity and long working hours). Evidence from the United Kingdom shows that those in dependent self-employment tend to be older and have lower skill levels (Böheim and Muehlberger, 2006), suggesting that there is a high likelihood of these workers becoming trapped in precarious, low-quality work.

*Source*: OECD/EU (2017) *The Missing Entrepreneurs 2017: Policies for Inclusive Entrepreneurship*, OECD Publishing, Paris.

### *The quality of self-employment*

Policy makers and researchers are increasingly interested in measuring the quality of work since there are strong links between work, lifestyle and standard of living (OECD, 2015). Moreover, there is evidence that job quality can be an important driver of labour force participation, productivity growth and aggregate economic performance (Cazes, Hijzen and Saint-Martin, 2015). Many international organisations, including the OECD, European Commission, International Labour Organisation and Eurofound, are developing assessment frameworks and indicators to assess job quality, but self-employment is often excluded in these analyses due to the high degree of heterogeneity among the self-employed and the difficulty in developing internationally comparable indicators. Job quality is often assessed with regard to three main aspects: (a) earnings, (b) job stability and (c) working conditions. This framework can also be applied to assess the quality of self-employment work, with some slight modifications in how these dimensions are measured.

Public policy to support business creation and self-employment often focuses on increasing the quantity of new businesses started and on labour market inclusion. However, it is as important to improve the quality of self-employment.

The changing nature of self-employment has introduced new challenges for policy makers as some of these forms of work may be low-quality and have little economic impact. Policy makers must therefore be careful when supporting people in self-employment because some may be better off working as dependent employees.

#### *(a) Earnings*

When assessing the earnings of the self-employed, both the level of earnings and the distribution of earnings need to be considered. Both aspects are important as there is a positive correlation between level of earnings and subjective well-being measures, both at the individual level and across countries. Further, for a given level of average earnings, overall well-being tends to be higher when there is a more equal distribution (Cazes, Hijzen and Saint-Martin, 2015).

In assessing the "quality" of earnings, choices need to be made on how they are measured, particularly for the self-employed. Gross wages are typically preferred when analysing the earnings of dependent employees due to the challenges in measuring net wages across countries, and hourly earnings are often considered to differentiate between job quantity issues and job quality issues. However, earnings are usually measured differently when examining the income of the self-employed. Net earnings are often used when assessing job quality since this measure has a more direct impact on quality of life. In addition, monthly earnings are preferred to hourly earnings since the self-employed typically have irregular work flows.

The self-employed are more likely than employees to be found among both the lower and upper tails of the income distribution than those in wage employment. Relative to employees on permanent contracts, the self-employed with employees have higher net monthly earnings. Within European Union countries, recent analysis shows that the self-employed with employees earned, on average, EUR 2 590 in 2015 relative to EUR 1 930 per month for employees on permanent contracts (Eurofound, 2016). But even the self-employed without employees typically earn more per month than some types of employees, such as those on fixed-term contracts – EUR 1 840 vs. EUR 1 150 in 2015) (Eurofound, 2016). The self-employed with employees tend to earn more than those without employees, on average, when controlling for hours worked (Eurofound, 2016). But it is important to recognise that there are many self-employed without employees who generate high earnings, e.g. highly skilled freelance workers.

Despite these general findings, there is a wealth of evidence to suggest that earnings of the self-employed relative to employees vary greatly by location, sector and by personal characteristics. For example, evidence from Germany shows that the median self-employed (including those with ownership of limited liability businesses) earned 13% more than the median employee in Germany, on average, but earned 15.0% more in East Germany and 14.8% less in West Germany (Martin, 2013). Further, evidence from Germany and the United States suggests that the better-educated have higher earnings levels when in self-employment relative to employment (Sorgner, Fritsch and Kritikos, 2014) (Hartog, van Praag and Van Der Sluis, 2010). Evidence on self-employment earnings by age is mixed with some research suggesting that the earnings profile is "U-shaped" across age groups, while other research finds no conclusive patterns (OECD/EU, 2017).

When assessing self-employment earnings, it is also important to also consider work-related benefits. Overall, the self-employed have access to fewer benefits than employees in most OECD countries (OECD/EU, 2014). For example, self-employed are generally not eligible for sick pay and are less likely to be affiliated with old-age pension schemes than employees in high-income countries (63% for the self-employed vs. 89% for employees) (International Labour Organisation, 2015). Moreover, they appear to be much less likely to make contributions to private pension schemes (OECD/EU, 2017). While these lower levels of benefits may be seen as appropriate given the lower social contributions that the self-employed tend to make, the administrative costs associated with accessing social security benefits also deter people from considering self-employment and make it more difficult to access benefits (OECD/EU, 2014).

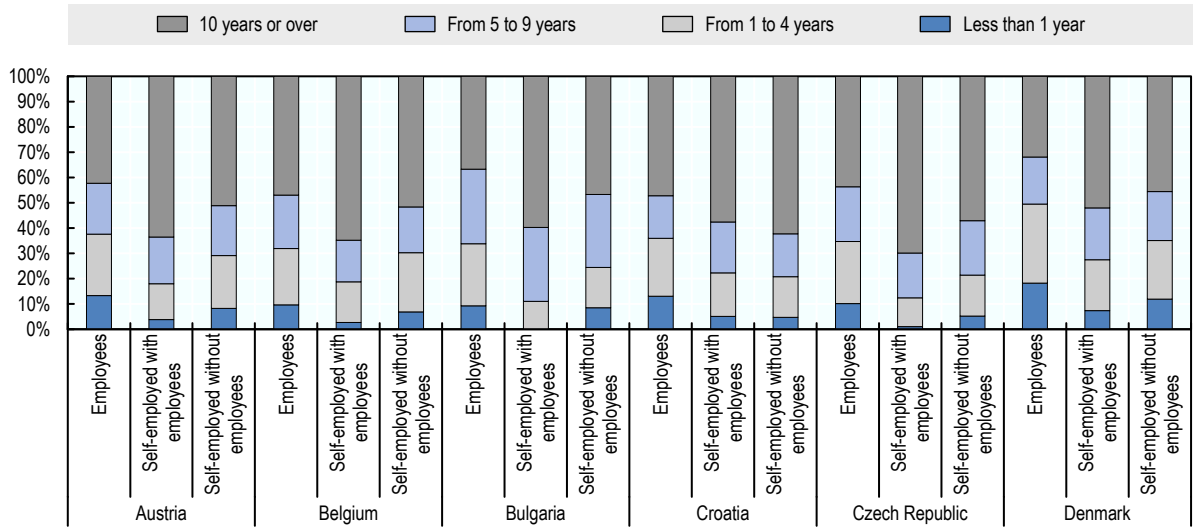
### *(b) Income security*

Self-employment is less secure than dependent employment as most new businesses exit before five years, which is an important consideration when interpreting earnings data for the self-employed. The majority of these self-employed workers do not have access to unemployment benefits, so they do not have the same security net as employees (OECD/EU, 2017). However, some of those who exit self-employment will quickly move into dependent employment.

Data on job tenure over 30 OECD and non-OECD member countries confirm that self-employment jobs are less likely to have shorter tenures than employees (Figure 2.15). However, more than half of the self-employed have been in their "jobs" for more than 10 years, which is greater than the proportion of employees (42%). A small difference in job tenure is observed between the self-employed with and without employees. Those with

employees were more likely to have been operating for more than 10 years (62%) whereas those without employees were more likely to have been operating for less than five years.

**Figure 2.15. Job tenure by work status (selected countries), 2017**




*Source*: Eurostat (2018), Labour Force Survey (series lfsa_qoe_4a2).

StatLink https://doi.org/10.1787/888933825104

One further symptom of the deterioration of security of self-employment is the increasing incidence of part-time self-employment. International research suggests that this growth in part-time self-employment has largely been involuntary, i.e. 30% of new entrepreneurs indicate that they started their business because they could not find work (Global Entrepreneurship Monitor, 2017). Moreover, over the period 2007-12, evidence shows that the percentage of self-employed workers looking for another job has gone up in many EU countries, although there are exceptions such as Germany and Poland (Hatfield, 2015).

The self-employed are also more likely than employees to indicate that they are not financially secure. Approximately 40% of the "solo" self-employed indicated that they were financially insecure, which was greater that the proportion of self-employed with employees, and employees on permanent contracts (Eurofound, 2016). However, the self-employed with employees were less likely to assess themselves as financially insecure compared with employees on fixed term or other types of contracts.

### *(c) Working conditions*

The third component of job quality captures the nature of working conditions. It covers a range of factors, including the number of hours worked, health and safety conditions, and the potential for training and skills development. Work-life balance is another important indicator of quality. This is especially important for the self-employed as flexibility is the defining feature of self-employment, and it is often an important factor in their decision to become self-employed.

Overall, self-employed workers tend to work longer hours than dependent employees. Self-employed workers who employ others tend to work longer hours than self-employed without employees. The latter tend to work longer hours than employees. This evidence also shows that the self-employed work longer working days, have shorter rest periods between work, and work more unsocial hours, which eats into their leisure time (Hyytinen and Ilmakunnas, 2007). Unsurprisingly, they are less likely to be absent from work (Lechmann and Schnabel, 2014).

Some of the self-employed may choose to work part-time as it enables them to achieve a better work-life balance. However, the evidence does not point to a marked difference in how employees and the self-employed view how working hours fit with family and social commitments (Eurofound, 2016). This suggests that some might be dissatisfied with their limited hours and would prefer to work more to be able to generate more earnings. Hours of work are therefore an ambiguous indicator of self-employment quality (Baumberg and Meager, 2015).

The self-employed are also less likely to undertake formal training, either for themselves or for any workers that they employ, than if they were working in bigger companies (Storey and Greene, 2010). Although this may be offset by informal on-the-job training, these differences reflect the fact that the self-employed are often less aware of the value of formal training, are put off by its cost, or are concerned that if they train their workers they are more likely to be poached by rival businesses that can offer their employees better opportunities. They are therefore less likely to have a clear pathway for professional development compared with employees.

Nevertheless, self-employed workers are more optimistic about their career prospects than dependent workers. Recent evidence shows that 38% of employees indicated that they had good prospects for career advancement in 2015 compared to 42% of the self-employed (Eurofound, 2016). Caution is needed in comparing the responses of employees and the self-employed because career advancement likely has very different meanings. For employees this likely refers to a promotion or moving to a new and presumably better job. However for the self-employed, this could be increasing business revenues, hiring employees or opening additional businesses. These outcomes are clearly not equivalent. Among the self-employed, those with employees were much more likely to have a positive outlook about future career advancements than those without employees (52% vs. 37%) (Eurofound, 2017). Most likely this is because they operate larger businesses with more stable income and greater opportunities for growth.

## *Policies to improve the quality of self-employment*

### *Improving the quality of businesses*

Public policy has traditionally sought to improve the quality of self-employment by making the business environment more favourable to the self-employed and by offering a range of supports to increase the chances of success for the self-employed. These support measures include entrepreneurship and business management training, coaching and mentoring, business counselling, and improved access to start-up financing and entrepreneurship networks.

National, regional and local governments take different approaches to delivering these support measures. Some use specialised agencies while others use mainstream delivery mechanisms. There is little evidence to suggest that one method is more effective than the

other, it often depends on the programme's objectives, available resources and the relative size of the target client group.

Programme evaluations suggest that supports have more positive results when they are designed and delivered in an integrated manner (i.e., from the start-up to post start-up phases). However, the success of a programme is heavily reliant on the extent to which it is designed to meet local needs and its ability to respond to changes in these needs.

### *Minimising "false" self-employment*

Much of the current policy debate surrounding the quality of self-employment is focused on the issue of dependent and false self-employment, including work arranged through online and mobile platforms. Evidence suggests that individuals working in false self-employment are very likely to be trapped in low-quality work. Therefore, policies combatting false self-employment will also improve the overall quality of self-employment.

Three approaches are typically used by policy makers to minimise false self-employment. The first is to clarify the work status of individuals (i.e., clearly distinguish between employees and the self-employed). This approach is taken in the Netherlands to address the growing prevalence of false self-employment (Box 2.4). The second is the introduction of intermediate work categories that treat this type of work separately. This approach is used by several EU countries. Finally, improving access to social security protection for the self-employed can help increase the quality of working conditions and income security for the self-employment, thereby removing incentives for false self-employment.

In practice, countries tend to take a multipronged approach to fighting false self-employment, including the use of measures to make it more attractive for employers to hire an employee versus contracting a "false" self-employed worker.

## Conclusion

The rise of temporary jobs in most OECD countries masks large regional differences within countries. The analysis shows that differences between regions largely depend on the characteristics of the regional economy. Regions with a higher share of educated workers have seen less temporary jobs than other regions. Overall, the sample of regions used in the analysis indicates that temporary contracts are associated with lower regional productivity and lower inclusion. This evidence is not conclusive regarding the nature of the relationship between labour market flexibility and regional performance. In fact, such evidence is based only on the distinction between temporary and permanent contracts and does not include all other forms of work that introduce flexibility in the labour market, e.g., part-time work, work in platform economies, etc. The OECD is committed to delving more into these issues and trying to better understand the trade-off between flexibility and quality of jobs at the local level.

The nature of self-employment has changed since the beginning of the 21st century. Most OECD countries have seen an increase in the number of self-employed workers without employees. This particular category of self-employment is more likely to represent the employment of last resort for some workers and has attracted "false" self-employment. In both cases, working conditions seem to be worse compared with "standard" dependent work. Overall, evidence suggests that individuals working in "false" self-employment are likely to be trapped in low-quality work. Consequently, policies combatting false self-

employment will also improve the overall quality of self-employment. At the same time, policies should continue to improve the business environment and increase the chances of success for entrepreneurs by offering entrepreneurship training, coaching and mentoring, business counselling, and improved access to start-up financing and entrepreneurship networks.

These trends in temporary work and self-employment raise important questions about labour market inclusion. An inclusive labour market should ensure access to jobs—but not just any job. It should also ensure that good-quality professional opportunities are available—for all types of people, living in all types of places. As regions strive to increase productivity, often through technology, their focus should also be on ensuring inclusion in all forms; how they can go about combining higher productivity and inclusion is the subject of the next chapter.

## Note

[1] Based on the contribution by Bertazzon and Rainero "The makeover of the local labour market, jobs and sectors in Veneto through the lens of administrative data", Veneto Lavoro, Italy.

## References

Autor, D. (2003), "Outsourcing at Will: The Contribution of Unjust Dismissal Doctrine to the Growth of Employment Outsourcing", *Journal of Labor Economics*, Vol. 21/1, https://economics.mit.edu/files/11572 (accessed on 16 April 2018).

Baumberg, B. and N. Meager (2015), "Job quality and the self-employed: Is it still better to work for yourself?", in Felstead, A., D. Gallie and F. Green (eds.), *Unequal Britain at Work*, Oxford University Press, Oxford.

Behling, F. and M. Harvey (2015), "The evolution of false self-employment in the British construction", *Work, Employment and Society*, Vol. 29/6, pp. 969-988.

Blanchard, O., F. Jaumotte and P. Loungani (2014), "Labor market policies and IMF advice in advanced economies during the Great Recession", *IZA Journal of Labor Policy* , Vol. 3.

Blanchard, O. and A. Landier (2002), "The Perverse Effects of Partial Labour Market Reform: Fixed-Term Contracts in France", *The Economic Journal*, Vol. 112, http://dx.doi.org/10.2307/798373.

Böheim, R. and U. Muehlberger (2006), "Dependent Forms of Self-employment in the UK: Identifying", *IZA Discussion Paper*, No. 1963, http://ftp.iza.org/dp1963.pdf.

Cazes, S., A. Hijzen and A. Saint-Martin (2015), "Measuring and Assessing Job Quality: The OECD Job Quality Framework", *OECD Social, Employment and Migration Working Papers*, No. 174, OECD Publishing, Paris, http://dx.doi.org/10.1787/5jrp02kjw1mr-en.

Deakin, S. (2013), "Addressing Labour Market Segmentation: The Role of Labour Law", *ILO Working Paper,* No. 52, http://www.ilo.org/wcmsp5/groups/public/---ed_dialogue/---dialogue/documents/publication/wcms_223702.pdf.

Eichhorst, W. et al. (2013), "Social protection rights of economically dependent self-employed workers", *IZA Research Report*, No. 54, http://legacy.iza.org/en/webcontent/publications/reports/report_pdfs/iza_report_54.pdf.

Eichhorst, W. and P. Marx (2015), *Non-standard employment in post-industrial labour markets: An occupational perspective*, Edward Elgar Publishing, https://books.google.fr/books?hl=en&lr=&id=nUvfBgAAQBAJ&oi=fnd&pg=PR1&dq=an+occupational+perspective+on+non-standard+employment&ots=QW_tww2JeR&sig=WSk_eJuZOQ8cIXeo425XkGIChbk (accessed on 16 April 2018).

Eurofound (2017), *Exploring self-employment in the European Union*, http://dx.doi.org/doi:10.2806/651917.

Eurofound (2016), *Sixth European Working Conditions Survey – Overview report*, http://eurofound.link/ef1634.

Global Entrepreneurship Monitor (2017), *Global Report 2016-17*, http://gemconsortium.org/report.

Hartog, J., M. van Praag and J. Van Der Sluis (2010), "If you are so smart, why aren't you an", *Journal of Economics & Management Strategy*, Vol. 19/44, pp. 947-989.

Hatfield, I. (2015), *Self-Employment in Europe,* http://www.ippr.org/files/publications/pdf/selfwww.ippr.org/files/publications/pdf/selfemployment-Europe_Jan2015.pdf?noredirect=1.

Hyytinen, A. and P. Ilmakunnas (2007), "What distinguishes a serial entrepreneur?", *Industrial and corporate change*, Vol. 16/5, pp. 793-821.

International Labour Organisation (2015), *World Employment and Social Outlook*, ILO, New York.

Jaimovich, N. and H. Siu (2012), "The Trend is the Cycle: Job Polarization and Jobless Recoveries", *NBER Working Papers*, No. 18334, National Bureau of Economic Reseach, Cambridge, MA, http://www.nber.org/papers/w18334 (accessed on 21 February 2018).

Jorens, Y. (2008), *Self-employment and bogus self-employment in the European construction*, http://www.efbww.org/default.asp?Issue=Self-employment%20and%20Bogus%20Self-employment&Language=EN.

Katz, L. and A. Krueger (2016), *The Rise and Nature of Alternative Work Arrangements in the United States, 1995-2015*, National Bureau of Economic Research.

Kleinknecht, A., F. van Schaik and H. Zhou (2014), "Is flexible labour good for innovation? Evidence from firm-level data", *Cambridge Journal of Economics*, Vol. 38/5, pp. 1207-1219, http://dx.doi.org/10.1093/cje/bet077.

Lechmann, D. and C. Schnabel (2014), "Absence from Work of the Self-Employed: A Comparison with Paid Employees", *Kyklos*, Vol. 67/3, pp. 368-390.

Martin, J. (2013), "The Impact on Earnings When Entering Self-Employment – Evidence for Germany", *SOEPpaper*, No. 537, http://dx.doi.org/10.2139/ssrn.2214877.

Molenaar, K. (2016), *They are not yet seen… but…: Hybrid Entrepreneurship emerging in a changing*, The Hague University of Applied Sciences, http://www.european-microfinance.org/.

Muehlberger, U. (2007), D*ependent Self-Employment: Workers on the Border Between Employment and Self-*, Palgrave Macmillan, Basingstoke.

Muehlberger, U. and S. Bertolini (2008), "The organizational governance of work relationships between", *Socio-Economic Review*, Vol. 6/3, pp. 449-472.

Muehlberger, U. and S. Pasqua (2009), "Workers on the border between employment and self-employment", *Review of Social Economy*, Vol. 67/2, pp. 201-228.

Muller, F. (2014), "Cross-border mobility of 'bogus' self-employed workers: a lack of legal framework", *European Labour Law Journal*, Vol. 3-4.

Nielen, S. and A. Schiersch (2014), "Temporary Agency Work and Firm Competitiveness: Evidence from German Manufacturing Firms", *Industrial Relations: A Journal of Economy and Society*, Vol. 53/3, pp. 365-393, http://dx.doi.org/10.1111/irel.12062.

OECD (2017a), *Entrepreneurship at a Glance 2017*, OECD Publishing, Paris, http://dx.doi.org/10.1787/entrepreneur_aag-2017-en.

OECD (2017b), *Labour Market Statistics: Full-time part-time employment - common definition*, OECD Employment and Labour Market Statistics (database), https://doi.org/10.1787/b111e2e7-en .

OECD (2016a), *Job Creation and Local Economic Development 2016,* OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264261976-en.

OECD (2016b), *New forms of work in the digital economy*, Working Party on Measurement and, Paris, http://www.oecd.org/officialdocuments/publicdisplaydocument .

OECD (2016c), *Employment Outlook 2016*, OECD Publishing, Paris, https://doi.org/10.1787/empl_outlook-2016-en.

OECD (2015), *In It Together: Why Less Inequality Benefits All*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264235120-en.

OECD (2011), *Divided We Stand: Why Inequality Keeps Rising*, OECD Publishing, Paris, http://www.oecd.org/els/soc/dividedwestandwhyinequalitykeepsrising.htm (accessed on 05 April 2018).

OECD/EU (2017), *The Missing Entrepreneurs 2017: Policies for Inclusive Entrepreneurship*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264283602-en.

OECD/EU (2014), *The Missing Entrepreneurs 2014: Policies for Inclusive Entrepreneurship in Europe*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264213593-en.

OECD/The European Commission (2013), *The Missing Entrepreneurs: Policies for Inclusive Entrepreneurship in Europe*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264188167-en.

Palier, B. and K. Thelen (2010), "Institutionalizing Dualism: Complementarities and Change in France and Germany", *Politics & Society*, Vol. 38/1, pp. 119-148, http://dx.doi.org/10.1177/0032329209357888.

Rapelli, S. (2012), *European I-Pros – Designing Economic Cultures*, European Forum of Independent, http://www.designingeconomiccultures.net/wp-content/uploads/2012/12/EFIPreport .

Roles, C. and A. Stewart (2012), "The reach of labour regulation: tackling sham contracting", *Australian Journal of Labour Law*, Vol. 25/3, pp. 258-283.

Smith, A. et al. (eds.) (2015), "False self-employment", in *Stretching the Sociological Imagination: Essays in Honour of John Eldridge*, Palgrave Macmillan, Basingstoke.

Sorgner, A., M. Fritsch and A. Kritikos (2014), "Do Entrepreneurs Really Earn Less?", *IZA Discussion Paper,* No. 8651, http://ftp.iza.org/dp8651.pdf.

Storey, D. and F. Greene (2010), *Small business and entrepreneurship*, Financial Times/Prentice Hall, London.

Weil, D. (2014), *The fissured workplace: Why work became so bad for so many and what can be done to improve it*, Harvard University Press.

Westerveld, M. (2012), "The 'New' Self-employed: An issue for social policy?", *European Journal of Social Security*, Vol. 14/3, pp. 156-173.

Williams, C. (2013), "Evaluating cross-national variations in the extent and nature of informal", *Industrial Relations Journal*, Vol. 44/5-6, pp. 479-494.

# Annex 2.A. Individual-level analysis of temporary employment

Besides the features of the local economy, the presence of non-standard work across regions is driven by the individual characteristics of the labour force. Using individual-level data from different countries' Labour Force Surveys, it is possible to have a better insight into the probability of a worker with specific characteristics of being employed in a temporary contract depending on the region he/she lives in. The analysis is conducted using a Linear Probability Model to determine the main elements that influence the likelihood of a worker being employed with a temporary contract.

**Table 2.A.1. Drivers of temporary employment based on personal characteristics**

| Explanatory variables | Dependent variable | | | |
|---|---|---|---|---|
| | Share of temporary employment | | | |
| **Personal characteristics** | **(1)** | **(2)** | **(3)** | **(4)** |
| Female | 0.0155*** | 0.015*** | 0.0187*** | 0.0157*** |
| Work experience (in months) | -0.0034*** | -0.0034*** | -0.0034*** | -0.0034*** |
| Work experience squared | 0.0000*** | 0.0000*** | 0.0000*** | 0.0000*** |
| Foreign nationality | -0.0403*** | -0.0418*** | -0.0417*** | -0.0395*** |
| Education | | | | |
| *Finished high school* | -0.0346*** | -0.0351*** | -0.0339*** | -0.0169*** |
| *Tertiary education* | -0.0587*** | -0.0602*** | -0.056*** | -0.038*** |
| Place of residence | | | | |
| *Lives in a town or suburb* | 0.0028*** | 0.0038*** | 0.0016*** | 0.0154*** |
| *Lives in a rural area* | 0.0169*** | 0.0182*** | 0.0156*** | 0.047*** |
| Works in a firm with over 10 employees | 0.0137*** | 0.0159*** | 0.0109*** | 0.0134*** |
| Works in the tradable sector | -0.024*** | - | - | -0.0242*** |
| Works in the service sector | - | 0.0249*** | - | - |
| Works in a tradable service | - | - | -0.0143*** | - |
| | | | | |
| **Regional characteristics** | | | | |
| Size of the regional workforce | 0.0000*** | 0.0000*** | 0.0000*** | 0.0000*** |
| Regional GDP per capita | 0.0000*** | 0.0000*** | 0.0000*** | 0.0000*** |
| Regional unemployment rate | 0.0034*** | 0.0033*** | 0.0036*** | 0.0034*** |
| Share of the regional labour force with tertiary education | -0.0014*** | -0.0014*** | 0.0000*** | -0.0013*** |
| | | | | |
| **Interaction terms** | | | | |
| Level of education ## Place of residence | | | | |
| *Finished high school & Lives in a town or suburb* | - | - | - | -0.0141*** |
| *Finished high school & Lives in a rural area* | - | - | - | -0.0328*** |
| *University educated & Lives in a town or suburb* | - | - | - | -0.0151*** |
| *University educated & Lives in a rural area* | - | - | - | -0.0446*** |
| | | | | |
| **R-squared** | 0.2264 | 0.2262 | 0.2256 | 0.2267 |
| **No. Observations** | 765,917 | 765,917 | 765,917 | 765,917 |
| **Countries** | 14 | 14 | 14 | 14 |
| **Country fixed effects** | Yes | Yes | Yes | Yes |
| **Year** | 2013 | 2013 | 2013 | 2013 |

*Note*: Standard errors are heteroscedasticity robust. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.
*Source*: Calculations based on EU Labour Force Surveys.

StatLink https://doi.org/10.1787/888933825142

# Chapter 3. Fostering social inclusion in local labour markets

*As technological change seeks to improve productivity and also shapes the nature of work, challenges for inclusion in particular places will become even more important to address. This chapter first considers whether increasing labour productivity in certain regions and cities actually creates a trade-off with inclusion for their residents—with different measures indicating there is not necessarily a trade-off as many places achieve growth in both. It then considers tailored programmes that address the concerns of particular disadvantaged populations to provide the complementary policies needed to facilitate labour market inclusion, taking the example of Indigenous People. It further considers the under-utilised potential of the social economy and social enterprises to create employment that is inclusive, as such entities often target disadvantaged groups and have strong local roots.*

**Box 3.1. Key messages**

**Achieving growth in productivity and inclusion**

- Automation and artificial intelligence can boost productivity, but there is not necessarily a trade-off with inclusion. Higher levels of productivity and higher rates of inclusion in regions tend to go hand in hand.
- Almost 30% of OECD residents live in regions that have been able to increase productivity and inclusion (labour force participation) over the last decade. However, another 50% live in regions that increased average productivity but at the cost of less inclusion—the remaining 20% live in regions without productivity growth.
- At the metropolitan scale, European cities have overall been more effective than cities in the Americas in increasing both productivity and labour force participation. Cities such as Stockholm and Budapest are able to achieve both, while Houston and San Francisco are not.
- The data makes clear that policies to boost productivity are a necessary but insufficient condition for inclusion. Complementary measures including place-specific actions for labour market integration and access to quality jobs are essential.

**Ensuring inclusion of disadvantaged groups in the labour market, including through the social economy**

- To promote labour market inclusion of particular disadvantaged communities, and taking the example of policies for Indigenous Peoples, policy opportunities include: pre-employment skills and training and other related support services, involving the target group in the programme design and delivery, and embedding these efforts in community-led development. These same lessons are applicable to other vulnerable groups, such as migrants.
- Some estimates show that social economy organisations account for 6.3% of jobs in the EU28 (over 8% in some countries, but in many other countries a much smaller share).
- Social economy organisations and social enterprises have a strong local focus and given their mission many effectively integrate disadvantaged groups in the labour market (e.g., long-term unemployed, people with disabilities, migrants).
- Policies can do more to provide a more propitious environment in which these social entities can thrive, such as: framework laws and regulations in a country, tailored business support, access to mainstream financing (e.g., guarantees), and social entrepreneurship skill development. More traditional social economy organisations also benefit from public sector support such as through public procurement, employment subsidies and longer-term funding cycles.

## Introduction

Megatrends, such as globalisation, automation, and digitalisation are exerting significant pressure on labour markets across the OECD. As shown in the previous chapters, these trends appear to increase regional disparities and tend to change the nature of work and job quality. While many occupations will be automated, an important question is whether new jobs are available for those who lose their jobs. Non-standard work arrangements are expanding in many countries—or are entering into new sectors. Some jobs are therefore likely to become more productive, while others less so, exacerbating the wage disparities across people and thus places. Many of the adjustment costs will be borne by low-skilled workers, as well as the long-term unemployed, youth not in employment, education or training (NEETs), and other disadvantaged groups in society. Low-skilled workers are also less mobile and therefore are more likely to be affected when a particular local labour market suffers. Given these important place-based factors for inclusion, tracking those dynamics and progress at the regional and local level is needed.

The chapter begins with an analysis of inclusiveness for particular places—namely regions—and the relationship with productivity. Indeed the changes in the work environment are likely to increase productivity for some jobs in some places more than others, with implications for inclusion, calling for further investigation of the "productivity-inclusiveness nexus". It also considers the special circumstances for vulnerable groups that have additional service needs for inclusion in labour markets—and such groups may be concentrated in particular places. The specific challenges faced by Indigenous People and the policy strategies in several countries to address this is used to illustrate the important need for involving such groups in the design and implementation of programmes serving their communities. Finally, it considers the social economy as one sector that tends to support labour market inclusion and often has a strong place-based dimension.

## The productivity-inclusiveness nexus: is there a trade-off?

### *Place matters for understanding the dynamics of productivity and inclusion*

Stagnating productivity growth is a preoccupation among both advanced and developing economies (OECD, 2016e). The discussion mostly revolves around the 'return of the Solow paradox', which refers to the fact that such a slowdown is taking place against the backdrop of unprecedented technological change in the world of work (Acemoglu et al., 2014). Indeed, "a country's ability to improve its standard of living over time depends almost entirely on its ability to raise its output per worker" (Krugman, 1994). That is, without productivity growth, OECD countries will struggle to improve overall economic development and well-being. Current trends in automation and other technological advances are therefore important to understand the productivity picture.

Recent OECD research has revealed important characteristics linked to the Solow paradox, namely that aggregate productivity masks large firm-level and regional differences. Global productivity performance is driven by so-called "frontier firms", whose growth has actually remained fairly strong over the past two decades[1]. For example, those operating within the manufacturing sector experienced an average productivity growth of 3.5% per year, compared to 0.5% for "non-frontier firms" (Andrews, Criscuolo and Gal, 2015). These findings suggest that the problem is not a lack of productive innovation but the slow pace of its diffusion. Further, because "frontier firms" tend to cluster around specific – mostly urban – locations in order to take

advantage of the benefits of agglomeration (Baldwin and Okubo, 2004; Ellison, Glaeser and Kerr, 2010), there are growing productivity gaps between regions across the OECD. The gap between the 10% most productive OECD regions and the 75% least productive has widened by roughly 60% over the past 20 years (OECD, 2016c). Furthermore, this divide in productivity performance does not only play out at a global scale; it is in fact also quite prominent within national borders (OECD, 2016e). Nonetheless, there are incidences of regions "catching-up to the frontier", usually helped by tradable sectors in the economy (e.g., tradable services, manufacturing and the extraction of natural resources) (OECD, 2016c).

Typically the issues of productivity and inclusion are studied separately. Indeed, it has generally been assumed that increases in average labour productivity would trickle down. However, such analyses do not typically consider the impact on inclusiveness, particularly for the most vulnerable, and in different places—cities, rural areas and in between. To ensure a greater understanding of this productivity-inclusiveness nexus, an economic geography lens can prove particularly useful (OECD, 2016e). Such an analysis can provide policy makers with complementary evidence and intelligence on what policies stimulate both productivity and inclusiveness, or if they boost productivity but not inclusiveness, what can be done to remedy this.

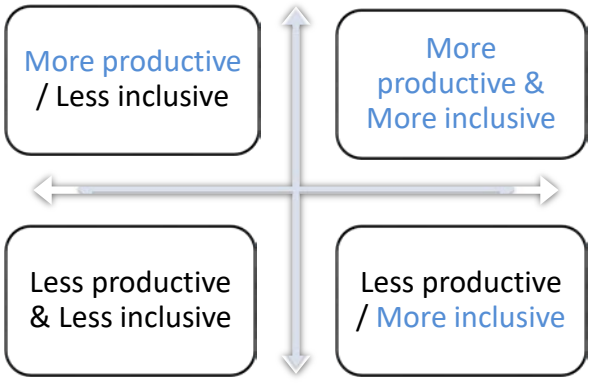
A large part of the literature on inclusiveness and on productivity has a national focus, neglecting a regional and local perspective. However, local conditions play a fundamental role in the implementation of policies to tackle both of these challenges. Transport, housing and active labour market policies, among many other relevant policy areas, are either decided on or implemented at the local level. Likewise, many OECD countries display strong subnational variations in terms of levels of disadvantage and poverty, educational attainment, and entrepreneurial activity (OECD, 2016c). Neglecting those places that are falling behind will have negative impacts on the opportunities and outcomes of the local population and, consequently, on aggregate national economic performance. Such a situation could encourage protectionism and citizen discontent—and has the potential to disrupt future economic growth (Cingano, 2014).

As regional differences in productivity have increased, inequalities in income, well-being and wealth – both between individuals and between regions – have also grown in many OECD economies. In general, top incomes have steadily risen – disproportionately so for the top 1% –, while the bottom of the distribution barely saw any gains and even suffered losses in real terms during the crisis. Across the OECD in 1990, the average disposable income of the richest 10% was seven times that of the poorest 10%; that gap had soared to approximately 9.5 times by 2014, and increased particularly fast during the financial crisis (OECD, 2015). Gaps between regions in terms of average household income, air pollution and safety are widening, too (OECD, 2016d). In terms of skills, between 2000 and 2014, the gap between the educational attainment of the highest-performing and the lowest-performing sub-regions also grew, albeit within a context of overall increases in levels of education (OECD, 2016a).

Given these dual trends (growing regional disparities in productivity and in inclusion), it is helpful to understand where productivity and inclusion progresses together, and where it does not (see Figure 3.1). A basic schematic helps set the stage for such an analysis of four general scenarios. Places—whether countries, regions or cities— can be: i) productive and inclusive, ii) neither, iii) achieving inclusiveness despite low productivity or iv) productive without being inclusive. It can be insightful to compare places that are similar to each other in order to identify economic and social commonalities, and policy

levers which may affect this nexus between the two. It is also useful to understand the relevant differences between places, since what works in one place may not work in another. The next step is then to quantify productivity and inclusion to assess the patterns to help identify policy strategies.

**Figure 3.1. Productivity and inclusion: a basic classification**




### *Productivity growth and increasing labour force participation occurring in many regions and metropolitan areas*

Defining the variables to consider for productivity and inclusion with a place-based dimension is constrained by the availability of data at the subnational level. The term productivity is broadly known to refer to the level of output generated, divided by the number of hours worked by workers to produce it. Given the lack of hourly productivity measures at the regional level across countries, the commonly used measure of productivity is Gross Domestic Product (GDP) per worker.[2] The concept of inclusiveness, like well-being, poses a greater quantification challenge as it can consider different dimensions of inclusion and should ideally go beyond averages in a place.

A simple approach is to consider whether regions improve both productivity and inclusion through an increasing rate of labour force participation. In other words, if productivity is improving while a greater share of the working age population is able to participate in the labour force, this is an "inclusive" form of productivity growth. Different factors influence the labour force participation in the short run (unemployment and wages), albeit in the long run other factors such as returns on education are likely to be particularly important (OECD, 2016b).

In most OECD regions, higher productivity tends to go along with higher inclusion (defined as labour force participation). While the relationship is not strong, it does highlight that there is *not* an implicit trade-off (Figure 3.A.1, Panel A). It is rare to find a highly productive region that has low overall levels of labour force participation. This implies that economies able to generate higher productivity are generally doing so while providing labour market opportunities.

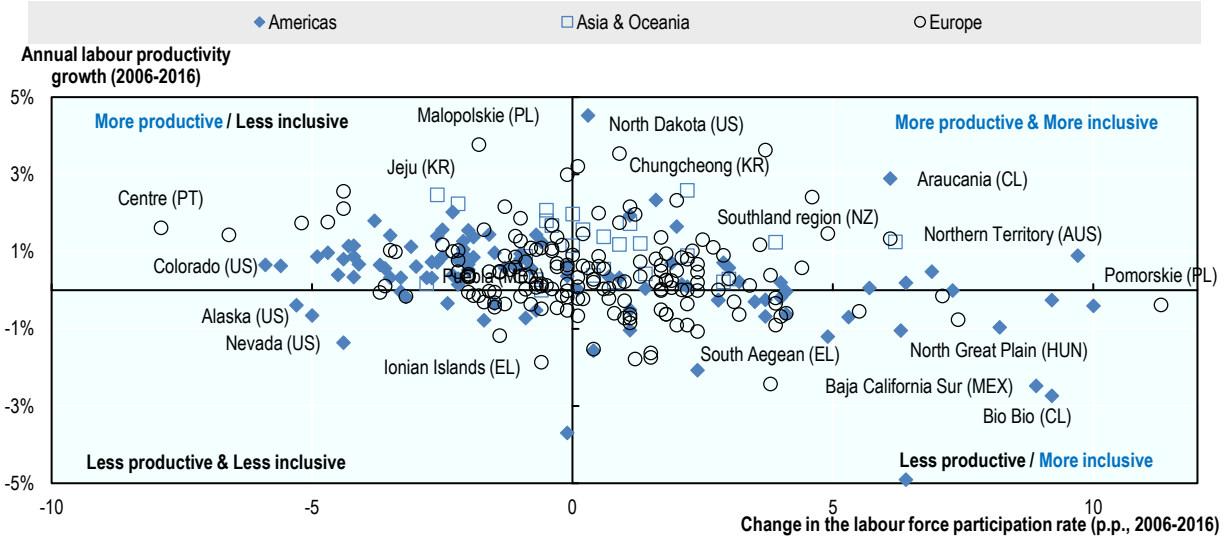
Nevertheless, there are regions in the same country at the same productivity level that are more or less capable of integrating the working age population in the labour force. For instance, the southern-Italian region of Sicily has very similar productivity levels to that of Marche, in the centre-east of the country. However, while Marche has a labour force participation rate of 52%, Sicily's remains under 40%. In the U.S., the states of New

Mexico and Utah are similar in terms of labour productivity levels; and yet Utah has a participation rate that is 11 percentage points higher than that of New Mexico.

In terms of growth, 29% of OECD inhabitants live in regions that have successfully increased both productivity and labour force participation over the last decade (https://doi.org/10.1787/888933825180 ). However, not all regions that have experienced productivity increases have increased their labour force participation. There are many regions in the top left of Figure 3.2 that experienced productivity growth but not greater inclusion—and this represents half (49%) of OECD residents. This group includes most U.S. states and Canadian provinces as well as many of the regions in Spain, Portugal, Ireland and the Netherlands. Also in this group is the Lesser Poland region, where Krakow is located. Lesser Poland's position in the graph stands in stark contrast to Greater Poland, whose capital is Poznan and which succeeded in significantly increasing productivity while also becoming more inclusive in terms of labour force participation. Places that endured lower levels of both productivity and labour market inclusiveness include many of the Greek and Italian regions, presumably due in large part to the effects of the 2008 financial crisis. The crisis is likely to have played a role in the performance of other regions as well over this particular decade and their ability to grow inclusively.

**Figure 3.2. Some regions increasing both productivity and inclusion, but many are not**

Annual growth in GDP per worker and change in the labour force participation rate, TL2 regions, 2006-2016




*Note*: Includes data for regions in all OECD countries except France, Japan, Lithuania, the Slovak Republic, Switzerland and Turkey.
*Source*: Calculations using OECD (2018), OECD Regional Statistics (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933825161

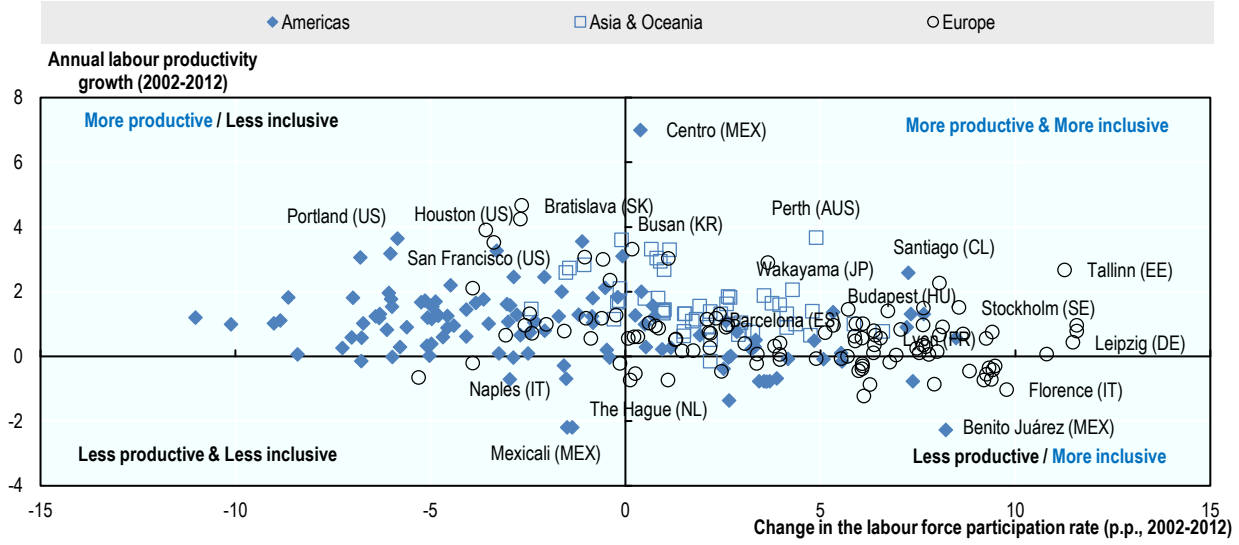
Cities tend to be highly productive but have challenges for inclusion. While average productivity may be high in cities, both ends of the skills spectrum (high- and low-skilled workers) live in cities (OECD, 2015b). While poverty rates tend to be lower in OECD cities on average (OECD, forthcoming) the cost of housing and other necessities can be significantly higher. Among metropolitan areas, the greater the size, the greater the level

of household income inequality present, even when controlling for income levels and country effects (OECD, 2016c). Cities are therefore a particularly important case to monitor for the productivity-inclusiveness nexus.

In terms of productivity growth, the picture for metropolitan areas is also mixed with some cities clearly achieving both productivity growth and greater inclusion in recent years, while others have not. The pattern of higher productivity locations having stronger labour force participation holds for metropolitan areas as it does for larger regions. In terms of growth, European cities have overall been more effective than cities in the Americas in increasing both productivity and labour force participation (Figure 3.3). Cities such as Budapest, Tallinn and Warsaw, have been growing more inclusively than cities such as Houston, San Francisco or Queretaro (Mexico).

**Figure 3.3. Some metropolitan areas increasing both productivity and inclusion, but many are not**

Growth in GDP per worker and the share of the adult population in the labour force, metropolitan areas, 2002-2012

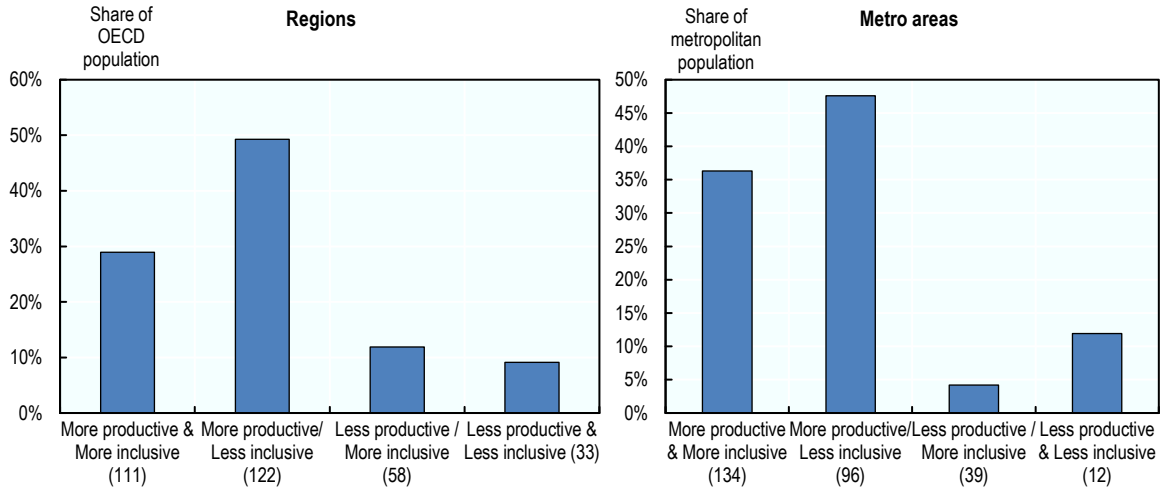



*Note*: Includes 280 metropolitan areas of 500 000 or more inhabitants across all OECD countries (except Iceland, Israel, Latvia, Lithuania, Luxembourg, New Zealand, the Slovak Republic and Turkey).
*Source*: Calculations using OECD (2018), "Metropolitan areas", OECD Regional Statistics (database), http://dx.doi.org/10.1787/region-data-en

StatLink https://doi.org/10.1787/888933825180

**Figure 3.4. Half of OECD residents living in places growing more productive but less inclusive**

Share of population living in TL2 regions and metropolitan areas according to the basic productivity-inclusiveness classification over the period 2006-2016 (TL2 regions), 2002-2012 (metropolitan areas)




*Note*: Numbers in parenthesis represent the number of regions that fall under each category. Panel A includes data for regions in all OECD countries except France, Japan, Lithuania, the Slovak Republic, Switzerland and Turkey. Panel B features data from 280 metropolitan areas of 500 000 inhabitants or more across all OECD countries (except Iceland, Israel, Latvia, Lithuania, Luxembourg, New Zealand, the Slovak Republic and Turkey).
*Source*: Calculations using OECD (2018), OECD Regional Statistics (database), http://dx.doi.org/10.1787/region-data-en & OECD (2018), "Metropolitan areas", OECD Regional Statistics (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933825199

## *Developing a more comprehensive measure of inclusion at the regional level*

Labour force participation rates used above as a measure of inclusion do not, however, address several important issues. That indicator does not capture the challenges for inclusion associated with skill-biased technological change and the relative wages in low-skilled jobs (Chapter 1) nor does it consider non-standard work that often involves lower wages and lower job quality (Chapter 2). The participation rate also does not account for the share of those participating in the labour force who are unemployed—whether for a short period of time or, more importantly, on a long-term basis. Many elements of material well-being linked to salary levels (or the availability of unemployment insurance) are therefore not reflected. Specific considerations for the most disadvantaged groups or the distribution across people in a particular place are not included either. Furthermore, recent evidence shows that while OECD countries have increased their integration of different "disadvantaged" populations in the labour market over the last decade, poverty nevertheless remains a concern (OECD, 2018a)

Overall measures of well-being at regional level highlight that regional disparities are greater than when measuring only income. For example, a composite indicator that combines income, unemployment and health status reveals that place-based disparities are indeed compounded when looking beyond income. This evidence from 26 OECD

countries also finds that the gaps in the composite indicator of multi-dimensional living standards between the top and bottom regions in a country are mainly driven by income and employment dimensions (Veneri, and Murtin, 2016). Given such results, it makes sense that a composite indicator for inclusion has a focus on those specific income and employment considerations that drive inter-regional variations and have an important impact on inclusion.

To better capture the multidimensional nature of inclusion, and to add a focus on the most disadvantaged, a composite indicator of inclusion was created at the regional level.[3] Such a composite indicator shows the "big picture" of inclusion, while allowing for comparisons across several countries and regions (although the need to ensure full comparability of data currently restricts the sample size of countries). There is always a risk that any composite indicator could be misused due to a lack of clarity in its design, or due to an oversimplification in the interpretation (OECD/EU/JRC, 2008). Keeping these issues in mind, an Inclusiveness Composite Indicator (ICI) was constructed with variables measuring unemployment, youth unemployment and long-term unemployment as well as the share of low-skilled workers (workers with less than secondary education), the share of individuals living in low work intensity households, material deprivation, the share of youth people (aged 15-24) not in education, employment or training (NEET), and the risk of poverty (see Table 3.1 and Box 3.2 for more details on the construction of the ICI).

**Table 3.1. Variables included in the Inclusiveness Composite Indicator and their weights**

Contribution of each indicator to the Inclusiveness Composite Indicator (ICI), %

| | Weight | | Weight |
|---|---|---|---|
| Workers with less than secondary education | 18.9 | Long-term unemployment rate | 16.3 |
| Unemployment rate | 18.7 | Share of youth not in education, employment or training, (NEET) | 5.2 |
| Youth unemployment rate | 18.4 | Material deprivation rate | 4.2 |
| Share of low work intensity households | 16.6 | Share of people at risk of poverty | 1.6 |

*Note:* The weights are calculated based on a principal-component analysis (PCA).
*Source*: Calculations based on data from Eurostat (2018), "Regional statistics by NUTS classification" (database). http://ec.europa.eu/eurostat/web/regions/data/database

StatLink https://doi.org/10.1787/888933825408

**Box 3.2. The Inclusiveness Composite Indicator (ICI)**

The Inclusiveness Composite Indicator (ICI) is a composite measure to capture different elements of inclusion in a region. Data used for the preliminary calculations of the ICI has been selected on the basis of its validity, reliability and policy relevance. Attention was also paid to the availability of time series data for future comparability. The following variables are included:

- Unemployment rate
- Youth unemployment rate
- Long-term unemployment rate
- Share of people working in households with very low work intensity
- Share of people suffering from severe material deprivation
- Share of people at risk of poverty (defined by a threshold at 60% of the national median income)
- Share of youth people (aged 15-24) Not in Education, Employment or Training (NEET)
- Percentage of the population whose highest level of educational attainment corresponds to primary schooling

The sample of countries was constrained by the availability of data, particularly related to indicators on poverty, material deprivation and disadvantaged groups in the labour market. The sample used here includes 112 regions in 16 European countries: Austria, the Czech Republic, Denmark, Finland, Greece, Hungary, Ireland, Italy, the Netherlands, Norway, Poland, the Slovak Republic, Slovenia, Spain, Sweden and Switzerland.

The interrelationships between the different indicators were assessed before including them in the composite indicator. In this case, Principal Component Analysis (PCA) – a statistical technique often used to find patterns in high-dimension datasets – was used to identify dimensions within the dataset.

Normalisation is a fundamental step in order to render variables comparable to each other in spite of the differences in the units used to measure them. Values used to construct the ICI were standardised (converted into z-scores, i.e. standard deviations from the mean). Given the choice of normalisation technique, attention was paid to potential extreme data points or skewed distributions.

Weights clearly have a strong impact on the final outcome of any composite indicator, and ultimately constitute value judgements about which variables play a more prominent role in shaping the phenomenon to capture. A number of weighting systems have been explored, including equal weighting and the use of regression coefficients. Finally, given the robustness and overall coherence of the results, PCA was used to determine the weights applied to each variable.

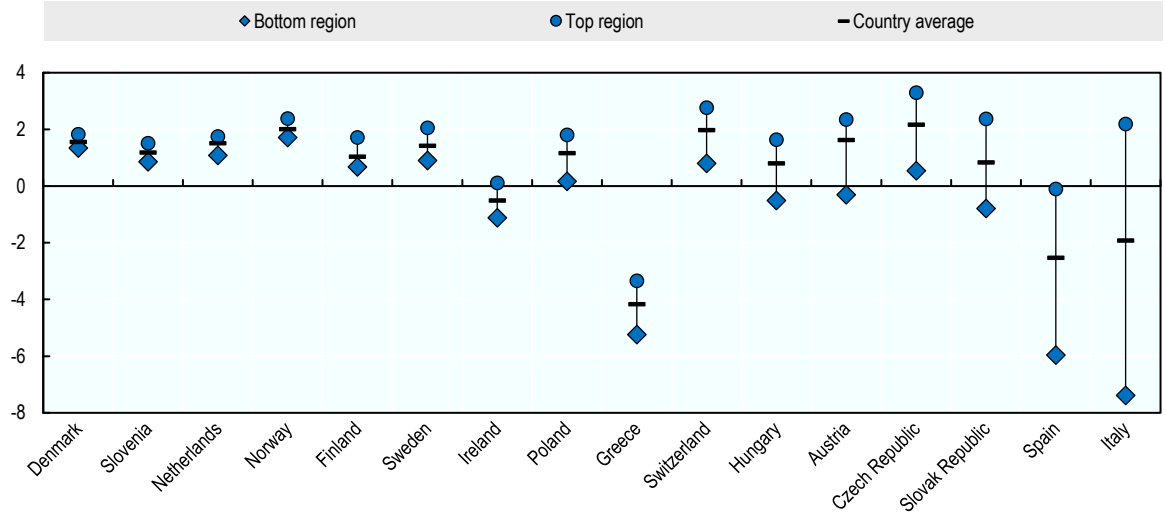
Uncertainty and sensitivity analyses were conducted to understand how variability in the inputs affects the final output of the composite indicator, and can be used to improve its structure. Several techniques have been used in the case of the ICI, such as the inclusion and exclusion of individual indicators, or testing different normalisation and weighting schemes.

As measured by the ICI, the average level of inclusion at country level masks large regional differences. In some countries the level of inclusion across regions varies widely. Even within countries that present a low national average for inclusiveness, there are regions with a positive ICI (Figure 3.5). This is the case for Italy and Spain, for example. It is therefore misleading to say that in those countries inclusion is necessarily low, as it depends on the regional economy.

Regional differences explain almost half of the total variation in the level of inclusion across the regions considered, and those gaps have been growing. Just over half (57%) of the difference in inclusion across regions is due to *between* country differences, i.e., different institutions and policies (labour market regulations, presence of collective bargaining and unions, income support, etc.), while 43% is due to *within* country variation, stemming from the different features of the local economies. It is interesting to note that the within-country variation has increased since 2010, in line with a trend of increasing regional gaps related to employment (OECD, 2016a). The variables that contribute the most to differences across regions in this index include the share of workers with low levels of education (less than secondary school), unemployment, and youth unemployment. Some counties such as Spain, Italy and Greece show massive regional differences in these rates. As the trends affecting the labour market have the potential to increase regional divides, the measures taken to promote inclusion could become even more critical in the future.

**Figure 3.5. Performance on the Inclusiveness Composite Indicator varies significantly across regions within the same country**

Performance of TL2 regions in the Inclusiveness Composite Indicator, 2016




*Note:* Regions are taken from Eurostat's NUTS2 classification (which corresponds to the OECD TL2 level), except in the case of Greece, Hungary, the Netherlands and Poland, where NUTS1 regions were used.
*Source*: Calculations based on data from Eurostat (2018), "Regional statistics by NUTS classification" (database). http://ec.europa.eu/eurostat/web/regions/data/database.

StatLink https://doi.org/10.1787/888933825218

### *Some regions also achieving productivity growth and greater inclusion as defined with a more comprehensive measure*

Over the long term, more productive regions tend to be more inclusive as well, according to this more comprehensive composite indicator of inclusion. Countries with a higher level of labour productivity also fare well on most inclusiveness indicators. This is true also when considering regions within countries. Regions with higher labour productivity tend to display greater inclusion (see Figure 3.6). Indeed, no region displays high labour productivity and low inclusion, while some regions (mainly in the Czech Republic and the Slovak Republic) display lower relative labour productivity yet higher relative scores for inclusion. These overall results may be in part related to the sample of countries for which data was available, as many of the countries included with higher labour productivity are typically also those with strong social protection systems (e.g. the Nordic welfare model).

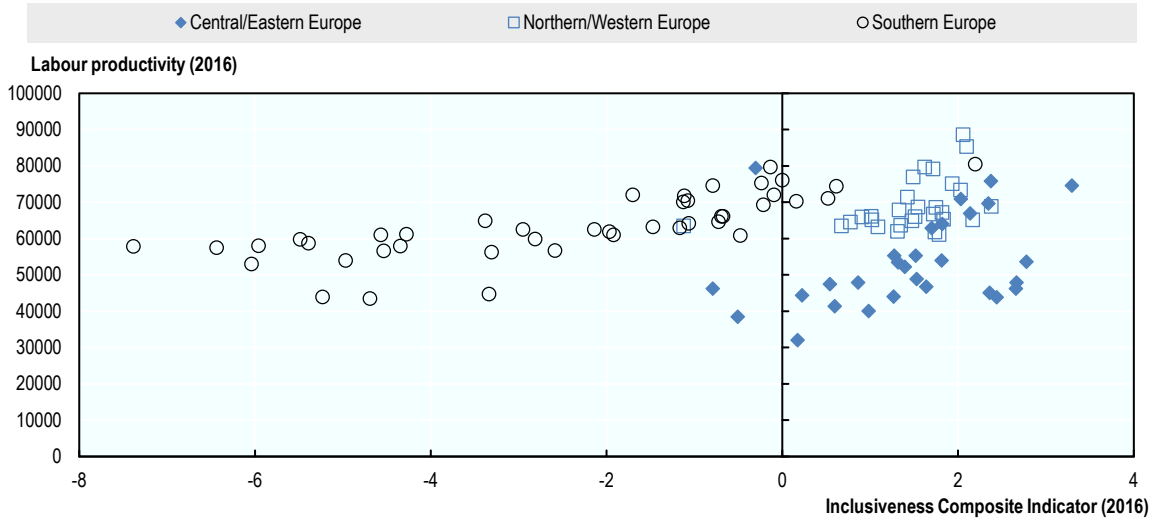
This relationship between higher productivity levels and higher rates of inclusion was also found with this analysis, similar to the findings using the more basic measure of labour force participation. At the country level, regions also tend to show this generally linear and positive relationship between productivity and inclusion (e.g. Czech Republic, Finland, Hungary, Italy, Spain, and Sweden). However, some of the high productivity countries are able to ensure inclusion even in their regions with relatively lower productivity levels in their country context (e.g. Denmark and the Netherlands). This relationship implies that increasing labour productivity would eventually result in greater inclusion, particularly if social systems are in place to support work or material well-being.

Some regions in a country are better at achieving inclusiveness for the same general level of productivity—highlighting the important regional differences in inclusiveness (see Figure 3.7) For example, Upper Norrland and South Sweden are subject to the same national framework conditions in Sweden. They have roughly the same productivity levels, but the former is able to achieve greater levels of inclusion than the latter. In Italy there are also several examples of regions with similar productivity levels but contrasting inclusion levels.

Over the period 2011-2016, the relationship is somewhat less clear but shows regional examples of productivity growth that also improves inclusion (Figure 3.8). When considering the change in labour productivity relative to the change in the ICI indicator over the period, over 90% of the regions (89) experienced an increase in labour productivity over the period, and around 40% of those (37 regions) managed to *also* increase inclusion. Some main exceptions to this trend were found in Italy and Greece, where many regions continue to suffer from high unemployment rates, especially for youth, despite rising labour productivity. Only three regions (two in Italy and one in the Netherlands) were in the category of declining productivity and inclusion. In contrast, in Norway, a high productivity country, all seven regions grew at the cost of a slight decrease in inclusion.

**Figure 3.6. European regions with higher productivity tend to also be more inclusive**

GDP per worker and the Inclusiveness Composite Indicator for TL2 regions in 15 European countries, 2016




*Note*: Labour productivity is measured as the share between GDP and regional employment. The values of the ICI range from -7.4 to 3.3, and are standardised so that the mean of the sample corresponds to 0. Regions are taken from Eurostat's NUTS2 classification (which corresponds to the OECD TL2), except in the case of Greece, Hungary, the Netherlands and Poland, where NUTS1 regions were used instead. Of the 16 countries in the analysis, Switzerland is not included in this graph due to lack of data availability.
*Source*: Calculations based on data from Eurostat (2018), "Regional statistics by NUTS classification" (database). http://ec.europa.eu/eurostat/web/regions/data/database.

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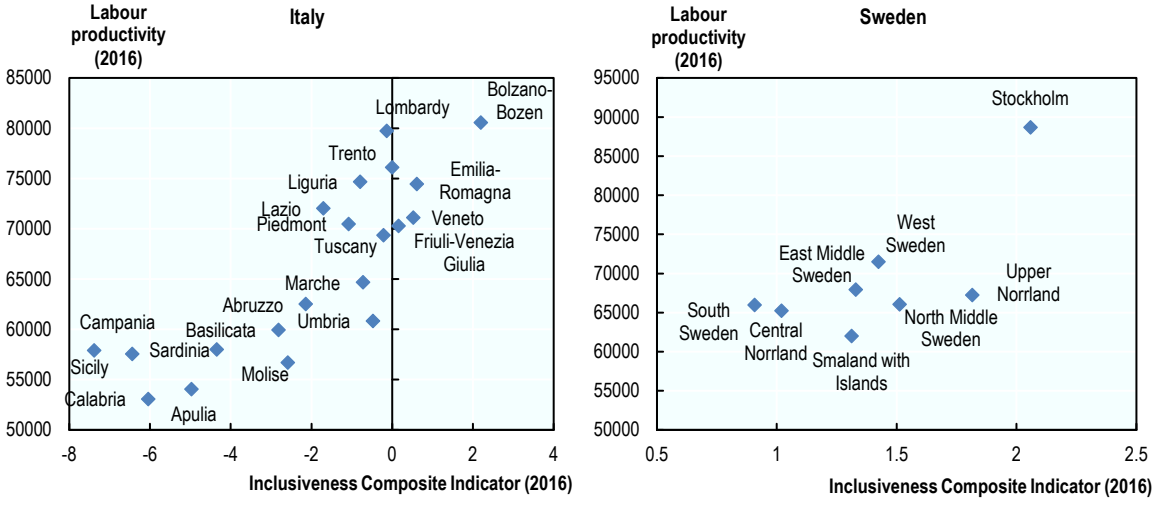
**Figure 3.7. Regional trends in productivity and inclusiveness: Italy and Sweden**



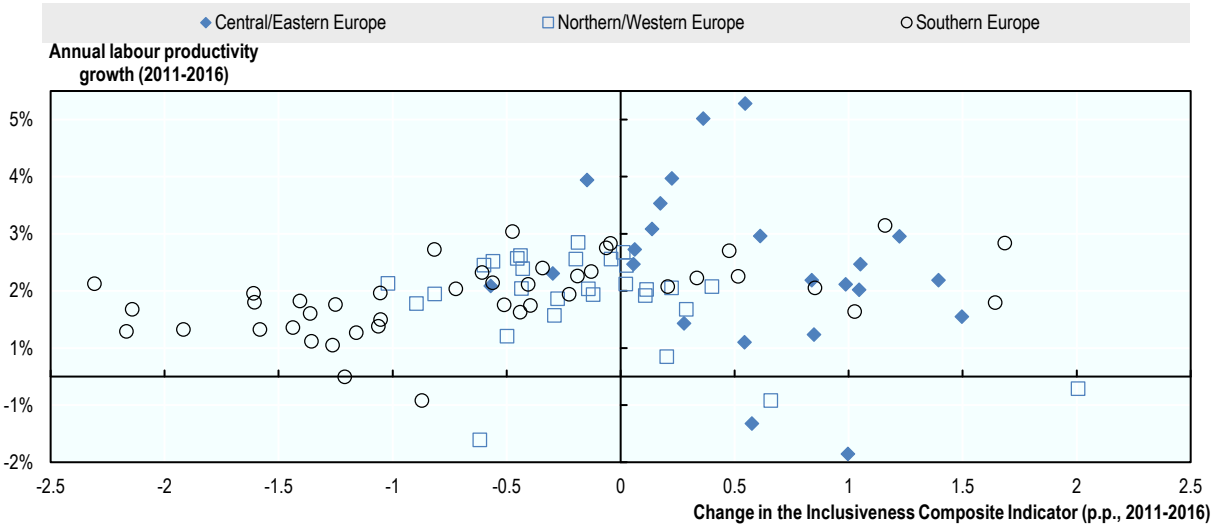

*Note*: Labour productivity is measured as the ratio of regional employment to GDP. The values of the ICI range from -7.4 to 3.3, and are standardised so that the mean of the sample corresponds to 0.
*Source*: Calculations based on data from Eurostat (2018), "Regional statistics by NUTS classification" (database). http://ec.europa.eu/eurostat/web/regions/data/database.

StatLink https://doi.org/10.1787/888933825256

**Figure 3.8. Many regions increasing labour productivity and inclusion simultaneously**

Changes in GDP per worker and the Inclusiveness Composite Indicator for TL2 regions in 15 European countries,

(2011-2016)




*Note*: Data for Poland covers the 2012-2016 period. Of the 16 countries in the analysis, Switzerland is not included in this graph due to lack of data availability.
*Source*: Calculations based on data from Eurostat (2018), "Regional statistics by NUTS classification" (database). http://ec.europa.eu/eurostat/web/regions/data/database.

StatLink https://doi.org/10.1787/888933825275

Many variables that determine inclusion at the regional level are also associated with an increase in labour productivity. The analysis of the components of the ICI reveals that most of the variables that increase inclusion are also associated with higher productivity. For instance, a reduction in the unemployment rate is one of the main determinants of inclusion and it is associated with higher labour productivity (Figure 3.A.2, Panel B.). Also, lower levels of the share of the youth population not in education, employment or training (NEET) are associated with higher regional labour productivity (Figure 3.A.2, Panel A.). Similarly, lower levels of material deprivation are associated with higher labour productivity (Figure 3.A.2, Panel C.). Policy strategies to reinforce productivity and inclusiveness at regional level could be mutually reinforcing. In the long term, regions and cities with higher productivity levels are generally also more inclusive as measured by different indicators, so there is no *a priori* trade-off between productivity and inclusion.

Several productivity-enhancing measures to support regional productivity growth are indeed likely to reinforce inclusion in the long term, such as for tradable sectors. Those sectors that are exposed to international competition (e.g., manufacturing, tradable services, natural resources) tend to have higher rates of productivity and innovate, thus contributing to regional productivity growth (OECD, 2016c). In the case of the Inclusiveness Composite Index, the share of GVA from the tradable sectors is indeed associated with a larger increase in inclusion (Figure A.3).

Increasing the quality of governance and institutions also enhances productivity by providing a more stable institutional framework. The implementation of the rule of law as

well as a simple and stable regulatory environment both help reduce some of the uncertainty for firms. A positive association is found between the European Quality of Governance Index (EQI)[4] with both productivity and the Inclusiveness Composite Index at regional level.

The main message from this analysis is that ensuring the labour force has the right skills is critical for both productivity and inclusiveness. Previous studies have highlighted that a high share of low-skilled workers is a notable bottleneck for regional growth (as measured by GDP per capita) (OECD, 2012). Regions that display a higher share of workers with more than a primary education (above the median level in the sample analysis above) display increasing productivity or increasing inclusiveness or both. Further work is necessary to achieve a better understanding of channels through which stronger productivity may result in higher inclusion, and vice versa. Nevertheless the analysis conducted underlines the importance of investing in the level of education and skills of the workforce and reducing material deprivation, including through greater access to the labour force. These factors are important determinants of an inclusive economy.

## Designing targeted programmes for disadvantaged groups: the case of Indigenous People

When it comes to the labour market, there are a wide range of disadvantaged groups that face additional hurdles for inclusion. Targeted policies may try to address the particular barriers or complementary measures to increase inclusion—whether it is the availability of affordable childcare for women or physical accessibility for those with disabilities. When groups facing disadvantages are concentrated in particular locations, or depend on important local actions, uniform national policies alone may not be enough—flexibility for local adaptation and/or locally initiated and complementary actions may be needed for greater success. This has been found, for example, in the case of migrants (OECD, 2018b).

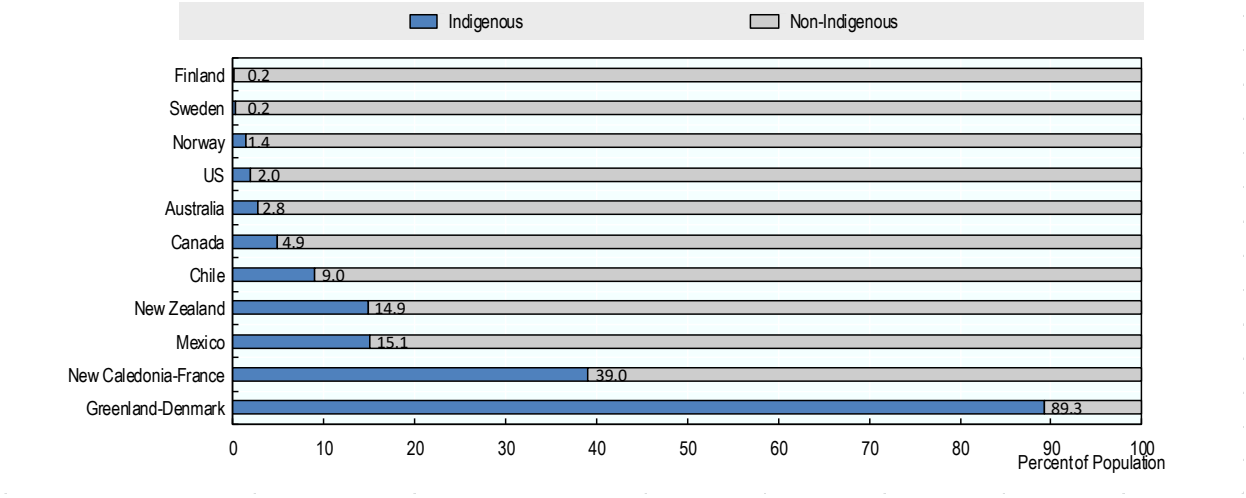
Indigenous People are another group that often faces challenges for labour market inclusion. In many countries, Indigenous People have faced historical marginalisation and social exclusion, with many still living in poverty. Due to their cultural differences, Indigenous People often face unique challenges when it comes to accessing local employment and economic development opportunities. In several OECD countries, they are therefore the target of many programmes and policies with the goal of improving their economic well-being.

OECD countries individually use different methods to identify Indigenous People. Other terms, such as Aboriginal, tribes and First Nations are used to commonly refer to Indigenous People. Many OECD countries have adopted self-identification as the most effective way of recognising Indigenous identity. The notion of self-identification acknowledges the autonomy of Indigenous People and their right to self-determination and status. While self-identification is an important concept embedded in principles of human rights, it does create challenges in seeking to understand evolving trends in Indigenous demographics, labour market and skills outcomes. Irregular data collection and analysis leaves large gaps in the understanding of Indigenous outcomes. However, progress can be seen within many OECD countries as national census and labour force survey estimates include more variables to better understand Indigenous outcomes.

### *Indigenous People experience labour market exclusion or under-performance*

Currently, the Indigenous population worldwide includes about 370 million people in more than 90 countries (United Nations Permanent Forum on Indigenous Issues,(n.d.)). Within the OECD, Indigenous populations are located in several member countries including Australia, Canada, Chile, Denmark (Greenland), Finland, France (New Caledonia), Mexico, New Zealand, Norway, Sweden, and the United States. Figure 3.9 shows the percentage of Indigenous People within each country based on country definitions. With high population growth rates in many countries, an increasing number of Indigenous People are entering labour markets. In Canada, recent forecasts show that the Indigenous population could represent about one fifth of Canada's labour force growth over the next 20 years if gaps in the labour force participation rate were to close (Drummond et al, 2017).

**Figure 3.9. Share of the population defined as Indigenous People, 2016**




*Note*: This graph is not inclusive of all Indigenous Peoples worldwide. Additionally, "Indigenous" in this context refers to the meaning understood within each country. Figures are for Greenland only and not the Kingdom of Denmark. Additionally, figures are for New Caledonia and not the Republic of France.

*Sources*: Australian Bureau of Statistics (2017), *Media Release - Census: Aboriginal and Torres Strait Islander population*, http://www.abs.gov.au/ausstats/abs@.nsf/MediaRealesesByCatalogue/02D50FAA9987D6B7CA25814800087E03?OpenDocument (accessed on 10 December 2017); Broch Hansen, K., K. Jepsen and P. Leiva Jacquelin (2017), *The Indigenous World 2017*, International Work Group for Indigenous Affairs, Copenhagen, https://www.iwgia.org/images/documents/indigenous-world/indigenous-world-2017.pdf (accessed on 10 December 2017); and Statistics Canada (2017), *Aboriginal peoples in Canada: Key results from the 2016 Census*, The Daily, http://www.statcan.gc.ca/daily-quotidien/171025/dq171025a-eng.htm (accessed on 10 December 2017).

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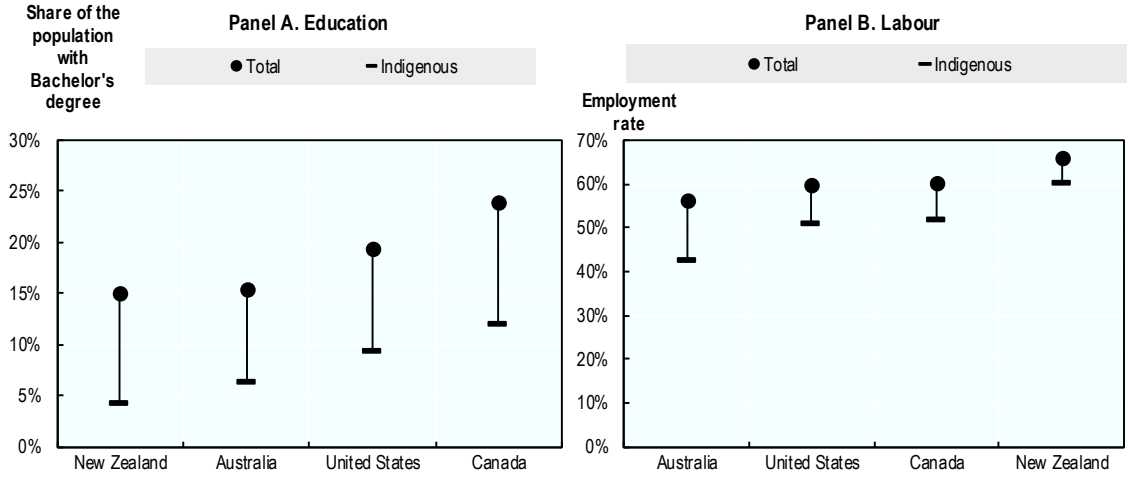
Indigenous People often lack access to education and training opportunities as well as early childhood education services, which can hinder their chances to find and maintain a job. Due to disparities between populations, Indigenous People's outcomes are often below those of the non-Indigenous population on a number of key economic and social indicators. For instance, when looking at the share of the population with a post-secondary education or employment rates, gaps in outcomes between Indigenous and

non-Indigenous populations can be seen in Australia, Canada, New Zealand, and the United States (see Figure 3.10).

Unemployment rates are also notably higher for Indigenous People. For example, the unemployment rate of Aboriginal and Torres Strait Islanders of Australia is about three times that of non-Indigenous people. In Canada, the unemployment rate for Indigenous People is almost double that of non-Indigenous people (11% compared to 6% in 2015). These labour market outcomes are often associated with the lower relative levels of educational attainment. In Canada, the United States and Australia, the share of the general population with a Bachelor's degree is at least double the percentage for that of Indigenous People. In New Zealand, that figure is triple.

**Figure 3.10. Indigenous People face large employment and skills gaps within the OECD, 2016**




*Source*: US Census Bureau, (2016, 2017), US Department of Labor, (2016), Ministry of Education - Education Counts (2017), Statistics New Zealand,(n.d.), Statistics Canada (2018), and Australian Bureau of Statistics (2018).

StatLink https://doi.org/10.1787/888933825313

### *Locally-adapted employment services helpful in matching Indigenous People with quality jobs*

The specific problems that Indigenous People face with respect to employability highlight the likely need for targeted measures. Some OECD countries are adapting their active labour market policies and programmes to ensure that services are targeted to meet the specific needs of this community. Indigenous employment programmes should consider the value of moving away from a job-first focus to ensure services can be catered to basic and foundational skills training that addresses the challenges that often prevent Indigenous People from maintaining a job. Several countries either have specific programmes or have local employment offices able to tailor programmes in locations with Indigenous People.

In Canada, the majority of active labour market programming for Indigenous People is delivered through the Indigenous Skills and Employment Training Strategy (ISETS). This entity, formerly known as ASETS, supports a network of 85 Indigenous service delivery

organisations that design and deliver employment programmes and services for Indigenous People with over 600 points of service across Canada. All Indigenous People, regardless of status or location, can access its programmes and services. ISETS' initiatives include: job-hunting skills and training, wage subsidies to encourage employers to hire Indigenous workers, financial subsidies to help individuals access employment or obtain skills for employment, entrepreneurial skills development, help in going back to school, and child care for parents in training (Employment and Social Development Canada, 2017). A good example of how labour market programmes are being targeted to Indigenous People is provided by the Centre for Aboriginal Human Resources Development (CAHRD), which combines education and employment support along with other related social services that increase employability (see Box 3.3).

**Box 3.3. Centre for Aboriginal Human Resources Development in Winnipeg, Manitoba**

In Canada, the Centre for Aboriginal Human Resource Development (CAHRD) is one of 84 Indigenous service delivery organisations under the Aboriginal Skills and Employment Training Strategy (ASETS).

CAHRD is a one-stop client service centre where a number of Indigenous non-governmental organisations (NGOs) now provide health, employment, literacy, education, training, and other support services to Winnipeg's Indigenous community. Their work and services focus on, and are coordinated to meet, the needs of Indigenous People as they adapt to the challenges of life in the more complex society of a modern urban setting. CAHRD provides employment, adult and post-secondary education, training, day care facilities, and student transitional housing services to prepare Indigenous People to be self-reliant and adaptable to the labour market. It serves all Indigenous People in the City of Winnipeg.

Central Employment Services by CAHRD help Indigenous People by creating an action plan to successfully attain career goals. Employment Counsellors offer career exploration options, referrals to employment, education and training, and job search strategies. An Employment Counsellor will conduct an individual personal assessment to identify an Indigenous Person's marketable skills. They will assist in overcoming any barriers that may limit employment opportunities and discuss an action plan for successfully attaining their personal career goals.

CAHRD also provides quality education and training programmes through partnerships with the local community, education institutions, business, and government. Neeginan College of Applied Technology, CAHRD's post-secondary training division offers post-secondary training mainly in industrial trades.

The Neeginan College of Applied Technology provides training in technical courses such as early childhood education, carpentry, and accounting, and positions such as building systems technician, medical laboratory technician, licensed practical nurse, educational assistant, and glassworker technician.

*Source*: OECD (2018c), *OECD Reviews on Local Job Creation: Indigenous Employment and Skills Strategies in Canada*, OECD Publishing.

In Australia, the Government has introduced the Indigenous Advancement Strategy (IAS) with the objective of achieving real results in the key priority areas of getting children to school, adults into work, and building safer communities. The Jobs, Land and Economy department of the IAS includes support for a range of activities that aim to develop the labour market and skills, including:

- Tailored Assistance Employment Grants – Tailored Assistance Employment Grants are available to support activities that connect working age Indigenous Australians with real and sustainable jobs. They also support Indigenous students in their transition from education to sustainable employment, including funding for cadetships. In addition, grants can provide employers with support that assists them to employ and retain Aboriginal and Torres Strait Islander job seekers.
- Vocational Training and Employment Centres (VTECs) – thirty VTECs work with Indigenous communities, employers, jobactive where Community Development Programme providers support job seekers find guaranteed jobs. VTECs provide wraparound support services for job seekers including training and mentoring for the first 26 weeks in employment.
- Employment Parity Initiative (EPI) – EPI works with large Australian companies to become Employment Parity Partners and commit to Indigenous workforce targets. The initiative aims to help an additional 20 000 Indigenous jobseekers find employment by 2020.
- Away from Base mixed-mode program (AFB) – AFB supports Indigenous students who are studying an approved mixed-mode course by distance education to access compulsory course elements in another location away from their permanent home for short periods of time.

In addition, the Australian Government has officially recognised that it is particularly hard for Aboriginal and Torres Strait Islander Australians to find jobs when they leave prison. The Australian Government is implementing the Time to Work Employment Service, which will support Aboriginal and Torres Strait Islander Australians in prison through access to in-prison employment services, the development of a transition plan, and a facilitated transfer to their post-release employment service provider.

The Community Development Programme (CDP) is the remote employment and community development service. The CDP supports job seekers in remote Australia to build skills, address barriers and contribute to their communities through a range of flexible activities.

The Australian Government delivers 'mainstream' employment services for all Australians, including Indigenous Australians, provided under the national *jobactive* employment service. The *jobactive* network operates in 1 700 locations across Australia. An objective of *jobactive* is to increase job outcomes for unemployed Australians with specific measures for Indigenous job seekers. Job seekers are provided with employment services based on their level of assessed need and assigned a stream of support. The Australian government announced in the 2017–18 budget that employment services were being boosted with a new service offer to better support Indigenous Australians to find employment (Department of Jobs and Small Business, 2018). Through the service offer, Indigenous Australians have access to culturally appropriate pre-employment training, work trials, preventative health activities, and Indigenous specific Work for the Dole Activities that are linked to community goals. Under this service offer, Indigenous Peoples are also eligible for a wage subsidy from the first day of services (rather than waiting until they have been in employment services continuously for the previous six

months). Eligible employers will have access to a wage subsidy of up to AUD 10 000 to hire Indigenous Australians (increased from AUD 6 500).

*ParentsNext* currently operates in 10 locations and has helped more than 12 500 parents to identify and work towards their goals. A national expansion will occur from 1 July 2018, assisting 68 000 parents (including 10 000 Indigenous parents) each year. The nationally expanded programme will provide parents with connections to a wide range of services, which could include pre-employment training, mentoring, work experience and job opportunities. These services will be delivered in a tailored fashion, recognising the individual needs of parents and their families.

Other countries, however, do not provide Indigenous People with targeted programmes. However, in some cases locally tailored approaches may be allowed. This is the case for some Nordic countries, where employment services for Indigenous People are provided through mainstream employment services. In Sweden, the Swedish Public Employment Service (*Arbetsförmedlingen*) is responsible for managing employment services for all citizens, both Sami and non-Indigenous populations, throughout the nation. *Arbetsförmedlingen* has 280 local employment offices, organised into 10 labour market areas spanning across Sweden. Similarly, employment services for Indigenous and non-Indigenous Norwegians are delivered through the Norwegian Labour and Welfare Administration (NAV). NAV employs 19 000 people in 456 offices located in different municipal and city districts. NAV and local authorities together decide what will be offered in each location; therefore, services are geographically customised to the needs of each local community.

### *Better orienting skills training to Indigenous People at the local level*

Due to persistent disparities between Indigenous and non-Indigenous populations, fundamental employment barriers faced by Indigenous People in many OECD countries lead to lower levels of skills and workplace experience. Educational attainment is a major determinant of labour market success. Education can provide the basic foundation for Indigenous People to find and sustain meaningful employment. Data from Statistics Canada shows that higher educational attainment not only yields higher employment rates, but also small differences between Indigenous and non-Indigenous outcomes (Statistics Canada, 2018). As the labour market undergoes structural change, a lack of qualifications brings a higher risk of unemployment. Indigenous learners require more support, resources and opportunities from high school into postsecondary education (e.g. college and university). Skills programmes must also engage employers to effectively build cultural awareness around Indigenous values and needs in the workplace.

Increasing access to and completion of higher education among Indigenous youth should remain a priority, and there are innovative examples to promote this. Education and skills are recognised as important tools for capacity building and assisting Indigenous communities to achieve their goals of self-determination and self-governance (Gallop, 2016).

There are examples of tailored higher education approaches to increase access with a focus on Indigenous People. For example, in Mexico inter-cultural universities (*universidades interculturales)* have been formed to increase Indigenous participation in tertiary education and to foster greater unity between Indigenous and non-Indigenous communities (OECD, 2017). These universities have been established within Indigenous communities, but are open to the participation of non-Indigenous students as well. The universities have a quota for enrolment with about 70% of the student body being

composed of Indigenous People and at least 20% representing a mixed (*mestizo*) background. These institutions rely on the basic principles of the local Indigenous communities to compose classroom content and pedagogy, including Indigenous "philosophies, cultures, languages and histories" (OECD, 2017).

Engaging Indigenous learners in apprenticeship training may require pre-apprentice training to address skills gaps. Apprenticeship programmes combine classroom-based learning with on-the-job training. Some OECD countries offer preparatory training courses that provide an intensive and sensitive teaching environment to tackle such gaps before young people start their apprenticeships and to help better find employment as an apprentice. Lessons from this promising practice include a partnership involving a range of actors including Indigenous People within the public and private sector as well as relevant local industries (see Box 3.4).

**Box 3.4. Training programmes for Indigenous People: Canada and Peru**

**Canada**

In Calgary, Alberta a successful programme for skills training called *Trade Winds to Success* is designed as recruitment and pre-apprenticeship programme to assist Indigenous People find work into Alberta companies. Typical training programmes include jobs like carpenter, electrician, iron worker, steam fitter, insulator, and industrial mechanic (millwright). The goal of the programme was to address the estimated shortfall of skilled workers in Alberta over next decade.

The programme begins with a three-week trade streaming process involving assessment testing and visits to training sites, shops and local education facilities. Participants then go to an Informed Career Decision Making course to ensure they choose to study the trade that is right for them. After this, they move to the pre-apprenticeship training, which includes: personal development (one week); academic upgrading (four weeks); writing an Entrance Exam from Apprenticeship Industry and Trades; progress to eight weeks of union shop and hand tools training; employment at unions or employer of choice; and mentorship.

One of the key features of the programme is following up with individuals six and 12 months after their participation. The programme consists of Indigenous staff and is designed for Indigenous learners, which created a sense of belonging and trust among participants. Since 2005, there have been over 1 000 graduates with a 90% placement rate for students finding a job after the programme completion. Trade Winds to Success is designed as a partnership between government, industries, Indigenous communities and unions.

**Peru**

In Peru, two training programmes (*Juntos* and *Sierra y Selva Exportadora*) were introduced, targeting the participation of Indigenous communities within the agricultural and trade sectors. The *Juntos* programme teaches banking and financial management courses. Popular courses among women leaders in the *Sierra y Selva Exportadora* programme included training on the genetic improvement of livestock and seeds, product processing, and industrial machine installation. The programmes resulted in increased collaboration between local employers and Indigenous communities, with all groups benefiting from improvements in production processes and connections to external markets.

*Source*: OECD (2018c) and ILO (2016).

### *Labour market integration through entrepreneurship and business innovation*

Entrepreneurship is an important driver of job creation at the local level across the OECD. Indigenous entrepreneurship can involve the creation, management and development of new businesses by and for Indigenous People. Indigenous entrepreneurs boost the local economy not only through their own employment and commerce, but often through the employment of other Indigenous People. In many Indigenous communities, youth entrepreneurs have become leaders in the revival of their community, language and culture. Many OECD countries have introduced programmes aimed at fostering more entrepreneurship opportunities among Indigenous youth in particular.

For example, in Australia the Barayamal Budding Entrepreneurs Program provides critical networking and mentoring support to Aboriginal and Torres Strait Islander Entrepreneurs. The programme also includes free legal, accounting, marketing, design and public relations advice. The special feature of this programme is the culturally sensitive support available at each stage, from concept development to an independent and profitable business. Through this initiative, Indigenous entrepreneurs have access to an extensive network of mentors, investors, funding sources, and potential customers. They also have access to co-working and collaborative spaces to facilitate knowledge exchange and networking.

Similarly in New Zealand, a new start-up business accelerator, Kōkiri, is helping Māori entrepreneurs turn their ideas into profitable businesses. The four-month programme aims to get new Māori ventures market-ready with the help of business insights from partners such as MYOB (business services software), Air New Zealand and Spark (entrepreneur support programme). Successful applicants to the programme will also get access to business workshops, investor groups, and co-working facilities.

### *Embedding employment services in local economic development*

Indigenous employment and skills programmes may be more likely to achieve success when they are led and delivered by Indigenous People themselves. Initiatives driven by Indigenous People prioritise the services and products they deem the most necessary for their communities while often working in roles that develop business and financial management skills. Furthermore, employment services could be provided through one-stop shops, allowing Indigenous job seekers easy access to the full range of services available. OECD governments are also recognising the increasing importance of taking a more holistic approach to Indigenous employment and skills outcomes as part of a wider community development approach.

At the national level, community-driven approaches—for Indigenous People or other vulnerable groups— require a certain degree of flexibility in the management and delivery of programmes. Given the importance of cohesive policies from different ministries (ex. Education, Labour), it helps if there is greater compatibility in the administration of programmes and within the design of policies. This allows local agencies can better connect activities and work in partnership to overcome policy silos at the local level.

At the local level, such development approaches require financial resources that are seldom available. Some OECD countries have devised project funding to support community-based Indigenous economic development. By allocating funding to local communities, Indigenous People are able to acquire further autonomy and set their own priorities for community development. For instance, in the United States, Indigenous

businesses are eligible for a number of federal grants. Under the federal Comprehensive Economic Development Strategy (CEDS), Indigenous People can create a strategy designed to contribute to effective economic development in Indigenous communities and regions through a locally-based, regionally-driven economic development planning process. The Southeastern Connecticut Enterprise Region (United States) is using this programme to develop a forward-looking education system—an approach that could prove more resilient in light of automation. New Zealand has also promoted a comprehensive economic development approach (see Box 3.5).

**Box 3.5. Fostering business innovation and employment: United States and New Zealand**

**United States**

Within the United States, the Southeastern Connecticut Enterprise Region provides support for 22 towns and two Native American Tribal Nations as an NGO, public-private regional economic development organisation. CEDS funding allows this Enterprise Region to transition from an industry-focused educational system to a system catering to future business needs. This agency aims to create a holistic talent supply that meets current and future industry needs while increasing collaboration between educational institutions in the region to foster more innovative delivery of programmes and services.

**New Zealand**

The New Zealand Ministry of Business, Innovation and Employment recognises a need to support further economic growth in the Indigenous community, the Māori. The Ministers for Economic Development and Māori Affairs created a Māori Economic Development Panel in 2011. This Panel released a Māori Economic Strategy and Action Plan in 2012 titled He kai kei aku ringa ("Providing the food you need with your own hands") which identifies that inclusive economic growth in New Zealand is tied to further economic development of the Māori community. To actualise the goals of He kai kei aku ringa, several programmes and policies have been implemented across New Zealand. The Vision Mātauranga policy seeks to support the better circulation, perpetuation and development of Māori science and innovation knowledge. This is achieved through increased advocacy for Māori-led research. The Te Pūnaha Hiringa: Māori Innovation Fund (NZD 3 million annually) and the Te Pūnaha Hihiko Vision Mātauranga Capability Fund act as financing resources for this policy. The desired outcomes of the policy are to increase capacity building in the Māori community and look to Māori peoples as leaders for the sustainable development of natural resources.

Along with provision for scientific and innovation in the Māori community, the New Zealand government has also created a Regional Growth Programme to stimulate economic development at the local level. The programme assesses trends in jobs, income and investment at the regional level to determine where to foster growth opportunities. The Regional Growth Programme has six focus areas including export markets, investment, innovation, skilled and safe workplaces, natural resources and infrastructure.

*Source*: The Southeastern Connecticut Enterprise Region and CEDS Strategy Committee; Cowser, Nancy; Hodge, Juliet; Mills, Robert; Nugent, 2017 and Ministry of Business, 2017

In some OECD countries, there has been substantial migration of Indigenous People to urban centres, calling for an important role of local leadership. From 2006 to 2016, the Indigenous population living in metropolitan areas of Canada increased by 59.7%. In Australia, the majority of Indigenous People live in cities and non-remote areas. Therefore, cities have a key role to play in better aligning local services to provide greater access to critical supports that Indigenous People need to ensure successful participation in the labour market. This often means that city governments have an important role to play in coordinating the range of services available and reducing duplication in programme delivery. Cities can also be spaces of opportunity to test new policy ideas and pilot new ways of working. Mayors are well placed to coordinate and establish essential partnerships with Indigenous leaders. At the national level, this requires policies to be designed in a manner which rewards local leadership and capacity on these issues. City leaders and local Indigenous communities need to work in partnership to define success and define community-led initiatives. Some city leaders are working actively in this area in a few cities, such as Winnipeg (see Box 3.6).

**Box 3.6. City of Winnipeg – Mayor's Indigenous Advisory Council**

In 2015, the Mayor of the City of Winnipeg announced the establishment of a Mayor's Indigenous Advisory Circle (MIAC). The role of the MIAC is to advise on policies the City of Winnipeg can implement to continue to build awareness, bridges and understanding between the Indigenous and non-Indigenous community. Meetings of the Advisory Circle are held quarterly and members include Indigenous elders, First Nation Chiefs, as well as members from the education and university sectors, and Aboriginal Chamber of Commerce.

A key achievement of the MIAC is the Indigenous Accord, which was adopted by City Council on 22 March 2017. The Indigenous Accord is a living document to guide the shared commitment to the Journey of Reconciliation in Winnipeg. Winnipeg's Indigenous Accord is not a one-off event, but an ongoing responsibility accepted by signatories, who - through becoming partners to the Accord - agree to report on the success of their commitment to reconciliation. It outlines a vision of reconciliation as well as a series of important commitments and principles.

*Source*: City of Winnipeg (2018), *Winnipeg's Indigenous Accord*, available at http://www.winnipeg.ca/Indigenous/WIA/default.stm.

## Supporting inclusion through the social economy and social enterprises

Better mobilising the social economy can be a promising opportunity to address labour market inclusion - particularly in light of changes associated with automation. Social economy organisations (SEOs), including traditional types and newer forms such as social enterprises (SEs), all share a common approach that puts people at the core (see Box 3.7). Such entities are well known for their capacity to identify and implement innovative approaches to integrating disadvantaged groups in the labour market. In addition, their strong local roots enhance their capacity to address the special considerations of disadvantaged populations in a particular place. To better capitalise on the potential of SEOs, policies can provide a more appropriate regulatory environment for their development as well as encourage activities in labour market integration.

**Box 3.7. Defining the social economy and social enterprises**

Social economy organisations traditionally refer to the set of associations, co-operatives, mutual organisations, and foundations whose activity is driven by values of solidarity, the primacy of people over capital, and democratic and participative governance. Among social economy organisations, social enterprises, which emerged more recently, distinguish themselves by a more pronounced entrepreneurial approach - their source of income coming primarily from commercial activities, rather than grants and donations. Social enterprises may emerge from the social economy or be outside of the social economy.

Social enterprises are identified by the OECD as "any private activity conducted in the public interest, organised with an entrepreneurial strategy, whose main purpose is not the maximisation of profit but the attainment of certain economic and social goals, and which has the capacity for bringing innovative solutions to the problems of social exclusion and unemployment."

More recently, the European Commission has defined a social enterprise as being "an operator in the social economy whose main objective is to have a social impact rather than make a profit for their owners or shareholders. It operates by providing goods and services for the market in an entrepreneurial and innovative fashion and uses its profits primarily to achieve social objectives. It is managed in an open and responsible manner and, in particular, involves employees, consumers and stakeholders affected by its commercial activities."

Source: (OECD, 1999) and (European Commission, 2011).

### *Active role of social economy organisations in labour market inclusion*

The empirical evidence shows that social economy organisations contribute to employment with a strong focus on disadvantaged groups. Despite the scarce availability of data, some countries have detailed datasets including statistical breakdowns by type of disadvantaged individuals (re)integrated. Data indeed suggests that in some countries not only do SEOs contribute to employment, but that they do so with a strong focus on disadvantaged groups. For example, this is the case in France, Spain and Greece. Some countries also collect detailed datasets focusing specifically on social enterprises, which is the case in the United Kingdom, Korea or Canada. The data shows that a large share of their efforts does indeed contribute to labour market integration of disadvantaged groups (see Table 3.2).

Social economy organisations can provide work-integration opportunities by creating transitional or permanent jobs, or a mix of both. Among SEOs, Work Integration Social Enterprises (WISEs), which aim at training and re-integrating disadvantaged individuals in the labour market, have a significant impact on employment. As shown by the study *Impact WISEs 2015*, 48.5% of WISEs' workers interviewed in nine EU countries[5] found a job in the same or another work-integration-enterprise or on the traditional labour market; 16.5% became self-employed or started a professional training course; 35% left and are again unemployed (ENSIE, 2017).

Work-integration opportunities are often combined with skills development activities. These integration opportunities can take the form of on-the-job training or training

activities aimed at enhancing employability. For instance, Simplon.co - a French social enterprise - provides free coding training to unemployed people, illustrating how social entrepreneurs can take advantage of technological progress to improve social inclusion (see Box 3.8). Another interesting example is the Danish social enterprise *Specialisterne* whose aim is to assess, train, employ and match people with autism spectrum disorder (ASD) with Danish companies in need of IT experts or consultants to perform crucial business services (testing of critical IT systems, software programming, coding, quality control, data analysis and conversion, etc.). *Specialisterne* Denmark employs approximately 50 IT experts, 75% of whom have been diagnosed with ASD, and the model has been franchised in more than 12 countries (OECD/EU, 2017).

**Table 3.2. The contribution of the social economy to employment, including for the most disadvantaged**

Selected OECD countries

| Country | Key Facts |
|---|---|
| France | • In France, in 2014 SEOs represented 10.5% of total employment. Among these SEOs, work integration entities employed 129 962 workers, of which 80% did not graduate from high-school, 50% were officially unemployed for more than one year and 45% were entitled to welfare benefits for those earning the lowest income (CNCRESS/Matarin, 2017). |
| Spain | • In Spain, SEOs generated direct or indirect employment for 12.5% of the working population (CEPES, 2016). Among Spanish SEOs' workers, 6.2% have a recognised disability, which is much higher than traditional companies (1.7%) (CEPES, 2015). |
| Greece | • In Greece, the number of employees in registered SEOs seems to be increasing steadily and the same is true for people with disadvantaged backgrounds. Overall, in 2012 there was only one employee, while in 2015 the number of employees rose to 813 with 224 among them coming from vulnerable groups (Greek Ministry of Employment, 2017). |
| United Kingdom/Scotland | • In 2017, in the UK, nearly 9% of the small business population were social enterprises, employing roughly 1.44 million people (UK Government, 2017). In addition, the Social Enterprise Survey revealed that more than two-thirds of social enterprises (69%) aim to support people from vulnerable groups, and almost half (44%) seek to employ them (SEUK, 2017).<br>• In Scotland (UK), according to the Social Enterprise Census, the 5 600 Scottish social enterprises create and sustain 81 357 full-time equivalent employees. Among these social enterprises, 41% employ people formerly disadvantaged in the labour market and almost one out of two social enterprises employ previously unemployed young people aged under 25 (49%). In addition, 63% of social enterprises provide training or support designed to boost employability (Social Value Lab, 2017). |
| Canada | • In Canada, social enterprises employ about 0.2% of the workforce. Among these workers, more than 74% are employed as part of the mission of the social enterprise, including individuals with disabilities and/or other employment barriers. For example, 43% of the responding social enterprises in Canada address poverty by targeting people with employment barriers, low income or the homeless. Finally, social enterprises' respondents provided training to 116 000 people (Elson P. R., 2016). |
| Korea | • In Korea, social enterprises employed in total 39 195 workers (representing 1.5% of total employment), of which 60% from vulnerable groups in 2016, the remaining are part of non-vulnerable groups, which is the same proportion as in 2015 and 2014.6. |

*Note*: Figures in this table may not match those of Figure 3.11 due to differences in data methodologies and different types of entities captured in each country.

**Box 3.8. Simplon.co: harnessing technologies to improve social inclusion**

Simplon.co, a network of learning centres (factories), has been offering, since 2013, free coding training to the unemployed. The "factories" provide accelerated learning on topics such as development, data, cyber security, with the ambition to bring diversity and social inclusion in the coding world. They also provide support in the search for apprenticeships or employment.

The training offered by Simplon.co primarily targets individuals who are under-represented in the digital professions such as women or individuals with little education, people from disadvantaged neighbourhoods, the unemployed, dropouts, people with disabilities, and refugees. The network, which has the label of a French Solidarity Enterprise with Social Utility (ESUS), adopts a hybrid economic model, based in part on the traditional financing allocated to vocational training in France (employment pole or regional funds) while also receiving sponsorship and subsidies.

After four years in existence, Simplon.co has trained nearly 1 500 people, of which 78% returned to employment (including permanent and fixed-term contracts). Some of the trainees were also hired by another branch of Simplon.co, called Simplon Prod, which produces websites, mobile apps, or delivers maintenance services.

Today, more than 40 "factories" have been created in France and abroad, notably in Africa, where the network implemented several experiments. In 2017, Simplon.co created a school in Dakar, in partnership with Orange (a French multinational telecommunications corporation). Other projects are also being implemented in North Africa. Another branch of Simplon.co called Simplon Corp provides training to employees of major companies such as L'Oréal or Louis Vuitton to raise awareness and/or upskill them in their digital transitions.

*Source*: https://simplon.co/qui-sommes-nous/

The contribution of social economy organisations is of course not limited to employment and work-integration of disadvantaged groups. These entities also produce goods and services that create a social, economic and/or environmental impact in different sectors of activity. For instance, they create innovative health services for the elderly or new and sustainable forms of tourism, transportation, and delivery of renewable energy. The different social innovations that support inclusion are further potential benefits to developing this social economy.

### *Important local impact of the social economy and social enterprises*

The strong potential of the social economy in improving labour market integration for disadvantaged groups also lies in its strong local roots. Social economy organisations mainly operate at the local level, which enables them to both identify and address local needs (OECD, 1999; OECD, 2003; Osborne, 2002). For example, in Canada, social enterprises are most likely to operate in neighbourhoods or local communities (58%) or in cities or towns (61%) (Elson P. R., 2016). Similarly, in the UK, 34% of social enterprises operate at a neighbourhood or local level, demonstrating their reach into communities (SEUK, 2017).

This capacity to develop local networks gives them a competitive advantage in engaging with "hard-to-reach" groups who may be otherwise unwilling to engage with government agencies. By operating locally, SEOs also contribute to the development of formal and informal networks of people, knowledge and resources, which can encourage citizens to become more involved in their community (Noya and Clarence, 2008). As local drivers of social inclusion and social innovation, SEOs can therefore play a key role in revitalising and addressing the challenges in the most deprived areas, and/or in remote rural or depopulated areas, by tackling unemployment and poverty.

Some empirical evidence, however, shows that social economy organisations do not necessarily operate predominantly in areas with high rates of poverty or unemployment. This indeed greatly varies across countries studied and sometimes even within each country. For example, while social enterprises predominantly operate in deprived areas in the United Kingdom more generally, this is not the case in Scotland. In addition, in a number of countries such as France, Korea or Greece no clear pattern emerges between the concentration of SEOs and the rates of poverty, unemployment and deprivation per region.

Social economy organisations and social enterprises tend to concentrate in urban areas (see Table 3.3). This is for instance the case in Greece, Korea and Canada, where these entities concentrate in the most populated areas. Although the capital city effect observed in France, Korea and Greece could simply be explained by the higher density of population in capital cities, this might also be due to the richness of services and opportunities offered to SEOs in cities compared to remote areas. No clear pattern, however, has been found between the regional density of SEOs and the indicators used to assess regional inclusion, such as the rate of deprivation, poverty or unemployment.

**Table 3.3. Understanding the spatial dimension of social economy organisations/ social enterprises**

Selected OECD countries

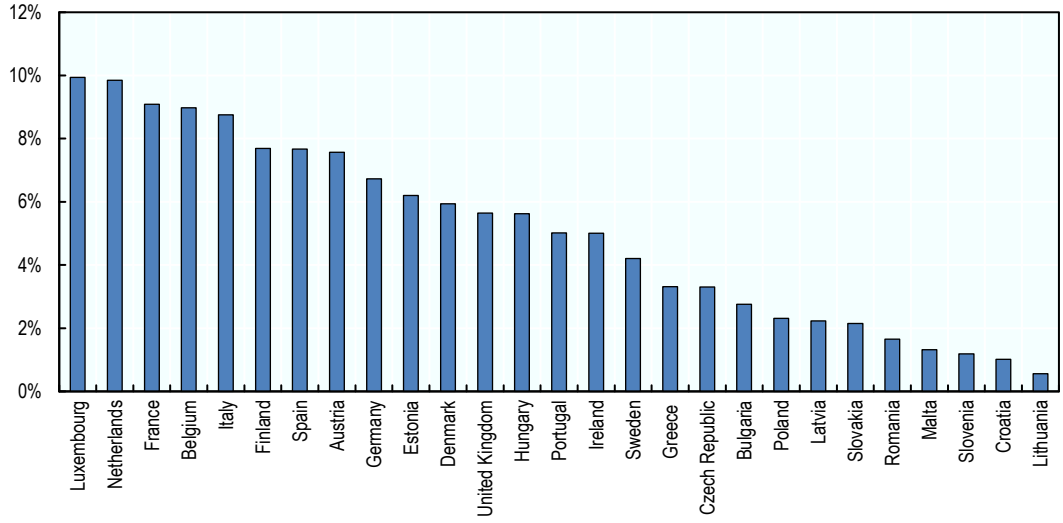
| Country | Key Facts |
|---|---|
| United Kingdom/Scotland | • In the UK, 28% of social enterprises operate in the most deprived areas and 25% in the second most deprived ones, i.e more than half of social enterprises in the country (SEUK, 2017). In addition, it appears that social enterprises tend to work with specific groups depending on location and local needs. For instance, in London where the poverty rate is the highest (27% in 2015), social enterprises were more likely to try to employ individuals striving to emerge from homelessness (14%) (SEUK, 2017; GLA, 2017).<br>• In Scotland (UK), however, social enterprises do not seem to operate predominantly in areas with high deprivation. In 2017, we observe that 17% of social enterprises were concentrated in the most deprived areas whereas the remainder 83% operated in the rest of Scotland. A similar trend was observed in 2015 (Social Value Lab, 2017). |
| France | • In France, the regions with the highest poverty rates, which are Provence-Alpes-Côte d'Azur (17.5%) and Occitanie (17.2%), are not the ones with the highest concentration of SEOs (CNCRESS/Matarin, 2017; Insee, 2014). However, there seems to be a "capital-city exception", since the metropolitan area of Île-de-France, where Paris is located, combines one of the highest poverty rates (15.6%) with the highest share of SEOs (27.5%) among French regions. |
| Korea | • Similarly in Korea, social enterprises do not particularly concentrate in areas with high unemployment rates. The province of Incheon, with the highest unemployment rate (4.9% in 2016), only concentrates 5.9% of all Korean social enterprises. Nonetheless, as in France, the "capital-city exception" seems to apply to Seoul, which combines one of the highest unemployment rates (4.2% in 2016) with the highest number of social enterprises (data provided by the Korean Government, 2016; Statistics Korea, unemployment rates 2016).<br>• In Korea, the most populated areas of the country, which are Seoul City and the province of Gyeonggi-do, have the highest number of social enterprises, accounting respectively for 17.4% and 16.9% of the total number of social enterprises in the country. On the other hand, the city of Sejong which is the country's least populated, only has nine social enterprises representing 0.5% of the total number of social enterprises (data provided by the Korean Government, 2016). |
| Greece | • The same conclusion applies to Greece. In 2015, the Western Greece region, which is the one with the highest material and social deprivation rate (47.3%), only accounted for 4% of SEOs (Greek Ministry of Employment, 2017). However, as observed in France and Korea, the largest concentration of active SEOs is observed in the urban region of Attica, where the capital of the country is located, and where the rate of material and social deprivation is quite high (35.3% for 2015). |
| Canada | • In Canada, urban social enterprises provide more jobs than rural social enterprises with respectively 53.3% and 41.6% of the 12 000 full-time jobs created in total by social enterprises (Elson P. R., 2016). In addition, it appears that 21% of urban social enterprises provide workforce integration as part of their social mission, which is twice the rate of rural social enterprises. This can be explained by the fact that rural social enterprises tend to operate in farmers' markets, in arts and culture, while urban SEOs focus on employment development and housing and are therefore much more likely to work with disadvantaged groups and those who face employment barriers (Ibid.). |

### *Social economy responsible for a notable share of employment in many countries, but there are opportunities to further develop*

While estimates may vary, one source finds that traditional social economy organisations account for 6.3% of employment and 13.6 million jobs across EU28 countries (EESC/CIRIEC, 2017).The diversity of definitions and legal frameworks, as well as different methods of data collection, makes cross-country comparability a major challenge.[7] For instance, some countries focus their efforts on measuring traditional SEOs without capturing social enterprises, while others have very detailed datasets on social enterprises, which may also fall outside of the traditional social economy definition. The significant data gaps for various countries can be partly explained by the vastly different levels of acceptance or recognition and understanding of the social economy across countries (Monzon, 2012; EESC/CIRIEC, 2017). A cross-country CIRIEC study shows that while employment in the social economy accounts for between 9% and 10% of the labour force in countries such as Belgium, Italy, Luxembourg, France and the Netherlands, it only accounts for less than 2% in Slovenia, Romania, Malta, Lithuania, Croatia and the Slovak Republic (see Figure 3.11). Other country-specific sources enable comparisons beyond Europe, albeit using different measurement methodologies (see Table 3.2).

**Figure 3.11. The weight of the social economy varies considerably across countries**

Employment in social economy organisations as a percentage of total employment, 2015




*Note*: Figures refer to paid employment (as distinguished from voluntary unpaid work) in the social economy as defined by CIRIEC, including: cooperatives and similar accepted types; mutual societies and similar types; and finally associations, foundations and other related non-profits.
*Source*: OECD elaboration based on (EESC/CIRIEC, 2017).

StatLink https://doi.org/10.1787/888933825332

The social economy appears to be resilient in economic downturns, thereby supporting inclusion during the most challenging times. In countries such as Italy and Belgium, where employment in the public and private sectors decreased sharply during the period 2008-2010, employment in social enterprises actually grew. In Belgium, employment in social enterprises increased by 11.5%, with a peak in Brussels, which experienced 25% growth during the period. In Italy, employment in social cooperatives registered 20.1%

growth (European Union, 2016). In France, between 2000 and 2014, employment in the social economy registered significant and continuous growth (25%), while employment growth in the private sector was much lower (6%) (R&S, 2015).

This resiliency is potentially due to a number of factors. First, given the participatory governance structures, which include employees and beneficiaries and a primary social mission, such entities may prefer to retain employment during challenging times as they do not have the same profit distribution imperative of traditional firms. Another factor is that social economy organisations tend to be strongly embedded in local communities and economies, and therefore less exposed to global economic turbulence. In addition, the sustainability of social enterprises over the economic crisis can be explained by their mixed source of funding (both public and private), as well as the utilisation of non-monetary resources such as volunteers.

### *Policy actions to increase the impact of social economy organisations and social enterprises*

There is untapped potential within social economy organisations and social enterprises that requires policy action to unlock. These entities can help build more inclusive, and sustainable, societies. Much of the policy needs concern the development of enabling ecosystems (OECD, 2007; OECD/EU, 2016; OECD/EU, 2017; Noya and Clarence, 2013). Building a conducive ecosystem for social economy development notably includes:

- **Raising awareness and visibility of social economy organisations, including social enterprises.** This can be done through framework laws or national strategies that define the nature, mission and activities of social economy organisations and therefore help policy makers to more effectively target their support. This can also be done through lighter policy options such as communication campaigns or support to incubators or networks that connect social entrepreneurs to investors and public-sector representatives.
- **Providing business support to social enterprises throughout their developmental phase.** Targeted public support for structures such as hubs, accelerators or incubators can facilitate the development of social enterprises across territories and activity sectors.
- **Supporting a diversification of financial sources**. While public support (predominantly through grants and subsidies) is a major financial source for a number of social enterprises, an increasing number now seek to access financing provided by mainstream or new funders (e.g. commercial banks or impact investors). Still, mainstream funders or impact investors perceive social enterprises – especially in the early stages – as high-risk clients, and are therefore reluctant to invest in them. Policy makers need to raise awareness through capacity-building, along with efforts to share the risks with mainstream funders, impact investors and commercial banks, for example through guarantee schemes.
- **Fostering social-entrepreneurship skills in the education system**. In the long run, education and skills that breed entrepreneurial behaviours need to be developed. Educational programmes on social entrepreneurship provide students with opportunities to develop new solutions to unresolved social challenges, and learn about business-creation processes and planning at the secondary and higher education levels.

- **Ensuring institutional continuity and political support for social enterprise development.** Political impetus can act as a catalyst for both nascent and/or well-established ecosystems, fostering and accelerating favourable conditions for the growth of social enterprises. However, challenges may emerge when political support for developing the sector of social enterprises fluctuates owing to government changes. Sustained policy support is essential to establish an enabling ecosystem allowing social enterprises to thrive over time.

Concerning policy actions that are specifically designed to support the employment creation role of social economy organisations, policy makers could promote:

- **Funding stability.** Ensure that public financial support goes beyond short-term contract funding so that longer term employment plans can be developed;
- **Public procurement.** Use social clauses or reserved contracts and apply the best quality/price ratio in public procurement so that social enterprises can compete in getting public contracts;
- **Employment subsidies.** Provide employment subsidies for social enterprises working with disadvantaged individuals to offset the costs stemming from the loss of productivity associated with hiring individuals whose job performance is less than normal (OECD, 2014).

Finally, to better assess the importance of the social economy and social enterprises and to track progress, more data as well as data that is comparable across countries would help. It would also enable a better tailoring of policies and programmes to address the specificities of each country and the differences among and within regions. Although considerable efforts have been made during the last two decades, both in the academic field and by national statistical institutes and governments, much more needs to be done to make data collection more systematic for the different social economy groups over the coming years.[8]

## Conclusion

While technology, such as automation and artificial intelligence, could increase labour productivity for many jobs it can also pose a challenge for inclusion. Some groups may be increasingly excluded from the labour market or suffer from low-wage jobs and non-standard work. Effective policies to integrate disadvantaged groups in the labour market and ensure access to quality jobs will be critical for social cohesion and to reduce inequalities among people.

There is not necessarily a trade-off between productivity and inclusion in regions and metropolitan areas. In recent years, higher levels of productivity and higher rates of inclusion tend to go hand in hand. Many regions and metropolitan areas are indeed able to increase productivity and inclusion at the same time; however, many others have been unsuccessful. Within the same country and subject to the same national policies, some regions appear to be more effective at achieving inclusion for a given level of productivity than others. These within-country differences call for further research to understand what policies are needed to help regions achieve both productivity and inclusion in the particular country context.

To promote the labour market inclusion of particular disadvantaged communities, special efforts targeting these groups may be rewarded with greater success. An assessment considering Indigenous People highlights several policy lessons applicable to other

disadvantaged groups, such as migrants. They include: pre-employment skills and training and other related support services, involving the target group in the programme design and delivery, and embedding these efforts in community-led development.

In many OECD countries, more can be done to leverage the role of the social economy in assisting disadvantaged groups to be integrated into the labour market. Social economy organisations account for 6.3% of jobs in the EU28, and often target employment of disadvantaged individuals (e.g. long-term unemployed, people with disabilities, migrants). Social enterprises and other social economy organisations have a strong local focus that helps to better integrate such disadvantaged groups and some SEOs are taking advantage of digitalisation to promote inclusion.

## Notes

[1] The term 'frontier firms' refers to the 100 most productive companies in each 2-digit sector in the ORBIS database. All other enterprises are called a 'non-frontier firm'.

[2] Typically productivity levels are available at the scale of large OECD regions (TL2), and in many countries also the scale of small regions (TL3). GDP per worker is also available for metropolitan areas of 500 000 inhabitants or more in most OECD countries.

[3] This index supplements existing measures such as the Multi-Dimensional Living Standards as well as the OECD's Going for Growth Dashboard.

[4] The European Quality of Governance Index (EQI) is based on a survey of a sample of citizens in European regions (NUTS1 and NUTS2 depending on the country). The *EQI is* an indicator that ranges from 0 to 100. The survey provides perception-based information on public sector corruption and the quality of services provided. More information about the survey is available on the website of the Quality of Government Institute at the University of Gothenburg (*http://www.qog.pol.gu.se*).

[5] Note that the number of WISEs for France, Italy and Netherlands is over-represented in the sample with respectively 508, 188 and 73 out of 807 WISEs surveyed in total.

[6] Data provided by the Korean Ministry of Employment and Labour, February 2018.

[7] The statistical information provided in this section has been drawn from a number of publications indicated in the references and from secondary data supplied by national sources.

[8] This has also been recently underlined in a seminar organised by the OECD and the European Commission on *Satellite Accounts for the Third Sector and the Social Economy*, 16 October 2017, OECD Paris. For more information, please see: http://www.oecd.org/cfe/leed/working-seminar-on-satellite-accounts.htm

## References

Acemoglu, D. et al. (2014), "Return of the Solow Paradox? IT, Productivity, and Employment in US Manufacturing", *American Economic Review*, Vol. 104/5, pp. 394–399.

Andrews, D., C. Criscuolo and P. Gal (2015), *Frontier Firms, Technology Diffusion and Public Policy,* OECD Mimeo.

Australian Bureau of Statistics (2018), 2016 *Census: Aboriginal and/or Torres Strait Islander Peoples* QuickStats, Quickstats, http://quickstats.censusdata.abs.gov.au/census_services/getproduct/census/2016/quickstat/IQS036 (accessed on 03 July 2018).

Australian Bureau of Statistics (2017), *2016 Census shows growing Aboriginal and Torres Strait Islander population*, Census: Aboriginal and Torres Strait Islander population, http://www.abs.gov.au/ausstats/abs@.nsf/MediaRealesesByCatalogue/02D50FAA9987D6B7CA25814800087E03?OpenDocument (accessed on 09 July 2018).

Baldwin, R. and T. Okubo (2004), *Heterogeneous Firms, Agglomeration and Economic Geography: Selection and Sorting.*

CEPES (2015), *Las empresas de la economia social como palanca de creación de empleo para las personas con discapacidad, Resumen Ejecutivo*, Fundacion Once.

CNCRESS/Matarin (2017), *Atlas commenté de l'économie sociale et solidaire 2017*, Observatoire national de l'ESS – Conseil national des chambres régionales de l'économie sociale (CNCRES), Arnaud Matarin, 06/17 - 3e édition, Juris Editions, Paris.

Cingano, F. (2014), *Trends in Income Inequality and its Impact on Economic Growth*, OECD Publishing. http://dx.doi.org/10.1787/5jxrjncwxv6j-en.

Drummond, A. (2017), *The Contribution of Aboriginal People to Future Labour Force Growth in Canada*, Centre for the Study of Living Standards.

EESC/CIRIEC (2017), *Recent evolutions of the Social Economy in the European Union*, "Visits and Publications" Unit of the European Economic and Social Committee, European Union, Brussel.

Ellison, G., E. Glaeser and W. Kerr (2010), "What Causes Industry Agglomeration? Evidence from Coagglomeration Patterns", *American Economic Review,* Vol. 100/June 2010, pp. 1195–1213.

Elson P. R., H. (2016), *Canadian National Social Enterprise Sector Survey Report 2016.*

Employment and Social Development Canada (2017), *Engagement on the future of Indigenous labour market programming*, https://www.canada.ca/en/employment-social-development/programs/aboriginal-skills-employment-training-strategy/consultation-skills-employment-training/report-indigenous-labour-market-programming.html (accessed on 22 January 2018).

ENSIE (2017), *Work integration social enterprises. The empowerment of people through social enterprise to create a stronger society.*

European Commission (2011), *Social Business Initiative Creating a favourable climate for social enterprises, key stakeholders in the social economy and innovation*, Communication from the Commission to the European Parliament, The Council, The European Economic and Social Committee and The Committee of the Regions, 25.10.2011 COM(2011) 682 final, Brussels.

European Union (2016), *Social Enterprises and their Eco-system: Developments in Europe*, Publications Office of the European Union.

Gallop, C. (2016), "Supporting Success: Aboriginal Students in", *Canadian Journal of Higher Education*, Vol. Volume 46, No. 2, pp. 206 - 224.

Greek Ministry of Employment, S. (2017), *Annual Report 2017 & Action Plan for the Development of the Ecosystem for Social and Solidarity Economy 2017-2023*, Special Secretariat for Social & Solidarity Economy, Ministry of Employment, Social Security & Social Solidarity, Athens.

International Labour Organization (2016), "*The Labour Situation of Indigenous Women in Peru: A Study",* http://www.ilo.org/wcmsp5/groups/public/---dgreports/---gender/documents/publication/wcms_546285.pdf (accessed on 15 November 2017).

Krugman, P. (1994), *The Age of Diminished Expectations,* MIT.

Ministry of Business, I. (2017), *Māori Economic Development*, He kai kei aku ringa, http://www.mbie.govt.nz/info-services/infrastructure-growth/maori-economic-development (accessed on 04 December 2017).

Ministry of Education - Education Counts (2017), *"Educational attainment in the adult population",* https://www.educationcounts.govt.nz/statistics/indicators/data/education-and-learning-outcomes/3680 (accessed on 03 July 2018).

Monzon, J. (2012), *La Economía Social en la Unión*, European Economic and Social Committee.

Noya, A. and E. Clarence (2013), "Entrepreneurial Activities in Europe - Social Entrepreneurship", *OECD Employment Policy Papers*, No. 3, OECD Publishing, Paris, https://doi.org/10.1787/5jxrcml2kdtd-en.

Noya, A. and E. Clarence (2008), *"Improving social inclusion at the local level through the social economy"*, OECD LEED Programme, CFE/LEED, Paris, http://www.oecd.org/dataoecd/38/3/44688716.pdf?contentId=446887 (accessed on 16 March 2018).

OECD (2018a), *Employment Outlook 2018,* OECD Publishing, https://doi.org/10.1787/empl_outlook-2018-en.

OECD (2018b), *Working Together for Local Integration of Migrants and Refugees,* OECD Publishing, https://doi.org/10.1787/9789264085350-en.

OECD (2018c), *Indigenous Employment and Skills Strategies in Canada*, OECD Reviews on Local Job Creation, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264300477-en.

OECD (2017), *OECD Skills Strategy Diagnostic Report*, http://www.oecd.org/mexico/OECD-Skills-Strategy-Diagnostic-Report-Mexico.pdf (accessed on 03 December 2017).

OECD (2016a), *Job Creation and Local Economic Development 2016*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264261976-en.

OECD (2016b), *Making Cities Work for All: Data and Actions for Inclusive Growth*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264263260-en.

OECD (2016c), *OECD Regional Outlook 2016: Productive Regions for Inclusive Societies*, OECD Publishing, Paris, https://doi.org/10.1787/9789264260245-en.

OECD (2016d), *OECD Regions at a Glance 2016*, OECD Publishing, Paris, https://doi.org/10.1787/reg_glance-2016-en.

OECD (2016e), *The Productivity-Inclusiveness Nexus*, OECD Publishing, Paris, https://doi.org/10.1787/9789264258303-en.

OECD (2015a), *In It Together: Why Less Inequality Benefits All*, OECD Publishing, Paris, https://doi.org/10.1787/9789264235120-en.

OECD (2015b), *The Metropolitan Century : Understanding Urbanisation and its Consequences*, OECD Publishing, https://doi.org/10.1787/9789264228733-en.

OECD (2014), *Job Creation and Local Economic Development*, OECD Publishing, Paris, https://doi.org/10.1787/9789264215009-en.

OECD (2012), *Promoting Growth in All Regions*, OECD Publishing, https://doi.org/10.1787/9789264174634-en.

OECD (2007*), The Social Economy: Building Inclusive Economies*, OECD Publishing, Paris, https://doi.org/10.1787/9789264039889-en.

OECD (2003), *The Non-profit Sector in a Changing Economy*, OECD Publishing, Paris, https://doi.org/10.1787/9789264199545-en.

OECD (1999), *Social Enterprises*, OECD Publishing, Paris, http://www.oecd.org/cfe/leed/socialenterprises.htm (accessed on 16 March 2018).

OECD (forthcoming), *Regions and Cities at a Glance*, OECD Publications.

OECD/EU (2017), *Boosting Social Enterprise Development: Good Practice Compendium*, OECD Publishing, Paris, https://doi.org/10.1787/9789264268500-en.

OECD/EU (2016), *Policy Brief on Scaling the Impact of Social Enterprises*, Publications Office of the European Union, Luxembourg.

OECD/EU/JRC (2008), *Handbook on Constructing Composite Indicators: Methodology and User Guide*, OECD Publishing, Paris, https://doi.org/10.1787/9789264043466-en.

Osborne, S. (2002), *Community involvement in rural regeneration partnerships in the UK: evidence from England, Northern Ireland and Scotland*, Policy Press, London.

R&S (2015), *Economie sociale: Bilan de l'emploi en 2014*, Recherches & Solidarités, Lyon.

SEUK (2017), *The future of business. State of social enterprise survey 2017*, Social Enterprise UK, London.

Social Value Lab (2017), *Social Enterprise in Scotland - Census 2017, Social Value Lab, Glasgow*.

Statistics Canada (2018), *Data tables, 2016 Census*, 2016 Census of Population, https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/dt-td/Rp-eng.cfm?LANG=E&APATH=3&DETAIL=0&DIM=0&FL=A&FREE=0&GC=0&GID=0&GK=0&GRP=1&PID=110668&PRID=10&PTYPE=109445&S=0&SHOWALL=0&SUB=0&Temporal=2017&THEME=122&VID=0&VNAMEE=&VNAMEF= (accessed on 03 July 2018).

Statistics Canada (2017), *The Daily — Aboriginal peoples in Canada: Key results from the 2016 Census*, The Daily, http://www.statcan.gc.ca/daily-quotidien/171025/dq171025a-eng.htm (accessed on 30 October 2017).

Statistics New Zealand ((n.d.)), *Employment, NZ Social Indicators*, http://archive.stats.govt.nz/browse_for_stats/snapshots-of-nz/nz-social-indicators/Home/Labour%20market/employment.aspx (accessed on 03 July 2018).

Statistics New Zealand (2013*), 2013 Census QuickStats about Māori*, http://archive.stats.govt.nz/Census/2013-census/profile-and-summary-reports/quickstats-about-maori-english/population.aspx (accessed on 09 July 2018).

The International, Work Group for Indigenous Affairs and (IWGIA) (2018), *The Indigenous World 2018*, https://www.iwgia.org/images/documents/indigenous-world/indigenous-world-2018.pdf (accessed on 09 July 2018).

The Southeastern Connecticut Enterprise Region and S. CEDS Strategy Committee; Cowser, Nancy; Hodge, Juliet; Mills, Robert; Nugent (2017), *2017 Comprehensive Economic Development Strategy for the Southeastern Connecticut Economic Development District*, http://seccog.org/wp-content/uploads/2018/05/CEDS_2017_SECTER.pdf (accessed on 09 July 2018).

UK Government (2017), *Social Enterprise: Market Trends 2017, Department for Digital, Culture, Media & Sport and Department for Business, Energy & Industrial Energy*; Crown Copyright, London.

United Nations Permanent Forum on Indigenous Issues ((n.d.)), *Indigenous Peoples, Indigenous Voices*, http://www.un.org/esa/socdev/unpfii/documents/5session_factsheet1.pdf (accessed on 05 March 2018).

US Census Bureau (2017), *"Educational Attainment in the United States: 2016"*, https://www.census.gov/data/tables/2016/demo/education-attainment/cps-detailed-tables.html (accessed on 03 July 2018).

US Census Bureau (2016), *Facts for Features: American Indian and Alaska Native Heritage Month: November 2016,* https://www.census.gov/newsroom/facts-for-features/2016/cb16-ff22.html (accessed on 09 July 2018).

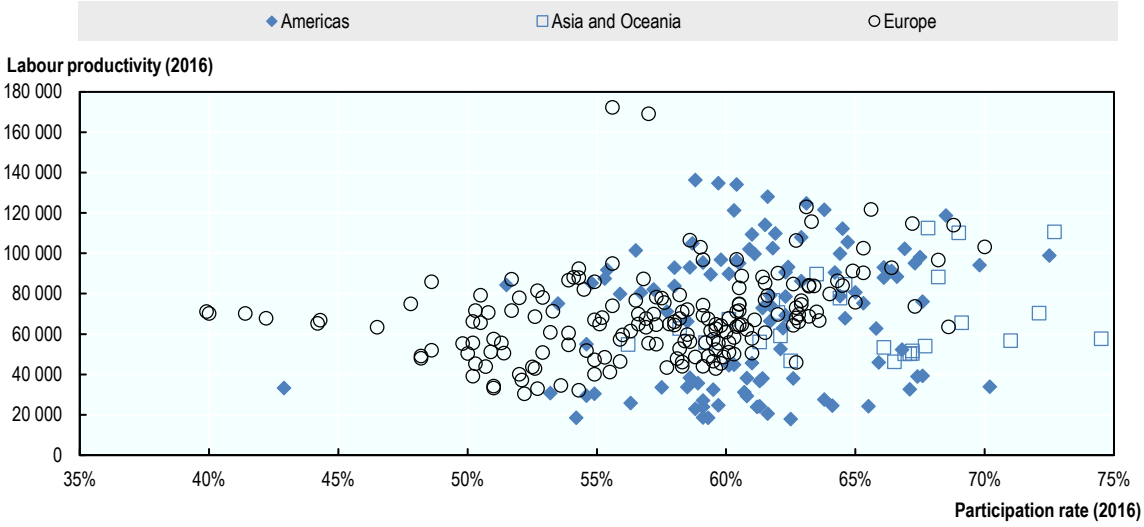
US Census Bureau (2016), "*2016 American Community Survey 1-Year Estimates"*, American FactFinder, https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml (accessed on 03 July 2018).

Veneri, P. and F. Murtin (2016), "Where is inclusive growth happening? Mapping multi-dimensional living standards in OECD regions", *OECD Statistics Working Papers*, No. 2016/01, OECD Publishing, Paris, https://doi.org/10.1787/5jm3nptzwsxq-en.

# Annex A.

**Figure 3.A.1. Productivity and labour force participation in OECD large regions and metropolitan areas**

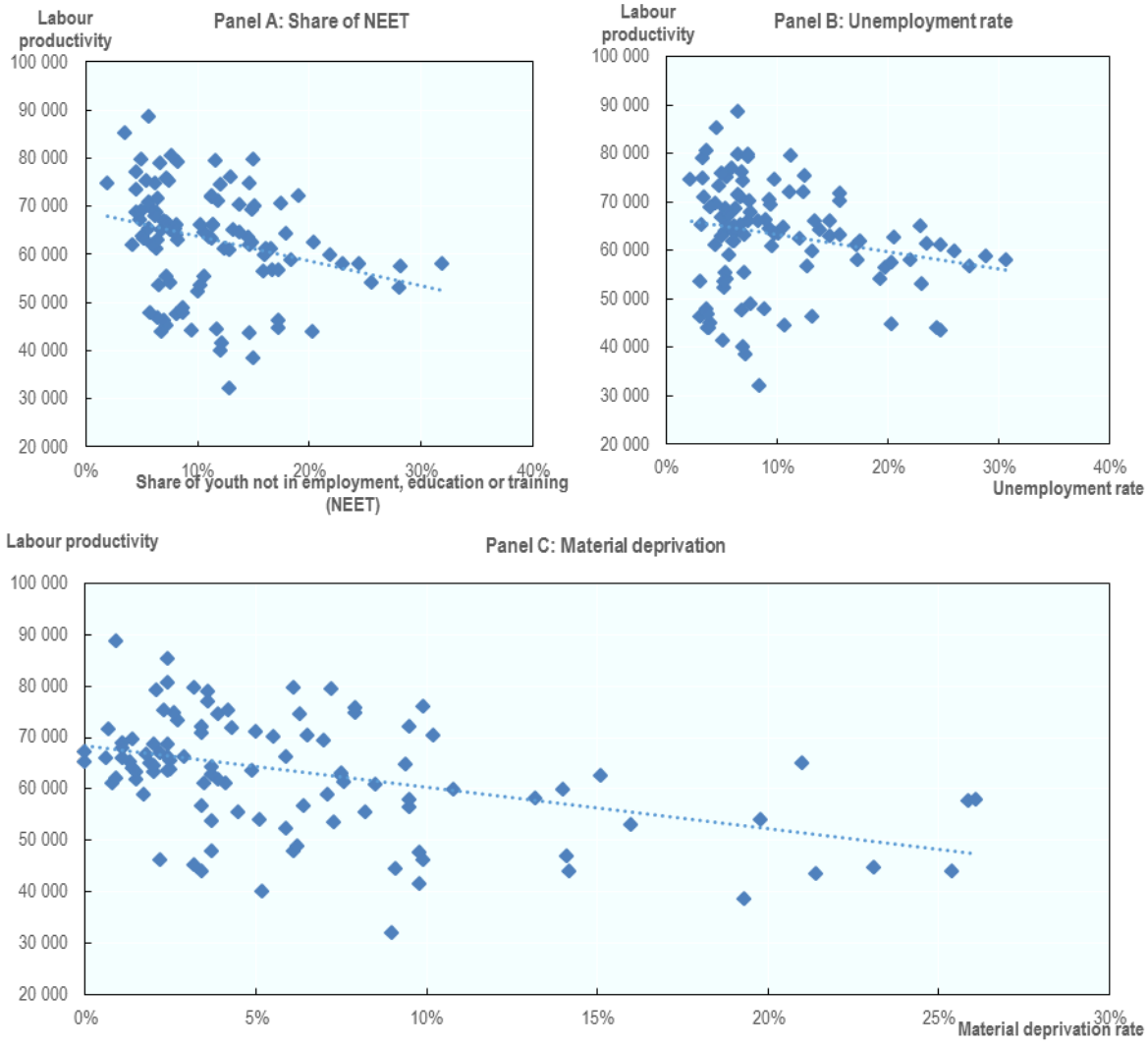
GDP per worker and the share of the working age population in the labour force, TL2 regions, 2016




*Note*: Washington, D.C. was excluded due to a GDP per worker around USD 300 000, which was significantly higher than that of other regions.
*Source*: Calculations using OECD (2018), OECD Regional Statistics (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933825351

**Figure 3.A.2. Low share of NEETs, low unemployment rate, and low material deprivation contribute to both productivity and inclusiveness in OECD TL2 regions, 2014**

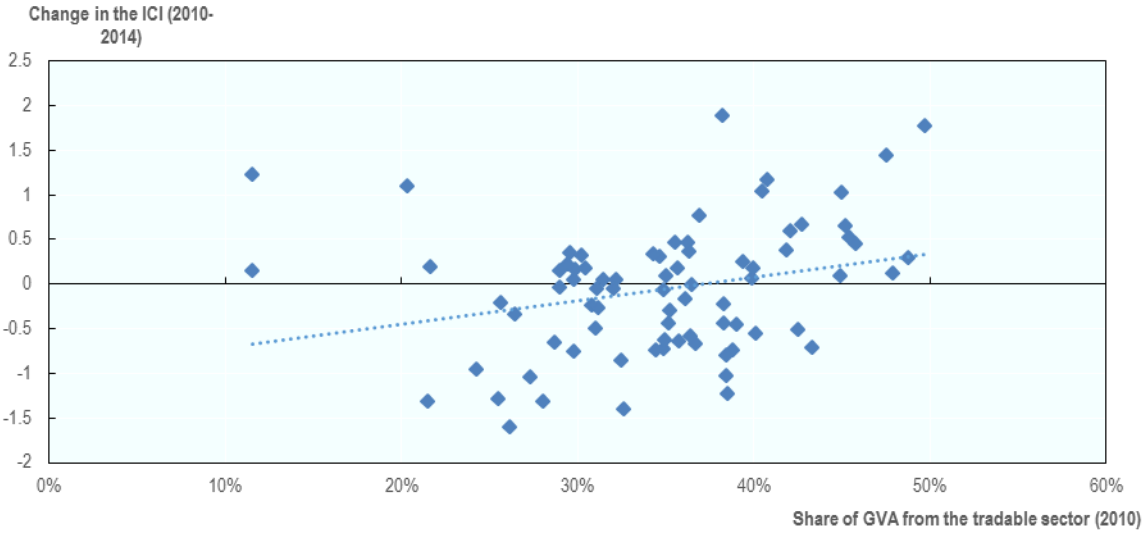



*Source*: Calculations based on data from Eurostat (2018), "Regional statistics by NUTS classification" (database). http://ec.europa.eu/eurostat/web/regions/data/database.

StatLink https://doi.org/10.1787/888933825370

**Figure A.3. Regions with a larger tradable sector have become more inclusive**

Change in the Inclusiveness Composite Indicator (2010-14) and the Gross Value Added in Tradable Sectors (2010) for TL2 regions




*Source*: Calculations using OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en .

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# Part II. Country profiles

# 4. Overview of country profiles

*This section presents an overview of the methodology followed across all country profiles, including data source for each country. It provides a guide to the indicators included in the country profiles in order to correctly interpret within country outcomes and cross-country differences.*

*These country profiles complement the analysis conducted in the first part of the report. They provide country specific indicators about regional and local disparities in employment and unemployment rates, as well as trends in job creation and the dynamic of the employment in the period 2011-16. For 21 countries, it also qualifies job creation according to the risk of automation associated with each occupation.*

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

Country profiles have been prepared for the following 36 countries:

**Table 4.1. List of country profiles**

| | | |
|---|---|---|
| Australia | Hungary | Poland |
| Austria | Ireland | Portugal |
| Belgium | Israel | Romania* |
| Canada | Italy | Slovak Republic |
| Chile | Japan | Slovenia |
| Czech Republic | Korea | South Africa* |
| Denmark | Latvia | Spain |
| Estonia | Lithuania | Sweden |
| Finland | Mexico | Switzerland |
| France | Netherlands | Turkey |
| Germany | New Zealand | United Kingdom |
| Greece | Norway | United States |

*Note*: *Non-OECD country members.

## Definition of local and regional areas

The local labour market is approximated by using geographical entities at the subnational level. According to data availability, the report considers either OECD TL2 regions or OECD TL3 regions (sub-regions).

Regions are classified by the OECD into two territorial levels that reflect the administrative organisation of countries. OECD's large regions (TL2) represent the first administrative tier of subnational government, such as the region of Veneto in Italy. OECD small (TL3) regions are contained within a TL2 region. For example, the TL2 region of Castilla-LaMancha in Spain encompasses five TL3 regions: Ciudad, Real, Guadalajara, Toledo and Albacete. In most cases, TL3 regions correspond to administrative regions, with the exception of Australia, Canada, Germany and the United States.

## Indicators and data coverage

Data used in the country profiles come from the OECD national accounts database and the OECD regional database, as well as labour force surveys. Detailed reference to the source of data is provided in each table and figure included in the country profiles.

### *Data at a national level:*

The estimation of the OECD averages at a national level takes into account all country members in 2015 and 2016 for the following indicators:

- **Labour force participation rate**: defined as labour force (15 to 64 years old) divided by the working-age population (15 to 64 years old).
- **Employment rate**: defined as employment (15 to 64 years old) over the working age population (15 to 64 years old)
- **Unemployment rate** (HUR): Harmonised unemployment rates (HUR) are defined the unemployed as people of working age who are without work, are available for work, and have taken specific steps to find work. This indicator is

calculated as the numbers of unemployed people over the labour force (15 to 64 years old), and it is seasonally adjusted.

- **Long-term unemployment rate:** defined as the share of unemployed (12 months of unemployment or more) over all unemployed.

Data were downloaded in May 2018.

### *Data at the regional level:*

Two main indicators are considered to measure regional disparities within each country:

- Disparity (coefficient of variation)

The indicators is defined as the standard deviation of the indicator across TL2 (TL3 in some cases) regions of the country divided by the distribution mean. This indicator provides better cross-country and cross-regional comparisons, as differences across regions are weighted by their mean value, thus eliminating any bias from the different size of the phenomenon in different countries.

- Best-worst performing region

A second estimation of regional disparities consists in the difference between the region with the highest employment rate (lowest unemployment rate) and the region with the lowest employment rate (highest unemployment rate), within each country. The difference is expressed in percentage points.

- OECD average

For the indicators of regional disparity the OECD average consists in the simple average of the regional disparity indicators across the following countries: Austria, Belgium, Canada, Chile, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Israel, Italy, Japan, Korea, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States.

### *Employment growth and contribution to job creation*

Employment is measured as the total number of jobs in a region during a specific period of time. In particular, net regional employment growth refers to the difference in the number of jobs between 2016 and 2011.

This change will be positive if the number of jobs is higher in 2016 than in 2011, indicating that the region has created jobs during this period (net job creation). Similarly, a negative difference implies a net loss of jobs.

In order to estimate the contribution of each region to job creation in the country, regional contribution refers to the number of jobs created (lost) in a region, divided by the total of jobs created (lost) in the country between 2011 and 2016, expressed in percentage values.

### *Trends in jobs at risk of automation*

Chapter 1 defined four categories of regions, according to employment trends and risk of automation. Each region is sorted in one of these categories according to whether they create or lose jobs, and in which occupations (defined by ISCO-08 occupations) this change in employment mainly occurred. From this classification, it is possible to identify

the "risk" associated to regional jobs. As presented in Chapter 1, the following, four typologies were defined:

- Type A: Creating jobs, predominantly in less risky occupations
- Type B: Creating jobs, predominantly in riskier occupations
- Type C: Losing jobs, predominantly in riskier occupations
- Type D: Losing jobs, predominantly in less risky occupations

The change of employment is measured for each ISCO-08 occupation, as the difference in the number of people employed in 2016 with respect to 2011. This study compares occupations in the bottom three deciles in terms of automation risk (low risk) with occupations in the top three deciles in terms of risk (high risk). Occupations are ranked according to the share of workers at risk of automation in each occupation

Country profiles display a set of graphs, taking an example for each category in each country. The colouring aims to differentiate occupations according to the level of risk (low, medium and high).

## List of occupations according to ISCO-08

**Table 4.2. Occupations ISCO-08**

Major and Sub-major groups

| Code | Major Group | Code | Sub-major Group |
|---|---|---|---|
| 1 | Managers | 11 | Chief Executives, Senior Officials and Legislators |
| | | 12 | Administrative and Commercial Managers |
| | | 13 | Production and Specialized Services Managers |
| | | 14 | Hospitality, Retail and Other Services Managers |
| 2 | Professionals | 21 | Science and Engineering Professionals |
| | | 22 | Health Professionals |
| | | 23 | Teaching Professionals |
| | | 24 | Business and Administration Professionals |
| | | 25 | Information and Communications Technology Professionals |
| | | 26 | Legal, Social and Cultural Professionals |
| 3 | Technicians and Associate Professionals | 31 | Science and Engineering Associate Professionals |
| | | 32 | Health Associate Professionals |
| | | 33 | Business and Administration Associate Professionals |
| | | 34 | Legal, Social, Cultural and Related Associate Professionals |
| | | 35 | Information and Communications Technicians |
| 4 | Clerical Support Workers | 41 | General and Keyboard Clerks |
| | | 42 | Customer Services Clerks |
| | | 43 | Numerical and Material Recording Clerks |
| | | 44 | Other Clerical Support Workers |
| 5 | Services and Sales Workers | 51 | Personal Services Workers |
| | | 52 | Sales Workers |
| | | 53 | Personal Care Workers |
| | | 54 | Protective Services Workers |
| 6 | Skilled Agricultural, Forestry and Fishery Workers | 61 | Market-oriented Skilled Agricultural Workers |
| | | 62 | Market-oriented Skilled Forestry, Fishery and Hunting Workers |
| | | 63 | Subsistence Farmers, Fishers, Hunters and Gatherers |
| 7 | Craft and Related Trades Workers | 71 | Building and Related Trades Workers (excluding Electricians) |
| | | 72 | Metal, Machinery and Related Trades Workers |
| | | 73 | Handicraft and Printing Workers |
| | | 74 | Electrical and Electronic Trades Workers |
| | | 75 | Food Processing, Woodworking, Garment and Other Craft and Related Trades Workers |
| 8 | Plant and Machine Operators and Assemblers | 81 | Stationary Plant and Machine Operators |
| | | 82 | Assemblers |
| | | 83 | Drivers and Mobile Plant Operators |
| 9 | Elementary Occupations | 91 | Cleaners and Helpers |
| | | 92 | Agricultural, Forestry and Fishery Labourers |
| | | 93 | Labourers in Mining, Construction, Manufacturing and Transport |
| | | 94 | Food Preparation Assistants |
| | | 95 | Street and Related Sales and Services Workers |
| | | 96 | Refuse Workers and Other Elementary Workers |
| 0 | Armed Forces Occupations | 1 | Commissioned Armed Forces Officers |
| | | 2 | Non-commissioned Armed Forces Officers |
| | | 3 | Armed Forces Occupations, Other Ranks |

# 5. Australia

*This profile provides an overview of labour market conditions in Australia, analysing trends and differences across 49 sub-regions (OECD TL3 regions).*

## Overview of local labour markets

The employment and unemployment rates provide an important indication of the extent to which available labour resources are used, and can provide insights about inclusiveness. In 2016, the employment rate was 5.4 percentage points above the OECD average, while the unemployment rate was similar to the OECD average. The long-term unemployment rate was lower (6.8 percentage points below) than the OECD average.

Sub-regions within Australia display differences in employment and unemployment rates. In 2016, the employment rate in Western Australia-Outback was about 90%, while in Townsville, the region with the lowest rate, was a much lower 58%. In terms of unemployment, regional disparities are also significant. The unemployment rate in Queensland-Outback was 16%, while in the region of Norwest was close to full employment with an unemployment rate just over 2%.

**Table 5.1. Overview of national and regional labour markets, Australia**

| | 2015 | 2016 |
|---|---|---|
| Labour force participation rate, % | 76.9 (71.3) | 76.9 (71.7) |
| Employment rate, % | 72.2 (66.3) | 72.4 (67.0) |
| Unemployment rate (HUR) , % | 6.1 (6.8) | 5.7 (6.3) |
| Long-term unemployment rate (% un.) | 23.5 (33.7) | 23.7 (30.5) |
| Regional disparities: | | |
| - Employment rate (disparity index) | 8.1 | 8.7 |
| - Employment rate (difference best-worst performing region) | 27.3 | 32.2 |
| - Unemployment rate (disparity index) | 38.7 | 46.1 |
| - Unemployment rate (difference best-worst performing region) | 10.9 | 14.0 |

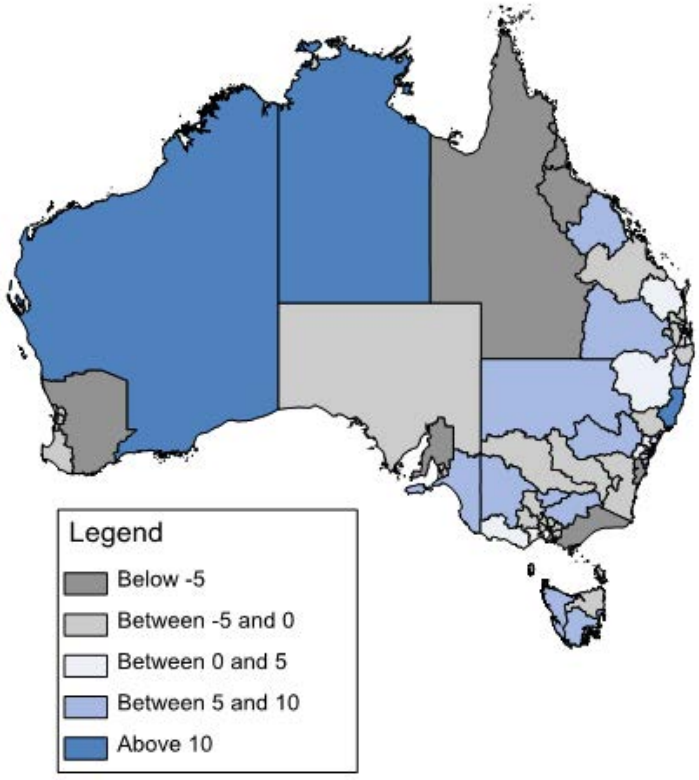
*Note*: The employment rate is calculated as the employment (15-64) at place of residence over the working age population (15-64). The unemployment rate is calculated as the unemployed over labour force (15-64). Regional disparity is measured as the standard deviation of the indicator across the TL3 regions of the country, divided by the distribution mean (i.e., coefficient of variation). The difference between the best and worst performing sub-region is expressed in percentage values.
*Source*: OECD elaborations based on data from OECD National Accounts and OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933825427

## Trend and aggregate indicators

The employment rate in Australia remained stable over the period 2011-16, registering a slight decrease of 0.1 percentage points. This aggregate performance masks large differences at the regional level as shown in the map in Figure 5.1. In particular, the main drop in the employment rate was registered in the sub-regions of Townsville (-19.1), Western Australia-Wheat Belt (-13.9) and Latrobe-Gippsland (-13.7). By contrast, the employment rate in Western Australia-Outback rose by 20 percentage points, and 13.4 percentage points in Mid Nord Coast.

**Figure 5.1. Regional employment rate growth (ppts), TL3 regions, 2011-2016, Australia**

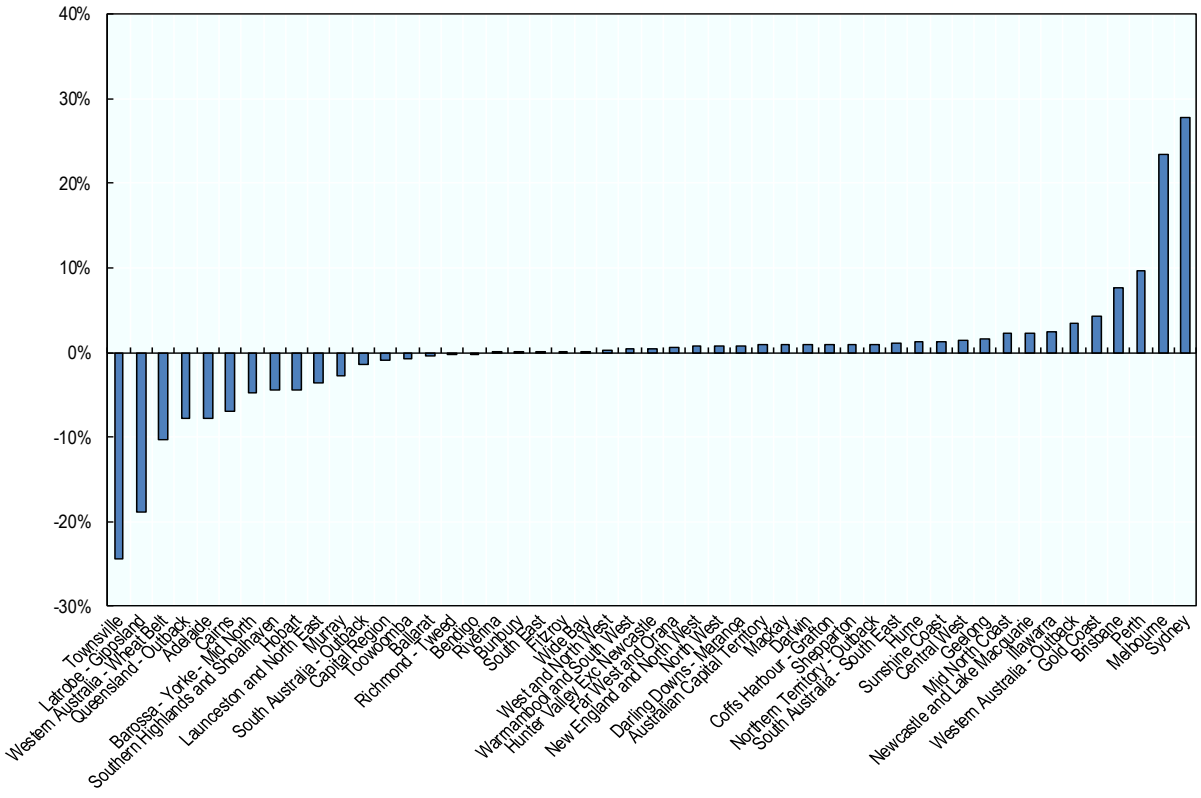



*Note:* The growth of the employment rate is calculated as the difference between the rate in 2016 and the rate in 2011.
*Source:* Calculations bases on the OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933826510

Over the period 2011-16, most of jobs were created in the sub-regions of Sidney and Melbourne, which combined accounted for more than half (51%) of net job creation in Australia. Job loss was concentrated in the sub-regions of Townsville and Latrobe-Gippsland, which combined account for 43% of net job decline in the economy (Figure 5.2).

**Figure 5.2. Contribution to national job creation by TL3 regions, 2011-2016, Australia**




*Note:* Job creation is calculated as the difference between employment in 2016 and employment in 2011.
Bar charts show the share of each region in the aggregate variation of jobs; the share of a region registering a net loss (gain) is calculated with respect of the sum of regions experiencing a net loss (gain) of jobs.
*Source:* Calculations bases on the OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933827194

## Jobs at risk of automation

Beside the number of jobs created (or destroyed), it is their "quality" that matters for economic development and inclusion. The analysis conducted in Chapter 1 of this report provides an indication of the share of jobs at risk of automation in the regional economy.

Lack of information about jobs at risk of automation prevents this type of analysis.

# 6. Austria

*This profile provides an overview of labour market conditions in Austria, analysing trends and differences across nine regions (OECD TL2 regions).*

## Overview of local labour markets

The employment and unemployment rates provide an important indication of the extent to which available labour resources are used, and can provide insights about inclusiveness. In 2016, Austria's employment rate was 4.6 percentage points above the OECD average, while the unemployment rate was in line with other OECD countries. However, the long-term unemployment rate is slightly above the average, with about 32% of unemployed people in this state for more than one year.

Regions within Austria display differences in terms of employment rate. For instance, in 2016, Vorarlberg and Upper Austria registered an employment rate of 75%, while in Vienna the rate was 63.7%. In terms of unemployment there is larger regional disparity; in 2016 the unemployment rate in the region of Vienna was 11.5% against an unemployment rate of just 3.5% in the region of Salzburg.

**Table 6.1. Overview of national and regional labour markets, Austria**

| | 2015 | 2016 |
|---|---|---|
| Labour force participation rate, % | 75.5 (71.3) | 76.2 (71.7) |
| Employment rate, % | 71.1 (66.3) | 71.6 (67.0) |
| Unemployment rate (HUR) , % | 5.7 (6.8) | 6.0 (6.3) |
| Long-term unemployment rate (% un.) | 29.2 (33.7) | 32.3 (30.5) |
| | | |
| Regional disparities: | | |
| - Employment rate (disparity index) | 5.1 (7.5) | 5.2 (7.2) |
| - Employment rate (difference best-worst performing region) | 11.0 (15.7) | 12.0 (15.5) |
| - Unemployment rate (disparity index) | 44.5 (26.4) | 45.9 (28.0) |
| - Unemployment rate (difference best-worst performing region) | 7.7 (7.6) | 8.0 (7.8) |

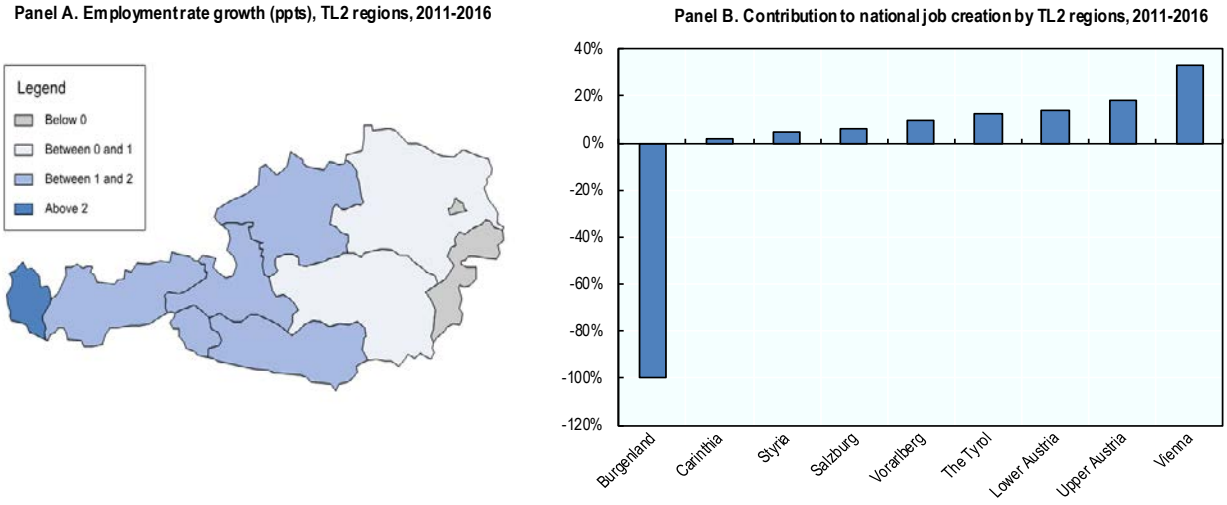
*Note*: The employment rate is calculated as the employment (15-64) at place of residence over the working age population (15-64). The unemployment rate is calculated as the unemployed over labour force (15-64). Regional disparity is measured as the standard deviation of the indicator across the TL2 regions of the country, divided by the distribution mean (i.e., coefficient of variation). The difference between the best and worst performing region is expressed in percentage values.
*Source*: OECD elaborations based on data from OECD National Accounts and OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933825446

## Trend and aggregate indicators

The employment rate of the Austrian economy remained stable over the period 2011-16, experiencing a slight increase of 0.4%. This aggregate performance masks large differences at the regional level as shown in the map in Figure 6.1. In particular, the employment rate declined in two regions: Vienna (-1.1) and Burgenland (-0.4). The most dynamic region during this period was Vorarlberg, which displayed an increase in the employment rate of 3.6 percentage points, followed by the region of Tyrol, where the employment rate increased by 1.4 percentage points.

**Figure 6.1. Regional employment growth and contribution to national employment growth, Austria**




*Note:* The growth of the employment rate is calculated as the difference between the rate in 2016 and the rate in 2011. Job creation is calculated as the difference between employment in 2016 and employment in 2011. Panel B shows the share of each region in the aggregate variation of jobs; the share of a region registering a net loss (gain) is calculated with respect of the sum of regions experiencing a net loss (gain) of jobs.
*Source:* Calculations bases on the OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933826529

Most of jobs in the period 2011-16 were created in the regions of Vienna and Upper Austria, which combined accounted for more than half (51%) of all net jobs creation in the economy. By contrast, Burgenland was the only region where a net loss of jobs was registered.

## Jobs at risk of automation

Beside the number of jobs created (or destroyed), it is their "quality" that matters for economic development and inclusion. The analysis conducted in Chapter 1 of this report provides an indication of the share of jobs at risk of automation in the regional economy. Over the period 2011-16, all of Austrian regions experienced a reduction in the share of jobs at high risk of automation – Type A and Type C in Table 6.2. However, the region of West Austria experienced an aggregate loss of jobs over the period 2011-16.

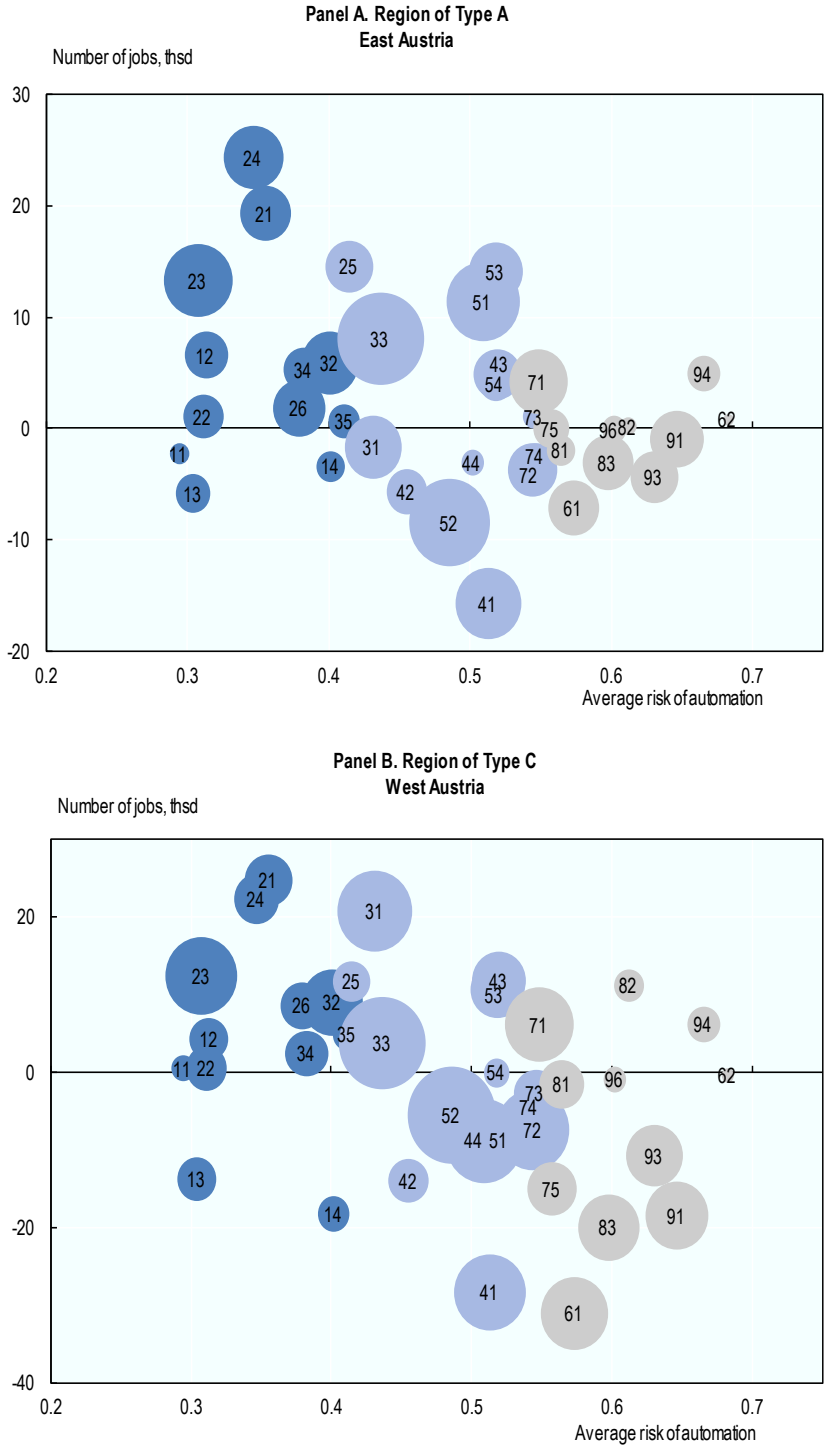
**Table 6.2. Trends in the jobs at risk of automation, Austria**

| A. Creating jobs, predominantly in less risky occupations | B. Creating jobs, predominantly in riskier occupations | C. Losing jobs, predominantly in riskier occupations | D. Losing jobs, predominantly in less risky occupations |
|---|---|---|---|
| East Austria | | West Austria | |
| South Austria | | | |

*Note*: Type A and Type C regions experienced an increase in the share of jobs at low risk of automation with respect to occupations at high risk of automation. Type B and Type D regions experienced an increase in the share of jobs at high risk of automation. In both Type A and Type B regions aggregate employment grew, while in the Type C and Type D regions employment declined.
The analysis for Austria includes three regions only, corresponding to level NUTS1.
*Source*: OECD Database

The detailed creation of jobs by occupation for one region per category is presented in Figure 6.2. In particular, the region of East Austria experienced employment growth mainly in occupations at low risk of automation, such as Business and Administration Professionals (24), Science and Engineering Professionals (21), and Teaching Professionals (23). At the same time, jobs in occupations as Labourers in Mining, Construction, Manufacturing and Transport (93) declined. A similar picture emerges for the region of West Austria, which experienced a reduction of employment, but mainly in occupations at high risk of automation, such as Drivers and Mobile Plant Operators (83), Cleaners and Helpers (91) and Agricultural Workers (61). In fact, while losing jobs in aggregate, the region of West Austria created jobs in occupations at low risk of automation, similar to those created in East Austria.

**Figure 6.2. Job creation by risk of automation, selected regions, 2011-16, Austria**




*Note:* Occupations (ISCO-08 code indicated in the bubble) are ranked from low to high risk of automation along the horizontal axis. Changes in the number of jobs for each occupation are reported along the vertical axis. Bubble size represents the share of jobs in the occupation with respect to total employment in the region.
*Source*: Calculations based on EU Labour Force survey.

StatLink https://doi.org/10.1787/888933827213

# 7. Belgium

*This profile provides an overview of labour market conditions in Belgium analysing trends and differences across three regions (OECD TL2 regions).*

## Overview of local labour markets

The employment and unemployment rates provide an important indication of the extent to which available labour resources are used, and can provide insights about inclusiveness. In 2016, Belgium displayed an employment rate of 4.7 percentage points below the OECD average, whereas the unemployment rate was 1.6 points above the OECD average, indicating the presence of idle resources. The situation is similar to 2015. Nevertheless, long-term unemployment is still a concern for the Belgian economy, with 52% of unemployed people in that status for more than one year, more than 22 percentage points above the OECD average.

Regions within Belgium display important disparities in terms of employment. In 2016, the employment rate in the Flemish region reached 66.3%, while in the region of Brussels was 54.6%. In terms of unemployment, regional disparities are large when compared to the OECD average. In 2016, the unemployment rate in the Flemish region was below 5%, while in Brussels it was approximately 17%.

**Table 7.1. Overview of national and regional labour markets, Belgium**

| | 2015 | 2016 |
|---|---|---|
| Labour force participation rate, % | 67.6 (71.3) | 67.6 (71.7) |
| Employment rate, % | 61.8 (66.3) | 62.3 (67.0) |
| Unemployment rate (HUR), % | 8.5 (6.8) | 7.9 (6.3) |
| Long-term unemployment rate (% un.) | 51.7 (33.7) | 52.0 (30.5) |
| Regional disparities: | | |
| - Employment rate (disparity index) | 11.5 (7.5) | 10.5 (7.2) |
| - Employment rate (difference best-worst performing region) | 12.6 (15.7) | 11.7 (15.5) |
| - Unemployment rate (disparity index) | 53.3 (26.4) | 55.6 (28.0) |
| - Unemployment rate (difference best-worst performing region) | 12.3 (7.6) | 12.0 (7.8) |

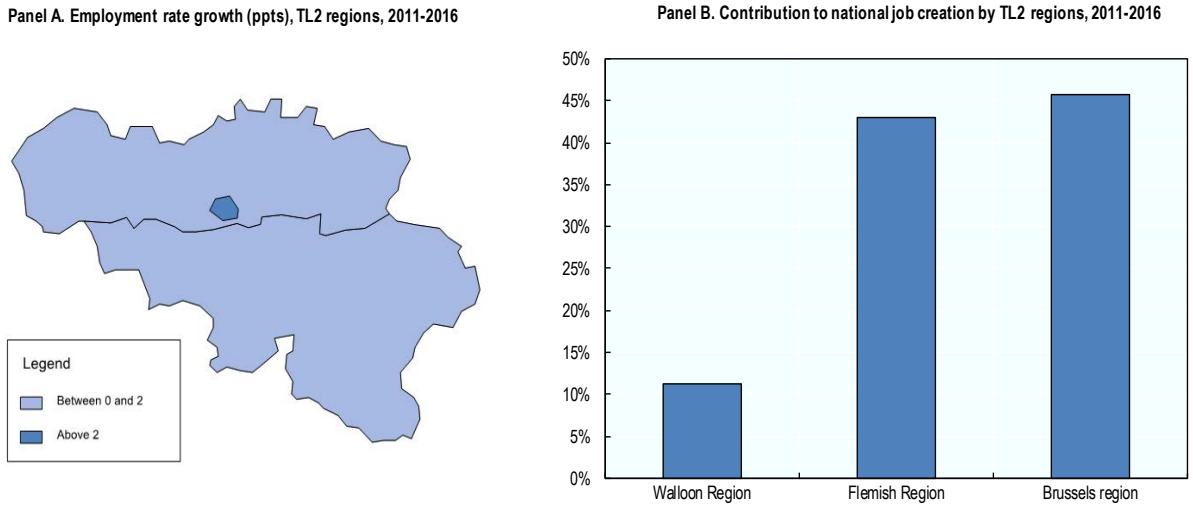
*Note*: The employment rate is calculated as the employment (15-64) at place of residence over the working age population (15-64). The unemployment rate is calculated as the unemployed over labour force (15-64). Regional disparity is measured as the standard deviation of the indicator across the TL2 regions of the country, divided by the distribution mean (i.e., coefficient of variation). The difference between the best and worst performing region is expressed in percentage values.
*Source*: OECD elaborations based on data from OECD National Accounts and OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933825465

## Trend and aggregate indicators

The employment rate of the Belgian economy remained stable over the period 2011-16, registering a slight increase of 0.5 percentage points. This aggregate performance masks differences at the regional level as shown in the map in Figure 7.1. Although all regions in the economy displayed an increase during this period, the most dynamic one was Brussels, where the rate increased by 2 percentage points, whereas in the Flemish region and the Walloon region, the increase was lower than 0.5 percentage points.

**Figure 7.1. Regional employment growth and contribution to national employment growth, Belgium**




*Note:* The growth of the employment rate is calculated as the difference between the rate in 2016 and the rate in 2011. Job creation is calculated as the difference between employment in 2016 and employment in 2011. Panel B shows the share of each region in the aggregate variation of jobs; the share of a region registering a net loss (gain) is calculated with respect of the sum of regions experiencing a net loss (gain) of jobs.
*Source*: Calculations bases on the OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933826548

The creation of jobs over the period 2011-16 was mainly concentrated in the Brussels region and the Flemish region, accounting together for about 89% of net job creation in Belgium.

## Jobs at risk of automation

Beside the number of jobs created (or destroyed), it is their "quality" that matters for economic development and inclusion. The analysis conducted in Chapter 1 of this report provides an indication of the share of jobs at risk of automation in the regional economy.

Data on the risk of automation is available only for sub-regions in Flanders (corresponding to the NUTS2 level, according to the European Classification). Over the period 2011-16, three of the five Flemish sub-regions experienced a reduction in the share of jobs at high risk of automation – Type A and Type C in Table 7.2. Still, in two regions

(Antwerp and West Flanders) most of the jobs created were in occupations at high risk of automation, as observed in category Type B.

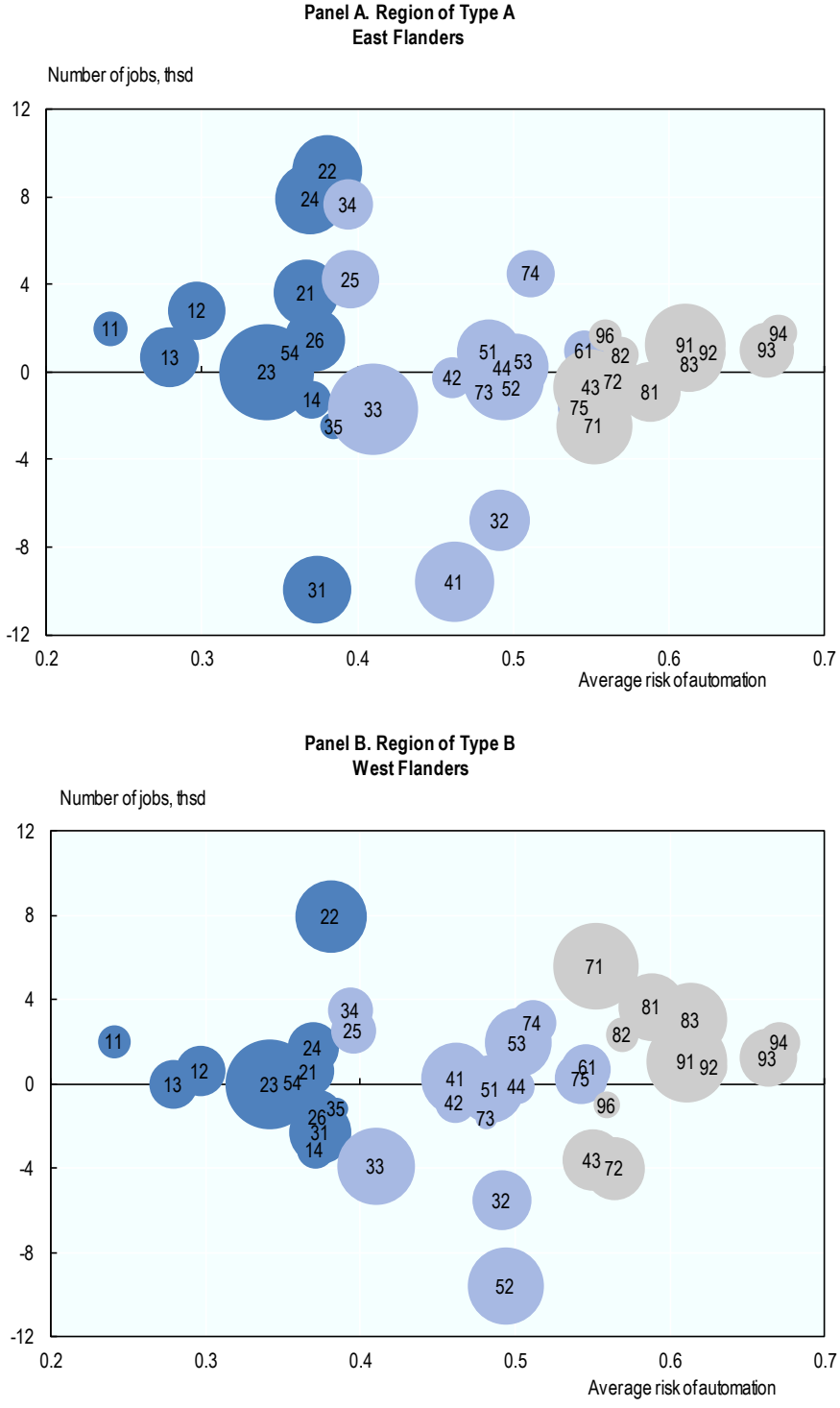
**Table 7.2. Trends in the jobs at risk of automation, Belgium**

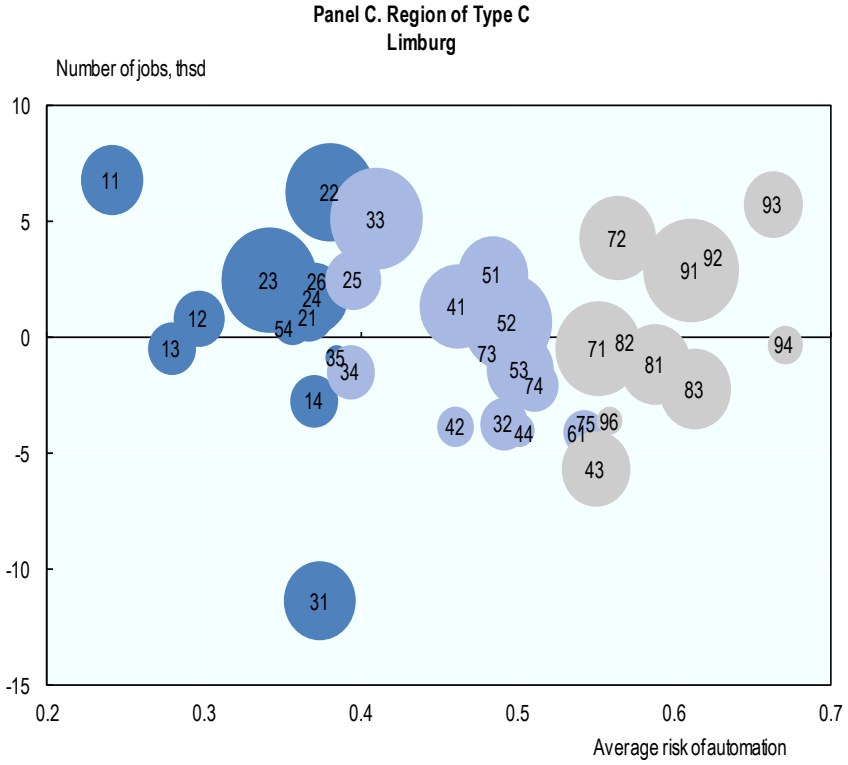
| A. Creating jobs, predominantly in less risky occupations | B. Creating jobs, predominantly in riskier occupations | C. Losing jobs, predominantly in riskier occupations | D. Losing jobs, predominantly in less risky occupations |
|---|---|---|---|
| East Flanders | Antwerp | Limburg | |
| Flemish Brabant | West Flanders | | |

*Note*: Type A and Type C regions experienced an increase in the share of jobs at low risk of automation with respect to occupations at high risk of automation. Type B and Type D regions experienced an increase in the share of jobs at high risk of automation. In both Type A and Type B regions aggregate employment grew, while in the Type C and Type D regions employment declined.
The analysis for Belgium includes information for Flanders region only.
*Source*: OECD calculations

The detailed creation of jobs by occupation for one sub-region per category is presented in Figure 7.2. In particular, the growth of employment in the region of East Flanders was mainly driven by jobs in occupations at low risk of automation, such as Health professionals (22), Business and Administration Professionals (24), and Legal, Social, Cultural and Related Associate Professionals (34). A similar picture emerges for the region of Limburg in Panel C, which experienced a reduction of employment, but mainly in occupations at high risk of automation, like Numerical and Material Recording Clerks (43) and Drivers and Mobile Plant Operators (83). Despite the loss of jobs in aggregate, the region of Limburg created jobs in occupations at low risk of automation such as Chief Executives, Senior Officials and Legislators (11) and Health Professionals (22). By contrast, the region of West Flanders registered a large increase in jobs in occupations at high risk of automation, like Building and Related Trades Workers (71), Stationary Plant and Machine Operators (81) and Drivers and Mobile Plant Operators (83).

**Figure 7.2. Job creation by risk of automation, selected regions, 2011-16, Belgium**






*Note:* Occupations (ISCO-08 code indicated in the bubble) are ranked from low to high risk of automation along the horizontal axis. Changes in the number of jobs for each occupation are reported along the vertical axis. Bubble size represents the share of jobs in the occupation with respect to total employment in the region.
*Source*: Calculations based on EU Labour Force survey.

StatLink https://doi.org/10.1787/888933827232

# 8. Canada

*This profile provides an overview of labour market conditions in Canada, analysing trends and differences across 10 provinces (OECD TL2 regions).*

## Overview of local labour markets

Employment and unemployment rates provide an important indication of the extent to which available labour resources are used, and can provide insights about inclusiveness. In 2016, Canada displayed an employment rate of 5.6 (percentage) points above the OECD average and an unemployment rate in line with the average. The long-term unemployment rate in the country was around 19 percentage points below the OECD average. These indicators are similar to those from 2015.

In 2016, provinces within Canada showed less disparity than the average across OECD countries. Still, the employment rate in the provinces of Saskatchewan and Alberta was about 75%, more than 10 percentage points above the rate displayed in Newfoundland and Labrador. Disparities in terms of unemployment are in line with the OECD average. In 2016, the unemployment rate in Newfoundland and Labrador was close to 14%, while in the province of British Columbia the rate was than 6.3%.

**Table 8.1. Overview of national and regional labour markets, Canada**

| | 2015 | 2016 |
|---|---|---|
| Labour force participation rate, % | 78 (71.3) | 78.1 (71.7) |
| Employment rate, % | 72.5 (66.3) | 72.6 (67.0) |
| Unemployment rate (HUR), % | 6.9 (6.8) | 7.0 (6.3) |
| Long-term unemployment rate (% un.) | 11.6 (33.7) | 11.6 (30.5) |
| Regional disparities: | | |
| - Employment rate (disparity index) | 4.9 (7.5) | 4.5 (7.2) |
| - Employment rate (difference best-worst performing province) | 11.7 (15.7) | 10.9 (15.5) |
| - Unemployment rate (disparity index) | 31.5 (26.4) | 29.3 (28.0) |
| - Unemployment rate (difference best-worst performing province) | 8.0 (7.6) | 7.6 (7.8) |

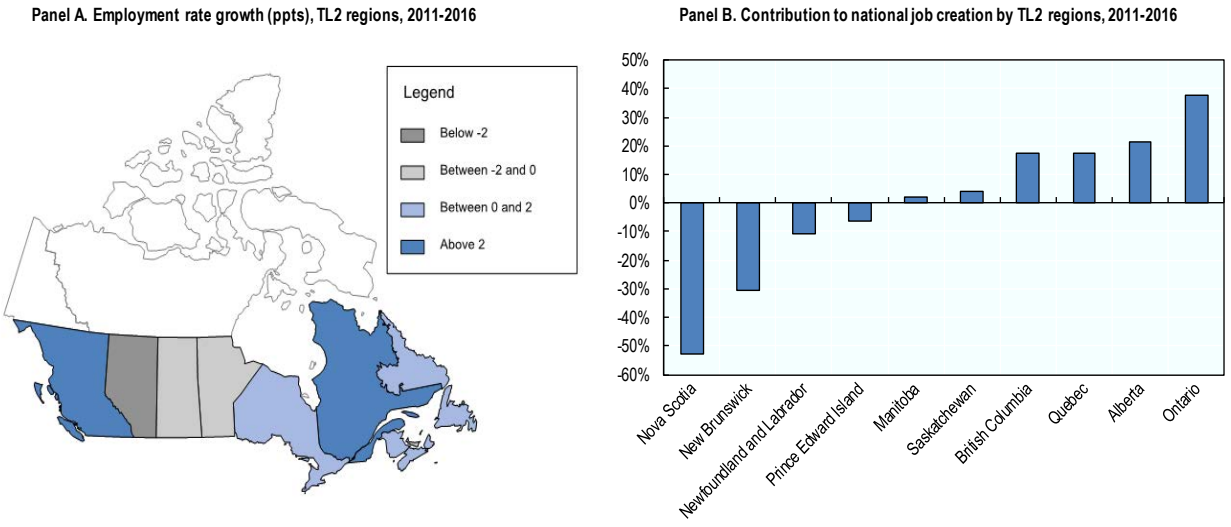
*Note*: The employment rate is calculated as the employment (15-64) at place of residence over the working age population (15-64). The unemployment rate is calculated as the unemployed over labour force (15-64). Regional disparity is measured as the standard deviation of the indicator across the TL2 regions of the country, divided by the distribution mean (i.e., coefficient of variation). The difference between the best and worst performing region is expressed in percentage values.
*Source*: OECD elaborations based on data from OECD National Accounts and OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933825484

## Trend and aggregate indicators

The employment rate of the Canadian economy remained stable over the period 2011-16, registering just a slight increase of 0.8 percentage points. This aggregate performance masks large differences across provinces as shown in the map in Figure 8.1. In particular, the most notable decline of the employment rate was registered in the province of Alberta (-2.5). Among the most dynamic provinces during this period are British Columbia, where the employment rate grew by 2.2 percentage points, and Quebec, where the employment rate grew by 2 percentage points.

**Figure 8.1. Regional employment growth and contribution to national employment growth, Canada**




*Note*: The growth of the employment rate is calculated as the difference between the rate in 2016 and the rate in 2011. Job creation is calculated as the difference between employment in 2016 and employment in 2011.
Panel B shows the share of each region in the aggregate variation of jobs; the share of a region registering a net loss (gain) is calculated with respect of the sum of regions experiencing a net loss (gain) of jobs.
Yukon, Northwest Territories and Nunavut are excluded from the analysis, because of limitations in the availability of data.
*Source:* Calculations bases on OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933826567

Over the period 2011-16, most of jobs were created in the provinces of Ontario and Alberta, which combined accounted for 60% of net job creation in the Canadian economy. By contrast, more than a half (53%) of the jobs lost in this period was concentrated in the province of Nova Scotia.

## Jobs at risk of automation

Beside the number of jobs created (or destroyed), it is their "quality" that matters for economic development and inclusion. The analysis conducted in Chapter 1 of this report provides an indication of the share of jobs at risk of automation in the regional economy.

Over the period 2011-16, nine out of ten provinces experienced a reduction in the share of jobs at high risk of automation – Type A and Type C in Table 8.2. The provinces of Prince Edward Island, Nova Scotia and New Brunswick experienced an aggregate loss of jobs over the period 2011-16, but mainly in occupations at high risk of automation (Type C in Table 8.2).

Still, in the province of Newfoundland and Labrador, most of the jobs created were in occupations at high risk of automation.

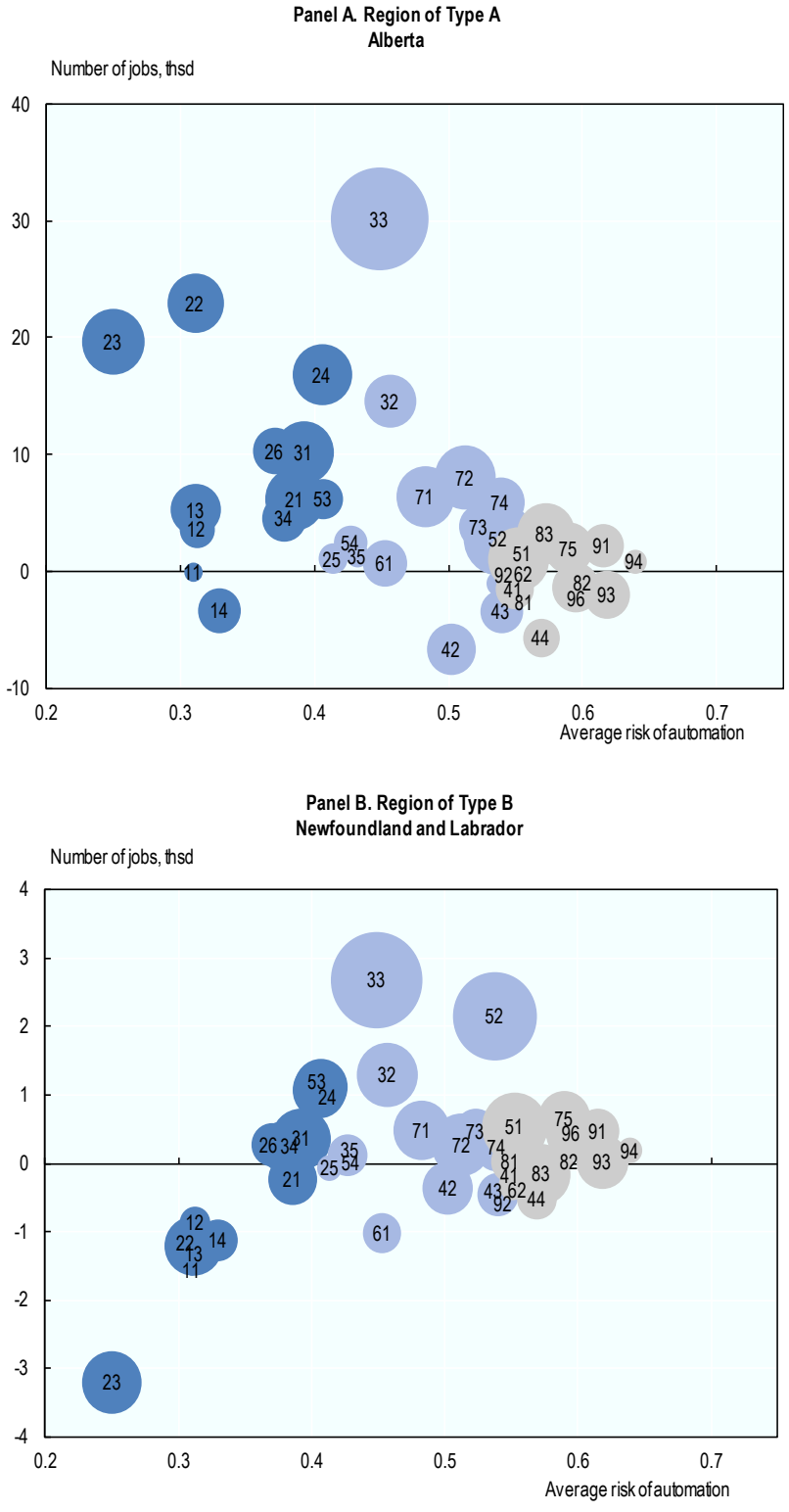
**Table 8.2. Trends in the jobs at risk of automation, Canada**

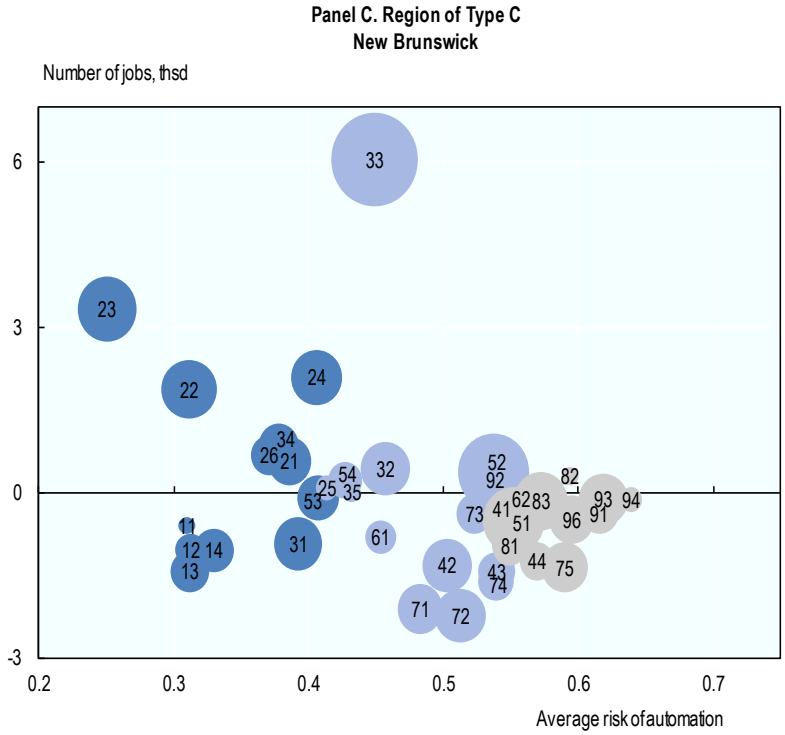
| A. Creating jobs, predominantly in less risky occupations | B. Creating jobs, predominantly in riskier occupations | C. Losing jobs, predominantly in riskier occupations | D. Losing jobs, predominantly in less risky occupations |
|---|---|---|---|
| Quebec | Newfoundland and Labrador | Prince Edward Island | |
| Ontario | | Nova Scotia | |
| Manitoba | | New Brunswick | |
| Saskatchewan | | | |
| Alberta | | | |
| British Columbia | | | |

*Note*: Type A and Type C regions experienced an increase in the share of jobs at low risk of automation with respect to occupations at high risk of automation. Type B and Type D regions experienced an increase in the share of jobs at high risk of automation. In both Type A and Type B regions aggregate employment grew, while in the Type C and Type D regions employment declined
Yukon, Northwest Territories and Nunavut are excluded from the analysis.
*Source*: OECD calculations

The detailed creation of jobs by occupation for one province per category is presented in Figure 8.2. In particular, the growth of employment in the province of Alberta was mainly driven by jobs in occupations at low risk of automation (e.g., Health professionals (22), Teaching professionals (23) and Business and Administration Associate Professionals (33)). A similar picture emerges for the province of New Brunswick, which experienced a reduction of employment, but mainly in occupations at high risk of automation, such as Food Processing, Woodworking and Garment Workers (75) and Building and Related Trades Workers (71). Despite the loss of jobs in aggregate, New Brunswick created jobs in occupations at low risk of automation similar to those created in Alberta. By contrast, the province of Newfoundland and Labrador registered a large increase in jobs in occupations at high risk of automation, such as Food Processing, Woodworking and Garment Workers (75), Personal Service Workers (51) and Sales Workers (52).

**Figure 8.2. Job creation by risk of automation, selected regions, 2011-16, Canada**






*Note:* Occupations (ISCO-08 code indicated in the bubble) are ranked from low to high risk of automation along the horizontal axis. Changes in the number of jobs for each occupation are reported along the vertical axis. Bubble size represents the share of jobs in the occupation with respect to total employment in the region.
*Source*: Calculations based on Labour Force survey.

StatLink https://doi.org/10.1787/888933827251

# 9. Chile

*This profile provides an overview of labour market conditions in Chile, analysing trends and differences across 15 regions (OECD TL2 regions).*

## Overview of local labour markets

The employment and unemployment rates provide an important indication of the extent to which available labour resources are used, and can provide insights about inclusiveness. In 2016, the employment rate was 4.8 percentage points below the OECD average, while the unemployment rate was in line with the average. Both indicators remained stable when compared to 2015.

Regions within Chile display large differences in terms of employment rate. In 2016, the employment rate was 68% in the region of Aysén, compared to 51% in the region of Biobío, more than 17 percentage points of difference. Disparities also exist in terms of unemployment. Although all regions displayed a single digit figure, the unemployment rate was above 8% in Tarapacá, Atacama and Coquimbo, while in the region of Los Lagos was just 3%.

**Table 9.1. Overview of national and regional labour markets, Chile**

| | 2015 | 2016 |
|---|---|---|
| Labour force participation rate, % | 66.8 (71.3) | 66.8 (71.7) |
| Employment rate, % | 62.4 (66.3) | 62.2 (67.0) |
| Unemployment rate (HUR) , % | 6.2 (6.8) | 6.5 (6.3) |
| Long-term unemployment rate (% un.) | - | - |
| Regional disparities: | | |
| - Employment rate (disparity index) | 6.9 (7.5) | 7.2 (7.2) |
| - Employment rate (difference best-worst performing region) | 17.0 (15.7) | 17.2 (15.5) |
| - Unemployment rate (disparity index) | 24.4 (26.4) | 28.6 (28.0) |
| - Unemployment rate (difference best-worst performing region) | 4.2 (7.6) | 5.2 (7.8) |

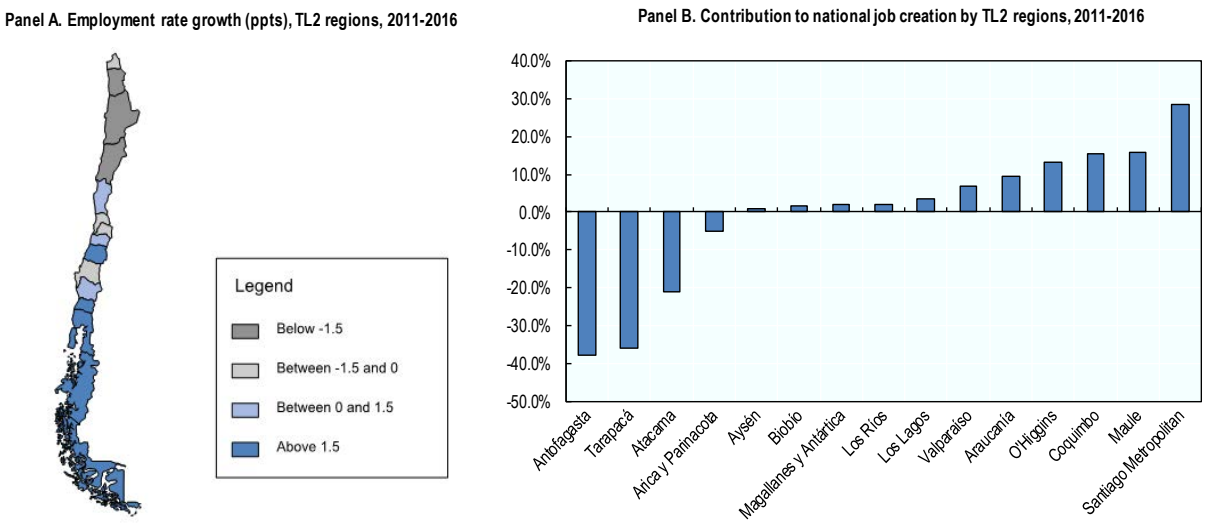
*Note*: The employment rate is calculated as the employment (15-64) at place of residence over the working age population (15-64). The unemployment rate is calculated as the unemployed over labour force (15-64). Regional disparity is measured as the standard deviation of the indicator across the TL2 regions of the country, divided by the distribution mean (i.e., coefficient of variation). The difference between the best and worst performing region is expressed in percentage values.
*Source*: OECD elaborations based on data from OECD National Accounts and OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en and from *Nueva Encuesta Nacional de Empleo* (New National Survey of Employment), Instituto Nacional de Estadística INE Chile.

StatLink https://doi.org/10.1787/888933825503

## Trend and aggregate indicators

The employment rate of the Chilean economy remained stable during the period 2011-16. However, the aggregate performance masks large differences at the regional level as shown in the map in Figure 9.1. In particular, the employment rate declined more significantly in the regions of Tarapacá (-2), Atacama (-1.8) and Antofagasta (-1.7). Among the most dynamic regions are Los Rios, which displayed an increase in the employment rate of 5.1 percentage points, and the region of Maule, where the employment rate grew by 2.7 percentage points.

**Figure 9.1. Regional employment growth and contribution to national employment growth, Chile**




*Note:* The growth of the employment rate is calculated as the difference between the rate in 2016 and the rate in 2011. Job creation is calculated as the difference between employment in 2016 and employment in 2011. Panel B shows the share of each region in the aggregate variation of jobs; the share of a region registering a net loss (gain) is calculated with respect of the sum of regions experiencing a net loss (gain) of jobs. Regional estimations based on population of 15 years old and over.
*Source*: Calculations based on data from *Nueva Encuesta Nacional de Empleo* (New National Survey of Employment), Instituto Nacional de Estadística INE Chile.

StatLink https://doi.org/10.1787/888933826586

Job creation during the period 2011-16 was concentrated in the metropolitan region of Santiago and the region of Maule, which combined accounted for 44% of net jobs creation in Chile. By contrast, 74% of net job decline was concentrated in the regions of Antofagasta and Tarapacá.

## Jobs at risk of automation

Beside the number of jobs created (or destroyed), it is their "quality" that matters for economic development and inclusion. The analysis conducted in Chapter 1 of this report provides an indication of the share of jobs at risk of automation in the regional economy.

Lack of information about jobs at risk of automation prevents this type of analysis.

# 10. Czech Republic

*This profile provides an overview of labour market conditions in Czech Republic, analysing trends and differences across eight regions (OECD TL2 regions).*

## Overview of local labour markets

The employment and unemployment rates provide an important indication of the extent to which available labour resources are used, and can provide insights about inclusiveness. Both rates show a positive scenario for the Czech Republic in 2016, particularly the employment rate of 72 %, was five percentage points above the OECD average. In addition, long-term unemployment rate has diminished in 2016, and it is considerably lower than the OECD average (13 percentage points lower in 2016).

Regions within the Czech Republic displayed less asymmetry than the average across OECD countries in 2015 and 2016, registering an improvement between these two years. However some differences still remain. In 2016, the employment rate in Prague was 75.7%, while in the regions of Moravian Silesia was more than six points lower, at 69.3%. In terms of unemployment, the largest differences are also registered in these two regions; in 2016 the unemployment rates was 2.3% in the Prague regions and 7% in the Moravian Silesia region.

**Table 10.1. Overview of national and regional labour markets, Czech Republic**

| | 2015 | 2016 |
|---|---|---|
| Labour force participation rate, % | 74 (71.3) | 75 (71.7) |
| Employment rate, % | 70.2 (66.3) | 72 (67.0) |
| Unemployment rate (HUR), % | 5.1 (6.8) | 4.0 (6.3) |
| Long-term unemployment rate (% un.) | 48.3 (33.7) | 43.2 (30.5) |
| Regional disparities: | | |
| - Employment rate (disparity index) | 4.0 (7.5) | 2.9 (7.2) |
| - Employment rate (difference best-worst performing region) | 8.1 (15.7) | 6.4 (15.5) |
| - Unemployment rate (disparity index) | 35.8 (26.4) | 35.5 (28.0) |
| - Unemployment rate (difference best-worst performing region) | 5.4 (7.6) | 4.7 (7.8) |

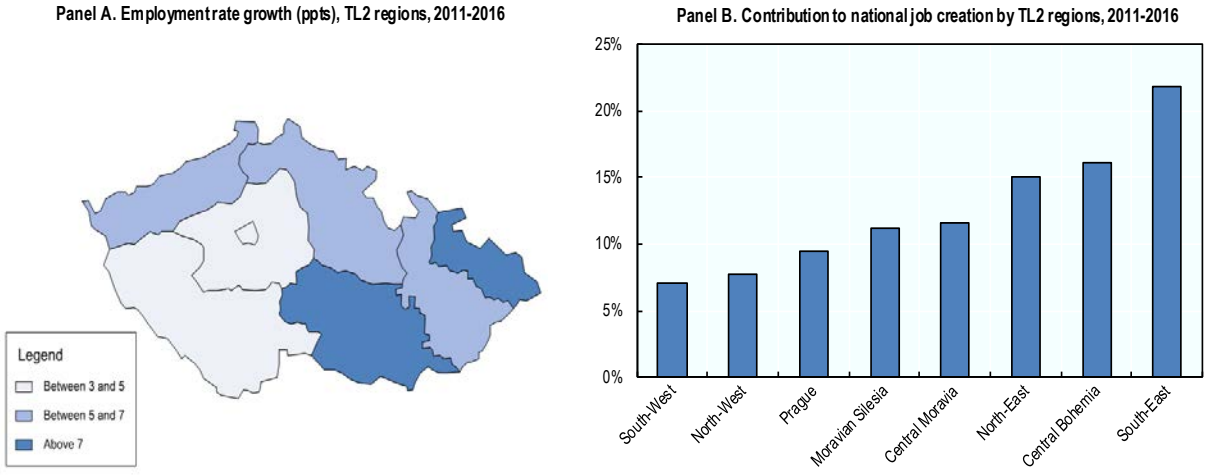
*Note*: The employment rate is calculated as the employment (15-64) at place of residence over the working age population (15-64). The unemployment rate is calculated as the unemployed over labour force (15-64). Regional disparity is measured as the standard deviation of the indicator across the TL2 regions of the country, divided by the distribution mean (i.e., coefficient of variation). The difference between the best and worst performing region is expressed in percentage values.
*Source*: OECD elaborations based on data from OECD National Accounts and OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933825522

## Trend and aggregate indicators

The employment rate in Czech Republic grew by 6.3 percentage points over the period 2011-16. Beyond the aggregate performance there are regional differences (Figure 10.1, Panel A). The employment rate increased in all regions of the country, but this increase was moderate in three regions: Prague (4.2), Central Bohemia (4.7) and South-West (5). The most dynamic regions were South-East, which displayed an increase in the employment rate of 7.2 percentage points, and Moravian Silesia, where the employment rate grew by 7.1 percentage points.

**Figure 10.1. Regional employment growth and contribution to national employment growth, Czech Republic**




*Note*: The growth of the employment rate is calculated as the difference between the rate in 2016 and the rate in 2011. Job creation is calculated as the difference between employment in 2016 and employment in 2011. Panel B shows the share of each region in the aggregate variation of jobs; the share of a region registering a net loss (gain) is calculated with respect of the sum of regions experiencing a net loss (gain) of jobs.
*Source*: Calculations bases on the OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933826605

Over the period 2011-16, most of jobs were created in the regions of South-East and Central Bohemia, accounting for about 38% of net job creation in Czech Republic. By contrast, the regions of South-West and Nord-West registered the lower contribution to national net job creation (15% combined). In all regions, however, it was registered an increase in net job creation (Figure 10.1, Panel B).

## Jobs at risk of automation

Beside the number of jobs created (or destroyed), it is their "quality" that matters for economic development and inclusion. The analysis conducted in Chapter 1 of this report provides an indication of the share of jobs at risk of automation in the regional economy. Over the period 2011-16, all eight regions in Czech Republic experienced a reduction in the share of jobs at high risk of automation – Type A in Table 10.2.

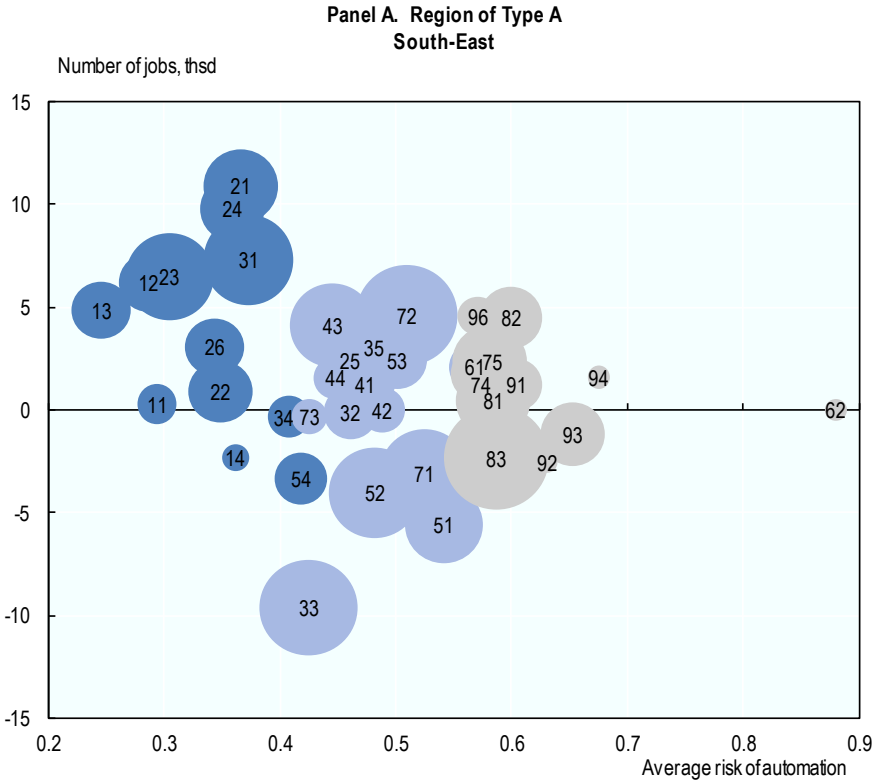
**Table 10.2. Trends in the jobs at risk of automation, Czech Republic**

| A. Creating jobs, predominantly in less risky occupations | B. Creating jobs, predominantly in riskier occupations | C. Losing jobs, predominantly in riskier occupations | D. Losing jobs, predominantly in less risky occupations |
|---|---|---|---|
| Prague | | | |
| Central Bohemia | | | |
| South-West | | | |
| North-West | | | |
| North-East | | | |
| South-East | | | |
| Central Moravia | | | |
| Moravian Silesia | | | |

*Note*: Type A and Type C regions experienced an increase in the share of jobs at low risk of automation with respect to occupations at high risk of automation. Type B and Type D regions experienced an increase in the share of jobs at high risk of automation. In both Type A and Type B regions aggregate employment grew, while in the Type C and Type D regions employment declined.
*Source*: OECD Database

The detailed creation of jobs by occupation for one region per category is presented in Figure 10.2. In particular, the South-East region is a sample of the situation experienced by all the regions in Czech Republic. The growth of employment was mainly driven by jobs in occupations at low risk of automation (e.g., Science and Engineering Professionals (21), Teaching professionals (23), and Business and Administration Professionals (24)).

**Figure 10.2. Job creation by risk of automation, selected regions, 2011-16, Czech Republic**




*Note:* Occupations (ISCO-08 code indicated in the bubble) are ranked from low to high risk of automation along the horizontal axis. Changes in the number of jobs for each occupation are reported along the vertical axis. Bubble size represents the share of jobs in the occupation with respect to total employment in the region.
*Source*: Calculations based on EU Labour Force survey.

StatLink https://doi.org/10.1787/888933827270

# 11. Denmark

*This profile provides an overview of labour market conditions in Denmark, analysing trends and differences across five regions (OECD TL2 regions).*

## Overview of local labour markets

The employment and unemployment rates provide an important indication of the extent to which available labour resources are used, and can provide insights about inclusiveness. In 2016, the Danish employment rate was 7.7 percentage points above the OECD average while the unemployment rate was 2.2 percentage points below the OECD average (Table 11.1). Along with this good performance there are however concerns about long-term unemployment which was 22.5% in 2016, eight percentage points below the OECD average.

Regional disparities within Denmark are considerably below the average across OECD countries. In 2016, the Capital region reached an employment rate of 77.7%, while Zealand, the region with the lowest rate, displayed a rate of 71.9%. In terms of unemployment, the asymmetry is even lower, since the difference between the region with the highest and the lowest rate (Capital region and Central Jutland, respectively) was just one percentage point.

**Table 11.1. Overview of national and regional labour markets, Denmark**

| | 2015 | 2016 |
|---|---|---|
| Labour force participation rate, % | 77.6 (71.3) | 78.0 (71.7) |
| Employment rate, % | 74 (66.3) | 74.7 (67.0) |
| Unemployment rate (HUR) , % | 4.6 (6.8) | 4.1 (6.3) |
| Long-term unemployment rate (% un.) | 26.9 (33.7) | 22.5 (30.5) |
| Regional disparities: | | |
| - Employment rate (disparity index) | 2.0 (7.5) | 3.1 (7.2) |
| - Employment rate (difference best-worst performing region) | 3.6 (15.7) | 5.8 (15.5) |
| - Unemployment rate (disparity index) | 6.9 (26.4) | 6.0 (28) |
| - Unemployment rate (difference best-worst performing region) | 1.1 (7.6) | 1.0 (7.8) |

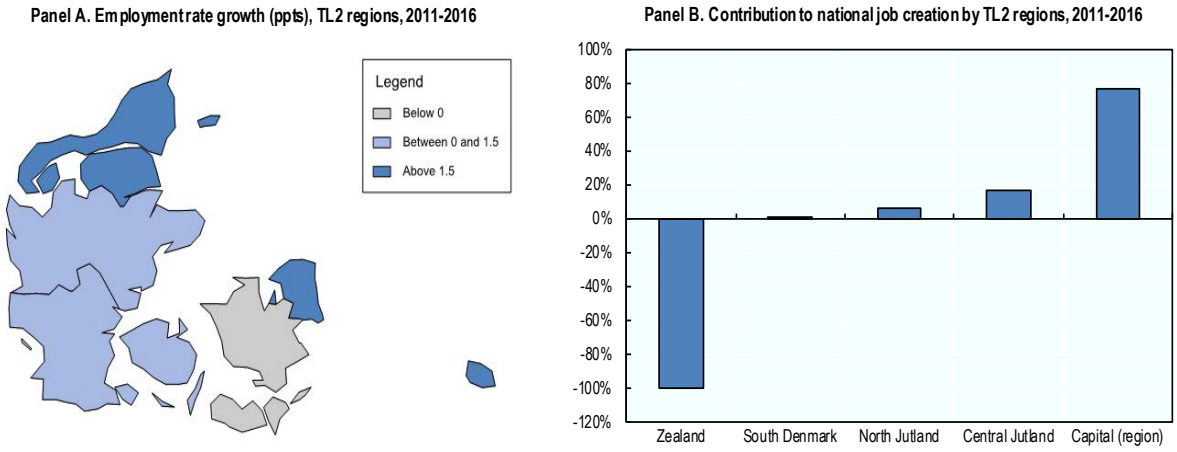
*Note*: The employment rate is calculated as the employment (15-64) at place of residence over the working age population (15-64). The unemployment rate is calculated as the unemployed over labour force (15-64). Regional disparity is measured as the standard deviation of the indicator across the TL2 regions of the country, divided by the distribution mean (i.e., coefficient of variation). The difference between the best and worst performing region is expressed in percentage values.
*Source*: OECD elaborations based on data from OECD National Accounts and OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933825541

## Trend and aggregate indicators

The employment rate of the Danish economy grew by 1.8 percentage points over the period 2011-16. This aggregate performance masks differences at the regional level as shown in the map in Figure 11.1. The employment rate during this period declined in the region of Zealand (-0.8). The most dynamic regions were the Capital Region, which displayed an increase in the employment rate of 3.8 percentage points, and North Jutland, where the employment rate grew by 2.2 percentage points.

**Figure 11.1. Regional employment growth and contribution to national employment growth, Denmark**




Note: The growth of the employment rate is calculated as the difference between the rate in 2016 and the rate in 2011. Job creation is calculated as the difference between employment in 2016 and employment in 2011. Panel B shows the share of each region in the aggregate variation of jobs; the share of a region registering a net loss (gain) is calculated with respect of the sum of regions experiencing a net loss (gain) of jobs.
*Source*: Calculations bases on the OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933826624

Over the period 2011-16, net job creation was concentrated in the Capital region, accounting for more the 77% of all jobs created in Denmark. By contrast, in Zealand was registered a net loss of jobs.

## Jobs at risk of automation

Beside the number of jobs created (or destroyed), it is their "quality" that matters for economic development and inclusion. The analysis conducted in Chapter 1 of this report provides an indication of the share of jobs at risk of automation in the regional economy.

Over the period 2011-16, four out of five regions experienced a reduction in the share of jobs at high risk of automation – Type A in Table 11.2. Still, in the region of North Jutland, most of the jobs created were in occupations at high risk of automation (Type B).

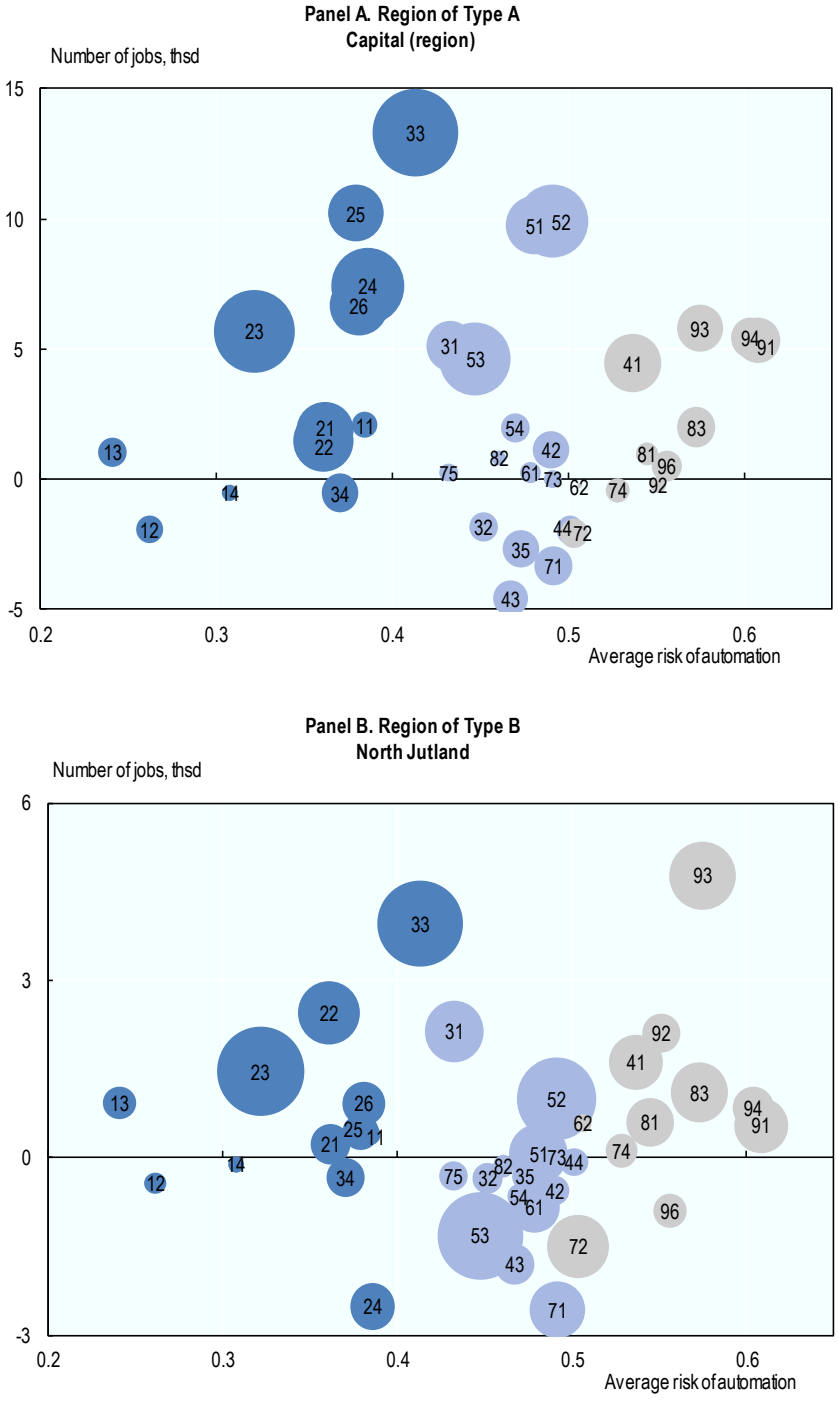
**Table 11.2. Trends in the jobs at risk of automation, Denmark**

| A. Creating jobs, predominantly in less risky occupations | B. Creating jobs, predominantly in riskier occupations | C. Losing jobs, predominantly in riskier occupations | D. Losing jobs, predominantly in less risky occupations |
|---|---|---|---|
| Capital (region) | North Jutland | | |
| Zealand | | | |
| South Denmark | | | |
| Central Jutland | | | |

*Note*: Type A and Type C regions experienced an increase in the share of jobs at low risk of automation with respect to occupations at high risk of automation. Type B and Type D regions experienced an increase in the share of jobs at high risk of automation. In both Type A and Type B regions aggregate employment grew, while in the Type C and Type D regions employment declined.
*Source*: OECD Database

The detailed creation of jobs by occupation for one region per category is presented in Figure 11.2. In particular, the growth of employment in the Capital region was mainly driven by jobs in occupations at low risk of automation, such as Business and Administration Associate Professionals (33), Information and Communications Technology Professionals (25) and Business and Administration Professionals (24). By contrast, the region of North Jutland registered an increase of jobs in occupations at high risk of automation, such as Labourers in Mining, Construction, Manufacturing and Transport (93) and Agricultural, Forestry and Fishery Labourers (92).

**Figure 11.2. Job creation by risk of automation, selected regions, 2011-16, Denmark**




*Note:* Occupations (ISCO-08 code indicated in the bubble) are ranked from low to high risk of automation along the horizontal axis. Changes in the number of jobs for each occupation are reported along the vertical axis. Bubble size represents the share of jobs in the occupation with respect to total employment in the region.
*Source*: Calculations based on EU Labour Force survey.

StatLink https://doi.org/10.1787/888933827289

# 12. Estonia

*This profile provides an overview of labour market conditions across 5 sub-regions (OECD TL3 region) in Estonia.*

## Overview of local labour markets

The employment and unemployment rates provide an important indication of the extent to which available labour resources are used, and can provide insights about inclusiveness. In 2016, the Estonian economy displayed an employment rate of 5.1 percentage points above the OECD average. In terms of unemployment, the country's performance is similar to the average, displaying an unemployment rate and a long-term unemployment rate slightly above the average. These rates remained stable between 2015 and 2016, slowly converging towards the OECD level.

Sub-regions within the country registered important differences in terms of employment rate. For instance, in 2015 the employment rate in the region of North Estonia was 67%, while in Northeast Estonia was 17 percentage points lower (59.7%). Geographical disparities also exist in terms of unemployment. For instance, North Estonia registered 13.8% of unemployment in 2015, while in South Estonia was only 5%.

**Table 12.1. Overview of national and regional labour markets, Estonia**

| | 2015 | 2016 |
|---|---|---|
| Labour force participation rate, % | 76.6 (71.3) | 77.4 (71.7) |
| Employment rate, % | 71.9 (66.3) | 72.1 (67.0) |
| Unemployment rate (HUR), % | 6.2 (6.8) | 6.8 (6.3) |
| Long-term unemployment rate (% un.) | 38.3 (33.7) | 31.6 (30.5) |
| Regional disparities: | | |
| - Employment rate (disparity index) | 9.1 | - |
| - Employment rate (difference best-worst performing regions) | 17.7 | - |
| - Unemployment rate (disparity index) | 35.7 | - |
| - Unemployment rate (difference best-worst performing regions) | 6.3 | - |

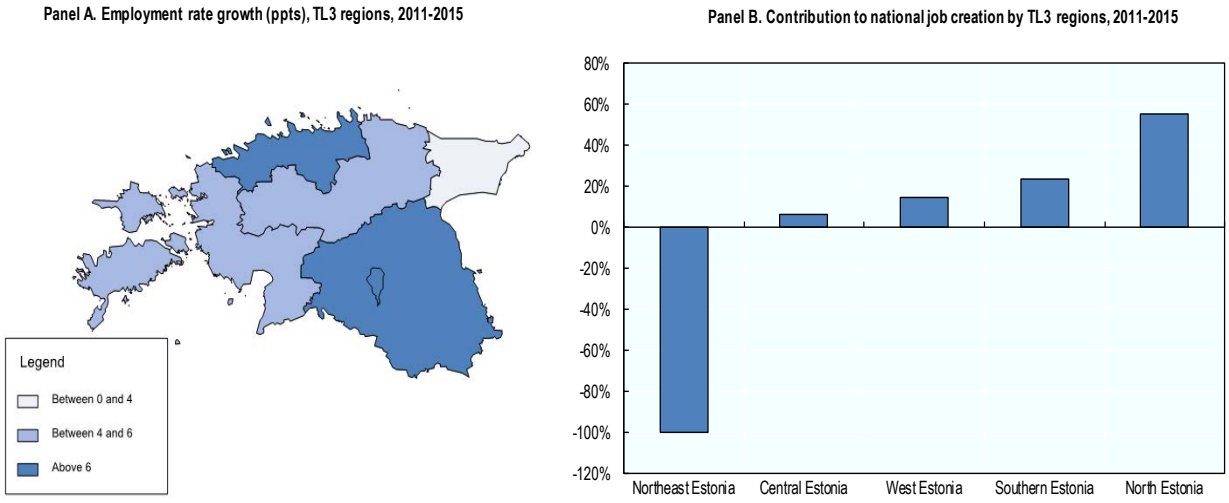
*Note*: The employment rate is calculated as the employment (15-64) at place of residence over the working age population (15-64). The unemployment rate is calculated as the unemployed over labour force (15-64). Regional disparity is measured as the standard deviation of the indicator across the TL3 regions of the country, divided by the distribution mean (i.e., coefficient of variation). The difference between the best and worst performing region is expressed in percentage values.
*Source*: OECD elaborations based on data from OECD National Accounts and OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933825560

## Trend and aggregate indicators

The employment rate of the Estonian economy grew by 6.2 percentage points over the period 2011-15. Although the employment rate rose in all sub-regions, there are still some geographical differences, as shown in the map in Figure 12.1. Southern Estonia, the most dynamic region during this period, displayed a growth of the employment rate of 7.7 percentage points. The increase in Northeast Estonia was considerably lower, just 1.1 percentage points.

**Figure 12.1. Regional employment growth and contribution to national employment growth, Estonia**




*Note:* The growth of the employment rate is calculated as the difference between the rate in 2015 and the rate in 2011. Job creation is calculated as the difference between employment in 2015 and employment in 2011. Panel B shows the share of each region in the aggregate variation of jobs; the share of a region registering a net loss (gain) is calculated with respect of the sum of regions experiencing a net loss (gain) of jobs.
*Source:* Calculations bases on OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933826643

Over the period 2011-15, most of jobs were created in the regions of North Estonia which accounted for more than half (55%) of net jobs created in the country. By contrast, the region of Northeast Estonia registered a net loss of jobs.

## Jobs at risk of automation

Beside the number of jobs created (or destroyed), it is their "quality" that matters for economic development and inclusion. The analysis conducted in Chapter 2 of this report provides an indication of the share of jobs at risk of automation in the regional economy.

Lack of data on the risk of automation at the sub-regional level constrained the analysis at the regional OECD TL2 level, which for Estonia represents the all country. Over the period 2011-16, Estonia experienced an increase in the share of jobs at low risk of automation – category A in Table 12.2.

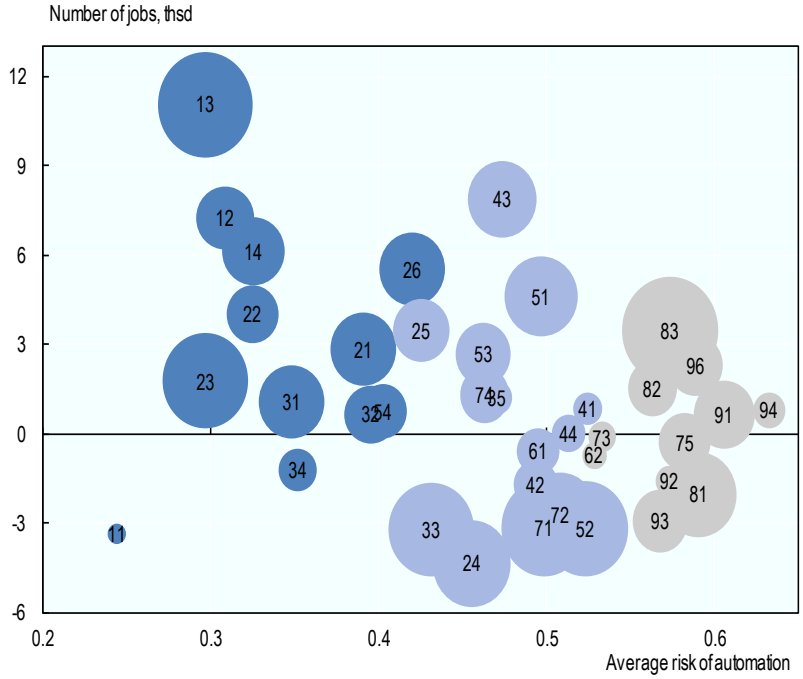
**Table 12.2. Trends in the jobs at risk of automation, Estonia**

| A. Creating jobs, predominantly in less risky occupations | B. Creating jobs, predominantly in riskier occupations | C. Losing jobs, predominantly in riskier occupations | D. Losing jobs, predominantly in less risky occupations |
|---|---|---|---|
| Estonia | | | |

*Note*: Type A and type C regions experienced an increase in the share of jobs at low risk of automation with respect to occupations at high risk of automation. Type B and Type D regions experienced an increase in the share of jobs at high risk of automation. In both A and B regions aggregate employment grew, while in the type B and type D regions employment declined.
*Source*: OECD elaborations.

A detailed analysis of job creation by occupations reveal that the rise of employment was driven mainly by occupations at low risk of automation, such as Production and Specialized Services Managers (13), Administrative and Commercial Managers (12) and Hospitality, Retail and Other Services Managers (14). In fact, Estonia has also experienced a drop in some occupations at high risk of automation like Labourers in Mining, Construction, Manufacturing and Transport (93) and Stationary Plant and Machine Operators (81).

**Figure 12.2. Job creation by risk of automation, 2011-16, Estonia**




Note: Occupations (ISCO-08 code indicated in the bubble) are ranked from low to high risk of automation along the horizontal axis. Changes in the number of jobs for each occupation are reported along the vertical axis. Bubble size represents the share of jobs in the occupation with respect to total employment in the region.
*Source*: Calculations based on EU Labour Force survey.

StatLink https://doi.org/10.1787/888933827308

# 13. Finland

*This profile provides an overview of labour market conditions in Finland, analysing trends and differences across five regions (OECD TL2 regions).*

## Overview of local labour markets

The employment and unemployment rates provide an important indication of the extent to which available labour resources are used, and can provide insights about the inclusiveness of labour markets. In 2016, the employment rate in Finland was in line with the OECD average, while the unemployment rate was slightly higher than the average. The good performance of the labour market is confirmed also by a long-term unemployment rate of 26.6%, lower than the OECD average (30.5%).

Employment disparities across Finnish regions are similar to the average across OECD countries. Still, the employment rate in the Aland Islands in 2016 was 81.6%, while the employment rate in the region of North and East Finland was more than 16 points lower (65.4%). In terms of unemployment, there is not much asymmetry across Finnish regions. For instance, the lowest rate registered in the region of Helsinki-Uusimaa (7.5%) was close to the unemployment rate in in North and East Finland (10.5%). In 2016, the difference between the best and worst performing region was considerably lower than the average difference within OECD countries, 2 percentage points against 7.8.

**Table 13.1. Overview of national and regional labour markets, Finland**

| | 2015 | 2016 |
|---|---|---|
| Labour force participation rate, % | 75.9 (71.3) | 76 (71.7) |
| Employment rate, % | 68.6 (66.3) | 69.1 (67.0) |
| Unemployment rate (HUR), % | 9.4 (6.8) | 8.8 (6.3) |
| Long-term unemployment rate (% un.) | 25.1 (33.7) | 26.6 (30.5) |
| | | |
| Regional disparities: | | |
| - Employment rate (disparity index) | 9.6 (7.5) | 9.3 (7.2) |
| - Employment rate (difference best-worst performing region) | 16.8 (15.7) | 16.2 (15.5) |
| - Unemployment rate (disparity index) | 11.3 (26.4) | 13.6 (28.0) |
| - Unemployment rate (difference best-worst performing region) | 2.5 (7.6) | 3.0 (7.8) |

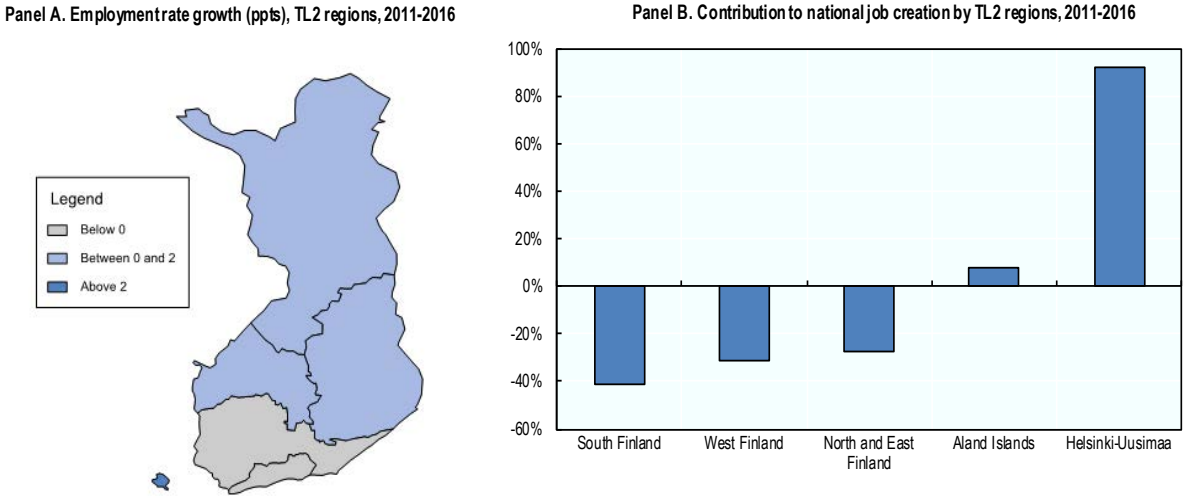
*Note*: The employment rate is calculated as the employment (15-64) at place of residence over the working age population (15-64). The unemployment rate is calculated as the unemployed over labour force (15-64). Regional disparity is measured as the standard deviation of the indicator across the TL2 regions of the country, divided by the distribution mean (i.e., coefficient of variation). The difference between the best and worst performing region is expressed in percentage values.
*Source*: OECD elaborations based on data from OECD National Accounts and OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933825579

## Trend and aggregate indicators

The employment rate in Finland remained stable over the period 2011-16, displaying a slight increase of 0.1 percentage points. This aggregate performance masks some differences at the regional level as shown in the map in Figure 13.1. During this period, the employment rate increased by 3.5 percentage point in the Aland Islands. On the other hand, the employment rate in the regions of Helsinki-Uusimaa and South Finland decreases (-1 and -0.1 percentage points, respectively).

**Figure 13.1. Regional employment growth and contribution to national employment growth, Finland**




*Note*: The growth of the employment rate is calculated as the difference between the rate in 2016 and the rate in 2011. Job creation is calculated as the difference between employment in 2016 and employment in 2011. Panel B shows the share of each region in the aggregate variation of jobs; the share of a region registering a net loss (gain) is calculated with respect of the sum of regions experiencing a net loss (gain) of jobs.
*Source*: Calculations bases on the OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933826662

Over the period 2011-16, job creation was strongly concentrated in the region of Helsinki-Uusimaa, accounting the 92% of net jobs creation in Finland. By contrast, the regions of South Finland and West Finland combined accounted for 72% of net jobs loss in the Finnish economy (Figure 13.1, Panel B).

## Jobs at risk of automation

Beside the number of jobs created, it is the quality of jobs that matters for economic development and inclusion. The analysis conducted in Chapter 1 of this report provides an indication of share of jobs at risk of automation in the regional economy.

Over the period 2011-16, all Finnish regions experienced a reduction of the share of jobs at high risk of automation – Type A and Type C in Table 13.2. Two of these regions experienced employment growth (Type A in Table 13.2), whereas the other three regions experienced a loss of jobs, but mainly in occupations at high risk of automation (Type C).

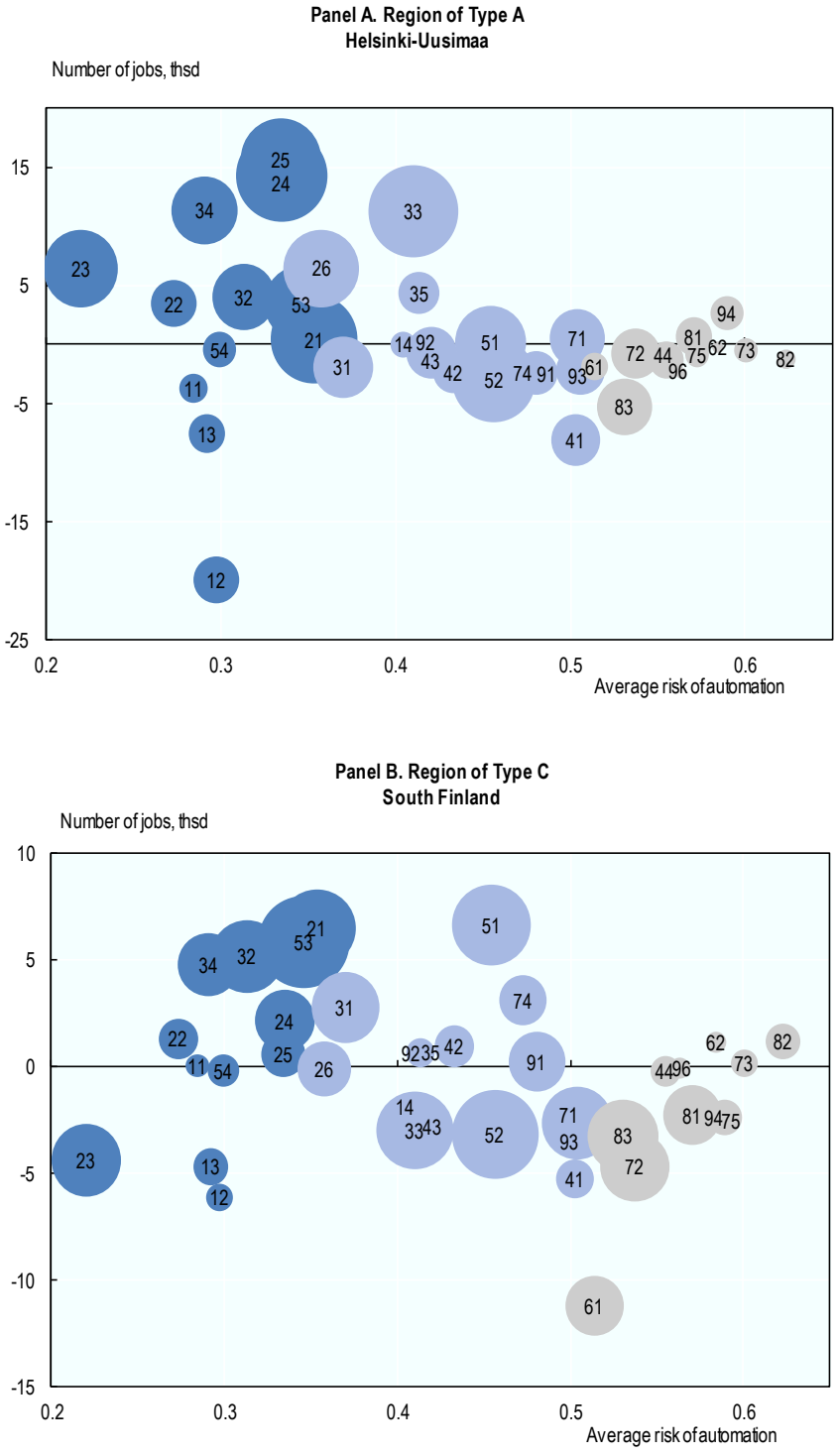
**Table 13.2. Trends in the jobs at risk of automation, Finland**

| A. Creating jobs, predominantly in less risky occupations | B. Creating jobs, predominantly in riskier occupations | C. Losing jobs, predominantly in riskier occupations | D. Losing jobs, predominantly in less risky occupations |
|---|---|---|---|
| Helsinki-Uusimaa | | West Finland | |
| Aland Islands | | South Finland | |
| | | North and East Finland | |

*Note*: Type A and Type C regions experienced an increase in the share of jobs at low risk of automation with respect to occupations at high risk of automation. Type B and Type D regions experienced an increase in the share of jobs at high risk of automation. In both Type A and Type B regions aggregate employment grew, while in the Type C and Type D regions employment declined.
*Source*: OECD Database

The detailed creation of jobs by occupation for one region per category is presented in Figure 13.2. In particular, the region of Helsinki-Uusimaa experienced employment growth mainly in occupations at low risk of automation, such as Business and Administration Professionals (24), Information and Communications Technology Professionals (25), and Legal, Social, Cultural and Related Associate Professionals (34). At the same time, jobs in occupations at high risk of automation, as Drivers and Mobile Plant Operators (83), declined in this region. The region of South Finland experienced a reduction of employment, but mainly in occupations at high risk of automation, such as Agricultural Workers (61) and Metal, Machinery and Related Trades Workers (72). Nevertheless, despite its aggregate loss of jobs, the region of South Finland has created jobs in occupations at low risk of automation, like Science and Engineering Professionals (21) and Health Associate Professionals (32).

**Figure 13.2. Job creation by risk of automation, selected regions, 2011-16, Finland**




*Note:* Occupations (ISCO-08 code indicated in the bubble) are ranked from low to high risk of automation along the horizontal axis. Changes in the number of jobs for each occupation are reported along the vertical axis. Bubble size represents the share of jobs in the occupation with respect to total employment in the region.
*Source*: Calculations based on EU Labour Force survey.

StatLink https://doi.org/10.1787/888933827327

# 14. France

*This profile provides an overview of labour market conditions in France and analyses trends and differences across 22 regions (OECD TL2 regions).*

## Overview of local labour markets

Employment and unemployment rates provide an important indication of the extent to which available labour resources are used, and can provide insights about the inclusiveness of labour markets. In 2016, the French economy displayed an employment rate similar to the OECD average and an unemployment rate above the OECD average. Long-term unemployment is also a concern for the French economy: in 2016, 44% of unemployed people were without job for more than one year.

Regions within France registered large differences in terms of employment rate – much higher than the OECD average. For instance, in 2016 the employment rate in the region Pays de la Loire was 67% of the working age population, while in Corsica it was about half (34%). Also, in terms of unemployment there are large regional differences. In 2016, the unemployment rate in the region Bourgogne-Franche-Comté was 12.8% of the labour force, against only 8% of the labour force in Provence-Alpes-Côte d'Azur.

**Table 14.1. Overview of national and regional labour markets, France**

| | 2015 | 2016 |
|---|---|---|
| Labour force participation rate, % | 71.5 (71.3) | 71.7 (71.7) |
| Employment rate, % | 63.8 (66.3) | 64.2 (67.0) |
| Unemployment rate (HUR), % | 10.4 (6.8) | 10.1 (6.3) |
| Long-term unemployment rate (% un.) | 42.8 (33.7) | 44.4 (30.5) |
| | | |
| Regional disparities: | | |
| - Employment rate (disparity index) | 13.7 (7.5) | 13.8 (7.2) |
| - Employment rate (difference best-worst performing region) | 32.2 (15.7) | 32.5 (15.5) |
| - Unemployment rate (disparity index) | 13.6 (26.4) | 13.4 (28.0) |
| - Unemployment rate (difference best-worst performing region) | 5.1 (7.6) | 4.8 (7.8) |

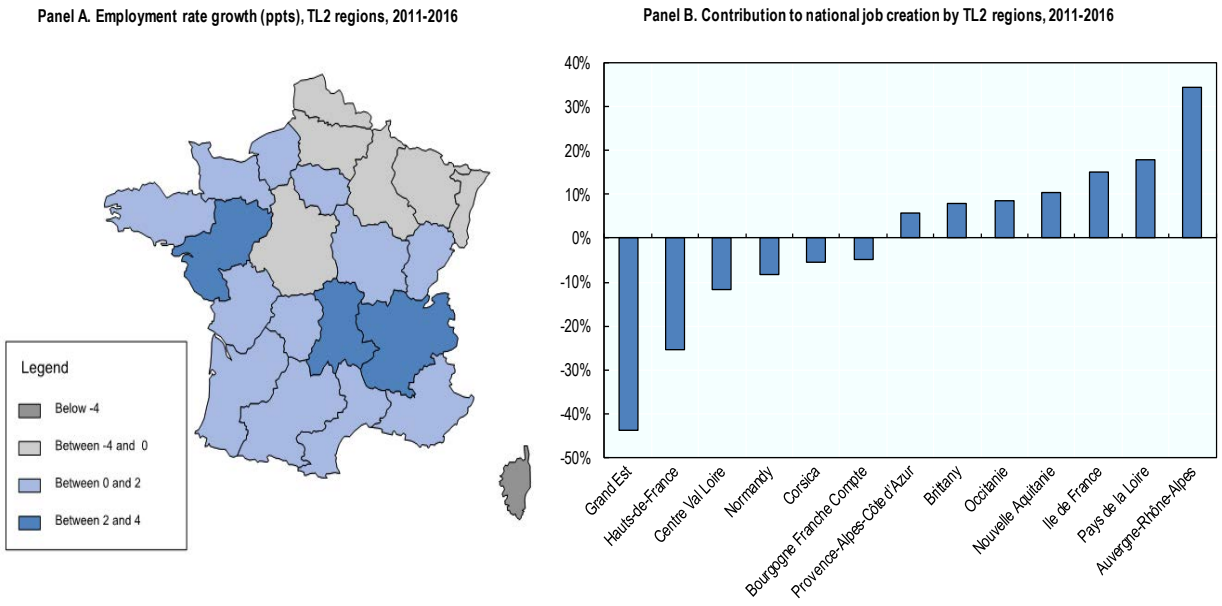
*Note*: The employment rate is calculated as the employment (15-64) at place of residence over the working age population (15-64). The unemployment rate is calculated as the unemployed over labour force (15-64). Regional disparity is measured as the standard deviation of the indicator across the TL2 regions of the country, divided by the distribution mean (i.e., coefficient of variation). The difference between the best and worst performing region is expressed in percentage values.
*Source*: OECD elaborations based on data from OECD National Accounts and OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933825598

## Trend and aggregate indicators

The employment rate of the French economy remained stable over the period 2011-16, registering a slight increase of 0.6 percentage points. This aggregate performance masks large differences at the regional level as shown in the map in Figure 14.1. In particular, the employment rate dropped in Corsica by more than 9 percentage points over this period. At the same time, the employment rate in Auvergne- Rhône Alpes and Pays de la Loire increased by more than 2 percentage points (2.3 and 2.8 respectively).

**Figure 14.1. Regional employment growth and contribution to national employment growth, France**




*Note*: The growth of the employment rate is calculated as the difference between the rate in 2016 and the rate in 2011. Job creation is calculated as the difference between employment in 2016 and employment in 2011. Panel B shows the share of each region in the aggregate variation of jobs; the share of a region registering a net loss (gain) is calculated with respect of the sum of regions experiencing a net loss (gain) of jobs.
Overseas departments not included
*Source*: Calculations based on OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933826681

The creation of jobs over the period 2011-16 was mainly concentrated in the Rhône-Alpes and the Pays de la Loire regions, which accounted for 52% of net job creation in France. By contrast, Grand-Est and Hauts-de-France accounted for about 70% of all jobs lost in the French economy.

## Jobs at risk of automation

Besides the number of jobs created, it is the quality of those jobs that matters for economic development and inclusion. The analysis conducted in Chapter 1 of the report provides an indication of the share of jobs at risk of automation in the regional economy. Over the period 2011-16, thirteen regions experienced a decline in the share of jobs at

high risk of automation (i.e. Type A and Type C in Table 14.2). Still, in three regions (Lower Normandy, Britanny, and Midi-Pyrénées) most of the jobs created over this period were in occupations at high-risk of automation. Among the ten regions that were losing jobs, six of them lost jobs mainly in occupations at low risk of automation.

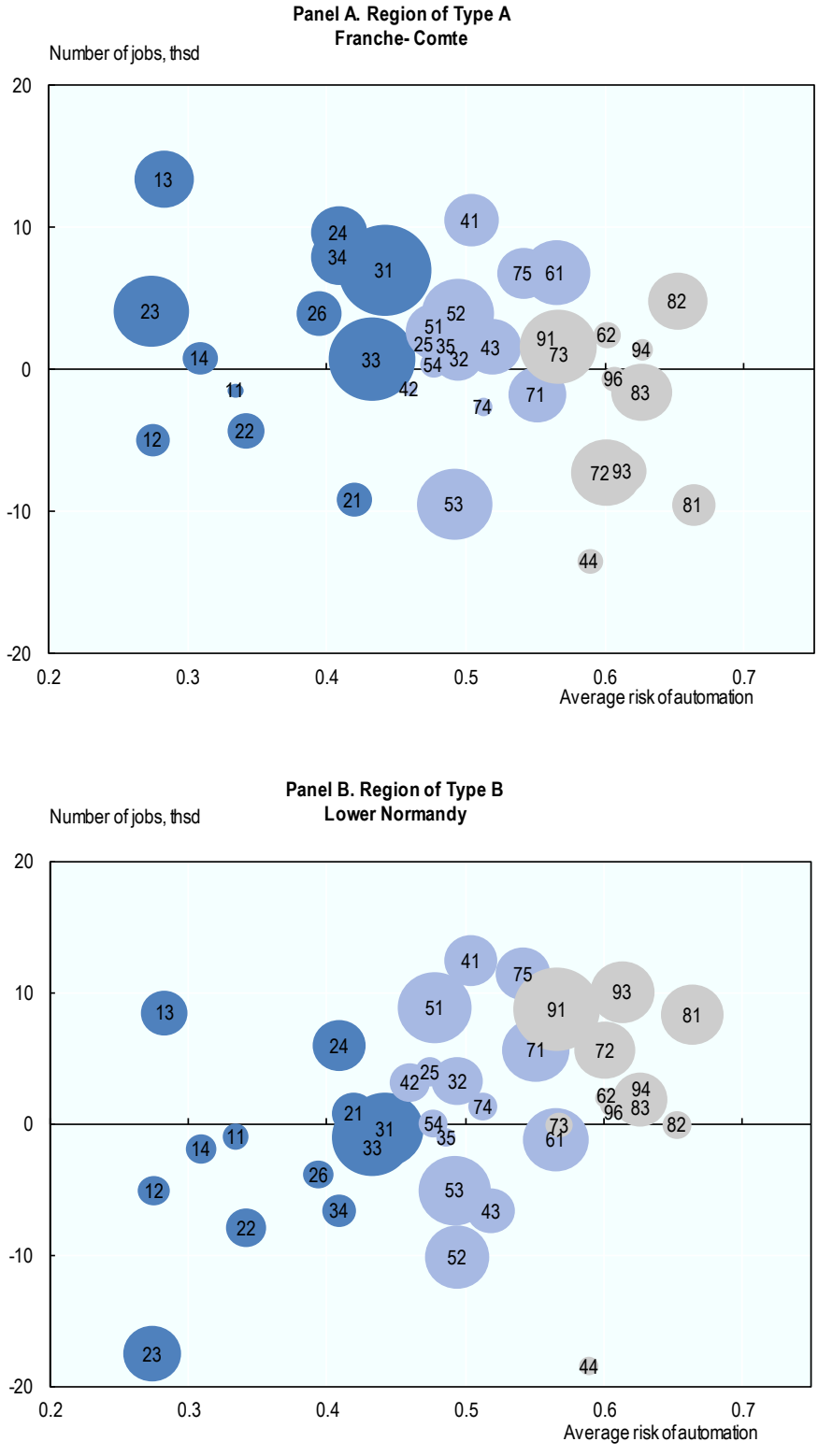
**Table 14.2. Trends in the jobs at risk of automation, France**

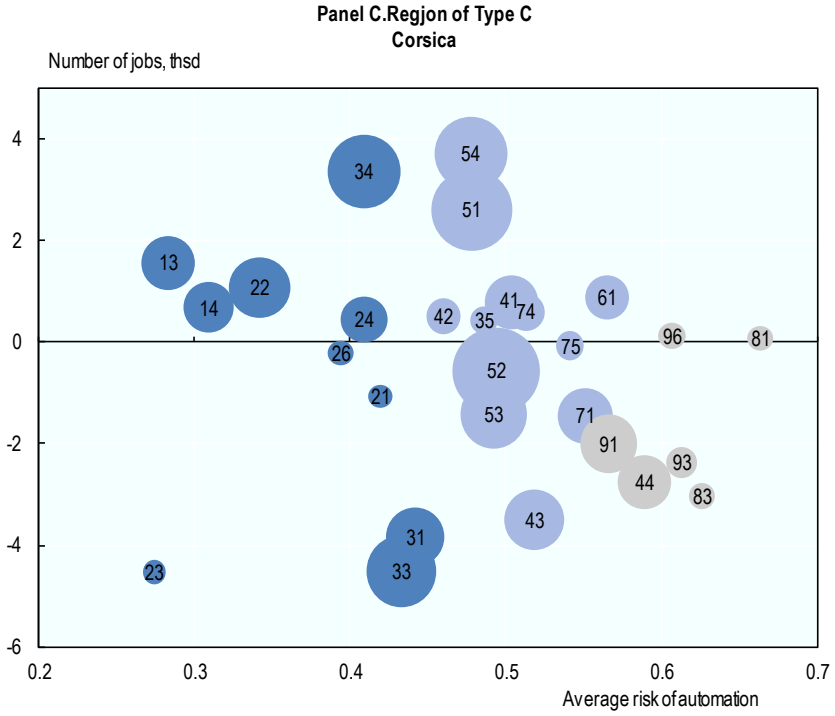
| A. Creating jobs, predominantly in less risky occupations | B. Creating jobs, predominantly in riskier occupations | C. Losing jobs, predominantly in riskier occupations | D. Losing jobs, predominantly in less risky occupations |
|---|---|---|---|
| Ile-de-France | Lower Normandy | Upper Normandy | Champagne-Ardenne |
| Franche-Comte | Brittany | Centre | Picardie |
| Loire Region | Midi-Pyrenees | Burgundy | Nord/Pas-de-Calais |
| Aquitaine | | Corsica | Lorraine |
| Limousin | | | Alsace |
| Rhone-Alpes | | | Poitou-Charentes |
| Auvergne | | | |
| Languedoc-Roussillon | | | |
| Provence-Alpes-Côte d'Azur | | | |

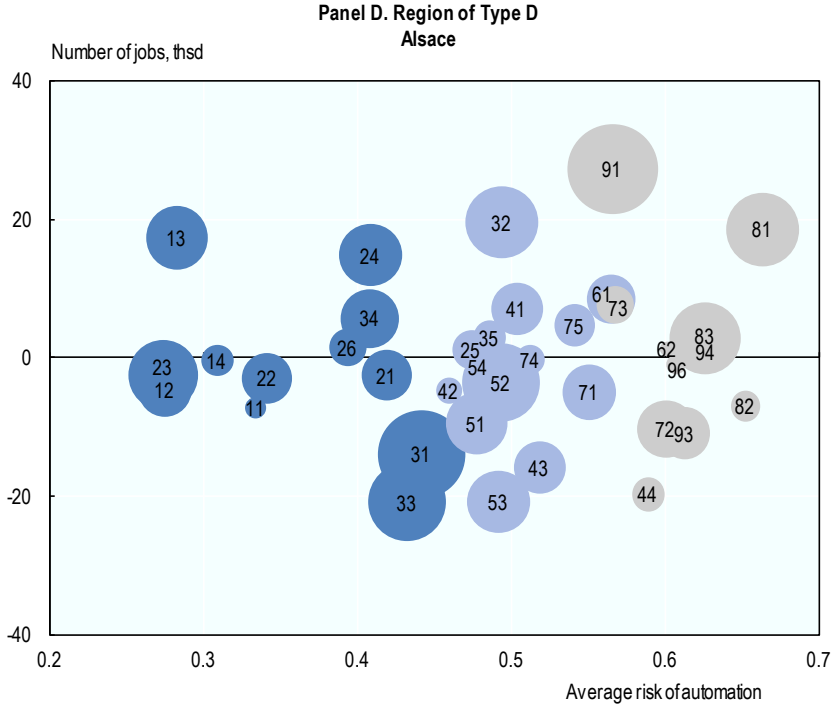
*Note*: Type A and Type C regions experienced an increase in the share of jobs at low risk of automation with respect to occupations at high risk of automation. Type B and Type D regions experienced an increase in the share of jobs at high risk of automation. In both Type A and Type B regions aggregate employment grew, while in the Type C and Type D regions employment declined
Overseas departments not included.
*Source*: OECD calculations.

The detailed creation of jobs by occupation for one region per category is presented in Figure 14.2. In particular, the region of Franche-Comté experienced employment growth mainly in occupations at low risk of automation, such as Managers (13), Teaching Professionals (23), and Technicians and Associate Professionals (34). A similar picture emerges for Corsica, where most of the jobs were indeed created as Legal, Social, Cultural and Related Associate Professionals (34). By contrast, in Lower Normandy, the largest share of jobs was created in occupations at high risk of automation, such as Cleaners and Helpers (91), Labourers in Mining, Construction, Manufacturing and Transport (93), Metal, Machinery and Related Trades workers (72), and Stationary Plant and Machine Operators (81). At the same time, jobs as Teaching Professionals (23) saw the largest drop. Finally, the region of Alsace experienced a reduction in employment that was mainly driven by the loss of jobs in occupations at low risk of automation, such as Technicians and Associate Professionals (31, 33).

**Figure 14.2. Job creation by risk of automation, selected regions, 2011-16, France**






*Note:* Occupations (ISCO-08 code indicated in the bubble) are ranked from low to high risk of automation along the horizontal axis. Changes in the number of jobs for each occupation are reported along the vertical axis. Bubble size represents the share of jobs in the occupation with respect to total employment in the region.
*Source*: Calculations based on the EU Labour Force survey.

StatLink https://doi.org/10.1787/888933827346

# 15. Germany

*This profile provides an overview of labour market conditions in Germany, analysing trends and differences across 16 regions (OECD TL2 regions).*

## Overview of local labour markets

The employment and unemployment rates provide an important indication of the extent to which available labour resources are used, and can provide insights about inclusiveness. In 2016, the employment rate in Germany was 7.7 percentage points above the OECD average, while the unemployment rate was 2.2 percentage points below the average. Still, long-term unemployment may be a source of concern for the German economy, with 41.2% the level was considerably higher than the OECD average (30.5%) in 2016.

In 2016, regions within Germany displayed less disparity than the average regional disparity across OECD countries. For instance, the best performing regions (namely, Bavaria and Baden-Wuerttemberg) displayed employment rates around 77%, not so different than the employment rate in the worst performing region, Bremen (71%). In terms of unemployment, however, regional differences are more pronounced. However, even in the worst performing regions (namely, Berlin, Saxony-Anhalt and Mecklenburg-Western Pomerania) the unemployment rate was single digit (around 7%).

**Table 15.1. Overview of national and regional labour markets, Germany**

| | 2015 | 2016 |
|---|---|---|
| Labour force participation rate, % | 77.6 (71.3) | 78.0 (71.7) |
| Employment rate, % | 74.0 (66.3) | 74.7 (67.0) |
| Unemployment rate (HUR), % | 4.6 (6.8) | 4.1 (6.3) |
| Long-term unemployment rate (% un.) | 44 (33.7) | 41.2 (30.5) |
| Regional disparities: | | |
| - Employment rate (disparity index) | 3.7 (7.5) | 3.0 (7.2) |
| - Employment rate (difference best-worst performing region) | 9.0 (15.7) | 6.9 (15.5) |
| - Unemployment rate (disparity index) | 34.0 (26.4) | 31.7 (28.0) |
| - Unemployment rate (difference best-worst performing region) | 6.7 (7.6) | 5.9 (7.8) |

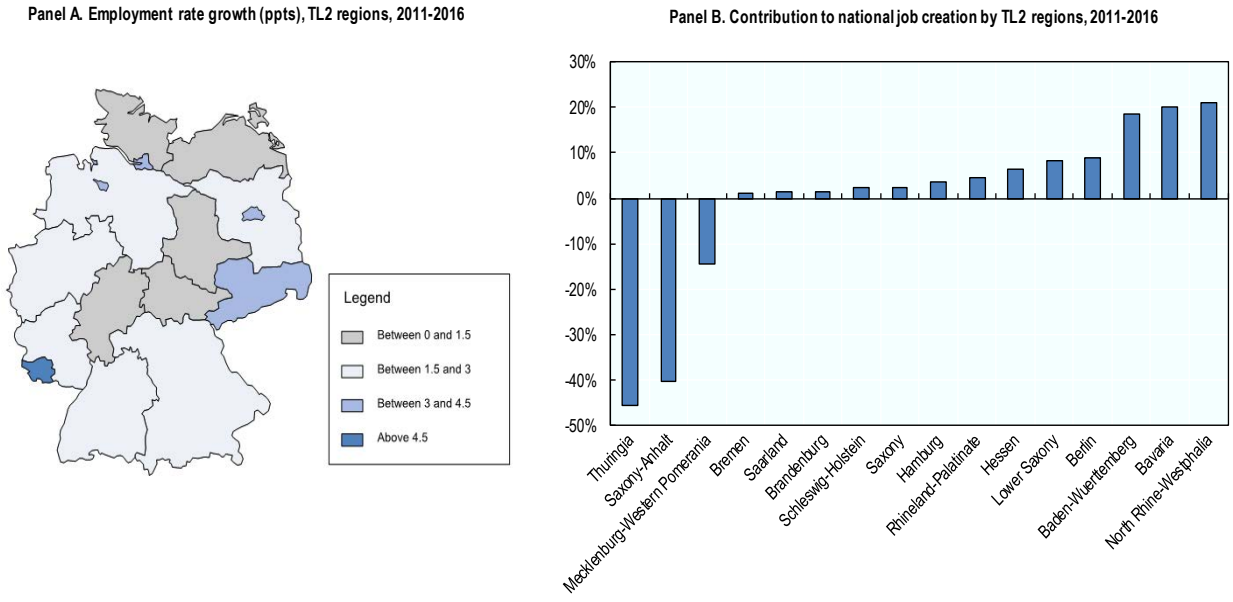
*Note*: The employment rate is calculated as the employment (15-64) at place of residence over the working age population (15-64). The unemployment rate is calculated as the unemployed over labour force (15-64). Regional disparity is measured as the standard deviation of the indicator across the TL2 regions of the country, divided by the distribution mean (i.e., coefficient of variation). The difference between the best and worst performing region is expressed in percentage values.
*Source*: OECD elaborations based on data from OECD National Accounts and OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933825617

## Trend and aggregate indicators

Over the period 2011-16, the employment rate of the German economy grew by 2.4 percentage points. Although the employment rate rose in all regions, there are still differences across them, as shown in the map in Figure 15.1. In particular, the region of Saarland displayed an increase of 5.6 percentage points during this period. In contrast, the employment rate in the regions of Thuringia and Mecklenburg-Western Pomerania, grew by just 0.4 and 0.9 percentage points respectively.

**Figure 15.1. Regional employment growth and contribution to national employment growth, Germany**




Note: The growth of the employment rate is calculated as the difference between the rate in 2016 and the rate in 2011. Job creation is calculated as the difference between employment in 2016 and employment in 2011. Panel B shows the share of each region in the aggregate variation of jobs; the share of a region registering a net loss (gain) is calculated with respect of the sum of regions experiencing a net loss (gain) of jobs.
*Source*: Calculations bases on the OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933826700

Over the period 2011-16, most of jobs were created in the regions of North Rhine-Westphalia and Bavaria, which combined accounted for the 41% of net jobs creation in Germany. By contrast, the loss of jobs was highly concentrated in the regions of Thuringia and Saxony-Anhalt, representing 85% of net jobs losses.

## Jobs at risk of automation

Beside the number of jobs created (or destroyed), it is their "quality" that matters for economic development and inclusion. The analysis conducted in Chapter 1 of this report provides an indication of the share of jobs at risk of automation in the regional economy.

Over the period 2011-16, six regions experienced a reduction in the share of jobs at high risk of automation – Type A and Type C in Table 15.2. Still, in five regions (Type B)

most of the jobs created were in occupations at high risk of automation, and other five regions (Type D) registered a large loss of jobs at low risk of automation.

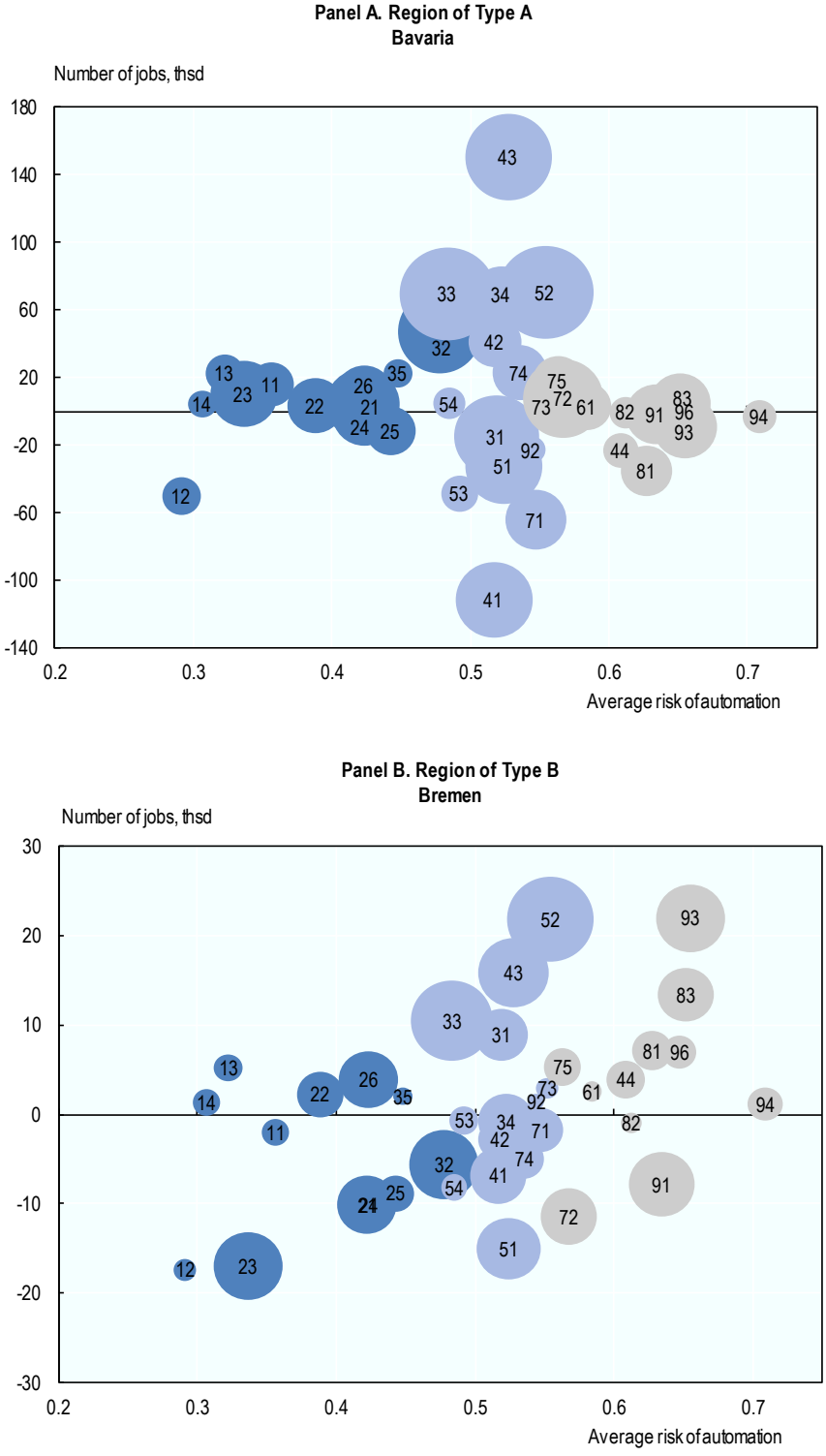
**Table 15.2. Trends in the jobs at risk of automation, Germany**

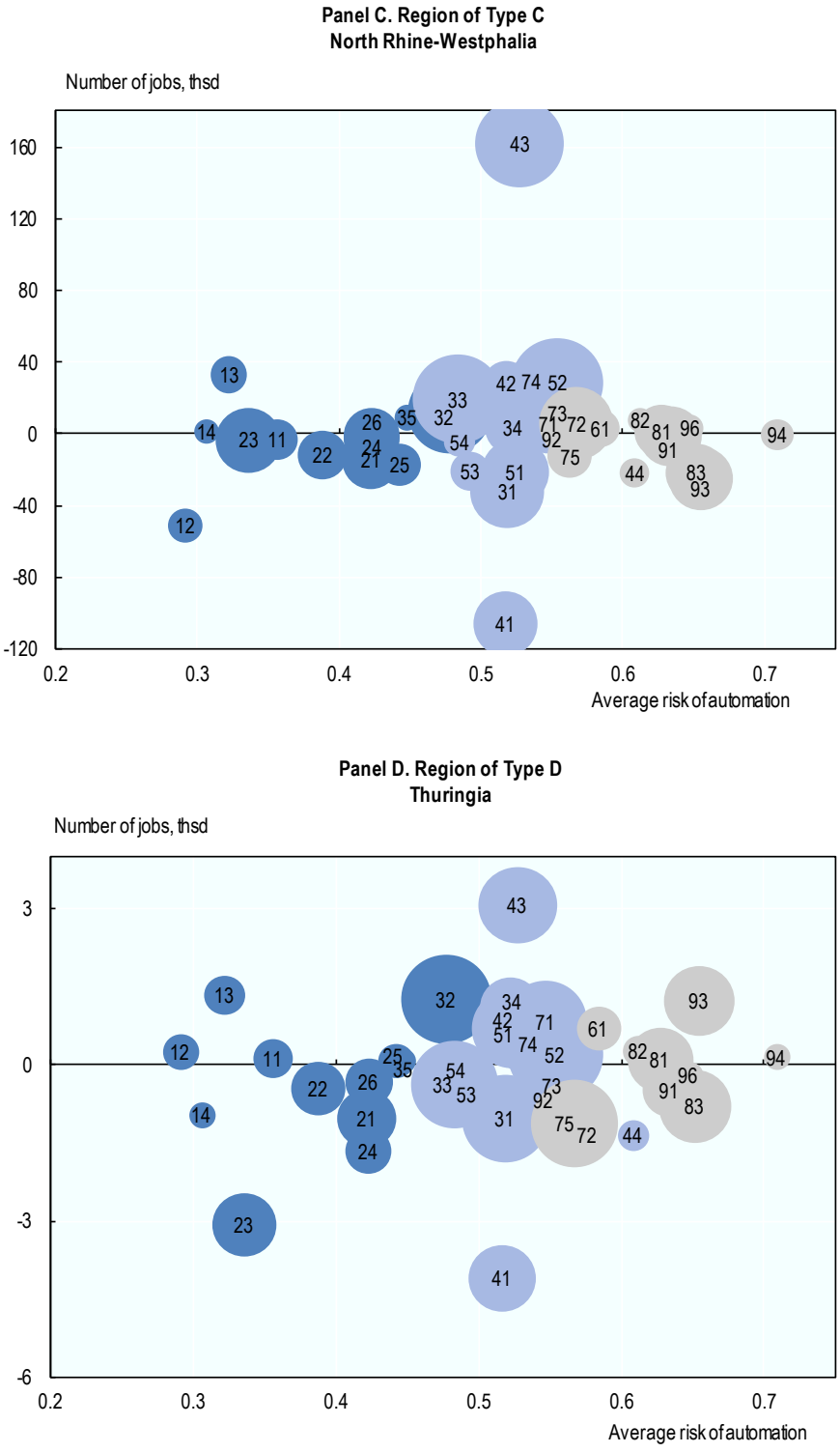
| A. Creating jobs, predominantly in less risky occupations | B. Creating jobs, predominantly in riskier occupations | C. Losing jobs, predominantly in riskier occupations | D. Losing jobs, predominantly in less risky occupations |
|---|---|---|---|
| Bavaria | Baden-Wuerttemberg | North Rhine-Westphalia | Hamburg |
| Hessen | Berlin | Saxony-Anhalt | Saarland |
| Lower Saxony | Brandenburg | | Saxony |
| Rhineland-Palatinate | Bremen | | Schleswig-Holstein |
| | Mecklenburg-Western Pomerania | | Thuringia |

*Note*: Type A and Type C regions experienced an increase in the share of jobs at low risk of automation with respect to occupations at high risk of automation. Type B and Type D regions experienced an increase in the share of jobs at high risk of automation. In both Type A and Type B regions aggregate employment grew, while in the Type C and Type D regions employment declined.
Analyse for the period 2011-2013.
*Source*: OECD Database

The detailed creation of jobs by occupation for one region per category is presented in Figure 15.2. In particular, the growth of employment in the region of Bavaria was mainly driven by jobs in occupations at low risk of automation (Health Associate Professionals (32) and Business and Administration Associate Professionals (33)). A similar picture emerges for the region of North Rhine-Westphalia, which experienced a reduction of employment mainly in occupations at high risk of automation, such as Drivers and Mobile Plant Operators (83)) but in fact, it created jobs in occupations at low risk of automation, like Production and Specialized Services Managers (13). By contrast, the region of Bremen registered a large increase of jobs in occupations at high risk of automation, such as Labourers in Mining, Construction, Manufacturing and Transport (93) and Stationary Plant and Machine Operators (81), while the largest drop was registered among Teaching Professionals (23). Finally, the reduction of employment in Thuringia was driven by losses in occupations at low risk of automation, such as Teaching Professionals (23) and Business and Administration Professionals (24).

**Figure 15.2. Job creation by risk of automation, selected regions, 2011-13, Germany**






Note: Occupations (ISCO-08 code indicated in the bubble) are ranked from low to high risk of automation along the horizontal axis. Changes in the number of jobs for each occupation are reported along the vertical axis. Bubble size represents the share of jobs in the occupation with respect to total employment in the region.
*Source*: Calculations based on EU Labour Force survey.

StatLink https://doi.org/10.1787/888933827365

# 16. Greece

*This profile provides an overview of labour market conditions in Greece, analysing trends and differences across 13 regions (OECD TL2 regions).*

## Overview of local labour markets

The employment and unemployment rates provide an important indication of the extent to which available labour resources are used, and can provide insights about inclusiveness. Despite the improvement experienced in comparison to 2015, the Greek economy in 2016 displayed an employment rate of 52%, i.e., 15 percentage points below the OECD average. In terms of unemployment the divergence is even more evident, with an unemployment rate almost four times higher than the OECD average, indicating the presence of a large share of unused resources. Long-term unemployment is also a concern for the economy; in 2016 the share of long-term unemployment was 70% of all unemployed people, more than twice the OECD average.

Employment differences within regions are less marked than the average of OECD countries. For instance, in 2016, South Aegean and the Ionian Islands displayed employment rates close to 57%, while the regions with the worst performance (West Macedonia and Western Greece) were around 47%. However, in terms of unemployment regional differences are still significant. In 2016, the unemployment rate in West Macedonia and Western Greece was more than 30%, while in the Ionian Islands, the rate was a much lower, 16%.

**Table 16.1. Overview of national and regional labour markets, Greece**

| | 2015 | 2016 |
|---|---|---|
| Labour force participation rate, % | 67.8 (71.3) | 68.2 (71.7) |
| Employment rate, % | 50.8 (66.3) | 52.0 (67.0) |
| Unemployment rate (HUR), % | 25.0 (6.8) | 23.6 (6.3) |
| Long-term unemployment rate (% un.) | 73.1 (33.7) | 72 (30.5) |
| Regional disparities: | | |
| - Employment rate (disparity index) | 6.3 (7.5) | 6 (7.2) |
| - Employment rate (difference best-worst performing regions) | 12.6 (15.7) | 10.6 (15.5) |
| - Unemployment rate (disparity index) | 18.2 (26.4) | 19.3 (28.0) |
| - Unemployment rate (difference best-worst performing regions) | 15.9 (7.6) | 15.2 (7.8) |

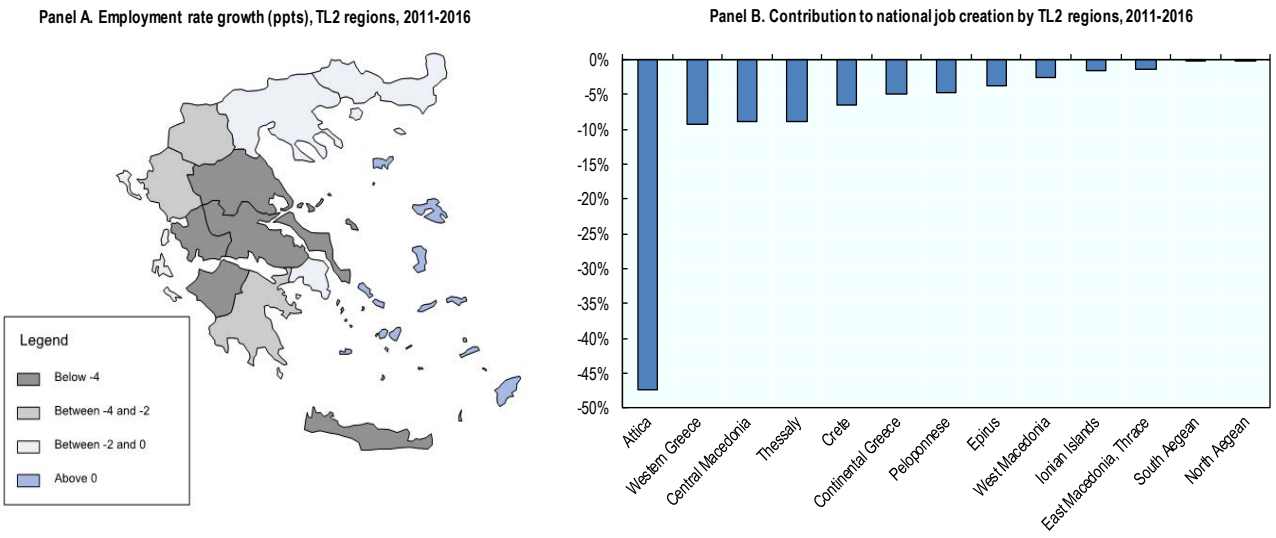
*Note*: The employment rate is calculated as the employment (15-64) at place of residence over the working age population (15-64). The unemployment rate is calculated as the unemployed over labour force (15-64). Regional disparity is measured as the standard deviation of the indicator across the TL2 regions of the country, divided by the distribution mean (i.e., coefficient of variation). The difference between the best and worst performing region is expressed in percentage values.
*Source*: OECD elaborations based on data from OECD National Accounts and OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933825636

## Trend and aggregate indicators

In the period 2011-16, the employment rate of the Greek economy declined by 2.2 percentage points. Beyond the aggregate performance, the map in Figure 16.1 shows the differences at the regional level. In particular, the employment rate remained constant in only two regions: North Aegean (0.5) and South Aegean (0.6) islands. Among the worst performing regions are Crete, which displayed a decrease in the employment rate of 5.4 percentage points, and Thessaly, where the employment rate decreased by 4.5 percentage points.

**Figure 16.1. Regional employment growth and contribution to national employment growth, Greece**




Note: The growth of the employment rate is calculated as the difference between the rate in 2016 and the rate in 2011. Job creation is calculated as the difference between employment in 2016 and employment in 2011. Panel B shows the share of each region in the aggregate variation of jobs; the share of a region registering a net loss (gain) is calculated with respect of the sum of regions experiencing a net loss (gain) of jobs.
*Source*: Calculations bases on OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933826719

Over the period 2011-16, all regions in Greece experienced a net loss of jobs (Figure 16.1). However, the region of Attica alone accounted for 47% of net job loss in Greece.

## Jobs at risk of automation

Beside the number of jobs created (or destroyed), it is their "quality" that matters for economic development and inclusion. The analysis conducted in Chapter 2 of this report provides an indication of the share of jobs at risk of automation in the regional economy. Over the period 2011-16, 12 out of 13 regions experienced a reduction in the share of jobs at high risk of automation – category A and C in Table 16.2. In spite of this, only the region of North Aegean displayed an increase of employment. Employment in the other

11 regions declined. By contrast, the Ionian Islands registered a large loss of jobs at low risk of automation (Type D in Table 16.2).

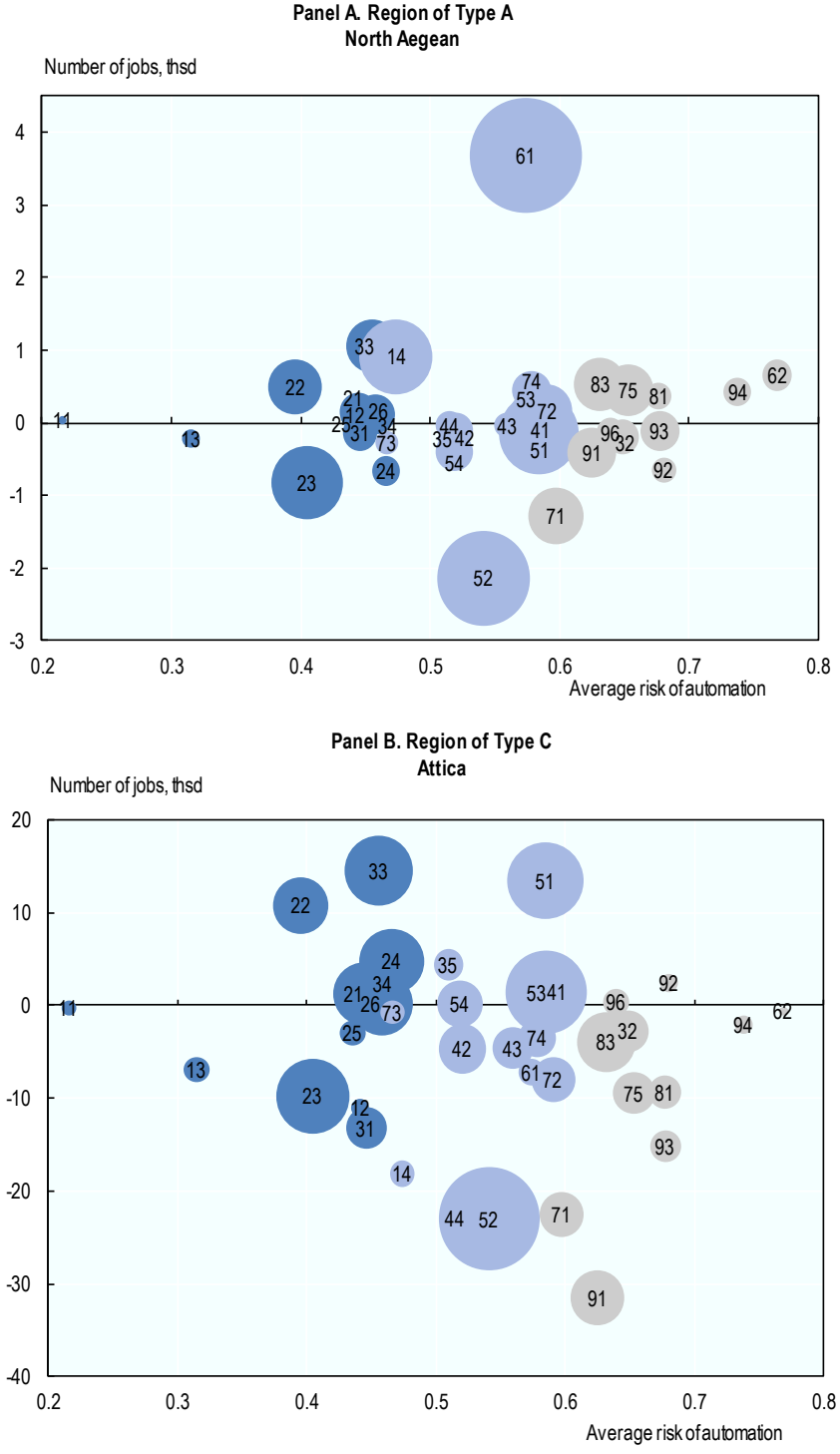
**Table 16.2. Trends in the jobs at risk of automation, Greece**

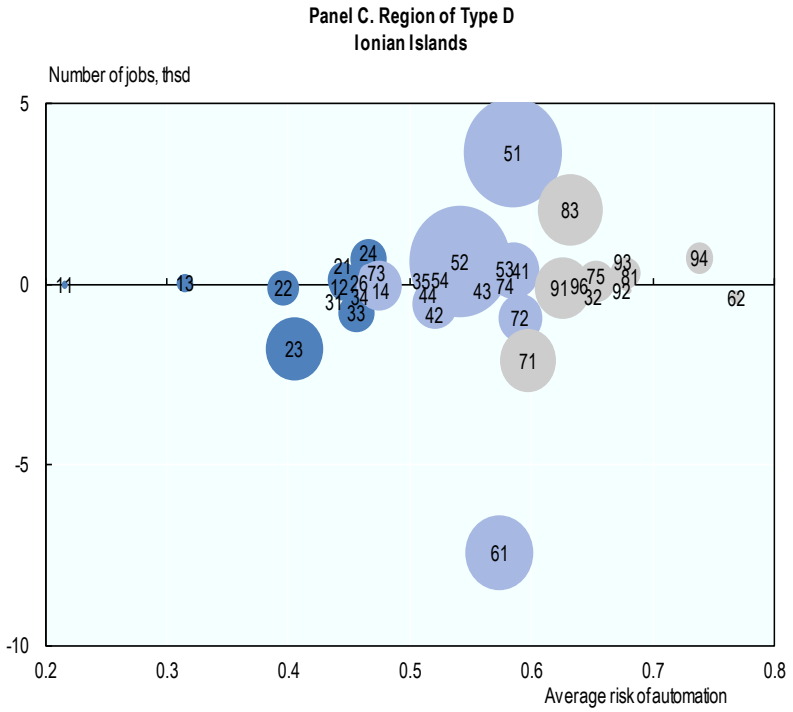
| A. Creating jobs, predominantly in less risky occupations | B. Creating jobs, predominantly in riskier occupations | C. Losing jobs, predominantly in riskier occupations | D. Losing jobs, predominantly in less risky occupations |
|---|---|---|---|
| North Aegean | | Attica | Ionian Islands |
| | | South Aegean | |
| | | Crete | |
| | | East Macedonia, Thrace | |
| | | Central Macedonia | |
| | | West Macedonia | |
| | | Epirus | |
| | | Thessaly | |
| | | Western Greece | |
| | | Continental Greece | |
| | | Peloponnese | |

*Note*: Type A and Type C regions experienced an increase in the share of jobs at low risk of automation with respect to occupations at high risk of automation. Type B and Type D regions experienced an increase in the share of jobs at high risk of automation. In both Type A and B regions, aggregate employment grew, while in type C and D regions employment declined.
*Source*: OECD elaborations.

The detailed creation of jobs by occupation for one region per category is presented in Figure 16.2. In detail, the region of North Aegean created jobs in occupations at low risk of automation: Health professionals (22) and Business and Administration Associate Professionals (33). Meanwhile, even though the region of Attica experienced an aggregate reduction of employment, it has been mainly in occupations at high risk of automation, such as Cleaners and Helpers (91), Building and Related Trades Workers (71), and Sales Workers (52). By contrast, the reduction of employment in the Ionian Islands was in occupations at low risk of automation, such as Business and Administration Associate Professional (33) and Teaching Professionals (23).

**Figure 16.2. Job creation by risk of automation, selected regions, 2011-16, Greece**






*Note:* Occupations (ISCO-08 code indicated in the bubble) are ranked from low to high risk of automation along the horizontal axis. Changes in the number of jobs for each occupation are reported along the vertical axis. Bubble size represents the share of jobs in the occupation with respect to total employment in the region.
*Source*: Calculations based on EU Labour Force survey.

StatLink https://doi.org/10.1787/888933827384

# 17. Hungary

*This profile provides an overview of labour market conditions in Hungary, analysing trends and differences across seven regions (OECD TL2 regions).*

## Overview of local labour markets

The employment and unemployment rates provide an important indication of the extent to which available labour resources are used, and can provide insights about inclusiveness. In 2016, both the employment and the unemployment rates were in line with the OECD average. Still, long-term unemployment could be a source of concern for the Hungarian economy, since 47.3% is a rate significantly higher than the OECD average.

Regions within Hungary displayed less asymmetry than the average regional disparity across OECD countries. In 2016, the employment rate was 69% in Central Hungary, while North Hungary, the region with the lowest rate, displayed a rate of 61%. In terms of unemployment, there are larger regional differences. In 2016, the unemployment rate in the region of North Great Plain was 9.3%, against only 2.7% in West Transdanubia.

**Table 17.1. Overview of national and regional labour markets, Hungary**

| | 2015 | 2016 |
|---|---|---|
| Labour force participation rate, % | 68.6 (71.3) | 70.1 (71.7) |
| Employment rate, % | 64.0 (66.3) | 66.5 (67.0) |
| Unemployment rate (HUR), % | 6.8 (6.8) | 5.1 (6.3) |
| Long-term unemployment rate (% un.) | 46.7 (33.7) | 47.3 (30.5) |
| | | |
| Regional disparities: | | |
| - Employment rate (disparity index) | 6.8 (7.5) | 5.8 (7.2) |
| - Employment rate (difference best-worst performing region) | 9.3 (15.7) | 8.5 (15.5) |
| - Unemployment rate (disparity index) | 36.6 (26.4) | 43.2 (28.0) |
| - Unemployment rate (difference best-worst performing region) | 7.2 (7.6) | 6.6 (7.8) |

*Note*: The employment rate is calculated as the employment (15-64) at place of residence over the working age population (15-64). The unemployment rate is calculated as the unemployed over labour force (15-64). Regional disparity is measured as the standard deviation of the indicator across the TL2 regions of the country, divided by the distribution mean (i.e., coefficient of variation). The difference between the best and worst performing region is expressed in percentage values.
*Source*: OECD elaborations based on data from OECD National Accounts and OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

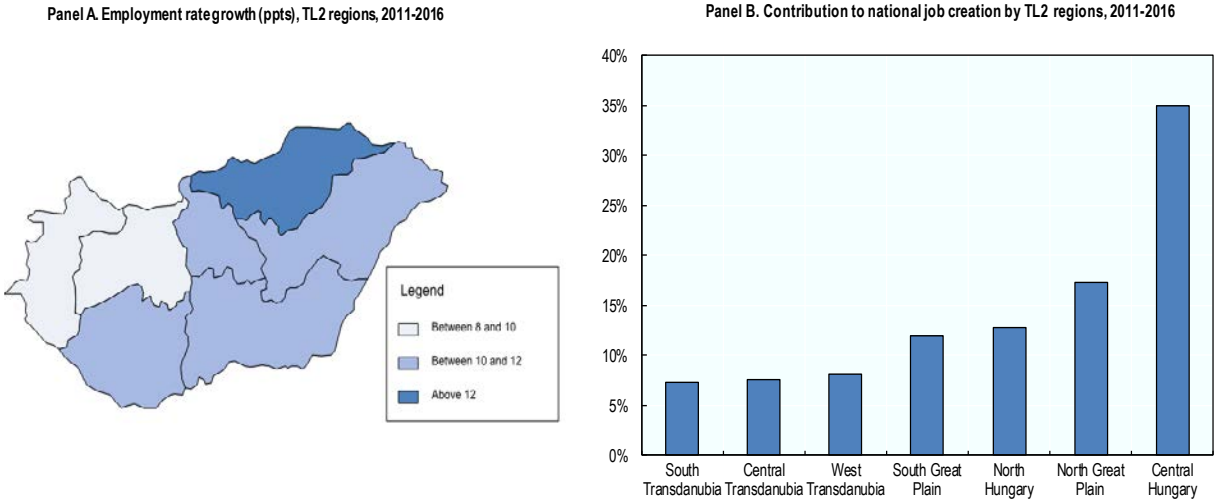
StatLink https://doi.org/10.1787/888933825655

## Trend and aggregate indicators

The employment rate of the Hungarian economy grew by 11% percentage points over the period 2011-16. Although all regions experienced a rise, the aggregate performance still

masks differences at the regional level, as shown in the map in Figure 17.1. North Hungary, the most dynamic region during this period, displayed a growth of 12.7 percentage points, while the employment rate in the region of West Transdanubia grew by a much lower 9 percentage points.

**Figure 17.1. Regional employment growth and contribution to national employment growth, Hungary**




*Note:* The growth of the employment rate is calculated as the difference between the rate in 2016 and the rate in 2011. Job creation is calculated as the difference between employment in 2016 and employment in 2011. Panel B shows the share of each region in the aggregate variation of jobs; the share of a region registering a net loss (gain) is calculated with respect of the sum of regions experiencing a net loss (gain) of jobs.
*Source:* Calculations bases on the OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933826738

Over the period 2011-16, all regions experienced an increase of employment, as shown in Panel B of Figure 17.1. However, job creation was mainly concentrated in the regions of Central Hungary and North Great Plain, accounting together for more than a half (52%) of net job creation in the Hungarian economy.

## Jobs at risk of automation

Beside the number of jobs created (or destroyed), it is their "quality" that matters for economic development and inclusion. The analysis conducted in Chapter 1 of this report provides an indication of the share of jobs at risk of automation in the regional economy.

Lack of information about jobs at risk of automation prevents this type of analysis.

# 18. Ireland

*This profile provides an overview of labour market conditions in Ireland, analysing trends and differences across two regions (OECD TL2 regions).*

## Overview of local labour markets

The employment and unemployment rates provide an important indication of the extent to which available labour resources are used, and can provide insights about inclusiveness. In 2016, both the employment and the unemployment rate in Ireland are similar to the OECD average (the unemployment rate is about 2 percentage point above the average). Long-term unemployment may be a concern for the economy. In 2016, more than 55% of unemployed people were long-term, a level considerably above the OECD average (30.5%)

The two regions analysed do not display large differences. The employment rate was about 68% in the Southern- Eastern region, whereas in the Border, Midland and Western region was about 64%. Likewise, differences in terms of unemployment between the two regions are just about 2 percentage points.

**Table 18.1. Overview of national and regional labour markets, Ireland**

| | 2015 | 2016 |
|---|---|---|
| Labour force participation rate, % | 70.1 (71.3) | 70.9 (71.7) |
| Employment rate, % | 64.7 (66.3) | 66.5 (67.0) |
| Unemployment rate (HUR), % | 10.0 (6.8) | 8.4 (6.3) |
| Long-term unemployment rate (% un.) | 57.6 (33.7) | 55.3 (30.5) |
| | | |
| Regional disparities: | | |
| - Employment rate (disparity index) | 3.8 (7.5) | 4.4 (7.2) |
| - Employment rate (difference best-worst performing region) | 3.4 (15.7) | 4.1 (15.5) |
| - Unemployment rate (disparity index) | 13.2 (26.4) | 16.2 (28.0) |
| - Unemployment rate (difference best-worst performing region) | 2.0 (7.6) | 2.1 (7.8) |

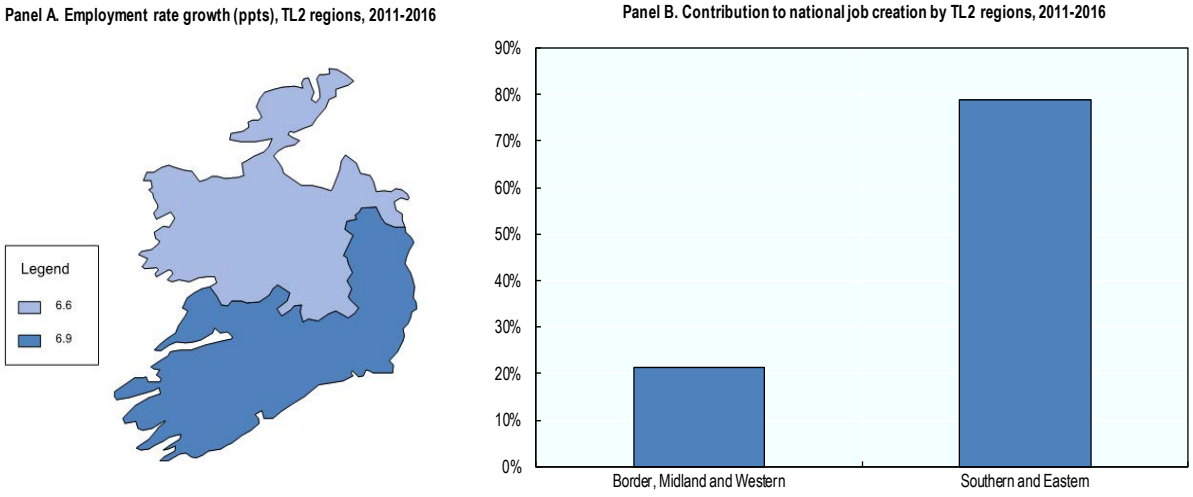
*Note*: The employment rate is calculated as the employment (15-64) at place of residence over the working age population (15-64). The unemployment rate is calculated as the unemployed over labour force (15-64). Regional disparity is measured as the standard deviation of the indicator across the TL2 regions of the country, divided by the distribution mean (i.e., coefficient of variation). The difference between the best and worst performing region is expressed in percentage values.
*Source*: OECD elaborations based on data from OECD National Accounts and OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933825674

## Trend and aggregate indicators

The employment rate of the Irish economy grew by 6.8 percentage points over the period 2011-16. As shown in the map in Figure 18.1, both regions experienced a similar growth level.

**Figure 18.1. Regional employment growth and contribution to national employment growth, Ireland**




Note: The growth of the employment rate is calculated as the difference between the rate in 2016 and the rate in 2011. Job creation is calculated as the difference between employment in 2016 and employment in 2011. Panel B shows the share of each region in the aggregate variation of jobs; the share of a region registering a net loss (gain) is calculated with respect of the sum of regions experiencing a net loss (gain) of jobs.
*Source*: Calculations bases on the OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933826757

Over the period 2011-16, most of jobs were created in the Southern and Eastern region, about 80% of net job creation in Ireland (Figure 18.1, Panel B).

## Jobs at risk of automation

Beside the number of jobs created (or destroyed), it is their "quality" that matters for economic development and inclusion. The analysis conducted in Chapter 1 of this report provides an indication of the share of jobs at risk of automation in the regional economy.

Over the period 2011-16, both regions included in the analysis experienced an increase in the share of jobs at low risk of automation – Type A in Table 18.2.

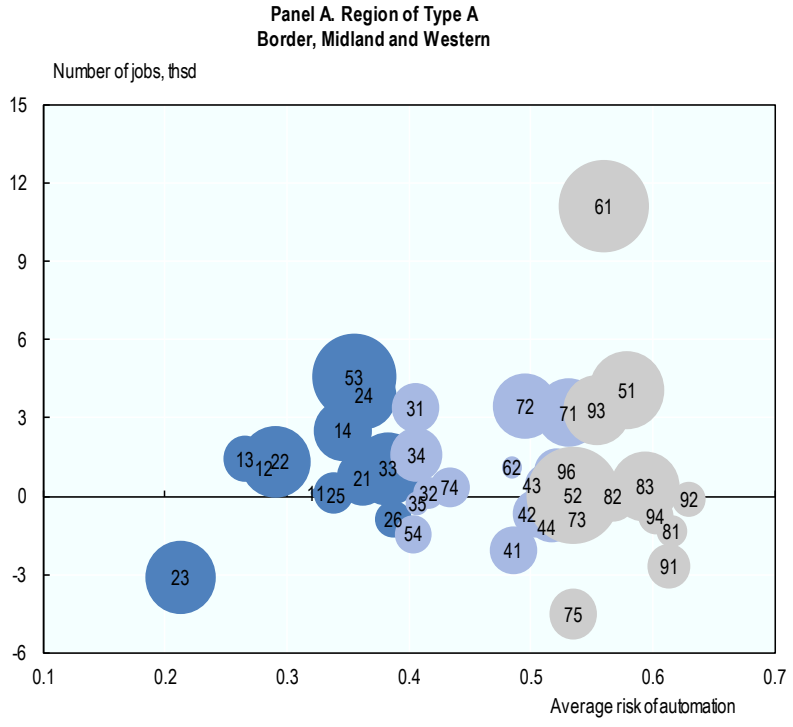
**Table 18.2. Trends in the jobs at risk of automation, Ireland**

| A. Creating jobs, predominantly in less risky occupations | B. Creating jobs, predominantly in riskier occupations | C. Losing jobs, predominantly in riskier occupations | D. Losing jobs, predominantly in less risky occupations |
|---|---|---|---|
| Border, Midland and Western | | | |
| Southern and Eastern | | | |

*Note*: Type A and Type C regions experienced an increase in the share of jobs at low risk of automation with respect to occupations at high risk of automation. Type B and Type D regions experienced an increase in the share of jobs at high risk of automation. In both Type A and Type B regions aggregate employment grew, while in the Type C and Type D regions employment declined.
*Source*: OECD elaborations.

The detailed creation of jobs by occupation for one region per category is presented in Figure 18.2. In detail, the Border, Midland and Western region is shown as an example of the situation displayed in the economy. This region experienced an increase of employment driven by occupations at low risk of automation, such as Personal Care Workers (53), Business and Administration Professionals (24) and Hospitality, Retail and Other Services Managers (14). In fact, this region has also experienced a drop in some occupations at low risk of automation such as Food Processing, Woodworking, Garment and Other Craft and Related Trades Workers (75) and Cleaners and Helpers (91).

**Figure 18.2. Job creation by risk of automation, selected regions, 2011-16, Ireland**




*Note:* Occupations (ISCO-08 code indicated in the bubble) are ranked from low to high risk of automation along the horizontal axis. Changes in the number of jobs for each occupation are reported along the vertical axis. Bubble size represents the share of jobs in the occupation with respect to total employment in the region.
*Source*: Calculations based on EU Labour Force survey.

StatLink https://doi.org/10.1787/888933827403

# 19. Israel

*This profile[1] provides an overview of labour market conditions in Israel, analysing trends and differences across six districts (OECD TL2 regions).*

## Overview of local labour markets

The employment and unemployment rates provide an important indication of the extent to which available labour resources are used, and can provide insights about inclusiveness. In 2016, the employment rate was in line with the OECD average, while the unemployment rate was 1.5 percentage points below the average. Long-term unemployment is also lower than the OECD average. In 2016, just 9.6% of unemployed people were in that status for more than one year, that is, 20 percentage points below the OECD average.

Regions within Israel display large differences in terms of employment rate. In 2016, the employment rate in the Tel Aviv district was 80.5%, while the employment rate in the Jerusalem district was more than 20 percentage points lower (60.1%). In terms of unemployment, regional differences are less pronounced, with the lowest rate registered in the Tel Aviv district (3.8%), and the highest rate in the Jerusalem district (6.5%).

**Table 19.1. Overview of national and regional labour markets, Israel**

| | 2015 | 2016 |
|---|---|---|
| Labour force participation rate, % | 72.2 (71.3) | 72.1 (71.7) |
| Employment rate, % | 68.3 (66.3) | 68.6 (67.0) |
| Unemployment rate (HUR), % | 5.2 (6.8) | 4.8 (6.3) |
| Long-term unemployment rate (% un.) | 11.5 (33.7) | 9.6 (30.5) |
| | | |
| Regional disparities: | | |
| - Employment rate (disparity index) | 13.2 (7.5) | 11.5 (7.2) |
| - Employment rate (difference best-worst performing region) | 22.6 (15.7) | 20.4 (15.5) |
| - Unemployment rate (disparity index) | 22.5 (26.4) | 20.8 (28.0) |
| - Unemployment rate (difference best-worst performing region) | 3.1 (7.6) | 2.7 (7.8) |

*Note*: The employment rate is calculated as the employment (15-64) at place of residence over the working age population (15-64). The unemployment rate is calculated as the unemployed over labour force (15-64). Regional disparity is measured as the standard deviation of the indicator across the TL2 regions of the country, divided by the distribution mean (i.e., coefficient of variation). The difference between the best and worst performing region is expressed in percentage values.
*Source*: OECD elaborations based on data from OECD National Accounts and OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

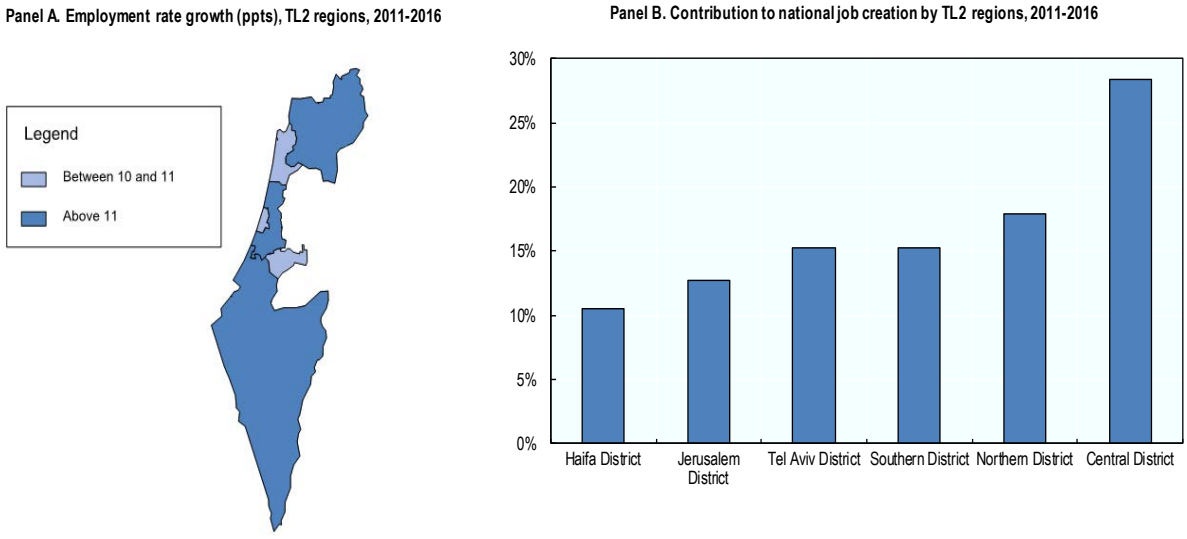
StatLink https://doi.org/10.1787/888933825693

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

## Trend and aggregate indicators

The employment rate in Israel grew by 11 percentage points over the period 2011-16. Although all regions experienced an increase in the employment rate, there are still regional differences, as shown in the map in Figure 19.1. The Central district, the most dynamic region during this period, displayed a growth of about 12 percentage points. The increase was less pronounced in the Haifa district, which displayed a growth of 10 percentage points.

**Figure 19.1. Regional employment growth and contribution to national employment growth, Israel**




*Note:* The growth of the employment rate is calculated as the difference between the rate in 2016 and the rate in 2011. Job creation is calculated as the difference between employment in 2016 and employment in 2011. Panel B shows the share of each region in the aggregate variation of jobs; the share of a region registering a net loss (gain) is calculated with respect of the sum of regions experiencing a net loss (gain) of jobs.
*Source:* Calculations bases on the OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933826776

Over the period 2011-16, all regions experienced net employment growth, as shown in Panel B. However, job creation was mainly concentrated in the Central district and the Northern district, accounting together for 46% of net job creation in the economy.

## Jobs at risk of automation

Beside the number of jobs created (or destroyed), it is their "quality" that matters for economic development and inclusion. The analysis conducted in Chapter 1 of this report provides an indication of the share of jobs at risk of automation in the regional economy.

Lack of information about jobs at risk of automation prevents this type of analysis.

# 20. Italy

*This profile provides an overview of labour market conditions in Italy, analysing trends and differences across 21 regions (OECD TL2 regions).*

## Overview of local labour markets

The employment and unemployment rates provide an important indication of the extent to which available labour resources are used, and can provide insights about inclusiveness. In 2016, the Italian economy displayed an employment rate of 57.3%, almost 10 percentage points below the OECD average, and an unemployment rate above the average by 4.4 percentage points. This indicates the presence of a large share of idle resources. Long-term unemployment may also be a concern for the Italian economy: in 2016 more than half of unemployed people (58.3%) were on that status for more than one year (28.2 percentage points above the OECD average).

Regions within Italy display large differences in terms of employment. In some regions, the employment rate in 2016 was above 65% (Emilia-Romagna, Valle de Aosta and Lombardy) or even above 70% (Autonomous Province of Bolzano), while in other regions it barely reached 40% (Calabria and Sicily). In terms of unemployment, regional differences are also striking. In 2016, the unemployment rate in Calabria and Sicily was higher than 22%, while in Lombardy the unemployment rate was 7.6% of the labour force.

**Table 20.1. Overview of national and regional labour markets, Italy**

| | 2015 | 2016 |
|---|---|---|
| Labour force participation rate, % | 64.0 (71.3) | 64.9 (71.7) |
| Employment rate, % | 56.3 (66.3) | 57.3 (67.0) |
| Unemployment rate (HUR), % | 11.9 (6.8) | 11.7 (6.3) |
| Long-term unemployment rate (% un.) | 58.9 (33.7) | 58.3 (30.5) |
| Regional disparities: | | |
| - Employment rate (disparity index) | 17.8 (7.5) | 17.4 (7.2) |
| - Employment rate (difference best-worst performing region) | 31.9 (15.7) | 32.4 (15.5) |
| - Unemployment rate (disparity index) | 44.1 (26.4) | 46.2 (28.0) |
| - Unemployment rate (difference best-worst performing region) | 19.4 (7.6) | 19.7 (7.8) |

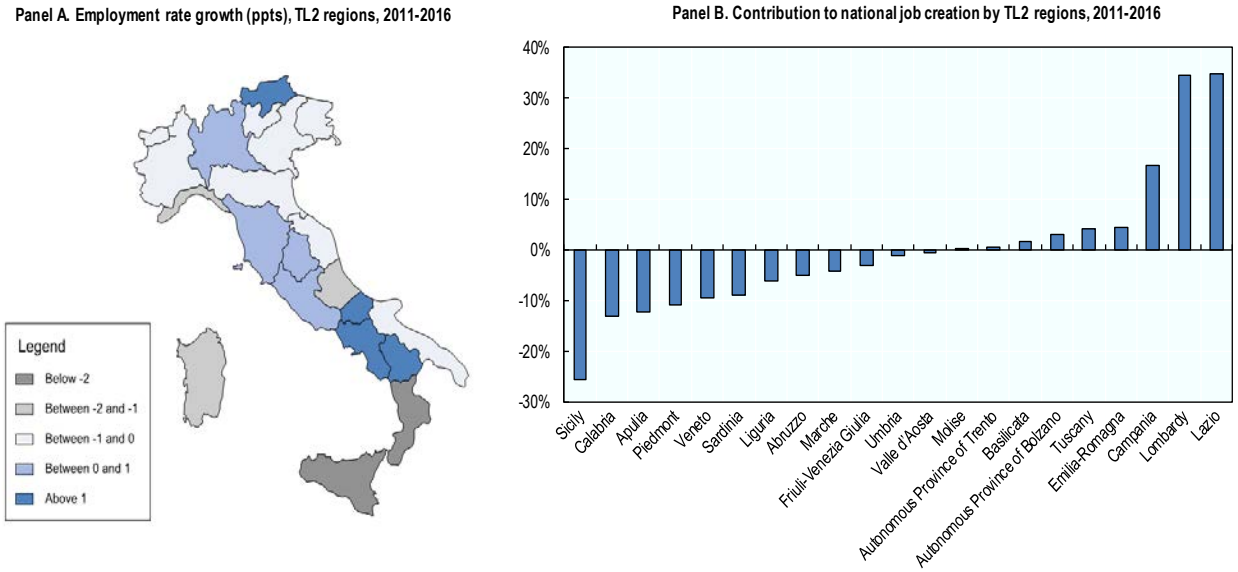
*Note*: The employment rate is calculated as the employment (15-64) at place of residence over the working age population (15-64). The unemployment rate is calculated as the unemployed over labour force (15-64). Regional disparity is measured as the standard deviation of the indicator across the TL2 regions of the country, divided by the distribution mean (i.e., coefficient of variation). The difference between the best and worst performing region is expressed in percentage values.
*Source*: OECD elaborations based on data from OECD National Accounts and OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933825712

## Trend and aggregate indicators

The employment rate in Italy remained stable over the period 2011-16, registering a slight decrease of 0.2 percentage points. This aggregate performance masks differences at the regional level as shown in the map in Figure 20.1. In particular, the employment rate declined by 3 percentage points in the regions of Calabria and Sicily. At the same time, the main increase (2.7 percentage points) was registered in the region of Basilicata.

**Figure 20.1. Regional employment growth and contribution to national employment growth, Italy**




*Note:* The growth of the employment rate is calculated as the difference between the rate in 2016 and the rate in 2011. Job creation is calculated as the difference between employment in 2016 and employment in 2011. Panel B shows the share of each region in the aggregate variation of jobs; the share of a region registering a net loss (gain) is calculated with respect of the sum of regions experiencing a net loss (gain) of jobs.
*Source:* Calculations bases on OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933826795

The creation of jobs over the period 2011-16, was mainly concentrated in the regions of Lazio and Lombardy, which combined accounted for about 70% of net job creation in Italy. By contrast, the regions of Sicily and Calabria accounted for 39% of net job losses.

## Jobs at risk of automation

Beside the number of jobs created (or destroyed), it is their "quality" that matters for economic development and inclusion. The analysis conducted in Chapter 1 of this report provides an indication of the share of jobs at risk of automation in the regional economy.

Over the period 2011-16, twelve regions experienced a reduction in the share of jobs at high risk of automation – Type A and Type C in Table 20.2. However, in three regions (Campania, Autonomous Province of Bolzano and Tuscany) most of the jobs created were in occupations at high risk of automation, while other six regions (Type D), registered a large loss of jobs, mainly in occupations at low risk of automation.

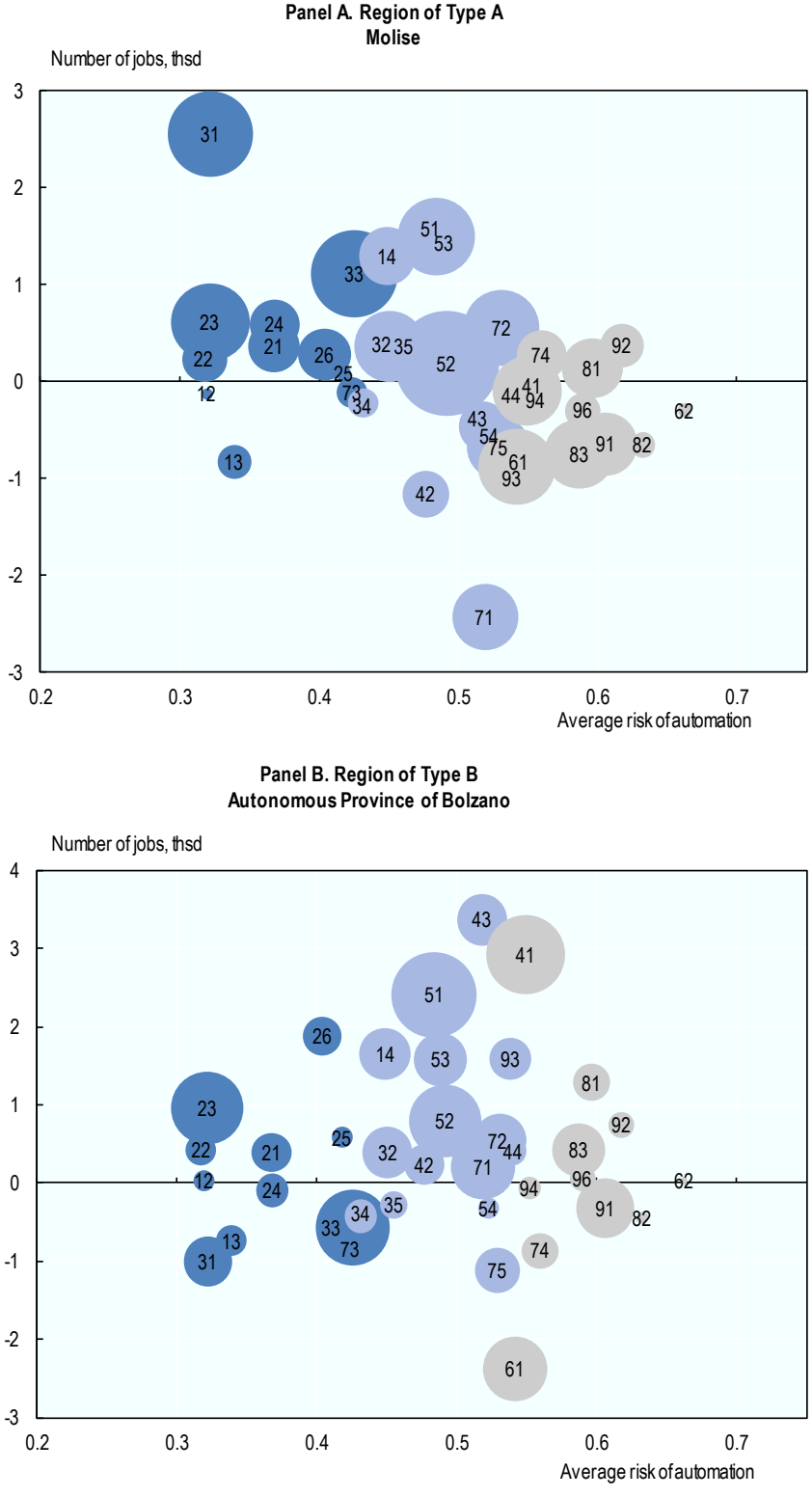
**Table 20.2. Trends in the jobs at risk of automation, Italy**

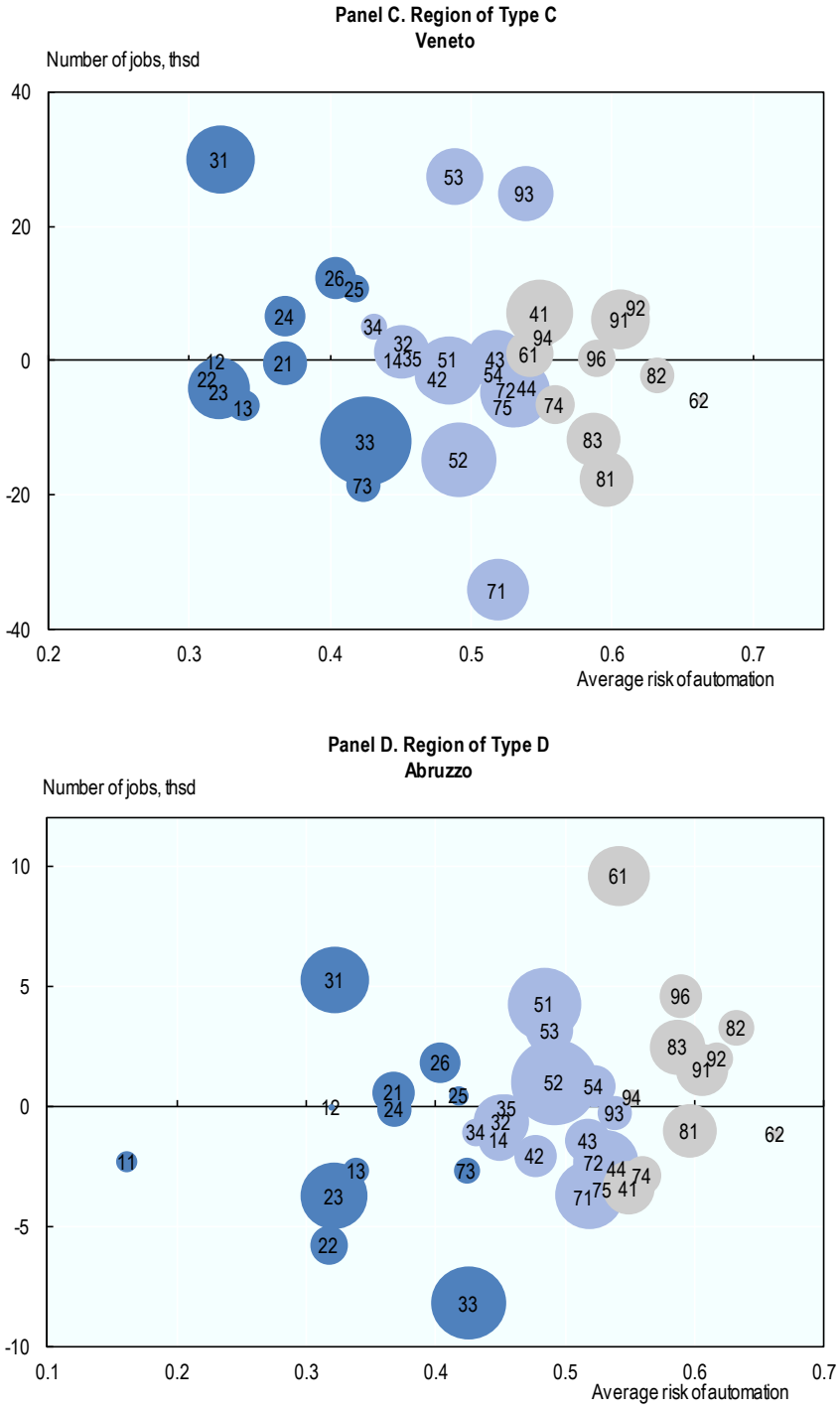
| A. Creating jobs, predominantly in less risky occupations | B. Creating jobs, predominantly in riskier occupations | C. Losing jobs, predominantly in riskier occupations | D. Losing jobs, predominantly in less risky occupations |
|---|---|---|---|
| Lombardy | Campania | Piedmont | Liguria |
| Molise | Autonomous Province of Bolzano | Valle d'Aosta | Abruzzo |
| Basilicata | Tuscany | Sicily | Apulia |
| Autonomous Province of Trento | | Sardinia | Calabria |
| Emilia-Romagna | | Veneto | Friuli-Venezia Giulia |
| Lazio | | Marche | Umbria |

*Note*: Type A and Type C regions experienced an increase in the share of jobs at low risk of automation with respect to occupations at high risk of automation. Type B and Type D regions experienced an increase in the share of jobs at high risk of automation. In both Type A and Type B regions aggregate employment grew, while in the Type C and Type D regions employment declined.
*Source*: OECD Calculations.

The detailed creation of jobs by occupation for one region per category is presented in Figure 20.2. In particular, the growth of employment in the region of Molise was mainly driven by jobs in occupations at low risk of automation (e.g., Science and Engineering Associate Professionals (31), Teaching professionals (23) and Business and Administration Associate Professionals (33)). The region of Veneto experienced a reduction of employment, but mainly in occupations at high risk of automation, such as Drivers and Mobile Plant Operators (83), Stationary Plant and Machine Operators (81) and Building and Related Trades Workers (71) and agricultural workers (61). In fact, while losing jobs in aggregate, Veneto created jobs in occupations at low risk of automation Science and Engineering Associate Professionals (31). By contrast, the Autonomous Province of Bolzano registered a large increase in jobs in occupations at high risk of automation as General and Keyboard Clerks (41) and Numerical and Material Recording Clerks (43). Finally, the reduction of employment in the region of Abruzzo was mainly driven by losses in occupations at low risk of automation, such as teaching professionals (23), Health Professionals (22) Business and Administration Associate Professionals (33), while most jobs generated correspond to high risk occupations.

**Figure 20.2. Job creation by risk of automation, selected regions, 2011-16, Italy**






*Note:* Occupations (ISCO-08 code indicated in the bubble) are ranked from low to high risk of automation along the horizontal axis. Changes in the number of jobs for each occupation are reported along the vertical axis. Bubble size represents the share of jobs in the occupation with respect to total employment in the region.
*Source*: Calculations based on EU Labour Force survey.

StatLink https://doi.org/10.1787/888933827422

# 21. Japan

*This profile provides an overview of labour market conditions in Japan, analysing trends and differences across 10 regions (OECD TL2 regions).*

## Overview of local labour markets

The employment and unemployment rates provide an important indication of the extent to which available labour resources are used, and can provide insights about inclusiveness. In 2016, the employment rate was 7.4 percentage points above the OECD average, while the unemployment rate was 3.2 percentage points below the average. This scenario remained stable compared to the performance in 2015. Still, long-term unemployment might be a source of concern for the economy. About 40% of unemployed people remain in that status for more than one year, a rate nine percentage points higher than the OECD average.

In 2015, regions within Japan displayed lower disparity than the OECD average. Still, the employment rate in the region of Hokuriku was 77.8%, while in the region of Hokkaido the rate was almost six percentage points lower (71.9%). Regional differences in unemployment are smaller, with the highest unemployment rate registered in Kyushu, Okinawa (4.2%), and the lowest rate in the region of Toukai (2.7%).

**Table 21.1. Overview of national and regional labour markets, Japan**

| | 2015 | 2016 |
|---|---|---|
| Labour force participation rate, % | 75.9 (71.3) | 76.9 (71.7) |
| Employment rate, % | 73.4 (66.3) | 74.4 (67.0) |
| Unemployment rate (HUR), % | 3.4 (6.8) | 3.1 (6.3) |
| Long-term unemployment rate (% un.) | 35.5 (33.7) | 39.5 (30.5) |
| Regional disparities: | | |
| - Employment rate (disparity index) | 2.4 (7.5) | - |
| - Employment rate (difference best-worst performing region) | 5.9 (15.7) | - |
| - Unemployment rate (disparity index) | 13.2 (26.4) | - |
| - Unemployment rate (difference best-worst performing region) | 1.5 (7.6) | - |

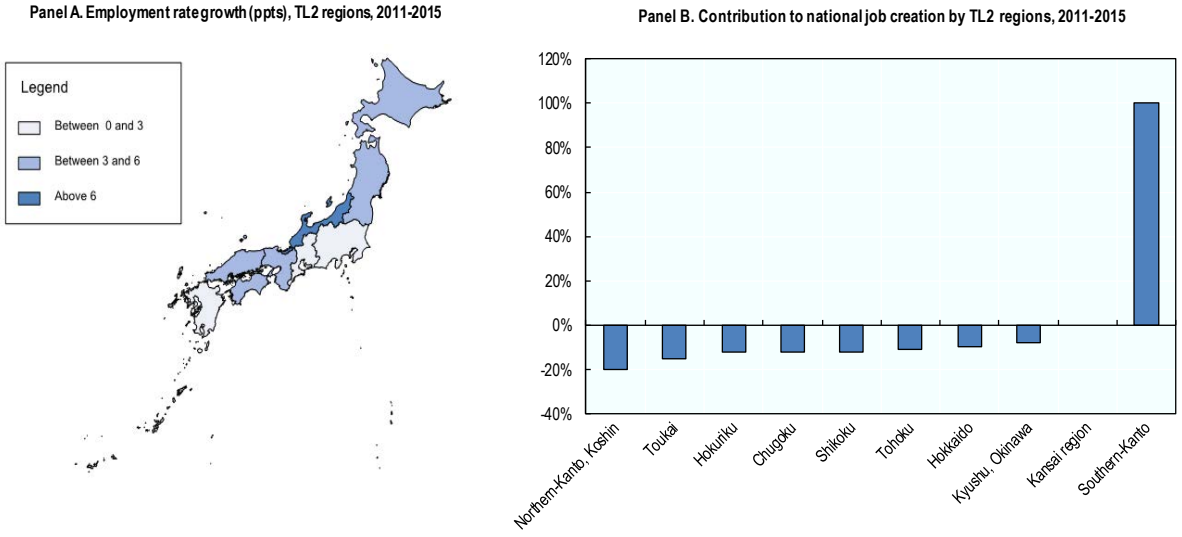
*Note*: The employment rate is calculated as the employment (15-64) at place of residence over the working age population (15-64). The unemployment rate is calculated as the unemployed over labour force (15-64). Regional disparity is measured as the standard deviation of the indicator across the TL2 regions of the country, divided by the distribution mean (i.e., coefficient of variation). The difference between the best and worst performing region is expressed in percentage values.
*Source*: OECD elaborations based on data from OECD National Accounts and OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933825731

## Trend and aggregate indicators

Although all regions in Japan experienced rising employment rate in the period 2011-2015, the aggregate performance still masks some differences at the regional level, as shown in the map in Figure 21.1. In Southern-Kanto, the most dynamic region during this period, the employment rate grew by 6.2 percentage points. By contrast, in the region of Northern-Kanto, Koshin, the employment rate grew by a much smaller 2.3 percentage points.

**Figure 21.1. Regional employment growth and contribution to national employment growth, Japan**




*Note:* The growth of the employment rate is calculated as the difference between the rate in 2015 and the rate in 2011. Job creation is calculated as the difference between employment in 2015 and employment in 2011. Panel B shows the share of each region in the aggregate variation of jobs; the share of a region registering a net loss (gain) is calculated with respect of the sum of regions experiencing a net loss (gain) of jobs.
*Source:* Calculations bases on the OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933826814

Over the period 2011-15, only the region of Southern-Kanto (which includes the metropolitan region of Tokyo) contributed to net job creation. By contrast, the region of Northern-Kanto, Koshin and the region of Toukai accounted for 35% of net job decline in the Japanese economy.

## Jobs at risk of automation

Beside the number of jobs created (or destroyed), it is their "quality" that matters for economic development and inclusion. The analysis conducted in Chapter 1 of this report provides an indication of the share of jobs at risk of automation in the regional economy.

Lack of information about jobs at risk of automation prevents this type of analysis.

# 22. Korea

*This profile provides an overview of labour market conditions in Korea, analysing trends and differences across seven regions (OECD TL2 regions).*

## Overview of local labour markets

The employment and unemployment rates provide an important indication of the extent to which available labour resources are used, and can provide insights about inclusiveness. In 2016, the employment rate was similar to the OECD average, while the unemployment rate was 2.6 percentage points below the OECD average. Likewise, the long-term unemployment rate was also low (about 29 percentage points below the average).

In 2016, regions within Korea displayed less asymmetry than the average regional disparity across OECD countries. Still, the employment rate in Jeju was 71.7 %, while the employment rate in the region of Gangwon was more than 10 points lower (61.2%). In terms of unemployment, regional disparities are small, with a difference of less than 2 percentage points between the lowest rate, registered in the regions of Jeju (2.3%), and the highest rate, registered in the Capital region (4.2%).

**Table 22.1. Overview of national and regional labour markets, Korea**

| | 2015 | 2016 |
|---|---|---|
| Labour force participation rate, % | 68.3 (71.3) | 68.7 (71.7) |
| Employment rate, % | 65.9 (66.3) | 66.1 (67.0) |
| Unemployment rate (HUR), % | 3.6 (6.8) | 3.7 (6.3) |
| Long-term unemployment rate (% un.) | 0.4 (33.7) | 0.9 (30.5) |
| Regional disparities: | | |
| - Employment rate (disparity index) | 5.0 (7.5) | 5.8 (7.2) |
| - Employment rate (difference best-worst performing region) | 9.2 (15.7) | 10.5 (15.5) |
| - Unemployment rate (disparity index) | 24.5 (26.4) | 20.1 (28.0) |
| - Unemployment rate (difference best-worst performing region) | 2.4 (7.6) | 1.9 (7.8) |

*Note*: The employment rate is calculated as the employment (15-64) at place of residence over the working age population (15-64). The unemployment rate is calculated as the unemployed over labour force (15-64). Regional disparity is measured as the standard deviation of the indicator across the TL2 regions of the country, divided by the distribution mean (i.e., coefficient of variation). The difference between the best and worst performing region is expressed in percentage values.
*Source*: OECD elaborations based on data from OECD National Accounts and OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

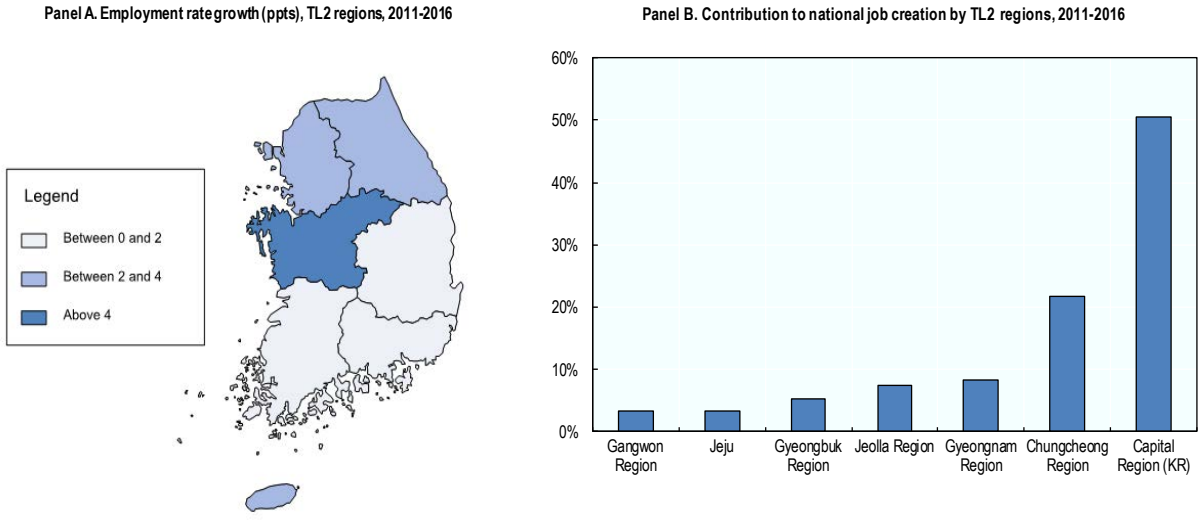
StatLink https://doi.org/10.1787/888933825750

## Trend and aggregate indicators

The employment rate of the Korean economy grew by 2.4 percentage points over the period 2011-16. Although the employment rate grew in all regions, there are still regional

differences, as shown in the map in Figure 22.1. While Chungcheong, the most dynamic region during this period, displayed a growth of 4.2 percentage points, the increase in the region of Gyeongnam was a much lower 1.5 percentage points.

**Figure 22.1. Regional employment growth and contribution to national employment growth, Korea**




*Note:* The growth of the employment rate is calculated as the difference between the rate in 2016 and the rate in 2011. Job creation is calculated as the difference between employment in 2016 and employment in 2011. Panel B shows the share of each region in the aggregate variation of jobs; the share of a region registering a net loss (gain) is calculated with respect of the sum of regions experiencing a net loss (gain) of jobs.
*Source:* Calculations bases on the OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933826833

Over the period 2011-16, job creation was highly concentrated in the Capital region, accounting for more than a half (51%) of net job creation in the Korean economy (Figure 22.1).

## Jobs at risk of automation

Beside the number of jobs created (or destroyed), it is their "quality" that matters for economic development and inclusion. The analysis conducted in Chapter 1 of this report provides an indication of the share of jobs at risk of automation in the regional economy.

Lack of information about jobs at risk of automation prevents this type of analysis.

# 23. Latvia

*This profile provides an overview of labour market conditions in Latvia across six sub-regions (OECD TL3 region).*

## Overview of local labour markets

The employment and unemployment rates provide an important indication of the extent to which available labour resources are used, and can provide insights about inclusiveness. In 2016, Latvia displayed an employment rate similar to the OECD average. The unemployment rate was, however, 3.3 percentage points above the average. Furthermore, long-term unemployment could be a source of concern for Latvia. In 2016, 42.6% of unemployed people were in that status for more than one year, a rate more than 12 percentage points above the OECD average.

Sub-regions within Latvia display important differences in terms of employment rate. For instance, in 2015 the employment rate in Riga was 72.1%, while in Latgale was more than 14 percentage points lower (57.6%). Geographical differences are even stronger in terms of unemployment. In 2015 the unemployment rate was 19% in Latgale, while only 5.9% in Pieriga.

**Table 23.1. Overview of national and regional labour markets, Latvia**

| | 2015 | 2016 |
|---|---|---|
| Labour force participation rate, % | 75.7 (71.3) | 76.3 (71.7) |
| Employment rate, % | 68.1 (66.3) | 68.7 (67.0) |
| Unemployment rate (HUR), % | 9.9 (6.8) | 9.6 (6.3) |
| Long-term unemployment rate (% un.) | 45.5 (33.7) | 42.6 (30.5) |
| Regional disparities: | | |
| - Employment rate (disparity index) | 8.0 | - |
| - Employment rate (difference best-worst performing region) | 14.5 | - |
| - Unemployment rate (disparity index) | 40.7 | - |
| - Unemployment rate (difference best-worst performing region) | 13.0 | - |

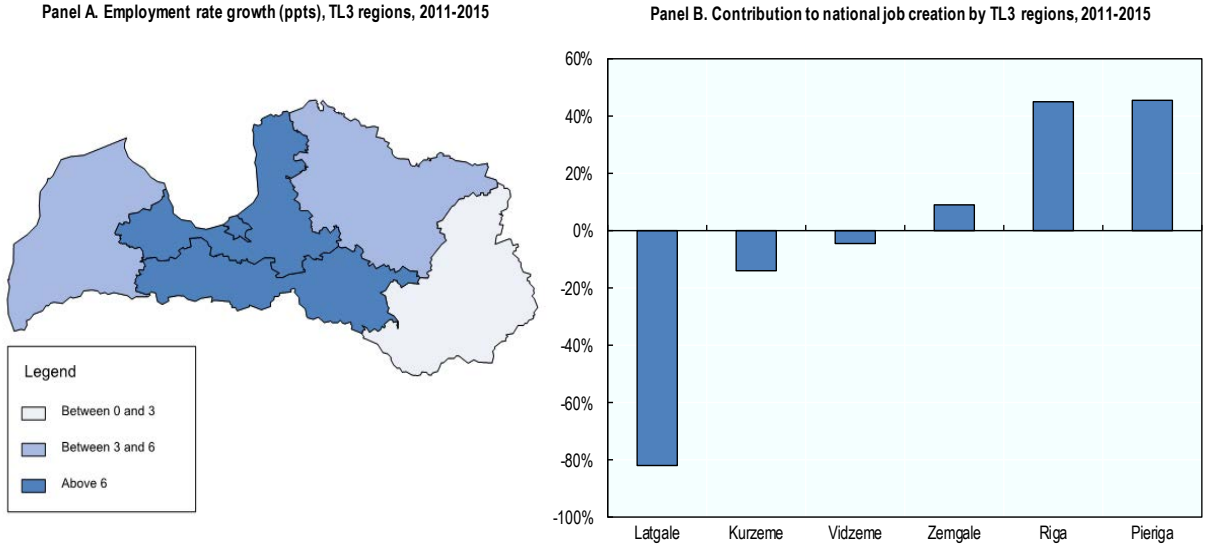
*Note*: The employment rate is calculated as the employment (15-64) at place of residence over the working age population (15-64). The unemployment rate is calculated as the unemployed over labour force (15-64). Regional disparity is measured as the standard deviation of the indicator across the TL3 regions of the country, divided by the distribution mean (i.e., coefficient of variation). The difference between the best and worst performing region is expressed in percentage values.
*Source*: OECD elaborations based on data from OECD National Accounts and OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933825769

## Trend and aggregate indicators

The employment rate in Latvia grew by 6.5 percentage points over the period 2011-15. Although the employment rate rose in all sub-regions, there are still regional differences, as shown in the map in Figure 23.1. Pieriga, the most dynamic sub-region during this period, displayed a growth of 9.4 percentage points. By contrast, in Latgale the employment rate grew by 2 percentage points.

**Figure 23.1. Regional employment growth and contribution to national employment growth, Latvia**




*Note:* The growth of the employment rate is calculated as the difference between the rate in 2015 and the rate in 2011. Job creation is calculated as the difference between employment in 2015 and employment in 2011. Panel B shows the share of each region in the aggregate variation of jobs; the share of a region registering a net loss (gain) is calculated with respect of the sum of regions experiencing a net loss (gain) of jobs.
*Source*: Calculations bases on OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933826852

Over the period 2011-16, most of jobs were created in the sub-regions of Pieriga and Riga, which combined accounted for 90% of net jobs creation in Latvia (Figure 23.1). By contrast, the sub-region of Latgale registered the largest loss of jobs, concentrating 82% of net jobs losses.

## Jobs at risk of automation

Beside the number of jobs created (or destroyed), it is their "quality" that matters for economic development and inclusion. The analysis conducted in Chapter 1 of this report provides an indication of the share of jobs at risk of automation in the regional economy.

Lack of information about jobs at risk of automation prevents this type of analysis.

# 24. Lithuania

*This profile provides an overview of labour market conditions across 10 sub-regions (OECD TL3 region) in Lithuania.*

## Overview of local labour markets

The employment and unemployment rates provide an important indication of the extent to which available labour resources are used, and can provide insights about inclusiveness. In 2016, the employment rate was in line with the OECD average, while the unemployment rate was just two percentage points above the average. Long-term unemployment, however, might be a source of concern for the economy. In 2016, 39% of unemployed were in that status for more than one year, a rate 8 percentage points higher than the OECD average.

Sub-regions within the country registered important differences in terms of employment rate. For instance, in 2015 the employment rate in the sub-region of Klaipeda was 73%, while in Šiauliai was 60%, more than 13 percentage points lower. Sub-regions differ also in terms of unemployment. For instance, the unemployment rate was 16% in Alytus, while in Klaipeda was a much lower 6%.

**Table 24.1. Overview of national and regional labour markets, Lithuania**

| | 2015 | 2016 |
|---|---|---|
| Labour force participation rate, % | 74.1 (71.3) | 75.5 (71.7) |
| Employment rate, % | 67.3 (66.3) | 69.5 (67.0) |
| Unemployment rate (HUR), % | 9.3 (6.8) | 8.1 (6.3) |
| Long-term unemployment rate (% un.) | 42.9 (33.7) | 38.6 (30.5) |
| | | |
| Regional disparities: | | |
| - Employment rate (disparity index) | 6.8 | - |
| - Employment rate (difference best-worst performing regions) | 13.5 | - |
| - Unemployment rate (disparity index) | 29.6 | - |
| - Unemployment rate (difference best-worst performing regions) | 9.5 | - |

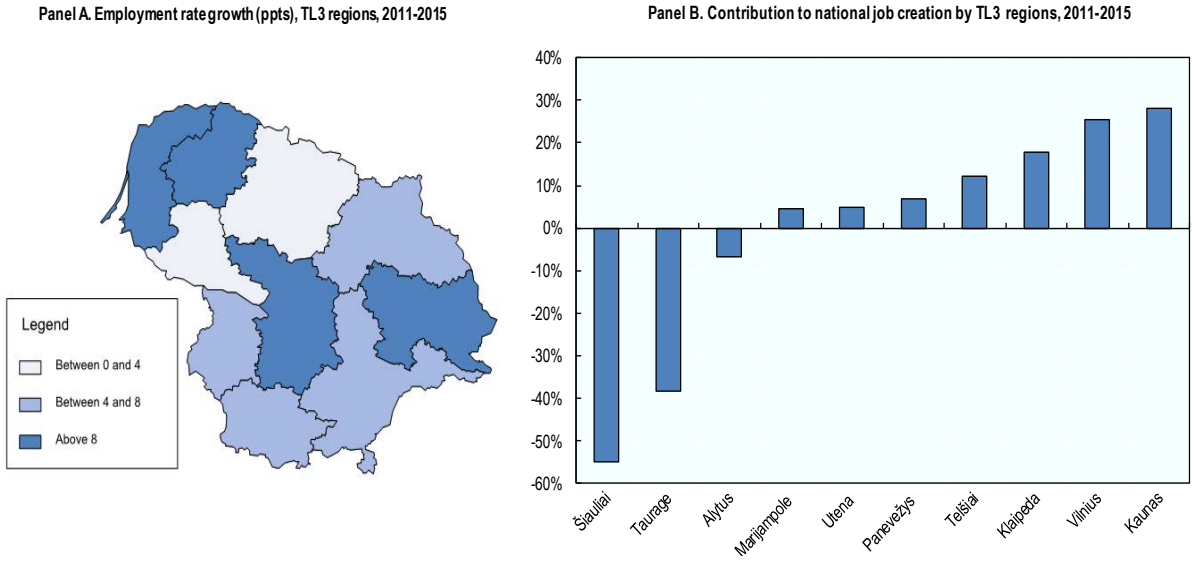
*Note*: The employment rate is calculated as the employment (15-64) at place of residence over the working age population (15-64). The unemployment rate is calculated as the unemployed over labour force (15-64). Regional disparity is measured as the standard deviation of the indicator across the TL3 regions of the country, divided by the distribution mean (i.e., coefficient of variation). The difference between the best and worst performing region is expressed in percentage values.
*Source*: OECD elaborations based on data from OECD National Accounts and OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933825788

## Trend and aggregate indicators

The employment rate of the Lithuanian economy grew by 7.1 percentage points over the period 2011-15. Although the employment rate rose in all sub-regions, there are regional differences, as shown in the map in Figure 24.1. In Telšiai, the most dynamic region during this period, the employment rate grew by 14 percentage points. The increase in Taurage was considerably lower, just 1.3 percentage points.

**Figure 24.1. Regional employment growth and contribution to national employment growth, Lithuania**




*Note:* The growth of the employment rate is calculated as the difference between the rate in 2015 and the rate in 2011. Job creation is calculated as the difference between employment in 2015 and employment in 2011. Panel B shows the share of each region in the aggregate variation of jobs; the share of a region registering a net loss (gain) is calculated with respect of the sum of regions experiencing a net loss (gain) of jobs.
*Source:* Calculations bases on OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933826871

Over the period 2011-15, most of jobs were created in the regions of Kaunas and Vilnius which combined accounted for more than half (54%) of net jobs created in the country. By contrast, the region of Šiauliai registered 55% of net jobs losses.

## Jobs at risk of automation

Beside the number of jobs created (or destroyed), it is their "quality" that matters for economic development and inclusion. The analysis conducted in Chapter 1 of this report provides an indication of the share of jobs at risk of automation in the regional economy.

The lack of information on the distribution of occupations across sub-regions prevents us from analysis the impact of automation across the country. However, there are data about the risk of occupations at the national level. The following provides an assessment of where the country stands in terms of employment trends by risk of automation at the national level.

Over the period 2011-16, Lithuania experienced an increase in the share of jobs at high risk of automation –Type B in Table 24.2.

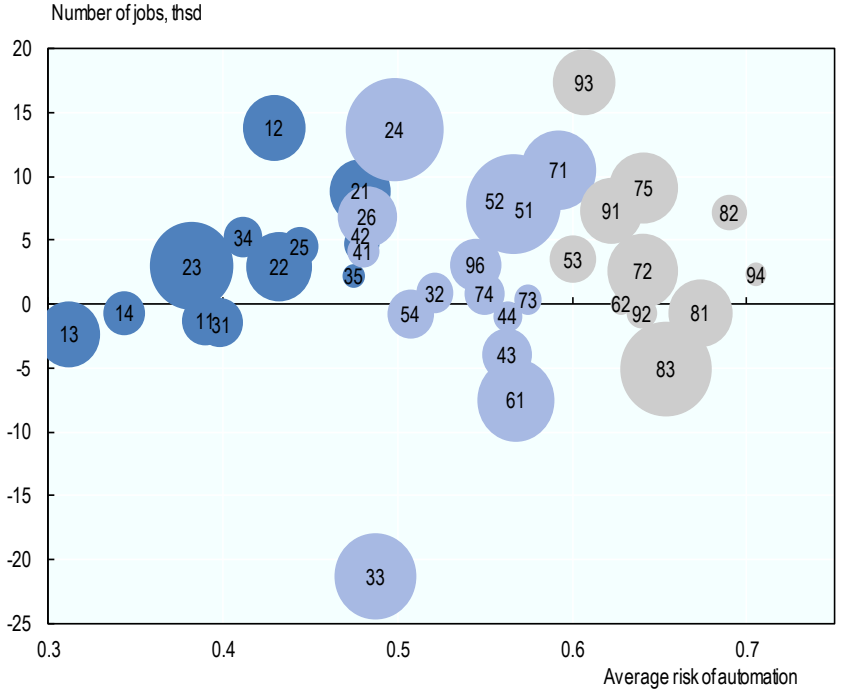
**Table 24.2. Trends in the jobs at risk of automation, Lithuania**

| A. Creating jobs, predominantly in less risky occupations | B. Creating jobs, predominantly in riskier occupations | C. Losing jobs, predominantly in riskier occupations | D. Losing jobs, predominantly in less risky occupations |
|---|---|---|---|
| Lithuania | | | |

*Note*: Type A and Type C regions experienced an increase in the share of jobs at low risk of automation with respect to occupations at high risk of automation. Type B and Type D regions experienced an increase in the share of jobs at high risk of automation. In both Type A and Type B regions aggregate employment grew, while in the Type C and Type D regions employment declined.
*Source*: OECD elaborations.

In particular, Lithuania experienced an increase of employment mainly driven by occupations at high risk of automation, such as Labourers in Mining, Construction, Manufacturing and Transport (93), Food Processing, Woodworking, Garment and Other Craft and Related Trades Workers (75) and Hospitality, Retail and Cleaners and Helpers (91). In fact, it also experienced a drop in some occupations at low risk of automation such as Production and Specialized Services Managers (13) and Hospitality, Retail and Other Services Managers (14).

**Figure 24.2. Job creation by risk of automation, selected regions, 2011-16, Lithuania**




*Note:* Occupations (ISCO-08 code indicated in the bubble) are ranked from low to high risk of automation along the horizontal axis. Changes in the number of jobs for each occupation are reported along the vertical axis. Bubble size represents the share of jobs in the occupation with respect to total employment in the region.
*Source*: Calculations based on EU Labour Force survey.

StatLink https://doi.org/10.1787/888933827441

# 25. Mexico

*This profile provides an overview of labour market conditions in Mexico, analysing trends and differences across 32 States (OECD TL2 regions).*

## Overview of local labour markets

The employment and unemployment rates provide an important indication of the extent to which available labour resources are used, and can provide insights about inclusiveness. In 2016, the employment rate was six percentage points below the OECD average, while the unemployment rate was 2.4 percentage points below the average. Furthermore, the long-term unemployment rate is around 28 percentage points below the OECD average, since only 2% of unemployed people in the country remain in that status for more than one year. For the Mexican economy however the main concern is the large share of informal workers, about 27% of all employed people in 2016 (Source: INEGI).

States within Mexico display large asymmetries in terms of employment rate. While in some states as Quintana Roo and Yucatan the employment rate in 2016 was more than 67%, the states of Veracruz and Chiapas displayed much lower rates, 53% and 54.2%, respectively. Also in terms of unemployment there are regional disparities. In 2016, the unemployment rate in the State of Tabasco was 7.4%, of the labour force, while in Guerrero, Yucatan and Oaxaca, was below 2.5%.

**Table 25.1. Overview of national and regional labour markets, Mexico**

| | 2015 | 2016 |
|---|---|---|
| Labour force participation rate, % | 63.6 (71.3) | 63.6 (71.7) |
| Employment rate, % | 60.7 (66.3) | 61.0 (67.0) |
| Unemployment rate (HUR) , % | 4.4 (6.8) | 3.9 (6.3) |
| Long-term unemployment rate (% un.) | 1.7 (33.7) | 2.0 (30.5) |
| Regional disparities: | | |
| - Employment rate (disparity index) | 6.0 (7.5) | 6.0 (7.2) |
| - Employment rate (difference best-worst performing region) | 14.1 (15.7) | 14.9 (15.5) |
| - Unemployment rate (disparity index) | 26.1 (26.4) | 29.8 (28.0) |
| - Unemployment rate (difference best-worst performing region) | 4.1 (7.6) | 5.3 (7.8) |

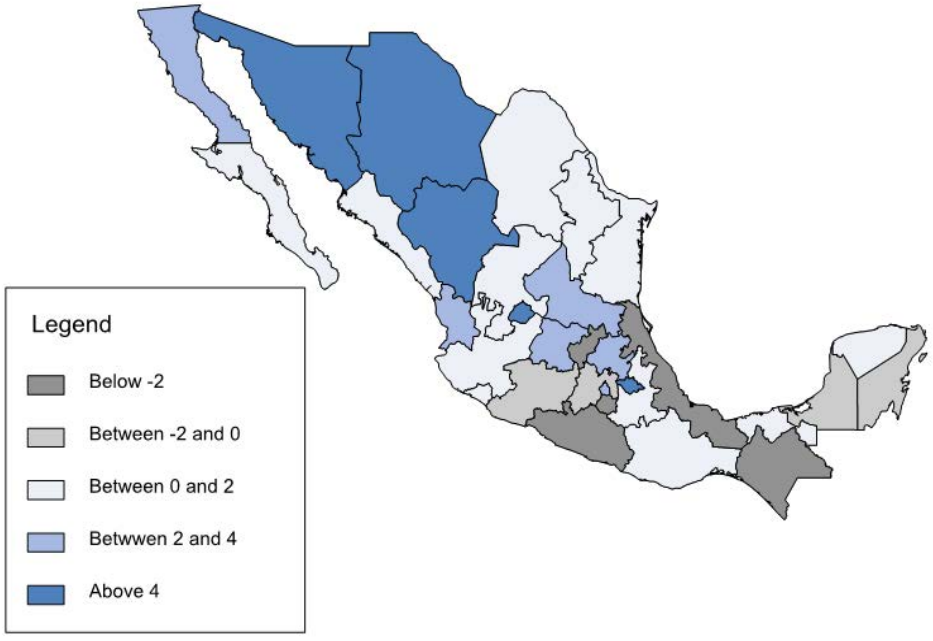
*Note*: The employment rate is calculated as the employment (15-64) at place of residence over the working age population (15-64). The unemployment rate is calculated as the unemployed over labour force (15-64). Regional disparity is measured as the standard deviation of the indicator across the TL2 regions of the country, divided by the distribution mean (i.e., coefficient of variation). The difference top to bottom region is expressed in percentage values.
*Source*: OECD elaborations based on data from OECD National Accounts and OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933825807

## Trend and aggregate indicators

The employment rate of the Mexican economy remained stable over the period 2011-16, registering a slight increase of 0.9 percentage points. This aggregate performance masks large differences across Mexican states as shown in the map in Figure 25.1. In particular, the decline in the employment rate was quite large in the states of Chiapas (-5.5), Veracruz (-2.6) and Queretaro (-2.5). Among the most dynamic states are Chihuahua, which displayed an increase in the employment rate of 8.3 percentage points, Sonora and Tlaxcala, where the employment rate grew by 5.8 and 5.7 percentage points, respectively.

**Figure 25.1. Regional employment rate growth (ppts), TL2 regions, 2011-2016, Mexico**

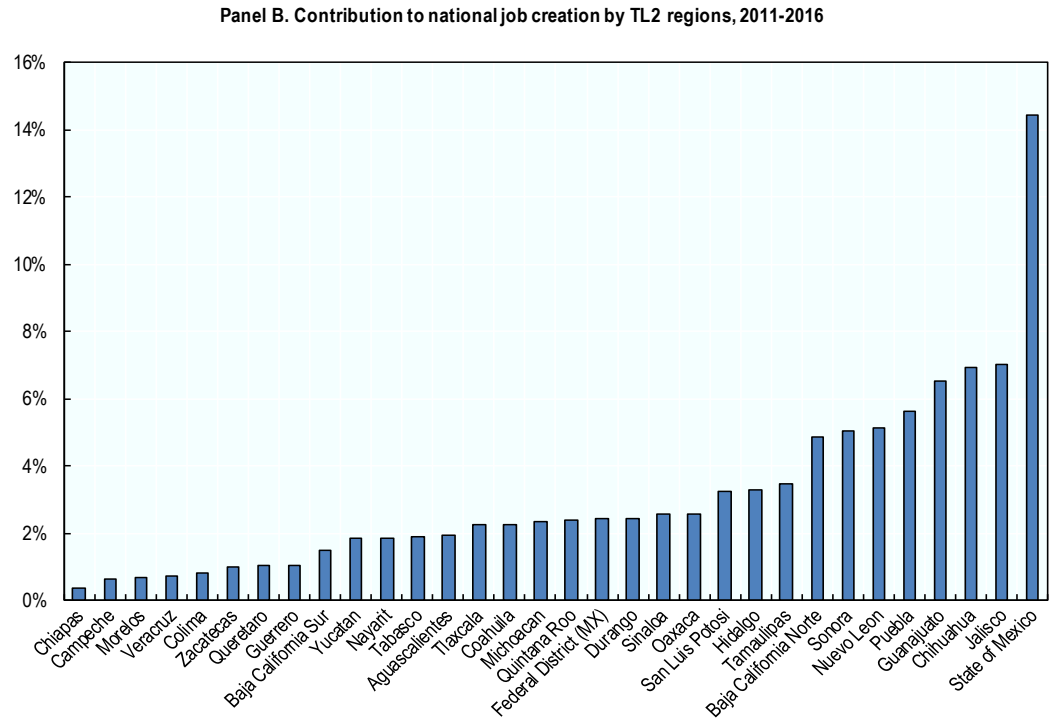



*Note:* The growth of the employment rate is calculated as the difference between the rate in 2016 and the rate in 2011.
*Source:* Calculations bases on the OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933826890

Over the period 2011-16, employment grew in all states, as shown in Figure 25.2. However, job creation was mainly concentrated in the State of Mexico and Jalisco, accounting together for 21% of net job creation in the Mexico.

**Figure 25.2. Contribution to national job creation by TL2 regions, 2011-2016, Mexico**




*Note:* Job creation is calculated as the difference between employment in 2016 and employment in 2011. Bar charts show the share of each region in the aggregate variation of jobs; the share of a region registering a net loss (gain) is calculated with respect of the sum of regions experiencing a net loss (gain) of jobs.
*Source:* Calculations bases on the OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933827460

## Jobs at risk of automation

Beside the number of jobs created (or destroyed), it is their "quality" that matters for economic development and inclusion. The analysis conducted in Chapter 1 of this report provides an indication of the share of jobs at risk of automation in the regional economy.

Lack of information about jobs at risk of automation prevents this type of analysis.

# 26. Netherlands

*This profile provides an overview of labour market conditions in Netherlands, analysing trends and differences across 12 provinces (OECD TL2 regions).*

## Overview of local labour markets

The employment and unemployment rates provide an important indication of the extent to which available labour resources are used, and can provide insights about inclusiveness. In 2016, the employment rate was 7.8 percentage points below the OECD average, with an unemployment rate in line with the average. Still, long-term unemployment could be a source of concern for the Dutch economy, given that 42.7% of unemployed people were in this status in 2016; a rate significantly higher than the OECD average (30.5%).

In 2016, provinces within the Netherlands displayed less asymmetry with respect to the average regional disparity across OECD countries. Still, the employment rate was 77% in the province of Zeeland and 76% in Utrecht, while in the province of Groningen was a lower 69%. In terms of unemployment, the lowest rate was registered in the province of Zeeland (4%), while Groningen (8.4%) and Flevoland (8.2%) registered the highest rates.

**Table 26.1. Overview of national and regional labour markets, Netherlands**

| | 2015 | 2016 |
|---|---|---|
| Labour force participation rate, % | 79.6 (71.3) | 79.7 (71.7) |
| Employment rate, % | 74.2 (66.3) | 74.8 (67.0) |
| Unemployment rate (HUR), % | 6.9 (6.8) | 6.0 (6.3) |
| Long-term unemployment rate (% un.) | 43.6 (33.7) | 42.7 (30.5) |
| Regional disparities: | | |
| - Employment rate (disparity index) | 2.9 (7.5) | 3.1 (7.2) |
| - Employment rate (difference best-worst performing region) | 7.6 (15.7) | 7.9 (15.5) |
| - Unemployment rate (disparity index) | 14.6 (26.4) | 20.3 (28.0) |
| - Unemployment rate (difference best-worst performing region) | 3.8 (7.6) | 4.4 (7.8) |

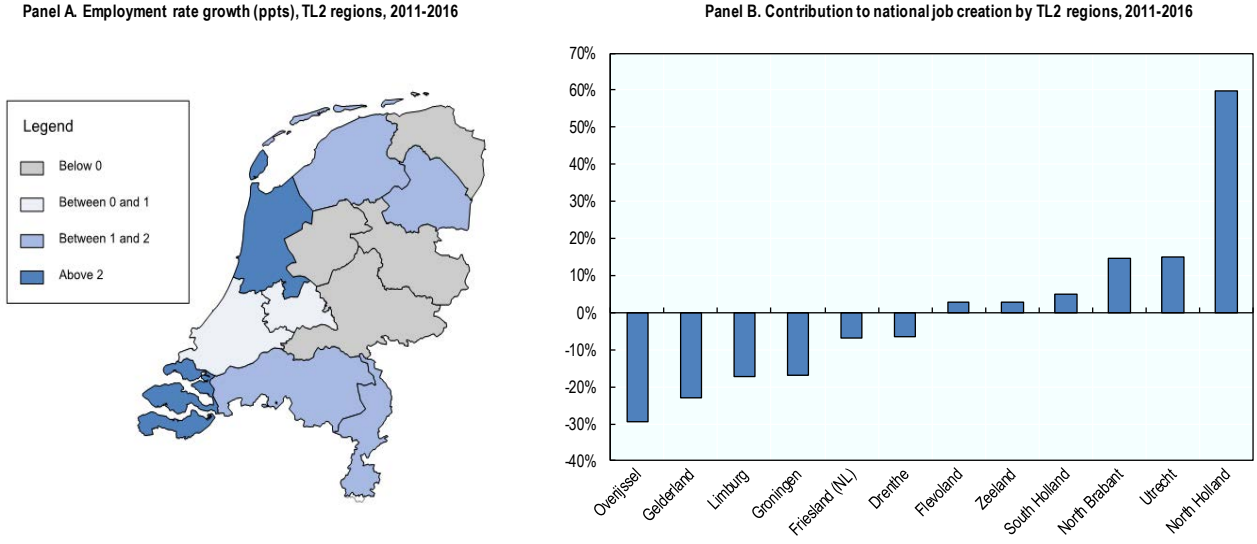
*Note*: The employment rate is calculated as the employment (15-64) at place of residence over the working age population (15-64). The unemployment rate is calculated as the unemployed over labour force (15-64). Regional disparity is measured as the standard deviation of the indicator across the TL2 regions of the country, divided by the distribution mean (i.e., coefficient of variation). The difference between the best and worst performing region is expressed in percentage values.
*Source*: OECD elaborations based on data from OECD National Accounts and OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933825826

## Trend and aggregate indicators

The employment rate of the Dutch economy remained stable over the period 2011-16, registering a slight increase of 0.8 percentage points. This aggregate performance masks differences at the provincial level as shown in the map in Figure 26.1. In particular, the employment rate declined in the provinces of Overijssel (-0.7) and Groningen (-0.6). Among the most dynamic provinces are Zeeland, which displayed an increase in the employment rate of 3.3 percentage points, and North Holland, where the employment rate grew by 2.2 percentage points.

**Figure 26.1. Regional employment growth and contribution to national employment growth, Netherlands**




*Note*: The growth of the employment rate is calculated as the difference between the rate in 2016 and the rate in 2011. Job creation is calculated as the difference between employment in 2016 and employment in 2011. Panel B shows the share of each region in the aggregate variation of jobs; the share of a region registering a net loss (gain) is calculated with respect of the sum of regions experiencing a net loss (gain) of jobs.
*Source*: Calculations bases on the OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933826909

Over the period 2011-16, the creation of jobs was mainly concentrated in the province of North Holland, accounting for 60% of net jobs creation in the Netherlands. By contrast, the provinces of Overijssel and Gelderland registered the largest decline in jobs, accounting for more than half (53%) of net job losses in the Dutch economy.

## Jobs at risk of automation

Beside the number of jobs created (or destroyed), it is their "quality" that matters for economic development and inclusion. The analysis conducted in Chapter 1 of this report provides an indication of the share of jobs at risk of automation in the regional economy.

Lack of information about jobs at risk of automation prevents this type of analysis.

# 27. New Zealand

*This profile provides an overview of labour market conditions in New Zealand, analysing trends and differences across 12 regions (OECD TL2 regions).*

## Overview of local labour markets

The employment and unemployment rates provide an important indication of the extent to which available labour resources are used, and can provide insights about inclusiveness. In 2016, New Zealand displayed an employment rate of 8.6 percentage points above the OECD average and an unemployment rate of 1.2 percentage points below the average. In addition, long-term unemployment in New Zealand is considerably below the OECD average (16 percentage points lower).

Regionals disparities in term of employment are in line with the average across OECD countries. Still, in 2016, the employment rate in Southland was 81% while in the Northland region was a much lower 65%. Disparities in terms of unemployment are less pronounced but still relevant. The unemployment rate in the Northland region in 2016 was above 9% while the region of Canterbury was a much lower 3.6%.

**Table 27.1. Overview of national and regional labour markets, New Zealand**

| | 2015 | 2016 |
|---|---|---|
| Labour force participation rate, % | 79.0 (71.3) | 79.9 (71.7) |
| Employment rate, % | 74.3 (66.3) | 75.6 (67.0) |
| Unemployment rate (HUR), % | 5.4 (6.8) | 5.1 (6.3) |
| Long-term unemployment rate (% un.) | 13.2 (33.7) | 14.1 (30.5) |
| Regional disparities: | | |
| - Employment rate (disparity index) | 5.5 (7.5) | 5.4 (7.2) |
| - Employment rate (difference best-worst performing region) | 11.7 (15.7) | 15.7 (15.5) |
| - Unemployment rate (disparity index) | 26 (26.4) | 25.4 (28.0) |
| - Unemployment rate (difference best-worst performing region) | 5.1 (7.6) | 6.1 (7.8) |

*Note*: The employment rate is calculated as the employment (15-64) at place of residence over the working age population (15-64). The unemployment rate is calculated as the unemployed over labour force (15-64). Regional disparity is measured as the standard deviation of the indicator across the TL2 regions of the country, divided by the distribution mean (i.e., coefficient of variation). The difference between the best and worst performing region is expressed in percentage values.
*Source*: OECD elaborations based on data from OECD National Accounts and OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

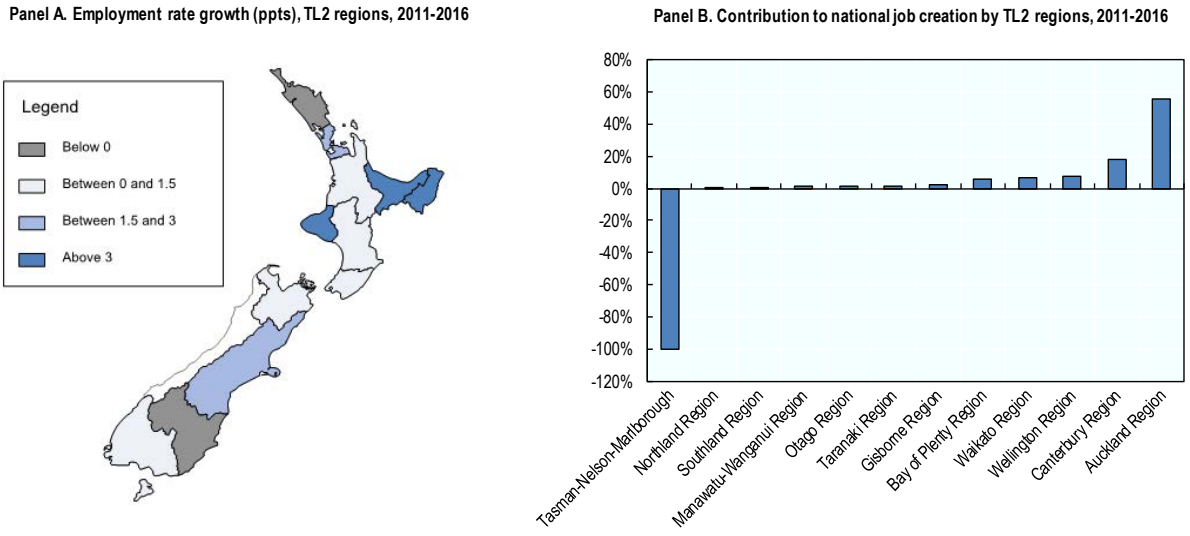
StatLink https://doi.org/10.1787/888933825845

## Trend and aggregate indicators

The employment rate grew by 3.1 percentage points over the period 2011-16. This aggregate performance masks differences at the regional level as shown in the map in

Figure 27.1. In particular, the employment rate declined in Otago (-1.4) and Auckland (-0.9). By contrast, in the regions of Bay of Plenty and Gisborne, the most dynamic ones during this period, the employment rate increased by more than 3 percentage points.

**Figure 27.1. Regional employment growth and contribution to national employment growth, New Zealand**




*Note*: The growth of the employment rate is calculated as the difference between the rate in 2016 and the rate in 2011. Job creation is calculated as the difference between employment in 2016 and employment in 2011. Panel B shows the share of each region in the aggregate variation of jobs; the share of a region registering a net loss (gain) is calculated with respect of the sum of regions experiencing a net loss (gain) of jobs.
*Source*: Calculations bases on the OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933826928

As shown in Panel B of Figure 27.1, the creation of jobs over the period 2011-16 was mainly concentrated in the region of Auckland, accounting for more than half (55%) of net job creation in New Zealand. The region of Tasman-Nelson-Marlborough concentrated all net job losses in New Zealand.

## Jobs at risk of automation

Beside the number of jobs created (or destroyed), it is their "quality" that matters for economic development and inclusion. The analysis conducted in Chapter 1 of this report provides an indication of the share of jobs at risk of automation in the regional economy.

Lack of information about jobs at risk of automation prevents this type of analysis.

# 28. Norway

*This profile provides an overview of labour market conditions in Norway, analysing trends and differences across seven regions (OECD TL2 regions).*

## Overview of local labour markets

The employment and unemployment rates provide an important indication of the extent to which available labour resources are used, and can provide insights about inclusiveness. In 2016, the employment rate in Norway was 7.4 percentage points above the OECD average, while the unemployment rate was 1.6 percentage points below the average. Both rates remained stable between 2015 and 2016. In addition, the long-term unemployment in Norway is considerably lower than the OECD average, 12.5% compared to 30.5%.

Regions within the country display less asymmetry than the average regional disparity across OECD countries. In 2016, the employment rate in the region of Oslo and Akershus was 76%, while in South-Eastern Norway, the region with the lowest rate, was about 72%. In terms of unemployment, disparities are even smaller. The difference between the region with the highest and the lowest rate (Agder and Rogaland and the region Northern Norway, respectively) was only 2.4 percentage points in 2016.

**Table 28.1. Overview of national and regional labour markets, Norway**

| | 2015 | 2016 |
|---|---|---|
| Labour force participation rate, % | 78.4 (71.3) | 78.2 (71.7) |
| Employment rate, % | 74.8 (66.3) | 74.3 (67.0) |
| Unemployment rate (HUR) , % | 4.4 (6.8) | 4.7 (6.3) |
| Long-term unemployment rate (% un.) | 11.7 (33.7) | 12.5 (30.5) |
| Regional disparities: | | |
| - Employment rate (disparity index) | 2.1 (7.5) | 2.3 (7.2) |
| - Employment rate (difference best-worst performing region) | 4.4 (15.7) | 5.2 (15.5) |
| - Unemployment rate (disparity index) | 11.7 (26.4) | 17.0 (28.0) |
| - Unemployment rate (difference best-worst performing region) | 1.3 (7.6) | 2.4 (7.8) |

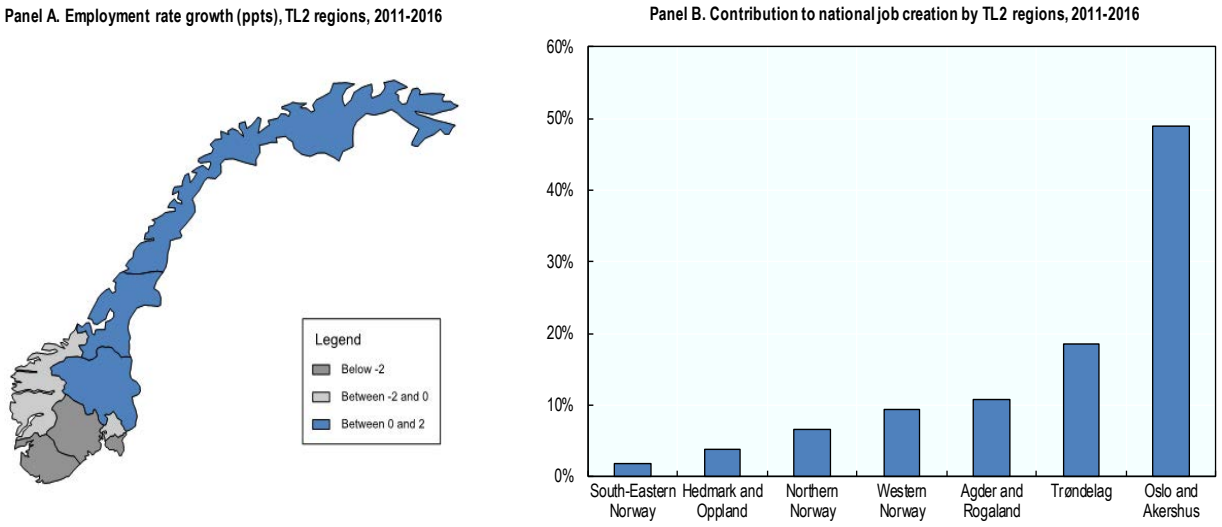
*Note* The employment rate is calculated as the employment (15-64) at place of residence over the working age population (15-64). The unemployment rate is calculated as the unemployed over labour force (15-64). Regional disparity is measured as the standard deviation of the indicator across the TL2 regions of the country, divided by the distribution mean (i.e., coefficient of variation). The difference between the best and worst performing region is expressed in percentage values.
*Source*: OECD elaborations based on data from OECD National Accounts and OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933825864

## Trend and aggregate indicators

Over the period 2011-16, the employment rate in Norway decreased by 1.5 percentage points. This aggregate performance masks differences at the regional level, as shown in the map in Figure 28.1. The employment rate during this period declined in four regions, with Agder and Rogaland (-2.3) and South-Eastern Norway (-2.1) displaying the largest drops. In contrast, the most dynamic regions were Trøndelag, where the employment rate grew by 1.8 percentage points and Hedmark and Oppland, where the employment rate grew by 2.2 percentage points.

**Figure 28.1. Regional employment growth and contribution to national employment growth, Norway**




*Note:* The growth of the employment rate is calculated as the difference between the rate in 2016 and the rate in 2011. Job creation is calculated as the difference between employment in 2016 and employment in 2011. Panel B shows the share of each region in the aggregate variation of jobs; the share of a region registering a net loss (gain) is calculated with respect of the sum of regions experiencing a net loss (gain) of jobs.
*Source*: Calculations bases on the OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933826947

Over the period 2011-16, all regions experienced a net increase of jobs, as shown in Panel B of Figure 28.1. However, job creation was mainly concentrated in the region of Oslo and Akershus, accounting for almost half (49%) of net job creation in Norway.

## Jobs at risk of automation

Beside the number of jobs created (or destroyed), it is their "quality" that matters for economic development and inclusion. The analysis conducted in Chapter 1 of this report provides an indication of the share of jobs at risk of automation in the regional economy.

Over the period 2011-16, all the regions in Norway experienced a reduction in the share of jobs at high risk of automation – Type A in Table 28.2.

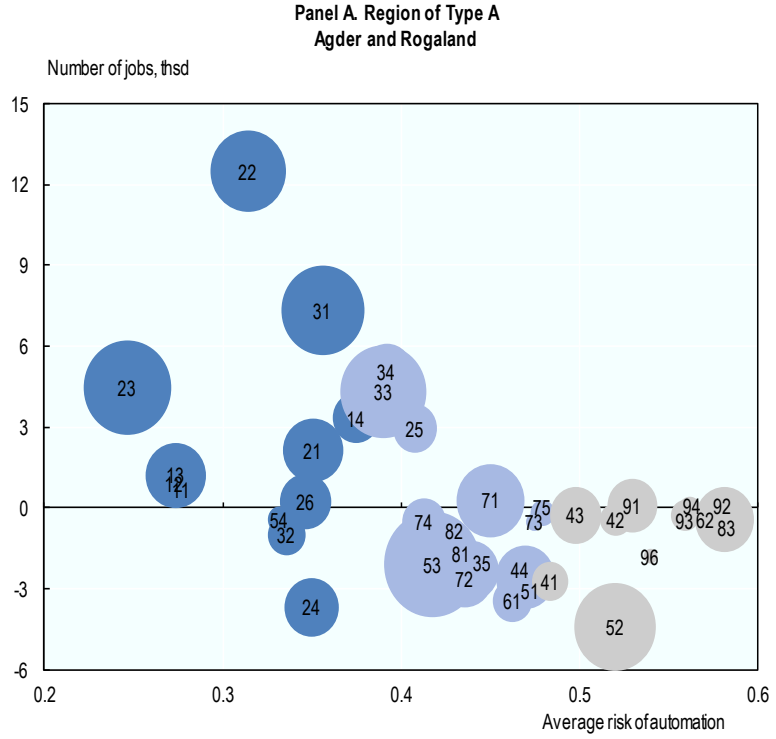
**Table 28.2. Trends in the jobs at risk of automation, Norway**

| A. Creating jobs, predominantly in less risky occupations | B. Creating jobs, predominantly in riskier occupations | C. Losing jobs, predominantly in riskier occupations | D. Losing jobs, predominantly in less risky occupations |
|---|---|---|---|
| Oslo and Akershus | | | |
| Hedmark and Oppland | | | |
| South-Eastern Norway | | | |
| Agder and Rogaland | | | |
| Western Norway | | | |
| Trøndelag | | | |
| Northern Norway | | | |

*Note*: Type A and Type C regions experienced an increase in the share of jobs at low risk of automation with respect to occupations at high risk of automation. Type B and Type D regions experienced an increase in the share of jobs at high risk of automation. In both Type A and Type B regions aggregate employment grew, while in the Type C and Type D regions employment declined.
*Source*: OECD Database

The detailed creation of jobs by occupation for one region per category is presented in Figure 28.2. In particular, the region of Agder and Rogaland is shown as an example of the situation displayed by all the regions in the economy. The growth of employment in this case was mainly driven by jobs in occupations at low risk of automation (e.g., Health professionals (22), Science and Engineering Associate Professionals (31) and Teaching professionals (23)). Furthermore, the region displays a decrease in jobs in occupations at high risk of automation, such as Sales Workers (52) and General and Keyboard Clerks (42).

**Figure 28.2. Job creation by risk of automation, selected regions, 2011-16, Norway**




*Note:* Occupations (ISCO-08 code indicated in the bubble) are ranked from low to high risk of automation along the horizontal axis. Changes in the number of jobs for each occupation are reported along the vertical axis. Bubble size represents the share of jobs in the occupation with respect to total employment in the region.
*Source*: Calculations based on EU Labour Force survey.

StatLink https://doi.org/10.1787/888933827479

# 29. Poland

*This profile provides an overview of labour market conditions in Poland, analysing trends and differences across 16 regions (OECD TL2 regions).*

## Overview of local labour markets

Employment and unemployment rates provide an important indication of the extent to which available labour resources are used, and can provide insights about the inclusiveness of labour markets. Both the employment and the unemployment rates are in line with the OECD average, in 2016 it was 64% and 6%, respectively. The long-term unemployment rate is slightly higher than the OECD average, it was 35% in 2016 compared to an OECD average of 30.5%.

Regions within Poland display lower disparity than the average regional disparity across OECD countries. For instance, in 2016 the employment rate in Mazowieckie was 67%, while in the region Warminsko-Mazurskie was 54.3%, i.e., 12 percentage points lower. Regions differ also in terms of unemployment, with the lowest rate registered in the regions of Lubuskie (4.8%), and the highest rate in Podkarpackie (9.8%). The reduction of regional employment disparity between 2015 and 2016 is due to the reduction of the very high employment rate in regions such as Lodzkie and Mazowieckie, and the increase, towards the national average, of the employment rate in regions such as Wielkopolskie and Zachodniopomorskie.

**Table 29.1. Overview of national and regional labour markets, Poland**

| | 2015 | 2016 |
|---|---|---|
| Labour force participation rate, % | 68.1 (71.3) | 68.8 (71.7) |
| Employment rate, % | 62.9 (66.3) | 64.5 (67.0) |
| Unemployment rate (HUR), % | 7.5 (6.8) | 6.2 (6.3) |
| Long-term unemployment rate (% un.) | 39.3 (33.7) | 35 (30.5) |
| | | |
| Regional disparities: | | |
| - Employment rate (disparity index) | 12.6 (7.5) | 5.2 (7.2) |
| - Employment rate (difference best-worst performing region) | 28 (15.7) | 12.3 (15.5) |
| - Unemployment rate (disparity index) | 20.4 (26.4) | 24.8 (28.0) |
| - Unemployment rate (difference best-worst performing region) | 5.9 (7.6) | 5.0 (7.8) |

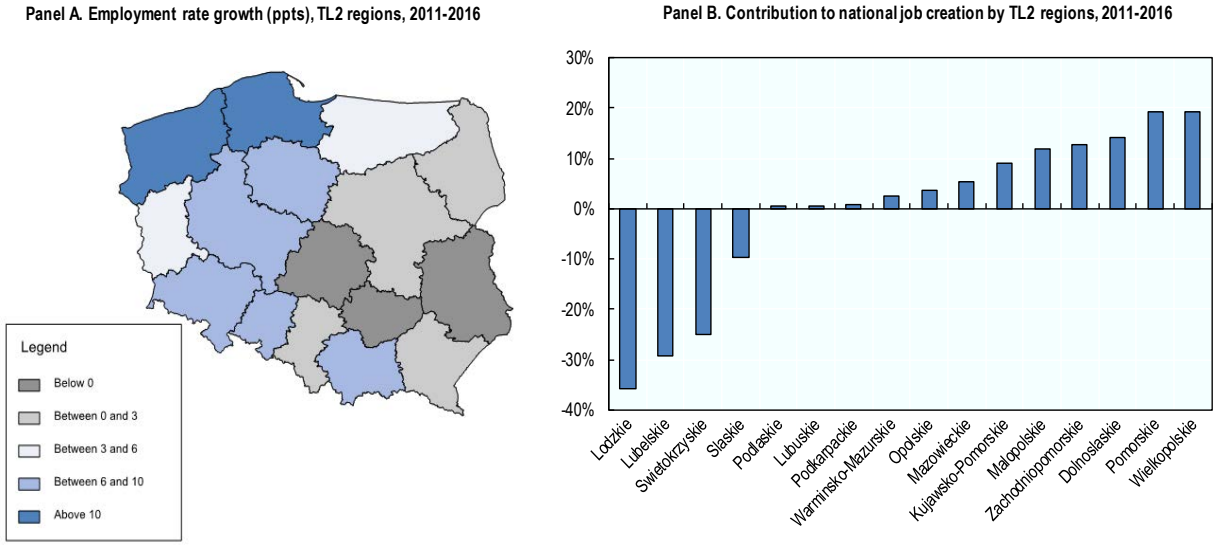
*Note*: The employment rate is calculated as the employment (15-64) at place of residence over the working age population (15-64). The unemployment rate is calculated as the unemployed over labour force (15-64). Regional disparity is measured as the standard deviation of the indicator across the TL2 regions of the country, divided by the distribution mean (i.e., coefficient of variation). The difference between the best and worst performing region is expressed in percentage values.
*Source*: OECD elaborations based on data from OECD National Accounts and OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933825883

## Trend and aggregate indicators

The employment rate of the Polish economy grew by 4.4 percentage points over the period 2011-16. This aggregate performance masks differences at the regional level as shown in the map in Figure 29.1, Panel A. The West-East divide seems to confirm the importance of the commercial links with European countries at the Western and Southern borders. In particular, the employment rate grew by 12.6 percentage points in West Pomerania, starting from 44% in 2011. In the same period, the employment rate dropped in Swietokrzyskie by 7 percentage points, reaching 59% in 2016. Overall, the regional employment rate is converging towards the national mean.

**Figure 29.1. Regional employment growth and contribution to national employment growth, Poland**




Note: The growth of the employment rate is calculated as the difference between the rate in 2016 and the rate in 2011. Job creation is calculated as the difference between employment in 2016 and employment in 2011. Panel B shows the share of each region in the aggregate variation of jobs; the share of a region registering a net loss (gain) is calculated with respect of the sum of regions experiencing a net loss (gain) of jobs.
*Source:* Calculations bases on the OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933826966

The creation of jobs over the period 2011-16 was mainly concentrated in the regions of Wielkopolskie and Pomorskie (Figure 29.1, Panel B), accounting for 38% of Polish net job creation. By contrast, two thirds of all jobs were lost in the regions of Lodzkie and Lubelskie.

## Jobs at risk of automation

Besides the number of jobs created, it is the quality of those jobs that matters for economic development and inclusion. The analysis conducted in chapter 1 of this report provides an indication of share of jobs at risk of automation in the regional economy.

Over the period 2011-16, all Polish regions experienced a reduction of the share of jobs at high risk of automation – Type A and Type C in Table 29.2. In particular, four regions experienced an aggregate loss of jobs, but mainly due to a reduction of employment in occupations at high risk of automation (Type C in Table 29.2).

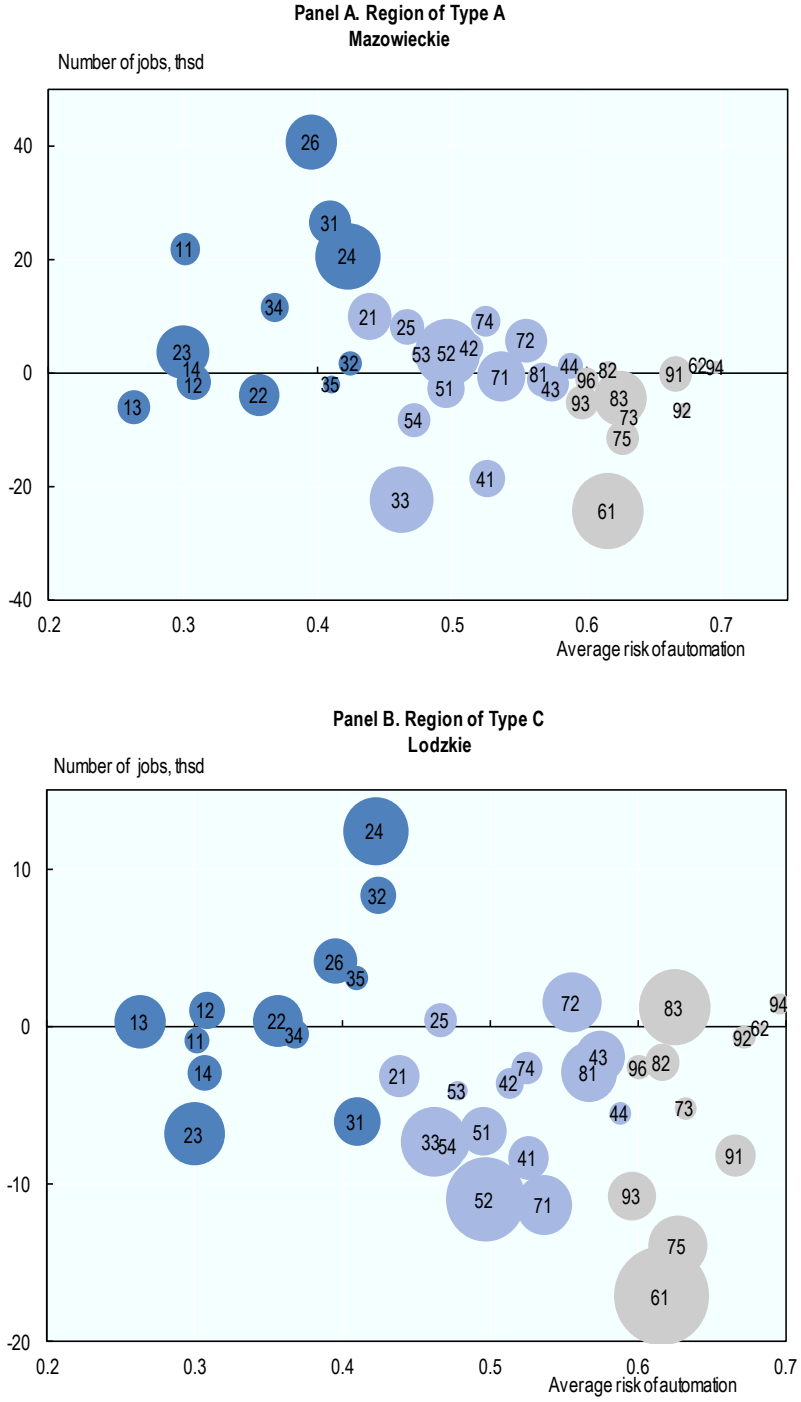
**Table 29.2. Trends in the jobs at risk of automation, Poland**

| A. Creating jobs, predominantly in less risky occupations | B. Creating jobs, predominantly in riskier occupations | C. Losing jobs, predominantly in riskier occupations | D. Losing jobs, predominantly in less risky occupations |
|---|---|---|---|
| Mazowieckie | | Lodzkie | |
| Malopolskie | | Slaskie | |
| Podkarpackie | | Lubelskie | |
| Podlaskie | | Swietokrzyskie | |
| Wielkopolskie | | | |
| Zachodniopomorskie | | | |
| Lubuskie | | | |
| Dolnoslaskie | | | |
| Opolskie | | | |
| Kujawsko-Pomorskie | | | |
| Warminsko-Mazurskie | | | |
| Pomorskie | | | |

*Note*: Type A and Type C regions experienced an increase in the share of jobs at low risk of automation with respect to occupations at high risk of automation. Type B and Type D regions experienced an increase in the share of jobs at high risk of automation. In both Type A and Type B regions aggregate employment grew, while in the Type C and Type D regions employment declined
*Source*: OECD Database

The detailed creation of jobs by occupation for one region per category is presented in Figure 29.2. For instance, the region of Mazowieckie experienced employment growth mainly in occupations at low risk of automation, such as Chief Executives, Senior Officials and Legislators (11), Legal, social and Cultural Professionals (26), and Science and Engineering Associate Professionals (31). At the same time, jobs in occupations as Drivers and Mobile Plant Operators (83) declined. A similar picture emerges for the region of Lodzkie, which experienced a reduction of employment, but mainly in occupations at high risk of automation, such as Food Processing, Woodworking, Garment and related trade workers (75), and agricultural workers (61). In fact, while losing jobs in aggregate, the region of Lodzkie created jobs in occupations at low risk of automation such as Business and Administration professionals (24).

**Figure 29.2. Job creation by risk of automation, selected regions, 2011-16, Poland**




*Note*: Occupations (ISCO-08 code indicated in the bubble) are ranked from low to high risk of automation along the horizontal axis. Changes in the number of jobs for each occupation are reported along the vertical axis. Bubble size represents the share of jobs in the occupation with respect to total employment in the region.
*Source*: Calculations based on EU Labour Force survey.

StatLink https://doi.org/10.1787/888933827498

# 30. Portugal

*This profile provides an overview of labour market conditions in Portugal, analysing trends and differences across seven regions (OECD TL2 regions).*

## Overview of local labour markets

The employment and unemployment rates provide an important indication of the extent to which available labour resources are used, and can provide insights about inclusiveness. In 2016, Portugal displayed an employment rate similar to the OECD average and an unemployment rate of almost five percentage points above the average. In addition, long-term unemployment could be a source of concern. In 2016, more than half of unemployed (55.4%) were in that status for more than one year; a rate significantly higher than the OECD average.

In 2016, regions within Portugal presented less asymmetry than the average regional disparity across OECD countries. Still, the employment rate in Algarve was 68.4%, while Madeira displayed a lower rate of 60.4%. Regions differ also in terms of unemployment, with the lowest rate registered in the Centre region (9%), and the highest rate in Madeira (13.6%).

**Table 30.1. Overview of national and regional labour markets, Portugal**

| | 2015 | 2016 |
|---|---|---|
| Labour force participation rate, % | 73.4 (71.3) | 73.7 (71.7) |
| Employment rate, % | 63.9 (66.3) | 65.3 (67.0) |
| Unemployment rate (HUR) , % | 12.7 (6.8) | 11.2 (6.3) |
| Long-term unemployment rate (% un.) | 57.4 (33.7) | 55.4 (30.5) |
| Regional disparities: | | |
| - Employment rate (disparity index) | 4.5 (7.5) | 5.1 (7.2) |
| - Employment rate (difference best-worst performing region) | 7.2 (15.7) | 8.0 (15.5) |
| - Unemployment rate (disparity index) | 12.5 (26.4) | 14.6 (28.0) |
| - Unemployment rate (difference best-worst performing region) | 5.4 (7.6) | 4.6 (7.8) |

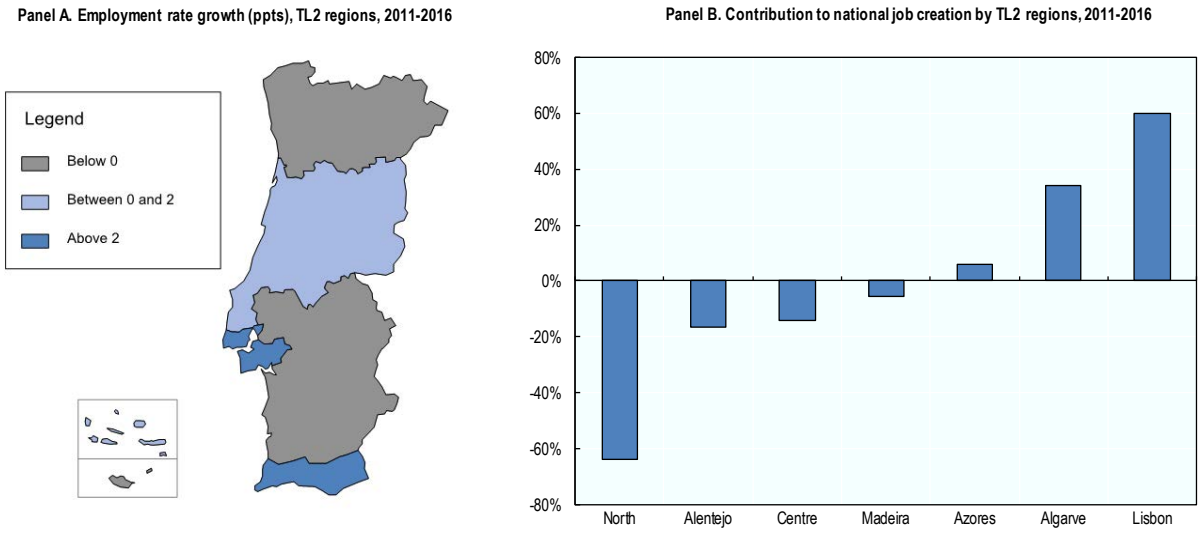
*Note*: The employment rate is calculated as the employment (15-64) at place of residence over the working age population (15-64). The unemployment rate is calculated as the unemployed over labour force (15-64). Regional disparity is measured as the standard deviation of the indicator across the TL2 regions of the country, divided by the distribution mean (i.e., coefficient of variation). The difference between the best and worst performing region is expressed in percentage values.
*Source*: OECD elaborations based on data from OECD National Accounts and OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933825902

## Trend and aggregate indicators

The employment rate of the Portuguese economy grew by 1.3 percentage points over the period 2011-16. This aggregate performance masks large differences at the regional level as shown in the map in Figure 30.1. In particular, the employment rate declined in Madeira (-1.2), Alentejo (-0.2) and the North region (-0.2). Among the most dynamic regions are Algarve, which displayed an increase in the employment rate of 4.3 percentage points, and Lisbon, where the employment rate grew by 3.3 percentage points.

**Figure 30.1. Regional employment growth and contribution to national employment growth, Portugal**




*Note:* The growth of the employment rate is calculated as the difference between the rate in 2016 and the rate in 2011. Job creation is calculated as the difference between employment in 2016 and employment in 2011. Panel B shows the share of each region in the aggregate variation of jobs; the share of a region registering a net loss (gain) is calculated with respect of the sum of regions experiencing a net loss (gain) of jobs.
*Source:* Calculations bases on the OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933826985

Over the period 2011-16, most of jobs were created in the region of Lisbon, accounting for more than 60% of net job creation in Portugal. By contrast, the North region registered the largest loss of jobs, representing about 64% of a net job decline in the economy.

## Jobs at risk of automation

Beside the number of jobs created (or destroyed), it is their "quality" that matters for economic development and inclusion. The analysis conducted in Chapter 1 of this report provides an indication of the share of jobs at risk of automation in the regional economy.

Lack of information about jobs at risk of automation prevents this type of analysis.

# 31. Romania

*This profile provides an overview of labour market conditions in Romania, analysing trends and differences across eight regions (OECD TL2 regions).*

## Overview of local labour markets

The employment and unemployment rates provide an important indication of the extent to which available labour resources are used, and can provide insights about inclusiveness. In 2016, the employment rate was 5 percentage points above the OECD average, while the unemployment rate was similar to the average. However, long-term unemployment could be a concern for the economy as 50.3% of unemployed people remain jobless for more than one year; a rate 20 percentage points higher than the OECD average.

Regions within the country registered important differences in terms of employment rate. For instance, in 2016 the employment rate in the North East region was 69%, while in South West Oltenia it was 56% (13 percentage points lower). Regional disparities are large also in terms of unemployment. In 2016, the unemployment rate was 14% in South West Oltenia against just 3.2% in the North East region.

**Table 31.1. Overview of national and regional labour markets, Romania**

| | 2015 | 2016 |
|---|---|---|
| Labour force participation rate, % | 66.1 (71.3) | 65.6 (71.7) |
| Employment rate, % | 61.7 (66.3) | 62 (67.0) |
| Unemployment rate (HUR), % | 7.0 (6.8) | 6.1 (6.3) |
| Long-term unemployment rate (% un.) | 43.9 (33.7) | 50.3 (30.5) |
| | | |
| Regional disparities: | | |
| - Employment rate (disparity index) | 8.3 | 8.4 |
| - Employment rate (difference best-worst performing region) | 13.8 | 13.3 |
| - Unemployment rate (disparity index) | 38.3 | 41.7 |
| - Unemployment rate (difference best-worst performing region) | 6.9 | 7.3 |

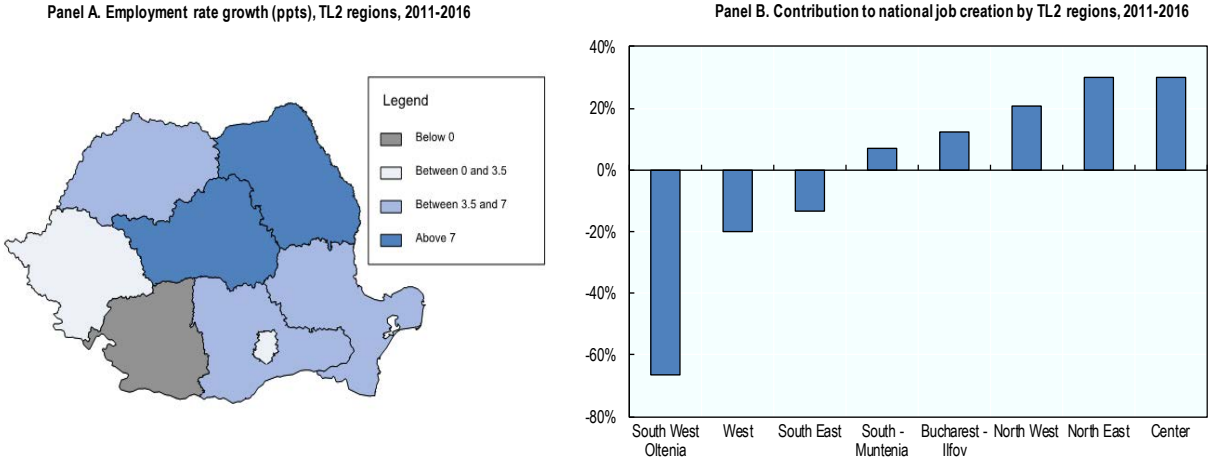
*Note*: The employment rate is calculated as the employment (15-64) at place of residence over the working age population (15-64). The unemployment rate is calculated as the unemployed over labour force (15-64). Regional disparity is measured as the standard deviation of the indicator across the TL2 regions of the country, divided by the distribution mean (i.e., coefficient of variation). The difference between the best and worst performing region is expressed in percentage values.
*Source*: OECD elaborations based on data from OECD National Accounts and OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933825921

## Trend and aggregate indicators

The employment rate in Romania grew by 2.6 percentage points over the period 2011-16. This aggregate performance masks large differences at the regional level as shown in the map in Figure 31.1. In particular, the employment rate declined in South West Oltenia by 2.6 percentage points, while the North East region, the most dynamic during this period, displayed an increase of 9.5 percentage points in the employment rate.

**Figure 31.1. Regional employment growth and contribution to national employment growth, Romania**




*Note:* The growth of the employment rate is calculated as the difference between the rate in 2016 and the rate in 2011. Job creation is calculated as the difference between employment in 2016 and employment in 2011. Panel B shows the share of each region in the aggregate variation of jobs; the share of a region registering a net loss (gain) is calculated with respect of the sum of regions experiencing a net loss (gain) of jobs.
*Source:* Calculations bases on the OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933827004

Over the period 2011-16, most of jobs were created in the Center and the North East regions, which combined accounted for 60% of net job creation in Romania. By contrast, the region of South West Oltenia accounted for 67% of net job losses in Romania.

## Jobs at risk of automation

Beside the number of jobs created (or destroyed), it is their "quality" that matters for economic development and inclusion. The analysis conducted in Chapter 1 of this report provides an indication of the share of jobs at risk of automation in the regional economy.

Lack of information about jobs at risk of automation prevents this type of analysis.

# 32. Slovak Republic

*This profile provides an overview of labour market conditions in Slovak Republic, analysing trends and differences across four regions (OECD TL2 regions).*

## Overview of local labour markets

The employment and unemployment rates provide an important indication of the extent to which available labour resources are used, and can provide insights about the inclusiveness of labour markets. In 2016, the employment rate was similar to the OECD average, 65%. By contrast, the unemployment rate was 9.7%, i.e., 3.4 percentage points above the OECD average. While both rates seem to slowly converge towards the OECD average, long-term unemployment could be a concern for the Slovak economy. With about 57% of unemployed people in that status for more than one year, it is more than 26 percentage points above the OECD average.

Regions within the country display large differences in terms of employment rate. In 2016, the employment rate in the region of Bratislava was almost 75%, more than 15 percentage points above the rate in East Slovakia. The asymmetry is evident also in terms of unemployment. For instance, the unemployment rate was about 13% in East Slovakia, whereas the capital region displayed a much lower 5.2%.

**Table 32.1. Overview of national and regional labour markets, Slovak Republic**

| | 2015 | 2016 |
|---|---|---|
| Labour force participation rate, % | 70.9 (71.3) | 71.8 (71.7) |
| Employment rate, % | 62.7 (66.3) | 64.9 (67.0) |
| Unemployment rate (HUR) , % | 11.5 (6.8) | 9.7 (6.3) |
| Long-term unemployment rate (% un.) | 62.3 (33.7) | 56.6 (30.5) |
| Regional disparities: | | |
| - Employment rate (disparity index) | 8.9 (7.5) | 9.9 (7.2) |
| - Employment rate (difference best-worst performing region) | 13.7 (15.7) | 15.7 (15.5) |
| - Unemployment rate (disparity index) | 37.0 (26.4) | 37.8 (28.0) |
| - Unemployment rate (difference best-worst performing region) | 9.3 (7.6) | 8.0 (7.8) |

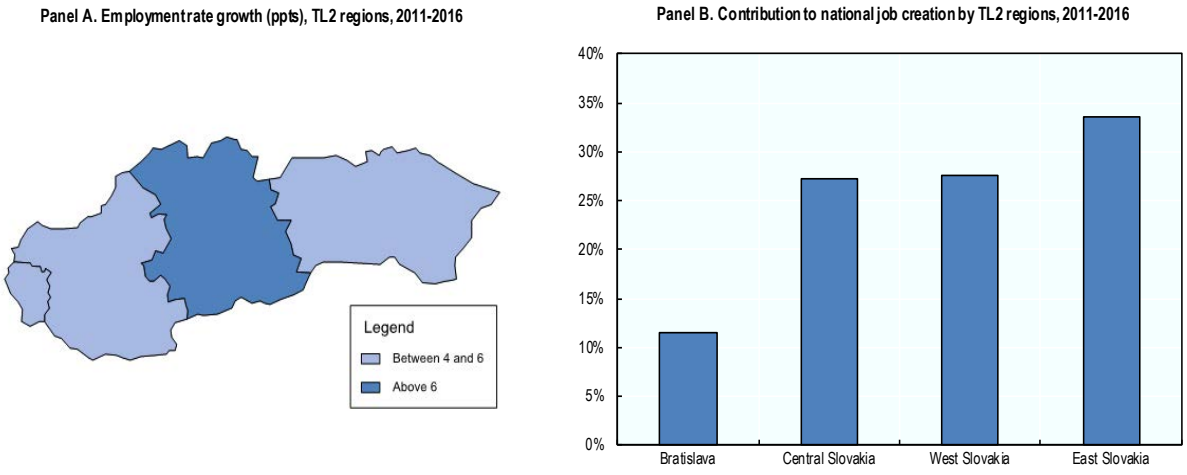
*Note*: The employment rate is calculated as the employment (15-64) at place of residence over the working age population (15-64). The unemployment rate is calculated as the unemployed over labour force (15-64). Regional disparity is measured as the standard deviation of the indicator across the TL2 regions of the country, divided by the distribution mean (i.e., coefficient of variation). The difference between the best and worst performing region is expressed in percentage values.
*Source*: OECD elaborations based on data from OECD National Accounts and OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933825940

## Trend and aggregate indicators

The employment rate of the Slovak economy grew by about 6 percentage points over the period 2011-16. All regions experienced a growing employment rate, but regional differences remain, as shown in the map in Figure 32.1. The most dynamic region was Central Slovakia, which displayed an increase in the employment rate of 6.5 percentage points, while Bratislava, the region with the lowest growth during the period, registered an increase of 4.7 percentage points.

**Figure 32.1. Regional employment growth and contribution to national employment growth, Slovak Republic**




Note: The growth of the employment rate is calculated as the difference between the rate in 2016 and the rate in 2011. Job creation is calculated as the difference between employment in 2016 and employment in 2011. Panel B shows the share of each region in the aggregate variation of jobs; the share of a region registering a net loss (gain) is calculated with respect of the sum of regions experiencing a net loss (gain) of jobs.
*Source:* Calculations bases on the OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933827023

Over the period 2011-16, all regions experienced an increase of employment, as shown in Panel B of Figure 32.1. Job creation however was concentrated in three regions (Central, West and East Slovakia), each one accounting for more than 25% of net job creation.

## Jobs at risk of automation

Beside the number of jobs created (or destroyed), it is their "quality" that matters for economic development and inclusion. The analysis conducted in Chapter 1 of this report provides an indication of the share of jobs at risk of automation in the regional economy.

Over the period 2011-16, only the region of Central Slovakia experienced a reduction in the share of jobs at high risk of automation – Type A in Table 32.2. Despite the aggregate increase in employment, most of the jobs created were in occupations at high risk of automation (Type B) in the other three regions.

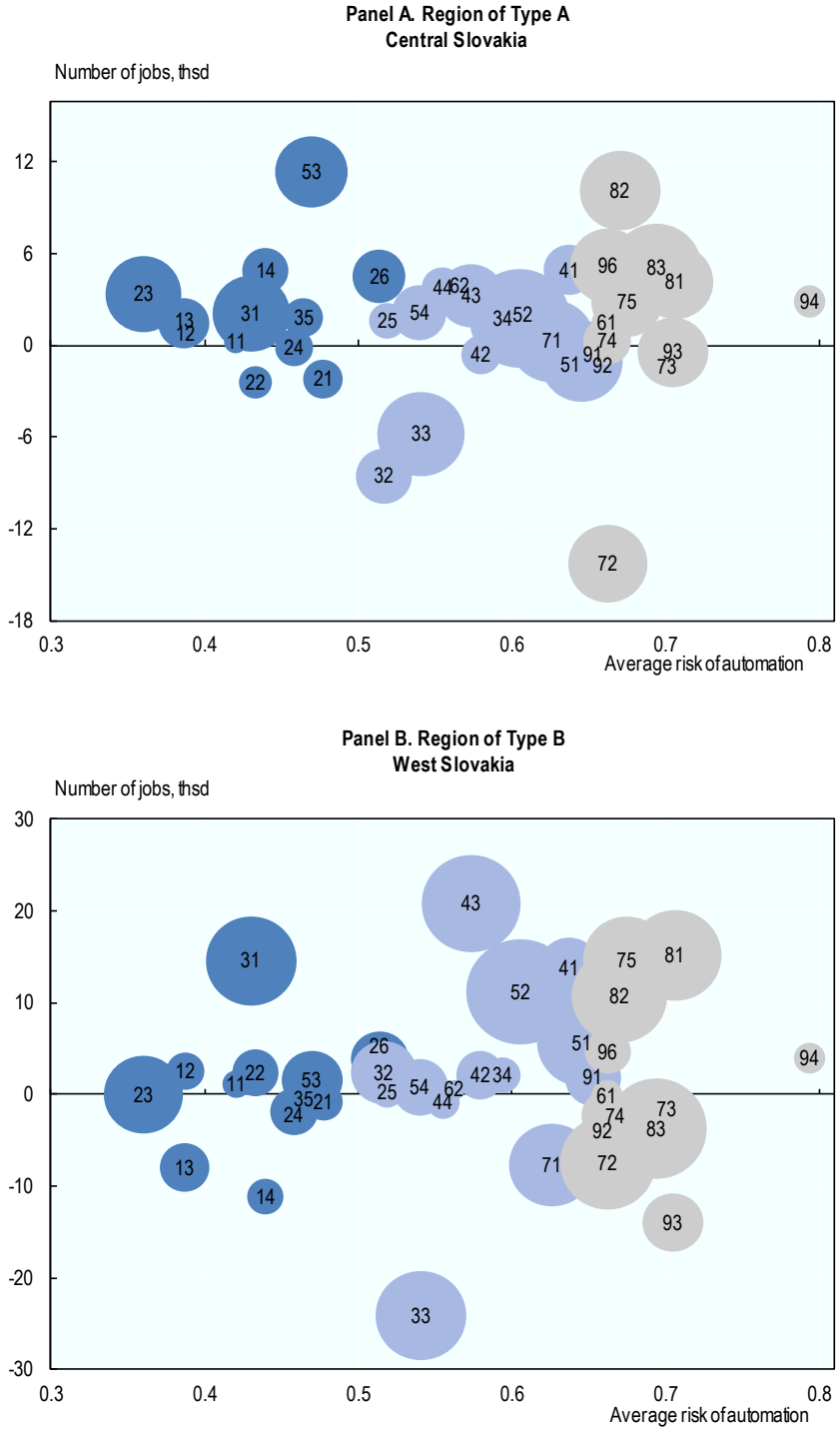
**Table 32.2. Trends in the jobs at risk of automation, Slovak Republic**

| A. Creating jobs, predominantly in less risky occupations | B. Creating jobs, predominantly in riskier occupations | C. Losing jobs, predominantly in riskier occupations | D. Losing jobs, predominantly in less risky occupations |
|---|---|---|---|
| Central Slovakia | Bratislava | | |
| | West Slovakia | | |
| | East Slovakia | | |

*Note*: Type A and Type C regions experienced an increase in the share of jobs at low risk of automation with respect to occupations at high risk of automation. Type B and Type D regions experienced an increase in the share of jobs at high risk of automation. In both Type A and Type B regions aggregate employment grew, while in the Type C and Type D regions employment declined.
*Source*: OECD Database

The detailed creation of jobs by occupation for one region per category is presented in Figure 32.2. In particular, the growth of employment in Central Slovakia was mainly driven by jobs in occupations at low risk of automation, such as Personal Care Workers (53), Hospitality, Retail and Other Services Managers (14) and Teaching Professionals (23). By contrast, job creation in the region of West Slovakia registered an increase in occupations at high risk of automation, such as Stationary Plant and Machine Operators (81), Food Processing, Woodworking, Garment and Other Craft and Related Trades Workers (75) and Assemblers (82).

**Figure 32.2. Job creation by risk of automation, selected regions, 2011-16, Slovak Republic**




*Note*: Occupations (ISCO-08 code indicated in the bubble) are ranked from low to high risk of automation along the horizontal axis. Changes in the number of jobs for each occupation are reported along the vertical axis. Bubble size represents the share of jobs in the occupation with respect to total employment in the region.
*Source*: Calculations based on EU Labour Force survey.

StatLink https://doi.org/10.1787/888933827517

# 33. Slovenia

*This profile provides an overview of labour market conditions in Slovenia, analysing trends and differences across two regions (OECD TL2 regions).*

## Overview of local labour markets

The employment and unemployment rates provide an important indication of the extent to which available labour resources are used, and can provide insights about inclusiveness. . In 2016, both the employment and the unemployment rate were in line with the OECD average (Table 33.1). While both rates seem to slowly converge towards the OECD average, long-term unemployment could be a concern for the economy. In 2016, more than half of unemployed people (55%) were on that status for more than one year; a rate considerably above the OECD average.

The two regions analysed do not display large differences. In 2016, the employment rate was 67% in West Slovenia, whereas East Slovenia displayed a rate of 64%. Similarly, the difference in terms of unemployment between the two regions is less than 2 percentage points.

**Table 33.1. Overview of national and regional labour markets, Slovenia**

| | 2015 | 2016 |
|---|---|---|
| Labour force participation rate, % | 71.8 (71.3) | 71.6 (71.7) |
| Employment rate, % | 65.2 (66.3) | 65.9 (67.0) |
| Unemployment rate (HUR), % | 9.0 (6.8) | 8.0 (6.3) |
| Long-term unemployment rate (% un.) | 52.3 (33.7) | 54.5 (30.5) |
| Regional disparities: | | |
| - Employment rate (disparity index) | 3.4 (7.5) | 3.1 (7.2) |
| - Employment rate (difference best-worst performing region) | 3.1 (15.7) | 2.9 (15.5) |
| - Unemployment rate (disparity index) | 22.7 (26.4) | 16.7 (28.0) |
| - Unemployment rate (difference best-worst performing region) | 2.9 (7.6) | 1.9 (7.8) |

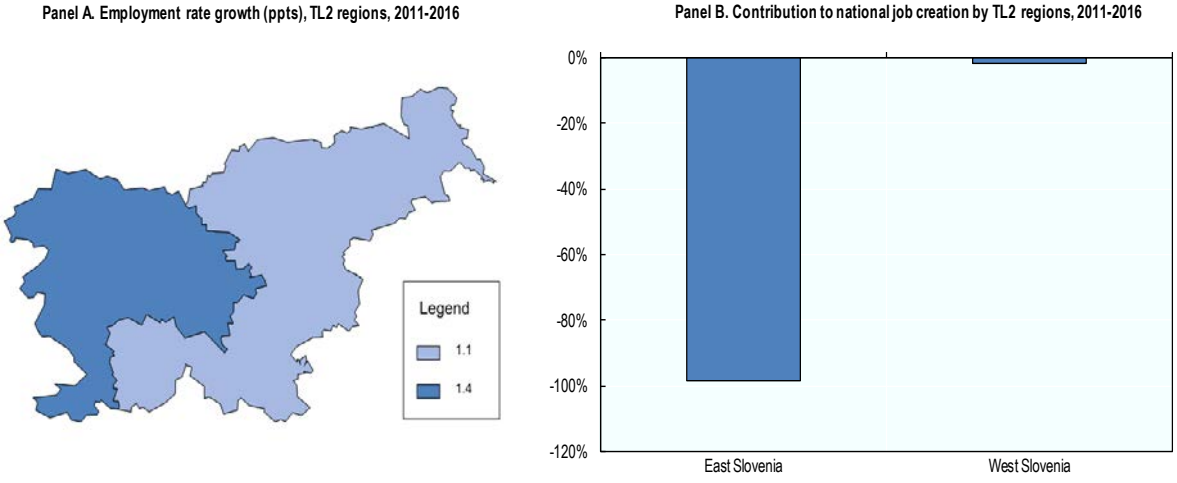
*Note*: The employment rate is calculated as the employment (15-64) at place of residence over the working age population (15-64). The unemployment rate is calculated as the unemployed over labour force (15-64). Regional disparity is measured as the standard deviation of the indicator across the TL2 regions of the country, divided by the distribution mean (i.e., coefficient of variation). The difference between the best and worst performing region is expressed in percentage values.
*Source*: OECD elaborations based on data from OECD National Accounts and OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933825959

## Trend and aggregate indicators

The employment rate of the Slovenian economy grew by 1.3 percentage points over the period 2011-16. As shown in the map in Figure 33.1, both regions experienced a similar increase.

**Figure 33.1. Regional employment growth and contribution to national employment growth, Slovenia**




Note: The growth of the employment rate is calculated as the difference between the rate in 2016 and the rate in 2011. Job creation is calculated as the difference between employment in 2016 and employment in 2011. Panel B shows the share of each region in the aggregate variation of jobs; the share of a region registering a net loss (gain) is calculated with respect of the sum of regions experiencing a net loss (gain) of jobs.
*Source:* Calculations bases on the OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933827042

Over the period 2011-16, the loss of jobs experienced by the Slovenian economy was mainly concentrated in East Slovenia.

## Jobs at risk of automation

Beside the number of jobs created (or destroyed), it is their "quality" that matters for economic development and inclusion. The analysis conducted in Chapter 1 of this report provides an indication of the share of jobs at risk of automation in the regional economy.

Over the period 2011-16, both East and West Slovenia experienced declining employment, which was mainly driven by a reduction of employment in occupations at high risk of automation –Type C in Table 33.2.

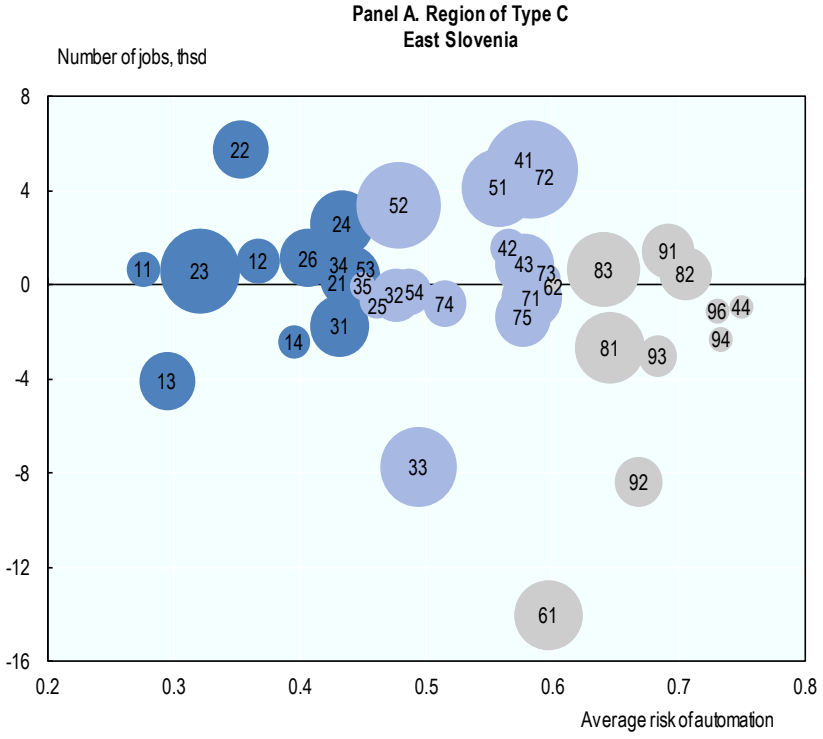
**Table 33.2. Trends in the jobs at risk of automation, Slovenia**

| A. Creating jobs, predominantly in less risky occupations | B. Creating jobs, predominantly in riskier occupations | C. Losing jobs, predominantly in riskier occupations | D. Losing jobs, predominantly in less risky occupations |
|---|---|---|---|
| | | East Slovenia | |
| | | West Slovenia | |

*Note*: Type A and Type C regions experienced an increase in the share of jobs at low risk of automation with respect to occupations at high risk of automation. Type B and Type D regions experienced an increase in the share of jobs at high risk of automation. In both Type A and Type B regions aggregate employment grew, while in the Type C and Type D regions employment declined.
*Source*: OECD elaboration.

In particular, the region of East Slovenia is shown as an example of the situation displayed by both regions in the economy. This region experienced a reduction of employment, but mainly in occupations at high risk of automation, such as Agricultural Workers (61), Labourers in Mining, Construction, Manufacturing and Transport (93) and Agricultural, Forestry and Fishery Labourers (92). In spite of the job loss in aggregate, the region of East Slovenia created jobs in occupations at low risk of automation such as Health Professionals (22) and Business and Administration professionals (24).

**Figure 33.2. Job creation by risk of automation, selected regions, 2011-16, Slovenia**




*Note:* Occupations (ISCO-08 code indicated in the bubble) are ranked from low to high risk of automation along the horizontal axis. Changes in the number of jobs for each occupation are reported along the vertical axis. Bubble size represents the share of jobs in the occupation with respect to total employment in the region.
*Source*: Calculations based on EU Labour Force survey.

StatLink https://doi.org/10.1787/888933827536

# 34. South Africa

*This profile provides an overview of labour market conditions in South Africa, analysing trends and differences across nine provinces (OECD TL2 regions).*

## Overview of local labour markets

The employment and unemployment rates provide an important indication of the extent to which available labour resources are used, and can provide insights about inclusiveness. In 2016, the employment rate in South Africa was 24 percentage points below the OECD average, while the unemployment rate was 26 points above the OECD average. This indicates the presence of a large pool of idle resources. Long-term unemployment could be a source of concern for the economy, since 59% of unemployed people were in that status for more than a year in 2016, a rate considerably higher than the OECD average.

Provinces within the country registered important differences in terms of employment rate. For instance, in 2016 the employment rate in the North West province was 53%, while in Eastern Cape was a much lower 34% (almost 20 percentage points lower). Regional disparities also exist in terms of unemployment. In 2016, the province of Free State displayed an unemployment rate of 34%, while the rate in Limpopo was 20%.

**Table 34.1. Overview of national and regional labour markets, South Africa**

| | 2015 | 2016 |
|---|---|---|
| Labour force participation rate, % | 58.5 (71.3) | 58.7 (71.7) |
| Employment rate, % | 43.7 (66.3) | 43.0 (67.0) |
| Unemployment rate (HUR), % | 25.4 (6.8) | 26.7 (6.3) |
| Long-term unemployment rate (% un.) | 57 (33.7) | 58.8 (30.5) |
| | | |
| Regional disparities: | | |
| - Employment rate (disparity index) | 16.6 | 16.0 |
| - Employment rate (difference best-worst performing region) | 20.3 | 19.5 |
| - Unemployment rate (disparity index) | 17.5 | 16.7 |
| - Unemployment rate (difference best-worst performing region) | 12.4 | 13.7 |

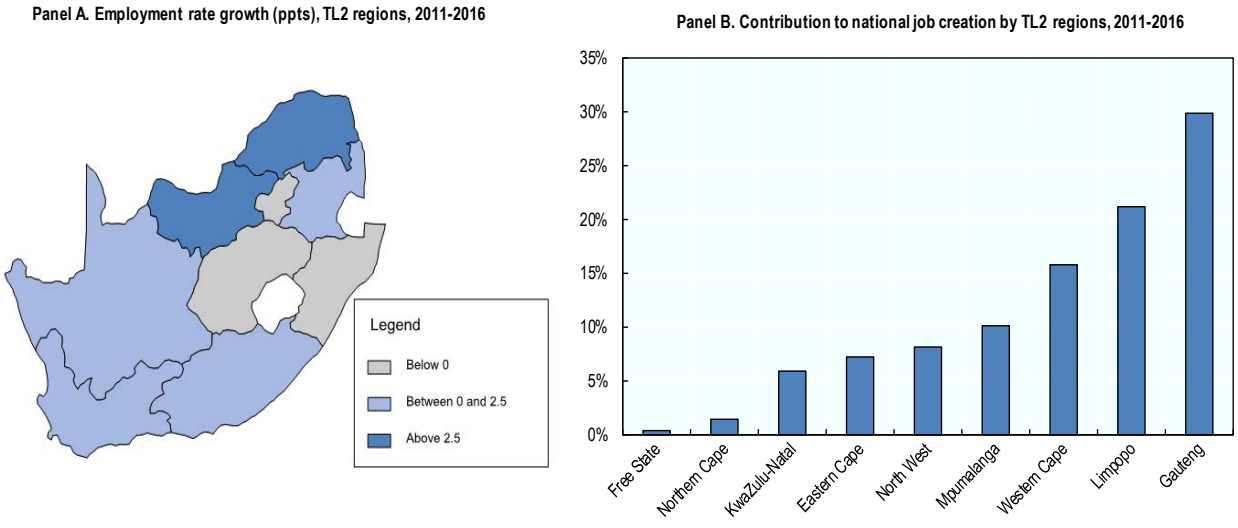
*Note*: The employment rate is calculated as the employment (15-64) at place of residence over the working age population (15-64). The unemployment rate is calculated as the unemployed over labour force (15-64). Regional disparity is measured as the standard deviation of the indicator across the TL2 regions of the country, divided by the distribution mean (i.e., coefficient of variation). The difference between the best and worst performing region is expressed in percentage values.
*Source*: OECD elaborations based on data from OECD National Accounts and OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en and Statistics South Africa (STATS SA).

StatLink https://doi.org/10.1787/888933825978

## Trend and aggregate indicators

The employment rate in South Africa grew by 1.1 percentage point over the period 2011-16. This aggregate performance masks large differences at the provincial level as shown in the map in Figure 34.1. In particular, the employment rate declined in the provinces of KwaZulu-Natal (-1.2) and Free State (-1.1), while Limpopo, the most dynamic during this period, displayed an increase of 7.3 percentage points.

**Figure 34.1. Regional employment growth and contribution to national employment growth, South Africa**




*Note:* The growth of the employment rate is calculated as the difference between the rate in 2016 and the rate in 2011. Job creation is calculated as the difference between employment in 2016 and employment in 2011. Panel B shows the share of each region in the aggregate variation of jobs; the share of a region registering a net loss (gain) is calculated with respect of the sum of regions experiencing a net loss (gain) of jobs.
*Source*: Calculations based in data from Statistics South Africa (STATS SA).

StatLink https://doi.org/10.1787/888933827061

Over the period 2011-16, most of jobs were created in the provinces of Gauteng and Limpopo, which combined accounted for more than half (51%) of net job creation in the whole country.

## Jobs at risk of automation

Beside the number of jobs created (or destroyed), it is their "quality" that matters for economic development and inclusion. The analysis conducted in Chapter 1 of this report provides an indication of the share of jobs at risk of automation in the regional economy.

Lack of information about jobs at risk of automation prevents this type of analysis.

# 35. Spain

*This profile provides an overview of labour market conditions in Spain, analysing trends and differences across 19 regions (OECD TL2 regions).*

## Overview of local labour markets

The employment and unemployment rates provide an important indication of the extent to which available labour resources are used, and can provide insights about inclusiveness. In 2016, the employment rate was 7.4 percentage points below the OECD average, while the unemployment rate was 13.4 percentage points above the OECD average, indicating the presence of a large share of unused resources. Both rates are however slowly converging towards the OECD average. In particular, the unemployment rate decreased of about 2 percentage points between 2015 and 2016, with the share of long-term unemployment shrinking below 50% in 2016.

Regions within Spain display large differences in terms of employment rate. In some regions the employment rate in 2016 was above 65% (Madrid, Catalonia, and Balearic Islands), while in other regions it barely reached 50% (Extremadura and Andalusia). In terms of unemployment, regional differences are even more striking. In 2016, the unemployment rate in Andalusia, Extremadura and Canary Islands was above 25%, while in the region of Navarra, the Basque Country, La Rioja, and Aragon was below 15% of the labour force. All regions experienced a double digit unemployment rate in 2015 and 2016.

**Table 35.1. Overview of national and regional labour markets, Spain**

| | 2015 | 2016 |
|---|---|---|
| Labour force participation rate, % | 75.5 (71.3) | 75.4 (71.7) |
| Employment rate, % | 57.8 (66.3) | 59.6 (67.0) |
| Unemployment rate (HUR), % | 22.1 (6.8) | 19.7 (6.3) |
| Long-term unemployment rate (% un.) | 51.6 (33.7) | 48.4 (30.5) |
| Regional disparities: | | |
| - Employment rate (disparity index) | 9.3 (7.5) | 9.0 (7.2) |
| - Employment rate (difference best-worst performing region) | 16.2 (15.7) | 16.6 (15.5) |
| - Unemployment rate (disparity index) | 26.7 (26.4) | 28.8 (28.0) |
| - Unemployment rate (difference best-worst performing region) | 17.8 (7.6) | 16.5 (7.8) |

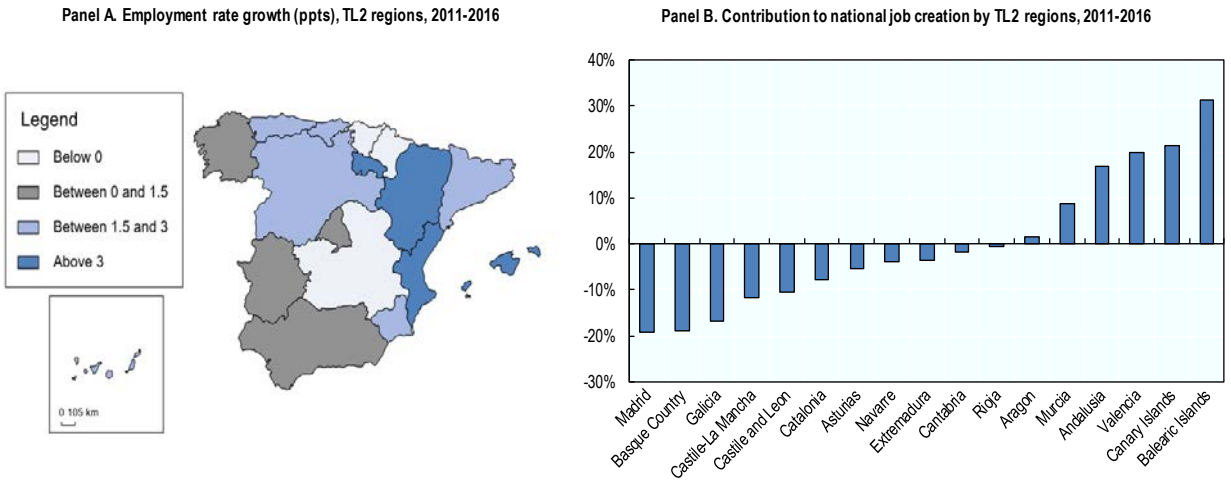
*Note*: The employment rate is calculated as the employment (15-64) at place of residence over the working age population (15-64). The unemployment rate is calculated as the unemployed over labour force (15-64). Regional disparity is measured as the standard deviation of the indicator across the TL2 regions of the country, divided by the distribution mean (i.e., coefficient of variation). The difference between the best and worst performing region is expressed in percentage values.
*Source*: OECD elaborations based on data from OECD National Accounts and OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933825997

## Trend and aggregate indicators

The employment rate of the Spanish economy grew by 1.5 percentage points over the period 2011-16. This aggregate performance masks large differences at the regional level as shown in the map in Figure 35.1. In particular, the employment rate declined in three regions: Navarra (-1.3), Basque Country (-0.5), Castile-La Mancha (-0.3). Among the most dynamic regions are Valencia, which displayed an increase in the employment rate of 3.5 percentage points, and the Balearic Islands, where the employment rate grew by 6.7 percentage points.

**Figure 35.1. Regional employment growth and contribution to national employment growth, Spain**




*Note*: The growth of the employment rate is calculated as the difference between the rate in 2016 and the rate in 2011. Job creation is calculated as the difference between employment in 2016 and employment in 2011. Panel B shows the share of each region in the aggregate variation of jobs; the share of a region registering a net loss (gain) is calculated with respect of the sum of regions experiencing a net loss (gain) of jobs.
The territories of Ceuta and Melilla are excluded from the analysis.
*Source*: Calculations bases on the OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933827080

Over the period 2011-16, most of jobs were created in the Balearic Islands and the Canary Islands, which combined accounted for more than half (52%) of net job creation in Spain. By contrast, the region of Madrid and the Basque Country registered the largest loss of jobs, more than a third (38%) of net job loss in the Spanish economy.

## Jobs at risk of automation

Beside the number of jobs created (or destroyed), it is their "quality" that matters for economic development and inclusion. The analysis conducted in Chapter 1 of this report provides an indication of the share of jobs at risk of automation in the regional economy. Over the period 2011-16, twelve regions experienced a reduction in the share of jobs at high risk of automation – Type A and Type C in Table 35.2. Still, in three regions (Aragon, Andalusia, and Murcia) most of the jobs created were in occupations at high

risk of automation, and other two regions (Castille and Leon, and Castille-La Mancha) registered a large loss of jobs at low risk of automation.

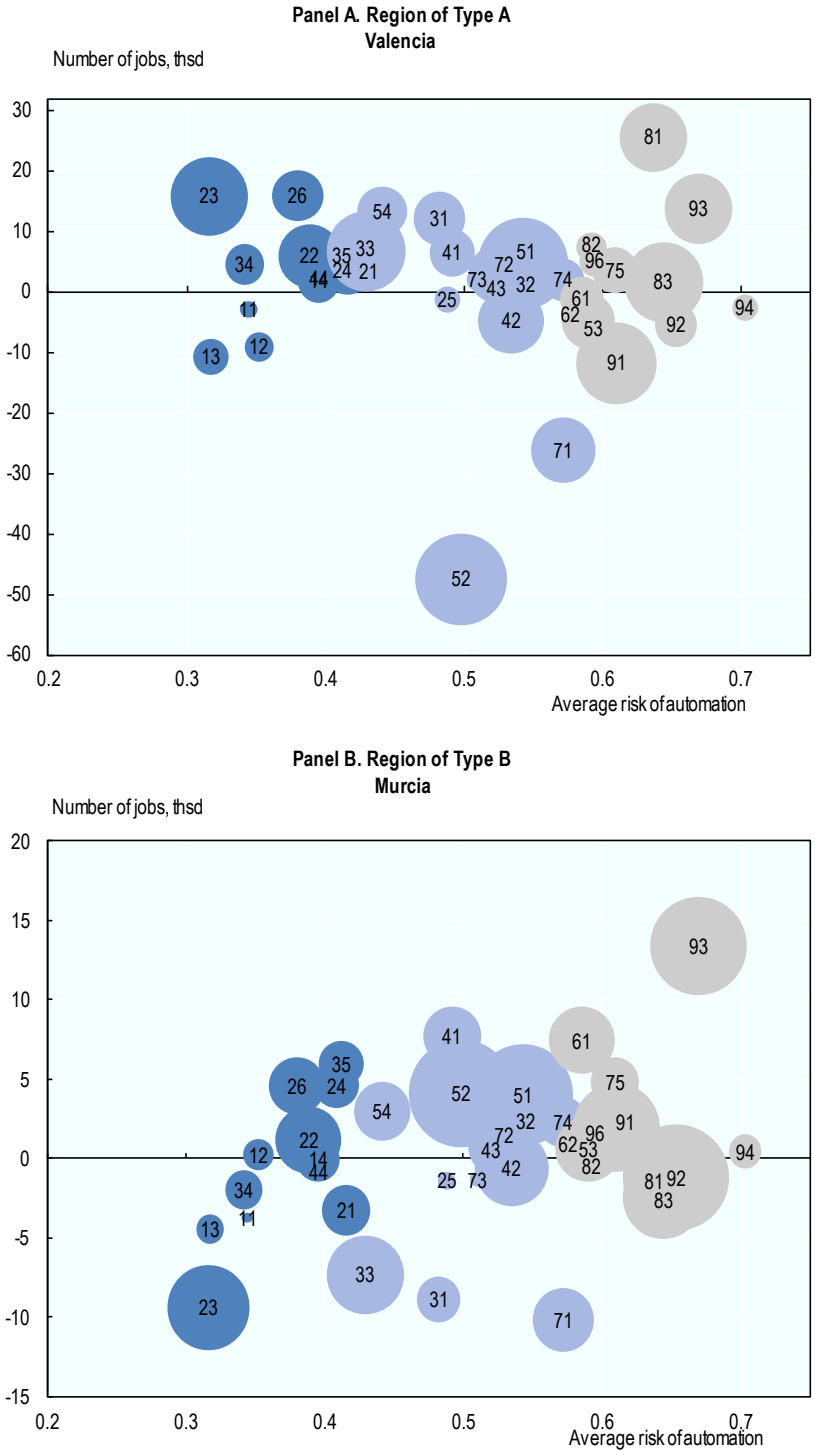
**Table 35.2. Trends in the jobs at risk of automation, Spain**

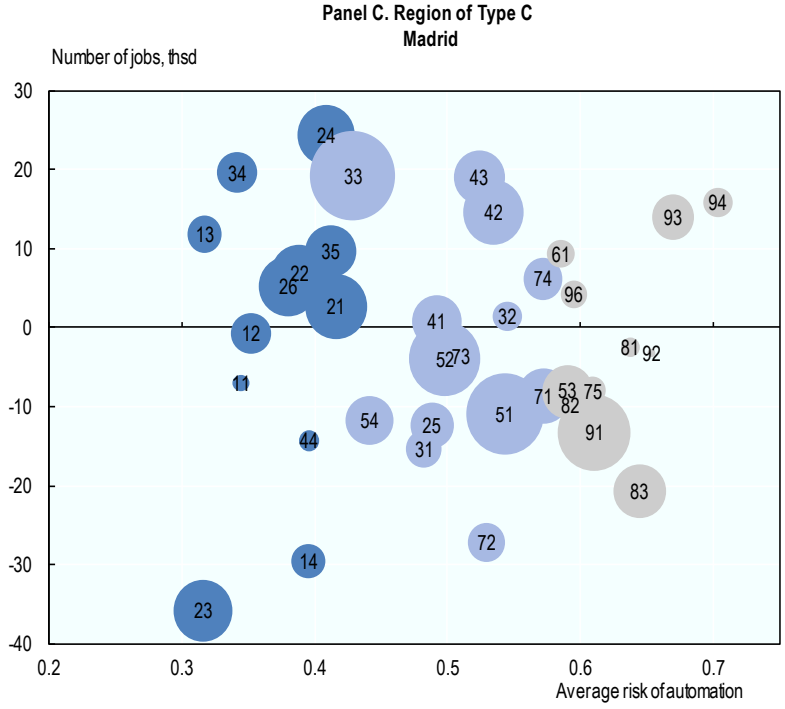
| A. Creating jobs, predominantly in less risky occupations | B. Creating jobs, predominantly in riskier occupations | C. Losing jobs, predominantly in riskier occupations | D. Losing jobs, predominantly in less risky occupations |
|---|---|---|---|
| Valencia | Aragon | Galicia | Castile and Leon |
| Balearic Islands | Andalusia | Asturias | Castile-La Mancha |
| Canary Islands | Murcia | Cantabria | |
| | | Basque Country | |
| | | Navarre | |
| | | Rioja | |
| | | Madrid | |
| | | Extremadura | |
| | | Catalonia | |

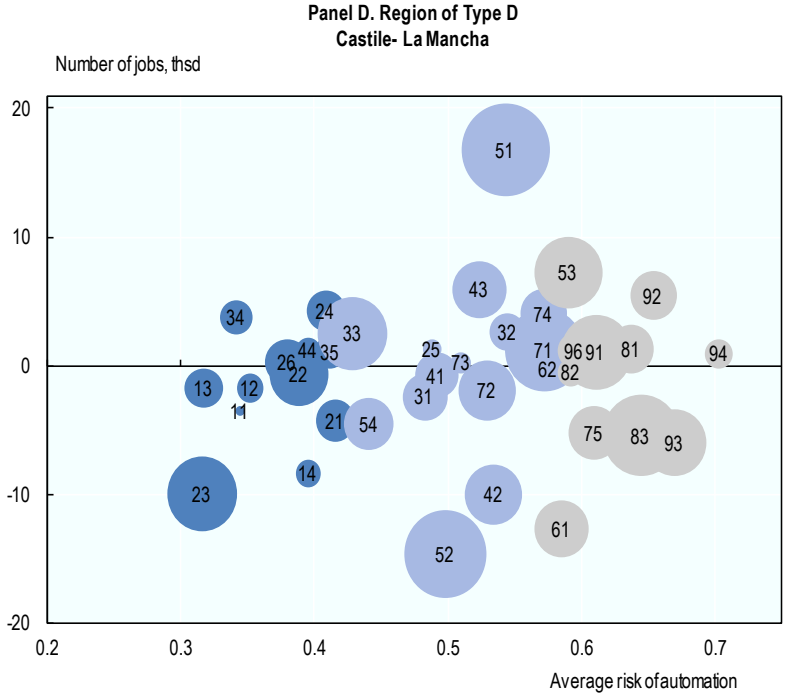
*Note*: Type A and Type C regions experienced an increase in the share of jobs at low risk of automation with respect to occupations at high risk of automation. Type B and Type D regions experienced an increase in the share of jobs at high risk of automation. In both Type A and Type B regions aggregate employment grew, while in the Type C and Type D regions employment declined.
Regions of Ceuta and Melilla are excluded.
*Source*: OECD Database

The detailed creation of jobs by occupation for one region per category is presented in Figure 35.2. In particular, the growth of employment in the region of Valencia was mainly driven by jobs in occupations at low risk of automation (e.g., Health professionals (22), Teaching professionals (23), Legal, Social and Cultural Professionals (26), Legal, Social, Cultural and Related Associate Professionals (34)). A similar picture emerges for the region of Madrid, where the largest number of jobs created was in occupations related to Business and Administration Professionals (24), and Associate Professionals in Legal, Social, and Cultural Activities (34). By contrast, the Region of Murcia registered a large increase in jobs in occupations at high risk of automation, such as Labourer in Construction, Manufacturing and Transports (93), while the largest drop was registered among Teaching Professionals (23). Finally, the reduction of employment in Castile-La Mancha was mainly driven by losses in occupations at low risk of automation, such as managers (13 and 14), and teaching professionals (23).

**Figure 35.2. Job creation by risk of automation, selected regions, 2011-16, Spain**






*Note:* Occupations (ISCO-08 code indicated in the bubble) are ranked from low to high risk of automation along the horizontal axis. Changes in the number of jobs for each occupation are reported along the vertical axis. Bubble size represents the share of jobs in the occupation with respect to total employment in the region.
*Source*: Calculations based on EU Labour Force survey.

StatLink https://doi.org/10.1787/888933827555

# 36. Sweden

*This profile provides an overview of labour market conditions in Sweden, analysing trends and differences across eight regions (OECD TL2 regions).*

## Overview of local labour markets

The employment and unemployment rates provide an important indication of the extent to which available labour resources are used, and can provide insights about inclusiveness. In 2016, the employment rate was 9.2 percentage points above the OECD average, whereas the unemployment rate was similar to the average. Both rates remained stable between 2015 and 2016. In addition, the long-term unemployment in Sweden is considerably lower than the OECD average; it was 16.8% in 2016 compared to an OECD average of 30.5%.

Regions within the country display low asymmetry. In 2016, the employment rate in Stockholm was 79%, and in North-Central Sweden, the region with the lowest rate, was a similarly high 74%. In terms of unemployment, regional disparities are also small. The difference between South Sweden (8.7%) and Upper Norrland (6.1%), the regions with the highest and the lowest rates, is considerably lower than average regional difference across OECD countries.

**Table 36.1. Overview of national and regional labour markets, Sweden**

| | 2015 | 2016 |
|---|---|---|
| Labour force participation rate, % | 81.7 (71.3) | 82 (71.7) |
| Employment rate, % | 75.5 (66.3) | 76.2 (67.0) |
| Unemployment rate (HUR) , % | 7.4 (6.8) | 7.0 (6.3) |
| Long-term unemployment rate (% un.) | 17.6 (33.7) | 16.8 (30.5) |
| Regional disparities: | | |
| - Employment rate (disparity index) | 2.6 (7.5) | 2.6 (7.2) |
| - Employment rate (difference best-worst performing region) | 5.2 (15.7) | 5.0 (15.5) |
| - Unemployment rate (disparity index) | 14.1 (26.4) | 12.3 (28.0) |
| - Unemployment rate (difference best-worst performing region) | 3.6 (7.6) | 2.6 (7.8) |

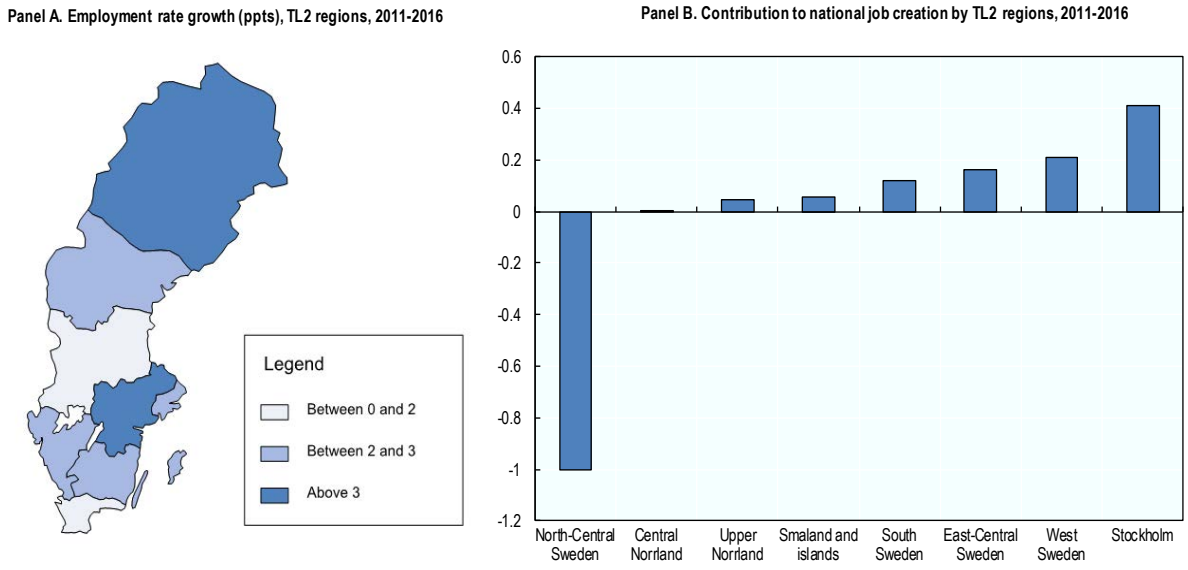
*Note*: The employment rate is calculated as the employment (15-64) at place of residence over the working age population (15-64). The unemployment rate is calculated as the unemployed over labour force (15-64). Regional disparity is measured as the standard deviation of the indicator across the TL2 regions of the country, divided by the distribution mean (i.e., coefficient of variation). The difference between the best and worst performing region is expressed in percentage values.
*Source*: OECD elaborations based on data from OECD National Accounts and OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933826016

## Trend and aggregate indicators

The employment rate of the Swedish economy grew by 2.5 percentage points over the period 2011-16. Although the employment rate grew in all regions, there are regional differences, as shown in the map in Figure 36.1. Upper Norrland, the most dynamic region during this period, displayed a growth of almost 5 percentage points. In contrast, the increase was less pronounced in the region of North-Central Sweden, where the employment rate barely grew (0.8 percentage points).

**Figure 36.1. Regional employment growth and contribution to national employment growth, Sweden**




Note: The growth of the employment rate is calculated as the difference between the rate in 2016 and the rate in 2011. Job creation is calculated as the difference between employment in 2016 and employment in 2011. Panel B shows the share of each region in the aggregate variation of jobs; the share of a region registering a net loss (gain) is calculated with respect of the sum of regions experiencing a net loss (gain) of jobs.
*Source:* Calculations bases on the OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933827099

## Jobs at risk of automation

Beside the number of jobs created, it is the quality of jobs that matters for economic development and inclusion. The analysis conducted in Chapter 1 of this report provides an indication of share of jobs at risk of automation in the regional economy.

Over the period 2011-16, all Swedish regions experienced a reduction of the share of jobs at high risk of automation – Type A and Type C in Table 36.2. North-Central Sweden is the only region that experienced an aggregate loss of jobs over the period, but it was mainly driven by reduction of employment in occupations at high risk of automation (Type C in Table 36.2).

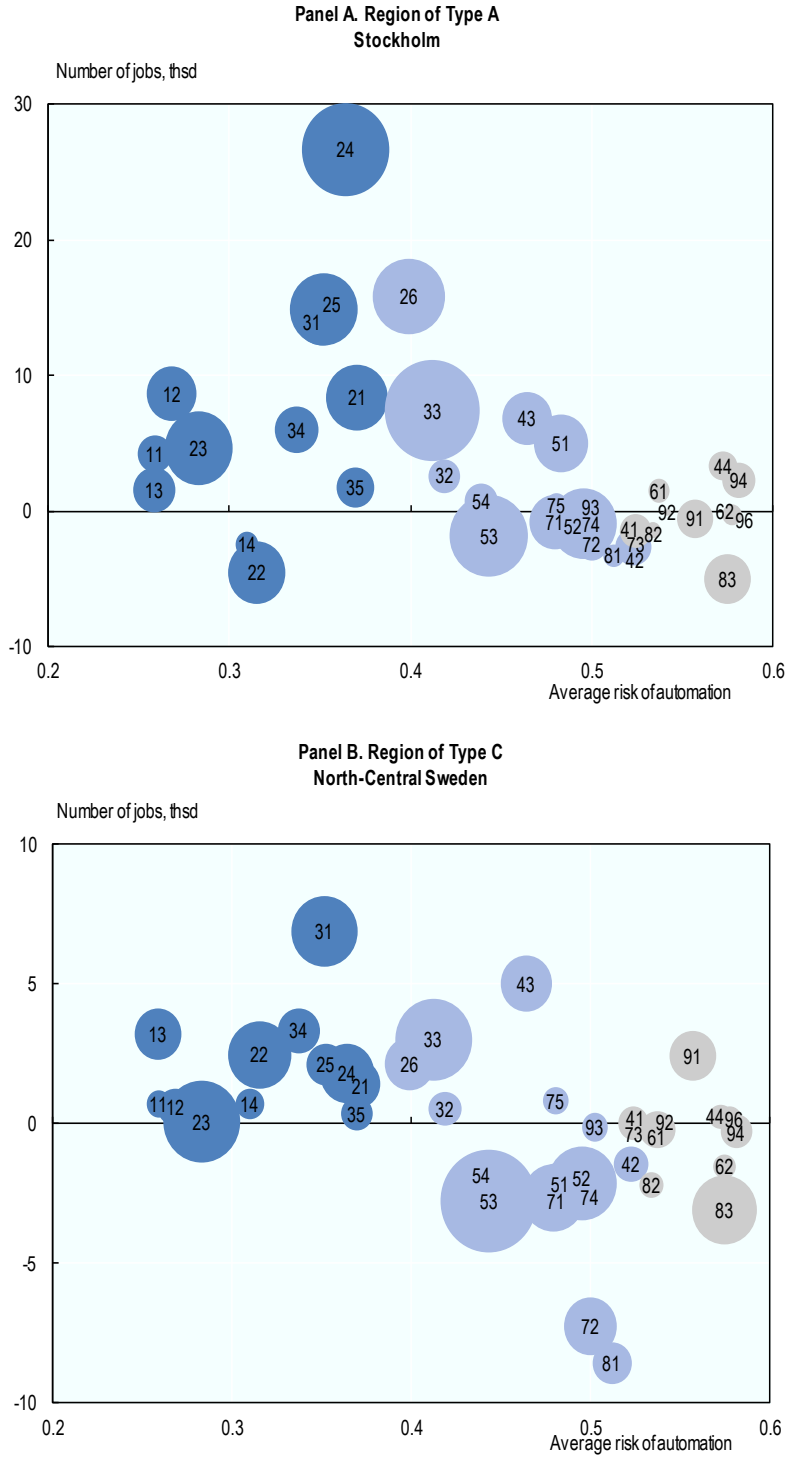
**Table 36.2. Trends in the jobs at risk of automation, Sweden**

| A. Creating jobs, predominantly in less risky occupations | B. Creating jobs, predominantly in riskier occupations | C. Losing jobs, predominantly in riskier occupations | D. Losing jobs, predominantly in less risky occupations |
|---|---|---|---|
| Stockholm | | North-Central Sweden | |
| East-Central Sweden | | | |
| Smaland and islands | | | |
| South Sweden | | | |
| West Sweden | | | |
| Central Norrland | | | |
| Upper Norrland | | | |

*Note*: Type A and Type C regions experienced an increase in the share of jobs at low risk of automation with respect to occupations at high risk of automation. Type B and Type D regions experienced an increase in the share of jobs at high risk of automation. In both Type A and Type B regions aggregate employment grew, while in the Type C and Type D regions employment declined.
*Source*: OECD Database

The detailed creation of jobs by occupation for one region per category is presented in Figure 36.2. In particular, the employment growth in the region of Stockholm was mainly due to occupations at low risk of automation, such as Business and Administration Professionals (24) and Information and Communications Technology Professionals (25). At the same time, jobs in occupations such as Drivers and Mobile Plant Operators (83) declined. A similar picture emerges for the region of North-Central Sweden, which experienced a reduction of employment, but mainly in occupations at high risk of automation, such as Assemblers (82) and Drivers and Mobile Plant Operators (83) and . In fact, while losing jobs in aggregate, this region created jobs in occupations at low risk of automation, such as Science and Engineering Associate Professionals (31) and Health Professionals (22).

**Figure 36.2. Job creation by risk of automation, selected regions, 2011-16, Sweden**




*Note:* Occupations (ISCO-08 code indicated in the bubble) are ranked from low to high risk of automation along the horizontal axis. Changes in the number of jobs for each occupation are reported along the vertical axis. Bubble size represents the share of jobs in the occupation with respect to total employment in the region.
*Source*: Calculations based on EU Labour Force survey.

StatLink https://doi.org/10.1787/888933827574

# 37. Switzerland

*This profile provides an overview of labour market conditions in Switzerland, analysing trends and differences across seven regions (OECD TL2 regions).*

## Overview of local labour markets

The employment and unemployment rates provide an important indication of the extent to which available labour resources are used, and can provide insights about inclusiveness. In 2016, Switzerland displayed an employment rate of 12.6 percentage points above the OECD average and an unemployment rate of 1.4 percentage points below the average. Still, long-term unemployment might be a source of concern for the economy, since 39% of unemployed people were unemployed for more than one year, a rate nine percentage points above than the OECD average.

In 2016, regions within Switzerland displayed less asymmetry than the average regional disparity across OECD countries, in terms of employment rate. Indeed, the rate in Central Switzerland was 83%, while the employment rate in the region of Lake Geneva was a similar 81%. Still regions differ in terms of unemployment, with the lowest rate registered in the region of Central Switzerland (3.5%), and the highest rate in the Lake Geneva region (7.8%).

**Table 37.1. Overview of national and regional labour markets, Switzerland**

| | 2015 | 2016 |
|---|---|---|
| Labour force participation rate, % | 83.3 (71.3) | 83.9 (71.7) |
| Employment rate, % | 79.2 (66.3) | 79.6 (67.0) |
| Unemployment rate (HUR), % | 4.8 (6.8) | 4.9 (6.3) |
| Long-term unemployment rate (% un.) | 39.6 (33.7) | 39.4 (30.5) |
| | | |
| Regional disparities: | | |
| - Employment rate (disparity index) | 6.4 (7.5) | 6.3 (7.2) |
| - Employment rate (difference best-worst performing region) | 12.2 (15.7) | 12.3 (15.5) |
| - Unemployment rate (disparity index) | 32.1 (26.4) | 31.6 (28.0) |
| - Unemployment rate (difference best-worst performing region) | 4.2 (7.6) | 4.3 (7.8) |

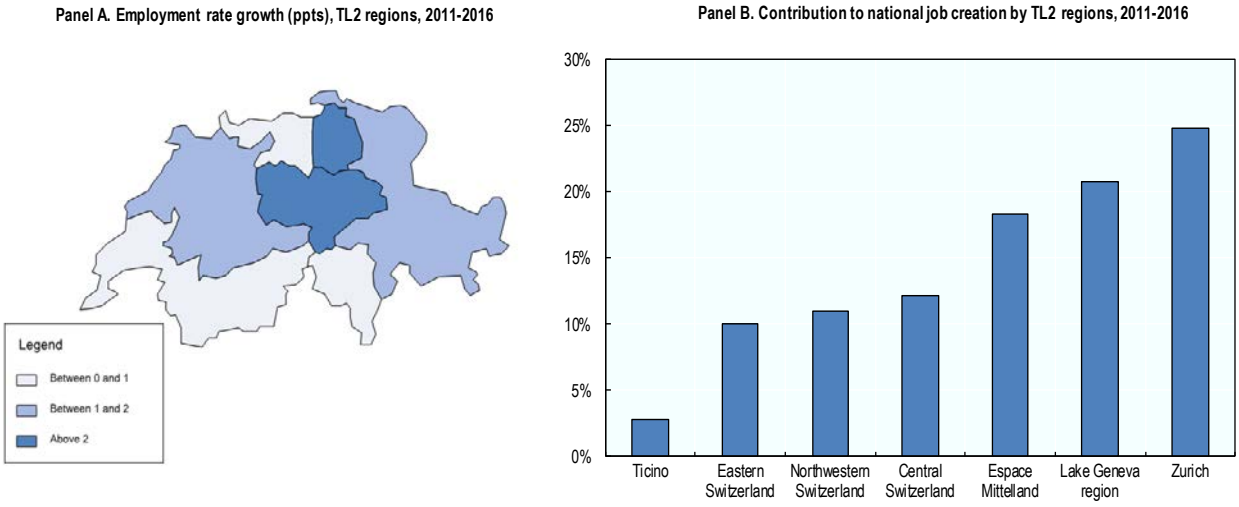
*Note*: The employment rate is calculated as the employment (15-64) at place of residence over the working age population (15-64). The unemployment rate is calculated as the unemployed over labour force (15-64). Regional disparity is measured as the standard deviation of the indicator across the TL2 regions of the country, divided by the distribution mean (i.e., coefficient of variation). The difference between the best and worst performing region is expressed in percentage values.
*Source*: OECD elaborations based on data from OECD National Accounts and OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933826035

## Trend and aggregate indicators

The employment rate of the Swiss economy grew by 1.1 percentage points over the period 2011-16. Although the employment rate grew in all regions, differences remain across regions, as shown in the map in Figure 37.1. For instance, Central Switzerland, the most dynamic region during this period, grew by 2.5 percentage points. The increase was less pronounced in the regions of Ticino and Lake Geneva, which barely grew (0.4 percentage points).

**Figure 37.1. Regional employment growth and contribution to national employment growth, Switzerland**




*Note:* The growth of the employment rate is calculated as the difference between the rate in 2016 and the rate in 2011. Job creation is calculated as the difference between employment in 2016 and employment in 2011. Panel B shows the share of each region in the aggregate variation of jobs; the share of a region registering a net loss (gain) is calculated with respect of the sum of regions experiencing a net loss (gain) of jobs.
*Source:* Calculations bases on the OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933827118

Over the period 2011-16, all regions experienced an increase of employment, as shown in Panel B of Figure 37.1. However, job creation was mainly concentrated in Zurich and the Lake Geneva region, together accounting for 46% of net job creation in the Swiss economy.

## Jobs at risk of automation

Beside the number of jobs created (or destroyed), it is their "quality" that matters for economic development and inclusion. The analysis conducted in Chapter 1 of this report provides an indication of the share of jobs at risk of automation in the regional economy.

Lack of information about jobs at risk of automation prevents this type of analysis.

# 38. Turkey

*This profile provides an overview of labour market conditions in Turkey, analysing trends and differences across 26 regions (OECD TL2 regions).*

## Overview of local labour markets

The employment and unemployment rates provide an important indication of the extent to which available labour resources are used, and can provide insights about inclusiveness. In 2016, the employment rate was 16.3 percentage points below the OECD average while the unemployment rate was 4.6 percentage points above the average, indicating the presence of a large pool of idle resources. Long-term unemployment is however below the OECD average. In 2016, it was 20.6% against an OECD average of about 30%.

In 2016, regions within Turkey registered large differences in terms of employment rate, significantly higher than the average regional disparity in OECD countries. For instance, the employment rate in the regions of Kastamonu and Tekirdag was 58% and 56% respectively, while in the region of Mardin was a much lower 29%. In terms of unemployment, regional differences are even more striking. In 2016, the unemployment rate in Mardin was above 28%, while in the regions of Trabzon, Agri and Manisa, the rate was just 5% of the labour force.

**Table 38.1. Overview of national and regional labour markets, Turkey**

| | 2015 | 2016 |
|---|---|---|
| Labour force participation rate, % | 56.1 (71.3) | 57 (71.7) |
| Employment rate, % | 50.2 (66.3) | 50.7 (67.0) |
| Unemployment rate (HUR) , % | 10.3 (6.8) | 10.9 (6.3) |
| Long-term unemployment rate (% un.) | 21.2 (33.7) | 20.6 (30.5) |
| | | |
| Regional disparities: | | |
| - Employment rate (disparity index) | 12.6 (7.5) | 12.5 (7.2) |
| - Employment rate (difference best-worst performing region) | 26.7 (15.7) | 28.3 (15.5) |
| - Unemployment rate (disparity index) | 47.7 (26.4) | 48.7 (28.0) |
| - Unemployment rate (difference best-worst performing region) | 20.8 (7.6) | 23.5 (7.8) |

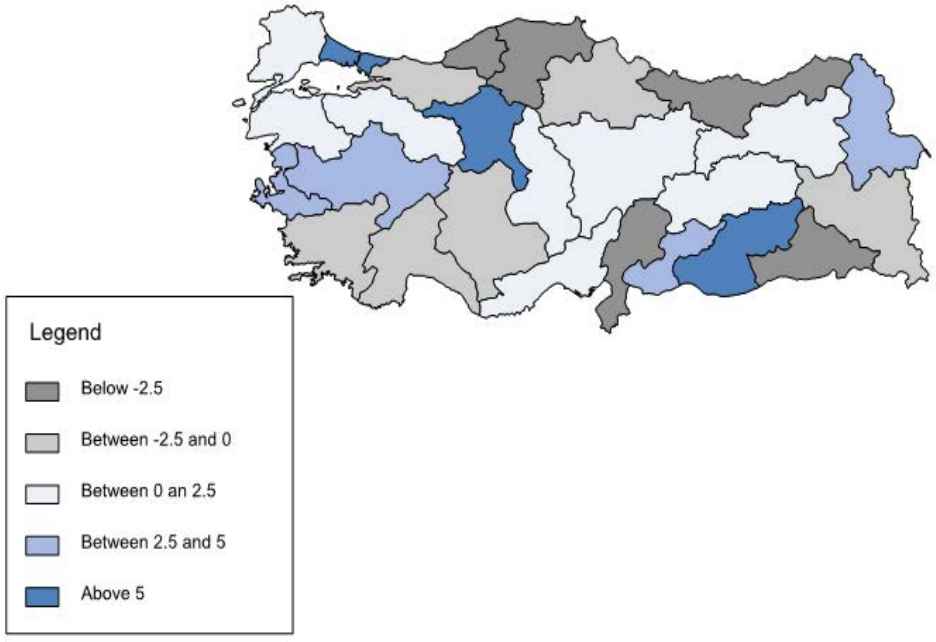
*Note*: The employment rate is calculated as the employment (15-64) at place of residence over the working age population (15-64). The unemployment rate is calculated as the unemployed over labour force (15-64). Regional disparity is measured as the standard deviation of the indicator across the TL2 regions of the country, divided by the distribution mean (i.e., coefficient of variation). The difference between the best and worst performing region is expressed in percentage values.
*Source*: OECD elaborations based on data from OECD National Accounts and OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933826054

## Trend and aggregate indicators

The employment rate of the Turkish economy grew by 1.5 percentage points over the period 2011-16. This aggregate performance masks large differences at the regional level as shown in the map in Figure 38.1. In particular, the decline in the employment rate was more pronounced in three regions: Zonguldak (-7), Kastamonu (-3.5) and Hatay (-3.4). Among the most dynamic regions are Istanbul, which displayed an increase in the employment rate of 8.4 percentage points, and Sanliurfa, where the employment rate grew by 7.5 percentage points.

**Figure 38.1. Regional employment rate growth (ppts), TL2 regions, 2011-2016, Turkey**

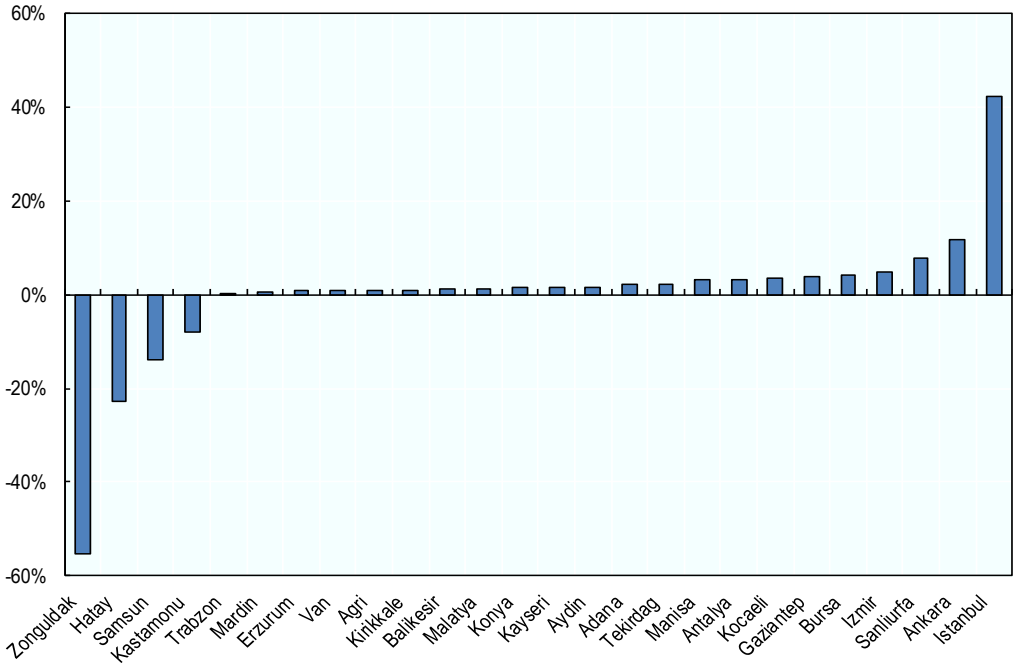



*Note:* The growth of the employment rate is calculated as the difference between the rate in 2016 and the rate in 2011.
*Source:* Calculations bases on the OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933827137

Over the period 2011-16, most of jobs were created in the regions of Istanbul and Ankara, which combined accounted for more than half (54%) of net job creation in Turkey (Figure 38.2). By contrast, the region of Zonguldak registered the largest loss of jobs, which represented 55% of net job decline in the Turkish economy.

**Figure 38.2. Contribution to national job creation by TL2 regions, 2011-2016, Turkey**




*Note:* Job creation is calculated as the difference between employment in 2016 and employment in 2011.
Bar charts show the share of each region in the aggregate variation of jobs; the share of a region registering a net loss (gain) is calculated with respect of the sum of regions experiencing a net loss (gain) of jobs.
*Source:* Calculations bases on the OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933827593

## Jobs at risk of automation

Beside the number of jobs created (or destroyed), it is their "quality" that matters for economic development and inclusion. The analysis conducted in Chapter 1 of this report provides an indication of the share of jobs at risk of automation in the regional economy.

Lack of information about jobs at risk of automation prevents this type of analysis.

# 39. United Kingdom

*This profile provides an overview of labour market conditions in the United Kingdom, analysing trends and differences across 12 regions (OECD TL2 regions).*

## Overview of local labour markets

The employment and unemployment rates provide an important indication of the extent to which available labour resources are used, and can provide insights about inclusiveness. In 2016, the employment rate in the United Kingdom was 6.5 percentage points above the OECD average. By contrast, the unemployment rate was lower, although very close, to the average (1.5 percentage points below). The long-term unemployment rate is also lower than the OECD average. In 2016, about 27% of unemployed people were in that status for more than one year (5 percentage points below the OECD average rate).

Nations and regions within the UK displayed less asymmetry than the average regional disparity across OECD countries. In 2016, the employment rate in South East (England) was 75%, while the lowest rate was registered in Northern Ireland (68%). In terms of unemployment, disparities are also weak. The difference between North East England (8.7%) and South East England (3.7%), the regions with the highest and the lowest rates respectively, is considerably lower than the OECD average.

**Table 39.1. Overview of national and regional labour markets, United Kingdom**

| | 2015 | 2016 |
|---|---|---|
| Labour force participation rate, % | 77.6 (71.3) | 78.2 (71.7) |
| Employment rate, % | 72.7 (66.3) | 73.5 (67.0) |
| Unemployment rate (HUR), % | 5.3 (6.8) | 4.8 (6.3) |
| Long-term unemployment rate (% un.) | 30.7 (33.7) | 27.2 (30.5) |
| Regional disparities: | | |
| - Employment rate (disparity index) | 4.1 (7.5) | 3.5 (7.2) |
| - Employment rate (difference best-worst performing region) | 8.8 (15.7) | 8.0 (15.5) |
| - Unemployment rate (disparity index) | 21.1 (26.4) | 19.4 (28.0) |
| - Unemployment rate (difference best-worst performing region) | 4.2 (7.6) | 3.5 (7.8) |

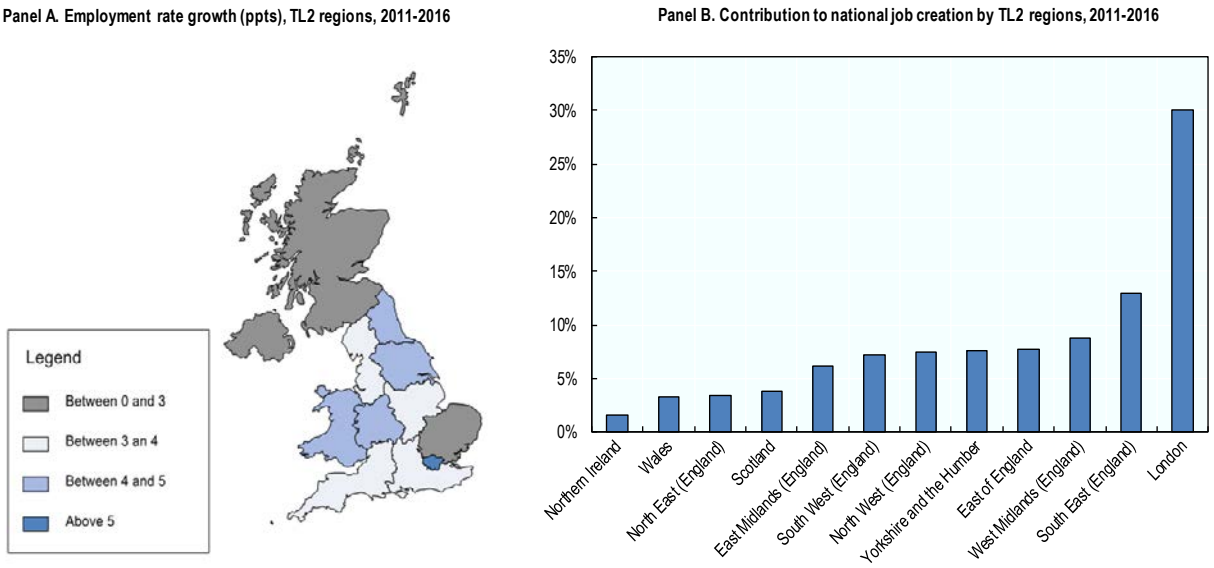
*Note*: The employment rate is calculated as the employment (15-64) at place of residence over the working age population (15-64). The unemployment rate is calculated as the unemployed over labour force (15-64). Regional disparity is measured as the standard deviation of the indicator across the TL2 regions of the country, divided by the distribution mean (i.e., coefficient of variation). The difference between the best and worst performing region is expressed in percentage values.
*Source*: OECD elaborations based on data from OECD National Accounts and OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933826073

## Trend and aggregate indicators

The employment rate of the United Kingdom grew by 4 percentage points over the period 2011-16. Although the employment rate grew in all nations and regions, geographical differences remain, as shown in the map in Figure 39.1. London, the most dynamic region during this period, displayed a growth of 6.2 percentage points. By contrast, the increase was less pronounced in Northern Ireland and Scotland, where the employment rate grew by 2.2 and 2.4 percentage points respectively.

**Figure 39.1. National and regional employment growth and contribution to UK employment growth**




*Note:* The growth of the employment rate is calculated as the difference between the rate in 2016 and the rate in 2011. Job creation is calculated as the difference between employment in 2016 and employment in 2011. Panel B shows the share of each region in the aggregate variation of jobs; the share of a region registering a net loss (gain) is calculated with respect of the sum of regions experiencing a net loss (gain) of jobs.
*Source*: Calculations bases on OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933827156

Over the period 2011-16, the creation of jobs was mainly concentrated in London, followed by South East England, together accounting for about 43% of net job creation in the UK (Figure 39.1, Panel B).

## Jobs at risk of automation

Beside the number of jobs created (or destroyed), it is their "quality" that matters for economic development and inclusion. The analysis conducted in Chapter 1 of this report provides an indication of the share of jobs at risk of automation in the regional economy.

Over the period 2011-16, 11 nations and regions experienced a reduction in the share of jobs at high risk of automation – Type A in Table 39.2. Still, in Northern Ireland most of the jobs created were in occupations at high risk of automation (Type B).

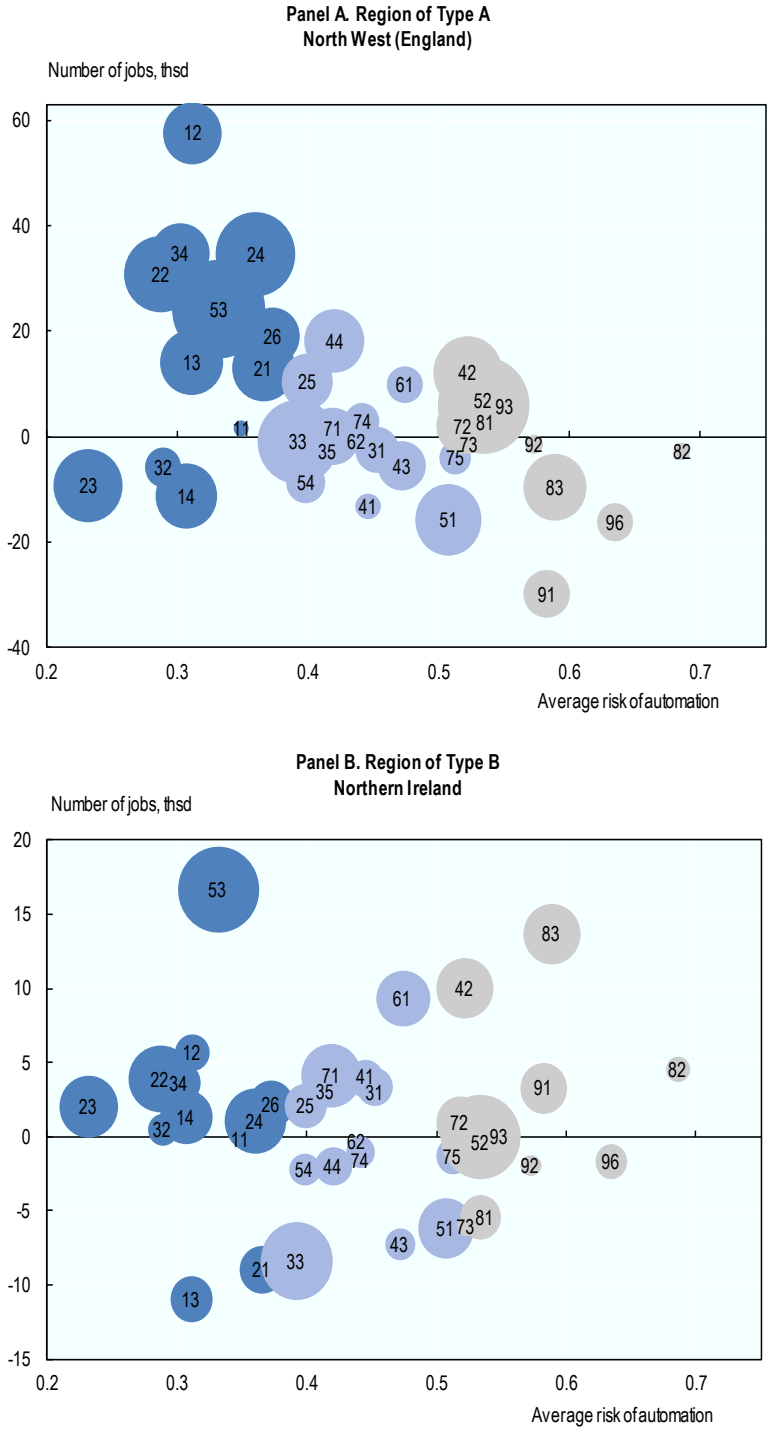
**Table 39.2. Trends in the jobs at risk of automation, United Kingdom**

| A. Creating jobs, predominantly in less risky occupations | B. Creating jobs, predominantly in riskier occupations | C. Losing jobs, predominantly in riskier occupations | D. Losing jobs, predominantly in less risky occupations |
|---|---|---|---|
| North East (England) | Northern Ireland | | |
| North West (England) | | | |
| Yorkshire and the Humber | | | |
| East Midlands (England) | | | |
| West Midlands (England) | | | |
| East of England | | | |
| London | | | |
| South East (England) | | | |
| South West (England) | | | |
| Wales | | | |
| Scotland | | | |

*Note*: Type A and Type C regions experienced an increase in the share of jobs at low risk of automation with respect to occupations at high risk of automation. Type B and Type D regions experienced an increase in the share of jobs at high risk of automation. In both Type A and Type B regions aggregate employment grew, while in the Type C and Type D regions employment declined.
*Source*: OECD calculations

The detailed creation of jobs by occupation for one region per category is presented in Figure 39.2. In particular, the growth of employment in North West England was mainly driven by jobs in occupations at low risk of automation, such as Administrative and Commercial Managers (12), Business and Administration Professionals (24) and Legal, Social, Cultural and Related Associate Professionals (34), displaying also a drop in high-risk occupations, such as Cleaners and Helpers (91). In contrast, Northern Ireland registered an increase of jobs in occupations at high risk of automation, such as Drivers and Mobile Plant Operators (83), Customer Services Clerks (42) and Assemblers (82).

**Figure 39.2. Job creation by risk of automation, selected nations and regions, 2011-16, United Kingdom**




*Note:* Occupations (ISCO-08 code indicated in the bubble) are ranked from low to high risk of automation along the horizontal axis. Changes in the number of jobs for each occupation are reported along the vertical axis. Bubble size represents the share of jobs in the occupation with respect to total employment in the region.
*Source*: OECD calculations based on EU Labour Force survey.

StatLink https://doi.org/10.1787/888933827612

# 40. United States

*This profile provides an overview of labour market conditions in the United States, analysing trends and differences across 50 states and the District of Columbia (OECD TL2 regions).*

## Overview of local labour markets

The employment and unemployment rates provide an important indication of the extent to which available labour resources are used, and can provide insights about inclusiveness. In 2016, the United States displayed an employment rate similar to the OECD average. The unemployment rate was slightly below the average; while the long-term unemployment rate is considerably lower than the OECD level (17.2 percentage points below the average).

In 2016, states within the United States displayed large differences in terms of employment. The difference between the employment rate in North Dakota and West Virginia, the states with the highest and the lowest rate respectively, was above 18 percentage points. The disparity in terms of unemployment is, however, less remarked than the OECD average, with a difference of almost four percentage points between the highest unemployment rate (New Mexico) and the lowest (South Dakota).

**Table 40.1. Overview of national and regional labour markets, United States**

| | 2015 | 2016 |
|---|---|---|
| Labour force participation rate, % | 72.6 (71.3) | 73 (71.7) |
| Employment rate, % | 68.7 (66.3) | 69.4 (67.0) |
| Unemployment rate (HUR), % | 5.3 (6.8) | 4.9 (6.3) |
| Long-term unemployment rate (% un.) | 18.7 (33.7) | 13.3 (30.5) |
| Regional disparities: | | |
| - Employment rate (disparity index) | 7.4 (7.5) | 7.1 (7.2) |
| - Employment rate (difference best-worst performing state) | 18.4 (15.7) | 18.0 (15.5) |
| - Unemployment rate (disparity index) | 21.4 (26.4) | 21.1 (28.0) |
| - EMP rate (difference best-worst performing state) | 4.1 (7.6) | 3.9 (7.8) |

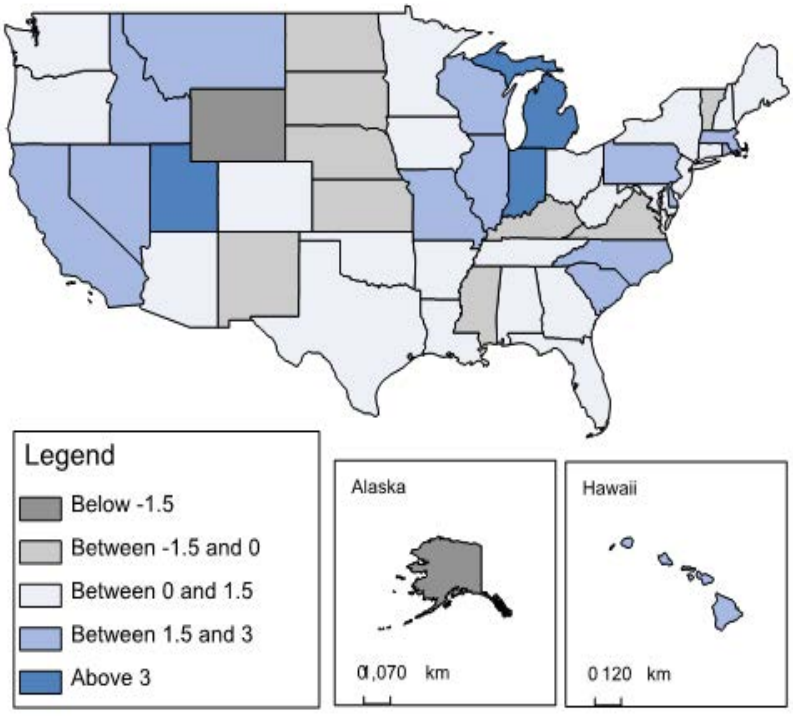
*Note*: The employment rate is calculated as the employment (15 years old and over) at place of residence over the working age population (15 years old and over). The unemployment rate is calculated as the unemployed over labour force (15 years old and over). Regional disparity is measured as the standard deviation of the indicator across the TL2 regions of the country, divided by the distribution mean (i.e., coefficient of variation). The difference between the best and worst performing region is expressed in percentage values.
*Source*: OECD elaborations based on data from OECD National Accounts and OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933826092

## Trend and aggregate indicators

The employment rate of the United States grew by 1.4 percentage points over the period 2011-16. This aggregate performance masks large differences at the regional level as shown in the map in Figure 40.1. In particular, the largest drops of the employment rate were registered in Wyoming (-2.6), Alaska (-2.2) and Vermont (-1.4). Among the most dynamic states is Michigan, which displayed an increase in the employment rate of 4 percentage points.

**Figure 40.1. Regional employment rate growth (ppts), TL2 regions, 2011-2016, United States**




*Note*: The growth of the employment rate is calculated as the difference between the rate in 2016 and the rate in 2011.Regional information corresponds to the population of more than15 years old.
*Source*: Calculations bases on the OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

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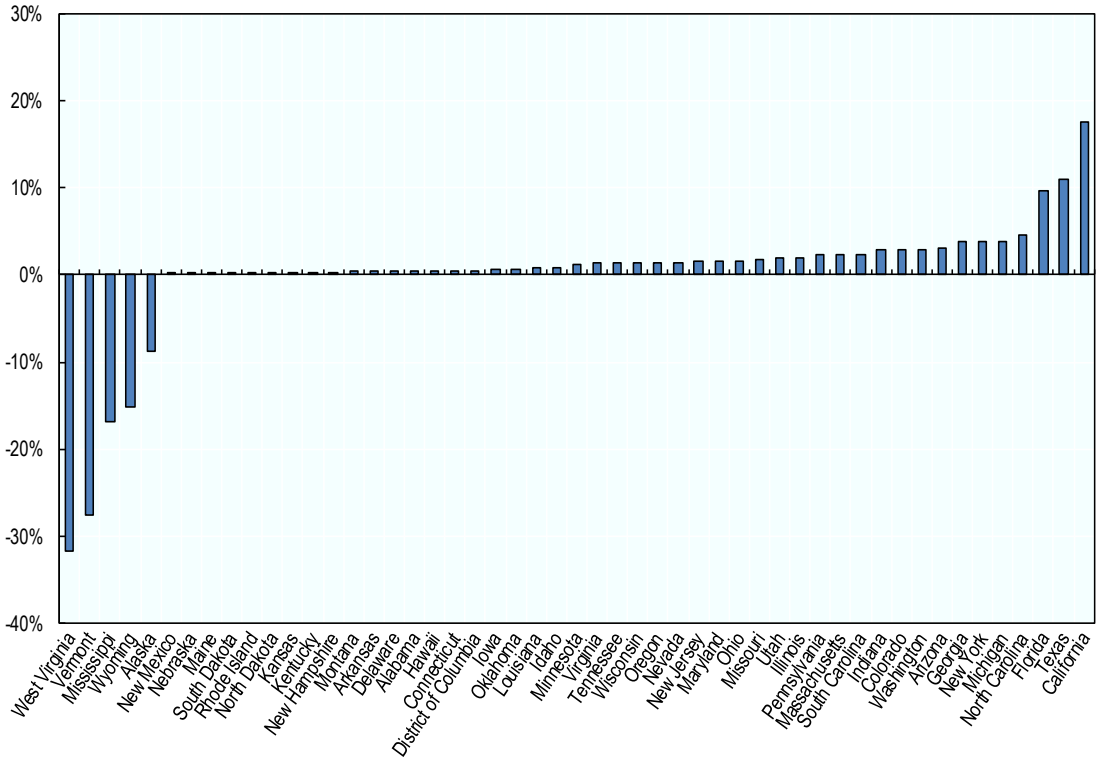
**Figure 40.2. Contribution to national job creation by TL2 regions, 2011-2016, United States**




*Note*: Job creation is calculated as the difference between employment in 2016 and employment in 2011.
Bar charts show the share of each region in the aggregate variation of jobs; the share of a region registering a net loss (gain) is calculated with respect of the sum of regions experiencing a net loss (gain) of jobs. Regional information corresponds to the population of more than15 years old.
*Source*: Calculations bases on the OECD (2018), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://doi.org/10.1787/888933827631

## Jobs at risk of automation

Beside the number of jobs created (or destroyed), it is their "quality" that matters for economic development and inclusion. The analysis conducted in Chapter 1 of this report provides an indication of the share of jobs at risk of automation in the regional economy.

Over the period 2011-16, 48 states and the District of Columbia experienced a reduction in the share of jobs at high risk of automation (Type A). West Virginia was the only state losing jobs in aggregate, but this loss was mainly driven by declining employment in occupations at high risk of automation (Type C). By contrast, the rise of employment in Tennessee was mainly driven by employment in occupations at high risk of automation (Type B).

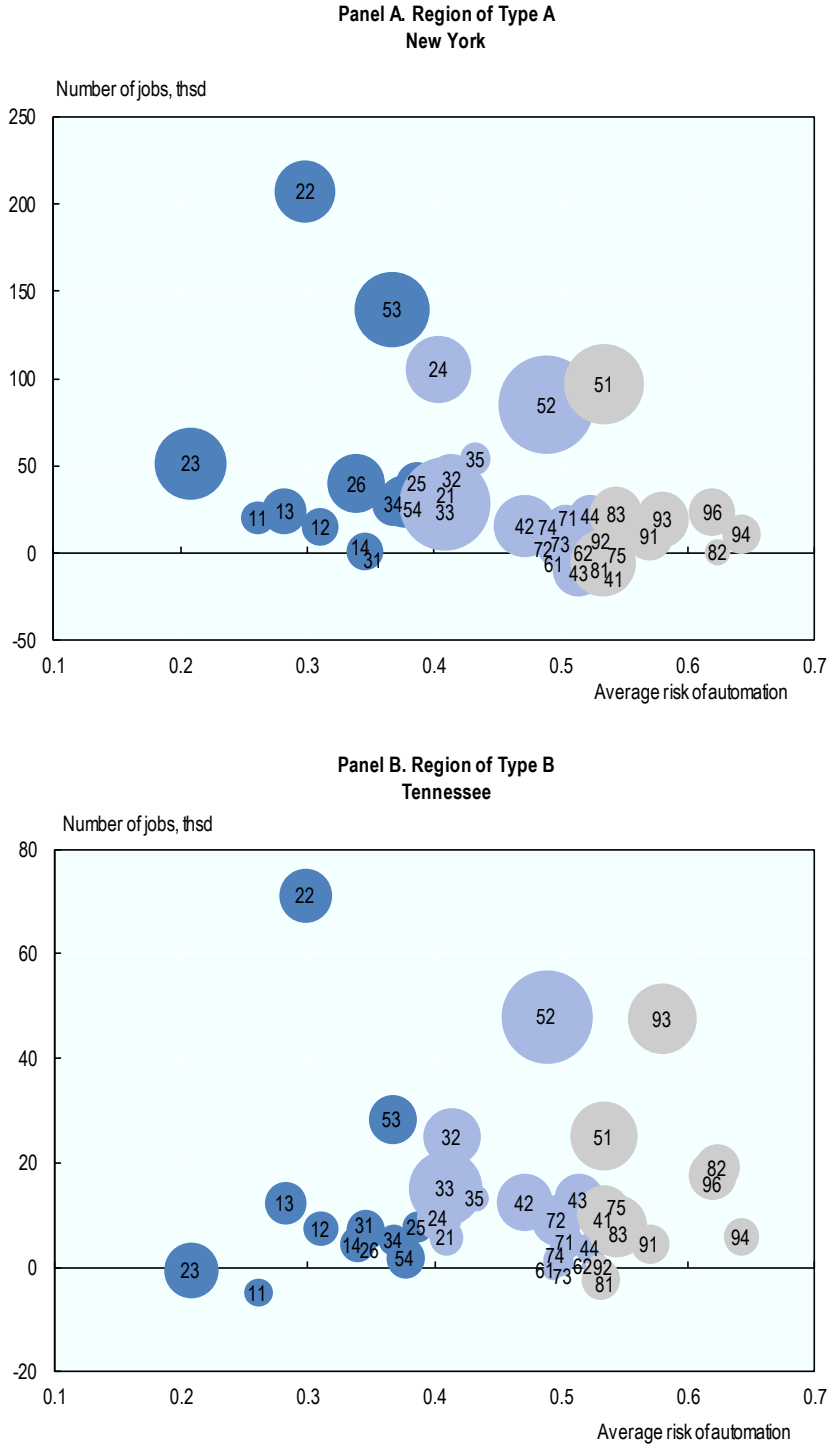
**Table 40.2. Trends in the jobs at risk of automation, United States**

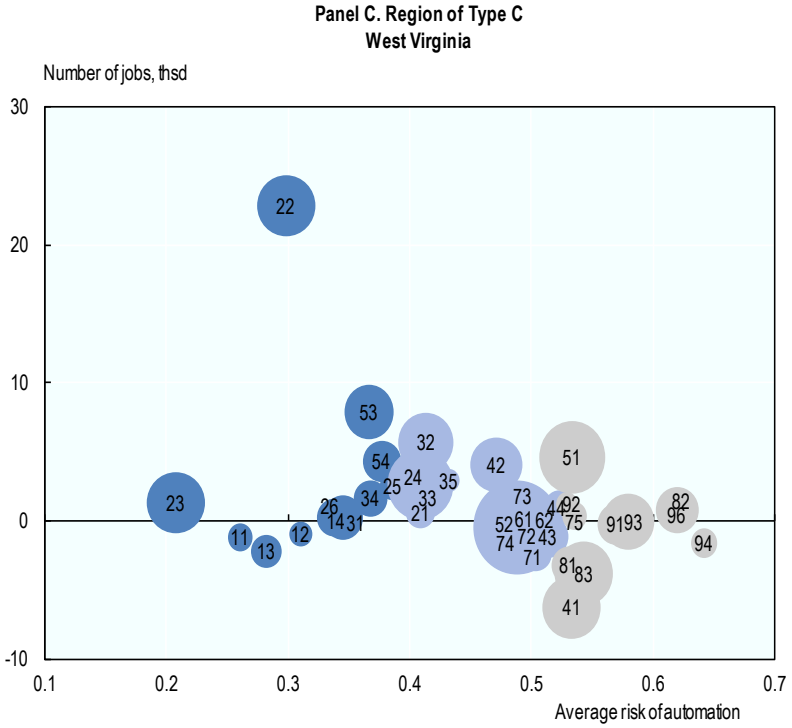
| A. Creating jobs, predominantly in less risky occupations | B. Creating jobs, predominantly in riskier occupations | C. Losing jobs, predominantly in riskier occupations | D. Losing jobs, predominantly in less risky occupations |
|---|---|---|---|
| 48 States and District of Columbia | Tennessee | West Virginia | |

*Note*: Type A and Type C regions experienced an increase in the share of jobs at low risk of automation with respect to occupations at high risk of automation. Type B and Type D regions experienced an increase in the share of jobs at high risk of automation. In both Type A and Type B regions aggregate employment grew, while in the Type C and Type D regions employment declined.
*Source*: OECD calculations

The detailed creation of jobs by occupation for one region per category is presented in Figure 40.3. In particular, the growth of employment in the state of New York was mainly driven by jobs in occupations at low risk of automation (e.g., Health professionals (22), Teaching professionals (23), Legal, and Personal Care Workers (53)). A similar picture emerges in West Virginia which, despite the aggregate loss, created jobs in the mentioned categories, while losing jobs in occupations at high risk of automation, such as General and Keyboard Clerks (41) and Drivers and Mobile Plant Operators (83). By contrast, Tennessee registered a large increase in occupations at high risk of automation, such as Labourer in Construction, Manufacturing and Transports (93), Personal Services Workers (51) and Assemblers (82).

**Figure 40.3. Job creation by risk of automation, selected regions, 2011-16, United States**






*Note*: Occupations (ISCO-08 code indicated in the bubble) are ranked from low to high risk of automation along the horizontal axis. Changes in the number of jobs for each occupation are reported along the vertical axis. Bubble size represents the share of jobs in the occupation with respect to total employment in the region.
*Source*: OECD calculations based on the U.S. Labour Force Survey.

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(85 2018 19 1 P) ISBN 978-92-64-30533-5 – 2018

# Job Creation and Local Economic Development 2018

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**ISBN 978-92-64-30533-5**
**85 2018 19 1 P**