

# 2 Understanding innovation in rural Switzerland

---

Switzerland is an innovation leader, with a long history of federalism, regional collaboration and bottom-up consensus-building. While several regions in Switzerland are top international performers in innovation, rural regions are on average lagging behind. This underlines the importance of understanding innovation through a rural lens and providing support to entrepreneurs, firms and innovators across rural regions. This chapter sets the scene for the report. It outlines the structure of rural regions, discusses trends in innovation across all types of regions, and identifies challenges in promoting well-being and adapting to changing societies.

---

Creation, destruction and the proliferation of advances in innovation shape how our societies respond to the challenges today and in the future. Regional governments across OECD countries count on innovation and the diffusion of innovation advances to spread prosperity and opportunities to all places. Rural regions, in particular, are experiencing fundamental changes to the way people, places and firms work and interact with each other. This is in part, due to megatrends in digitalisation, innovation, demographics and environment. When crises, such as the COVID-19 pandemic, require heavy support in public service delivery and tailored approaches for recovery, rural regions often do not have the same opportunities as more densely populated regions closer to metropolitan areas (OECD, 2020<sup>[1]</sup>; 2021<sup>[2]</sup>).

The governance structure of Switzerland is federal. Critically, in the context of Switzerland, this means that Swiss cantons<sup>1</sup> have a strong mandate to propose and shape policies, levy taxes<sup>2</sup> and distribute government resources, including those directly or indirectly related to promoting innovation. Unlike countries with centralised systems of governance, the Swiss system works on the basis of subsidiarity, i.e. cantonal and regional competition and self-determination within the federal framework. More specifically, the innovation ecosystem in Switzerland is characterised by a structure of cantons that associate themselves and then apply for funding of their respective regional innovation systems (RIS).<sup>3</sup> To overcome challenges of scale, and build synergies and cohesion within and between functional urban areas, cantons are incentivised to associate with each other before developing an RIS. As of 2022, there are currently six inter-cantonal RIS. These entities have a mandate to provide support, in particular to small- and medium-sized enterprises (SMEs), to promote innovation and competitiveness. They are co-ordinated at the federal level within the State Secretariat for Economic Affairs (SECO).<sup>4</sup>

While entrepreneurs and innovators all share certain entrepreneurial, risk-taking or problem-solving characteristics across cantons, differences in sectoral, occupational and territorial resources affect how innovation occurs and, more importantly, the societal or business purpose they serve. As elaborated by the OECD (forthcoming<sup>[3]</sup>), focusing on improving the conditions that encourage innovation adoption and entrepreneurial activities is more relevant for well-being in rural regions than an innovation that focuses on high-technology (high-tech) sectors alone.

## Structure of rural areas in Switzerland

The socio-economic, territorial and multilingual structure of Switzerland is an important characteristic of its economy today. Territories in Switzerland are composed of a historical confederation of different communities with various linguistic and cultural attributes, with some territories specialising in specific sectors including agri-foods and manufacturing. Today it is thriving as one of the capitals of luxury manufacturing (notably precision watchmaking) and as an international hub of financial markets and the pharmaceutical industry. As one of the few OECD countries in continental Europe that is not a member of the European Union, it affords a certain autonomy in determining national policies while also incurring additional complications in trade and foreign affairs.

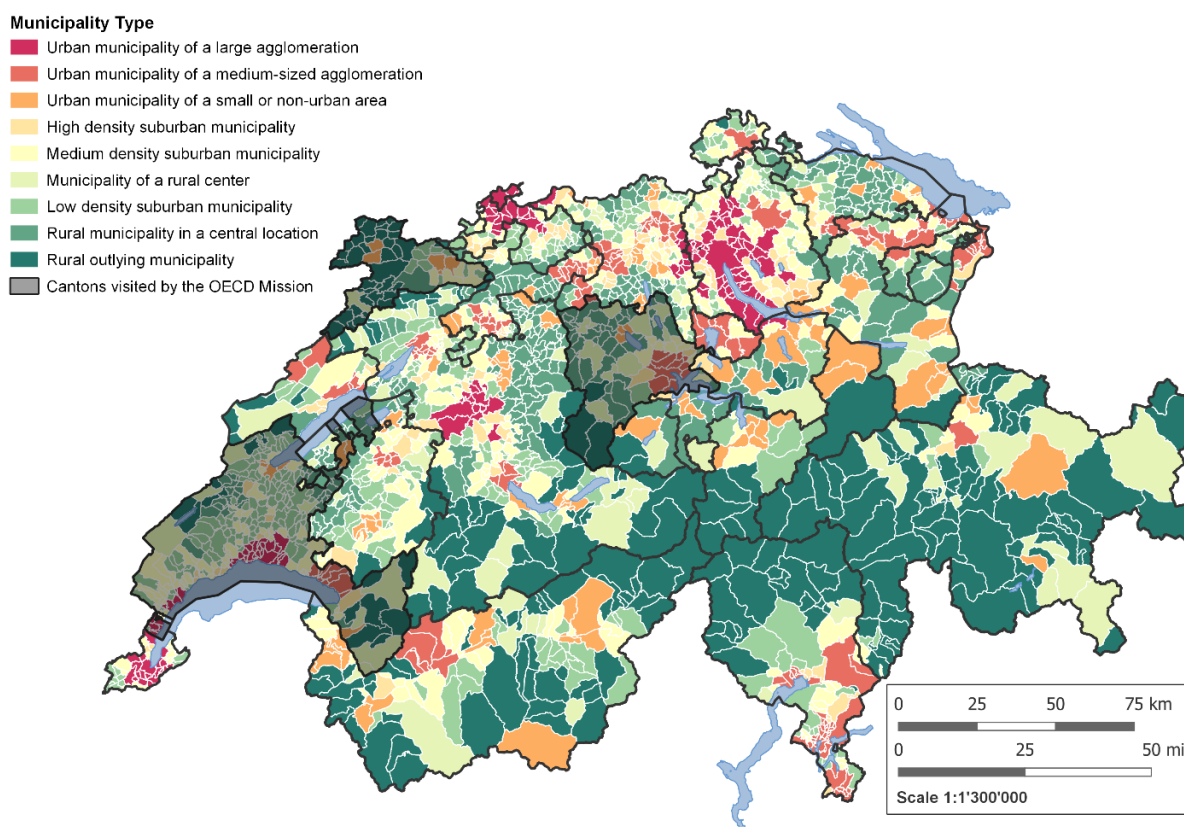
Within Switzerland, the development of industries and activities are dispersed across regions with different territorial attributes. Likewise, differences in demographics and labour supply within Switzerland are important aspects of understanding opportunities in Switzerland. The rest of this section defines rural areas in Switzerland while exploring economic activities and demographic trends across Switzerland and within the large RIS regions of Northwestern Switzerland, Central Switzerland and Western Switzerland, with examples from the cantons of Jura, Lucerne and Vaud in each of those respective regions (see Figure 2.1 for a graphical description of typology of municipalities and areas visited for the case study).

## Defining rural Switzerland

Rural regions in Switzerland are defined centrally, with most ministries aligning with definitions provided by the Federal Statistical Office (FSO). In the case of Switzerland, the national classification is based on density, size and accessibility of places, with the base unit for the classification at the level of the *commune*. Communes, a relatively small local area unit akin to *municipalities*, are first split into three categories that determine characteristics as urban, peri-urban or rural, then categorised into a typology with nine categories based on density, size and accessibility (Figure 2.1 and Box 2.1). One further typology with 25 categories differentiates each of the 9 categories with criteria based on socio-economic factors. For the purpose of readability, the report refers to the typologies based on either the 3 or 9 categories of communes. According to this definition, the case study areas for the report are primarily peri-urban and rural areas. The report also uses the more aggregate OECD definition of administrative regions based on travel time and distance to functional urban areas (FUAs), to address privacy concerns flagged by the Swiss FSO, as described in Box 2.1.

**Figure 2.1. Administrative typologies for classification of territories**

Municipalities (communes) of Switzerland



Note: The shaded areas in the map above reflect the cantons that were selected as the “entry point” into a study of the larger regions, exploring implications on rural and peri-urban areas. These include Vaud, Jura and Lucerne (from left to right).

Source: Federal Statistical Office, elaborated by SECO staff.

## Box 2.1. Territorial and sectoral classifications

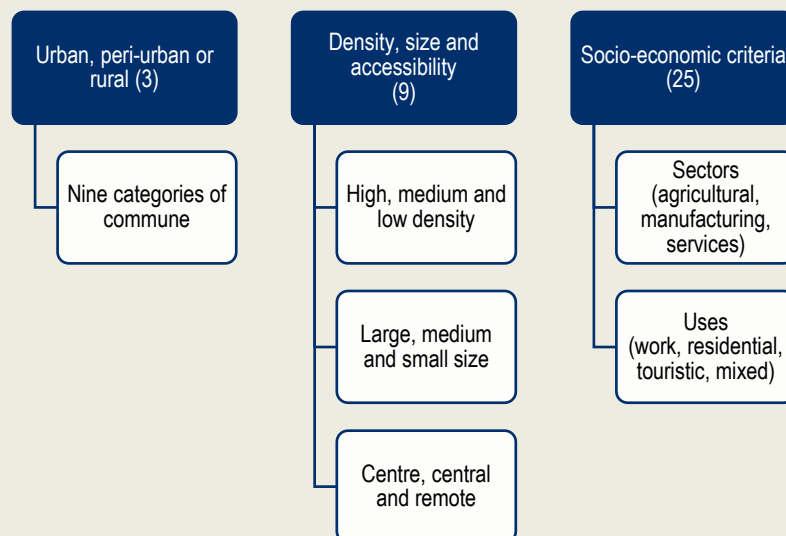
Using consistent classifications of territories and sectors enables harmonisation and comparability between different sources of information. When possible, the report will prioritise using national classifications of territorial characteristics but may have to adjust when it may be necessary, either because of privacy concerns or comparability purposes, to use alternative classifications. Unless otherwise stated, sectoral classifications are aligned with international definitions and are only adapted if the data resource in question only contains a limited sample of the sectors.

### Swiss territorial classifications

The standard for territorial analysis in this report will be the Swiss National Territorial Classifications (FSO, 2017<sup>[4]</sup>). For the purposes of this report, we use the nine-tiered classification system that aggregates small administrative zones (communes) into nine key categories and three sub-categories. The Swiss national classification of territories is based on the criteria of density, size and accessibility. The nine categories are based on characteristics of communes, including: urban municipalities of a large agglomeration; urban municipalities of a medium-sized agglomeration; urban municipalities of a small or non-urban area; high-density suburban municipality; medium density suburban municipality; municipality of a rural centre; low-density suburban municipality; rural municipality in a central location; and rural outlying municipality.

For the purposes of readability, the nine communal categories are grouped into metropolitan, peri-urban and rural areas. In Figure 2.1, metropolitan regions refer to the three categories in red hues, peri-urban regions refer to the three categories in yellow hues, while rural areas refer to the categories in green hues. When comparative data is available or if, for data privacy regions, analysis needs to be grouped at a larger level, the report uses the most recently adopted definitions of territorial disaggregation elaborated recently by Fadic et al. (2019<sup>[5]</sup>). OECD territorial classifications are elaborated in more detail below.

Figure 2.2. National typology of Swiss communes



Source: FSO (2017<sup>[4]</sup>), *Typologie des communes et typologie urbain-rural 2012*, <https://www.bfs.admin.ch/bfs/fr/home/bases-statistiques/niveaux-geographiques.assetdetail.2543324.html>; Fadic, M. et al. (2019<sup>[5]</sup>), "Classifying small (TL3) regions based on metropolitan population, low density and remoteness", <https://doi.org/10.1787/b902cc00-en>.

### OECD classification of rural regions: Defining rural using physical and driving distances within administrative boundaries

Rural is everywhere and exists as a continuum. What we commonly understand as rural is implicitly spatial and relative. In practice, governments delineate typologies of territories but there is no clear cut-off between regions or areas. Rural characteristics can exist within more urbanised regions and rural attributes are apparent across the spectrum of territorial characteristics. This continuum of rurality is delineated in the recent OECD publication on rural well-being (2020<sup>[1]</sup>).

The term rural is often used to describe territories that have relatively low-density human settlement patterns, with relatively large distances to more densely populated areas. Often, rural regions are characterised as regions with activities closely related to natural resource industries such as mining and agriculture. However, this sectoral definition overlooks many of the different varieties of rural territories, and what this means for political agenda-setting in rural regions. Indeed, a region identified as “rural” has implications on government finance and wider regional policy making.

In consultation with OECD member national governments, the OECD harmonised a set of guidelines for classifying territorial characteristics across countries that avoid the traditional, and sometimes harmful, rural-urban dichotomy. This unified definition of rural provides the basis for analysis across countries within rural economies (OECD, 2020<sup>[1]</sup>). The most recent definitions of rural regions have benefitted from a reflection on the combination of physical (“first-nature”) and human (“second-nature”) geographies. Rural regions are defined by economic remoteness, with three distinct features related to the physical distance to major markets, economic connectedness and sector specialisation. Considering these features, rural regions are physically distant to major markets, with specialisation in niche markets and those linked with natural resources such as agriculture and tourism. The degree of economic connectedness with surrounding areas may vary by relative density, infrastructure availability and complementarities between and within rural regions.

In 2019, the OECD published a new classification based on FUAs, which incorporates density and the driving estimations in terms of the time it takes to access dense metropolitan areas. To the furthest extent possible, rural will be defined as 1 of 3 types of regions with less than 50% of the regional population living in metropolitan areas. This includes rural regions inside FUAs (where at least 50% of the population is within a 1-hour driving distance away from a dense urban area with a population larger than 250 000 inhabitants), rural regions close to small or medium cities of populations smaller or equivalent to 250 000 inhabitants, and rural remote areas. When this is not possible, the second-best definition will include EUROSTAT’s degree of urbanisation classification which consists of cities, towns and suburbs and rural areas. Finally, when no other method of measurement is available, we will use a measure of the degree of rurality within large regions (TL2) or within the country. This is based on a simple calculation of the population total within each of the five access-to-city typologies over the total TL2 or country population. The three non-metropolitan categories within the access-to-city typology in the entire population are then used as a proxy for the degree of rurality of the TL2 region, or country.

The diverse types of rural regions all have different characteristics and policy needs. There are three types of non-metropolitan regions (NMRs) that are considered to share more rural characteristics than urban ones, to various degrees. NMRs are defined as having less than 50% of the population living in an FUA with a population larger than 250 000 inhabitants. The three types of NMRs include regions with access to a metropolitan region, non-metropolitan areas with access to a small- or medium-sized city, and NMRs in remote areas.

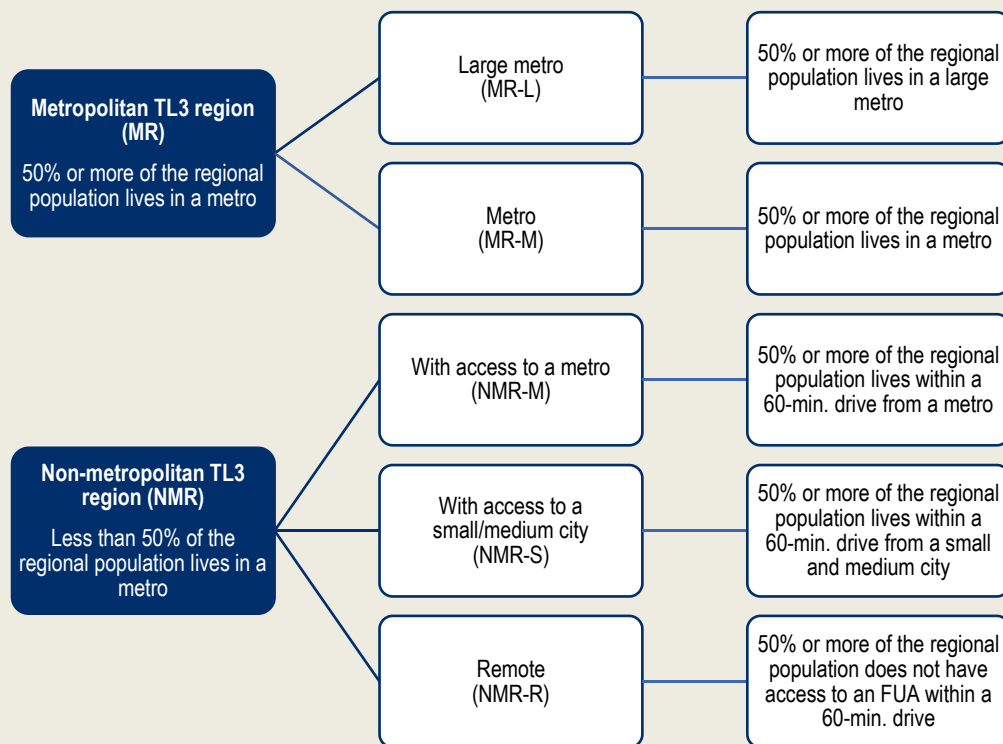
- NMRs with access to a metropolitan region: These regions have 50% or more of the regional population living within a 60-minute drive to a metropolitan area. This is similar in part to towns and suburbs surrounding the distant periphery of major metropolitan centres. An example of such regions includes Tyrolean Oberland in Austria (AT334), Montmagny in Quebec, Canada

(CA2418), Jura in France (FRC22), and Nagasaki in Japan (JPJ42). The challenges of such regions are often tied to economies of metropolitan areas, while focusing on industries such as tourism, without some of the infrastructure barriers of less densely populated areas.

- NMRs with access to small- or medium-sized cities: These regions are regions with 50% or more of the regional population living within a 60-minute drive from a small- or medium-sized city. Examples of these types of regions include the administrative district of Neufchâteau in Belgium (BE344), San Antonio in Chile (CL056), South Bohemia in the Czech Republic (CZ031), East Lancashire in the United Kingdom (UKD46) or Springfield in Illinois, United States (US158). These regions have a strong manufacturing base and linkages to neighbouring economies.
- NMRs without access to cities (remote): These regions are regions with 50% or more of the regional population without access to an FUA (metropolitan) within a 60-minute drive. Examples of such areas include West Estonia in Estonia (EE004), Lapland in Finland (FI1D7), Sonneberg in Germany (DEG0H) and Lesbos in Greece (EL411). Rural remote areas have economies with fewer interlinkages with major cities and often focus on tourism, while rural remote regions, such as those in Canada, Chile, Colombia, Finland and the US often also have an important share of the population with an indigenous heritage that face distinct challenges.

The schematic breakdown is available in the figure below.

**Figure 2.3. OECD typology for access to cities**



Note: Large metro: An FUA with a population larger than 1.5 million inhabitants; Metro: an FUA with a population larger than 250 000 inhabitants; Small or medium city: an FUA with a population smaller or equal to 250 000 inhabitants.

Source: Fadic, M. et al. (2019<sup>[5]</sup>), "Classifying small (TL3) regions based on metropolitan population, low density and remoteness", <https://doi.org/10.1787/b902cc00-en>.

### Sectoral classifications

These statistics gathered from the Swiss National Enterprise Registry (STATENT), a Survey on Research and Development (R&D Survey) and a Survey on Value-Added (VA Survey) and base sectoral classifications on the national classification of sectoral activities (NOGA) harmonised to the International standard industrial classifications (United Nations ISIC 4<sup>th</sup> revision (UN, 2008<sup>[6]</sup>)). For the purpose of readability, the sectoral classifications are grouped into the following ten major sectoral groups:

1. **Agriculture:** Agriculture, forestry and fishing (ISICr4 1-3).
2. **Mining:** Mining and quarrying (ISICr4 5-9)
3. **Manufacturing:** Manufacturing including Food, beverages and tobacco (ISICr4 10-12); Textiles and footwear (ISICr4 13-15); Wood and paper (ISICr4 16-18); Petroleum and chemicals (ISICr4 20-22); Metallics, computers, electrical and motor vehicles (ISICr4 23-30); and Other manufacturing (ISICr4 31-33).
4. **Utility and construction:** Electricity, gas, water and waste management (ISICr4 34-39); and Construction (ISICr4 41-43).
5. **Wholesale and retail trade, transportation and repair of motor vehicles:** Wholesale and retail trade (ISICr4 45-47); and Transportation and storage (ISICr4 48-53).
6. **Hospitality:** Accommodation and services (ISICr4 55-56).
7. **Information and communication:** Information and communication (ISICr4 58-63).
8. **Financial and real estate:** Financial and insurance activities (ISICr4 64-66); Real estate (ISICr4 68).
9. **Professional services:** Professional, scientific and technical activities (ISICr4 69-75); and Administrative and support service activities (ISICr4 76-82, 99).
10. **Public and community services:** Public administration and defence (ISICr4 88); Education (ISICr4 85); and Human health, residential care and social work (ISICr4 86-88); Arts and other service activities (ISICr4 90-98).

For illustrative purposes, some categories may be combined. In other cases, for privacy concerns, some sectoral categories had to be combined or excluded. In the report, the condensed categorical groupings include: 1) Agriculture; 2) Manufacturing; and 3) Trade and services (Groups 5-9 from the categories above). After discussions with the national statistical office, the public works and services (Groups 4 and 10 from the categories above) were excluded from some of the analyses. It was also suggested to group some of the categories further. The category of mining is often excluded because of a small number of observations.

Source: UN (2008<sup>[6]</sup>), *International Standard Industrial Classification of All Economic Activities (ISIC), Rev. 4*, [https://unstats.un.org/unsd/publication/seriesm/seriesm\\_4rev4e.pdf](https://unstats.un.org/unsd/publication/seriesm/seriesm_4rev4e.pdf).

### ***Understanding economic activities and rural well-being in Switzerland***

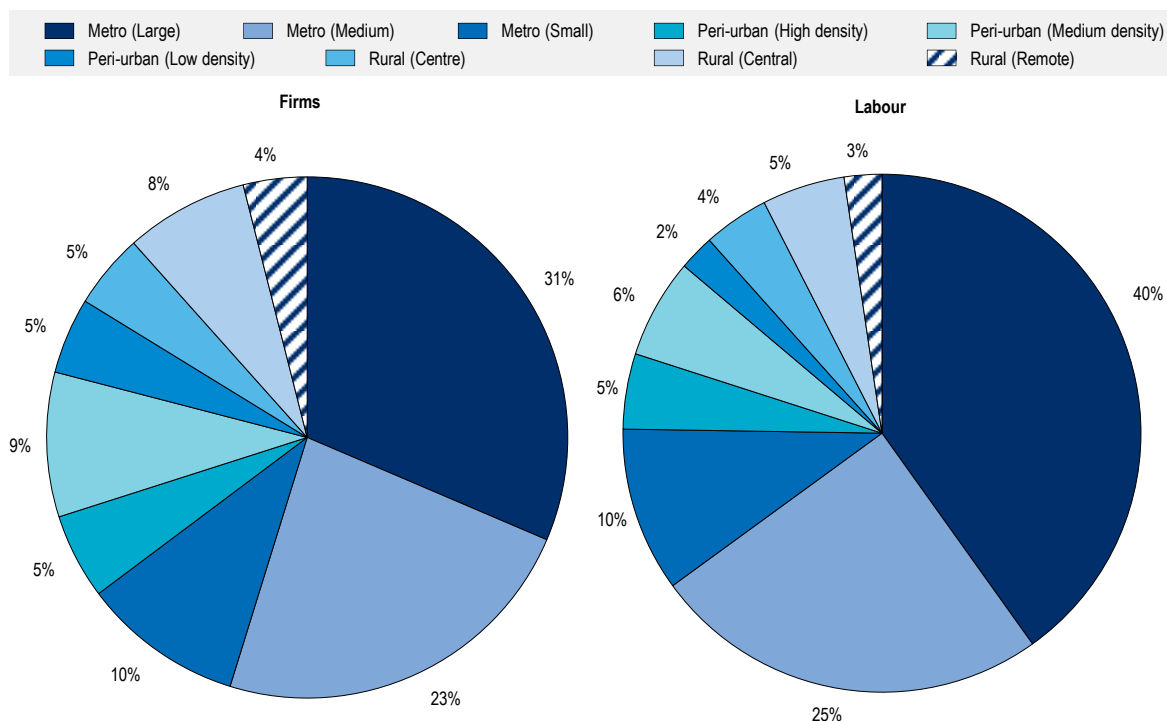
Most firms are located in metropolitan areas of Switzerland. Metropolitan areas, according to national territorial classification systems, account for two-thirds of the economy (Figure 2.4). Rural and peri-urban areas account for approximately equal shares of the rest of the economy. This share of jobs and firms in peri-urban and rural areas are similar to those in non-metropolitan areas in OECD countries. In most OECD countries, we observe close to 29% of individuals living in non-metropolitan areas based on OECD-wide harmonised definitions (Fadic et al., 2019<sup>[5]</sup>).<sup>5</sup> The relatively small territorial mass and driving distances on the scale of other OECD countries suggest that physical distances in Switzerland may be less of a

constraint, although people in areas in the periphery and mountainous zones, such as those in the Jura region or the Alpine Arc for example, may nevertheless may find it relatively harder to access similar resources as those in dense metropolitan areas.

Compared to metropolitan regions, firms in non-metropolitan regions have fewer employees on average. While 36% of firms are located in non-metropolitan areas in Switzerland, only 25% of labour is located in non-metropolitan regions in 2019 (Figure 2.4). In comparison, 40% of firms and 30% of jobs are in non-metropolitan regions in other OECD countries.<sup>6</sup> In peri-urban regions, the share of firms and jobs vary less substantially. Among the six non-metropolitan territorial categories, the territories that demonstrate the largest gap in the shares of the economy are those in rural areas. The distribution of firms to jobs suggests that firms in non-metropolitan areas tend to employ fewer individuals per firm, with the majority of the difference due to a smaller share of labour of firms in rural areas. This observation is standard among other developed countries and underlines the importance of focusing on policies to support SMEs and entrepreneurship in rural areas.

**Figure 2.4. Non-metropolitan areas contain 1/3 of firms and 1/4 of jobs in Switzerland**

Share of firms and jobs, by Swiss National Classification of Territories, 2019



Note: Classifications are defined using the nine-tiered classification of rural areas as elaborated in Box 2.1.

Source: Swiss National Enterprise Registry (STATENT), Federal Statistical Office as elaborated by the OECD.

The agricultural, manufacturing and service sectors are the dominant sectors in non-metropolitan areas.<sup>7</sup> In rural and peri-urban areas, the economy is characterised by a sizeable agriculture and forestry sector, yet the firms in the sector do not employ an equal share of the economy (Figure 2.5). The strong share of firms in the trade, transport, finance and professional services in non-metropolitan areas is better reflected in the share of employment. As expected, there is also a sizeable share of hospitality services in rural and peri-urban areas. This is likely tied to the important role of tourism in rural mountainous regions.<sup>8</sup> Notably, there is a very small share of firms in the information and communication technology (ICT) services sector

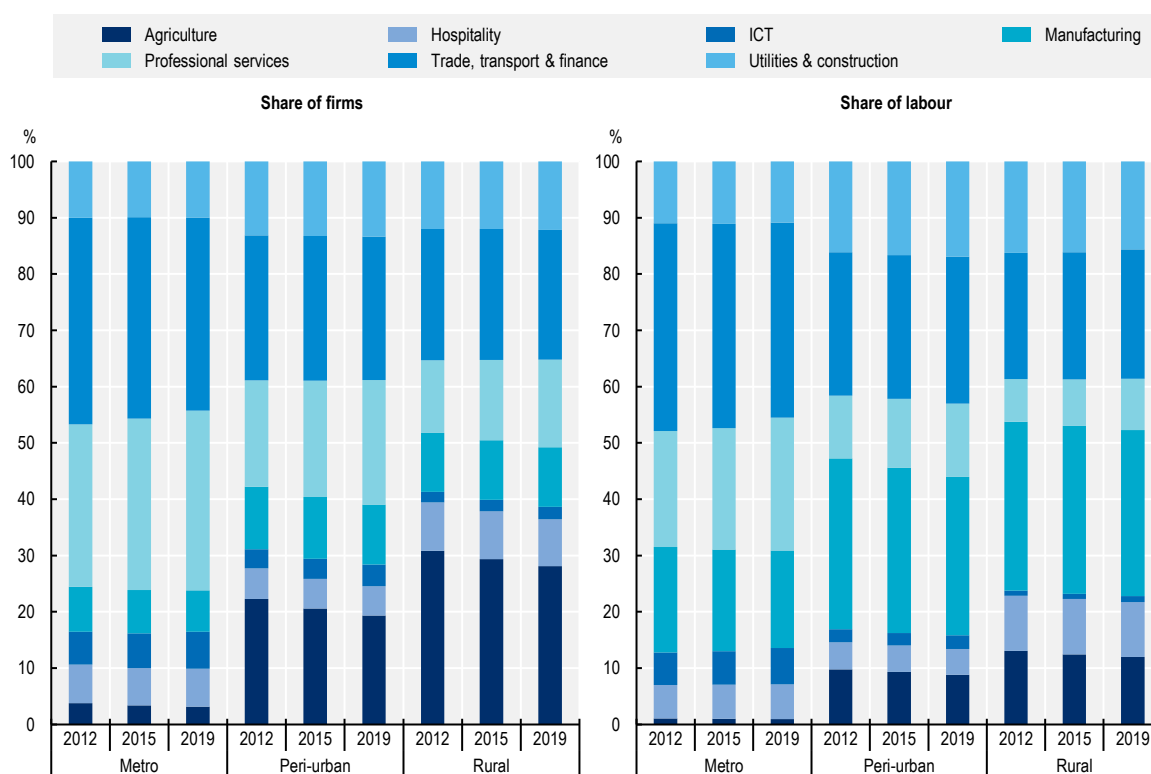


and a negligible share in rural areas, suggesting that policies only focused on innovation in the ICT services sector will not be relevant for development in rural areas.

The professional services sector is a small but increasingly important share of the economy in non-metropolitan areas. The sector is important for building amenable entrepreneurship ecosystems and support services. Firms in this sector include legal and accounting services, management consultancies, architectural and engineering activities, scientific research and development (R&D), advertising and market research and other professional and scientific-technical activities. We observe a sectoral shift in the period from 2012 to 2019 with a small relative fall in the share of the agricultural sector and a relative increase in the share of ICT activities and professional services sector activities in non-metropolitan regions (Figure 2.5). This change is small but simultaneously due to an absolute fall in the number of firms in the agricultural and forestry sector and growth in the absolute number of firms in ICT and professional services in rural areas.<sup>9</sup>

**Figure 2.5. A fall in agricultural and manufacturing activities is accompanied by a rise in trade and services in rural and peri-urban areas**

Total share of firms and jobs (full-time equivalent), by sector in 2012, 2015 and 2019



Note: To limit headquarter bias, data is presented at the plant level. Sectors were aggregated based on the NOGA08 codes. The “Utilities & construction” category includes electricity, water, waste and construction sectors; the “Trade, transport & finance” category includes the wholesale, retail, transportation, storage, financial, insurance and real estate activities; the “Professional services” sector includes professional, scientific, technical, and administrative and support service activities. All other categories are not aggregated across large sectoral categories. Mining is removed for visual purposes. Further information on sectoral categories is available in Box 2.1.

Source: Swiss National Enterprise Registry (STATENT), Federal Statistical Office as elaborated by the OECD.

The growing relevance of professional services sectors in non-metropolitan areas is an important observation and opportunity for policy makers in metropolitan and non-metropolitan regions. For rural development, focusing on innovation and entrepreneurship the traditional sectors of agriculture and natural resource-based activities, or the largest employment sector of manufacturing overlooks other opportunities and growing activities in rural regions. Taking into consideration the changing structure of rural regions, supporting the development of professional and ICT services is an important aspect of targeting policies for the future of equitable development in Switzerland.

Traditional manufacturing and agricultural sectors are likely to continue to hold a relatively stronger role in rural areas than in metropolitan areas. Policies that continue to support innovation through adoption are still important in these sectors. However, firms in these sectors are likely older and established. To encourage innovation, they would require either help in understanding how to change long-standing products and processes, or competitive pressures. On the other hand, supporting the development of professional services to such sectors can improve turnover, productivity and jobs in areas with traditional regional activities. For example, incentives in agricultural policy, as will be further discussed in Chapter 4, could increasingly focus on supporting innovation and development of professional services in the agri-food chain rather than primarily focusing on the traditional agricultural sectors where innovation could be supported through competition-increasing mechanisms. Such arrangements would be beneficial to the development of jobs and businesses in rural areas, helping to focus public services provided to support regional innovation, while simultaneously continuing to uphold agricultural output and exports.

Encouraging innovation and development in non-traditional, service sectors can support a welfare-improving approach to rural development. With higher levels of wages and benefits in services sectors, supporting firms and job growth in the professional services sector can provide jobs and productivity-driven improvement to the welfare of rural communities. The government of Switzerland's initiatives to focus on regional innovation as a driver for growth in SMEs and entrepreneurship should be reinforced to include a strong focus on quality jobs, in particular in the services sector.

The gender gap in peri-urban and rural areas of Switzerland is much larger than in metropolitan areas. Switzerland has reduced the gender gap in terms of full-time equivalent jobs since the early 2010s (Figure 2.6, Panel A); however, further progress is needed particularly in peri-urban and rural areas. In low-density peri-urban areas, there are over two men employed to every woman, while in metro areas the ratio was slightly more equal at 1.45 men to every woman.<sup>10</sup> While variations between types of territories were substantial, the areas with the highest disparities were those in peri-urban regions. A welfare-first approach to rural development can, at least partially, be achieved, by focusing on gender equality across territories.

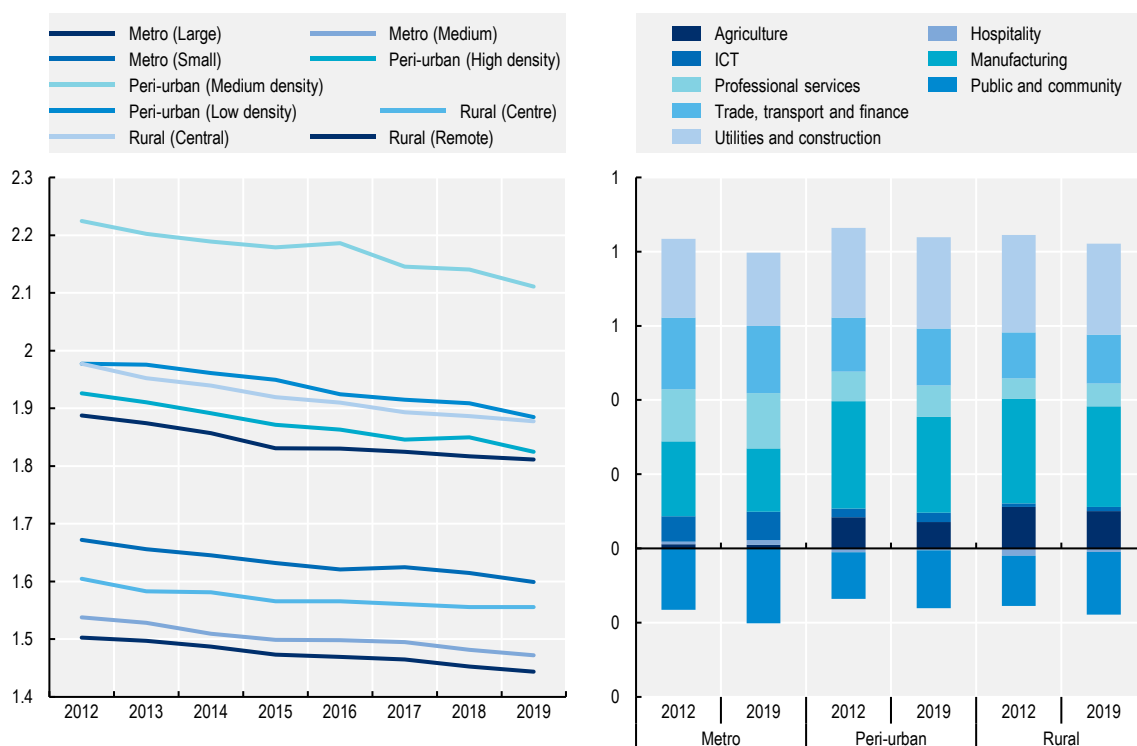
The low gender gap in some service sectors, such as in ICT, is a promising avenue for well-being and innovation in rural areas. Encouraging the growth of the ICT sector can simultaneously target the development of innovation ecosystems and the creation of quality jobs for women in rural areas. Unlike in metropolitan regions, the gap in employment for men and women in ICT sectors is relatively small, suggesting that ICT jobs may be more amenable to employment for women in rural areas. It would be important for regional innovation initiatives to take into consideration what is driving the success in ICT-related employment and consider initiatives to encourage the development and upgrading of ICT-related firms and services in rural regions, including through STEM (science, technology, engineering and mathematics) education and programmes.

Without targeted programmes for women and gender mainstreaming, focusing on the growing services sector alone is likely to slow down the progress in closing the gender gap in Switzerland. The gender gap in the professional services sector is sizeable, even if it is not as substantial as in other sectors such as manufacturing, utilities and construction, and the transport sector (Figure 2.6, Panel B). With improvements in working conditions in this sector, alongside a focus on development, Switzerland can make a sizeable dent in the reduction of gender inequalities in peri-urban and rural areas by activating the female workforce

and creating an environment for them to be productive. Recently, the autonomous Swiss Innovation Agency, Innosuisse, has taken a first step towards the inclusion of women in innovation-related projects in the services and ICT sector by establishing gender requirements in the new Innovation Booster programme (an instrument that encourages challenge-based innovation programmes, further described in Chapter 3. However, in other OECD countries, such as Canada, the United States and, forthcoming, Scotland (United Kingdom), regional development agencies and government departments directly create programmes to address the challenges of women in establishing and growing innovative businesses through specific women innovation and entrepreneurship strategies and programmes (ACOA, 2021<sup>[7]</sup>; ISED, 2021<sup>[8]</sup>; MBDA, 2022<sup>[9]</sup>). For example, in Canada, several regional development agencies including Atlantic Canada Opportunities Agency, Prairies Economic Development Canada (PrairiesCan), Pacific Economic Development Canada (PacifiCan), in collaboration with a federal agency, Innovation, Science and Economic Development Canada (ISED), deliver the Women’s Entrepreneurship Strategy (Pacific Economic Development Canada, 2022<sup>[10]</sup>).

**Figure 2.6. The gender gap in jobs is improving but still persistent across territories**

Gender gaps in full-time equivalent (FTE) employment



Note: Employment is estimated in full-time equivalents. The gender gap as measured in Panel A is the ratio of male-to-female employment within territories over time. The interpretation is the number of males to females in FTE employment. The gender gap as measured in Panel B is the yearly shares of the difference between FTE employment for males and females within territories. This is interpreted as a contribution to the total difference in the number of men to the number of women in each territory and in each year in FTE employment.

Source: STATENT, Swiss Federal Statistical Office.

With the normalisation of remote work in many OECD countries, supporting opportunities for women remote working in STEM occupations also requires reflection on work-life balance regulations. Work-life balance measures, such as remote work, are critical for women in the labour market (OECD/ILO, 2021<sup>[11]</sup>). Remote working could also be beneficial for women for several reasons (OECD, 2022<sup>[12]</sup>). In the post-COVID-19 transition, some governments are working towards generalising incentives to encourage remote work (OECD, 2021<sup>[13]</sup>). Country and regional governments that are taking active steps in promoting remote work tend to focus on strengthening enabling conditions, creating incentives for take-up of remote work for SMEs, awareness raising campaigns and other remote working attraction tools.<sup>11</sup> However, some studies are suggesting that it may hamper advancements, in particular for women in STEM, and lead to a heavier load of household labour and child care for women (Kossek, Allen and Dumas, 2020<sup>[14]</sup>). If work-life balance regulations and benefits, such as maternal, paternal, parental, sick-family leave regulations and child care benefits, are not able to adapt to the change in work arrangements, there is a likelihood that household burdens may increasingly fall on women. Countries like France, Italy, the Netherlands and Spain have increased care leave provisions to support women and families who are now remote working, while Japan, Korea and the United States have reformed parental leave schemes as a response to the COVID-19 crisis (OECD/ILO, 2021<sup>[11]</sup>).

## Box 2.2. Cantons of Jura, Luzern and Vaud

### Sectoral structure of select cantons in Switzerland

Cantons within Switzerland vary in sectoral intensity. In the canton of Vaud, the share of firm activities are quite similar to those in the rest of the country but there is a substantially higher share of firms in the agricultural, forestry and fishery sector in Jura and Lucerne than in Vaud and other cantons, with Lucerne having a sizeably larger number of firms across all sectors than Jura.<sup>12</sup> The sectoral composition of these three case study areas suggests the need to approach policies in view of both the territorial and sectoral differences. In particular:

- In Vaud, a relatively stronger reliance on non-agricultural industries such as professional services is a promising avenue for growth.
- In Jura canton, there are lower levels of activities, with the development of a nascent tourism industry<sup>13</sup> that focuses on building opportunities for firms in agriculture and related professional services that are likely to provide additional avenues for growth.
- In 2017, manufacturing firms, which account for 12% of all firms, employed a third of the working population in the Jura region. Critically, while the number of firms is smaller in the traditional Jurassian manufacturing sector, it employs more individuals on average than those in other regions. In Jura, innovation-related policies could benefit from encouraging the adaption of the traditional manufacturing sector to new technologies and focus on developing supporting services for encouraging the development of more diversity of industries.
- The region of Lucerne is a central tourist destination characterised by a relatively high level of activities in professional services and agricultural services. Addressing structural issues related to the clustering of innovation only around universities may help expand some of the benefits of innovation in this region. Overtourism is often a challenge in this region.

### Size structure of cantons in Switzerland

Small firms are drivers of growth in the cantons of Jura, Lucerne and Vaud. The agricultural sector is a relatively strong sector in Jura and Lucerne, and the sector in these cantons is characterised primarily by small firms. However, as in the overall economy, the share of total employment attributed to small firms is lower than those in medium or large firms. Over time, we have observed an increasing share of

larger firms but a fall in overall agricultural activities. Encouraging the growth of agricultural firms in the Jura and Luzern regions, while building the capacity of other professional support services in the agri-food chain can provide opportunities for employment-enhancing policies.

A small share of ICT firms in the Jura, Lucerne and Vaud regions account for a larger share of labour than those in other sectors. The ICT sector is an untapped potential for growth in rural regions but does not necessarily lead to more jobs. Jobs in these sectors tend to offer higher wages and, as previously discussed, can provide opportunities for reducing the employment gender gap in rural regions. In the Jura, Luzern and Vaud regions, 20-40% of firms in the ICT sector are small, but they account for close to 90% of employment in this sector in each of the areas. In contrast to other sectors, the share of small firms is much smaller, while its share of sectoral labour is equally as high. The interpretation is that each small ICT firm carries a more important share of cantonal labour than in other sectors.

Most professional services firms are small but there is a growing share of firms and employment in larger-sized firms in Lucerne and Vaud. Furthermore, there is a large and growing share of labour that is attributed to larger firms. Less than 10% of firms having more than 50 employees account for between 60% to 70% of labour. While there is a very small share of large-sized firms in Jura, Luzern and Vaud, they all account for a sizeable share of labour. Supporting the development and growth of such firms can improve jobs and the quality of jobs in the professional services sector. Focusing on scaling up firms in these cantons through more productive products and processes can support rural communities as they transition out of traditional manufacturing and agricultural sectors.

Source: OECD calculations using STATENT, Swiss Federal Statistical Offices.

### **Targeting programmes to SMEs in non-metropolitan regions**

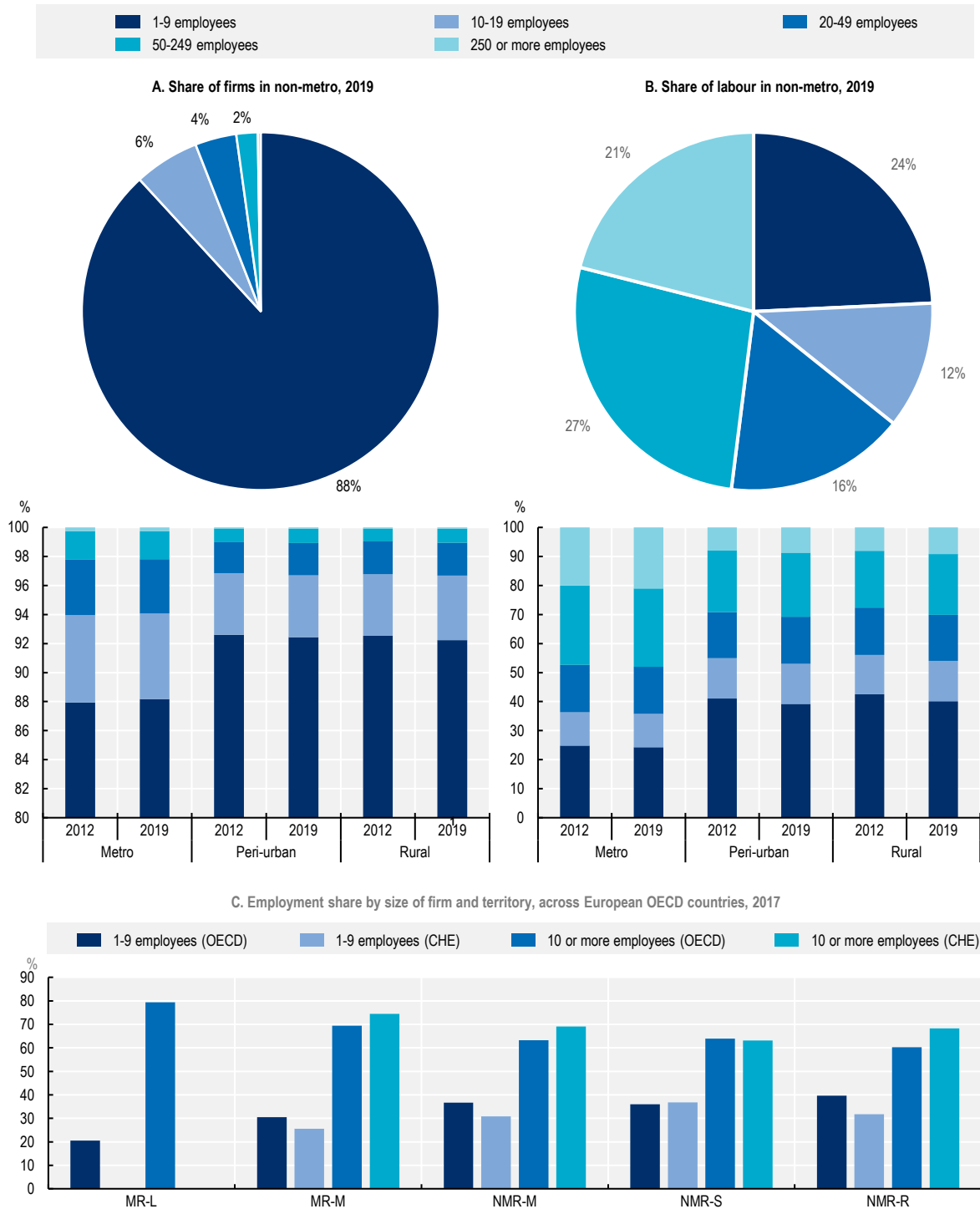
Small firms in rural and peri-urban areas account for a larger share of employment than in metropolitan regions.<sup>14</sup> The majority of firms in Switzerland are small (1-9 employees). In metropolitan areas in 2019, small firms accounted for 88% of the economy, while in non-metropolitan regions they accounted for 92% (Figure 2.7). As the share of small firms in non-metropolitan areas (rural and peri-urban) is slightly higher than in metropolitan areas, the share of labour employed in these firms is substantially higher. Small firms account for 40% of the labour force in non-metropolitan areas, while those in metropolitan regions only account for approximately 25% of total employment. In comparison, larger firms (with 50-249 employees and 250 or more employees) account for a very small share of firms (close to 0%) but a substantially larger share of employment in metropolitan areas (18% in metropolitan versus 9% in non-metropolitan areas).

While there are relatively more small firms in non-metropolitan regions, the territorial distribution of the size of firms in Switzerland is similar to those in other OECD countries (Figure 2.7, Panel C). In OECD countries the employment share in small firms (1-9) in non-metropolitan regions reaches between 35% to 40%,<sup>15</sup> while the same size of firms contributes to close to 20% of employment in large metropolitan regions. Based on the OECD categorisation of large Swiss regions (TL3), there are slightly fewer small firms in some of the most remote areas.

Encouraging national-level policies to focus on growth and innovation in SMEs will have a stronger impact in non-metropolitan areas. Federal innovation policies targeting SMEs are a key component of the Swiss regional innovation system (RIS), yet, as further explored in Chapter 3, most national policies have a harder time reaching SMEs and often are better targeted at firms with easier access to networks in metropolitan regions. As is already the case in Switzerland, encouraging innovation programmes and firm support directed towards SMEs is low-hanging fruit for uplifting productivity, growth and jobs through equitable development (EAER, 2021<sup>[15]</sup>).

**Figure 2.7. Small firms account for a larger share of activities and labour in rural and peri-urban regions of Switzerland**

Distribution of firms and labour (FTE), by size groups, 2012 and 2019



Note: Size groups refer to the number of full-time employees within each firm. They include firms with 1-9, 10-19, 20-49, 50-249 and 250 employees and more. Countries included in Panel C for OECD comparison include Austria, the Czech Republic, Estonia, France, Hungary, Italy, Lithuania, Poland, Portugal, the Slovak Republic and Spain. In Switzerland, there is no large region (TL3) that has over 2.5 million inhabitants and is therefore not comparable to the OECD category "Large Metropolitan" region as described in Box 2.1.

Source: Swiss National Enterprise Registry (STATENT) and OECD Regional Business Demography statistics.

## Key messages on the structure of rural areas in Switzerland

- Most firms are in metropolitan areas of Switzerland, as in other OECD countries.
- Yet small firms in rural and peri-urban regions account for a larger share of employment than in metropolitan regions.
- Compared to metropolitan areas, firms in non-metropolitan regions on average tend to employ fewer workers.
- The agricultural, services and manufacturing services are prominent sectors in non-metropolitan regions.
- The professional services sector is increasingly an important share of the economy in non-metropolitan regions, and the ICT sector may be an interesting sector to explore for further engagement with the less active female labour force.
- For reducing territorial inequalities and increasing well-being, focusing on encouraging innovation and development in sectors with higher levels of wages and benefits, and lowering gender gaps is critical.

## Innovation in Switzerland

Innovation is a precursor of long-term growth, productivity and, in some cases, well-being (Aghion and Howitt, 1990<sup>[16]</sup>; OECD, 2016<sup>[17]</sup>; Romer, 1990<sup>[18]</sup>). Enhancing the creation, adoption and diffusion of innovative products and processes,<sup>16</sup> is often a target of policy makers and community leaders alike. While innovation can also be destructive and vary across industries and geographies (Autor, 2014<sup>[19]</sup>; McCann, 2019<sup>[20]</sup>), creative destruction in itself is a driver of innovation and resilient economies (Aghion, Antonin and Bunel, 2021<sup>[21]</sup>). This report considers that on average, innovation occurs and affects societies differently in rural regions than in urban regions, primarily due to the underlying sectoral, occupational and territorial attributes that characterise low-density areas with longer distances from metropolitan FUAs (OECD, 2020<sup>[1]</sup>).

Following the literature review, our current knowledge of drivers of innovation and rural development tells us that:

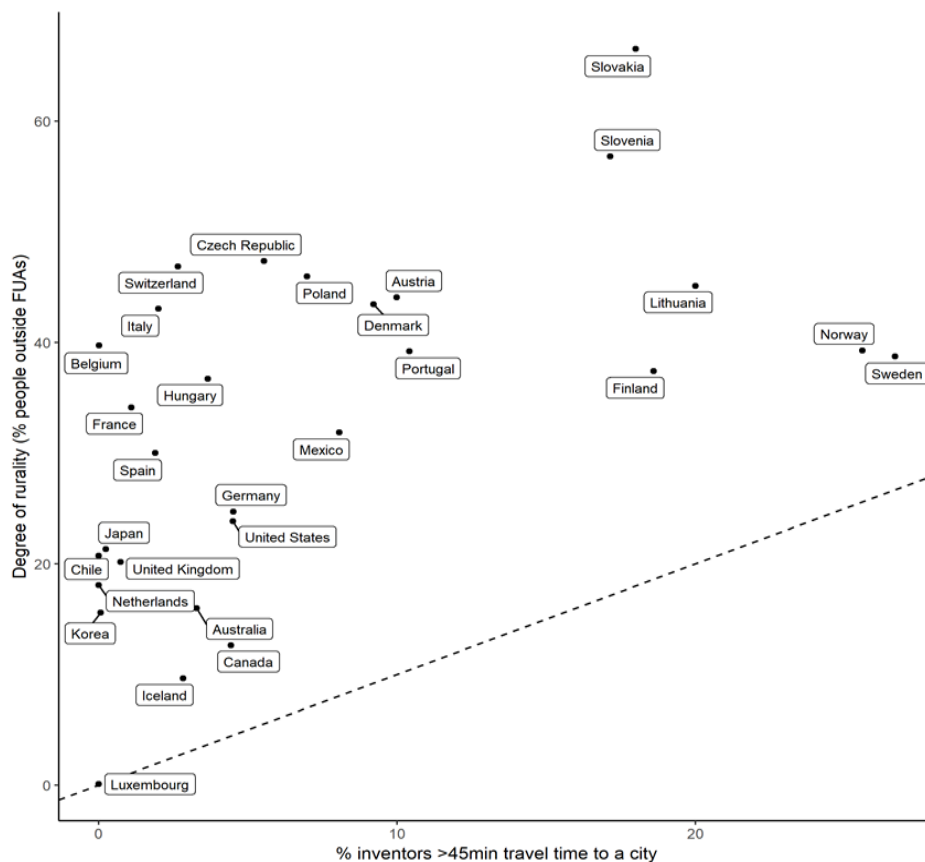
- Innovation is a predecessor of growth but not necessarily well-being for all territories (Aghion and Howitt, 1990<sup>[16]</sup>; OECD, 2016<sup>[17]</sup>; Romer, 1990<sup>[18]</sup>; McCann, 2019<sup>[20]</sup>).
- Framework conditions, such as access to labour, capital, markets and public services, encourage innovation and innovation adoption and diffusion but can be better targeted to satisfy the structure of rural regions (Aghion et al., 2001<sup>[22]</sup>; Andersson et al., 2009<sup>[23]</sup>; Bloom, Draca and Van Reenen, 2016<sup>[24]</sup>; Goos, Manning and Salomons, 2014<sup>[25]</sup>; Grossman and Helpman, 1990<sup>[26]</sup>; OECD, 2013<sup>[27]</sup>; 2020<sup>[1]</sup>).
- Innovation and its diffusion and adoption occur in networks and can be a source of growth for rural areas if barriers to physical and digital distances can be addressed (Akcigit, Grigsby and Nicholas, 2017<sup>[28]</sup>; Lengyel et al., 2020<sup>[29]</sup>; Sorenson, 2018<sup>[30]</sup>; Ahrend et al., 2017<sup>[31]</sup>).

In peripheral areas of Switzerland, the traditional view of innovation, one with a high and fast frequency of exchanges with innovation partners is not widely observed (Mayer, 2020<sup>[32]</sup>). This would suggest that innovation itself, in addition to innovation diffusion and adoption, may be limited. However, such an assumption precludes innovation as high-tech, based on quick interactions and firms that race to be first to the market. When studies have taken a territorial approach, this type of innovation is not as largely observed in rural areas as it is in dense cities. Economic geographers have started conceptualising

alternatives such as what is considered “slow innovation” (Shearmur and Doloreux, 2016<sup>[33]</sup>), which is the occurrence of innovation based on isolated development and limited, but strategic interactions with partners. This leaves room for creativity based on the fringe and unconventional ideas, shielded from pressures to deliver fast to markets (Mayer, 2020<sup>[32]</sup>). “Slow innovation” has the advantage of not being time-dependent, meaning it does not lose value rapidly, with a lower frequency of interactions and a strategic search for knowledge. In the peripheral mountainous areas of the European Alps (Osttirol, Austria and Piedmont, Italy), Mayer (2020<sup>[32]</sup>) observes a selective in-migration of entrepreneurs and innovative actors that seek such assets of peripheral regions.

Most inventors live relatively close to FUAs and distances across regions are relatively small. Unlike other larger OECD countries, for much of the inhabited territory in Switzerland, individuals can physically reach territories across cantons with relatively shorter travel times. For example, while a relatively high percentage (over 45%) of individuals live outside of FUAs (Veneri, 2018<sup>[34]</sup>), the share of registered inventors with a travel time that is longer than 45 minutes away from an FUA is less than 5% (Figure 2.8).

**Figure 2.8. Inventors in rural regions and travel times**



Note: Dotted line represents the 45-degree angle.

Source: OECD calculations based on PATSTAT and OECD (forthcoming<sup>[3]</sup>), *Enhancing Innovation in Rural Regions: Synthesis Report*, OECD Publishing, Paris.

### **Entrepreneurship rates are strong in Switzerland**

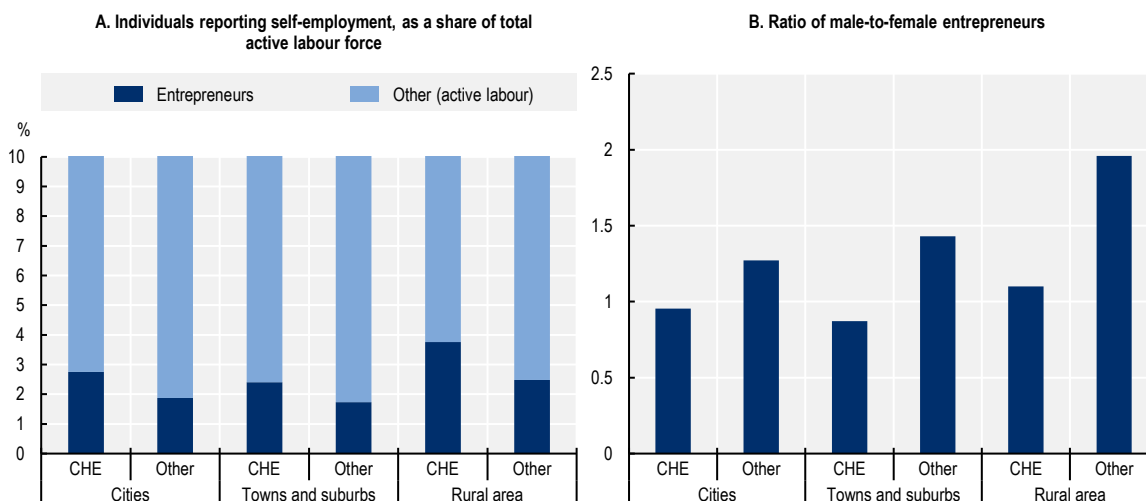
There are 10 to 20 more entrepreneurs per 1 000 active workers in Switzerland, as compared to other European countries. According to European Commission (EC) Labour Force Statistics, there are more entrepreneurs as a share of the active labour force than in other European OECD countries (Figure 2.9).



For Swiss policy makers, focusing on encouraging start-up entrepreneurship (OECD, forthcoming<sup>[3]</sup>) and entrepreneurship in scalable activities is an important factor in generating employment growth and well-being in territories (McKenzie et al., 2021<sup>[35]</sup>). As actors of change, entrepreneurs, and in particular young entrepreneurs who start firms with high levels of education are better prepared for change (OECD, forthcoming<sup>[3]</sup>). While it is clear that entrepreneurs are playing a large role in regions across Switzerland, it would be important to explore what kind of entrepreneurs create scalable firms and what kinds of interventions can support entrepreneurship focused on more than mere subsistence.

Evidence from the European Union (EU) Labour Force Survey depicts that Switzerland has higher ratios of self-employed entrepreneurs across all territories than other European OECD countries. Furthermore, there is a higher share of entrepreneurs in rural regions than in cities or towns and suburbs (Figure 2.9). In most countries, rates of entrepreneurship in rural areas are high as a share of the active labour population, reflecting to some extent a different mix of opportunities for the labour force. The high level of entrepreneurship in Switzerland is a strong indicator of a dynamic economy and a promising avenue for encouraging change and innovation adoption in rural regions.<sup>17</sup>

**Figure 2.9. Self-Employment in Switzerland and European countries, 2019**



Note: The active labour force is defined as the part of the registered population between the ages of 15-64 who are either searching for work, in training, self-employed or in active employment. Areas are classified by Eurostat's degree of urbanisation.

Source: European Labour Force Survey (2019).

Entrepreneurship rates are promising for women in Switzerland. In European OECD statistics, one female entrepreneur is missing per three males in European OECD countries. While Switzerland has more gender parity in entrepreneurship than other European OECD countries, there is still a small rural penalty for female entrepreneurs in rural areas. While there is a smaller share of women entrepreneurs in rural areas, the rates themselves are a positive indicator of entrepreneurship in Switzerland. More recent findings from 2020 confirm the continued high trend of female entrepreneurship (Swiss Federal Statistical Office, 2021<sup>[36]</sup>).

Women still face acute challenges as entrepreneurs. Growing firms and gaining venture funding is still a challenge for women entrepreneurs and globally, the type of firms women tend to start are more often in wholesale retail (Global Entrepreneurship Monitor, 2021<sup>[37]</sup>). In traditional "start-up" sectors (new ICT firms), women only account for 20% of founders (Impact Hub Zürich, n.d.<sup>[38]</sup>). Notably, higher entrepreneurship rates for women come in stark contrast to the gender gaps in the active labour force

across territories in Figure 2.6. It is well documented that female founders often have a more gender-balanced workplace, yet often firms with female founders hire fewer individuals (Global Entrepreneurship Monitor, 2021<sup>[37]</sup>). Supporting the well-being and growth of female-founded firms may help relieve at least some of the disparities in the territorial gender gaps.

Supporting fledging female entrepreneurs is a promising opportunity for growth in rural regions. Accessing the hidden resource of female entrepreneurship in Switzerland may help diversify the labour force and economic activities across all regions, and in particular in rural and peri-urban regions that show lower levels of female participation in the labour force. In addition, some studies show that the kinds of firm women establish, tend to answer to otherwise unmet needs or have social purposes. While the opportunity is promising, women-led firms often face increasing challenges. Scaling up among female-owned firms is less common (Baldegger, Gaudart and Wild, 2020<sup>[39]</sup>). Unfortunately, there is little evidence of programmes to support female founders and very little is known about the challenges faced by female entrepreneurs specifically in rural regions of Switzerland.

### ***Product and process innovation in Switzerland***

Product and process innovation is driven by ingenious individuals and learning through networks. In some industries, this type of activity can be proxied by education levels and a number of co-publications for innovations in the high-tech sector that often occur in large firms, and involve patenting and sharing of findings with other experts. Swiss regions are often at the top of the charts in this type of innovation. For smaller firms, however, this type of innovation is often irrelevant.

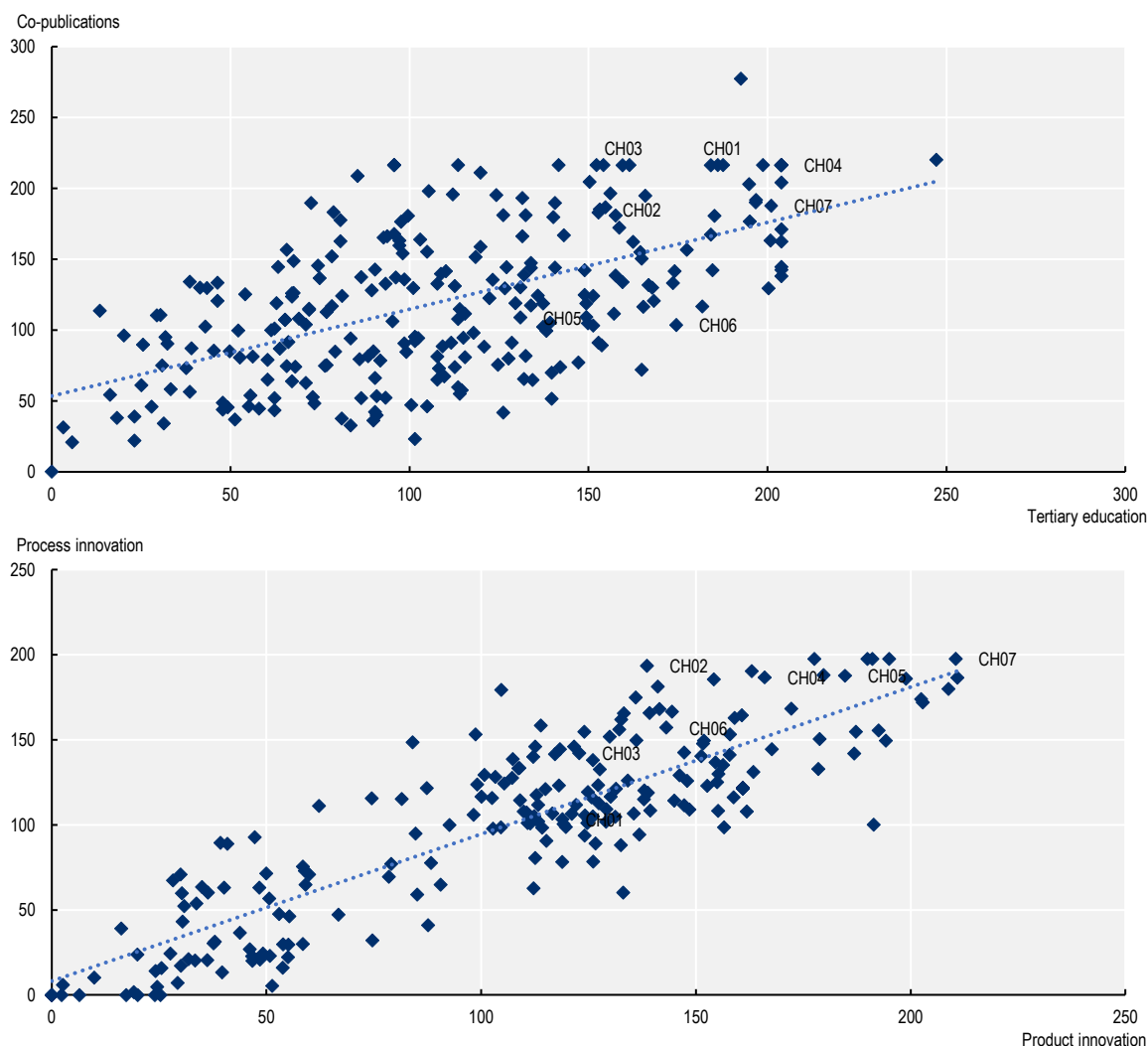
Regions in Switzerland perform relatively strongly in standard indicators of high-tech innovation as compared to other OECD countries. In Figure 2.10, some of the standard indicators show that Swiss regions have repeatedly performed in the top quartiles of standard indicators of innovation. This includes the share of tertiary education workers, the number of co-publications as well as product and process innovations. Each one of these indicators suggests that the capacity for firms and workers to innovate is strong, even if some heterogeneities exist between large regions. In particular, this finding supports the argument that high-tech innovation, often characterised as an innovation that is more common in large firms, is quite advanced in Switzerland.

There is high innovation in both metropolitan and non-metropolitan regions. The large region of Ticino (CH07)<sup>18</sup> and Zurich (CH04) perform highly in indicators associated with high-tech innovation as well as those associated with innovation more widely in products and processes (Figure 2.10). However, programmes that support high-tech innovation are not necessarily the type of innovation that is most relevant to non-metropolitan areas. For example, in Central Switzerland, where the canton of Lucerne is located, indicators of high-tech innovation are relatively low, as compared to other Swiss regions, but are high for product and process innovation. With an economic structure in Luzern that has a relatively stronger share of professional services and wholesale and trade, firms in Luzern are more likely to benefit from innovation programmes that encourage the diffusion and adoption of already existing forms of innovation from other regions. In the large region of Lake Geneva (CH01), where the canton of Vaud is located, small and medium enterprises are lagging behind in basic product and process innovation adoption (Figure 2.10).

In the region of Espace Mittleland, process innovation is much more common than product innovation. Espace Mittleland (CH02), where the canton of Jura is located, has a relatively high level of co-publications for the share of tertiary educated workers (Figure 2.10), which may reflect the character of innovation in this large region. The region includes mountainous areas, as well as industrial parks and traditional manufacturing. It demonstrates a high level of process innovation and, while the level of product innovation is high, it is relatively less than expected given its industrial structure.

**Figure 2.10. Innovation in large regions of Switzerland, 2020**

Co-publications, tertiary education, process and process innovation as indicators of innovation and innovation diffusion



Note: Data includes TL2 regions with available data in all EU countries, Norway, Switzerland and Republic of Türkiye, as well as the EU average. Large regions of Switzerland refer to Lake Geneva Region (CH 01), Espace Mittelland (CH02), Northwestern Switzerland (CH03), Zurich (CH04), Eastern Switzerland (CH05), Central Switzerland (CH06) and Ticino (CH07). Co-publications refer to international scientific co-publications per million population, where at least one co-author is based abroad or outside the EU for the EU-27. Tertiary education refers to the share of persons aged 25-34 that have completed some form of post-secondary education over the population between and including 24 to 25 year-olds. Process innovation refers to the number of SMEs that introduced at least one business process innovation either new to the firm or new to the market, over the total number of SMEs. Product innovation refers to the number of SMEs that introduced at least one product innovation (new or significantly improved good or service) over the total number of SMEs.

Source: EC (2021<sub>[40]</sub>), *European Innovation Scoreboard (database)*, [https://ec.europa.eu/growth/industry/policy/innovation/scoreboards\\_en](https://ec.europa.eu/growth/industry/policy/innovation/scoreboards_en).

### **Spending, jobs and firms in R&D**

R&D activities to a large part, indicate whether firms participate in actively contributing to the production of new and improved products or processes. They are particularly relevant for innovation in high-tech industries but not necessarily the adoption and diffusion of such innovations. Nevertheless, in some

regions, R&D jobs and expenditures indicate that firms are actively working on generating new-to-firm and new-to-market innovations and can still provide insights into some of the regional innovation puzzles.

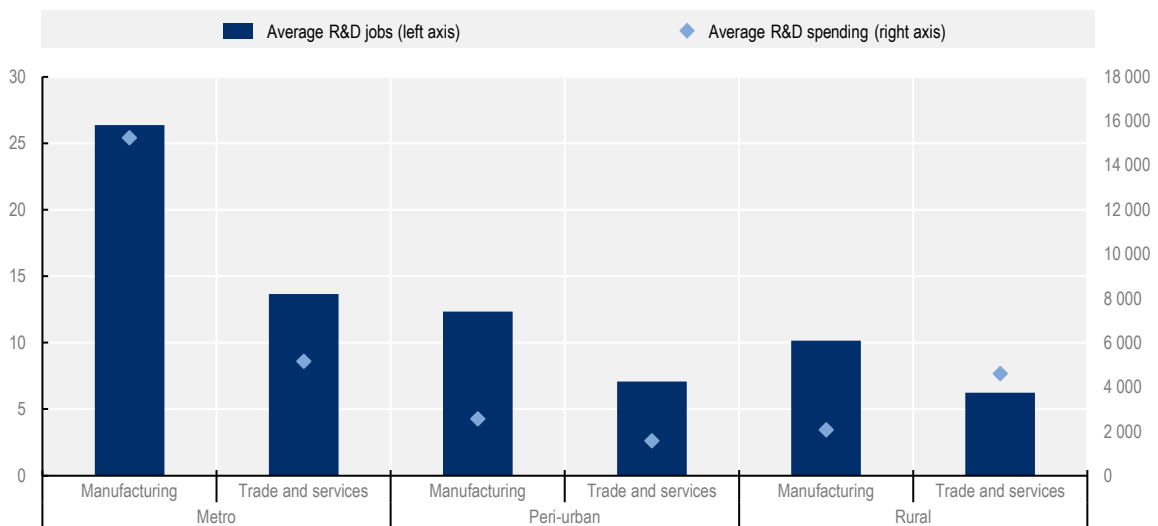
R&D activities are higher in metropolitan areas. There are more R&D jobs and expenditures per firm in metropolitan regions than in peri-urban or rural regions (Figure 2.11). This trend is observed widely in the spatial literature on innovation. In part, this is reflected in the size of the market, the type of innovation activities that take place in larger firms, as well as a stronger diversity of support services and supply chains available in metropolitan regions.

R&D activities are highest in manufacturing, especially in metropolitan areas. On average, manufacturing firms have more R&D jobs and more R&D spending than firms in other sectors across all regions (Figure 2.11). This is particularly acute in metropolitan regions. The connection between the process for formal innovation and manufacturing is clearly captured by such R&D statistics, and while we should still consider that some biases in reporting might lead to an overestimate of R&D activities in regions (OECD, forthcoming<sup>[3]</sup>), the sector itself is a clear leader of R&D-related innovation in most regions.

Nevertheless, there are relatively strong R&D activities in the trade and services sector in rural areas. On average there is more R&D expenditure in the trade and services sector than in the manufacturing sector in rural areas. This is particularly interesting as an opportunity to consider the development of industries away from traditional manufacturing, into new forms of services. Policies to support inter-disciplinarily can help build the development of the growing ecosystem around firm activities. An example of an initiative that promotes interdisciplinary includes the Innovation Booster programme offered by Innosuisse and similar interdisciplinary programmes supported in innovation parks further described in Chapter 3.

**Figure 2.11. R&D jobs and spending (per firm)**

Average R&D jobs and spending per firm, by territory and large sector, 2019



Note: Average R&D jobs refer to the average number of jobs involved in R&D in the sample of firms that reported any R&D activities. Average R&D spending is in Swiss Francs (2015). Groups of rural, peri-urban and metro areas are categorised in Box 2.1 and Veneri (2018<sup>[34]</sup>).

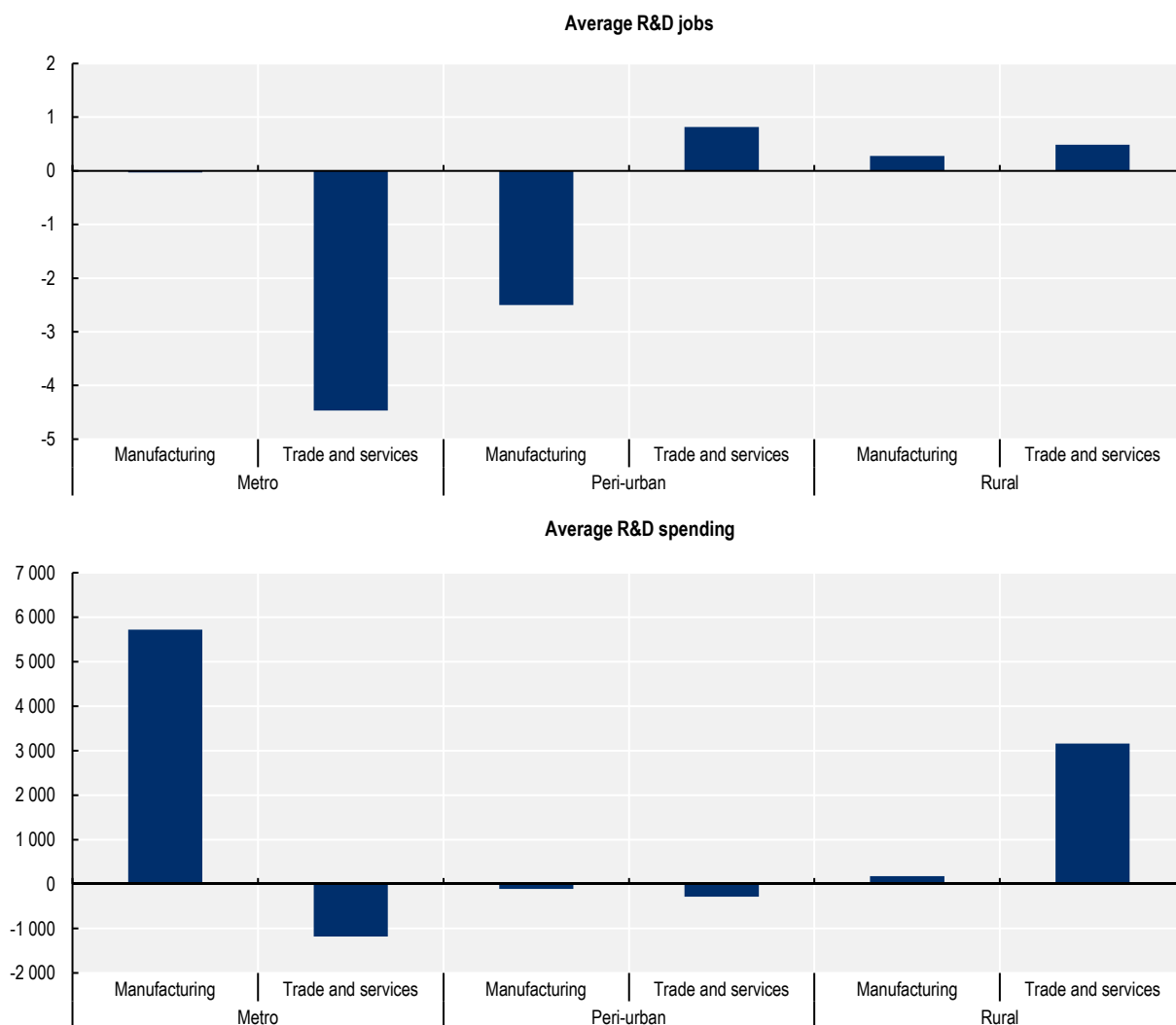
Source: Swiss R&D Survey, Swiss Federal Statistical Offices, as elaborated by the OECD.

The average number of R&D jobs grew from 2012 to 2019 in rural regions, while there is a strong decline in metropolitan regions (Figure 2.12). Likewise, there is a growth in R&D activities that peri-urban regions are observing in the trade and services sector. The increase in R&D activities per firm is a sign of the growth of traditional innovation activities. In line with an increasing transition to trade and services activities

in rural regions, this trend indicates a promising opportunity for rural regions to contribute more fully to innovation in Switzerland, while also being able to benefit from the positive impacts of innovation in rural regions.

**Figure 2.12. Changes in R&D jobs and spending, 2012-19**

Average job (FTE) changes and spending changes, by large sector and territory



Note: Average R&D jobs refer to the average number of jobs involved in R&D in the sample of firms that reported any R&D activities. R&D in-house (intramural) expenditure refers to R&D expenditures within firms, per firm. Extramural expenditure refers to R&D expenditures in Switzerland and abroad. All currency is in Swiss Francs (2015).

Source: Swiss R&D Survey.

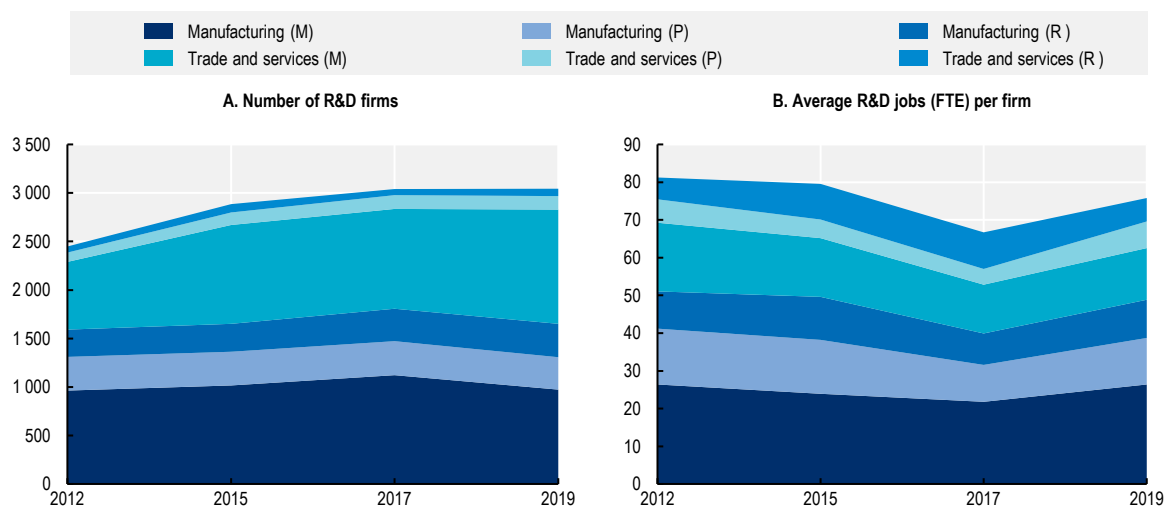
In metropolitan areas, a decline in R&D jobs per firm is accompanied by an increase in expenditure per firm, in particular in the manufacturing sector (Figure 2.12). In metropolitan regions, firm activities in R&D are shifting from those that require R&D staff to those that primarily involve R&D expenditures. It is not currently possible to understand whether this is due to higher input costs for R&D in some businesses, or because of changes in trends of outsourcing R&D activities. While we observe a fall in manufacturing R&D jobs on average across Switzerland from 2012 to 2017 and stagnant change in 2012-19, spending on R&D

in manufacturing is still increasing in metropolitan regions. Such a pattern could be explained if R&D activities are increasingly outsourced; other explanations for this pattern may be general equilibrium effects and competition from external sources of jobs during the Swiss Franc crisis in 2015.<sup>19</sup> Some evidence from the location of spending further explored below, suggests that in part, this is due to outsourcing of R&D in manufacturing in metropolitan regions (Figure 2.14). This is not observed in manufacturing sectors in rural regions, where there are small levels of growth in jobs and expenditure per firm.

R&D spending quadrupled in the rural trade and services sector from 2012 to 2019. According to Figures 2.12 and 2.13, the trade and services sector is particularly strong in leading to an increase in expenditure as compared to the manufacturing sector in rural regions. Expenditures on R&D in rural regions grew from CHF 90 000 (approximately EUR 83 000) to CHF 360 000 (approximately EUR 331 000) from 2012 to 2019.<sup>20</sup>

The trade and services sector in rural areas is experiencing a 36% increase in average jobs per firm and a threefold increase in average R&D expenditure per firm. The average number of jobs in R&D in the trade and services sector in rural regions grew close to one per two firms. Likewise, the growth in R&D expenditures per firm in the trade and services sector reflected a close to threefold increase in rural regions. A similar trend was not observed in metropolitan regions. This finding is promising for reducing gaps in R&D activities across regions. In the rural trade and services sectors, there are more R&D jobs, expenditure per firm and more firms operating (Figures 2.12 and 2.13). The relative increase of average R&D jobs per firm in the trade and services sector suggests that further activity is being picked up in the R&D sector, and R&D workers are still being hired to participate in innovative activities in rural regions, even if the same cannot be said in metropolitan regions.

**Figure 2.13. R&D firms and jobs**



Note: R&D firms refer to the number of firms reporting any R&D activity. R&D jobs refer to the average number of full-time equivalent (FTE) jobs that participate in R&D in firms conducting any form of R&D.

Source: R&D Survey, Swiss Federal Statistical Office as elaborated by the OECD.

In 2019, close to 35 cents per Swiss Franc spent on R&D was outsourced; in rural regions, only 4 cents per Swiss Franc left the firm for R&D expenses. R&D spending in rural regions focuses more on internal R&D processes than on metropolitan regions. This trend has been increasing over time (see Annex A). In 2012, 18 cents per Swiss Franc were spent outside of the firm, while in rural regions this was only 2 cents. While spending within firms or investing in other Swiss or foreign firms may be preferable depending on the model of innovation the firm pursues, the lack of investment for in-house research may limit some of

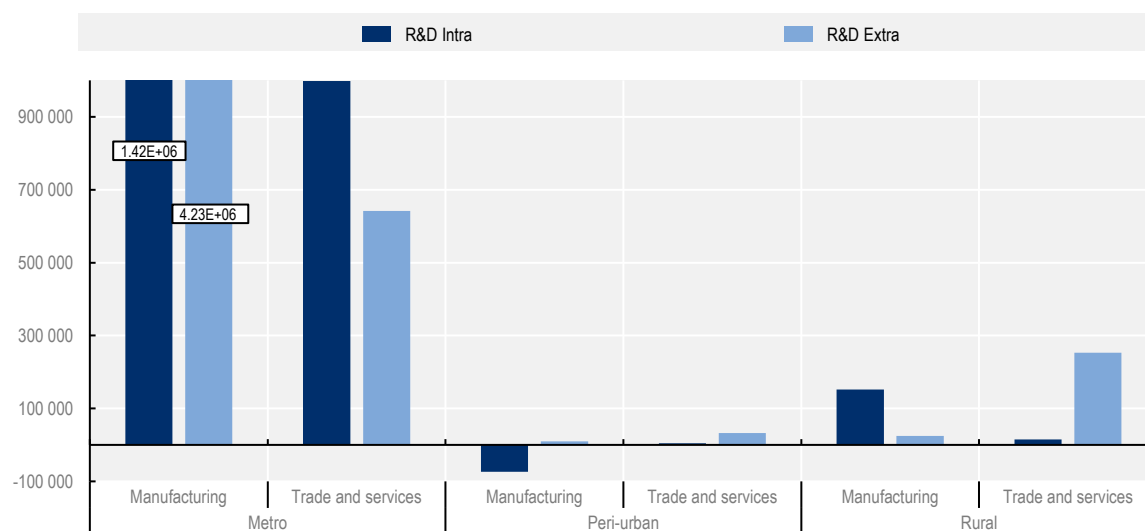
the immediate benefits of investments in innovation on the labour market and the diffusion of skills within regions.

Rural firms are increasingly spending a larger share of R&D investments in-house in the manufacturing sector and out of the firm in the trade and services sector. The change in R&D investments from 2012 to 2019 primarily went to R&D investments outside of firms (67% of the change) rather than within firms (33% of the change). However, in rural regions, we observe that 62% of the change in expenditures is due to increased external expenditure, with the majority of the increase in expenditure due to increases in the trade and services sectors outsourcing R&D expenditure (Figure 2.14 and Annex A).

Focus on bringing more support for R&D investments in rural regions could unlock the stagnant innovation and productivity rates. Firms in metropolitan and peri-urban regions may be choosing to invest in R&D outside of firms in metropolitan regions, either for cost-saving purposes (wages premiums may be lower in smaller firms, or firms not located in high-income regions) or because innovation in such firms is reaching saturation point. On the other hand, firms in rural regions are not yet fully saturated in terms of R&D expenditures and may be able to conduct more in-house research because of lower reservation wages, and fixed and variable costs. As will be discussed in the next section, because rural and non-metropolitan regions are not yet full saturated, focusing on R&D and innovation in rural regions may also help reverse the productivity slowdown.

**Figure 2.14. The composition of R&D spending across territories and sectors**

Spending by destination, territories, and sectors, 2019, in 2015 CHF



Note: Graph depicts the levels of R&D spending, by destination from in 2019 within aggregate sectors and territories. Due to sample size and interpretation, the public and community service sectors, the financial, insurance and real estate sector and utility and construction sectors are excluded.

Source: Swiss R&D Survey, Federal Statistical Office as elaborated by OECD.

## Key messages on innovation in Switzerland

- Entrepreneurship rates are strong in rural regions of Switzerland but there is still a penalty for women in rural regions.
- Swiss regions perform relatively strongly in high-tech innovation but some regions are still lagging in basic product and process innovation.
- There are more R&D investments and jobs in metropolitan regions and, in general, in the manufacturing sector, however, increases in R&D spending are not contributing to the growth of R&D jobs in metropolitan regions.
- There is an increasing opportunity for R&D activities in the trade and services sector in rural regions, where increased R&D investment coincides with increased R&D jobs.
- Rural firms are increasingly outsourcing R&D spending in the services and trade sectors.
- Focusing on bringing more support for R&D investments and other innovation activities in rural regions could unlock the stagnant productivity rates in Switzerland.

## Promoting equality and adapting to demographic change

Innovation is often used as a tool to bring prosperity to regions. While it often is linked to growth in jobs and wages, it can also accentuate territorial inequalities via trends in concentration and diversification. Productivity is often used as a proxy for innovation adoption; while it is not perfect, under the assumption that innovation is productivity-enhancing, the trends should be related. After exploring trends in territorial productivity, the following section highlights the link between innovation, productivity and firm-level outcomes. It concludes with considerations for promoting well-being as rural regional governments anticipate demographic change and the future of rural areas. Due to sample size and privacy-related limitations, some of the territories in this section use the OECD territorial classification of regions (cantons) as defined in Fadic et al. (2019<sub>[5]</sub>) and described in Box 2.1.

### ***Productivity and regional inequalities in Switzerland***

While still a leader in innovation, Switzerland is experiencing a productivity growth slowdown (Ollivaud, 2017<sub>[41]</sub>) that is unequal across territories (Figure 2.15). In Switzerland, the slowdown is linked to the role of innovation and entrepreneurship, demographic change and low integration of women and migrants. From the period 2012-19, aggregate labour productivity<sup>21</sup> in Switzerland grew at around 1% per annum on average, with annual labour productivity growth rates remaining around 0, or negative. Aggregate growth rates over the entire period reached their highest points in 2018 and 2019 at close to 4% as depicted in Figure 2.15. This came after positive growth in prior decades as reported in Ollivaud (2017<sub>[41]</sub>). The aggregate relative productivity slowdown masks territorial divergences. Whereas productivity in high-density peri-urban areas soared (at 2% in 2019 as compared to 2012), productivity in rural remote areas and peri-urban low-density areas fell behind, particularly after 2015.<sup>22</sup> In 2019, central rural regions and low-density peri-urban contracted by 14% and 5%. This reinforces the importance of strategies for innovation and entrepreneurship that consider spatial aspects to bring more inclusivity.

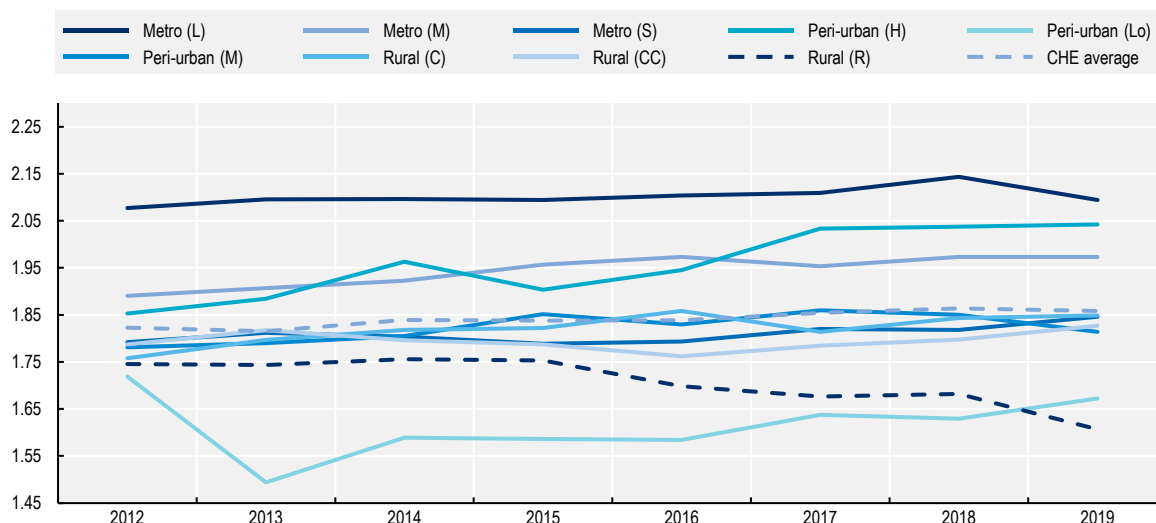
Innovation (R&D) is positively associated with increases in productivity but is contingent on territorial and sectoral attributes (Figure 2.16). A rise in jobs in R&D is associated with an increase in productivity in the next period for all of Switzerland. Likewise, a rise in R&D expenditure is associated with an 8% increase in productivity in the next period. Estimates are not significant when controlling for territorial and sectoral fixed effects but negative for non-metropolitan regions.<sup>23</sup>



Additional R&D expenditures are negatively associated with increases in labour productivity in metropolitan regions, yet positive in non-metropolitan regions. While the correlation is noisy, it describes a potential saturation of the R&D expenditure market in non-metropolitan regions, as suggested in the previous section.

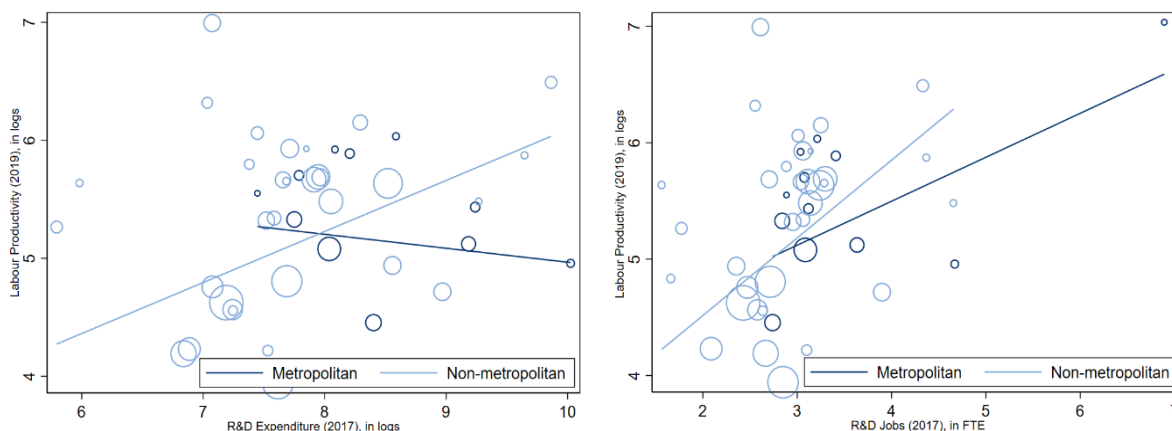
**Figure 2.15. The divergence of productivity across Swiss territories**

Labour productivity growth, by nine-tier national territorial classifications



Note: Labour productivity is reported based on value-added over (FTE) employment. Areas are classified into the nine-tier classification of areas. All figures are deflated to 2015 CHF. The agriculture and fishery sectors are excluded because of the lack of data availability in the value-added survey. To facilitate interpretation and after consultation with the FSO financial, insurance and real estate sector, utilities and construction, as well as public and community services are excluded from this analysis. Source: Swiss Value-Added Survey and STATENT, Federal Statistical Office.

**Figure 2.16. Innovation activities and labour productivity**



Note: Labour productivity is reported based on value-added over (FTE) employment. All expenditure and value-added figures are in millions of 2015 CHF. Observations are on a cantonal and aggregate sectoral level. To facilitate interpretation and analysis, the public sector and other community services sectors are excluded from the R&D statistics. Bubbles are weighted by labour (FTE). The figure includes only data from 2017 and 2019. To facilitate interpretation and after consultation with the FSO, activities in the agriculture and fisheries sector, financial, insurance and real estate sector, utilities and construction, as well as public and community services are excluded from this analysis. Classifications of territories are based on Fadic et al. (2019<sub>[5]</sub>). Source: Swiss Value-Added Survey, STATENT and Swiss Research & Development Survey, Federal Statistical Office.

There is a higher return of R&D jobs on productivity in non-metropolitan regions. For each R&D job, there is a higher return to labour productivity in the following year for those in non-metropolitan regions. Non-metropolitan regions may have lower average levels of R&D jobs in sectors, as compared to metropolitan regions (Figure 2.16) but the return on R&D jobs on productivity is higher.

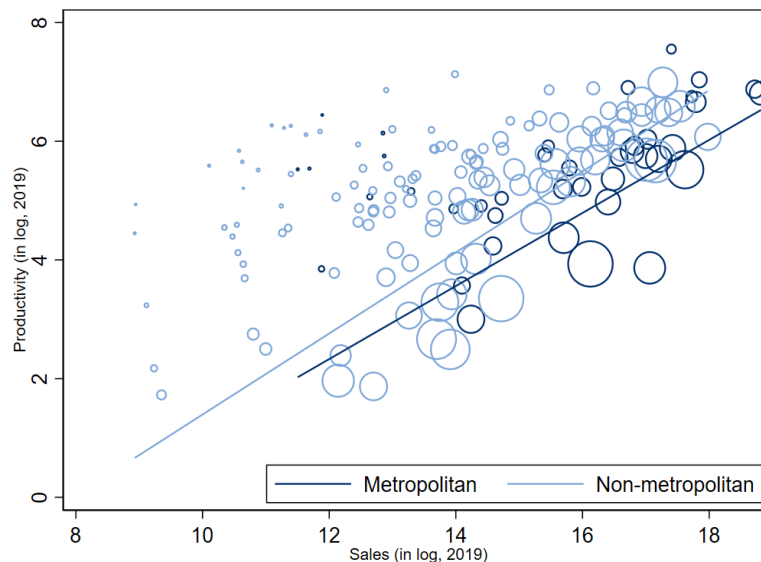
Nevertheless, there is a rural penalty on the return from R&D activities when controlling other factors such as the year, sector and region. The pure effect of belonging to a non-metropolitan region on labour productivity is negative. It is strongest and only statistically significant for non-metropolitan rural remote areas. In remote rural regions, belonging to a non-metropolitan region results in lower productivity in the following period as compared to metropolitan regions.<sup>24</sup>

Access to markets matters for innovation outcomes. Part of the productivity penalty in the previous figures is associated with access to higher sales volumes and prices. In Figure 2.17, for firms with the same level of productivity, there is a higher level of sales for metropolitan regions. This finding suggests that access to markets makes a larger contribution to innovation adoption and productivity in metropolitan regions than in non-metropolitan regions.

Access to larger labour markets is associated with higher productivity. Larger cantonal and sectoral labour markets (larger circles in Figure 2.17) tend to have higher sales, even for less productive activities in cantons. If firms in regions and sectors have access to larger labour markets, there is a larger possibility to find a large enough market for skilled labour. Rural regions may have fewer sales even if they are equally as productive, not necessarily only because of firm absorptive capacities, but also because of access to labour markets.

### Figure 2.17. Sales and labour productivity

Annual labour productivity and sales by canton and sector, classified by access to cities, 2019



Note: Labour productivity is reported based on value-added over (FTE) employment. Value-added and sales are in millions of 2015 CHF. Observations are on a cantonal and aggregate sectoral level. Due to small sample size issues originating from the value-added survey, the canton of Graubünden is excluded from the analysis. Bubbles are weighted by labour (FTE). The figure includes only data from 2019. To facilitate interpretation and after consultation with the FSO, activities in the agriculture and fisheries sector, financial, insurance and real estate sector, utilities and construction, as well as public and community services are excluded from this analysis. Classifications of territories are based on the OECD classifications based on access to cities as explained in Veneri (2018<sup>[34]</sup>) and Fadic et al. (2019<sup>[5]</sup>).

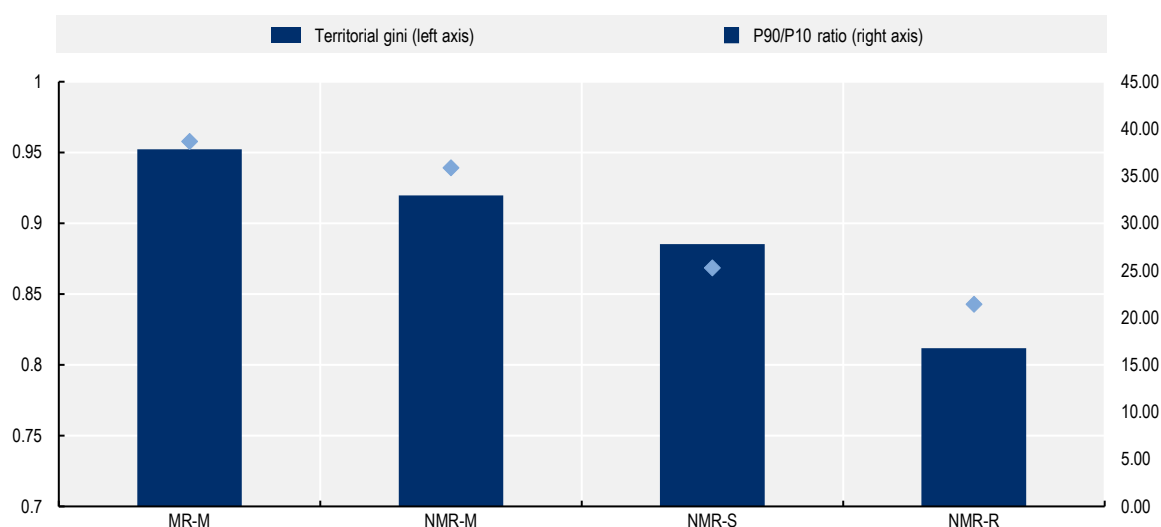
Source: Swiss Value-Added Survey and STATENT Federal Statistical Office.

While sales volumes may be high in metropolitan regions, so is diversification; the opposite is true for non-metropolitan regions that are more concentrated (Figure 2.18). Using an indicator of territorial inequality (McCann, 2013<sup>[42]</sup>), we observe a stronger diversification between firms within metropolitan regions than those in non-metropolitan regions. Diversification of the shares of sales is highest in metropolitan regions and has been stable from 2012 to 2019.

Yet more concentration also coincides with less inequality between firms within non-metropolitan regions. Firms in the top 10<sup>th</sup> percentile of all firms have almost 40 times more sales than those in the bottom 10<sup>th</sup> percentile in metropolitan regions. In comparison, the top 10<sup>th</sup> percentile of firms have a little more than 20 times more than those in the bottom 10<sup>th</sup> percentile in non-metropolitan regions in rural remote areas (Figure 2.18). There are larger differences between outcomes for firms at the top and bottom of the distribution in metropolitan areas. Inequality at the top and bottom end of firm sales are stronger in more dense regions close to FUAs.

### Figure 2.18. Territorial inequality and diversification

Territorial Gini on sales across territories and p90/p10 ratio of share, 2019



Note: Following McCann (2013<sup>[42]</sup>), territorial inequalities evaluate the parity between the share of individual firms within each of the territories. In this figure we use indicators based on firm sales. The Territorial Gini refers to the inequality of sales values between firms. The P90/P10 ratio is the ratio of total sales attributed to the top 10<sup>th</sup> percentile of firms, ranked by sales and the bottom 90<sup>th</sup> percentile of firms. Classifications of territories are based on Fadic et al. (2019<sup>[5]</sup>). Due to challenges with sample sizes, the report uses the OECD classification rather than the national classification for territories. The abbreviations refer to metropolitan regions (cantons) with a large city of more than 250 000 inhabitants (MR-M), non-metropolitan regions near a city of more than 250 000 inhabitants (NMR-M), non-metropolitan regions near a city with between 50 000 and 250 000 inhabitants (NMR-S), and non-metropolitan remote regions (NMR-R). Switzerland does not have any metropolitan regions classified as a region with a very large city of more than 1 million inhabitants (MR-L). To facilitate interpretation and after consultation with the FSO, activities in the financial, insurance and real estate sector, utilities and construction, as well as public and community services are excluded from this analysis.

Source: STATENT, Federal Statistical Office as elaborated by the OECD.

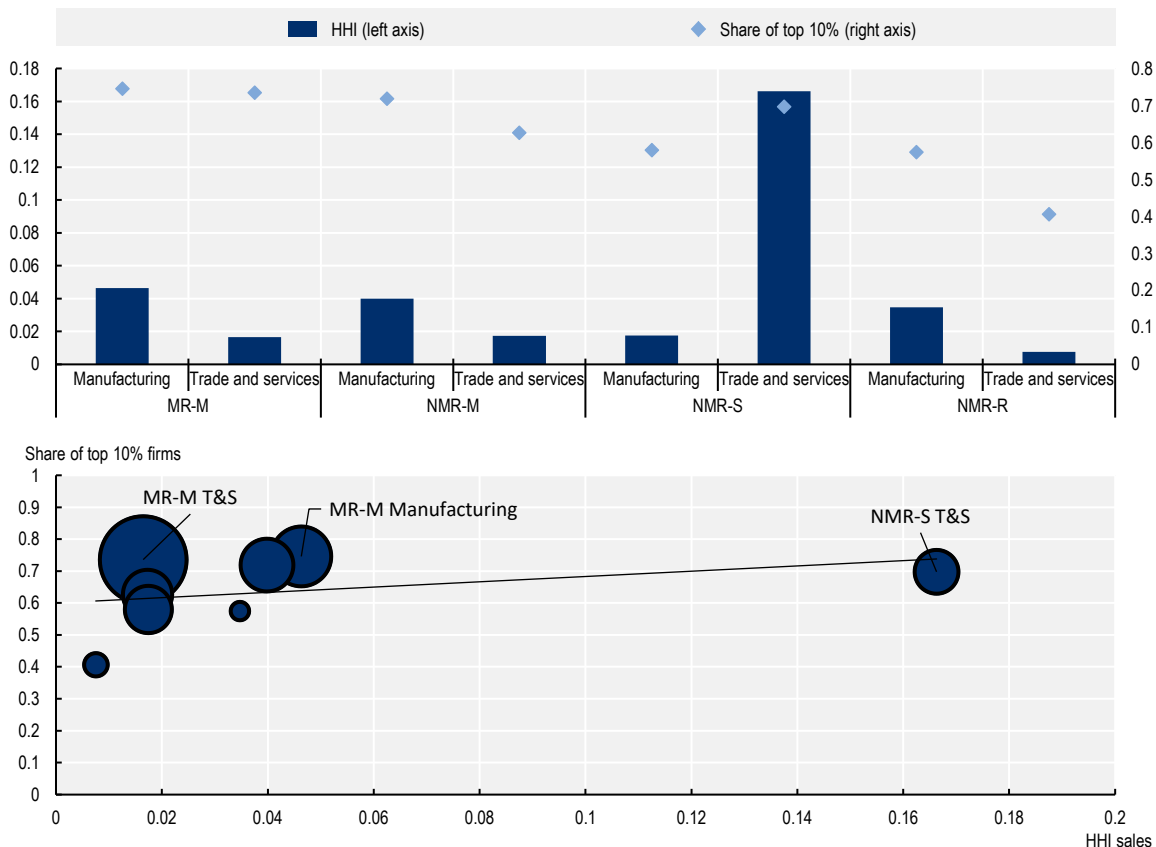
While diversification in metropolitan areas and concentration in non-metropolitan areas are not uncommon, it can be indicative of one of two main phenomena: i) that market failures are limiting competition and opportunities for some firms within the same sector; ii) that diversification of activities between sectors is high in the region, or a mixture of both. In the first scenario (market failures), governments should enact to ensure a fair playing field through competition policies and support for the development of diversified industries. In this second scenario (diversification), governments should not react unless outcomes are lagging.

In non-metropolitan regions, the low levels of inequality suggest that markets are working well despite less competition and more concentration. For regions in the phase of catching up to other regions, concentration can be a good strategy if firms are particularly productive. However, as observed from Figure 2.17, this is not necessarily the case in sectors in non-metropolitan regions. Non-metropolitan regions may need further diversification, before focusing on concentration.<sup>25</sup> This finding supports earlier recommendations that call for the need to diversify sectors in non-metropolitan regions of Switzerland. Furthermore, there may still be some sectors of activity, for example in the agri-food chain as discussed in Chapter 4, where more competition could be encouraged to counteract the productivity slowdown and encourage innovation.

On a sectoral level, markets are functioning competitively. While in some sectors and regions, the top 10% of firms capture over 70% of sales in metropolitan regions (Figure 2.19), the Herfindahl-Hirschman indicator of diversification is still within reasonable bounds.

**Figure 2.19. Sales concentration and competition across territories**

Share in sales of top 10% firms and Herfindahl-Hirschman Index (HHI) of concentration, 2019



Note: The HHI measures the share of sales in each sector and region to determine market concentration and competitiveness. The formula consists of  $HHI = \sum_{i=1}^N s_i^2$  normalised to 1. A low level of HHI indicates a highly competitive industry in the territory, while a high level of HHI indicates a highly concentrated industry in the specific territory. Because the indicators are split both by territory and sector, the numbers are slightly higher than anticipated. The share of the top 10% of firms refers to the share of sales that the top 10% of firms contain. Close to 1 refers suggests that the top 10% of high-sales firms have the quasi-totality of the market. Figures in the lower panel are weighted by the share of the labour force. Classifications of territories are based on Fadic et al. (2019<sub>[5]</sub>). Due to challenges with sample sizes, the report uses the OECD classification rather than the national classification for territories. The abbreviations refer to metropolitan regions (cantons) with a large city of more than 250 000 inhabitants (MR-M), non-metropolitan regions near a city of more than 250 000 inhabitants (NMR-M), non-metropolitan regions near a city with between 50 000 and 250 000 inhabitants (NMR-S), and non-metropolitan remote regions (NMR-R). Switzerland does not have any metropolitan regions classified as a region with a very large city of more than 1 million inhabitants (MR-L).

Source: STATENT, Federal Statistical Office as elaborated by the OECD.

Nevertheless, a relatively higher level of concentration is observed in trade and services<sup>26</sup> in non-metropolitan regions close to small cities. This could indicate opportunities for innovation through promoting competition and activity in this sector and type of region. A high Herfindahl-Hirschman Index (HHI) indicates high levels of concentration but not necessarily low competition if all firms are gaining equal shares of the economy. However, if we jointly observe an HHI with a high share of total sales activities in only the top 10% of firms, it can indicate market failures due to low competition.

In general, in Switzerland, competition is strong; however, relative to other regions, some sectors may be less competitive, with a high concentration of close to 70% of all sales going to the top 10% of high-sales firms in both the trade and services sector in non-metropolitan regions close to small cities. In line with previous recommendations and in lieu of specific intervention from competition authorities, working on encouraging entrepreneurship and innovation in this type of region and sector can provide some part of the solution to unlocking equity and growth in non-metropolitan regions close to small cities. As observed in Chapter 4, there are clear cases where export and sales markets are dominated by two to three firms in the agri-food chain that includes the wholesale and trade market for raw agricultural products and foods.<sup>27</sup> In this case, policies to encourage new firms in this sector may be needed to help entrepreneurs overcome anti-competitive practices.

### ***Anticipating demographic change: Younger and older workers***

A future-looking approach for rural regions and rural areas often starts by understanding how current trends are changing society and transforming policy implementation. It anticipates future trends with adaptive policies that can improve well-being and productivity regardless of the future scenario (OECD, 2021<sup>[43]</sup>). An integrated policy approach also includes a vision that is focused on the value-added of rural regions rather than just sectors (OECD, forthcoming<sup>[3]</sup>). While it is difficult to predict all future changes, governments with strategic foresight that includes a rural lens are prepared for adapting to change more quickly and have found the practice useful for building consensus and ownership. In some cases, to adapt to change, governments may also consider the use of experimental tools, such as regulatory sandboxes, or other experimentation processes that can provide new public services to a changing economy, as elaborated in Chapter 3.

There are two men employed for every employed woman in low-density peri-urban areas, as observed previously in this chapter (Figure 2.6). While the rate is still high in many metropolitan regions, it is lower than in most non-metropolitan regions. A forward-looking and inclusive strategy also addresses some of the barriers to participation in the labour market and entrepreneurship for the under-represented population, including women, youth and migrants. Rural and peri-urban regions suffer from a loss of opportunities for competitiveness, productivity and diverse labour market through a lower activation of the female workforce. Currently, no specific targets for encouraging entrepreneurship and opportunities for women and other harder-to-reach communities are included in the government's New Regional Policy (NRP), however, they are incorporated into some Innosuisse instruments. A more inclusive strategy might include specific support and targets that trace and make reforms to correct for market failures in access to government services for all parts of society, for all individuals in Switzerland. Furthermore, there are long argued gains in productivity through more inclusive policies.

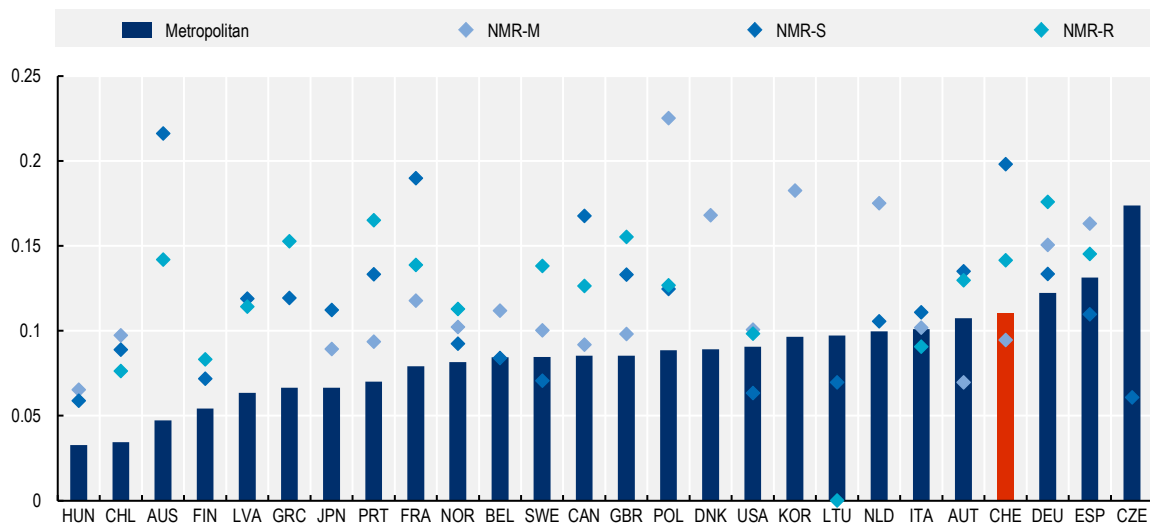
Skills gaps and demographic change is a key challenge for innovation, as it often entails lower innovation activity rates and the need for continuous lifelong upskilling policies for younger and older workers. Cantonal authorities identified that their largest challenges had more to do with demographic change and migration patterns than those directly concerned with building more business opportunities. Demographic change has not spared Switzerland. In non-metropolitan regions of Switzerland, there is a higher rate of older workers as compared to metropolitan regions (Figure 2.20). In addition, some cantons are also suffering from a lack of young workers. This suggests that there is both a need for policies to ensure that older workers are productive and have access to lifelong learning opportunities in rural regions, including

adult learning, lifelong learning and upskilling opportunities, reducing incentives for early retirement and considering health and other social services as part of a holistic approach (Lewis and Ollivaud, 2020<sup>[44]</sup>). Likewise, early engagement for entrepreneurship and leadership courses with youth in rural regions and increasing consideration for how to adapt economies to the change in the outflow of younger workers should be taken under consideration.

Migration is positively associated with innovation, entrepreneurship and firm performance across regions (OECD, 2022<sup>[45]</sup>; Kerr, 2018<sup>[46]</sup>; Guichard, Özgüzel and Kleine-Rueschkamp, forthcoming<sup>[47]</sup>). This is especially the case in Switzerland (Beerli et al., 2021<sup>[48]</sup>), even though, there is evidence of local labour market frictions (OECD, 2022<sup>[45]</sup>). In the case of Switzerland, daily cross-border migrants positively contribute to closing the skills gap, such as in the northern border Jura region. Recent work by Beerli et al. (2021<sup>[48]</sup>) found that the removal of barriers to European cross-border migrants in Switzerland impacted regions close to the border increasing wages for high-wage native workers, productivity, firm size and innovation in firms where there was a prior skills shortage. While the challenges may be outside of the direct programme of work of regional development agencies, co-ordinating with local cantons who make decisions on migration permits is an important step in shaping local policies to support closing the skills gap. Furthermore, encouraging a spatially conscious approach through co-ordination mechanisms with relevant skills, employment and migration authorities can help some of these issues.

## Figure 2.20. Older workers across territories

Share of older working age population aged 55-59, 2018



Note: Classifications of territories are based on Fadic et al. (2019<sup>[5]</sup>). The abbreviations refer to metropolitan regions (cantons) with a large city of more than 250 000 inhabitants (MR-M), non-metropolitan regions near a city of more than 250 000 inhabitants (NMR-M), non-metropolitan regions near a city with between 50 000 and 250 000 inhabitants (NMR-S), and non-metropolitan remote regions (NMR-R). Switzerland does not have any metropolitan regions classified as a region with a very large city of more than 1 million inhabitants (MR-L).

Source: OECD (2022<sup>[49]</sup>), *Regional Demography*, [https://stats.oecd.org/Index.aspx?DataSetCode=REGION\\_DEMOGR](https://stats.oecd.org/Index.aspx?DataSetCode=REGION_DEMOGR) (accessed on 15 June 2022).

## Key messages on promoting well-being and adapting to change

- Productivity, as a measure of innovation adoption, is diverging across territories in Switzerland.
- R&D-based innovation is positively associated with increases in productivity particularly for non-metropolitan regions, even though the penalty for the rural remote region is persistent.
- Access to markets and the labour force matters for productivity and sales, but is a bigger challenge in non-metropolitan regions.
- While sales volumes may be lower in non-metropolitan regions, so are firm-level inequalities that may contribute to an easier environment for nascent entrepreneurs.
- In regions and sectors of Switzerland, markets still remain well functioning despite divergences between the top- and bottom-performing firms that are more pronounced in metropolitan regions.
- There is room for boosting competition in the trade and services sector in non-metropolitan regions close to small cities.
- Demographic disparities, based on gender and age, are an important challenge for rural regions that need to be addressed through co-ordination with other ministries.

## References

- ACOA (2021), “ACOA investments support resources and opportunities for women entrepreneurs across Atlantic Canada”, Atlantic Canada Opportunities Agency, <https://www.canada.ca/en/atlantic-canada-opportunities/news/2021/05/acoa-investments-support-resources-and-opportunities-for-women-entrepreneurs-across-atlantic-canada.html>. [7]
- Aghion, P., C. Antonin and S. Bunel (2021), *The Power of Creative Destruction*, Harvard University Press. [21]
- Aghion, P. et al. (2001), “Competition, imitation and growth with step-by-step innovation”, *Review of Economic Studies*, Vol. 68/3, pp. 467-492, <https://doi.org/10.1111/1467-937x.00177>. [22]
- Aghion, P. and P. Howitt (1990), “A model of growth through creative destruction”, *National Bureau of Economic Research*, Vol. w3223. [16]
- Ahrend, R. et al. (2017), “What makes cities more productive? Evidence from five OECD countries on the role of urban governance”, *Journal of Regional Science*, Vol. 57/3, pp. 385-410, <https://doi.org/10.1111/jors.12334>. [31]
- Akcigit, U., J. Grigsby and T. Nicholas (2017), “The rise of American ingenuity: Innovation and inventors of the golden age”, *National Bureau of Economic Research*, Vol. w23047. [28]
- Andersson, F. et al. (2009), “Reaching for the stars: Who pays for talent in innovative industries?”, *The Economic Journal*, Vol. 119/538, pp. F308-F332, <https://doi.org/10.1111/j.1468-0297.2009.02277.x>. [23]
- Autor, D. (2014), *Polanyi's Paradox and the Shape of Employment Growth*, National Bureau of Economic Research, Cambridge, MA, <https://doi.org/10.3386/w20485>. [19]

- Baldegger, R., R. Gaudart and P. Wild (2020), *Global Entrepreneurship Monitor 2019/2020: Report on Switzerland*, School of Management Fribourg (HEG-FR), HES-SO, University of Applied Sciences and Arts Western Switzerland, <https://www.gemconsortium.org/economy-profiles/switzerland-2> (accessed on 22 November 2021). [39]
- Berli, A. et al. (2021), “The abolition of immigration restrictions and the performance of firms and workers: Evidence from Switzerland”, *American Economic Review*, Vol. 111/3, pp. 976-1012, <https://doi.org/10.1257/aer.20181779>. [48]
- Bloom, N., M. Draca and J. Van Reenen (2016), “Trade induced technical change? The impact of Chinese imports on innovation, IT and productivity”, *The Review of Economic Studies*, Vol. 83/1, pp. 87-117. [24]
- EAER (2021), *Switzerland’s SME Support*, Federal Department of Economic Affairs, Education and Research, <https://www.kmu.admin.ch/kmu/en/home/New/publikationen/politique-pme.html>. [15]
- EC (2021), *European Innovation Scoreboard (database)*, European Commission, [https://ec.europa.eu/growth/industry/policy/innovation/scoreboards\\_en](https://ec.europa.eu/growth/industry/policy/innovation/scoreboards_en). [40]
- 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>. [5]
- FSO (2017), *Typologie des communes et typologie urbain-rural 2012*, Swiss Federal Statistical Office, <https://www.bfs.admin.ch/bfs/fr/home/bases-statistiques/niveaux-geographiques.assetdetail.2543324.html>. [4]
- Global Entrepreneurship Monitor (2021), *Women’s Entrepreneurship 2020/21: Thriving Through Crisis*. [37]
- Goos, M., A. Manning and A. Salomons (2014), “Explaining job polarization: Routine-biased technological change and offshoring”, *American Economic Review*, Vol. 104/8, pp. 2509-2526, <https://doi.org/10.1257/aer.104.8.2509>. [25]
- Grossman, G. and E. Helpman (1990), “Trade, innovation, and growth”, *The American Economic Review*, Vol. 80/2, pp. 86-91, <http://www.jstor.org/stable/2006548> (accessed on 9 November 2020). [26]
- Guichard, L., C. Özgüzel and L. Kleine-Rueschkamp (forthcoming), “Migrants and patenting across OECD counties”, *OECD Regional Development Working Papers*. [47]
- Impact Hub Zürich (n.d.), *Female Founders*, <https://female-founders.ch/> (accessed on 17 May 2022). [38]
- ISED (2021), *Women Entrepreneurship Strategy*, Innovation, Science and Economic Development Canada, <https://ised-isde.canada.ca/site/women-entrepreneurship-strategy/en>. [8]
- Kerr, W. (2018), *The Gift of Global Talent*, Stanford University Press, <https://doi.org/10.1515/9781503607361>. [46]



- Kossek, E., T. Allen and T. Dumas (2020), "Boundaryless work: The impact of COVID-19 on work-life boundary management, integration, and gendered divisions of labor for academic women in STEM", [14]  
<https://nap.nationalacademies.org/resource/26061/Kossek%20et%20al%20-%20FINAL.pdf>  
 (accessed on 5 May 2022).
- Lengyel, B. et al. (2020), "The role of geography in the complex diffusion of innovations", [29]  
*Scientific Reports*, Vol. 10/1, <https://doi.org/10.1038/s41598-020-72137-w>.
- Lewis, C. and P. Ollivaud (2020), "Policies for Switzerland's ageing society", *OECD Economics Department Working Papers*, No. 1600, OECD Publishing, Paris, [44]  
<https://doi.org/10.1787/3f8a12c6-en>.
- Mayer, H. (2020), "Slow innovation in Europe's peripheral regions: Innovation beyond acceleration", in Döringer, S. and J. Eder (eds.), *Schlüsselakteure der Regionalentwicklung - welche Perspektiven bietet Entrepreneurship für ländliche Räume?*, Verlag der Österreichischen Akademie der Wissenschaften. [32]
- MBDA (2022), "Women-owned and indigenous small businesses thrive with EDA and MBDA support", Minority Business Development Agency, United States Department of Commerce, [9]  
<https://www.commerce.gov/news/blog/2022/03/women-owned-and-indigenous-small-businesses-thrive-eda-and-mbda-support> (accessed on 3 May 2022).
- McCann, P. (2019), "Perceptions of regional inequality and the geography of discontent: Insights from the UK", *Regional Studies*, Vol. 54/2, pp. 256-267, [20]  
<https://doi.org/10.1080/00343404.2019.1619928>.
- McCann, P. (2013), *Modern Urban and Regional Economics*, Oxford University Press. [42]
- McKenzie, D. et al. (2021), "Training entrepreneurs", *VoxDevLit*, Vol. 1/2, [35]  
[https://voxdev.org/sites/default/files/Training\\_Entrepreneurs\\_Issue\\_2.pdf](https://voxdev.org/sites/default/files/Training_Entrepreneurs_Issue_2.pdf).
- OECD (2022), "Mainstreaming teleworking and gender equality: A double-edged sword?", [12]  
 OECD, Paris, <https://www.oecd-forum.org/posts/mainstreaming-teleworking-and-gender-equality-a-double-edged-sword> (accessed on 5 May 2022).
- OECD (2022), *Regional Demography*, Regional Database, OECD, Paris, [49]  
[https://stats.oecd.org/Index.aspx?DataSetCode=REGION\\_DEMOGR](https://stats.oecd.org/Index.aspx?DataSetCode=REGION_DEMOGR) (accessed on 15 June 2022).
- OECD (2022), *The Contribution of Migration to Regional Development*, OECD Regional Development Studies, OECD Publishing, Paris, <https://doi.org/10.1787/57046df4-en>. [45]
- OECD (2021), *Forward-looking Public Service*, OECD, Paris, [43]  
<https://www.oecd.org/gov/pem/public-sector-leadership-implementation/pem-forward-looking/>  
 (accessed on 15 October 2021).
- OECD (2021), *Implications of Remote Working Adoption on Place Based Policies: A Focus on G7 Countries*, OECD Regional Development Studies, OECD Publishing, Paris, [13]  
<https://doi.org/10.1787/b12f6b85-en>.
- OECD (2021), *Policies for Present and Future Service Delivery Across Territories*, OECD, Paris. [2]

- OECD (2020), *Rural Well-being: Geography of Opportunities*, OECD Rural Studies, OECD Publishing, Paris, <https://doi.org/10.1787/d25cef80-en>. [1]
- OECD (2016), *OECD Regional Outlook 2016: Productive Regions for Inclusive Societies*, OECD Publishing, Paris, <https://doi.org/10.1787/9789264260245-en>. [17]
- OECD (2013), *Regions and Innovation: Collaborating across Borders*, OECD Reviews of Regional Innovation, OECD Publishing, Paris, <https://doi.org/10.1787/9789264205307-en>. [27]
- OECD (forthcoming), *Enhancing Innovation in Rural Regions: Synthesis Report*, OECD Publishing, Paris. [3]
- OECD/ILO (2021), “Women at Work in G20 Countries: Policy Action Since 2020”, OECD, Paris, <https://www.oecd.org/gender/OECD-ILO-2021-Women-at-Work-P%C3%B6licy-Action-Since-2020-G20-Italy.pdf>. [11]
- Ollivaud, P. (2017), “Boosting productivity in Switzerland”, *OECD Economics Department Working Papers*, No. 1443, OECD Publishing, Paris, <https://doi.org/10.1787/a29cbbbe-en>. [41]
- Pacific Economic Development Canada (2022), “WeBC supports women entrepreneurs through the pandemic and beyond”, Government of Canada, <https://www.canada.ca/en/pacific-economic-development/campaigns/stories/stories-webc.html> (accessed on 19 August 2022). [10]
- Romer, P. (1990), “Endogenous technological change”, *Journal of Political Economy*, Vol. 98/5 part 2, pp. S71-S102, <https://www.jstor.org/stable/2937632>. [18]
- Shearmur, R. and D. Doloreux (2016), “How open innovation processes vary between urban and remote environments: Slow innovators, market-sourced information and frequency of interaction”, *Entrepreneurship & Regional Development*, Vol. 28/5-6, pp. 337-357, <https://doi.org/10.1080/08985626.2016.1154984>. [33]
- Sorenson, O. (2018), “Innovation policy in a networked world”, *Innovation Policy and the Economy*, Vol. 18, pp. 53-77, <https://doi.org/10.1086/694407>. [30]
- Swiss Federal Statistical Office (2021), *Swiss Labour Force Survey in Brief: 03 Work and Income*, <https://www.bfs.admin.ch/bfs/en/home/statistics/work-income/surveys/slfs.assetdetail.18144207.html>. [36]
- UN (2008), *International Standard Industrial Classification of All Economic Activities (ISIC), Rev. 4*, United Nations, [https://unstats.un.org/unsd/publication/seriesm/seriesm\\_4rev4e.pdf](https://unstats.un.org/unsd/publication/seriesm/seriesm_4rev4e.pdf). [6]
- Veneri, P. (2018), “Urban spatial structure in OECD cities: Is urban population decentralising or clustering?”, *Regional Science*, Vol. 97/4, pp. 1355-1374, <https://doi.org/10.1111/pirs.12300>. [34]

## Notes

<sup>1</sup> Cantons refer to the 26 small regions (TL3) in Switzerland.

<sup>2</sup> Not only do cantons propose policies and programmes, they also levy taxes. Through the New Regional Policy (NRP) that creates the framework for the regional innovation system (RIS), the Swiss Confederation provides matching funds for each Swiss franc invested by the cantons. Within the framework set by the confederation, the cantons set their strategies and objectives as well as invest their own money.

<sup>3</sup> For more information on the NRP and the RIS, see Chapter 3.

<sup>4</sup> For more information on multi-level governance and innovation policy in Switzerland, see Chapter 3.

<sup>5</sup> For Switzerland, the report by Fadic et al. (2019<sup>[5]</sup>) identified Switzerland as one of the countries with a very high level of non-metropolitan population, with 50% of the population living in non-metropolitan areas. However, this is due to the compatibility of territorial definitions across countries.

<sup>6</sup> The countries with available data included in this statistic are Austria, the Czech Republic, Estonia, France, Hungary, Italy, Lithuania, Poland, the Slovak Republic and Spain.

<sup>7</sup> For classification of territories and sectors, please refer to Box 2.1. Trade and professional services sectors include professional, scientific, technical and administrative and support services, as well as a grouping of other services that include wholesale and retail trade, transportation and motor vehicle repair, and financial and real estate services. The public services sector was excluded from this analysis

<sup>8</sup> The high shares of agriculture, public and professional services and manufacturing in metropolitan areas also holds when using alternatively classification of the OECD based on TL3 regions.

<sup>9</sup> The number of firms in the agriculture, forestry and fishery sector fell from close to 59 000 in 2012 to close to 53 000 in 2019. The number of firms in the professional services sector grew from 113 000 in 2012 to 132 500 in 2019. In the rural and peri-urban regions alone, the agriculture, forestry and fishery sector fell from close to 48 000 firms in 2012 to close to 34 000 firms in 2019. The number of firms in the professional services sector grew from close to 30 000 in 2012 to 35 000 in 2019.

<sup>10</sup> This is based on statistics of full-time equivalent (FTE) workers in Switzerland.

<sup>11</sup> This includes the Telearbeitsplats!Offensive (Austria), Live for the Moment (New Brunswick, Canada), the Our Rural Future strategy (Ireland), the Teleworking Strategy in Trentino (Italy), regional visas to attract remote workers (Estonia, Germany, Hungary, Spain, among others), and local grants (Portugal and United States). In other cases, countries like Sweden are focusing on building digital infrastructure and digital skills.

<sup>12</sup> According to OECD Territorial Classifications (TL3), Jura and Lucerne are considered non-metropolitan regions, close to small metropolitan regions, and Vaud is a medium-sized metropolitan region. In Switzerland, there are no large metropolitan areas as per the OECD definition of at least 2.5 million residents or more in the functional urban area of the city.

<sup>13</sup> See Chapter 3 for an example of innovation in tourism from the Jura region

<sup>14</sup> Metropolitan areas refer to the large category of “metro”. Non-metropolitan areas refer to the large categories of “peri-urban” and “rural”.

<sup>15</sup> Whether the share is closer to 30% or 40% depends on whether statistics include self-employed workers.

<sup>16</sup> This includes management and marketing practices.

<sup>17</sup> While this is promising, it is important to also consider that the structure of the economy in rural regions also lends itself to more self-employed entrepreneurs working in the agriculture and manufacturing sectors.

<sup>18</sup> See presentation by *regiosuisse* on high performance of the region of Ticino.

<sup>19</sup> This was due to an announcement by the government of Switzerland that they would no longer peg the Swiss franc to the euro on 15 January 2015.

<sup>20</sup> Currency is deflated to 2015 CHF levels. Exchange rate used for 31 December 2015: 1.0835 CHF to 1 EUR.

<sup>21</sup> Productivity estimates use value-added and full-time employment labour productivity estimates.

<sup>22</sup> This was also the year of the Swiss franc crisis.

<sup>23</sup> Estimates use a linear fixed effects model with year, sector, territorial and regional controls.

<sup>24</sup> This refers to estimates of R&D expenditures and jobs that are 0.53 and 0.56 points lower when in non-metropolitan regions as compared to metropolitan regions respectively.

<sup>25</sup> Diversification is normal in dynamic economies; however, high levels of market capture for a few firms, may nevertheless indicate barriers to opportunities for entry and growth of new firms. While Switzerland is not observing an increase in inequality between market shares of firms in 2019, inequality was still higher in metropolitan regions and lowest in non-metropolitan regions (Figure 2.18). In a sector specific analysis this tends to indicate potential for anti-competitive behaviour, which is associated with low productivity. In a territorial analysis, high levels of diversity may also enable spill overs from few firms fuelling smaller firms.

<sup>26</sup> Please see Box 2.1 for more information sectoral categories.

<sup>27</sup> Wholesale trade and services includes “activities of those involved in bringing sellers and buyers together or undertaking commercial transactions on behalf of a principal...such agents involved in the sale of: agricultural raw materials, live animals, textile raw materials and semi-finished goods; fuels, ores, metals and industrial chemicals, including fertilizers; food, beverages and tobacco; textiles, clothing, fur, footwear and leather goods; timber and building materials; machinery, including office machinery and computers, industrial equipment, ships and aircraft; and furniture, household goods and hardware” (UN, 2008<sup>[6]</sup>).



**From:**  
**Enhancing Innovation in Rural Regions of Switzerland**

**Access the complete publication at:**

<https://doi.org/10.1787/307886ff-en>

**Please cite this chapter as:**

OECD (2022), "Understanding innovation in rural Switzerland", in *Enhancing Innovation in Rural Regions of Switzerland*, OECD Publishing, Paris.

DOI: <https://doi.org/10.1787/aaec6a67-en>

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

This document, as well as any 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. Extracts from publications may be subject to additional disclaimers, which are set out in the complete version of the publication, available at the link provided.

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