



FUTURE OF WORK AND SKILLS

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Summary

Three ongoing mega-trends have the potential of significantly altering the nature of work in all G20 countries, albeit with different intensity: globalisation, technological progress and demographic change - as well as the changes in values and preferences that will go paired with them. Together, these trends are likely to affect the *quantity* and *quality* of jobs that are available, as well as *how* and *by whom* they will be carried out.

Driven by these trends, the future of work will no doubt offer unparalleled opportunities. New technologies and new markets will generate new and more productive jobs. The ability to de-bundle jobs into smaller tasks will allow work to be carried out more efficiently on a truly global, digital assembly line. In the future, workers are likely to have more say about who they work for, how much they work, as well as where and when they work. Such increased flexibility will provide greater opportunities for under-represented groups to participate into the labour market, such as women, senior workers and those with disabilities.

However, there are also significant challenges associated with increased globalisation, rapid technological progress and demographic change. In the advanced economies, fears around massive unemployment caused by automation and globalisation have been flagged; they are probably exaggerated, but significant upheaval is nevertheless likely as jobs are destroyed in some areas, while others emerge elsewhere. Adjustment costs may be significant and are more likely to be borne by the low-skilled as well as those currently performing more routine tasks that are more likely to be automated. Combined with a general increase in the demand for higher level skills, these trends may lead to further increases in inequality. Moreover, the new forms of work that are emerging raise serious concerns about the quality of jobs that are created.

The emerging economies also face a number of challenges. Rapid advances in automation and the use of robots together with some re-shoring of jobs in advanced economies may limit the jobs potential of an expanding manufacturing sector. This may make it harder to escape the middle-income trap and to ensure a more even sharing of increased prosperity. It could also make it harder to generate the job growth required to provide employment opportunities for the large number of young people entering the labour market each year in many of the emerging economies. Moreover, providing these large cohorts of young people with the right skills to find good jobs will also be a major challenge.

What is certain is that the future is uncertain. It is, therefore, difficult (if not counter-productive) to try and plan in detail for the potential changes that might affect the world of work in the years to come. What is important, however, is to build resilient and adaptable labour markets that allow workers and countries to manage the transition with the least possible disruption, while maximising the potential benefits offered by the three mega-trends. G20 countries should be at the policy forefront when it comes to shaping the future of work, not least because of their economic reach but also because technological diffusion will put them at the frontier of the changes that are to come.

Against this backdrop, the present concept note discusses: the mega-trends that are shaping the world of work and the challenges that they set for labour markets in G20 countries. Going forward, some of these challenges include the design and implementation of policies which will:

- Prepare young people for the jobs of the future by ensuring that they are equipped with the right type of skills to successfully navigate through an ever-changing, technology-rich work environment, and give all workers the opportunity to continuously maintain their skills, upskill and/or reskill throughout their working lives.

- Design labour market institutions (e.g. minimum wages; employment protection; health and safety regulations) which encourage employers to seize the opportunities offered by technological change and globalisation, while making sure that the risks are not borne disproportionately by workers in the form of low pay, precariousness and poor working conditions.
- Re-think social security systems to minimise the chances of people slipping through the holes by: (i) tailoring or adapting them to the new forms of employment; or (ii) decoupling them entirely from people's work status and history.
- Strengthen activation frameworks to mitigate some of the inevitable adjustment costs of moving towards more globalised and technologically advanced economies by helping those workers who have been displaced by changing skills needs into a new job quickly.
- Promote new forms of social dialogue which allow tailored solutions to new challenges to emerge at the firm-level, while strengthening the voice of those workers who are increasingly working independently and separated by distance, language and legal context.

Mega-trends shaping the future of work

Several “mega-trends” are sweeping across G20 countries and are changing the nature of work – they affect what kind of work is done, who carries it out, and where and how it is carried out. These trends are: technological progress, demographic change, globalisation and value changes.

Technological progress

Technological advances are permitting an increasing number of tasks traditionally performed by humans to become automated. Initially, such automation focused primarily on routine tasks (e.g. clerical work, bookkeeping, basic paralegal work and reporting). However, with the advent of Big Data, artificial intelligence (AI), the Internet of Things and ever-increasing computing power (i.e. the digital revolution), non-routine tasks are also increasingly likely to become automated.

These changes are affecting advanced and emerging economies alike – although the nature of the effect on the latter is perhaps more disputed. Some argue that emerging economies are at a comparative advantage and that new technologies will allow them to “leapfrog” advanced economies. Others, however, believe that recent developments in robotics and 3D printing allow firms in advanced economies to locate production closer to domestic markets in more fully automated factories. As a result, some emerging economies are experiencing “premature deindustrialisation”. In these countries, the manufacturing share of employment is peaking well below the levels experienced by advanced economies in their early stages of industrial development, which leaves them in a middle-income trap (Rodrik, 2015). In addition, while advanced economies currently have the strongest incentive to automate (because of their relatively higher labour costs), estimates show that the risk of automation is also high in emerging economies (McKinsey Global Institute, 2017).

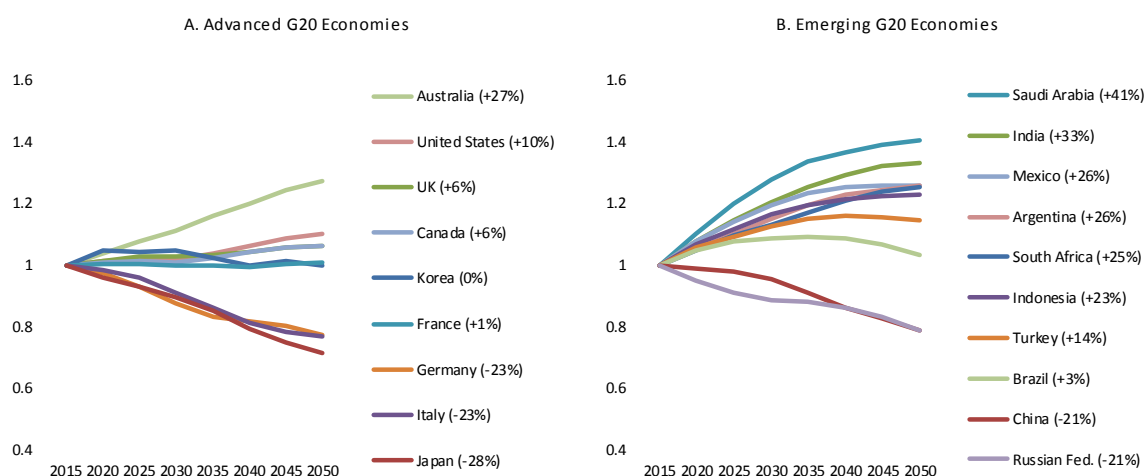
Technological advances are affecting labour markets in many other ways as well. For example, the internet facilitates new and more efficient ways of matching the demand for and supply of labour. It allows jobs to be de-bundled into a set of smaller tasks and creates opportunities for workers around the world to enjoy the flexibility and benefits of freelancing and to top up their incomes. This trend has led to the flourishing of the “gig”, “on-demand”, “sharing” or, more generally, the “platform” economy (e.g. AirBnB, Uber, Lyft, Task Rabbit, etc.)

Demographic change

Over the next few decades, G20 countries will undergo significant demographic change. In some countries, a dramatic decline is expected in the share of the working-age population (-28% in Japan; -23% in Italy and Germany; -21% in the Russian Federation and China) while in others the working-age population is likely to swell significantly by 2050 (+41% in Saudi Arabia, +33% in India, +27% in Australia, and +26% in Mexico and Argentina) (Figure 1). In countries with ageing populations (including some emerging economies), shortages of qualified labour are likely to arise as large cohorts of older workers are retiring. Population ageing is also likely to lead to important reallocations of labour and resources across sectors and occupations as consumer tastes change: demand is likely to shift from durable goods (such as cars) towards services (such as health care). In countries with a young and growing workforce, the opposite is likely to happen as the middle class expands and rapid urbanisation takes place. The challenge, however, will be to harness the full potential of this demographic dividend, ensuring that youth have the skills necessary to be gainfully employed and make a contribution to economic growth.

Figure 1. G20 countries will be experiencing rapid demographic change

Change in the working age population in G20 countries 2015-2050 (2015=100)



Notes: Medium fertility variant.

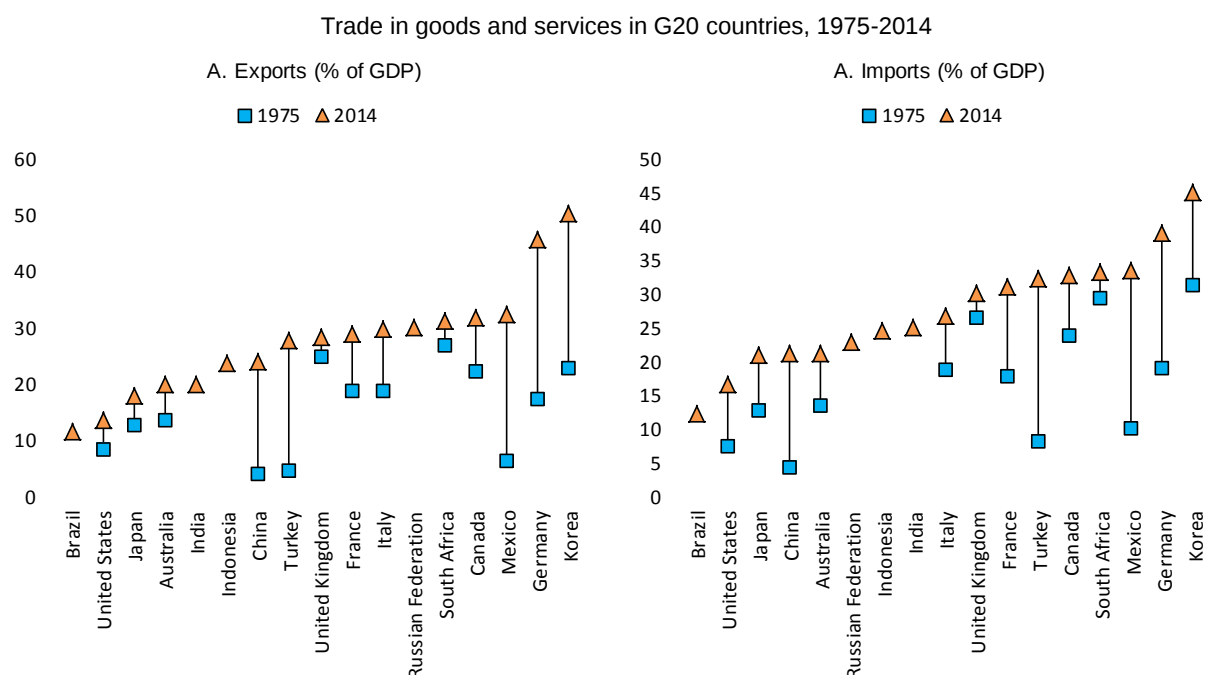
Source: United Nations, Department of Economic and Social Affairs, Population Division (2015). World Population Prospects: The 2015 Revision, DVD Edition.

Globalisation

The world economy is becoming integrated through trade at an unprecedented pace. Trade as a share of GDP has risen in both emerging and advanced G20 economies (Figure 2), and many of the emerging economies have become major players in the world market, both as exporters and importers. The rapid fall in the cost of communication and transportation has not only promoted the integration of goods and services markets, but has also facilitated an accelerated pace of technological dissemination. These developments have been accompanied by innovations in business organisation which have allowed new trends in trade to develop, including the “trade in tasks” – global value chains, segmentation of production through offshoring, and global out-sourcing – all of which are allowing distant economies to be integrated into the global market (OECD, 2012).

The integration of product, service, financial and technology markets is having significant consequences for labour markets around the world, as they become increasingly interconnected. This can have significant positive employment effects: for example, it has been estimated that between 30% and 40% of jobs in the business sector in most European countries in 2011 were sustained by consumers in foreign markets (OECD, 2016a). However there are also fears about potential negative effects, which cannot be dismissed out of hand. In advanced economies, workers are concerned about job opportunities lost to offshoring and services outsourcing as well as about the increased vulnerability associated with job and income volatility. At the same time, workers in many emerging economies worry about the adverse consequences of trade liberalisation, lagging employment opportunities for growing labour forces, and competition from other emerging economies (OECD, 2012). Indeed, one additional reason why many emerging economies are experiencing a premature deindustrialisation is because of their exposure to international trade. A more general concern expressed by workers in all countries (advanced and emerging alike) is that globalisation is contributing to increased income inequality and poorer working conditions.

Figure 2. Trade has gained in importance in G20 countries



Source: OECD (2017), Trade in goods and services (indicator). DOI: 10.1787/0fe445d9-en (Accessed on 30 January 2017).

Value changes

Changing demographics and technological advances are also having an impact on individual preferences and societal values – not just in terms of the goods and services they demand, but also in the way people choose to work. Even existing forms of flexible work (like part-time) may still be too restrictive, particularly for parents who want to be able to fit their work around their family lives. The question is not how many hours individuals spend at work, but rather whether they get the job done. And technology is increasingly allowing jobs to become customisable, with individuals able to choose who they work for, where they work, how much they work, and the pace at which they work. As a result, the boundary between work and personal life is becoming increasingly blurred and we are witnessing a gradual move away from individuals trying to achieve a better “work-life balance” towards a greater “work-life integration”. Value changes are likely to be equally significant in emerging economies. For example, as more and more women enter the labour force in those countries, the demand for more flexible ways of working which allow parents to combine family and professional responsibilities is likely to increase.

Challenges

Untangling the effects of these various megatrends on labour markets is difficult, not least because they are contemporaneous events. In addition, these trends are often highly interrelated. For example, greater international competition arising from trade may have speeded up the adoption of new technology. At the same time, the expansion in international trade may not have been possible without the various technological innovations that have improved communications and lowered transport costs. Similarly, population ageing may be speeding up the development and adoption of labour-replacing technologies. Some trends are reinforcing each other, such as the increase in demand for skilled labour that is likely to result from both population ageing and technological progress. Conversely, the effects of some trends might work in opposing directions: for emerging economies, for example, international trade is opening up

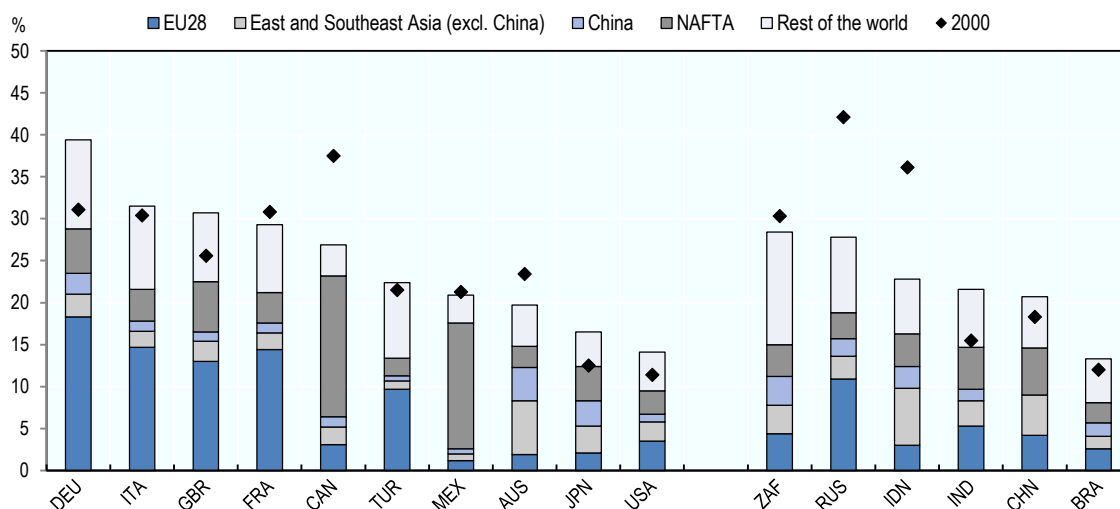
new opportunities for expanding employment in manufacturing, but technological change is creating competition from labour-replacing technologies. In what follows, therefore, the focus is on key outcomes, regardless of which of the mega-trends is actually driving them. More specifically, the implications of the mega-trends are analysed in terms of their impact on: (i) the quantity of jobs; (ii) the quality of jobs; and (iii) inclusiveness.

Quantity of jobs

Of all the mega-trends, technological progress and international trade have been the two most feared to result in significant job losses.

Despite estimates that a large number of jobs in advanced economies are potentially offshorable (Blinder, 2009) and that the scope of offshoring has recently expanded beyond routine work to include technology-intensive service jobs (OECD, 2013), **offshoring** has accounted for only a small share of realised job losses in practice. In fact, trade is likely to remain mutually advantageous and will not result in a reduction in overall employment in the long run (OECD, 2007a). While firms in more advanced economies have offshored a large share of jobs to countries with lower labour costs, this has also allowed them to expand their market shares, profits and capital spending, and this process has often resulted in the creation of new, more skilled jobs (OECD, 2007b). What is certain, however, is that a large share of jobs today are related to global value chains and are, therefore, driven by consumers in other countries. In 2011, for example, more than 30% of jobs in the business sector in most advanced economies (26% on average in emerging economies) were sustained by consumers in foreign markets - a share which was much larger in some small European countries (Figure 3).

Figure 3. Jobs in the business sector sustained by foreign final demand, by region of demand, 2011



Notes: The business sector is defined according to ISIC Rev.3 Divisions 10 to 74 i.e. total economy excluding Agriculture, forestry and fishing (Divisions 01 to 05), Public administration (75), Education (80), Health (85) and Other community, social and personal services (90 to 95).

Source: OECD Science, Technology and Industry Scoreboard 2015.

From the point of view of emerging economies, a more worrying trend is that many advanced economies appear to be “reshoring” – either by transferring activities back to their home country (back-shoring) or to a neighbouring country (near-shoring). The multinational firm, in particular, seems to be in retreat: recent estimates suggest that, in 2016, multinationals’ cross-border investment fell by 10-15% (The

Economist, 2017). The trend towards reshoring is driven by a number of factors including: the eroding cost advantage of emerging economies, the underestimation of the full cost of offshoring, the need for production to be close to markets and innovation, the protection of intellectual property, the need to balance cost savings and risk dispersion. However, recent OECD work suggests that the phenomenon of reshoring is unlikely to mean the end of offshoring, nor is it expected to bring back all the activities that have been offshored during the past decades and restore manufacturing in OECD economies back to its level of the 1970s or 1980s (De Backer et al., 2016). Instead, it is likely that companies will look for more diversified sourcing strategies which will result in production and manufacturing becoming increasingly concentrated in regional/local hubs closer to end markets, both in developed and emerging economies. Importantly, emerging economies will no longer only serve as centres of supply but also as centres of demand and the advent of new technologies will make regional value chains more feasible (De Backer et al., 2016).

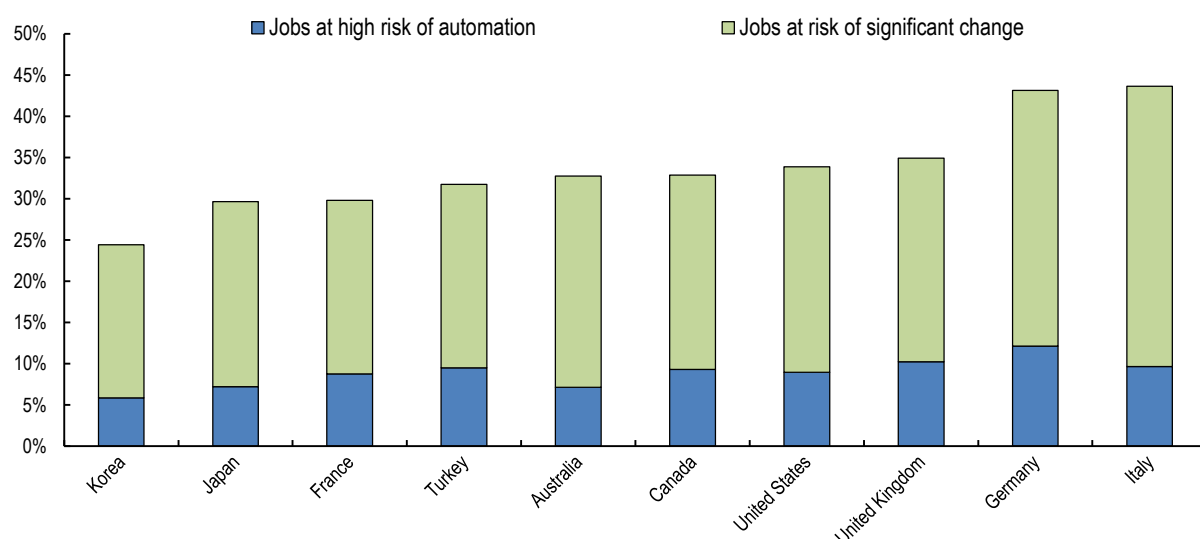
So far, the greatest fears of employment losses have been linked to **technological change**. While the job losses of major innovations in the past (e.g. the steam engine, electricity and the assembly line) have proven to be short-lived and have, in the long-term, made room for the creation of more productive and rewarding jobs (Mokyr, Vickers and Ziebarth, 2015; OECD, 2015a), the lessons of the past may not always apply to the future. Indeed, the threat to jobs posed by what some have called the “Second Machine Age” (Brynjolfsson and McAfee, 2014) or the “Fourth Industrial Revolution” (Schwab, 2016) could be far more significant as cheaper and better digital technologies result in a rapid substitution of capital for labour. Some have painted a particularly gloomy picture and believe that 47% of all persons employed in the US are currently working in jobs that could be performed by computers and algorithms within the next 10 to 20 years (Frey and Osborne, 2013). Similar estimates are available for other countries, including Germany, where the estimate of the share of jobs at risk of automation is as high as 59% (Brzeski and Burk, 2015). For Europe as a whole, the share of jobs susceptible to automation ranges between 45% to more than 60%, with Southern European workforces facing the highest exposure to a potential automation (Bowles, 2014).

However, more recent studies argue that the share of jobs at risk of automation may have been significantly overestimated by the aforementioned studies. For example, a study commissioned by the OECD (Arntz, Gregory and Zierahn, 2016) suggests that it is highly unlikely that entire occupations will be automated given that, in practice, even occupations labelled as high-risk are likely to still contain a substantial share of tasks that are hard to automate and, also, that there is a lot of heterogeneity in the tasks performed within each occupation. Taking this task- (rather than occupation-) based approach, it is believed that, on average across 21 OECD countries, 9% of jobs face a high risk of automatibility (i.e. where at least 70% of the tasks could be automated) - while for another 25% of jobs between 50% and 70% of the tasks could change significantly because of automation (Arntz, Gregory and Zierahn, 2016).¹ This estimate is similar for the ten G20 countries that participated in the OECD Adult Skills Survey: the proportion of occupations at high risk is greatest in Germany (12.2%)² and lowest in Korea (5.9%) (Figure 3). Such differences across countries in the risk of automation may reflect general differences in workplace organisation, differences in previous technology investments, as well as differences in the education of workers. Automatability tends to be lower in countries that already invest a lot in ICT as well as in those with higher levels of education amongst workers.

¹ Another recent study estimates that, while few occupations are fully automatable, 60% of all occupations have at least 30% technically automatable activities (McKinsey Global Institute, 2017).

² These results for Germany are very similar to the results of a recent representative survey among German employees, where 13 % of employees considered it likely or highly likely that their job would be replaced by machines (BMAS, 2016). The results for Germany are also comparable to a recent study by Dengler and Matthes (2015) who use a different methodological approach but also find that 15% of all jobs in Germany are at risk of automation.

Figure 4. 9% of jobs are at high risk of automation in advanced G20 countries



- Jobs are at high risk of automation if at least 70% of tasks are at risk of being automated. Jobs are at risk of significant change if between 50% and 70% of tasks are at risk of being automated.
- Data for Belgium correspond to Flanders and data for the United Kingdom to England and Northern Ireland.
- Data correspond to 2012 for countries participating in the first round of the Survey of Adult Skills: Australia, Canada, France, Germany, Italy, Japan, Korea, United States and United Kingdom. Data correspond to 2015 for countries participating in the second round of the Survey of Adult Skills: Turkey.

Source: OECD calculations based on the Survey of Adult Skills (PIAAC) (2012, 2015); and Arntz, Gregory and Zierahn (2016), "The risk of automation for jobs in OECD countries: A comparative analysis", *OECD Social, Employment and Migration Working Papers*, No. 189, OECD Publishing, Paris

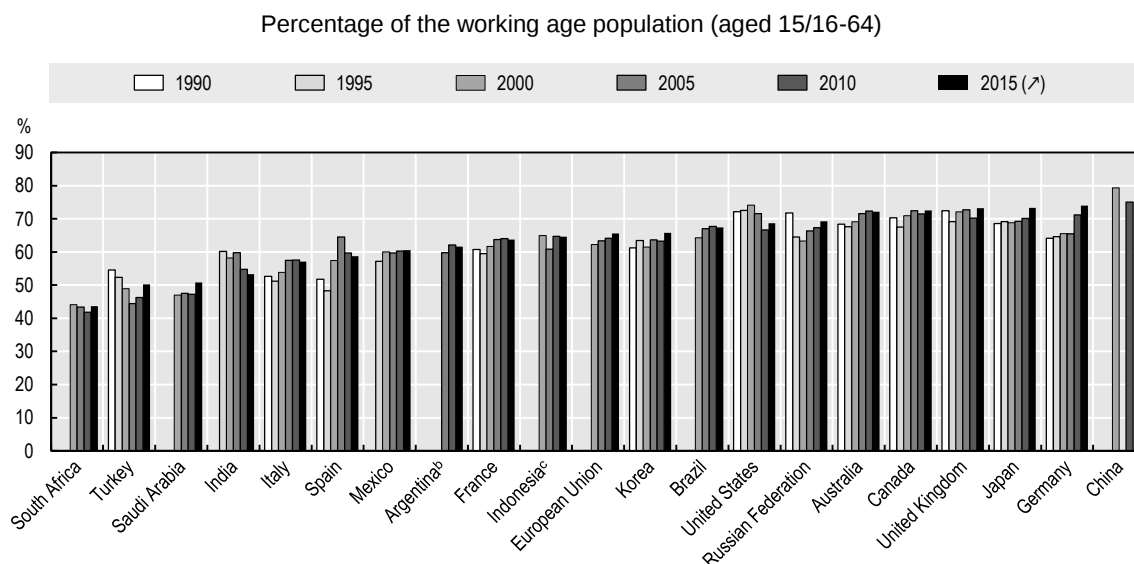
Even these estimates, however, should not necessarily be equated with actual or expected employment losses from technological change, for at least three reasons. First, the adoption of new technologies is often a slow process due to a host of economic, legal and societal hurdles, so that actual automation will take place at a far slower pace than what might be expected. Second, even in the case where new technologies are introduced, workers can adjust to the challenge of automation by switching tasks, thus preventing technological unemployment. Third, technological change does not just destroy jobs, but also generates new ones through its effect on productivity and the demand for new technologies. For example, it has been estimated that, for each high-tech job created in industries such as Computing Equipment or Electrical Machinery, some 4.9 additional jobs are created for lawyers, taxi drivers, and waiters in the local economy (Moretti, 2011).³ Sometimes, technological innovation can even have very unpredictable effects on labour markets like, for example, the effect that the contraceptive pill had on female labour force participation and employment.

Overall, it is not clear that the digital revolution has, to date, had a dramatic impact on either the destruction or creation of jobs. In the United States, for example, the emergence of new technology-related industries throughout the 2000s - including online auctions, video and audio streaming, and web design - has had only negligible effects on aggregate employment patterns, employing less than 0.5% of the workforce (Berger and Frey, 2016). Instead, most job growth in advanced economies has recently come from either technology-using (e.g. professional services) or other sectors that are not particularly intensive

³ Similarly, Goos et al. (2013) estimated that in the European Union over the period 2000-2011, the creation of one high-tech job resulted in more than four additional non-high tech jobs in the same region.

in new technology (e.g. health care, government, and personal services). From a quantity point of view, there is also no indication that global trends have had so far a negative impact on aggregate employment in G20 countries. If anything, the employment-to-population ratio has increased in most (though not all) countries between 1990 and 2015 (Figure 4).

Figure 5. Employment-to-population ratios have risen in most G20 countries



a) 1990 refers to 1992 for the Russian Federation; 1995 refers to 1993-1994 for India; 2000 refers to 1999-2000 for India, 2001 for Brazil and South Africa, 2002 for the European Union; 2005 refers to 2004-2005 for India and 2006 for Indonesia and Saudi Arabia; 2010 refers to 2009-2010 for India and 2009 for Brazil and Saudi Arabia; and 2015 refers to 2011-12 for India, 2013 for Indonesia and 2014 for Brazil. No data available in 1990 for Argentina, Brazil, China, the European Union, India, Indonesia, Mexico, Saudi Arabia and South Africa; in 1995 for Argentina, Brazil, China, the European Union, India, Indonesia, Mexico, Saudi Arabia and South Africa; in 2000 for Argentina, and in 2005 and 2015 for China.

b) Selected urban areas only. Data refer to the second quarter of each year.

c) Data refer to August for each year since 2006.

Source: OECD Labour Force Statistics Database and OECD calculations for Argentina based on the Encuesta Permanente de Hogares (EPH), India based on the National Sample Survey (NSS), Indonesia based on Sakernas and Saudi Arabia based on LFS results.

Inclusiveness

While globalisation, technological progress and demographic change may not (yet) have had a major impact on employment overall, there is an indication that they are changing the *structure of occupations* in some G20 countries (with sometimes large transition costs) and, with it, the income distribution. More specifically, there are signs that, in many countries, labour markets are polarising and/or that, inequality is on the rise.

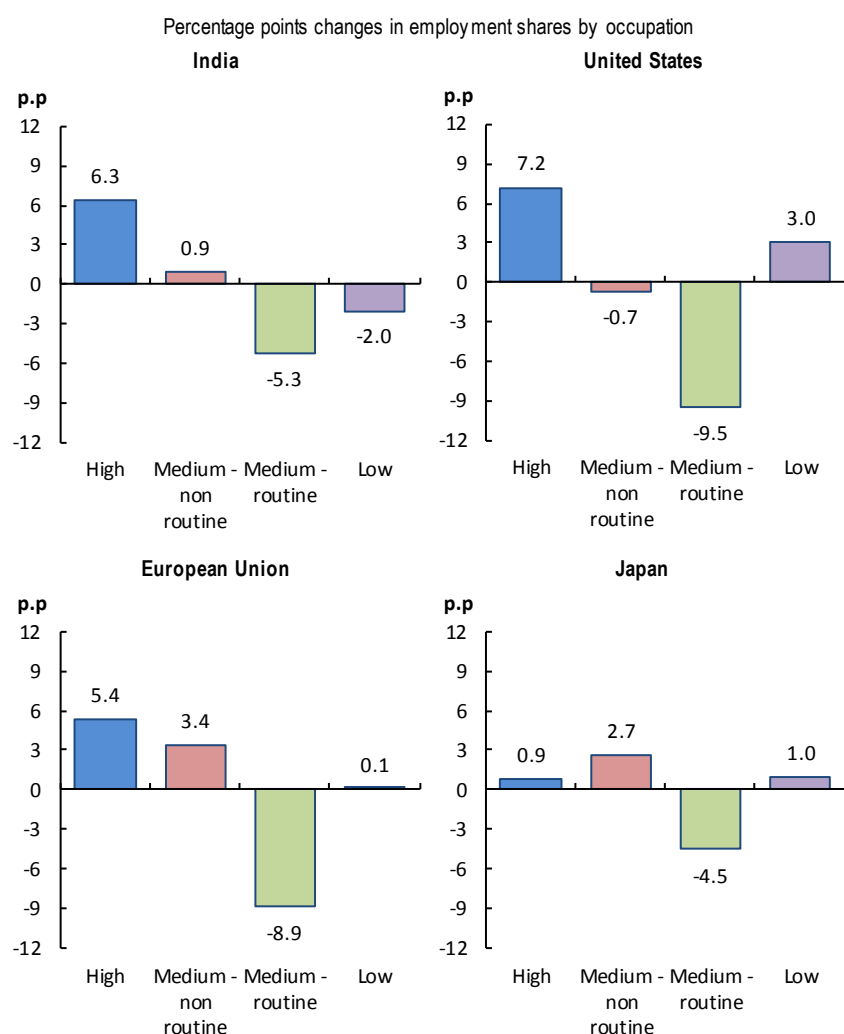
Polarisation

In some G20 countries, the occupational structure is “polarising” into high-skilled/high-paying jobs on the one hand, and low-skilled/low-paying jobs on the other. Technological change has generally been skill-biased, meaning that it has made skilled labour more productive and, therefore, increased the demand for it. At the same time, there has been a fall in the demand for mid-level skills as routine occupations have either been offshored or automated, as well as a small increase the demand for low-skilled (non-routine) jobs associated with demographic change and the shift in consumption towards personal services.

Together, these trends have resulted in a hollowing out of the occupational structure (Figure 5). Not all countries are experiencing the same trend, however. For example, in China, there has been strong growth in the share of middle-skilled occupations, driven in part by growing mechanisation in agriculture (World Bank, 2016). However, the share of occupations that could experience automation tends to be larger in emerging economies: China and India together account for the largest technically automatable employment potential in the G20, with more than 700 million full-time equivalents between them (McKinsey Global Institute, 2017). Even in emerging economies, therefore, the risk of polarisation is still significant and will depend to a large extent on the speed at which new technologies will be adopted (World Bank, 2016; Maloney and Molina, 2016). Lower wage costs, however, are likely to slow down the adoption of new technologies, at least in the short-run.

Figure 6. There is evidence of labour market polarisation in some G20 countries

Percentage point change in employment shares by occupation category, 2002-2014



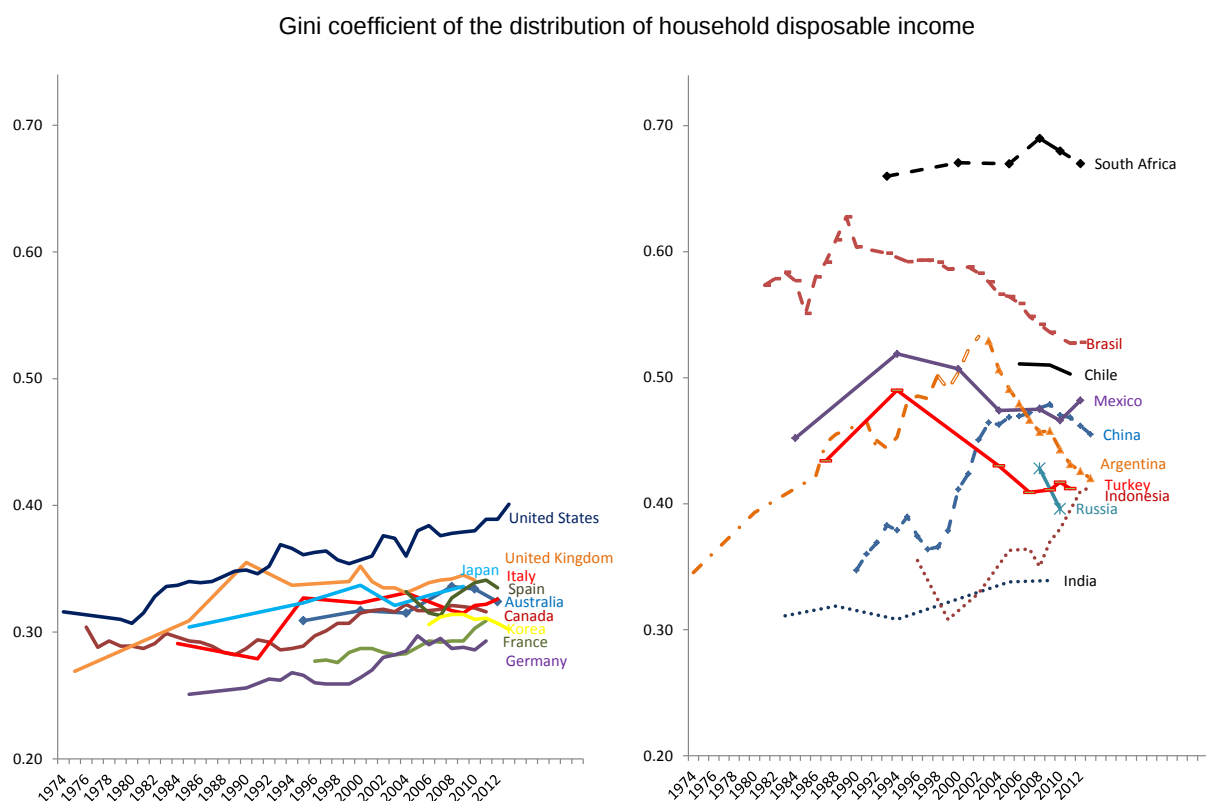
Notes: 1999-2000 and 2011-12 for India.

Source: OECD estimates based on EU-LFS, Japanese Labour Force Survey, BLS Current Population Survey and the National Sample Survey.

Inequality

The change in occupational structure has also had an impact on inequality. On the one hand, in countries where the supply of high-skilled workers has failed to keep up with the increased demand for them, the returns to skill and, therefore, wage inequality have increased. On the other hand, the disappearance of mid-level jobs has reinforced competition for lower-paid jobs, which has held down wages in the bottom half of the earnings distribution. At the same time, low-skilled workers have borne the brunt of the adjustment costs in terms of employment losses (and recent evidence suggests that such adjustment costs may be significant given that the process of adjustment is remarkably slow – Autor, Dorn and Hanson, 2016). Together, these trends have contributed to a significant rise in income inequality in most advanced G20 countries in terms of both market and disposable income (OECD, 2015b). Amongst the emerging economies of the G20, inequality has been increasing in some (e.g. China, India, Indonesia and the Russian Federation), while falling in others (e.g. Brazil, Argentina, Mexico and Turkey) (Figure 6) (ILO, IMF, OECD and World Bank, 2015). There has also been a secular downward trend in the labour share in most G20 countries.

Figure 7. Inequality has increased in most advanced G20 economies, while it remains high in many emerging G20 economies



Notes: Data for Indonesia, Argentina, Brazil, South Africa, India and China are not strictly comparable with the OECD Income Distribution Database data. The Gini coefficients are based on equivalised incomes for OECD countries and the Russian Federation and per capita incomes for other countries except India and Indonesia for which per capita consumption was used. The Gini coefficient scores 0 when everybody has identical incomes and 1 when all the income goes to only one person.

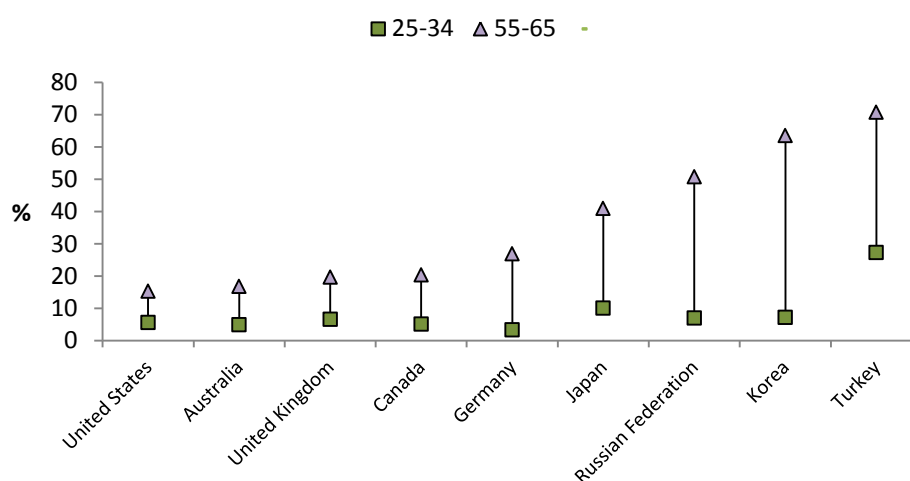
Source: OECD Income Distribution Database for OECD countries and Russian Federation. World Bank, Poverty and Inequality Database for India. Statistics Indonesia (Susenas) for Indonesia. OECD (2015), All on Board: Making Inclusive Growth Happen in China, OECD Publishing, Paris for China. SEDLAC (Socio-Economic Database for Latin America and the Caribbean) Database for Argentina and Brazil. For South Africa, data refer to Leibbrandt, M., I. Woolard, A. Finn and J. Argent (2010), "Trends in South African Income Distribution and Poverty since the Fall of Apartheid", OECD Social, Employment and Migration Working Papers, No. 101,

A few other aspects of the relationship between inclusiveness and the future of work are worth highlighting:

- First, the **change in the occupational structure** may also engender regional inequalities given that new jobs are more likely to be created in areas where there is a high concentration of high-skilled workers, which are usually very different from those areas experiencing employment losses (Berger and Frey, 2016).
- Second, some of these trends could benefit some traditionally **disadvantaged groups**. For example, even relatively inexperienced young people might have a comparative advantage over older workers in technology-intensive industries, because they are more familiar with digital media and have stronger ICT competences (Figure 7).
- Third, technological innovations could make it easier for **parents to combine family responsibilities with work** by allowing them to work more flexibly. This could increase female employment and reduce gender gaps in the labour market. Similarly, technology could facilitate certain workplace adjustments to increase the employment rates of workers with disabilities.

Figure 8. Younger people are better prepared for the new digital working environment than older people

Share of 15-24 and 55-64 year-olds with no computer experience or who failed the ICT core test



Notes: UK = England and Northern Ireland. The sample for the Russian Federation does not include the population of the Moscow municipal area.

Source: Survey of Adult Skills (PIAAC) (2012, 2015), Table A3.7 (P).

Quality of jobs

The interaction of technological progress with changing preferences is generating unprecedented opportunities for work to be carried out more flexibly and, thereby, to increase the employment rates of

certain population sub-groups and also to boost the work satisfaction of some workers who may feel constrained by more traditional working arrangements.

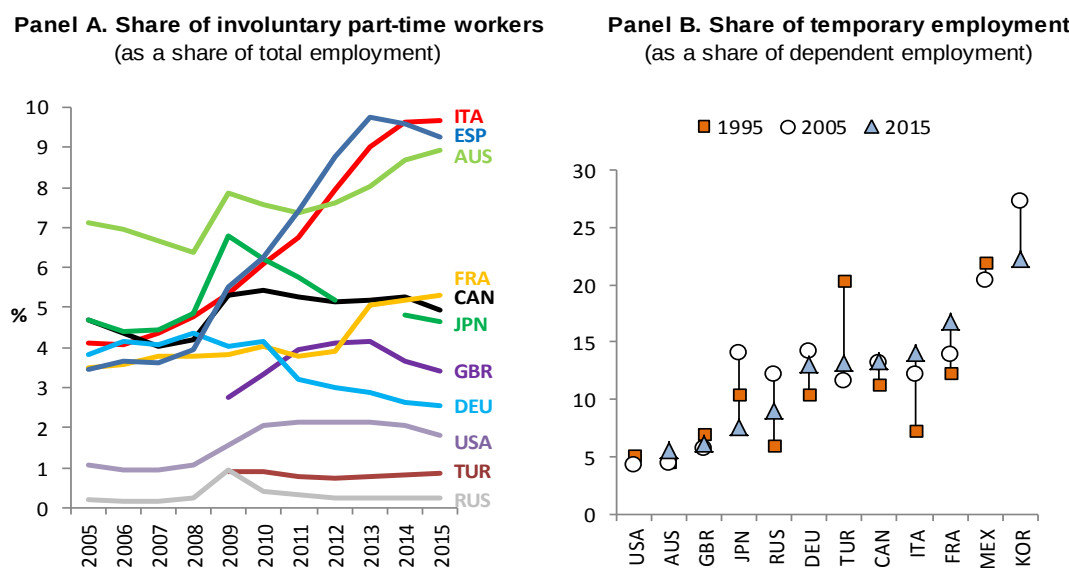
A particularly interesting development in recent years has been the rise of the platform economy. For employers this has provided access to a much larger pool of skills and experience at a fraction of the cost of hiring workers on traditional contracts (OECD, 2016a). The platform economy presents advantages for workers as well, since it allows them to choose both where and when they work – which can be particularly useful for single parents, students and seniors (OECD, 2016a).

However, much work in the platform economy is carried out in small units and irregularly. Platform workers may therefore have multiple jobs, work long hours and under high stress. They might also become dependent on highly specialised activities and might not find such “digital assembly line” work satisfactory (OECD, 2016a). In addition, such work frequently has no social security coverage, can be terminated at will, and wages are low due to a high level of competition. While platform work has created many opportunities for workers in emerging economies, it has also risked engendering a “race to the bottom” in both pay and working conditions. Moreover, it is likely that a great deal of this work remains undeclared, fomenting the informal economy.

While there is much talk about the rise of the platform economy, reliable and internationally comparable data are currently not available. However, most existing estimates suggest that the overall level of such work remains low – despite high growth rates in recent years. In the United States, for example, the share of workers who provide services through online intermediaries (such as Uber or Task Rabbit) has recently been estimated at 0.5% of all workers in 2015 (Katz and Krueger, 2016). According to another study, 1% of adults in the United States earned income from the Online Platform Economy in any given month between October 2012 and September 2015, while more than 4% participated over the entire period (JP Morgan Chase Institute, 2016). Finally, the McKinsey Global Institute (2016) estimates that 20-30% of the working-age population in the United States and Europe engage in some form of independent work and that, amongst these, 15% have used a digital platform .

There has been an increase in the share of non-standard employment in many G20 countries (OECD, 2014). For example, between 2005 and 2015, the share of involuntary part-time workers in total employment more than doubled in Spain and Italy, and saw very large increases in Australia and France as well (Figure 8, Panel A) – although much of that was crisis-related rather than reflecting a structural change. For example, in Canada, the United Kingdom, Japan and the United States, there were also relatively large increases in involuntary part-time workers during the crisis, but their share has been falling again since. The picture on temporary employment is more mixed, with increases (as a share of dependent employment) between 1995 and 2015 observed in Australia, the Russian Federation, Germany, Canada, Italy and France, but falls in Turkey and Japan (Figure 8, Panel B). While in most countries there has been no marked increase in the share of self-employment overall, this partly reflects the declining importance of agriculture where the self-employed account for a high share of employment. Among technicians and associate professionals, however, there has been a much clearer trend increase in the share of self-employed.

Figure 9. There has been an increase in the share of non-standard work in some G20 countries



Source: OECD Labour Force Statistics Database.

Non-standard employment has been associated with much lower job quality including lower wages (and fewer work-related benefits), greater job insecurity (including lack of social protection), and higher job strain (including longer working hours). Such workers may also receive less training and have lower career advancement opportunities than workers on traditional, open-ended contracts (OECD, 2014). Further, the incidence of informality is typically higher among the self-employed, and informal work is associated with lower job quality (OECD, 2015c). In countries where informal employment is widespread, this poses a pressing challenge.

Policy response

Globalisation, technological progress and demographic change will undoubtedly have effects on the labour market – however both the magnitude of their impacts and the speed at which those will be felt are highly uncertain. In the face of this, rather than trying to plan the future in detail, it is more important that the labour market institutions and policies that are in place enable individual workers and countries to weather these changes with the least disruption possible, while maximising the potential benefits offered by the mega-trends. Building such resilient/adaptable labour markets will require: i) social safety nets that are tailored to the new world of work and limit the chances of people slipping through the holes; ii) updated employment regulations that are adapted to an increasingly diverse range of forms of employment; iii) activation policies (including active labour market programmes) that help displaced workers back into work quickly; iv) skills policies that prepare young people for the jobs of the future and give adults the opportunity to continuously maintain their skills, upskill and/or reskill; and v) strong social dialogue that strengthens workers' voice and enables fair and flexible working arrangements to emerge at the firm level.

Social security

The new ways of working that are emerging are setting significant challenges for existing social security systems. While many countries were already struggling to provide adequate cover for workers on non-standard work contracts, the advent of the platform economy has added to these difficulties as an

increasing number of workers only work occasionally and/or have multiple jobs and income sources, with no statutory working hours or minimum wages. Many of them do not even have worker status. Current social security systems are still largely based on the notion of a unique employer-employee relationship. As an illustration of the problem, in over half of G20 countries with available data, the self-employed currently have no access to unemployment benefits, while in most countries they face different rules from standard workers with regards to old age and invalidity as well as health benefits (Figure 9). Matters are complicated further by the fact that at least some self-employed workers have more than one job – one as employee and the other(s) as independent. A recent study estimated that in the EU: 13% of all those in employment aged 15-64 were at risk of not being entitled to unemployment benefits (54.5% of the self-employed); and 8% were at risk of not being entitled to sickness benefits (37.5% of the self-employed) (Matsaganis et al., 2016).

Adapting social security systems to the new world of work may require a fundamental paradigm shift, where entitlements are linked to individuals rather than jobs, and where they are portable from one job to the next. Such an approach should also encourage labour mobility, since current arrangements may lock individuals in to their existing job out of fear that moving would result in a loss of their entitlements. It could also make independent work more attractive to many individuals. In the United States, Social Security accounts are already “multiemployer” – although they are difficult to extend to platform work since they usually result from bargaining between unions and employers (OECD, 2016b). France recently introduced the *Compte personnel d’activité* which allows workers to preserve accumulated training rights throughout their careers, even when they switch employer.

To finance benefits, new types of workers will also need to be covered by the tax system. In France, since the introduction of the Finance Bill 2016, all platforms are required to provide an annual earnings statement to service providers in order to facilitate their tax returns. In Estonia, the tax authorities are working together with platform operators to develop a system whereby tax is withheld directly via the platform to facilitate income tax collection. For example, Uber drivers are allowed to opt-in to a system where Uber sends drivers’ income data to the tax office, so it is automatically added to their tax return.

Figure 10. Benefit rules for the self-employed are different from those of standard workers

	Old age, invalidity	Health	Accidents	Unemployment	Family
Australia					
Canada					
France					
Germany					
Italy					
Japan					
Korea					
Mexico					
Turkey					
United Kingdom					
United States					

	No benefit
	Optional enrolment
	Different rules from standard workers
	Same rules as the general scheme

Source: OECD (2016c), Report on Pension Systems for the Self-Employed in OECD and EU Countries.

Another idea being discussed in some countries is that of introducing a *basic income guarantee* – i.e. an unconditional income transfer that would replace other forms of public transfers without any means-testing or work requirement. Proponents of this approach see it as an important solution to the large-scale unemployment that they believe automation will generate. In some countries, a basic income guarantee could have the advantage of filling the gaps left by existing social security systems while also offering a simpler alternative to the complex mixture of in- and out-of-work benefits. However, its cost could be a major stumbling block and its effect on work incentives also needs to be carefully assessed. The OECD has estimated that, a basic income that is budget neutral and thus replaces many cash transfers to the population up to retirement age would provide a level of income that is below the poverty line and expose some of the vulnerable groups to higher risks of poverty (OECD, 2017). In some countries, experiments with basic income guarantees are currently underway or planned (e.g. Finland; the Canadian Province of Ontario; Oakland, US; and the Dutch city of Utrecht), and evaluations of these schemes will offer useful evidence as to whether they are viable solutions for the social security challenges posed by the future of work.⁴

Because this is an area where policy makers may have to go back to the drawing board, emerging economies might be at a comparative advantage in that they may be able to skip an entire stage in the development of their social protection systems. In fact, this is what many emerging economies have already been doing by introducing social protection mechanisms which break the traditional link between entitlement to benefits and specific patterns of work (usually full-time on a permanent contract) and job search. Instead, conditional cash transfer programmes like *Bolsa Familia* in Brazil and *Prospera* in Mexico provide a basic income which is independent of the individual's employment status. The lessons from such programmes could be invaluable for policy makers in more advanced economies who are thinking about the possibility of introducing a basic income guarantee.

Finally, it is worth noting that some platforms have put in place their own mechanisms to improve worker protection. For example, the freelancer platform Upwork offers the following services: a) calculation and payment of wages (including any applicable overtime wages); b) collection, payment, and reporting of all required taxes on such wages; c) unemployment insurance and workers' compensation coverage; d) administration of legally required benefits, including health insurance, disability insurance, paid sick leave, paid vacation, severance, notice or termination costs, retirement benefits or other welfare or pension benefits; and e) administration of legally required leaves of absence, wage garnishments, and unemployment claims.

Activation

It is essential to provide workers who are displaced by any of the trends described in this note with a safety net to ensure that they and their families do not fall into poverty and also to provide them with the means necessary to find a new job. However, such financial support may not be sufficient to help displaced workers find new work quickly and other measures may be needed. The provision of welfare benefits may also act as a disincentive to work. This is why it is critical to put in place, alongside adequate social safety nets, an effective activation framework which: (i) motivates jobseekers to actively pursue employment; (ii) improves their employability; and (iii) expands the set of opportunities for them to be placed and retained in appropriate jobs (OECD, 2015d). Strong activation policies can help countries mitigate some of the inevitable adjustment costs of moving towards more globalised and technologically advanced economies. A strong focus of these policies should be on making sure that individuals have the right skills to adapt to changing skill needs (see below). The new forms of work that are emerging may, however, hinder the ability of countries to enforce the principle of mutual obligations given that monitoring work activity will

⁴ Another solution which has been proposed is that of employee capital participation schemes (Freeman, 2015): workers could own shares of the firm, hold stock options, or be paid in part from the profits.

become much more difficult. Activation more generally might become more difficult as a growing share of the unemployed are no longer eligible to unemployment benefits and will not therefore be in touch with the authorities. In many ways, this parallels the challenges that many emerging economies already encounter due to the existence of large informal sectors.

Labour market institutions

The mega-trends and their expected impact on the labour market also raise questions about the future role and coverage of labour market institutions, like the minimum wage, employment protection legislation, working time regulations and regulations to safeguard occupational health and safety. This is particularly so with the emergence of new forms of employment which do not fit easily with the standard definition of employment for which many of these institutions have been developed.

The minimum wage perfectly illustrates the kind of dilemma that policy makers are increasingly likely to face. On the one hand, with inequality high and/or rising in many G20 countries, minimum wages can play an important role in boosting the incomes of those at the bottom of the wage distribution. In line with this, Germany introduced a national minimum wage in 2015 and the issue is also being debated in other countries (e.g. Italy). However, minimum wages do not guarantee that workers will be able to work enough hours to escape poverty – and this is a challenge which is likely to grow as more individuals engage in crowd work and have to hold more than one job at any particular time in order to make ends meet. Even more important, however, is that minimum wage legislation may not be applicable to many of the new forms of employment where workers become independent contractors and are often paid on a piece-rate basis. Worse – increases in the minimum wage might provide further incentives for employers to lower labour costs by outsourcing work through online platforms. This raises serious challenges to the usefulness of minimum wage policy and may be yet another argument for considering some form of basic income guarantee, as discussed above.

Similar questions arise concerning employment protection legislation. On the one hand, and given that the mega-trends are likely to result in a significant re-allocation of labour resources across sectors and occupations, countries will need to have rules in place regarding hiring and firing that allow firms to adjust their workforce to changing demand conditions and technology. Overly rigid employment protection legislation which unnecessarily maintains inefficient worker-firm matches is likely to result in lower productivity and growth. On the other hand, however, the emergence of new forms of employment is likely to result in lower job security for many workers as they will not be protected by the standard rules for hiring and firing that have been defined for open-ended contracts. Oftentimes, less strict rules will apply (e.g. in cases of temporary employment, temporary work agency work or dependent self-employment) while in others, workers might be excluded from employment protection legislation altogether (e.g. the self-employed). For some of the new forms of work emerging, it is not even clear what the status of workers is, who the employer is, and what rules should apply to them. It will therefore be critical that countries examine their legal framework to determine whether it needs to be updated and adjusted in order to provide some form of minimum employment protection for all workers (including those in new forms of employment). The trick, however, is to do this without unnecessarily stifling innovation in the way work is organised and carried out.

Finally, countries also face policy challenges with regards to regulations that seek to improve workplace safety and health. New forms of employment, particularly crowd sourcing, tend to transfer responsibilities for occupational health and safety away from the employer and into the hands of individual workers, who often lack the training or resources to take appropriate measures to ensure that working conditions and the working environment are safe. Sometimes, strong competition between workers may result in corners being cut and unnecessary risks being taken while, at the same time, labour inspectorates are often not adequately prepared to deal with these new forms of employment. Regulations may therefore

need to be adapted/clarified, and monitoring and control mechanisms strengthened and improved. Enforcing safety and health regulations also becomes more difficult within the context of global supply chains and offshoring, which allow companies to avoid costly regulations at home by shifting production to less regulated labour markets abroad. While most firms take their own action through corporate social responsibility programmes, this is an area where international co-operation is particularly important – for example through country adherence to the OECD’s *Guidelines for Multinational Enterprises* (see joint ILO-OECD note on Global Supply Chains).

Skills

Governments will need to ensure that workers are equipped with the right type of skills to navigate successfully through an ever-changing, technology-rich work environment. This will require high-quality initial education and training, but also good skills assessment and anticipation systems, the right types of incentives for individuals to invest in those skills most needed in the labour market, and the provision of effective, up-to-date and tailored information, advice and guidance. It will also require modern systems of lifelong learning to help workers adapt and update their skills over the course of their career.

Two types of skills are likely to be particularly important in the future. First, with the disappearance of routine tasks, growing emphasis will be placed on skills which are more difficult to automate. In particular, there is evidence that the labour market is increasingly rewarding *soft skills* such as the ability to communicate, work in teams, lead, solve problems and self-organise (e.g. Deming, 2015). Second, the importance of digital skills is increasing. While the demand for ICT specialist skills has been growing fast, the existing evidence does not suggest that major shortages are likely to arise. However, there is much more concern about individuals’ ICT generic skills, such as the ability to use communication and information search or office productivity software. Here, existing evidence suggests a significant mismatch between the demand and supply of skills (OECD, 2016d). In Italy and Korea, around a quarter of adults report having no experience in using computers or lack the most elementary computer skills, such as the ability to use a mouse (OECD, 2013).

Rapidly changing skills needs raise the risk of skills mismatch and shortage, both of which have significant economic costs. For individuals, skills mismatch has a negative impact on job satisfaction and wages. For firms, it reduces productivity and increases on-the-job search and turnover, while shortages increase the cost of hiring and hinder the adoption of new technologies. At the macroeconomic level, mismatch increases equilibrium unemployment and reduces GDP growth via misallocation of human capital and/or the reduction in productivity it generates, while skills shortages have equally adverse effects on labour productivity. Furthermore, recent research has shown that countries which are better at meeting the demand for skills also have lower wage inequality (OECD, 2015e). Yet, across G20 countries with available data, two in five employers claim they have difficulties finding the right people to fill jobs.

These challenges are even greater in countries with ageing populations, where the majority of the future workforce has already left initial education. As a result of rapid technological change, the skills of these workers will become obsolete more quickly, while at the same time they will be required to stay in the labour force for longer. To help these individuals adapt to changing labour market needs, it will be particularly important for governments to design *high-quality lifelong learning systems* which will permit adults to regularly update, upgrade, and sometimes even acquire completely new knowledge, skills and competences in order to stay employed and/or find new employment. Given that low-skilled workers are likely to bear the brunt of adjustment costs, efforts should be targeted on them, as well as on small- and medium-sized enterprises which tend to face greater barriers to investments in training.

Social dialogue and worker voice

With regards to social dialogue, the future of work poses at least two key issues. First, and given the current trends towards more flexible and tailored working arrangements, one-size-fits-all regulation is unlikely to offer solutions that meet the needs of all employers and workers. This seems to call for multi-level collective bargaining systems with a significant role for firm-level bargaining, which allow tailored solutions to emerge at the firm-level. The challenge, however, is to try and achieve this without taking the “collective” out of the collective bargaining process and undermining its very foundation. The second issue is that, in some countries, it is becoming harder to organise workers and give them a voice. This trend is likely to continue as workers are increasingly working alone and separated by different geographies, languages and legal contexts (OECD, 2016a). As independent work becomes more common, the number of workers covered by collective agreements is likely to fall – while it is precisely those workers who are likely to be the most vulnerable and stand to gain the most from social dialogue.

Solutions to address this problem of worker voice are nevertheless emerging in the form of new social partnerships. For example, in the United States, the Freelancers Union promotes the interests of independent workers, including platform-based workers, and currently has more than 250 000 members – although it cannot engage in collective bargaining, call for labour inspections or get involved in any decision about the firms that their members provide services for (OECD, 2016a). Since 2015, Lyft and Uber drivers in the city of Seattle have been able to unionise and engage in collective bargaining on such issues as pay and working conditions. A freelancer group also represents drivers in New York. In Germany, the largest metalworkers’ union (IG Metall) has been behind the creation of FairCrowdWork Watch, a platform dedicated to improving digital workers’ working conditions. Similarly, ver.di, the United Services Union, is providing legal and support services for crowd-workers. What is needed from governments to promote such developments in social dialogue and worker representation is a favourable legal and regulatory framework.

Conclusions

The confluence of several megatrends -- globalisation, digitalisation and demographic change -- is changing profoundly the nature of work in terms of the type of jobs being created, the skills required for these jobs and the way work is organised. These trends are challenging traditional labour market and social policies and require new thinking to help navigate and shape the new world of work in ways to ensure a fair sharing of the benefits that these changes may bring while limiting their costs. Labour markets will need to be made more flexible and adaptable. This can be achieved through policies that seek to:

- Prepare young people for the jobs of the future by ensuring that they are equipped with the right type of skills to successfully navigate through an ever-changing, technology-rich work environment, and give all workers the opportunity to continuously maintain their skills, upskill and/or reskill throughout their working lives.
- Design labour market institutions (e.g. minimum wages; employment protection; health and safety regulations) which encourage employers to seize the opportunities offered by technological change and globalisation, while making sure that the risks are not borne disproportionately by workers in the form of low pay, precariousness and poor working conditions.
- Re-think social security systems to minimise the chances of people slipping through the holes by: (i) tailoring or adapting them to the new forms of employment; or (ii) decoupling them entirely from people’s work status and history.

- Strengthen activation frameworks to mitigate some of the inevitable adjustment costs of moving towards more globalised and technologically advanced economies by helping those workers who have been displaced by changing skills needs into a new job quickly.
- Promote new forms of social dialogue which allow tailored solutions to new challenges to emerge at the firm-level, while strengthening the voice of those workers who are increasingly working independently and separated by distance, language and legal context.

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