Research Article

Is COVID-19 an Advantage to Disadvantaged Groups? Evidence from Administrative Data on Working Hours in Turkey

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ABSTRACT

This paper examines the effects of COVID-19, which caused a recession in many fields in 2020, on the working hours of workers. Using the quarterly microdata set of the TurkStat Household Labour Force Surveys and the Oxford COVID-19 Government Response Tracker (OxCGRT) database, we found that the greatest work loss occurred in the second quarter of 2020 when the first shock of the pandemic was experienced. We also show that the stringency of the restrictions affects work loss. We present evidence that women, youth, informal, and temporary workers, who are classified as disadvantaged groups in the Turkish labor market, lost fewer working hours in the first period of the pandemic. Our quantitative analysis suggests that workers between the ages of 15 and 24 lost at least 2 hours less in the second quarter of 2020. Compared to the pre-pandemic period, working-hour gaps between formal and informal workers and permanent and temporary workers closed by about 1.5 hours in the same quarter. In addition, it is predicted that as the stringency of the restrictions increases by 10 points, working-hour gaps between the genders will be lessened by about 0.1 hours. The elderly, university graduates and those working in small businesses are the groups most affected by the pandemic. We also find that the balance between hourly wages and working hours has been disrupted at the beginning of the pandemic.

Keywords: COVID-19, working hours, lockdown, Turkish labor market, disadvantaged groups

1. INTRODUCTION

The COVID-19 virus, which emerged in the city of Wuhan, China, in late 2019 and spread rapidly across the world, has caused great changes in the lives of people. To resist the pandemic and hinder the spread of the virus, many countries have taken unprecedented precautions. With the number of cases reaching millions, precautions such as social distancing rules, city lockdowns, and travel restrictions have resulted in severe economic downturns. It has been estimated that the COVID-19 pandemic has been the greatest crisis in modern times after the Great Depression and World War II (Ji et al., 2022; Alon et al., 2020; Ando et al., 2022). The effect of the pandemic on labor markets is reported to be more devastating compared to recent crises (Montenovo et al., 2020; Bui et al., 2020; Groshen, 2020; Dasgupta et al., 2021; Verick et al., 2022).

The effects of COVID-19 have raised considerable interest among researchers and numerous articles have been published in a short time (Brodeur et al., 2021). Many studies have been conducted to investigate the impact of COVID-19 on the labor market in various countries. All the studies that use administrative microdata, surveys, and macroeconomic indicators conclude that COVID-19 has caused a labor market recession. Lockdowns and social distancing rules are regarded as important causes of the decline in labor markets. According to Galasso and Foucault (2020), one of the causes of variation in loss of employment during the first waves of the pandemic was a difference in the strictness of the level of precautions in various countries. Gupta et al. (2022) determined that social distancing policies were the reason for 60 percent of the 12-point decrease in the employment rate in the US. Juranek et al. (2021) documented that in Scandinavian countries where COVID-19 has a similar spread, the labor market of Sweden, which applied softer restrictive policies than others, has been less affected by the pandemic. Verick et al. (2022) claimed that the root cause of the decrease in the labor market of middle- and high-income countries is the lockdowns, while Aum et al. (2021) argued that the root cause is COVID-19 itself in South Korea, where lockdowns have not been applied.

In papers examining the impact of COVID-19 on the labor market, the effect of the pandemic on existing inequalities among demographic groups is elaborated on. Gender, age, education, and race have been the most compared groups, while employment, unemployment, earnings, and working hours have been frequently used as labor force indicators. Some papers in the related literature are summarised in Appendix Table A1. While most studies point out that women are more affected by the pandemic than men, some studies demonstrate men are more affected, or that the pandemic affects both genders equally. Studies that document women being more affected have shown that the burden of housework and childcare, which increased during lockdowns, falls more heavily on women, and that is why female workers have lost more in employment and working hours (Adams-Prassl et al., 2020; Alon et al., 2020; Collins et al., 2021; Farré et al., 2020). Although there is some variation among countries, there is a large body of literature that documents workers in the accommodation and food sectors, and youth, the less educated, non-whites, or minorities have been in a more vulnerable position due to the pandemic. Furthermore, jobs are classified as essential or non-essential, and those requiring a high degree of contact or those that can be done from home, with limitations due to the pandemic and social distancing rules. It has been noted that non-essential jobs, those that cannot be done from home, and those requiring contact have been disproportionately affected by the pandemic (see Appendix Table A1).

Labor market losses have been associated with employment losses and working-hour losses. Unlike recent crises, lockdowns, and restrictions are also effective in labor losses caused by COVID-19. The number of working hours is a suitable indicator to measure labor losses, as it represents both the decrease in employment and the reduction in working hours of workers who are still employed (Dasgupta et al., 2021; Verick et al., 2022). Across the world, working hours decreased by 8.8 percent (equivalent to 255 million full-time jobs assuming a 48-hour working week) in 2020 compared to the last quarter of 2019 (ILO, 2021). Asfaw (2022) estimated the cost of lost working hours from March 2020 to February 2021 due to the pandemic at 138 billion dollars in the US. On the other hand, a labor plan based on a reduction in working hours may be a good policy to control the virus and boost employment, according to Aldieri et al. (2022).

Of papers that examine the effects of COVID-19 on the labor market in Turkey, to the best of our knowledge, only Aldan et al. (2021) used periodical administrative microdata. We note that their study primarily focused on the effect of the pandemic on demographic groups, but not on working hours and job characteristics groups (see Appendix Table A1). In the other studies about Turkey, on the other hand, less comprehensive survey data and macroeconomic indicators are utilized (Aygün et al., 2022; Noyan Yalman et al., 2021; Şahbaz Kılınç, 2021; Kul Parlak and Çiftçi, 2022; Bulut and Pınar, 2020). We seek answers to questions such as "How has the pandemic affected disadvantaged groups[1] in the Turkish labor market?" and "How much is the working-hour loss in these groups?" Finding answers

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[1] A disadvantaged or vulnerable group is defined as a group that has difficulties gaining access to the labor market and finding a job and, after entering the labor market, has difficulty

to the questions was difficult at first because the household labor survey provides annual data in Turkey and no other administrative survey about the pandemic has been made. However, we were able to scrutinize this further by obtaining the quarterly microdata. In our analyses, labor losses are examined by using the working hour indicator to capture the effect of both the demographic characteristics of workers and the characteristics of their jobs. Most of the research in the literature focuses on the pandemic's initial short-term consequences. The point that makes this study different from previous studies in the literature is that it focuses on the variations among the periods of the pandemic and considers the stringency[2] of the restrictions applied during the pandemic. In that way, we do not limit analyses to short-term effects but also cover the effects of periods after the initial shock and estimate the impact of the level of lockdowns. Therefore, in the analyses of the study, we include demographic and job characteristics of workers representing the whole population of the country and the stringency of the restrictions and cover all quarters of 2020. Examining this broad perspective reveals the important contribution of our study. In summary, the results of this study are as follows:

i) The Turkish labor market suffered the greatest loss during the pandemic's initial shock in the second quarter of 2020. However, there has been an improvement in working hours in the third and fourth quarters, approaching pre-pandemic levels.

ii) It has been observed that the severity of policies against the pandemic affects working hours. As the stringency of lockdowns and restrictions increases, working hours decrease.

iii) It is found that the working hours of disadvantaged groups have been affected less by the pandemic. Women and youth have experienced less loss during all periods of the pandemic, but for informal and temporary workers, this is only true in the second quarter of 2020.

iv) The working hours of the elderly, university graduates, and those working in small businesses have reduced more under pandemic conditions. Moreover, it was observed that the working hours of these groups decreased more as the closures and restrictions increased.

v) The balance between hourly wages and working hours was broken in the second quarter of 2020.

Some of the findings of this study are compatible with previous studies. However, there has been no evidence in previous studies that COVID-19 gives disadvantaged groups an advantage in terms of working hours. Therefore, we bring a different result to the literature. The remainder of this paper is organized as follows: The second section discusses the Turkish labor market before and during the pandemic. The third section provides the data. In the fourth section, we present the method and findings. The last section concludes the paper.

2. The Turkish Labor Market Before and During the Pandemic

The first COVID-19 case in Turkey was announced on March 11, 2020, and soon after, as in most countries, the first restrictions began to be implemented. Many precautions were put in place to combat the virus, such as closing cafés, restaurants, cinemas, and gyms; suspending formal education; imposing a curfew and travel ban; and making the use of masks mandatory (Güner et al., 2020; Sülkü et al., 2021). However, the severity of the precautions varied across periods. The Oxford COVID-19 Government Response Tracker (OxCGRT) database, which covers government policies on closure and containment, health, and economic policy for more than 180 countries as of 1 January 2020, is used to capture the effects of the stringency of restrictions on the labor market. The stringency index, which consists of nine ordinal indicators including precautions such as school closures, workplace closures, the cancellation of public events, and travel restrictions, takes a value between 0 and 100 depending on their severity (Hale et al., 2021). Figure 1 shows the seasonally and calendar-adjusted average actual weekly working hours and the stringency index for Turkey.

The average actual weekly working hours fluctuated around 45 hours in 2018 and 2019. However, with the onset of the pandemic, the average actual working hours decreased to 38 hours in April 2020. It is observed that the stringency index reached its highest value at that time. After this sharp reduction, there were some improvements in the next three months. The negative correlation between working hours and stringency appeared in the second quarter of 2020 but not in the third and fourth quarters. To examine the changes in the basic labor force indicators before and during the pandemic, employment, unemployment, and labor force participation rates covering the second, third, and fourth quarters of 2020 (2020Q2–2020Q4) and the same periods of the year before the pandemic (2019Q2–2019Q4) are shown in Table 1.

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finding a well-paid, non-exploitative job with decent working conditions or employment guarantee (Anker, 1995). Generally, women, youth, and less educated individuals are represented as disadvantaged in the labor market (OECD, 2021; Monastiriotis and Laliotis, 2019). Moreover, as far as employment conditions are concerned, low-wage workers, informal, and temporary workers can be classified as disadvantaged groups.

[2] According to The Oxford COVID-19 Government Response Tracker (OxCGRT) database.
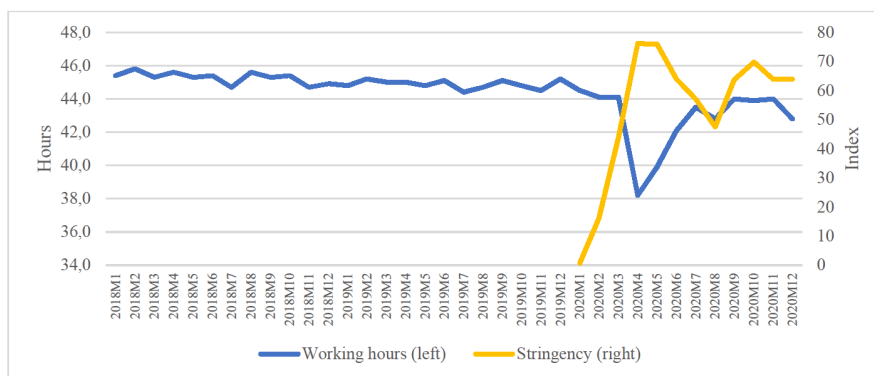
Note: The lines present the monthly averages. Source: Working Hours: TurkStat, Labour Force Statistics; Stringency Index: Hale et al. (2021).

Figure 1. Seasonally and calendar-adjusted average actual weekly working hours and the stringency index

According to the basic labor force indicators, employment, and labor force participation rates of women, those in the 15–24 and 55–64 age groups, and those with lower education levels, are quite low. However, there was a decrease in both rates in all demographic groups during the pandemic. It was also observed that the unemployment rate decreased between the two periods. Accordingly, employment losses in 2020 led to inactivity rather than unemployment (ILO, 2021). Measures taken to contain the spread of the virus contributed to the contraction of the labor market. Moreover, quarantines and other containment measures caused transitions from employment and unemployment to inactivity, since they hindered labor demand and discouraged the will to search for a job (Ando et al., 2022; Şahbaz Kılınç, 2021).

Table 1. Labor force indicators before and during the pandemic (weighted)

	Employment Rate (%)		Unemployment Rate (%)		Labor Force Participation Rate (%)	
	2019Q2-2019Q4	2020Q2-2020Q4	2019Q2-2019Q4	2020Q2-2020Q4	2019Q2-2019Q4	2020Q2-2020Q4
Total	50.6	47.5	13.7	**13.3**	58.7	54.7
Gender						
Male	68.8	65.1	12.2	12.4	78.4	74.3
Female	32.4	29.7	16.7	15.1	38.9	34.9
Age groups						
15-24	**33.6**	29.1	25.2	25.6	44.9	39.1
25-34	60.1	56.7	15.1	14.9	70.8	66.6
35-44	63.9	61.6	10.3	9.9	71.2	68.3
45-54	55.5	53.1	9.7	9.3	61.4	58.9
55-64	33.9	31.2	7.6	6.8	36.7	**33.5**
Education levels						
Not completed	29	25.1	12.1	13.1	**33**	28.9
Primary school	49.8	45.8	10.9	10.2	55.9	51
Lower sec. school	44	40.4	16.1	15.7	52.5	47.9
Upper sec. school	51.3	48.1	15.5	14.8	60.8	56.5
University degree	69.2	65.7	14.5	14.1	80.9	76.5
Postgraduate degree	84.1	82.2	6.6	6.5	90.1	87.9

Note: The sample includes individuals aged 15-64. Source: Authors' calculations based on TurkStat Household Labour Force Surveys.

3. Data

In this study, we used the administrative quarterly microdata covering 2018, 2019, and 2020 of the Household Labour Force Survey prepared by TurkStat. We restricted our sample to respondents aged 15 to 64 years. In all calculations based on the data set, the sample weights provided in each survey's microdata samples were used to generate estimates at the national level.

In the Household Labour Force Survey by TurkStat,[3] which covers all settlements in Turkey and 52 weeks of the year as the reference period, samples consisted of 374,162 individuals (in 2018), 366,551 individuals (in 2019), and 469,087 individuals (in 2020). Various demographic and job characteristic variables were used in the research, as far as the data set allows.[4]

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[3] The Household Labour Force Survey quarterly microdata set is only accessible at Data Research Centers, which exist in TurkStat Presidency building and some Regional Offices, after the data request is approved and the protocol containing the confidentiality rules is signed.

[4] It has been reported that some of the variables present in the annual data set are not available in the quarterly data set because they are not suitable for producing reliable estimates in quarterly periods.

However, we were unable to use some variables that may affect working hours, such as the number of children or union membership, because the data set did not include this information about individuals. In addition, the surveys presented only cross-sectional data. For this reason, changes in the information of individuals over time cannot be observed. To conduct analyses, we pooled quarterly data sets covering the 12 quarters between the first quarter of 2018 and the fourth quarter of 2020.

Figure 2 depicts the average actual weekly working hours for the demographic and job characteristics groups across the quarters to obtain preliminary information before proceeding to the analyses.
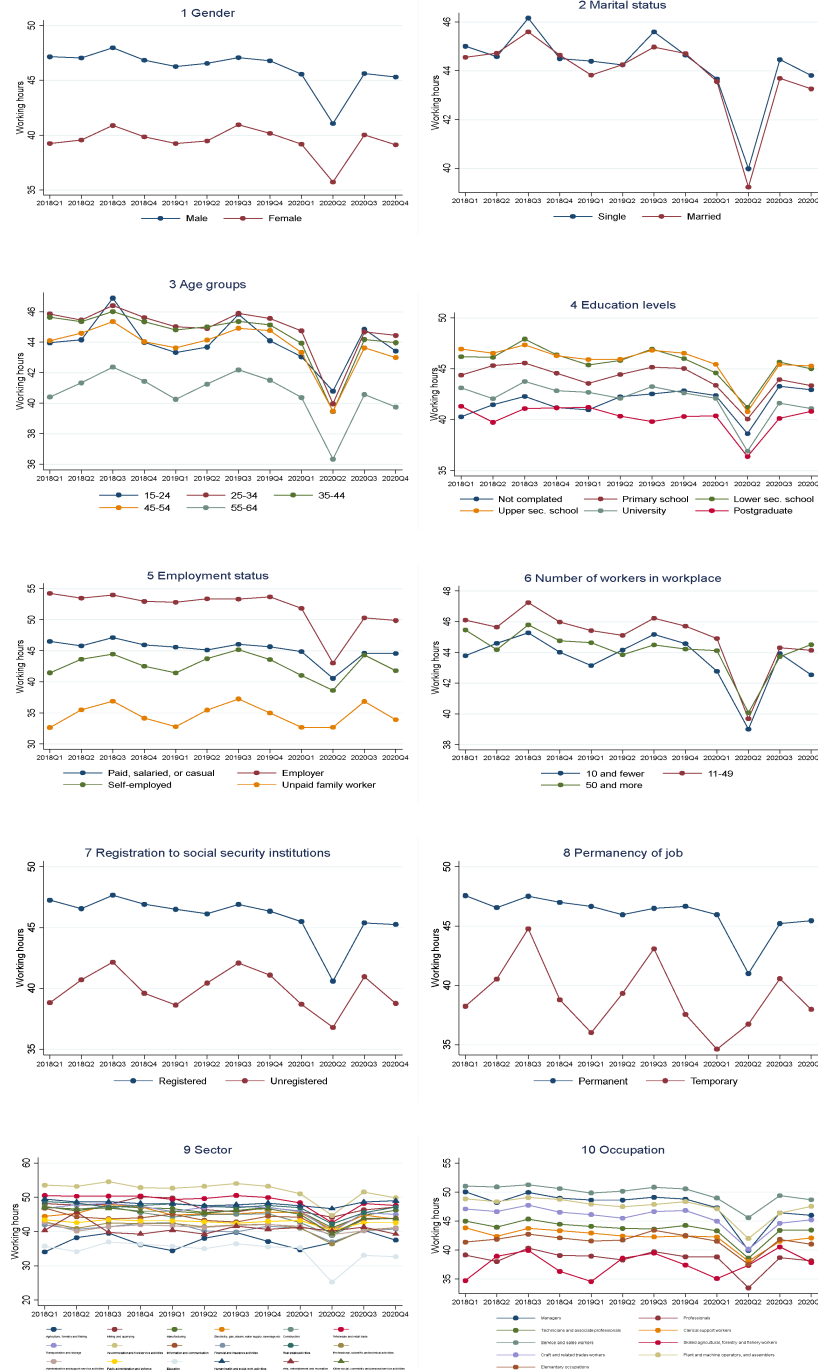

Figure 2. Average actual weekly working hours of demographic and job characteristics groups (weighted)

Notes: The lines present the quarterly averages. The sample includes workers aged 15–64. Permanency of job (2.8) is only available for paid, salaried, or casual workers. Source: Authors' calculations based on TurkStat Household Labour Force Surveys.

The greatest impact of the pandemic on working hours was observed in the second quarter of 2020 (Figure 2.1-10). There have been reductions in all groups except skilled agricultural, forestry, and fishery workers (Figure 2.10), those working in the agriculture, forestry, and fisheries sectors (Figure 2.9), and temporary workers (Figure 2.8), whose working hours increase seasonally in the second and third quarters of the year. Women (Figure 2.1), those in the age group of 55–64 (Figure 2.3), unpaid family workers (Figure 2.5), informal workers (Figure 2.7), and temporary workers (Figure 2.8) have fewer working hours in each quarter than others.

4. Methodology and Findings

In this paper, we investigated how COVID-19 affects working hours, whether there is any variation among periods during the pandemic, the impact of stringency of the restrictions applied against the virus on working hours, and how the working hours of demographic and job characteristic groups are affected by the pandemic. For that purpose, three different regression models were applied to two panels. Panel 1 covers all workers (paid, salaried, or casual; employer; self-employed; unpaid family worker), while Panel 2 represents only paid, salaried, or casual workers. In this way, we check estimations results to be consistent with the subset of the sample. We are also able to utilize 'permanency of job' and 'hourly wage' variables, which are only available for paid, salaried, or casual workers.

In regression models, we used individual variables and time periods or the stringency index. To investigate the impact of the pandemic on the working hours of different demographic and job characteristic groups, we also added interactions of individual variables and time periods or the stringency index to the models. The regression models are named A, B, and C as given below:

$$Y = X\beta_1 + Q\alpha_1 + (X^*Q)\gamma_1 + \varepsilon \qquad (A)$$

$$Y = X\beta_2 + P\alpha_2 + (X^*P)\gamma_2 + \varepsilon \qquad (B)$$

$$Y = X\beta_3 + S\alpha_3 + (X^*S)\gamma_3 + \varepsilon \qquad (C)$$

where Y denotes actual weekly working hours in the reference week; X is a matrix of individual independent variables; Q represents quarters (2018Q1, 2018Q2, ..., 2020Q4); P represents the pre-pandemic period and quarters in the pandemic (2018Q1-2020Q1, 2020Q2, 2020Q3, 2020Q4); S is the stringency index; and ε is the error term. X accounts for demographic and job characteristic variables. Demographic variables include gender (male; female), age groups (15-24; 25-34; 35-44; 45-54; 55-64), education levels (not completed any educational institution; primary school; lower secondary school; upper secondary school; university degree; postgraduate degree) and marital status (single; married). Job characteristics consist of employment status (paid, salaried, or casual; employer; self-employed; unpaid family workers), sector (18 main activity classes), the number of workers in the workplace (10 and fewer; 11-49; 50 and more), occupation (one-digit ISCO-08 codes), registration to social security institutions (registered; unregistered), permanency of job (permanent; temporary), and hourly wage[5]. Hourly wage and permanency of job variables are not available for employers, self employed, and unpaid family workers. Therefore, these two variables are included only in the Panel 2 models. β is the coefficient of the individual independent variables; α is the coefficient of the quartiles and the stringency index; γ is the coefficient of the interaction of the individual independent variables and the quartiles or the stringency index.

Model A includes all 12 quarters, from the first quarter of 2018 to the fourth quarter of 2020. In this model, while quarters during the pandemic were investigated, the effects of pre-pandemic quarters were controlled. In Model B, we combined the pre-pandemic quarters (2018Q1–2020Q1) into a single period. In that way, it is supposed that the quarters before the pandemic are homogeneous, and the periodic effects before the pandemic are not considered. As a result, using Models A and B, we investigated the effects of quarters during the pandemic on working hours in two ways. In addition, differences among pandemic periods can be observed. We focused on the coefficients of the second, third, and fourth quarters of 2020 in Models A and B. In Model C, unlike Models A and B, we utilized the average stringency index of the quarters instead of the periods[6]. We investigated the effects of the stringency of lockdown and restriction

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[5] The hourly wage variable does not exist in the dataset. For this reason, the hourly wage variable was generated as follows: First, using the 2003 base consumer price index (CPI) for all quarters, we created a real variable from individuals' monthly earnings. Second, this variable was multiplied by 7/30 to calculate the real weekly wage. Finally, the real weekly wage was divided by the actual weekly working hours.

[6] The stringency index value was zero for 2018 and 2019.

measures on working hours with Model C. Using the stringency index, which takes a continuous value instead of a quarter dummy, we were able to predict working hours at any stringency quantity. For example, a 10-point increase in the stringency index reduced working hours by 0.6 hours for Panel 1 and by 0.2 hours for Panel 2 (see Appendix Table A2).

In this study, we were mostly interested in disadvantaged groups. For this reason, we concentrated on the variables of gender, age groups, education levels, registration to social security institutions, permanency of the job, and hourly wage. Sector and occupation were treated as control variables. To reduce the space used, we did not give the estimation results, which include all coefficients, in this section.[7] By the purpose of our study, we interpreted the γ interaction coefficients of the second, third, and fourth quarters of 2020 and the stringency index, which show the effects of the pandemic on the groups. The estimation results for the groups are presented in Tables 2 and 3, in two separate parts as demographic and job characteristic groups, respectively.

Table 2 displays the COVID-19 effect on working hours by demographic groups, and Table 3 displays the COVID-19 effect on working hours by job characteristic groups. Looking at both tables, the coefficient signs and statistical significance of all three models are mostly like each other. Accordingly, it can be determined that the three approaches used to comprehend the role of the pandemic in reducing working time are compatible. In addition, there were no large differences between the coefficients of Panel 1 and Panel 2. As a result, we conclude that the estimation results are consistent with the sample subset.

In Table 2, the female coefficients are positive and statistically significant, implying that the working-hour gaps between the genders narrowed during the pandemic. Furthermore, a 10-point increase in the stringency index reduces the difference in working hours by about 0.1 hours. Our findings are consistent with Hupkau and Petrongolo (2020) for the UK and Harman (2021) for Slovakia, but inconsistent with Alon et al. (2020) for the US, which found women are disproportionately affected, and Meekes et al. (2020) for the Netherlands, which found women and men equally affected.

The interaction coefficients of age groups in Table 2 are negative and statistically significant, suggesting that, particularly in the first quarter of the pandemic, the working-hour loss of individuals between the ages of 15 and 24 is at least two hours less than that of the other age groups. Our study found that youth are the age group least affected by the pandemic, unlike previous papers that documented that youth are affected more. However, findings for the elderly are in line with Bui et al. (2020) for the US, and Aldan et al. (2021) for Turkey.

There are some differences among the models for the effect of the pandemic on groups with various educational levels. The coefficients also vary across panels and quarters. In the first period of the pandemic, it is observed that while the working hours of those with higher education decreased more in Panel 2, there was no significant change in Panel 1. However, the interaction coefficients of the third and fourth quarters of 2020 and the stringency index were negative in all models. Contrary to our findings, Farré et al. (2020) for Spain and Bell and Blanchflower (2020) for the US point out that the less-educated workers are affected more by the pandemic. Our results suggest that university-educated individuals are the education group who lost the most working hours during the pandemic in the Turkish labor market.

In Table 3, the coefficients of employment status are available for Panel 1. Zimpelmann et al. (2021) for the Netherlands and Aygün et al. (2022) for Turkey found that the self-employed were severely affected by the pandemic. However, our results showed that the working hours of unpaid family workers and employers fell more.

According to Aum et al. (2021), small establishments accounted for most employment losses in South Korea because of the COVID-19 shock. Our findings, in parallel, showed that workers in larger workplaces were less affected by the pandemic. While the coefficient values rose in the second and fourth quarters of 2020, when the restrictions were more severe, they fell in the third quarter, when the restrictions were somewhat loosened.

In Table 3, it is seen that registration to social security institutions and the permanency of jobs are factors that affected working hours in the first period of the pandemic. In the related literature, informal workers (Beccaria et al. (2022) for Latin American countries, Dasgupta et al. (2021) for middle-income countries) and temporary workers (Adams-Prassl et al. (2020) for the UK, the US, and Germany, and Ando et al. (2022) for European countries) were hit hardest by the pandemic crisis. In our research, it was determined that working-hour gaps between formal and informal workers, as well as permanent and temporary workers, closed in the second quarter of 2020. However, in the third and fourth quarters, the coefficients of these variables became smaller and insignificant. Similarly, while the coefficients of the hourly wage variable were positive and statistically significant in the first quarter of the pandemic, their magnitudes decreased and even became negative in subsequent quarters. For these variables, it can be deduced that the short-term

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[7] Estimation results with all coefficients are presented in Appendix Table A2.

Table 2. COVID-19 effect on working hours by demographic groups (weighted)

Working hours	PANEL 1 (ALL WORKERS)							PANEL 2 (PAID, SALARIED, OR CASUAL WORKERS)						
	2020Q2		2020Q3		2020Q4		Stringency	2020Q2		2020Q3		2020Q4		Stringency
	1A	1B	1A	1B	1A	1B	1C	2A	2B	2A	2B	2A	2B	2C
γ														
Gender														
Female	1.4114***	0.9290***	1.1755***	0.6932***	1.0289***	0.5466***	0.0117***	1.0034***	0.5665**	0.8791***	0.4422**	0.5341*	0.0972	0.0075***
	(0.3134)	(0.2525)	(0.2848)	(0.2161)	(0.2759)	(0.2042)	(0.0022)	(0.3235)	(0.2640)	(0.2840)	(0.2138)	(0.2745)	(0.2011)	(0.0022)
Age groups														
25–34	-3.0259***	-2.1075***	-2.2260***	-1.3076***	-1.1532***	-0.2348	-0.0192***	-3.1544***	-2.4557***	-2.5908***	-1.8921***	-1.4891***	-0.7904***	-0.0275***
	(0.5046)	(0.4143)	(0.4495)	(0.3451)	(0.4421)	(0.3354)	(0.0036)	(0.5104)	(0.4318)	(0.4370)	(0.3421)	(0.4237)	(0.3250)	(0.0036)
35–44	-3.4445***	-2.2265***	-2.7218***	-1.5038***	-1.5559***	-0.3379	-0.0219***	-3.8245***	-3.1159***	-2.8323***	-2.1237***	-1.3059***	-0.5973	-0.0333***
	(0.5464)	(0.4453)	(0.5061)	(0.3790)	(0.4860)	(0.3686)	(0.0039)	(0.5721)	(0.4658)	(0.5061)	(0.3818)	(0.4922)	(0.3633)	(0.0039)
45–54	-2.9979***	-1.9974***	-2.8538***	-1.8533***	-1.8242***	-0.8237**	-0.0245***	-3.1448***	-2.5319***	-2.6757***	-2.0628***	-1.0026*	-0.3897	-0.0293***
	(0.5872)	(0.4763)	(0.5343)	(0.4093)	(0.5267)	(0.3994)	(0.0042)	(0.6447)	(0.5085)	(0.5815)	(0.4256)	(0.5698)	(0.4096)	(0.0044)
55–64	-4.1231***	-3.0301***	-4.1727***	-3.0797***	-2.2981***	-1.2051**	-0.0373***	-3.9623***	-3.3507***	-3.0539***	-2.4422***	-1.5043*	-0.8926	-0.0378***
	(0.7064)	(0.5574)	(0.6552)	(0.4910)	(0.6416)	(0.4727)	(0.0050)	(0.8734)	(0.6782)	(0.7962)	(0.5756)	(0.7776)	(0.5495)	(0.0059)
Education														
Primary school	0.3451	0.6474	-1.1726*	-0.8703	-1.6205**	-1.3182**	-0.0109**	-0.6284	-0.4530	-1.2834	-1.1080	-1.5363*	-1.3608*	-0.0163**
	(0.7202)	(0.5743)	(0.6939)	(0.5410)	(0.6878)	(0.5332)	(0.0054)	(1.0509)	(0.8827)	(0.9230)	(0.7260)	(0.9051)	(0.7031)	(0.0075)
Lower sec. school	-0.0637	0.3192	-1.0613	-0.6785	-1.8858***	-1.5029***	-0.0140**	-0.8606	-0.8525	-0.9940	-0.9859	-1.2814	-1.2734*	-0.0206***
	(0.7674)	(0.6168)	(0.7270)	(0.5658)	(0.7190)	(0.5555)	(0.0057)	(1.0549)	(0.8908)	(0.9215)	(0.7282)	(0.9013)	(0.7025)	(0.0075)
Upper sec. school	-0.8237	-0.3598	-1.4111*	-0.9472*	-1.9336***	-1.4697***	-0.0173***	-1.8141*	-1.6664*	-1.6237*	-1.4760**	-1.5077*	-1.3600*	-0.0268***
	(0.7625)	(0.6102)	(0.7249)	(0.5627)	(0.7181)	(0.5538)	(0.0056)	(1.0459)	(0.8777)	(0.9206)	(0.7240)	(0.9037)	(0.7025)	(0.0075)
University	-0.9219	-0.6817	-2.1776***	-1.9373***	-2.4889***	-2.2487***	-0.0288***	-2.2401**	-2.1518**	-2.5029***	-2.4146***	-1.9900**	-1.9017***	-0.0412***
	(0.8113)	(0.6471)	(0.7683)	(0.5923)	(0.7612)	(0.5831)	(0.0059)	(1.1296)	(0.9093)	(1.0212)	(0.7707)	(0.9957)	(0.7366)	(0.0078)
Postgraduate	1.5525	1.5958*	-1.0256	-0.9824	-0.5475	-0.5043	-0.0029	-2.4458	-2.3785***	-2.4264	-2.3591***	-0.1330	-0.0656	-0.0428***
	(1.0160)	(0.8151)	(0.9353)	(0.7120)	(0.9302)	(0.7054)	(0.0073)	(1.6308)	(1.0700)	(1.5979)	(1.0192)	(1.5509)	(0.9440)	(0.0097)
Marital status														
Married	-0.5043	-0.5081*	-0.4030	-0.4068*	-0.4106	-0.4144*	-0.0073***	-0.4415	-0.2060	-0.5730*	-0.3375	-0.6153**	-0.3798	-0.0068***
	(0.3447)	(0.2767)	(0.3205)	(0.2459)	(0.3135)	(0.2368)	(0.0025)	(0.3520)	(0.2810)	(0.3280)	(0.2503)	(0.3135)	(0.2311)	(0.0025)
Observations			471,776							308,529				
R-squared	0.1836	0.1782	0.1836	0.1782	0.1836	0.1782	0.1746	0.2482	0.2374	0.2482	0.2374	0.2482	0.2374	0.2332

The dependent variable is the actual weekly working hours in the reference week. γ is the coefficient of the interaction terms. Statistical significance level: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are in parentheses. Reference categories are male, 15–24, not completed any educational institution, and single, respectively. Reference periods are the first quarter of 2018 (2018Q1) for Model A and the pre-pandemic period (2018Q1-2020Q1) for Model B. All regressions control sector and occupation and use sample weights. The sample includes workers aged 15–64.

Table 3. COVID-19 effect on working hours by job characteristics groups (weighted)

Working hours	PANEL 1 (ALL WORKERS)							PANEL 2 (PAID, SALARIED, OR CASUAL WORKERS)						
	2020Q2		2020Q3		2020Q4		Stringency	2020Q2		2020Q3		2020Q4		Stringency
	1A	1B	1A	1B	1A	1B	1C	2A	2B	2A	2B	2A	2B	2C
γ														
Employment status														
Paid, salaried, or casual	2.3830***	2.1665***	0.1365	-0.0800	0.9417	0.7252	0.0149***							
	(0.7603)	(0.5867)	(0.7086)	(0.5180)	(0.7339)	(0.5521)	(0.0055)							
Employer	0.5938	-0.3434	1.1375	0.2004	1.2950	0.3579	0.0022							
	(0.9856)	(0.7847)	(0.8957)	(0.6684)	(0.9234)	(0.7050)	(0.0071)							
Self-employed	2.2976***	1.0139*	3.2734***	1.9897***	2.3598***	1.0761**	0.0198***							
	(0.6903)	(0.5241)	(0.6651)	(0.4905)	(0.6863)	(0.5189)	(0.0051)							
Number of workers in the workplace														
11–49	1.3193***	1.1652***	0.4680	0.3140	1.6962***	1.5422***	0.0174***	1.5571***	1.2946***	0.2874	0.0249	1.5304***	1.2679***	0.0125***
	(0.4097)	(0.3454)	(0.3554)	(0.2789)	(0.3472)	(0.2684)	(0.0029)	(0.4122)	(0.3428)	(0.3638)	(0.2827)	(0.3488)	(0.2632)	(0.0029)
50 and more	1.9801***	2.2754***	0.6828**	0.9781***	2.1917***	2.4870***	0.0314***	1.5862***	1.7667***	0.4139	0.5944**	1.9678***	2.1482***	0.0208***
	(0.3949)	(0.3286)	(0.3479)	(0.2703)	(0.3430)	(0.2640)	(0.0028)	(0.4345)	(0.3319)	(0.3988)	(0.2835)	(0.3946)	(0.2776)	(0.0029)
Registration to SSI														
Unregistered	2.1966***	1.4024***	1.2945***	0.5003	0.4925	-0.3017	0.0097***	2.5262***	1.6869***	0.9895*	0.1502	0.7504	-0.0889	0.0125***
	(0.4563)	(0.3707)	(0.4098)	(0.3117)	(0.4174)	(0.3217)	(0.0033)	(0.5992)	(0.4990)	(0.5175)	(0.3975)	(0.5114)	(0.3895)	(0.0041)
Permanency of job														
Temporary								2.5639***	1.3731**	1.8964***	0.7055	0.2433	-0.9475**	0.0016
								(0.7643)	(0.5591)	(0.7091)	(0.4809)	(0.6809)	(0.4384)	(0.0047)
Hourly wage								0.4656*	0.4145***	0.2421	0.1909	-0.1592	-0.2104*	0.0057***
								(0.2579)	(0.0893)	(0.2788)	(0.1385)	(0.2703)	(0.1205)	(0.0010)
Observations			471,776							308,529				
R-squared	0.1836	0.1782	0.1836	0.1782	0.1836	0.1782	0.1746	0.2482	0.2374	0.2482	0.2374	0.2482	0.2374	0.2332

The dependent variable is the actual weekly working hours in the reference week. γ is the coefficient of the interaction terms. Statistical significance level: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are in parentheses. Reference categories are unpaid family workers, 10 and fewer, registered, and permanent, respectively. Reference periods are the first quarter of 2018 (2018Q1) for Model A and the pre-pandemic period (2018Q1-2020Q1) for Model B. All regressions control sector and occupation and use sample weights. The sample includes workers aged 15–64.

effects at the beginning of the pandemic were considerable, but after the initial shock wore off, they returned to the pre-pandemic period.

The β coefficient of the hourly wage variable shows that as hourly wages rise, the working hours decrease (see Appendix Table A2). According to standard labor supply theory, the income effect is more dominant (Anxo and Karlsson, 2019). However, the degree of the income effect has been quite lessened in the second quarter of 2020. This situation is also evident in Figure 3, where the average hourly wages are shown throughout the quarters. This can be explained by the fact that despite losses in working hours, incomes remained stable, or the employment losses of low-paid workers were higher (Cortes and Forsythe, 2020; Lemieux et al., 2020) during the initial phase of COVID-19.
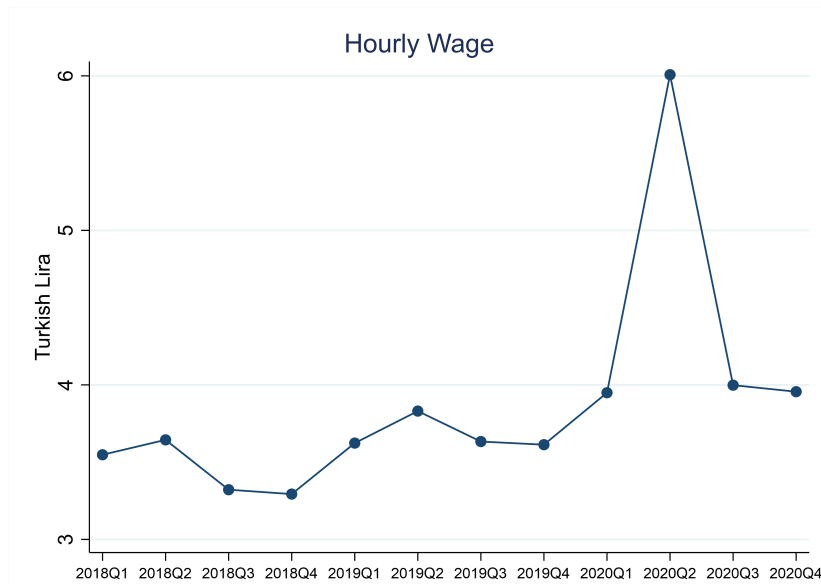
Figure 3. Average hourly wages (weighted)

Notes: The lines present the quarterly averages adjusted by 2003 prices. The sample includes workers aged 15–64. Hourly wage is only available for paid, salaried, or casual workers. Source: Authors' calculations based on TurkStat Household Labour Force Surveys.

5. Conclusion

COVID-19, which emerged as a health crisis, has caused an unprecedented economic recession worldwide in recent years. Furthermore, with the increasing number of cases and containment measures, there has been a sharp drop in labor markets. In many studies examining the effects of the pandemic on labor markets, it has been stated that the pandemic has exacerbated the inequalities that already exist in the labor markets. The effects of the pandemic have been more devastating for disadvantaged or vulnerable groups (Bell and Blanchflower, 2020; OECD, 2021; Krafft et al., 2021; Soares and Berg, 2022). Several studies document that the closure and restriction measures implemented by governments to prevent the spread of the virus were effective in labor markets.

In our study, we examined the effect of COVID-19 on the Turkish labor market in terms of working hours. We specifically investigated how the pandemic affects the working hours of disadvantaged groups. For this purpose, we utilized the quarterly microdata set of the TurkStat Household Labour Force Surveys, covering 12 quarters from the first quarter of 2018 to the fourth quarter of 2020. Additionally, the Oxford COVID-19 Government Response Tracker (OxCGRT) database was used to examine the impact of the stringency of closures and restrictions.

Our findings indicate that the initial shock of COVID-19, which occurred in the second quarter of 2020, resulted in the greatest loss of working hours. However, the losses were largely offset in subsequent quarters. During this period, the easing of closures and restrictions may have triggered a recovery in working hours (Casarico and Lattanzio, 2022). Our results also suggest that the severity of the measures applied affected working hours. Consistent with previous studies, we found that working hours decreased as the stringency of restrictions increased.

Our study, contrary to the literature, concluded that disadvantaged groups were not affected more during the pandemic, and even working-hour gaps among groups were narrowed. We observed a reduction in the gender gap in working hours during the pandemic, supported by positive and statistically significant coefficients for females. This contrasts with numerous studies conducted in the UK, the US, Spain, and the Netherlands, which suggested that women were more severely impacted. Similarly, our findings regarding age groups diverge from previous research that suggested youth were more affected by the pandemic in European countries, Canada, and the US. Instead, our results indicated that youth experienced fewer reductions in working hours during the initial quarter of the pandemic. Although our findings indicated variations in the impact of the pandemic on educational groups, it was concluded that university-educated individuals in Turkey lost the most working hours during the pandemic. This differs from studies in Turkey, Spain, and the US, which suggested that less-educated workers were more affected. Furthermore, our study revealed that unpaid family workers and employers experienced more significant decreases in working hours, contrary to earlier

research in the Netherlands and Turkey, which emphasized the impact on the self-employed. Larger workplaces were also less affected, like the findings in South Korea. We found that working-hour gaps between formal and informal workers, as well as permanent and temporary workers, closed in the second quarter of 2020, unlike studies in Latin American and European countries. While women and youth suffered less loss throughout the pandemic, informal and temporary workers experienced it only in the first quarter of the pandemic. Similarly, our study revealed that the balance between working hours and hourly wages was disrupted by the beginning of the pandemic. However, the changes in the second quarter of 2020 were compensated for in the following periods. It can be deduced that during the first shock of COVID-19, in which the income effect decreased according to the labor supply theory and the average hourly wage rose, workers tried to protect their incomes, or low-wage workers experienced more layoffs.

The conflicting results with the literature may be due to various reasons. First, the employment and labor force participation rates of women, youth, and less educated individuals have been low for a long time in Turkey. Furthermore, the average working hours of women, informal, and temporary workers are considerably lower than those of men, formal, and permanent workers. Therefore, the impact of an external shock on groups that already have a small proportion of employment and fewer working hours may be smaller in absolute terms. Second, it should be highlighted that the results apply only to individuals in employment; unemployed and inactive persons are not included in the analysis. Individuals in disadvantaged groups who had low working hours before COVID-19 were likely to experience more employment losses during the pandemic. Additionally, the continued employment of individuals who have higher working hours in these groups may increase the average working hours of disadvantaged groups throughout the pandemic. Finally, we cannot compare the working outputs of the same individuals before and during pandemic periods because the data set is not arranged by longitudinal surveys. For more precise results, a panel dataset containing the working information of individuals before and during the pandemic can be used.

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REFERENCES

Acheampong, T. Y. (2021). A gender analysis of Covid-19 impacts on the Hungarian labour market. *Journal of Economics, 6*, 45–57. https://doi.org/10.46763/joe21600145a

Adams-Prassl, A., Boneva, T., Golin, M., & Rauh, C. (2020). Inequality in the impact of the coronavirus shock: Evidence from real time surveys. *Journal of Public Economics, 189*. https://doi.org/10.1016/j.jpubeco.2020.104245

Aldan, A., Çıraklı, M. E., & Torun, H. (2021). Covid 19 and the Turkish labor market: Heterogeneous effects across demographic groups. *Central Bank Review, 21*(4), 155–163. https://doi.org/10.1016/j.cbrev.2021.12.003

Aldieri, L., Bruno, B., & Vinci, C. P. (2022). Employment support and COVID-19: Is working time reduction the right tool? Economies, 10(6), 141. https://doi.org/10.3390/economies10060141

Alon, T., Doepke, M., Olmstead-Rumsey, J., & Tertilt, M. (2020). This time it's different: The role of women's employment in a pandemic recession. National Bureau of Economic Research (NBER), Working Paper 27660.

Ando, S., Balakrishnan, R., Gruss, B., Hallaert, J., Jirasavetakul, L. F., Kirabaeva, K., Klein, N., Lariau, A., Liu, L. Q., Malacrino, D., Qu, H., & Solovyeva, A. (2022). *European labor markets and the COVID-19 pandemic: Fallout and the path ahead.* Departmental Papers, No. 2022/004. Washington, DC: International Monetary Fund. https://doi.org/10.5089/9798400200960.087

Anker, R. (1995). Labour market policies, vulnerable groups and poverty. In J. Figuero & L. Shaheed (Eds.), *Poverty: New approaches to analysis*

and policy (pp. 49–88). Geneva, Switzerland: International Labour Organization (International Institute for Labour Studies).

Anxo, D., & Karlsson, M. (2019). Overtime work: A review of literature and initial empirical analysis. ILO Conditions of Work and Employment Series, No. 104. Retrieved from https://www.ilo.org/wcmsp5/groups/public/—ed_protect/—protrav/—travail/documents/publication/wcms_663072.pdf

Asfaw, A. (2022). Cost of lost work hours associated with the COVID-19 pandemic—United States, March 2020 through February 2021. *American Journal of Industrial Medicine, 65*(1), 20–29. https://doi.org/10.1002/ajim.23307

Aum, S., Lee, S. Y., & Shin, Y. (2021). COVID-19 doesn't need lockdowns to destroy jobs: The effect of local outbreaks in Korea. *Labour Economics, 70*. https://doi.org/10.1016/j.labeco.2021.101993

Aygün, A. H., Köksal, S., & Uysal, G. (2022). Unpacking the effects of Covid-19 on labor market outcomes: Evidence from Turkey. Economic Research Forum Working Papers (No. 1533).

Beccaria, L., Bertranou, F., & Maurizio, R. (2022). COVID-19 in Latin America: The effects of an unprecedented crisis on employment and income. *International Labour Review, 161*(1), 83–105. https://doi.org/10.1111/ilr.12361

Brodeur, A., Gray, D., Islam, A., & Bhuiyan, S. (2021). A literature review of the economics of COVID-19. *Journal of Economic Surveys, 35*(4), 1007–1044. https://doi.org/10.1111/joes.12423

Bui, T. T., Button, P., & Picciotti, E. G. (2020). Early evidence on the impact of coronavirus disease 2019 (COVID-19) and the recession on older workers. *Public Policy & Aging Report, 30*(4), 154–159. https://doi.org/10.1093/ppar/praa029

Bulut, R., & Pınar, Ç. (2020). Covid-19 pandemisi döneminde Türkiye'de istihdam ve işsizlik. *Oğuzhan Journal of Social Sciences, 2*(2), 217–225.

Casarico, A., & Lattanzio, S. (2022). The heterogeneous effects of COVID-19 on labor market flows: evidence from administrative data. *Journal of Economic Inequality, 20*(3), 537–558. https://doi.org/10.1007/s10888-021-09522-6

Collins, C., Landivar, L. C., Ruppanner, L., & Scarborough, W. J. (2021). COVID-19 and the gender gap in work hours. *Gender, Work and Organization, 28*(S1), 101–112. https://doi.org/10.1111/gwao.12506

Cortes, G. M., & Forsythe, E. (2020). Heterogeneous labor market impacts of the COVID-19 pandemic. Upjohn Institute Working Paper 20-327. Kalamazoo, MI: W.E. Upjohn Institute for Employment Research. https://doi.org/10.17848/wp20-327

Dasgupta, S., Dierckxsens, M., & Verick, S. (2021). The impact of the COVID-19 crisis on middle-income countries. The Indian Economic Journal, 69(3), 534–552. https://doi.org/10.1177/00194662211023847

Farré, L., Fawaz, Y., González, L., & Graves, J. (2020). How the COVID-19 lockdown affected gender inequality in paid and unpaid work in Spain. IZA Discussion Paper No. 13434. http://dx.doi.org/10.2139/ssrn.3643198

Galasso, V., & Foucault, M. (2020). Working during COVID-19: Cross-country evidence from real-time survey data. OECD Social, Employment and Migration Working Papers, No. 246. https://doi.org/10.1787/34a2c306-en

Groshen, E. L. (2020). COVID-19's impact on the U.S. labor market as of September 2020. *Business Economics, 55*(4), 213–228. https://doi.org/10.1057/s11369-020-00193-1

Gupta, S., Montenovo, L., Nguyen, T., Lozano-Rojas, F., Schmutte, I., Simon, K., Weinberg, B. A., & Wing, C. (2022). Effects of social distancing policy on labor market outcomes. *Contemporary Economic Policy, 41*(1), 166–193. https://doi.org/10.1111/coep.12582

Güner, R., Hasanoğlu, İ., & Aktaş, F. (2020). COVID-19: Prevention and control measures in community. *Turkish Journal of Medical Sciences, 50*(9), 571–577. https://doi.org/10.3906/sag-2004-146

Hale, T., Angrist, N., Goldszmidt, R., Kira, B., Petherick, A., Phillips, T., Webster, S., Cameron-Blake, E., Hallas, L., Majumdar, S., & Tatlow, H. (2021). A global panel database of pandemic policies (Oxford COVID-19 Government Response Tracker). *Nature Human Behaviour, 5*(4), 529–538. https://doi.org/10.1038/s41562-021-01079-8

Harman, J. (2021). Impact of the Covid 19 pandemic on the labor market in the Slovak Republic: Women vs. Men. *Ekonomické Rozhľady – Economic Review, 50*(4), 396–409. https://doi.org/10.53465/er.2644-7185.2021.4.396-409

Hupkau, C., & Petrongolo, B. (2020). Work, care and gender during the COVID-19 crisis. *Fiscal Studies, 41*(3), 623–651. https://doi.org/10.1111/1475-5890.12245

International Labour Organization. (2021). ILO monitor: COVID-19 and the world of work (7th ed.). Retrieved from https://www.ilo.org/wcmsp5/groups/public/—dgreports/—dcomm/documents/briefingnote/wcms_767028.pdf

Ji, X., Bu, N. T., Zheng, C., Xiao, H., Liu, C., Chen, X., & Wang, K. (2022). Stock market reaction to the COVID-19 pandemic: an event study. *Portuguese Economic Journal*, 1–20. https://doi.org/10.1007/s10258-022-00227-w

Juranek, S., Paetzold, J., Winner, H., & Zoutman, F. (2021). Labor market effects of COVID-19 in Sweden and its neighbors: Evidence from administrative data. *Kyklos, 74*(4), 512–526. https://doi.org/10.1111/kykl.12282

Krafft, C., Assaad, R., & Marouani, M. A. (2021). The impact of COVID-19 on Middle Eastern and North African labor markets: Vulnerable workers, small entrepreneurs, and farmers bear the brunt of the pandemic in Morocco and Tunisia. Economic Research Forum Policy Brief No. 55.

Kul Parlak, N., & Çiftçi, A. N. (2022). Crowding-out effect of the COVID-19 pandemic on the unregistered employment: Divergence in the formal–informal labor market in Turkey. *Journal of Social Policy Conferences*, 82, 93–135. https://doi.org/10.26650/jspc.2022.82.1051110

Lemieux, T., Milligan, K., Schirle, T., & Skuterud, M. (2020). Initial impacts of the COVID-19 pandemic on the Canadian labour market. *Canadian Public Policy, 46*(S1), S55–S65. https://doi.org/10.3138/CPP.2020-049

Meekes, J., Hassink, W., & Kalb, G. R. (2020). Essential work and emergency childcare: Identifying gender differences in COVID-19 effects on labour demand and supply. Life Course Centre Working Paper No. 2020-27. http://dx.doi.org/10.2139/ssrn.3727684

Milovanska-Farrington, S. (2021). The Effect of COVID-19 as an economic shock on the gender and ethnic gap in labour market outcomes. *Studies in Microeconomics, 9*(2), 227–255. https://doi.org/10.1177/23210222211046411

Monastiriotis, V., & Laliotis, I. (2019). Labour market vulnerability and labour market outcomes during the economic upswing. Research Note 06/2019. Brussels: DG Employment, European Commission.

Montenovo, L., Jiang, X., Rojas, F. L., Schmutte, I. M., Simon, K. I., Weinberg, B. A., & Wing, C. (2020). Determinants of disparities in Covid-19 job losses. National Bureau of Economic Research (NBER), Working Paper 27132.

Noyan Yalman, İ., Aydın Ünal, E., & Koşaroğlu, Ş. M. (2021). The effect of Covid-19 epidemic process on labor markets: An applied research. *Atatürk University Journal of Economics and Administrative Sciences 35*(3), 1125-1144. https://doi.org/10.16951/atauniiibd.905180

OECD. (2021). *OECD employment outlook 2021: Navigating the COVID-19 crisis and recovery*. OECD Publishing, Paris. https://doi.org/10.1787/5a700c4b-en

Soares, S., & Berg, J. (2022). The labour market fallout of COVID-19: Who endures, who doesn't and what are the implications for inequality. International Labour Review, 161(1), 5–28. https://doi.org/10.1111/ilr.12214

Sülkü, S., Coşar, K., & Tokatlıoğlu, Y. (2021). COVID-19 Process: Turkey experience. *Sosyoekonomi, 29*(49), 345–372. https://doi.org/10.17233/sosyoekonomi.2021.03.18

Şahbaz Kılınç, N. (2021). Effects of Covid-19 outbreak on labor market in TR71 region. *Kırklareli University Journal of the Faculty of Economics and Administrative Sciences, 10*(2), 313–336. https://doi.org/10.53306/klujfeas.937763

Verick, S., Schmidt-klau, D., & Lee, S. (2022). Is this time really different? How the impact of the COVID-19 crisis on labour markets contrasts with that of the global financial crisis of 2008–09. *International Labour Review, 161*(1), 125–148. https://doi.org/10.1111/ilr.12230

Zimpelmann, C., von Gaudecker, H. M., Holler, R., Janys, L., & Siflinger, B. (2021). Hours and income dynamics during the Covid-19 pandemic: The case of the Netherlands. Labour Economics, 73. https://doi.org/10.1016/j.labeco.2021.102055

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Appendix

Table 4. Appendix A1: The impact of COVID-19 on groups in labor markets

Author(s)	Country	Groups	Labor Force Indicators	Methodology and Findings
Acheampong (2021)	Hungary	Gender, sector	Employment and unemployment rates	t-test. Women are more affected by the pandemic. Women lost more jobs in accommodation and food services, while men lost more jobs in the transportation and storage sector.
Adams-Prassl et al. (2020)	The UK, US, and Germany	Gender, education, age, occupation, industry, work arrangement, and tasks can be done from home	Job loss, earnings loss, furloughing and short-time work, hours worked.	Linear probability models. Employees in Germany are less affected by the pandemic than those in the US and UK. Women and less-educated workers are more affected by the crisis. Workers who can do fewer tasks from home are more likely to experience job loss and a drop in earnings. Temporary workers are more likely to lose their jobs.
Aldan et al. (2021)	Turkey	Gender, age, education, parenthood	Participation, employment, unemployment	Linear probability models. Women, especially mothers, are more adversely affected by the pandemic. The impact of the pandemic is hardest on the young (15–24) and the elderly (55+). The effect decreases as the level of education increases.
Alon et al. (2020)	The US	Gender, marital status, children	Employment, unemployment, hours worked, wage	Macroeconomic model. Women are disproportionally affected by the pandemic.
Ando et al. (2022)	European countries	Age, gender, education, type of contract, sector	Hours worked, employment and unemployment rates	The youth, temporary and part-time workers, and those with lower education levels are more affected by the pandemic. In addition, contact-intensive activities register substantial drops in output and hours worked. There is a high degree of heterogeneity among countries, although there are no large gender differences.
Aum et al. (2021)	South Korea	Occupation, education, age, gender, employment type, industry, establishment size	Unemployment, non-participation, employment	Difference-in-differences. Employment losses are mostly concentrated in small businesses and the accommodation/food, education, real estate, and transportation industries. The lower-educated, youth, low-wage, temporary workers, and the self-employed are more affected by COVID-19.
Aygün et al. (2022)	Turkey	Gender, education, children, formality, sector, age, marital status	Income loss, decrease in work hours, employed, unemployed, inactive	Linear probability model, multinomial logit model. Women, less educated individuals, and those with children are more affected by the pandemic. Self-employment and informal employment are other factors that contribute to vulnerability.
Beccaria et al. (2022)	Latin American countries	Gender, employment status	Activity, employment, and unemployment rates, working hours	Women and informal wage employment are more affected by the pandemic.
Bui et al. (2020)	The US	Gender, age	Employment, unemployment, and labor force participation rates	Those near retirement ages, especially women, are hit hardest by COVID-19.
Collins et al. (2021)	The US	Gender, children's age	Working hours	Fixed effects regression models. Working hours of mothers with young children are reduced by four to five times more than fathers during the period from February through April 2020. The gender gap in working hours increased by 20-50 per cent.
Cortes and Forsythe (2020)	The US	Occupations, industries, gender, education, age, race, and ethnicity	Employment rate, transition out of employment	Regression models. Workers in low-wage occupations and sectors, youth, women, lower-educated, and Hispanics are more affected by the pandemic.
Dasgupta et al. (2021)	Middle-income countries	Sector, gender, age, informality	Employment, working hours	Transport, accommodation, tourism and hospitality sectors, women, youth, immigrants, and informal workers are more affected by the crisis.
Farré et al. (2020)	Spain	Gender, education, age, children	Employment rates, employment status	Regression models. The hospitality and retail sectors are hit hardest. Those with low education and women are more affected by the pandemic.

Table 4. Contunied

Author(s)	Country	Groups	Labor Force Indicators	Methodology and Findings
Galasso and Foucault (2020)	Australia, Austria, Brazil, Canada, France, Germany, Italy, New Zealand, Poland, Sweden, the UK, and the US	Education, family income group, occupational type, employment status, age, gender, geographical location, life satisfaction	Working in the regular workplace, working from home, and stopping working	There are big differences among countries. Stopping working rates are high in Italy and France, while they are low in Australia and the US. College graduates and white-collar workers mostly worked from home. Blue-collar workers, individuals with low education, and low-income workers are more likely to stop working.
Groshen (2020)	The US	Sector, sex, race	Unemployment rate, the change in payroll jobs	Leisure and hospitality, retail trade sectors are strongly affected during the shutdown. The jobs of Hispanic, African American, and women workers are more disrupted.
Harman (2021)	Slovakia	Gender, region, education, age	Employment, unemployment	While men are more affected by the pandemic, especially highly educated women are more resilient to crisis.
Hupkau and Petrongolo (2020)	The UK	Gender, age, children, education, ethnicity, region, industry, income, work from home	Job loss, furloughing, working hours loss, earning loss.	Linear probability models. Women and men are almost equally affected in terms of job loss and furloughing. However, women's working hours and earnings are less affected by the pandemic compared to men's.
Lemieux et al. (2020)	Canada	Gender, age, children, province, occupation, hourly-salaried, union status, class of worker, earning	Hours worked, employment	Difference-in-differences. Workers in the lowest earnings quartile accounted for almost half of the job losses between February 2020 and April 2020. Accommodation and food services sectors, youth, hourly-paid, and non-union workers are more affected by the pandemic.
Meekes et al. (2020)	Netherlands	Gender, age, household composition, type of contract, type of job, full/part-time status	Employment, working hours, hourly wages	Differences-in-differences. Non-essential workers are more affected by COVID-19. On average, men and women are equally affected. Single-parent essential workers are more adversely affected.
Milovanska-Farrington (2021)	The US	Gender, ethnicity, age, marital status, household size, number of children, age of the youngest child, education, employment status	Hours worked, employment, unemployment duration, earnings	OLS, Probit regression models. Aside from the increase in the gap in the duration of unemployment between women and men with children, no worsening of gender differences is observed during the pandemic. Hispanics are the most adversely affected by COVID-19.
Montenovo et al. (2020)	The US	Gender, race, ethnicity, age, children, education, occupation, industry, state	Unemployment, absence from work	Regression models. Those working in occupations that require contact and cannot be performed remotely, women, Hispanics, youth, and high school educated, are more affected by the pandemic.
Noyan Yalman et al. (2021)	Turkey, Middle Anatolia cities	Gender, age, sector	Change in working hours	Chi-square test. While private sector workers are more affected, there is no significant difference between gender and age groups.
Verick et al. (2022)	More than 50 counties	Sector, gender, age	Employment	In the accommodation and food services sectors, women and youth are more affected by the pandemic.
Zimpelmann et al. (2021)	Netherlands	Gender, education, income, age, sector, work doable from home, work status	Employment, working hours, household income,	Regression models. Working hours of lower-educated or low-income workers drop almost twice as much as others. During the early stages of the pandemic, women and self-employed workers are disproportionately affected.

Table 5. Appendix A2: Estimation results (weighted)

Working hours	PANEL 1 (ALL WORKERS)			PANEL 2 (PAID, SALARIED, OR CASUAL WORKERS)		
	(1A)	(1B)	(1C)	(2A)	(2B)	(2C)
Quarter/Period(α)						
2018Q2	-1.3322			-1.1105		
	(1.2265)			(1.2943)		
2018Q3	-1.4994			-0.9971		
	(1.2484)			(1.2887)		
2018Q4	0.0471			-1.5592		
	(1.2512)			(1.2925)		
2019Q1	1.0937			-0.3458		
	(1.2695)			(1.2997)		
2019Q2	-0.3453			-1.8439		
	(1.2839)			(1.2980)		
2019Q3	0.0516			-1.2089		
	(1.3230)			(1.4242)		
2019Q4	-0.7494			-0.3649		
	(1.2775)			(1.2780)		
2020Q1	-0.0505			-0.6313		
	(1.2928)			(1.3691)		
2020Q2	-8.6011***	-8.2187***		-4.6894***	-3.6746***	
	(1.3929)	(1.1065)		(1.5132)	(1.2178)	
2020Q3	-1.6266	-1.2441		-0.7015	0.3133	
	(1.2920)	(0.9765)		(1.3300)	(0.9813)	
2020Q4	-2.6645**	-2.2821**		-0.4216	0.5932	
	(1.2804)	(0.9610)		(1.2970)	(0.9361)	
Stringency(α)			-0.0564***			-0.0155
			(0.0099)			(0.0102)
Gender(β)						
Female	-5.2466***	-4.7642***	-4.7897***	-3.3876***	-2.9507***	-2.9931***
	(0.1972)	(0.0670)	(0.0692)	(0.2009)	(0.0739)	(0.0723)
Gender(γ)						
2018Q2x(Female)	0.0695			0.0391		
	(0.2823)			(0.2862)		
2018Q3x(Female)	0.4849*			0.3753		
	(0.2880)			(0.2892)		
2018Q4x(Female)	0.6586**			0.5029*		
	(0.2765)			(0.2745)		
2019Q1x(Female)	0.3767			0.4507		
	(0.2759)			(0.2762)		
2019Q2x(Female)	0.3189			0.3461		
	(0.2836)			(0.2800)		
2019Q3x(Female)	1.0664***			0.6553**		
	(0.2945)			(0.3063)		
2019Q4x(Female)	0.8449***			0.5264**		
	(0.2741)			(0.2666)		
2020Q1x(Female)	0.6013**			0.7223***		
	(0.2738)			(0.2751)		
2020Q2x(Female)	1.4114***	0.9290***		1.0034***	0.5665**	
	(0.3134)	(0.2525)		(0.3235)	(0.2640)	
2020Q3x(Female)	1.1755***	0.6932***		0.8791***	0.4422**	
	(0.2848)	(0.2161)		(0.2840)	(0.2138)	
2020Q4x(Female)	1.0289***	0.5466***		0.5341*	0.0972	
	(0.2759)	(0.2042)		(0.2745)	(0.2011)	
Stringencyx(Female)			0.0117***			0.0075***
			(0.0022)			(0.0022)
Age Groups(β)						
25–34	1.9983***	1.0800***	1.1054***	0.9636***	0.2649***	0.3203***
	(0.3064)	(0.1050)	(0.1082)	(0.2902)	(0.1021)	(0.1052)
35–44	1.4236***	0.2056*	0.2561**	0.4948	-0.2139*	-0.1089
	(0.3363)	(0.1137)	(0.1173)	(0.3540)	(0.1229)	(0.1233)
45–54	0.7803**	-0.2202*	-0.1727	-0.1475	-0.7603***	-0.6583***
	(0.3647)	(0.1233)	(0.1271)	(0.4216)	(0.1447)	(0.1432)
55–65	-0.3041	-1.3971***	-1.3412***	-0.9394	-1.5511***	-1.4436***
	(0.4587)	(0.1496)	(0.1542)	(0.5796)	(0.1831)	(0.1891)
Age Groups(γ)						
2018Q2x(25-34)	-0.4551			-0.4654		
	(0.4320)			(0.4167)		
2018Q2x(35-44)	-0.6999			-0.5916		
	(0.4733)			(0.4994)		
2018Q2x(45-54)	-0.4453			-0.6635		
	(0.5138)			(0.5832)		

Table 5. Contunied

Working hours	PANEL 1 (ALL WORKERS)			PANEL 2 (PAID, SALARIED, OR CASUAL WORKERS)		
	(1A)	(1B)	(1C)	(2A)	(2B)	(2C)
2018Q2x(55-64)	-1.1397*			-0.5480		
	(0.6374)			(0.8039)		
2018Q3x(25-34)	-2.7428***			-2.2810***		
	(0.4387)			(0.4266)		
2018Q3x(35-44)	-3.1106***			-2.1252***		
	(0.4804)			(0.4987)		
2018Q3x(45-54)	-2.8875***			-2.1731***		
	(0.5245)			(0.5759)		
2018Q3x(55-64)	-3.3140***			-2.2433***		
	(0.6421)			(0.8030)		
2018Q4x(25-34)	-0.6420			-0.1216		
	(0.4307)			(0.4064)		
2018Q4x(35-44)	-0.8160*			-0.0198		
	(0.4663)			(0.4762)		
2018Q4x(45-54)	-1.0626**			0.1458		
	(0.5068)			(0.5589)		
2018Q4x(55-64)	-0.1299			0.4229		
	(0.6268)			(0.7647)		
2019Q1x(25-34)	-0.3256			-0.2447		
	(0.4386)			(0.4187)		
2019Q1x(35-44)	-0.2227			0.0346		
	(0.4739)			(0.4817)		
2019Q1x(45-54)	-0.0557			0.2678		
	(0.5142)			(0.5591)		
2019Q1x(55-64)	0.2418			0.3263		
	(0.6457)			(0.7823)		
2019Q2x(25-34)	-0.6280			-0.0463		
	(0.4482)			(0.4296)		
2019Q2x(35-44)	-0.7157			0.1999		
	(0.4861)			(0.4942)		
2019Q2x(45-54)	-0.5301			0.5881		
	(0.5224)			(0.5649)		
2019Q2x(55-64)	-0.8714			0.6305		
	(0.6463)			(0.7943)		
2019Q3x(25-34)	-2.0079***			-1.6088***		
	(0.4501)			(0.4433)		
2019Q3x(35-44)	-2.7592***			-1.6495***		
	(0.4953)			(0.5196)		
2019Q3x(45-54)	-2.3251***			-1.6663***		
	(0.5356)			(0.5988)		
2019Q3x(55-64)	-2.4539***			-1.5534*		
	(0.6500)			(0.8261)		
2019Q4x(25-34)	-0.0753			-0.0148		
	(0.4359)			(0.4070)		
2019Q4x(35-44)	-0.6111			-0.0477		
	(0.4786)			(0.4797)		
2019Q4x(45-54)	-0.0487			0.2295		
	(0.5176)			(0.5536)		
2019Q4x(55-64)	-0.5281			-0.1473		
	(0.6336)			(0.7537)		
2020Q1x(25-34)	-0.5781			-0.7148*		
	(0.4366)			(0.4154)		
2020Q1x(35-44)	-1.1568**			-0.9551**		
	(0.4705)			(0.4798)		
2020Q1x(45-54)	-0.7559			-0.7104		
	(0.5110)			(0.5582)		
2020Q1x(55-64)	-0.7095			-0.8131		
	(0.6332)			(0.7577)		
2020Q2x(25-34)	-3.0259***	-2.1075***		-3.1544***	-2.4557***	
	(0.5046)	(0.4143)		(0.5104)	(0.4318)	
2020Q2x(35-44)	-3.4445***	-2.2265***		-3.8245***	-3.1159***	
	(0.5464)	(0.4453)		(0.5721)	(0.4658)	
2020Q2x(45-54)	-2.9979***	-1.9974***		-3.1448***	-2.5319***	
	(0.5872)	(0.4763)		(0.6447)	(0.5085)	
2020Q2x(55-64)	-4.1231***	-3.0301***		-3.9623***	-3.3507***	
	(0.7064)	(0.5574)		(0.8734)	(0.6782)	
2020Q3x(25-34)	-2.2260***	-1.3076***		-2.5908***	-1.8921***	
	(0.4495)	(0.3451)		(0.4370)	(0.3421)	
2020Q3x(35-44)	-2.7218***	-1.5038***		-2.8323***	-2.1237***	
	(0.4939)	(0.3790)		(0.5061)	(0.3818)	
2020Q3x(45-54)	-2.8538***	-1.8533***		-2.6757***	-2.0628***	
	(0.5343)	(0.4093)		(0.5815)	(0.4256)	

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Table 5. Contunied

	PANEL 1 (ALL WORKERS)			PANEL 2 (PAID, SALARIED, OR CASUAL WORKERS)		
Working hours						
	(1A)	(1B)	(1C)	(2A)	(2B)	(2C)
2020Q3x(55-64)	-4.1727***	-3.0797***		-3.0539***	-2.4422***	
	(0.6552)	(0.4910)		(0.7962)	(0.5756)	
2020Q4x(25-34)	-1.1532***	-0.2348		-1.4891***	-0.7904**	
	(0.4421)	(0.3354)		(0.4237)	(0.3250)	
2020Q4x(35-44)	-1.5559***	-0.3379		-1.3059***	-0.5973	
	(0.4860)	(0.3686)		(0.4922)	(0.3633)	
2020Q4x(45-54)	-1.8242***	-0.8237**		-1.0026*	-0.3897	
	(0.5267)	(0.3994)		(0.5698)	(0.4096)	
2020Q4x(55-64)	-2.2981***	-1.2051**		-1.5043*	-0.8926	
	(0.6416)	(0.4727)		(0.7776)	(0.5495)	
Stringencyx(25-34)			-0.0192***			-0.0275***
			(0.0036)			(0.0036)
Stringencyx(35-44)			-0.0219***			-0.0333***
			(0.0039)			(0.0039)
Stringencyx(45-54)			-0.0245***			-0.0293***
			(0.0042)			(0.0044)
Stringencyx(55-65)			-0.0373***			-0.0378***
			(0.0050)			(0.0059)
Education(β)						
Primary school	-0.9856**	-1.2880***	-1.2431***	-2.5963***	-2.7718***	-2.7361***
	(0.4609)	(0.1544)	(0.1583)	(0.6079)	(0.2123)	(0.2171)
Lower secondary school	-1.6959***	-2.0788***	-1.9888***	-3.1901***	-3.1981***	-3.0968***
	(0.4848)	(0.1637)	(0.1678)	(0.6028)	(0.2122)	(0.2169)
Upper secondary school	-2.4680***	-2.9319***	-2.8480***	-3.9954***	-4.1431***	-4.0401***
	(0.4851)	(0.1632)	(0.1673)	(0.6067)	(0.2130)	(0.2174)
University	-3.5884***	-3.8286***	-3.7180***	-4.1444***	-4.2327***	-4.0391***
	(0.5189)	(0.1734)	(0.1780)	(0.7149)	(0.2505)	(0.2461)
Postgraduate	-4.9152***	-4.9584***	-4.9094***	-2.7348**	-2.8021***	-2.4339***
	(0.6424)	(0.2128)	(0.2198)	(1.3059)	(0.4381)	(0.4026)
Education(γ)						
2018Q2x(Primary school)	0.5242			0.2208		
	(0.6308)			(0.8608)		
2018Q2x(Lower secondry school)	0.0577			0.0947		
	(0.6679)			(0.8550)		
2018Q2x(Upper secondary school)	0.1946			-0.1519		
	(0.6709)			(0.8613)		
2018Q2x(University)	0.5598			0.2038		
	(0.7184)			(0.9768)		
2018Q2x(Postgraduate)	0.6569			-0.0666		
	(0.8926)			(1.6500)		
2018Q3x(Primary school)	0.3427			0.5278		
	(0.6477)			(0.8770)		
2018Q3x(Lower secondry school)	0.8964			1.4133		
	(0.6875)			(0.8756)		
2018Q3x(Upper secondary school)	0.1315			0.3381		
	(0.6861)			(0.8750)		
2018Q3x(University)	-0.1675			0.4279		
	(0.7393)			(0.9792)		
2018Q3x(Postgraduate)	-0.3477			0.8494		
	(0.9233)			(1.5741)		
2018Q4x(Primary school)	-0.5641			0.3028		
	(0.6442)			(0.8643)		
2018Q4x(Lower secondry school)	-0.5826			0.6075		
	(0.6795)			(0.8588)		
2018Q4x(Upper secondary school)	-1.1547*			0.2357		
	(0.6785)			(0.8624)		
2018Q4x(University)	-0.6539			0.6316		
	(0.7224)			(0.9696)		
2018Q4x(Postgraduate)	-0.1774			0.9541		
	(0.8880)			(1.5943)		
2019Q1x(Primary school)	-1.1256*			-0.6141		
	(0.6429)			(0.8777)		
2019Q1x(Lower secondry school)	-0.9305			-0.5219		
	(0.6814)			(0.8756)		
2019Q1x(Upper secondary school)	-1.2286*			-0.4846		
	(0.6765)			(0.8721)		
2019Q1x(University)	-0.4033			0.0240		
	(0.7236)			(0.9838)		
2019Q1x(Postgraduate)	-0.2040			0.3393		
	(0.8891)			(1.5666)		
2019Q2x(Primary school)	-0.7454			-0.5721		

Table 5. Contunied

Working hours	PANEL 1 (ALL WORKERS)			PANEL 2 (PAID, SALARIED, OR CASUAL WORKERS)		
	(1A)	(1B)	(1C)	(2A)	(2B)	(2C)
	(0.6454)			(0.8360)		
2019Q2x(Lower secondry school)	-0.6959			0.0133		
	(0.6827)			(0.8332)		
2019Q2x(Upper secondary school)	-1.0325			-0.3995		
	(0.6799)			(0.8330)		
2019Q2x(University)	-0.6062			0.1319		
	(0.7250)			(0.9403)		
2019Q2x(Postgraduate)	-0.1737			0.8509		
	(0.9226)			(1.5543)		
2019Q3x(Primary school)	0.1928			-0.2346		
	(0.6630)			(0.9125)		
2019Q3x(Lower secondry school)	0.3829			0.5884		
	(0.6993)			(0.9044)		
2019Q3x(Upper secondary school)	0.3788			0.5259		
	(0.7001)			(0.9066)		
2019Q3x(University)	0.3984			0.5832		
	(0.7474)			(1.0074)		
2019Q3x(Postgraduate)	-0.2489			1.4940		
	(0.9476)			(1.6636)		
2019Q4x(Primary school)	-0.4456			-0.4961		
	(0.6642)			(0.8641)		
2019Q4x(Lower secondry school)	-1.0237			-0.5427		
	(0.6968)			(0.8559)		
2019Q4x(Upper secondary school)	-0.5664			-0.2285		
	(0.6974)			(0.8599)		
2019Q4x(University)	-0.3214			-0.0117		
	(0.7353)			(0.9507)		
2019Q4x(Postgraduate)	-0.0584			1.3749		
	(0.8899)			(1.4953)		
2020Q1x(Primary school)	-1.7707**			-1.2315		
	(0.6879)			(0.9348)		
2020Q1x(Lower secondry school)	-2.3977***			-1.6188*		
	(0.7259)			(0.9341)		
2020Q1x(Upper secondary school)	-1.9351***			-1.3631		
	(0.7211)			(0.9325)		
2020Q1x(University)	-1.8548**			-2.0014*		
	(0.7611)			(1.0316)		
2020Q1x(Postgraduate)	-1.1483			-2.9539*		
	(0.9028)			(1.5818)		
2020Q2x(Primary school)	0.3451	0.6474		-0.6284	-0.4530	
	(0.7202)	(0.5743)		(1.0509)	(0.8827)	
2020Q2x(Lower secondry school)	-0.0637	0.3192		-0.8606	-0.8525	
	(0.7674)	(0.6168)		(1.0549)	(0.8908)	
2020Q2x(Upper secondary school)	-0.8237	-0.3598		-1.8141*	-1.6664*	
	(0.7625)	(0.6102)		(1.0459)	(0.8777)	
2020Q2x(University)	-0.9219	-0.6817		-2.2401**	-2.1518**	
	(0.8113)	(0.6471)		(1.1296)	(0.9093)	
2020Q2x(Postgraduate)	1.5525	1.5958*		-2.4458	-2.3785**	
	(1.0160)	(0.8151)		(1.6308)	(1.0700)	
2020Q3x(Primary school)	-1.1726*	-0.8703		-1.2834	-1.1080	
	(0.6939)	(0.5410)		(0.9230)	(0.7260)	
2020Q3x(Lower secondry school)	-1.0613	-0.6785		-0.9940	-0.9859	
	(0.7270)	(0.5658)		(0.9215)	(0.7282)	
2020Q3x(Upper secondary school)	-1.4111*	-0.9472*		-1.6237*	-1.4760**	
	(0.7249)	(0.5627)		(0.9206)	(0.7240)	
2020Q3x(University)	-2.1776***	-1.9373***		-2.5029**	-2.4146***	
	(0.7683)	(0.5923)		(1.0212)	(0.7707)	
2020Q3x(Postgraduate)	-1.0256	-0.9824		-2.4264	-2.3591**	
	(0.9353)	(0.7120)		(1.5979)	(1.0192)	
2020Q4x(Primary school)	-1.6205**	-1.3182**		-1.5363*	-1.3608*	
	(0.6878)	(0.5332)		(0.9051)	(0.7031)	
2020Q4x(Lower secondry school)	-1.8858***	-1.5029***		-1.2814	-1.2734*	
	(0.7190)	(0.5555)		(0.9013)	(0.7025)	
2020Q4x(Upper secondary school)	-1.9336***	-1.4697***		-1.5077*	-1.3600*	
	(0.7181)	(0.5538)		(0.9037)	(0.7025)	
2020Q4x(University)	-2.4889***	-2.2487***		-1.9900**	-1.9017***	
	(0.7612)	(0.5831)		(0.9957)	(0.7366)	
2020Q4x(Postgraduate)	-0.5475	-0.5043		-0.1330	-0.0656	
	(0.9302)	(0.7054)		(1.5509)	(0.9440)	
Stringencyx(Primary school)			-0.0109**			-0.0163**
			(0.0054)			(0.0075)
Stringencyx(Lower secondry school)			-0.0140**			-0.0206***

Table 5. Contunied

Working hours	PANEL 1 (ALL WORKERS)			PANEL 2 (PAID, SALARIED, OR CASUAL WORKERS)		
	(1A)	(1B)	(1C)	(2A)	(2B)	(2C)
			(0.0057)			(0.0075)
Stringencyx(Upper secondary school)			-0.0173***			-0.0268***
			(0.0056)			(0.0075)
Stringencyx(University)			-0.0288***			-0.0412***
			(0.0059)			(0.0078)
Stringencyx(Postgraduate)			-0.0029			-0.0428***
			(0.0073)			(0.0097)
Marital Status(β)						
Married	-0.2434	-0.2395***	-0.2314***	0.3190	0.0835	0.1215
	(0.2183)	(0.0740)	(0.0765)	(0.2273)	(0.0826)	(0.0803)
Marital Status(γ)						
2018Q2x(Married)	0.1243			-0.0819		
	(0.3110)			(0.3223)		
2018Q3x(Married)	0.4110			-0.1592		
	(0.3223)			(0.3238)		
2018Q4x(Married)	0.2619			-0.0931		
	(0.3028)			(0.3039)		
2019Q1x(Married)	-0.4280			-0.5653*		
	(0.3050)			(0.3088)		
2019Q2x(Married)	-0.0495			-0.3797		
	(0.3154)			(0.3163)		
2019Q3x(Married)	-0.1072			-0.0196		
	(0.3259)			(0.3322)		
2019Q4x(Married)	-0.0439			0.1238		
	(0.3048)			(0.3038)		
2020Q1x(Married)	-0.0121			-0.5818*		
	(0.3015)			(0.3073)		
2020Q2x(Married)	-0.5043	-0.5081*		-0.4415	-0.2060	
	(0.3447)	(0.2767)		(0.3520)	(0.2810)	
2020Q3x(Married)	-0.4030	-0.4068*		-0.5730*	-0.3375	
	(0.3205)	(0.2459)		(0.3280)	(0.2503)	
2020Q4x(Married)	-0.4106	-0.4144*		-0.6153**	-0.3798	
	(0.3135)	(0.2368)		(0.3135)	(0.2311)	
Stringencyx(Married)			-0.0073***			-0.0068***
			(0.0025)			(0.0025)
Employment status(β)						
Paid, salaried, or casual	5.3828***	5.5993***	5.5705***			
	(0.5130)	(0.1721)	(0.1768)			
Employer	9.0967***	10.0339***	10.0298***			
	(0.6340)	(0.2162)	(0.2225)			
Self-employed	2.3520***	3.6357***	3.6333***			
	(0.4764)	(0.1593)	(0.1637)			
Employment status(γ)						
2018Q2x(Paid, salaried, or casual)	0.7641					
	(0.7111)					
2018Q2x(Employer)	1.1208					
	(0.8912)					
2018Q2x(Self-employed)	1.4202**					
	(0.6609)					
2018Q3x(Paid, salaried, or casual)	1.3011*					
	(0.7106)					
2018Q3x(Employer)	1.6463*					
	(0.9131)					
2018Q3x(Self-employed)	1.9571***					
	(0.6612)					
2018Q4x(Paid, salaried, or casual)	0.0173					
	(0.7301)					
2018Q4x(Employer)	0.0979					
	(0.8906)					
2018Q4x(Self-employed)	0.8423					
	(0.6792)					
2019Q1x(Paid, salaried, or casual)	-0.2680					
	(0.7487)					
2019Q1x(Employer)	0.0595					
	(0.9189)					
2019Q1x(Self-employed)	0.5252					
	(0.6822)					
2019Q2x(Paid, salaried, or casual)	-0.4455					
	(0.7296)					
2019Q2x(Employer)	1.0521					

Table 5. Contunied

Working hours	PANEL 1 (ALL WORKERS)			PANEL 2 (PAID, SALARIED, OR CASUAL WORKERS)		
	(1A)	(1B)	(1C)	(2A)	(2B)	(2C)
	(0.9225)					
2019Q2x(Self-employed)	1.3701**					
	(0.6781)					
2019Q3x(Paid, salaried, or casual)	-0.2003					
	(0.7149)					
2019Q3x(Employer)	1.0701					
	(0.9136)					
2019Q3x(Self-employed)	2.6077***					
	(0.6664)					
2019Q4x(Paid, salaried, or casual)	-0.1118					
	(0.7233)					
2019Q4x(Employer)	1.4450					
	(0.8924)					
2019Q4x(Self-employed)	1.5222**					
	(0.6727)					
2020Q1x(Paid, salaried, or casual)	0.1119					
	(0.7290)					
2020Q1x(Employer)	1.1529					
	(0.9062)					
2020Q1x(Self-employed)	0.9909					
	(0.6766)					
2020Q2x(Paid, salaried, or casual)	2.3830***	2.1665***				
	(0.7603)	(0.5867)				
2020Q2x(Employer)	0.5938	-0.3434				
	(0.9856)	(0.7847)				
2020Q2x(Self-employed)	2.2976***	1.0139*				
	(0.6903)	(0.5241)				
2020Q3x(Paid, salaried, or casual)	0.1365	-0.0800				
	(0.7086)	(0.5180)				
2020Q3x(Employer)	1.1375	0.2004				
	(0.8957)	(0.6684)				
2020Q3x(Self-employed)	3.2734***	1.9897***				
	(0.6651)	(0.4905)				
2020Q4x(Paid, salaried, or casual)	0.9417	0.7252				
	(0.7339)	(0.5521)				
2020Q4x(Employer)	1.2950	0.3579				
	(0.9234)	(0.7050)				
2020Q4x(Self-employed)	2.3598***	1.0761**				
	(0.6863)	(0.5189)				
Stringencyx(Paid, salaried, or casual)			0.0149***			
			(0.0055)			
Stringencyx(Employer)			0.0022			
			(0.0071)			
Stringencyx(Self-employed)			0.0198***			
			(0.0051)			
Number of workers in workplace(β)						
11–49	-0.9465***	-0.7924***	-0.8633***	-0.6404***	-0.3779***	-0.4045***
	(0.2360)	(0.0850)	(0.0874)	(0.2463)	(0.0915)	(0.0908)
50 and more	-1.3869***	-1.6822***	-1.7803***	-0.7191**	-0.8995***	-0.9130***
	(0.2342)	(0.0833)	(0.0859)	(0.3027)	(0.1143)	(0.1061)
Number of workers in workplace(γ)						
2018Q2x(11-49)	-0.0314			0.2519		
	(0.3439)			(0.3521)		
2018Q2x(50 and more)	-0.7799**			-0.4614		
	(0.3423)			(0.4029)		
2018Q3x(11-49)	-0.1449			0.4953		
	(0.3565)			(0.3618)		
2018Q3x(50 and more)	-0.1108			0.5900		
	(0.3458)			(0.3951)		
2018Q4x(11-49)	-0.0307			-0.0222		
	(0.3383)			(0.3450)		
2018Q4x(50 and more)	-0.6676**			-0.6419		
	(0.3334)			(0.3979)		
2019Q1x(11-49)	0.0346			0.1368		
	(0.3401)			(0.3438)		
2019Q1x(50 and more)	-0.2352			-0.1885		
	(0.3426)			(0.3952)		
2019Q2x(11-49)	0.1399			0.4107		
	(0.3540)			(0.3558)		
2019Q2x(50 and more)	-0.6961**			-0.2299		
	(0.3520)			(0.4027)		

Table 5. Contunied

Working hours	PANEL 1 (ALL WORKERS)			PANEL 2 (PAID, SALARIED, OR CASUAL WORKERS)		
	(1A)	(1B)	(1C)	(2A)	(2B)	(2C)
2019Q3x(11-49)	0.0361			0.4900		
	(0.3652)			(0.3673)		
2019Q3x(50 and more)	-0.3543			0.3396		
	(0.3598)			(0.4218)		
2019Q4x(11-49)	0.4036			0.4822		
	(0.3402)			(0.3408)		
2019Q4x(50 and more)	-0.3690			0.0130		
	(0.3353)			(0.3816)		
2020Q1x(11-49)	0.8976**			0.3236		
	(0.3512)			(0.3478)		
2020Q1x(50 and more)	0.5949*			-0.2274		
	(0.3367)			(0.3997)		
2020Q2x(11-49)	1.3193***	1.1652***		1.5571***	1.2946***	
	(0.4097)	(0.3454)		(0.4122)	(0.3428)	
2020Q2x(50 and more)	1.9801***	2.2754***		1.5862***	1.7667***	
	(0.3949)	(0.3286)		(0.4345)	(0.3319)	
2020Q3x(11-49)	0.4680	0.3140		0.2874	0.0249	
	(0.3554)	(0.2789)		(0.3638)	(0.2827)	
2020Q3x(50 and more)	0.6828**	0.9781***		0.4139	0.5944**	
	(0.3479)	(0.2703)		(0.3988)	(0.2835)	
2020Q4x(11-49)	1.6962***	1.5422***		1.5304***	1.2679***	
	(0.3472)	(0.2684)		(0.3488)	(0.2632)	
2020Q4x(50 and more)	2.1917***	2.4870***		1.9678***	2.1482***	
	(0.3430)	(0.2640)		(0.3946)	(0.2776)	
Stringencyx(11-49)			0.0174***			0.0125***
			(0.0029)			(0.0029)
Stringencyx(50 and more)			0.0314***			0.0208***
			(0.0028)			(0.0029)
Registration to SSI(β)						
Unregistered	-6.1891***	-5.3949***	-5.4286***	-3.6793***	-2.8400***	-2.9256***
	(0.2829)	(0.0967)	(0.0995)	(0.3527)	(0.1212)	(0.1232)
Registration to SSI(γ)						
2018Q2x(Unregistered)	0.8148**			1.1221**		
	(0.3956)			(0.4963)		
2018Q3x(Unregistered)	2.0520***			1.4835***		
	(0.3972)			(0.4887)		
2018Q4x(Unregistered)	-0.3960			-0.3989		
	(0.4027)			(0.4872)		
2019Q1x(Unregistered)	-0.3708			0.1141		
	(0.4125)			(0.4981)		
2019Q2x(Unregistered)	0.5404			0.5470		
	(0.4110)			(0.4958)		
2019Q3x(Unregistered)	1.4087***			1.3053**		
	(0.4127)			(0.5145)		
2019Q4x(Unregistered)	1.6215***			1.0328**		
	(0.4036)			(0.4926)		
2020Q1x(Unregistered)	0.8194**			1.4034***		
	(0.4073)			(0.5020)		
2020Q2x(Unregistered)	2.1966***	1.4024***		2.5262***	1.6869***	
	(0.4563)	(0.3707)		(0.5992)	(0.4990)	
2020Q3x(Unregistered)	1.2945***	0.5003		0.9895*	0.1502	
	(0.4098)	(0.3117)		(0.5175)	(0.3975)	
2020Q4x(Unregistered)	0.4925	-0.3017		0.7504	-0.0889	
	(0.4174)	(0.3217)		(0.5114)	(0.3895)	
Stringencyx(Unregistered)			0.0097***			0.0125***
			(0.0033)			(0.0041)
Permanency of job(β)						
Temporary				-10.7824***	-9.5915***	-9.5414***
				(0.5445)	(0.1587)	(0.1570)
Permanency of job(γ)						
2018Q2x(Temporary)				1.9575***		
				(0.6804)		
2018Q3x(Temporary)				4.9219***		
				(0.6726)		
2018Q4x(Temporary)				0.6323		
				(0.6723)		
2019Q1x(Temporary)				-1.1090		
				(0.6963)		
2019Q2x(Temporary)				1.6377**		

Table 5. Contunied

Working hours	PANEL 1 (ALL WORKERS)			PANEL 2 (PAID, SALARIED, OR CASUAL WORKERS)		
	(1A)	(1B)	(1C)	(2A)	(2B)	(2C)
				(0.6753)		
2019Q3x(Temporary)				3.4506***		
				(0.6999)		
2019Q4x(Temporary)				-1.4513**		
				(0.6744)		
2020Q1x(Temporary)				-2.2079***		
				(0.6963)		
2020Q2x(Temporary)				2.5639***	1.3731**	
				(0.7643)	(0.5591)	
2020Q3x(Temporary)				1.8964***	0.7055	
				(0.7091)	(0.4809)	
2020Q4x(Temporary)				0.2433	-0.9475**	
				(0.6809)	(0.4384)	
Stringencyx(Temporary)						0.0016
						(0.0047)
Hourly wage(β)				-0.8220***	-0.7708***	-0.8363***
				(0.2565)	(0.0852)	(0.0737)
Hourly wage(γ)						
2018Q2x(Hourly wage)				0.1352		
				(0.3018)		
2018Q3x(Hourly wage)				-0.0680		
				(0.2764)		
2018Q4x(Hourly wage)				-0.1122		
				(0.3014)		
2019Q1x(Hourly wage)				-0.0914		
				(0.2819)		
2019Q2x(Hourly wage)				-0.1712		
				(0.2761)		
2019Q3x(Hourly wage)				-0.2736		
				(0.2932)		
2019Q4x(Hourly wage)				-0.3917		
				(0.2646)		
2020Q1x(Hourly wage)				0.4490		
				(0.2806)		
2020Q2x(Hourly wage)				0.4656*	0.4145***	
				(0.2579)	(0.0893)	
2020Q3x(Hourly wage)				0.2421	0.1909	
				(0.2788)	(0.1385)	
2020Q4x(Hourly wage)				-0.1592	-0.2104*	
				(0.2703)	(0.1205)	
Stringencyx(Hourly wage)						0.0057***
						(0.0010)
Constant	45.8038***	45.4214***	45.5260***	53.1635***	52.1487***	52.2467***
	(0.8977)	(0.3012)	(0.3096)	(0.9530)	(0.3210)	(0.3226)
Observations	471,776	471,776	471,776	308,529	308,529	308,529
R-squared	0.1836	0.1782	0.1746	0.2482	0.2374	0.2332

The dependent variable is the actual weekly working hours in the reference week. α is the coefficient of the quartiles and the stringency index; β is the coefficient of the individual independent variables; γ is the coefficient of the interaction terms. Statistical significance level: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are in parentheses. Reference categories are male, 15–24, not completed any educational institution, single, unpaid family worker, 10 and fewer, registered, and permanent, respectively. Reference periods are the first quarter of 2018 (2018Q1) for Model A and the pre-pandemic period (2018Q1-2020Q1) for Model B. All regressions control sector and occupation and use sample weights. The sample includes workers aged 15–64.