

# 1 Analysis of online job postings in the Umbria region

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This chapter analyses the demand for labour in Umbria in between January 2018 and June of 2022 as measured by online job postings (OJPs). The analysis examines both long-term trends in demand, caused by factors such as digitalisation and sudden shifts due to the COVID-19 crisis in 2020. The chapter identifies high-demand and rapid-growth occupations and examines their characteristics using information contained in the requirements mentioned in OJPs. In particular, the analysis presents job characteristics such as educational and experiential requirements, as well as the types of contracts offered in job postings. Lastly, the chapter combines online job postings data with employment data obtained from the Labour Force Survey, to compare the prevalence of OJPs with that of employment figures and provide insight into labour shortages.

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## Highlights

- Umbria's demand for labour as measured by online job postings has generally recovered well after the first peak of the COVID-19 crisis in between January and October of 2020.
- Data on the volume of online job postings (OJPs) also show that a large part of the most highly demanded occupational groups in Umbria are high-skilled roles, such as business and administration (associate) professionals. The top growing high-skill occupation in Umbria, *sales and marketing managers*, grew nearly ninefold in terms of OJPs in 2022 with respect to 2018.
- Many of the most highly demanded and fastest growing medium-skill jobs are clerical positions, some of which require performing advanced administrative tasks, such as statistical, finance, and insurance clerks and accounting and bookkeeping clerks, while others involve completing less sophisticated procedures, such as secretaries (general) and receptionists (general). COVID-19 also had a pronounced impact on the demand for Nursing Professionals which increased almost six-fold during the period examined.
- After the pandemic, certain low-skilled occupations in the food-industry such as waiters, bartenders and kitchen helpers have grown significantly in demand. Similarly, the volume of new job postings for sales roles such as shop sales assistants has increased. The food industry has benefited from increased tourism in Umbria in 2021, while sales roles are most likely in higher demand due to the general economic upturn experienced in 2021 and the start of 2022.
- Information contained in OJPs also indicates that low-skill occupations are more likely than medium-skill and high-skill occupations to receive part-time contracts. They are also slightly less likely to be offered a permanent contract, a factor that can lead to volatility in earnings and uncertainty in working conditions for those workers.
- A comparison between OJPs and data on employment coming from the Italian Labour Force Survey shows that certain high-skilled (technical) professions are often overrepresented in online job postings, while professions that require direct human contact are underrepresented. This calls for caution when interpreting the results. At the same time, the comparison between the rapidly growing volume of new vacancies posted online for certain roles and the figures on employment creation can be helpful to identify areas with emerging labour shortages. This analysis shows that the growth in new OJPs for transport and storage labourers, manufacturing labourers and waiters and bartenders has outpaced the increase in employment in these roles, hinting to potential bottlenecks in those labour market segments.

The region of Umbria in Italy has seen many challenges over the last few years, chief among them the COVID-19 crisis. The labour market has seen important changes due to this unforeseen crisis, but also due to long-term trends such as digitalisation. Trends in online job postings (OJPs)<sup>1</sup> (see also Box 1.1) for the period in between January 2018 – June 2022 highlight an overall positive trend in labour demand for the Umbria region. Despite the heavy burden that the COVID-19 has inflicted on the Italian and Umbrian economy, the number of OJPs has started to increase again, pointing to potential shortages and strong demand.

The labour market in Umbria is relatively tight, but other challenges remain as well. For instance, the demand for workers in low(er) skilled occupations is highly volatile and those workers are also more exposed also to the negative effects of digitalisation, artificial intelligence and automation as well as to higher turnover and seasonal demand in some of these occupations. Such higher volatility means that demand for low-skill occupations is harder to predict and it is hard to know whether certain trends will persist in the future, complicating the planning of effective labour market and training response to these challenges.

Results in this chapter show that, broadly speaking, the labour market demand published online is stronger for high-skilled occupations, than for low-skilled occupations. A relatively strong demand for high-skill workers can pose challenges as both the Umbrian and Italian populations are educated at a relatively lower skill level than other OECD countries (OECD, 2019<sup>[11]</sup>). However, data collected on the universe of online job postings published in Umbria also show a significant demand for some low-skilled occupations such as freight-handlers and shop sales assistants.

### Box 1.1. Online job postings

This report leverages vacancy data collected from the internet on a monthly basis. This dataset of OJPs spans from January of 2018 to June of 2022 and contains data both at the regional (Umbrian) and national (Italian) level. The data is collected, transformed and harmonised by Lightcast (formerly Emsi-Burning Glass Technologies). The data is composed of 6 762 872 individual level job postings for Italy and 72 434 for Umbria.

The dataset contains up to 70 different variables ranging from skill keywords for each job posting, qualifications and experience required to fill the job, the job's geographical location, as well as the type of contract offered (permanent, temporary). The OECD further transformed the data to create yearly aggregates, cross tabulations and other statistics presented in the document.

Using the information contained in online job postings has two main advantages over traditional data sources such as labour force surveys or national accounting data. Firstly, OJPs make it possible to track trends in a timely manner as OJPs are collected daily from available jobs posted online. Secondly, information in OJPs is more granular than in other data sources, allowing to be much more detailed on the specific occupations and skills that are in high demand across the Umbrian labour market.

OJPs, however, also have some limitations as they may provide less comprehensive coverage of some occupations and sectors where vacancies are not typically advertised through online platforms, which is addressed in a later subsection of this report.

While these data have several advantages when it comes to analyse labour market dynamics (granularity and timeliness), they also have shortcomings and disadvantages that need to be considered. The last section in this chapter addresses potential issues of representativeness by means of a compositional comparison between the EU – Labour Force Survey and the dataset of OJPs used in these analyses. While some high-skill occupations are indeed more featured in the Lightcast data, over- or under-representation does not appear to be a concern for most occupations.

Besides looking at trends in OJPs and detecting the more prominent occupations at different levels of aggregation, this chapter also looks at job characteristics and requirements as they appear in OJPs. In particular, the types of contracts and number of working hours offered to low-skill, medium-skill and high-skill jobs is analysed, as well as the required education level and years of experience.

## Tracking the evolution of OJPs in Umbria (and Italy) around the COVID-19 crisis

Umbria's local labour market saw a period of relative growth in the period between 2018 and 2022, in line with the observed national trend. GDP growth in the region for the year 2021 has recorded an impressive 7.1% increase, bringing the GDP per-capita back to pre-COVID levels (Istat, 2022<sup>[2]</sup>). The analysis of labour demand, through the lens of Lightcast data, mirrors the positive economic trend,<sup>2</sup> even after considering the strong decline in economic activity triggered by the COVID-19 pandemic and accompanying lockdowns.

Figure 1.1 shows that the average monthly volume of OJPs for Umbria increased around four times in between January 2018 and June 2022. It should be kept in mind that such an increase is certainly due to an increase in the demand, that is signalling an increase in its tightness, but also to a more widespread use of online channels to advertise new vacancies as digital tools have become more mainstream in the hiring process of Italian firms during the pandemic and in more recent months.

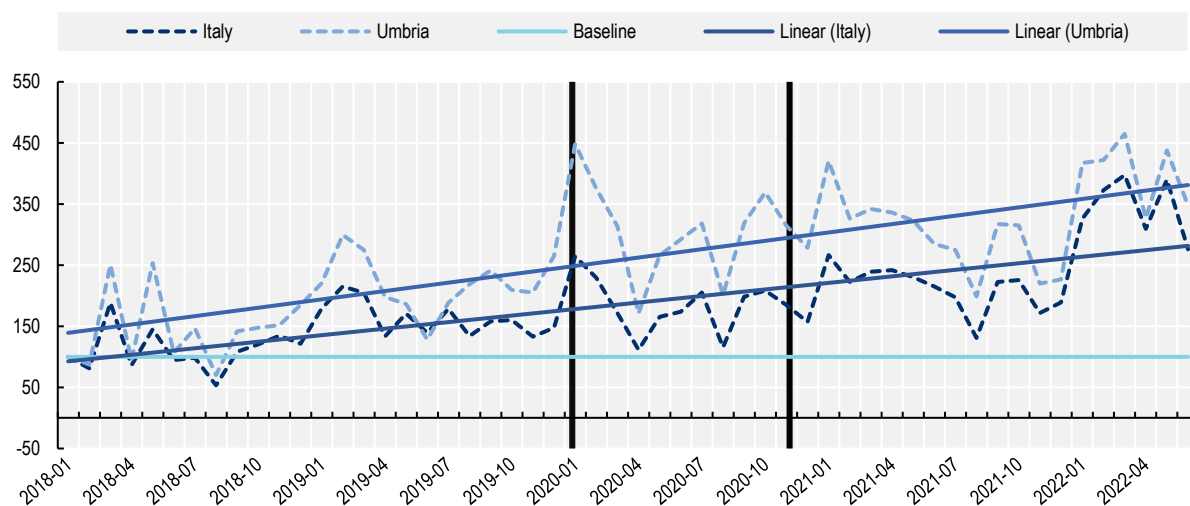
Results also show that the COVID-19 shock strongly influenced the Italian and Umbrian economy during the entire year of 2020. In Figure 1.1 the 'peak of the pandemic period' is enclosed by two vertical lines in between January 2020, when the Italian government declared a "State of Emergency" and the establishment of the so called 'colour system'<sup>3</sup> in November of the same year. Within these two dates, a U-shaped pattern characterises the evolution of OJPs.

In Italy, a noticeable decline in new job postings published online can be observed right after the declaration of the emergency state, in between January 2020 and April 2020. The volume of new job postings published in the month of April 2020 dropped to the levels that were recorded approximately two years before the pandemic (in the first semester of 2018), signalling a significant set-back of the labour market demand at the national level. This reduction in labour demand protracted throughout the entirety of 2020, although a mild recovery started in May 2020 when the Italian government declared the end of the first tight lockdown measures and gradually reopened some economic activity.

In the Umbria region the decline in OJPs is even more pronounced than in Italy as a whole. Partially, the pronounced decline can be attributed to the impact of the mobility restrictions during the lockdown on key economic sectors for the Umbrian economy. Right before the pandemic, in 2019, data on employment from the Labour Force Survey indicates that roughly 25% of the labour force was employed in the *Wholesale and retail trade, transport, accommodation and food service activities* sector, roughly 20% in the *Industry sector* and roughly 20% in the *Public administration, defence, education, human health and social work activities*.<sup>4</sup> All these sectors were severely impacted by the mobility restrictions, which also influenced their labour demand in the form of OJPs.

In January 2020, Umbria experienced a 5-fold increase in the volume of OJPs with respect to January 2018, but during the lockdown the volume of new online job postings published online dropped significantly. The announcement of the colour system in November 2020, with more precise rules to contain the pandemic diffusion and the announcement of a massive vaccination rollout plan in January 2021, led to a moderate restoration of confidence and expectations, providing firms with the possibility to reopen activities and plan new hiring.<sup>5</sup> This relative return to normalcy is visible one year after the state of emergency was declared, and it signals the beginning of a recovery phase marked by a strong increase in the volume of OJPs starting in January 2021 both in Italy and Umbria. Umbria's recovery has been stronger than in the aggregate figures for the country, in line with a stronger GDP growth in the region relative to the Italian average.

Figure 1.1. Overall trends of OJPs by month in Italy and Umbria



Note: This figure shows the evolution of monthly OJPs relative to the volume of postings in January 2018, normalized to 100, for both Italy and Umbria.

Source: OECD calculations based on Lightcast data.

### Evolution in online job postings by required skill levels

Italy's labour market is grappling with skill and qualification mismatches. Only about 1 in 6 adults in Italy holds a tertiary degree, which is among the lowest rates in the OECD countries. This trend is also reflected in the region of Umbria, where a similar figure holds true. (Istat, 2020<sub>[3]</sub>). Education figures for Umbria and Italy as a whole are largely comparable, although slightly more Umbrians have obtained a post-secondary school certificate, 34.9% in 2019 compared to 30.9%. Furthermore, skill levels of the Italian adult population are also relatively low compared to other OECD countries (OECD, 2019<sub>[1]</sub>). At the same time, in 2016, around 40% of the Italian workforce reported being either over- or under-qualified for their job (OECD, 2019<sub>[1]</sub>).

Against this backdrop, the Italian public employment system serves a disproportionately large fraction of job-seekers at the lower end of the skill distribution, individuals for whom caseworkers act as pivotal intermediary in their labour market prospects. To better understand labour demand in this context, it is informative to examine online job postings that are categorized into high, medium, and low-skilled occupational groups,<sup>6</sup> as in Figure 1.2 (Panel A, B and C).

The evolution of OJPs for high-skilled occupations in Umbria follows closely the Italian trend (see Panel A in Figure 1.2). The two series show a strong correlation (+0.9), indicating that increases (or decreases) in the volume of OJPs in Umbria follow a similar behaviour to the one in the whole Italy, despite a higher overall volatility in Umbria attributable to a relatively lower number of job postings published in the region.<sup>7</sup>

The most notable differences between Umbria and Italy are, instead, observed when comparing the trends in new job postings for medium and low-skilled occupations (Panel B and Panel C, respectively). The growth for these occupations was more pronounced for Umbria than for the Italian benchmark, signalling a relatively higher demand for workers in those occupations at the local level than in Italy. Notably, however, the demand for low skilled workers in Umbria is rather volatile, with OJPs following an irregular pattern of strong and weak demand over time, even within the same year. As further explored in the section when focusing on job characteristics, workers employed in these categories are more likely to face temporary jobs as exemplified by sales workers, sometimes even of a seasonal nature as exemplified, for instance, by workers of the food-industry.

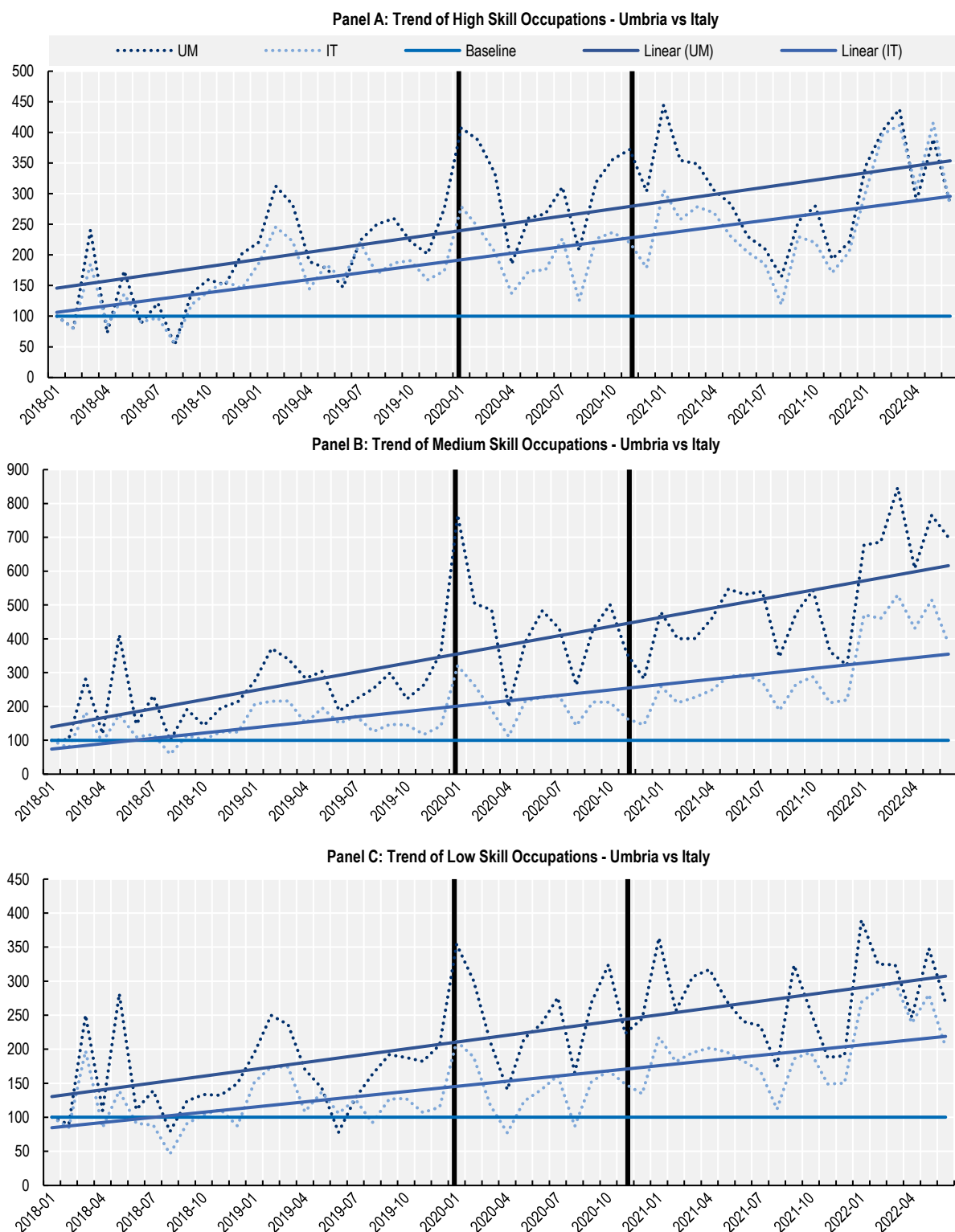
It is worth noting that a very volatile demand for low-skilled workers can represent a challenge when planning and delivering active labour market policies, as low skilled individuals typically represent a large share of the unemployed seeking support from public employment services (PES). For instance, sudden or frequent declines in demand for low-skilled workers, signalled by fewer and more volatile volume of job postings published online over time, can be associated with a rapid increase of benefit claimants, putting particular pressure on PES caseworkers. Similarly, the difficulties in predicting the evolution in the demand for low-skilled workers (due to its high volatility) can limit the ability of the PES to plan the training offered to low-skilled unemployed.

### Box 1.2. Public Employment Services and volatile demand

About 42% of all unemployed workers in Italy and 60% in Umbria contact the PES, but at the same time, the PES is facing very high caseloads. On average, in 2016 in Italy, each caseworker was responsible for around 400 unemployed people. While the caseload was lower in Umbria, it still amounted to around 200 cases per PES staff, which is still significantly higher than in most EU countries. Many PES offices also report shortages. In 2016, 83.5% of local employment offices felt that they lacked human resources. In the same year, however, the number of PES staff members was on the decline, worsening the availability of staff. The lack of human resources is among some of the possible reasons as to why fewer Italians contact the PES than in other countries. Individuals may not see the value in contacting the Public Employment Services (PES) due to perceived staffing shortages, which may make it difficult for them to receive assistance. Additionally, there may be concerns about the effectiveness of the PES as a job broker, stemming from their limited resources as well as perceptions about the quality of the services they are able to provide (OECD, 2019<sup>[1]</sup>).

PES do not only help unemployed people to find jobs, but they also have a large mandate to help with “upskilling” and “reskilling” (European Commission, 2020<sup>[4]</sup>). Upskilling means that people are trained to improve their existing skills, like strengthening people’s existing digital skills. Reskilling on the other hand means that people obtain new skills, for instance, during the pandemic some hospitality workers that lost their jobs retrained to work in health care. The need for upskilling and reskilling is larger for low-skilled workers, who are disproportionately faced with the threat of job automation. Volatile labour demand for low-skilled workers and the accompanying increase in unemployed low-skilled workers can therefore lead to larger demand for skills training. This in turn can increase in caseloads for PES workers, leading to an impact on the quality of service that job seekers receive from the PES.

Figure 1.2 Overall trends in Italy and Umbria by skill-level



Note: Linear trends on panel A, B and C are calculated on a standardised index Jan-2018 = 100. The vertical black dotted lines indicate important COVID-19 related events.

Source: OECD calculations based on Lightcast data.

## What occupations and occupational groups capture the largest share of demand channelled through online job postings in Umbria?

The granularity and the high volume of the information contained in OJPs make it possible to obtain insights on trends in the labour market demand at different level of aggregation. In the first part of this section the focus will be on larger occupational groups, using the 2nd digit of the ISCO-08 classification (International Standard Classification of Occupations). This is done to give a broad overview of the labour market demand in Umbria in between January 2018 and June 2022. The second part of this section, instead, focuses on a specific view of the demand for detailed occupations in Umbria, discussing statistics stemming from OJPs at the 4<sup>th</sup> digit of the ISCO-08 classification. The two analyses are complementary in providing both an overall picture of the aggregate demand and a more nuanced and granular view of the jobs that have been in high demand in Umbria starting from 2018.

### ***A broad view of the labour market demand in Umbria stemming from OJPs***

The analysis of the demand in OJPs focusing on large occupational groups shows that a relatively large share of OJPs is concentrated in high skill occupations (ISCO 1 to 3). In fact, 44.7% of all Umbria's OJPs in between January 2018 and June 2022 are aimed at high-skill occupations, compared to 24.5% at medium-skill and 30.8% at low-skill occupations. Statistics on employment at the two-digit ISCO level show 35.4% of all employees work high-skill jobs, 35.7% medium-skill and 28.8% low-skill. This indicates that, at a first approximation, the labour market demand published online is to a large extent seeking high-skilled workers, in higher numbers than are currently employed. Medium-skill jobs are relatively less prominent in the OJPs data than in the employment data. This result can be attributed to a relative strong demand for workers in the high-skill category which could potentially lead to shortages if the demand for these workers is stronger than the labour supply. However, this result can also partially be attributed to the fact that vacancies for those roles are more often posted online than in the case of mid and low skilled workers (discussed in Box 1.3).

#### **Box 1.3. Prevalence of high skilled jobs in OJPs**

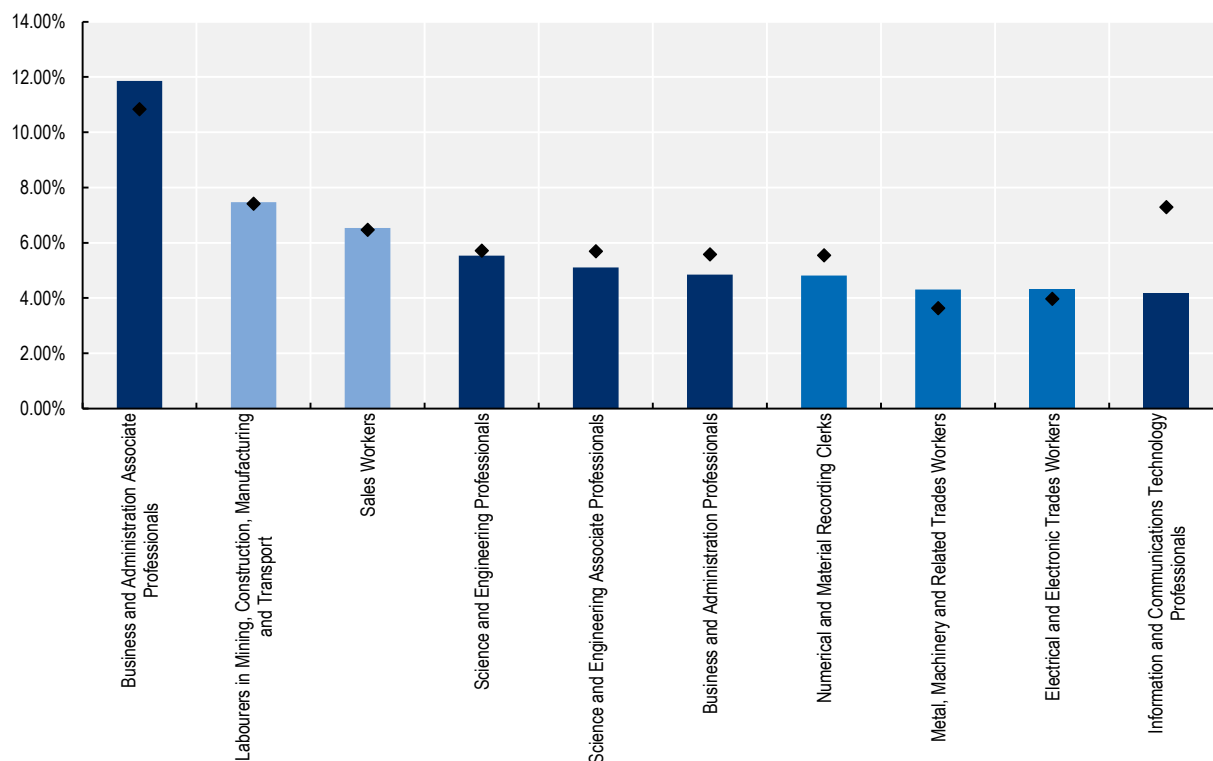
A higher prevalence of high-skilled occupations in online job postings is frequently observed. It could mean that there is higher demand for high-skilled workers, but additionally, it has to do with which jobs are more likely to post their vacancies online. For example, (Carnevale, Jayasundera and Repnikov, 2014<sup>[5]</sup>) estimate that around 80-90% of postings requiring at least a bachelor's degree can be found online, whereas 40-60% of job postings requiring a high school degree are advertised on the internet. Still, online vacancy data reflect labour demand reasonably well, especially when compared to survey data, and the differences that emerge appear relatively stable over time. (Hershbein and Kahn, 2016<sup>[6]</sup>). Moreover, a dedicated subsection assesses how, for Umbria's labour market, the gap between online and offline job posting is closing and it is not cause of concern for the analyses carried out in the remainder of this work.

The analysis in Figure 3 indicates that the demand for the top 10 broad occupational groups (at the 2nd digit level of ISCO) is quite heterogeneous with a higher prevalence of high-skilled occupations within the top 10, followed by relatively more modest demand for workers in medium and low skilled occupations. of all OJPs.



Results in Figure 1.3 reveal that the strength of the demand in Umbria per occupational group as measured by the share of OJPs over the total number OJPs aligns relatively well with the national shares at the broad occupation level. A notable exception is the group of Information and communications technology professionals, which is discussed in the next subsection.

**Figure 1.3. Top 10 Occupational groups at the ISCO-08 2-digit level for Umbria by share of volume of OJPs**



Note: Each vertical bar represents the share of OJPs for the occupational group at hand relative to the total number of vacancies posted between in Umbria in between January 2018 and June 2022. Dots show the equivalent share of the occupation for the Italian territory. Results are ranked in a decreasing fashion and their colours change depending on whether the occupation belongs to the high (darkest blue), medium (medium blue) or low-skill (lightest blue) class.

Source: OECD calculations based on Lightcast data.

### *High-skill occupations*

Overall, a sizeable share (31.6%) of job postings published in Umbria seeks professionals in five different high-skilled occupational groups (Figure 1.3). Around one third of these OJPs (11.9%) are targeted at Business and Administration-related occupations. In particular, Business and Administration Associate Professionals comprise the largest share of OJPs over the period, and Business and Administration Professionals (4.9%) also make up a significant part of OJPs.

Business and administration professionals perform analytical, conceptual and practical tasks to provide services in financial matters, human resource development, public relations, marketing and sales in the technical, medical, information and communications technology areas. They also conduct reviews of organizational structures, methods and systems as well as quantitative analyses of information affecting investment programmes. Occupations in this sub-major group are Finance Professionals, Administration Professionals or Sales, Marketing and Public Relations Professionals. (ISCO-08, part III).

Business and administration *associate* professionals, instead, perform mostly technical tasks connected with the practical application of knowledge relating to financial accounting and transaction matters, mathematical calculations, human resource development, selling and buying financial instruments, specialized secretarial tasks, and enforcing or applying government rules. Also included are workers who provide business services such as customs clearance, conference planning, job placements, buying and selling real estate or bulk commodities, and serving as agents for performers such as athletes and artists. Examples of occupations in this major occupational group are Financial and Mathematical Associate Professionals, Sales and Purchasing Agents and Brokers or Business Services Agents. (ISCO-08, part III).

All in all, the two occupational groups are similar, but business and administration associate professionals (such as accounting assistants or bookkeeper) tend to carry out tasks of a more technical nature than business and administration professionals (such as financial planners or investment advisers).

Science and engineering-related occupational groups also make up a large share of total online job postings collected in Umbria in the period between 2018 and June 2022. Taken together, Science and Engineering professionals and associate professionals sum to approximately 10.6% of total new job postings published in Umbria.

Science and engineering professionals typically conduct research; improve or develop concepts, theories and operational methods; or apply scientific knowledge relating to fields such as physics, astronomy, meteorology, chemistry, geophysics, geology, biology, ecology, pharmacology, medicine, mathematics, statistics, architecture, engineering, design and technology. Examples of occupations in this group are Physical and Earth Science Professionals or Mathematicians, Actuaries and Statisticians among which there are research-oriented professionals such as Astronomers, Medical or Nuclear physicists. (ISCO-08, part III).

Science and engineering *associate* professionals, instead, perform technical tasks connected with research and operational methods in science and engineering. They supervise and control technical and operational aspects of mining, manufacturing, construction and other engineering operations, and operate technical equipment including aircraft and ships. Specific jobs associated with this occupational group are chemistry, geology or meteorology technicians. (ISCO-08, part III).

The last high-skill occupational group in the top-10 are the Information and communications technology professionals. Approximately 4.2% of the total OJPs over the period of analysis in Umbria were searching for these professionals. This group comprises, amongst others, software and applications developers, database and network professionals, and system analysts. The fact that ICT professionals are among the top-10 occupations suggests an increasing demand for workers with digital skills, driven by the rapid technological progress and the use of ICT that has spread across many different types of workplaces (OECD, 2021<sup>[7]</sup>).

The difference in the share of online job postings (OJPs) for ICT professionals is particularly pronounced between Umbria and Italy as a whole. Demand in Umbria (4.2%) lagged behind significantly compared to demand at the national level (7.3%). While the process of digitalisation plays a large role in Umbria's labour market developments, Umbria is likely still in the process of adopting information technology, and less so involved in the *development* of such technology as hinted by the higher requirement of software developers at the national than at the regional level.

### *Medium-skill occupations*

A non-negligible share (13.4%) of the top 10 occupational groups in terms of online job postings seeks medium-skilled professionals belonging to the three very diverse occupational groups. These major occupational categories are *Numerical and material recording clerks*, *Metal, machinery and related trades workers* and *Electrical and electronics trades workers*. Clerks perform much less physically demanding tasks than occupations in the other two groups. All three of these occupational groups, however, do require

education at the second ISCO skill level (ISCO-08, Part III). This entails some form of secondary education. Often, these kinds of jobs require specialised vocational education and/or on-the-job training. Sometimes experience and on-the-job training can be substitutes for formal education. (ISCO-08, part I).

Numerical and material recording clerks help with accounting and bookkeeping records and computations. They also compile statistical, financial and other numerical data. They are often tasked with recording produced, stocked, ordered and dispatched goods, or for example coordinating the timing of passenger and freight transport. Examples of occupations within this group are finance clerks, accounting clerks, wage clerks, and dispatch clerks. (ISCO-08, part III).

Metal, machinery and related trades workers, on the other hand, perform much more physical tasks. They for example use tools and machines to cast, weld, and forge metal. They help install, maintain, and repair heavy metal structures and industrial machinery, including engines and vehicles. Metal casting moulders, welders, lock smiths, machine tool operators, and motorcycle mechanics are all examples of trades within this occupational group. (ISCO-08, part III).

Much like metal, machinery and related trades workers, electrical and electronics trades workers also perform practical tasks. They have to install, fit and maintain electrical wiring systems and machinery. They also inspect and test electrical and electronic systems, equipment, cables, and machinery to identify hazards and defects. Or they for instance join electrical, telecommunications and data cables. Electricians, lift mechanics, electric power line workers, and computer hardware installers for example all fall under the definition of electrical and electronics trades workers. (ISCO-08, part III).

### *Low-skill occupations*

Some 14% of OJPs published in Umbria in the period in between 2018 and 2022, sought workers in low-skilled occupations in the broad occupational groups of *labourers in mining, construction, manufacturing and transport* (7.5%) and *sales workers* (6.7%). These groups are the second and third most sought after employees in terms of OJPs. Their jobs consist of very different types of tasks, with one being manual labour and the other consisting of service jobs. These two ISCO categories make up nearly half of the total number of OJPs looking for low-skilled labour (46%).

Labourers in this occupational group work in different industries but perform similar kinds of tasks. The tasks are routine and involve manual labour. Examples are digging holes and spreading excavated materials, (un)loading, moving, stacking and storing materials, equipment, products, supplies, baggage and cargo, and cleaning machinery, equipment and tools. (ISCO-08, part III).

Sales workers also perform routine tasks, but the labour is not as physically demanding. They sell goods at stores, market stalls, door-to-door or via the telephone. They can also sell and serve food at counters or in the street. Additionally, they can be involved with wrapping or packing the goods, determining the product mix, buying or contracting suppliers for products to be sold, or with determining stock and price levels. Examples of jobs in this occupational group are market vendors, grocers, supermarket supervisors, shop assistants and store cashiers. (ISCO-08, part III).

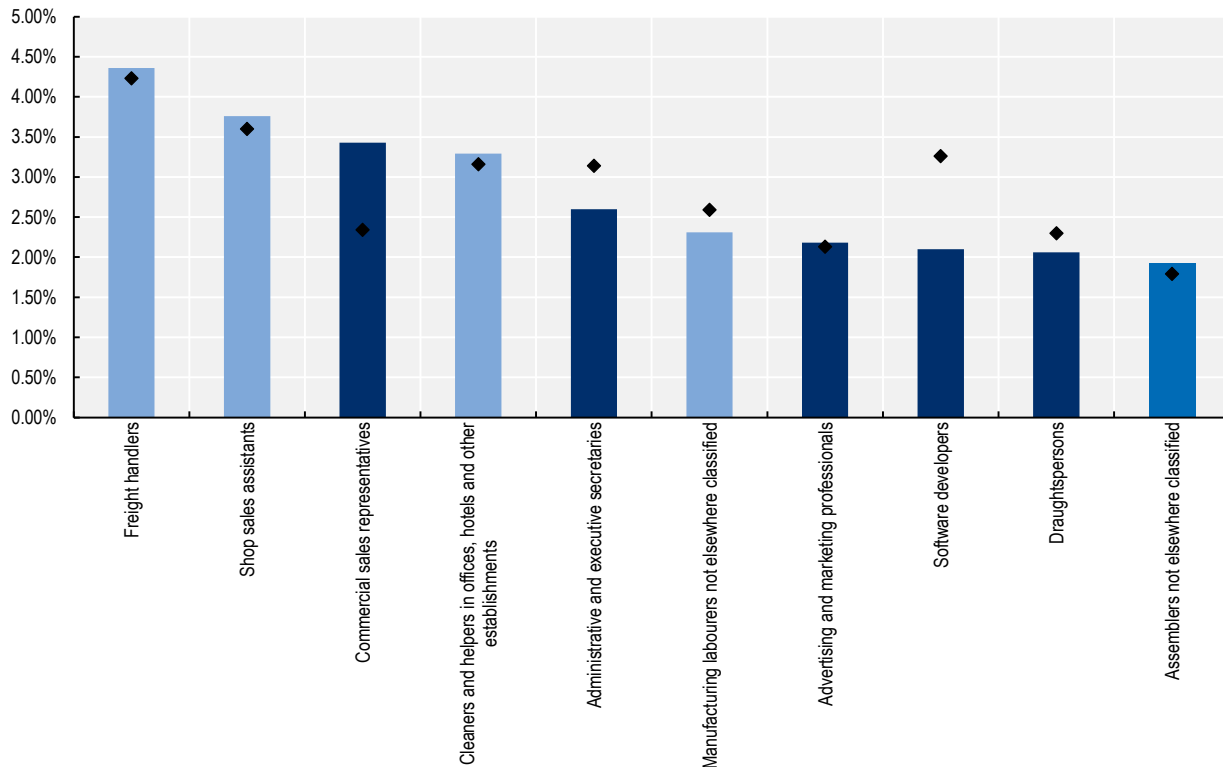
### ***Going granular: What specific occupations recorded the largest shares of job postings in Umbria?***

The analysis of broad occupational groups in the previous section gives a sense of the overall dynamics of the demand for workers in Umbria. Using larger occupational groups, however, can mask the more detailed trends at the occupation level. This section therefore looks into the OJPs for a wide range of more detailed occupations, analysing the evolution in the volume of job postings advertised in Umbria for 411 different occupations classified at the 4<sup>th</sup> digit of the ISCO-08 occupational classification.

Investigating Umbria’s labour market demand at this level of granularity is key to policy makers as it allows to provide more precise indications on what specific occupations may face shortages and labour market bottlenecks. It also enables policy makers to create tailored policies to respond to specific challenges and, for instance, to assess whether the current education and training offer (i.e. the Regional Training Catalogue<sup>8</sup>) matches the particular demands of the local labour market (see Chapter 2).

On the other hand, however, as the analysis focuses on a more granular and detailed set of occupations, the relative availability of information decreases and statistics for smaller occupations may end up being more volatile and, in cases, more difficult to interpret.<sup>9</sup>

**Figure 1.4. Top 10 Occupations at the ISCO-08 4-digit level for Umbria by share of OJPs**



Note: Each vertical bar represents the share of OJPs for the occupational group at hand relative to the total number of vacancies posted between in Umbria in between January 2018 and June 2022. Dots show the equivalent share of the occupation for the Italian territory. Results are ranked in a decreasing fashion and their colours change depending on whether the occupation belongs to the high (darkest blue), medium (medium blue) or low-skill (lightest blue) class.

Source: OECD calculations based on Lightcast data.

Figure 1.4 presents the average share of OJPs for the top 10 occupations out of the 411 for which information is available at the 4<sup>th</sup> digit ISCO level. Notably, in between January 2018 and June 2022, the top 10 occupations in Figure 1.4 represent a relatively large share (28%) of total job postings collected for that period.<sup>10</sup>

The top 10 occupations in Figure 1.4 range over all skill levels, which confirms the heterogeneous and varied nature of the labour market demand in Umbria. Out of the top ten occupations in Figure 1.4, “assemblers not elsewhere classified” is the only medium-skilled occupation, while there are significantly more low- and high-skilled occupations.

Four out of the top 10 most sought-after occupations at the four-digit level are low-skilled occupations, even though high-skilled occupations were more prevalent in the top 10 at the broader two-digit level. However, looking beyond the top 10, the statistics are unchanged, and 44.7% of all OJPs are for high-skilled labour at this ISCO digit level as well. This result suggests that the demand for high-skilled labour is more spread out over different occupations, while the demand for low-skill labour is much more concentrated in a selected sample of few occupations.

The four low-skill occupations in the top 10 account for 13.8% of all OJPs in Umbria in between Jan-2018 and Jun-2022. Some of these occupations, such as *manufacturing labourers not elsewhere classified and shop sales assistants*, can be seen as the driving reason why the occupational groups *labourers in mining, construction, manufacturing and transport* and *sales workers* were so prevalent when discussing the broader occupational level in the previous subsection.

Freight handlers have the largest share of all OJPs, at 4.4%. They typically “*carry out tasks such as packing, carrying, loading and unloading furniture and other household items, or loading and unloading ship and aircraft cargo and other freight, or carrying and stacking goods in various warehouses*” (see ISCO-08, part III). This is also a job that is highly physical and requires relatively lower qualifications than the average. The increased popularity of e-commerce has had a great impact on the logistics sectors of many countries as well as in Italy. As Italian consumers are increasingly more online, this has led to a significant increase in the number online purchases (e-commerce) which has contributed to the expansion in the demand in the logistic sector.<sup>11</sup>

The next largest share of online job postings (3.8%) was looking for shop sales assistants. This job is part of the low-skilled occupational group of sales workers, which is one of the high demand occupational groups that was discussed in the previous subsection. Demand for sales workers contributed to 6.5% of all OJPs, and more than half of those OJPs are specifically looking for shop sales assistants. A shop sales assistant’s tasks are: “*selling a range of goods and services directly to the public or on behalf of retail and wholesale establishments, and explain the functions and qualities of these goods and services.*” (ISCO-08, part III).

Commercial sales representative is another sales-related job that is part of the top 10 jobs with the largest shares of OJPs in Umbria. These workers, among which after-sales service adviser, canvassers or commercial travellers, typically “*represent companies to sell various goods and services to businesses and other organizations and provide product specific information as required*”. They usually solicit orders and sell goods to retail, industrial, wholesale and other establishments. Among their tasks, commercial sales representatives also obtain and update knowledge of market conditions and of employer’s and competitors’ goods and services selling equipment, supplies and related services to business establishments or individuals. This is a high-skilled job that is part of the highly demanded broader occupational group of business and administration associate professionals.

When comparing the number of average job postings in Umbria and Italy, the most notable difference is found for the occupation of *software developers* (Figure 1.4). This occupation represents a smaller share of the overall demand in Umbria (2% share of total OJPs) relative to Italy as a whole (3.1%). This is in accordance with what was observed in Figure 1.3, where the demand for ICT professionals is significantly higher in Italy as a whole than in Umbria specifically. Again, it could be because Umbria’s enterprises are more focused on adopting the existing information technology in the process of digitalisation, and are less involved in the aspects related to its *development*.

While the analysis of the list of top 10 occupations offers a perspective on those jobs making up the largest volume of vacancies in Umbria, it does not allow to appreciate the dynamics in the demand, and hence, how, if at all, trends are changing over time. The next section will discuss the evolution of the demand and the potential shift that may have happened over time in Umbria with the aim of highlighting where and how much the demand has shifted.

## The evolution of the demand: Which of Umbria's occupations are on the rise?

Mega trends such as digitalisation and population ageing, or even sudden and unprecedented shocks such as the COVID-19 pandemic, are reshaping labour markets and skill demands radically. To capture these changes, this section focuses on the evolution of the demand for labour by identifying and analysing occupations for which the number of online job postings has increased most notably in Umbria. Focussing on the dynamics (the *growth*) rather than on a static picture of the demand makes it possible to isolate occupations that have the potential to *change* the composition of the labour market. Whether that potential will translate into employment depends on how the supply side of the market, the workforce, responds to the new and emerging need of the demand side. In this ever-evolving environment the PES can act as an informed intermediary, aligning the expectations of both sides of the market.

The *fast-growing* occupations differ from the top 10 occupations presented in section 1 (as can be seen in Figure 1.4 and Table 1.1). This shows that demand patterns in the labour market are changing. The table should be read as follows: *Advertising and marketing professionals*, the last entry in Table 1.1, have grown from a (very low) average of approximately 7 new job postings published online per month in the first semester of 2018 (column (1) to an average of 41 new online postings per month in the first semester of 2022 (column (2)). The volume of job postings for this occupation has, hence, increased roughly 6 times (growth factor) in the period under consideration, signalling increasing demand for professionals in that occupation. Details about the calculation of growth factors can be found in Box 1.4. While the current demand for the fast-growing occupations may seem low in absolute terms, the analysis of the dynamics for these occupations can shed light on interesting and emerging patterns in the labour market.

**Table 1.1. Top 10 fast-growing occupations at the ISCO-08 4-digit level**

Occupational code (ISCO-08)	Occupation title	Average OJPs per month (January-June 2018) (1)	Average OJPs per month (January-June 2022) (2)	Growth factor (2)/(1)
2359	Teaching professionals not elsewhere classified*	0.17	8.00	48.00
3423	Fitness and recreation instructors and program leaders*	1.33	14.17	10.62
3315	Valuers and loss assessors*	1.17	12.00	10.29
4110	General office clerks*	1.67	16.00	9.60
4419	Clerical support workers not elsewhere classified	2.50	21.83	8.73
1221	Sales and marketing managers	2.67	23.17	8.69
5131	Waiters	7.33	47.67	6.50
5244	Contact centre salespersons	2.50	15.83	6.33
2221	Nursing professionals	2.00	11.67	5.83
2431	Advertising and marketing professionals	7.33	41.50	5.66

Note: Column (1) contains the average number of OJPs in the first semester of 2018; column "S1-22 (Avg)" contains the average number of OJPs posted in the first semester of 2022. Column "Growth" contains the ratio of the values reported in S1-22 (Avg) over the values reported in S1-18 (Avg). The occupations displayed have an average number of OJPs above the overall mean of 7.92 OJPs per month throughout the period. \* Denote occupations with emerging demand.

Source: OECD calculations based on Lightcast data.

### Box 1.4. Calculation of fastest-growing occupations and occupations with emerging demand

Trends in demand are measured by computing the growth factor (i.e. the ratio) between the average number of new monthly OJPs in the first semester of 2022 relative to those published in the first semester of 2018 in each occupation. Only occupations that have an average number of monthly OJPs larger than the mean for the entire period (7.92 OJPs) are included in the analysis, and the top ten *fastest-growing* occupations per skill level are discussed. Using a growth factor calculated as the ratio between OJPs in two periods of time has the advantage of being simple to interpret. Moreover, by comparing the same months of two different years makes it possible to control for the seasonality patterns that might affect an occupation and confound a measure of growth.

Yet, the growth factor is sensitive to the starting average number job postings in the first semester of 2018; as it is the denominator. If the starting number of OJPs was very low, this number can inflate the growth. When this is the case, this limitation is pointed out to inform the reader to be cautious in the interpretation of the growth factor. At the same time, these jobs are interesting as these occupations can represent new and *emerging demand* across Umbria's online labour market. These occupations are included to showcase their exceptional growth, despite small starting numbers and are treated separately in the next subsection. Occupations with emerging demand had a below average number of monthly OJPs in the first semester of 2018 (1.87) compared to all occupations but had more than 7.92 average monthly OJPs over the entire time period.

Source: OECD calculations based on Lightcast data.

### **Occupations with emerging demand**

The top four fastest-growing occupations in Umbria when comparing the first semester of 2022 to the first semester of 2018 can all be considered occupations with emerging demand (See Box 1.4). While caution is necessary when looking at the absolute values of their growth factors, as they had a very low average number of OJPs in the first semester of 2018, these occupations are still characterised by exceptionally large growth. Three out of these four occupations are high-skill: *Teaching professionals not elsewhere classified*, *Fitness and recreation instructors and program leaders*, and *Valuers and loss assessors*, while the last one: *General office clerks*,<sup>12</sup> requires medium-skill.

The average number of OJPs grew most rapidly for *Teaching professionals not elsewhere classified*, as it increased around 48 times during the period of analysis. This occupation includes those who provide educational counselling to students. The COVID-19 crisis has shown the limits of remotely provided education (DaD, Didattica a Distanza), leading many parents and students to seek out privately held counselling to boost students' performance, which increased demand for this occupational group starting in 2020. After the peak of the pandemic passed, demand remains still high.

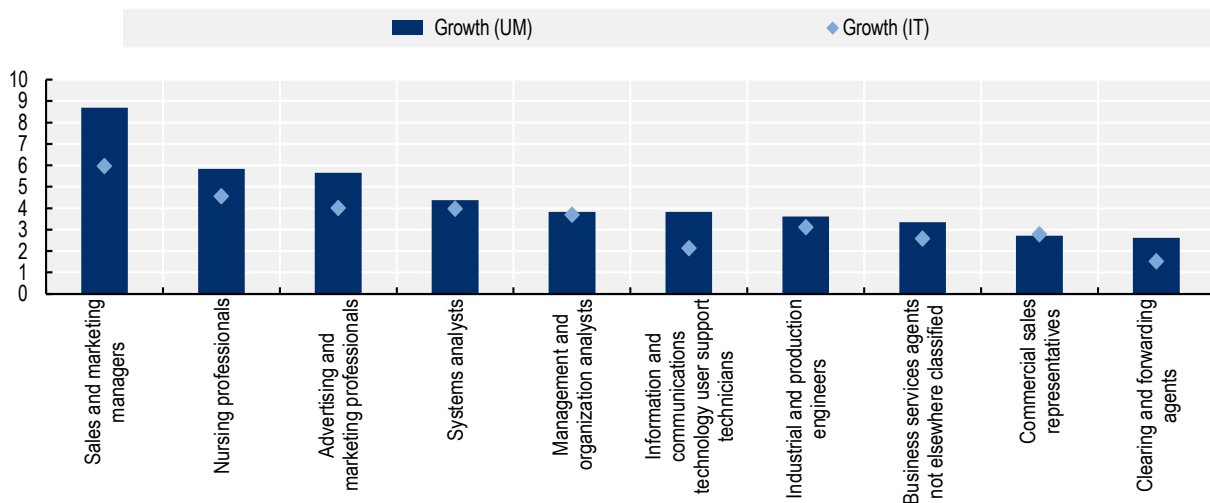
The number of OJPs for *Fitness and recreation instructors and program leaders* increased from 1.3 up to 14.2 on average per month. Aerobics instructors, fitness instructors, personal trainers, and even jobs like sailing instructor and horse-riding instructor are all examples of this occupation. The exceptional growth in OJPs can be evidence that this job is currently more advertised online than it was previously, or perhaps the pandemic brought extra awareness of the importance of physical activity for general health. Studies have for example shown the benefits of home-based exercise and of a physically active lifestyle during the pandemic (Ravalli and Musumeci, 2020<sup>[8]</sup>; Pippi and Fanelli, 2021<sup>[9]</sup>).

Valuers and loss assessors are employees that value property and various goods, and assess losses covered by insurance policies. OJPs for this job increased over tenfold in between 2018 and 2022, meaning that this job is now the 47<sup>th</sup> most in demand job out of 411. In 2018 it was ranked 109<sup>th</sup>. Potentially, this is due to a post-COVID increase in bankruptcies in Umbria in 2021 and 2022 (INSOL Europe, 2021<sup>[10]</sup>; INSOL Europe, 2022<sup>[11]</sup>), which require assessment by insurers. Unlike Italy as a whole, the Umbria region saw increased bankruptcies in 2021 and 2022.

### **High-skill occupations with increasing demand in online job postings**

The ten fastest growing high-skilled occupations in Umbria grew in between 8.7 and 2.6 times (Figure 1.5). The fastest growing occupation was a managerial job: Sales and marketing managers. The slowest growing occupation in the top ten, *Clearing and forwarding agents*, still grew nearly threefold. The former is the only managerial function in the top 10, with five of the remaining nine occupations being roles as “professionals”, and four occupations which are “technicians and associate professionals”.

**Figure 1.5. Top 10 fast-growing high-skill occupations at the ISCO-08 4-digit by growth**



Note: Bars represent the growth for each occupation expressed as a simple ratio between the average number of OJPs in the first semester of 2022 over the average number of OJPs posted in the first semester of 2018. Dots overlaying each bar show the equivalent growth of the same occupation for the Italian territory. The occupations displayed have an average number of OJPs above the overall mean of 7.92 OJPs per month. Four occupations with emerging demand have been excluded from the graph: Teaching professionals not elsewhere classified, Fitness and recreation instructors and program leaders, Valuers and loss assessors, and Research and development managers.

Source: OECD calculations based on Lightcast data.

COVID-19 had a pronounced positive impact on the demand for certain high-skilled occupations. In particular the number of OJPs for *Nursing Professionals*, increased almost six-fold during the period. The COVID-19 crisis was first and foremost a health crisis, leading to increased rates of hospitalisations in both Umbria and Italy as a whole. This increased pressure and work-related stress for health care professionals (Paolucci et al., 2021<sup>[12]</sup>). Furthermore, the Italian health care system was already dealing with an aging workforce and with budget cuts, worsening the ease with which new staff could be found (Gostoli, 2020<sup>[13]</sup>).



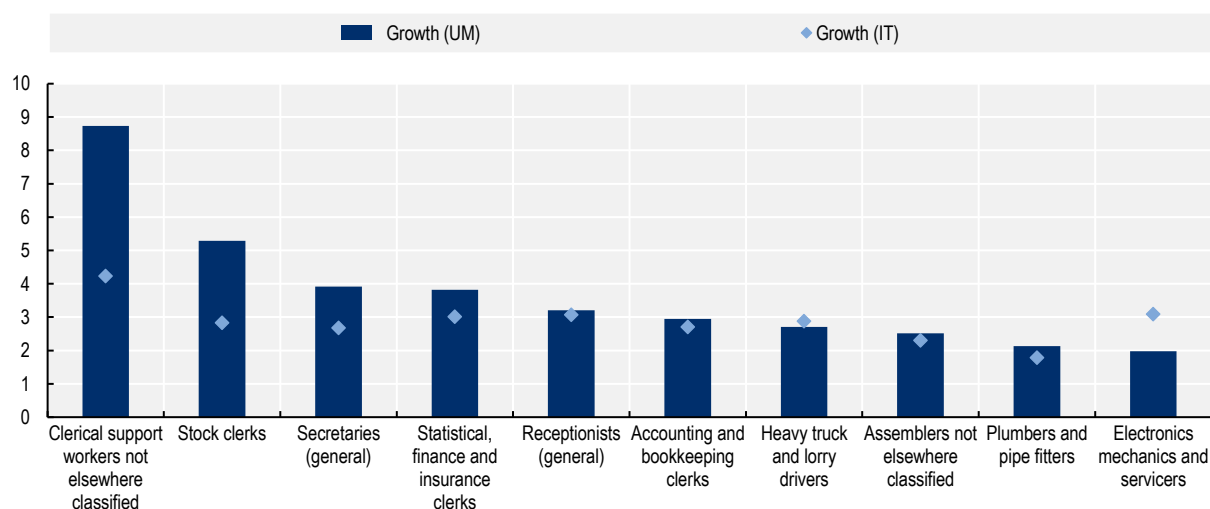
The other “professional” roles in the top ten represent occupations that are typically performed in a business setting within companies: advertising and marketing professionals, systems analysts, management and organisation analysts and industrial and production engineers. Demand for advertising and marketing professionals increased fivefold over the period, followed by system analysts which increased around 4.4 times. The number of OJPs for management and organization analysts increased nearly fourfold, and OJPs for industrial and production engineers around threefold. These occupations encompass four different areas that are typically associated with the operations of a company: sales, information technology, management, and product design.

Among the associate professionals, the demand for information technology user support is particularly high. IT roles are in demand in multiple different sectors, making the gap between demand and supply difficult to fill. This is reflected in sectoral studies (Umbria Domani, 2022<sup>[14]</sup>) and agreements between technical schools and the chamber of commerce (Perugia Today, 2022<sup>[15]</sup>), which are encouraging young high-school graduates to pursue IT positions.

### **Medium-skill occupations with increasing demand in online job postings**

Concerning the medium skill occupations, most of the fastest-growing occupations are subgroups of *Clerical Support Workers*, as can be seen from Figure 1.6. These business-related jobs cover six out of the ten entries. Clerks are endowed with tasks such as recording, organising or retrieving information related to the functioning of a firm and can be seen as complementary to the fast-rising high-skill business-related jobs mentioned in the previous paragraph.

**Figure 1.6. Top 10 fast-growing medium-skill occupations at the ISCO-08 4-digit by growth**



Note: Bars represent the growth for each occupation expressed as a simple ratio between the average number of OJPs in the first semester of 2022 over the average number of OJPs posted in the first semester of 2018. Dots overlaying each bar show the equivalent growth of the same occupation for the Italian territory. The occupations displayed have an average number of OJPs above the overall mean of 7.92 OJPs per month. One occupation with emerging demand has been excluded from the graph: General office clerks.

Source: OECD calculations based on Lightcast data.

When it comes to clerical occupations, it's important to distinguish between jobs that involve more advanced administrative tasks and those that involve less sophisticated procedures. In the first category, "Statistical, finance, and insurance clerks" and "Accounting and bookkeeping clerks" have seen an increase of 3.8 and 3 times respectively.

In the second category, "Clerical support workers not elsewhere classified" have seen an increase of 8.7 times, making this the fastest growing medium-skill occupation. Noticeably, this growth is much more pronounced in Umbria than in Italy as a whole. Additionally, "Secretaries" with an increase of 3.9 and "Receptionists" with an increase of 3.2 are two other clerical roles that perform less sophisticated administrative tasks.<sup>13</sup> For these two roles the growth is much more comparable to the growth in Italy as a whole. Additionally, one of the emerging occupations is another one of those clerical roles: general office clerks which increased nearly tenfold,.

Finally, another one of the clerical roles, *Stock clerks* which increased 5.3 times, can be seen as one facet of the logistical roles within a firm. Another logistical medium-skill occupation that is in high demand is that of *Heavy truck and lorry drivers*, which increased 2.7 times. The logistics sector is an interesting case, as not only is it a large sector in Umbria, but there are also a few fast-growing occupations, both at the medium-skill and the low-skill level, see Box 1.5.

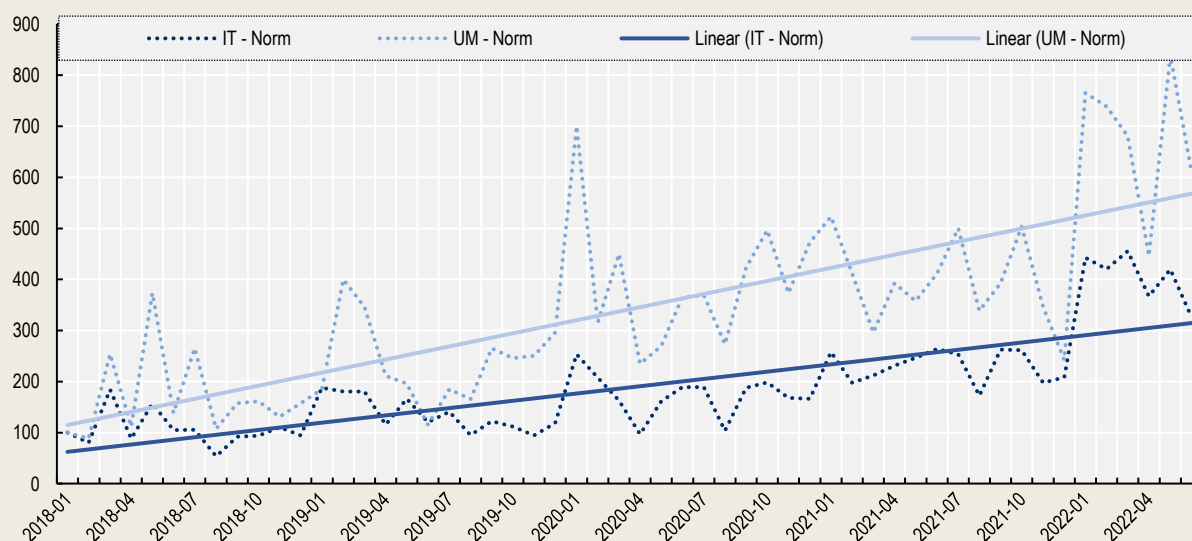
### Box 1.5 Fast-growing occupations in the logistics sector

The logistics sector was one of the least negatively impacted by the COVID-19 crisis compared to other economic sectors. Social distancing measures and long queues in brick-and-mortar stores have prompted many retailers to shift their focus to e-commerce digital stores, reducing the role of distributors. According to a recent report by the Observatory on Contract Logistics hosted by the Polytechnic University of Milan, the logistics sector is experiencing a growth rate of 2.8% in 2022, building on an already positive growth rate of 4.7% over 2020 (Frosi, 2021<sup>[16]</sup>). At the same time data from the LFS shows that the share of people that work as transport and storage labourers has also increased by 0.35% in between 2018-2021. The share of OJPs looking for these types of workers did increase by 0.7% in the same time period. The positive trend is also reflected at the local level where, anecdotally firms are constantly on the hunt for new, and possibly young personnel (Perugia Today, 2022<sup>[17]</sup>).

For these reasons, Figure 1.7 depicts the time-series of three ISCO-08 4-digit occupational codes, related to the logistics sector that provide opportunities for the PES to help unemployed Umbrians find employment: *Stock clerks* (code 4321), *Heavy truck and lorry drivers* (code 8332) and *Freight handlers* (code 9333). *Stock clerks* are endowed with the task of maintaining records of goods produced and production materials received; *Heavy truck and lorry drivers* instead drive and tend heavy motor vehicles to transport goods, liquids and heavy; *Freight handlers* pack, carry, load and unload goods.<sup>14</sup>

The relative importance for these occupations in Umbria compared to Italy as a whole is confirmed by the faster growth in Figure 1.7. The series appears to take-off in January 2020 and proceeds by being relatively stable around an index of four times the initial level of January 2018 for the whole 2021. It then spikes again in January 2022. In April 2022 the number of OJPs decreased but remained more than 4 times larger than in 2018, and well above the level in April of 2021. Lightcast data, therefore, confirm the increasing demand of individuals to be recruited in the logistic sector in various roles.

**Figure 1.7. Trend of fast-growing logistic-related occupations**



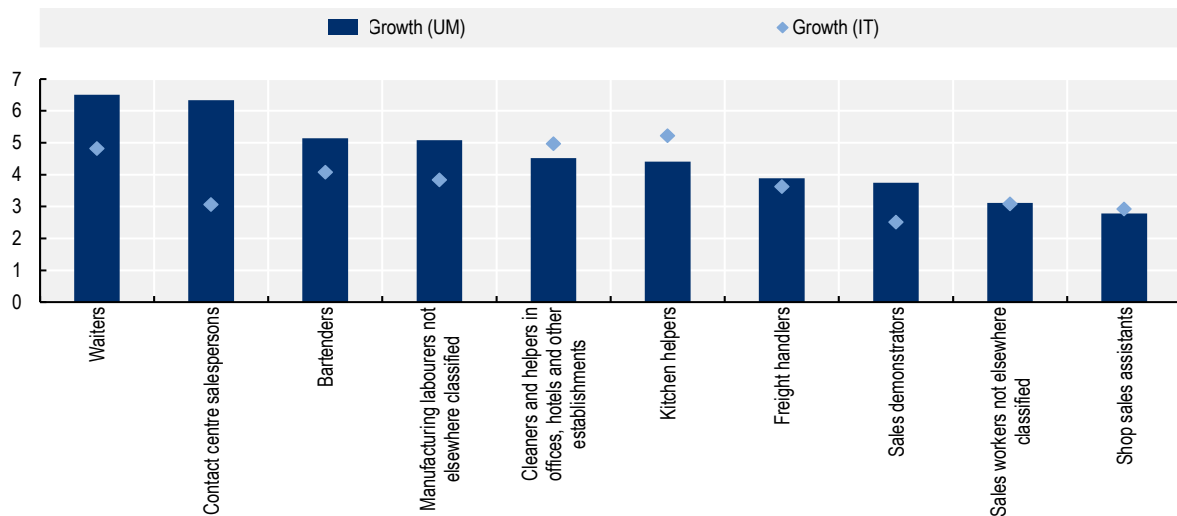
Note: The series combines OJPs related to three ISCO-08 4-digit occupational codes: Stock clerks (code 4321), Heavy truck and lorry drivers (code 8332) and Freight handlers (code 9333). Linear trends are calculated on a standardised index Jan-2018 = 100.

Source: OECD calculations based on Lightcast data; (Frosi, 2021<sup>[16]</sup>); (Perugia Today, 2022<sup>[17]</sup>); ISCO-08.

### ***Low-skill occupations with increasing demand in online job postings***

The fastest growing low-skill occupations increased between 6.5 and 2.8 times (Figure 1.8), which means that the growth rates are less spread out than for the medium- and high-skill occupations. As mentioned previously, low-skill occupations are characterized by a higher volatility in demand, leading to more pressure on the public employment system. At the same time, helping unemployed people transition into low-skilled occupations can be easier for the PES, considering the requirements for these types of jobs. This will be discussed in more detail in the next subsection.

Figure 1.8. Top 10 fast-growing Low-Skill occupations at the ISCO-08 4-digit by growth



Note: Bars represent the growth for each occupation expressed as a simple ratio between the average number of OJPs in the first semester of 2022 over the average number of OJPs posted in the first semester of 2018. Dots overlaying each bar show the equivalent growth of the same occupation for the Italian territory. The occupations displayed have an average number of OJPs above the overall mean of 7.92 OJPs per month. Source: OECD calculations based on Lightcast data.

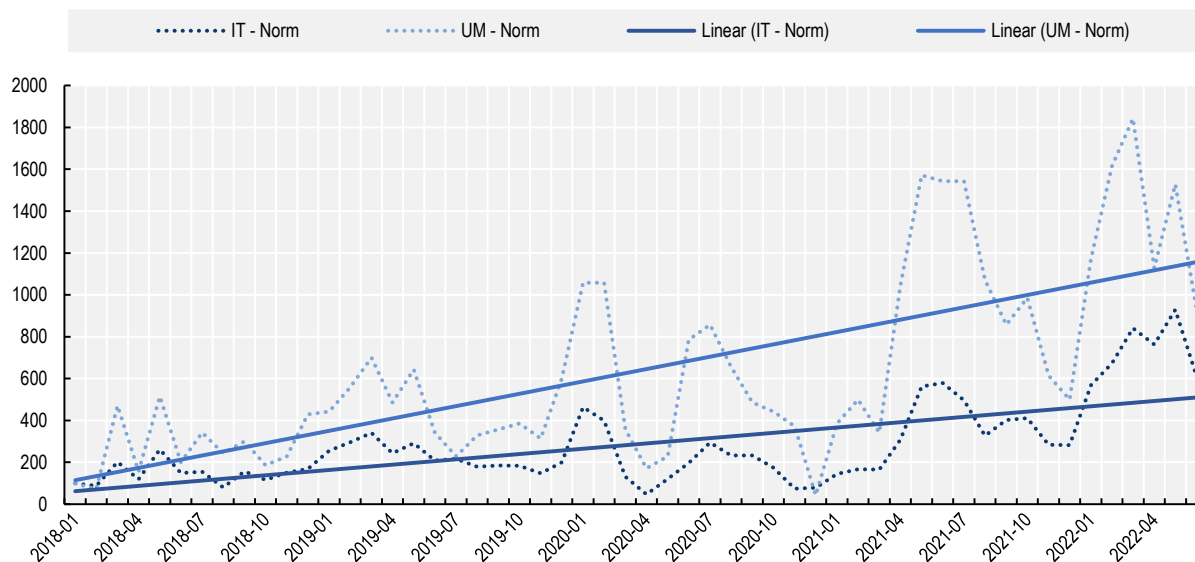
Two occupational areas stand out within Figure 1.8: sales and the food service industry. *Contact centre salespersons*, *Sales demonstrators*, *Shop sales assistants*, and *Sales workers not elsewhere classified* represent three different channels through which employers put forward their sale strategies: by phone, on specific premises like exhibitions or market fairs, and in brick-and-mortar stores. All these roles are tasked to present goods, assist customers in their choices and sell goods on behalf of retailers. These occupations, while closely related, were affected differently by the COVID crisis. On the one hand the risk of infection while carrying out face-to-face interactions increased the need for online sales activities or sales over the phone. This could have a positive impact on the number of OJPs for *Contact centre salespersons*. On the other hand, the ability to curb the rate of infections via the vaccine roll-out allowed live interactions to be restored, which could have had a positive effect on the demand for *Sales demonstrators* and *Shop sales assistants*. Furthermore, domestic demand in Italy, and most likely Umbria as well increased in the first half of 2022, leading to an estimated total increased economic output of 3.9% in 2022 (European Commission, 2023<sub>[18]</sub>). This can also be result in increased demand for sales personnel.

Fast-growing Low-skilled occupations within the food service industry are *waiters*, *kitchen helpers* and *bartenders*. *Waiters* are the top fast-growing occupation in this category moving from an average number of 7 posts a month in the first semester of 2018 to an average of about 47 posts per month in the first semester of 2022, representing a six-fold increase. In a related fashion the demand for *Bartenders* has moved from an average of 3.5 OJPs per month to an average of 18 OJPs per month for the same period, revealing a volume of demand five times higher in 2022. *Kitchen helpers* follow, with a similar increase of 4.4 times during the period, made by an average volume of OJP of about 30 in the first semester of 2022 with respecting to the starting point of about 7 in the same semester of 2018.

The high demand for food industry workers after 2021 reflects the success story of post-COVID tourism in the Umbria region that, according to the observatory on tourism of the Umbria region, has welcomed a record number of tourists in 2021 and 2022 (Regione Umbria, 2022<sub>[19]</sub>). In general, food industry jobs are characterised by a high level of volatility, and a demand which is quite seasonal in nature (Figure 1.9). The right end of the Umbrian graph shows a great spike in OJPs for waiters, kitchen helpers and bartenders

between March 2021 and September 2021 and a second spike in March 2022 evolving over Q2 2022 summer in a similar fashion. The growth is much more pronounced for Umbria than for Italy as a whole.

**Figure 1.9. Trend of fast-growing food-industry occupations**



Note: The series combines OJPs related to three ISCO-08 4-digit occupational codes: Waiters (code 5131), Kitchen helpers (code 9412) and Bartenders (code 5132). Linear trends are calculated on a standardised index Jan-2018 = 100. The Lightcast dataset ends in June of 2022. The data collection is usually followed by a process of data-refinement that can last months; for this reason the last few points of the series should not be interpreted as a decline in this occupational category.

Source: OECD calculations based on Lightcast data.

## What are the job characteristics of fast-growing and emerging occupations?

Public employment systems heavily invest resources in training courses for people with low employment prospects, in order to help them exit the unemployment pool. In order to show the average profile that employers are looking to hire, this section looks at *required educational background* and *required experience* for different types of jobs. Additionally, this section offers a descriptive view of *the contractual stability*<sup>15</sup> of the offered contract and of the *working hours*, to assist the PES with fine-tuning jobseekers' expectations on what types of contracts they can expect to receive. Consistently with the previous analysis, a distinction is made between profiles and contracts for occupations at different skill levels.

### Comparison of High, Medium and Low-skilled occupations

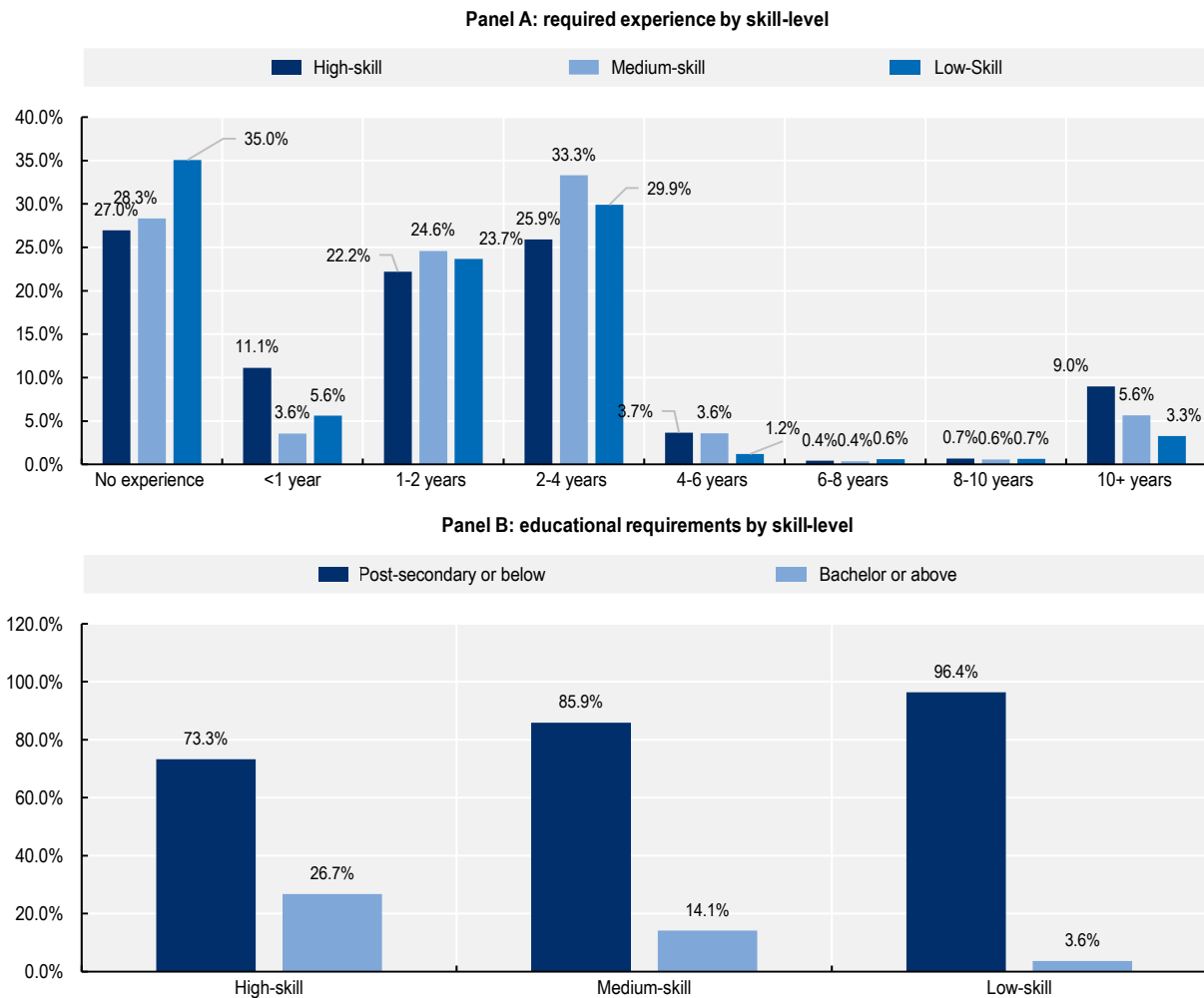
In general, the OJPs for low-skilled occupations in Umbria require fewer years of experience than OJPs for either medium- or high-skilled occupations, as can be seen in Figure 1.10, Panel A. The majority of OJPs for low-skilled occupations specify that candidates should have zero to four years of experience. 35% of the online vacancies for low-skilled positions even require *No Experience* dedicated to them.

Yet, an important share for high-skilled occupations also consists of entry-level positions, as 10% of the vacancies are open to workers with a *1-year experience*, and 27% to workers with *No experience*, suggesting an important role for internships or traineeships in this type of vacancies, which is further explored below.

The right side of Panel A shows that the vacancies for high-skilled occupations often require more experience. OJPs dedicated to candidates with ten or more years of experience are about 9% in high-skilled occupations, followed by 6% for medium- and 3% for low-skilled occupations.

In terms of *educational level*, which can be seen in Panel B of Figure 1.10, the results are as expected: high-skilled occupations require a higher education. Roughly one third of their vacancies are specifically looking for candidates with a bachelor's degree or higher qualification. The same requirements are instead rarely asked for low-skilled occupations (3.6%), and medium-skilled occupations (14.1%).

**Figure 1.10. Expected candidate profile – comparison of high-, medium- and low-skilled occupations**



Note: NAs constitute 59% of the sample for the required experience, and 0.1% for the education requirements.

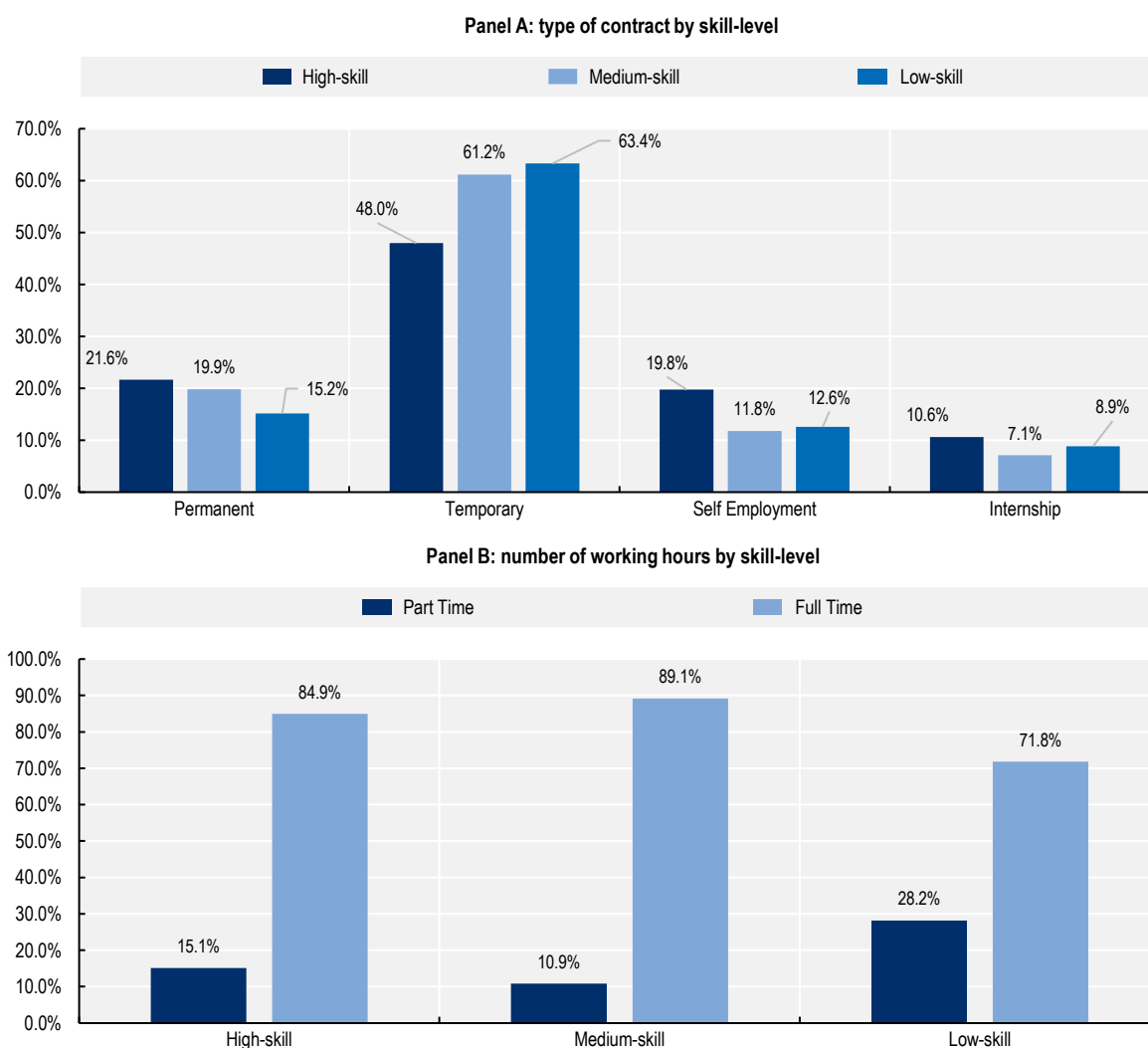
Source: OECD calculations based on Lightcast data.

Based on the analysis of online job postings, it appears that the number of permanent contracts offered by employers is relatively similar across all skill levels, although low-skilled workers are less likely to be offered a permanent contract (Figure 1.11 Panel A). In terms of contractual stability, the largest difference is seen for self-employed contracts, with OJPs for high-skilled occupations more likely to look for workers in this category. Temporary contracts are offered in just above 60% of vacancies for both medium- and low-skilled occupations, compared to 49% for high-skilled occupations. However, the difference in temporary contracts is not compensated by permanent contracts but by self-employment, indicating that a significant

portion of fast-growing high-skilled occupations can be considered as consultancy roles rather than actual employment.

Regarding the working hours, the largest imbalance between part-time and full-time contracts is in the low-skill category, where the former covers a share of 28% and the latter of 72% (panel B of Figure 1.11). In contrast high-skilled and medium-skilled occupations offer *part-time* contracts 14% and 11% of the time. Contributing to the lower prevalence of full-time contracts for low-skill occupations, could be the high-degree of substitutability in skill and the seasonal nature of these jobs. Employers benefit from offering employees flexible contracts, allowing them to access workers almost on demand, whenever the workload exceeds expectations.

**Figure 1.11. Offered contract characteristics – comparison of high-,medium-. and low-skilled occupations**



Note: NAs constitute 14% of the sample for the contract types, and 25% for the number of working hours.

Source: OECD calculations based on Lightcast data.

Comparing requirements and contractual characteristics of occupations *between* skill levels allows to understand similarities and differences that can be crucial in the design of training offers that serve to align expectations between supply and demand. Yet, *within* skill-level, there is still quite a lot of heterogeneity between occupations, details on job characteristics per skill-level can be found in Annex 1.A.

## Demand and supply on the labour market: OJPS versus employment data

The analysis of OJPs offers a unique opportunity to investigate labour market demands. The previous sections are an example of the types of insights that can be generated by using data that is detailed for many different occupations and is updated frequently. OJPs data can show occupation-specific trends and heterogeneity between different occupations, and easily track this on a month-to-month basis.

Yet, online job postings cannot inform on the supply side of the labour market and on actual employment. Additional information can be gathered from employment data. In this subsection the analysis of Umbria's OJPs is complemented by data specific for this region from the EU – Labour Force Survey (LFS) in the period 2018-2021. This is to say that, while OJPs provide information on the strength of the demand (as new vacancies can be interpreted as the desire of employers to hire), the LFS offers insights on the volume of individuals that are actually employed in a certain occupation (that is when employers have found the right candidates and their desire to hire have been fulfilled).

In terms of statistical granularity, it's important to note that the LFS data is less detailed compared to the Lightcast data. The LFS provides a representative snapshot of employment over the course of a year, whereas the Lightcast dataset tracks labour demand in near real-time through online job postings. Additionally, the LFS only offers data at the ISCO-08 three-digit level due to sample size limitations, which is less specific than the four-digit level that the OJPs provide.

The comparison between data from OJPs and the LFS can provide valuable insights. However, there may be a mismatch between the two datasets. Lightcast data relies on online job postings, which may not represent all types of roles and occupations in the labour market. The LFS data, instead, can be used to check the representativeness of the online landscape for the entire labour market.

Additionally, the comparison between the two datasets can provide signals on the emergence of potential shortages in the labour market. If there are more OJPs for a certain position than the number of people currently performing that role, it could suggest difficulties for the supply side to adjust to the needs of the demand side, resulting in unfilled vacancies. Alternatively, it could suggest high labour turnover in that role, where many employees leave their positions and are replaced by new employees, which does not necessarily indicate labour shortages.

The first part of this subsection addresses the representativeness of the Lightcast data comparing the share of OJPs by occupation with the share of people employed. The LFS data here can be seen as showing relevancy of different occupations in the labour market as a whole. The second part focuses more on the dynamics on the labour market. It expands on why certain differences are detected, assessing the possibility that the gaps found can be attributed to a tightness on the labour market, that is whether employers will have a harder time when trying to find employees.

### ***A discussion of the representativeness of OJPs against LFS data***

To assess representativeness, the benchmark measure used is a comparison between the percentage share of individuals employed in a certain occupation in the LFS data with the percentage share of OJP in the Lightcast data, for the same occupation, during the entire period of analysis (Cammeraat and Squicciarini, 2021<sup>[20]</sup>). Comparing the stock of employed with the stock of vacancies gives, to a first approximation, a sense of the occupational codes for which the OJP data are unbalanced.

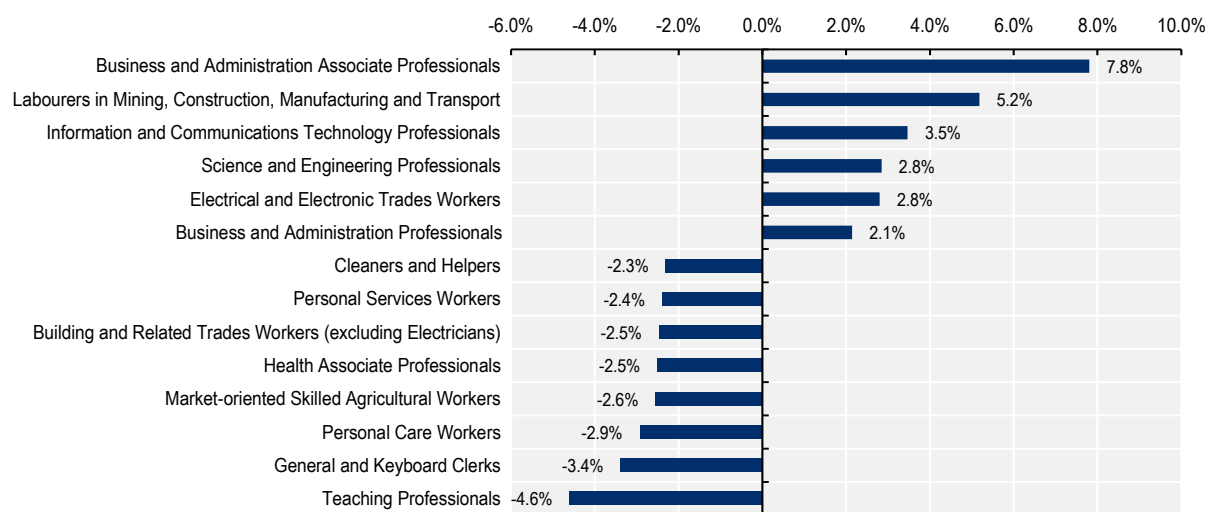


One important caveat to this analysis is that for the Umbria region specifically, it cannot be guaranteed that the benchmark of the LFS data is fully representative of the real employment situation in the region. While the LFS is representative on a country level, it could be the case that within the specific region of Umbria, certain occupations are under- or overrepresented, when compared to the actual working population. This analysis should therefore be interpreted as indicative of how representative the OJPs are for the total labour market landscape rather than conclusive.

The comparison unveils three imbalances worth discussing. Firstly, occupations that require public selection are less represented in the Lightcast data than in employment data. For example, Teaching Professionals cover a share 4.4% higher in the LFS data than in the Lightcast dataset, followed by Health Associate Professionals with an imbalance of 2.6% (Figure 1.12). The public selection process is in place to assure the required level of professionalism from the future government employee and is required by law for every publicly financed institution in Italy (Ministro per la Pubblica Amministrazione, 2015<sup>[21]</sup>). This means that teaching positions in public schools and roles in the public health system both are recruited via public selection.

Secondly, occupations which require a direct human contact between the employer and the employee, such as Personal Care Workers, and Cleaners and Helpers, seem to be less in terms of OJPs, with an imbalance of 3% and 2.2% respectively. Vacancies for these occupations might be better advertised through word of mouth given the level of trust required, on the part of the employer, to allow the worker to operate in her own personal space.

**Figure 1.12. Difference in volume between LFS and OJP at the ISCO-08 2-digit for the years 2018-2021**



Note: The bar-chart shows the difference between the percentage share that each occupation covers in the Lightcast data and the percentage share that the same occupation covers in the LFS data, at the ISCO-08 2-digit level for the years 2018, 2019, 2020 and 2021 pooled together. A positive number indicates a higher percentage share, for each occupation, in the Lightcast dataset; a negative number instead represents a higher share in the LFS data than in the Lightcast data. Only occupations with an absolute difference above 2% are shown.

Source: OECD calculations based on Lightcast data and EU-LFS data aggregating the period 2018-2021.

Thirdly, certain occupations seem to be overrepresented in the Lightcast data. Jobs as Business and Administration (Associate) Professionals are more present in OJPs than in employment data. Focusing on jobs that seem to be overrepresented, Table 1.2 reports the top 10 list of occupations, this time at the 3rd digit of the ISCO-08 classification, ranked by the highest difference in share between the LFS and the Lightcast data. Seven out of ten positions are filled by various types of high-skill occupations, mostly business professionals, such as Sales and purchasing agents and brokers, Administrative and specialised secretaries and Business services agents, along with technical occupations, such as Software and applications developers, Engineering professionals, and Physical and engineering science technicians. Cammeraat and Squicciarini (2021<sup>[20]</sup>) previously showed similar overrepresentation of professionals and technicians in OJPs data for the US, UK, Canada, Australia, Singapore and New Zealand. This is possibly due to higher propensity of employers to post these types of vacancies online. This behaviour results in a higher probability to encounter these occupations in the Lightcast data. As was mentioned in section 1, Carnevale, Jayasundera and Repnikov (2014) estimate that around 80-90% of postings requiring at least a bachelor's degree can be found online, whereas 40-60% of job postings requiring a high school degree are advertised on the internet.

**Table 1.2. Top 10 Occupations at the ISCO 3-digit with highest difference in share between LFS and Lightcast, for the period 2018-2021**

ISCO-08 3-d	ISCO-08 3-d Name	Share (LFS)	Share (Lc)	Difference
933	Transport and storage labourers	0.83%	4.39%	3.56%
251	Software and applications developers and analysts	0.42%	3.90%	3.48%
214	Engineering professionals (excluding electrotechnology)	1.02%	4.16%	3.14%
332	Sales and purchasing agents and brokers	2.22%	5.10%	2.88%
334	Administrative and specialised secretaries	0.48%	2.93%	2.46%
311	Physical and engineering science technicians	2.05%	4.44%	2.40%
243	Sales, marketing and public relations professionals	0.69%	2.91%	2.22%
741	Electrical equipment installers and repairers	1.30%	3.41%	2.10%
333	Business services agents	1.03%	3.00%	1.97%
932	Manufacturing labourers	0.47%	2.15%	1.68%

Source: OECD calculations based on Lightcast and EU – Labour Force Survey data.

Another discrepancy that stands out is the overrepresentation of transport and storage labourers (difference of 3.6 percentage points). In this situation it is more likely that dynamics on the labour market are at play. For instance, when employment (in the LFS data) does not track demand (in the Lightcast data) this could be due to the existence of a supply-shortage. This suggests that not enough workers are available to fulfil the demand, creating an imbalance of OJPs that does not translate to actual jobs.

The likelihood of a vacancy being posted online and the dynamics on the labour market contribute jointly to overrepresentation, and disentangling the precise reasons is not always possible.

### ***Combining OJPs and LFS data to get insights about labour shortages***

The labour market is not static, supply and demand change from month to month and year to year. To capture these fluctuations on a yearly basis, this section discusses the construction of a preliminary

*tightness indicator* that tries to combine information on the volume of OJPs with that of employed individuals by occupation and over time.

In a nutshell, the objective of the proposed tightness indicator is to build a measure of general tightness of the labour market in a certain year. To do so, it first calculates the relative ease or difficulty with which employers can hire employees for a specific occupational group, by comparing its tightness to the general tightness on the entire labour market in each year. Lastly, for ease of interpretation, the relative tightness per occupation in 2018 is used as a benchmark to follow the developments per occupation in each year. Caution needs to be exercised in interpreting the results from the tightness indicator, as of course both the LFS and the Lightcast data have limitations. Technical details of the calculation can be found in Box 1.6.

### Box 1.6. A tentative indicator of labour market tightness combining OJPs and LFS data

The goal of the tightness indicator is to calculate the relative ease with which employers can hire employees for certain occupational groups, relative to the general labour market, and relative to the situation for that occupational group in 2018. To observe the tightness for a certain occupation in a specific year  $t$ , it is first necessary to know how tight the labour market in general is.

For this purpose, the general tightness,  $GT_t$ , is calculated as follows:  $GT_t = \frac{\sum_i LC_{it}}{\sum_i LFS_{it}}$ . In this equation,  $LC_{it}$  measures the number of OJPs for occupational group  $i$  in year  $t$ , likewise  $LFS_{it}$  measures the number of people in the LFS data that indicated working in occupational group  $i$  in year  $t$ .

Next, the tightness per occupational group  $i$  relative to the entire labour market is measured by:  $RT_{it} = \frac{LC_{it}/LFS_{it}}{GT_t}$ . A relative tightness larger than 1 indicates that the situation for that occupation is tighter than the situation in the general labour market, while a value below 1 indicates that it is relatively easier to find employees for that occupation than it is to find employees on the labour market in general.

Lastly, the tightness indicator  $TI_{it}$  is calculated by indexing the relative tightness in 2019, 2020 and 2021 to the relative tightness in 2018. A value above 1 means that the number of OJPs compared to the number of people employed in a certain occupational group, relative to the general tightness, grew compared to that same number in 2018. A value below 1 indicates that the labour market for those positions got slacker compared to the situation in 2018.

The analysis focuses on the ten occupational groups that had the largest shares of OJPs in 2021, which jointly represent 32.5% of all OJPs in 2021. These groups are considered a substantial part of the total number of vacancies posted online. The dynamics of these specific groups are analysed in Table 1.3.

The results show that all the occupations in Table 1.3, with the exception of shop salespersons and domestic, hotel and office cleaners and helpers, had tighter than average labour markets in both 2018 and 2021.<sup>16</sup> This is a preliminary indication that the volume of OJPs for these positions relative to employment is higher than in other positions, signalling that it is relatively hard to find workers to fill vacancies for those jobs.

Only three out of the ten largest occupations in terms of OJPs record tighter labour markets in 2021 relative to 2018, as can be seen from the column labelled “2021”. Results suggest a tighter labour market for Physical and engineering science technicians, Software and applications developers and analysts, and the previously mentioned domestic, hotel and office cleaners and helpers. Results for some of these occupations, however, need to be interpreted with caution as Physical and engineering science technicians, Software and applications developers and analysts technical occupational groups are likely overrepresented in OJPs, potentially biasing upward the values of the tightness indicator.

The indicator on the other hand seems to suggest that labour market for the other technical professional occupational group in the top 10, that of engineering professionals (excluding electrotechnology), has by contrast become less tight in 2019, 2020 and 2021 compared to 2018.

The other seven out of ten largest occupations in terms of shares of OJPs did see fluctuations over time, but the indicator built on the combination of OJPs and LFS data does not seem to suggest a tighter labour market demand for them in 2021 compared to 2018 (although these are still tighter than the general labour market on average in both years). For example, the tightness indicator for transport and storage labourers peaked in 2020, and it is still larger than average in 2021, but tightness has decreased in intensity relative to 2018. This could mean that in between the LFS in 2020 and 2021 more people have been employed as transport and storage labourers, or that the demand for them has decreased. Even a position such as Electrical equipment installers and repairers, which was around 60% less tight in 2019, 2020 and 2021 compared to 2018, still has relatively more demand compared to employees than what is observed in the average labour market.

**Table 1.3. Tightness indicator for the largest occupations in terms of share of OJPs in 2021**

ISCO08_3D	Label	2019	2020	2021
933	Transport and storage labourers	1.10	1.31	0.81
214	Engineering professionals (excluding electrotechnology)	0.77	0.71	0.84
311	Physical and engineering science technicians	0.92	1.09	1.22
332	Sales and purchasing agents and brokers	0.87	0.90	0.70
251	Software and applications developers and analysts	0.92	0.94	1.52
741	Electrical equipment installers and repairers	0.58	0.60	0.57
522	Shop salespersons	0.81	0.69	0.57
911	Domestic, hotel and office cleaners and helpers	1.03	1.55	1.42
243	Sales, marketing and public relations professionals	1.20	0.71	0.99
431	Numerical clerks	1.37	0.80	0.76

Note: the ratios have been calculated using the method described in Box 1.6. A. Values above 1 indicate that the number of OJPs compared to the number of people employed in a certain occupational group, relative to the general tightness, grew compared to that same number in 2018. Source: OECD calculations based on Lightcast and EU – Labour Force Survey data.

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## Annex 1.A. Job characteristics per skill-level

### High-skill occupations

In general, high-skilled occupations show high barriers to entry in terms of years of experience and high diploma requirements. The scope for retraining existing human capital to meet employers' expectation appears to be limited. However, these generalisations hide a level of heterogeneity as for young talents and, in turn, for the public employment system, the opportunity lies in entry level programs that could facilitate the transition from school to work.

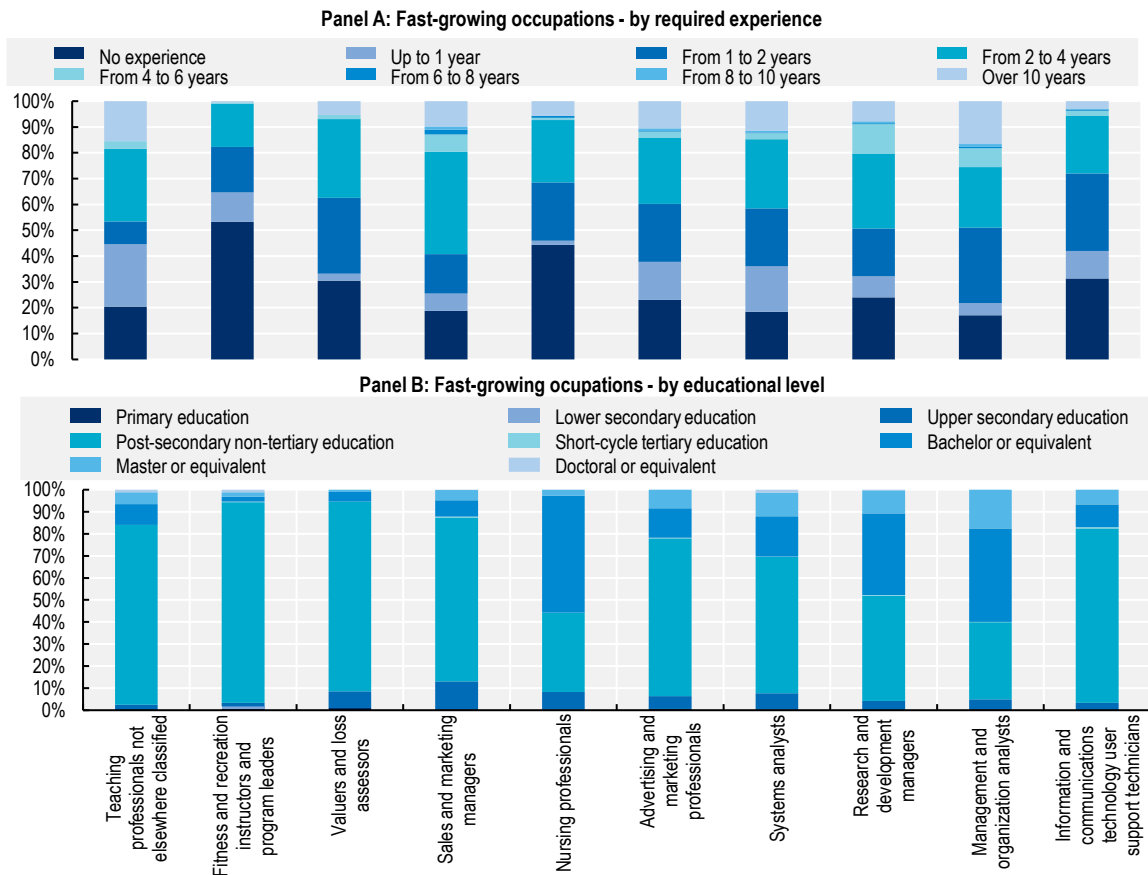
Most of the OJPs for high-skilled occupations that search for candidates with multiple years of experience, consist of vacancies dedicated to for example managerial positions (Annex Figure 1.A.1. ). Among the ten fast-rising and emerging occupations, *Sales and marketing managers*, *Research and development managers* and *Management and organization analysts* open in between 20 to 30% of their vacancies to candidates with more than 4 years of experience.

On the other hand, a significant share of fast-growing IT and health-related vacancies are open to candidates with very little experience. This result is potentially driven by the COVID-19 crisis, to the extent that, for IT professionals, it has spurred firms to accelerate the digital conversion of many production tasks. For health-professionals, it has required a vaccination rollout of massive scale. In fact, Panel A of Annex Figure 1.A.1 shows how employer in the hunt for *Nursing professionals* and *Information and communications technology user support technicians* dedicate up to 40% to entry-level candidates in the form of *No-experience*.

The educational level required for high-skill jobs is the second barrier to entry, and only partially mirrors the experience requirements. Panel B of Annex Figure 1.A.1 suggests how some professions more than other consider a higher education as a crucial requirement. In fact, *Nursing professionals*, *Management and organization analysts* and *Research and development managers* feature a share ranging from 50 to 60% of vacancies dedicated to candidates with a bachelor or more.

The vast majority of the rest of the high-skilled jobs is open to candidates with post-secondary non-tertiary education. In the context of Italy and Umbria, this means that people have followed either courses in the higher technical education and training system (IFTTS) or in the vocational education and training system in the Regions (European Commission, 2022<sup>[22]</sup>).

## Annex Figure 1.A.1. Top 10 fast-growing High-Skill occupations – Expected Candidate Profile



Note: NAs constitute 52% of the sample for experience and 0.1% for education.  
Source: OECD calculations based on Lightcast data.

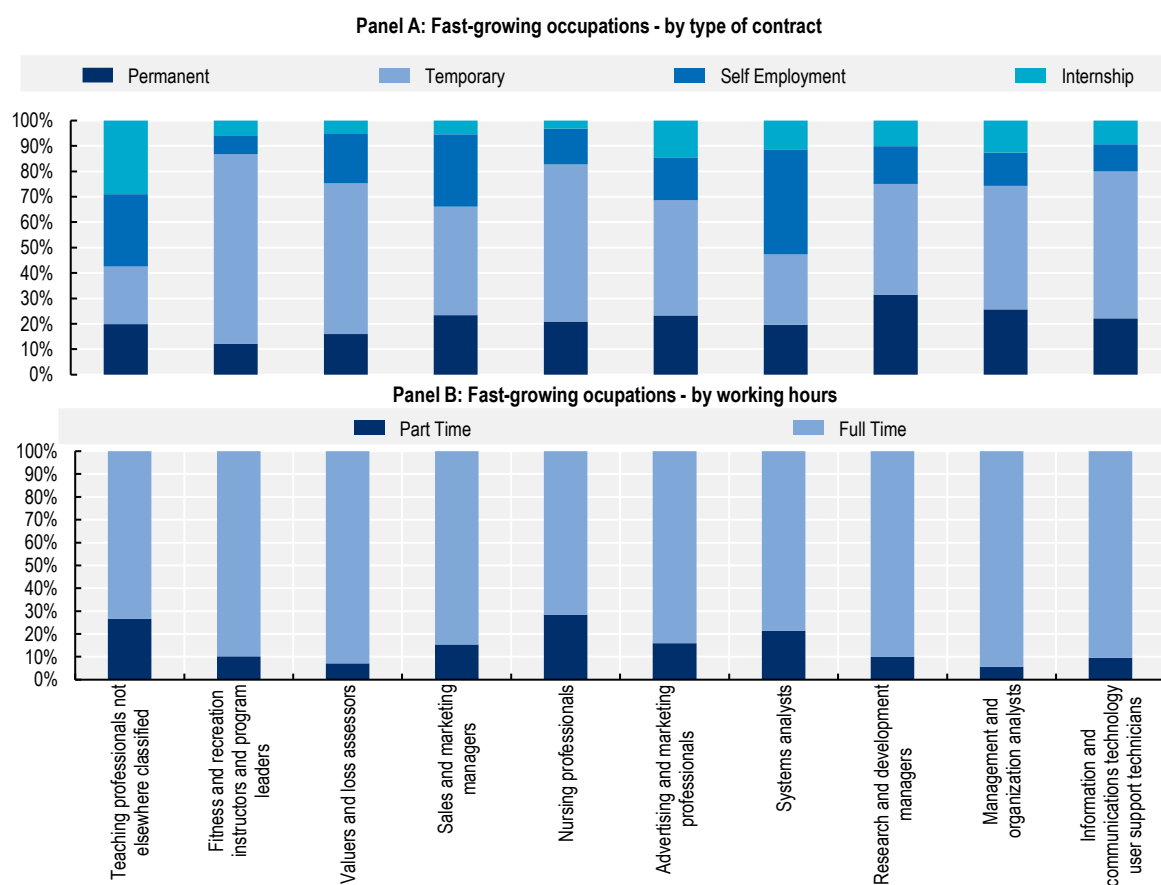
As around 10% of the vacancies for high-skilled jobs in Umbria are open to candidates with up to 1 year of experience, it is good to look at the types of contract high-skilled occupations are offered. Low experience for high skilled occupations hints to an important role for internship and traineeship programs especially for young individuals in a delicate school to work transition. Indeed, especially for occupations in the right end of Annex Figure 1.A.2 panel A, that is, a mixture of IT-based and analyst professions, up to 10% of vacancies are dedicated to internship programs.

Furthermore, in accordance with the previous subsection, for high-skill occupations there are high shares of self-employment contracts. Panel A in Annex Figure 1.A.2 shows how self-employment plays an important role for *System analysts* and *Teaching professionals not elsewhere classified*. These results should not come as a surprise. The formers, *system analysts* are endowed with the task of managing the IT infrastructure, a role often externalized by firms; the latter instead, include teachers who provide privately held lectures and hence are not formally part of a school.

The standard number of working hours for high-skill occupations appears to be a full-time contract (Panel B of Annex Figure 1.A.2). Although there are three notable exceptions: *Nursing professionals*, *Teaching professionals not elsewhere classified* and *System analysts* have around 30% of vacancies dedicated to part-time work. Two of these positions also had a high prevalence of self-employment, which often goes hand-in-hand with a non-traditional workload that is not exactly between 38-40 hours each week.



## Annex Figure 1.A.2. Top 10 fast-growing High-Skill occupations – Offered Contract Characteristics



Note: NAs constitute 20% of the sample for type of contract and 31% for working hours.

Source: OECD calculations based on Lightcast data.

### Medium-skill occupations

As seen previously, some of the *medium-skilled* occupations showed lower barriers to entry and encompass tasks that appear easier to prepare for in a more limited time span. This opens the door for the public employment system to experiment with training programs that could help certain unemployed individuals to be hired in medium-skill jobs.

According to the ISCO-08 classification, seven out of the ten fast-growing and emerging medium-skill occupations require workers to perform clerical tasks. These clerical jobs can be further divided into two categories. The first category consists of clerical occupations that require a higher level of expertise and a higher level of education. General office clerks, Clerical support workers not elsewhere classified, Stock clerks, Statistical, finance and insurance clerks and Accounting and bookkeeping clerks all belong to this category. As evidenced in Annex Figure 1.A.3, Panel A and B these occupations require both the highest levels of experience and the highest education among the fast-growing medium-skilled occupations. Accounting and bookkeeping clerks are even comparable to high-skill occupations in required experience and education.

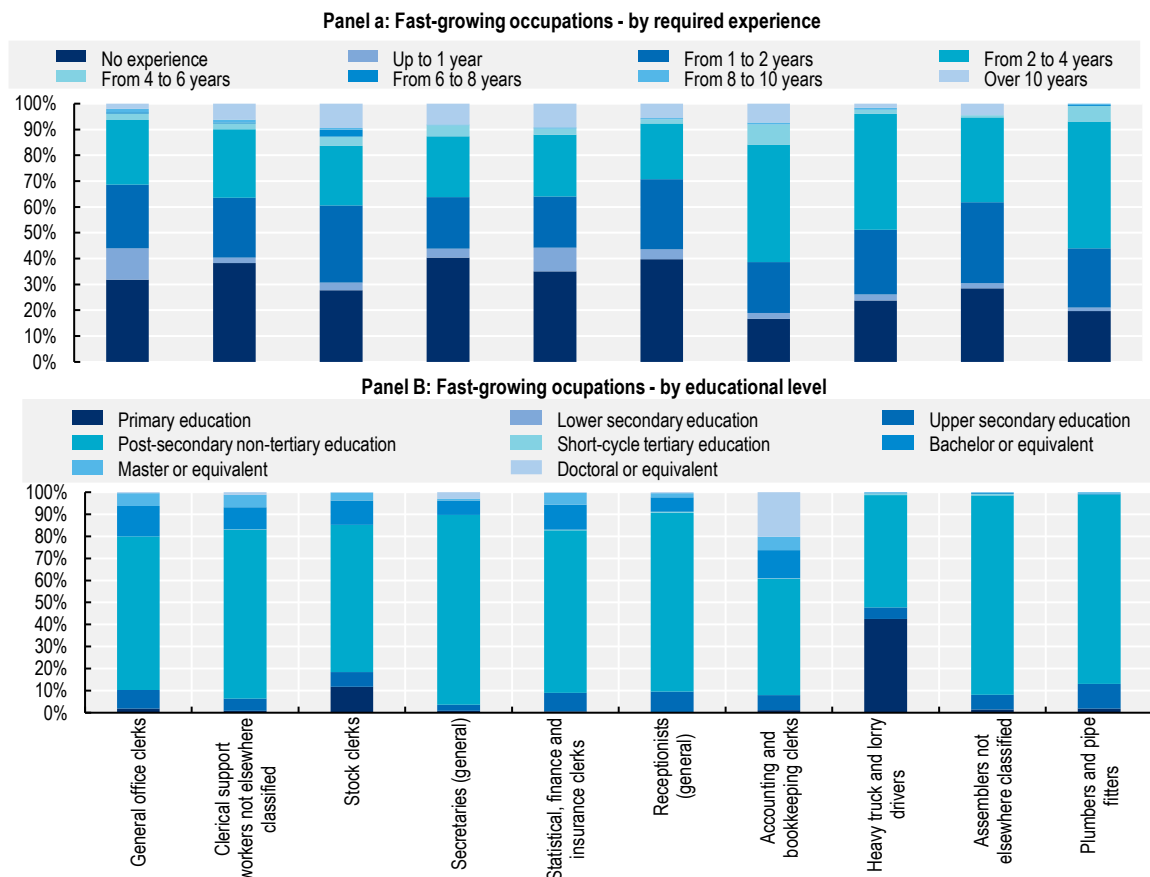
The second category of clerical occupations present an opportunity for the public employment system in terms barriers to entry and of skill conversion. It includes Secretaries (general) and Receptionists (general), which in general have low experience requirements and often do not require tertiary education. This is evidenced by the 40% of vacancies accepting candidates with *No experience* and up to 90% of the vacancies requiring only *post-secondary non-tertiary education*. According to the ISCO-08 classification

Receptionists are endowed with tasks such as receiving and welcoming clients, making appointments, dealing with telephone requests for information or appointments while Secretaries are required to handle correspondence, produce written drafts conformed to office standards, helping to organize meetings etc. The level of tasks required coupled with the low barrier to entry might justify dedicated training programs to endow a specific target of jobseekers with the necessary knowledge of basic typewriting and spreadsheet software helping them to jumpstart their pathways in similar occupations.

For the non-clerical occupations, it stands out that plumbers and pipe fitters are more often required to have from 2 to 4 years of experience, while the majority of positions for assemblers not elsewhere classified are open to people with less than 2 years of experience (Annex Figure 1.A.3, Panel A). Education requirements for these positions are very similar however, with around 90% of OJPs requiring post-secondary non-tertiary education. Plumbers can for example obtain a diploma from a technical institution, or professional qualification.

Heavy truck and lorry drivers are the only job in the top 10 medium-skill occupations that require only primary education in 40% of OJPs. However, this does not mean that there are no requirements in terms of diplomas or qualifications. More important than traditional formal education, in this role it is necessary to have a C driving license, which allows someone to drive motor vehicles for the transport of goods with a total mass exceeding 3.5 tons, or a CE license which allows loads exceeding 3.5 tons up to 7.5 tons. Additionally, heavy truck and lorry drivers need to have a CQC (Carta di Qualificazione del Conducente), which is a driving licence specifically for drivers who professionally carry out the road haulage of goods (Polizia Di Stato, 2020<sup>[23]</sup>).

### Annex Figure 1.A.3. Top 10 fast-growing Medium-Skill occupations – Expected Candidate Profile



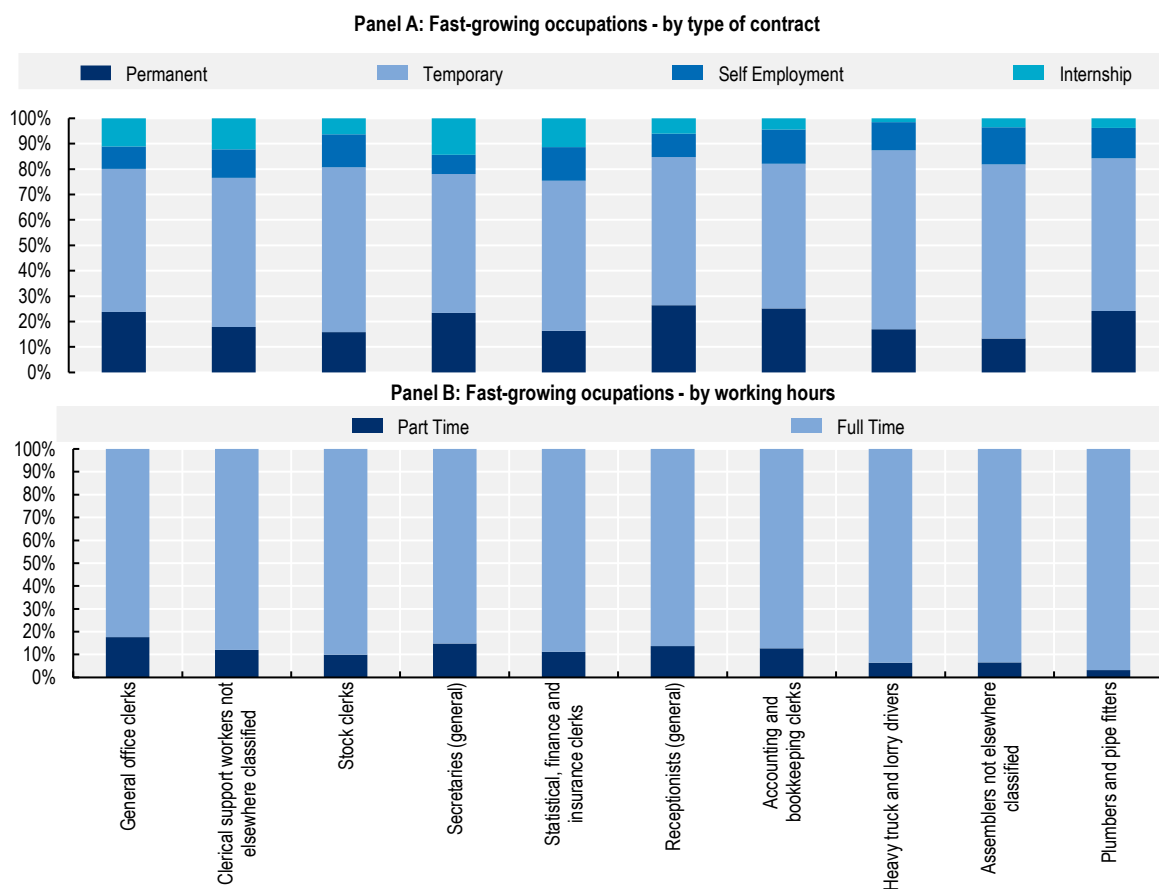
Note: NAs constitute 63% of the sample for experience and 0.1% for education.

Source: OECD calculations based on Lightcast data.

In terms of the types of contracts that are offered, Panel A in Annex Figure 1.A.4 shows that the top ten fastest growing and emerging occupations are very similar to all medium skill occupations. Most contracts are temporary, with around 20% of offered contracts being permanent contracts. Internship positions are most common for secretaries, clerical support workers not elsewhere classified and general office clerks.

Similarly, the share of vacancies offering a full-time contract is just below 90%, which is again perfectly in line with all the other medium-skill occupations (Panel B of Annex Figure 1.A.4). Part-time positions are most uncommon for the non-clerical positions: heavy truck and lorry drivers, assemblers not elsewhere classified and plumbers and pipe fitters.

### Annex Figure 1.A.4. Top 10 fast-growing Medium-Skill occupations – Offered Contract Characteristics



Note: NAs constitute 11% of the sample for type of contract and 24% for working hours.

Source: OECD calculations based on Lightcast data.

## Low-skill occupations

Low-skilled occupations represent a share of about one third of the employed individuals in the Umbrian economy.<sup>17</sup> Differently from the other two skill-levels, and as explored below, they face higher uncertainty in terms of stability of their jobs and higher competition, while at the same time having the lower barriers to entry. For these reasons they also represent an important target for the public employment service. The average benefit receiver is likely to have been laid-off or to seek training in occupations belonging to this category.

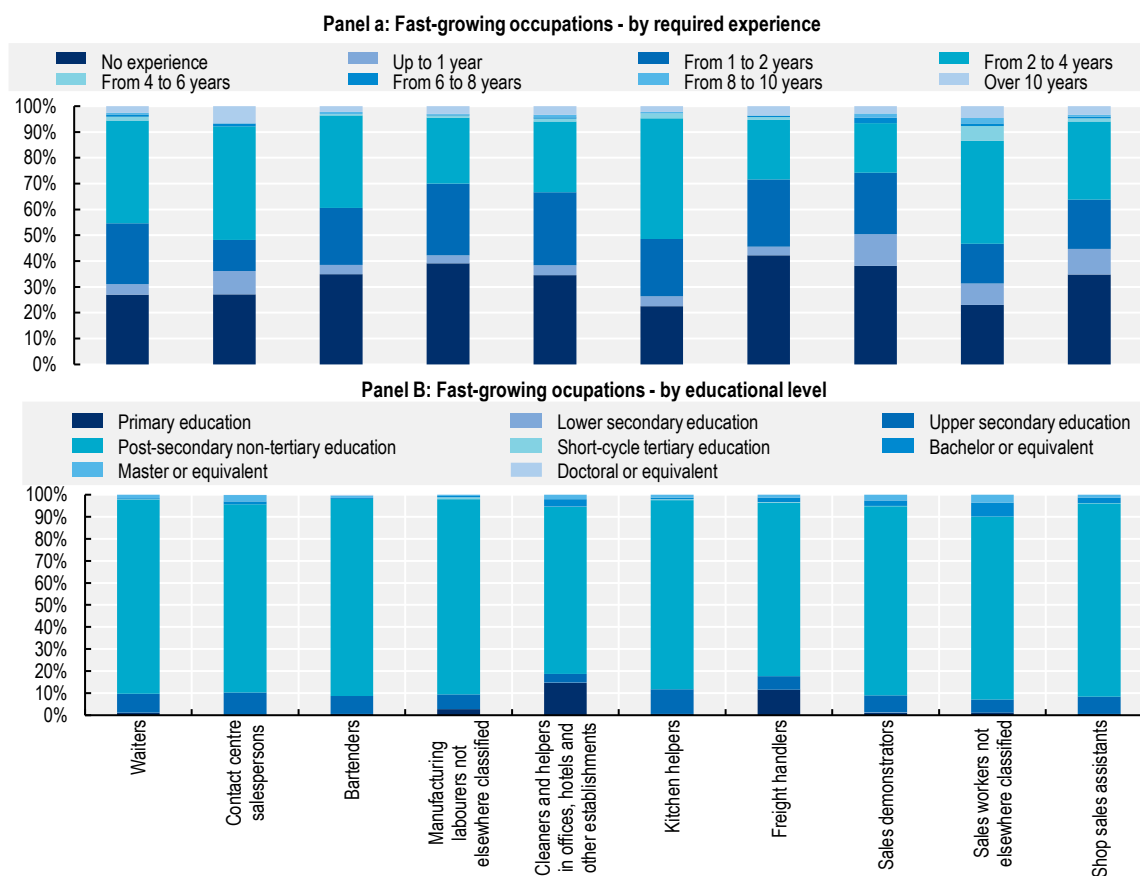
Three of the ten fast-growing low-skill occupations are part of the food industry, which contributes to volatility. The food industry is significantly affected by seasonality as was discussed previously, but at same time these occupations can provide opportunities to a large proportion of low-skilled unemployed people, given the total share of OJPs looking for food industry workers and the fact that is one of the areas where OJPs are fastest-growing.

However, there are more barriers to entry for food industry jobs than might originally be thought for a low-skill category. Annex Figure 1.A.5 shows that the required level of experience is a non-negligible requirement. Furthermore, the education level required is also quite similar to that of medium-skill occupations, with the vast majority of OJPs asking for post-secondary non-tertiary education. The underlying skills needed to perform food industry jobs are, however, not necessarily learned in school, but on the job. Panel A of Annex Figure 1.A.5 in fact, shows how from 50 to 60% of the vacancies associated with Waiters, Bartenders and Kitchen helpers still require from 2 to 4 years of experience and only about 20% to No experience.

Another fast-growing occupational area that in fact does have lower barriers to entry is sales. To this subgroup belong Contact centre salespersons, Sales demonstrators, Sales workers not elsewhere classified and Shop sales assistants. As shown in Annex Figure 1.A.5, Panel A, with the exception of Sales workers not elsewhere classified, OJPs for these positions are looking for candidates with less than 1 year of experience nearly 50% of the time, while the remaining half requires at least 2 years. Sales workers not elsewhere classified, however, often need to possess between 2 to 4 years of experience.

Cleaners and helpers in offices, hotels and other establishments, and freight handlers have the lowest barriers to entry both in terms of experience and in terms of education. Around 30% of vacancies are open to people without experience, and more than 10% of OJPs for these positions are open to people with only primary education.

## Annex Figure 1.A.5. Top 10 fast-growing Low-Skill occupations – Expected Candidate Profile



Note: NAs constitute 60% of the sample for experience and 0.1% for education.

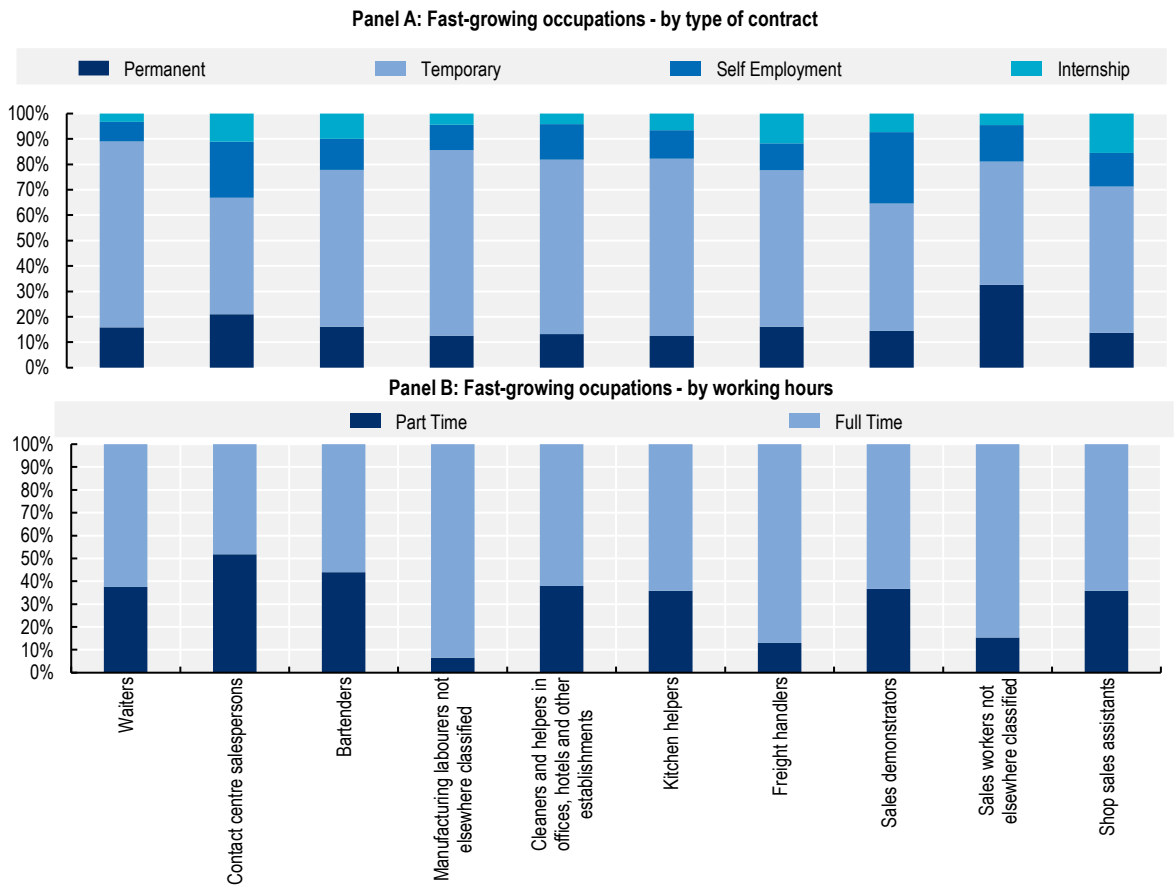
Source: OECD calculations based on Lightcast data.

Looking at the types of contracts that are offered to most of the fastest growing low-skill occupations, it stands out that between 10% and 20% of OJPs offer permanent contracts, which is lower than for the medium and high-skill occupations. Lower rates of permanent contracts contribute to lower job stability of low-skill occupations. One exception is the contract that is often offered to sales workers not elsewhere classified, as more than 30% of vacancies for this role offer permanent contracts.

Although sales workers not elsewhere classified often receive permanent contracts, there is also volatility for sales workers in general, as temporary contracts still dominate the type of contracts offered. Contact centre salesperson and Sales demonstrators trade-off roughly 20% of their share of temporary offers in favour of self-employment contracts. These positions along with shop sales assistants also receive part-time contracts in 40 to 50% of OJPs.

Part-time positions are much more prevalent for low-skill occupations, which can also contribute to volatility. Part-time contracts make up around 40% of OJPs for many of the food industry and sales positions (Annex Figure 1.A.6, Panel B). On the one hand, part-time contracts can offer flexibility to (young) workers to pursue for example education or fulfil other jobs. On the other hand, atypical part-time arrangements such as zero-hours contracts (*lavoro a chiamata o intermittente*) can lead to unpredictable working hours and earnings volatility (OECD, 2019<sup>[24]</sup>).

Annex Figure 1.A.6. Top 10 fast-growing Low-Skill occupations – Offered Contract Characteristics



Note: NAs constitute 14% of the sample for type of contract and 22% for working hours.

Source: OECD calculations based on Lightcast data.

## Notes

<sup>1</sup> Data used in this report come from Lightcast: <https://lightcast.io/>. More insights about the data can be found in Box 1.1.

<sup>2</sup> In the period under analysis, Umbria represents 1.06% of the total OJPs posted in Italy during the period and 7.1% of the online vacancies posted in the Centro macro-region.

<sup>3</sup> The colour system included three tiers of anti-COVID measures, corresponding to the colours yellow, orange and red. Regions in Italy were assigned a colour based on an epidemiological assessment by the ministry. The anti-COVID measures included different levels of limitation to retail and service activities, limits to individual movement, curfews, and mandatory distance learning. (Manica et al., 2021<sup>[25]</sup>)

<sup>4</sup> Eurostat calculations based on EU-LFS data. Sectorial classification is the NACE 2.0. Table code: LFST\_R\_LFE2EN2.

<sup>5</sup> The high uncertainty in the period that immediately follows the pandemic makes particularly difficult to interpret labour market indicators. This applies to the period starting in January 2021, which shows a significant spike in monthly job postings in January 2021. One possible interpretation of it is that, as firms re-opened to economic activities, so did hiring, with a large number of vacancies that had been kept on hold until the announcement of the vaccination plan and that were instead published as the economy started to reopen.

<sup>6</sup> High-skilled occupations group together the ISCO-08 1-digit codes 1, 2 and 3 where code 1 stands for *legislators, senior officials, and managers*, code 2 for *professionals* and code 3 for *technicians and associate professionals*. Medium-skilled occupations group together the ISCO-08 1-digit codes 4, 7 and 8 where code 4 stands for *clerks*, code 7 for *craft and related trades workers* and code 8 for *plant and machine operators and assemblers*. Low-skilled occupations group together the ISCO-08 1-digit code 5 for *service workers and shop and market sales workers* and code 9 for *elementary occupations*.

<sup>7</sup> The OJPs in Umbria is characterised by a higher degree of volatility displaying a standard deviation of 139 vis-à-vis Italy standard deviation of 98 in Italy.

<sup>8</sup> See: <https://www.arpalumbria.it/catalogo-regionale-dellofferta-formativa>.

<sup>9</sup> Deriving insights from the lower end of the volume distribution requires an important caveat. There are two competing reasons why an occupation can be characterised by low demand: on the one hand an occupation can have a genuine low request from employers in the period and the market under analysis; on the other hand, for some occupations, online job boards might not be the most convenient channel to advertise a vacancy, creating selection in the sample.

<sup>10</sup> The top 26 occupations at the 4<sup>th</sup> digit level represent, instead, 50% of total volume of OJP collected in Umbria. Similar representativeness is found in the metrics for Italy as a whole.

<sup>11</sup> In 2021 93% of the Italian population had access to the internet, and 10% of all purchases was made online (ITA, 2022<sup>[26]</sup>).

<sup>12</sup> The increased demand for general office clerks is in line with the other trends that are observed for medium-skill jobs, and will be discussed in that section.

<sup>13</sup> The requirements and task descriptions of secretaries and receptionists will be discussed in more detail in another subsection.

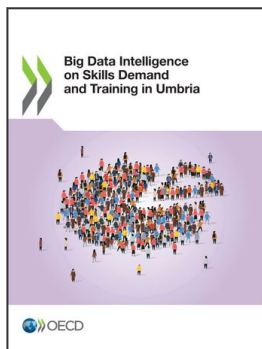
<sup>14</sup> Both Freight handlers and Stock clerks are discussed in more detail in Chapter 3 of this report.

<sup>15</sup> Contractual stability entails the type of contract someone receives: permanent, temporary, self-employment or internship.

<sup>16</sup> While the tightness indicator for domestic, hotel and office cleaners and helpers increased in 2019 and 2020, it saw a slight decline in 2021. The indicator therefore remained smaller than average in 2021. The tightness indicator for shop sales persons was smaller than average in 2018, and continued to decline.

<sup>17</sup> In the EU-LFS data 34% self-report in a High-skill occupation (code 1, 2, and 3 of the ISCO-08 classification at 1-digit), 37% in a medium-skilled (code 4, 7, and 8 of the ISCO-08 classification at 1-digit) and 29% in a low-skilled occupation (code 5, and 9 of the ISCO-08 classification at 1-digit). In the Lightcast data the share is 45% high-skill, 31% medium-skill and 24% low-skill.





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