



► Research Brief¹

August 2021

The impact of COVID-19 on the Turkish labour market during 2021: Results from a nowcasting model using Google mobility data

1. Summary

The COVID-19 pandemic is far from over in 2021 and so its effects on the Turkish labour market. This research briefs uses Google mobility data to estimate the impact of the pandemic on hours worked until July 2021. It does so for the overall economy, for 16 regions and for, probably, the two hardest-hit sectors of the economy, the food and beverage sector and the accommodation sector.

This methodology first links the actual impact on hours worked during 2020 (for which HLFS microdata is utilized) with mobility indices of the same period. Then, it uses the estimated relationship to extrapolate the results onto 2021 on a weekly basis. The results suggests that even though the overall impact on hours worked has decreased in 2021 compared to 2020, it has significantly increased for the hospitality sector, which was already in a difficult situation.

Apart from this forecasting exercise, this brief calculates the impact of the pandemic on the hours worked by several vulnerable² groups during 2020. The mentioned groups include informal workers, young people (15-24), Syrian migrants and domestic workers. In all cases the impact was over 20 per cent, and in the case of domestic workers reached 40.5 per cent.

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² A situation of vulnerability is often characterized by inadequate earnings, low productivity as well as difficult working conditions that go against workers' fundamental rights.

2. Background

The COVID-19 crisis has reached the summer of 2021 in Turkey with renewed hopes due to a vaccination progress that translates into more than 63.1 million doses³ administered and roughly a quarter of the population fully vaccinated. And yet, 2021 has not been easy neither for the general population nor for economic activity. New waves of the pandemic and the so-called alpha, beta, gamma and delta variants⁴ of the virus have been behind renewed measures intended at promoting social isolation to slow down the transmission of the virus.

The effects that the new restrictions have had on economic activity have been seldom explored, though. The March update of the ILO Ankara Research Brief⁵ series exposed the reduction in hours worked up to December 2020 and offered a glimpse at how the new, hospitality-oriented, restrictions affect workers. The Turkish Statistical Institute has been regularly publishing employment figures since then, however, these figures do not contain information on hours worked and on the number of workers on leave any more. As it is now known thanks to the work of the ILO monitor -see ILO (2021a)- and the World Economic Social Outlook -ILO (2021b)-, measuring employment levels⁶ in the context of the current pandemic does not adequately discuss the extent to which workers have been affected. The currently available information leaves us, thus, with a very partial knowledge about the pandemic's impact on the Turkish labour market.

An increasingly popular way of overcoming lack of relevant data during this pandemic has been brought by Google and its mobility reports. Google provides information on mobility in a number of items (hospitality, shops, residential areas, among other) in the form of 6 indices that started being recorded in February 2020. This was, for instance, the method chosen by Sampi and Jooste (2020) for a nowcasting model of industrial production in Latin America and the Caribbean. Mobility indices have also been used by ILO (2021a, b) to better understand the evolution of hours worked in regions for which data was not available. Likewise, this research brief estimates the empirical relationship between Google Mobility Indices and the reduction in hours worked to produce a nowcasting model of the impact of COVID-19 on hours worked. The idea is to then plug the most recent data from Google Mobility Indices into the model to find out what the impact was during 2021.

Lack of relevant data does not only concern the months of 2021. Even though the Turkish Statistical Institute did publish data on hours worked and workers on leave until November 2020, the just mentioned data only referred to Turkey as a whole, for men, women and both sexes together. We know, though, the impact of the anti-COVID19 measures is far from being evenly distributed. And if the average number of hours worked lost during 2020 is estimated at 14.9 per cent, some groups may have faced much higher losses in hours worked, above 20, 30 and perhaps even 40 per cent. In addition, it is also suspected that not all regions of the country were equally impacted by the pandemic; for instance, some early measures were only applied in metropolitan municipalities (Büyükşehir Belediyesi) plus Zonguldak.⁷ The 4-tier system towards normalization⁸ applied from March 2021 onwards also created differences across regions and, moreover, the economic and demographic

³ See https://covid19asi.saglik.gov.tr/?_Dil=2, accessed as of 18-7-2021.

⁴ See <https://www.who.int/en/activities/tracking-SARS-CoV-2-variants/> for more information.

⁵ See https://www.ilo.org/wcmsp5/groups/public/---europe/---ro-geneva/---ilo-ankara/documents/publication/wcms_775757.pdf

⁶ See Gürsel et al. (2021) for an analysis of the most recent TurkStat data on employment.

⁷ See, for instance, <https://www.hurriyet.com.tr/gundem/zonguldakta-neden-sokaga-cikma-yasagi-uygulaniyor-zonguldak-buyuksehir-mi-41496354>.

⁸ See <https://www.garda.com/crisis24/news-alerts/446091/turkey-authorities-will-introduce-a-covid-19-normalization-system-based-on-provincial-level-epidemiological-risk-from-march-1-update-32>

structure of the different regions have likely played a role in determining the exact impact of the pandemic.

In this research brief, the aforementioned lack of data is compensated thanks to the microdata of the 2020 Household Labour Force Survey. Section 3 expands previous ILO Research Briefs by calculating the full impact (measured as hours worked equivalent) of COVID-19 on a number of groups (Syrian refugees, informal workers, young people, etc.) that we were not able to analyse in spite of their likely high vulnerability. Section 4, in turn, takes a step further and estimates a nowcasting model for the impact of COVID-19 with the aim of knowing how the pandemic impacted workers during 2021. This model is used to predict the impact at the national and at the regional level. Section 4.4 exploits the fact that some mobility indices refer to restaurants and hotels to predict the impact of COVID-19 on the accommodation as well as in the food and beverage sector during 2021. Section 5 concludes.

3. The impact of COVID-19 on the most vulnerable ones

Previous ILO-Ankara research briefs have shown that the pandemic has had unequal effects on workers in Turkey. Some of these groups include young people (and in particular young women), who usually have more precarious contracts; informal workers, who were not protected by the ban on dismissals and domestic workers, who combine high informality levels with the difficulties associated to a job that is performed in someone else's house during pandemic times.

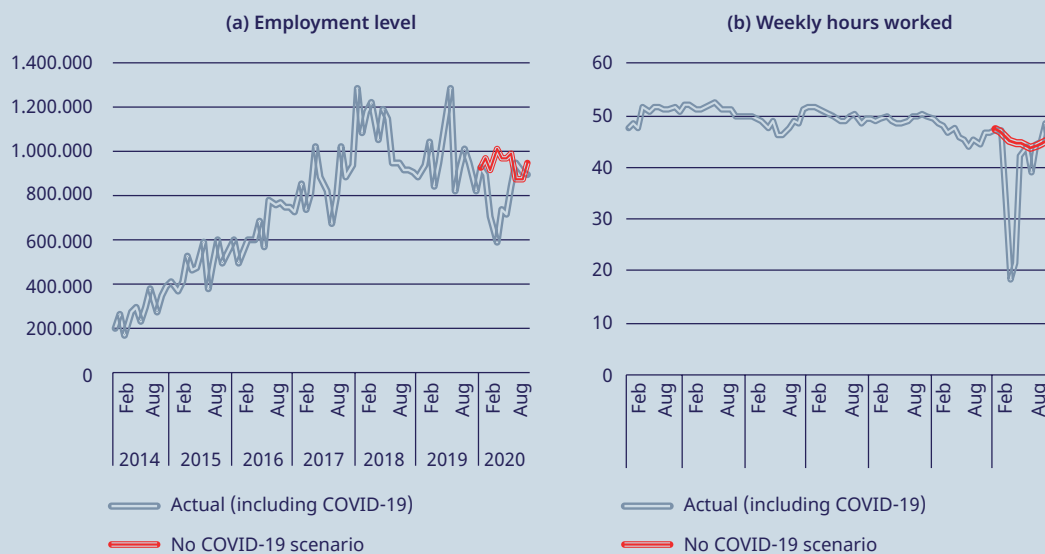
On top of these groups, we fear that Syrian refugees have been badly hit by the pandemic. For instance, the findings of Elçi et al. (2021) show that COVID-19 had a higher financial impact on Syrian than on Turkish citizens. Moreover, refugees' underdeveloped networks, informal work arrangements and increasing tendency to work in the hospitality sector⁹ constitute but worrying signals about their situation during the pandemic.

3.1 Methodology and data sources

Methodology. The impact of COVID-19 on the labour market is measured in hours (of work). This includes two items, reductions in hours worked by those employed (for instance, a store owner needs to close earlier due to some restrictions) and the hours of work missed by those who lost their jobs or those who should have got hired in normal times but were not because of the pandemic. The impact on the aforementioned items is measured by comparing the number of hours worked and the number of people in employment during the pandemic with a counterfactual. Said counterfactual constitutes a hypothetical scenario that answers "how many people would have had a job had not the pandemic existed?" or "how many hours would those who remain employed had worked without the pandemic?". In practice, these questions are answered by means of an Autoregressive Distributed Lag model (ADL) where we use historical data (since 2014) on the variables of interest (for instance, the employment level of Syrian refugees) as well as a number of macroeconomic indicators that help predict labour market outcomes during the pandemic. Full details on the methodology including the names of the macroeconomic variables can be found in the ILO-Ankara research briefs of December 2020 and January 2021.

⁹ ILO forthcoming report on Syrian refugees.

► **Figure 1. The impact of the pandemic on Syrian refugees**



Source: HLFS microdata 2014-2020 and ILO's own calculations.

Notes: The figures show (a) employment levels and (b) hours worked by those in employment using actual data and a counterfactual built based on a hypothetical scenario where no pandemic existed. Figures refer to those aged 15 and above.

Still, and for the purpose of illustrating how the counterfactual looks like we refer the reader to Figure 1, where the case of Syrian refugees is shown.¹⁰ As it can be seen in Figure 1.a the employment level of refugees had been increasing hand in hand with the growing presence of Syrians in Turkey. Such growth came to a halt once the number of Syrians became stabilized and, since then, employment has been fluctuating in accordance to the changes occurring in the local labour market (see the dip in employment after mid-2018, for example). Based on the same figure we can conclude that the impact of COVID-19 measures caused the employment level of Syrian refugees to touch bottom in the second quarter of 2020, with a low at around 600 thousand workers, a level unseen since 2015. Figure 1.b, in turn, shows the number of weekly hours worked by Syrian refugees from 2014 to 2020, including hypothetical hours (in red) for the scenario without COVID-19. Weekly hours show a decreasing trend in line with the country trend but, trends aside, we can see the dramatic reduction in hours worked by Syrian workers during April and May of 2020 in comparison with the expected level.

Data source. The impact of COVID-19 on hours worked is estimated using macroeconomic aggregates available at TurkStat website as well as time series obtained from microdata of the 2014-2020 period HLFSs, which was also provided by TurkStat. It should be noted that the microdata “as it is provided” by the institute does not contain identifiers for Syrian refugees nor for the month of the year. Refugees are identified among the foreign population present in the database based on a number of variables like the year of arrival to Turkey, their demographic structure and their labour market situation among other variables. The first version of the identification methodology can be seen in Pinedo (2020a) while an updated methodology will be published in a forthcoming ILO report. With regards to the identification of the month when interviews took place, we refer the reader to Appendix A for more information.

¹⁰ Details on how Syrian refugees are identified in the HLFS microdata can be found in Pinedo (2020a). Moreover, an updated methodology together with new results will be available in a forthcoming ILO-Ankara report.

3.2 The forgotten ones

The effects of the crisis were asymmetric across workers' groups. Indeed, larger working time losses are usually found among workers with a number of known traits such as informality, younger age, being a migrant and working in the hospitality sector. The fact that young people have been greatly affected comes as no surprise, previous cohorts of young people were also enduring long unemployment spells during the financial crisis a decade ago. The COVID-19 induced crisis has brought two elements that were not present in previous economic crisis, though; a ban on dismissals on formal workers and social distance. And these two elements have disproportionately affected some of the most vulnerable workers.

► Table 1. Reduction in hours worked during 2020, by group

Group	Reduction (%)	Group	Reduction (%)
Turkey average	14.9	Accommodation sector	45.7
15-24 year-old workers	22.9	Food and beverage sector	31.2
25-34 year-old workers	15.3	Domestic workers	40.5
Informal workers	23.6	Syrian refugees	24.3

Source: Household Labour Force Survey 2014-2020 and ILO's own calculations.

Notes: This figure shows the average impact of COVID-19 on hours worked during 2020. The impact is shown as a percentage (%) of the baseline scenario. The baseline represents the number of hours that would have been worked in Turkey during 2020 had not the pandemic existed.

► **Figure 2. Impact of COVID-19 on hours worked during 2020, by group and source**



Source: Household Labour Force Survey 2014-2020 and ILO's own calculations.

Notes: This figure shows the impact of COVID-19 on hours worked. The impact is shown 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 impact is split between two sources, employment losses (measured in equivalent hours) and the reduction in hours worked by those who are still employed.

As it can be seen in Table 1, hours worked during 2020 were reduced by 22.9 per cent for youth aged 15-24, however, so-called young adults aged 25-34 suffered milder effects with a reduction in line with the country average. Then, informal workers and Syrian refugees (which is almost a tautology since most Syrians work informally) endured similar reductions as to those of young people standing at, respectively, 23.6 and 24.3 per cent. Even though having similar average effects differences in the reaction of workers to anti-COVID measures can be appreciated in Figure 2. For instance, Syrian workers seem to pick up jobs quicker once restrictions are eased, a sign of lacking safety nets.

But it is when explore by economic activity that we find the workers that were most affected by the pandemic: Workers in the accommodation sector missed 45.7 per cent of the hours they would have normally worked during 2020, those in the food and beverage sector missed 31.2 per cent and for domestic workers it stands at 40.5 per cent.

With respect to the impact on domestic workers it can be seen that it remained high even when few anti-COVID19 measures (curfews, etc.) were in place (July, August, September, October 2020). This could be explained by the fear that some people may have had about bringing strangers to their houses given the risk of infection. Another plausible cause for the sustain impact is the existence of extra duties at home. Since most domestic workers are women and schools were closed, they may have been forced to stay at home, as it is highly unlikely that they could have been able to afford childcare. At last, the analysis of the impact of the crisis on the hospitality sector is, due to its dramatic effects and due to the available information from Google Mobility indices, reserved for Section 4.4, where it is explored in detailed.

4. A nowcasting model to monitor the effects of the pandemic

A slower than desired vaccination rollout, the appearance of new virus strains and the government efforts to slow down the number of infections, have plagued 2021 of anti-COVID19 measures. The effects of these measures have likely reached the labour market since there were restrictions to travel, closure of certain businesses and heavy restrictions on others. Unfortunately, information on hours worked and workers on leave is not available for 2021 and, thus, other tools need to be developed so as to estimate the ongoing impact of the pandemic.

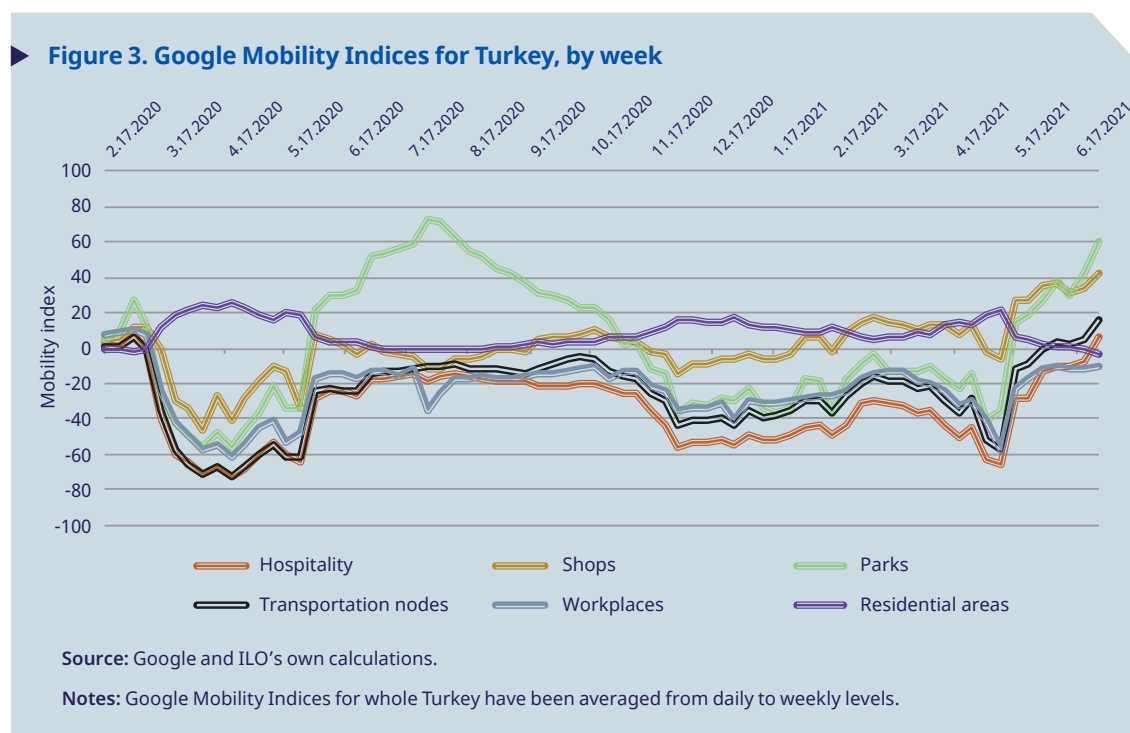
4.1 Methodology

Predicting hours of worked lost during 2021 relies on a nowcasting model linking the impact on hours worked occurred in 2020 with Google Mobility indices. The idea is, based on that relationship and on the values that mobility indices took during 2021, predict the impact on the most recent measures. The mentioned indices come from Google's COVID-19 Community Mobility Reports. These reports use data provided by apps like Google Maps and tracks the number of people visiting retail shops, grocery stores, parks, transit stations, workplaces, and residential areas. Each of the indices 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 2020.¹¹ A quick look at how these indices evolved over the last year and a half suggests that several movements are due to the policy measures taken by the government. For instance, a dramatic drop in mobility can be seen in Figure 3 in all but the residential mobility index starting in March

¹¹ Technical explanation taken from <https://ourworldindata.org/covid-mobility-trends>.

2020, which reflects the strong stay at home policy active applicable at that time. Other drops in workplaces mobility can be seen during 2020's festival of the sacrifice (Kurban Bayramı or Eid el-Adha), at the enactment of weekend curfews in late November 2020, or at the total curfew that took place in May 2021. Moreover, an interesting decoupling of the "hospitality" and "workplaces" indices, which walked hand-in-hand at the beginning of the pandemic, can be observed from June 2020, marking the change in policy of the government towards social-oriented restrictions.

The relationship between mobility indices the impact of COVID-19 on hours worked is estimated with a fractional regression model.¹² This model is chosen over a linear regression model with the intention of bounding the impact to be between 0 and 100. Even though in principle the impact could be positive (i.e. people could have worked more than they would have done so without COVID-19) the world situation and the employment levels showcased by the Turkish economy as published by TurkStat suggest this is unlikely to be case, at least for now. In addition, the actual data utilized to estimate the model only uses a certain range of mobility values occurred during 2020, i.e. we do not know how mobility interacts with hours worked outside of the observed range of mobility. As a result, positive impacts of COVID-19 would be dubious, how can we know certain mobility values are associated with positive impacts if these indices have not been observed in the past.



The model¹³ is estimated at the monthly level for Turkey as a whole as well as for 16 regions. The regions and the provinces that compose each of these regions are shown in Appendix B for the reader's information. In total, the 11 monthly impacts, February 2020 to December 2020, multiplied by 16 regions plus Turkey yield 187 observations. These impacts are calculated using Section's 3 methodology at the regional level using microdata from the HLFS 2014-2020.

¹² Results from a linear regression model are shown for Turkey in Appendix D for comparison

¹³ In practice the impacts are transformed to lie between 0 and 1. Then a Logit model that allows the dependent variable to take values between 0 and 1 is estimated using a quasilielihood estimator with robust standard errors.

The main variables used to explain changes in the share of hours of work lost are the 6 mobility indices provided by Google. These indices are initially measured on a daily basis at the provincial level. The aggregation from daily to monthly is a simple average while the geographical aggregation weights the indices by the population of the respective province. Other covariates include binary indicators for the regions in which the impact is measured; the idea is to control for different levels of compliance and for an asymmetric implementation of anti-COVID measures. In addition, the employment structure and the demographic structure of the respective regions is included with variations at the quarterly level.¹⁴ The former is added because some curfew measures were aimed at specific age groups; also, it is known that younger people faced more employment losses than adults. In turn, the latter is added to take into account the sectoral component of the measures and the global situation; for instance, a province with a sizeable tourism industry may have suffered more than another province which has, let's say, a more relevant manufacturing industry (whose workers were authorized to continue working).

In addition to estimating the relationship between the impact on hours worked and the mobility indices, in-sample and out-of-sample estimations are produced at a monthly and a weekly level. The latter estimates are carried out plugging in weekly values of mobility indices are plugged in the model. Daily estimates could, in principle, be retrieved as daily data exists, however, estimations at such level would not be reliable; the original data on impacts is monthly, it is an average of the effects occurring during week days and weekends; whole weeks means downsizing the effects, but daily effects would be qualitatively different.

4.2 Country level results

According to the model estimates, the impact on hours worked endured during 2021 has been 7.8 per cent, sensibly milder than it was during 2020 at 16.4 per cent. This reduction has not been achieved due to the availability of vaccines, let us remember that in Turkey it was not until June 2021 when a relatively high percentage of the population was fully vaccinated. In fact, it could be argued that this reduction has been achieved in spite of the existence of the pandemic and the virus new strains. Better targeted measures with a focus on social activities and mobility that also granted a wide array of exceptions for most economic activities to operate.

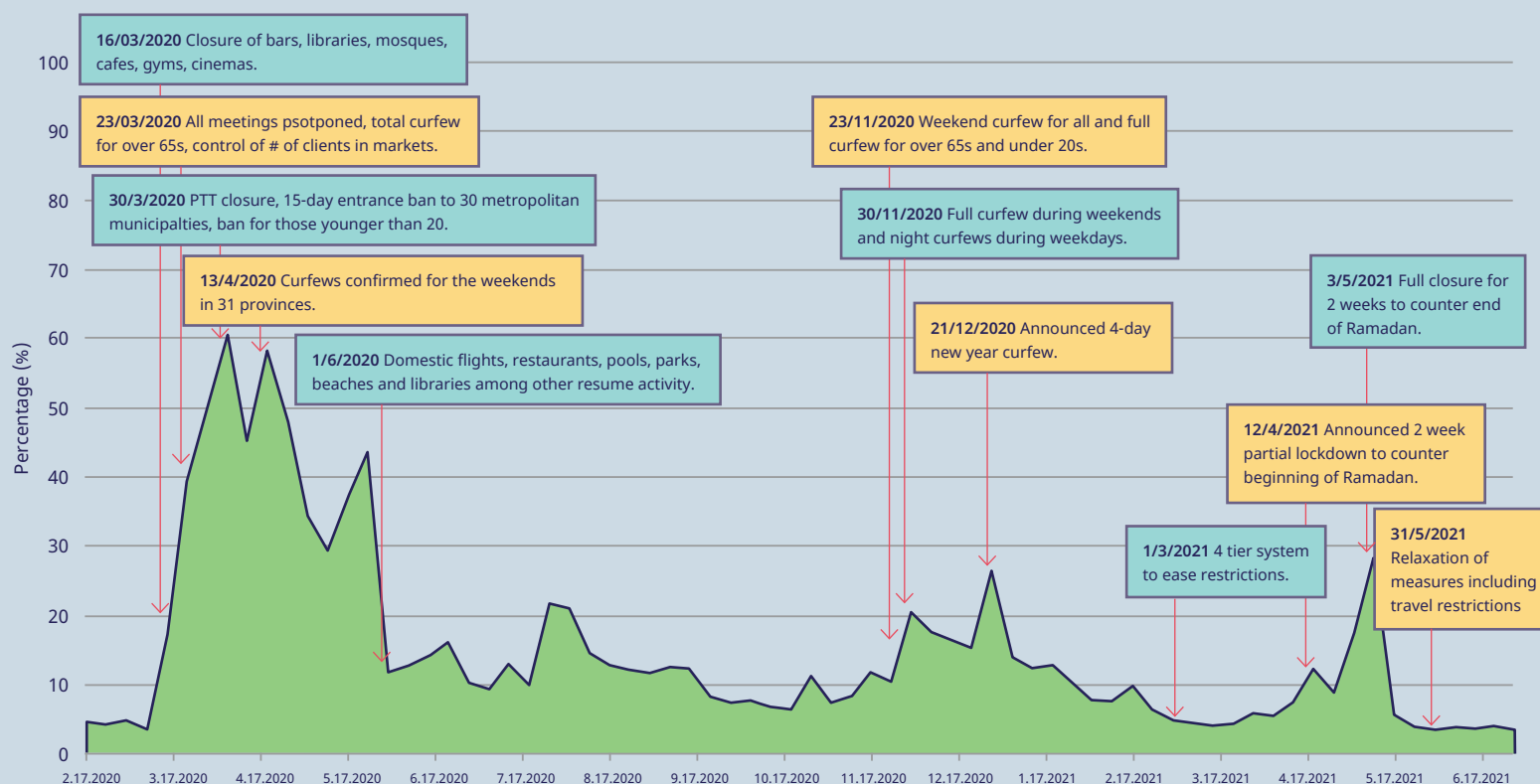
The cited measures and the estimated impact on hours worked are available in Figure 4 for every week since the beginning of the pandemic (mid-February 2020) to July 2021. In said figure it becomes apparent that the difficulty in handling such crisis, paired with panic and severe restrictions paralyzed the economic activity of the country. In fact, during some weeks of April losses of up to 60 per cent of the hours that should have been worked occurred at the country level. But a global pandemic is hard to control with local measures. Soon governments across the globe made a shift in paradigm, going from short-term emergency measures to a long-term battle of attrition against the virus with the aim of protecting the economy as much as possible.

The shift in paradigm can be observed towards the end of November 2020, when the government changed the way of counting cases and started to offer figures of over 30 thousand cases per day. This served as the justification for night and weekend curfews, closure of several places where social activities were carried out and just allowing restaurants

¹⁴ These variables could have been added at the monthly level but they would be less reliable due to the sample size plus it is hardly needed; the age structure changes slowly over years and the employment structure changes seasonally, quarters are enough to cover it.

and bars to deliver food away from their premises. These measures, even if extremely harsh for the affected sectors (see Section 4.4) seemed to have kept the number of cases under control and the hours of work lost at a more modest 20 per cent.

Figure 4. Reduction in hours worked in Turkey, by week



Source: Household Labour Force Survey 2014-2020, Google Mobility Indices and ILO's own calculations.

Notes: This figure shows the impact of COVID-19 on the hours worked in Turkey. The impact is shown 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. Results for 2020 are interpolated from monthly impacts using Google mobility indices. The results for 2021 are extrapolated using the same method. The events referred to in the figure are associated to the week in which they were applied not to a particular day. The day shown refers to the first day of said week for ease of reference.

The improvement of the pandemic situation in February 2021 prompted the government to ease some of the restrictions using a 4-tier system, which in practice depended on the COVID-19 risk, low, medium, high and very high. The new system was not successful and the number of cases spiked to over 60 thousand in April, coinciding in time with the arrival of the Ramadan. Given the social nature of this celebration and the high mobility which is associated with it, a so-called "full closure" was mandated for the first two weeks of May, raising the share of hours worked lost to almost 30 per cent country-wide, the highest level since May 2020. After June measures were eased again, and, with the help of a speedier vaccination rollout, Turkey (with the information available at the moment of drafting this brief) went back to -almost- normal, as least in what refers to hours worked. And yet, it is to be seen whether this normalization applied to all groups of workers.

Leaving the evolution aside, the effects of the measures seem to be stronger when they are first enacted. Then, their impact seems to vanish. This can be seen, just to mention two examples, during April 2020 and during the December 2020-February 2021 period. In both cases similar measures were held during the mentioned periods, yet the efficacy of

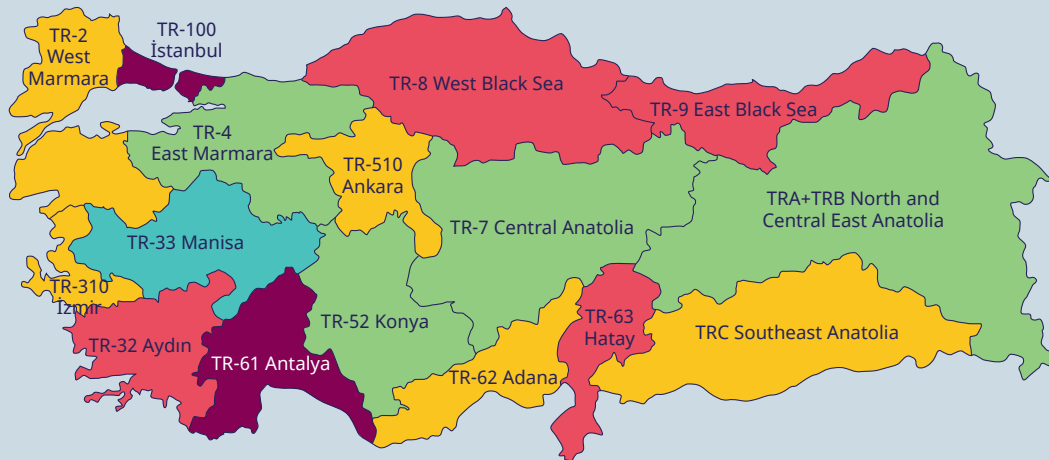
the measures seems to have decreased slowly. One to interpret it is as a growing lack of compliance by the public due to the stringency of the measures as found out by Batman et al. (2021) in tourists visiting Antalya. Another possibility could be related to people getting back to work as the measures are better understood or there is a higher need to generate income.

4.3 Regional results

The Turkish government has taken a national approach to tackle the crisis and so, most COVID-related measures were applied nation-wide. However, there were also notable exemptions to this rule which made restrictions vary from province to province, and, thus, the impact of the measures on local labour markets. One such exemption took place at the outset of the pandemic when a ban to enter and exit 30 metropolitan areas as well as Zonguldak was announced. This event was followed by similar measures that took place on the same provinces like a weekend curfew announced on April 10, a 3 days curfew announced for the 23-26 April period and another one for the 1-3 May period. Something similar, albeit in a more involved fashion, happened in March 2021. A 4-tier system whereby restrictions could be eased based on the local risk was implemented allowing each province to have different restrictions in place.

In addition to different restrictions, Turkish regions also showcase marked differences in their employment and demographic structure and these are also likely to affect the link between COVID measures and hours worked. For instance, some sectors like manufacturing and transportation have been granted several exceptions to continue in operation while other businesses like restaurants have had a much harder time to remain open. Likewise, provinces with higher shares of prime age workers (not too young to be easily dismissed, not too old to suffer from COVID-19) are less likely to have witnessed dramatic falls in economic activity. As a result of these differences, estimating regional results for the impact of COVID-19 can be useful for the purpose of policy-making and resource allocation. These estimates could, in principle, be done at the district level thanks to the level of detailed offered by Google's Community Mobility Reports. However, employment data from the HLFS is provided at the NUTS2 level, meaning mobility indices need to be aggregated for coherence. In addition, mobility data is far from complete in (mostly) eastern provinces of Turkey -see Appendix C for the list of provinces with missing values. This may, perhaps, be due to the smaller population of cited provinces or due to a lower penetration of smart phones that can be tracked. All missing values were imputed using the regional weighted average. For example, the transport mobility indices of Muş, Hakkari and Bitlis are provided by Van.

► **Figure 5. Reduction in hours worked by region. Pandemic average, February 2020 to July 2021.**



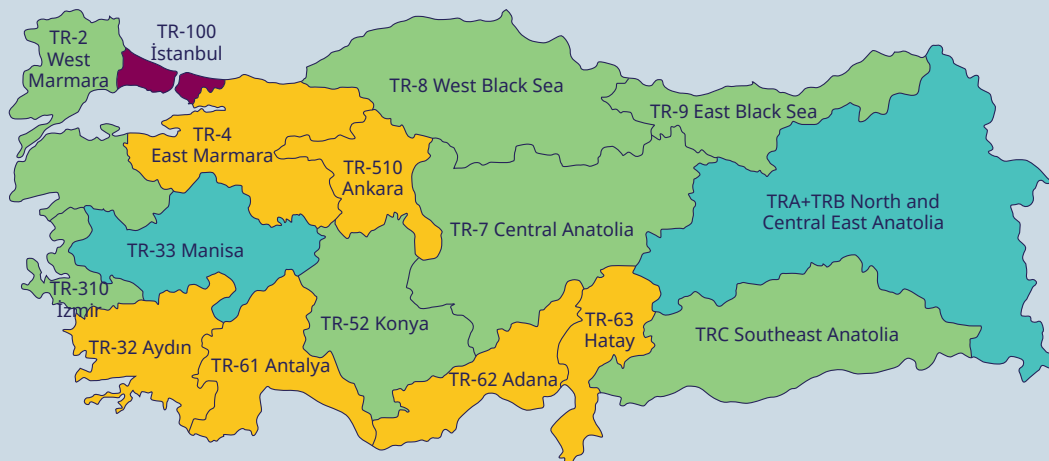
Reduction on hours worked, February 2020-July 2021

6-9% 9-12% 12-15% 15-18% 18-21%

Source: Household Labour Force Survey 2014-2020, Google Mobility Indices and ILO's own calculations.

Notes: This figure shows the impact of COVID-19 on the hours worked of the different regions of Turkey. The impact is shown as a percentage (%) of the baseline scenario. The baseline represents the number of hours that would have been worked in the respective region had not the pandemic existed.

► **Figure 6. Reduction in hours worked by region. April/May 2020.**



Impact on hours worked, April/May 2021

20-30% 30-40% 40-50% 50-60%

Source: Household Labour Force Survey 2014-2020 and ILO's own calculations.

Notes: This figure shows the impact of COVID-19 on the hours worked of the different regions of Turkey. The impact is shown as a percentage (%) of the baseline scenario. The baseline represents the number of hours that would have been worked in the respective region had not the pandemic existed.

An uneven picture. The estimates obtained from the nowcasting model suggest that the impact on hours worked varied widely from region to region. These results are shown on a week by week basis in Appendix E for each of the 16 regions in which Turkey was split for the study (see Appendix B for the provinces included in each region). In addition, and to facilitate the regional comparison, two maps (Figure 5 and 6) are provided with, respectively, the average impact on hours worked during the whole length of the pandemic (February 2020-July 2021) and with the impact during the months of April and May of 2020, which is when the impact peaked due to the severity of the restrictions.

According to the results, the most affected regions are Antalya and Istanbul, with overall hours of work losses close to 20 per cent. The marked touristic and service-oriented profile of these regions is probably related to the hefty price paid in terms of economic activity reduction. As an example, Arlı & Bayırhan (2021) note that yacht business owners of Antalya used to predict the bankruptcy of many of their businesses in the future if the effects of COVID-19 were to continue as they were taking place at the time of the study, September/October 2020.

Next in the list of affected regions are other coastal areas of Turkey such as Aydın and the Black Sea. The presence of Aydın is by no means surprising as it includes Muğla, one of the most famous destinations in Turkey and one of the provinces that attracts more tourist in the country. Other coastal regions follow in the list, with their impact likely diminishing in line with the weight of the hospitality sector in their economy. At last, the least impacted regions seem to be located in landlocked areas of Central and Eastern Anatolia. One of the reasons for the smaller impact is likely related to the employment structure, as in these regions the manufacturing sector or the agricultural sector play a more prominent role than the hospitality sector. In addition, there is a correlation between the population of the region and the impact on hours worked which might be caused by the asymmetric measures imposed by the government.

The uneven effects of the selective curfews imposed early on in the pandemic (April/May 2020) can be better seen in Figure 6. The impact on hours worked is noticeably higher in the populated regions of Turkey. As such, Istanbul, with losses of more than 50 per cent of the hours that would have been worked without pandemic, and regions like Ankara, Antalya, Izmir, East Marmara (Bursa included), Aydın, Adana and Hatay faced reductions that exceeded the 40 per cent mark during the peak of the pandemic. Once again, smaller regions (population-wise) or regions where the agricultural sector takes on larger share of the employment were less affected with reductions ranging between 20 to 40 per cent.

4.4 An analysis of the hospitality sector

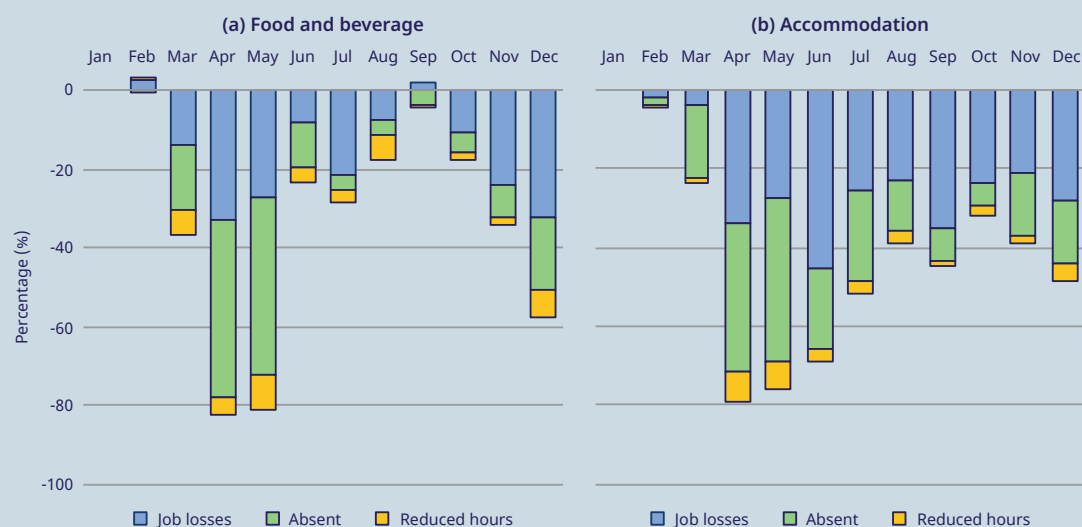
The analysis of impact of the pandemic at the regional level seem to be, in several cases, linked to the respective provinces' hospitality sector and tourism industry. However, hospitality does not exceed 10 per cent of the workforce in most regions¹⁵ which prompts a question about the individual impact that COVID-19 had on this industry for it to affect aggregate results. Previous Research Briefs by the ILO Office for Turkey estimated employment losses to fluctuate (during 2020) between 15 to 30 per cent of the value that would have been attained without pandemic. However, these estimates did not include the effect of workers on leave (working 0 hours) nor the effect of workers spending less hours at the workplace due to, say, lower demand. The above-mentioned remark has an answer reflected in Figure 7, where the total impact of COVID-19 is measured as the sum of (1) the hours of work lost

¹⁵ With the NUTS2 subregion of Antalya being the only exception.

because of employment losses, (2) hours of work lost because too many workers were on leave and, (3) the hours of work lost because some workers worked less hours than they would have without pandemic.¹⁶ The actual impact on COVID-19 on the hospitality sector reached 80 per cent at its peak, which is more than double the estimated impact on employment. Since then, the share of hours of work lost due to those in employment working less hours than that expected has decreased yet it remains significant, especially after the second wave restrictions were imposed in late November of 2020.

In addition, previous analysis based on data published by the Turkish Statistical Institute were not able to distinguish between the main components of the hospitality sector, namely the food and beverage industry and the accommodation sector.¹⁷ These two subindustries, even though undoubtedly related, were affected by the pandemic differently. On the one hand, the activity of the food and beverage industry (restaurants, bars) fluctuated wildly, negatively in curfew times and positively when restrictions were eased. On the other hand, the accommodation sector has suffered a more sustained impact over time since they were not just affected by local restrictions but also by a lack of international demand and fear from an infectious disease. Results in Figure 7 are, precisely, split by subindustry, with a food and beverage sector fully recovering as restrictions were eased during the Autumn of 2020 and an accommodation sector trailing behind expected activity levels all year long.

► **Figure 7. Impact on hours worked in the hospitality sector in 2020, by source**



Source: Household Labour Force Survey 2014-2020 and ILO's own calculations.

Notes: This figure shows the impact of COVID-19 on hours worked. The impact is shown 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 impact is split between two sources, employment losses (measured in equivalent hours) and the reduction in hours worked by those who are still employed.

And yet, the first half of 2021 has not been as far from providing a recovery to the hospitality sector. As restrictions continued intermittently during the first months of the year, the impact on hours worked on these two sectors was likely to continue. In order to measure the impact on these two industries during 2021 2 nowcasting models, one for the food and beverage sector and one for the accommodation sector, similar to the one used

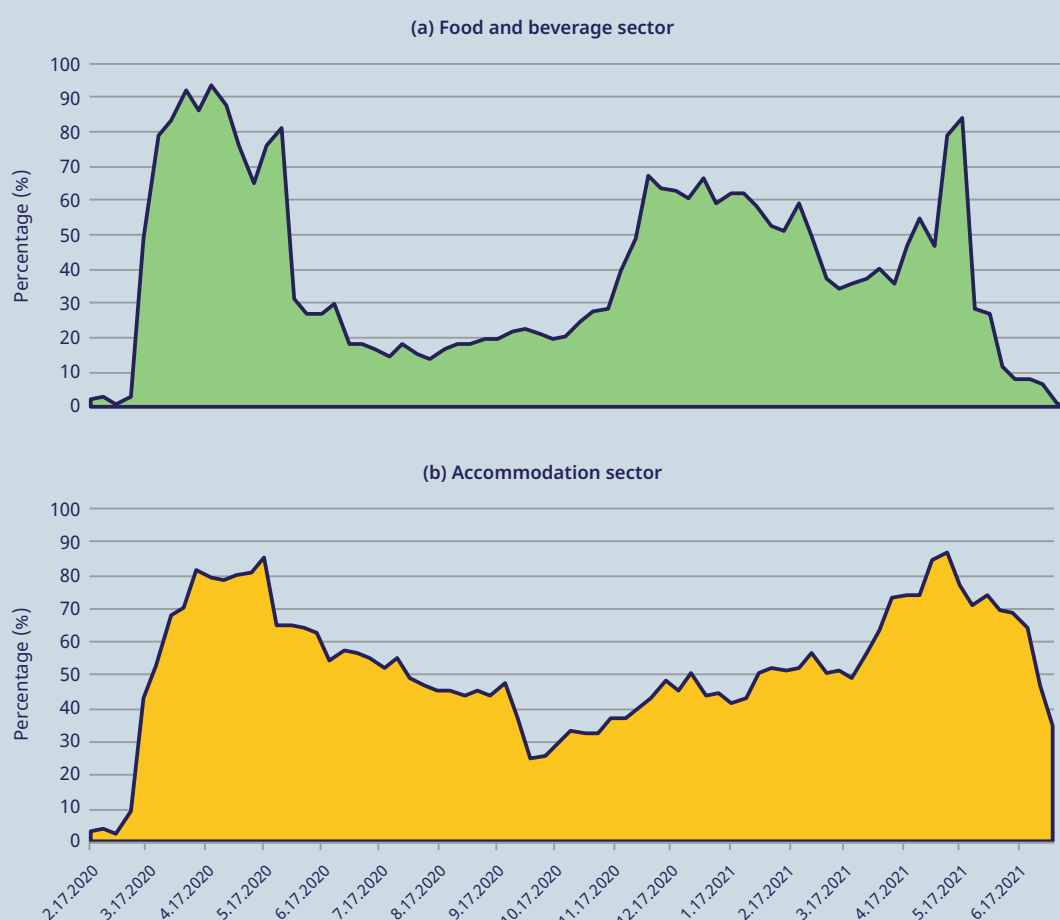
¹⁶ See the January brief of the ILO Office for Turkey for the methodology.

¹⁷ Codes 55 and 56 of the ISIC rev.4 classification.

in Sections 4.2 and 4.3 are utilized. The idea remains the same, estimating the association between mobility indices and the impact on hours worked during 2020 to then extrapolate it to 2021 using the most recent data on mobility.

On the one hand, the model for the food and beverage sector involves the estimation of a fractional logistic regression with the impact on hours worked (as measured with data from the HLFS) as the dependent variable. The explanatory variables include an index based on mobility in recreational places (restaurants, coffee shops, malls, museums, libraries) as well as a square and a cubic term to allow for certain non-linearities in the relationship. Moreover, it includes mobility in transport nodes, the share of informal workers and the share of workers in hospitality. The model is estimated at the national level as well as at the regional level for two made-up regions, coastal Turkey and inland Turkey, 33 observations in total. In terms of the relevance of the variables we find that all three terms related to mobility in recreational places are statistically significant at 1%, which is not surprising given the fact that the mobility and the impact measured correspond to the same type of businesses.

► **Figure 8. Reduction in hours worked in the hospitality sector, by week**



Source: Household Labour Force Survey 2014-2020, Google Mobility Indices and ILO's own calculations.

Notes: This figure shows the impact of COVID-19 on the hours worked of the food and beverage sector of Turkey. The impact is shown as a percentage (%) of the baseline scenario. The baseline represents the number of hours that would have been worked in the respective sector had not the pandemic existed. Results for 2020 are interpolated from monthly impacts using Google mobility indices. Results for 2021 are extrapolated using the same method. The food and beverage sector refers to code 55 of ISIC rev.4 while accommodation refers to code 56.

On the other hand, the model for the accommodation sector follows the same idea, but with different explanatory variables as there is no sole index that captures mobility in hotels and similar venues. In this sense, mobility in recreational venues, shops, parks, transport nodes and residential areas were included, together with the share of formal workers and the share of workers in hospitality.

The results of extrapolating the 2020 relationship between impact and mobility onto 2021 can be found in Figure 8, separately for each of the sectors under analysis. The impact of COVID-19 on hours worked during 2021 has been calculated at the weekly level for the whole duration of the pandemic, since mid-February 2020 to mid-July 2021. The predicted impact for 2021 points at a terrible year for both sectors, with an average reduction of hours worked estimated at 36.5 per cent for the food and beverage sector and at 56.5 per cent for the accommodation sector, even worse than the one attained during 2020. It is also worth noting that that relaxation of measures right at the arrival of the 2021 summer have done good to both sectors; restaurants, bars and the like seem to have recovered normal activity levels and even the accommodation sectors is approaching the 30 per cent losses mark, which a significant improvement given the situation in which it found itself during the Ramadan.

5. Conclusions

The COVID-19 pandemic and its effects did not finish in 2020. New waves and new variants continued hitting Turkey during the first half of 2021 forcing the government to take on a number of measures so as to keep the number of cases under control. But, although the disease itself has not changed much since 2020, the effects of the anti-COVID measures on the labour market have done so. The new focus of the measures lies on an extreme limitation of social activities (including closure of venues where these activities occur) while granting exceptions to most remaining economic sectors. This strategy has, according to a nowcasting model estimated with Google mobility indices, reduced the overall impact¹⁸ of COVID-19 on hours worked from 14.9 (2020) to 7.9 per cent (2021) but have deepened the wound of an already badly hit hospitality sector.

Indeed, the impact on hours worked in the food and beverage sector as well as the accommodation sectors has increased from 2020 to 2021. Specifically, it advanced from 31.2 to 36.5 per cent in the former sector and from 45.7 to 56.5 per cent in the latter. July figures offer a glimpse of optimism, though. According to the estimates, the situation in the food and beverage sector is close to normal (in terms of working hours) while it has noticeably improved in the accommodation sector. Still, a new surge of COVID-19 cases cannot be discarded as it is happening in other countries where measures have been relaxed, and if this were to happen the situation shall be re-evaluated. Moreover, as it is mentioned in Karsavuran (2021), reductions in hours worked is by far not the only problem in the hospitality sector (and probably other sectors as well), worsening of working conditions among those employed is also a reality that needs active monitoring.

On top of analyzing the current situation, this research brief has also analyzed the full impact of the pandemic during 2020 on several groups for which data was not available and who are in an extreme situation of vulnerability. As such, the average reduction of hours worked during 2020 for domestic workers (40.5 per cent less hours worked), Syrian refugees (24.3 per cent), young people aged 15-24 (23.3 per cent for women, 22.3 for men) and informal

¹⁸ In this brief impact means “full” impact, i.e. it adds up the reduction in hours of those who continued in employment plus the hours that those not in employment would have worked if COVID-19 had not existed.

workers (23,6 per cent) is calculated. These figures have confirmed the existence of two pandemics; one for formal, prime-aged workers whose overall impact has been mild at worst, and another one for those in the informal economy or without job security. In this sense, this crisis has emphasized the importance of formalized work arrangements.

All in all, it looks like the impact of the crisis on the labour market has been softened as of July 2021. However, the likelihood of scarring effects on younger people, the end of the ban on dismissals, and the possibility of a new wave of coronavirus (and the resulting measures) invites to further monitoring of the situation in coming months.

► References

Arlı, E. & Bayırhan, İ. (2021). The impact of the COVID-19 pandemic process on yacht operators: Application on a marina in Antalya. *Journal of Multidisciplinary Academic Tourism*, Vol. 6, Issue 2, pp. 81-88, 2021.

Batman, O. & Bilgili, İ. & Yıldırhan, R. (2021). Otel çalışanı ve misafirin COVID 19 pandemi kurallarına uyumu: Antalya ve Muğla karşılaştırması. *Sosyal, Beşeri ve İdari Bilimler Dergisi*, Vol. 3, Issue 12, pp. 935-955, 2021.

Elçi, E. & Kirişcioğlu, E. & Üstübcü, A. (2021). How COVID-19 financially hit urban refugees: Evidence from mixed-methods research with citizens and Syrian refugees in Turkey. *Disasters*, 1 July 2021.

Gürsel, S. & Uysal, G. & Mutluay, H. (2021). İşgücünden kitlesel çıkış, işsizlik oranında düşüş. *Betam, İşgücü Piyasası Görünümü*, Temmuz 2021.

ILO (2021b). *World Employment and Social Outlook: Trends 2021*. International Labour Office, Geneva.

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

ILO (forthcoming). 10 years of refugee crisis in Turkey: A labour market perspective. ILO Office for Turkey.

Ilgaz, B. & Dündar, Y. & Silik, C. & Atalay, M. (2021). The impact of the COVID-19 outbreak on local tourist behaviour in Antalya, Turkey. *Management, Economic Engineering in Agriculture and Rural Development*, Vol.21, Issue 1, 2021.

Karsavuran, Z. (2021). The effects of COVID-19 on tourism and hospitality employment. In *Handbook of research on the impacts and implications of COVID-19 on the tourism industry*, edited by Mahmut Demir, Ali Dalgıç and Fatma Doğanay, June 2021.

Mugaloğlu, E. & Polat, A. & Tekin, H. & Kılıç, E. (2021). Assessing the impact of COVID-19 pandemic in Turkey with a novel economic uncertainty index. *Journal of Economic Studies*, online version 21 June 2021.

Pinedo-Caro, L. (2020a). Identifying Syrian refugees in Turkish microdata. *IZA Journal of Development and Migration*, 11:17, 2020.

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

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

Pinedo-Caro, L. (2021b). Impact of the second wave COVID measures on employment in Turkey. *ILO Research Brief*, March 2021.

Sampi, J. & Jooste, C. (2020). Nowcasting economic activity in times of COVID-19: An approximation from the Google Community Mobility Report. *World Bank, Policy Research Working Paper 9247*, May 2020.

► Appendix A. Identification of the month in HLFS microdata

Information on the month of the year when interviews took place in HLFS microdata is of crucial importance to a) understand how employment levels and hours worked changed in 2020 and b) obtain a long enough time series so as to be able to reliably predict a counterfactual scenario in which the pandemic never existed.

Unfortunately, the month of the year is not provided in the publicly available microdata and needs to be identified. Such identification goes as follows:

► Years 2014-2018: 12 splits with the same number of observations in the same order as the data is provided.

► Year 2019: Four splits of equal size in the same order as the data is provided:

► 1st split: 3rd quarter

► 2nd split: 4th quarter

► 3rd split: 1st quarter

► 4th split: 2nd quarter

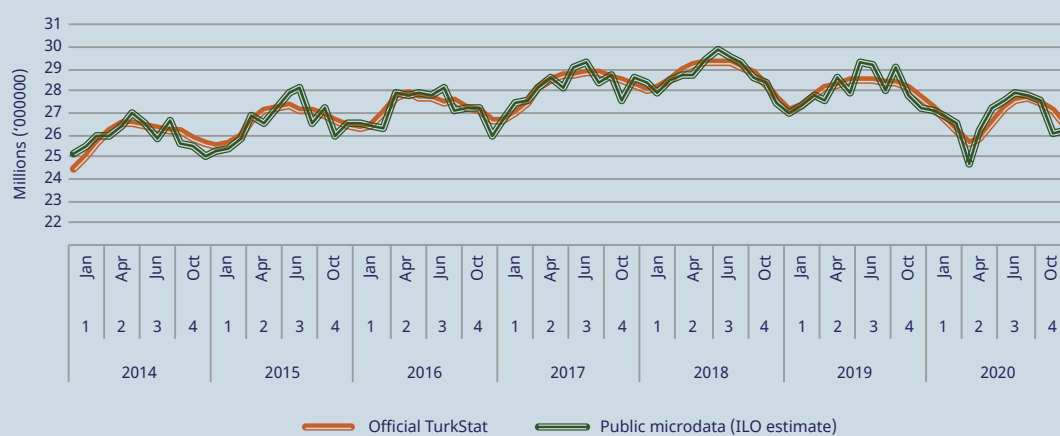
Months are then identified by splitting each of the quarters into 3 groups with the same number of observations in the original order.

► Year 2020: 12 splits with a different number¹⁹ of observations in the same order as the data is provided. The number of observations of each split is chosen so as to match the total (weighted) population across all months.

The outcome of such identification is then tested against TurkStat official data releases of employment figures. The results from the test are shown in Figure A.1. It should be noted that these time series should not match perfectly, as one comes from the raw microdata while the other one has been reworked by TurkStat to remove noise and smooth it out. However, seasonality should be matched as that component has not been erased in either of the series shown below.

¹⁹ The data collection process suffered, apparently, some changes due to the pandemic that affected the sample size.

► **Figure A.1 Employment levels, TurkStat official release vs. ILO estimates from microdata**



Source: Microdata from the Household Labour Force Survey 2014-2020 and TurkStat public releases.

► Appendix B. Regions and provinces

► Table B.1. Regions used in the report and provinces included

Region	NUTS	Provinces included
Istanbul	TR100	Istanbul
West Marmara	TR2	Tekirdağ, Edirne, Kırklareli, Balıkesir, Çanakkale
İzmir	TR310	İzmir
Aydın	TR32	Aydın, Denizli, Muğla
Manisa	TR33	Manisa, Afyonkarahisar, Kütahya, Uşak
East Marmara	TR4	Bursa, Eskişehir, Bilecik, Kocaeli, Sakarya, Düzce, Bolu, Yalova
Ankara	TR510	Ankara
Konya	TR52	Konya, Karaman
Antalya	TR61	Antalya, Isparta, Burdur
Adana	TR62	Adana, Mersin
Hatay	TR63	Hatay, Kahramanmaraş, Osmaniye
Central Anatolia	TR7	Kırıkkale, Aksaray, Niğde, Nevşehir, Kırşehir, Kayseri, Sivas, Yozgat
West Black Sea	TR8	Zonguldak, Karabük, Bartın, Kastamonu, Çankırı, Sinop, Samsun, Tokat, Çorum, Amasya
East Black Sea	TR9	Trabzon, Ordu, Giresun, Rize, Artvin, Gümüşhane
North and Central East Anatolia	TRA+TRB	Erzurum, Erzincan, Bayburt, Ağrı, Kars, Iğdır, Ardahan, Malatya, Elazığ, Bingöl, Tunceli, Van, Muş, Bitlis, Hakkari
Southeast Anatolia	TRC	Gaziantep, Adıyaman, Kilis, Şanlıurfa, Diyarbakır, Mardin, Batman, Şırnak, Siirt

Notes: Regions take the names from the NUTS statistical regions of Turkey at varying levels.

► Appendix C. Missing values, Google Mobility Indices

► Table C.1 Provinces (out of 81) with at least 20% of missing values,²⁰ by index

Index (total)	Province
Hospitality (7)	Gümüşhane, Bayburt, Iğdır, Ardahan, Bingöl, Tunceli, Hakkari
Shops (13)	Sinop, Artvin, Gümüşhane, Erzincan, Bayburt, Iğdır, Ardahan, Bingöl, Tunceli, Hakkari, Kilis, Şirnak, Siirt
Parks (18)	Bilecik, Burdur, Kırıkkale, Bartın, Çankırı, Artvin, Gümüşhane, Erzincan, Bayburt, Ağrı, Kars, Iğdır, Ardahan, Bingöl, Tunceli, Muş, Hakkari, Kilis, Şirnak
Transport (22)	Uşak, Karaman, Kırıkkale, Karabük, Bartın, Rize, Artvin, Gümüşhane, Bayburt, Ağrı, Kars, Iğdır, Ardahan, Bingöl, Tunceli, Muş, Bitlis, Hakkari, Kilis, Batman, Şirnak, Siirt
Workplaces (0)	
Residential (16)	Bartın, Çankırı, Sinop, Rize, Artvin, Gümüşhane, Bayburt, Kars, Iğdır, Ardahan, Bingöl, Tunceli, Muş, Bitlis, Hakkari, Kilis

²⁰ There was no region (out of the 16 regions defined for this study) where any given month had no values from any of its provinces.

► Appendix D. Comparison of estimates: Fractional regression model vs. linear regression model

► Table D.1 Reduction in hours worked, actual data vs. estimates from 2 models

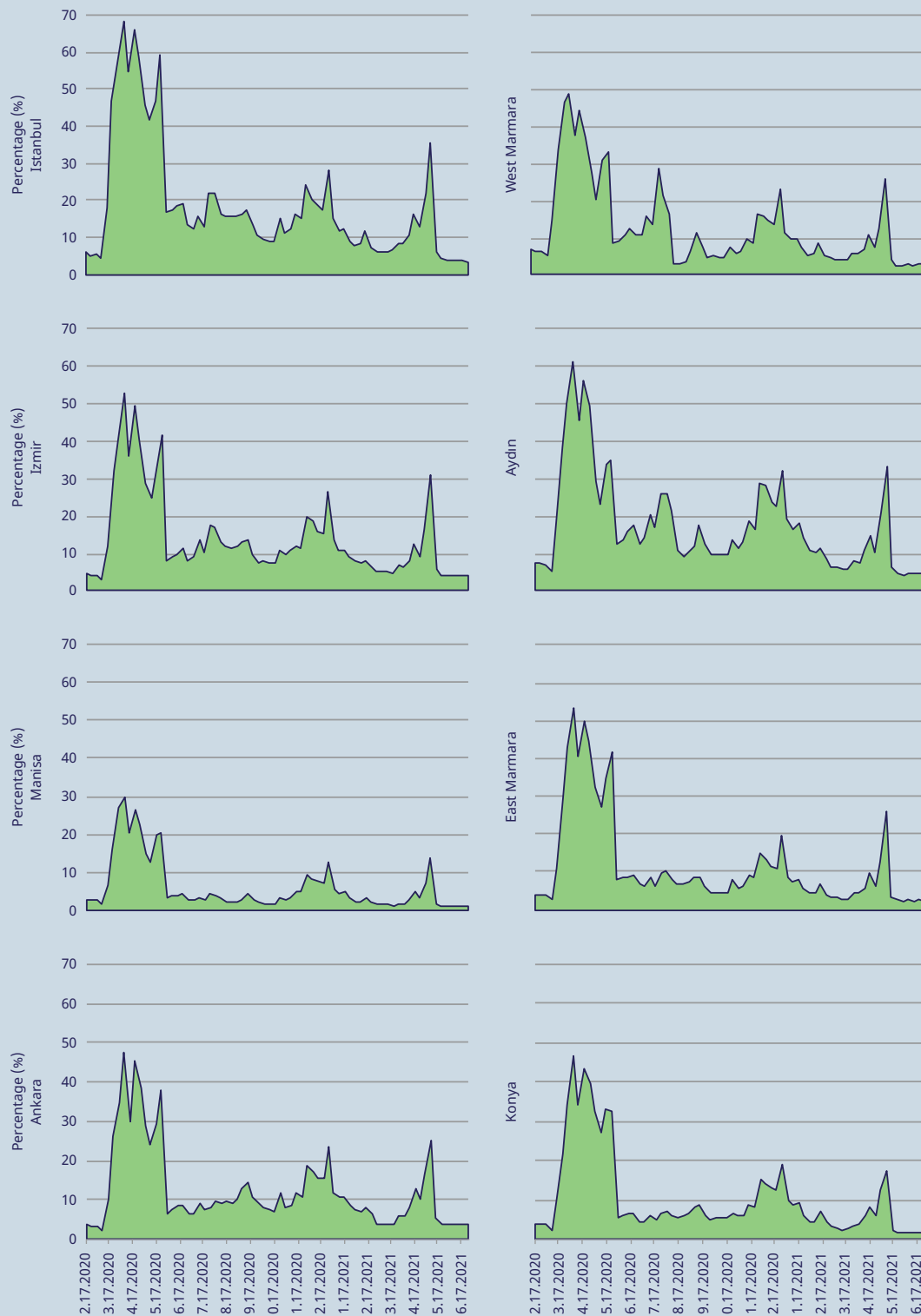
Year	Month	Actual reduction (%)	Linear regression model (%)	Fractional regression model (%)
2020	Feb	1.5	2.7	4.2
	Mar	19.6	17.5	16.5
	Apr	46.6	48.0	49.2
	May	41.2	39.7	41.0
	Jun	16.6	14.1	14.0
	Jul	11.2	12.3	12.5
	Aug	12.1	15.0	15.3
	Sep	7.6	11.1	10.8
	Oct	11.4	7.9	7.9
	Nov	11.8	10.8	9.4
	Dec	16.5	17.3	15.6
2021	Jan		18.6	16.2
	Feb		9.2	7.9
	Mar		2.4	4.4
	Apr		7.3	7.4
	May		14.8	12.2
	Jun		-0.6	3.9
	Jul		-3.4	3.4

Source: Household Labour Force Survey 2014-2020, Google Mobility Indices and ILO's own calculations.

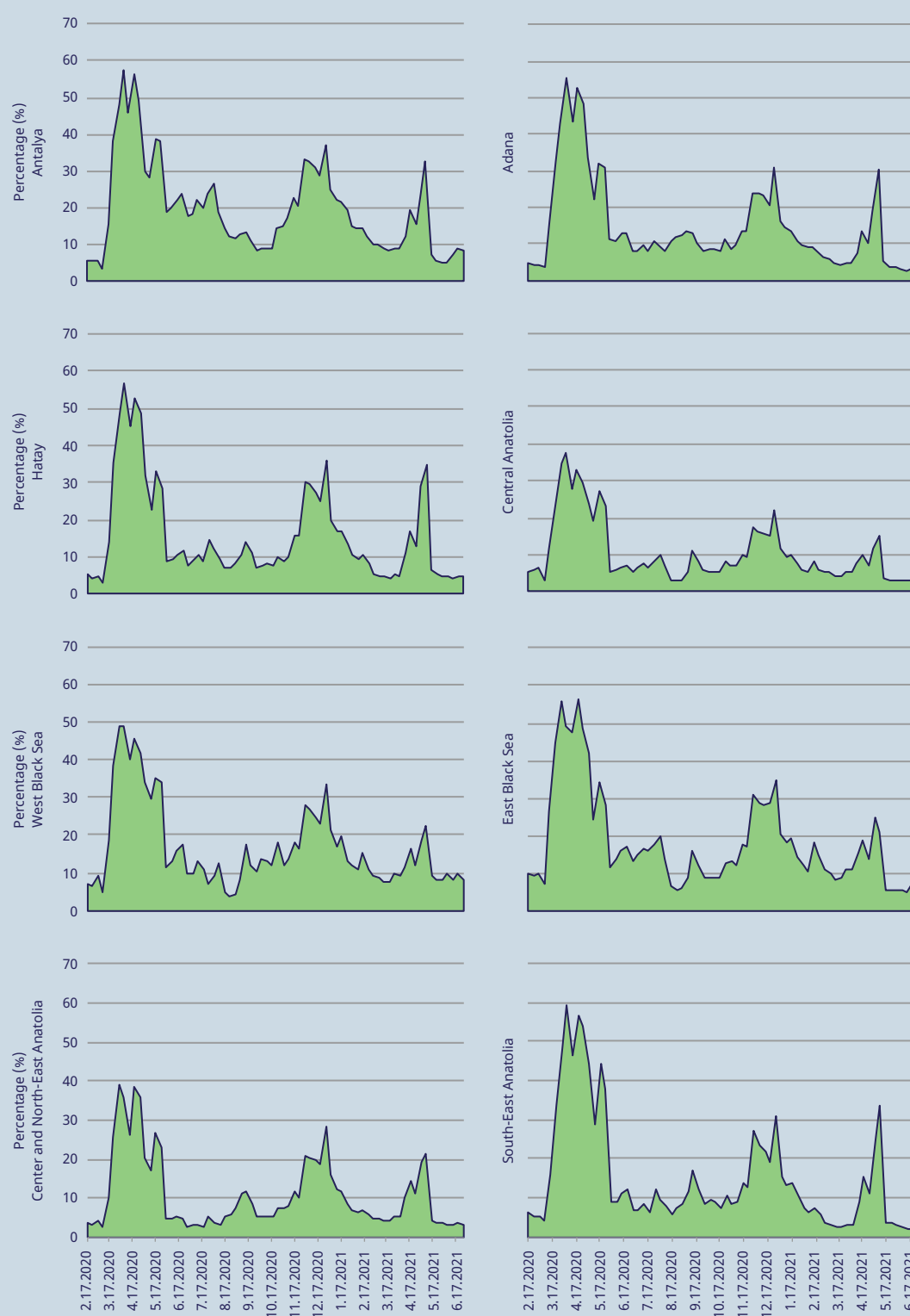
Notes: This figure shows the impact of COVID-19 on the hours worked of Turkey. The column 'actual reduction' shows the impact as a percentage (%) of the baseline scenario. The baseline represents the number of hours that would have been worked in the respective region had not the pandemic existed. The model columns show the predictions for 2020 and the forecasts for 2021 of a linear regression model and a fractional regression model.

► Appendix E. Regional impact of the pandemic on hours worked

► Figure E.1 Reduction in hours worked, by week and region (1/2)



► Figure E.1 Reduction in hours worked, by week and region (2/2)



Source: Household Labour Force Survey 2014-2020, Google Mobility Indices and ILO's own calculations.

Notes: This figure shows the impact of COVID-19 on the hours worked in 8 regions of Turkey. The impact is shown 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. Results for 2020 are interpolated from monthly impacts using Google mobility indices. The results for 2021 are extrapolated using the same method.