



OECD Local Economic and Employment Development (LEED)
Papers 2024/03

Bringing Trentino's productivity growth back on track

OECD



Bringing Trentino's productivity growth back on track

A comparison with OECD “peer” regions

The Autonomous Province of Trento (Trentino) is among the most productive regions in Europe, but over the past two decades its productivity growth has stagnated. As a result, the productivity gap of Trentino widened by over 20% compared to regions with the same productivity level in 2000. The benchmarking of productivity drivers in Trentino with those of “peer” regions points to several policy priorities, including: reviving productivity in tradeable sectors, also through increased internationalisation; increasing the share of the labour force with a tertiary education; and getting more out of public R&D while boosting private sector R&D.

JEL codes: D24, J21, J24, L11, O3, O47, R11

Keywords: subnational productivity, international comparison, drivers of productivity, sectoral analysis

ABOUT THE OECD

The OECD is a multi-disciplinary inter-governmental organisation with member countries which engages in its work an increasing number of non-members from all regions of the world. The Organisation's core mission today is to help governments work together towards a stronger, cleaner, fairer global economy. Through its network of specialised committees and working groups, the OECD provides a setting where governments compare policy experiences, seek answers to common problems, identify good practice, and co-ordinate domestic and international policies. More information available: www.oecd.org.

ABOUT OECD LOCAL ECONOMIC AND EMPLOYMENT DEVELOPMENT (LEED) PAPERS

The OECD Local Economic and Employment Development (LEED) Programme Papers present innovative ideas and practical examples on how to boost local development and job creation. A wide range of topics are addressed, such as employment and skills; entrepreneurship; the social economy and social innovation; culture; and local capacity building, among others. The series highlights in particular policies to support disadvantaged places and people, such as the low skilled, the unemployed, migrants, youth and seniors.

This paper is published under the responsibility of the Secretary-General of the OECD. The opinions expressed and the arguments employed herein do not necessarily reflect the official views of OECD member countries.

This paper was authorised for publication by Lamia Kamal-Chaoui, Director, Centre for Entrepreneurship, SMEs, Regions and Cities, OECD.

This document, as well as any statistical data and map included herein, are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

Cover image: @getty/Vladimir Drozdin

© OECD 2024

The use of this work, whether digital or print, is governed by the Terms and Conditions to be found at <https://www.oecd.org/termsandconditions>.

Foreword

Many OECD countries have productivity boards that regularly review national productivity performance. Institutions promoting productivity analyses at subnational level are less common, despite regional productivity differentials within OECD countries being large and persistent, as highlighted by the OECD Regional Outlook 2023 (OECD, 2023^[1]). This report contributes to the activities of the Provincial Board for Productivity and Competitiveness (*il coordinamento provinciale per la produttività e la competitività*) established by the Autonomous Province of Trento, Italy, in 2022. The Board brings together local partners in the analysis of the province's productivity performance. This first report expands the evidence base available to the Board, while drawing more general lessons on the analysis of productivity at a subnational scale. Two additional reports will be published in the next two years, containing a more detailed analysis on selected topics.

This report includes the findings from a series of consultations with local stakeholders (social partners and trade associations), carried out in 2023. The OECD is very grateful to all participants for their contributions.

This report was prepared within the framework of the Spatial Productivity Lab (SPL) at the OECD Trento Centre for Local Development. The Trento Centre is part of the Local Employment and Economic Development (LEED) Programme at the OECD Centre for Entrepreneurship, SMEs, Regions and Cities (CFE), led by Lamia Kamal-Chaoui, Director.

It was authored by Carlo Menon and Wessel Vermeulen, Economists at the Spatial Productivity Lab of the OECD Trento Centre for Local Development, with research assistance from Chiara Gastaldi and Silvia Delladio, under the supervision of Alessandra Proto, Head of the OECD Trento Centre for Local Development, CFE.

Nadim Ahamad, Deputy Director, CFE, Alexander Lembcke, Head of Unit, CFE, and the members of the Scientific Committee of the Provincial Board shared helpful comments and suggestions. Rudiger Ahrend, Head of Division, CFE and Karen Maguire, Head of Division, LEED Programme, CFE, provided guidance along the full process of the publication.

Table of contents

Foreword	3
Executive summary	6
1 The local dimension of productivity	9
Productivity matters for well-being and inclusion	9
Productivity gaps are sizable across and within countries	11
Regional productivity reviews help productivity policies 'go local'	13
2 Is Trentino losing ground? Productivity trends in the last two decades	15
Introduction	15
Comparing Trentino with international peers	17
Reviving productivity growth is the key to higher income	21
3 The productivity of Trentino's firms	24
Introduction	24
Trentino's productivity gap is mainly due to relatively weaker productivity in the manufacturing sector and in tradeable services	24
Internationalisation can help unlock the untapped potential of Trentino firms	28
Retail and tourism activities need an integrated approach to exploit synergies	30
4 Other drivers of productivity: Trentino's strengths and gaps	32
Introduction	32
A well-functioning labour market that can further benefit from better including women	33
Education levels among the workforce can be boosted	37
Private sector R&D can further leverage publicly supported research centres	39
References	44
Notes	47

FIGURES

Figure 1.1. Regional productivity strongly correlates with worker income and economic inclusion	11
Figure 1.2. Within-country variation in GDP per worker can be as sizable as between countries	12
Figure 1.3. Within countries productivity differences are persistent	12
Figure 2.1. Real GDP per capita has declined since 2001 in Trentino	16
Figure 2.2. Trentino's peer regions	19
Figure 2.3. In 2001, Trentino and its peers rank high relative to their country averages	19
Figure 2.4. Alternative sets of peer regions also highlight Trentino's productivity gap	20

Figure 2.5. Trentino and its peers had parallel trends in productivity until 2001	21
Figure 2.6. Productivity, rather than employment rates, explains Trentino's widening gap	22
Figure 2.7. Trentino belongs to a group of high-productivity regions that have been losing ground	22
Figure 2.8. In Trentino low productivity growth is combined with a growing population	23
Figure 3.1. Trentino requires more productivity growth in the manufacturing and tradeable services	25
Figure 3.2. The most productive tradeable firms of Trentino are half as productive as the most productive firms in the peer regions	26
Figure 3.3. Trentino lacks a productivity premium for large firms in tradeable sectors	27
Figure 3.4. In Trentino there are more small firms and fewer young firms than in the peer regions	28
Figure 3.5. Foreign investments and trade of goods are lower in Trentino than in the peer regions	29
Figure 4.1. Low unemployment rates but low female labour participation	35
Figure 4.2. In Trentino only 37% of workers found their current job through a formal channel	37
Figure 4.3. Persistent gaps in share of tertiary education among Italian and foreign born	38
Figure 4.4. Provincial government push for R&D needs more synergies with the private sector	42

INFOGRAPHICS

Infographic 1. Benchmarking drivers of productivity for Trentino	8
--	---

BOXES

Box 1.1. How is productivity measured?	10
Box 1.2. National productivity boards: review and main findings	13
Box 2.1. The fiscal and legislative autonomy of the Autonomous Province of Trento	16
Box 2.2. Trentino productivity knowledge sharing	17
Box 2.3. Selecting peer regions for Trentino	18
Box 2.4. Alternative criteria to identify peer regions	20
Box 3.1. What can small retailers do in an increasingly online world?	30
Box 3.2. The Swiss tourism model	31
Box 4.1. EU Regional Competitiveness Index	32
Box 4.2. Benchmarking drivers of productivity	33
Box 4.3. "Tu sei" Project: Students' training in Trentino	34
Box 4.4. Stakeholder voices: labour shortages and working conditions in Trentino	35
Box 4.5. Stakeholder voices: addressing the gender gap in entrepreneurship	36
Box 4.6. Stakeholder voices: rewarding continuous training to manage changing skills needs	39
Box 4.7. Stakeholder voices: a "last mile" effort to fully leverage public research institutions	40
Box 4.8. Trentino's Smart Specialisation and Internationalisation Strategy	41
Box 4.9. High Impact Actions to broaden and diffuse innovation to SMEs in regions	43

Executive summary

Local productivity matters for well-being and inclusion. Productivity growth is the fundamental engine of economic growth that supports improvements in wealth, inclusiveness and wellbeing. Productivity levels vary widely across regions, because many sources of productivity growth are determined by many local factors that are inherently spatial in nature. These include agglomeration effects, infrastructure, and, indeed, geography itself; where regions are and their proximity to gateways, markets, natural assets etc also matters. The functioning of local labour markets, the financial resources available for firms to invest and grow, skills development, local governance and knowledge diffusion by public and private institutions can all also vary substantially at the regional level..

Trentino was in the top decile of most productive regions in the OECD in 2023, however its real GDP per worker declined by 7.6% since 2001. During the same period, OECD regions grew on average by about 20%. Trentino, a mountainous region in Northern Italy, offers a diverse industrial structure and hosts a dynamic university, despite the lack of a large city. The sluggish productivity dynamics over the last two decades reflect a similar national trend for Italy. However, Trentino's legal status as an Autonomous Province facilitates the crafting of tailored economic and social policies that can help revive local productivity growth, addressing place-specific bottlenecks and leveraging local assets. It also provides the conditions to pilot innovative policy approaches that can then be adapted to other places in Italy facing similar challenges.

To understand Trentino's productivity slowdown, its productivity performance is benchmarked with peer regions. Ten peer regions are selected from Austria, Ireland, the Netherlands, Belgium, Germany and Greece. Peer regions had the same productivity level (measured as GDP per worker) of Trentino in 2001, are located in Europe (outside Italy), and have fewer than one million inhabitants. In 2001, the selected peer regions ranked among the wealthiest in their countries, like Trentino in Italy. Trentino's peer regions had a similar trend in GDP per worker from the 1980s until the early 2000s'. However, in the last two decades, whilst productivity growth maintained its momentum in most peer regions, it stagnated in Trentino, resulting in productivity gaps of over 20% with peer regions.

Strengthening and upgrading Trentino's manufacturing sector is key to reducing the gap with the peer regions. Productivity growth in industrialised countries has been typically faster in manufacturing than in the service sectors. Trentino's economy is well-diversified across sectors, some of which have comparatively high productivity levels. However, Trentino's manufacturing sector accounts for a smaller share in the economy and has a lower average productivity relative to its peers. Medium-high technology activities account for about 27% of the province manufacturing employment, compared to more than 40% in Belgian and German peer regions. Trentino's large tradeable services sectors have also experienced little productivity growth in recent decades. The productivity gap in tradeable sectors, which combines manufacturing and tradeable services, in part reflects a dearth of large high productivity firms, which are more common in peer regions.

Internationalisation can help boost the productivity of Trentino's tradeable sectors. Between 2010 and 2020, Inward FDI in Trentino was associated with fewer than 0.5 jobs per 1000 workers, compared to between 1 and 2 jobs per 1000 workers in peer regions. Moreover, in 2019, Trentino exports and import

amounted to 18% and 12%, respectively, of regional GDP. The corresponding statistics for the two peer regions for which data are available were twice as large.

The retail and tourism sectors are important for Trentino's economy but their contribution to productivity growth has been limited. In sectors that are relatively large in Trentino compared with its peers, such as Trade and hospitality, or Public administration and social services, productivity has declined. Specifically, retail and tourism may need to further embrace digitalisation to support growth. A unified economic approach across both sectors could harness synergies, expanding the local retail market through both national and international visitors. Simultaneously, a dynamic retail sector serves as a further draw for tourists.

Trentino has a well-functioning labour market, but female activity rate and education levels are lower than in peers. Infographic 1 summarises Trentino's performance across other drivers of productivity such as the local labour market, workers' skills and training, business dynamics, Research and Development (R&D) and innovation. A number of strengths and weaknesses emerge.

- Unemployment rates have remained low through economic cycles, including for youth, and the participation rate is on a par with peers. However, activating female workers to address labour shortages, reduce skill mismatch and fully harness the local female talent pool could be enhanced by removing the barriers that impedes their complete integration into the labour market.
- Education levels among the workforce can be boosted. One in five persons has a tertiary education in Trentino, compared with more than one in three among peers.

Private sector R&D needs to make better use of provincially supported research institutions. Government supported R&D expenditures in Trentino are high relative to peers, but do not compensate for a shortfall in the private sector. The private sector accounted for 0.6% of spending of regional GDP in 2019, compared with 2% on average among peers.

Infographic 1. Benchmarking drivers of productivity for Trentino

	↑ Better than peer/improving	— Same as peer/stable	↓ Worse than peer/falling behind
	2019 Level relative to peers	2015-19 change	2015-19 change relative to peers
GDP			
Regional GDP, per capita real ppp	↓	↑	↓
Regional GDP, per worker real ppp	↓	—	↓
Labour market			
Employment Rate (% employment 15+ over population 15+)	—	—	↓
Unemployment Rate (% unemployed 15+ over labour force 15+)	↑	↑	↓
Youth Unemployment Rate (% unemployment 15-24 over labour force 15-24)	↑	↑	↑
Gender gap in the activity rate, 15+	↓	↑	↑
Female managers (% of all managers)	↓	—	—
Skills and talent			
Population 25-64 with tertiary educ. (as % population 25-64)	↓	↑	↓
Foreign-born of 15-64 (as % of population 15-64)	—	—	↓
Percentage of people with tertiary educ. among foreign born of 25-64	↓	↓	↓
Managers under 40 years (% of all managers)	↓	—	—
Business dynamism			
Average employment size of active enterprises	↓	↑	—
New firms with employees per 1000 population)	—	—	—
Share of new firms in the business population	↓	—	↓
Share of 3-year-old firms in the business population	↓	—	—
Research and innovation			
R&D Expenditures by the Business Sector (in % of GDP)	↓	—	—
R&D Expenditures by the Government Sector (in % of GDP)	↑	—	—

Note: See Box 2.3 on selecting peer regions and Box 4.2 on data and methodology.

Source: OECD calculations based on OECD Regional Statistics.

1 The local dimension of productivity

Productivity matters for well-being and inclusion

Productivity measures the efficiency of producing goods and services with labour, capital, knowledge, technology, natural resources and other inputs. Productivity gains can arise from optimally allocating resources across different production factors within firms (e.g. investing in more efficient machinery) as well as through channelling resources toward the most productive firms. At the regional level, productivity also benefits from synergies that emerge from local ecosystems, such as through access to local public goods, such as transport infrastructures, or knowledge spillovers across firms and research institutions, including through personal interactions and workers' mobility. Box 1.1 provide further details on the measurement of productivity at the regional level.

Regional productivity is strongly positively correlated with economic indicators for household and workers' income and economic inclusion. Productivity growth allows firms to expand and pay higher wages to workers. The income earned in a region also increases the tax revenue of governments, which provide the resources needed for public services. Higher regional productivity is related to higher real income for workers, higher disposable income of households, and a decrease in the share of people that are at risk of poverty or social exclusion in places (Figure 1.1). These statistical relations exist even when accounting for structural differences between places, such as allowing for differences due to being rural or urban, coastal or mountainous, industrial or services oriented. High regional productivity may also strengthen the resilience of local economies to economic shocks and disruption, such as from economic recessions or local sectoral shocks. Regional productivity is also positively associated with the quality of the natural environment and life expectancy, among others (OECD, 2016^[2]). However, the relation between economic performance and well-being is complex and many other factors play a role.

Box 1.1. How is productivity measured?

Pragmatic measures of productivity must be used for regional analysis due to data limitations.

The multifactor productivity (MFP) measure is considered the ideal indicator for firm and regional productivity as it captures the efficiency with which a combination of inputs, such as labour and capital, are transformed into outputs. Thereby, it allows for a nuanced understanding of productivity dynamics, reflecting improvements in technology, skill levels, and organisational efficiency. However, multifactor productivity is de facto a residual measure after accounting for all factors of production, and these are not always possible to measure exhaustively. Several production factors, in particular intangibles, can be difficult to measure across regions and time. As such, regional comparisons of productivity are typically based on more simple measures of productivity.

A simple measure of productivity divides total measured output by the number of workers, to create a measure of labour productivity.

The combined value of all private and public sector production can be summed to obtain a measure of regional GDP, which can be combined with statistics on total regional employment. GDP per worker is a pragmatic measure for productivity because both regional GDP estimates and the number of workers (total employment) are widely available, allowing for comparison across regions and time. Where possible, a better estimate for labour productivity is GDP per hour worked.

GDP per capita is widely used to measure the economic development of regions and countries and closely relates to GDP per worker. GDP per capita equals GDP per worker multiplied by the employment rate, formally:

$$\frac{\text{GDP}}{\text{capita}} = \frac{\text{GDP}}{\text{worker}} \times \frac{\text{employment}}{\text{population}} \quad \text{Equation 1}$$

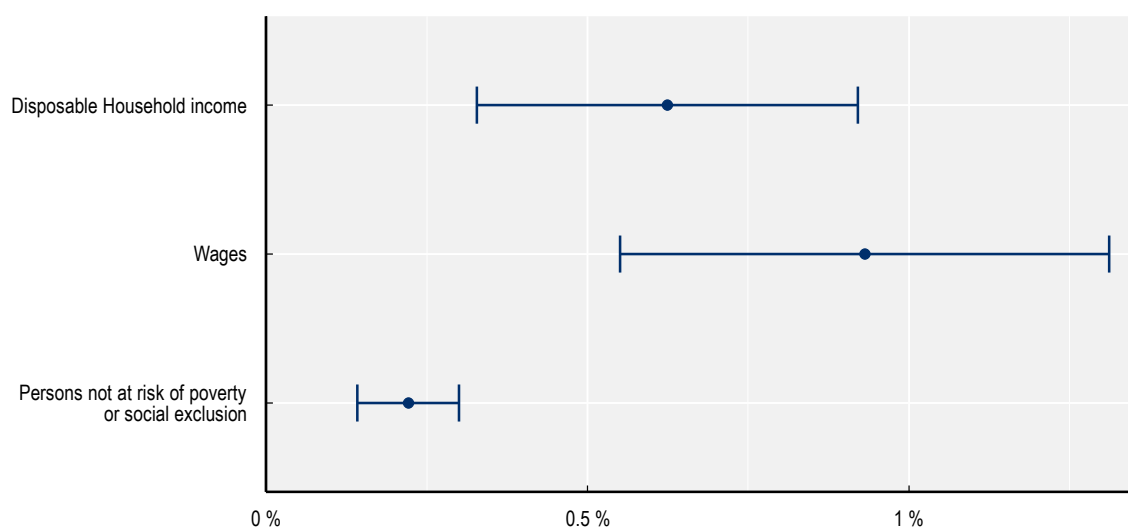
Hence, for equal levels of the employment rate differences in GDP per capita are entirely due to labour productivity. In terms of growth rates, GDP per capita is fully determined by the growth rate of GDP per worker when employment ratios are constant. For instance, aging may reduce employment rates in a place, such that productivity must increase to maintain an equal level of GDP per capita.

Regional productivity can also be measured as the total added value created in a region divided by the number of workers.

This measure relies on two economic variables that are most commonly available across regions and over time. It is also closely related to GDP per capita, a widely used indicator to measure the economic strength of countries and regions. The measure shares the same limitations of other labour productivity measures: If a firm invests in additional inputs, such as capital and technology, labour productivity would increase, even if the productivity of workers per unit of capital input remains constant. To compare productivity numbers across places and time, GDP can be adjusted for inflation and price level differences across countries. However, deflators and purchasing-power indicators are not typically available at subnational level, which dictates caution in interpreting relatively small differences in regional productivity.

Figure 1.1. Regional productivity strongly correlates with worker income and economic inclusion

An increase in GDP per worker by 1% is associated with an increase of...



Note: Estimates from a linear regression of log GDP per worker on the log of household income and the log of average worker compensation, and the percent of persons not at risk of poverty or social exclusion, using a sample of 83 to 142 TL2 regions in Europe, between 2010 and 2018. Region fixed effects and time fixed effects included. Bars represent 95% confidence intervals, based on standard errors clustered by region.

Source: OECD calculations based on OECD Regional Statistics (database), <https://www.oecd.org/regional/regional-statistics/> (GDP per worker, GDP per capita, Disposable household income) and Eurostat tables ILC_PEPS11 (Persons at risk of poverty or social exclusion) and NAMA_10R_2COE (Compensation of employees by NUTS 2 regions).

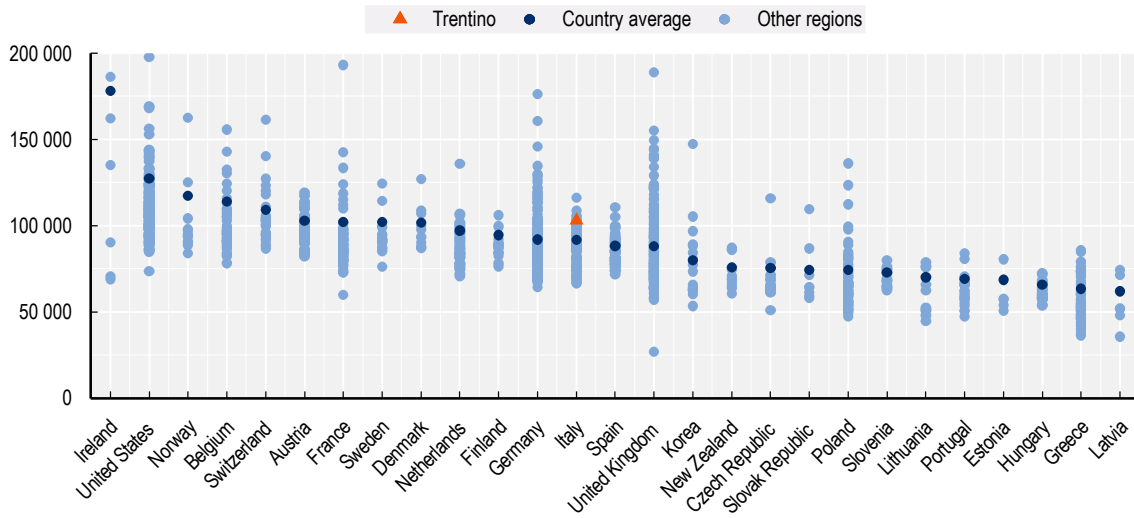
Productivity gaps are sizable across and within countries

Across the OECD, variation in GDP per worker across countries can be as large as the variation across regions within the same country. Figure 1.2 presents the GDP per worker in 2019. On average, productivity in the United States, at USD 127 000, is twice that of Latvia, at USD 61 979. At the same time, in several countries, the least productive regions are below the Latvian national average, while the most productive regions in many countries are above the average of the United States.¹ Within countries, productivity in the most productive region is about twice as high as in the least productive region on average across OECD countries (OECD, 2020^[3]; OECD, 2023^[1]).

Within-country income and productivity differentials have slightly increased in two decades, in contrast to cross-countries differences. The Theil index measures the spread (variance) in productivity levels across regions. Overall, productivity disparities declined across OECD regions between 2001 and 2019 (Figure 1.3) (OECD, 2016^[2]; OECD, 2018^[4]; OECD, 2020^[3]; OECD, 2023^[1]). The trend has been driven by a reduction in cross-country productivity inequality, while within-country regional differences marginally increased. Indeed, in 15 out of 27 countries with available data regional income inequalities have widened over the last 2 decades. One of the reasons behind these patterns is the role of regions hosting large metropolitan areas, which tend to be the most productive regions across OECD countries and experience persistently high growth rates that non-metropolitan regions are often unable to match (OECD, 2018^[4]).

Figure 1.2. Within-country variation in GDP per worker can be as sizable as between countries

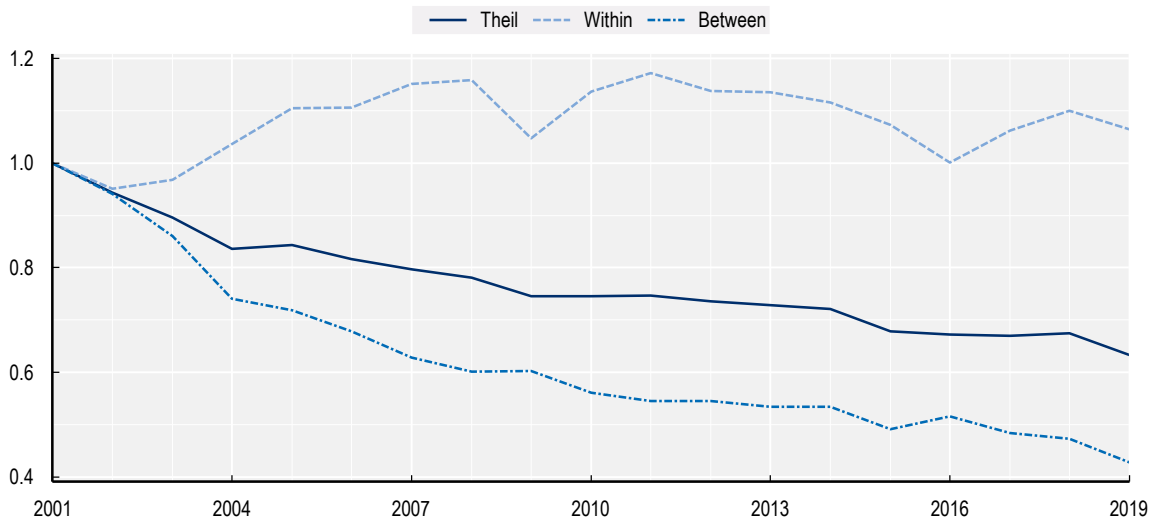
GDP per worker (USD2015 PPP), by TL3 region, 2019.



Note: Regions with GDP per worker above USD 200 000 are suppressed. GDP deflators and purchasing-power indicators are not typically available at subnational level, which dictates caution in interpreting relatively small differences in regional productivity.
 Source: OECD Regional Statistics (database), <https://www.oecd.org/regional/regional-statistics/>.

Figure 1.3. Within countries productivity differences are persistent

Theil index based on GDP per worker (USD2015, PPP), TL3, 2001=1.



Note: Countries included are Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Latvia, Lithuania, the Netherlands, New Zealand, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden United Kingdom and the United States.
 Source: OECD (2023_[11]) based on OECD Regional Statistics (database), <https://www.oecd.org/regional/regional-statistics/>.

Spatial disparities in productivity are also evident at a small spatial scale. Even within the same large region (TL2), the most productive smaller area (TL3) is on average 56% more productive than the least productive one. Intraregional (TL2) productivity differences account, on average, for 60% of total disparities in productivity across TL3 regions in OECD countries (OECD, 2018_[5]). Although larger or urban regions

are more likely to enjoy higher productivity levels, productivity growth can happen anywhere. In fact, four in ten non-metropolitan remote regions in the OECD experienced high productivity growth in 2014-19 compared to only three in ten large metropolitan regions. The trend in part reflects the catching up of regions in Centre-East Europe.

Regional productivity reviews help productivity policies ‘go local’

Regional productivity reviews ensure that local productivity policies build upon a solid evidence base. Regional productivity reviews are flexible and collaborative tools, rooted in the local context and designed to adapt to the specific situation of each region. A primary goal of the regional productivity reviews is to build a solid evidence base on local productivity dynamics. A second goal is to delve into critical aspects of the regional economic context, in order to develop targeted and specific economic policy recommendations.

Despite the evidence pointing to the important of space, regional productivity reviews remain rare.

The Trentino productivity review mirrors similar national reviews. Across the OECD many countries regularly review national productivity performance to inform policy on, for instance, the business environment, adoption of advanced technologies and education and skills (Box 1.2). Some countries include a subnational angle to review how regions contribute to the national average. Subnational analyses are less common. Notable exceptions are the annual reviews of competitiveness and well-being for the Basque country and the reviews of The Productivity Institute (TPI) for UK regions (Orchestra, 2022^[6]; Menukhin, Gouma and Orega-Argilés, 2023^[7]). Both organisations also work closely with regional stakeholders, including those representing the private sector, to gain insights on local constraining factors for productivity growth and to facilitate the translation from analysis to policy and new practices in the private sector.²

Spatial productivity differentials exist because many sources of productivity growth are locally defined or are increasingly sensitive to regional and local conditions. Some drivers of productivity are inherently spatial, meaning that economic dynamics explicitly interact with the geographical location of economic activity or the geographical features of a place. The spatial drivers of productivity include the climate, the topography and the economic accessibility of a region. Other factors include local infrastructure and governance as well as the efficiency of the labour market, the effectiveness of financial institutions. Cultural and social norms can also play a factor.³ Global trends such as globalisation and technological change have heightened the importance of agglomeration economies to the benefit of large metropolitan areas, making the spatial dimensions even more prominent over the last decades (OECD, 2023^[1]).

Different types of places need different productivity policies. Connected regions with large cities and high transport accessibility require a completely different set of productivity policies compared to remote and scarcely populated regions. Low productivity regions may struggle to trigger productivity growth due to specific weaknesses in some of the drivers, such as human capital, digital infrastructure or access to capital. Other regions may fail to fully leverage the potential of their productivity drivers due to limited governance capabilities or weak local institutions.

Box 1.2. National productivity boards: review and main findings

National productivity boards are independent governmental institutions established to track developments in productivity and competitiveness. Their goal is to provide analysis and policy-oriented solutions. Following the recommendation by the European Commission in 2016, 19 out of 27 European Union (EU) countries had established a national productivity board by 2023. Italy is not one of them. Among OECD member states beyond the EU, productivity commissions are present in

Australia, New Zealand, Chile, Mexico, and the UK. The national productivity boards provide regular, e.g. annual, updates about the state of countries' productivity, through reports to the government or national parliaments.

The reviews identify capital investments, skills and human capital, innovation, digitalisation, and entrepreneurship as key drivers of productivity. Human capital and skills are the most discussed topics by productivity commissions together with R&D and innovation. Relatively few boards (e.g. Ireland) have given attention to the role of Small and medium-sized enterprises (SMEs) in fostering productivity. National productivity reviews tend to focus on country level indicators and macro sectors, such as manufacturing, business services, and construction. The analysis is mainly descriptive, focusing on levels and long-term trends of Gross Domestic Product (GDP), Value Added (VA) and Total Factor Productivity (TFP).

Reviews typically dedicate less attention to regional policy implications with some exceptions. The Australian commission identified migration policies and land use regulations as key areas for regional productivity, while the commission for the UK recognised the need to empower local communities and provide policies to attract and retain talents to alleviate regional disparity.

The reviews most often recommend policy makers to prioritise investments, increase the quality of education and decrease inequality in education and training opportunities. In their most recent reviews, many boards focused on the impact of the COVID-19 crisis on productivity, helping governments in the recovery process. Few reviews have discussed the impact of climate change on productivity and the inclusion of broader indicators that go beyond GDP and encompass well-being and social performance.

Sources: OECD elaboration based on national productivity reviews. (OECD, 2015^[8]), (Pilat, 2023^[9]).

Productivity policies should build upon evidence on local assets to leverage on. Local economies can firstly exploit their economic strengths, such as firms and sectors that are internationally competitive in their respective business activities. However, even small and micro firms in remote regions with limited potential to access international markets may have an unfilled productivity potential that can be unleashed, e.g. by promoting digital adoption or improving managerial practices. Productivity of the private sector also depends on regional framework conditions, which are the policy institutions, entrepreneurial and civic culture and other productivity fundamentals.

2 Is Trentino losing ground?

Productivity trends in the last two decades

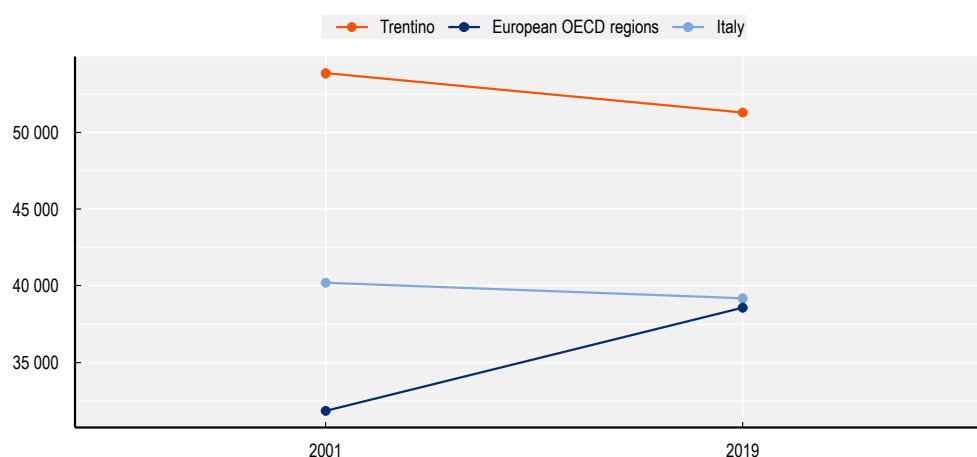
Introduction

Trentino is a wealthy and productive region by Italian and OECD standards. The Autonomous Province of Trento, referred to as Trentino in this report, is located in Northern Italy. Trento has a population of around 540 000, of which 120 000 live in the provincial capital Trento. Its entire territory is mountainous, with a central valley providing the main connectivity with the rest of Italy to the south, and the Province of Bolzano and Austria to the north. Trento ranks high in GDP per capita terms relative to the Italian national average and other European OECD TL3 regions. In 2001 and 2019, Trentino's GDP per capita was more than USD 10 000 above the mean of OECD regions and other Italian regions (Figure 2.1).⁴ In 2001, Trentino's GDP per capita reached nearly USD 54 000 (in USD2015 PPP terms, EUR 40 000 in EUR2015 terms), relative to USD 40 000 (EUR 30 000) for Italy overall and USD 32 000 for the average European OECD region. In 2019, Trentino's GDP per capita remained above the average OECD region and the Italian average. Productivity measures depict a similar picture. Trentino's productivity remained above the average of Italian regions and other non-large metropolitan OECD regions in 2019. Its productivity ranked 83rd out of 1098 OECD regions, positioning it within the top 10% of European OECD regions, once regions with very large cities are excluded.⁵

However, real GDP per capita in Trentino has decreased between 2001 and 2019, a trend it shared with the Italian national average. Trentino's GDP per capita declined by 4.7% in real terms (to USD 51 000, EUR 38 000), while GDP per capita in European OECD regions grew by more than 20% on average over the same period. The negative trend in the GDP per capita of Trentino mirrors the Italian national trend (-2.6%). However, while the national context clearly plays a major factor in regional economic performance, it is not the only factor, and there is considerable scope for regions to leverage their comparative advantages. This is particularly relevant for the Autonomous Province of Trento, as it has more space to design its economic policies relative to non-autonomous provinces in Italy, (see Box 2.1). Trentino can also contribute to Italian productivity by promoting policies that can be replicated at national level, as happened in the past.⁶

Figure 2.1. Real GDP per capita has declined since 2001 in Trentino

Mean GDP per capita (USD2015 PPP).



Note: Italy represents the national average, while European OECD regions is the average over all European OECD TL3 regions that are not classified as a region with a very large city following the access to city regional typology (Fadic et al., 2019^[10]).

Source: OECD Regional Statistics (database), <https://www.oecd.org/regional/regional-statistics/>.

Box 2.1. The fiscal and legislative autonomy of the Autonomous Province of Trento

The Autonomous Province of Trento retains policy-making authority from the Autonomous region Trentino-Alto Adige/Südtirol. Italy's devolved local governance confers significant policy making powers to its 20 first-level sub-national units, i.e. regions. Moreover, five regions are designated by the Italian Constitution as "autonomous". Trentino-Alto Adige/Südtirol is one of the five autonomous regions and further delegates its powers to its constituent provinces, Trento and Bolzano-Bozen, which are thus named "autonomous provinces". In this framework, the devolved powers transferred to the autonomous provinces cover political, legislative, administrative and fiscal issues.

The Autonomous Province of Trento has traditionally self-financed economic policies and instruments using its operating surpluses. The autonomous status allows Trentino to retain most of the tax revenue that the province raises for the national government. This tax retention creates surpluses that allow it to fund economic policies more flexibly, for instance to support active labour market policies, support research and innovation activities in public and semi-public institutions and some entrepreneurship incentive programmes.

Source: (OECD, 2021^[11]), (Barr et al., 2012^[12])

The international comparative analysis of this report aims to complement existing evidence produced by other institutions in the province. Various institutions in the province provide regular reports on the provincial economy including the provincial statistics office, the regional branch of the Italian central bank and the local industrial representative associations. Box 2.2 provides further details on these reports.

Box 2.2. Trentino productivity knowledge sharing

The international comparative analysis of this report aims to complement existing reporting from other institutions in the province. Various institutions in the province provide regular reports on the provincial economy. In addition, academics from the University of Trento contribute to productivity analysis for the labour market for specific sectors and policies (Tundis, Gabriele and Zaninotto, 2017^[13]).

The Trento regional branch of Banca d'Italia publishes an annual credit and labour market review. It provides data about the local economy, including how economic conditions affect households, businesses, and territorial entities and the role of decentralized public finance (Banca d'Italia, 2023^[14]).

The Statistics office of the Province, ISPAT, has calculated labour productivity statistics using firm-level data, allowing it to compare the productivity of Trentino with other Italian regions (ISPAT, 2023^[15]). Moreover, ISPAT has analysed the structure and dynamics of the local production system across economic sectors from 2000 to 2019. Its set of structural data and economic indicators describes the composition of productive sectors, their positioning in the national context including territorial comparisons and a growth and productivity analysis (ISPAT, 2023^[15]).

Confindustria Trento regularly produces the report “Tableau du Bord” containing structural and cyclical indicators of the local economy. Its analyses offer an up-to-date overview of Trentino economic dynamics and a dashboard of the key indices of the provincial economy (Confindustria Trento, 2023^[16]). A position paper titled “The centrality of the individual and quality of life” addresses issues on how to place the individual and quality of life at the centre of productivity growth for a sustainable transition of Trentino businesses (Confindustria Trento, 2021^[17]).

Chamber of Commerce of Trento’s Office of Studies and Research conducts quarterly and annual cyclical surveys. The surveys allow monitoring the performance of local businesses and occupational trends in major production sectors such as manufacturing, construction industries, wholesale and retail trade, freight transportation, business services, and artisanship. Additional reports include detailed analysis on key topics of local economy including consumer confidence, occupational forecasts, foreign investments and retail sector (Camera di Commercio di Trento, 2023^[18]).

Agenzia del Lavoro, Trento’s public employment services prepares annual employment reports on the labour market of the province. The data presented in its latest report provides an analysis of the overall economic context and variables related to the labour market (Agenzia del Lavoro, 2023^[19]).

Source: (Banca d'Italia, 2023^[14]), (ISPAT, 2023^[15]), (Confindustria Trento, 2023^[16]), (Camera di Commercio di Trento, 2023^[18]), (Agenzia del Lavoro, 2023^[19]), (Tundis, Gabriele and Zaninotto, 2017^[13]).

Comparing Trentino with international peers

To learn more about the productivity gap that emerged in Trentino over the last two decades, its productivity performance is benchmarked with other OECD peer regions. The purpose of comparing economic indicators for Trentino with peer regions is to learn which drivers of productivity in Trentino have kept pace with peers, and which drivers have lagged. Peer regions are selected based on a similar productivity level to Trentino in 2001. The potential pool of peer regions is limited to those of European countries, except Italy, with less than one million inhabitants in 2001, which compares with 0.5 million in Trentino. Box 2.3 provides further detail on the selection process.

Box 2.3. Selecting peer regions for Trentino

Peer region analysis serves to compare Trentino's performance against other regions that were at comparable productivity levels in the past. The peer regions are chosen from among OECD TL3 regions, based on the difference with Trentino in 2001. The following selection criteria are applied, using 2001 as the reference year:

- Peer regions should have less than one million inhabitants (compared with Trentino's 0.5 million).
- GDP per worker (EUR2015, in Purchasing Power Parity terms) lies within 10% from Trentino.
- The regions are located in Europe (i.e. OECD regions in the Americas and Asia are excluded).
- Other Italian regions are excluded to make the peer region group explicitly international.

The data are taken from the OECD Regions and Cities database.

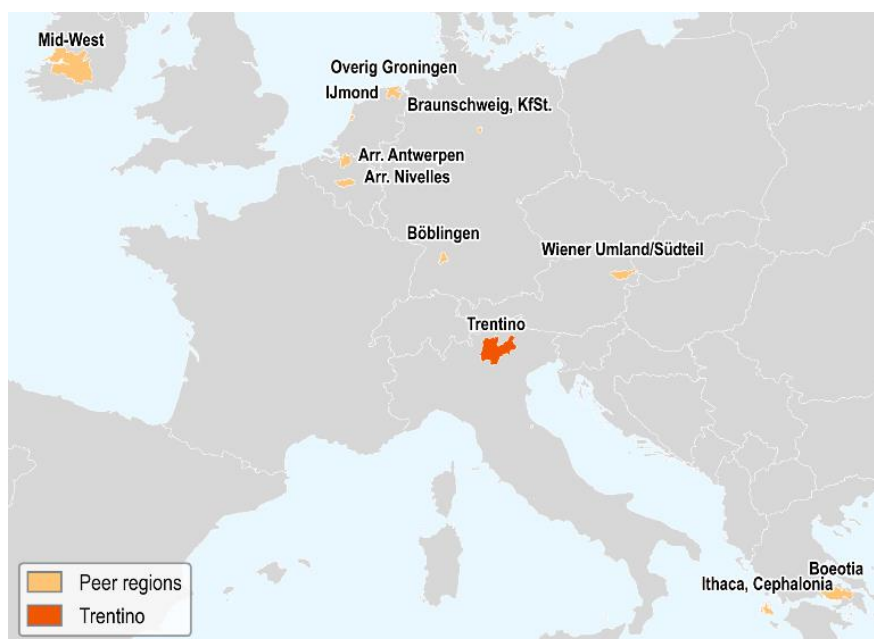
These selection criteria produce 25 candidate regions. This is narrowed down further by taking a maximum of two regions from each country, where the regions within each country are ranked based on increasing difference in GDP per worker. This yields ten regions: Wiener Umland/Südteil (Austria), Arr. Antwerpen and Arr. Nivelles (Belgium), Böblingen and Kreisfreie Stadt Braunschweig (Germany), Ithaca, Cephalonia and Boeotia (Greece), Mid-West (Ireland), Overig Groningen and IJmond (Netherlands).

The ten regions represent a mix of areas that are part of a large (Wiener Umland/Südteil, Nivelles, Böblingen, IJmond) or mid-size (Antwerpen, Kreisfreie Stadt Braunschweig, Overig Groningen), metropolitan region areas that are located near a small urban area (Mid-West Ireland) and remote regions (Ithaca, Cephalonia and Boeotia). Box 2.4 presents robustness results based on alternative selection criteria.

Ten regions are selected from Austria, Ireland, the Netherlands, Belgium, Germany and Greece (Figure 2.2). The selected regions include some that are predominantly rural as well as places with or near major cities. For instance, Antwerpen is one of the main cities in Flemish Belgium and hosts a major European sea port. IJmond is near but excludes the city of Amsterdam and hosts a large steel plant. Similarly, Wiener Umland/Südteil is located near the Austrian national capital region of Vienna, and Boeotia is a rural region in mainland Greece. The German district of Böblingen is near the city of Stuttgart and hosts production facilities of car manufacturers and their suppliers.

In 2001, the selected peer regions ranked among the wealthiest in their countries, like Trentino in Italy. Figure 2.3 presents the value of GDP per worker in 2001 for Trentino, the peer regions and all other regions across OECD countries for which data is available. For all countries the peer regions had a GDP per worker above their national average, and for Austria, the Netherlands and Greece the regions were the most productive in 2001.

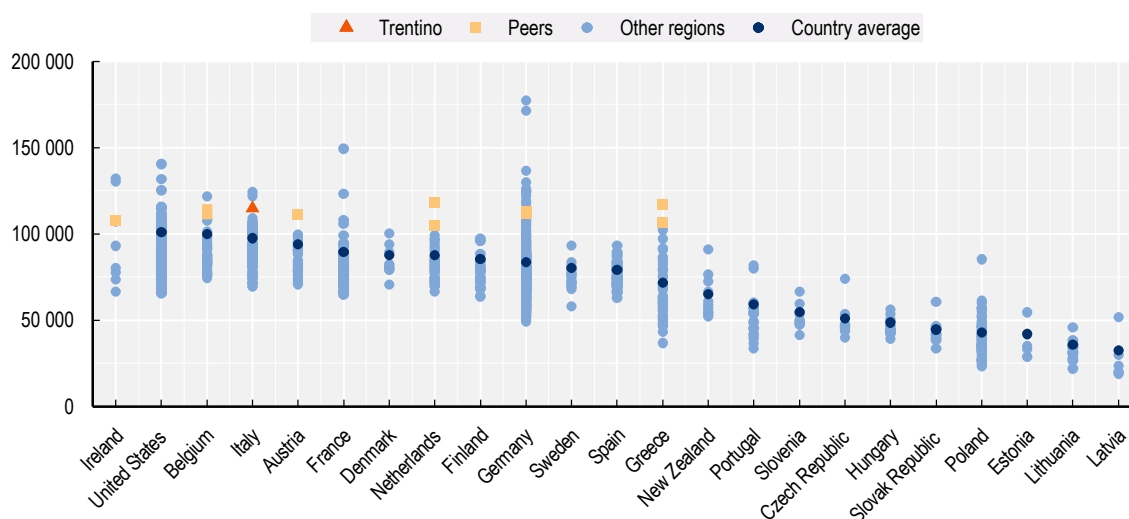
Figure 2.2. Trentino's peer regions



Note: See Box 2.3 for details on the selection of peer regions.
 Source: OECD elaboration.

Figure 2.3. In 2001, Trentino and its peers rank high relative to their country averages

GDP per worker (USD2015 PPP), 2001.



Note: See Box 2.3 for details on the selection of peer regions.
 Source: OECD Regional Statistics (database), <https://www.oecd.org/regional/regional-statistics/>.

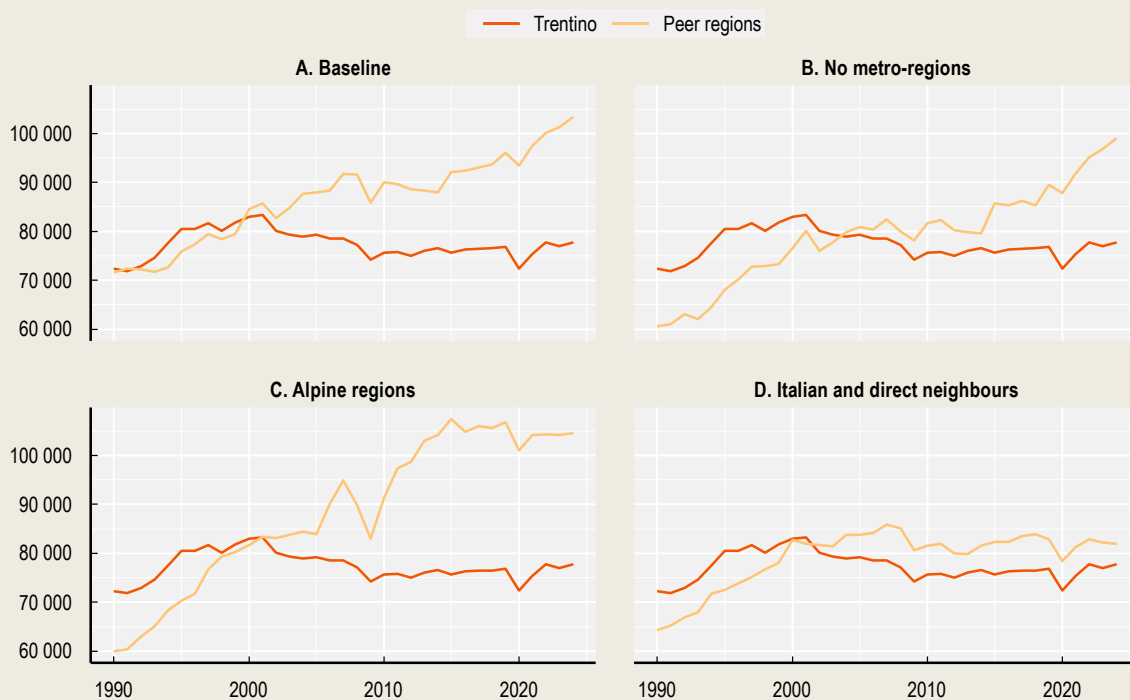
Trentino's peer regions had a similar trend in GDP per worker until the early 2000's; by 2023, peer regions are 30% more productive on average. Figure 2.5 presents the evolution of GDP per worker for Trentino and the average of the ten peer regions, respectively, between 1987 and 2023. Trentino and peer regions had similar productivity growth rates prior to 2001. In the following two decades, the productivity of peer regions grew steadily following a similar trend, while Trentino's productivity stagnated.

Box 2.4. Alternative criteria to identify peer regions

Alternative criteria to identify peer regions still show a productivity gap for Trentino in 2019. A coincidental feature of the peer regions selected using the baseline criteria is that productivity trends and levels appear quite aligned between 1990 and 2001, while the peer regions were not selected based on this pre-2001 trend. This pre-trend can be a useful benchmark on which to compare alternative selections. Figure 2.4 compares the baseline case (Panel A) with three alternative selections of peer regions. In Panel B, all metro-regions are excluded, which differs from the baseline case where some regions are part of metropolitan areas. In Panel C, only regions from the alpine countries are included, to align with the orographic nature of Trentino. In Panel D, Italian regions are included, as well as countries that have a land border with Italy, France, Switzerland, Austria and Slovenia. All alternative selections allow for a larger difference in GDP per worker in 2001 to assure that the additional restrictions still result in a sufficient number of regions. In each alternative case, Trentino has a negative productivity gap with its peers in 2019, although the size differs, with the smallest difference observed when other Italian regions are included in the selection. The productivity growth rates pre-2001 were higher in the peer regions, especially in panels B and C.

Figure 2.4. Alternative sets of peer regions also highlight Trentino's productivity gap

GDP per worker (EUR2015, PPP).

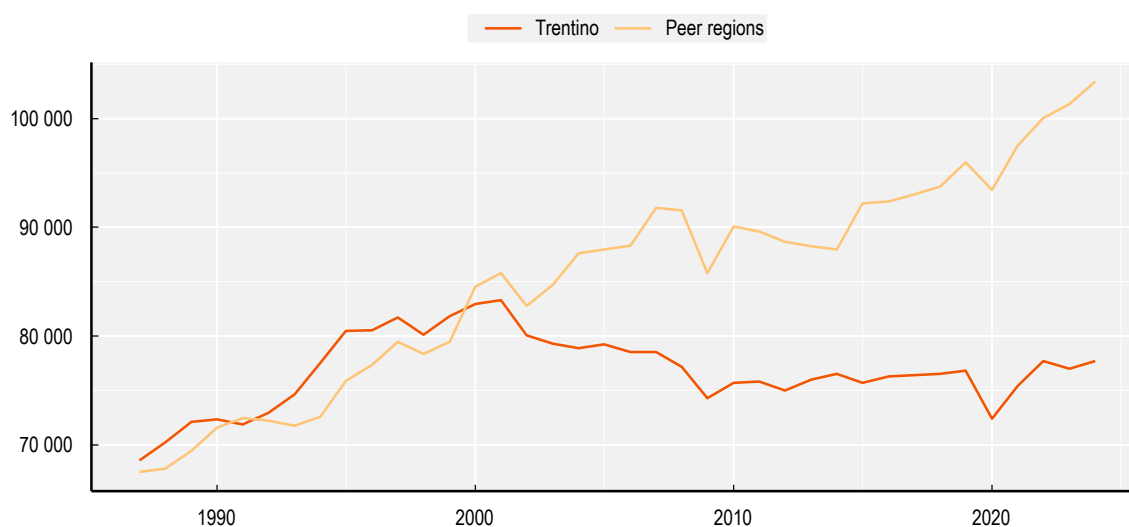


Note: Not all regions have data going back to 1987.

Source: OECD calculations based on ARDECO (European Commission).

Figure 2.5. Trentino and its peers had parallel trends in productivity until 2001

GDP per worker (EUR2015, PPP).



Note: See Box 2.3 for details on the selection of peer regions. Not all regions have data going back to 1987. Data is based on the ARDECO database of the European Commission which allows to present longer trends relative to OECD data on which the peer regions are selected. Source: OECD calculations based on ARDECO (European Commission).

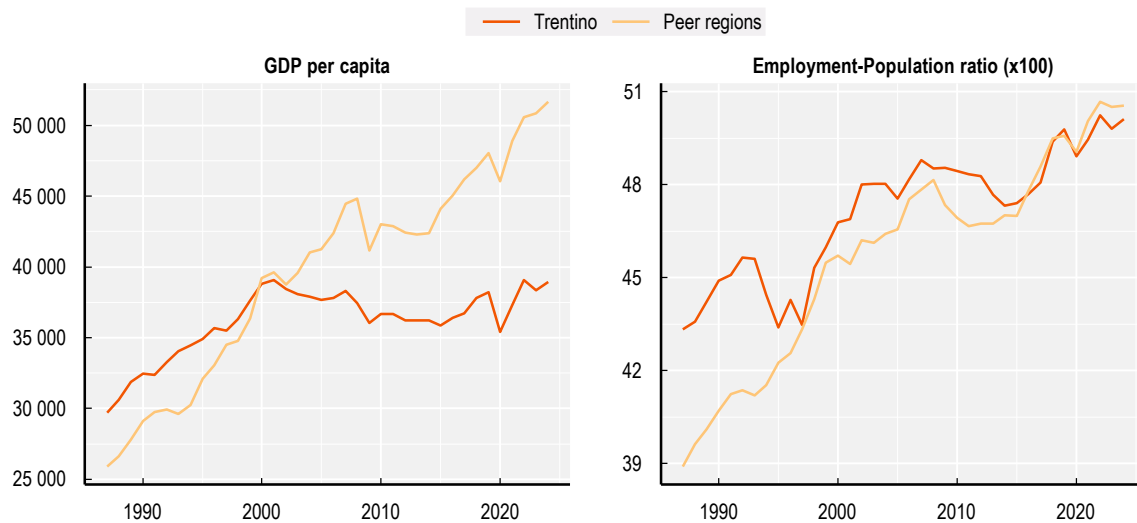
Reviving productivity growth is the key to higher income

The fall in productivity growth in Trentino was the main factor driving the relative decline in GDP per capita in Trentino. Figure 2.6 shows that before 2001, peer regions on average experienced a higher growth rate allowing them to converge to Trentino's level of GDP per capita by 2000 and after 2001, GDP per capita growth flatlined in Trentino while among peer regions growth continued. The global financial crisis of 2007-08 and the COVID-19 pandemic appear to have had no effect on the long-term trend.

The stronger GDP per capita growth of peer regions before 2000 can be attributed to differences in the employment rate. An increase in the employment rate allows a region to increase the economic value per person, even if productivity levels remain constant. Before 2000, a stronger growth in the employment rates in the peer regions and a similar growth rate in productivity resulted in a converge of the peer regions GDP per capita towards the level of Trentino (Figure 2.6). Since 2000, employment rates in Trentino and the peer regions have maintained similar levels.

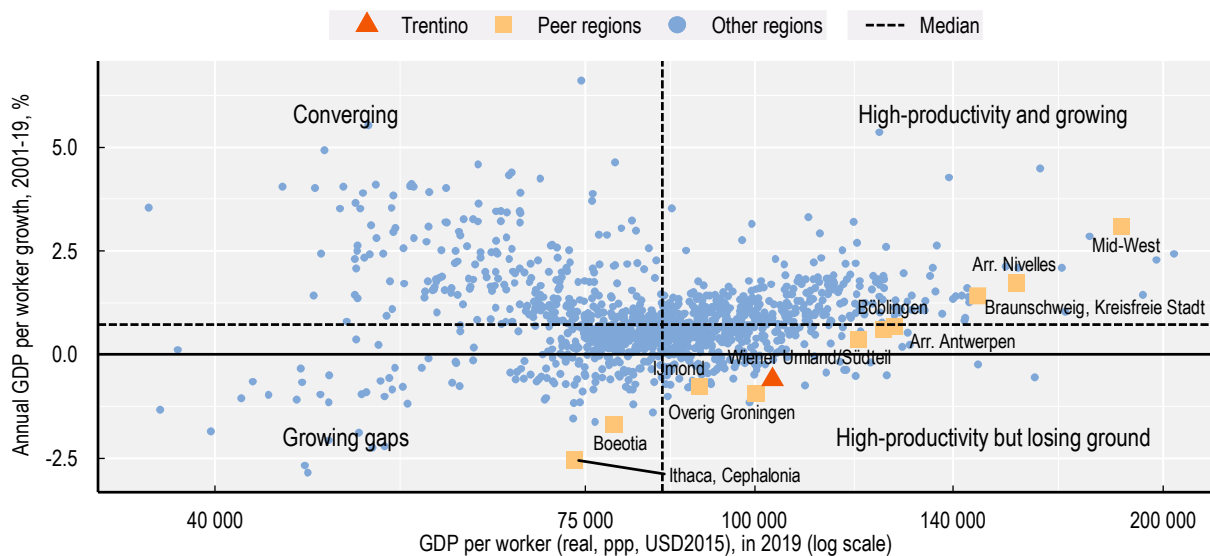
Trentino belongs to a group of high-productivity regions that are falling behind because of their persistently lower growth rates. Using the level and growth rate of GDP per worker, OECD regions can be divided in four quadrants (Figure 2.7). High-productivity regions are those with GDP/worker levels above the median OECD region. Trentino still belongs to this group of regions, as do most of the selected peer regions. Regions with positive growth rates in GDP per worker are present both in wealth and less-wealthy regions. Growing regions with below median levels GDP per worker are converging towards the mean (top left). However, many high-productivity regions also have above median growth rates (top right). Many of Trentino's peers are part of this group. Both high-productivity and low-productivity regions can have a poor growth performance. Trentino belongs to high-productivity regions that are losing ground (bottom right), while the two Greek regional peers, due to poor growth performance, now belong to the regions with growing gaps (bottom left).

Figure 2.6. Productivity, rather than employment rates, explains Trentino's widening gap



Note: See Box 2.3 for details on the selection of peer regions. Not all regions have data going back to 1987. GDP per capita in EUR2015 PPP. Source: OECD calculations based on ARDECO (European Commission).

Figure 2.7. Trentino belongs to a group of high-productivity regions that have been losing ground

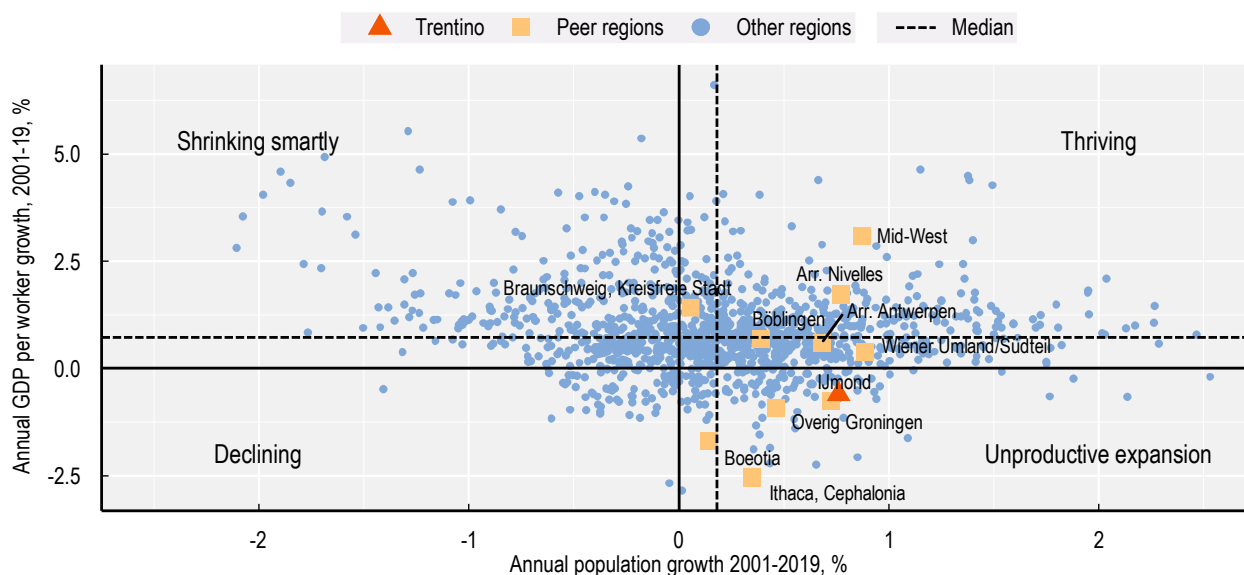


Note: See Box 2.3 for details on the selection of peer regions. Source: OECD calculations based on OECD Regional Statistics (database), <https://www.oecd.org/regional/regional-statistics/>.

Trentino has faced population growth and declining productivity, while most of its peer regions have been growing in both dimensions. In a scatter plot with population growth on the vertical axis and productivity growth on the horizontal axis. Four quadrants are defined based on the median annual population growth between 2001-19 and the median annual GDP per worker growth between 2001-19. Many regions in the top-left quadrant have experienced negative population growth but positive productivity growth, thus, are “shrinking smartly”. In “thriving regions” in the top right quadrant both population and productivity have been growing. “Unproductive expansion” regions are experiencing population growth but negative productivity growth. “Declining” regions see both below median population and productivity growth

which is negative for many (Figure 2.8). While most peer regions belong to the group of thriving regions, Trentino is classified as a region with “unproductive expansion”. In these regions, population growth is not driven by an increase in living standards, and in the long-term can lead to challenges such as increased social service demand and resource constraints.

Figure 2.8. In Trentino low productivity growth is combined with a growing population



Note: See Box 2.3 for details on the selection of peer regions.

Source: OECD calculations based on OECD Regional Statistics (database), <https://www.oecd.org/regional/regional-statistics/>.

3 The productivity of Trentino's firms

Introduction

The productivity and well-being of a region is driven by the productivity of its firms in the private sector. This chapter focuses on indicators of productivity within Trentino's private sector in comparison with peer regions, disentangling the relative contributions of different sectors and types of firms. It assesses to which extent the productivity gap of Trentino is due to its sectoral specialisation in low-productivity sectors, or rather to a lower average productivity within individual sectors. The chapter also investigates whether the small average size of Trentino firms and the relative scarcity of large firms contributes to a widening gap with peer regions.

An efficient allocation of resources to the most productive sectors or firms results in higher aggregate productivity. Combined with productivity gains within firms, the flow of inputs towards the most productive parts of the economy is the main driver of aggregate productivity growth in the private sector. Conversely, if production factors are disproportionately allocated to less productive sectors, or to the less productive firms within sectors, the overall productivity of the region declines.

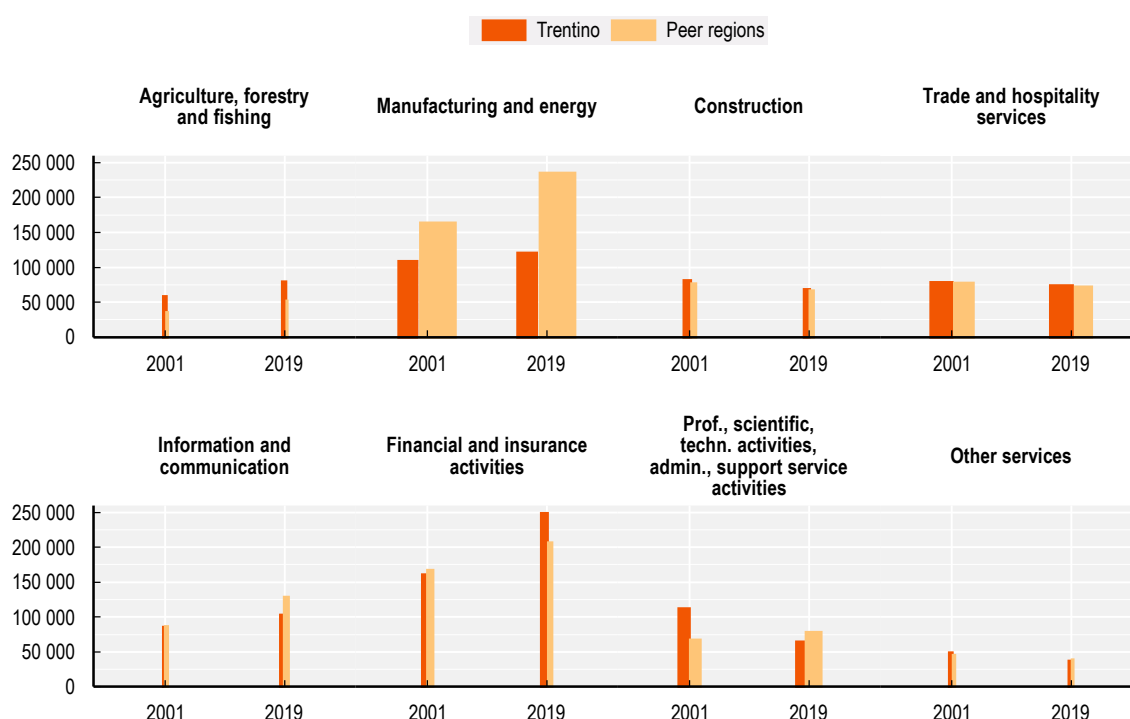
Trentino's productivity gap is mainly due to relatively weaker productivity in the manufacturing sector and in tradeable services

Trentino's economy is well-diversified across sectors, some of which have comparatively high productivity levels. In Trentino, manufacturing and energy production accounts for 18% of total value added in the region (Figure 3.1). Trade and hospitality services (21%) is the largest business sector in the economy in 2019. Relative to its peers, Trentino has higher GVA per worker in Agriculture (USD 80 000 vs 52 000), Financial and Insurance services (USD 25 000 vs 20 000) (Figure 3.1).⁷

Trentino's manufacturing sector accounts for a smaller share in the economy and has a lower average productivity relative to peers. Across peer regions, and across OECD countries more generally, manufacturing and energy are the sectors that contribute the most to high productivity levels and productivity growth. In Trentino, manufacturing and energy account for 18% of Trentino's GVA, compared to 33% on average across peer regions. These shares have stayed constant between 2001 and 2019. Furthermore, the productivity in this sector was about half of its peer regions in 2019. Productivity in the manufacturing sector grew in Trentino between 2001 and 2019, but not as fast as in peer regions. As a result, the productivity gap grew from 33% of the productivity level of its peers to 49%. Manufacturing output, which results from the combination of the productivity and the size of the sector, followed a similar trend: it grew by 15% in Trentino and by 35% in the peer regions. Other sectors in which the productivity gap with peers increased are Information and communication and Professional and scientific services. These two sectors combined accounted for less than 12% of total GVA in the region in 2019.

Figure 3.1. Trentino requires more productivity growth in the manufacturing and tradeable services

GVA per worker (USD2015, PPP).



Notes: See Box 2.3 for details on the selection of peer regions. Bar widths are proportional to the value added (VA) share of the sector in total economy, as indicator below the bars.

Source: OECD calculation based on OECD Regional Statistics (database), <https://www.oecd.org/regional/regional-statistics/>.

Trentino's largest services sectors have seen little productivity growth. Trade and hospitality accounted for almost 20% of the provincial economy in 2019. However, between 2001 and 2019, productivity in the Trade and hospitality sector declined by 6.5%. The Information and communication sector experienced productivity growth, but to a lower extent than in peer regions, while the sector of Financial and insurance activities experienced stronger growth than in the peer regions. Professional, scientific, and technical activities and administrative services experienced a significant decline in productivity between 2001-19, falling below the average productivity of peer regions.

Firms in tradeable sectors are fewer and less productive in Trentino than in peer regions

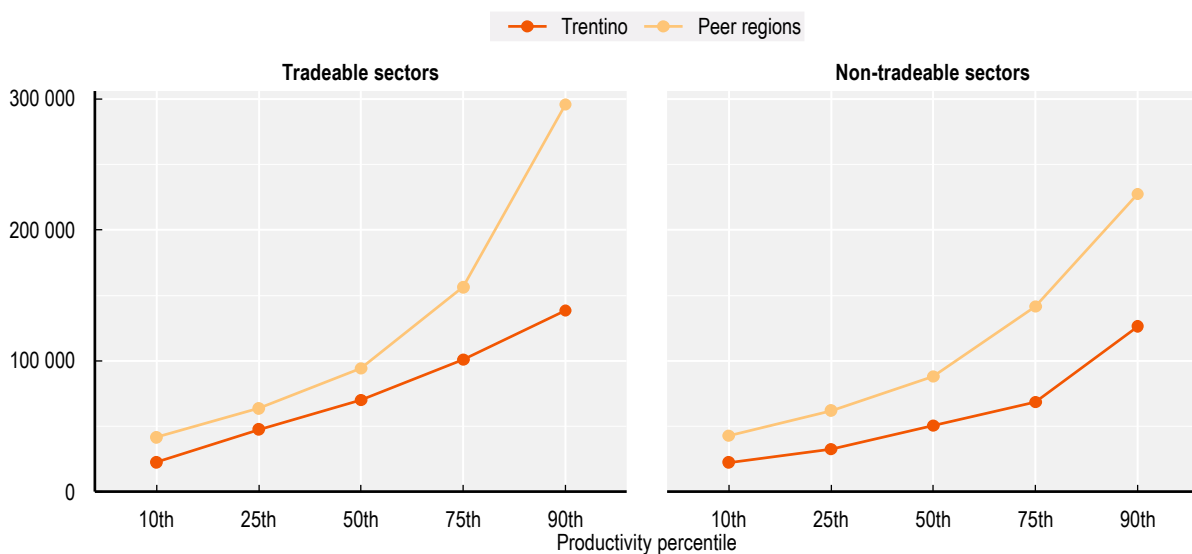
Firms in tradeable sectors are more exposed to national and international competition which can foster productivity growth. The distinction between tradeable and non-tradeable sectors acknowledges that firms can operate in sectors that are tradeable without actually engaging in trade themselves (OECD, 2018^[4]). Even without selling their goods and services abroad, firms in tradeable sectors are exposed to competition from abroad. This holds true for both small manufacturers and business services providers. Firms in hospitality and other tourism activities host foreign visitors, which counts as exports, and compete with touristic offers in other regions and countries. This competitive pressure ensures that tradeable sectors account for most of the productivity growth in the economy, which in turn drives aggregate productivity improvements.

Trentino faces a productivity gap in tradeable sectors due to a lack of very productive firms. The productivity of the bottom 50% of firms in Trentino is very close to the productivity of the bottom 50% of

firms in the peer regions in both the tradeable and non-tradeable sectors. This contrasts with productivity of the top 25% firms, and in particular of the top 10%, which is much higher in peer regions, especially in tradeable sectors (Figure 3.2). Trentino therefore lacks very productive firms that can lift overall productivity both directly and through business interactions, knowledge diffusion and other positive spillovers on smaller firms. The chart also shows that the productivity difference between tradeable and non-tradeable sectors in peer regions is concentrated in the top 25% firms. In Trentino, tradeable and non-tradeable sectors have a similar level of productivity instead, due to the lack of high-productivity firms in the tradable sectors.

Figure 3.2. The most productive tradeable firms of Trentino are half as productive as the most productive firms in the peer regions

Value added per worker at the 10th, 25th, 50th, 75th, and 90th percentile, 2019.



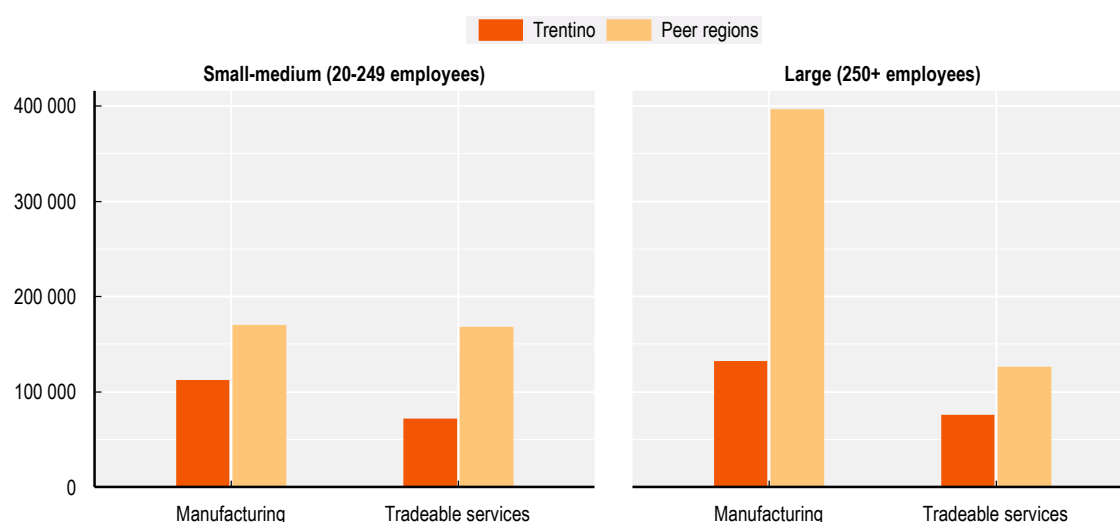
Note: Productivity based on value added method, as in Gal (2013_[20]). Firm observations are weighted by firms' employment. Firms with more than 5000 employees are omitted. See Box 2.3 for details on the selection of peer regions. Due to the scarce coverage in the ORBIS dataset, Dutch and Greek peer regions are omitted. Due to the exiguous sample of firms, the value for large firms in construction sector in Trentino is omitted. Tradeable sectors include extractive industries, manufacturing, advanced and other tradeable services.

Source: OECD calculations based on Orbis.

In manufacturing, productivity tends to increase with firm size, but this productivity premium for larger firms is much smaller in Trentino relative to other places. Business dynamics can allocate resources to the most productive firms. In tradeable sectors, especially manufacturing, productivity growth typically allows a firm to expand in employment, while investments increase its capital stock. This dynamic results in larger firms being more productive, especially in the manufacturing sector, where economies of scale tend to be larger than in services, on average (Berlingieri, Calligaris and Criscuolo, 2018_[21]). In Trentino there are few large manufacturing firms, and they are only marginally more productive than smaller firms. In 2019, there were 15 manufacturing firms with more than 250 employees headquartered in Trentino, accounting for about 13% of employment in the sector. Their aggregate productivity was 18% above the average productivity of medium and small firms (firms with fewer than 250 employees). In peer regions, the productivity of large firms in manufacturing sectors is 134% above that of medium and small firms (Figure 3.3). This is closely linked to the lack of very productive firms in tradeable sectors Trentino that emerges in Figure 3.2.

Figure 3.3. Trentino lacks a productivity premium for large firms in tradeable sectors

Weighted average productivity (value added per worker) of firms, 2019, EUR.



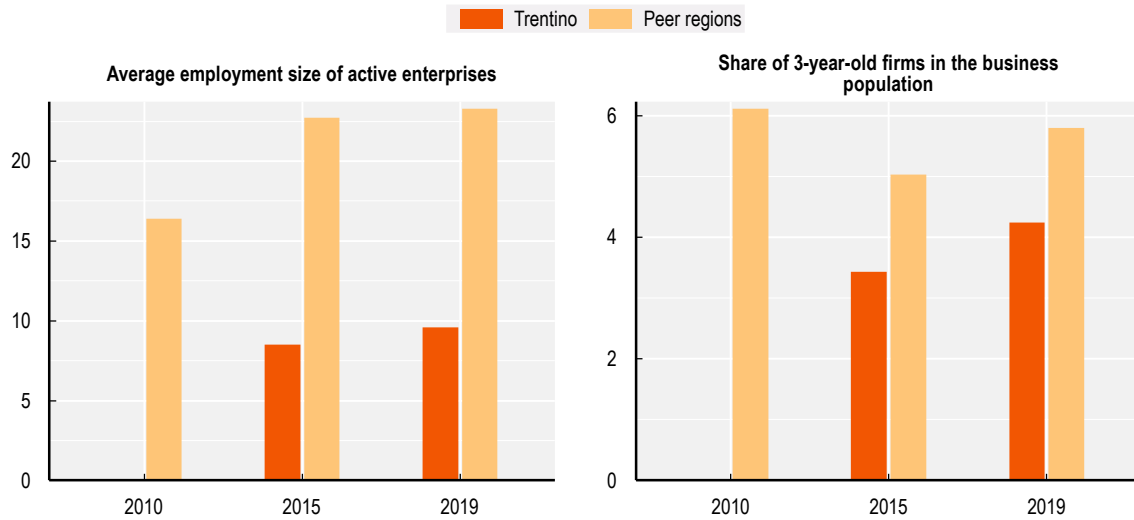
Note: Productivity based on value added method. Firm observations are weighted by firms' employment. Firms with more than 3000 employees are omitted. See Box 2.3 for details on the selection of peer regions. Due to the scarce coverage in the ORBIS dataset, Dutch and Greek peer regions are omitted. Due to the exiguous sample of firms, the value for large firms in construction sector in Trentino is omitted.

Source: OECD calculations based on Orbis.

In Trentino there are fewer large firms than in peer regions. The dearth of large firms in Trentino is not limited to the manufacturing sectors. The average size of firms in the private business economy in Trentino is less than ten employees, compared with more than 25 employees across peer regions (Figure 3.4). Moreover, 36% of workers are employed in micro-enterprises (those with less than 10 employees), relative to 24% in the peer regions (excluding Greece).⁸ While on average Trentino firms grew in employment between 2015 and 2019, the gap has not narrowed.

A large share of micro or small firms may reflect a young firm population, but this is not the case of Trentino. The majority of young businesses that are not originating from mergers or acquisitions are micro-firms with less than 10 employees (Calvino, Criscuolo and Menon, 2018_[22]). Therefore, a high share of micro or small firms may indicate a healthy firm churning process whereby new businesses replace firms that exit the market. However, young firms are about as frequent in Trentino as in peer regions, with 4% of firms which are three years old in Trentino, compared with almost 6% across peer regions on average.⁹ This suggests that the population of micro and small firms in Trentino is composed of mature businesses, which typically have a lower probability to grow (OECD, 2021_[23]). In both Trentino and peer regions, however, the share of young businesses has increased between 2015 and 2019, providing some indication that business dynamism and start-up rates are gaining momentum (Figure 3.4, right pane).

Figure 3.4. In Trentino there are more small firms and fewer young firms than in the peer regions



Note: See Box 2.3 for details on the selection of peer regions. Trentino data from 2010 is unavailable.

Source: OECD calculations based on OECD Regional Statistics (database), <https://www.oecd.org/regional/regional-statistics/>.

Internationalisation can help unlock the untapped potential of Trentino firms

Trentino firms have scope to internationalise to the same extent as firms in peer regions.

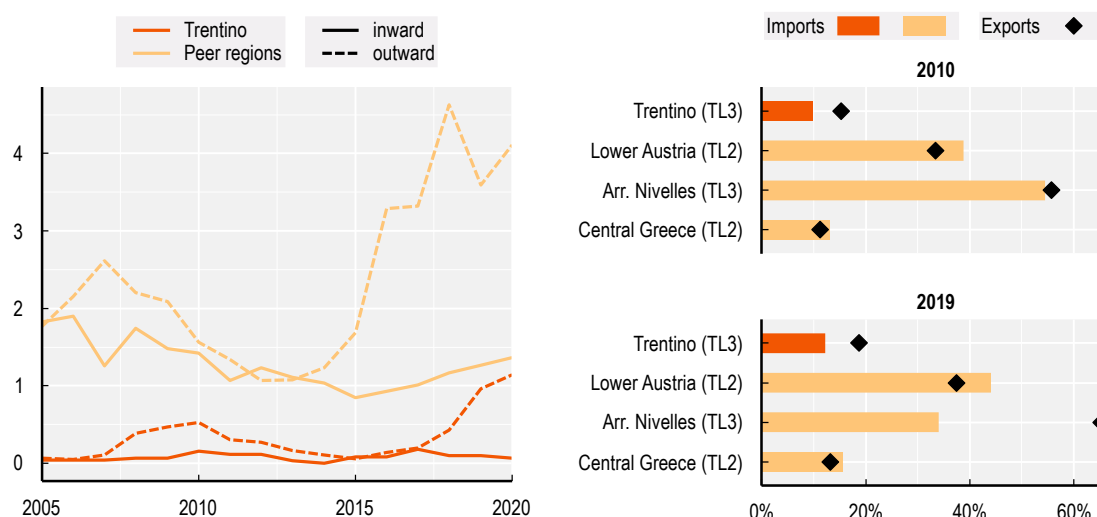
International activities of firms can be measured through investment activities, where firms take partial or full ownership of a foreign firm, and through international trade. The participation in international trade and investments can be both an outcome from productivity and a driver. On one hand, international trade and investments require the ability to overcome administrative, language and other barriers that are associated with crossing borders for commercial activity. Only the most productive firms may have the ability and resources to tackle such barriers and profitably engage with international clients and suppliers. On the other hand, participation in international trade and investments may also provide opportunities for learning, technology adoption and competitive forces that further stimulate productivity growth within a firm.

Inward foreign direct investments (FDIs) may boost productivity of the newly foreign owned firm, for instance when it adopts technologies of its new parent company. Local productivity and employment spillovers from FDIs may be present but are also very context specific. For instance, local direct competitors may see their business decline, but firms that provide complementary services and goods may benefit (Lembcke and Wildnerova, 2020^[24]).

Trentino has a larger FDI outflow and a lower FDI inflow than peer regions. Outward investments relative to the GDP of the investing region are about twice as large in Trentino as in peer regions over the same period.¹⁰ Conversely, inward capital expenditure over GDP are about five times larger in peers than in Trentino, on average between 2010 and 2020. Relative to peer regions, the aggregate inflow of FDI is lower in Trentino because inward FDI projects are both fewer and smaller in size. Inward FDI in Trentino can be associated to less than 0.5 jobs per 1000 workers, compared to between 1 and 2 jobs per 1000 workers in peer regions between 2010 and 2020 (Figure 3.5 left panel).

Figure 3.5. Foreign investments and trade of goods are lower in Trentino than in the peer regions

Left panel: Three-year moving average of the total number of jobs associated to FDI projects per 1000 workers in region. Right panel: International goods trade as % of regional GDP.



Note: Jobs from FDI projects by region from fDi Markets, which is based on publicly announced greenfield projects. For few OECD regions international trade statistics are available. The two TL2 regions contain the respective TL3 peer regions in Austria (Wiener Umland/Südteil) and Greece (Boeotia). Arrondissement Antwerp was excluded because its trade statistics are especially skewed due to its international seaport. See Box 2.3 for details on the selection of peer regions.

Source: OECD calculations based on OECD Regional Statistics (database), <https://www.oecd.org/regional/regional-statistics/>, and fDi Markets.

Between 2010 and 2019, the value of exports as a percentage of regional GDP in Trentino was less than half of the corresponding value in Austrian and Belgian peer regions. In 2019, exports were equivalent to around 18% of regional GDP and imports around 12% (Figure 3.5 right panel). In Lower Austria the comparable figures were more than 35% and 40% of GDP, respectively, and in Arr. Nivelles (Belgium), exports were equivalent to over 60% of GDP with imports more than 30%. However, some care is needed in interpretation as the higher import and export figures may reflect integration in complex GVCs, resulting in high shares of import content in exports. In terms of magnitude, Trentino's trade level is like that of Central Greece.

Small firms, especially in agriculture, have managed to increase exports through cooperative firms. Trentino has several larger cooperatives specialised in wine making and fruit, specifically apples. These cooperatives form a network of producers which have assisted the supply chain management required for smaller producers to export.

International exchange and multilingualism can help overcome some of the international barriers firms face. Trentino is located near the border of Austria and lies on a major transport route towards Germany. While this gives opportunities to increase international business activities, borders and language differences also represent barriers to trade. In 2014, the Piano Straordinario "Trentino Trilingue" introduced a trilingual (Italian, German, and English) educational system from kindergarten to high school with the adoption of the Content and Language Integrated Learning (CLIL). Furthermore, proficiency in German can represent a competitive asset for the region and professional upgrading. Currently, out of the total capital expenditure in outward FDI, only 5.8% is destined to German-speaking markets (Germany, Austria, and Switzerland).¹¹ Euregio – the Alpine Euroregion consisting of Tyrol, South Tyrol, and Trentino established a collaborative programme between Euregio industrial associations to facilitate student exchange experiences based on funded internships in companies.

Retail and tourism activities need an integrated approach to exploit synergies

Retail and tourism sectors can leverage important synergies. As a mountain region, tourism in Trentino is well-developed, however it is also susceptible to large fluctuations. In 2022, tourist arrivals increased by almost 50% in Trentino from the previous year, largely indicating a recovery from the COVID-19 pandemic. Retail is a non-tradeable sector, servicing local demand. However, retail and tourism can have important synergies because the attractiveness of a region for tourism is in part due to having lively towns that support retail activity. For example, the recovery of tourism between 2021 and 2022 directly increased the turnover of the food sector by 7% and the non-food retail sector by 9% (Camera di Commercio di Trento, 2022^[25]).

The presence of retail stores may be threatened by the trend of e-commerce replacing sales in physical stores. Small stores may not be able to rely only on sales to tourists while simultaneously facing the challenge of adopting digital tools for their administration or expanding to e-commerce. The adoption of such technologies requires investments as well as digital skills, which may not always be present among the owners and employees of small stores (OECD, 2023^[26]). Box 3.1 discusses how existing stores in towns and cities may use the opportunity of online sales and overcome barriers to its adoption.

Box 3.1. What can small retailers do in an increasingly online world?

Some retail stores are going through a digital transition that may offer opportunities for establishment growth. Between 2010 and 2022, 630 retail shops closed in Trentino, accounting for more than 10% all stores in the province. Clothing and other textile stores were most hurt with 81 stores closing over the period (Camera di Commercio di Trento, 2023^[27]). Part of this decline can be attributed to the rise in e-commerce. For instance, when consumers increasingly buy clothing and other goods online, the need for physical stores in population centres declines, and jobs of shop assistants are replaced by workers in distribution centres, potentially located elsewhere in the country or abroad. However, Trentino shops could use the potential of e-commerce to unlock national and international markets and compensate for the reduction in physical sales by adopting a hybrid model (OECD, 2023^[26]). Between 2010 and 2022, more than 230 firms have engaged in e-commerce activities in Trentino (Camera di Commercio di Trento, 2023^[27]).

The adoption of e-commerce platforms and strategic use of such technologies can be daunting for small business. First, a key barrier to e-commerce adoption is lack of technical digital skills. There are many different software programs and sales platforms but limited resources to guide toward a unique set of solutions. Second, maintaining an e-commerce website requires an initial investment in technology and marketing. Furthermore, managing shipping and logistic can be complex and costly especially with limited resources.

Small shops that manage to overcome those barriers can reach a broader audience beyond the local area. A website and social media presence can motivate customers to visit the shop. E-commerce platforms also provide valuable data on demand trends that can help businesses make informed decisions and tailor offering to customer preferences. A study by Salesforce.com indicates that digital orders are increasingly influenced by physical stores, and retailers with physical stores will grow online sales at a rate of 1.5 times faster than those without (OECD Cogito, 2022^[28]).

Source: (ILO, 2021^[29]), (OECD Cogito, 2022^[28]), (OECD, 2023^[26]), (Camera di Commercio di Trento, 2023^[27]).

Trentino is not alone in facing the challenges of the changing patterns of tourism and how it interacts with the wider economy. The “Swiss model” of tourism is regularly cited as innovative in the face of changing trends. The model relies on adopting digital tools and strong collaboration among

stakeholders, specifically to create local tourism promotion strategies that work well for places, including the local retail sector (Box 3.2). In France, *Action Coeur de Ville* is a national project to revitalise small towns in France, backed by the *Caisse des Dépôts* (Ministère de la cohésion des territoires et des relations avec les collectivités territoriales, 2019^[30]). This programme allows towns to apply for funding for local development, including to expand or improve the tourism offer, provided that such initiatives are also well integrated with other policy areas, such as housing, culture, employment, mobility and local retail.

Box 3.2. The Swiss tourism model

Switzerland is known for its well-established and successful tourism industry. The Swiss model often serves as a benchmark for effective tourism management and currently includes initiatives such as sustainable tourism practices, high-quality services, and natural and cultural resources preservation.

The Swiss tourism recovery 2020-23 programme aimed to tap into types of tourism that are growing and contribute best to its destinations. The programme aims to promote sustainable tourism development by encouraging guests to stay longer in one place. Extended stays can reduce the ecological footprint and increase added value. The “Swisstainable” campaign is another initiative to promote sustainability-oriented product development. Cities will also be marketed as a starting point for Swiss holidays by positioning them as “City Nature Resorts”. The planned activities are intended to replenish the cities with visitors, help city hotels achieve higher occupancy rates and local shops increase their revenues. Business tourism is also stimulated to open new market segments.

The Tourist Office 3.0 initiative is an initiative to support digitalisation in the tourist sector. It aims to bring together technology partners, tourist offices and other stakeholders locally to analyse the future function of the tourist office. The Swiss strategy recognises that the wider sector can promote digitalisation through its links with local SMEs. The Tourist Office 3.0 initiative recommends establishing a collaboration platform for tourism SMEs and destinations that supports their access to information, best practices and knowledge-sharing opportunities.

Source: (OECD, 2022^[31]).

4 Other drivers of productivity: Trentino's strengths and gaps

Introduction

The comparison of Trentino with peer regions across drivers of productivity points to Trentino's relative strengths or weaknesses. The analysis compares Trentino with peer regions across a range of indicators covering the local labour market, workers' skills and training and R&D and innovation. Indicators for these three subjects are summarised in the Infographic in the executive summary. Methodologically, the analysis builds on similar approaches adopted by The European Commission (Box 4.1), the Productivity Institute in the UK and the Basque Institute for Competitiveness Orkestra, Spain (see Box 4.2 for details).

Box 4.1. EU Regional Competitiveness Index

The European Commission has published a competitiveness index of European regions since 2010. Based on NUTS2 level large regions (broadly overlapping with OECD TL2 regions), regions are scored across multiple economic and social dimensions that cover the quality of government and macroeconomic stability, the ability to innovate and having a well-functioning labour market and the extent that firms adopt new technology and work at the forefront of technology.

The interactive tools of the 2022 edition include comparison across selected peer regions. The website of the EU Regional Competitiveness index includes options to review the scores and rankings of the individual indicators and compare regions with so-called peers. The comparison with peers allows to create a score card to visualise whether a region is underperforming, performing similarly or overperforming individual competitiveness indicators relative to its regional peers.

How does Trentino perform in the EU regional Competitiveness Index?

According to the EU's 2022 scorecard, Trentino is mostly underperforming relative to the peer selected by the EU's algorithm. Trentino reaches similar or slightly higher scores in three of the 11 indicators, notably "health", "higher education and life-long learning" and "business sophistication". All other indicators indicate a lower score relative to its peers. The overall score of 90.2 compares to the EU27 average of 100, ranking Trentino 141 of 234 regions.

Source : (Dijkstra et al., 2023^[32]), https://ec.europa.eu/regional_policy/assets/regional-competitiveness/index.html.

Trentino's healthy labour market could benefit from an inflow of skilled workers, which would also be instrumental to boost private R&D investments. The labour market is functioning well, but female participation is lagging, suggesting the need for further initiatives to create a more inclusive labour market. The educational attainment of locals and share of high educated migrants remains behind peer regions.

Finally, public support on R&D is high in Trentino, but private sector investments remain low compared to its peers.

Box 4.2. Benchmarking drivers of productivity

Innovative tools to visualise the multi-dimensionality of regional competitiveness.

Highlighting the regional performance over a range of indicators can be more informative than providing a single score of competitiveness, especially when the objective is to provide recommendations on policy options. This report develops such a score card building on similar approaches developed elsewhere. For instance, The UK based Productivity Institute has developed Productivity scorecards, that compare UK ITL1 (equivalent to OECD TL1) regions with the national average and also offer some insights on short-term and long-term changes, comparing ITL3 (equivalent to OECD TL3) regions to the ITL1 average (Menumkin, Gouma and Orega-Argilés, 2023^[7]). The European Commission also rates the competitiveness of NUTS2 regions (equivalent to OECD TL2 regions for many countries) across multiple dimensions, providing a scorecard for each region relative to a set of peer regions for most recent years (see Box 4.1 for further details). Finally, The Basque Competitiveness Institute Orkestra provides an interactive website that presents economic and social (well-being) indicators across European NUTS2 regions over time as well as annual reports on the Basque Country.

Data

The data for the scoreboard in this report is retrieved from OECD Regional statistics. Where data for specific years are missing, the year before or after is used to fill in. Where TL3 level data are missing, TL2 level data is used. One indicator is calculated using micro data of the European labour force survey, notably the percentage of young (under 40 year old) managers of all managers in the workforce.

Traffic lighting

The infographic in the executive summary summarises for Trentino the five- and ten-year development for each indicator, as well as the level in 2019 and the change since 2015 relative to its peers. Thresholds are chosen to determine under- and overperformance of Trento relative to its own past and to peers. The threshold for the “level relative to peers” is set at 10 percentage points, for five-year change at one percentage points. The thresholds for the relative trend difference are set at one percentage point. For some variables the ratios are reversed for a consistent interpretation, e.g. for the unemployment rate a lower rate is better.

A well-functioning labour market that can further benefit from better including women

Trentino’s labour market has maintained low unemployment rates through economic cycles, including for youth. In 2019, the unemployment rate was 5% in Trentino compared with 6.3% among its peers. Even in the aftermath of the global financial crisis, between 2010 and 2015, the unemployment rate did not surpass 7% (Figure 4.1). Part of the low unemployment rate and the resilience of the local labour market can be attributed to effective provincial public employment services, which execute the active labour market policies in the province (Barr et al., 2012^[12]). Youth unemployment, at 11.5% in 2019, is below peer regions (16.0%) and its trend has been outperforming peers over the past 10 years. Box 4.3 provides an example of a long-running initiative coordinated with the provincial branch of the employers’ association Confindustria to provide real world business experience to students, which can help their transition to the job market after their studies.

Box 4.3. “Tu sei” Project: Students' training in Trentino

Since 2008, the Tu Sei project aims at reinforcing the school-training-work chain by fostering collaboration between Trentino local businesses and high schools. As a collaboration between the Autonomous Province of Trento and Confindustria Trento, it is a well-established annual initiative which has involved more than 10 856 students, 263 schools, and a total of 287 companies over the years (Confindustria Trento, 2023^[33]). The schools' goal is to promote skills that are functional to the labour market as well as innovate in terms of interdisciplinary approaches, hands-on learning, problem-solving, project-based work, and entrepreneurial skills. Meanwhile, businesses are encouraged to become "educational" and capable of conveying to young people the skills and tasks required by the business environment (Confindustria Trento, 2021^[17]).

An educational institute and a local business collaborate yearly to provide a real business project experience. To provide students with an effective school-work alternation path, the Tambosi Institute started collaborating with Saidea in 2017. Saidea is an ICT services company specialized in management of corporate information systems. Instead of an internship, Saidea asks the selected class to implement a specific project every year. For example, students collaborated on the development of software for managing the company's warehouse and the creation of a deadline management system. Students have weekly meetings with members of the team, mirroring the typical activity of the company towards clients. By doing this, a real connection is established between the students and the job market, and in this case, with the information technology sector (Saidea, 2021^[34]).

Source: (Confindustria Trento, 2023^[33]) (Confindustria Trento, 2021^[17]) (Saidea, 2021^[34])

While employers experience labour and skills shortages in 2022 and 2023, attracting workers may still be feasible through reviewing working conditions. Box 4.4 recounts the views of local stakeholders on difficulties in the local labour market. While employers may have difficulties finding enough workers, part of this may be due to local workplace practices that prevent potential candidates from looking for jobs in Trentino. One suggestive indicator is the possibility to take on responsibilities for you people. However, the share of young managers (those 40 years old or less) decreased from 18.4% to 16.8% in Trentino, compared with nearly 30% in peer regions.

Box 4.4. Stakeholder voices: labour shortages and working conditions in Trentino

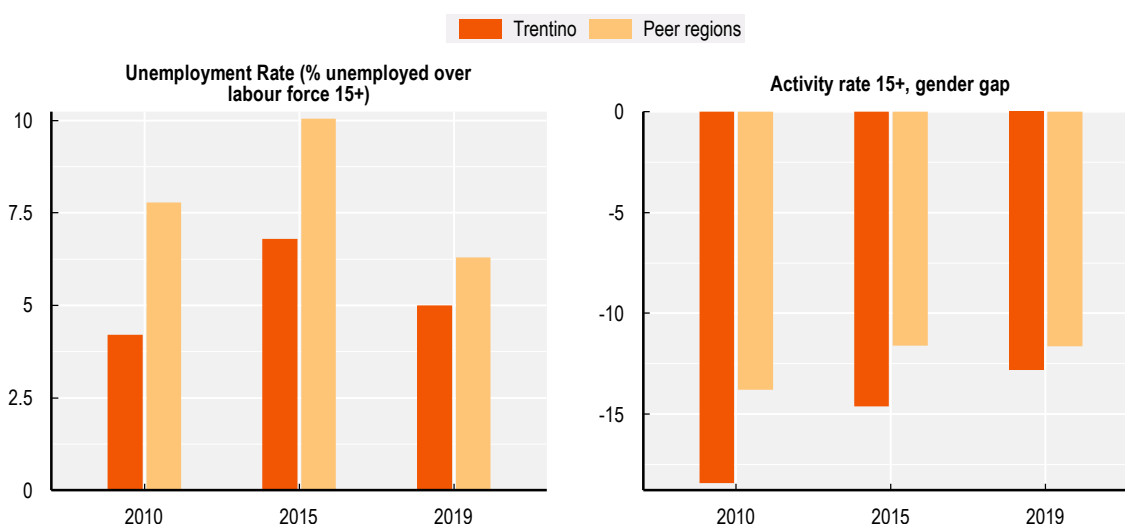
Labour shortages are prevalent across sectors in Trentino. Employers report that an increasing number of vacancies remains open for longer due to the lack of workers with the required technical skills, formal degrees or necessary experiences. Regional stakeholders observe that some firms have increased investments in automating production processes to address the lack of workers.

Improving working conditions and collective coordination for contracts are among the priorities for the future. One of the factors that may underly labour shortages is work conditions becoming less attractive to prospective workers. Salaries remain low while employers struggle to navigate the fiscal burden and social premiums paid on top of wages. Local employers may need a change of perspective that focuses on increasing value added and productivity rather than costs, to improve working condition and attract workers to the region to alleviate labour shortages. Salaries for young workers are considered not to be appealing compared to those offered in the neighbouring regions.

Source: Stakeholder interviews.

Increasing the participation of women in the labour market could in part be address the experienced labour shortages. In Trentino, the male-female difference (gender gap) in labour market participation has decreased from 18 percentage points (p.p.) in 2010 to 13 in 2019. In peer regions the gender gap decreased from 14 p.p. to 12 (Figure 4.1). However, labour force survey data does not show a larger gender gap within firms than in peers. For instance, in 2019 the share of female managers was around 26% in Trentino, relative to 30% in peer regions, while the percentages in both Trentino and its peers appear to be stable between 2015 and 2021.

Figure 4.1. Low unemployment rates but low female labour participation



Note: See Box 2.3 for details on the selection of peer regions.

Source: OECD calculations based on OECD Regional Statistics (database), <https://www.oecd.org/regional/regional-statistics/>.

Beyond the job market, the gender gap in Trentino is present in entrepreneurship and the representation among economic policy stakeholders. In Trentino, only 18.5% of enterprises are women-led. This represents a lost opportunity of talented people who could have created successful businesses but various barriers hold them back (Box 4.5). Moreover, during the preparation of this report

the OECD spoke with 13 stakeholders representing trade and industry associations, employer associations and labour unions. All designated interlocuters were men. Women are represented in sub-committees, often tasked with specific issues related to female participation in their sectors.

Box 4.5. Stakeholder voices: addressing the gender gap in entrepreneurship

Women among “missing” entrepreneurs in the EU, Italy and Trentino

If women participated in early-stage entrepreneurship at the same rate as “core age” men (i.e. 30-49 years old), there would be an additional 5.5 million women entrepreneurs in the European Union (OECD/European Commission, 2023^[35]). Among European countries, Italy has the highest ratio of “missing” women entrepreneurs to number of early stage entrepreneurs. Surveys reveal that women are held back in business creation by a range of barriers such as a self-perceived fear of failure and skills gaps. In Trentino, women-led enterprises constitute a minority, representing 18.5% of total businesses, and they are predominantly concentrated in traditional sectors (Camera di Commercio Trento, 2023^[36]).

Trentino experiences

Cultural barriers, lack of role models and insufficient entrepreneurship training are cited as among the most important barriers to women entrepreneurship. These barriers may come on top of other constraints many small businesses face, such as access to credit and time required for bureaucratic procedures. A lack of childcare or other care facilities for elderly also binds many women to remain at home. Improving the gender balance among the company boards and in representative organisations can help make the issue of the missed opportunities of female entrepreneurship salient.

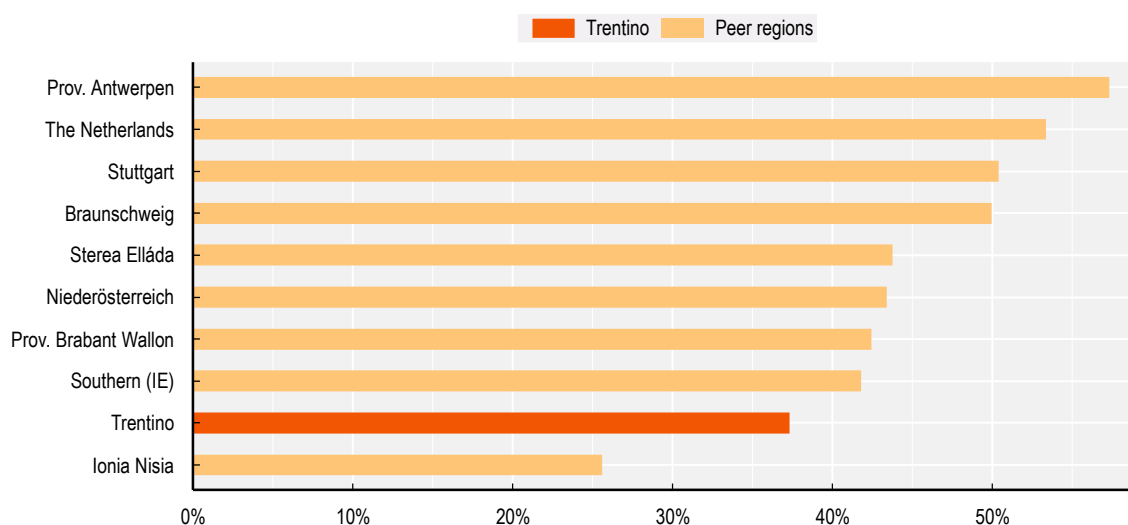
The Trentino Committee for the Promotion of Women’s Entrepreneurship (CIF) provide female focused entrepreneurship courses and workshops. CIF collaborates with the Provincial Commission for Equal Opportunities, the Trento Employment Agency and the Trentino School of Management. CIF also advocates for women entrepreneurs, facilitate professional support networks and highlight success cases that can act as role models to inspire others.

Source: Interview with stakeholders, (OECD/European Commission, 2023^[35]).

Formal methods to find a job account for 37% of job matches in Trentino, relative to 50% on average across the Dutch, German and Austrian peer regions in 2021 (Figure 4.2). Formal methods for job matching include responses to publicly advertised job ads, or hires supported by public services, including employment services or training institutions. Informal methods instead include family ties and social relationships. Informal channels bring a number of potential advantages in job search, for instance low search and recruitment costs. However, the prevalence of informal channels also makes the local labour market less permeable to outsiders, including skilled workers from other regions and countries and may not reach the best candidates for each vacancy. This can exacerbate some of the problems of Trentino labour market, such as the low female labour participation and the scarcity of highly educated workers. The low rate of formality in hiring in Trentino may depend on national factors, as in the Italy as a whole the share of workers who found their job through informal channels is equal to 28%.

Figure 4.2. In Trentino only 37% of workers found their current job through a formal channel

Workers finding their current through formal channels, %, 2021.



Note: The regions represent the European NUTS2 regions of the selected regions, except for the Netherlands, where the national average is given as no regional information exists in the survey. Formal methods include job advertisement, public employment services, private employment agency, education or training institutions, public competition application. Informal methods include friends, relatives or acquaintances, and direct contact with employer.

Source: OECD calculations based on the European labour force survey.

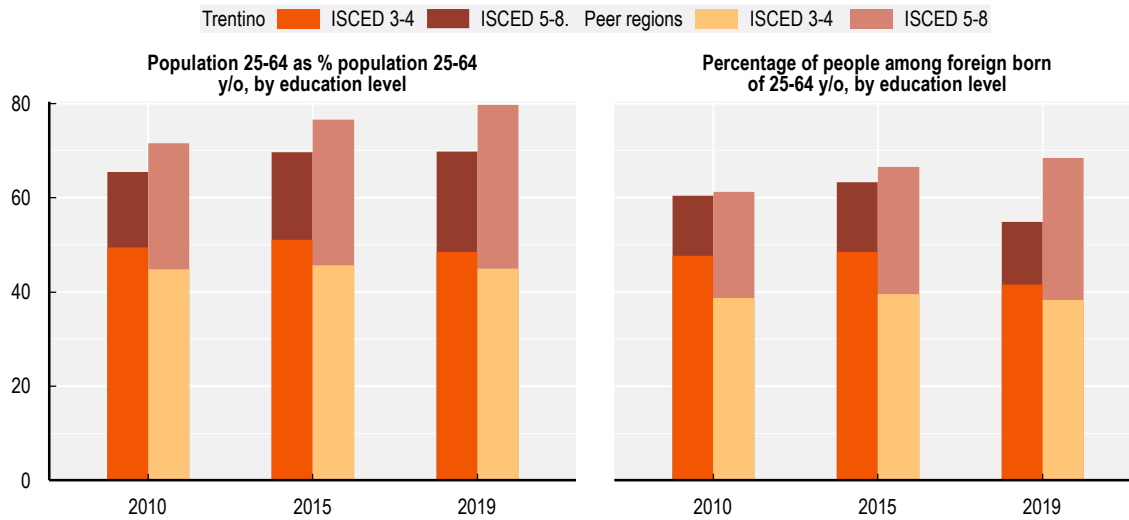
Education levels among the workforce can be boosted

One in five persons have a tertiary education in Trentino, compared with more than one in three in its peers. Seven in ten people aged 25-65 have at least a secondary degree in Trentino, with compares to eight in ten people among peer regions. The share of people with at least secondary education has increased over the past ten years by 4.4 percentage points, compared to eight percentage points in peer region (Figure 4.3). Trentino's share of tertiary educated workers increased from 16% in 2010 to 21% in 2019. In peer regions the same share increased from 27% to 35%, which leaves Trentino about 14 percentage points below that of its peers.

Trentino has a similar share of foreign-born workers relative to peers, but they are on average less educated. The share of foreign born in Trentino and peer regions is very similar, increasing from around 13% in 2010 to 16% in 2019. However, the share of foreign born with tertiary education in Trentino lags peer regions. In 2019, 13% of foreign born had a tertiary education, relative to 30% on average in peer regions.

In Trentino relatively few workers with a degree in Science, Technology, Engineering, and Mathematics (STEM) work in a STEM-related occupations. While Trentino shares a comparable percentage of workers with STEM degrees to its peer regions, at 23.4% in 2019, only 23.6% of those are employed in STEM-related occupations. This contrasts with the situation in the peer regions, where the figure is slightly higher at 27%. In the Netherlands, Belgium, and Germany, the ratio of individuals with STEM degrees working in STEM fields exceeds 30%. This suggests that Trentino's labour market might not be fully utilizing the skills of its STEM-educated workforce, leading to a mismatch between educational qualifications and job market demands.

Figure 4.3. Persistent gaps in share of tertiary education among Italian and foreign born



See Box 2.3 for details on the selection of peer regions. Regional level information is available for Germany, Austria, Belgium, Ireland and Greece at TL2 level. For Netherlands no regional disaggregation is possible and the national figures are included.

Source: OECD calculations based on European labour force survey.

Skills initiatives that combine training and work create opportunities for young and older workers to upskill and gain further qualifications. To address the gap in training, local stakeholders, including industry associations, unions, training institutions, and employment agencies promote existing training programs that align current market trends and specific firm needs with the educational attainment of workers. Education in Italian provinces is provided by secondary technical schools, vocational education and training, professional university's programmes, and industrial research doctorates. Companies often rely on local training organizations affiliated with unions or the Trentino School of Management (TSM), the Trentino People's University (UPT) and CiEffe, a vocational training institute helping companies in Trentino gain technical-related skills for their employees. Many programmes of these institutions aim to combine schooling and work, which can be an attractive option for people that do not have the opportunity to follow a full-time degree. In 2021, about one in seven workers in Trentino indicate to have recently followed some form of training. This compares with one in 12 on average across peer regions.¹² Yet, local stakeholders recount how some employers may not sufficiently appreciate the link between formal skills acquisition for current workers and firm performance (Box 4.6).

Box 4.6. Stakeholder voices: rewarding continuous training to manage changing skills needs

Stakeholders widely acknowledge the need for further investments in continuous skills development. Some workers are dismissed, rather than retrained, when firms automate parts of their production. Hospitality requires managers with sector-specific knowledge, while few people in the region have the formal qualifications to take such role. Consulting and advisory to firms is often drawn from outside the region because of a local lack of expertise and formal credentials. Continuous learning programmes are not widely available in firms, as it is often viewed as a benefit for workers rather than an investment to increase their productivity.

Various education and training initiatives are present in the region, but they are not sufficient to address all challenges. For students, some vocational education programmes combine work and study, which can help those less likely to acquire advanced degrees to remain engaged with study programmes. Such programmes may also be suitable for older workers wishing to acquire new skills. In family-owned firms, generational coaching and mentoring can help prepare the next generation.

Firms need to invest in the skills of current workers, but such training must also be rewarded. Managerial responsibilities are based on seniority and formal qualifications. Yet, often job tenure tends to be more important than formal qualifications in promotion decisions, decreasing training incentives.

Further collaboration between industry associations, unions, training institutions, and employment agencies can enhance existing training programs in the tourism sector. An improved training supply can contribute to higher qualification standards for personnel in the tourism sector. Investment in local training options, for instance a dual system, where students alternate between school and work, could offer attractive options for high-school graduates as well as current workers that wish to up-skill.

Source: Stakeholder interviews.

Private sector R&D can further leverage publicly supported research centres

Trentino hosts a large university and two regional research centres. The university of Trento has more than 800 academic staff and 16 000 students. Among them, 43% of graduates (academic year 2022/2023) and 60% of academic staff are in STEM (Science, Technology, Engineering and Mathematics).¹³ The two regional research centres are Bruno Kessler Foundation (FBK) and Edmund Mach Foundation (FEM), which jointly employ a further 500 researchers. FBK is focused on information technology, microchips, artificial intelligence and robotics, while FEM concentrates on agricultural and biotechnology. The two centres have benefited from long-term support of the provincial government. The strong productivity performance in the agricultural sector relative to peers (Figure 3.1) attests to successful collaboration between the research community and the sector. Box 4.7 provides evidence from local stakeholders on the effort to bring innovative solutions in the retail and tourism sector.

Box 4.7. Stakeholder voices: a “last mile” effort to fully leverage public research institutions

Trentino stands out for its highly rewarded research centres, including the Bruno Kessler Foundation, the Edmund Mach Foundation, and the University of Trento. These centres of excellence have the potential to drive innovation. However, there is a pressing need for closer cooperation between these entities and local firms. Local stakeholders are calling for greater synergy, improved knowledge sharing, and a more profound understanding of the operational needs of local businesses. This collaborative approach is crucial for fostering an environment where academic research can be effectively translated into commercial applications, thereby enhancing the region's competitive edge.

The tourism sector offers a positive example in this context. Trentino Marketing has adopted HBenchmark, an innovative Hospitality Data Intelligence tool, to support tourism operators in managing their offerings more effectively. By leveraging real-time data, this tool aids in the optimisation of planning, promotion, and investment strategies for hotels.

However, the full potential of tools like HBenchmark can only be realised when combined with specialised expertise, such as the role of the revenue manager. Despite the availability of general consultancy services, Trentino faces a challenge in attracting and retaining professionals in specialised positions like revenue management. These experts are crucial for interpreting the wealth of data provided by platforms like HBenchmark and translating it into actionable strategies. However, such professionals tend to move to large urban agglomerations in search of better career opportunities, which creates a skill gap in the local market. Addressing this issue is essential for Trentino to harness the full scope of opportunities presented by data intelligence in tourism and to ensure that such innovative tools lead to tangible improvements in the sector's growth and sustainability.

Trentino is also focusing on innovative environmental solutions for urban areas showing signs of decline. The retail sector, particularly in historic city centres, is undergoing a transformation, integrating more closely with e-commerce, especially in the non-food segment. This evolution necessitates a reevaluation of urban development policies, ensuring they account for the changing landscape of retail and online commerce. The Trentino regeneration plans are at a critical juncture, aiming to revitalise these urban spaces while preserving their historic value.

Source: Stakeholder interviews.

Public sector supported R&D are embedded in regional strategies for innovation that incorporate national and international collaboration. Beyond support for research, the province aims to stimulate private sector innovation through its regional development agency and long-term economic development strategies. Its smart specialisation strategy identifies areas for innovation that builds on the presence of high-tech research centres as well as its natural environment (see Box 4.8). The province also engages in international collaboration, for instance through participation of the macro-regional strategy for Alpine regions (EUSALP).

Box 4.8. Trentino's Smart Specialisation and Internationalisation Strategy

Smart specialisation and productivity

Trentino's 2021-2027 smart specialisation and sustainability strategy (S4) contributes to productivity growth by aligning local public policies with private sector actions. The plan identified four specialisation areas that encompass sectors and economic activities where the Province possesses a competitive advantage. The areas are "sustainability, mountain and energy resources", "ICT and digital transformation", "smart industry" and "health, nutrition and lifestyle". These areas align with European long-term strategies that focus on sustainability and climate neutrality by 2050, digitalisation and strengthening SMEs.

The Strategy focuses on productivity growth in high valued added sectors

High value added sectors, such as high tech manufacturing and knowledge intensive and advanced services are active across the specialisation areas. This includes high value added agriculture, medical and health services and technologies, advanced manufacturing techniques and ICT services. The tourism sector is featured through the areas of digital technologies for tourism and sport and sustainable mobility.

Building on local strengths

The strategy aims to build on local strengths of the region. These strengths include the specialisation in the research centres that can contribute to the specialisation areas, the geography and natural resources of the Province and activities of best performing sectors and firms in the region.

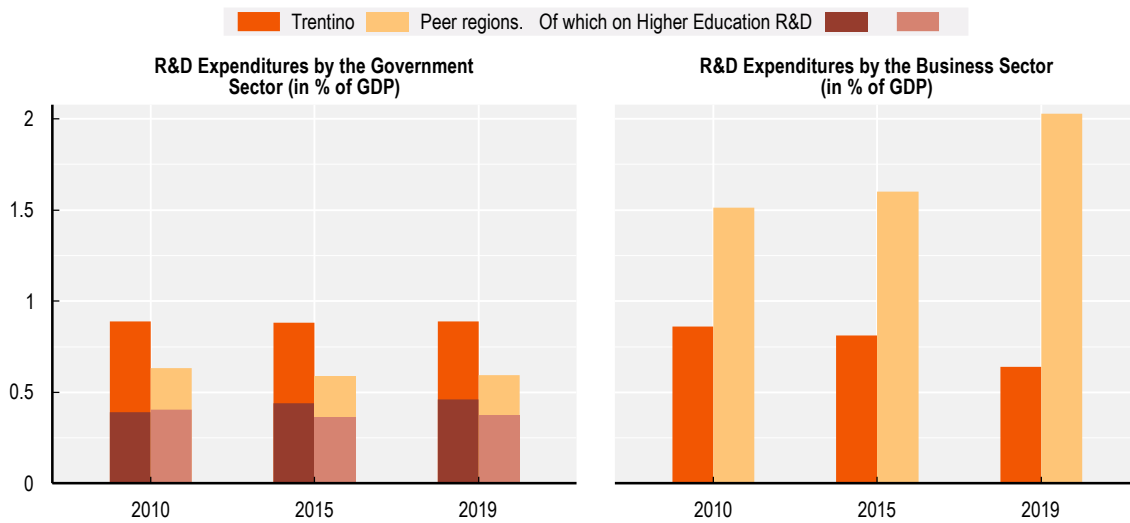
Recognising existing challenges

The S4 also highlights potential bottlenecks and challenges to make progress on the specialisation areas. The strategy aims to increase R&D investments in private sector and create further synergies with the publicly funded research, increase the formal education or skills attainment in the workforce, increase the collaboration at the regional and European level, especially with similarly innovation focused places.

Source: Autonomous Province of Trento.

Government supported R&D expenditures in Trentino are high, but do not fully compensate for a shortfall in the private sector. The provincial support for public research institute is confirmed in the statistics for R&D spending. Relative to peers, government spending on R&D is almost twice as large as peers, amounting to over 0.44% of regional GDP (Figure 4.4). R&D spending in the academic sector, often also benefitting from public support can be added to this. The share of R&D spending amounts to 0.46% of GDP in 2019, above the 0.37% seen on average in peer regions. Taking government and higher education together, in 2019 total public R&D spending is 0.89% in Trentino and 0.63% in peer regions. The private sector, instead, accounts for 0.6% of spending of regional GDP in Trentino, relative to 2% among peer regions in the same year. Hence, the larger public spending share does not fully bridge the gap in overall spending with the peer regions.

Figure 4.4. Provincial government push for R&D needs more synergies with the private sector



Note: See Box 2.3 for details on the selection of peer regions.

Source: OECD calculations based on OECD Regional Statistics (database), <https://www.oecd.org/regional/regional-statistics/>.

A deficit in private sector innovation is a common challenge in regions with large share of small and medium sized enterprises. Many different policy initiatives exist across OECD regions to broaden innovation to the private sector, and specifically to include SMEs. Box 4.9 provide two recent examples of policy experiments in Cantabria (Spain) and Slovenia. In Cantabria, the initiative focused on technology adoption in the agri-food industry in preparation for the ongoing green and digital transitions. In Slovenia, the initiative focused on establishing closer connections between research institutes and SMEs to allow for increasing the technological readiness of production, for instance for Industry 4.0.

Box 4.9. High Impact Actions to broaden and diffuse innovation to SMEs in regions

The challenge to involve SMEs in a coordinated push for technology adoption and more innovation is shared across many regions. Relative to large firms, SMEs often lack the capacity to dedicate substantial resources to R&D or to update well-established production processes with new technologies. However, SMEs constitute the lion share of regional economies and may have the best potential for growth through innovation and technology adoption.

High Impact Initiatives (HIA) provide lessons from policy experiments that aim to broadening innovation activity. In Cantabria, Spain, a HIA, aimed to build demand and support for the use of renewable energy, digitalisation technologies and to promote social inclusion in the agri-food sector. Cantabria is a region located in Spain's northern coast where the agri-food sector represents about 20% of the region's total industrial GDP and employment. The HIA helped several small, traditional agri-food companies address cost-related obstacles associated with the green and digital transitions. It also helped build awareness of the benefits associated with such transitions and necessary skills for managers and employees. By supporting small businesses in isolated rural areas, the HIA not only contributed to generating social inclusion in these areas but also helped firms mitigate the risk of being left behind in the industrial transition.

A HIA in Slovenia focused on broadening the innovation base and building SME capacity for innovation diffusion. The expected result was a greater collaboration between industrial SMEs and service providers (especially universities) and piloting and demonstrating SME-generated innovations in Industry 4.0. The HIA consisted of an innovation voucher system to support piloting and demonstrate innovations with high levels of technological readiness. It was a physical and virtual platform that brought together equipment, resources and expertise from a wide range of organisations specialised in Industry 4.0 development and deployment. Concretely, the HIA provided financial vouchers to five SMEs needing support to digitalise and automate production. To obtain the voucher, each SME had to partner with a research organisation to jointly develop an Industry 4.0 project under the guidance of an international expert.

Source: (OECD, 2023^[37]).

References

- Agenzia del Lavoro (2023), *38 Rapporto sull'Occupazione in provincia di Trento 2023*, Agenzia del Lavoro, <https://www.agenzialavoro.tn.it/content/download/11695/187549/file/38%C2%B0%20Rapporto%20occupazione%202023.pdf>. [19]
- Banca d'Italia (2023), *Economie regionali. L'economia delle Province autonome di Trento e di Bolzano. Report annuale*, <http://www.bancaditalia.it>. [14]
- Barr, J. et al. (2012), "Local Job Creation: How Employment and Training Agencies Can Help - The Labour Agency of the Autonomous Province of Trento, Italy", *OECD Local Economic and Employment Development (LEED) Papers*, No. 2012/17, OECD Publishing, Paris, <https://doi.org/10.1787/5k919d0trlf6-en>. [12]
- Berlingieri, G., S. Calligaris and C. Criscuolo (2018), "The Productivity-Wage Premium: Does Size Still Matter in a Service Economy?", *AEA Papers and Proceedings*, Vol. 108, pp. 328-33, <https://doi.org/10.1257/PANDP.20181068>. [21]
- Calvino, F., C. Criscuolo and C. Menon (2018), "A cross-country analysis of start-up employment dynamics", *Industrial and Corporate Change*, Vol. 27/4, <https://doi.org/10.1093/icc/dty006>. [22]
- Camera di Commercio di Trento (2023), *Dal 2010 perso oltre il dieci per cento dei negozi la serie storica dei dati raccolti negli ultimi dodici anni evidenzia la significativa trasformazione del comparto*, https://www.tn.camcom.it/sites/default/files/uploads/documents/ComunicatiStampa/Anno_2023/23CSCommercio2022.pdf. [27]
- Camera di Commercio di Trento (2023), *La congiuntura in Provincia di Trento 2023*, <https://www.tn.camcom.it/sites/default/files/uploads/documents/StudiRicerche/congiuntura/Bollettino%20-%20IV%20trim%202023.pdf>. [18]
- Camera di Commercio di Trento (2022), *La congiuntura in provincia di Trento-2° Trimestre 2022*, <https://www.tn.camcom.it/sites/default/files/uploads/documents/StudiRicerche/congiuntura/BollettinoSecondoTrimestre2022.pdf>. [25]
- Camera di Commercio Trento (2023), *Imprese femminili in Trentino nel 2022*, <https://www.tn.camcom.it/content/impresefemminili-trentino-nel-2022>. [36]
- Confindustria Trento (2023), *15 anni di collaborazione tra scuola e impresa con il progetto "Tu sei"*, <https://www.confindustria.tn.it/it/notizie/notizie-dallassociazione/notizie/15-anni-di-collaborazione-tra-scuola-e-impresa-con-il-progetto-tu-sei/>. [33]

- Confindustria Trento (2023), *Tableau de bord Il cruscotto dell'economia trentina*, [16]
<https://www.confindustria.tn.it/media/aedbzvzvz/2307-tableau-de-bord.pdf>.
- Confindustria Trento (2021), "Centralità dell'individuo e della qualità della vita", [17]
<https://www.confindustria.tn.it/media/ci5dfqjx/centralit%C3%A0-dellindividuo-e-della-qualit%C3%A0-della-vita.pdf> (accessed on 5 October 2023).
- Dijkstra, L. et al. (2023), *EU Regional Competitiveness Index 2.0*, <https://doi.org/10.2776/46106>. [32]
- Fadic, M. et al. (2019), "Classifying small (TL3) regions based on metropolitan population, low density and remoteness", *OECD Regional Development Working Papers*, No. 2019/06, OECD Publishing, Paris, <https://doi.org/10.1787/b902cc00-en>. [10]
- Gal, P. (2013), "Measuring Total Factor Productivity at the Firm Level using OECD-ORBIS", *OECD Economics Department Working Papers*, No. 1049, OECD Publishing, Paris, <https://doi.org/10.1787/5k46dsb251s6-en>. [20]
- ILO (2021), *Small goes digital: how digitalization can bring about productive growth for micro and small enterprises*, International Labour Organization, https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_ent/---ifp_seed/documents/publication/wcms_808632.pdf. [29]
- ISPAT (2023), *Competitività del sistema produttivo Struttura economica del Trentino e mappatura settoriale*, Provincia autonoma di Trento ISPAT, <https://statweb.provincia.tn.it/SistemaInformativoImprese/Report%20Competitivit%C3%A0%20Oistema%20produttivo.pdf> (accessed on 4 October 2023). [15]
- Jong, D. et al. (2021), "A comprehensive approach to understanding urban productivity effects of local governments: Local autonomy, government quality and fragmentation", *OECD Regional Development Papers*, No. 11, OECD Publishing, Paris, <https://doi.org/10.1787/5ebd25d3-en>. [38]
- Lembcke, A. and L. Wildnerova (2020), "Does FDI benefit incumbent SMEs?: FDI spillovers and competition effects at the local level", *OECD Regional Development Working Papers*, No. 2020/02, OECD Publishing, Paris, <https://doi.org/10.1787/47763241-en>. [24]
- Menukhin, O., F. Gouma and R. Orega-Argilés (2023), *TPI UK ITL1 Scorecards*, [7]
<https://doi.org/10.48420/21931770>.
- Ministère de la cohésion des territoires et des relations avec les collectivités territoriales (2019), *Guide du programme national Action Coeur de Ville*, [30]
https://www.entreprises.gouv.fr/files/files/directions_services/coeur-de-ville/acv-guidedeprogramme.pdf (accessed on 4 March 2024).
- OECD (2023), *OECD Regional Outlook 2023: The Longstanding Geography of Inequalities*, [1]
 OECD Publishing, Paris, <https://doi.org/10.1787/92cd40a0-en>.
- OECD (2023), *Regions in Industrial Transition 2023: New Approaches to Persistent Problems*, [37]
 OECD Regional Development Studies, OECD Publishing, Paris, <https://doi.org/10.1787/5604c2ab-en>.
- OECD (2023), "SMEs in the era of hybrid retail: Evidence from an OECD D4SME survey", *OECD SME and Entrepreneurship Papers*, No. 41, OECD Publishing, Paris, <https://doi.org/10.1787/882f30b0-en>. [26]

- OECD (2022), *OECD Tourism Trends and Policies 2022*, OECD Publishing, Paris, [31]
<https://doi.org/10.1787/a8dd3019-en>.
- OECD (2021), *Understanding Firm Growth: Helping SMEs Scale Up*, [23]
<https://doi.org/10.1787/fc60b04c-en>.
- OECD (2021), “The future of remote work: Opportunities and policy options for Trentino”, *OECD Local Economic and Employment Development (LEED) Papers*, No. 2021/07, OECD Publishing, Paris, <https://doi.org/10.1787/35f78ced-en>. [11]
- OECD (2020), *OECD Regions and Cities at a Glance 2020*, OECD Publishing, Paris, [3]
<https://doi.org/10.1787/959d5ba0-en>.
- OECD (2018), *Productivity and Jobs in a Globalised World: (How) Can All Regions Benefit?*, [4]
 OECD Regional Development Studies, OECD Publishing, Paris,
<https://doi.org/10.1787/9789264293137-en>.
- OECD (2018), “Spatial productivity differences within and across regions”, in *OECD Regions and Cities at a Glance 2018*, OECD Publishing, Paris, https://doi.org/10.1787/reg_cit_glance-2018-9-en. [5]
- OECD (2017), *The Geography of Firm Dynamics: Measuring Business Demography for Regional Development*, OECD Regional Development Studies, OECD Publishing, Paris, [40]
<https://doi.org/10.1787/9789264286764-en>.
- OECD (2016), *OECD Regional Outlook 2016: Productive Regions for Inclusive Societies*, OECD Publishing, Paris, <https://doi.org/10.1787/9789264260245-en>. [2]
- OECD (2015), *The Future of Productivity*, OECD Publishing, Paris, [8]
<https://doi.org/10.1787/9789264248533-en>.
- OECD Cogito (2023), *The Comeback Kid: How smart policy turned Trentino around*, [39]
<https://oecdcoigito.blog/2023/07/25/the-comeback-kid-how-smart-policy-turned-trentino-around/> (accessed on 18 December 2023).
- OECD Cogito (2022), *Digital commerce is changing America’s main streets... could it be for the better?*, <https://oecdcoigito.blog/2022/11/25/digital-commerce-is-changing-americas-main-streets-could-it-be-for-the-better/>. [28]
- OECD/European Commission (2023), *The Missing Entrepreneurs 2023: Policies for Inclusive Entrepreneurship and Self-Employment*, OECD Publishing, Paris, [35]
<https://doi.org/10.1787/230efc78-en>.
- Orkestra (2022), *2022 Basque Country Competitiveness Report*, Basque Institute of Competitiveness, <http://www.orkestra.deusto.es>. [6]
- Pilat, D. (2023), “The Rise of Pro-Productivity Institutions: A Review of Analysis and Policy Recommendations”, *Productivity Insights Paper*, No. 15, The Productivity Institute, Manchester, UK, <https://www.productivity.ac.uk/wp-content/uploads/2023/03/PIP015-Policies-for-Productivity-FINAL-160323.pdf> (accessed on 23 May 2023). [9]
- Saidea (2021), *Formazione e stage in Saidea: il progetto Tu sei*, [34]
<https://www.saidea.it/blog/formazione-e-stage-in-saidea-il-progetto-tu-sei>.

- Tsvetkova, A. et al. (2020), “The spatial dimension of productivity: Connecting the dots across industries, firms and places”, *OECD Regional Development Working Papers*, No. 2020/01, OECD Publishing, Paris, <https://doi.org/10.1787/ba5edb47-en>. [41]
- Tundis, E., R. Gabriele and E. Zaninotto (2017), “Investigating the effectiveness of public subsidies to hotels: Evidence from an Alpine region”, *Tourism Management Perspectives*, Vol. 23, pp. 8-18, <https://doi.org/10.1016/j.tmp.2017.03.005>. [13]

Notes

¹ TL3 level data on GDP per worker for Chile, Mexico and Columbia are not available, while their national average lies below that of Latvia in 2019. TL3 level data is not available for Canada, nor for Japan after 2016. Luxembourg is excluded because the country has only one single region.

² See OECD Spatial Productivity Lab 21st meeting, 18 October 2023, <https://www.oecd.org/cfe/leed/spl-meetings.htm>.

³ The OECD Spatial Productivity Lab has published several papers on drivers of productivity (Tsvetkova et al., 2020^[41]; Jong et al., 2021^[38]).

⁴ In this report, 2019 is taken as the main reference year of current situation. The economic statistics for the years 2020 and 2021 are strongly affected by the extraordinary but temporary restrictions and consequences of the COVID-19 pandemic. Such temporary disturbances are unlikely to provide good insights on long-term trends. Statistics for 2022 are not yet widely available for all relevant comparative regions and countries, leaving 2019 as the main reference year.

⁵ The OECD uses TL2 (large) and TL3 (small regions), which for most countries equivalent to NUTS2 and NUTS3 regions. As an Autonomous Province, Trentino is designated as a TL2 region with only one TL3 region, the Province of Trento. Given the population (and economic) size of Trentino, this report aims to compare Trentino to other TL3 regions where possible, since TL2 regions can be quite large in OECD countries. For the comparison of Trentino with other OECD regions, the sample is limited to regions located in Europe, and excludes metropolitan regions with a very large city (>1.5 million inhabitants), following the OECD access to city typology (Fadic et al., 2019^[10]).

⁶ For some examples of innovative policies in Trentino, see OECD Cogito (2023^[39]).

⁷ The sector of real estate activities has much higher values of GVA per worker than the other sectors, because of imputations made to include the ‘rental’ services owner occupiers receive from their homes, often referred to as impute rent. As such, this sector is excluded in commentary in the remainder of this report. As this report focuses on the business economy, the Public administration and other social services are also excluded from the analysis.

⁸ OECD calculations based on the European labour force survey, using the NUTS2 regions of the peer regions, except for the Netherlands where the national average is taken as no regional information is

available. In the two Greek regions, 52% (Stera Elláda) and 62% (Ionia Nisia) of workers are employed in micro-enterprises.

⁹ The share of three year old firms in the business population provides a measure of start-ups that excludes those that did not survive past the first two years (OECD, 2017^[40]).

¹⁰ OECD calculations based on fDi Markets.

¹¹ OECD calculations based on fDi Markets. When excluding one large outward investment, the percentage increases to 11%. Capital expenditure in inward investments from German-speaking countries amounts to 16% of total expenditure. When excluding one large inward investment, the percentage increases to 25%. fDi Markets is based on publicly announced greenfield FDI projects and may not cover all FDI investments between regions.

¹² Based calculations from the European labour force data. See notes of Figure 4.3 for details.

¹³ The following disciplines were included: Civil, Environmental and Mechanical Engineering, Physics, Agricultural Sciences, ICT, Industrial Engineering, Math, Biology, Chemistry, Psychology and Cognitive Sciences

More information about the project

oe.cd/SPL-Trentino



www.trento.oecd.org