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# Working time and the future of work



**Jon Messenger**

Team Leader, Working Conditions Group

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# Working time and the future of work

**Jon Messenger\***

Team Leader, Working Conditions Group, ILO

\* Team Leader, Working Conditions Group, ILO. Email: [messenger@ilo.org](mailto:messenger@ilo.org)  
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# Abstract

This paper reviews trends and developments in both hours of work and the organization of working time (working time arrangements) and considers their implications for the future of work. Since the Industrial Revolution there has been a downward trend in hours of work (in those countries with longitudinal data on working hours), which moved in tandem with increases in wages and productivity – creating a virtuous cycle. In recent decades, however, this trend has ceased or even reversed in some cases. This has been accompanied by a bifurcation of working hours, with substantial portions of the global workforce working either excessively long hours (more than 48 hours per week), which particularly affects men, or short hours/part-time work (less than 35 hours per week), which predominantly impacts women. Regarding the organization of working time, there has been a diversification in working time arrangements, with a movement away from the standard workweek consisting of fixed working hours each day for a fixed number of days and towards various forms of “flexible” working time arrangements (e.g. new forms of shift work, hours averaging, flexi-time arrangements, compressed workweeks, on-call work) along with demands for extended and even 24/7 availability, with widely divergent effects depending on the specific arrangement. The other key emerging issue regarding the organization of working time concerns the impact of new information and communications technologies (New ICTs), such as smartphones and tablet computers, which enable constant connectivity. These New ICTs have resulted in a blurring of the boundaries between paid working time and both the times and spaces that are normally reserved for personal life. The paper raises a question as to whether, given the impacts of recent technological developments on employment, the resumption of the historical trend towards an overall reduction of working hours has become an economic and a social imperative. This would require public policies promoting the reduction of working hours, particularly for those workers working excessively long hours, as well as some basic guarantees regarding minimum working hours for those working in part-time jobs with very short hours. Such policies need to be combined with both policies and practical guidance regarding how to develop balanced working time arrangements that ensure minimum periods of rest, including paid leave, and can benefit both workers and enterprises.

# Preface

In August 2017, the Director-General of the International Labour Organization convened an independent Global Commission on the Future of Work. The Commission will produce an independent report on how to achieve a future of work that provides decent and sustainable work opportunities for all. This report will be submitted to the centenary session of the International Labour Conference in 2019.

The Future of Work Research Paper Series aims to support the work of the Commission by publishing in-depth, original studies on specific topics of interest to the Commission, ranging from explorations of artificial intelligence and the platform economy to lifelong learning and universal social protection. Each paper provides a critical analysis of current and future developments and raises important questions about how to ensure a future of inclusive development with decent work at its heart.

The strengths of this insightful Research Paper lie in its scope of both rich ideas and empirical frame. It makes three important arguments which feed in directly to the Global Commission. The first is that we need to grasp the contemporary phenomenon of a “bifurcation” of working time – namely, that the world’s workforce is divided between segments experiencing excessive hours on the one hand and short/variable hours on the other. Despite the adoption in 1919 of ILO Convention 1, more than one in three workers in the world regularly work more than 48 hours per week. Also, one in five are in short part-time employment. This means a majority (some 55%) fall outside the “standard” range of 35-48 weekly hours; and this is especially true in developing regions due to the high share who regularly work 50+ and even 60+ hours per week.

Very short hours work is dominated by women; in Africa, the Americas and the Arab States, the paper reports that around one in four women in informal employment work less than 20 hours per week. It can be a signal of time-related underemployment; the paper shows it is a growing problem since the 2008-9 financial crisis in the United States and most European countries. We are also reminded of the fact that part-time work is heterogeneous. While it has the potential to enable work-life balance with decent protections, “marginal part-time work” is often low-skilled and affords workers limited autonomy and time sovereignty.

The second key argument is debates about working-time flexibility must distinguish between employer-led flexibility (to meet operational and profit pressures for example) and worker-led flexibility (to align hours with family commitments, for example). The evidence suggests each form has significantly different health effects; this includes the damage caused by unpredictable changes in working hours on mental health and quality of family life. There seems to be class bias in access to worker-led working-time flexibility; more research is needed here.

The third argument is that digital and ICT advances are bringing conflicting results. Teleworking and mobile work promise improved productivity and work-life balance, yet these benefits come at the expense of longer hours and the blurring of work-private life boundaries. Gig economy work (both micro task or crowdwork and manual services work) likewise offers more working time control but also injects new problems of high levels of unpaid task-search time (crowdwork) and information asymmetries that undermine worker control (e.g. Uber and Didi).

Pulling together these arguments, and drawing on extensive research, Jon Messenger establishes a comprehensive empirical justification for a set of concrete policy interventions, contingent on the country's development context. These include a reduced full-time working week (for the same weekly wage), improved rights for workers in part-time employment (including a guaranteed right to minimum working hours) and the right to disconnect from ICT – each guided by ILO principles concerning health and safety, gender equality, productivity and workers' time sovereignty.

Jon C. Messenger is Team Leader, Working Conditions Group at the International Labour Office in Geneva, Switzerland. Jon is responsible for the ILO's work programme on working time, work organization, and work-life balance. He specializes in policy-focused research, policy advice and technical assistance, with a particular interest in issues relating to working time flexibility, work sharing, and new and evolving forms of work organization such as telework. He is the author and/or editor of a number of publications, including *Decent Working Time: New trends, new issues*; *Working Time around the World*; *Work Sharing during the Great Recession: New developments and beyond*; and *Working Anytime, Anywhere: The effects on the world of work*.

**Damian Grimshaw**  
*Director*  
*Research Department*

# 1. Introduction

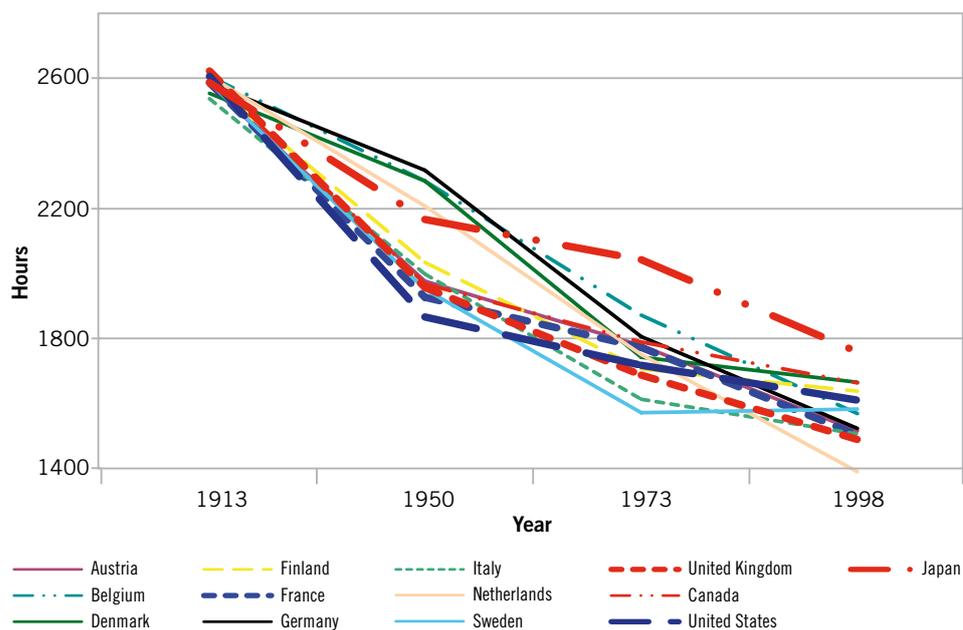
In his essay “Economic possibilities for our grandchildren”, John Maynard Keynes predicted that the generation of his grandchildren would be working three hours a day or a 15-hour workweek (Keynes, 1930). As outlandish as this bold prediction might seem in hindsight, at the time it reflected a trend towards declining working hours that was already well-established, and the mass unemployment of the Great Depression was pushing it forward further. The first international labour standard, the ILO Hours of Work (Industry) Convention, 1919 (No. 1), had already enshrined a long-sought trade union objective, the eight-hour workday, into international law, alongside a 48-hour weekly limit on working time – a radical notion at a time when 60-plus hour workweeks were still common everywhere.

In the same article, Keynes also wrote about the then-emerging problem of technological unemployment, which he defined as follows: “unemployment due to our discovery of means of economizing the use of labour outrunning the pace at which we can find new uses for labour” (ibid.). However, Keynes only viewed this situation as a short-term problem; he said that “in the long run, this means that mankind is solving its economic problem.” (ibid.) Of course, he was referring to the problem of scarcity – the core problem that has plagued humanity since the beginning of time. He expected that human adaptation to this situation would be difficult, but eventually the problem of technological unemployment would be solved by a substantial reduction in the workweek, as discussed above.

In fact, at the very time that Keynes was writing his famous essay, the Great Depression, a wide range of both public and private work sharing initiatives – that is, reducing hours of work to preserve or create jobs – emerged in both Europe and North America. The adoption of the ILO Forty-Hour Week Convention, 1935 (No. 47) reflected the spirit of the times. Only two decades after the adoption of the 48-hour week, there was already a building consensus regarding the principle of a five-day workweek with two consecutive days of rest. However, while the primary focus of Conventions Nos. 1 and 30 was the protection of workers, the economic and social crisis of the Great Depression resulted in the reduction of working hours being seen as a tool to combat unemployment as well. National labour laws on working time have largely followed the international standards, such that the 40-hour workweek is now the most common national standard for normal weekly hours of work – and the dominant standard in the developed world – while the 48-hour workweek remains common in developing countries. (ILO, 2018a).

As the Second World War was drawing to a close in 1944, the ILO convened its annual conference in Philadelphia and adopted the Declaration of Philadelphia, which boldly asserted that “all human beings, irrespective of race, creed or sex, have the right to pursue both their material well-being and their spiritual development in conditions of freedom and dignity, of economic security, and equal opportunity” (Article 2(a)). In other words, work is about more than just meeting material needs; people also need to have the opportunity for fulfilling personal lives as well. And in the period of prosperity following the Second World War, the international consensus around the reduction of working hours towards the “social standard” of the 40-hour workweek – based on the country’s level of development – continued to build, culminating in the adoption of the ILO Reduction of Hours of Work Recommendation, 1962 (No. 116).

**Figure 1. Annual hours worked per person employed, total employment, 20th century**



Source: Maddison, 2001, p. 347.

Likewise, the historical evolution in actual hours of work has followed a downward trend since the excessively long hours that prevailed at the dawn of the Industrial Revolution – a pattern that held during much of the 20th century across the industrialized world. From a base of between 2,500 and 3,000 hours per worker per year back in 1900, on average, working hours gradually declined as countries reached higher levels of development. By the year 2000, average annual hours of work were below 2,000 per worker in nearly all the developed countries, and in many of those countries (e.g. France, Germany, and the Netherlands) the average annual hours were substantially less, closer to 1,500 hours per year. However, in the last few decades of the 20th century, this trend ceased or even reversed in some of these countries. Figure 1 above illustrates this phenomenon (Maddison, 2001).

Thus, as we have seen, international labour standards set the tone for a gradual reduction in the working hours provisions of national labour laws, and ultimately for reductions in actual hours of work in many countries – typically based on their level of development – over the course of the 20th century.<sup>1</sup> However, these reductions have taken different forms, including reductions in the standard workweek, part-time work (i.e. jobs with fewer hours than the standard workweek in the particular country), increases in paid annual leave and paid holidays, and more customized arrangements achieved through collective bargaining, such as the recent agreement for a 28-hour workweek with options for individual working time choices in the German metalworking sector (IG Metall, 2018). These and other significant trends and developments regarding working time and their implications for the future of work will be reviewed and discussed in the remainder of this paper.

<sup>1</sup> No longitudinal data on working hours covering the entire 20th century exists for most if not all developing countries.

## 2. Hours of work

The topic of working time can be divided into two main components: (1) hours of work; and (2) the organization of working time, which is more commonly known as *working time arrangements* or *work schedules*. This section of the paper will focus on important trends and developments regarding both hours of work – that is the *length* or *volume* of working hours – in both the formal economy and the informal economy and working time arrangements. It will also consider the effects of the length or volume of working hours on both workers and enterprises.

### 2.1. Bifurcation of working hours: *Both long and short hours*

One of the dominant features of the context for any discussion or debate on working time and the future of work is the uneven distribution of working time. While the traditional concern about excessively long hours of work – which, as we saw in the Introduction, dates back to the dawn of the Industrial Revolution – continues to be a problem in some parts of the world and among some groups of workers, short hours of work – called part-time work – has emerged as a concern in other parts of the world and among other groups of workers. Part-time work is particularly a concern for those workers with very short hours of work – often referred to as *marginal part-time employment* – because of its association with *time-related underemployment*,<sup>2</sup> few or no benefit entitlements (e.g. paid leave), and often unpredictable work schedules. This subsection will discuss both of these phenomena, as well as the unique situation of working hours in the informal economy.

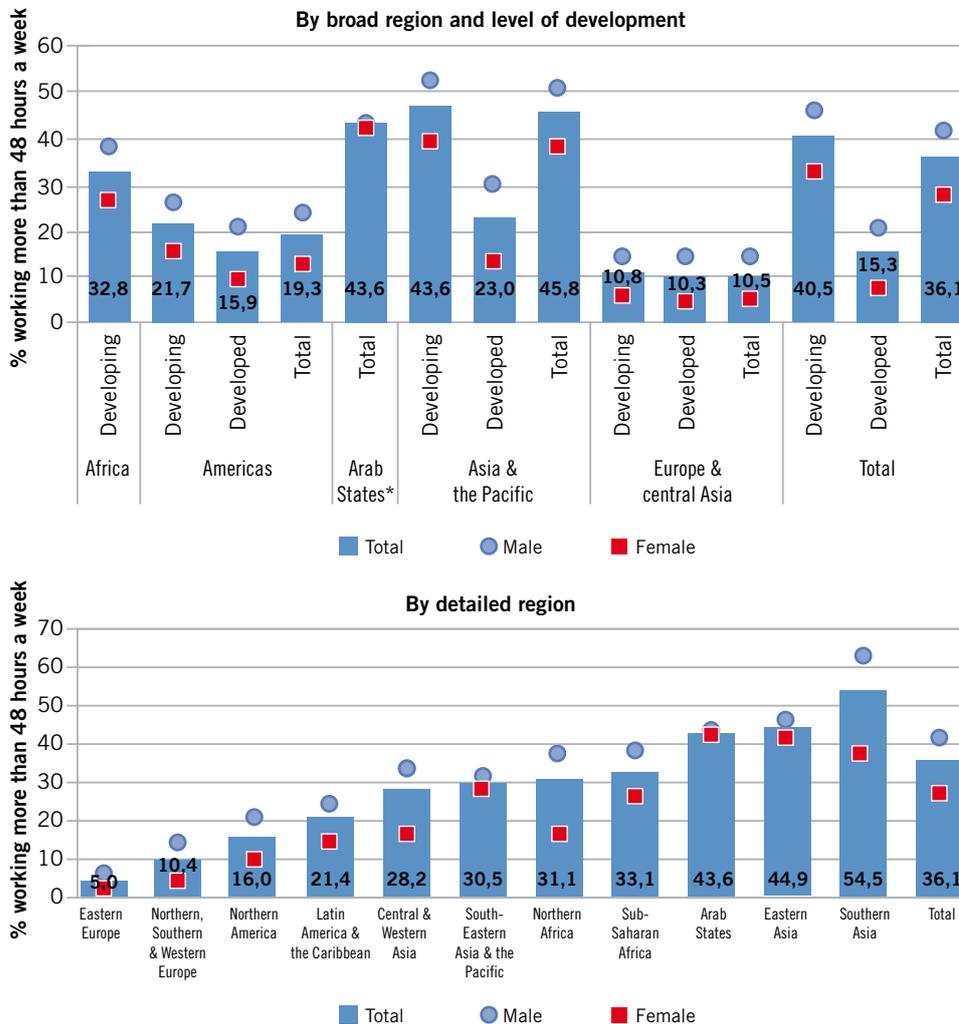
#### Excessively long hours of work

Excessively long hours of work can be defined as regularly working more than 48 hours per week. This definition is in line both with the relevant international labour standards, Conventions Nos. 1 and 30 – which limit normal working hours to 48 per week – and also with relevant literature regarding the effects of working hours on occupational safety and health, work–life balance, and productivity and performance (see the discussion regarding the effects of working hours later in this section.)

As shown in figure 2, approximately one-third of the global workforce (36.1 per cent) works more than 48 hours per week. The proportion of workers working such excessively long hours is more than double in developing countries as compared with developed countries. In the former, such long hours of work are driven mainly by low wages, which means that workers often need to work long hours to make ends meet (see e.g. Lee, McCann and Messenger, 2007). The situation is a bit different in developed countries, particularly for certain categories of professional workers and managers, who may be expected to work whatever hours are required to complete their assignments and/or may work long hours to show their commitment to the organization and thus advance their careers (ibid.)

<sup>2</sup> The time-related underemployment rate is a measure of labour underutilization that provides information regarding the share of employed persons who are willing and available to increase their working time (for production within the SNA production boundary) and who worked fewer hours than a specified time threshold during the reference period. It signals inadequate employment (ICLS, 2008).

**Figure 2. Excessive hours of work (more than 48 hours a week): Global and regional estimates, total employment, latest year available (percentages)**



Note: Global estimates based on 131 countries representing 95 per cent of world employment. Data for the latest available year: 2013 or later (mainly 2014–15) for 80 of the countries covered.

\* Arab States: the number of countries considered is insufficient to build conclusions on those regional estimates.

Sources: Bonnet, 2017; ILOSTAT and ILO calculations based on labour force or other nationally representative household survey data.

There is also a substantial gender difference in excessive hours: men are twice as likely as women to work excessive hours in developed countries; men are also more likely than women to work excessive hours in developing countries, but the difference is proportionately smaller. However, it is important to keep in mind that this gender difference in paid work does not reflect the substantially greater amount of time that women devote to household tasks and care work as compared to men. In fact, this burden of women's unpaid work accounts for much of the difference between women and men in paid working hours (Lee, McCann and Messenger, 2007). The proportion of workers who are working such long hours is highest in the Asia and the Pacific region (45.8 per cent), particularly Southern and Eastern Asia, followed by the Arab States region (43.6 per cent). In contrast, the proportion of workers working excessive hours is lowest in all the subregions of Europe, particularly Eastern Europe, followed by Northern America.

## Short hours, marginal part-time work, and time-related underemployment

Short hours of work – often called “part-time work” – means regularly working less than the full-time hours in a particular country. Specifically, the ILO Part-Time Work Convention, 1994 (No. 175), defines a part-time worker as an “employed person whose normal hours of work are less than those of comparable full-time workers”. However, most statistical definitions of part-time work focus on the number of hours worked per week – with thresholds of less than 35 hours per week, or sometimes less than 30 hours per week, used as the basis for determining which workers are working “part-time”.

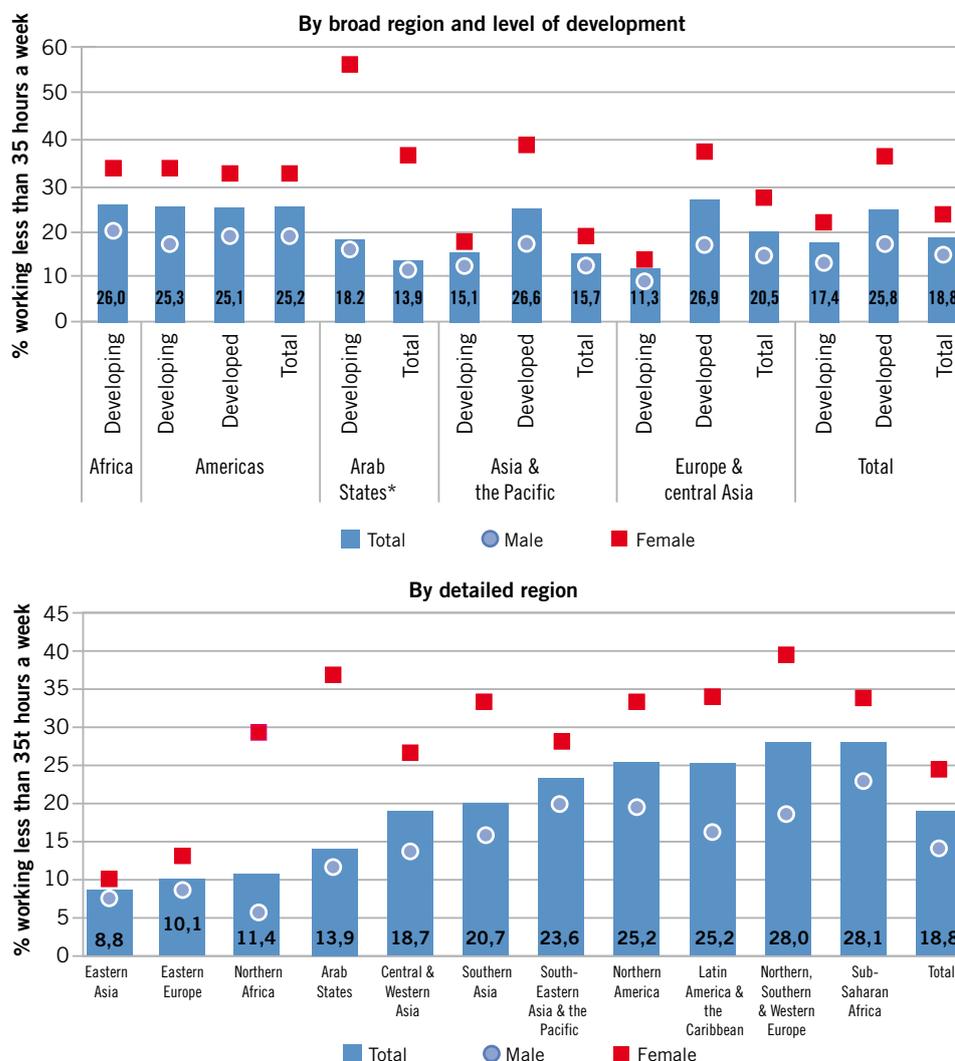
Based on this definition, figure 3 indicates that slightly less than one-fifth of the global workforce (18.8 per cent) is working such short, or part-time, hours of work.<sup>3</sup> Part-time work has been gradually increasing in most developed countries, where short hours are widely seen as a mechanism for promoting work–family reconciliation and work–life balance in general (Fagan et al., 2014). The proportion of workers working such short or part-time hours is substantially higher in developed countries as compared with developing countries. There is also a substantial gender difference in short or part-time hours, but the reverse of the one for long hours: women are twice as likely as men to work short hours across the world, and this gender difference is much greater in developed countries than in developing ones. This situation is due primarily to the fact that women frequently bear the primary responsibility for unpaid household and care work, and in particular the importance of children as a determinant of women’s paid working hours (see Lee, McCann and Messenger, 2007, Chapter 4 for an in-depth discussion of this issue).

Despite the fact that the proportion of short hours is higher overall in developed countries than developing ones, the proportion of workers working short hours is actually the highest in a developing region, Africa (26.0 per cent), and particularly sub-Saharan Africa (28.1 per cent). However, the proportions of workers working short or part-time hours is also substantial in the Americas and in the Europe and Central Asia region, particularly Northern, Southern and Western Europe (28.0 per cent).

Regarding very short hours of work – defined here as less than 15 or less than 20 hours per week (depending upon the available data) and often referred to as *marginal part-time employment* (see Messenger and Wallot, 2015) – figure 4 shows that the proportion of workers working such very short hours remains quite small overall – a mere 5.1 per cent of the global workforce. The proportion is slightly higher in some regions of the world, particularly sub-Saharan Africa and Southern Asia. However, the most striking aspect of marginal part-time work is its gender dimension: the proportion of women working very short hours is substantially higher than for men in every single region of the world, and double or even triple the rate in most regions. As with part-time work in general, this situation is due primarily to women’s disproportionate burden of unpaid household and care work, which limits the extent of their participation in the paid labour force.

<sup>3</sup> Part-time hours of work should be distinguished from the contractual arrangements associated with part-time employment, which are often inferior to the contractual arrangements for those workers in full-time employment (ILO, 2011).

**Figure 3. Short hours of work (less than 35 hours a week): Global and regional estimates, total employment, latest year available (percentages)**



Note: Global estimates based on 131 countries representing 95 per cent of world employment. Data for the latest available year: 2013 or later (mainly 2014–15) for 80 of the countries covered.

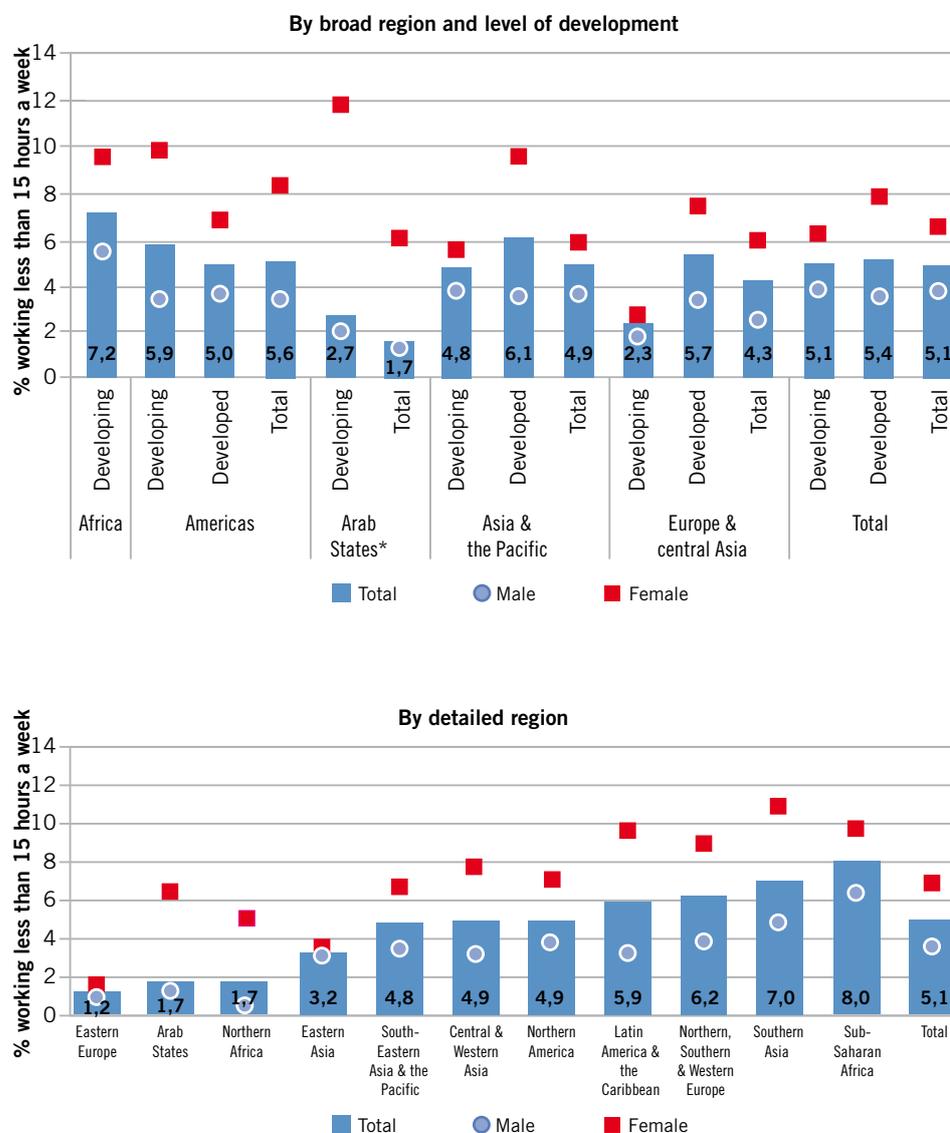
\* Arab States: the number of countries considered is insufficient to build conclusions on those regional estimates.

Sources: Bonnet, 2017; ILOSTAT and ILO calculations based on labour force or other nationally representative household survey data.

The main reason for concern regarding very short hours of work is that this is frequently an involuntary state for workers – that is, they tend to be associated with time-related underemployment. In the United States for example, there is an ongoing structural shift towards more intensive use of part-time employment by many employers, which is driving the elevated rate of involuntary part-time work (Golden, 2016). In 2015 there were 6.4 million involuntary part-time workers in the United States, and they made up 4.4 per cent of the total workers in the labour force, which is an increase of roughly 2.0 million from just prior to the last recession (ibid., p. 4).<sup>4</sup> Involuntary part-time workers

<sup>4</sup> The proportions for women and men were 5.1 and 4.0 per cent, respectively.

**Figure 4. Very short hours of work (less than 15 hours a week): Global and regional estimates, total employment, latest year available (percentages)**



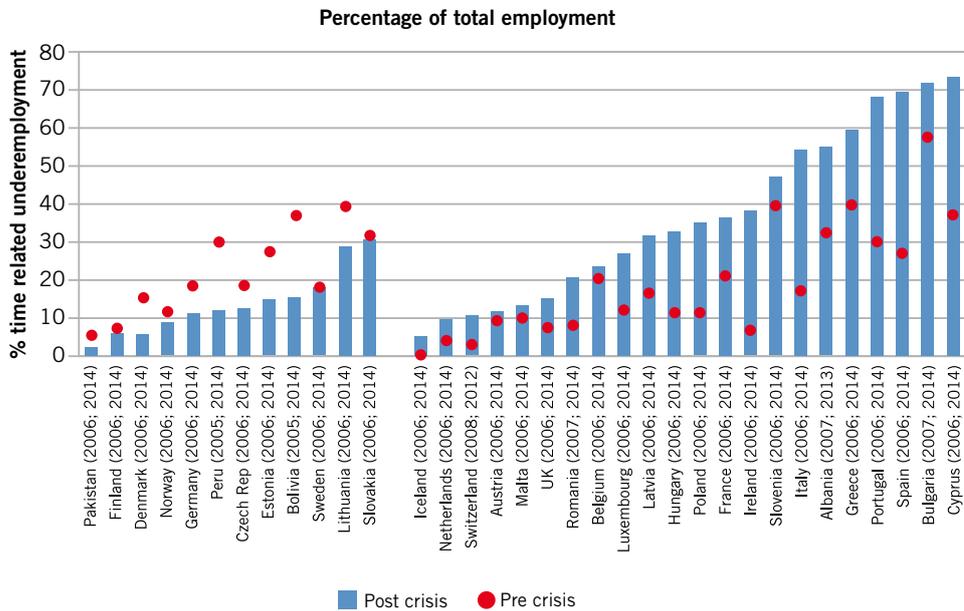
Note: Global estimates based on 131 countries representing 95 per cent of the world employment. Data for the latest available year: 2013 or later (mainly 2014–15) for 80 of the countries covered.

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Sources: Bonnet, 2017; ILOSTAT and ILO calculations based on labour force or other nationally representative household survey data.

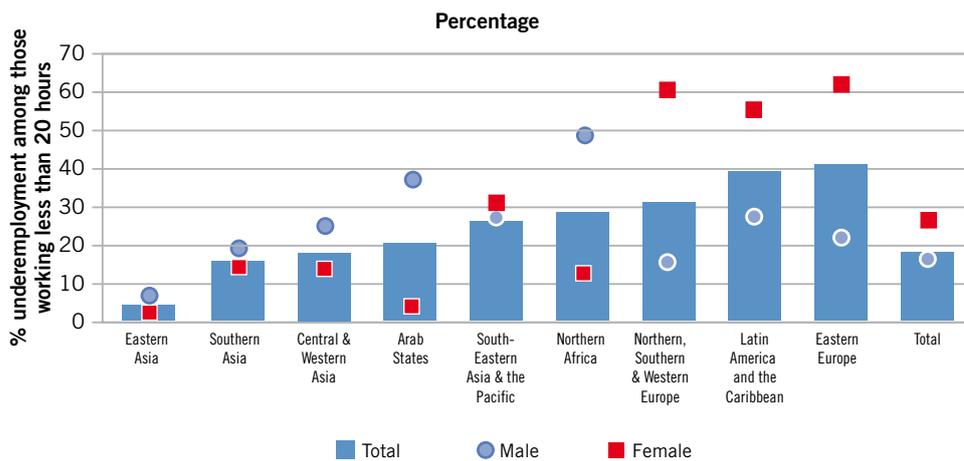
are not only earning less income than they would prefer, but also suffer because part-time jobs offer relatively lower wage rates and benefit coverage, and often have more variable hours and unpredictable work schedules. The United States is, however, no exception regarding this particular phenomenon because time-related underemployment levels remained high or have even increased following the global economic crisis of 2007-2009 in many countries (see figure 5). In various regions of the world, this is in particular impacting women in their quest for decent work (see figure 6).

**Figure 5. Time-related underemployment pre- and post-economic crisis for workers with very short hours of work (less than 20 hours a week)**



Source: ILOSTAT and ILO calculations based on labour force or other nationally representative household survey data.

**Figure 6. Time-related underemployment: Global and regional estimates, employees, latest year available**

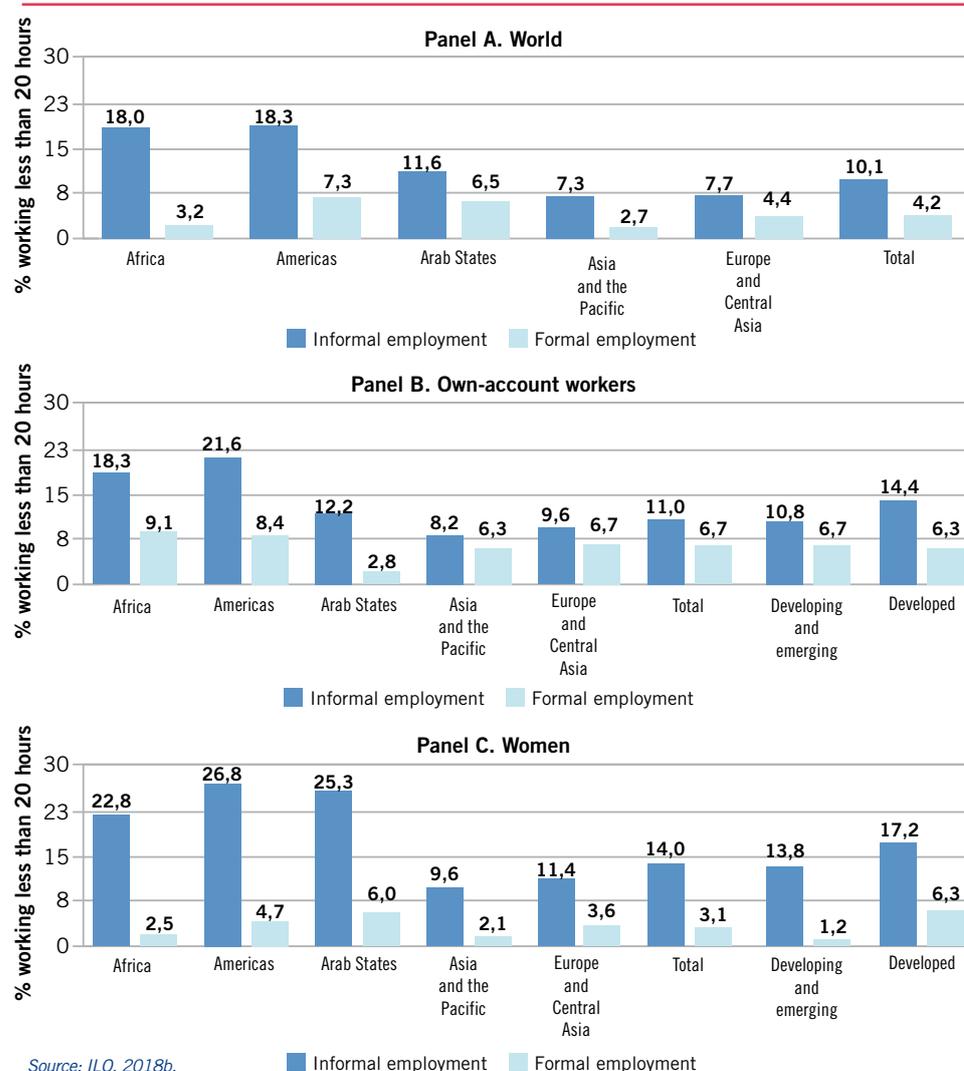


Source: ILO calculations based on national household surveys.

## 2.2. Working hours in the informal economy, particularly self-employed workers

The issues of both very short and excessively long working hours are both prominent in the informal economy that dominates much of the developing world. In fact, the share of workers who have very short working hours is higher among those workers in informal employment than workers in formal employment in all regions of the world (figure 7, panel A). Overall, 10.1 per cent of workers in informal employment are working less than 20 hours per week, compared to 4.2 per cent in formal employment. Africa shows the largest difference with a proportion of workers with very short hours that is over five times higher among workers in informal employment compared with those in formal employment. Regarding self-employment (figure 7, panel B), the share of self-employed (own-account) workers working very short hours is significantly higher among those operating informally (11.0 per cent) compared with those self-employed workers with formal enterprises (6.7 per cent).

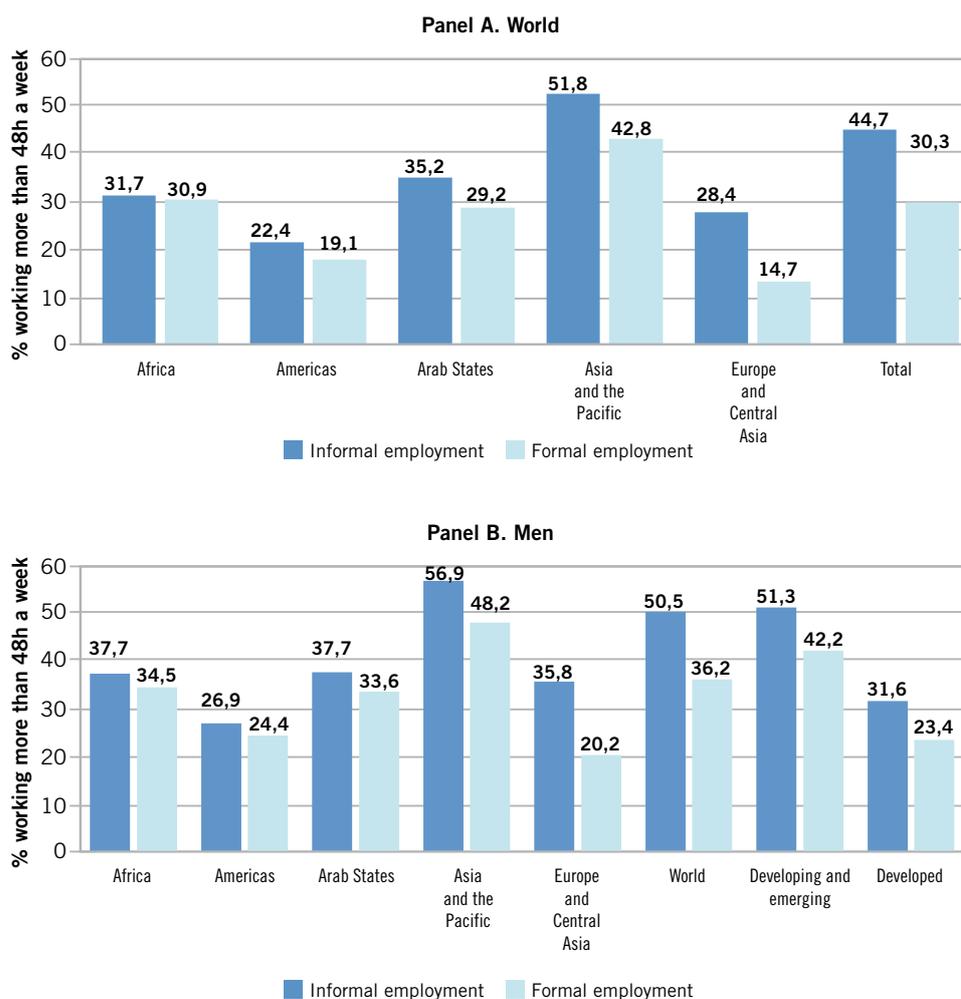
**Figure 7. Proportion of workers with less than 20 hours a week and the formal or informal nature of worker's main job, latest available year (percentages)**



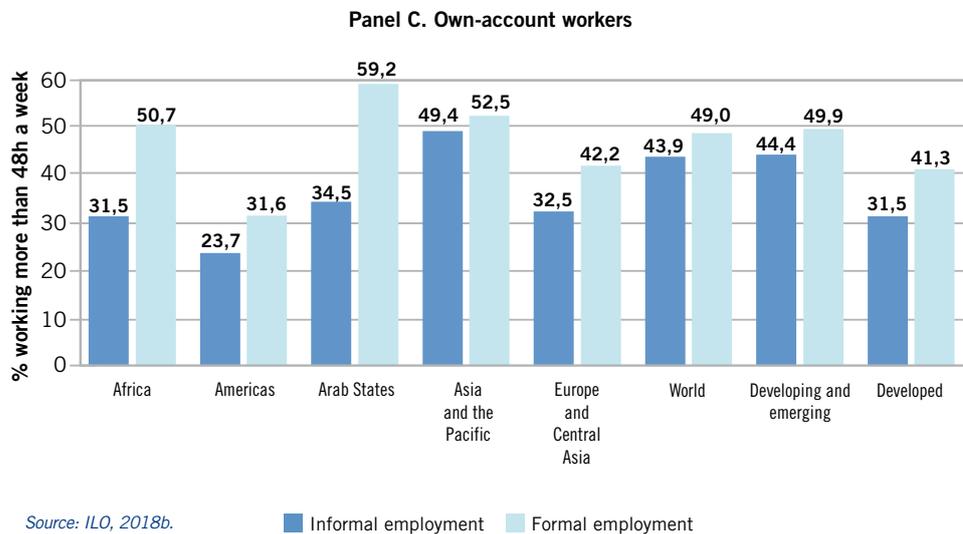
The situation of women in informal employment is perhaps the most extreme (figure 7, panel C). Globally, more than 14 per cent of those women in informal employment work less than 20 hours a week compared with 3.1 per cent of those in formal employment. This proportion exceeds 20 per cent in the Africa, Americas and Arab States regions. The most plausible explanation for this situation is women's burden of unpaid domestic and care work (ILO, 2018b; see also Lee, McCann and Messenger, 2007).

While workers in informal employment are more likely to hold jobs associated with very short hours of work than those in formal employment, at the same time those workers in informal employment are *also* even more likely to work excessively long hours (see figure 8, panel A). The phenomenon of excessively long hours in informal employment is most extreme in the Asia and the Pacific Region, but excessive hours in informal jobs appears to affect nearly half of all employees in the developing world (44.7 per cent; see figure 8, panel A). This is particularly the case for men and employees with informal jobs in developing countries (figure 8, panel B).

**Figure 8. Proportion of workers working more than 48 hours a week and the formal or informal nature of workers' main job (percentages, based on latest available year)**



**Figure 8. Proportion of workers working more than 48 hours a week and the formal or informal nature of workers' main job (percentages, based on latest available year)**



Self-employed (own-account) workers show a very different picture regarding excessively long hours. The global incidence of excessive hours among those with informal economic units is quite high (43.9 per cent), but nonetheless it is still less than the comparable figure for self-employed workers in the formal economy – where *nearly half* of them (49.0 per cent) work excessively long hours. In fact, in all of the regions of the world the minority of those self-employed workers who have established formal economic units is more likely to work excessive hours than their counterparts operating their businesses on an informal basis (figure 8, panel C).

### 2.3. Effects of working hours on OSH, work–life balance and productivity and performance

The length or volume of working hours – particularly excessively long hours of work – can have important consequences for both workers and enterprises. The adverse consequences of long hours stem from disturbances in individuals' sleep, biological rhythms, and family and social life, which in turn have negative effects on their level of fatigue and their mood, and ultimately on their health, safety and performance at work (Tucker and Folkard, 2012).

An increasing body of empirical evidence underlines the adverse effects of regular long working hours (defined as more than 48 hours or more than 50 hours per week depending on the specific study) on human health and workplace safety. Multiple studies regarding health agree that the negative effects of regular long working hours include both short- and long-term effects. Acute reactions involve physiological responses such as increased levels of fatigue, stress and sleeping disorders, as well as unhealthy

lifestyle habits such as smoking, alcohol abuse, irregular diet and lack of exercise. Long-term effects include an increased incidence of cardiovascular disease, gastrointestinal and reproductive disorders, musculoskeletal disorders, chronic infections and mental illnesses (Tucker and Folkard, 2012; see also NIOSH, 2004 and Spurgeon, 2003). In addition to these health implications, it is clear that work schedules which regularly involve extended hours decrease workplace safety, as the risk of occupational accidents and injuries rises with increasing length of the work schedule – which is also costly for enterprises (see e.g. Johnson and Lipscomb, 2006).

Excessively long weekly hours of work are positively associated with chronic effects of fatigue, leading to health problems such as cardiovascular disease, gastrointestinal disorders, and even higher mortality rates (e.g. *karōshi* in Japan). Long weekly hours are also positively associated with poorer mental health status, i.e. higher rates of anxiety, depression and sleep disorders (Afonso, Fonseca and Pires, 2017). Recent results from a study in the United States tracking chronic disease risks from exposure to long-hours work schedules over a 32-year period clearly showed that regularly working long hours for a long period is significantly associated with elevated risks of heart disease, non-skin cancer, arthritis and diabetes. The observed risk was much higher among women than among men (Dembe and Yao, 2016). Because women’s health may be disproportionately affected by working long hours, employers should consider specific policies to help women better manage the demands of combining work and family, and thereby help them maintain good health (ibid.). In addition, research results from Japan suggest that working long hours during the first trimester of pregnancy is associated with spontaneous abortion and premature birth (Takahashi, 2014). Factors such as autonomy, high job demands, external pressure to work overtime, and low rewards (e.g. lack of overtime premia) mediate the relationship between overtime work and occupational health and safety. In general, however, reducing excessively long working hours is likely to result in positive effects on occupational safety and health.

Long weekly hours (more than 48 hours per week) are also associated with reduced levels of reported work–life balance and increased work–family conflict (Fagan et al., 2012). Long working hours pose particular problems for work–life balance if they are involuntary and inflict negative effects on workers’ private lives and well-being. Fagan et al. (2012) review a number of studies that have identified long working hours as an important predictor of work–life conflict, and they conclude that work–family incompatibility, less engagement in community and civic life, and lower fertility rates are all common outcomes of excessively long hours of work. Work–life imbalances may also reduce mental well-being, resulting in stress, anxiety, and lower job and life satisfaction. Thus, reductions in long hours are likely to improve workers’ work–life balance and may also increase their life satisfaction, which is also known as “happiness”, mainly in the economics literature (Hamermesh, Kawaguchi and Lee, 2014).

Regarding short working hours (part-time work), both the positive and negative findings regarding the effects of such hours are often due to different reasons for working part-time, i.e. voluntary vs. involuntary part-time work and the varying nature of part-time jobs. In this respect, it is useful to distinguish between quality part-time work and “marginal” part-time employment with very short hours of work (including on-call work). While the first type frequently has positive effects on work–life balance, the latter is often found in low-skilled part-time jobs and tends to be characterized by little job autonomy, irregular hours and unpredictable work schedules (Messenger and Wallot,

2015). This latter type of part-time work poses severe challenges to workers' ability to effectively manage and balance their work and non-work responsibilities.

Finally, it is widely believed that long working hours result in high productivity, but this is actually a myth. In fact, longer hours of work are generally associated with lower unit labour productivity, while shorter hours of work are linked with higher productivity. Working excessively long hours on a regular basis has been shown to reduce hourly productivity due to greater fatigue, and those workers with long hours and/or heavy workloads report decreasing job satisfaction and motivation and also higher rates of absenteeism and staff turnover (Golden, 2012). Likewise, countries with long hours of work often have relatively low unit labour productivity. For example, comparing several OECD countries, an ILO analysis found that the relationship between the number of hours worked annually per person and labour productivity (measured as GDP per hour worked) was strongly negative (ILO, 2009). A recent analysis of the relationship between working hours and labour productivity using historical data on munitions workers (Pencavel, 2014) found that, above a specific hours threshold (in this case, 49 hours), output rises at a decreasing rate as hours increase – an empirical demonstration of the phenomenon of declining marginal productivity. Pencavel links this finding with the recent OSH literature showing that long working hours are correlated with an increased risk of accidents and illnesses, which also increases costs to enterprises (see also Tucker and Folkard, 2012).

## 3. The organization of working time or working time arrangements

### 3.1. Diversification in working time arrangements

In addition to hours of work, the other major dimension of working time is the organization of working time – which is often referred to either as “working time arrangements” or as “work schedules”. Any given number of hours of work can, at least theoretically, be organized in an almost infinite number of ways, and how those hours are organized can have important consequences for both workers and enterprises. One has only to think of the difference between a 40-hour workweek that is worked as a regular daytime shift and the same 40-hour workweek that is worked as a permanent night shift to see what a major difference work schedules can make.

Comparable international data on *actual* working-time arrangements or work schedules (as opposed to arrangements as defined in national laws or regulations) are rare outside the European Union (EU) Member States. In fact, it was only in 2008 that the 18th International Conference of Labour Statisticians (see ICLS, 2008) established a formal

definition of working-time arrangements, as well as a corresponding typology of the different arrangements, thereby providing a conceptual foundation for the collection of internationally comparable data on such arrangements. According to ICLS, 2008:

*Working-time arrangements describe measurable characteristics of a job that refer to the organization (length and timing) and scheduling (stability or flexibility) of work and non-work periods during a specified reference day, week, month or longer period and applies to all types of jobs... (p. 46) ...Multiple characteristics (such as a part-time, flexible schedule) may apply as they are not mutually exclusive (p. 54).*

This section of the paper will review important recent developments regarding working time arrangements, most prominently the expanding use of various types of working time flexibility, and the effects of various arrangements on both workers and enterprises.

## The classic “standard workweek”: Fixed daily working hours for a fixed number of days

In discussing work schedules, it makes sense to begin by discussing the traditional work schedule which has long been dominant in the formal economies of most of the world: the so-called “standard workweek” consisting of fixed working hours each day for a fixed number of days, usually a Monday-to-Friday (for a 40-hour normal workweek) or Monday-to-Saturday (for normal workweeks longer than 40 hours) daytime shift. It appears that the classic “working 9 to 5” standard workweek is slowly declining, particularly in many of the developed countries. For example, in the United States – often cited as the “prototype” of the 24/7 economy – by 2010–11, 20 per cent of all wage and salary employees already worked *more than half of their total working time* outside of the standard hours of 6 a.m. to 6 p.m., including 13 per cent who worked regularly on weekends (Enchautegui, 2013). And in the European Union (EU), in 2015 52 per cent of workers in the EU-28 worked at least one Saturday per month; 26 per cent worked at least one Sunday a month; and 19 per cent worked at night (Eurofound, 2017).

From a gender perspective, women in the EU are more likely to work regular schedules than men, and also less likely to work at night; this partially reflects continuing gender segregation in different industries, with women remaining dominant in services, e.g. education, health and social work, and public administration, while men comprise a large majority of the workforce in construction and manufacturing (Eurofound, 2017). In Australia, men who are single jobholders are more likely than comparable women to work Monday to Friday (72 vs. 54 per cent), while women who were single jobholders are slightly more likely than men to work on weekends (73 vs. 69 per cent) (Australian Bureau of Statistics, 2010). And in the United States, men were more likely than women to work an “alternate shift” other than a regular daytime schedule (McMenamin, 2007).

However, these figures reveal only part of the story. Even within so-called “normal working hours”, there can be large variations in both working hours and work schedules depending upon the specific type of working time arrangement. This is particularly

the case for workers in on-call arrangements (called by different names in different countries, e.g. “zero-hours contracts” in the United Kingdom and “just-in-time schedules” in the United States), but as we will see in the next section, it affects many workers in other working time arrangements as well.

## 3.2. Expanding use of various types of flexible working time arrangements

Not all workers have ever worked a standard workweek. Even at the time of the adoption of ILO Convention No. 1, some basic types of shift work arrangements were already in use in the manufacturing industry. Nowadays, there is a diverse array of shiftwork arrangements, but there are also many other types of flexible working time arrangements as well.

In the context of reviewing the expanding use of various types of flexible working time arrangements that vary from the classic notion of the “standard workweek”, the concept of *working time flexibility* (also called “temporal flexibility”) needs to be distinguished from other forms of employment flexibility, such as numerical or contractual flexibility (e.g. fixed-term contracts, temporary agency work), wage flexibility and functional flexibility (or polyvalence). Working time arrangements/work schedules can be made more flexible by a variation in one or more of the following four elements: (1) the number of hours worked each working day; (2) the number of hours worked each week; (3) the specific hours (timing) of work during a working day; and (4) the specific days of the week during which work is performed.

Flexible work schedules and other types of flexible working time arrangements can provide some of the most cost-effective solutions to achieve work–life balance. However, the specific type of working time flexibility involved has a distinctive impact on work–life balance. In general one can distinguish between working time flexibility that is employer-led and that which is worker-led (see e.g. Fagan et al., 2012). Employer-oriented flexibility includes, for example, schedules that are being determined and varied according to the operational requirements of the business, such as shift work, hours averaging arrangements (including annualized hours) and on-call work. Worker-oriented flexibility, on the other hand, refers to working time arrangements where employees have some degree of choice or influence over the timing (and sometimes also the place) of their work. Some prominent models are flexi-time arrangements, time-banking and compressed workweeks. It is also possible for many different types of working time arrangements to be “balanced”—meaning that they are specifically designed to meet the needs of *both* workers *and* enterprises.

### A. Employer-oriented flexible WTAs

Extensions in opening and operating hours, including the growth of 24/7 operations, have led to a growth of work schedules that cover this expansion in evening, night and weekend operations (see e.g. Presser and Gornick, 2005). Jobs with variable hours and unpredictable work schedules have also become prominent, for example in sectors such as retailing and domiciliary care. The variability of working hours occurs often in “real time” as employees are requested at short notice to remain at work, or leave early, to reflect particular work circumstances (Blyton and Jenkins, 2011). The extent to

which employer-led working time flexibility has the potential to be disruptive of work–life balance depends on several factors linked to the working time laws and regulations in the country: for instance, whether or not there is a requirement to provide workers with advance notice of their work schedules and whether workers have the right to refuse overtime work or an alternative shift schedule.<sup>5</sup>

For example, atypical schedules, e.g. working evenings, nights or on weekends, can have important effects on workers' health and well-being. Research in Canada revealed that full-time employees working on weekends have significantly higher emotional exhaustion, job stress and psychosomatic health problems than employees not involved in weekend work (Jamal, 2004). A study on work–life satisfaction showed that nurses on night shifts in Italy reported low levels of quantity of sleep, with more frequent chronic fatigue, psychological and cardiovascular symptoms compared with day shift workers (Ferri et al., 2016).

As noted earlier, one traditional working time “flexibility” instrument – which actually consists of a wide array of different work schedules – is shift work. Shift work allows companies to extend their operating hours beyond the working time of individual workers; to make more intensive use of their fixed assets (e.g. physical plant and equipment in manufacturing); and to better accommodate peak periods of demand (e.g. the “stacking” of multiple part-time work shifts in the retail trade). Shift systems can take a nearly infinite variety of forms, but fall into two basic categories: fixed shift systems, in which a particular group of workers always works the same shift; or rotating shift systems, in which workers are assigned to work shifts that vary regularly over time – “rotating” around the clock (e.g. from morning to afternoon/evening to night shift). Although the specific shift systems vary among countries and across economic sectors, shift work remains one of the most common types of employer-led working time flexibility, involving approximately one-fifth of the workforce in Australia, the EU Member States, and the United States, among others (see Australian Bureau of Statistics, 2010; Eurofound, 2017; and McMenemy, 2007).

Tucker and Folkard (2012) review and synthesize the vast literature regarding the effects of work schedules, particularly various types of shift patterns, on occupational safety and health. They emphasize the “almost infinite number of shift systems in operation” (p. 23), with variance among shift systems along a number of dimensions, such as: the number and length of shifts; shift starting and ending times; whether shifts rotate or not and if so, the direction of rotation; the number of days off and whether those days off are consecutive or not, etc. They also emphasize that the health effects of work schedules may take years to become apparent. Nonetheless, they find an association between shift work and various cardiovascular diseases (e.g. angina pectoris, myocardial infarction and higher mortality rates due to heart diseases), digestive disorders, and other problems with workers' physical health (e.g. cancer, maternity problems). Night workers may be at greater risk of these types of occupational diseases than other shift workers, and in addition, the risk of accidents and injuries increases when working four or more night shifts in a row (ibid.).

Some other types of employer-led flexible WTAs are designed to vary the number of hours worked based on business needs. One type of such variable hours is hours averaging arrangements, including annualized hours. Such arrangements allow for variations in

<sup>5</sup> For an in-depth discussion of how different types of national legal and regulatory structures affect working time practices, see Berg, Bosch and Charest, 2014.

daily and weekly hours of work within specified legal limits, such as maximum daily and weekly hours, while requiring that working hours either: (1) reach a specified weekly average over the period within which the hours are averaged; or (2) remain within a fixed annual total. As long as the maximum hours limits are respected, as well as the weekly average hours or total annual hours, no overtime premium is payable for those hours worked beyond the statutory normal hours in the country, thus saving companies the cost of overtime premia. Some other important provisions of hours averaging arrangements include the advance notice period for changes in work schedules; the period of time over which hours worked are averaged (called the “reference period”); and the conditions under which overtime premia will be paid (e.g. if the weekly average hours or total annual hours are exceeded).

On-call work<sup>6</sup> is perhaps the most extreme example of employer-led flexible WTAs that are designed to vary the number of hours and/or days worked based on business needs. With on-call work arrangements, however, there is often *no guaranteed number of working hours*, and the number of hours worked varies greatly from week to week. In addition, the work schedules associated with such on-call arrangements are often unpredictable – they can change at a moment’s notice, which is why on-call work is referred to as “just-in-time scheduling” in the United States. The relationship between highly variable on-call working time arrangements and detrimental health effects, as well as problems with balancing paid work and personal life, has also been found to be strong (see e.g. Adams and Prassl, 2018; Campbell, 2018; McCrate, 2018). Likewise, in a study of Venezuelan fishers, one-third of these workers reported mental health problems and identified the working time unpredictability as an obstacle for meeting family obligations (Yanes and Primera, 2006).

Employer-led flexible WTAs can also have an impact on the fit and coordination with domestic routines for the household (meal times, child and elder care responsibilities) and social life (leisure activities, family life, volunteering, etc.). For example, working non-standard hours is associated with a higher degree of dissatisfaction about the time spent with children (La Valle et al., 2002). Moreover, the quality of marital relationships can also be negatively affected by non-standard schedules (Kalil, Ziol-Guest and Levin Epstein, 2010). Thus, workers who report not having spent enough time with their partners show decreased rates of compatibility with their partners. Chances of separation and divorce also increase significantly while working non-standard hours; for example, working fixed non-day shifts increased the chance of separation by six times for men married less than five years with at least one child (Presser and Gornick, 2005).

## B. Employee-oriented flexible WTAs

Typically, those working time arrangements in which employees have some degree of choice or at least influence over their work schedules, or the scope to choose particular working hours, result in positive effects on worker well-being and work–life balance (see e.g. Fagan et al., 2012). It is important to emphasize that options for adapting working time to family or other personal needs should be developed in such a way that all workers can access them, regardless of occupation, sector, status or country (Eurofound, 2016). One prominent example of employee-oriented working time flexibility is flexi-time; this is a working time arrangement in which employees can choose their preferred work schedule, i.e. choosing their starting and finishing times of work each day

<sup>6</sup> A distinction should be made between “on-call work” arrangements, in which workers have no guaranteed minimum hours, and the “on-call hours” of workers who have established contractual working hours and are required to work “on call” for additional periods (e.g. doctors and nurses).

within specified limits. In a study of office-based employees in Australia, researchers found evidence that employees who use flexi-time reported significantly higher levels of work–life balance than their counterparts on traditional fixed schedules (Hayman, 2009). In fact, both flexi-time arrangements and compressed workweeks have positive effects on productivity, employee job satisfaction, and satisfaction with work schedules; in addition, flexi-time has a strong positive impact on absenteeism as well (see e.g. Baltes et al., 1999). These positive effects appear to be due to a better match between employees’ working hours and their biological rhythms, as well as greater job autonomy and reduced work–life conflict.

Unsurprisingly, flexi-time is one of the most common employee-oriented flexible working time arrangements, for example, in the EU (Eurofound, 2017). Some of the more complex forms of flexi-time arrangements can blur into time-savings account (“time banking”) arrangements, since they allow workers to accumulate credit hours, and in some cases, even to use their “banked” hours to take full days off. There is a dual logic of such arrangements: they are typically designed both as a measure to facilitate employees’ work–life balance, but also as a tool to help enterprises to better adapt working hours to fluctuations in the establishment’s workload. A notable case in this respect is Finland, where working time accounts have spread to several sectors, such as the ski industry, thus permitting employees to work more hours or days in the high season in exchange for taking an equivalent amount of time off in the future. Furthermore, some of the Finnish collective agreements comprise innovative working time practices, such as 12-hour shifts that are compensated with longer leave periods (Eurofound, 2016).

In general, a differentiated experience of access to flexible working time arrangements and work–life balance options across organizational hierarchies and occupational levels can be observed. Upper-level professionals are more likely to benefit from access to working time choices and work–life balance measures to a much greater degree than their counterparts at lower levels of the hierarchy (Blyton and Jenkins, 2011). Evidence from the United Kingdom indicates that this uneven distribution is further heightened by an unequal knowledge of and access to such working time-related work–life balance measures (Hooker et al., 2007). For this reason, a number of countries (e.g. Australia, Netherlands, United Kingdom) have established a legal “right-to-request flexible working arrangements” that aim to ensure that employers offer a broad range of employees access to at least some types of flexible working arrangements (see e.g. OECD, 2016). While the nature and beneficiaries of flexible working arrangements vary among different countries, industries and enterprises, statutory right-to-request policies are designed to provide employees with a legal right to request flexible working hours and to have these requests considered seriously by employers, to promote work–life balance among the workforce, to prevent discrimination, and to increase labour force participation. In some cases, such flexibility in workplace practices may be regulated by collective bargaining or enterprise-level agreements (Hegewisch, 2009; Eurofound, 2016).

## C. Balanced forms of flexible WTAs

It is also possible for flexible working time arrangements to be “balanced” – that is, they can be designed to meet the needs of *both* workers and enterprises. Compressed working weeks (CWWs) involve the same number of working hours being scheduled over fewer days than is typical in a standard workweek, which also results in longer working days. CWWs are typically a good example of a flexible working time arrangement that can benefit *both* employers and employees – that is, it is often a *balanced working time*

*arrangement.* The logic underlying CWWs varies by organization, but they are often used in office environments to reduce the costs of starting up operations, as well as energy and other variable operating costs. Another benefit from the employer’s point of view is that CWWs are scheduled on a regular basis. Thus, CWWs offer a degree of flexibility, but are nonetheless predictable; it is thus easier to schedule meetings, coordinate with co-workers, and communicate with clients. A very typical CWW is working 10 hours a day for 4 days a week. This offers several work–life balance advantages, such as long weekends, and the ability to accomplish errands and family-related tasks on a typical workday, thus avoiding crowds. There is a significant correlation between CWWs and improved work–life balance among workers (see e.g. Bambra et al. 2008); however, offering employees choices and also worker engagement in designing such working time arrangements are keys to achieving a “win-win” situation (Wadsworth and Facer, 2016).

## 4. New ICTs and the blurring between working time and personal time

### 4.1. Telework and ICT-mobile work<sup>7</sup>

New information and communications technologies (New ICTs), such as smartphones and tablet computers, have revolutionized everyday work and life in the 21st century. On the one hand, they enable constant connection with friends and family, as well as with work colleagues and supervisors; on the other hand, paid work may increasingly intrude into the time periods and physical spaces normally reserved for personal life. Crucial to this development is the detachment of work from traditional office spaces. 21st-century office work is often supported by internet connections, and thus can be done from basically anywhere at any time. This new independence of work from place changes the role of technology in the work environment dramatically.

The detachment of work from the employer’s premises actually dates back to the previous century (Messenger and Gschwind, 2015). In the 1970s and 1980s, visionaries such as Jack Nilles (Nilles, 1975, 1988) and Allan Toffler (Toffler, 1980) predicted that the work of the future would be relocated into, or close to, employees’ homes with the help of modern technology – so-called “telecommuting” or “telework”. To fully understand the effects of New ICTs on the world of work, it is thus important to make a conceptual link between the early days of telework/telecommuting and such arrangements today. Technological advances are the motor of change in this context, and they have fostered the evolution of telework in three distinct stages or “generations”

<sup>7</sup> Unless otherwise specified, the findings presented in this subsection are drawn from the report *Working anytime, anywhere: The effects on the world of work* (Eurofound and ILO, 2017).

(see Messenger and Gschwind, 2016 for a full discussion of this evolutionary process). *New ICTs have enabled the mobile, virtual connection of workers to the “office” from almost anywhere at any time*; this is the “Third Generation of Telework”, the virtual office (Messenger and Gschwind, 2016).

This subsection of the paper synthesizes the findings from a joint ILO-Eurofound report, *Working anytime, anywhere: The effects on the world of work* (Eurofound and ILO, 2017), based on national studies from 15 countries together with data from the Sixth European Working Conditions Survey (Eurofound, 2017), to analyse the effects of this Third Generation of Telework – which the joint ILO-Eurofound report calls *Telework/ICT-Mobile Work (T/ICTM)* – on the world of work. T/ICTM work can be defined as the use of ICTs, such as smartphones, tablets, laptops and PCs, for the purpose of working outside the employer’s premises. The joint report classifies employees who are performing T/ICTM work in relation to their place of work (home, office and/or another location) and also the intensity and frequency of their work using ICTs outside the employer’s premises. The following groups of T/ICTM workers were identified: regular home-based teleworkers; occasional T/ICTM workers, with mid-to-low mobility and frequency of work outside the employer’s premises, either at home or another location; and high-mobile T/ICTM workers, who have a high frequency of working in various places outside the employer’s premises, including working from home.

The incidence of T/ICTM work seems to be closely related to the level of technological development in a country, and ensuring adequate connectivity is obviously an essential prerequisite for enabling this type of work. However, the actual adoption of such work arrangements is also closely linked to economic structures and cultures of work. For example, it is not an accident that telework in its original form of working from home/telecommuting originated in southern California (Nilles, 1975). By the mid-1970s, southern California already had key economic and cultural forces promoting telework: ICTs which (although considered primitive now) were more advanced than anywhere else at that time and also massive traffic jams and resulting pollution from auto-based commuting. The same phenomenon is visible in large urban areas around the world today, particularly mega-cities such as Lagos, Manila, Mexico City, Mumbai and São Paulo. These cities are among the most populous urban concentrations in the world, with more than 20 million inhabitants each. The number of cars in cities such as Mexico City and São Paulo – which include many advanced age and even illegal vehicles (i.e. without a licence) – exceeds five million, with severe consequences for both urban mobility and the environment (Mello and Dal Colletto, 2015). The average (one way) commuting time in these two cities is currently one hour and forty minutes (Sanchez, 2013). Moreover, this commuting time may be significantly longer in some of these trips because of frequent construction work to repair roads, rain and traffic accidents. The result is not only increased levels of stress, but also increased exposure to pollutants, such as fine particulate matter (PM2.5) and ozone (O3) that far exceed World Health Organization standards, resulting in cardio-respiratory diseases (ibid).

Countries analysed in the joint ILO-Eurofound report that have relatively high shares of workers using ICTs to perform work outside the employer’s premises are Finland, Japan, Netherlands and Sweden as well as the United States. Different forms of T/ICTM work can be expected to continue to develop on different paths. While working regularly with ICTs from outside the employer’s premises is still comparatively rare in most of the countries analysed, the findings of this study suggest that important changes are taking place for a growing part of the workforce; the number of employees working flexibly in relation to space and time is growing – and will likely continue to grow – enabled by the continuing

development of ICTs. However, T/ICTM work will probably not grow across all occupations and in all sectors. Rather, it is more likely to become an established work arrangement for those whose tasks are already ICT-enabled. Nonetheless, current trends suggest that larger shares of workers will have ICT-enabled jobs in the future (Eurofound, 2017).

The results presented in the joint ILO-Eurofound report demonstrate that the working hours of T/ICTM workers, and particularly high-mobile T/ICTM workers, are typically longer than the hours of those workers who always work at the employer's premises. T/ICTM workers in general are also more likely to perform paid work in the evenings and on weekends than those workers who always work in the office, although they are less likely to work at night. Finally, a substantially higher share of T/ICTM workers enjoy a significant degree of working time autonomy than their office-based counterparts, which is important in relation to the reported work–life balance of workers. The findings also show differences among countries, which seem to be related to country-specific working time patterns, cultures and gender roles.

The studies referred to in the national reports indicate generally positive effects of T/ICTM work on individual performance. The potential for an increase in productivity with T/ICTM work is mainly related to the spatial and temporal flexibility that such work arrangements offer and the associated consequences, such as reduced commuting time, savings on office space, increased working time autonomy and innovative working behaviours, as well as the possibility of working longer and with fewer interruptions. Individual characteristics such as motivation and skills seem to play a role, but so too does the work efficiency associated with the use of ICTs.

Regarding the effects of T/ICTM work on work–life balance, it can be concluded that T/ICTM work, particularly working from home (regular home-based telework), appears to have a positive effect on overall work–life balance, mainly because of the reduction in commuting time and increased autonomy to organize working time based on individual workers' needs and preferences. At the same time, there is some risk of overlap between work and private or family life – that is, work–home interference – because of longer hours of work and the combination of paid work and other responsibilities, which may result in increased work–family conflict. Thus, although it appears that T/ICTM work can help to facilitate a better work–life balance for workers, it seems that a significant part of this work arrangement has a supplemental character – that is, it leads to working beyond normal/contractual working hours, which often appears to be unpaid. Therefore, this arrangement does not always reduce work–family conflict. On the contrary, the findings of this study show that a high level of use of ICTs outside the employer's premises can potentially jeopardize work–life balance. *In all types of T/ICTM work there is a clear risk of a blurring of the boundaries between paid work and personal life, with working time impinging on personal time.* This is a consequence of the typically longer working days and weeks of T/ICTM workers, but it also appears to be related to a lack of “boundary management”. Thus, it appears that the higher working time autonomy of employees doing T/ICTM work can contribute to improved work–life balance for regular home-based teleworkers and those working occasionally outside the employer's premises, but it does not seem to have this effect for those doing high-mobile T/ICTM or T/ICTM work at a high intensity.

There are also important differences in these work–life balance effects according to gender: women tend to work shorter hours in T/ICTM work, and they seem to get slightly better work–life balance results than men when they do T/ICTM work. In this regard, women tend to use more regular home-based telework (rather than working in other

places outside the “office”), and in most contexts they appear to do so mainly to balance work and family-related tasks.

All of these findings suggest that the effects of T/ICTM work are highly ambiguous and perhaps even contradictory. Specifically, it appears that T/ICTM work is not unequivocally advantageous compared to traditional office work at the employer’s premises. Neither does this type of work arrangement seem to result in mainly negative effects. On the positive side, T/ICTM workers report a reduction in commuting time, greater autonomy regarding the organization of their working time, better overall work–life balance and higher productivity. The disadvantages of T/ICTM work with which workers seem to struggle the most are its tendency to extend working hours, to create an overlap between paid work and personal life due to a blurring of work–life boundaries, and also to lead to the intensification of work. It appears that many of these ambiguous or paradoxical effects have to do with the interactions among ICT use, the place of work in specific work environments and the characteristics of different occupations. Moreover, whether T/ICTM work substitutes for work in the office, or instead supplements it, appears to be an important factor affecting whether the reported outcomes are positive or negative.

## 4.2. The “gig economy” and on-demand work<sup>8</sup>

The so-called “gig economy” (also called the “on-demand economy”) generally describes one of two types of jobs: micro-tasks that are performed online and can therefore be organized on a global scale (i.e. “crowdwork”); and manual services that are enabled by online companies using websites and mobile apps but performed locally (i.e. “on-demand services”). Both types of jobs rely heavily on ICTs, and are therefore strongly connected to the latest technological advancements. However, they are also marked by tasks that require some human level of abstraction or manual dexterity (De Stefano, 2016).

The gig economy appears to be undergoing a rapid expansion in many countries, albeit from a very low baseline. For example, a 2015 report by the World Bank estimates that the gig economy is growing by about 33 per cent annually (Kuek et al., 2015). An important aspect of the gig economy is the spatial divide between its workers and customers. Large-scale analyses of transaction records show that gig economy jobs are performed all around the globe, but primarily in countries with developing and emerging economies such as India and the Philippines – as is the case with other forms of offshoring as well. Customers, instead, are concentrated in developed economies (Graham, Hjorth and Lehdonvirta 2017). Wide spatial distribution also exists among gig economy workers, particularly regarding crowdwork, which can be performed essentially anywhere at any time.

The key question for determining working time arrangements in the gig economy revolves around classifications. Legal definitions of crowdwork and on-demand service work have not yet caught up with reality on the ground in many jurisdictions, which gives providers some leeway at the moment. However, De Stefano (2016) argues that codification of the gig economy may well lead to a reclassification of these workers as employees in

<sup>8</sup> Research assistance for this section provided by Lutz Gschwind is gratefully acknowledged.

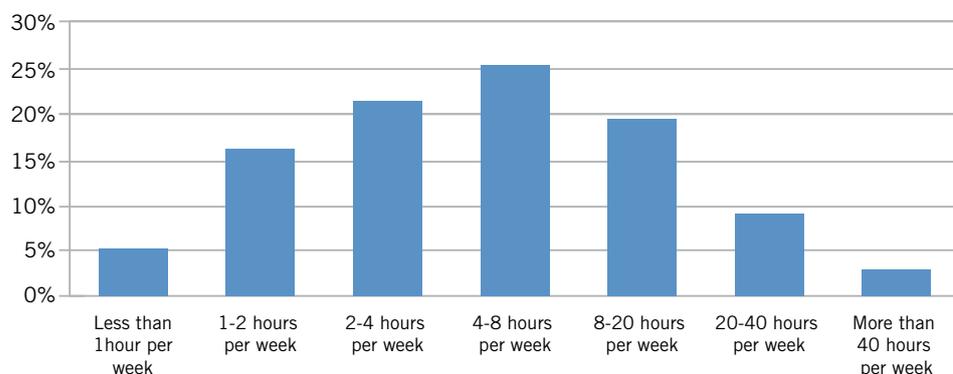
the near future. This is because online platforms still exert a large amount of control over the services provided via the terms and conditions of their contracts: workers are required to deliver services according to standards set by the company and may even wear company uniforms, while, unlike self-employed workers, having little freedom to choose tasks and customers themselves. As a result, some court cases in the United States have ruled in favour of classifying some of these workers as employees (Aloisi, 2016; De Stefano, 2016). Moreover, a recent comparative study on gig economy jobs in Europe indicates that workers often do not agree with the typical classification (i.e. self-employed) either. Around half of all crowdworkers who earn more than 50 per cent of their income in the gig economy consider themselves to be full-time employees (Huws, Spencer and Joyce, 2016).

Vagueness in the classification of gig work has to be taken into account when considering statistics on working time in the gig economy. For example, a recent study on two of the largest crowdwork platforms, Mechanical Turk and Crowdflower, found that platform workers perform 18 minutes of unpaid work (access, search and set-up) for every hour of paid work (Berg, 2016). However, such differentiations between paid and unpaid work do not apply in the same way to self-employed workers. Therefore, the classification of gig workers is very critical for debates about working time.

Moreover, the gig economy rarely provides full-time employment. For example, using data from an online survey, Hall and Krueger (2017) found that only 20 per cent of Uber drivers in the United States derived all their income from the online platform. Likewise, results of the gig economy study in Europe indicate that only 3 to 11 per cent of respondents derive their income entirely from performing crowdwork (Huws, Spencer and Joyce, 2016). Complementing income from other sources as the prime motivation for gig work is, in a similar vein, mentioned most frequently by crowdworkers on Amazon Mechanical Turk and Crowdflower (Berg, 2016). Perhaps the best available data on the working time of crowdworkers is provided by Ipeirotis (2010), who conducted a survey among 1,000 workers of the Mechanical Turk platform. About half of the respondents came from the United States and 35 per cent from India. Interestingly, however, reported working hours did not deviate between the two groups. Respondents typically spent between four and eight hours per week working on the platform. Less than 10 per cent worked more than half-time and only a small fraction spent more than a 40-hour workweek on the platform (see figure 9). Such results indicate that workers actually spend relatively little time performing gig economy work. The differentiation between paid regular work, paid work in the gig economy, and unpaid work is thus rather blurred.

The flip side of this vagueness regarding working time in the gig economy is autonomy. Hall and Krueger (2017) found that working time autonomy seems to be a dominant motivator for those who provide crowdwork and on-demand services. For example, setting one's own schedule was stated to be a major reason for joining Uber by 87 per cent of respondents in their survey. The results of a survey among workers for Amazon's Mechanical Turk show, in a similar vein, that task autonomy is a major contributor to workers' intrinsic work motivation (Kaufmann, Schulze and Veit, 2011). Indeed, the gig economy is frequently praised for its potential to enable reconciliation between paid work and personal life. Providers themselves use the promise of work-life balance as their main tool to attract labour. The underlying assumption is that workers can decide for themselves when to work, where to work and which job to accept. There are, of course, differences between ICT-based crowdwork and ICT-enabled on-demand services, but the overall positive expectations for the gig economy prevail in many studies. For example, a recent report by the World Bank concludes that gig economy jobs allow individuals "to take better care of their families, continue to study, or start their own

**Figure 9. Working hours spent on Mechanical Turk per week**



Source: Ipeirotis, 2010.

businesses while working and earning a salary” (Kuek et al., 2015, p. 4). Similarly, the European Foundation for the Improvement of Living and Working Conditions (Eurofound) states that “the increased level of autonomy to choose when and where to work, how long to spend, and what work to perform (resulting in a better work–life balance and the opportunity to combine multiple jobs) is often singled out as the main advantage of crowd employment for workers” (Eurofound, 2015, p. 115).

Thus, expectations about work–life balance in the gig economy are widespread, but they are rarely based on robust empirical evidence. Even the most extensive survey-based study in the literature (Huws, Spencer and Joyce, 2016) does not include explicit questions related to the boundaries between paid work and private life. Insight into this aspect of the gig economy is only provided marginally, as, for example, with an analysis of both structured and open-ended questions in a survey among workers on the platforms Mechanical Turk and Crowdfunder (Berg, 2016). About 10 per cent of respondents, women to a larger extent than men, stated that they work for the platforms because they can only work from home due to care responsibilities, health reasons or disabilities. However, many of those who joined for other reasons might potentially also enjoy the advantages of workplace flexibility. Moreover, the survey provides no information about potential adverse effects such as blurred boundaries between paid work and private life. Thus, the results of available large-scale surveys are limited in this regard. Instead, we are required to turn to case studies.

Two recent case studies, one regarding crowdwork and one regarding on-demand services, are instructive. The first study relies on detailed interviews with 30 workers in three of the world’s largest crowdwork platforms: Mechanical Turk, MobileWorks and CloudFactory (Lehdonvirta, 2018). A detailed analysis of the interviews indicates that their work–life balance is marked by an interaction of two factors: the availability of work and dependence on income from the platform. Workers were most likely to realize the potential working time flexibility of crowdwork if: (1) demand for their services was high; and (2) they did not rely entirely on income from the platform. Low demand decreases working time autonomy for all workers, since there are generally fewer times and tasks to choose from. This reduction in flexibility is even more pronounced among those who work on the platforms full-time. Full-time crowdworkers feel pressured to work on evenings, holidays and weekends because they must be constantly available in order to avoid missing out on new offers. (Lehdonvirta, 2018). Hence, while occasional or part-time gig economy work as a supplement to a regular job may offer working time autonomy, full-time gig work appears to lead to a substantial blurring of the boundaries between paid work and personal life.

Results of the second study, this one among those workers providing on-demand services, mirror the findings for crowdworkers described above. Rosenblat and Stark (2016) analysed the online posts of Uber drivers on several platforms, both open-access and membership-based ones. None of the forums are controlled by Uber and all posts are anonymous; thus, they give very detailed insights into workers' perspectives. The results show that the promised flexibility and work–life balance are constrained in many ways. Drivers are forced to take on any customer once they are logged into the system; refusal can lead to suspension of the driver's account. Workers thus live with constant uncertainty about the pay and time of their work. This system is combined with an incentive structure that offers guaranteed wages for drivers with high reliability and persuading notifications for drivers who decide to go offline in areas with high demand. Thus, in actuality the promised flexibility breaks down and work–life boundaries become increasingly blurred for workers providing on-demand services as well.

## 5. Policy suggestions: Towards a reduction of working hours with balanced working time arrangements

### 5.1. Reducing hours of work, guaranteeing minimum hours, and promoting work sharing

Amazingly enough, a century after the adoption of Convention No. 1 in 1919, approximately one-third of the global workforce still works more than 48 hours per week. As we saw in the introduction of this paper, there has been substantial progress in reducing working hours in many countries during this period – particularly those countries with advanced economies, and especially in Europe; nonetheless, excessively long hours remain a serious concern in most of the world today.

At the same time, a world that has never been able to provide decent jobs for everyone who needed and wanted one is now faced with the so-called “Fourth Industrial Revolution” of digitalization and robotics technologies, which, while it has many advantages, also has the potential to replace human workers. For example, Frey and Osborne's (2013, 2017) landmark study of the job replacement risk in the US labour market finds that about half (47 per cent) of all jobs in the United States, particularly those marked by routine tasks (e.g. record-keeping, calculus and repetitive customer service) are highly susceptible to substitution and thus can be classified as “high risk” – meaning that the probability of computerization of these jobs exceeds 70 per cent. Of course, this is just one study, and there are also many other studies presenting vastly

different estimates of the potential impact of digitalization and robotics on employment. Nonetheless, scholars do seem to agree on the potential of computers to replace a significant portion of all human labour in the near future.

So, what is the correct response to the potential impact of digitalization on employment? Many alternatives have been proposed – ranging from essentially retaining the status quo, to offering a government-guaranteed job at a “living wage” to everyone who wants one, to providing a universal guarantee of a basic income to all citizens in a country. While some of these policy proposals may well be laudable, they are typically quite expensive for governments and sometimes completely untested as well. Yet, there is an often overlooked and much less expensive alternative with a century-long long track record of success – reducing hours of work. A reduction of working hours could mean a shorter working day (e.g. a six-hour working day), a shorter workweek (e.g. a four-day workweek), or a shorter working year based on additional days of paid annual leave, paid holidays or other types of leave. Experimentation with reduced *full-time hours*<sup>9</sup> can take place at the national level, such as it has in countries as diverse as France, with the 35-hour average workweek<sup>10</sup> (see Messenger and Ghosheh, 2013 for a discussion of the French experience with the 35 hours and its effects) and the Republic of Korea (see discussion of the Korean experience below); at the sectoral level, as in Germany (see the next section); or even at the enterprise level, such as a recent experiment with a four-day workweek by one New Zealand company (see Graham-McClay, 2018).

There are a number of reasons why reduced full-time hours is not only a bold idea, but also a sound one. As was discussed earlier in this paper, shorter working hours are positively associated with higher labour productivity per hour due to reduced fatigue, increased worker motivation, decreased absenteeism, lower risks of mistakes and accidents at work, and reduced employee turnover. Shorter working hours are also likely to reduce occupational health problems and associated health-care costs and to improve workers’ work–life balance, especially for those workers working excessively long hours. A reduction in working hours, such as a shorter full-time workweek, would also directly address the issue of “time poverty”, particularly in developing countries where hours of work are generally the longest, and especially among women in those countries – who often work both long hours in paid work, and at the same time, bear a disproportionate share of the burden of unpaid domestic and care work. Finally, shorter working hours may also increase life satisfaction and “happiness” as well (Hamermesh, Kawaguchi and Lee, 2014).

While many workers are working too much, others are working short (part-time) hours or even very short hours – “marginal” part-time employment – despite the fact that many of them would prefer to have full-time jobs (Fagan et al., 2014; see also ILO, 2016). In other words, they are underemployed, and as we have seen, most of these involuntary part-time workers are women. Involuntary part-time workers are not only earning less income than they would prefer, but also suffer because part-time jobs offer relatively lower wage rates and benefit coverage, and often have more variable hours and unpredictable work schedules. At the same time, the improvement of such working time arrangements is likely to be a rational choice for many businesses, as it is a basic truth in the 21st century that “your people are your business”. With decent working time arrangements that include adequate protections for workers, high turnover costs and absenteeism can be pre-empted and greater productivity and customer satisfaction can be gained.

<sup>9</sup> Unlike part-time work, a reduction in full-time hours of work does not imply a reduction in pay.

<sup>10</sup> The “35-hour workweek” in France is actually a weekly average calculated on an annual basis.

Thus, it is a fundamental challenge for everyone to ensure that non-standard forms of employment, including “marginal” part-time employment, are characterized by responsible collaboration, social inclusion, and parity in rights and benefits. Towards this end, some specific policy suggestions include the following:

- Apply the principle of equal treatment of full-time and part-time workers working in comparable jobs, enshrined in the ILO Part-Time Work Convention, 1994 (No. 175).
- Introduce some basic guarantees regarding *minimum* working hours, as well as stipulating appropriate penalties in the event of non-compliance.
- Adopt regulations that mitigate some of the vulnerabilities of “marginal” part-time workers, such as premium hours pay, a fixed minimum compensation rate for “on-call” times not worked, and/or favourable unemployment/social benefits.
- Provide workers with adequate advance notice of their work schedules, in order to allow them to be able to properly plan their personal lives, including their family responsibilities.
- Provide for paid leaves (e.g. sick leave, annual leave) on a pro-rata basis compared with full-time staff.
- Promote worker awareness regarding their labour rights under these arrangements, in order to prevent discrimination – particularly against women and youth, who are overrepresented in “marginal” part-time employment.
- Provide these workers with equal access to career development and skill training opportunities compared to full-time staff, to help position them to make a successful transition from “marginal” part-time work into regular part-time or full-time jobs.

Of course, many workers who are able and available for work are completely unemployed as well. Reducing hours of work could also help to facilitate the sharing of jobs through work-sharing arrangements. During the global economic crisis, work-sharing policies and measures such as *Kurzarbeit* in Germany encouraged companies to respond to reduced demand for their products and services by reducing working hours instead of cutting jobs. For example, instead of laying off 20 per cent of the workforce, employers could reduce working hours for all workers by 20 per cent – from a five-day workweek to a four-day workweek (Messenger and Ghosheh, 2013; see also Messenger, 2009). Similar measures can be used in good economic times as well: for example, permanently reducing the standard legal workweek can, if properly structured, help encourage additional hiring and thus increase overall employment above the level that would have existed in the absence of such measures (Messenger and Ghosheh, 2013). The recent experience of the Republic of Korea, where the normal legal workweek was reduced from 44 to 40 hours per week in phases (depending on the size of the organization) between 2004 and 2011, illustrates the positive effect of reducing working hours on employment. Following the implementation of the 40-hour workweek, the Korea Labor and Society Institute (KLSI) reported in 2012 that the “total working hours decreased from 1.87 billion to 1.64 billion and jobs steadily increased” by 12.3 per cent from 21.57 million in 2001 to 24.24 million in 2011 (KLSI, 2012). The KLSI report also found that, for every 10 per cent decrease in working hours, there was a corresponding 9.7 per cent increase in employment.<sup>11</sup>

<sup>11</sup> This is actually a very high job generation figure. For every 10 per cent decrease in working hours, a 5 or 6 per cent increase in employment would be more typical (Messenger and Ghosheh, 2013). However, the very long working hours prevailing in the Republic of Korea at that time most likely contributed to these large employment effects.

It is important to bear in mind, however, different country situations, for instance those countries with lower levels of economic development. In such environments, pervasive economic informality, low productivity and low levels of remuneration (among other factors) render substantial reductions in actual working hours unlikely in the near future. Even though those workers working in the informal economy may not be directly impacted by legal changes such as reductions in the standard working day and/or workweek – especially the self-employed who make up the vast majority of informal workers – there is nonetheless scope to extend basic social protections to these workers and also to empower them to improve their productivity, so that they can earn more while working fewer hours.

## 5.2. Developing balanced working time arrangements

Despite the obvious importance of reducing overall hours of work, the ways in which those hours are structured is also of great importance. As we saw earlier in this paper, working time arrangements/ work schedules can have widely divergent effects depending on the specific type of arrangement and also on how that arrangement is structured. If properly structured, working time arrangements can be mutually advantageous for both workers and employers, as they can improve working conditions and allow workers to have a better balance between paid work and their personal lives, while simultaneously enabling employers to better adapt their workforce to fluctuations in workload, and providing additional business benefits that can make their enterprises more sustainable, such as decreased absenteeism, increased retention of current employees and improved recruitment of new employees. Working time arrangements can also improve employee morale and attitudes, which in turn can improve productivity, quality, and ultimately firm performance (see e.g. Golden, 2012).

Based upon both international labour standards related to working time and the findings of recent research on working time and its effects (summarized earlier in this paper), the ILO has identified five significant dimensions of decent work in the area of working time, or “decent working time” (ILO, 2007). These five dimensions of decent working time are as follows: working time arrangements should

- promote health and safety;
- be “family-friendly” and improve workers’ work-life balance;
- promote gender equality;
- advance the productivity and sustainability of enterprises;
- and offer workers a degree of choice and influence over their hours of work.

These five dimensions provide a set of guiding principles that point towards decent working time. As principles, they will of course vary substantially in their implementation from one country to another, according to variations in national, regional, and perhaps even local circumstances. Nonetheless, these guiding principles can provide a basis for developing working time arrangements/work schedules that can effectively balance workers’ needs with firms’ business requirements – that is, the *balanced working time arrangements* that were discussed earlier in this paper.

In order to put decent working time into action, enterprises need to seek possibilities to arrange working hours/work schedules in ways that can accommodate the needs of workers, while simultaneously meeting their business requirements. This “win-win”

approach takes into account both workers' and employers' preferences, as suggested in the ILO Reduction of Hours of Work Recommendation, 1962 (No. 116). While it is not possible to discuss the full range of potential working time arrangements here, the ILO has prepared a practical tool on working time, called the *Guide to developing balanced working time arrangements* (ILO, forthcoming), to assist ILO constituents in designing and implementing new working time arrangements in a balanced manner that benefits both workers and enterprises. In this context it is important to emphasize the particularly problematic nature of on-call work with highly variable hours and unpredictable schedules; the policy suggestions presented earlier regarding "marginal" part-time workers also apply to these workers.<sup>12</sup> In addition, national policies that establish a legal "right-to-request flexible working arrangements" (discussed earlier in this paper) can help to ensure that employers offer a broad range of employees access to at least some types of flexible working arrangements (e.g. flexi-time, telework).

Finally, when considering how to achieve balanced working time arrangements, the issue of constant availability for work due to ICT connectivity also needs to be considered. This is an emerging issue for which only a few initiatives, in a handful of countries, have been undertaken thus far. These initiatives reflect a new policy approach, known as the "right to be disconnected", which is a potentially effective response to the blurring of boundaries between paid working time and those times normally reserved for personal life. This approach attempts to limit the negative effects of ICTs by protecting employees' non-working time to address these work–life conflict and well-being issues. The majority of initiatives to date have taken place at company/workplace level, most prominently in France and Germany. In the majority of cases, different collective agreements have limited the functioning of company e-mail servers after normal working hours, as well as during weekends and holiday periods. In addition, France enacted a specific article on the right to be disconnected (*le droit à la déconnexion*) in a recent revision of the French labour code, in 2016,<sup>13</sup> which includes an obligation for every company with 50 employees or more to negotiate "the use of ICTs", in order to ensure respect for the rest and holiday periods of workers and their personal and family lives.

### 5.3. The important role of social dialogue, including collective bargaining

National legislation often plays a role in setting the maximum limits on working time. Social dialogue, including collective bargaining, has an important role to play as well. For example, collective agreements may further reduce hours of work and also provide a framework for organizing working time arrangements as well. Working time can be further shaped at the enterprise level, through different working time arrangements. The organization of work – including working time provisions – in enterprises can be an important subject for negotiation between workers and employers, so as to cater for the particular interests of individuals within a collective framework (see e.g. Bosch and Lehdorff, 2001). For example, the German metalworkers' union IG Metall signed an innovative collective agreement with the employers' organization Gesamtmetall in February 2018 (IG Metall, 2018). Full-time employees who have worked for at least two years in an enterprise are entitled to reduce their working time to 28 hours for up to two years (renewable at the request of the employee). In exchange, employers can recruit a higher

<sup>12</sup> In fact, these groups overlap to a large extent because on-call workers often work very short hours. For example, almost 40 per cent of "zero-hours" workers in the United Kingdom work less than 16 hours per week (Messenger and Wallot, 2015).

<sup>13</sup> Article L2242-8, modified by Law no. 2016-1088 of 8 August 2016, article 55 (V).

proportion of new employees on contracts with longer working hours (up to 40 hours) to balance the reduction in working time. The agreement includes a moderate 4.3 per cent pay increase over a period of 27 months (plus supplementary cash payments). From 2019 onwards, all employees will receive 27.5 per cent of their monthly pay as a supplement (*tarifliches Zusatzgeld*). Employees in special circumstances, namely those doing shift work and those who have young children or who are caring for a family member at home, have the right to convert this 27.5 per cent pay supplement into additional leave days.<sup>14</sup>

## 6. Conclusion

A century ago, with the adoption of ILO Convention No. 1, the world embarked upon a path of working time reduction that continued, albeit with wide variations among countries, for most of the 20th century. Now, in the 21st century, we are facing the so-called “Fourth Industrial Revolution” of digitalization and robotics technologies, with an uncertain but potentially enormous impact on employment. While this situation may seem dramatically different than anything that we have ever seen, in fact *we have been here before*. At the time of the greatest jobs crisis in modern history, the Great Depression, Keynes coined the term “technological unemployment” to describe a then-emerging phenomenon (Keynes, 1930) and the world responded by dramatically reducing working hours – first, temporarily in response to that crisis, and then, later, on a permanent basis. A virtuous cycle of reduced hours and increased productivity ensued in the decades following the Second World War, leading to a rising economic tide that swelled national GDP and income – as well as workers’ wages.

Although the immediate global economic crisis of our own time, the Great Recession, has passed, the global jobs crisis continues with no end in sight, and at least in the short term, technological advances threaten to further exacerbate an already difficult situation. *Now is the time for action*. The best available empirical evidence shows that reducing full-time working hours, combined with basic guarantees regarding minimum working hours for part-time workers, can lead to numerous positive outcomes for workers, enterprises and society as a whole: fewer occupational health problems and reduced health care costs; more and better jobs; better work–life balance; and more satisfied, motivated, productive employees resulting in more sustainable enterprises. In addition, shorter working hours can even make an important contribution to the “greening” of economies because the more we work, the greater our “carbon footprint”; so, cutting back on the number of days that we work – and therefore the number of times that we have to commute from our homes to our workplaces – is bound to have a positive impact on the environment as well.

Thus, a return to the historical path of working time reduction, combined with balanced working time arrangements, can be the next step on the long road to a happier, healthier and more sustainable society.

14 Tarifvertrag für die Metall- und Elektroindustrie in Baden-Württemberg zwischen der IG Metall und Gesamtmetall Baden-Württemberg, signed on 5.2.2018, in force from 1 January 2018 – 31 March 2020. The collective agreement covers around 900,000 employees in car making, electrical and electronic goods and metal production in Baden-Württemberg and could be extended to the metal, electrical and electronics sectors in the whole of Germany, which would cover around 3.9 million employees.

# References

- Adams, A.; Prassl, J. 2018. *Zero-hours work in the United Kingdom*, Conditions of Work and Employment Series No. 101 (Geneva, International Labour Office).
- Afonso P.; Fonseca, M.; Pires, J. F. 2017. “Impact of working hours on sleep and mental health”, in *Journal of Occupational Medicine*, Vol. 67, No. 5, pp. 377–382.
- Aloisi, A. 2016. “Commoditized workers: Case study research on labor law issues arising from a set of ‘on-demand/gig economy’ platforms”, in *Comparative Labor Law & Policy Journal*, Vol. 37, No. 3, pp. 653–670.
- Australian Bureau of Statistics. 2010. *Working time arrangements* (Canberra).
- Baltes, B. B.; Briggs, T. E.; Huff, J. W.; Wright, J. A.; Neuman, G. A. 1999. “Flexible and compressed workweek schedules: A meta-analysis of their effects on work-related criteria”, in *Journal of Applied Psychology*, Vol. 84, No. 4, pp. 496–513.
- Bambra, C.; Whitehead, M.; Sowden A.; Akers J.; Petticrew, M. 2008. “A hard day’s night? The effects of compressed working week interventions on the health and work–life balance of shift workers: A systematic review”, in *Journal of Epidemiology and Community Health*, Vol. 62, No. 9, pp. 764–777.
- Berg, J. 2016. *Income security in the on-demand economy: Findings and policy lessons from a survey of crowdworkers* (Geneva, International Labour Office).
- Berg, P.; Bosch, G.; Charest, J. 2014. “Working-time configurations: A framework for analyzing diversity across countries”, in *Industrial and Labor Relations Review*, Vol. 67, No. 3, pp. 805–837.
- Blyton, P.; Jenkins, J. 2011. “Life after Burberry: Shifting experiences of work and non-work life following redundancy”, in *Work, Employment and Society*, Vol. 26, No. 1, pp. 26–41.
- Bosch, G.; Lehdorff, S. 2001. “Working time reduction and employment: Experiences in Europe and economic policy recommendations”, in *Cambridge Journal of Economics*, Vol. 25, No. 2, pp. 209–243.
- Bonnet, F. 2017. *A factsheet on working time*, paper prepared for the Technical Exchange on Work–Life Balance, 29–30 May 2017, Geneva (Geneva, International Labour Office).
- Campbell, I. 2018. *On-call and related forms of casual work in New Zealand and Australia*, Conditions of Work and Employment Series No. 102 (Geneva, International Labour Office).
- De Stefano, V. 2016. ‘The rise of the just-in-time workforce: On-demand work, crowdwork, and labor protection in the gig-economy’, in *Comparative Labor Law & Policy Journal*, Vol 37, No. 3, pp. 471–504.
- Dembe, A.; Yao, X. 2016. “Chronic disease risks from exposure to long-hour work schedules over a 32-year period”, in *Journal of Occupational and Environmental Medicine*, Vol. 58, No. 9, pp. 681–687.
- Enchautegui, M. E. 2013. *Nonstandard work schedules and the well-being of low-income families*. Low-Income Working Families Paper No. 26 (Washington DC, Urban Institute).

- Eurofound. 2015. *New forms of employment* (Luxembourg, Publications Office of the European Union).
- . 2016. *Sustainable work throughout the life course: National policies and strategies* (Luxembourg, Publications Office of the European Union).
- . 2017. *Sixth European Working Conditions Survey: Overview report (2017 update)* (Luxembourg, Publications Office of the European Union).
- ; ILO. 2017. *Working anytime, anywhere: The effects on the world of work*, (Luxembourg, Publications Office of the European Union, and Geneva, International Labour Office).
- Fagan, C.; Lyonette, C.; Smith, M.; Saldaña-Tejeda, A. 2012. *The influence of working time arrangements on work-life integration of “balance”: A review of the evidence*, Conditions of Work and Employment Series No. 32 (Geneva, International Labour Office).
- Fagan, C.; Norman, H.; Smith, M.; Gonzalez Menendez, M. C. 2014. *In search of good quality part-time employment: An international review*, Conditions of Work and Employment Series No. 43 (Geneva, International Labour Office).
- Ferri, P. ; Guadi, M. ; Marcheselli, L ; Balduzzi, S ; Magnani, D. ; Di Lorenzo, R. 2017. “The impact of shift work on the psychological and physical health of nurses in a general hospital: A comparison between rotating night shifts and day shifts”, in *Risk Management and Healthcare Policy*, Vol. 9, pp. 203–211.
- Frey, C. B.; Osborne, M. A. 2013. *The future of employment: How susceptible are jobs to computerisation?* (Oxford, Oxford University Press).
- ;—. 2017. “The future of employment: How susceptible are jobs to computerisation?”, in *Technological Forecasting and Social Change*, Vol. 114, Issue C, pp. 254–280.
- Golden, L. 2012. *The effects of working time on productivity and firm performance: A research synthesis paper*, Conditions of Work and Employment Series No. 33 (Geneva, International Labour Office).
- . 2016. *Still falling short on hours and pay. Part-time work becoming new normal* (Washington DC, Economic Policy Institute).
- Graham, M.; Hjorth, I.; Lehdonvirta, V. 2017. “Digital labour and development: Impacts of global digital labour platforms and the gig economy on worker livelihoods”, in *European Review of Labour and Research*, Vol. 23, No. 2, pp. 135–162.
- Graham-McLay, C. 2018. “A 4-day workweek? A test run shows a surprising result”, in *The New York Times*, 19 July.
- Hall, J. V.; Krueger, A. B. 2017. “An analysis of the labor market for Uber’s driver-partners in the United States”, in *ILR Review*, Vol. 71, No. 3, pp. 705–732.
- Hamermesh, D. S.; Kawaguchi, D.; Lee, J. 2014. *Does labor legislation benefit workers? Well-being after an hours reduction*, NBER Working Paper No. 20398 (Cambridge, MA, National Bureau of Economic Research).
- Hayman, J. R. 2009. “Flexible work arrangements: Exploring the linkages between perceived usability of flexible work schedules and work/life balance”, in *Community, Work & Family*, Vol. 12, No. 3, pp. 327–338.

Hegewisch, A. 2009. *Flexible working policies: A comparative review*, Equality and Human Rights Commission. Research Report No. 16. Available at: [http://www.equality-ne.co.uk/downloads/426\\_Flexible-Working-Policies.pdf](http://www.equality-ne.co.uk/downloads/426_Flexible-Working-Policies.pdf).

Hooker, H.; Neathey, F.; Casebourne, J.; Munro, M. 2007. *The Third Work–Life Balance Employee Survey: Main findings*, Employment Relations Research Series No. 58 (London, Department for Trade and Industry).

Huws, U.; Spencer, N. H.; Joyce, S. 2016. *Crowd work in Europe: Preliminary results from a survey in the UK, Sweden, Germany, Austria and the Netherlands* (Brussels, Foundation for European Progressive Studies).

ICLS. 2008. Report of the Conference, 18th International Conference of Labour Statisticians, 24 November–5 December 2008 (Geneva, International Labour Office).

IG Metall. 2018. Press release on the outcomes of the collective agreement signed on 5 February 2018, in force from 1 January 2018 to 31 March 2020.

ILO. 2007. *Decent working time: Balancing workers' needs with business requirements* (Geneva, International Labour Office).

—. 2009. *Key Indicators of the Labour Market*, 6th edition (Geneva, International Labour Office).

—. 2011. *Working time in the 21st century*, Discussion Report for the Tripartite Meeting of Experts on Working-Time Arrangements (Geneva, International Labour Office).

—. 2016. *Non-standard employment around the world: Understanding challenges, shaping prospects* (Geneva, International Labour Office).

—. 2018a. *Ensuring decent working time for the future: General Survey concerning working-time instruments*, Report III (B), International Labour Conference, 107th Session, Geneva. 2018 (Geneva, International Labour Office).

—. 2018b. *Women and men in the informal economy. A statistical picture*, 3rd edition (Geneva, International Labour Office).

—. Forthcoming. *Guide to developing balanced working time arrangements* (Geneva, International Labour Office).

Ipeirotis, P. G. 2010. *Demographics of Mechanical Turk*, SSRN Scholarly Paper (Rochester, NY, Social Science Research Network).

Jamal, M. 2004. "Burnout, stress, and health of employees on non-standard work schedules: A study of Canadian workers", in *Stress and Health*, Vol. 20, No. 3, pp. 113–119.

Johnson J.; Lipscomb J. 2006. "Long working hours, occupational health and the changing nature of work organization", in *American Journal of Industrial Medicine*, Vol. 49, No. 11, pp. 921–929.

Kalil, A.; Ziol-Guest, K. M.; Levin Epstein, J. 2010. "Nonstandard work and marital instability: Evidence from the National Longitudinal Study of Youth", in *Journal of Marriage and Family*, Vol. 72, No. 5, pp. 1289–1300.

Kaufmann, N.; Schulze, T.; Veit, D. 2011. "More than fun and money: Worker motivation in crowdsourcing: A study on Mechanical Turk", in *Proceedings of the Seventeenth Americas Conference on Information Systems* (Detroit, MI).

- Keynes, J. M. 1930. "Economic possibilities for our grandchildren", in *Essays in Persuasion* (New York, Harcourt Brace), pp. 358–373.
- KLSI. 2012. South Korea report on the economically active population (Seoul, Korea Labor and Society Institute).
- Kuek, S. C. ; Paradi-Guilford, C ; Fayomi, T.; Imaizumi, S.; Ipeirotis, P.; Pina, P.; Singh, M. 2015. *The global opportunity in online outsourcing* (Washington DC, World Bank).
- La Valle, I.; Arthur, S.; Millward, C., Scott, J; Clayden, M. 2002. *Happy families? Atypical work and its influence on family life* (Bristol, Policy Press and York, Joseph Rowntree Foundation).
- Lee, S; McCann, D.; Messenger, J. C. 2007. *Working time around the world: Trends in working hours, laws and policies in a global comparative perspective* (London and New York, Routledge and International Labour Office).
- Lehdonvirta, V. 2018. "Flexibility in the gig economy: Managing time on three online piecework platforms", in *New Technology, Work and Employment*, Vol. 33, No. 1, pp. 13–29.
- Maddison, A. 2001. *The world economy: A millennial perspective* (Paris, Organisation for Economic Co-operation and Development).
- McCrate, E. 2018 *Unstable and on-call work schedules in the United States and Canada*, Conditions of Work and Employment Series No. 99 (Geneva, International Labour Office).
- McMenamin, T. M. 2007. "A time to work: recent trends in shift work and flexible schedules", in *Monthly Labor Review*, Vol. 130, No. 12, pp. 3–15.
- Mello, A.; Dal Colletto, A. 2015. *Study on telework/ICT-mobile work and its effects in Brazil*, Unpublished ILO country report.
- Messenger, J. C. 2009. *Work sharing: A strategy to preserve jobs during the global jobs crisis*, INWORK Policy Brief No. 1 (Geneva, International Labour Office).
- Messenger, J.C.; Ghosheh, N. 2013. *Work sharing during the Great Recession: New developments and beyond*. (Cheltenham, UK, Edward Elgar Publishing Ltd. and Geneva, International Labour Office).
- ; Gschwind, L. 2015. *Telework, new ICTs and their effects on working time and work–life balance: Review of the literature* (unpublished) (Geneva, International Labour Office).
- ; —. 2016. 'Three generations of telework: New ICTs and the (r)evolution from home office to virtual office', in *New Technology, Work and Employment*, Vol. 31, No. 3, pp. 195–208.
- ; Wallot, P. 2015. *The diversity of marginal part-time employment*, INWORK Policy Brief No. 7 (Geneva, International Labour Office).
- NIOSH. 2004. *Overtime and extended work shifts: Recent findings on illnesses, injuries, and health behaviors* (Cincinnati, Ohio, National Institute of Occupational Safety and Health).
- Nilles, J. M. 1975. "Telecommunications and organizational decentralization", in *IEEE Transactions on Communications*, Vol. 23, No. 10, pp. 1142–1147.

—. 1988 “Traffic reduction by telecommuting: A status review and selected bibliography”, in *Transportation Research Part A: General*, Vol. 22, No. 4, pp. 301–317.

OECD. 2016. *Be flexible! Background brief on how workplace flexibility can help European employees to balance work and family* (Paris, Organisation for Economic Co-operation and Development).

Pencavel, J. 2014. “The productivity of working hours”, in *The Economic Journal*, Vol. 125, No. 589, pp. 2052–2076.

Presser, H. B.; Gornick, J. C. 2005. ‘The female share of weekend employment: A study of 16 countries’, in *Monthly Labor Review*, Vol. 128, No. 8, pp. 41–53.

Rosenblat, A.; Stark, L. 2016. “Algorithmic labor and information asymmetries: A case study of Uber’s drivers”, in *International Journal of Communication*, Vol.10, pp. 3758–3784.

Sanchez, J. G. 2013. *Clean Air Institute 2013 Report on Air Quality in Latin America* (Fonte, Clean Air Institute). Available at: <http://www.cleanairinstitute.org/calidaddelaireamericalatina/cai-report-english.pdf>.

Spurgeon, A. 2003. *Working time: Its impacts on safety and health* (Seoul, International Labour Organization and Korea Occupational Safety and Health Research Institute).

Takahashi, M. 2014. “Work–family balance in Japan from the gender perspective: Comparison with countries of the EU”, in *Kansai Sociological Review*, No. 13, pp. 75–84. (in Japanese).

Toffler, A. 1980. *The third wave* (New York, Bantam).

Tucker, P.; Folkard, S. 2012. *Working time, health and safety: A research synthesis paper*, Conditions of Work and Employment Series No. 31 (Geneva, International Labour Office).

Wadsworth, L. L.; Facer, R. L. 2016. “Work–family balance and alternative work schedules: Exploring the impact of 4-day workweeks on state employees”, in *Public Personnel Management*, Vol. 45, No. 4, pp. 382–404.

Yanes, L.; Primera, C. 2006. “Condiciones de trabajo y salud de los pescadores artesanales del occidente de Venezuela”, in *Salud de los Trabajadores*, Vol. 14, No. 2, pp. 13–28.

