International Labour Organization

ILO Monitor: COVID-19 and the world of work. Eighth edition

Updated estimates and analysis

27 October 2021

Key messages

Latest labour market developments

Return to workplace and vaccination: Slow progress in low- and middle-income countries

Progress in vaccination has emerged as a critical factor for labour market recovery. In early October, the share of fully vaccinated people globally reached 34.5 per cent – however, with **considerable differences between high-income (59.8 per cent) and low-income countries (1.6 per cent). Higher vaccination rates are associated with less stringent workplace restrictions.** Overall, workplace closures have become increasingly targeted at specific areas and sectors.

Hours worked: A stalled global recovery

Globally, **labour market recovery from the pandemic shock has stalled during 2021**, with little progress being made since the fourth quarter of 2020. Global working hours in 2021 are estimated to remain significantly below the level attained in the last quarter of 2019, at –4.5 per cent (equivalent to 131 million full-time jobs) in the first quarter of this year, –4.8 per cent (140 million full-time jobs) in the second quarter and –4.7 per cent (137 million full-time jobs) in the third quarter. However, this aggregate picture masks **great divergence between countries**. Working hours in high- and upper-middle-income countries tended to recover in 2021, while both lower-middle and low-income countries continued to suffer large losses.

Productivity and enterprises: The disproportionate shock of COVID-19

As lower-productivity enterprises and lower-paid workers were disproportionately harmed by the pandemic, **global labour productivity (output per working hour) grew in 2020 by more than twice the long-term average. In 2021, global labour productivity growth has slowed down significantly**, with negative growth in low- and lower-middle-income countries. As a result, **the "productivity gap" between developing and advanced economies has grown**. In 2020, the average worker in a high-income country produced 17.5 times more output per hour than the average worker in a low-income country. This gap **has increased to 18.0 in 2021, the biggest difference since 2005**.

Employment, unemployment and inactivity: An unequal picture

The latest global estimates and country-level data confirm the **unequal employment impact of the COVID-19 crisis in 2020, as well as the fragile, and often diverging, recovery trends over the first half of 2021**. The number of people employed and participating in the labour force has not fully recovered and "labour market slack" remains significant in many countries. **Young people, especially young women, continue to face greater employment deficits, while the situation continues to be lagging in middle-income countries**.

Stimulus, vaccination and job recovery

Stimulus: Indispensable but developing countries do not have the same options

While fiscal stimulus packages continue to be a key tool to support the recovery, the fiscal stimulus gap in developing countries (particularly low-income countries) remains largely unaddressed. Estimates show that, on average, **an increase in fiscal stimulus of 1 per cent of annual GDP would have increased annual working hours by 0.3 percentage points by the first quarter of 2021 relative to the last quarter of 2019**.

Vaccination: Faster roll-outs are crucial for recovery

Higher vaccination rates are also associated with a stronger and faster labour market recovery. Estimates indicate that, **for every 14 persons fully vaccinated in the second quarter of 2021, one full-time equivalent job was added to the global labour market**. This implies that the slow roll-out of vaccination in developing countries has been retarding labour market recovery, increasing the divergence between countries.

Prospects for the rest of 2021: Weak and uncertain

Prospects for labour market recovery for the rest of 2021 remain weak and uncertain. Reflecting the stalled recovery in 2021 to date, **significant downward adjustments have been made to the projected working hours for 2021**, from the –3.5 per cent (–100 million FTE jobs) relative to the last quarter of 2019 that was forecast by the ILO in June 2021, **to the –4.3 per cent (–125 million FTE jobs)** that the ILO forecasts today. Vaccination will continue to be a key factor in shaping the eventual labour market outcome for 2021. **In a "fair vaccination" scenario** for the fourth quarter of 2021, which assumes an equitable distribution of vaccines globally, **low-income and lower-middle-income countries could reduce their working-hour losses in the fourth quarter considerably**: hours worked would increase by 2.0 and 1.2 percentage points in low-income and lower-middle-income countries, respectively.

Looking ahead

Notwithstanding the resumption of global economic growth, overall recovery in hours worked is now **flatlining significantly below pre-pandemic levels, and with a "great divergence" between advanced and developing countries**. In low- and middle-income countries, fiscal constraints and slow vaccination progress are hindering recovery, compounded by additional downside risks including debt distress and global supply chain bottlenecks. **Global action, including financial and technical support, provides the key for a human-centred recovery**. In this regard the recent, and unprecedented, allocation by the IMF of US$650 billion in special drawing rights offers a major opportunity. To mobilize and facilitate these global efforts, the ILO will support national tripartite dialogues in Member States and convene a major international policy forum with multilateral institutions and other key actors.

Part I. Labour market developments in 2020–21: Increasing disparities

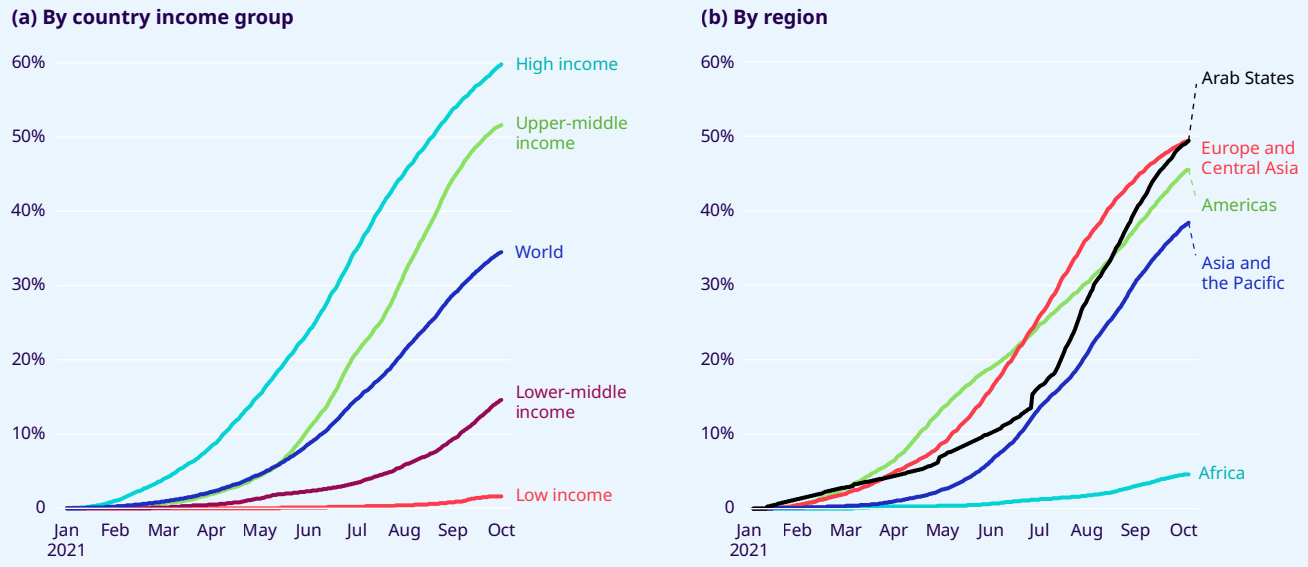
1. Return to workplace and vaccination

The labour market situation in 2021 continues to be impacted by the evolving dynamics of the pandemic. The roll-out of vaccination campaigns has helped some countries combat the virus and open up, but this has been mainly concentrated in advanced economies. In early October, **the share of fully vaccinated people globally reached 34.5 per cent, but with large differences between countries**. While high-income countries have the highest percentage of fully vaccinated people at 59.8 per cent, the proportion is much lower at 14.6 per cent in lower-middle-income countries and only 1.6 per cent in low-income countries (figure 1 (a)).

This great unevenness in vaccination is also reflected in regional figures (figure 1 (b)). In the Americas, Europe and Central Asia, and the Arab States, more than 40 per cent of the population was fully vaccinated by early October. Vaccination rates have followed a similar trend in Asia and the Pacific (38.4 per cent) but are still lagging behind other regions, though with substantial differences across countries, while in Africa, progress in vaccination has been very slow (4.6 per cent).

As vaccination rates have increased, **workplace closures (WPC) (figure A1, Statistical annex) are currently on a downward trend**. While most workers still live in countries with some form of workplace restrictions, the strictest form of closure (economy-wide required closures for all but essential workplaces) has nearly disappeared (affecting less than 1 per cent of the employed globally in early October 2021, compared to a peak of 41 per cent in April 2020).

Figure 1. Share of population fully vaccinated against COVID-19 (percentage)



Note: Total number of people who received all doses prescribed by the vaccination protocol, divided by the total population of the country.

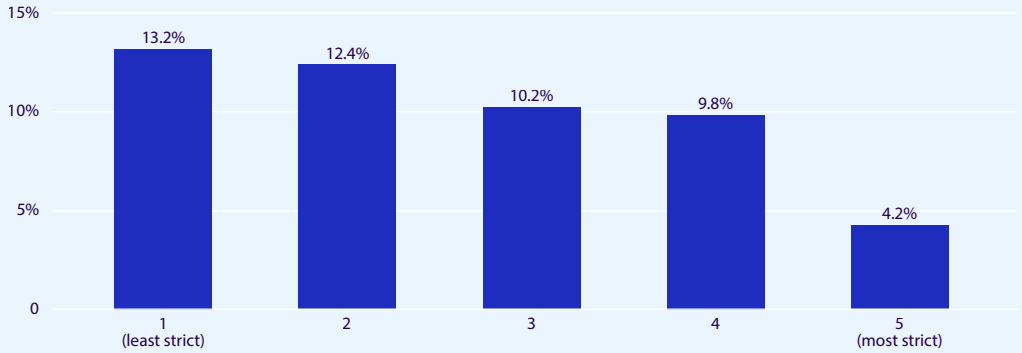
Source: Our World in Data; ILO estimates.

However, once again, there are **considerable differences between regions** (for more details see figures A2 and A3 in Statistical annex). Europe and Central Asia has seen a significant decrease in restrictions as vaccinations progressed in the course of 2021. By contrast, restrictions in Asia and the Pacific have become more widespread in recent months, with a large majority of workers residing in countries with some form of current workplace closure measures. At the same time, these measures have become increasingly targeted at specific areas.

Evidence shows that **higher rates of vaccination are associated with less stringent workplace restrictions** (figure 2). Using a scale of workplace restrictions ranging from 1 (most stringent) to 5 (least stringent), an average of 4.2 per cent of the population was fully vaccinated among countries with the most stringent restrictions, while the share was 13.2 per cent among countries with the least stringent restrictions.[1] It is important to note that many other factors can impact the level of workplace closures, such as government policies and the possibility of telework, with the latter being disproportionately an option for higher-skilled occupations and in certain sectors.

1 Vaccine deployment is playing a critical role in economic recovery. Vaccines have been demonstrated to be highly effective in protecting against symptomatic COVID-19, and critically against hospitalization and death. This protection allows economies to recover due to relaxation of public health restrictions and behavioural changes.

Figure 2. Average of population fully vaccinated by workplace closure (WPC) stringency (ranked 1–5), 1 Jan – 4 Oct 2021 (percentage)



Note: The WPC stringency (1–5) denotes the following:
1 Recommended closures
2 Required closures for some sectors or categories of workers – targeted areas only
3 Required closures for some sectors or categories of workers – total economy
4 Required closures for all but essential workplaces – targeted areas only
5 Required closures for all but essential workplaces – total economy

Source: ILOSTAT database, ILO modelled estimates; the Oxford COVID-19 Government Response Tracker; Our World in Data.

2. Working hours: A stalled global recovery

After some significant gains in the second half of 2020, **the recovery in working hours has stalled during 2021**.[2] During the third quarter of 2021, it is estimated that global hours worked (adjusted for population aged 15–64)[3] were still 4.7 per cent below the level of the fourth quarter of 2019 (the pre-crisis benchmark), equivalent to the loss of 137 million full-time jobs. The first and second quarters of 2021 saw similar deficits in working hours (–4.5 and –4.8 per cent, respectively)[4] (figure 3).

This global picture is of a "great divergence" between richer and poorer economies, which reflects, to a large degree, the evolution of the pandemic, and the uneven availability of fiscal stimulus and vaccines (see Part II for an analysis). High-income countries have experienced a stronger but still incomplete recovery, with working hours still 3.6 percentage points lower in the third quarter of 2021 than the pre-crisis benchmark (though this represents an improvement on the 5.2 per cent deficit observed in the last quarter of 2020) (figure 4). In contrast, low- and lower-middle-income economies, which have the lowest vaccination rates combined with limited fiscal stimulus, suffered setbacks in recovery. In low-income countries, working hours decreased further, from a gap of 3.7 per cent in the last quarter of 2020 to 5.7 per cent in the third quarter of 2021. Lower-middle-income countries saw a similar deterioration in the gap in working hours from 5.6 per cent to 7.4 per cent, while working hours in upper-middle-income countries recovered at the beginning of 2021, but have stagnated since.[5] This uncertain and unequal process of recovery is a matter of serious concern.

From a regional perspective, Europe and Central Asia came closer to the pre-crisis benchmark with a gap of 2.5 per cent, followed by Asia and the Pacific at 4.6 per cent. In contrast, Africa, the Americas and Arab States saw larger gaps of 5.6, 5.4 and 6.5 per cent, respectively (see Statistical annex for further details).

2 Estimates based on the ILO nowcasting model.

3 Population adjustment is necessary to provide a comprehensive and internationally comparable measure of work activity. Average global population growth during the last decade was approximately 1 per cent annually, with wide variation among countries. To properly capture work activity, changes in working hours need to account for this change to ensure that the level increase in population is not driving growth in hours worked (for the same reason, employment is often adjusted for population aged 15–64, using the employment-to-population ratio indicator). The ILO nowcasting model uses population aged 15 to 64 to adjust hours worked to further ensure comparability, as people above 65 tend to present much lower employment-to-population ratios and their share in total population is highly heterogeneous across countries.

4 The estimates have only been slightly revised since the previous update of the model, the WESO Trends (April 2021) estimates.

5 In upper-middle-income countries excluding China, the same pattern is observed, but there is a shift in the level. In the third quarter of 2021, this group of countries registered a –6.2 per cent decline with respect to the pre-crisis benchmark, well below the level observed in high-income countries.

Figure 3. Change in global working hours (adjusted for population aged 15–64) relative to 2019 Q4 (percentage)

Source: ILOSTAT database, ILO modelled estimates.

Figure 4. Change in working hours relative to 2019 Q4 (adjusted for 15–64 population), by country income group (percentage)

Source: ILOSTAT database, ILO modelled estimates.

3. Productivity and enterprises: The asymmetric shock of COVID-19

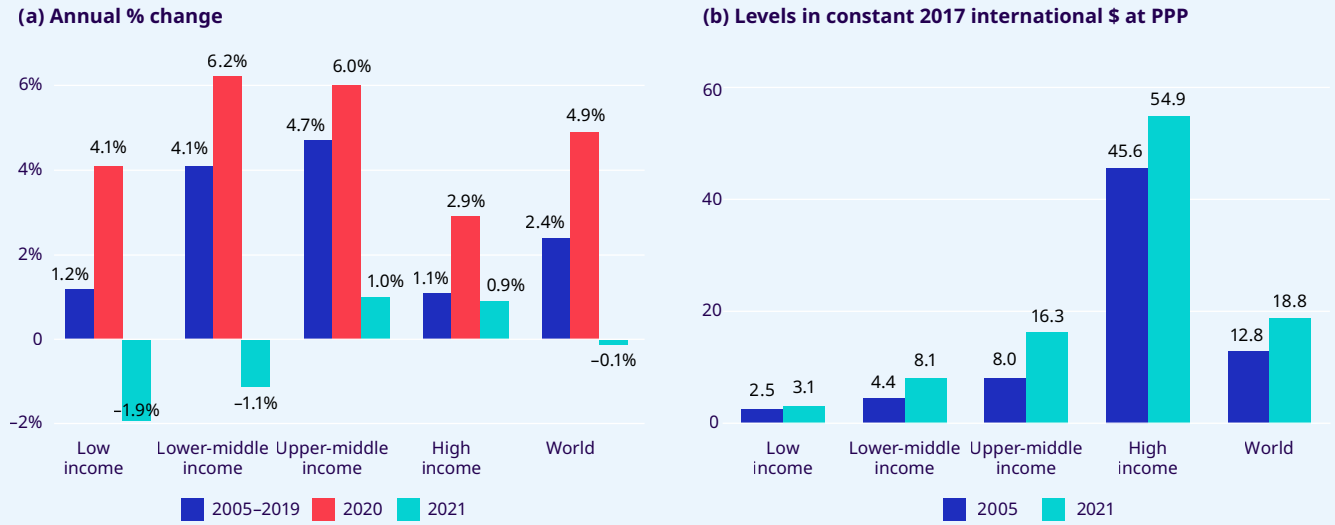
Labour productivity, measured as the average output generated per worker or per hour worked, is a key indicator of the efficiency of a country's economy and labour market.[6] The impact of the COVID-19 pandemic resulted in unprecedented and volatile developments in gobal labour productivity levels. **The world's output per hour worked surged by 4.9 per cent in 2020, more than double the long-term average annual rate of 2.4 per cent registered between 2005 and 2019 (figure 5(a)).** Increases in average output per hour worked are observed across all major country income groups.

However, in 2021, there has been **a sharp reversal in global labour productivity growth with significant differences between countries**. Global output per hour worked is projected to decline by 0.1 per cent, with the strongest contractions in low-income (–1.9 per cent) and lower-middle-income countries (–1.1 per cent). High-income countries are expected to maintain slightly positive productivity growth (0.9 per cent).

These trends point to **a further widening in the "productivity gap" between the world's low- and high-income economies**. In 2020, in real terms, the average worker in a high-income country produced 17.5 times more output per hour than the average worker in a low-income country. **This is projected to widen to 18.0 in 2021, the largest gap since 2005 (figure (5b)).**

Emerging evidence suggests that **an important and worrying compositional effect underpinned the productivity growth surge in 2020: lower-productivity firms and sectors and lower-paid workers were disproportionately affected by the pandemic, while high-productivity enterprises and high earners saw far less damage.**

Figure 5. Output per hour worked



Note: Output expressed at purchasing power parity (PPP) is used to account for price differences across countries.

Source: ILO estimates; World Bank, World Development Indicators Database; IMF, World Economic Outlook Database (October 2021).

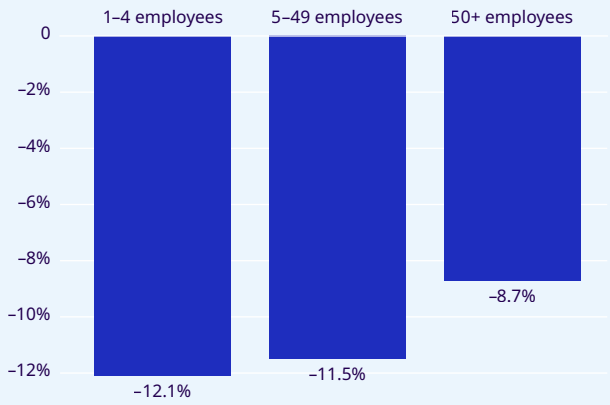
6 The focus of the present analysis is on output per hour worked. As has been shown in prior *ILO Monitor* reports, in the context of a pandemic characterized by widespread workplace closures, changes in working hours provide a more accurate indication of the state of the labour market than changes in employment. Similarly, in these circumstances, the productivity measure output per hour worked has strong interpretational advantages vis-à-vis output per employed person. In the long run, labour productivity is one of the primary determinants of living standards, as higher productivity enables (but does not guarantee) increased consumption and/or a reduction in working hours for equal or greater pay. At the enterprise level, holding all else constant, if labour productivity increases, a business becomes more profitable. However, important aspects related to employment quality during periods of changes in productivity need to be carefully assessed, especially in terms of wages and earnings of workers. This dimension will need careful monitoring in the months and years ahead.

For instance, analysis from 26 countries[7] shows that smaller firms have seen substantially larger declines in hours worked than larger firms (figure 6).[8] Establishments with 1–4 employees saw a decline in working hours of 12.1 per cent and those with 5–49 employees registered a decline of 11.5 per cent. Establishments with 50 or more employees experienced a decline of only 8.7 per cent. Importantly, smaller firms in this sample of countries also registered larger outright employment losses, an indication of greater destruction of small establishments vis-à-vis larger enterprises.

The pandemic resulted in a marked shift in the composition of employment between 2019 and 2020, resulting in a lower share of total working hours in 2020 in small firms and a larger share in large firms. As larger firms generally produce more output per hour worked on average than smaller firms, **this compositional effect was reflected in the unprecedented increase in aggregate labour productivity**.[9] This development reflects the asymmetric impact of COVID-19 on small firms and the workers employed in these units, which have borne the brunt of the fallout from the pandemic.[10]

Many small firms are engaged in the sectors hardest hit by pandemic-related restrictions, including restaurants and face-to-face service sector activities. At the same time, smaller firms are also disadvantaged in terms of access to capital and they face higher average debt ratios, severely limiting their capacity to maintain output and threatening their prospects to remain viable over an extended period facing such a large shock to demand.[11] Small firms in low- and lower-middle-income countries are particularly vulnerable, as they benefit less from government assistance programmes.

Figure 6. Hours worked by establishment size (per cent change in 2020)



Source: ILO estimates based on ILO Harmonized Microdata collection.

Similar observations can be made for low-paid workers. Analysis of **labour force survey data from 23 countries covering hourly wages of employees shows that lower-paid workers have suffered disproportionately during the pandemic** (figure 7). In 2020, the share of workers earning below the 40th percentile hourly wage[12] declined by 4.8 per cent.[13] Some countries suffered a much larger decline. Overall, the pandemic in 2020 resulted in a **significantly smaller share of lower-wage workers in the labour force than in 2019 as low-wage earners suffered disproportionately in terms of employment and working-hour losses**.

7 Countries include: Argentina, Austria, Botswana, Brazil, Chile, Costa Rica, Czechia, Dominican Republic, El Salvador, Iran (Islamic Republic of), Italy, Jamaica, Kosovo, Mexico, Mongolia, North Macedonia, Occupied Palestinian Territory, Panama, Paraguay, Peru, Serbia, Seychelles, South Africa, Thailand, Turkey and Viet Nam.

8 Bloom et al. https://www.nber.org/system/files/working_papers/w28233/w28233.pdf provide a discussion of these developments in the United States and United Kingdom.

9 The often sizeable productivity differential between small and large firms has been documented in detail across a wide range of countries and industries. See: OECD, *OECD Compendium of Productivity Indicators*, 2021, https://doi.org/10.1787/f25cdb25-en.

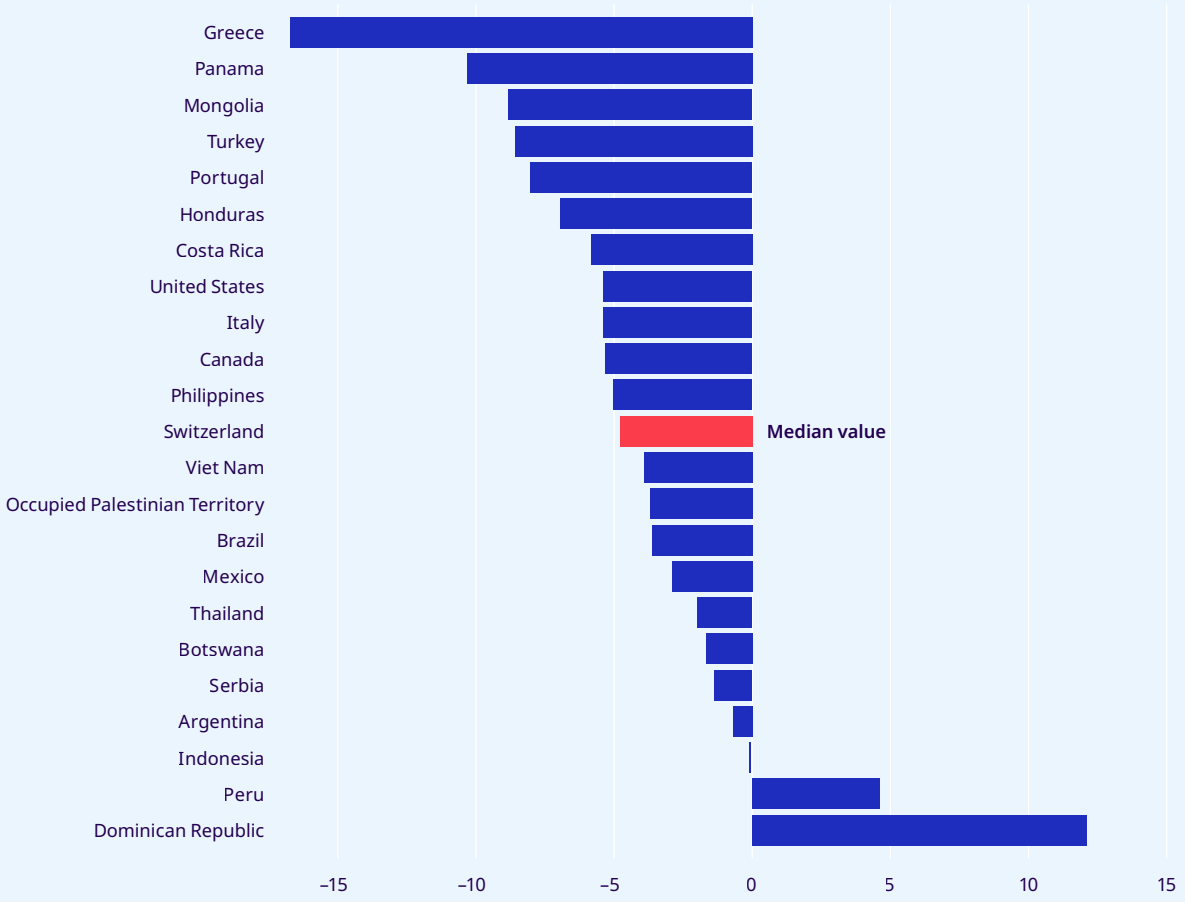
10 It is important to note that this analysis focuses only on employees. In the sample of 26 countries analysed above, employees comprise 63.5 per cent of total employment. Own-account workers comprise 25.9 per cent and (unpaid) contributing family workers a further 6.4 per cent. Globally, own-account workers accounted for 24 per cent of the overall decline in global employment in 2020, while contributing family workers accounted for 12 per cent. As these categories of workers have lower than average productivity levels, their pandemic-induced reduction in working hours in 2020 further contributed to the increase in productivity growth.

11 See: https://hbr.org/2019/08/the-gap-between-large-and-small-companies-is-growing-why.

12 Defined as the inflation-adjusted 2019 wage at the 40th percentile.

13 The median value has been used given the small sample of countries, which have a large range of values.

Figure 7. Changes in shares of low-wage workers (percentage point change in 2020)



Note: Low-wage workers are defined as employees earning less than 40th percentile of the inflation-adjusted 2019 wage.

Source: ILO estimates based on ILO Harmonized Microdata collection.

The **disproportionate impact of the pandemic on small firms and on lower-wage workers has important implications for recovery prospects**. The abrupt and large-scale reduction in the share of smaller firms operating in the economy could limit job prospects as small firms provide the majority of job opportunities in many countries, particularly for lower-wage workers. This raises the risk of long-term negative consequences or "hysteresis" in which extended periods of inactivity and unemployment can lead to skills depreciation and discouragement at the individual level, damaging prospects for long-term gains in productivity at the firm level and lowering potential economic growth rates. Moreover, with a growing productivity gap between developing and advanced economies, the positive contribution of productivity to promoting inclusive growth and the creation of decent jobs is being further jeopardized in the countries that need this push the most.

4. Employment, unemployment and inactivity: An unequal impact and an uneven recovery

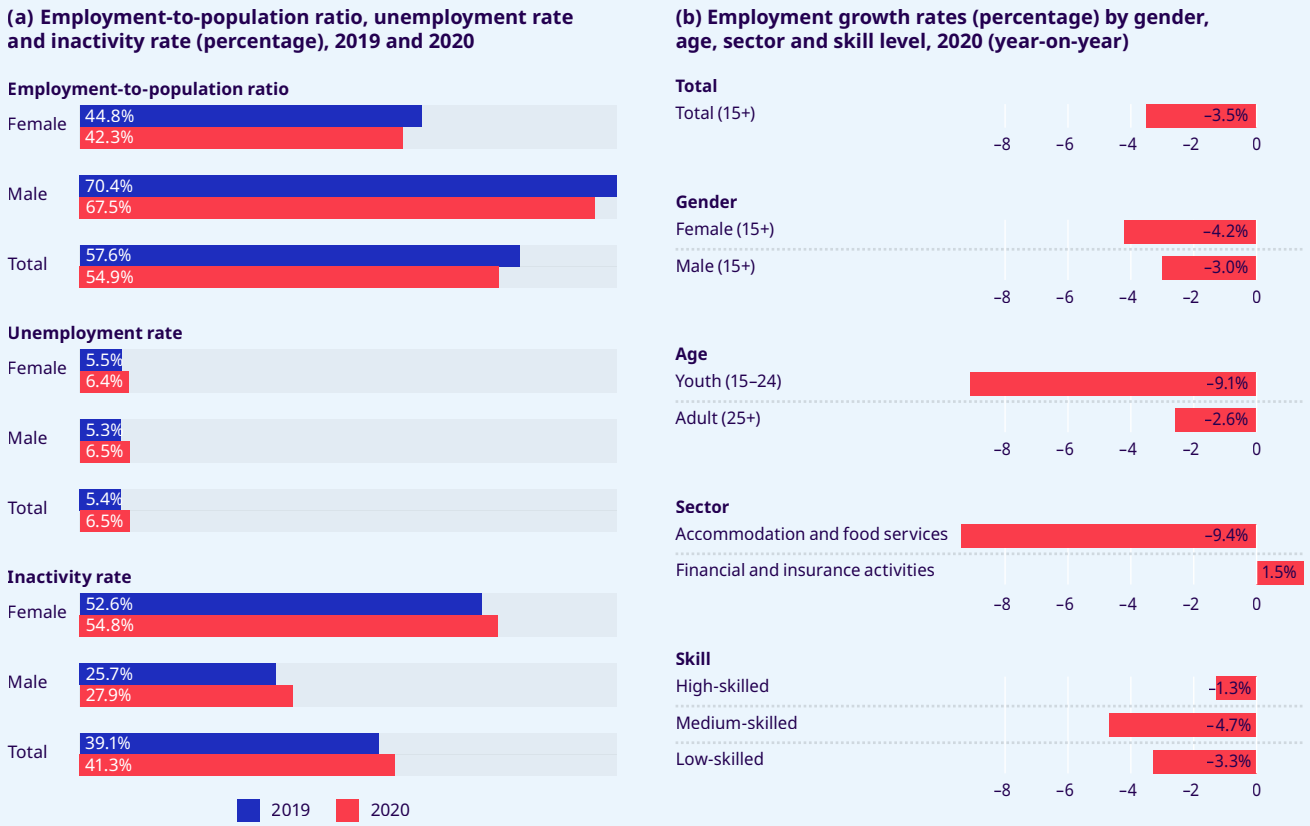
These developments in working hours and enterprise structure have translated into an uneven and fragile recovery in employment, unemployment and inactivity. **The latest global estimates and country-level data confirm that, overall, the crisis has resulted in a significant employment deficit, which persists in most countries**. While unemployment has been gradually declining, inactivity has often stayed high, leaving the overall employment-to-population ratio well below the pre-pandemic benchmark.

In 2020, ILO estimates show that the global employment-to-population ratio decreased from 57.6 in 2019 to 54.9 per cent in 2020 (figure 8 (a)), though this decline masks considerable differences between groups of workers and between sectors. As highlighted by the seventh edition of the ILO Monitor and the ILO World Employment and Social Outlook Trends 2021 report, **global employment in 2020 declined more for women, youth, and the medium- and low-skilled** (figure 8(b)). Women were disproportionately affected, accounting for 38.9 per cent of total employment before the COVID-19 crisis (2019) but making up 47.6 per cent of employment losses in 2020. Even starker is the disproportionate impact on youth who represented just 13 per cent of total employment in 2019, but made up 34.2 per cent of the 2020 decline in employment.

Major differences are also observed between sectors. Reflecting the substantial effects of lockdown measures on service sectors, global employment in accommodation and food services suffered the largest sectoral decline in 2020 (–9.4 per cent), while, in contrast, financial and insurance activities registered positive growth last year (1.5 per cent).

In 2021, the recovery in employment continues to be fragile and often uneven. An analysis of 39 countries with quarterly labour force survey data

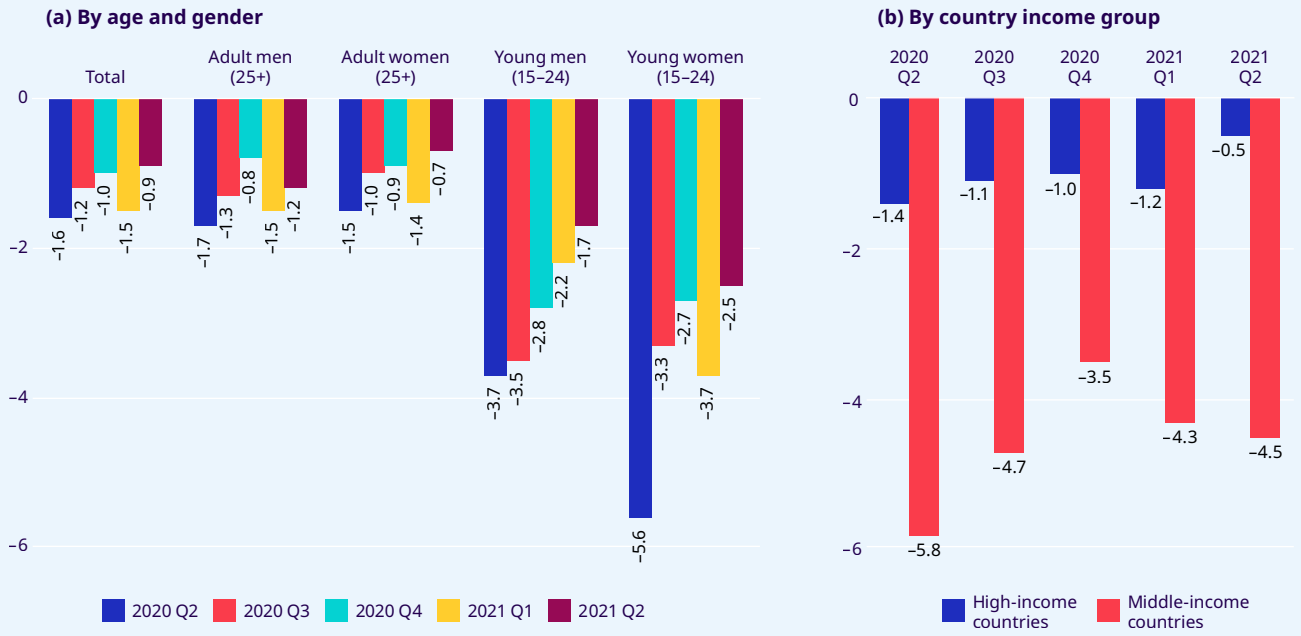
Figure 8. Key labour market indicators, global estimates, 2019–2020



Notes: For definitions of these indicators, see the https://ilostat.ilo.org/resources/concepts-and-definitions/

Source: ILO modelled estimates; authors' calculations.

Figure 9. Change in employment-to-population ratio, 2020 Q2–2021 Q2 (percentage points)



Note: The sample of 39 countries is balanced over the period 2019 Q1–2021 Q2; the unweighted median value (not simple average) in this sample is used to minimize the impact of extreme values. The figures presented are the differences in the employment-to-population ratio (percentage points) relative to the same quarter in 2019.

Source: ILOSTAT; authors' calculations.

shows that after some recovery and convergence across different demographic groups in 2020 (figure 9 (a)), the situation deteriorated at the beginning of 2021 with the emergence of COVID-19 variants and renewed lockdown measures. While there was some improvement in the second quarter of this year, youth,[14] especially young women, still faced the biggest deficit relative to the pre-crisis situation in 2019.

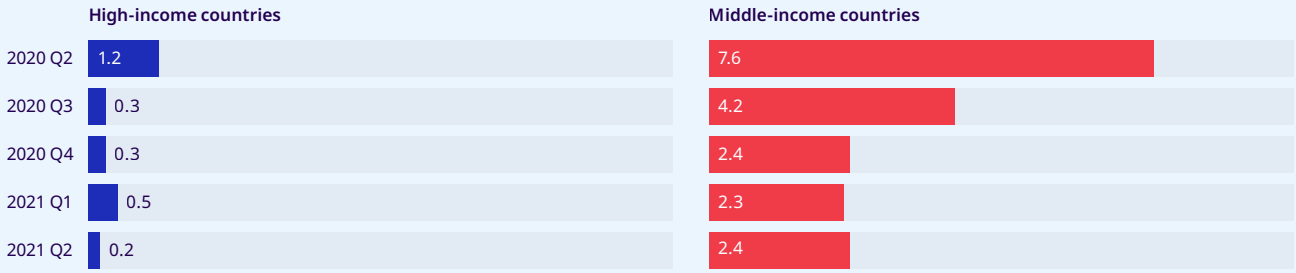
There are also large differences between high-income and middle-income countries (low-income countries are not included in the sample due to data constraints).[15] As highlighted by previous editions of the *ILO Monitor*, middle-income countries were hit hardest by the lockdown measures, especially in the second quarter of 2020 (figure 9 (b)). Though there was some recovery and convergence in the employment-to-population ratio over the third and fourth quarters of last year, **the intensification of the pandemic at the beginning of 2021 led to a renewed divergence, with advanced economies heading faster to a labour market recovery**. The more positive trends in high-income countries have been driven by the higher vaccination rates and greater use of stimulus (see Part II), along with job retention schemes and other policy measures that have stabilized employment and supported efforts to open up economies on the road to recovery.

Higher inactivity rates have persisted into 2021, especially in middle-income economies (figure 10). Available data shows that after the sharp rise in inactivity in the second quarter of 2020, inactivity rates remained high in middle-income countries in 2021,

14 See also ILO Briefing note: An update on the youth labour market impact of the COVID-19 crisis (ilo.org).

15 The sample includes 30 high-income and 9 middle-income countries: Australia, Austria, Belgium, Brazil, Bulgaria, Canada, Chile, Colombia, Costa Rica, Cyprus, Czechia, Denmark, Estonia, Finland, France, Greece, Hungary, Iceland, Italy, Japan, Korea (Republic of), Latvia, Lithuania, Luxembourg, Mexico, Moldova (Republic of), Netherlands, Norway, Paraguay, Poland, Portugal, Romania, Slovakia, Slovenia, South Africa, Spain, Sweden, Switzerland, and the United States. Due to the lack of comparable data, there are no low-income countries in this sample.

Figure 10. Change in inactivity rate, by country income level, 2020 Q2–2021 Q2 (percentage points)



Note: Sample of 39 countries (30 high-income and 9 middle-income countries) is balanced over the period 2019 Q1–2021 Q2; the unweighted median value (not simple average) in this sample is used to minimize the impact of outliers. The figures presented are the differences in the inactivity rate (percentage points) relative to the same quarter in 2019.

Source: ILOSTAT; authors' calculations.

while in high-income countries, the rate returned to close to the pre-crisis level by 2021 Q2. The continuing participation deficit due to both lower employment-to-population ratios and higher rates of inactivity indicates **that considerable "labour slack" or labour underutilization persists in many countries, especially middle-income economies**. In a number of advanced economies, there is also evidence of labour shortages as reflected by an increased number of vacancies. In the case of the United States, for instance, job openings reached a series peak in July 2021 (11.1 million, which is up from the 6.5 million openings in August 2020).[16] As witnessed prior to the COVID-19 crisis, **labour shortages vary across countries and are more evident in certain sectors and occupations**. Overall, the mismatch between the available jobs and what workers can and want to do (in terms of skills and wages) needs to be carefully analysed and monitored during the recovery (see box 1).

16 See the U.S. Bureau of Labor Statistics, Job Openings and Labor Turnover Summary (bls.gov).

Box 1. Annual employment losses understate the full impact of the COVID-19 crisis on the labour market in 2020 and 2021

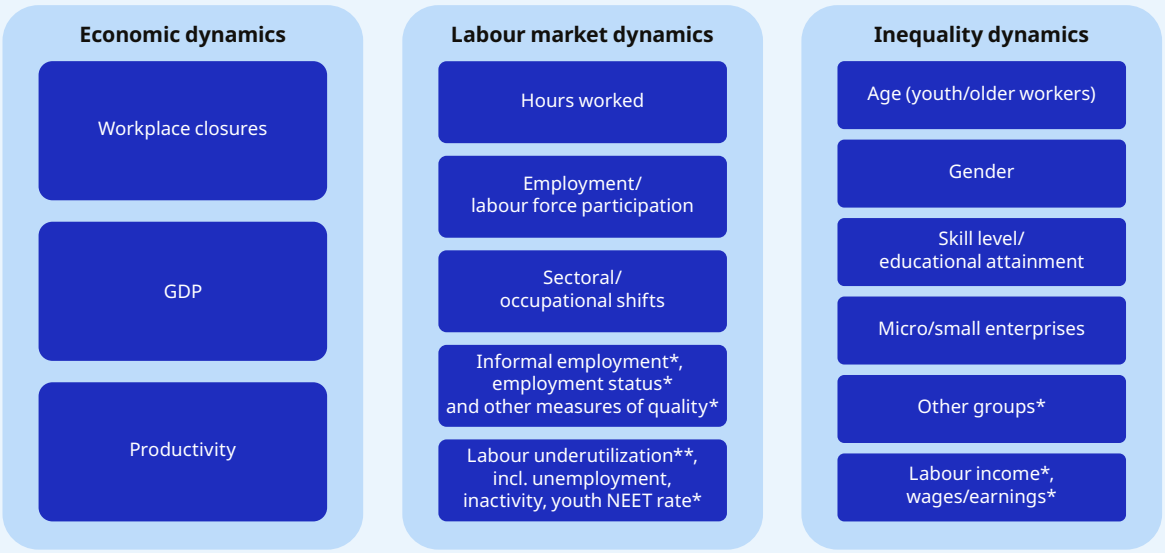
The analysis of the labour market, as outlined in the *ILO Monitor* series, requires tracking not just one figure, like the unemployment rate, but a set of indicators covering both quantity and quality dimensions. The analysis, as presented in this edition, has been based on a set of key indicators that provide insights on the transmission of lockdown measures and other subsequent economic effects on labour markets around the world. In this context, monitoring recovery from the COVID-19 crisis can be structured around three key pillars (figure 11):

1) **Economic dynamics:** Monitoring requires a continuing assessment of how lockdown measures, opening up of economies (for example, changes in workplace closures) and changes in policies affect GDP and productivity;
2) **Labour market dynamics:** Monitoring needs to look at the subsequent effects on the labour market in terms of changes in hours worked (its importance is also highlighted in box A, Technical annex), employment/labour force participation, sectoral/occupational shifts in employment, and impact on informal employment and other measures of employment quality. The resulting impact on labour underutilization, including unemployment, inactivity and youth NEET rates, needs to be carefully monitored (beyond the single measure of unemployment). Mismatches between vacancies and the jobless (both unemployed and inactive) also need to be assessed where relevant data is available; and
3) **Inequality dynamics:** Given the unequal impact of the crisis and the uneven recovery trends, monitoring recovery requires taking into account distributional aspects as reflected in differences by age (young/older versus prime-age workers), gender, skill level and enterprise size (smaller enterprises versus larger firms). In addition, a critical dimension of inequality is represented by not only trends in labour income and wages/earnings but also their distribution. A comprehensive inequality analysis of recovery trends involves disaggregation and analysis of other indicators, including those listed under other pillars.

As a key input for policymaking, judging recovery trends needs to be based on careful diagnostics of the labour market and an assessment of deficits (relative to a pre-crisis period and/or longer-term trends). The indicators suggested here are based on the analysis undertaken for the *ILO Monitor* series to serve as a framework for further recovery monitoring. However, at the country level, other indicators may be needed depending on the nature of the labour market and availability of data (though the last 18 months have also shown that data from different sources can be used in employment diagnostics[a]). Overall, regular monitoring, assessments and dialogue within governments and with social partners and other stakeholders are critical to ensure that the analysis translates into effective policy responses.

[a] See, for example, ILO's rapid employment assessments, https://www.ilo.org/emppolicy/Whatsnew/WCMS_754961/lang--en/index.htm

Figure 11. Recovery monitoring framework



Note: Youth NEET rate = the share of youth not in education, employment or training; * Not all of these indicators have been analysed in this current *Monitor* but represent important measures of the impact of the COVID-19 crisis (as also highlighted in previous editions of the *Monitor*) and are critical for future tracking of recovery trends; ** For more details on a definition of labour underutilization, see ILO's ILOSTAT database.

Part II. Stimulus, vaccination and job recovery

1. Fiscal stimulus in mitigating labour market disruptions: Indispensable but still limited in developing countries

In response to the massive labour market disruptions caused by the pandemic, governments have launched fiscal stimulus programmes on an unprecedented scale, particularly in high-income countries. The ILO's previous analysis (6th edition of the *Monitor*, September 2020) confirmed that these stimulus programmes have had a very significant impact in mitigating labour market damage, but also highlighted their uneven distribution between countries. The capacity of high-income countries to deploy levels of financial resources unavailable in other countries has generated a major "fiscal stimulus gap" which has in turn shaped the uneven trajectory of the recovery process.

The latest IMF estimates show that global fiscal stimulus put in place to respond to the COVID-19 crisis amounted to US$16.9 trillion,[17] which has been heavily concentrated in advanced economies (85.9 per cent of global spending).[18] Emerging and developing economies accounted for just 13.8 and 0.4 per cent of the global stimulus, respectively. Though the pandemic continues to disrupt labour markets, the majority of emerging and developing economies are unable to provide higher levels of fiscal support in 2021 and beyond, adversely impacting their recovery process.[19] As of June 2021, half of low-income countries were already in debt distress or at high risk.[20]

At the same time, concerns about inflationary pressures related to stimulus and significant global supply chain bottlenecks have also emerged. While care is needed in designing and adapting stimulus packages to improve their impact and efficiency in rapidly evolving circumstances,[21] **premature withdrawal of fiscal support would risk exacerbating labour market disruptions or slowing down job recovery**. The evidence confirms the importance of continued strong stimulus.

Based on data from 51 countries for the period from 2020 Q2 to 2021 Q1, figure 12 shows a clear correlation between the fiscal stimulus (as a percentage of GDP) and changes in working hours. Controlling for a range of other factors, such as public health measures and labour market structure (see Technical annex 2 for further details), this correlation remains significant and large. The estimation shows that, **on average, an increase in fiscal stimulus of 1 per cent of annual GDP is associated with a 0.3 percentage point increase in working hours** relative to the last quarter of 2019 in annualized terms. This is a larger effect than previously estimated.[22,23]

17 The above-the-line measures (additional spending and foregone revenue) amounted to US$10.8 trillion while the below-the-line discretionary fiscal responses (equity, loans and guarantees) represented a further US$6.1 trillion, see IMF *Fiscal Monitor*, October 2021.

18 The shares are based on the additional spending and foregone revenue component only, see IMF *Fiscal Monitor*, October 2021. The groupings of developed, emerging markets and low-income developing countries is based on the IMF definition.

19 IMF *Fiscal Monitor*, April 2021 and October 2021.

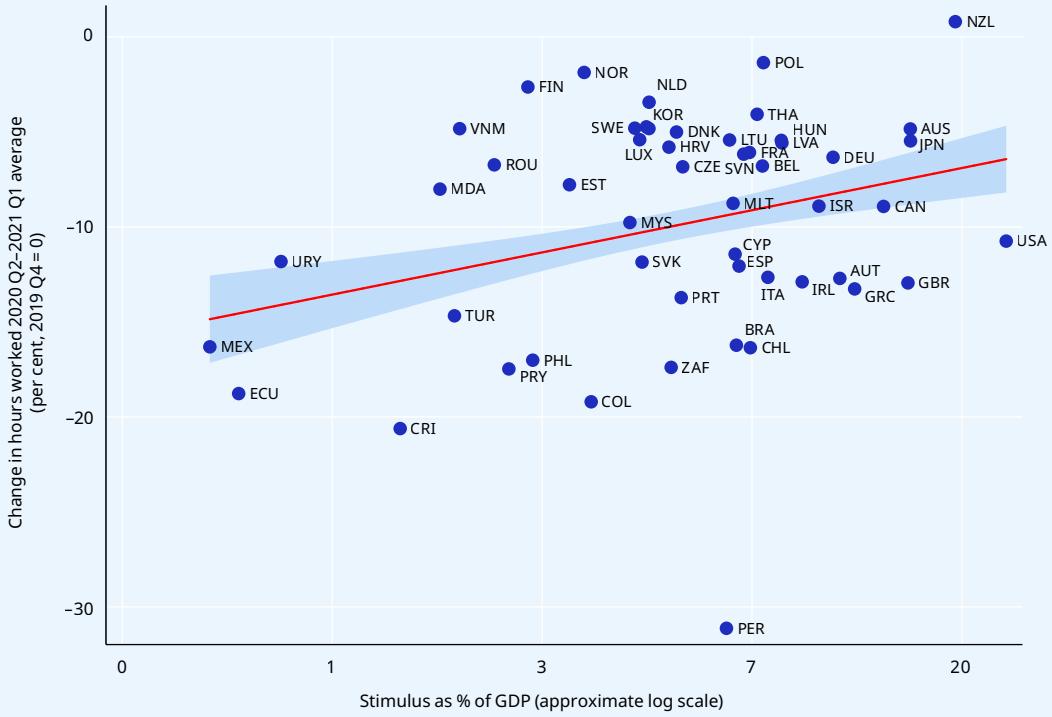
20 See https://www.imf.org/external/Pubs/ft/dsa/DSAlist.pdf.

21 The policy design should take into account timely information on, among others, the size of the output gap, the degree of recovery in the labour market, and the supply side capacity. The emphasis should continue to be placed on public health measures, protecting employment in particular for the most vulnerable populations, and support to small and medium-sized enterprises. Integration of labour market policy into macroeconomic policymaking is also necessary, for instance job retention schemes have helped in preserving employee-employer matches and hence facilitated the resumption of normal operations. See for instance: https://www.oecd-ilibrary.org/sites/490d4832-en/index.html?itemId=/content/publication/490d4832-en&_ga=2.130222095.1647813223.1634032211-798085439.1631712729.

22 The results in the 6th *Monitor* produced the equivalent of an increase of 0.8 percentage points in the quarter of analysis, the second quarter of 2020, which in annualized terms implies a 0.2 percentage point increase. Hence, the current exercise points to a somewhat stronger effect. This can have multiple causes, for instance the dynamic effects of fiscal policy would have started to materialize. Nonetheless, higher data availability and data quality can also be driving the result. In the current edition, only labour-force-survey-based observations are included in the analysis, whereas in the previous exercise modelled data were included as well.

23 As fiscal policy expansions are known to have persistent effects (spanning a horizon of several years), we expect the current estimated effect to be below the cumulative effect in the long run, that is, we expect the multiplier to be larger than our current estimate. See, for instance: Christina D. Romer and David H. Romer, "The Macroeconomic Effects of Tax Changes: Estimates Based on a New Measure of Fiscal Shocks", *American Economic Review* 100, No. 3 (2010): 763–801; Olivier Blanchard and Roberto Perotti, "An Empirical Characterization of the Dynamic Effects of Changes in Government Spending and Taxes on Output", *The Quarterly Journal of Economics* 117, No. 4 (2002): 1329–1368. Moreover, public health restrictions impede normal activity in certain industries, hence the multiplier is likely to be smaller during periods of stringent restrictions.

Figure 12. Relationship between fiscal stimulus (per cent of GDP) **and average change in working hours** (per cent) **, 2020 Q2–2021 Q1 relative to 2019 Q4**



Note: The figure plots the relationship between change in working hours (%) and fiscal stimulus (percentage of GDP on a log scale) in 51 countries for which the necessary data are available. The working-hour figures refer to the non-calendar year from 2020 Q2 through 2021 Q1. The red line displays fitted values, while the area shaded in light blue shows the 95% confidence interval.

Source: ILOSTAT database; IMF *Fiscal Monitor*; authors' calculations.

2. The crucial effects of COVID-19 vaccinations on labour markets

Along with fiscal stimulus, **vaccination has been a crucial factor in determining labour market recovery**. As indicated earlier (Part I), vaccinations are key to opening up the economy and lowering the risk associated with everyday consumption and production activities.[24,25] The enormous differences between countries in the roll-out of vaccination is contributing directly to the highly uneven process of job recovery around the world.

Analysis of data from 28 countries over the first two quarters of 2021 shows that vaccination[26] is positively correlated with the recovery in working hours (figure 13). The strong association holds after the inclusion of relevant control factors.[27] The estimates imply that**, globally, an additional 10 percentage points in the share of the population becoming fully vaccinated is associated with a recovery in**

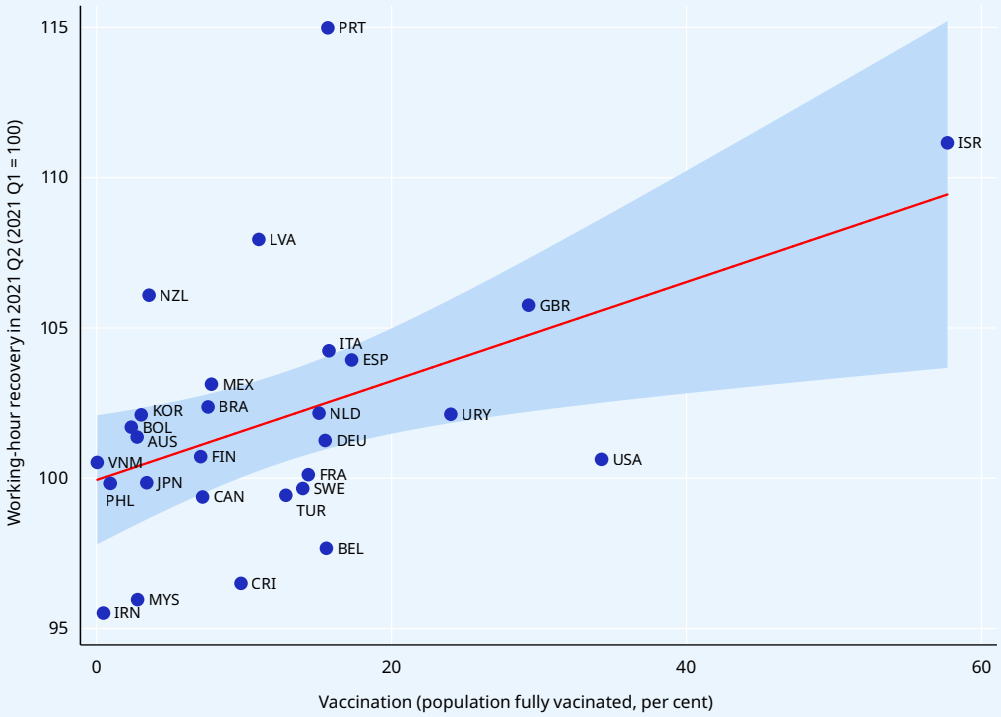
24 See, for instance, a recent ILO publication on vaccination and consumer demand: https://www.ilo.org/global/research/publications/WCMS_806472/lang--en/index.htm.

25 Early vaccination access is also important to prevent future new variants. See for instance: https://www.who.int/news-room/feature-stories/detail/the-effects-of-virus-variants-on-covid-19-vaccines.

26 The vaccination measure used is the average share of fully vaccinated persons during 2021 Q2 in each country. The proxy of labour market recovery is the observed change in working hours between 2021 Q1 and 2021 Q2. Working hours are indexed to 100 in 2021 Q1 (for example, a value of 105 would indicate a 5 per cent increase).

27 We control for the recovery in hours during the previous quarter, the COVID-19 caseload change between 2021 Q1 and 2021 Q2, national income, and the share of elderly population. This measured association is used as the basis for the remainder of the section. This analysis is based on the 28 countries with available vaccination and labour force survey data on hours worked for 2020 Q4, 2021 Q1 and 2021 Q2. Even after controlling for other potential drivers, the model set-up does not allow for causal inference, which is outside of the scope of the present study. Hence, the results should be taken for their indicative value and not as a causal claim.

Figure 13. Working-hour recovery versus average share of fully vaccinated persons



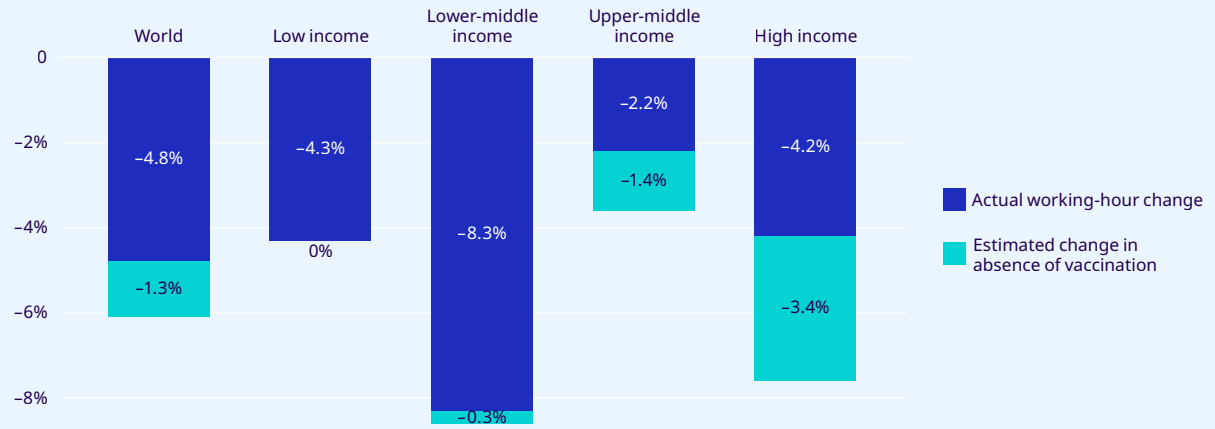
Note: The figure plots the relationship between the recovery in working hours in the second quarter of 2021 (100 indicates the same level as the first quarter of 2021) and vaccination (percentage of population fully vaccinated) in 28 countries for which the necessary data are available. The red line displays fitted values, while the area shaded in light blue shows the 95% confidence interval.

Source: ILOSTAT database; Our World in Data; authors' calculations.

working hours of 1.9 per cent (or the equivalent of 52 million full-time jobs). This means that during the second quarter of 2021, **on average, for every 14 persons fully vaccinated, a full-time equivalent job was added to the global labour market**.

This suggests **that vaccination already substantially boosted the recovery and generated strong divergence across countries as early as the second quarter of 2021**. This effect can be quantified by estimating a "counterfactual" change in working hours in the absence of vaccinations and comparing it to actual losses (figure 14). These estimates show that, if no vaccinations had taken place, global working-hour losses would have reached 6.0 per cent, 1.2 percentage points higher than the losses actually recorded in that quarter. This difference is equivalent to an additional loss of 37 million full-time jobs (figure 14). As expected, this estimated positive effect was largest in high-income countries (3.4 percentage points) reflecting their relatively high vaccination rates, while the effect is almost zero in low-income countries and negligible in lower-middle-income countries (0.3 percentage points).

Figure 14. Estimating the impact of vaccination on working hours, 2021 Q2 (percentage)



Note: The change in working hours of both the actual estimates (nowcast-based) and the counterfactual scenario are relative to the fourth quarter of 2019, adjusting for population growth. The counterfactual no vaccination scenario estimates additional changes in working hours in the absence of vaccination. Differences in the effect of the vaccine derive from differences in vaccination rates, not the actual effectiveness of the vaccines.

Source: ILOSTAT database, ILO modelled estimates; Our World in Data; authors' calculations.

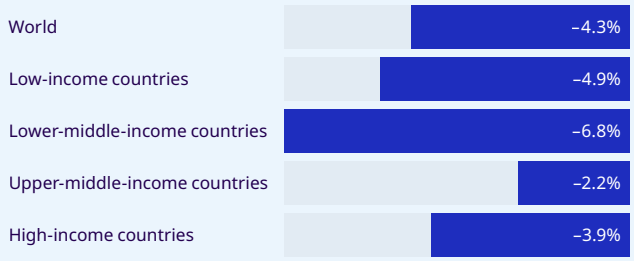
3. Prospects for the rest of 2021

A two-speed recovery is projected for 2021 and beyond. The optimism that prevailed at the beginning of 2021 has faded under the effects of new waves of the pandemic, the appearance of new COVID variants and the slow and uneven roll-out of vaccinations. Wide access to vaccines, combined with relatively strong fiscal stimulus, will likely enable high-income countries to record a faster recovery in working hours than the rest of the world. By contrast, low-income countries and lower-middle-income countries, which lack both, are likely to experience recurrent disruptions to the labour market and other damaging risks.

Globally, worsening prospects for the second half of this year have resulted in a significant downward revision to the overall projection for working-hour recovery in 2021. Compared to its level in the fourth quarter of 2019, the revised projection is for a deficit of 125 million full-time equivalent jobs in 2021, compared to the projection of 100 million in the *ILO World Employment and Social Outlook Trends 2021* report.

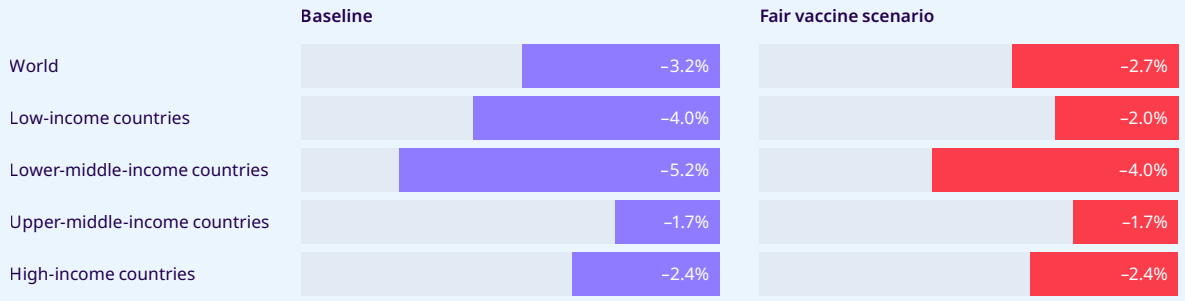
Even in the absence of a further wave of the pandemic, overall, the **fourth quarter of 2021 is expected to see only a modest recovery in working hours**. Upper-middle-income and high-income countries will recover fastest and furthest, but working hours will remain substantially below their level of the fourth quarter of 2019 in low- and lower-middle-income countries (figure 15).

Figure 15. Change in working hours relative to 2019 Q4 (adjusted for population aged 15–64): Projections for 2021 (percentage)



Source: ILOSTAT database, ILO modelled estimates; authors' calculations.

Figure 16. Change in working hours relative to 2019 Q4 (adjusted for population 15 to 64): Fair vaccination and baseline scenario for 2021 Q4 (percentage)



Source: ILOSTAT database, ILO modelled estimates; authors' calculations.

Addressing this working-hour deficit will require a surge in vaccinations, especially in developing countries. A more equitable distribution of vaccines in the fourth quarter of 2021 would enable low-income and lower-middle-income countries to sizeably reduce the gap in working hours with respect to upper-middle- and high-income countries**.**

Such potential impacts can be demonstrated by comparing the "baseline" scenario (that is, one in which vaccination roll-out follows the 2021 average pace recorded thus far and which assumes that there are no further downside economic risks, including in global supply chains and energy prices) and the "fair vaccination" scenario (in which vaccines are distributed equitably across countries – proportional to population) (figure 16).[28] This estimation shows that, in just one quarter, low-income countries would see their hours worked increase by 2.0 percentage points (relative to the pre-crisis benchmark) if they had equitable access to vaccines, effectively closing the gap in working hours with upper-middle-income and high-income countries. In lower-middle-income countries, the effect is estimated to be somewhat lower, equal to 1.2 percentage points. Nonetheless, this would allow these countries to reduce the current gap by roughly 40 per cent.

This evidence suggests that **taking steps to address inequality in vaccinations could bring rapid and substantial benefits to the global labour market, resulting in a fairer and more inclusive recovery.**

28 The scenario assumes no negative impact of a more equitable distribution on upper-middle and high-income countries. The assumption is that these countries can maintain their pace of vaccination, while additional production capacities are distributed to low- and lower-middle-income countries. The scenario only provides a rough estimate, hinging among other aspects on the assumption that even at the relatively low vaccination rates that would be achievable within a quarter in low-income countries, enough vulnerable persons would be vaccinated to allow a significant relaxation of restrictions, resulting in improving economic activity (consistent with the results of the analysis of section 2.2). The simulation is restricted to the last quarter of 2021 as the estimation method of the effect does not allow for extrapolation to longer horizons.

Part III. Looking ahead: Achieving a human-centred recovery

The evidence presented in this *Monitor* shows that the realities of labour market dynamics in 2021 to date differ markedly from the commitments and aspirations that the international community has expressed on repeated occasions. These include the ILO Global Call to Action for a Human Centred Recovery from the COVID-19 crisis that is inclusive, suitable and resilient, adopted by the International Labour Conference in June 2021, as well as the UN Secretary General's Report "Our Common Agenda" published in September and the UN Global Accelerator for Jobs and Social Protection launched jointly with the ILO the same month.

Together with the global agreements which pre-date the pandemic, in particular the UN 2030 Agenda for Sustainable Development and the Paris Agreement on Climate Change, these amount to a collective statement of the future that people want and towards which the COVID recovery should take them. Yet this is not the road now being taken.

Notwithstanding the resumption of global economic growth, overall recovery in hours worked is now flatlining significantly below pre-pandemic levels, and with very significant differences between countries according to income level. This *Monitor* presents a significant downward revision to the ILO's previous projection for 2021 as the slow, uneven, fragile and uncertain trajectory of labour markets proceeds.

The evidence is of a "great divergence" in the recovery paths of higher- and of lower-income countries caused above all by the major differences in the roll-out of vaccinations and that of fiscal stimulus. Concerns over this trend which is leaving many behind in the recovery are compounded by the additional downside risks in respect of supply chain bottlenecks and disruption, energy, inflation and debt distress.

Corrective action needs to start with radically strengthened international action and cooperation to help lower-income countries to increase their rates of vaccination to levels comparable to those in the higher-income countries. In addition to saving lives this would enable a more equitable and inclusive process of economic and labour market recovery and add to resilience by offering greater protection to all countries from risks of resurgent virus variants.

Similarly, international cooperation is the key to providing necessary financing of the recovery process. The limited initiatives undertaken to date, while welcome, are clearly insufficient. In this regard, the recent, and unprecedented, allocation by the IMF of US$650 billion in special drawing rights offers a major opportunity. Rechannelling these funds to the countries that need them, and to the purposes that advance human-centred recovery, stands as an immediate priority for the international community.

The constraints on resources, and the multiple demands on them, against a background of increased debt and inflationary pressures, make it imperative to direct them to uses which maximize their positive impact on jobs and incomes and benefit particularly the hardest-hit by the crisis and the most vulnerable. They must also facilitate the transitions already underway before the pandemic struck and which have been accelerated or made more urgent by it. Taken together, this points to the need for priority attention to youth and to women, to those in the informal economy, and for the green, digital, and health and care economies.

Resisting the pressure for premature fiscal consolidation must be matched by national policies which ensure coherent strategies that provide for efficient investment in inclusive, sustainable and resilient recovery.

Accordingly, the ILO will support the holding of National Tripartite Dialogues for Human-Centred Recovery in its Member States, bringing together governments and employers' and workers' organizations to help formulate such strategies. It will also convene a major multilateral policy forum in the first part of 2022 to promote the international cooperation needed to enable the success of those strategies.

Statistical annex

Table A1. Quarterly estimates of working hours, world and by region
(percentage change and full-time equivalent jobs rounded to the nearest 100,000)

Reference area	Time	Change in working hours relative to 2019 Q4 (adjusted for population aged 15-64)	Equivalent number of full-time jobs (48 hours/week)
World	2020 Q1	–4.9%	–142,000,000
	2020 Q2	–18.7%	–543,200,000
	2020 Q3	–7.4%	–217,000,000
	2020 Q4	–4.5%	–131,900,000
	2021 Q1	–4.5%	–131,400,000
	2021 Q2	–4.8%	–140,100,000
	2021 Q3	–4.7%	–136,900,000
	2021 Q4	–3.2%	–94,600,000
Africa	2020 Q1	–1.6%	–5,800,000
	2020 Q2	–16.5%	–61,400,000
	2020 Q3	–8.4%	–31,400,000
	2020 Q4	–4.5%	–16,900,000
	2021 Q1	–6.9%	–26,100,000
	2021 Q2	–4.5%	–17,300,000
	2021 Q3	–5.6%	–21,700,000
	2021 Q4	–4.0%	–15,600,000
Americas	2020 Q1	–3.2%	–11,900,000
	2020 Q2	–28.7%	–108,300,000
	2020 Q3	–15.7%	–59,500,000
	2020 Q4	–8.7%	–32,900,000
	2021 Q1	–7.1%	–27,100,000
	2021 Q2	–5.8%	–21,900,000
	2021 Q3	–5.4%	–20,600,000
	2021 Q4	–3.7%	–14,200,000

Table A1. (cont'd)

Reference area	Time	Change in working hours relative to 2019 Q4 (adjusted for population aged 15-64)	Equivalent number of full-time jobs (48 hours/week)
Arab States	2020 Q1	–2.3%	–1,200,000
	2020 Q2	–19.4%	–9,800,000
	2020 Q3	–9.3%	–4,700,000
	2020 Q4	–5.0%	–2,500,000
	2021 Q1	–7.2%	–3,700,000
	2021Q2	–6.5%	–3,400,000
	2021Q3	–6.5%	–3,400,000
	2021Q4	–4.5%	–2,400,000
Asia and the Pacific	2020 Q1	–6.4%	–113,200,000
	2020 Q2	–17.2%	–306,200,000
	2020 Q3	–5.6%	–100,700,000
	2020 Q4	–3.5%	–61,700,000
	2021 Q1	–3.2%	–57,800,000
	2021 Q2	–4.8%	–86,700,000
	2021 Q3	–4.6%	–83,100,000
	2021 Q4	–3.2%	–57,200,000
Europe and Central Asia	2020 Q1	–3.0%	–9,900,000
	2020 Q2	–17.6%	–57,500,000
	2020 Q3	–6.4%	–20,800,000
	2020 Q4	–5.5%	–17,900,000
	2021 Q1	–5.1%	–16,600,000
	2021 Q2	–3.3%	–10,900,000
	2021 Q3	–2.5%	–8,200,000
	2021 Q4	–1.6%	–5,200,000

Source: ILO nowcasting model (see Technical annex 1).

Table A2. Quarterly estimates of working hours, world and by country income group
(percentage change and full-time equivalent jobs rounded to the nearest 100,000)

Reference area	Time	Change in working hours relative to 2019 Q4 (adjusted for population aged 15-64)	Equivalent number of full-time jobs (48 hours/week)
World	2020 Q1	–4.9%	–142,000,000
	2020 Q2	–18.7%	–543,200,000
	2020 Q3	–7.4%	–217,000,000
	2020 Q4	–4.5%	–131,900,000
	2021 Q1	–4.5%	–131,400,000
	2021 Q2	–4.8%	–140,100,000
	2021 Q3	–4.7%	–136,900,000
	2021 Q4	–3.2%	–94,600,000
Low-income countries	2020 Q1	–1.8%	–3,300,000
	2020 Q2	–13.6%	–25,000,000
	2020 Q3	–7.8%	–14,400,000
	2020 Q4	–3.7%	–7,000,000
	2021 Q1	–5.8%	–10,900,000
	2021 Q2	–4.3%	–8,200,000
	2021 Q3	–5.7%	–10,800,000
	2021 Q4	–4.0%	–7,700,000
Lower-middle-income countries	2020 Q1	–2.7%	–26,600,000
	2020 Q2	–29.5%	–297,600,000
	2020 Q3	–9.5%	–96,100,000
	2020 Q4	–5.6%	–57,300,000
	2021 Q1	–6.5%	–65,900,000
	2021 Q2	–8.3%	–85,100,000
	2021 Q3	–7.4%	–76,100,000
	2021 Q4	–5.2%	–53,800,000

Table A2. (cont'd)

Reference area	Time	Change in working hours relative to 2019 Q4 (adjusted for population aged 15-64)	Equivalent number of full-time jobs (48 hours/week)
Upper-middle-income countries	2020 Q1	–7.9%	–99,200,000
	2020 Q2	–11.8%	–147,100,000
	2020 Q3	–5.6%	–70,300,000
	2020 Q4	–3.4%	–43,100,000
	2021 Q1	–2.3%	–29,000,000
	2021 Q2	–2.2%	–27,000,000
	2021 Q3	–2.6%	–33,100,000
	2021 Q4	–1.7%	–21,800,000
High-income countries	2020 Q1	–2.8%	–13,000,000
	2020 Q2	–15.7%	–73,400,000
	2020 Q3	–7.7%	–36,300,000
	2020 Q4	–5.2%	–24,500,000
	2021 Q1	–5.5%	–25,600,000
	2021 Q2	–4.2%	–19,800,000
	2021 Q3	–3.6%	–17,000,000
	2021 Q4	–2.4%	–11,300,000

Source: ILO nowcasting model (see Technical annex 1).

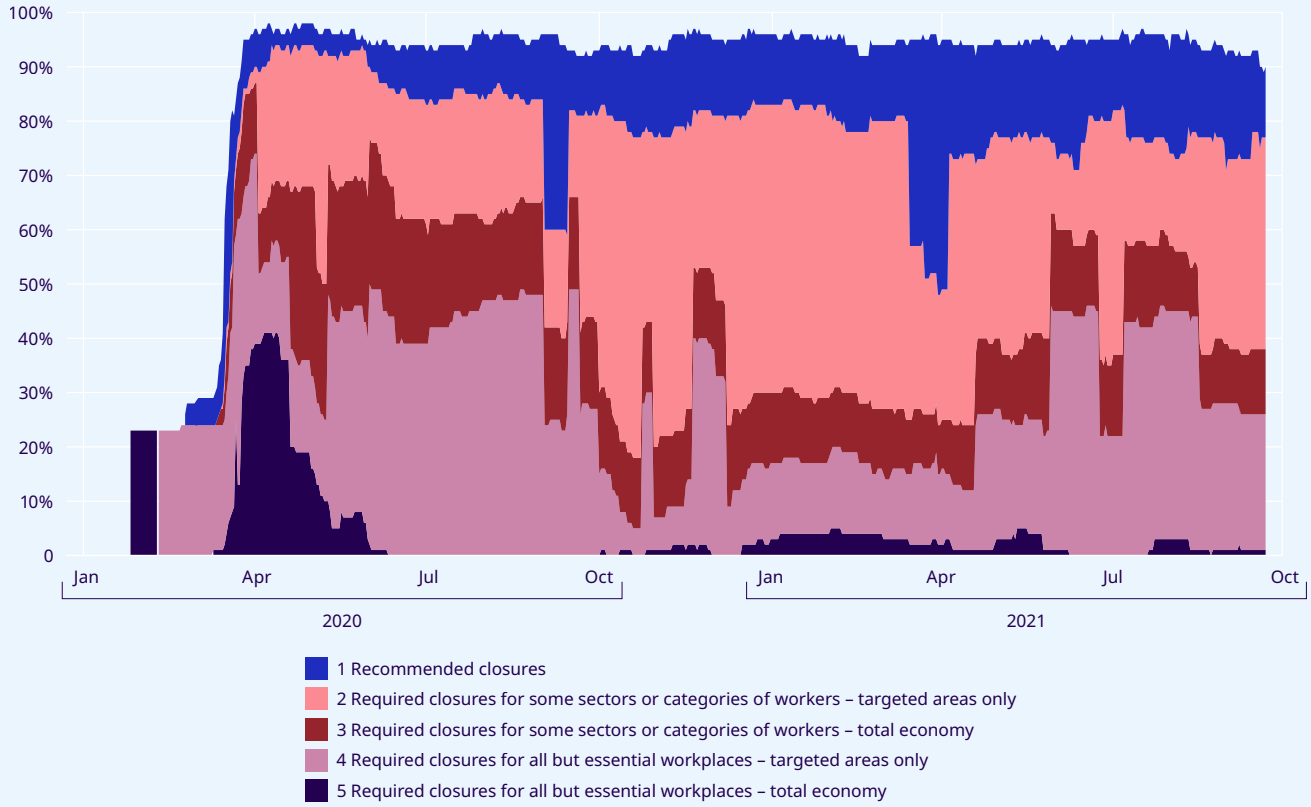
Table A3. Output per hour worked (constant 2017 international $ at PPP) **and annual changes** (%)

	Output per hour worked (constant 2017 international $ at PPP)				Average annual change, 2005–2019 (%)	Change in 2020 (%)
	2005	2019	2020	2021p		
World	**12.8**	**18.0**	**18.9**	**18.8**	**2.4**	**4.9**
Low-income countries	2.5	3.0	3.1	3.1	1.2	4.1
Lower-middle-income countries	4.4	7.7	8.2	8.1	4.1	6.2
Upper-middle-income countries	8.0	15.2	16.1	16.3	4.7	6.0
High-income countries	45.6	52.9	54.4	54.9	1.1	2.9
Africa	**5.8**	**7.0**	**7.3**	**7.2**	**1.4**	**3.4**
Northern Africa	12.8	16.2	17.5	17.7	1.7	7.5
Sub-Saharan Africa	4.3	5.3	5.4	5.3	1.5	2.7
Americas	**31.7**	**35.1**	**38.3**	**36.7**	**0.7**	**9.3**
Latin America and the Caribbean	15.8	17.4	19.0	17.7	0.7	9.2
Northern America	57.1	65.4	69.1	69.3	1.0	5.7
Arab States	**32.0**	**29.7**	**30.3**	**29.5**	**–0.5**	**2.0**
Asia and the Pacific	**6.1**	**12.2**	**13.0**	**13.1**	**5.1**	**6.4**
Eastern Asia	6.8	15.4	16.2	16.6	6.1	5.1
South-Eastern Asia and the Pacific	8.6	13.3	13.8	13.9	3.2	3.8
Southern Asia	4.1	7.6	8.2	8.1	4.6	7.1
Europe and Central Asia	**33.4**	**40.2**	**41.5**	**41.6**	**1.3**	**3.3**
Northern, Southern and Western Europe	48.5	54.1	54.9	54.8	0.8	1.5
Eastern Europe	20.1	28.2	29.1	29.6	2.4	3.2
Central and Western Asia	16.5	25.8	29.1	28.8	3.2	13.0

Note: p = projection.

Source: ILO estimates; World Bank, World Development Indicators Database; IMF, World Economic Outlook Database (October 2021).

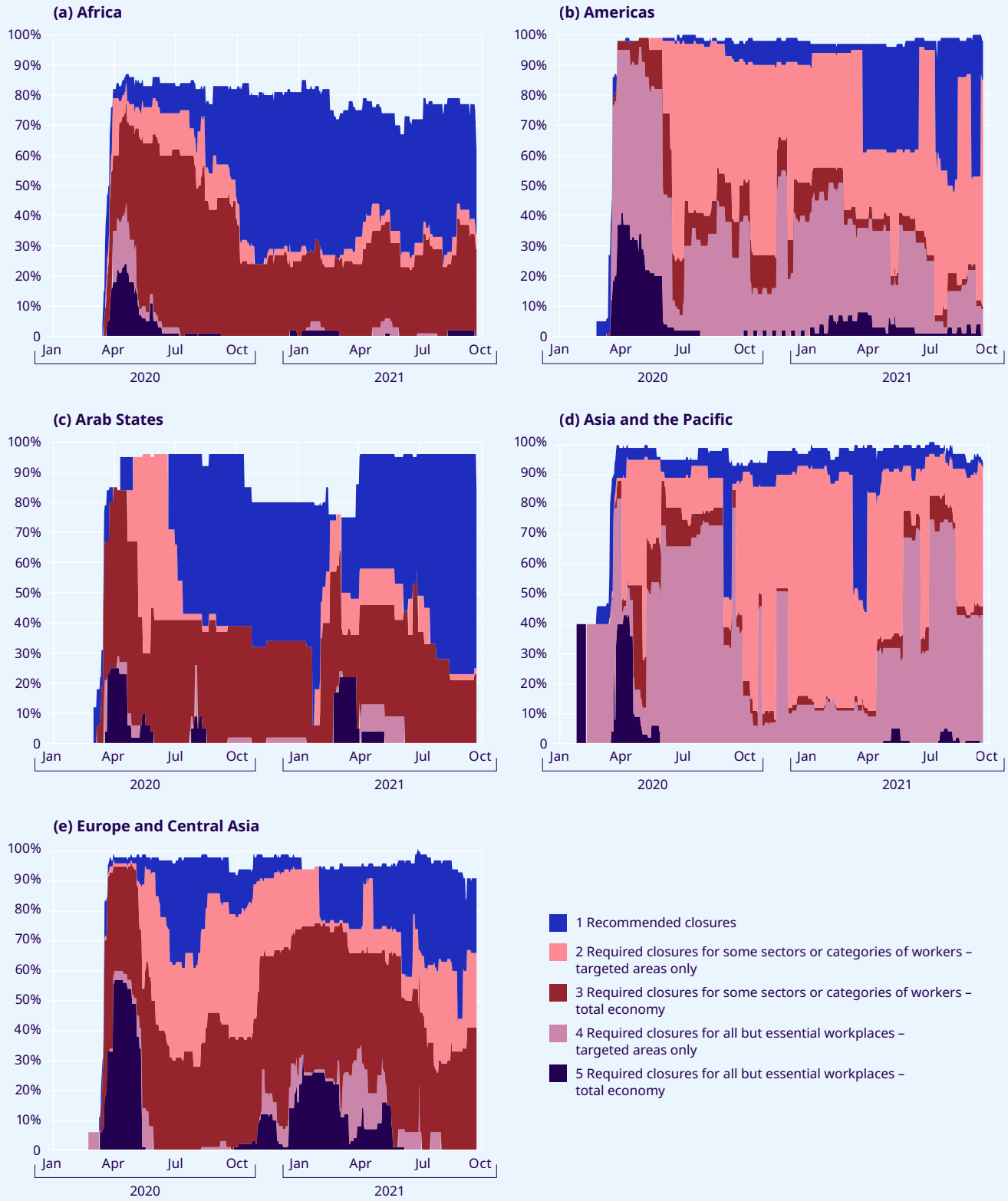
Figure A1. Share of world's employed in countries with workplace closures, January 2020–September 2021 (percentage)



Note: The shares of workers in countries with required workplace closures for some sectors or categories of workers and countries with recommended workplace closures are stacked on top of the share of workers in countries with required closures for all but essential workplaces.

Source: ILOSTAT database, ILO modelled estimates and the Oxford COVID-19 Government Response Tracker.

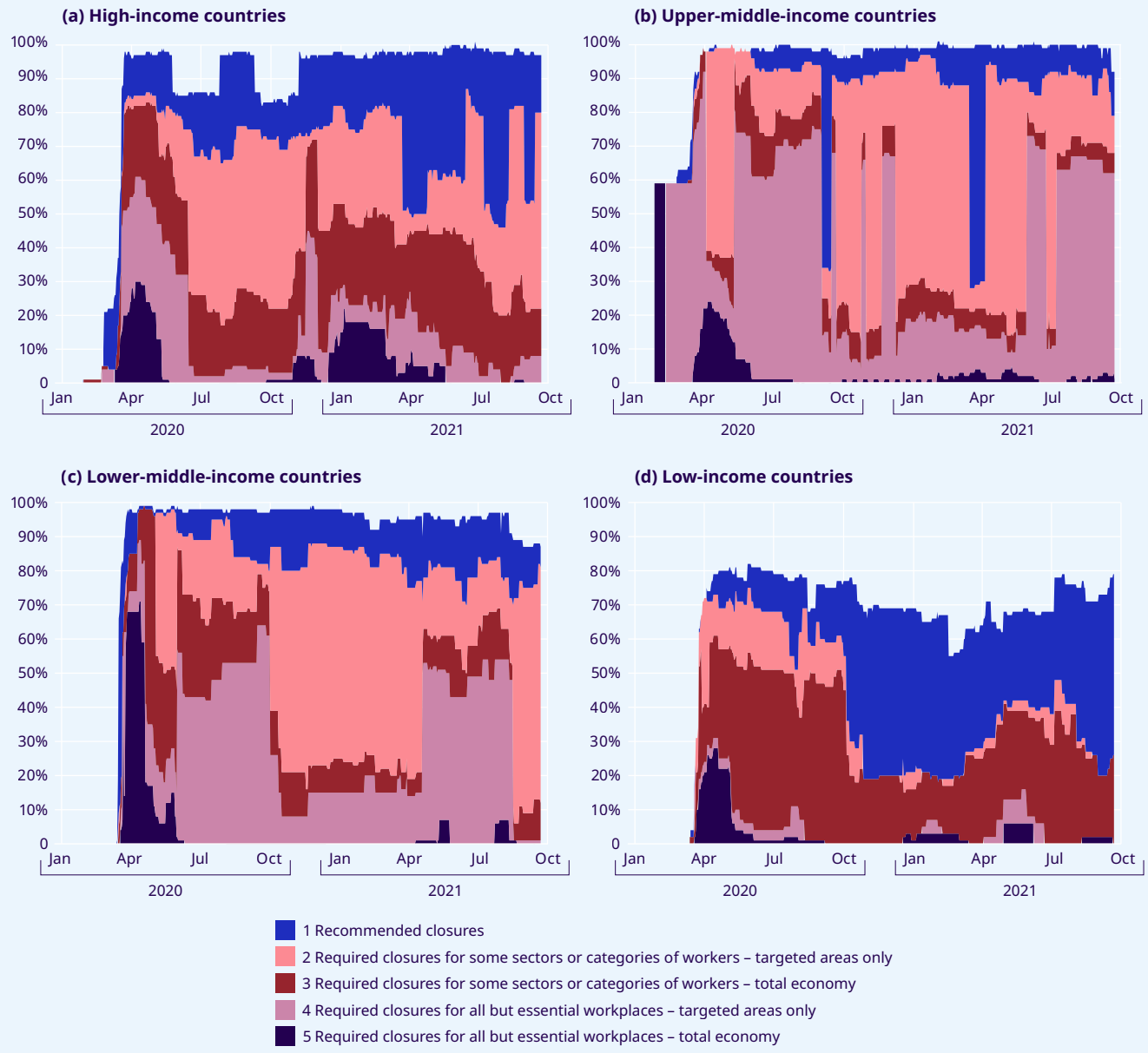
Figure A2. Share of world's employed in countries with workplace closures, January 2020–September 2021, by region (percentage)



Note: The shares of workers in countries with required workplace closures for some sectors or categories of workers and countries with recommended workplace closures are stacked on top of the share of workers in countries with required closures for all but essential workplaces.

Source: ILOSTAT database, ILO modelled estimates and the Oxford COVID-19 Government Response Tracker.

Figure A3. Share of world's employed in countries with workplace closures, by country income group, January 2020–September 2021 (percentage)



Note: The shares of workers in countries with required workplace closures for some sectors or categories of workers and countries with recommended workplace closures are stacked on top of the share of workers in countries with required closures for all but essential workplaces.

Source: ILOSTAT database, ILO modelled estimates and the Oxford COVID-19 Government Response Tracker.

Technical annexes

Annex 1. Changes in working hours: The ILO's nowcasting model

The ILO continues to monitor the labour market impacts of the COVID-19 pandemic using its "nowcasting" model. This is a data-driven statistical prediction model that provides a real-time measure of the state of the labour market, drawing on real-time economic and labour market data. In other words, no scenario is specifically defined for the unfolding of the crisis; rather, the information embedded in the real-time data implicitly defines such a scenario. The target variable of the ILO nowcasting model is change in hours worked[29] adjusted for population aged 15–64 relative to a pre-COVID-19 benchmark (see box A). To estimate this change, a fixed reference period is set as the baseline, namely, the fourth quarter of 2019 (seasonally adjusted). The model produces an estimate of the change in hours worked adjusted for population aged 15–64 relative to this baseline. (The figures reported should therefore not be interpreted as quarterly or inter-annual growth rates.) In addition, to compute the full-time equivalent jobs of the changes in working hours adjusted for population aged 15–64, a benchmark of weekly hours worked in the fourth quarter of 2019, before the COVID-19 pandemic, is used. This benchmark is also used to compute the time series of average hours worked adjusted for population aged 15–64.

For this edition of the *ILO Monitor*, the information available to track developments in the labour market has increased yet again. The model incorporates additional labour force survey data for the first, second and third quarters of 2021, and up-to-date high-frequency economic data such as retail sales, administrative labour market data or confidence survey data. Additionally, up-to-date mobile phone data from Google Community Mobility Reports and the most recent values of the COVID-19 Government Response Stringency Index (hereafter "Oxford Stringency Index"), have been used in the estimates.

Drawing on available real-time data, the model estimates the historical statistical relationship between these indicators and hours worked per person aged 15–64, and uses the resulting coefficients to predict how hours worked adjusted for population aged 15–64 change in response to the most recent observed values of the nowcasting indicators. Multiple candidate relationships were evaluated on the basis of their prediction accuracy and performance around turning points to construct a weighted average nowcast. For countries for which high-frequency data on economic activity were available, but either data on the target variable itself were not available or the above methodology did not work well, the estimated coefficients and data from the panel of countries were used to produce an estimate.

An indirect approach is applied for the remaining countries: this involves extrapolating the change in hours adjusted for population aged 15–64 from countries with direct nowcasts. The basis for this extrapolation is the observed mobility decline from the Google Community Mobility Reports and the Oxford Stringency Index, since countries with comparable drops in mobility and similar stringent restrictions are likely to experience a similar decline in hours worked adjusted for population aged 15–64. From the Google Community Mobility Reports, an average of the workplace and "retail and recreation" indices was used. The stringency and mobility indices were combined into a single variable using principal component analysis.[30] Additionally, for countries without data on restrictions, mobility data, if available, and up-to-date data on the incidence of COVID-19 were used to extrapolate the impact on hours worked adjusted for population aged 15–64. Because of countries' different practices in counting cases of COVID-19 infection, the more homogenous concept of deceased patients was used as a proxy of the extent of the pandemic. The variable was computed at an equivalent monthly frequency, but the data were updated daily based on the Our World in Data online repository.[31] Finally, for a small number of countries with no readily available data at the time of estimation, the regional average was used to impute the target variable. Table A4 summarizes the information and statistical approach used to estimate the target variable for each country.

29 Hours actually worked in the main job.

30 For the first three quarters of 2021 additionally a dummy variable for developed countries to account for differential impacts of those variables on working hours, as well as a de-trending procedure for Google Mobility Reports data, were used.

31 Hannah Ritchie, Edouard Mathieu, Lucas Rodés-Guirao, Cameron Appel, Charlie Giattino, Esteban Ortiz-Ospina, Joe Hasell, Bobbie Macdonald, Diana Beltekian and Max Roser (2020) – "Coronavirus Pandemic (COVID-19)". Published online at OurWorldInData.org. Retrieved from: https://ourworldindata.org/coronavirus.

Table A4. Approaches used to estimate changes in working hours

Approach	Data used	Reference area
Nowcasting based on high frequency economic data	High-frequency economic data, including: labour force survey data; administrative register labour market data; Purchasing Managers Index (country or group); national accounts data; consumer and business confidence surveys	Albania, Argentina, Australia, Austria, Belgium, Bolivia (Plurinational State of), Bosnia and Herzegovina, Botswana, Brazil, Bulgaria, Canada, Chile, China, Colombia, Costa Rica, Croatia, Cyprus, Czechia, Denmark, Ecuador, Estonia, Finland, France, Germany, Greece, Hong Kong (China), Hungary, Iceland, India, Indonesia, Iran (Islamic Republic of), Ireland, Israel, Italy, Japan, Latvia, Lebanon, Lithuania, Luxembourg, Macao (China), Malaysia, Malta, Mexico, Mongolia, Montenegro, Netherlands, New Zealand, North Macedonia, Norway, Occupied Palestinian Territory, Paraguay, Peru, Philippines, Poland, Portugal, Puerto Rico, Republic of Korea, Republic of Moldova, Romania, Russian Federation, Saudi Arabia, Serbia, Singapore, Slovakia, Slovenia, South Africa, Spain, Sweden, Switzerland, Thailand, Turkey, Ukraine, United Kingdom, United States, Uruguay, Viet Nam
Extrapolation based on mobility and containment measures	Google Community Mobility Reports (2020 Q2 and onwards) and/or Oxford Stringency Index	Afghanistan, Algeria, Angola, Azerbaijan, Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belize, Benin, Bhutan, Brunei Darussalam, Burkina Faso, Burundi, Cabo Verde, Cambodia, Cameroon, Central African Republic, Chad, Congo, Cuba, Côte d'Ivoire, Democratic Republic of the Congo, Djibouti, Dominican Republic, East Timor, Egypt, El Salvador, Eritrea, Ethiopia, Fiji, Gabon, Gambia, Georgia, Ghana, Guam, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Iraq, Jamaica, Jordan, Kazakhstan, Kenya, Kuwait, Kyrgyzstan, Lao People's Democratic Republic, Lesotho, Liberia, Libya, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Mozambique, Myanmar, Namibia, Nepal, Nicaragua, Niger, Nigeria, Oman, Pakistan, Panama, Papua New Guinea, Qatar, Rwanda, Senegal, Sierra Leone, Solomon Islands, Somalia, South Sudan, Sri Lanka, Sudan, Suriname, Swaziland, Syrian Arab Republic, Tajikistan, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkmenistan, Uganda, United Arab Emirates, United Republic of Tanzania, United States Virgin Islands, Uzbekistan, Vanuatu, Venezuela (Bolivarian Republic of), Yemen, Zambia, Zimbabwe
Extrapolation based on the incidence of COVID-19	COVID-19 incidence proxy, detailed subregion	Armenia, Comoros, Equatorial Guinea, French Polynesia, Maldives, New Caledonia, Saint Lucia, Saint Vincent and the Grenadines, Sao Tome and Principe, Western Sahara
Extrapolation based on region	Detailed subregion	Channel Islands, Korea (Democratic People's Republic of), Samoa

Notes: (1) The reference areas included correspond to the territories for which ILO modelled estimates are produced. **(2)** Countries and territories are classified according to the type of approach used for 2020 Q2. **(3)** For the Philippines, the releases of April 2020 and October 2020 of the Labour Force Survey were used; the data were benchmarked against the April and October 2019 data; the results for the missing months were directly interpolated or extrapolated using Google Community Mobility Reports data. **(4)** For India, up to the third quarter of 2020 the employment-to-population ratio of workers, excluding those temporarily absent from work, is used as a proxy of hours worked. Evidence from other countries suggests that this proxy is reasonably accurate, though it does tend to underestimate the actual working-hour loss. The data are taken from the Consumer Pyramids Household Survey conducted by the Centre for Monitoring Indian Economy, and in particular from: Marianne Bertrand, Rebecca Dizon-Ross, Kaushik Krishnan and Heather Schofield "Employment, Income, and Consumption in India during and after the Lockdown: A V-Shape Recovery?", Rustandy Center for Social Sector Innovation, 18 November 2020.

The latest data update spanned the period from 28 August 2021 to 7 September 2021, depending on the source. Because of the exceptional situation, including the scarcity of relevant data, the estimates are subject to a substantial amount of uncertainty. The unprecedented labour market shock created by the COVID-19 pandemic and the subsequent recovery are difficult to assess by benchmarking against historical data. Furthermore, at the time of estimation, consistent time series of readily available and timely high-frequency indicators, including labour force survey data, remained scarce. These limitations result in a high overall degree of uncertainty. For these reasons, the estimates are being regularly updated and revised by the ILO.

Box A. Tracking labour markets during a prolonged pandemic – the relevance of working hours

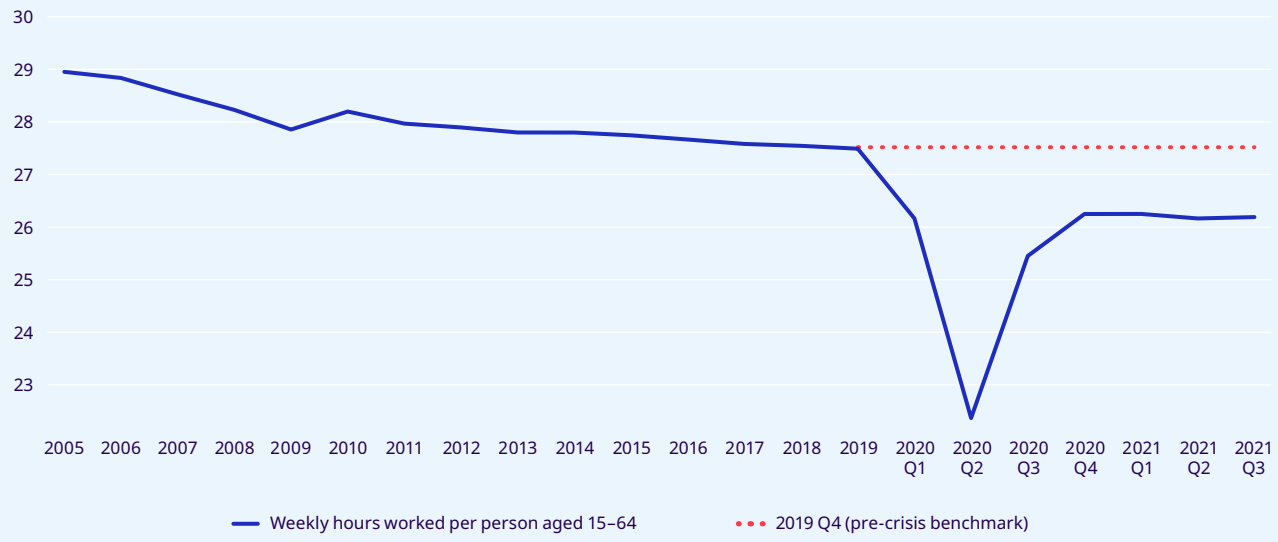
From its second edition onwards, the *ILO Monitor* has been regularly providing estimates of the evolution of working hours relative to the last pre-crisis quarter (the fourth quarter of 2019), adjusting for population aged 15–64. The adjustment simply consists in dividing the hours worked by population aged 15–64.

Actual hours of work remain the most comprehensive and internationally comparable indicator of labour market activity. Because considerable differences exist at the country level in the composition of changes in working hours due to employment changes (and hence unemployment and inactivity) or adjustment of work-week hours, focusing on the traditional headline indicators such as the unemployment rate alone would result in a very incomplete picture.

Population adjustment is also necessary for comprehensiveness and international comparability. Average global population growth during the last decade was approximately 1 per cent annually, with wide variation among countries. To properly capture work activity, changes in working hours need to account for this change to ensure that the level increase in population is not driving growth in hours worked (for the same reason, employment is often adjusted for population aged 15–64, using the employment-to-population ratio indicator). The ILO nowcasting model uses population aged 15–64 to adjust hours worked. Similarly, the estimate of full-time equivalent jobs represents the difference between the full-time equivalent jobs of the target quarter and the full-time equivalent jobs in the last quarter of 2019 adjusted by the gross growth rate of population aged 15–64.

Using the fourth quarter of 2019 as a reference period and adjusting for population facilitates measurement of the gap in work activity per capita in a given quarter compared to the latest pre-pandemic quarter (2019 Q4). It should be noted that the pre-pandemic level of hours worked might never be regained. Up to 2019 there was a slight but persistent decline in hours worked per person in the working-age population. If this tendency persists into the future, the hours worked per capita would be below the last quarter of 2019, even at very long time horizons. At the present moment, this structural effect is very small, more than one order of magnitude smaller than the cyclical effect of the pandemic (see figure A4). Nonetheless, in the long run it could become the dominant driving force of the change in hours adjusted for population aged 15–64.

Figure A4. Hours worked per person in the working-age population (aged 15–64), 2005–2021 Q3



Source: ILO modelled estimates based on the ILO nowcasting model.

Annex 2. Methodology used to estimate the impact of fiscal policies on labour markets

The present annex is an updated version of Annex 4 of the 6th edition of the *ILO Monitor*, reflecting new information, methodological changes and data updates.

Inferring the economic effect of fiscal stimulus is a central topic in economics, and a wide range of theoretical and empirical approaches are used for that purpose. Given that changes in fiscal policy are plausibly related to the state of the economy, the causal effect that they have on economic conditions is notoriously difficult to measure.[32] This difficulty is compounded by complex policy actions: as public health measures reduce economic activity, expansionary fiscal measures (for example, job retention schemes and supplementary unemployment benefit programmes) are adopted to tackle the economic damage caused. Conversely, economic necessity might lead governments to adopt less stringent public health restrictions and no expansionary fiscal policy measure.

Estimation procedure

Given the challenges in measuring the impact of stimulus programmes, the strategy used in the analysis for this edition of the *ILO Monitor* focuses on measuring whether expansive policies have already had an effect on economic activity, *not* the cumulative impact that fiscal policy will eventually have.

Let FP_i denote an index that defines the intensity of expansionary fiscal policy of country i. We are interested in measuring the effect of this index on the changes in economic activity. Let ΔY_i denote the change in economic activity, expressed as a percentage, from the second quarter of 2020 to the first quarter of 2021 relative to the baseline, namely the fourth quarter of 2019, in a given country i. We need to find an estimate of the parameter γ in the following expression:

$$\Delta Y_i = \gamma \times FP_i + u_i$$

where u_i denotes the effect of all other factors that drive the loss of economic activity. One key difficulty in estimating γ, the effect of expansionary fiscal policy on economic activity, is that the disruption in consumption and production due to the public health restrictions introduced is very plausibly related to the fiscal policy. In order to estimate the desired effect, we therefore need to account for the effect of public health restrictions.[33] In particular, we assume:

$$u_i = \alpha + \beta \times dhr_i + \varepsilon_i$$

which states that the economic loss attributable to all other drivers can be expressed as the sum of three elements. A constant, α; the effect of a variable capturing the disruption on consumption and production activities caused by the public health situation and restrictions, dhr_i; and a residual term, ε_i. We expect that countries with more stringent public health restrictions, and hence greater disruption to normal consumption and production, will experience greater decreases in economic activity[34] – all else being equal. Finally, the term ε_i captures all other potential drivers. Hence, we can express the loss in economic activity as:

$$\Delta Y_i = \alpha + \gamma \times FP_i + \delta \times dhr_i + \varepsilon_i$$

Under this empirical strategy, we measure the association between stimulus programmes and economic losses from the second quarter of 2020 to the first quarter of 2021, after controlling for the disruption caused by public health restrictions. This can be more succinctly expressed as obtaining the ordinary least squares (OLS) estimate of γ, $\hat{\gamma}$. To estimate the parameter, we simply run an OLS regression following the expression above.

For this measurement to have a causal interpretation, it would be necessary that ε_i (all other economic drivers of activity loss) be uncorrelated with our explanatory variables. Adapting the empirical strategy to plausibly ensure that this condition (or similar conditions) is fulfilled is beyond the scope of the current exercise. We therefore do not claim to have found a causal relationship. Instead, we would argue that the association detected is highly

32 See, for example: Olivier J. Blanchard and Daniel Leigh, "Growth Forecast Errors and Fiscal Multipliers", *American Economic Review* 103, No. 3 (2013): 117–120; Emi Nakamura and Jón Steinsson, "Fiscal Stimulus in a Monetary Union: Evidence from US Regions", *American Economic Review* 104, No. 3 (2014): 753–792; Christina D. Romer and David H. Romer, "The Macroeconomic Effects of Tax Changes: Estimates Based on a New Measure of Fiscal Shocks", *American Economic Review* 100, No. 3 (2010): 763–801.

33 For robustness we add other potential controls, but they are not included in the final analysis because they turn out to have insignificant effects.

34 This is not tautological: difficulties in the production or consumption of certain goods and services could be offset by consumption and production of other goods and services.

informational. Another key driver of economic activity potentially related to stimulus programmes, monetary policy changes (proxied by changes in policy interest rates), has been tested in a robustness exercise but did not yield any substantial difference in the results. Moreover, the sectoral composition of employment, used in the fiscal stimulus analysis of the 6th edition of the *ILO Monitor* was also included in the regression with no substantial change in results either. Both the monetary policy and sectoral composition proxies were insignificant and hence excluded from the regression analysis discussed in the main text.

It is important to emphasize that the effects of fiscal policy on economic activity during the period of analysis are likely to be smaller than in a longer horizon of analysis. The effect of fiscal stimulus can certainly have a contemporaneous effect on economic output and activity. However, a key element in the multiplier effect of fiscal stimulus relies on dynamic effects, which take time (for instance, several quarters) to materialize.[35] Hence, the multiplier may be smaller than usual. For this reason, the present exercise aims to provide evidence only with regard to the hypothesis that the expansionary fiscal policies already implemented have palliated the losses in economic activity. The estimates obtained cannot therefore be used to assess what the total effect of fiscal stimulus programmes will be or to draw normative conclusions about the adequate size of such programmes.

Data used

As a proxy of economic activity, we use average changes in working hours for selected countries from the second quarter of 2020 to the first quarter of 2021. Concerning country selection, only reported labour force survey observations are included.[36] To measure fiscal stimulus we use the (log of the) ratio of stimulus to annual GDP. Finally, we use a combination of two variables to take into account how large the COVID-19 economic shock would be if the influence of fiscal policy were excluded. The first is the decline in mobility to workplace and retail stores (an average of the two) from Google Community Mobility Reports. This variable captures reasonably well the degree to which the public health situation (the state of the pandemic itself and the restrictions taken to combat it) affects normal production and consumption activities. Hence, it is reasonable to assume that we should expect greater economic damage in countries where the decline in this variable is larger. The second variable used is the Oxford Stringency Index, described in Annex 1. We expect countries with more stringent measures to register greater declines in economic activity. We combine these two variables using principal component analysis to produce the proxy of dhr_i.[37]

Table A5 summarizes the proxies used for each variable and their data sources.

Table A5. Summary of variables and data sources

Represented variable	Symbol	Data used
Decline in activity	ΔY_i	Average change in working hours adjusted for population aged 15–64 from the second quarter of 2020 to the first quarter of 2021 relative to the baseline, namely the fourth quarter of 2019. Source: ILOSTAT.
Index of fiscal stimulus	FP_i	Log of value of above-the-line measures expressed as a share of GDP in 2019. Source: International Monetary Fund.
Index of disruption caused by public health situation and restrictions	dhr_i	Mobility decline, average of workplace and retail mobility, and stringency of government measures (combined into a single index using principal component analysis). Source: Google Community Mobility Reports and Oxford COVID-19 Government Response Tracker

35 See: Christina D. Romer and David H. Romer, "The Macroeconomic Effects of Tax Changes: Estimates Based on a New Measure of Fiscal Shocks", *American Economic Review* 100, No. 3 (2010): 763–801.

36 Iceland has been excluded from the analysis due to the limitations of international comparability of hours worked during the period, among others due to the recent implementation of contractual reductions of work hours resulting from collective bargaining.

37 Adding the variables separately does not alter the results in any meaningful manner.

Regression set-up and results

The results from running an OLS regression following:

$$\Delta Y_i = \alpha + y \times FP_i + \delta \times dhr_i + \varepsilon_i$$

can be seen in table A6 (51 observations, *R*-squared: 0.628).

Table A6. Regression results

Variable	Coefficient	Standard error
FP_i	1.62	0.64
dhr_i	3.49	0.41

Annex 3. Methodology used to estimate the impact of vaccination on labour markets

Vaccination campaigns have started relatively recently; hence, a comprehensive assessment of their economic impact is not possible at the present moment. Nonetheless, we expect that at least a critical mass of vaccinations must occur before any significant impact on economic conditions can be observed. Importantly, this impact should be observable at relatively early stages of vaccine roll-outs. As the most vulnerable groups are vaccinated, the burden on health systems is reduced significantly even at the beginning of deployment. This allows for less stringent public health restrictions. Hence, we can expect that vaccination campaigns have had an impact on recovery as early as the second quarter of 2021 – at least in countries that were able to offer vaccines at scale during that period. To test this hypothesis, we use a sample of 28 countries with labour force survey data for the second and first quarters of 2021.[38]

Estimation procedure

The strategy to test the hypothesis broadly follows the empirical design of the fiscal policy exercise (documented in Annex 2). Let FV_i denote the share of the population of country *i* that are fully vaccinated. We are interested in measuring the effect of this variable on change in working hours between the second and first quarters of 2021. Let $\Delta Y_{i,t}$ denote the change in working hours, expressed as gross growth rate in percentage, between the two quarters (*t* refers to the second quarter of 2021), in a given country *i*. We want to find an estimate of the parameter β in the following expression:

$$\Delta Y_{i,t} = \beta \times FV_{i,t} + v_{i,t}$$

where $v_{i,t}$ denotes the effect of all other factors that drive the change in working hours. One key difficulty in estimating β, the effect of vaccination on working hours, is that there are several factors that can be the driving cause of changes in working hours and vaccination. Whereas it is not possible to be exhaustive, particularly given the small sample size, we assume that the following are confounding factors. National income and share of elderly population are assumed to be confounding factors as countries with higher incomes and countries with a higher share of elderly population are likely to vaccinate more and earlier than those countries which do not face those circumstances. Hence, if these variables had an influence in working hours via another mechanism than that of vaccination, they have the potential to bias our estimates. For similar reasons, we assume that the lag of growth in hours to control for the economic situation immediately before the roll-out started at scale, and the growth rate of

38 Iceland has been excluded from the analysis due to the limitations of international comparability of hours worked during the period, among others due to the recent implementation of contractual reductions of work hours resulting from collective bargaining.

the COVID-19 caseload are confounding factors.[39,40] All these factors can affect the growth in hours worked. Hence, we assume:

$$v_{i,t} = \theta + \theta_1 \times lpc_{i,t} + \theta_2 \times eld_{i,t} + \theta_3 \times covid_{i,t} + \varphi \times \Delta Y_{i,t-1} + \omega_{i,t}$$

which states that the economic loss attributable to all other drivers can be expressed as the sum of five elements. The terms that appear in the equation are: a constant, the effect of national income, the effect of the share of elderly in overall population, the effect of the increase in COVID-19 cases with respect to the previous quarter, a lag of the growth rate in working hours, and a residual term. Hence, we can express the change in working hours as:

$$\Delta Y_{i,t} = \theta_0 + \theta_1 \times lpc_{i,t} + \theta_2 \times eld_{i,t} + \theta_3 \times covid_{i,t} + \varphi \times \Delta Y_{i,t-1} + \beta \times FV_{i,t} + \omega_{i,t}$$

Under this empirical strategy, we measure the association between vaccination and the change in working hours, after controlling for all the aforementioned factors. This can be more succinctly expressed as obtaining the ordinary least squares (OLS) estimate of β,$\hat{\beta}$. To estimate the parameter, we simply run an OLS regression following the expression above.

For this measurement to have a causal interpretation, it would be necessary that $\omega_{i,t}$ (all other drivers of activity loss) be uncorrelated with our explanatory variables. Adapting the empirical strategy to plausibly ensure that this condition is fulfilled is beyond the scope of the current exercise. We therefore do not claim to have found a causal relationship. Instead, we would argue that the association detected is highly informational.

Data used

As a measure of labour market activity, we use average changes in working hours for selected countries from during the second quarter of 2021. The countries are selected on the following basis: only reported labour force survey observations are included.[41] Table A7 summarizes the indicators used for each variable and their data sources:

Table A7. Indicators and data sources

Represented variable	Symbol	Data used
Change in working hours	$\Delta Y_{i,t}$	Change in working hours adjusted for population aged 15–64 during the second quarter of 2021 relative to the previous quarter. The change is indicated as the gross growth rate in a percent scale, hence 100 indicates no change relative to previous quarter. Source: ILOSTAT.
National income per capita	$lpc_{i,t}$	Log of GDP per capita, constant 2017 international $ at PPP. Source: International Monetary Fund.
Share of elderly population	$eld_{i,t}$	Share of population above 65. Source: United Nations World Population Prospects.
Change in COVID-19 caseload	$covid_{i,t}$	Growth rate of average quarterly COVID-19 cases. Source: Our World in Data.
Share of fully vaccinated population	$FV_{i,t}$	Fully vaccinated persons divided by population. Source: Our World in Data.

39 One key concern, particularly given the limited sample size, is that the estimated effect of vaccination is simply capturing different evolutions of countries' public health situations given the new variant outbreaks predominant in the period. If a country suffers an outbreak, its economic activity will tend to decline. If this happens to countries which happened to have, say, high vaccination rates, this would bias downwards our estimates. Indeed, the increase in COVID-19 cases during 2021 Q2 is a clear feature of the period. In our sample of 28 countries, all countries registered an increase in cases during the period. The increasing caseload is indeed negatively correlated with recovery. Hence, when controlling for this factor, the estimated effect of vaccination on working hours slightly increases.

40 Notice that we do not include any measure concerning stringency of public health measures or hospitalizations and deaths resulting from COVID-19. We expect that the vaccine results in increased working hours precisely because of their effect on the dimensions that those indicators aim to capture.

41 Iceland has been excluded from the analysis due to the limitations of international comparability of hours worked during the period, due to implementation of contractual reductions of work hours resulting from collective bargaining.

Regression set-up and results

The results from running an OLS regression following:

$$\Delta Y_{i,t} = \theta_0 + \theta_1 \times lpc_{i,t} + \theta_2 \times eld_{i,t} + \theta_3 \times covid_{i,t} + \varphi \times \Delta Y_{i,t-1} + \beta \times FV_{i,t} + \omega_{i,t}$$

can be seen in table A8 (28 observations, *R*-squared: 0.613).

Table A8. Regression results

Variable	Coefficient	Standard error
$lpc_{i,t}$	–3.78	1.73
$eld_{i,t}$	26.74	15.45
$covid_{i,t}$	–4.55	2.11
$\Delta Y_{i,t-1}$	–0.36	0.12
$FV_{i,t}$	0.19	0.05

Given the magnitude and the speed with which the positive effect of vaccination is shown to materialize, a word of caution is needed. The exercise, with all its data and methodological limitations, is designed to capture the immediate effect following the first roll-out at scale of vaccines. Hence, the results should not be extrapolated to longer horizons or later stages of vaccination roll-outs – as we have no evidence on which to base inference.[42]

Annex 4. Methodology to project changes in working hours

The estimate of working hours in the fourth quarter of 2021 is based on a crisis recovery model. This is specified as an error correction model of the form:

$$\Delta h\_(i,t) = \beta\_(0,i) + \beta\_(1,i)\ gap\_(i,t\text{-}1) + \beta\_(2)\ gap\text{^}2\_(i,t\text{-}1) + \beta\_(3) h\_(i,t\text{-}1) + \beta\_(4)\ \Delta GDP\_(i,t) \qquad (1)$$

The gap is given by the difference of hours worked relative to a medium-term trend, gap_(i,t) = h_(i,t) – trend_(i,t), where the evolution of the trend in working hours is determined by a geometric average between the long-run target and a function of current working hours.

The variable of interest Δh_(i,t) is the change in working hours per population aged 15–64. The gap refers to the working hours relative to the long-run trend. The crisis recovery mechanism works through this gap, where the size of parameters β_(1,i) and β_(2) determine the speed with which working hours increase to close the gap when such a gap exists. The model mechanics are such that larger gaps result in a larger change in hours worked. In order to capture scarring or hysteresis, the medium-term trend is modelled to react to the gap with a parameter γ_1, but it also has a component reverting to its long-term target with a parameter γ_2. The country-specific constant is calculated to imply zero change when the long-run target is achieved.

The parameters of the projection model are estimated empirically to the largest extent possible. Equation (1) is estimated at the quarterly frequency for 30 countries with suitable data up to 2019 using multilevel mixed-effects methods, meaning that the distribution of the slope parameters for the gap is also estimated. This provides baseline estimates of the parameters. In addition, the impact of vaccination on the recovery speed parameter β_(1,i) is estimated.[43] This parameter is then adjusted for each country according to the projected progress in vaccination.

42 For instance, the dynamics might show that the effect fades rapidly, or to the contrary, that it is highly persistent. Similarly, it is reasonable to expect that at higher vaccination rates (once the most vulnerable groups are protected), the marginal impact of vaccination on the economy diminishes.

43 The vaccine effect analysis directly investigated the change in working hours, while for this projection model, the impact on the recovery speed parameter is estimated. Implied outcomes are roughly comparable.

The scarring parameters are set to $\gamma_1 = 0.05$ and $\gamma_2 = 0.9$ for upper-middle- and high-income countries, and to $\gamma_1 = 0.02$ and $\gamma_2 = 0.95$ for lower-middle- and low-income countries. The logic here is that in the latter country groups, people are more likely to fall back on low-quality employment options out of necessity. This does not mean that the affected workers will be less scarred by an extended loss of activity; on the contrary, they might find it even harder to enter into quality employment again the longer they remain in low-quality activities.

The fair vaccine distribution scenario uses the baseline projection, but assumes a counterfactual distribution of vaccines across the world. For low- and lower-middle-income countries, vaccination is assumed to be a fixed share, proportional to their population, of the average global vaccination pace observed during the first three quarters of 2021. For upper-middle-income and high-income countries, the scenario assumes that the increase in vaccine distribution to countries with lower income does not reduce their ability to provide vaccines. The shortfall is expected to be absorbed by increased supply[44] and decreased needs in countries with sufficiently high vaccination rates. The implied additional change in the rate of vaccination is then multiplied by the coefficient derived from the vaccination impact analysis to obtain the counterfactual change in hours worked.

44 Industry estimates suggest vaccine production in the last quarter of 2021 to be substantially above the average pace of the first three quarters and exceedingly above the vaccination doses implied by the scenario in low- and lower-middle-income countries. See: https://www.ifpma.org/resource-centre/momentum-of-covid-19-vaccine-manufacturing-production-scale-up-is-now-sufficient-for-step-change-in-distribution-and-opens-way-for-urgent-political-leadership-and-country-preparedness/.