

# **1** How the labour market and skills needs in Japan are changing during the COVID-19 crisis

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In general, the Japanese labour market has avoided many of the negative consequences of the COVID-19 crisis observed internationally; a small number of industries and some socio-economic groups have borne the brunt of the pandemic's effect. This chapter first provides an overview of the impact of the pandemic on the labour market, focusing particularly on those segments of the workforce most affected. It then discusses how the demand and supply of skills had been changing prior to the pandemic. Finally, using innovative methods, the chapter presents an overview of skill requirements in the Japanese labour market and how the pandemic has affected key skills trends.

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# In Brief

## The pandemic has accelerated pre-existing skills trends in Japan

The COVID-19 crisis has put pressure on the Japanese labour market and amplified existing challenges. Though government interventions have kept the unemployment rate relatively stable, the employment of women and non-regular workers has taken a hit. Industries such as restaurants and accommodation have experienced large fluctuations in both employment and earnings. In order to offset declining economic activity, caused by confinement and social distancing, many companies and workers reduced earnings and working hours.

Japanese adults face a challenging labour market situation after the pandemic, and pre-existing skills imbalances are putting into question whether the Japanese labour force has the appropriate skills required in the post-COVID-19 economy. Innovative analysis that map the occupational structure of the Japanese economy to the corresponding skill requirements show that foundational and social skills are the most commonly required skills in existing jobs while relatively few workers are in jobs requiring advanced cognitive skills and mathematics and programming. Only moderate technical skills are in high demand in Japan, driven by the larger share of craft and trade occupations relative to advanced engineering. At the same time, the demand for social and analytical skills has increased, especially during the pandemic.

### 1.1. The COVID-19 crisis and recovery in Japan

The COVID-19 pandemic had mixed effects on the Japanese economy, setting in motion changes in business activities and affecting people's lives. After the confirmation of Japan's first case of coronavirus on 15 January 2020, the government requested the cancellation, postponement, or scaling down of social events attracting a large number of people, as well as the temporary closure of elementary and junior high schools from March through the Spring Break. However, the number of infected people continued to increase, and the first wave reached its peak of 644 positive cases per day in April 2020. In order to limit the spread of the virus, the Japanese Government declared a state of emergency in seven prefectures, including the Tokyo metropolitan area, requesting residents to refrain from going out and companies to close their businesses temporarily.

In spite of Japan's relatively low infection rates compared to other OECD countries like Italy or the United Kingdom, the government adopted a number of large-scale emergency economic measures, totalling as high as JPY 120 trillion, as an initial response to the COVID-19 outbreak (Cabinet Office, 2020<sup>[1]</sup>). Measures during this initial phase focused in particular on safeguarding employment and businesses by greatly expanding job retention schemes and by strengthening the counselling and support system for jobseekers. In addition, Japan was one of very few OECD countries offering a flat-rate cash payment of JPY 100 000 to all its residents to help people make ends meet (OECD, 2020<sup>[2]</sup>) (a careful analysis the policy response of the Japanese Government during the pandemic will be presented in Chapter 2). As a result of the first wave of COVID-19 contagions, Japan's real GDP recorded a significant decline in the second quarter of 2020: -7.9% compared to the previous quarter.

The late spring in 2020 brought a moment of relief in the fight against the pandemic in Japan, with the number of infected people shrinking from 12 089 in April to 1 747 in June. Encouraged by the positive health outcomes, the government actively promoted a few economic stimulus measures, such as the “Go to Travel” subsidy programme aimed at boosting the demand for domestic tourism. Yet, the number of infected people gradually surged again during the end of the summer and the fall of 2020, reaching as high as 154 700 in January 2021 and leading to the declaration of a new state of emergency. The Japanese Government responded to the negative impacts of the second wave of infections with the approval of a new set of economic measures. In addition to the maintenance of job retentions schemes, the new policies were also characterised by an expansion of the public support to cover the promotion of labour mobility, including support for changing jobs and industries.

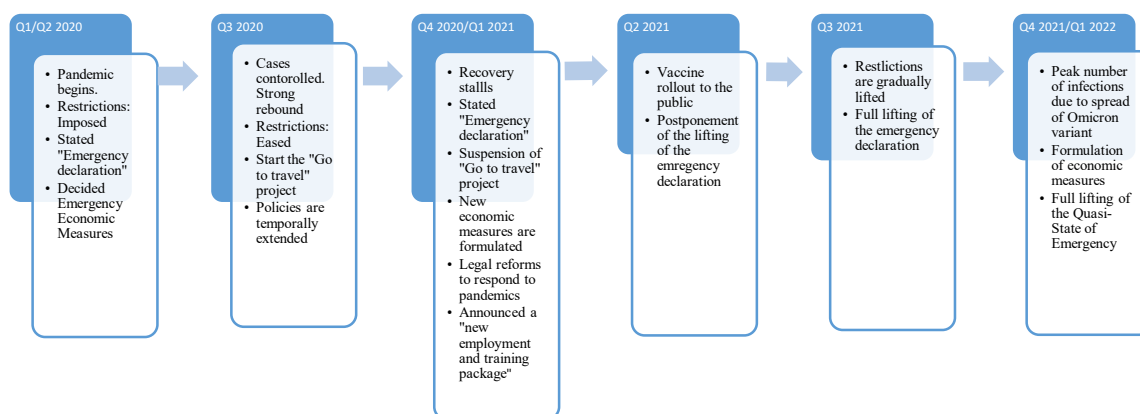
After the first year of the health crisis, the consequences for the Japanese economy were multiple. Output dropped as sanitary restrictions restrained consumption and investment. Real GDP declined by 4.5% in 2020 from the previous year while the reduced economic activity reflected in a 5.2% decrease in private consumption. The global economic slowdown and momentary disruption of supply chains led to a 6.9% decrease in imports and an 11.7% decrease in exports. Exports have since rebounded as major trading partners have recovered and are set to remain firm, while other indicators showed a sluggish recovery in 2021. Similarly, due to the restrictions put in place by the government on people entering the country from overseas, the number of foreign visitors to Japan in 2020 was only 4.12 million, a huge decrease of 87% from the previous year (Ministry of Land, Infrastructure, Transport and Tourism, 2021<sup>[3]</sup>).

Vaccinations against the coronavirus for health care workers started in February 2021, expanding to the elderly in April. In the meantime, the government announced a new employment and training package aimed at strengthening vocational training (e.g. by opening public vocational training courses that could be completed in a shorter period of time than in the past, and setting up more online training courses). Further, the government decided to provide an additional cash payment of JPY 50 000 per child in March 2021 as a livelihood support for low-income child-rearing households.

The total number of infected people reached again a record high (567 572) in August 2021. Only in October 2021 did the Japanese Government decide to lift the third state of emergency, which had been in effect since April. Subsequent waves of infection have resulted in higher numbers of positive cases (peaking at almost 100 000 cases per day in February 2022), but containment measures have been less strict than in the initial phases of the pandemic.

Over the past two years of the health crisis, the entire Japanese labour market has been shaken by the COVID-19 pandemic. Health concerns and restrictions on mobility strongly affected the way both employers and employees conducted their work activities. All of a sudden and with a quick turnaround, companies had to review their work styles and be innovative in order to continue operating. Teleworking became one of the main solutions to prevent businesses from closing, in addition to reduction in face-to-face interactions through staggered work schedules and bicycle commuting. As a result of the changes in companies’ behaviour, some workers saw a decrease in their working hours and earnings. At the same time companies were able to keep much of their staff employed thanks to government-led retention schemes, and the government’s digital shift allowed for online career guidance and online learning programmes to be implemented. However, there is still little use of labour market information systems to help align the supply and demand of skills in the labour market. To shed new light on the profound changes brought on by the COVID-19 pandemic, the remainder of this report presents in details how Japan’s labour market and skills needs have transformed and are still evolving in the recovery from the crisis.

Figure 1.1. The evolution of the COVID-19 crisis in Japan



Source: Authors' elaboration.

## 1.2. The impact of the crisis on the Japanese labour market

### 1.2.1. Overall employment rates decreased only marginally in Japan during the COVID-19 pandemic

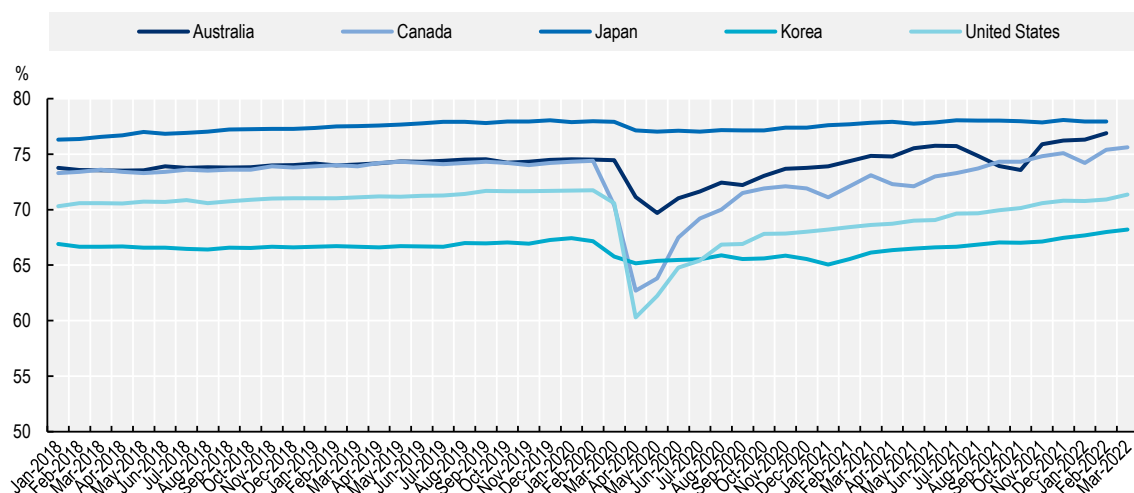
Around the world, the COVID-19 pandemic led to an unprecedented economic and employment crisis. Efforts to contain the spread of the virus led to numerous countries closing their borders and severe contractions in many economic activities. In the majority of OECD countries, lockdowns and uncertainty about the national and global outlook resulted in fall in employment rates and a surge in unemployment and inactivity. In the OECD, the employment rate started declining in February 2020, with the quarterly employment rate falling from 68.9% in Q4 2019 to 63.5% in Q2 2020 for people aged 15-64 (seasonally adjusted) (OECD, 2021<sup>[4]</sup>). In a few countries, the decline has been even steeper. For instance, employment fell by 11 percentage points between January 2020 and April 2020 in both Canada and the United States (Figure 1.2).<sup>1</sup>

By contrast, in Japan the COVID-19 pandemic led to only a minor decrease in the employment rate. In fact, although the pandemic reached Japan relatively early, its effects have been less drastic than in other OECD countries. Japan's employment rate dipped in May 2020 to 77% (0.8 percentage points less than in January 2020), and has since recovered to its pre-COVID-19 level. Successive waves of infection have had minor effects on the employment rate, but restrictions have led to more drastic declines in economic growth (OECD, 2021<sup>[5]</sup>).

The unemployment rate (seasonally adjusted) rose to 3.1% in October 2020 compared with the 2019 average of 2.4%, and has since declined to 2.6% in June 2022. Even though the unemployment rate has returned close to its pre-pandemic levels, the pace of recovery has been lacking in force, and total hours worked in the economy were still around 7% lower in June 2022 than in December 2019.

**Figure 1.2. The overall employment rate has been affected only marginally in Japan**

Monthly employment rate (aged 15-64)



Source: OECD Short-Term Labour Market Statistics.

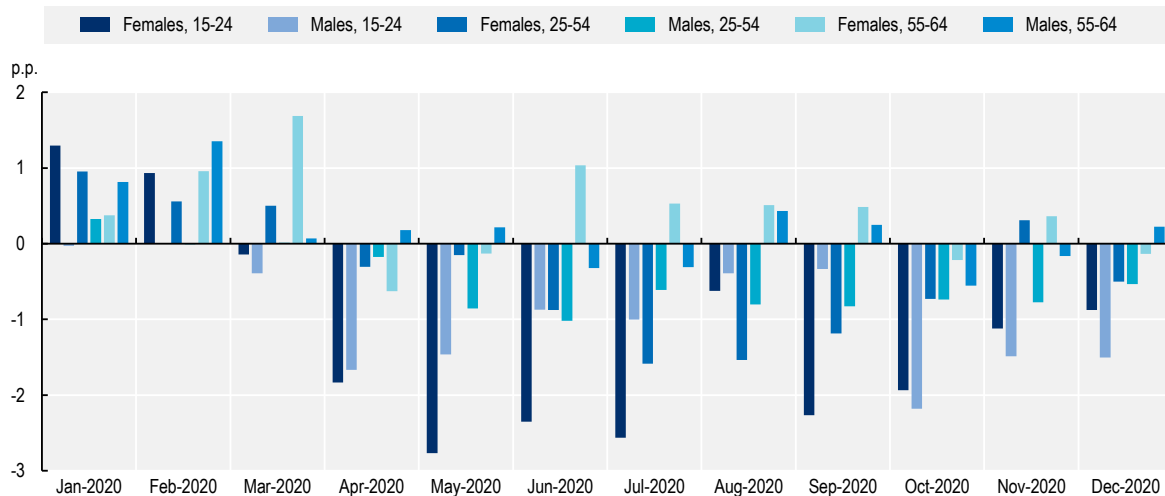
### **1.2.2. Women and young people were hit harder by the pandemic, deepening existing labour market divides**

Though the pandemic did not cause a major fall in the overall employment rate, it did have a substantial impact on certain groups in Japan. Women and young people have borne the brunt of COVID-19 on the labour market, with young women aged 15-24 being most negatively affected (Figure 1.3). May 2020 saw the largest drop in the employment rate for young women aged 15-24 compared to May 2019 (-2.8 percentage points), and this negative trend continued over the year. Young men aged 15-24 are the second most affected group, with their largest drop being a -2.2 percentage points in the employment rate in October 2020 compared to October 2019. Women aged 25-54 have also been disproportionately affected by the pandemic when compared with their male counterparts.

The negative effect on women and young people reflects these groups being overrepresented in non-regular and part-time work (Yamaguchi, 2019<sup>[6]</sup>), as well as being more concentrated in service-oriented occupations, which were severely impacted by the crisis. Similar trends are evident in other OECD countries, where women and young adults accounted for the bulk of the labour force in affected industries (OECD, 2021<sup>[7]</sup>). The only demographic group recording a positive growth in the employment rate has been women aged 55-64. This is possibly due to the increase of women aged 55-59 in health care employment, especially due to the rising labour demand in the health and welfare industry. Data from the Japanese labour force survey shows that between June 2019 and 2020, employment rose by 80 000 people among women aged 55-59. Of that increase three out of four women age 55-59 year-old were employed in the health care sector.

**Figure 1.3. Women and youth were impacted more than others**

Percentage point change in monthly employment rate (aged 15-64), 2020 compared to 2019



Note: p.p.: percentage points. Ratio to the same period of the preceding year.

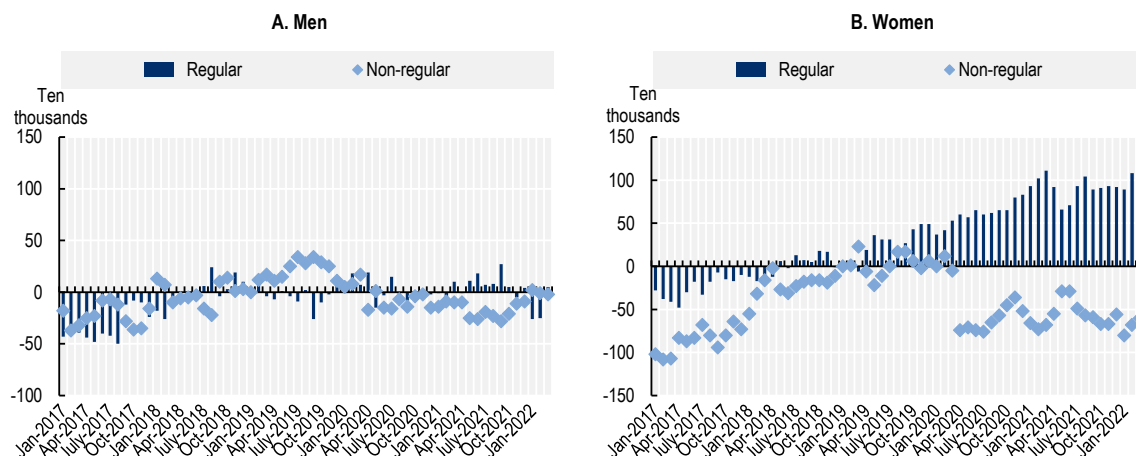
Source: OECD Short-Term Labour Market Statistics.

Non-regular employment decreased more than regular employment, reflecting, on the one hand, the wide use of non-regular contracts in the exposed industries (such as in restaurants and hotels) and, on the other hand, the more unstable nature of non-regular job contracts. The number of people in regular employment has been on the rise for several years, and remained relatively stable during the pandemic and even displayed a slight increase, particularly for women. By contrast, non-regular employment suffered under the pressure of COVID-19, and in October 2021 there were nearly 1 million (920 000) fewer non-regular workers in the economy than in January 2020.

There is an unequal distribution of non-regular employment across genders. In January 2020, women made up a 68.5% of non-regular employees. In April 2020, there were 740 000 fewer women employed as non-regular workers compared with January 2019 (Figure 1.4). The proportion of women employed as regular workers has slightly increased since the start of the pandemic, yet total employment of women remained lower in 2021 than in 2019. In January 2022 there were 800 000 fewer women working in non-regular jobs than in January 2019. There were only minor fluctuation in the number of men employed during the crisis. Japan's tax and social security system is part of the explanation of why so many Japanese women work as non-regular employees. Indeed, women who make less than a designated ceiling are exempt from income tax and can be claimed by their husbands as dependent spouses, resulting in a substantial tax deduction for their household. Working full-time would not only lead to higher taxes, but the women would also be required to pay for their own health insurance and pension premiums. Although the government has in recent years undertaken tax reform and other measures to make tax and social security systems more favourable to second-earners, still many women opt for non-regular and part-time work (OECD, 2015<sup>[8]</sup>; Shibata, 2017<sup>[9]</sup>). However, non-regular status typically means lower pay, less generous benefits and higher job insecurity, especially during economic contractions.

**Figure 1.4. Women in non-regular employment experienced the largest decrease during the pandemic**

Number of employed as regular and non-regular employees, by gender, using January 2019 as base



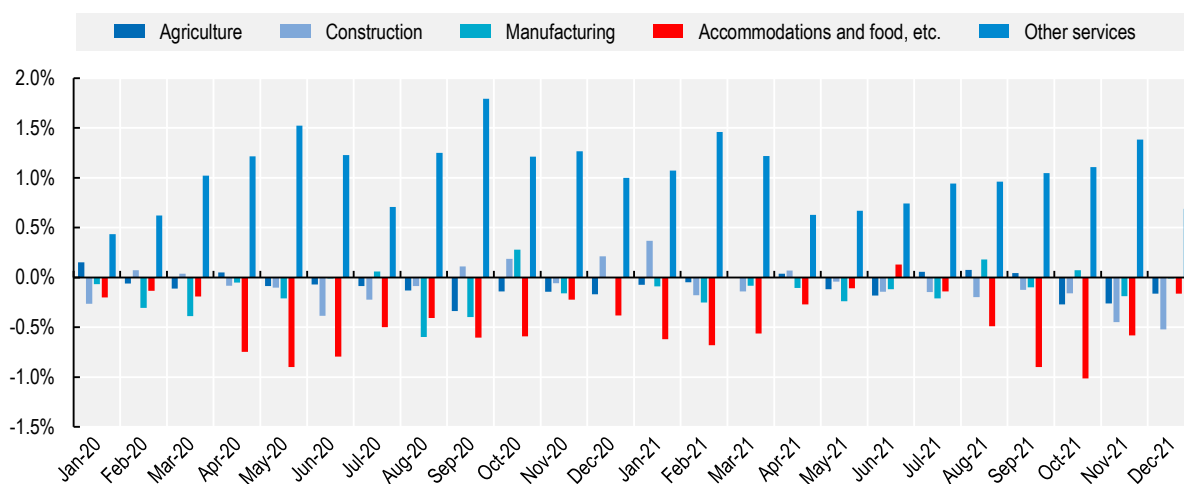
Note: Seasonally adjusted.

Source: Japanese Labour Force Survey.

Sectors and industries were affected differently by the need for social distancing, the temporary drop in consumer demand, and disruptions in global markets and supply chains due to the pandemic. Services that rely on face-to-face interactions, sales of non-essential goods and international movement experienced a large direct impact of containment and mitigation measures. Indeed, accommodation, food and personal services experienced the largest reduction in output and employment, with the greatest drop in 2020 in employment occurring in May (-0.90 percentage points compared to May 2019) (Figure 1.5). Agriculture and manufacturing all saw a decline in employment, though less drastic. These industries continued to experience decreasing levels of employment throughout 2020 and 2021 (with a couple of exceptions). The only sector that saw a continuous increase in the employment throughout the pandemic is the “other services” sector, likely due to the rise in demand of certain services such as health care, IT and other support services necessary during the pandemic.

**Figure 1.5. Employment decreased in accommodation, food, and personal services, while it constantly increased in the other services sector even during the pandemic**

Percentage point change in employment (aged 15+), year on year



Note: Ratio to the same period of the preceding year. The industry of Accommodations and food, etc. refers to accommodations, eating and drinking services, living-related and personal services and amusement services.

Source: Japanese Labour Force Survey.

### **1.2.3. The pandemic had negative labour market impacts on inactivity and labour market participation, especially for women**

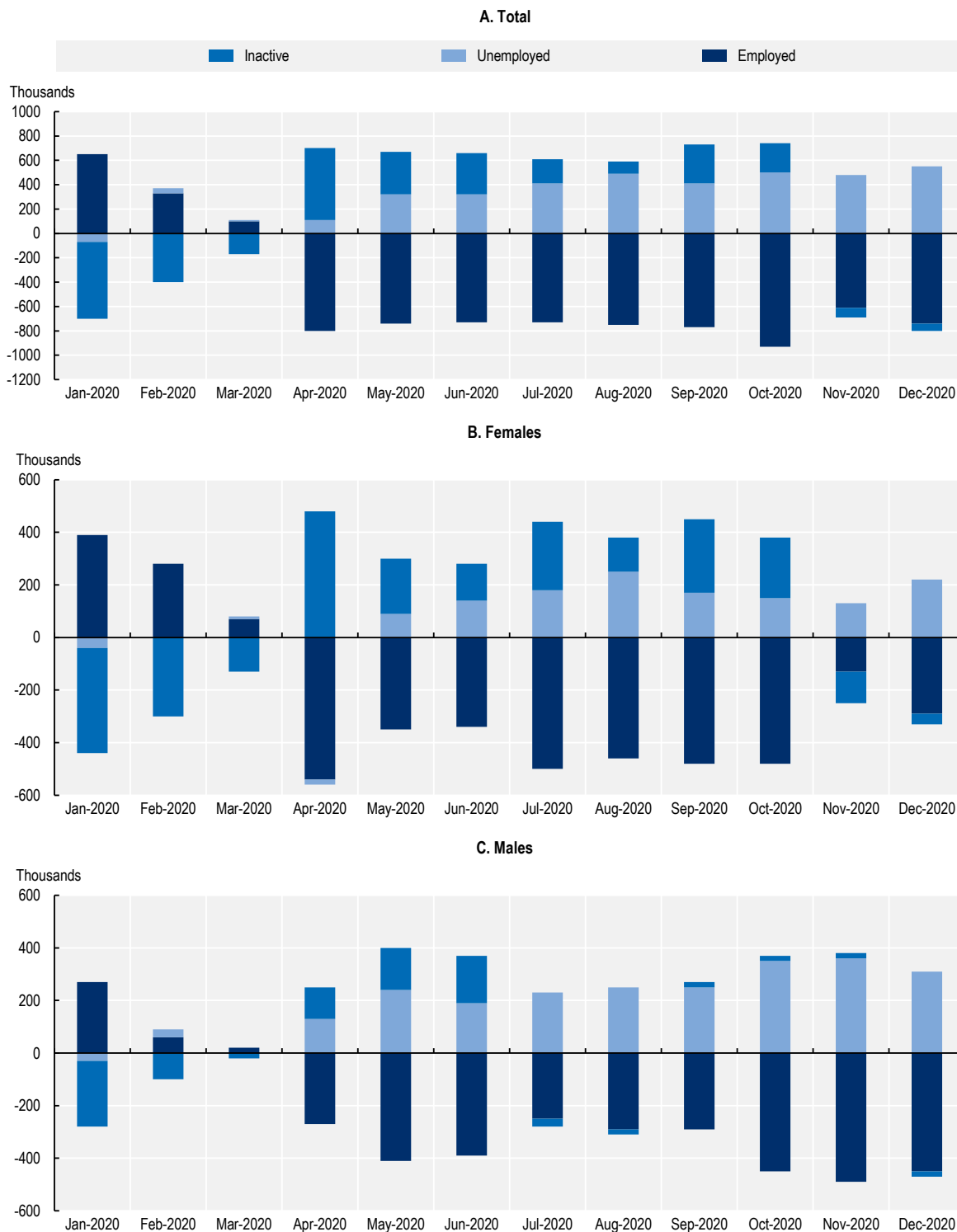
The modest rise in unemployment in Japan during the crisis masks deeper impacts in the labour market. For instance, there was a sharp increase in inactivity among the working-age population in April 2020, where approximately 590 000 more people left the labour force compared to April 2019 (Figure 1.6). Inactivity continued to rise until November 2020. Unemployment peaked in December 2020 with 550 000 more people being unemployed compared to the same month in the preceding year.

The increase in inactivity was more prevalent among women, where 480 000 left the labour force in April 2020 compared with the previous year (by contrast, only 120 000 men became inactive during the same period). This is likely due to traditional gender roles linked to childcare and the closures of schools and childcare facilities. At the same time, women make up a larger share of non-regular workers, who are more likely to drop out of the labour force than regular workers. In contrast, men experienced more unemployment which peaked in November 2020 for this group, likely due to their concentration in affected industries such as construction and manufacturing and the prevalence of young adults in non-regular employment contracts.



**Figure 1.6. The immediate response to the COVID-19 pandemic was a move from employment to inactivity, especially for many women**

Change in working age population (aged 15+), 2020 compared to 2019, seasonally adjusted



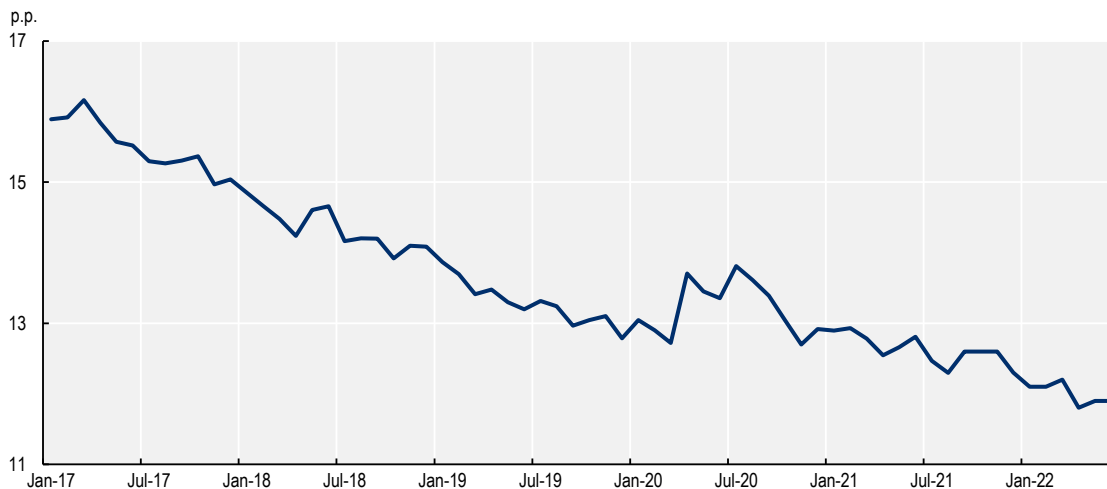
Source: OECD Short-Term Labour Market Statistics.

The gender employment gap has been declining for a number of years; however, the COVID-19 pandemic pushed the gap back to the same levels as the beginning of 2019 (Figure 1.7). The pandemic saw a rise in the gender employment gap from 13 percentage points in January 2019 to 14 percentage points in July 2020. Prior to the pandemic, the Japanese Government had implemented several policies to improve working conditions for women and increase women's labour force participation, but the projected effects of these policies were distorted due to the closure of day care centres and increase of women with home schooling responsibilities during the pandemic. As restrictions are easing and the economy is returning to normal, policies limiting working hours and increasing the provision of childcare places are having pronounced effects on the participation of mothers with young children, though demand for childcare still remains unmet. Yet, deregulation, unfavourable work contracts and low wages for day-care worker have led to a shortage of staff in day-care, in some cases forcing centres to close. The effective job-opening ratio (an indicator of how many jobs are available out of the total number of job seekers registered at the public employment service) for childcare workers in 2021 was more than twice as high as the average for all occupations, and the labour shortage remains serious, leaving many women with no options to alleviate the responsibilities of childcare (Ministry of Health, Labour and Welfare, 2022<sup>[10]</sup>).

Employers are becoming more accountable for increasing the labour participation of women. New legislation in effect since the start of the pandemic requires employers with over 100 regular workers to establish gender action plans and disclose related information (OECD, 2021<sup>[5]</sup>). As companies are committing to increase the hiring of women and improve their working conditions, it is likely that such policies have mitigated some of the negative employment effects of COVID-19 on women, but they have not been enough to offset the substantial unemployment and dropout rate of women in Japan. Women were disproportionately affected by the pandemic due to a combination of reasons. Women are overrepresented in service industries that were forced to shut down, they are more likely to be in part-time and non-regular employment and thus among the first to be considered for retrenchments, and during school lockdown women took on more caring roles in the household, leading to a reduction in working hours. There has been a substantial re-absorption of women into employment since July 2020, however this has largely been due to a pick-up in hiring of non-regular workers, who experience less stable employment, lower wages and fewer benefits.

**Figure 1.7. After constant declines over the years, during the pandemic the gender employment rate gap in Japan returned to the same levels of the beginning of 2019**

Gender employment rate gap, seasonally adjusted



Note: p.p.: percentage points. The gap is calculated as the difference in employment rates between men and women aged 15-64 years old.  
Source: OECD Short-Term Labour Market Statistics.

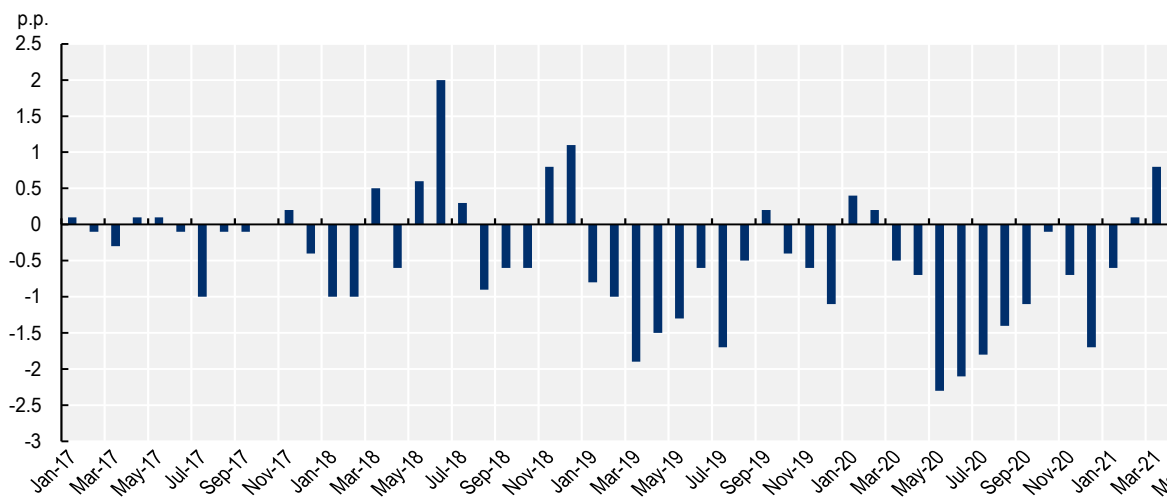
### 1.2.4. In order to absorb some of the labour market shocks of the pandemic, earnings and hours worked were drastically reduced

In addition to a rise in inactivity following the outbreak of the COVID-19 pandemic, the Japanese labour market also adjusted to the crisis through a substantial decrease in average earnings. Year-on-year changes in real earnings were already negative in 2019 but even larger falls occurred during the pandemic (Figure 1.8). The largest fall occurred in May 2020 with a 2.3 percentage point reduction compared with May 2019. Out of the G7 countries for which data is available, Japan saw the largest drop in hourly earnings in manufacturing during the crisis (Figure 1.9).

The reduction in real earnings is in part due to the decrease in base pay, but can mainly be attributed to a reduction in special pay (such as mid-year and end-year bonuses) and overtime pay (Leussink, 2021<sup>[11]</sup>). In fact, an analysis regarding changes in earnings before (2015-19) and after (2020) the outbreak of COVID-19, controlling for firm size, industry, employment type, and gender, shows that the monthly earnings level of women and non-regular workers fell significantly in 2020 compared to men and regular workers respectively, while the gap has narrowed compared to the pre-COVID-19 level when converted to hourly wages (Annex 1.A). By comparison, countries like the United States and Italy saw minimal disruptions to earnings in manufacturing, while the United Kingdom and Canada had large drops in earnings which quickly stabilised in the third quarter of 2020.

**Figure 1.8. Real earnings declined in 2019 but steeper falls occurred during the pandemic**

Percentage point change in real wages, year on year

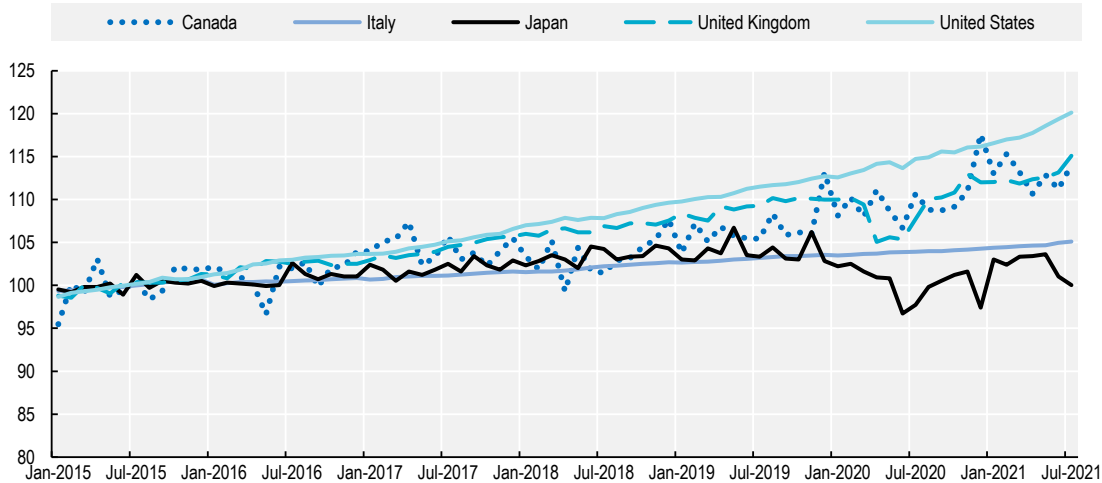


Note: p.p.: percentage points. Change in real earnings relative to the same period of the preceding year.

Source: Ministry of Health, Labour and Welfare, Monthly Labour Survey.

**Figure 1.9. Out of the G7 countries for which data are available, Japan saw the largest drop in hourly earnings in manufacturing during the crisis**

Hourly earnings index for manufacturing (2015=100), seasonally adjusted



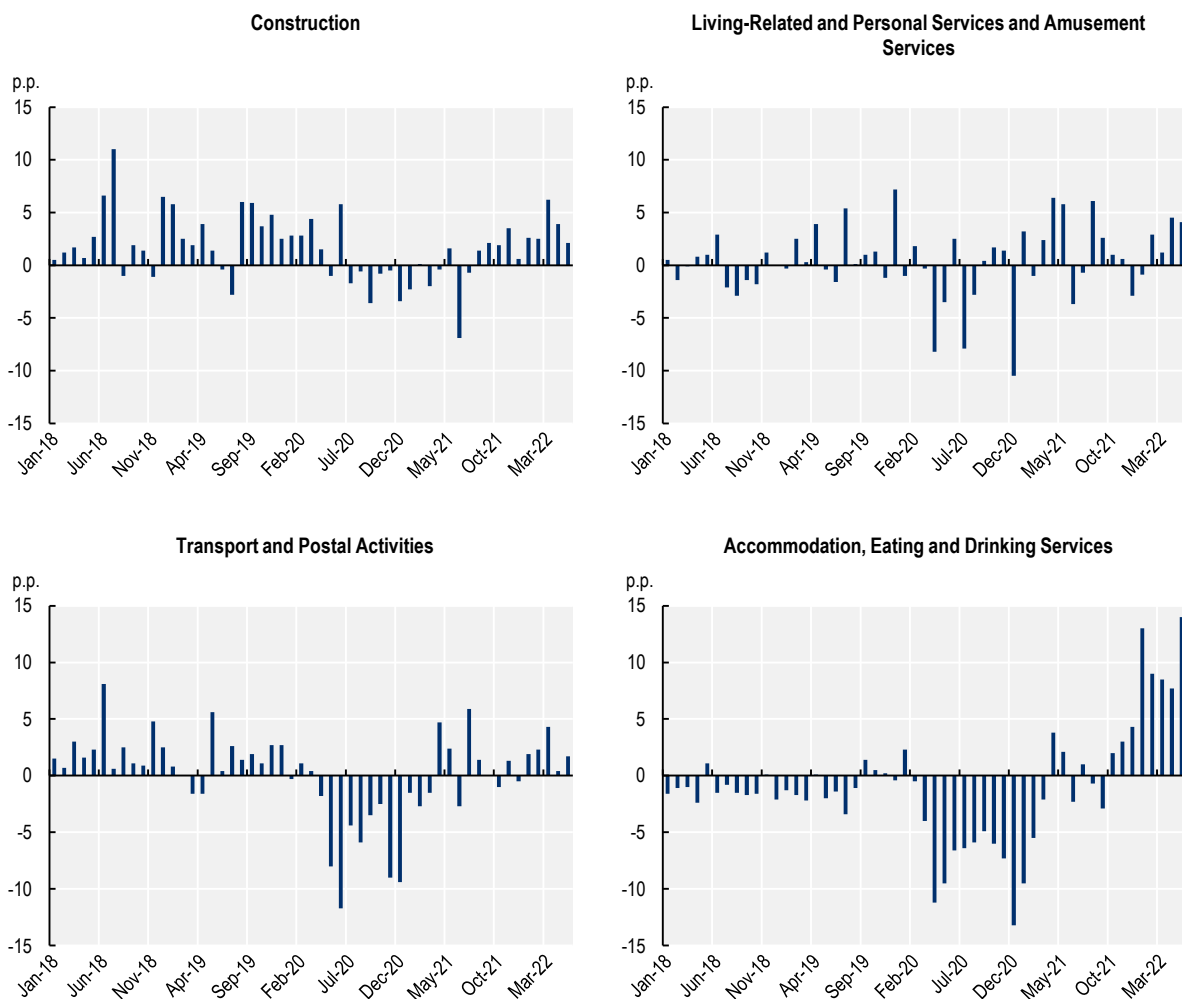
Note: Data refer to cash earnings of employees in the manufacturing industries before deductions for income taxes, social insurance contributions, union dues, payments for goods purchased, etc. Total cash earnings include contractual cash earnings (scheduled cash earnings and overtime pay) plus special cash earnings (retroactive payments of wages, payments such as summer and year-end bonuses, marriage allowances). Data for Japan refer to manufacturing as defined in the Japan Standard Industrial Classification, and cover establishments with 30 or more employees selected from the latest Establishment Census.

Source: OECD Main Economic Indicators (MEI).

Other than manufacturing, construction, personal services, transport and accommodation industries saw a large decrease in total cash earnings during the pandemic (Figure 1.10). These declines were persistent in these industries throughout 2021, except for a few modest short-term increases. Social distancing and lockdown measures have been the main driver of the decline in living-related, personal services and amusement services and accommodations, eating and drinking services industries. Since easing of social distancing measures, these industries are gradually picking up.

**Figure 1.10. Construction, personal services, transport and accommodation industries saw the largest decrease in earnings during the pandemic**

Percentage point change in total cash earnings, year on year



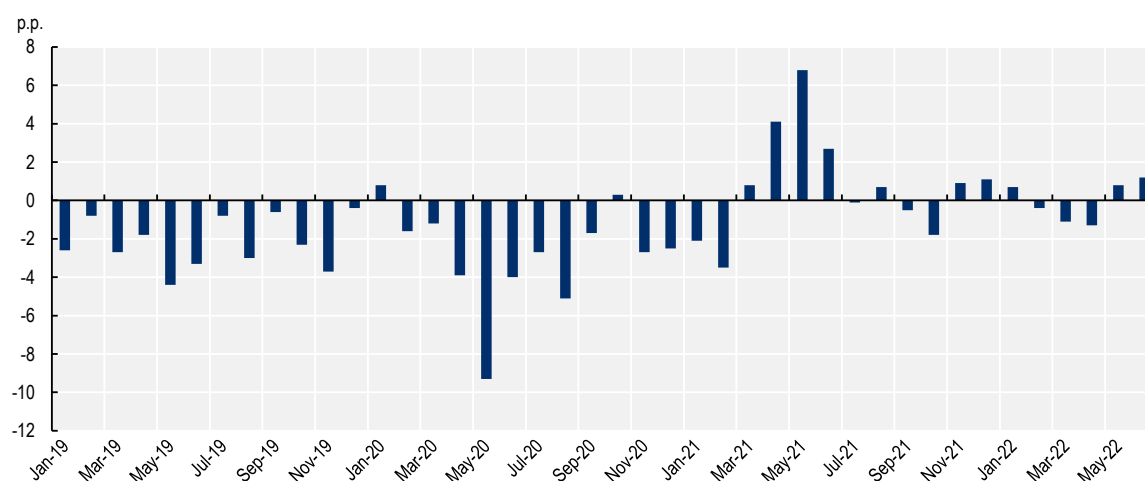
Note: p.p.: percentage points. Seasonally adjusted.

Source: Ministry of Health, Labour and Welfare, Monthly Labour Survey.

The pandemic also amplified a negative trend in hours worked in Japan. Throughout 2019 hours worked had been declining, varying between 0.4 and 4.4 percentage points less than the same period in 2018 (Figure 1.11). In May 2019 hours worked dropped by 4.4 percentage points and there was a further decrease of 9.3% in May 2020. The government expanded employment subsidies which allowed employers to put workers on temporary leave while keeping them employed. As a reaction to the sharp decline in consumer demand, worker hours were reduced. Overtime work was drastically reduced to offset the decrease in demand, but there were also reductions in scheduled working hours per day and reduced number of workdays. The reduction in working hours were particularly prominent for those who worked more than 50 hours pre-pandemic, women, workers living in Tokyo and Kansai region and service-intensive industries (Takami, 2021<sup>[12]</sup>).

**Figure 1.11. The COVID-19 crisis intensified an already negative trend in hours worked**

Average hours worked, year on year



Note: p.p.: percentage points. Ratio to the same period of the preceding year.

Source: Ministry of Health, Labour and Welfare, Monthly Labour Survey.

### 1.3. The skills composition of the Japanese labour force and its evolution during the pandemic

#### 1.3.1. Skills imbalances were rising in the Japanese labour market prior to the pandemic

Prior to the pandemic, both labour shortages and hiring mismatch were on the rise in Japan (OECD, 2021<sub>[13]</sub>). The effective job-opening ratio, an indicator of how many jobs are available relative to the total number of job seekers registered at the public employment service (Hello Work), hit a 45-year high in 2018. At the same time the relationship between the unemployment rate and the vacancy rate – the so-called Beveridge Curve – indicated that despite an increase in vacancies, there was no decrease in unemployment, suggesting mismatch. Many companies faced difficulties in recruiting workers with the right vocational skills, with 53% of companies reporting difficulties in attracting skilled workers already in the labour force due to difficulties in hiring motivated young and mid-career workers. A further 88% of employers faced talent shortages, much higher than the OECD average of 53% (OECD, 2021<sub>[13]</sub>).

Skills shortages in Japan were also evident in the OECD Skills for Jobs indicators. The indicators showed that shortages were most intensive in security occupations, construction and mining occupations and transport and machine operation occupations. The Japanese skill shortages differed from the average for OECD countries. The OECD average had a concentration of skill shortages in high-qualified occupations, with shortages in reading comprehension, writing and critical thinking. For Japan, the largest skill shortages were found in technical skills such as repair, operation monitoring and equipment maintenance, which are skills associated with low and middle-skilled occupations. Comparatively, these technical skills were in surplus in the OECD average. It should be noted, however, that a surplus of a certain skill does not mean that this skill is not needed in the labour market, but only that the supply exceeds the demand.

Data from the Survey of Adult Skills (PIAAC) show that the skills for workers are not always put to full use at work, meaning that, although employed Japanese adults have high literacy and numeracy proficiency, the intensity of use of these skills is lower than in many other OECD countries (OECD, 2021<sub>[13]</sub>). There is

also a substantial gap in skills use between men and women, as well as between full-time and part-time workers, for both literacy and numeracy skills.

### **1.3.2. A diverse range of skills are present in the Japanese labour market**

A previous report by the OECD provided an overview of skills developments in Japan based on PIAAC data collected in 2012 (OECD, 2021<sup>[13]</sup>). The Japanese economy has since undergone considerable changes, both in terms of skill requirements within occupations and in terms of the occupational composition of the labour force. Therefore, in order to capture the current skills make-up of the Japanese labour market, there is a need to incorporate newer data. In an effort to use more recent labour market data and a Japan-specific skill taxonomy, this report innovatively combines two new databases – the recently released Japanese O\*NET database (called “job tag”) by the Japan Institute for Labour Policy and Training and the Japanese Panel Study of Employment Dynamics (JPSED) published by the Recruit Works Institute – to paint a clearer picture of current skills composition and developments in Japan. Details on the two datasets and how they were merged can be found in Box 1.1.

#### **Box 1.1. Measuring skills in Japanese data**

##### **Understanding occupational skills**

Despite the key role skills play in societies and economies, there is little agreement in the literature as to what “skills” are and how they should be defined. The term “skill” can refer to generic cognitive (e.g. reasoning or remembering) and non-cognitive abilities (e.g. teamwork or self-organisation) as well as to skills that are specific to a particular job, occupation or sector (e.g. accounting or hair colouring) (OECD, 2016<sup>[14]</sup>). The great number of empirical studies on skills reflects the many ways that skills have been approximated in the literature and, as such, highlights the difficulty of coming up with a shared definition of what skills are or a good proxy or indicator for measuring them (see OECD (2017<sup>[15]</sup>) for analysis of previous literature on skills).

Most studies of skill requirements undertaken internationally rely on the United States O\*NET database, under the assumption that its content is relevant to other countries (Bruns, Evans and Luque, 2012<sup>[16]</sup>; Frey and Osborne, 2017<sup>[17]</sup>). The O\*NET database describes the skills, abilities and knowledge required in each occupation by defining the level at which they are used, and their importance. However, the O\*NET database has been constructed gathering information on the tasks and skills that are part of occupations in the United States. Adopting this data for other countries is possible under the assumption that occupations have the same skill requirements, irrespective of country characteristics such as the level of digitalisation at work or the type of technologies and tools that are available in local labour markets i.e. truck drivers in the United States uses the same level of skills as truck drivers in Germany. Though this might be true for countries with a similar economic structure and level of development as the United States, the American O\*NET may not be an appropriate measure of skill requirements in very different labour markets as is the case of Japan. First, in Japan, the practice of life-long employment can be a barrier for horizontal skill transfers between employers, meaning that the responsibility of post-education skills investment falls on the company – a fact evident by the lack of private adult learning opportunities outside the company. Secondly, as the Japanese economy relies heavily on internal training for career purposes, there is a risk that skills requirements are more firm-specific and are not as transversal as in an economy with more horizontal movement of workers between firms, such as the United States. Finally, a large share of Japanese companies are small and medium-sized enterprises (SMEs). SMEs tend to invest less in training of their workforce than larger enterprises (OECD, 2021<sup>[18]</sup>), and this may yield different skill requirements at work.<sup>1</sup>

### “Job tag”

To facilitate the practice of career education in schools, job hunting for job seekers, and recruiting activities of companies in Japan, Ministry of Health, Labour and Welfare launched a new website “job tag” in 2020. Four types of information are currently available: text-based descriptions, cross-occupational numeric estimates, recent labour market information, and visual content (short videos). The source of the first two types of information is the database called “input data” developed by the Japan Institute for Labour Policy and Training (JILPT). The domains and items of cross-occupational numeric estimates are basically derived from US O\*NET, “job tag” contains a taxonomy of skills, knowledge, work context and work activities, and it measures their level or importance in each occupations. The taxonomy is standardised so that every occupation has a value for every skill, ranging from 0 if the skill is not used in that occupation to 7 if it is required at high levels. The levels have been determined through surveying workers in the different occupations. After conducting interviews with career consultants starting in June 2018 and individual industries (IT, manufacturing) starting in October 2018, workers surveys were conducted in December 2018 and November 2019 (about 50 workers on average per occupation) to compile quantitative data for about 500 occupations (The Japan Institute for Labour Policy and Training, 2020<sup>[19]</sup>). Thereafter, about 10 new occupations will be added each year.

The occupations listed in “job tag” are intended to cover existing occupations in a systematic and comprehensive manner. However, since the design of the database is focused on being useful to career consultants and corporate human resource personnel who provide employment assistance, occupations that use these services less (e.g. professional sports players and artists) are not included (The Japan Institute for Labour Policy and Training, 2021<sup>[20]</sup>).

To understand the advantages of the “job tag” data, it is first crucial to understand the relationship between skills and tasks, and how tasks can be taken as proxies for skills. Acemoglu and Author (2010<sup>[21]</sup>) define a task as a “unit of work activity that produces output (goods and services)”, while a skill is “a worker’s endowment of capabilities for performing various tasks”. As workers apply their skills to perform tasks and those tasks produce an output, we accept that one skill can perform several tasks, and a worker can change the set of tasks they perform in response to changes in labour market conditions and technology while still using the same set of skills. If a task (or a group of similar tasks) is performed less and less over a given time period, it is inferred that the corresponding skill (or skills) needed to carry out that task is less present in the labour market.

The Japan Institute for Labour Policy and Training defines skills, work context and work activities as following (The Japan Institute for Labour Policy and Training, 2020<sup>[19]</sup>):

- **Skills:** Occupational skills refer to “the acquired ability of an individual to perform work”. In other words, among the individual abilities of being able to do this kind of work, the abilities that can be accumulated and improved through practice and training are vocational skills. Skills here is a quantification of the standard skill requirements for the performance of duties. There are 35 skills items that are similar to the US O\*NET skill areas (39 items).
- **Work Context:** The nature (characteristics) of the activities performed at work and the environment surrounding them can be described from various perspectives. For example, the need for teamwork (interpersonal relationships), whether the work is done indoors or outdoors (physical environment), and the extent to which individuals are allowed discretion in their work (structural characteristics). The “Work Context” information area shows the standard situation for each occupation in terms of these information. “Job tag” is mainly based on the US O\*NET (categorised into 57 elements) with some localisation, and 37 elements are currently available (most of them were answered by workers on a 5-point scale), though at the time of the analysis only 23 were developed (the rest were added in 2022). The reason why the number of work



context elements is less than half that of the US O\*NET is to reduce the burden on survey respondents, and was determined based on the opinions of career consultants and other factors.

- **Work activities:** Work activities, like Generalised Work Activities (GWA) in the US O\*NET, are an accumulation of similar underlying job activities and job actions in fulfilling major work roles. While the US O\*NET lists “importance” and “level,” “job tag” collects only “importance” – a survey design decision intended to reduce survey response time for participants and make it easier to compare the different elements.

### **Creating a time-varying database to measure the skills composition of the Japanese workforce using the Japanese Panel Study on Employment Dynamics (JPSED) survey**

As the “job tag” database presents a static snapshot of skills used in different occupations, it needs to be merged with time-varying labour market data source to capture change in the skill composition of the workforce over the years. For the purpose of this report, the JPSED survey, published by the Recruit Works Institute, was used. The survey, carried out between 2016 and 2021, contains responses from approximately 60 000 people per year in Japan on various topics related to the labour market. The survey was merged with “job tag” by matching at the occupation level using a cross-walk developed by the OECD. As the JPSED survey contains 223 occupations (excluding unclassified) while “job tag” contains approximately 500 occupations, some occupations were matched directly (such as the occupation named “aestheticians” in JPSED and the occupation named “aestheticians” in “job tag”, while some occupations in “job tag” were combined to create an “umbrella” occupation that more closely matched that in JPSED (such as the occupations “Japanese cuisine cook”, “sushi chef” and “soba and udon cook” in “job tag” which have been all merged and matched with “Japanese cooks and sushi chefs” in JPSED).

1. This does not mean, however, that the skills differ across countries, just the levels. This is also reflected in the way O\*NET surveys are set up – each occupation has the same list of skills just at a different level, e.g. both data scientist and cleaner will have the skill “programming”, but the data scientist will have a much higher level for that skill than the cleaner. When comparing US O\*NET and “job tag” these differences become evident. For example, one of the key skills of a psychiatrist is social perceptiveness/understanding of other people’s reactions, which has a high level in both the “job tag” and US O\*NET (5.2 for the former and 5.3 in the latter out of 7). However, due to the differences in how psychiatrists conduct their work, Japanese psychiatrists require a level of 4.4 for the skill “co-ordinating with others”, while American psychiatrist only require a level of 3.8 for the same skill, possibly due to the high rate of psychiatrists working on in-patient treatment relative to the United States.

By combining data from the JPSED and “job tag”, it is possible to construct an indicator to represent the skills composition of the Japanese workforce.<sup>2</sup> This indicator is calculated as a weighted average, using the employment share of each occupation as a weight – in other words, the score of each skill used in each occupation – a value that ranges between 0 and 7 – is multiplied by the number of employed people in the occupation based on the JPSED, and then dividing that by the total number of employed people. The result is that each skill gets a value between 0 and 7 that shows how prevalent that skill is in the workforce. For a skill to have a high value, it will need to be required in many large occupations – occupations that employ many people. If a skill has a low value, this can be because: i) it is only required at a low level for any occupation; ii) it is required at a high level for some occupations but those occupations employ relatively few people; or iii) a mix of the two.

Figure 1.12 summarises the skills composition of the Japanese workforce in 2021. The results show that foundational skills – i.e. those skills that are the building block for a lifelong learning such as listening comprehension, explanatory skills, reading comprehension and writing skills – are most present in the labour market. Figure 1.13 show that these are the dominant skills even in occupations in Japan that require them the least – i.e. the minimum requirement for reading, writing, listening and explaining is relatively high. A high level of foundational skills is an indicator of a knowledge-based economy with a

highly qualified labour force, where most jobs (both physical and analytical) requires the worker to engage in relative high levels of reading, writing, speaking and listening. It is therefore hardly surprising that in a modern highly-developed economy such as Japan that many occupations require a high level of foundational skills.

In addition to foundational skills, high levels of social skills are also important. Social skills measure the level at which different social interactions are required at work – e.g. guidance, understanding of other people's reactions, co-ordinating with others, persuasion, negotiation and ongoing observation and evaluation. Most jobs in the Japanese workforce require a relative high level of social skills, still the value of the top percentiles for social skills are lower than for foundational skills. Social skills are increasing in prominence in the labour market, as repetitive and routine tasks are automated. A US study shows that workers who possess both high social and technical skills experience better employment prospects and wages, compared with those who only have high technical skills (Deming, 2017<sup>[22]</sup>). A relatively high level of social skills in Japan in 2021 reflects many people working in occupations where work tasks require a moderate to high level of social skills, whereas there are few occupations currently that require a very high level of social skills.

Advance cognitive skills are central to solving non-routine problems and managing non-routine situations, and are key in a world of rapid changes and uncertainty. The requirement of advanced cognitive skills indicates how complex tasks are. However, for the time being, advanced cognitive skills are relatively less present in the Japanese workforce. While complex problem solving and critical thinking rank mid-tier in Japan, rational decision making ranks low in the skills composition list.

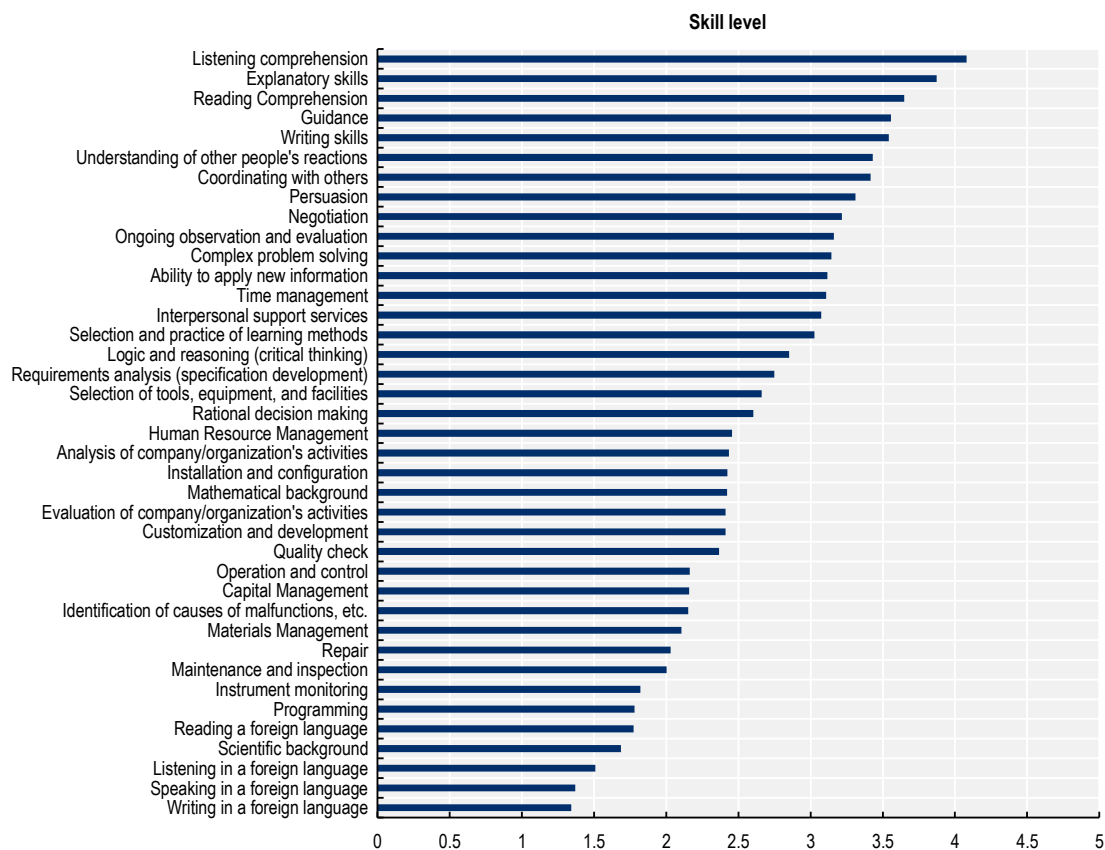
Technical skills such as requirement analysis, selection of tools and installation and configuration score in the middle to low end of the scale. Figure 1.13 shows that there are very few occupations that require high levels of technical skills, as the median is low. Since the calculation is a weighted average of the level of skills for an occupation and the share of people working in that occupation, it is possible that technical skills rank low because there are not many people working in the few occupations that require technical skills. This may reflect the structure of the Japanese economy or suggest a difficulty in finding workers with the required technical skills. The latter would be in line with the shortage in technical skills found in the OECD Skills for Jobs Indicators.

At the bottom of the list are reading, writing, speaking and listening skills related to foreign languages. This may reflect that Japanese companies put a limited premium on foreign language skills and therefore the occupations use foreign language skills less. This does not, however, reflect the actual level of language skills in the society, just the skills presence in the carrying out of job-related tasks. It is still worth noting that (if excluding the skill 'repair') foreign language has the lowest maximum value of all skills in the Japanese labour market.

Overall, the analysis of minimum, maximum and mean values shows a more 'normal' distribution for skills with a high frequency – meaning the mean is approximately halfway between the minimum and maximum values – and a distribution skewed towards low values for skills with a low frequency. This is likely due to very few workers in occupations of high value of low-frequency skills.

Figure 1.12. The skills composition of the Japanese workforce is very diverse

Skills composition indicator (scale 1-7)

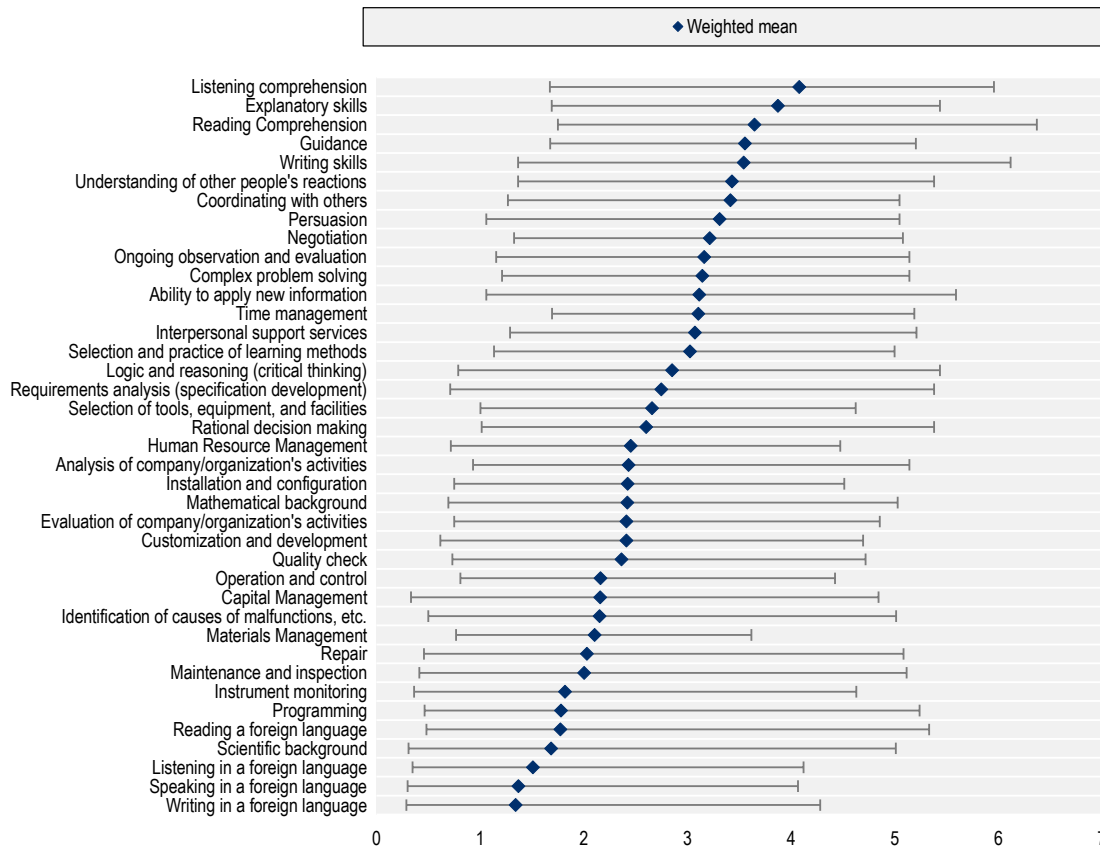


Note: The Skills Composition Indicator is calculated using a weighted average, taking into account both skill level of occupation and number of people working in that occupation, and it is calculated by multiplying each skill level for a given occupation with the number of workers in that occupation, and then dividing by the total number of workers in the data set. The sample includes employees between 20 and 65 years old. The full scale for skill level ranges from 0 to 7, but has been shortened to 0-5 to better present the data.

Source: Japanese Panel Study of Employment Dynamics and "job tag".

**Figure 1.13. Foundational skills have higher minimum value than technical skills because they are needed for almost every job in the Japanese economy**

Minimum and maximum level for each skill and the weighted mean



Note: The weighted mean is calculated using a weighted average, taking into account both skill level of occupation and number of people working in that occupation, and it is calculated by multiplying each skill level for a given occupation with the number of workers in that occupation, and then dividing by the total number of workers in the data set. Minimum/maximum value refers to occupation with the lowest/highest value in the dataset. 50<sup>th</sup> percentile shows the value at which 50% of the population score equal or less than. The sample includes employees between 20 and 65 years old. The scale for skill level ranges from 0 to 7, but has been shortened to 0-5 to better present the data.

Source: Japanese Panel Study of Employment Dynamics and "job tag".

### 1.3.3. The skills composition of the Japanese workforce is evolving

Across most OECD countries, substantial changes in skill needs are challenging labour market and training policies and contributing to skill mismatch and shortages. In general, social and analytical skills are on the rise while many countries are experiencing a declining demand of manual skills (Nedelkoska and Quintini, 2018<sup>[23]</sup>). The skills composition of Japan is in constant evolution. Table 1.1 shows the results of estimating changes in skill requirements over time, while controlling for changes in the age structure and the gender structure of the working population – two social indicators that have seen large changes in the Japanese labour market in recent years. To compare with the findings in the literature, indicators for social and analytical skills have been constructed (see Box 1.2 for details).

Econometric results using individual-level data point to a significant upward trend in the incidence of social skills and abilities in Japan, with much of this increase occurring during the pandemic. Indeed, a positive increase in social skills and social work contexts can be observed in all years (though less intensely in 2020), with 2021 showing a particularly large increase in comparison to the other years. By contrast, analytical skills requirements in the Japanese workforce remained quite stable over time, except for a significant jump in 2021. Pre-pandemic studies using German and UK data show a similar trend for social skills, although they also show a consistent increase in analytical skill requirements (Nedelkoska and Quintini, 2018<sup>[23]</sup>). Overall, the analysis on Japan indicates that the pandemic has increased the speed at which the labour market is moving towards more social and analytical skills. As we are not able to observe changes within occupations, this is a reflection of a change in the structure of employment in the context of the pandemic. For example, the increase in intensity could be due to a shift in the labour market towards jobs that can be carried out remotely through teleworking. It remains to be seen if this increase is structural will be sustained after the pandemic.

**Table 1.1. Social skills have increased significantly in Japan while the pandemic has accelerated the shift in both social and analytical skills**

Marginal effects of the change in social skills, social work contexts and analytical skills, 2017-2021

	Social skills	Social work contexts	Analytical skills
2018 dummy	0.006 (0.003)*	0.006 (0.003)	0.000 (0.002)
2019 dummy	0.007 (0.003)*	0.01 (0.003)**	-0.001 (0.003)
2020 dummy	0.006 (0.003)	0.006 (0.003)	-0.002 (0.003)
2021 dummy	0.013 (0.003)**	0.014 (0.003)**	0.006 (0.002)*
Female	-0.15 (0.004)**	0.042 (0.006)**	-0.246 (0.005)**
Age	0.002 (0.000)**	0.001 (0.000)**	0.003 (0.000)**
N	175 168	175 168	175 168

Note: The sample includes employees between 20 and 65 years old. Marginal effects estimated from the results of logit models. Standard errors clustered by prefecture in parentheses. Significant at: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Source: JPSED 2017-21.

Table 1.2 shows the results of estimating key indicators for manual skills,<sup>3</sup> using the same specifications as for analytical skills, social skills and social work contexts. For all three indicators an increase can be observed in all years, though the intensity of the increase drops significantly in 2021. This could be due to the physical restrictions implemented during the pandemic, where carrying out physical tasks became difficult while observing strict lockdown and social distancing rules. More data is needed to evaluate whether this slowdown in the rate of increase is a temporary reaction to restrictions or if the pandemic has permanently slowed the rise in importance of manual skills in the Japan workforce, but previous analysis on manual skills in Japan have yielded similar results (Handel, 2012<sup>[24]</sup>)

**Table 1.2. Manual skills are still increasing in Japan, though less intensely than before the pandemic**

Marginal effects of the change in indicators of manual skills, 2017-2021

	Manual handling of objects, tools and controls	Use of whole body to carry out physical activities	Use of hands and arms to handle and move objects
2018 dummy	0.008 (0.002)**	0.013 (0.003)**	0.008 (0.002)**
2019 dummy	0.015 (0.003)**	0.013 (0.003)**	0.015 (0.003)**
2020 dummy	0.018 (0.004)**	0.013 (0.004)**	0.019 (0.003)**
2021 dummy	0.009 (0.004)*	0.007 (0.004)	0.011 (0.004)**
Female	-0.005 (0.007)	-0.102 (0.007)**	0.002 (0.008)
Age	-0.005 (0.000)**	-0.001 (0.000)**	-0.005 (0.000)**
N	175581	175581	175581

Note: The sample includes employees between 20 and 65 years old. Marginal effects estimated from the results of logit models. Standard errors clustered by prefecture in parentheses. Significant at: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Source: JPSED 2017-21.

## Box 1.2. Calculation of changes in social, analytical and manual skills

### Social and analytical indices

In order to understand how the demand for social and analytical skills has evolved in Japan in the last five years – between 2017 and 2021 – three variables are created for the purpose of the analysis:

- Analytical skills equals 1 if at least one of the following variables scored in the top tercile for that skill: complex problem solving, logic and reasoning (critical thinking) or rational decision making. Otherwise it equals 0.
- Social skills equals 1 if at least one of the following variables scored in the top tercile for that skill: understanding of other people's reaction, persuasion and negotiation. Otherwise it equals 0.
- Social work contexts equals 1 if at least one of the following variables scored in the top tercile for that work context: interacting with others, working in a group or team or co-ordinating and learning with others. Otherwise it equals 0.

Skill demands in the three skills and one work context are then estimated as a function of time. The reference year is taken to be 2017 and skill demand in 2018, 2019, 2020 and 2021 is expressed as difference relative to the reference year. Logit models are estimated since the four skills/work contexts are defined as binary variables. The variables of interest are the year dummies (2018-21), while 2017 is the reference year against which the trend is estimated.

### Manual skills

Calculating the skill trends in manual work is made more complicated as the indicators for manual work are not categorised under the same category in "job tag" and hence the respondents have not answered the questions using the same scale. Therefore we cannot construct a dummy variable for manual work. However, three binary variables are created for the purpose of analysing trends in manual work:

- Manual handling of objects, tools and controls equals 1 if this skill is scored in the top tercile for that occupation. Otherwise it equals 0.
- Use the whole body to carry out physical activities equals 1 if this skill is scored in the top tercile for that occupation. Otherwise it equals 0.
- Use hands and arms to handle and move objects equals 1 if this skill is scored in the top tercile for that occupation. Otherwise it equals 0.

For both the social and analytical indices and manual skills, the estimates are done at the individual level.

## Key takeaways

Reductions in wages and working hours have helped Japan to dampen falls in employment and rises in unemployment during the COVID-19 crisis relative to many other OECD countries. However, a small number of industries and some socio-economic groups have borne the brunt of the pandemic's employment impact, particularly women and non-regular workers, and those working the accommodation and living-service sector.

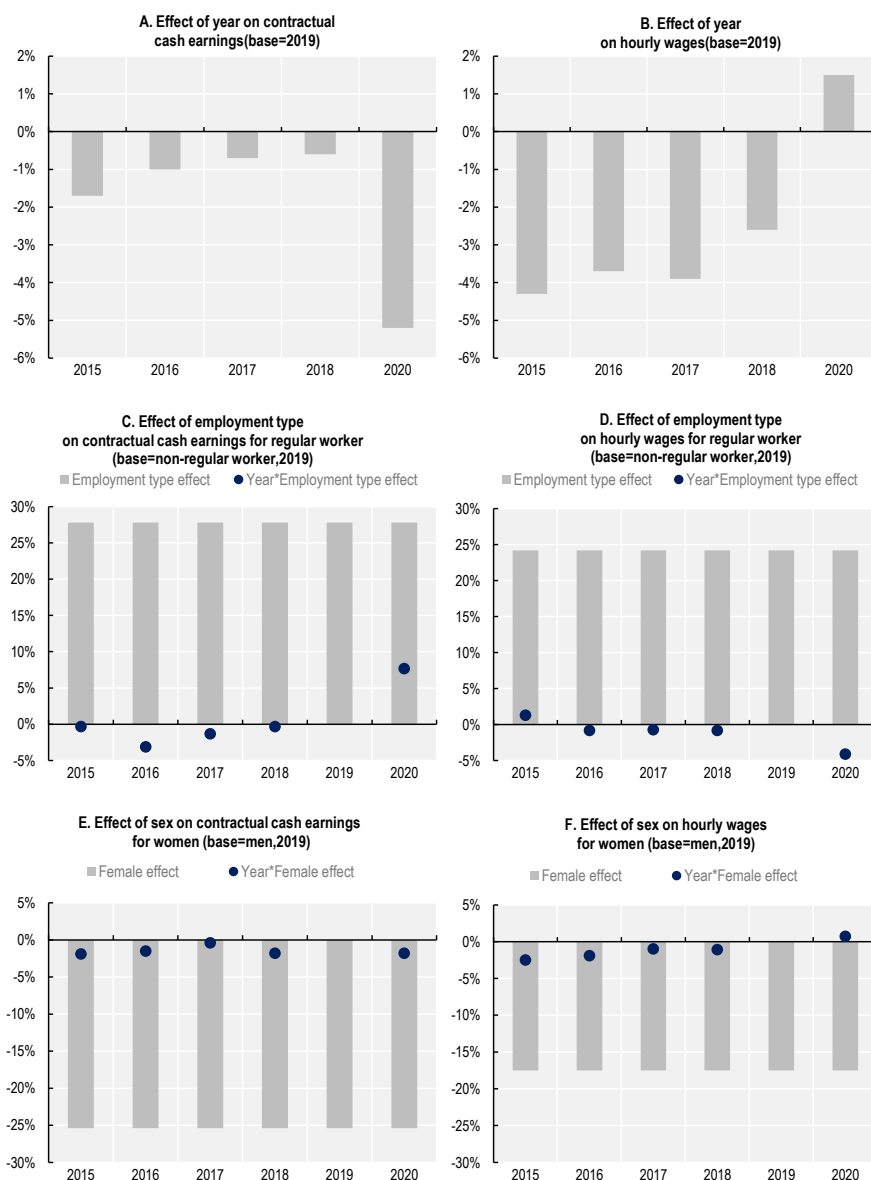
Analysis of the Japanese labour market prior to the pandemic shows that skills mismatches had been emerging for some time. Employers found it increasingly difficult to fill vacancies due to the lack of appropriate skills in the labour market, and the OECD's Skills for Jobs indicators showed that, in contrast to the OECD average, shortages were concentrated in technical skills. An analysis of the current skill composition of the Japanese workforce shows that fundamental and social skills are most present in the labour market, while technical skills and foreign languages are less present. Advance cognitive skills, a good indicator for complex work tasks that cannot easily be automated, are perhaps less present in Japan than might be expected.

Looking at trends over time, there has been an increase in social and analytical skills, especially during the pandemic, while the growth rate of manual skills has tapered off – indicating that the Japanese labour market is experiencing many of the same trends as in other OECD countries.



# Annex 1.A. Additional data

## Annex Figure 1.A.1. Effects on wages by year, employment type and sex



Note: The panels show estimates of the impact of selected variables on wages for workers other than part time workers and temporary workers. Hourly wages means the contractual cash earnings divided by the sum of scheduled working hours and overtime working hours. The base year is 2019. Wage effects are estimated controlling for variables such as year, sex, employment type, firm size, industry, education, age, age-squared, years of service, and years of service-squared using a log-linear regression. The effects in the panels are the coefficients obtained from the regressions. Panels C and D show the effect using the interaction term for year and employment type, and Panel E and F show the effect using the interaction term for year and sex. For Panels A, B, D and F, all variables above are statistically significant at 1%. For Panel C, the interaction terms of regular worker and 2015, and regular worker and 2018 are not significant, while the others are statistically significant at 1%. For Panel E, the interaction term of women and 2017 is statistically significant at 5%, while the others are statistically significant at 1%.

Source: OECD analysis based on Basic Survey on Wage Structure supported by the Ministry of Health, Labour and Welfare.

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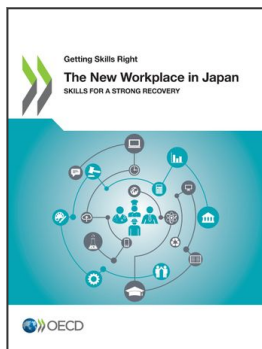
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## Notes

<sup>1</sup> However, these large falls partly reflect a difference in the statistical treatment of workers on short-term lay-off: In North America, these workers are counted as unemployed rather than as still employed as in some other countries.

<sup>2</sup> Bruns, Evans and Luque, 2012<sup>[15]</sup> calculate skills composition in Brazil and the United States by using US O\*NET and combining it with Brazilian and American labour force surveys (*Perquisa Nacional por Amostragem de Domicilios*, US Census and the American Community survey,) under the assumption that US O\*NET is an appropriate reference scheme for the Brazilian labour market. The authors estimate skills composite by income quantile using five indices comprised of underlying skills, as defined by Acemoglu and Autor, 2010<sup>[18]</sup>. The result shows average indices scores by income quantiles, as well as percentage of occupations in which the underlying indices skills are considered important or very important. This method has two drawbacks: i) the analysis of skill indices as opposed to direct skills does not allow for an analysis of importance of certain skills over others, and ii) by focusing on the highest scoring occupations it does not accurately present the presence of skills in the labour market. Therefore, the analysis for Japan will take into account all skills at all values to present a complete overview of skills in the economy.

<sup>3</sup> Refer to Box 1.2 for details on the construction of the indicators for manual skills.



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