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Abstract

During the Covid-19 pandemic, many governments recommended quarantine to those who had close contact with infected individuals. We conducted a large-scale retrospective survey to study the consequences of such quarantine for labor outcomes. A sizable fraction of quarantined workers experienced reductions in hours worked and earnings, not only during quarantine but also after quarantine. Even uninfected workers experienced negative labor impacts, likely capturing the pure effects of quarantine independent of the effects of Covid-19 symptoms. Non-regular workers and workers without remote work options were more negatively affected by quarantine. We estimate that the quarantine resulted in a large reduction in the aggregate hours and that the reduction is mainly due to the scarring effects.

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1 Introduction

During the Covid-19 pandemic, many governments recommended quarantine to those who had close contact with infected individuals for a certain period. The U.K. asked 14 days of quarantine at the initial stage of the pandemic, which was shortened to 10 days in December 2020. The U.S. also began with 14 days of quarantine and lifted the recommended quarantine for vaccinated individuals in December 2021. Japan also started with 14 days of recommended quarantine, which was subsequently shortened to 10 days in January 2022 to 7 days in January 2022 to 5 days in July 2022.[1] Given its widespread use across countries, it is important for us to understand its benefits and costs in order to evaluate the efficacy of past policies and to design better policies in the future.

In this paper, we aim to shed light on the cost of quarantine policy in the labor market by conducting a large-scale retrospective survey. In the survey, we asked quarantined workers how quarantine affected their labor outcomes. We first analyze summary statistics on hours worked and earnings during and after the quarantine period. We then perform regression analyses to understand which characteristics of workers are associated with negative labor outcomes. Finally, we estimate the reduction in the aggregate labor supply due to quarantine. Some quarantined workers turned out to be infected with Covid-19, while others were not. Throughout the analyses, we pay particular attention to the labor outcomes of uninfected quarantined workers after the quarantine period to see if quarantine had "scarring" effects independently of the health effects associated with Covid-19 symptoms.

We find that a large fraction of quarantined workers experienced reductions in daily hours worked or daily earnings during quarantine relative to their levels right before quarantine. 36 percent and 23 percent of workers experienced reductions in daily hours worked and daily earnings, respectively, during quarantine. The average reduction in earnings during quarantine conditional on a reduction was 55 percent. For some workers, reductions in hours worked and earnings continued even after the quarantine period, albeit by a smaller degree. 15 percent of workers experienced a reduction in monthly hours after quarantine and 12 percent of workers experienced a reduction in monthly earnings after quarantine. The average reduction in earnings after quarantine conditional on a reduction was 38 percent. The reductions in hours and earnings after quarantine lasted for 2.7 months and 3.5 months, respectively, on average.

Reductions in hours and earnings after quarantine were observed not only for infected workers but also for uninfected workers. 43 percent and 26 percent of uninfected

[1] In all of the three countries mentioned, governments no longer ask for quarantine after close contact, though precautions are recommended for five to seven days.

workers experienced reductions in hours worked and earnings during the quarantine period, respectively. 20 percent and 14 percent of uninfected workers experienced reductions in hours worked and earnings even after the quarantine period, respectively. The average duration of reductions in hours worked and earnings was 2.2 months and 2.7 months, respectively.

Negative labor outcomes of infected quarantined workers likely capture the effects of both quarantine itself and possible symptoms associated with Covid-19 infection—symptoms known to be often persistent. However, negative labor outcomes of uninfected quarantined workers likely capture the pure effects of quarantine, independent of the effects associated with possible Covid-19 symptoms. The continuation of negative labor outcomes among uninfected quarantined workers after the quarantine period suggests the scar of quarantine. That is, quarantine had a persistent impact on hours worked and earnings independent of the persistent health effects associated with Covid-19 infection.

We find that non-regular workers, workers without remote work options, and workers in food–beverage–accommodation industries were more likely to experience reductions in hours worked and earnings and that these workers suffered a larger reduction in earnings on average if they did experience reduced earnings. These results hold both during and after the quarantine. Female workers were more likely to experience reduced hours than male workers during quarantine. Older workers were less likely to experience reductions in hours and earnings than younger workers during quarantine. Workers without children, more educated workers, and workers with higher income were less likely to experience a reduction in earnings than workers living with children, uneducated workers, and workers with lower income, respectively, both during and after quarantine.

At the aggregate level, we find that quarantine had a modest impact on aggregate hours in 2020 and 2021 but a sizable impact in 2022. The reduction in the aggregate hours worked attributable to quarantine of uninfected workers—relative to the aggregate hours in 2019—was 0.06 percent in 2020, 0.23 percent in 2021, and 0.98 percent in 2022. While the average reduction per uninfected quarantined worker declined over time, a spike in the number of uninfected quarantined workers pushed up the aggregate reduction in hours worked. More than three-quarters of the aggregate reduction in hours worked is due to the scar of quarantine, that is, the continued reduction in hours worked among uninfected quarantined workers.

Our paper contributes to an extensive literature on labor market dynamics during the Covid-19 pandemic. This literature has examined various aspects of labor markets, including heterogeneous labor-market impacts (Alon et al., 2020; Coibion et al., 2020; Albanesi and Kim, 2021; Kikuchi et al., 2021; Shibata, 2021; Alon et al., 2022; Bluedorn et al., 2023; Cortes and Forsythe, 2023), remote work (Bartik et al., 2020; Deole et al., 2023; Hansen et al., 2023;

Soh et al., 2024), reallocation and sectoral mismatch (Forsythe et al., 2022; Pizzinelli and Shibata, 2023) labor-market effects via infection (Fischer et al., 2022; Goda and Soltas, 2022; Chiba et al., 2024), and the decline in the labor force participation rate (Faberman et al., 2022; Abraham and Rendell, 2023; Lee et al., 2023).

Our paper is closely related to a set of studies aimed at understanding the effects on non-pharmaceutical interventions (NPIs) on labor markets. Some authors have examined the effect of lockdown policies—likely the most strict form of NPI in a pandemic—on labor market outcomes, often exploiting variations across time and space in policy. Such studies include, but are not limited to, Bartik et al. (2020), Baek et al. (2021), Spiegel and Tookes (2021), and Chetty et al. (2024). Our paper differs from these papers because we focus on a different NPI—quarantine policy—and we conduct an original retrospective survey.

We complement the literature that analyzes the benefits of quarantine policy for reducing transmission.[2] This literature evaluates the efficacy of quarantine policies in mitigating the spread of the virus (see Sivaraman et al. (2024) for review). As discussed earlier, however, it is important for policymakers to understand both the benefits and costs of quarantine policy in order to design better policies in the future. To our knowledge, our paper is the first to quantitatively investigate the negative impact of quarantine policy on labor outcomes—the cost of quarantine policy.

Our analysis of the uninfected workers' labor outcomes after the quarantine period is related to the literature on the scarring effects of negative shocks in the labor market. Many have empirically documented that recession and unemployment have long-lasting effects on earnings and employment (Kahn, 2010; Davis and von Wachter, 2011; Yagan, 2019; Heathcote et al., 2020; Jaimovich and Siu, 2020; Arellano-Bover, 2022). Some have examined, either empirically or theoretically, the scarring effects associated with the COVID-19 pandemic (Barrero et al., 2023; Jackson and Ortego-Marti, 2024). We add to this literature by documenting that even a very short disruption in the labor market—quarantine typically lasted less than two weeks—can have persistent effects on labor outcomes.

This paper is organized as follows. Section 2 describes the survey design. Section 3 discusses summary statics on labor outcomes following quarantine. Section 4 discusses regression analysis to understand the type of individuals who are more likely to experience the scar. Section 5 discusses the aggregate reduction in labor supply associated with quarantine policy. Section 6 concludes.

[2]See Aleta et al. (2020), Cheng et al. (2020), Hellewell et al. (2020), and Malheiro et al. (2020), for example.

2 Survey and Data

We conducted a large-scale retrospective survey in Tokyo from February 14, 2023 to February 21, 2023 to collect data on hours worked and earnings surrounding the quarantine period.

We collected the participants with the help of Cross Marketing Inc., an online marketing company in Japan[3]. The company has access to a pool of individuals interested in participating in various surveys. They can earn "points" that can be used for future expenditures upon completion of each survey.[4] Randomly selected individuals residing in Tokyo and aged between 20 to 64 years old were contacted with a targeted number of responses for each five-year interval age and sex set to match the age and sex distribution from the Population Census.

Among the collected participants agreeing on the survey guidelines, we conducted a screening survey to identify those who had close contact with individuals infected with Covid-19 and who had a job in March 2020.

If a participant satisfied these two criteria, s/he proceeded to the main survey. We asked various questions regarding (i) demographic/socio-economic characteristics, (ii) job/employment characteristics, (iii) labor outcomes since the quarantine began, and (iv) other information.

For demographic/socio-economic characteristics, we asked presence of a partner (including spouse), presence of children—defined as children in college or below—and elderly—defined as person aged 65 or more—in a household, worker's education, and income of the respondent and his/her partner.

For job/employment characteristics, we asked the type of employment (regular employee, non-regular employee, self-employment/freelance, family business, or others), availability of remote work (at least partially available or not available), and industry.

For the labor outcomes, we asked total 8 questions. Three questions were about the labor outcomes during the quarantine period: (i) whether daily hours worked during quarantine changed from the level just before quarantine; (ii) whether daily earnings changed from the level just before quarantine; and (iii) if the answer to the second question is yes, the magnitude of the earnings reduction as a percentage of the pre-quarantine level. Note that, if a respondent had multiple experiences of quarantine due to close contact during the Covid-19 pandemic, he/she answers an outcome of his/her first experience.[5]

Five questions were about the labor outcomes after the quarantine period: (i) whether monthly hours worked after the quarantine changed relative to the level just before

[3] https://www.cross-m.co.jp/en/

[4] The specific amount of points given upon completing our survey is hidden information for us.

[5] There is no response that had zero days of quarantine following close contact.

quarantine; (ii) whether monthly earnings changed after the quarantine relative to the level just before quarantine; (iii) if the answer to the first question is yes, the duration of the reduction in hours worked (in months); if the answer to the second question is yes hours, (iv) the magnitude of the earnings reduction as a percentage of the pre-quarantine level and (v) the duration of the earning reduction (in months).

Note that our survey collected data on hours and earnings with "high frequency". We asked changes in daily hours and earnings during the quarantine period and changes in monthly hours and earnings after the quarantine period *relative to the level right before the quarantine began*. With this high-frequency nature of our questions, these reported reductions in hours worked and earnings likely reflect the effects of quarantine, as opposed to the effects related to the low labor demand during the pandemic.

For "other information," we asked; when the quarantine began; how many days the quarantine lasted; whether the respondent took a Covid-19 test after being exposed to an infected person; their test results if they were tested—that is, whether they were infected with Covid-19.

The total number of responses completing the main questions is 7,998.[6] There were two responses with 999 days of quarantine and we removed the two responses from the samples throughout the analysis.

Table 1 shows summary statistics for key variables from our survey. The average age is 42.8. The share of workers with college or more education is 63 percent in our survey, substantially larger than 36 percent based on the Labor Force Survey. 66.8 percent of respondents lived with their spouse/partner, 12.7 percent lived with elderly(s) where elderly refers to someone aged 65 or more, and 42.5 percent lived with child(ren) where children include infants and primary-school, secondary-school, high-school, and college students. The average earnings of respondents are 4.3 million yen and those of partners are also 4.3 million yen. According to the Basic Survey on Wage Structure, the average annual earnings over 2020 to 2022 are 3.7 million yen. The share of non-regular employees is 23.8 percent. Our survey features a smaller share of non-regular employees relative to the share of non-regular employees in 2020 with age 15 to 64 from the Labour Force Survey—33 percent. These demographic and socioeconomic distributions are relatively stable over time.

The sample sizes increase over time. The sample sizes are 574, 1,274, and 5,606 in 2020, 2021, and 2022, respectively. The number of infections in our sample is 2.2 and 9.8 in 2021 and 2022, respectively, relative to 2020. This increasing pattern is qualitatively consistent with the increasing pattern in the number of infections. According to the Ministry of Health,

[6]We contacted 137,831 individuals in total. Among them, 28,154 individuals, 20.4 percent, completed the filtering questions and 7998 individuals had experience of quarantine.

Labour and Welfare, the numbers of infections are 60,312, 383,060, and 3,987,922 in 2020, 2021, and 2022, respectively. The numbers of infections are 6.4 and 66.1 in 2021 and 2022, respectively, relative to 2020. Note that the number for 2023 is small because our survey took place in February: Our survey only covers information about quarantines that occurred in January and early February in 2023.

	Year of close contact				
Variable	2020-2023	2020	2021	2022	2023
Number of samples	7,996	574	1,274	5,606	542
Average age	42.8	42.5	41.5	43.0	43.6
Share of male (%)	50.6	54.9	55.1	49.6	45.8
Share of college or more education (%)	62.9	67.1	62.9	62.8	59.8
Share of living with spouse/partner (%)	66.8	58.0	62.5	68.6	67.5
Share of living with elderly(s) (%)	12.7	13.1	13.9	12.3	13.7
Share of living with children (%)	42.5	32.6	39.6	44.9	35.4
Average income (million yen)	4.3	4.5	4.4	4.3	4.0
Partner's average income (million yen)	4.3	4.3	4.3	4.2	4.5
Share of non-regular employee (%)	23.8	21.9	22.9	24.1	25.2
Share of remote work available workers (%)	53.4	56.0	54.5	53.6	46.5
Average duration of quarantine (days)	7.8	8.4	10.3	7.3	6.0

Table 1: Summary statistics of demographic/family/employment characteristics

3 Labor Outcomes During and After Quarantine

Table 2 presents summary statistics on labor outcomes during and after quarantine. We compute these statistics with full samples, samples of workers tested positive, and samples of workers tested negative. The statistics are computed for 2020-2023, as well as for each year.

From 2020 to 2023, 35.6 percent and 22.6 percent of quarantined workers experienced reductions in hours and earnings, respectively. The average reduction in earnings was 55.4 percent conditional on a reduction. In other words, nearly a quarter of workers lost more than half of their pre-quarantine earnings on average.

Reductions in hours and earnings were observed even after the quarantine period is over. 15.3 percent and 12.0 percent of quarantined workers continued to suffer reductions in hours and earnings, respectively, after the quarantine period. The reduction in earnings was 37.5 percent on average. The reduction in hours and earnings lasted for 2.7 months and 3.5 months, respectively. In other words, more than ten percent of workers suffered in the labor market for nearly a quarter after quarantine.

The likelihood of reductions in hours worked and earnings as well as the size of the

Variable	Sample	Year of close contact 2020-2023	2020	2021	2022	2023
Labor outcomes during quarantine						
Share of workers with reduced hours (%)	Full	35.6	35.5	37.6	35.2	36.2
	Tested positive	33.1	36.9	38.3	31.0	31.3
	Tested negative	42.8	36.0	39.8	43.3	45.4
Share of workers with reduced earnings (%)	Full	22.6	24.0	24.6	22.1	22.1
	Tested positive	21.7	24.3	24.3	20.8	18.5
	Tested negative	25.6	22.5	28.2	25.0	29.5
Average size of reduction in earnings (%)	Full	55.4	51.8	51.4	56.6	57.2
	Tested positive	53.5	51.4	49.8	55.0	55.9
	Tested negative	56.2	54.0	52.2	56.6	58.7
Labor outcomes after quarantine						
Share of workers with reduced hours (%)	Full	15.3	15.5	16.2	14.9	17.7
	Tested positive	13.1	14.0	15.5	12.2	12.8
	Tested negative	19.8	19.8	20.4	19.0	26.1
Share of workers with reduced earnings (%)	Full	12.0	12.5	13.5	11.3	15.9
	Tested positive	10.8	11.7	13.3	9.9	9.5
	Tested negative	14.3	14.4	16.2	13.1	23.7
Average size of reduction in earnings (%)	Full	37.5	41.9	39.8	37.0	32.2
	Tested positive	34.1	43.2	36.3	32.3	25.5
	Tested negative	39.4	41.2	42.4	39.4	35.9
Average duration of reduced hours (month)	Full	2.7	4.0	4.4	2.2	1.9
	Tested positive	3.0	4.0	4.5	2.3	2.8
	Tested negative	2.2	4.0	3.0	2.1	1.3
Average duration of reduced earnings (month)	Full	3.5	6.0	5.2	2.9	2.3
	Tested positive	3.9	5.8	4.9	3.3	2.1
	Tested negative	2.7	5.8	3.6	2.4	2.2

Table 2: Summary statistics of labor outcomes

reduction in earnings remained relatively stable over time. However, the duration of reductions in hours and earnings becomes noticeably shorter over time: The duration of the reduction in hours declines from 4.0 months in 2020 to 1.9 months in 2023. The duration of the reduction in earnings declines from 6.0 months in 2020 to 2.3 months in 2023.

Importantly, even uninfected quarantined workers—those workers tested negative—experienced a persistent reduction in hours and earnings. 19.8 percent and 14.3 percent of uninfected quarantined workers had reductions in hours and earnings after quarantine, respectively. The average reduction in earnings was 39.4 percent on average. The reduction in hours and earnings lasted for 2.2 months and 2.7 months on average, respectively. This result indicates that quarantine had persistent negative effects on hours and earnings independent of the negative health effects associated with Covid-19 infection—such health effects are known to be also persistent and often referred to as "Long COVID." We call this persistent negative impact on labor outcomes for uninfected quarantined workers "the scar of quarantine."

The duration of the scar—the duration of reduction in hours and earnings for uninfected quarantined workers—declined over time. The duration of hours reduction declined from 4.0 months in 2020 to 1.3 months in 2023. The duration of earnings reduction declined from 5.8 months in 2020 to 2.2 months in 2023. The likelihood and the size of the reduction remained stable over time for uninfected workers. The likelihood of reduction in hours and earnings varied from 19.8 percent in 2020 to 19.0 percent in 2022 and from 14.4 percent in 2020 to 13.1 percent in 2022, respectively. The size of earnings reduction was 41.2 percent in 2020 and 39.4 in 2022.

4 Heterogeneity in Labor Outcomes During and After Quarantine

The previous section established that a sizable fraction of workers experienced reductions in hours worked and earnings during and after the quarantine period. In this section, we use regression analysis to study what types of workers are more likely to experience such negative labor outcomes.

4.1 Specification

We analyze how labor outcomes are related to workers' characteristics using a simple OLS regression:

$$y_i = \boldsymbol{\beta}' \mathbf{x}_i + \epsilon_i,$$

where y_i is an outcome variables of individual i, $\mathbf{x}_i$ is a vector of characteristics of individual i, $\boldsymbol{\beta}$ is a vector of coefficients on each characteristics, and ϵ_i is a disturbance term.

For outcome variables, we consider the eight statistics—three during the quarantine period and five after the quarantine period—discussed in the previous section.

The worker's characteristics, $\mathbf{x}_i$, include the following variables. For household characteristics, we have a dummy for female, a dummy for older age group (40 or more), a dummy for college education. For socioeconomic characteristics, we have a dummy for living with elderly, a dummy for living with kids, a dummy for higher income (four million yen or more), a dummy for having a partner/spouse with lower income (between zero and four million yen), a dummy for having a partner/spouse with higher income (four million yen or more). For job characteristics, we have a dummy for non-regular employee, a dummy for remote work option availability, dummies for raw material sector, manufacturing sectors, and food–beverage–accommodation sector[7]. Other variables are a dummy for tested positive, a dummy for test not taken, a dummy for longer quarantine (8 days or more), and dummies for month–year fixed effect.

4.2 Results

4.2.1 Characteristics Related to Hours and Earnings During Quarantine

Table 3 presents the regression results for the three labor outcome variables during quarantine. The first, second, and third columns are the for reduction in hours, reduction in earnings, and the size of earnings reduction (conditional on reduced earnings), respectively.

Some demographic and socioeconomic characteristics were associated with labor outcomes in a statistically significant way. Female workers were 5.0 percentage point more likely to experience a reduction in hours than male workers. Female workers had an earnings reduction 5.4 percentage point larger than male workers did. Older workers were 3.3 percentage point and 3.1 percentage point less likely to experience a reduction in hours and earnings, respectively, than younger workers. Workers with a college degree or higher were 2.3 percentage point less likely to face reduced earnings than workers without a college degree. Workers living with children faced 2.8 and 3.0 percentage point higher likelihoods of hours and earnings reduction, respectively. Workers with higher income were

[7]We classified industries into four sectors. Raw materials sector includes agriculture, fisheries/forestry/aquaculture, and mining. Manufacturing sector includes construction industry and manufacturing. Food–beverage–accommodation sector consists of just food–beverage–accommodation industry. The rest is the service sector excluding food–beverage–accommodation. It includes wholesale and retail, financial and insurance, real estate, transportation, information services and research, telecommunications, electric/gas/water/heat supply, medical and welfare, education and learning support, other services, public service, and others.

	Reduction dummy		Size of reduction
	Hours	Earnings	Earnings
Sex: female	0.050***	−0.005	5.404**
	(0.018)	(0.009)	(2.583)
Age: older (40+)	−0.033***	−0.031***	1.202
	(0.006)	(0.005)	(1.653)
College or more	0.028*	−0.023**	2.278
	(0.017)	(0.011)	(2.289)
Living with elderly	0.036*	0.015	−3.643
	(0.019)	(0.012)	(2.602)
Living with children	0.028**	0.030**	−0.538
	(0.014)	(0.013)	(1.836)
Income: higher (4M+ yen)	0.001	−0.082***	−6.265***
	(0.021)	(0.010)	(2.111)
Partner's income: lower (0-4M yen)	0.019	−0.008	3.362**
	(0.017)	(0.015)	(1.705)
Partner's income: higher (4M+ yen)	−0.008	−0.008	4.978**
	(0.018)	(0.014)	(2.101)
Non-regular employee	0.068***	0.217***	20.878***
	(0.017)	(0.028)	(2.310)
Remote work available	−0.232***	−0.153***	−16.046***
	(0.018)	(0.018)	(2.050)
Industry: Food–beverage –accommodation	0.066***	0.054***	3.526***
	(0.017)	(0.011)	(1.298)
Test: positive	0.087***	0.017**	0.867
	(0.008)	(0.007)	(1.528)
Test: not taken	−0.038***	−0.035***	0.513
	(0.012)	(0.009)	(1.552)
Quarantine: longer (8+ days)	0.064***	0.066***	0.794
	(0.016)	(0.013)	(1.172)
Num.Obs.	7025	7025	1462
R^2	0.109	0.194	0.254

* p < 0.1, ** p < 0.05, *** p < 0.01

Diaplaying estimated coefficients for selected variables with their industry-clustered standard errors in parenthesis.

Table 3: Estimated coefficients from the regression of labor outcomes during quarantine

8.2 percentage point less likely to experience a reduction in earnings than workers with lower income.

Job characteristics—non-regular vs. regular, remote work availability, and industry—were associated with the labor outcomes during quarantine in a statistically significant and quantitatively important way. Non-regular employees were 6.8 percentage point and 21.7 percentage point more likely to experience reductions in hours and earnings, respectively, than regular employees. Non-regular employees faced 20.9 percentage point larger reduction in earnings than regular employees did. Workers with remote work options are 23.2 percentage point and 15.3 percentage point less likely to experience the reduction in hours and earnings, respectively, than workers without remote work options. Workers with remote work options faced 16.0 percentage point smaller reduction in earnings than workers without remote work option did. Workers in food–beverage–accommodation industries are 6.6 percentage point and 5.4 percentage point more likely to experience reduction hours and earnings than workers in the service sector, respectively. Workers in food–beverage–accommodation industries faced 3.5 percentage point larger reduction in earnings than workers in the service sector did.

The test outcome and quarantine duration were associated with some labor outcomes in a statistically significant way. Workers tested positive were 8.7 percentage point and 1.7 percentage point more likely to experience reductions in hours worked and earnings, respectively, than workers tested negative. Workers experienced a reduction in hours 6.4 percentage point more likely and a reduction in earnings 6.6 percentage point more likely when quarantine is longer than a week than when quarantine is a week or shorter.

4.2.2 Characteristics Related to Hours and Earnings After Quarantine

Table 4 presents the regression results with the labor outcomes after quarantine. As in Table 3, the first, second, and third columns are the for reduction in hours, reduction in earnings, and the size of earnings reduction (conditional on reduced earnings), respectively. The fourth and fifth columns are the duration of reductions in hours and earnings.

Some demographic and socioeconomic characteristics were associated with some labor outcomes after quarantine in a statistically significant way. Female workers faced 0.60 months shorter duration of reduction in hours than male workers. Older workers experienced 1.37 months longer reduction in earnings than younger workers. Workers with a college degree or higher were 1.5 percentage point and 3.3 percentage point less likely to experience reduction in hours and earnings, respectively, than workers without a college degree.

Workers with higher income were 2.0 percentage point less likely to experience a hours reduction and 3.5 percentage point less likely to experience an earnings reduction than

	Reduction dummy		Size of reduction	Duration of reduction	
	Hours	Earnings	Earnings	Hours	Earnings
Sex: female	−0.006	−0.016	−0.143	−0.598**	−0.100
	(0.008)	(0.012)	(2.305)	(0.269)	(0.495)
Age: older (40+)	−0.005	−0.003	0.425	0.499*	1.369**
	(0.006)	(0.006)	(2.452)	(0.259)	(0.644)
College or more	−0.015**	−0.033***	−0.007	−0.213	0.366
	(0.007)	(0.009)	(1.967)	(0.276)	(0.472)
Living with elderly	0.014	0.018	1.833	0.334	0.772
	(0.014)	(0.014)	(3.656)	(0.378)	(0.619)
Living with children	0.019*	0.018**	−1.282	0.065	−0.421
	(0.011)	(0.009)	(1.979)	(0.332)	(0.300)
Income: higher	−0.020**	−0.035***	−8.524***	−0.245	−0.112
(4M+ yen)	(0.010)	(0.009)	(2.740)	(0.343)	(0.455)
Partner's income: lower	−0.005	−0.017	1.860	−0.807**	−0.246
(0-4M yen)	(0.013)	(0.011)	(2.660)	(0.318)	(0.436)
Partner's income: higher	−0.003	−0.010	1.318	−0.635***	−0.841
(4M+ yen)	(0.013)	(0.008)	(2.103)	(0.239)	(0.551)
Non-regular employee	0.091***	0.084***	6.438***	−0.407	−0.801
	(0.016)	(0.013)	(1.886)	(0.295)	(0.622)
Remote work available	−0.067***	−0.061***	−4.410	0.378*	0.354
	(0.011)	(0.011)	(2.935)	(0.216)	(0.469)
Industry: Food–beverage	0.067***	0.053***	−4.814***	−0.134	−0.129
–accommodation	(0.010)	(0.009)	(1.389)	(0.148)	(0.200)
Test: positive	0.057***	0.029***	6.092***	−0.499*	−0.102
	(0.008)	(0.008)	(2.319)	(0.255)	(0.428)
Test: not taken	−0.010	−0.003	3.790*	0.375	0.669
	(0.010)	(0.009)	(2.177)	(0.465)	(0.585)
Quarantine: longer (8+ days)	0.029**	0.027***	2.983*	−0.137	−0.763
	(0.012)	(0.006)	(1.799)	(0.177)	(0.578)
Num.Obs.	7025	7025	738	993	738
R^2	0.060	0.076	0.152	0.153	0.152

* p < 0.1, ** p < 0.05, *** p < 0.01

Diaplaying estimated coefficients for selected variables with their industry-clustered standard errors in parenthesis.

Table 4: Estimated coefficients from the regression of labor outcomes after quarantine

workers with lower income. Workers with higher income experienced 8.5 percentage point smaller reduction in earnings than workers with lower income. Workers faced 0.81 months and 0.64 months shorter duration of reduction in hours when his/her partner's income was less than four million yen and when his/her partner's income was more than four million yen, respectively, than when a worker had no partner. Workers' household member composition—living with children or elderly—had no statistically significant relation to labor outcomes.

Job characteristics were related to some labor outcomes after quarantine in a statistically significant and quantitatively important way. Non-regular employees are 9.1 percentage point and 8.4 percentage point more likely to experience reductions in hours and earnings, respectively, than regular employees. Non-regular employees faced an earning reduction that is 6.4 percentage point larger than regular employees did. Workers with remote work option were 6.7 percentage point and 6.1 percentage point less likely to experience reductions in hours and earniings, respectively, than the ones without remote work option. Workers in food–beverage–accommodation industry were 6.7 percentage point and 5.3 percentage point more likely to experience hours and earnings reduction, respectively, than those in service sector. Workers in food–beverage–accommodation industry faced 4.8 percentage point smaller reduction in earnings than the ones in service sector did. These job characteristics were overall not associated with the duration outcomes in a statistically significant way.

Test outcomes and duration of quarantine were also associated with some labor outcomes in a statistically significant way. Workers tested positive were 5.7 percentage point and 2.9 percentage point more likely to experience reductions in hours and earnings, respectively, than workers tested negative. Workers tested positive faced 6.1 percentage point larger earnings reduction than workers tested negative did. The likelihood of hours reduction is 2.9 percentage point higher when quarantine is of longer duration (longer than seven days) than when quarantine is of short duration (within seven days).

4.2.3 Characteristics Related to Scar (Hours and Earnings of Tested Negative After Quarantine)

We now analyze heterogeneity in the scarring effects of quarantine. For that purpose, we run regressions with labor outcomes after quarantine using only the sample of uninfected workers—workers tested negative. The estimated coefficients are presented in Table 5.

Some demographic and socioeconomic characteristics are related to some aspects of the scar, though the relations are typically weaker than what we have seen in Table 3 and 4. Uninfected workers with college or more education were 2.9 percentage point less likely to experience a reduction in earnings than uninfected workers without college education. Uninfected workers with higher own income were 3.7 percentage point less likely to experience

	Reduction dummy		Size of reduction	Duration of reduction	
	Hours	Earnings	Earnings	Hours	Earnings
Sex: female	−0.001	−0.017	−2.315	−0.432	1.227
	(0.010)	(0.013)	(3.882)	(0.597)	(1.203)
Age: older (40+)	−0.009	−0.014	−2.458	0.721	1.717*
	(0.013)	(0.011)	(3.425)	(0.580)	(0.991)
College or more	−0.009	−0.029**	−2.698	−0.219	0.098
	(0.015)	(0.013)	(3.457)	(0.620)	(0.367)
Living with elderly	0.015	0.036*	−1.714	−0.759	0.298
	(0.012)	(0.021)	(4.032)	(0.611)	(0.862)
Living with children	0.018	0.013	2.807	−0.587	−0.899
	(0.016)	(0.011)	(2.369)	(0.563)	(0.695)
Income: higher (4M+ yen)	−0.014	−0.037***	−4.713	−0.246	0.596
	(0.013)	(0.012)	(3.770)	(0.704)	(1.101)
Partner's income: lower (0-4M yen)	0.005	−0.004	−2.541	−0.782	−0.904
	(0.011)	(0.010)	(3.809)	(0.610)	(1.285)
Partner's income: higher (4M+ yen)	−0.005	0.003	−4.066	−0.824	−1.908
	(0.018)	(0.007)	(3.427)	(0.641)	(1.278)
Non-regular employee	0.086***	0.072***	13.739***	−0.007	−1.243
	(0.023)	(0.018)	(2.562)	(0.474)	(1.175)
Remote work available	−0.077***	−0.053***	−1.590	0.936**	1.106
	(0.016)	(0.013)	(4.490)	(0.372)	(0.970)
Industry: Food–beverage –accommodation	0.105***	0.080***	−9.820***	−0.917***	0.656
	(0.014)	(0.012)	(1.846)	(0.280)	(0.431)
Quarantine: longer (8+ days)	0.017	0.031***	5.889**	−0.210	−0.506
	(0.016)	(0.010)	(2.409)	(0.454)	(0.853)
Num.Obs.	3199	3199	296	386	296
R^2	0.063	0.073	0.290	0.220	0.219

* p < 0.1, ** p < 0.05, *** p < 0.01

Diaplaying estimated coefficients for selected variables with their industry-clustered standard errors in parenthesis.

Table 5: Estimated coefficients from the regression of labor outcomes after quarantine with samples of workers tested negative

a reduction in earnings than uninfected workers with lower own income. Sex, age, living with children or elderly, and the existence of partner, and partner's earnings were not associated with the outcome variables in a statistically significant way.

Job characteristics were associated with some of the labor outcomes of uninfected workers in a statistically significant and quantitatively important way, as in the previous subsection. That is, among uninfected workers, non-regular workers, workers without remote work options, and workers in food–beverage–accommodation industries were more likely to experience reductions in hours worked and earnings.

The quarantine duration was also associated with some of the labor outcomes of uninfected workers in a statistically significant and quantitatively important way, as in the previous subsection. Workers with longer quarantine were 3.1 percentage point more likely to experience a reduction in earnings than workers with shorter quarantine, with 5.9 percentage point larger reduction.

5 Macroeconomic Impact

In this section, we estimate the reduction in aggregate hours associated with quarantine in Japan.

5.1 Estimation Procedure

First, we estimate the average reduction in hours for each year of quarantine, industry, and test outcomes from our survey. We begin by splitting the entire sample into sub-samples based on the year of quarantine, industry, and test outcomes. For each sub-sample, we estimate the likelihood of reduction in hours for both during and after quarantine. To obtain the average reduction of hours, we multiply it with the product of average size of earnings reduction during/after quarantine conditional on reduction—substitute for the size of reduction in hours conditional on reduction because our data does not have information on the size of hours reduction—and the average duration of quarantine/hours reduction.

Second, we compute the average reduction in hours for each year of quarantine and test outcomes. To this end, we take the average over industries of the average reduction for each year of quarantine, industry, and test outcomes obtained in the previous step using industry-wise employment from Population Census as weight for each industry to aggregate. By this procedure of taking industry-wise employment weighted average, we can match our samples to data in terms of the distribution of workers' industry, which is not matched in our survey design.

Third, we compute average reduction per quarantined worker for each year by aggregating over the test outcomes. In computing the average reduction caused by quarantine, it is not clear if the reduction of hours for tested positive is due to quarantine or infection. We attribute all of their reductions to infection because the reduction in hours by tested positive in our paper is smaller than the average reduction of hours due to infection in Chiba et al. (2024). Thus, we set the hours reduction for workers tested positive to zero.

Finally, we obtain the aggregate reduction due to quarantine by multiplying the average reduction per quarantined worker with the number of close contacts within workers. We estimate the number of close contacts within workers by multiplying 5.35 on the estimated number of positive cases within workers based on a survey conducted in a city in Toyama[8], which showed that there are a total of 530 close contacts for 99 infected people. The number of positive cases within workers are estimated by combining data on the number of positive cases with ages between 20 to 69 from the Ministry of Health, Labour, and Welfare and the labor force participation rate within age 15 to 64 from Labor Force Survey.

In addition to the baseline scenario, we compute the reduction in aggregate hours under two different scenarios to take into account uncertainties associated with various assumptions in the baseline calculation. In one scenario, we provide a low estimate on the reduction by assuming (i) one day shorter quarantine duration, (ii) a month shorter duration of hours reduction after quarantine, (iii) average hours reduction during and after quarantine 20 percent smaller than the average earnings reduction, and (iv) fewer cases of quarantine obtained from data of (iv-a) the number of positive cases between age 20 to 59 and (iv-b) the labor force participation rate of age 15 or more. In the other scenario, we provide a large estimate on the reduction by assuming (i) one day longer quarantine duration, (ii) a month longer duration of hours reduction after quarantine, (iii) the size of hours reduction during and after quarantine 20 percent larger than the ones of earnings, and (iv) larger cases of quarantine obtained from data of (iv-a) the number of positive cases between age 20 to 79 and (iv-b) the labor force participation rate within age 15 and 64 (same as the baseline). Table 5.1 summarizes these assumptions.

5.2 Result

We plot the aggregate hours reduction of 2020, 2021, and 2022 in the left panel of Figure 1 as black bars. In the figure, we plot them relative to the aggregate hours in 2019. The upper and lower end of band represent the estimated reduction from the two alternative scenarios. According to the left panel, the aggregate reduction in hours due to quarantine was modest

[8] https://www.niid.go.jp/niid/ja/2019-ncov/2488-idsc/iasr-news/10285-495p04.html

(i) Quarantine duration	
Data source and assumptions	
High estimate	Baseline plus one day
Baseline	Our survey
Low estimate	Baseline minus one day
Averages in each year (unit: days)	
High estimate	8.5 in 2020, 8.6 in 2021, 5.4 in 2022
Baseline	7.7 in 2020, 7.8 in 2021, 4.7 in 2022
Low estimate	6.9 in 2020, 7.1 in 2021, 4.2 in 2022
(ii) Duration of reduction after quarantine	
Data source and assumptions	
High estimate	120% of baseline
Baseline	Our survey
Low estimate	80% of baseline
Averages in each year (unit: months)	
High estimate	3.7 in 2020, 3.1 in 2021, 1.7 in 2022
Baseline	3.2 in 2020, 2.6 in 2021, 1.2 in 2022
Low estimate	2.7 in 2020, 2.1 in 2021, 0.8 in 2022
(iii) Size of reduction after quarantine	
Data source and assumptions	
High estimate	120% of baseline
Baseline	Our survey
Low estimate	80% of baseline
Averages in each year (unit: percent)	
High estimate	38.1 in 2020, 36.5 in 2021, 24.5 in 2022
Baseline	31.7 in 2020, 30.4 in 2021, 20.4 in 2022
Low estimate	25.3 in 2020, 24.4 in 2021, 16.3 in 2022
(iv-a) Number of positive cases from the Ministry of Health, Labour, and Welfare	
Age groups used	
High estimate	Of age 20–79
Baseline	Of age 20–69
Low estimate	Of age 20–59
Values (unit: million)	
High estimate	0.19 in 2020, 1.08 in 2021, 17.09 in 2022
Baseline	0.18 in 2020, 1.02 in 2021, 15.94 in 2022
Low estimate	0.16 in 2020, 0.94 in 2021, 14.33 in 2022
(iv-b) Labor force participation rate from Labor Force Survey	
Age groups used	
High estimate	Of age 15–64 in 2019 (same as baseline)
Baseline	Of age 15–64 in 2019
Low estimate	Of age 15 and over in 2019
Values	
High estimate	0.78
Baseline	0.78
Low estimate	0.61

Table 6: Data source in benchmark and assumptions in low estimate and high estimate scenarios

The numbers in parenthesis of the first four three rows show averages over industries and test outcomes. When we compute the averages, quarantine duration, duration of reduction after quarantine, and the size of reduction during/after quarantine for workers tested positive are set to zero as is consistent with the procedure in Section 5.1. Due to this manner of averaging, the differences in the average quarantine duration across scenarios are less than one day, and the differences in the average duration of reduction after quarantine across scenarios are less than one month.

in 2020 and 2021 but sizable in 2022. The aggregate reduction in 2020 was 0.06 percent of 2019 aggregate hours and the one in 2021 is 0.23 percent. The number increased to 0.98 percent in 2022.

We decompose the aggregate reduction into reduction per quarantine—shown in the middle panel—and the cases of quarantine—shown in the right panel—both as black bars. According to the middle panel, the reduction per quarantine decreased over time. The reduction in hours per quarantine was 118.1 hours in 2020, 74.8 hours in 2021, and 20.2 hours in 2022. In contrast, the cases of quarantine significantly increased over time. According to the right panel, the estimated number of quarantine surged from 0.7 million in 2020 to 66.2 million in 2022. This significant increase in the cases of quarantine dominated the decrease in reduction per quarantine, making the aggregate impact increase over time.

The scar played a crucial role in determining the aggregate impact. The gray bars in the left and middle panels show the corresponding reduction without the scar—aggregate and individual reductions excluding the reduction after quarantine. According to the middle panel, the reduction per quarantine would have been 9.6 hours in 2020, 9.0 hours in 2021, and 4.3 hours in 2022 without the scar. The smaller reduction per quarantine resulted in a smaller aggregate hours reduction. According to the left panel, 0.005 percent in 2020, 0.028 percent in 2021, and 0.21 percent in 2022. These aggregate reductions without the scar (gray bars) were 8.3 percent in 2020, 12.1 percent in 2021, and 21.4 percent in 2022 relative to the ones with the scar (blue bars). In other words, the scar explained more than three quarters of the aggregate hours reduction.

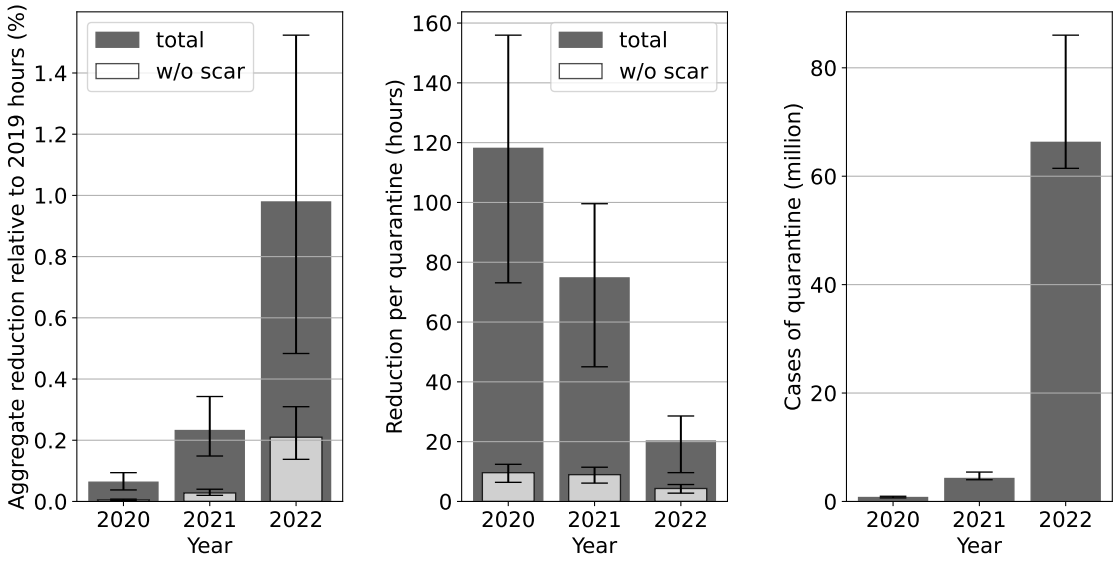

Figure 1: Aggregate reduction by quarantine, reduction per quarantine, and cases of quarantine

6 Conclusion

We investigated the consequences of quarantine policy for labor outcomes of quarantined workers. Our data revealed that hours worked and earnings declined for a large fraction of workers not only during quarantine but also after quarantine. Importantly, even uninfected workers experienced reductions in hours and earnings after quarantine, i.e. quarantine leaves scar on hours and earnings. Our regression analysis found that non-regular employees suffered more and workers with remote work option suffered less. We estimated the quarantine reduced aggregate hours worked in Japan non-trivially and the majority of the reduction is associated with the scarring effects of the quarantine policy.

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A Appendix

A.1 Regressions with Full-samples for Robustness

In this appendix, we provide regression results with full samples to discuss the robustness of the findings in Section 4.2 whose regressions use only the samples of employees.

Due to the difference in samples, few changes are made in the specification of $\mathbf{x}_i$ from Section 4.1. Instead of a non-regular employee dummy, a set of dummies for employment type (employees—benchmark, family business, and self-employed/freelance) is used in this Appendix. Also, $\mathbf{x}_i$ does not contain a remote work option dummy in the alternative regressions because our data cannot tell if non-employees had a remote work option.

Table 7, 8, and 9 present the alternative regression results. The three tables consider labor outcomes during quarantine, labor outcomes during quarantine, and uninfected workers'

labor outcomes after quarantine, respectively. (They correspond to Table 3, 4, and 5 in Section 4.2.)

For most characteristics, the relations to labor outcomes are broadly consistent with the ones found in Section 4.2. Female workers and older workers are more likely to experience a reduction in hours. Workers with a college degree or higher and workers without children are less likely to experience reductions in hours and earnings than workers without a college degree and workers with children, respectively. WWorkers in the food–beverage–accommodation industry, workers tested positive, workers with longer duration of quarantine are more likely to experience reductions in hours and earnings than workers in other service sectors, workers tested negative, and workers with shorter duration of quarantine, respectively.

The only noteworthy difference from the results in Section 4.2 is the coefficients on own income. According to the alternative regressions with full samples—Table 8, Table 8, and Table 9—Workers with higher income are less likely to experience reductions in hours and earnings than workers with lower income in a strongly statistically significant and quantitatively important manner, which we did not find in Section 4.2 where we used only samples of employees.

The importance of income in the alternative regressions is likely due to the the omission of non-regular employee dummy and remote work availability dummy. In section 4.2, we find that the employment type (regular vs non-regular) and remote work availability are the two most important characteristics related to the labor outcomes. However, these two job characteristics are not included in the alternative regressions with full samples because we asked these two job characteristics only for employees. Since employment type and remote work availability are correlated with the level of income, the strong relations between the two job characteristics and the labor outcomes are absorbed by the income dummy in the alternative regressions.

	Reduction dummy		Size of reduction
	Hours	Earnings	Earnings
Sex: female	0.070***	0.017	8.996***
	(0.023)	(0.013)	(2.357)
Age: older (40+)	−0.014	0.005	5.567***
	(0.010)	(0.008)	(1.695)
College or more	−0.042**	−0.085***	−0.808
	(0.019)	(0.012)	(2.346)
Living with elderly	0.031**	0.014	−1.350
	(0.016)	(0.014)	(2.344)
Living with children	0.032**	0.027**	−1.336
	(0.013)	(0.011)	(2.105)
Income: higher	−0.083***	−0.205***	−15.390***
(4M+ yen)	(0.024)	(0.014)	(1.629)
Partner's income: lower	0.023*	−0.006	3.864**
(0-4M yen)	(0.013)	(0.014)	(1.882)
Partner's income: higher	−0.017	−0.006	4.274*
(4M+ yen)	(0.015)	(0.018)	(2.507)
Employment: family business	0.092	0.143**	16.742*
	(0.064)	(0.058)	(8.670)
Employment: self-employed/freelance	0.026	0.133***	15.818***
	(0.039)	(0.034)	(2.804)
Employment: other	−0.157***	−0.096*	16.781***
	(0.055)	(0.058)	(3.969)
Industry: Food–beverage	0.117***	0.126***	10.008***
–accommodation	(0.020)	(0.015)	(1.401)
Test: positive	0.080***	0.019**	0.955
	(0.010)	(0.008)	(1.919)
Test: not taken	−0.044**	−0.036***	1.649
	(0.018)	(0.013)	(1.801)
Quarantine: longer (8+ days)	0.063***	0.066***	2.596***
	(0.018)	(0.013)	(0.936)
Num.Obs.	7996	7996	1809
R^2	0.061	0.129	0.151

* p < 0.1, ** p < 0.05, *** p < 0.01

Diaplaying estimated coefficients for selected variables with their industry-clustered standard errors in parenthesis.

Table 7: Estimated coefficients from the alternative regression of labor outcomes during quarantine

	Reduction dummy		Size of reduction	Duration of reduction	
	Hours	Earnings	Earnings	Hours	Earnings
Sex: female	0.010	−0.006	1.233	−0.987***	−0.224
	(0.009)	(0.010)	(1.471)	(0.378)	(0.369)
Age: older (40+)	0.016**	0.014*	1.708	0.390**	1.090**
	(0.008)	(0.008)	(1.775)	(0.191)	(0.477)
College or more	−0.036***	−0.055***	−1.269	−0.342	0.239
	(0.009)	(0.008)	(1.611)	(0.259)	(0.379)
Living with elderly	0.007	0.021**	−0.431	0.136	0.665
	(0.015)	(0.011)	(2.447)	(0.412)	(0.502)
Living with children	0.015*	0.017***	−1.434	−0.008	−0.374
	(0.009)	(0.007)	(2.857)	(0.316)	(0.299)
Income: higher	−0.068***	−0.083***	−9.741***	−0.142	0.344
(4M+ yen)	(0.008)	(0.009)	(1.995)	(0.304)	(0.324)
Partner's income: lower	0.000	−0.008	3.151	−0.124	0.039
(0-4M yen)	(0.014)	(0.011)	(2.534)	(0.420)	(0.508)
Partner's income: higher	−0.010	−0.010	−0.706	−0.115	−0.419
(4M+ yen)	(0.014)	(0.007)	(2.698)	(0.350)	(0.380)
Employment: family business	0.186***	0.195***	19.310**	−0.241	−1.730**
	(0.055)	(0.054)	(9.722)	(0.469)	(0.698)
Employment: self-employed/freelance	0.076**	0.108***	12.577***	2.098***	2.030**
	(0.033)	(0.028)	(2.161)	(0.515)	(0.824)
Employment: other	−0.015	0.000	23.897***	2.386***	1.232**
	(0.030)	(0.031)	(4.562)	(0.710)	(0.478)
Industry: Food–beverage	0.094***	0.065***	−3.887***	−0.358*	−0.566**
–accommodation	(0.013)	(0.010)	(1.174)	(0.182)	(0.284)
Test: positive	0.057***	0.025***	6.439***	−0.558**	−0.508**
	(0.006)	(0.008)	(2.266)	(0.253)	(0.249)
Test: not taken	−0.013	−0.008	6.192**	0.306	0.676
	(0.010)	(0.009)	(2.443)	(0.397)	(0.445)
Quarantine: longer (8+ days)	0.035***	0.034***	4.437**	0.038	−0.362
	(0.010)	(0.008)	(1.798)	(0.151)	(0.375)
Num.Obs.	7996	7996	961	1224	961
R^2	0.048	0.066	0.171	0.115	0.156

* p < 0.1, ** p < 0.05, *** p < 0.01

Diaplaying estimated coefficients for selected variables with their industry-clustered standard errors in parenthesis.

Table 8: Estimated coefficients from the alternative regression of labor outcomes after quarantine

	Reduction dummy		Size of reduction	Duration of reduction	
	Hours	Earnings	Earnings	Hours	Earnings
Sex: female	0.013	−0.016	0.229	−0.939	0.508
	(0.012)	(0.012)	(2.789)	(0.602)	(0.653)
Age: older (40+)	0.014	0.007	1.174	0.576	1.299*
	(0.013)	(0.011)	(3.169)	(0.536)	(0.746)
College or more	−0.036**	−0.050***	−5.670*	−0.212	0.163
	(0.014)	(0.014)	(3.334)	(0.582)	(0.445)
Living with elderly	−0.006	0.032	−4.649*	−0.690	0.943
	(0.013)	(0.019)	(2.506)	(0.484)	(0.760)
Living with children	0.015	0.012	1.926	−0.591	−1.080
	(0.012)	(0.010)	(1.958)	(0.578)	(0.682)
Income: higher	−0.060***	−0.084***	−8.678***	−0.011	1.613*
(4M+ yen)	(0.012)	(0.011)	(2.831)	(0.630)	(0.917)
Partner's income: lower	0.002	−0.004	0.834	−0.447	−0.341
(0-4M yen)	(0.011)	(0.010)	(3.901)	(0.829)	(1.335)
Partner's income: higher	−0.014	0.004	−5.266	−0.057	−0.445
(4M+ yen)	(0.020)	(0.011)	(3.379)	(0.792)	(1.226)
Employment: family business	0.182***	0.157***	16.362	−0.422	−2.013***
	(0.060)	(0.053)	(11.454)	(0.942)	(0.772)
Employment: self-employed/freelance	0.057**	0.119***	12.792***	2.298	2.831**
	(0.027)	(0.036)	(3.187)	(1.448)	(1.153)
Employment: other	0.070***	0.107**	22.045**	2.159*	1.484*
	(0.025)	(0.047)	(9.605)	(1.284)	(0.797)
Industry: Food–beverage	0.140***	0.089***	−6.779***	−0.905***	0.151
–accommodation	(0.013)	(0.014)	(1.499)	(0.235)	(0.524)
Quarantine: longer (8+ days)	0.025*	0.041***	6.989***	−0.328	−0.567
	(0.014)	(0.013)	(2.127)	(0.454)	(0.411)
Num.Obs.	3548	3548	382	465	382
R^2	0.051	0.077	0.256	0.167	0.192

* p < 0.1, ** p < 0.05, *** p < 0.01

Diaplaying estimated coefficients for selected variables with their industry-clustered standard errors in parenthesis.

Table 9: Estimated coefficients from the alternative regression of labor outcomes after quarantine with samples of workers tested negative