▶ Research Brief[1]

March 2021

Impact of the Second Wave COVID Measures on Employment in Turkey

1. Summary

The feared COVID-19 second wave, which was associated to large increases in cases in most European countries, also came to Turkey in Autumn 2020. As a result, the government of Turkey announced on 30 November 2020 a number of measures aimed at restricting mobility and lowering the transmission of the disease. This research brief assesses the effects of these measures on the December Turkish labour market. This is done by isolating monthly impacts from the three-month moving average data points released by the Turkish Statistical Institute (see Section 3 for details).

It is estimated (Section 4.1) that the new anti-COVID19 measures have destroyed 2.3 million jobs in December.[2] In addition, these measures have brought the employment losses faced by the hospitality sector back to April and May levels. This brief also analyses (Section 4.2) the evolution of the crisis for young people, women, and informal workers. The employment levels of all these groups are on a negative trend that is not expected to have changed until the measures were relaxed in early March.

On top of this, the present document also analyzes (Section 4.3) the suitability of the official unemployment rate as an indicator to measure the health of the labour market. Two alternative, "broader" unemployment rates are suggested and their properties in terms of informing policy-makers assessed. At last, Section 5 concludes.
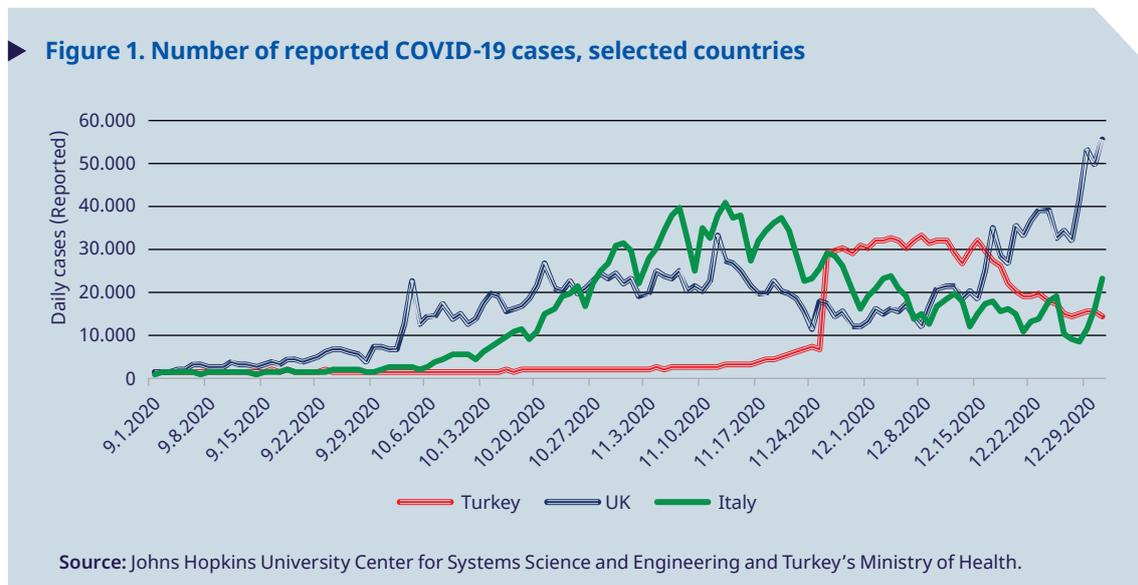
---

2. Background

Starting towards the end of the summer, a deadly second wave of COVID-19 infections seemed to have appeared in European countries as well as (we can say this retrospectively) in Turkey. The combination of more flexible lockdown measures together with colder weather conditions encouraging people to socialize indoors seem to have sparked the number of infections as it can be seen in Figure 1 for Italy, the United Kingdom and Turkey. Turkey's surge in cases peaks in early December/late November but such a late arrival is due to a different, stricter, reporting strategy by the Ministry of Health. Apparently, December figures are closer to the actual number of cases as they also include the asymptomatic ones. Therefore, we can guess that if the same reporting strategy had been followed since September, we would have seen in Turkey a second wave surge with a similar timing to the one showcased by other countries.

As a result of the surge in cases the Turkish government imposed weekend-long curfews as well as a restriction of activities during weekdays from 9pm to 5 am. Some sectors were exempt from this restrictions (manufacturing, health, agriculture) and many professionals who perform their duties during weekdays continued their working lives as usual. However, establishments like cafes, bars and restaurants were not allowed to offer in-person dining services and other establishments like Turkish baths, theatres, cinemas and similar entertainment places were closed altogether.

▶ **Figure 1. Number of reported COVID-19 cases, selected countries**

Source: Johns Hopkins University Center for Systems Science and Engineering and Turkey's Ministry of Health.

These strict measures did help flattening the curve of COVID-19 infections (Figure 1) but, once again, what started as a sanitary crisis with over 30,000 cases a day soon saw its effects spilled over other spheres of the society, including the labour market. This brief shows the impact of these measures on the Turkish labour market in terms of hours of work lost and in terms of employment. Section 3 explains the assumptions used to retrieve December data from the November publication of Turkstat while Section 4 shows the impact of the second wave on a number of labour market outcomes.

---

[3] Data on hours lost is only available for the whole economy and by gender.

3. Methodology and Data Sources

This brief uses data from the Turkish Statistical Institute, including employment figures, hours worked by those who continue working as well as a number of macroeconomic indicators that include, among other, confidence indices from February 2014 to November 2020.

The calculation of the impact of COVID-19 on the labour market is divided into three components; a) employment, which counts people who were dismissed as well as the people that was not hired because of the pandemic, b) excess leave, which counts the number of employed people that under normal conditions would not have been away from their jobs and c) reductions in hours worked among those who continued working during the pandemic.

The measurement of the impact on each of these three components is done by comparing the actual figures on the mentioned three indicators with a counterfactual. Said counterfactual constitutes a hypothetical scenario that assumes there was no COVID-19 during 2020. This scenario answers questions of the type "if there had not been COVID-19 what would have been the employment level in Turkey during 2020?". It is calculated with the help of an Autoregressive Distributed Lag model (ADL) that uses past information on the forecasted variables, the month of the year (to predict seasonal patterns) as well as a number of macroeconomic indicators. Information on macro aggregates is collected up to January 2020 since they were also affected by the pandemic and would create inaccurate predictions. For more details on the macroeconomic aggregates utilized in the econometric model we refer the reader to the December edition of this series. Moreover, the January 2021 edition provides a precise definition for the total impact (employment, excess leave and hours worked) and we recommend the interested reader to look at the methodology section of said brief.

Isolated monthly impact. Data on employment and hours worked is released by the Turkish Statistical Institute on a monthly basis, however, the values reported do not exclusively refer to the advertised month. The institute uses a 3-month moving average whereby a given month (i.e. November) is averaged with data from the previous and subsequent months (i.e. October and December). This feature adds confidence to the estimates but at the same time creates an artificially smoother series. In the current context smoother series translates into muffled impacts, i.e. impacts showcased by months in which heavier restrictions were taking place are smaller than they actually were while the contrary also holds.

This feature of the data (3-month moving average) is undone in this brief[4] so as to offer (actual or isolated) monthly impacts for certain indicators. Details on how this is achieved are available in Appendix A. In this brief we refer to the actual monthly impacts as "isolated" so as to distinguish them from the monthly impacts calculated with 3-months moving average time series. It should be noted that the isolated impacts are an approximation based on "reasonable" assumptions for informative purposes but may differ from the ones that would have been obtained with the actual month by month data.

---

[4] Note that TurkStat have started releasing pure monthly data from 10 March 2021.

4. Impact of the Second Wave

The second wave of COVID-19, or more properly speaking, the measures undertaken to minimize the impact of said wave have, once again, caused job losses, losses in hours worked and an increase in the number of workers on leave. The interest of Section 4.1 lies on the full impact on the second wave, that is employment losses (workers dismissed or workers who did not get hired), excess leave (workers that remain employed but work 0 hours) and reduced hours worked among those who remain employed and working. These results are measured as full-time equivalent jobs (after converting the reduction in hours worked into full-time jobs). Unfortunately, the data that allows for such calculations is currently limited to Turkey as a whole, as well as for all men and all women. As a result, analysis of certain subgroups (Section 4.2) is limited to employment losses (which disregards excess leave and reductions in hours worked among those that remain working). This analysis calculates the impact of the pandemic at the sectoral level, by age group and by the formality of work arrangements.
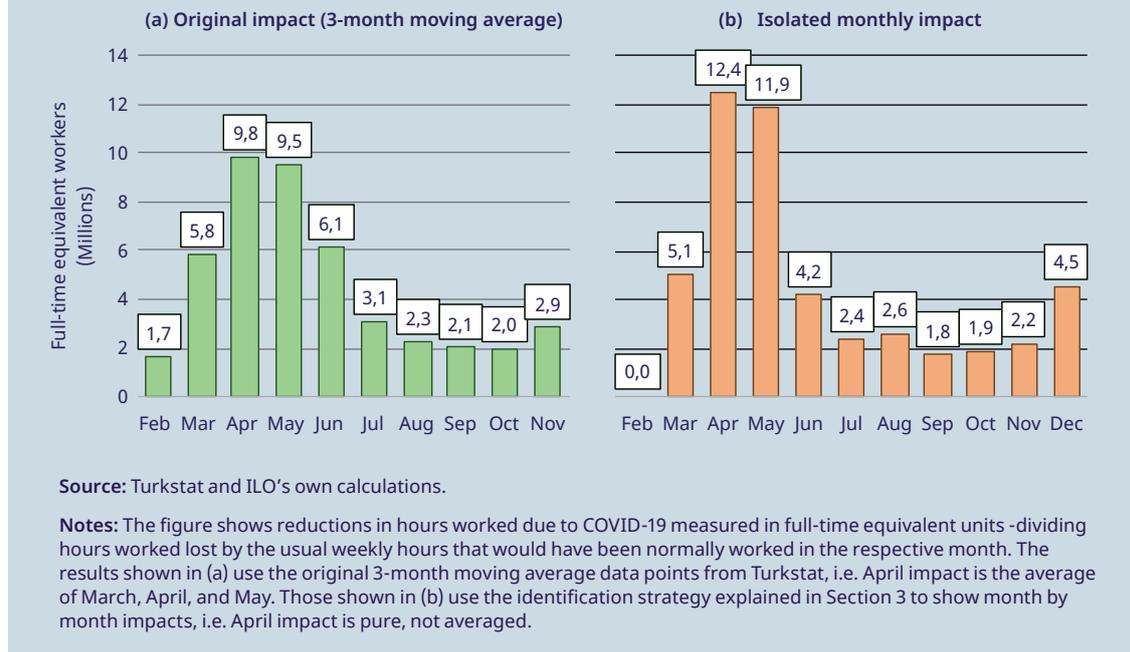
4.1 Full impact

The impact of COVID-19 calculated based on the original data released by the Turkish Statistical Institute[5] shows (Figure 2a) an increase in the number of jobs lost (measured in terms of full-time equivalent units) with respect to the no COVID-19 baseline. This increase is likely due to the impact of the new measures announced by the President of Turkey to combat the novel coronavirus on November 30. Obviously, the effect of these measures is not expected to appear as early as November, but it is important to remember that TurkStat averages data points, as it is explained in Section 3. Indeed, the November data released by TurkStat is an average of October, November, and December with the latter being the likely source of the impact.

The extent to which the isolated impact of December is leading the change in trend showcased by the November data can be better seen in Figure 2b, where the monthly isolated impacts are provided from February to December 2020. These results suggest that the most recent anti-COVID19 measures may have costed Turkey 2.3 million FTE[6] jobs. Moreover, the isolated impacts also seem to suggest bigger losses in terms of economic activity back in April and May. A comparison of the original impacts (using 3-month moving average data points) with the isolated monthly impacts predicts an increase of 2.6 million FTE jobs in April and an increase of 2.4 million in May. At the same time the isolated impacts seem to be lower in March and June, suggesting that the lockdown measures put in place at the beginning of the pandemic may have disturbed economic activity more than it was shown in the January brief of this series. A similar picture can be retrieved by looking at the percentage of hours of work lost (Figure 3, blue bars). According to the isolated impacts the loss increased from 6.4 per cent in November to 16.9 per cent in December, a level similar to the one occurred in June.

---

[5] November 2020 data, released as of February 10.
[6] Full-time equivalent.

▶ **Figure 2. Reduction in hours worked, expressed in full-time equivalent workers.**


(a) Original impact (3-month moving average) **(b) Isolated monthly impact**

Source: Turkstat and ILO's own calculations.

Notes: The figure shows reductions in hours worked due to COVID-19 measured in full-time equivalent units -dividing hours worked lost by the usual weekly hours that would have been normally worked in the respective month. The results shown in (a) use the original 3-month moving average data points from Turkstat, i.e. April impact is the average of March, April, and May. Those shown in (b) use the identification strategy explained in Section 3 to show month by month impacts, i.e. April impact is pure, not averaged.

A different perspective at the impact of November measures is offered by Google's mobility indices.[7] These indices come from Google's COVID-19 Community Mobility Reports. These reports use data provided by apps like Google Maps and track the number of people visiting retail shops, grocery stores, parks, transit stations, workplaces, and residential areas. For the composite index shown in Figure 3 (green bar) data on parks and residential areas mobility is excluded due to weaker relationships with economic activity. Moreover, the composite index (an average of the 4 individual mobility indices utilized) is calculated by Google in relation to a baseline, said baseline represents a normal value for the same day of the week, given as median value over the five-week period from January 3rd to February 6th 2020.[8]

The composite index built from Google's information on mobility is highly correlated with the reduction in hours worked. But it seems to be closer to the isolated impacts than to the 3-month moving average data points giving foot to the assumption that the latter muffle the true impact of the crisis on the labour market. Google's index and the isolated impacts seem to go hand in hand on remarkably similar levels until December 2020. A plausible interpretation for the decoupling of these two measures is given by better targeted anti-COVID19 measures. That is, a set of measures that maximize mobility restrictions while reducing the impact on jobs and on the labour market more generally. In this sense, the new measures seem to be doing a better job than the ones enacted back in April 2020; the ratio of share of hours of work lost to change in the mobility index in December stood much lower at 0.55 compared to the 0.83 achieved in April and May. This was probably achieved by limiting the effects of the lockdown measures in sectors like manufacturing, health and supply chains which remained outside of the scope of the new legislation among other exemptions.

[7] Even though Google collects data from all over the country, areas/groups of people without smart phones are not common tend to be underrepresented.
[8] Technical explanation taken from https://ourworldindata.org/covid-mobility-trends.

**Figure 3. Changes in mobility and reductions in hours worked**
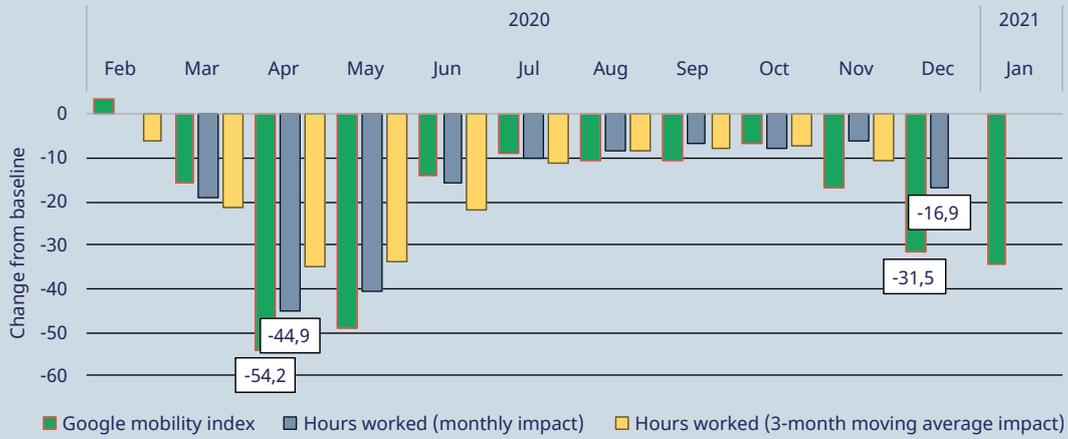
Source: Google, Turkish Statistical Institute, and ILO's own calculations.

Notes: This figure shows the impact of COVID-19 on the number of hours worked in Turkey as a percentage (%) of the baseline scenario. The baseline represents the number of hours that would have been worked in Turkey had not the pandemic existed. The yellow bar uses the original 3-month moving average data points from Turkstat, i.e. April impact is the average of March, April, and May. The blue bar uses the identification strategy explained in Section 3 to show month by month impacts, i.e. April impact is pure, not averaged. Google's mobility index is added for comparison (green bar). Note that park and residential mobility were excluded because they are not strongly related to employment.

Gender overview. In previous releases of this Research Brief series it became clear that working women were affected more than men by the COVID-19 crisis. For example, as of April 2020, women endured a 38.5 per cent reduction in hours worked while for men it stayed at 32.5 per cent. However, the recovery has also showcased a gender imbalance. Up to November men's hours of work were recovering at a good pace while those corresponding to women were actually diverging from the baseline.

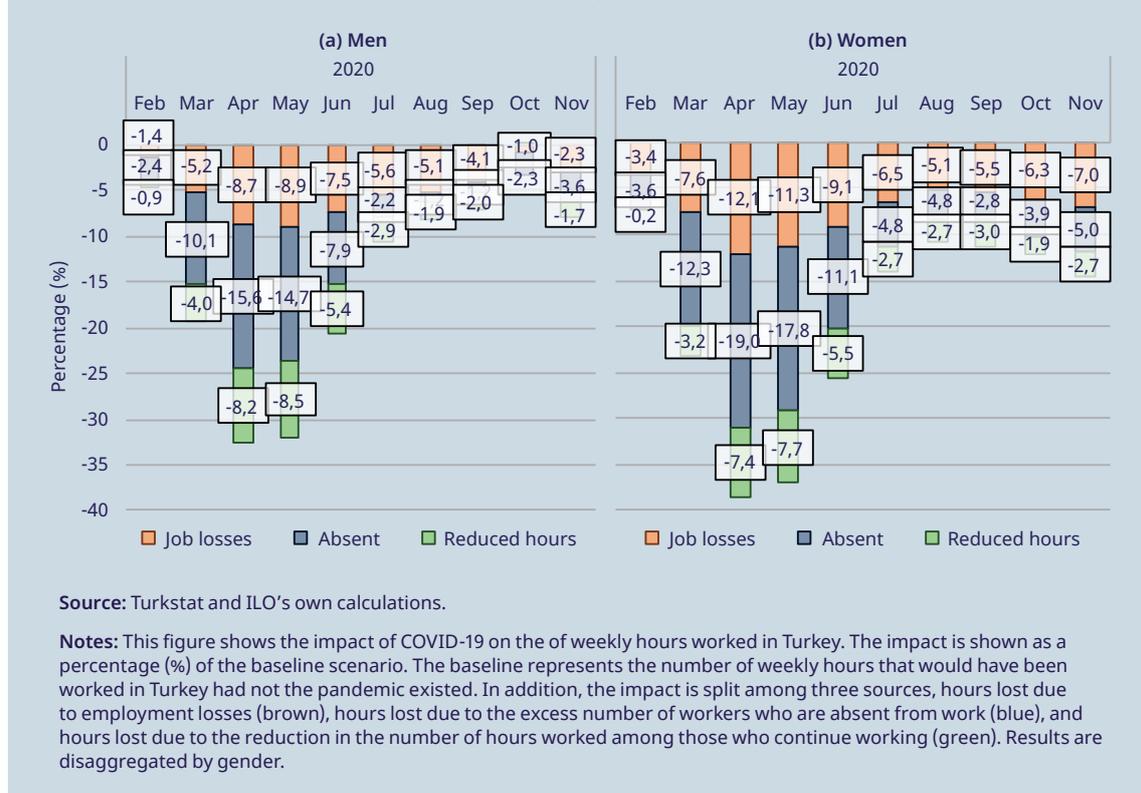**Figure 4. Reduction in hours worked (in %), by gender**
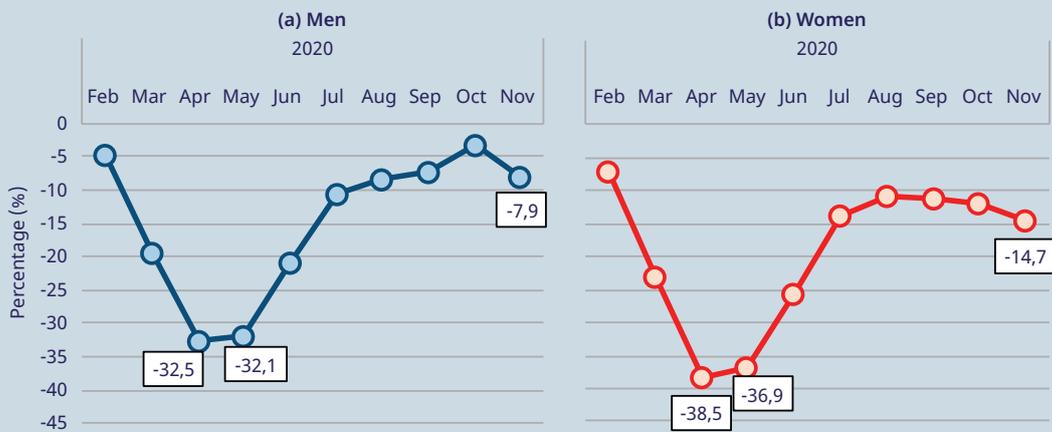
Source: Turkstat and ILO's own calculations.

Notes: This figure shows the impact of COVID-19 on the of weekly hours worked in Turkey. The impact is shown as a percentage (%) of the baseline scenario. The baseline represents the number of weekly hours that would have been worked in Turkey had not the pandemic existed. Results are disaggregated by gender.

Data for December's impact has not been calculated by gender, however, the November impact (calculated using 3-month moving average data points) hints that both, men and women, were heavily affected. Latest available figures point at a 7.9 per cent share of hours lost for men and at 14.7 per cent for women, almost double. However, as it can be seen in Figure 2 and 3 the isolated December impact is likely much higher. At this stage it is safe to say that this pandemic has had quite different effects for women in comparison to the ones brought by the financial crisis. Back in 2008 and 2009 women's employment actually increase as the result of a surge in female labor supply. Women seemed to be countering the job losses held by men. But this time is different; schools are closed, and the extra household duties including child and elderly care disproportionably fall on women's shoulders. On top of this many of the jobs women tend to seek involve close contact with others (cleaning, care, hospitality) which are among the most punished economic sectors.

▶ **Figure 5. Reduction in hours worked (in %), by gender and source**

Source: Turkstat and ILO's own calculations.

Notes: This figure shows the impact of COVID-19 on the of weekly hours worked in Turkey. The impact is shown as a percentage (%) of the baseline scenario. The baseline represents the number of weekly hours that would have been worked in Turkey had not the pandemic existed. In addition, the impact is split among three sources, hours lost due to employment losses (brown), hours lost due to the excess number of workers who are absent from work (blue), and hours lost due to the reduction in the number of hours worked among those who continue working (green). Results are disaggregated by gender.

Long-term scarring effects for women's labour market ambitions are a possibility. However, using November data we can observe that the number of women who are willing to work (but are not actively looking for a job) has increased by 1.5 million while the number of full-time equivalent jobs lost stands at 1.27 million. That is, women's behaviour has not really change since the last crisis -they still want to join the labour market- but the conditions have changed. Speedy vaccination roll-outs and an end of restrictive measures might be enough to boost women's employment back to baseline levels. Yet if this is not the case, other alternatives to bring women back to the labour market will be due.

4.2 Effects on employment

The full impact of the pandemic is calculated thanks to data on hours worked and on workers who remain in the workplace. However, this data is only available for the country as a whole as well as for female and male workers. These three broad groups do not allow us to follow-up the impact of the pandemic on the most vulnerable ones. This section precisely analyzes some of the mentioned groups calculating employment losses and, thus, disregarding excess leave and reductions in hours worked among those who continue working (the other 2 components of the total impact).

Informality. With this data limitation in mind it is easy to understand the new drop in employment among informal[9] workers (Figure 6a). These workers lack employment protection, and an increasing employment deficit is predicted with similar results also shown in Gürsel et al. (2021). On the contrary, the second wave had no apparent effect on formal employment, yet some of them may have still been put on leave or on reduced hours.

▶ **Figure 6. Employment losses (%), by age group, gender, and formality of work arrangements**
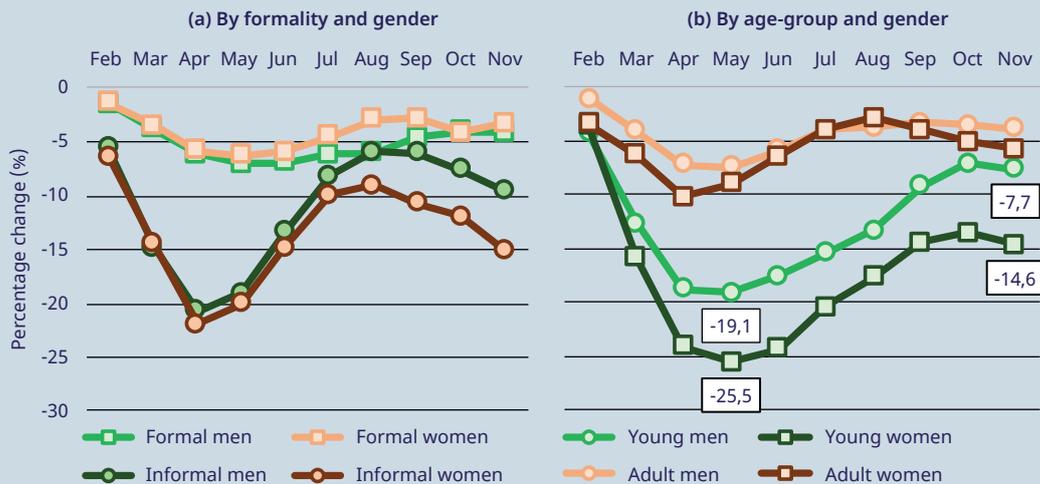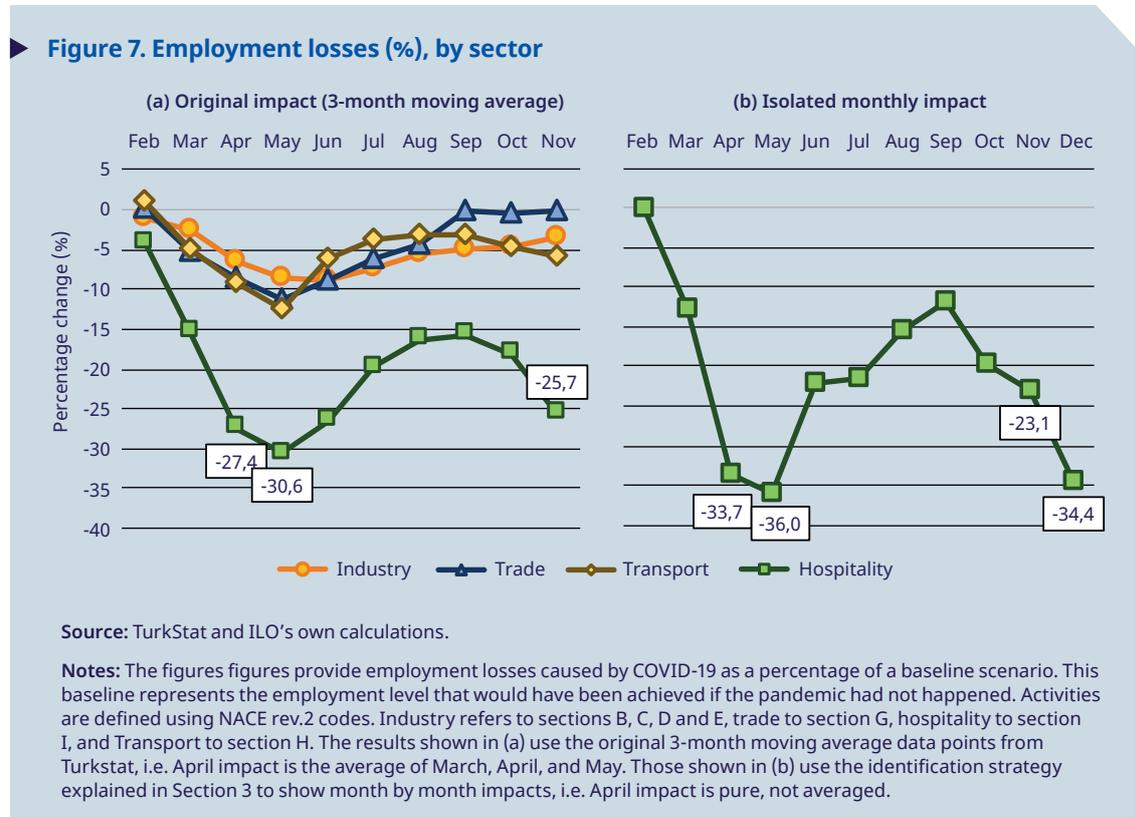

Source: Turkstat statistics and ILO's own calculations.

Notes: The figures provide employment losses caused by COVID-19 as a percentage of a baseline scenario. This baseline represents the employment level that would have been attained without COVID-19.

Young women. The new restrictions seem to have affected both groups of women more severely, the adult ones, and the young ones. The case of young women is particularly worrying for two reasons. First of all the time away from work of many of these young women is approaching a year. This may likely add difficulties and lower the chances of finding a job. Of course it can be argued that, overall, women's willingness to work is increasing (Figure 9) yet this says nothing about the quality of the jobs they will be finding. They may not be looking for a job because of the prospects ahead of them, but rather out of necessity. In other words, the qualifications lost during the time spent away from the labour market constitute the second problem. They may not be recovered that easily and it may pose a long-term decent work deficit.

---

9   Understood as not being registered in the social security institute as part of the person's job.

Hospitality. As part of the restrictions announced on 30 November restaurants were only allowed to serve on a take-away basis and, to make matters worse, only during restricted hours. On top of that, venues that may constitute an essential part of certain accommodation establishments such as SPAs, swimming pools, saunas and so on were closed altogether. As a result of these measures the hospitality sector (which includes accommodation as well as food and beverage service activities) suffered a similar blow to the one experienced back in April and May of 2020 (Figure 7b). These results follow the same methodology explained in Section 3. In this case the isolated monthly impacts are calculated to show the effects of the new measures on the hospitality sector. According to these results, a hospitality sector which by no means managed to achieve a full recovery during summer, went back to estimated losses in employment of 34.4 per cent. This figure is close to the ones experienced in April under similar restrictions, 33.7 and 36.0 per cent respectively in April and May.

▶ **Figure 7. Employment losses (%), by sector**

(a) Original impact (3-month moving average)

(b) Isolated monthly impact

Legend: Industry · Trade · Transport · Hospitality

Source: TurkStat and ILO's own calculations.

Notes: The figures figures provide employment losses caused by COVID-19 as a percentage of a baseline scenario. This baseline represents the employment level that would have been achieved if the pandemic had not happened. Activities are defined using NACE rev.2 codes. Industry refers to sections B, C, D and E, trade to section G, hospitality to section I, and Transport to section H. The results shown in (a) use the original 3-month moving average data points from Turkstat, i.e. April impact is the average of March, April, and May. Those shown in (b) use the identification strategy explained in Section 3 to show month by month impacts, i.e. April impact is pure, not averaged.

In terms of support to the sector, measures were announced on January 27 by the government. In this regard, around 200,000[10] businesses such as cafes, eating houses and restaurants (those in group 56 of NACE rev.2) may be eligible to receive payments provided that they faced losses of at least 50 per cent of their 2019 turnover if their 2019 turnover level was less than 3 million Lira. These are a one off-payment between 2,000 and 40,000 Lira.[11] Apart from the hospitality sector, other relevant economic activities such as manufacturing, trade or transport seem to remain operating at near full-speed, meaning the provisions whereby they are not to be affected by the new lockdown measures are actually working. This kind of dual speed evolution, also termed K-shaped recovery, is a source of concern in itself; it divides the economy into winners and losers and threatens with increasing income inequality between families involved in the hospitality sector and the rest of the society.
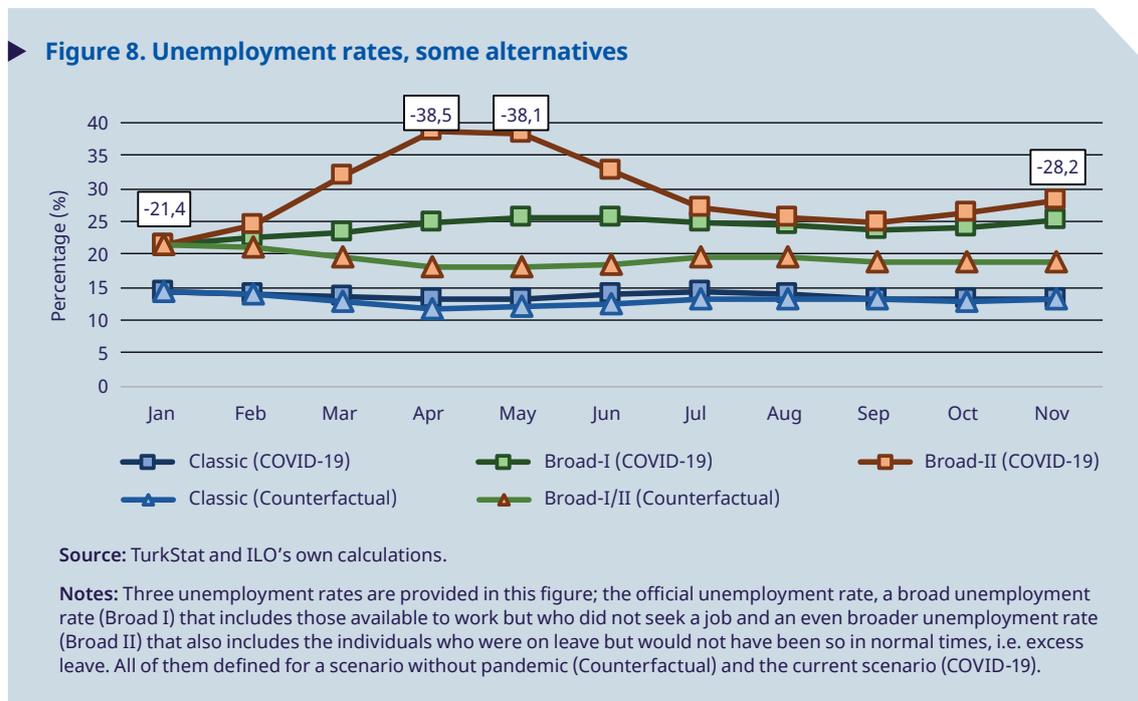
---

[10] https://www.sabah.com.tr/ekonomi/2021/02/07/kafe-restoran-destegi-basliyor
[11] See https://izto.org.tr/tr/duyurular/genel-duyurular/yiyecek-ve-icecek-isletmelerine-verilecek-ciro-kaybi-destegi-odemeleri-icin-basvuru-sureci-basladi.

4.3 On unemployment and inactivity

The pandemic has not just changed the way we live but also the way we measure the evolution of the crisis. Indicators like the employment level or the unemployment rate has lost its meaning; the former because of the high number of workers on leave and the latter because the current conditions are not favourable for people to actively seek a job.[12] In turn, this pandemic has taught us that being aware of reductions in hours worked as well as of the number of workers on leave is crucial to assess the full impact of the pandemic (Figure 2, 3, 4 and 5). Similarly, when we assess the status of those who are out of employment it might be important to notice the number of people not looking for a job but ready to start working shortly. As it can be seen in Figure 9, the number of individuals ready to work increased dramatically at the beginning of the pandemic and increased once again after the application of the second wave anti-COVID19 measures.
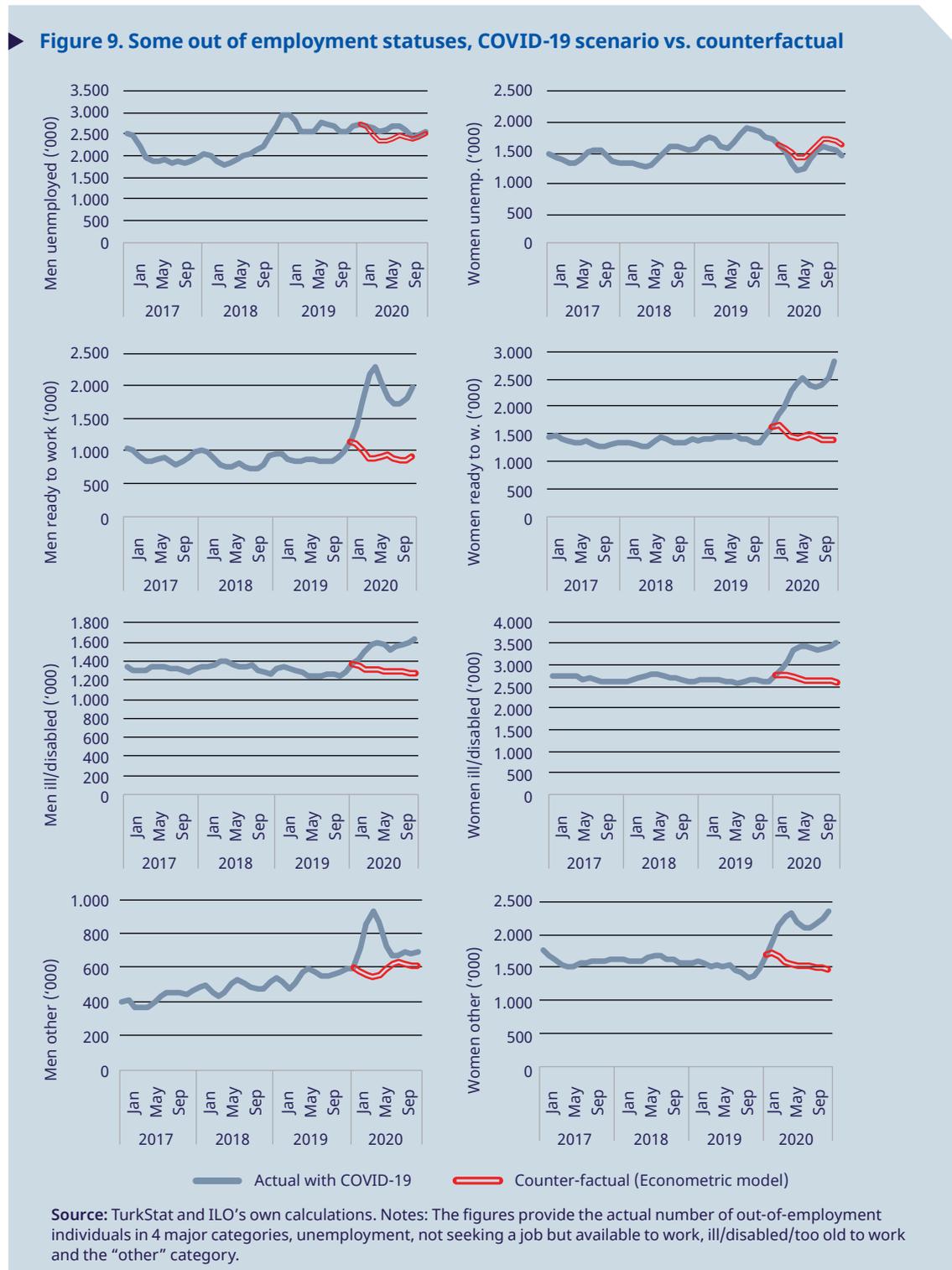
Are there alternative unemployment indicators able to track the pandemic? A good candidate for a crisis tracking indicator is expected to possess two characteristics; firstly, it should showcase higher values than it would have taken without the crisis. Otherwise it would not be able to warn us that things are going wrong. Second of all, it should be counter-cyclical, i.e. it should go up when things get tougher and decrease when the situation gets better. This way policy-makers would not just notice that there is a problem, they would also know when the situation worsens even further. When assessed against this criteria, the official unemployment rate does an extremely poor job as a tracking indicator. As it can be seen in Figure 8, not only it does not reach a higher level during the crisis, but even decreases when job losses were at their peak back in April and May 2020.

▶ **Figure 8. Unemployment rates, some alternatives**

Source: TurkStat and ILO's own calculations.

Notes: Three unemployment rates are provided in this figure; the official unemployment rate, a broad unemployment rate (Broad I) that includes those available to work but who did not seek a job and an even broader unemployment rate (Broad II) that also includes the individuals who were on leave but would not have been so in normal times, i.e. excess leave. All of them defined for a scenario without pandemic (Counterfactual) and the current scenario (COVID-19).

---

[12] Using active or passive channels to find a job is a pre-requisite to be considered unemployed, the others being having looked for a job in the previous 4 weeks and being able to start it soon thereafter. Note this criteria has changed since January 2021 after the implementation of the 19th ICLS standards and definitions.

COVID-19 and the restrictions put in place to prevent its spread have likely affected the job-seeking behaviour of many people. Some might be willing to work yet are afraid of contracting the illness or may have added responsibilities at home that prevents them from attending a workplace regularly. As a consequence, it would make sense to define unemployment in a broader sense, as it has been done by DISK (2021) or as it will be reflected by TurkStat,[13] so as to better capture the struggles that many people are going through during the pandemic. An obvious candidate for such a broader definition is the inclusion of individuals that are available to work even if they did not seek one.

▶ **Figure 9. Some out of employment statuses, COVID-19 scenario vs. counterfactual**

Actual with COVID-19   Counter-factual (Econometric model)

Source: TurkStat and ILO's own calculations. Notes: The figures provide the actual number of out-of-employment individuals in 4 major categories, unemployment, not seeking a job but available to work, ill/disabled/too old to work and the "other" category.

---

[13] See public announcement n6 by the Turkish Statistical Institute as of 22/02/2021.

The resulting broad definition (labelled Broad-I in Figure 8) took off as early as February 2020 from the values it was expected to have attained without the COVID-19 crisis. The Broad-I unemployment rate was expected to hover around the 20 per cent mark (hypothetical scenario without pandemic) and during the pandemic was consistently higher, showcasing an increase of around 5 percentage points. However, the actual Broad-I unemployment rate did not change much throughout the crisis, i.e. 24.7 per cent in April and 24.4 per cent in August even though the situation of April was markedly different to the one in August. We conclude that the Broad-I unemployment rate is an improvement over the official unemployment rate in terms of measuring the impact of the crisis -at least increases its level-, yet it is not ideal because it was only weakly following the momentum of the pandemic.

A second alternative for the official unemployment, labelled Broad-II in Figure 8, includes workers who are on leave as a result of COVID-19, i.e. they would not have been on leave under normal conditions. These workers, which are referred to as "absent" in Figure 5, have been a source of controversy since the beginning of the pandemic because they were categorized as "employed" even though their companies were often not paying them, and it was not clear when they would be able to return to work. It can also be argued that these workers are willing to work, after all they were employed before the pandemic, and as such they fit well into the concept of unemployment. This definition works much better in tracking the pandemic in the sense that i) its levels are far higher than they would have been without pandemic and ii) they are counter-cyclical, i.e. the rate increases when the labour market situation deteriorates.

Unemployment aside, the particularities of this crisis has also taught us to look at other economically inactive groups. For instance, there have been strong increases in the number of inactive individuals classified as ill/disabled/too old to work. Something similar can be attested (Figure 9) among those classified as "other",[14] especially among women. There are several interpretations for this phenomenon, for instance, people at risk of serious symptoms because of pre-existing underlying illnesses may have left their jobs (forcefully or willingly, does not matter in terms of interpretation). Moreover, some people may be citing fear of COVID-19 as the reason for not looking for a job and, since it may not be a pre-recorded category they would be classified as other. Explanations aside, it is needed to better understand the characteristics of the people behind these categories; first by disaggregating the "ill/disabled/too old to work" group and second by summarizing the answers given by the "other" group.

---

[14] Other means not unemployed, not available to work, not taking care of family or household, not studying, not sick/disabled/too old to work and not retired.

5. Concluding Remarks

The measures against COVID-19 announced on 30 November 2020 have unsurprisingly affected the Turkish labour market. The isolation of the December impact suggests that 2.3 million jobs (full-time equivalent) were lost between November to December 2020 as a consequence of said measures. And yet it can be argued that the measures taken to slow down the spread of the second wave did a better job than the ones put in place during the first wave in terms of minimizing mobility (which increases infection rates) while keeping employment losses at check. As an example, the measures in place back in May 2020 reduced mobility (Google Mobility index) by 49 per cent while reducing hours worked by 40.8 per cent, a 0.83 damage ratio.[15] In contrast, those of December managed to reduce mobility by 31 per cent while keeping hours of work losses at 16.9 per cent, resulting in a sensibly lower damage ratio, 0.55.

The impact of the second wave was not evenly spread across the economy, though. The heavy restrictions faced by the hospitality sector brought employment losses in said sector back to April 2020 levels while other sectors remained mostly unaffected in a what has been termed a K-shaped recovery. Aid packages have already been established by the government as relieve to restaurants and cafes, but this is likely not enough. Many workers and businesses in the hospitality sector are not registered and will be left out of the main aid channels. Since these are mostly low-paid workers majority of whom are women there is a risk for greater inequality in the coming future. As a result, there is a need for measures that assist affected workers in terms of active labour market polices and targeted employment services centred on re-skilling and adaptation for a post-COVID19 labour market.

In addition, it can be argued that this crisis has been different to previous ones. Classic labour market indicators were unable to provide adequate information to policy makers. One such indicator is the unemployment rate. This brief has tested the evolution of the official unemployment rate as well as of two other "broader" unemployment rates during 2020. The conclusion is that some form of time-related underemployment (this brief tested excess workers on leave) is necessary to track the present crisis.

Apart from the need of new indicators, the crisis has also proven to be different for women. Women's employment showcased a counter-cyclical movement during the 2008 financial crisis which was not repeated this time. Not because they are not available to work (nearly 3 million women would be able to start a job as of November) but because there are less jobs in sectors where women would normally find them and, thus, many of them do not have incentives to actively look for a job. Yet it is crucial that affected women return to the labour market as soon as possible and this should be one of the primary focus of employment services. In fact, as suggested by a joint document written by ILO, WHO, PBSO and INTERPEACE (2021), employment programs could be created with the aim of generating immediate temporary jobs so as to keep vulnerable groups from spending too much time in economic inactivity.

---

[15] The damage ratio divides the reduction in hours worked by the reduction in mobility. How many percentage points of damage (reduction in hours worked) are created by reducing mobility by 1 percentage point.

▶ # References

Pinedo-Caro, L. (2020). The impact of the pandemic on employment in Turkey: What would have happened without COVID-19? ILO Research Brief, December 2020.

Pinedo-Caro, L. (2021). Beyond unemployment: The impact of the pandemic on hours worked in Turkey. ILO Research Brief, January 2021.

ILO (2021). ILO Monitor: COVID-19 and the world of work. Seventh edition.

ILO, WHO, PBSO and INTERPEACE (2021). From crisis to opportunity for sustainable peace: A joint perspective on responding to the health, employment, and peacebuilding challenges in times of COVID-19. Summary and key recommendation, 25 February 2021.

DISK 2021. İşsizlik ve istihdamın görünümü raporu. Şubat 2021.

Gürsel, S. & Uysal, G. & Şahin, M.C. (2021). Korona salgınının istihdam üzerindeki asimetrik etkileri: Kayıt dışı istihdama çokuş. BETAM Araştırma Notu 21/255, Mart 2021.

► ## Appendix A. From a three-month moving average to monthly estimates

If the individual monthly impacts (measured as the % change from the baseline) on a certain indicator (i.e. hours worked) were additively-separable,[16] the 3-month moving average impacts for the February-November period could be defined as:

$$x_{feb} \approx \frac{i_{jan}+i_{feb}+i_{mar}}{3} \quad (1)$$

$$x_{mar} \approx \frac{i_{feb}+i_{mar}+i_{apr}}{3} \quad (2)$$

$$x_{apr} \approx \frac{i_{mar}+i_{apr}+i_{may}}{3} \quad (3)$$

$$x_{may} \approx \frac{i_{apr}+i_{may}+i_{jun}}{3} \quad (4)$$

$$x_{jun} \approx \frac{i_{may}+i_{jun}+i_{jul}}{3} \quad (5)$$

$$x_{jul} \approx \frac{i_{jun}+i_{jul}+i_{aug}}{3} \quad (6)$$

$$x_{aug} \approx \frac{i_{jul}+i_{aug}+i_{sep}}{3} \quad (7)$$

$$x_{sep} \approx \frac{i_{aug}+i_{sep}+i_{oct}}{3} \quad (8)$$

$$x_{oct} \approx \frac{i_{sep}+i_{oct}+i_{nov}}{3} \quad (9)$$

$$x_{nov} \approx \frac{i_{oct}+i_{nov}+i_{dec}}{3} \quad (10)$$

where the x_j, $j \in$ (feb,...,nov) are parameters (known values) denoting the impact of the pandemic calculated with 3-month moving average data points and the i_j, $j \in$ (feb,...,nov) denote the individual contributions to the average impact on a monthly basis (unknown).

This constitutes a system of 10 equations with 12 unknowns without a unique solution. In order to find a solution assumptions are made with respects to two of the unknowns. Specifically, the individual impact on January and the individual impact on February are both set to 0. That is assuming the pandemic did not have a meaningful effect on labour market-related variables until March. These two assumptions are based on mobility data from Google; according to this data there was no change in mobility[17] during February with respect to the pre-established baseline. Once the individual impacts of January and February are set to 0 the system can be solved iteratively starting by the individual impact of March, i_{mar} and finalizing with the individual impact of December, i_{dec}.

[16] They are not. But it is a close approximation whenever there is limited variation in the counterfactual values, as it is the case.
[17] Mobility items used are "retail and recreation", "grocery and pharmacy", "transit stations" and "workplaces".