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DISCUSSION PAPER SERIES

IZA DP No. 17371

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ABSTRACT

School Closures and Parental Labor Supply: Differential Effects of Anticipated and Unanticipated Closures*

This paper studies the labor supply responses of parents to anticipated school closures due to school holidays and unanticipated school closures due to the COVID-19 pandemic in Switzerland. Using the variation in the timing of school holidays by region, we find that while both fathers and mothers reduce hours worked in response to school holiday closures, fathers reduce theirs much more than mothers. To identify the effects of pandemic school closures, we focus on marginal workers – those in occupations that were resilient to the pandemic labor demand shocks but had limited ability to work remotely and therefore, faced the greatest challenge in meeting increased child care needs. We find that the unanticipated pandemic school closures reduced the hours worked of parents somewhat less than for workers without children. We find almost no negative effects on mothers, while for fathers, we find that their labor supply was affected less than that of men without children. In our heterogeneity analyses, we discover that fathers of older children and/or with greater ability to work remotely were the least affected by these school closures. This suggests that parents were able to successfully accommodate the increased child care needs due to lack of in-person schooling without any negative impact on their labor supply.

JEL Classification: D13, J16, J22

Keywords: COVID-19, school closures, lockdown measures, parental labor supply, gender

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1 Introduction

Schools are important not only for building children's human capital, but also for providing child care for a substantial part of the day, thus allowing parents to do paid work. In this paper, we study the effects of both anticipated (school holidays) and unanticipated (COVID-19 pandemic) school closures on parents' labor supply in Switzerland, studying adjustments at both the intensive and extensive margins. We use original data we collected on school holidays and COVID-19 pandemic school closures as well as novel information on the likely resiliency of jobs to pandemic labor demand shocks in order to identify the causal effects of these school closures.

The timing of school closures due to school holidays in Switzerland varies across cantons (similar to states). By comparing parents across cantons as well as with workers without children, we find sizeable reductions in parents' labor supply during school holidays. The absolute reduction in labor supply is larger for fathers than for mothers, but the reductions are similar relative to their baseline labor supply. These estimates indicate that schools serve an important role as a source of child care, thus enabling parents to work.

At the beginning of the COVID-19 pandemic, many countries implemented Non-Pharmaceutical Interventions (NPIs) to slow down the spread of the new coronavirus. Like many countries in Europe, Switzerland also closed schools and workplaces in March 2020 as part of its pandemic measures. We find that pandemic school closures reduced hours worked of parents, but somewhat less than for workers without children. We focus on *marginal* parents, who had to choose between paid work and care work. We find that the unanticipated pandemic school closures had almost no negative effects on mothers, while for fathers, we find that their labor supply was affected less than that of men without children. In our heterogeneity analyses, we discover that fathers of older children and/or with greater ability to work remotely were the least affected by these school closures.

Our study connects to two related strands of literature. First, Gelbach (2002), Fitzpatrick (2010), Barua (2014), Finseraas *et al.* (2017), Graves (2013a), Graves (2013b) and Gangl and Huber (2023) show that a child's entry into school is associated with increased maternal labor force participation. Whereas during school holidays, mothers reduce hours worked to spend more time on care work (Ward (2019), Duchini and Effenterre (2022), Cowan *et al.* (2023), and Price and Wasserman (2023)).

Second, while there is a large literature documenting the effects of the COVID-19 pandemic

and subsequent lockdown measures on employment outcomes, such as Chetty *et al.* (2020), Adams-Prassl *et al.* (2020), Alon *et al.* (2020), Benzeval *et al.* (2020), Faber *et al.* (2020), Schröder *et al.* (2020), Albanesi and Kim (2021), Barrero *et al.* (2021), Campa *et al.* (2021), Hossain and Hossain (2021), Goldin (2022), Casarico and Lattanzio (2022), and Bluedorn *et al.* (2023), only a few attempt to disentangle and quantify the causal effects resulting from the labor demand shocks to those resulting from the labor supply shock due to school closures on parents. In addition, earlier papers that study the impact of child care shocks on parental labor supply only looked at child care costs and child care availability (or early childhood education), rather than school closures.

In a pre-COVID-19 study, Jaume and Willén (2021) find that unanticipated school closures due to teacher strikes in Argentina led to mothers dropping out of the labor force and large reductions in their earnings. Papers looking at the impact of K-12 school closings and reopenings due to COVID-19 pandemic measures in the US also find similar effects on parents of school-age children. Garcia and Cowan (2022) show that when schools closed both fathers and mothers reduced hours worked and both were less likely to work full-time, with negative effects seen on their earnings, but only mothers were less likely to work at all. Similarly, Amuedo-Dorantes *et al.* (2023) find unanticipated school closures in the US have a long-term negative impact on mothers' labor supply. While Hansen *et al.* (2022) show that K-12 school reopenings are associated with increases in employment and hours worked among married women with school-age children with no measurable effects on labor supply of childless women, custodial fathers, or unmarried women.

In addition, Boca *et al.* (2021) show that the gender gap in household and care related activities increased during the COVID-19 pandemic. Andrew *et al.* (2022) also provide evidence that the COVID-19 pandemic worsened the gender division of labor in paid work and care work between parents of school-age children in two-parent opposite-gender families. They find that mothers' paid work decreased much more than fathers', and that mothers spent substantially more time doing child care and housework than their male partners.

We contribute to these two strands of literature in two ways. First, we compare and contrast school holiday closures with pandemic school closures, which is helpful in looking for possible alternative explanations for the absence of a pandemic effect. Second, we develop a novel identification strategy by focusing on pandemic resilient workers in order to plausibly separate labor supply responses from labor demand effects. These workers are in occupations where they were able to continue working while adhering to physical distancing requirements. Our results indicate that these workers were minimally affected by workplace closures. Therefore, workers in these pandemic

resilient occupations with children needed to balance their paid work with increased care work resulting from pandemic school closures (hence marginal parents).

The rest of this paper is structured as follows. In Section 2, we explain the Swiss institutional background. Section 3 describes the data and Section 4 presents some descriptive evidence. Section 5 outlines our empirical strategy. Results are discussed in Section 6 while Section 7 concludes.

2 Background

Switzerland is composed of 26 cantons (similar to states) and has three levels of government: federal, cantonal and communal (municipality). Most matters related to health and education are administered at the cantonal level.

Cantons are responsible for the administration and regulation of K-12 education—they each set their own school calendars and curricula, while the federal government sets the overall framework. Compulsory education lasts 11 years and is divided into lower and upper primary and lower secondary education. Lower primary education starts with kindergarten and is for children aged four to eight, while upper primary is for children aged eight to 12. Lower secondary education (middle school) is for ages 12 to 15. Upper secondary education, which is not compulsory, is another three to four years and could consist of either general education (high school) to prepare students to enter traditional tertiary institutions or vocational education. There is some cantonal variation in these age brackets.

Schools in Switzerland regularly close for extended holidays during the school year, outside of the long summer holidays. The exact start and end dates of these school holidays and their duration vary by canton and commune and over years, which are detailed further in Section 3.1.

In the initial phase of the COVID-19 pandemic, cantons bordering France and Italy, where infections first appeared and started to increase rapidly, introduced some early NPIs, such as canceling several large public events. As the pandemic worsened, the federal government required all cantons to implement stricter NPIs, termed *lockdown* measures. Cantons could expand on them further and in certain cases, could also relax them.

To protect jobs from being lost due to the economic impacts of these NPIs, as well as the labor demand shocks resulting from the pandemic, Switzerland extended the provision of existing *short-time* work (furlough pay). The eligibility criteria were expanded and the application process was

simplified.[1] In addition to workers on permanent and open-ended contracts, apprentices, temporary workers, and employees with fixed-term contracts also became eligible for short-time work, and the waiting period was waived. Companies still needed to obtain the consent of all employees who would be placed on short-time work. These employees were compensated with 80 percent of the loss of income resulting from the reduced work hours, up to a maximum of around 10,000 CHF, which came from the unemployment insurance fund. The number of workers placed on short-time work rose from around 5,000 in February 2020 to around 970,000 in March and to 1.3 million in April 2020.[2] The average duration of short-time work lasted for three to four months at the beginning of the pandemic. In April 2020, short-time work subsidies covered more than 70% of contracted hours (Magda and Lipowska (2022)).

3 Data

3.1 School closures

We collected daily data on school holidays for all 26 cantons from 2005 to 2021. These include the extended holidays during the school year, which is common in Switzerland, as well as the long summer holidays, which normally take place between July and August. School holidays average around 13 weeks in total over the calendar year. If there are differences at the municipality (communal) level within a canton, we chose the start and end dates of the holidays in the municipality of the capital city of the canton. Figure A1 shows the variation in extended school holidays by canton for the year 2023.

Similarly, we collected daily data on pandemic related measures affecting schools for the years 2020 and 2021 for the 10 largest cantons in terms of population using officially published cantonal legal decisions and ordinances applying the federal COVID-19 pandemic related legislation. We collected data separately for the three different school types: primary, middle and high school. The data collected cover information on when schools were completely closed, when schools were re-opened (with or without restrictions), when hybrid options were offered, and when other types of restrictions were in place, such as mask mandates, COVID-19 testing, COVID-19 certification, limitations on sports activities (all sports, or only water or contact sports), etc.

For each day for each school type (primary, middle and high school) in each canton, we define

[1] Expansion and simplification of application process for STW.
[2] Figures provided by the Swiss State Secretariat for Economic Affairs (SECO).

a binary variable on school closures that is equal to one if schools had been completely closed with a remote teaching mandate in place and zero otherwise. We then calculate a weekly moving sum of this binary variable on school closures and then take the average over all 10 cantons by type of school (primary, middle and high school). This is the national school closure variable that we use in our model. If schools had been closed (or equivalently, a remote teaching mandate was in effect) for a whole calendar week, we compute this value as 7. Otherwise, the value is the total number of days schools were closed during the school week. This variable, therefore, takes a value between 0 and 7.

Unlike US data on school closures (the Burbio K-12 School Opening Tracker,[3] the U.S. School Closure and Distance Learning Database (Parolin and Lee (2021)), or the COVID-19 School Data Hub[4]), we only observe variation by school type at the canton level and not at the school or school district level. However, we aggregate over all cantons for which we collected this data so our final school closure variable only varies by school type and over time for the whole of Switzerland.

Figure 1a shows the distribution of school holidays by canton over the year 2019. There are about four "peaks" shown: the winter or ski holidays in February, Easter holidays in April, the summer school holidays in July and the fall holidays in October, reflecting what is shown in Figure A1 and exhibiting large cantonal variations.

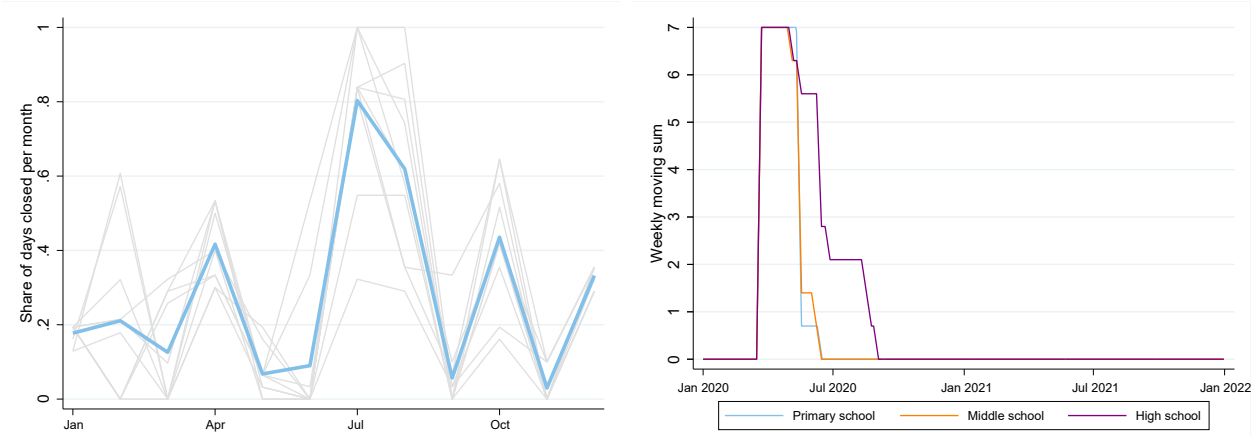
Figures A3a, A3b and A3c show the data we collected on pandemic school closures by school type and canton for 2020 and 2021. Within each school type, we uncover heterogeneity in the pandemic measures across cantons as well as across time. In Figure 1b, we calculate the number of days closed in the past week, and average this over all cantons by school type. We observe that the longest period of school closures occurred in high schools. Most importantly, we note that school closures mainly occurred during the first lockdown, from March to June 2020, and were not implemented again in subsequent lockdowns. Therefore, pandemic school closures in Switzerland were of much shorter duration than elsewhere. Finally, Figure A2 compares school holidays with the pandemic school closures for the year 2020.

[3] http://about.burbio.com/school-opening-tracker
[4] https://www.covidschooldatahub.com/

Figure 1: Measures of school closures

(a) School holidays by canton

(b) Days closed in past week



Notes Panel (a): Calculations are based on data collected on cantonal school holidays. For the purpose of this graph we keep the 10 largest cantons in terms of population size for which we have also collected data on pandemic related school closures. The graph shows the share of days closed per month of the year 2019. The solid blue line is the average over the cantons, and the grey lines show the cantons separately. Notes Panel (b): We calculate the number of days closed in the past week, and average this variable over all cantons by school type.

3.2 Swiss employment and household data

Our primary data source is the Swiss Labor Force Survey (SLFS), which provides information on the structure of the labor force and employment behaviors of the working age permanent resident population. More specifically, it provides information on labor force participation, employment status, labor market earnings, wages, working hours, as well as socio-demographic characteristics such as marital status, age, education and nationality. It also includes some information about other household members, such as their age, gender and education, as well as their relationship to the person surveyed so that it is possible to identify spouses or partners and their labor market situation, as well as identify the number of children and their ages. There is also some limited information on the employer.

Since 2010, the SLFS is conducted on a continuous basis using a representative sample of the population (120,000 annual interviews). Those selected to participate in the survey are interviewed four times over a one and a half-year period (except for people aged 75 and over who are only interviewed once). They are interviewed in two consecutive quarters and then interviewed again after two quarters for another two consecutive quarters. This leads to an unbalanced panel. From 1991 to 2020, the SLFS was a telephone survey and from 2021, it has been fielded as a mixed mode survey (either online or by telephone), with online being the preferred option. Therefore, it was not greatly affected by the COVID-19 pandemic measures. As shown in Figure A4, interviews are distributed fairly evenly throughout the year in 2020.

To better understand household dynamics, we also use the Swiss Household Panel (SHP), which is an ongoing, nationally representative, longitudinal survey (Tillmann *et al.* (2022)). This survey is conducted annually from September to February and all members of the household are interviewed. The SHP includes an additional COVID-19 module that was fielded between May and June 2020, right after the implementation of the most stringent lockdown measures. It contains, among other variables, specific questions on how parents dealt with the consequences of pandemic school closures.

3.3 Lockdown, Home Office and Stringency Indices

We identify marginal parents using information on their occupation in the SLFS. We determine whether these occupations were deemed as *essential* or whether the work could be done while adhering to physical distancing requirements or whether the work could be done from home.

When the federal government implemented the first lockdown, it indicated the essential sectors that were excluded from having to follow the lockdown measures.[5] We created a binary variable that is equal to one if the occupations are in these sectors and zero otherwise.[6]

Faber *et al.* (2020) define a *Lockdown Index* based on an occupation's need for physical proximity between workers and/or customers rather than the ability to perform the job from home, which the authors considered more applicable to the Swiss context where the government's policies focused on enforcing physical distancing in order to slow down the spread of COVID-19. We define our Resiliency Index as 1 - Lockdown Index. The Resiliency Index's values range from 0 and 1. The higher the value, the more *resilient* the occupation was to lockdown policy shocks.

Dingel and Neiman (2020) created the Home Office Index[7], which Rutzer and Niggli (2020) adapted for Switzerland. This Index is based on responses to two Occupational Information Network (O*NET) surveys that explore "work context" and "generalized work activities." Occupations identified through these surveys as requiring regular outdoor activities or significant use of vehicles, mechanized devices, or equipment are deemed incompatible with remote work.

We also use a Stringency Index to determine how strictly pandemic restrictions were enforced. The KOF Swiss Economic Institute produced a Stringency Index (Pleninger *et al.*, 2022) for Switzerland, which is constructed similarly to the Oxford Stringency Index, but accounts for variations in how lockdown policies were implemented across cantons and over time in Switzerland. The KOF Stringency Index is compiled from nine sub-indicators for: school closures, workplace closures,

[5] https://www.admin.ch/gov/en/start/documentation/media-releases.msg-id-78454.html
[6] See appendix A.1.1 for a more detailed explanation on the definition of essential sectors.
[7] https://cieb.shinyapps.io/HomeOffice_CH/

cancellation of public events, restrictions on gatherings, closure of public transport, stay-at-home requirements, restrictions on internal movement, international travel controls, and public information campaigns. For our analyses, we use the sub-indicator for workplace closures only. This sub-indicator is coded as follows: 0 = no measure, 1 = recommend closing (or working from home) or significant alterations to business, 2 = require closing (or working from home) for some sectors or categories of workers, 3= require closing (or working from home) for all-but-essential workplaces. The Index values range from 0 (= no measures) to 100 (= full lockdown). This data is available at the national and at the cantonal level for all 26 cantons from January 2020 onwards.

3.4 COVID-19 data

Barrero *et al.* (2022) find negative effects of people's desire to physically distance during the pandemic on labor supply. We assume that people would be more likely to want to phyiscally distance when COVID-19 incidence are high. Therefore, we include as a control the weekly COVID-19 incidence among those aged 20 to 69 years old. We also include as a control the weekly COVID-19 incidence for those aged 0-19 years old since, independent of school closures, parents will need to care for their school-age children if they are sick or infected and unable to attend or are restricted from attending school.

Our data comes from the Swiss Federal Office of Public Health (FOPH),[8] which provides figures on laboratory-confirmed cases by age group and by canton compiled by the Federal Office of Public Health (FOPH). This data is from 2020 to 2021. We construct a variable for the weekly COVID-19 incidence as the share of confirmed cases per 1,000 of the population in that age group at the cantonal level.

In Figure A5, we plot the COVID-19 incidence rate (share of confirmed COVID-19 cases per 1,000 of the population) against the KOF Stringency Index sub-indicator for workplace closure as well as the period of school closures, shaded in grey and referring to the period March to August 2020. We can see that whenever COVID-19 cases started to increase rapidly, the Swiss government implemented NPIs such as school and workplace closures in order to slow down the spread of COVID-19.

Table A4 in the Appendix provides a detailed summary statistics of these variables.

[8] https://opendata.swiss/en/dataset/covid-19-schweiz

4 Descriptive statistics

To identify the causal impacts of school closures on parental labor supply, we construct two outcome variables using the SLFS that we term the *conditional* and *unconditional* hours worked. We define *conditional* hours worked as the reported hours worked in the past week of the interview date in the SLFS for those who state that they are employed. This variable captures adjustments made at the intensive margin among those who remain employed. To account for adjustments at the extensive margin as well, we use another variable that we term *unconditional* hours worked. Using the full sample, we define hours worked for those who are employed as we did for the *conditional* hours variable, and we set hours worked to zero for those who are unemployed or not in the labor force at the time of interview. This variable then captures adjustments at both the intensive and extensive margins.

We then identify the *marginal* parents who had to balance paid work with the increased care work resulting from the unanticipated pandemic school closures. These are workers in occupations that had high pandemic resiliency (i.e., with a Resiliency Index value above 0.6) but were less able to work remotely (Home Office Index value below 0.5). These marginal workers were much less affected by any labor demand shocks, and therefore, faced the greatest challenge in meeting the increased care work demands since they had to maintain their regulars hours worked and could not easily work remotely.

The Resiliency Index is somewhat correlated with the Home Office Index but the correlation is only partial. Figure A10 demonstrates that between 2021 and 2019, a sizable expansion of remote work occurred in occupations with a Home Office Index value of around 0.5 or higher. We explain further our reasoning to focus on this group of workers and test our assumptions in Section 6.2.

Table 1 presents summary statistics by gender of our sample constructed from the SLFS, which we restrict to individuals aged between 20 and 64 years old at the time that they were surveyed. Panel (a) presents the summary statistics for individuals with children while Panel (b) for individuals without children. Comparing the marginal and non-marginal fathers, we see that employed marginal fathers worked about two more hours, were half as likely to have ever worked remotely in the past four weeks and were also more likely to work in the essential sectors. For mothers, we see that similarly, marginal mothers were less likely to have worked remotely and even more likely

to work in the essential sectors (51 percent),[9] but we see no difference in both measures of hours worked. Non-marginal parents tend to have one more year of education. We also see that mothers worked only about 24 hours per week as compared to fathers who worked 40 to 42 hours (which is the full-time rate) and are slightly less likely to be married (81-82 percent as compared to men at 88 percent).

[9] We see about half as many more women as men work in the essential sectors, which is in line with the stylized facts mentioned in the literature examining the COVID-19 impacts on employment (for example, Alon *et al.* (2020), Albanesi and Kim (2021), and Bluedorn *et al.* (2023)).

Table 1: Summary statistics by children status

(a) With children

	Men		Women	
	Marginal	Non-marginal	Marginal	Non-marginal
Outcome variables				
Conditional working hours	42.46	40.48	24.04	24.62
Unconditional working hours	36.50	35.39	17.88	18.49
Employed (=1)	0.96	0.96	0.88	0.87
WFH at extensive margin (=1)	0.27	0.49	0.22	0.46
Control variables				
Age	44.04	44.26	41.42	41.68
Female (=1)	0.00	0.00	1.00	1.00
Married (=1)	0.88	0.88	0.82	0.81
Swiss (=1)	0.57	0.61	0.57	0.66
Number of children in HH: 0 to 17 years	1.80	1.79	1.76	1.73
Number of people in HH	4.07	3.99	3.93	3.82
Years of education	14.12	15.16	13.84	14.85
Essential sector (=1)	0.34	0.14	0.51	0.20
Short-time work received (=1)	0.02	0.02	0.02	0.03
Observations	13775	44639	19426	42602

(b) Without children

	Men		Women	
	Marginal	Non-marginal	Marginal	Non-marginal
Outcome variables				
Conditional working hours	40.63	39.14	30.18	31.56
Unconditional working hours	31.49	30.94	22.44	23.84
Employed (=1)	0.88	0.88	0.87	0.86
WFH at extensive margin (=1)	0.21	0.39	0.16	0.37
Control variables				
Age	46.12	44.59	46.88	44.94
Female (=1)	0.00	0.00	1.00	1.00
Married (=1)	0.47	0.43	0.49	0.42
Swiss (=1)	0.66	0.67	0.69	0.76
Number of children in HH: 0 to 17 years	0.00	0.00	0.00	0.00
Number of people in HH	2.39	2.31	2.36	2.27
Years of education	13.64	14.59	13.38	14.27
Essential sector (=1)	0.30	0.12	0.51	0.19
Short-time work received (=1)	0.02	0.02	0.02	0.03
Observations	25753	79272	33296	71708

Notes: Means are calculated using the Swiss Labor Force Survey (SLFS) data. The sample is restricted to individuals who were aged between 20 and 64 years. The period covered is from 2018 to 2021. The binary variable married is equal to 1 if the individual is married or in a registered partnership, 0 otherwise. The number of observations refers to the total population in the sample and not only employed individuals.

Comparing men with and without children, we find that men without children in the household worked slightly fewer hours and were less likely to be employed. Whereas women without children

worked substantially more, about 30 conditional hours per week, but still not at a full-time rate, and were equally as likely to be employed. We do see that individuals without children are older, and are only half as likely to be married. Similar to parents, marginal individuals without children were more likely to be employed in the essential sectors.

In the appendix Table A1, we compare the pre-pandemic period (2018 and 2019) with the pandemic period (2020 and 2021) for the same sample. In terms of changes in the two outcome variables between these two periods, we see small decreases in the mean of both conditional hours worked (from 34.6 to 34.3) and unconditional hours worked (from 25.5 to 25.2). In addition, about 39 percent of the working population has worked from home at least once in the past four weeks since the pandemic started as compared to 33 percent before the pandemic. We also see an increase in *short-time* work from one to three percent. However, this is likely not an accurate indicator of the actual number of workers who benefited from this policy, according to Götz *et al.* (2021).[10]

In the appendix (Figures A6 and A7), we also present descriptive evidence of the evolution of hours worked over the period of school closures. We calculate weekly averages and smooth them with a local polynomial smoother. These graphs replicate the descriptive evidence shown in Tables 1 and A1 but provide a more detailed picture.

In the following tables, we present a simple difference-in-differences analyses in hours worked for men and women across days when schools were open and when schools were closed due to school holidays (Table 2) and due to pandemic measures (Table 3).

From Table 2, we see that women with children work fewer hours than women without children in general, but men with children work greater hours than men without children. While everyone reduce hours during school holidays, those with children reduce hours the most and fathers reduce hours much more than mothers. In the appendix, Table A2 presents the same analysis only for marginal workers. School holidays may occur at times in the calendar year when labor demand may also be somewhat lower. Therefore, this seasonality effect precludes any causal interpretation of the results presented here.

[10] Götz *et al.* (2021) note that the SLFS underestimates the actual number of people placed on short-time work in all quarters of 2020. For example, during the first lockdown in the second quarter of 2020, the figures provided by the Swiss State Secretariat for Economic Affairs (SECO) show an average of one million workers who were placed on short-time work. But for this reference period, this figure is around a third lower in the SLFS. Since the SLFS survey only asks about the employment status in the week before the survey date, employed persons who received short-time work benefits before or after this reference week would not have been counted. Whereas, the SECO statistics include all workers who ever received short-time work benefits at some point during a quarter. As many short-time work episodes in 2020 only lasted a few months, the reference week approach of the SLFS could account for a considerable part of the difference in the extent of reported short-time work.

Table 2: Labor supply during school holidays

	School open (1)	School closed (2)	Difference (2) - (1)	
A. Women				
With children	18.14	13.34	-4.803***	(0.180)
Without children	22.81	19.32	-3.490***	(0.167)
Difference	-4.67***	-5.982***	-1.313***	
	(0.158)	(0.201)	(0.151)	
B. Men				
With children	38.89	30.44	-8.452***	(0.227)
Without children	31.25	28.17	-3.074***	(0.189)
Difference	7.648***	2.27***	-5.378***	
	(0.182)	(0.254)	(0.171)	
Observations	107531	65393	172924	

Notes: Means of unconditional hours worked are calculated using the Swiss Labor Force Survey (SLFS) data. The sample is restricted to individuals who were aged between 20 and 64 years. The years 2018 and 2019 are included. Standard errors in parenthesis: * 0.1, ** 0.05 and *** 0.01. The standard errors of the diff-in-diff estimates are calculated as follows: $\frac{diff_1 - diff_2}{\sqrt{\frac{(sd_{1,post})^2}{n_1} + \frac{(sd_{2,post})^2}{n_2}}}$.

As for school closures due to the pandemic measures, Table 3 present the difference-in-differences analyses comparing men and women with and without children across pre-pandemic and pandemic periods. The pre-pandemic period is from 1 January 2019 until 15 March 2020 while the pandemic period when the lockdown resulted in school closures runs from 16 March 2020 until 30 June 2020 (we exclude July and August). The post-lockdown period when schools re-opened runs from 1 September 2020 until 31 December 2021.

We find that women with children generally work fewer hours than women without children, while the opposite is true for men (as we have already seen). Women with children work approximately four hours less than women without children, while men with children work about six hours more than men without children. Although women without children reduced hours slightly more during the pandemic than women with children, about 1.8 hours less versus 1.5 hours, the changes in relative terms are about the same (8 percent). The reduction in labor supply of men without children is larger in absolute value than the reduction in labor supply of men with children (2.8 hours worked versus by 1.7 hours) with the change in relative terms being double. Therefore, when we take the difference-in-differences, we get positive values.[11]

[11] When we only look at workers in resilient occupations, i.e., occupations with a Resilience Index value over 0.6, the reduction in labor supply for both parents and non-parents is much smaller in absolute magnitude, so the differential effect on parents is similar to those reported in the main text.

Table 3: Labor supply during pandemic school closures (marginal workers)

	Before Covid (1)	During Covid (2)	After Covid (3)	Diff. (2) - (1)		Diff. (3) - (2)	
A. Women							
With children	18.22	16.73	18.94	-1.499**	(0.500)	2.212***	(0.500)
Without children	22.40	20.60	23.60	-1.802***	(0.454)	2.997***	(0.440)
Difference	-4.179***	-3.876***	-4.66***	0.303		-0.784***	
	(0.317)	(0.624)	(0.300)	(0.272)		(0.263)	
B. Men							
With children	37.27	35.60	38.15	-1.670*	(0.743)	2.556***	(0.690)
Without children	31.42	28.63	32.29	-2.796***	(0.600)	3.659***	(0.573)
Difference	5.843***	6.970***	5.867***	1.126***		-1.102**	
	(0.435)	(0.906)	(0.390)	(0.378)		(0.382)	
Observations	23700	5981	26421	29681		32402	

Notes: Means of unconditional hours worked are calculated using the Swiss Labor Force Survey (SLFS) data. The sample is restricted to individuals who were aged between 20 and 64 years. Before Covid: 01.01.2019 - 15.03.2020. During Covid: 16.03.2020 - 30.06.2020. After Covid: 01.09.2020 - 31.12.2021. The months July and August are not included. Standard errors in parenthesis: * 0.1, ** 0.05 and *** 0.01. The t-statistic of the diff-in-diff estimates are calculated as follows: $\frac{diff_1 - diff_2}{\sqrt{\frac{(sd_{1,post})^2}{n_1} + \frac{(sd_{2,post})^2}{n_2}}}$.

When comparing the early pandemic and later pandemic periods (when many lockdown measures were lifted), we see that both men and women increase hours worked more as compared to the pre-pandemic period and that those without children increase hours slightly more than those with children.

These tables show that during school holidays individuals with children reduced their hours worked more than individuals without children with fathers reducing hours the most, whereas during the pandemic school closures, individuals with children reduced their hours worked less than individuals without children with fathers reducing their hours the least. In section 6, we will present the causal effects of school closures on parents' labor supply from adopting a difference-in-differences specification that controls for seasonality, which we will explain in the next section.

5 Model

5.1 Anticipated closures: school holidays

To determine the labor supply effects resulting from school closures due to school holidays, we estimate the following model:

$$Y_{it} = \beta_0 + \beta_1 \sum_{k=1}^{7} \text{School holidays}_{ict-k} \times \text{child age}_i + \beta_2 \text{child age}_i + \theta' X_{it} + \tau_i + \tau_m + \epsilon_{it} \quad (1)$$

The dependent variable Y_{it} are the conditional and unconditional hours worked in the past week of the interview date, as described in Section 4. The independent variable is the total number of days schools were closed in the past week of the interview date due to school holidays at the cantonal level ($\sum_{k=1}^{7} \text{School holidays}_{ict-k}$) interacted with a binary variable (child age_i) that is equal to one if there are school-age children (those aged below 18 years old) present in the household. The school holidays variable does not vary by school type and its value ranges from 0 to 7.

We add a vector of individual controls, $\theta' X_{it}$, which include age, a binary variable for gender (zero for male and one for female), marital status (one if married and zero otherwise), nationality (one if Swiss and zero otherwise), the total number of children in the household, and the total number of people in the household. We also include individual fixed effects (τ_i) for unobserved time invariant characteristics as well as monthly fixed effects (τ_m) to capture seasonal changes. Finally, standard errors are clustered at the individual level (ϵ_{it}). We restrict the sample to individuals who were aged between 20 and 64 years old and to the pre-pandemic years 2018 and 2019.

5.2 Unanticipated closures: pandemic school closures

We identify the causal effects of the unanticipated labor supply shock resulting from the pandemic school closures using the following model:

$$\begin{aligned} Y_{it} = \beta_0 + \beta_1 \sum_{k=1}^{7} \text{School closure}_{it-k} \times \text{child age}_i + \beta_2 \text{KOF workplace closure}_{ct} \\ + \beta_3 Essential_{it} + \beta_4 Trnsfr_{it} + \beta_5 \sum_{k=1}^{7} \text{School holidays}_{ict-k} \\ + \gamma' \sum_{k=1}^{7} \text{School closure}_{it-k} + \delta' \text{child age}_i + \theta' X_{it} + \tau_i + \tau_m + \tau_y + \epsilon_{it} \end{aligned} \quad (2)$$

The dependent variable Y_{it} are again the conditional and unconditional hours worked in the past week of the interview date. The independent variable, $\sum_{k=1}^{7} \text{School closure}_{it-k}$, is constructed using the data we collected on pandemic school closures and explained in detail in Section 4. We

merged the pandemic school closures data to the SLFS data using the interview date and the school type of the youngest child in the household based on their age. We then interact this variable with the binary variable, child age$_i$, which is equal to one if there is a youngest child in the household in any one of the school type (primary, middle or high school) and zero otherwise.

To separate the labor supply effect of school closures from the effects of other lockdown measures that could have affected labor demand, we include as a control the KOF Stringency Index subindicator for workplace closure, KOF workplace closure$_{ct}$.

In addition, we include a binary variable that is equal to one if the individual worked in one of the essential sectors, $Essential_{it}$, and another binary variable equal to one if the individual received a short-time work subsidy from the government (furlough pay) in the past week, $Trnsfr_{it}$. We also add as a control the variable, $\sum_{k=1}^{7}$ School holidays$_{ict-k}$, which is the total number of days schools were closed in the past week of the interview date due to school holidays at the cantonal level.

Finally, we include separately each of the school closure variables by school type, $\gamma' \sum_{k=1}^{7}$ School closure$_{it-k}$, for primary, middle and high schools. And also the binary variables, δ'child age$_i$, which takes the value of one if the individual has a child in primary, middle or high school, and zero otherwise.

As before, we add a vector of individual controls, $\theta' X_{it}$, which include age, a binary variable for gender (zero for male and one for female), marital status (one if married and zero otherwise), nationality (one if Swiss and zero otherwise), the total number of children in the household, and the total number of people in the household. In addition, we include the share of confirmed COVID-19 cases per thousand for those aged 0 to 19 years old and for those aged 20 to 69 years old. We also add individual fixed effects (τ_i) for unobserved time invariant characteristics as well as monthly fixed effects (τ_m) to capture seasonal changes. Finally, standard errors are clustered at the individual level (ϵ_{it}). We restrict the sample to individuals who were aged between 20 and 64 years old at the time that they were surveyed and to the years 2019 to 2021.

6 Results

6.1 Anticipated closures: school holidays

We first study the effects of anticipated school closures due to school holidays on parents' labor supply. Table 4 provides estimates of the impact of school closures due to school holidays (Equation 1). The main effect of school holidays is a reduction in both conditional and unconditional hours worked for everyone, similar to what we have seen in Table 2 for unconditional hours worked.

However, school holidays have an additional effect on households with school-age children. Row 1 shows the estimates of the effects of the disruption to labor supply caused by school holidays, which amounts to an additional 0.3 hour (conditional hours) for each day school is closed. The effect of holiday related school closures on labor supply of fathers is larger (0.4) than for mothers (0.3), but roughly similar in percentage terms.

School holidays lower unconditional labor supply more strongly than conditional labor supply. The effect of school holidays is 0.6 hour for parents. It amounts to 0.9 hour for men, while it is 0.5 hour for women. Interestingly, the main effects of holiday related school closures, in row 3, are only slightly larger for conditional hours (0.5 hour) as compared to unconditional hours (0.4 hour).

These effects on parents add up to -0.747 hour per school day closed (- 0.329 - 0.418 = -0.747), which is about 5.2 hours less per week (-0.747* 7 = -5.229). Unconditional hours worked for fathers decrease by -10.3 hours per week of holiday related school closures, which is almost one third of the baseline labor supply of 32.0 hours per week. For mothers, the effects of holiday related school closures lead to a reduction in unconditional hours of 6.1 hours per week of school closures, which is also about one third of the unconditional labor supply of 19.6 hours. These reductions in unconditional hours worked suggest that families adjust their labor supply in order to be together during the school holidays.[12]

Table 4: School closures due to holidays

	Cond. hours			Uncond. hours		
	(1)	(2)	(3)	(4)	(5)	(6)
	All	Women	Men	All	Women	Men
School disrupt. × child in HH	-0.329***	-0.276***	-0.372***	-0.648***	-0.468***	-0.870***
	(0.035)	(0.047)	(0.051)	(0.036)	(0.043)	(0.059)
Child in HH (=1)	-0.603	-1.650*	0.299	-0.946	-2.473**	0.788
	(0.677)	(0.993)	(0.918)	(0.800)	(1.094)	(1.161)
School disrupt.	-0.418***	-0.367***	-0.463***	-0.496***	-0.401***	-0.596***
	(0.023)	(0.033)	(0.033)	(0.025)	(0.032)	(0.038)
Individual FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Child age controls	No	No	No	No	No	No
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Mean of dep. var	34.77	28.63	40.53	25.56	19.58	32.05
Observations	126713	61375	65338	172378	89749	82629
R-squared	0.02	0.02	0.03	0.03	0.03	0.04

Notes: Robust clustered standard errors.
* 0.1, ** 0.05 and *** 0.01.

[12]In Switzerland, most full-time workers are eligible for four to six weeks of paid vacation per year (which is pro-rated for part-time workers). If reductions in labor supply fully accommodate for school holiday closures (around 13 weeks over the calendar year), the reduction in labor supply would need to be around one third to one half.

Table A10 in the appendix presents results for school holidays but excludes the months of July and August when most schools close for the summer in most cantons. These estimates show that we do indeed identify the effects of the large variation in school breaks during the academic year across cantons since the results remain unaffected by excluding the summer months. The results for marginal workers only are shown in the appendix Table A11.

6.2 Unanticipated closures: pandemic school closures

We now turn to the impact of the unanticipated pandemic school closures. We estimate Equation 2 on the sample of marginal workers. The results are shown in Table 5. We find that workers with school-age children showed a smaller reduction in both conditional and unconditional hours worked as compared to workers without children, suggesting that overall school closures did not negatively affect parents' labor supply (Row 1). The effects on men for both conditional and unconditional hours are larger than on women but both sets of estimates are not statistically significant.

Table A12 presents the results on unconditional hours worked for female marginal workers only. We introduce the independent variables and controls in a step-wise fashion from Columns 1 to 9. Column 1 reflects what we find in the simple Difference-in-Differences analysis as shown in Table 3. Adding controls then reduces the negative effect of school closures to zero for this group of marginal mothers.

In Table A13, we present the estimates for individuals in highly resilient occupations but without restricting by remote work possibility.

Table 5: School closures due to pandemic (marginal)

	Conditional hours		Unconditional hours	
	Women	Men	Women	Men
School disrupt. × child age	0.110	0.180	0.016	0.190
	(0.097)	(0.124)	(0.097)	(0.150)
KOF workplace closure	-0.024	-0.193	-0.017	-0.056
	(0.159)	(0.204)	(0.185)	(0.265)
School holidays	-0.238***	-0.428***	-0.432***	-0.706***
	(0.038)	(0.048)	(0.040)	(0.058)
Essential sector (=1)	1.881**	-2.880*	13.825***	16.910***
	(0.952)	(1.634)	(0.690)	(1.478)
Short-time work received (=1)	-7.879***	-9.357***	-6.940***	-8.244***
	(0.490)	(0.645)	(0.505)	(0.790)
Covid incidence 0 to 19 yo	0.216***	-0.103	0.139	-0.088
	(0.082)	(0.090)	(0.093)	(0.120)
Covid incidence 20 to 69 yo	-0.135*	0.005	-0.109	-0.019
	(0.080)	(0.094)	(0.090)	(0.131)
Individual FE	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
School disrupt. controls	Yes	Yes	Yes	Yes
Child age controls	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Mean of dep. var.	27.95	41.15	20.87	33.19
Observations	29214	23658	39117	29331
R-squared	0.03	0.04	0.05	0.04

Notes: Robust clustered standard errors.
* 0.1, ** 0.05 and *** 0.01.

Addressing labor demand. To more clearly distinguish the labor supply effects from the labor demand effects of the pandemic measures, we estimate various models to better understand how much labor supply is correlated with workplace closures. Note that our sample of marginal workers consists of those in highly resilient occupations but with lower possibility to work remotely.[13] To validate our assumption for restricting our sample to resilient workers only, we estimate Equation 2 but we drop our school closure variables and child variables. We present these estimates separately for men and women working in different occupations that vary according to their resiliency to pandemic measures in Figure A12.

We can see that workers in occupations that were more heavily affected by the lockdown measures experienced a greater reduction in hours worked as compared to those workers in more resilient occupations (Resilience Index over 0.6) who saw almost no impact on their hours worked, by one fewer conditional hours worked (Figure A12a) and two fewer unconditional hours worked (Figure

[13] We checked if there are any differences in the gender share and parenthood share by occupational resilience or ability to work remotely but as shown in Figures A8 and A9, this does not seem to be the case.

A12b).[14]

Table A14 presents an analysis of the impact of school closures for resilient workers only (those in occupations with Resilience Index over 0.6), disaggregated by gender, and examines the robustness of our design through varying our econometric specifications. We show results with and without the control for labor demand (KOF Stringency Index subindicator for workplace closure), Columns 1 and 4 versus Columns 2 and 5, which serve to assess the influence of labor demand factors. In addition, we do another sensitivity check by excluding the control for short-time work, which is potentially endogenous (Columns 3 and 6). Thereby, we ensure that the school closure effects we observe are not confounded by other policies that affected labor demand.

For mothers, the analysis indicates that school closures did not significantly alter their labor supply, despite the presence of positive point estimates; this result holds steady even when controlling for labor demand factors and the provision of short-time work, underscoring its robustness. Conversely, the impact on men is markedly different, with a notably smaller decrease in labor supply as compared to men without children, which is in contrast to our finding shown in Table 5.

Compared to the labor supply responses of all women and men, we find that for mothers employed in resilient occupations, the impact of school closures on labor supply is observed to be somewhat smaller in absolute value than the overall effects reported for all women. On the other hand, fathers in resilient occupations exhibit a response to school closures that is quantitatively similar to the general male population. The underlying dynamics become clearer upon examining the labor supply reactions of women in non-resilient occupations. Looking at Figure A14 in the appendix, which shows the estimates of school closures on hours worked, we find that women with children working in least and most resilient occupations decreased their hours worked (conditional and unconditional) much less than women without children. While it is men with children working in more resilient occupations that decreased their hours worked less than men without children. Effects tend to be larger (in absolute sense) for women in occupations that are not resilient (Resilience Index below 0.2). In our estimates on resilient workers, we exclude these women and, therefore, our estimates of the effects of school closures are somewhat lower in the resilient sample, compared to the main sample.

To check the sensitivity of these results, we estimate as before the same specification for workers in different occupations classified by their resiliency to the pandemic measures. Considering the

[14]However, this may not fully take into account all labor demand effects such as factors driving consumer demand or measures that affected other aspects of business operations and international supply chains.

results on unconditional hours worked, as shown in Figure (A13b), for men we see a homogeneous effect in terms of decrease in hours worked during school closures over the distribution of the resilience index. For women, however, we clearly see that individuals in non-resilient occupations are not decreasing their hours worked at all. Generally, as compared to men, women decrease their hours worked less for anticipated school closures. Women might decrease their hours in more resilient occupations less than men because they mostly work part-time and thus, already anticipate increased child care responsibilities when making long-term employment choices with respect to their labor supply.

Of course, by focusing on resilient workers, i.e., by restricting our sample to workers in occupations with resilience index of 0.6 or higher only, we do not provide evidence on all workers. However, the negative labor demand effects were relatively short lived in Switzerland as firms received significant support through two government measures: short-time work subsidies and COVID-19 pandemic loans. This greatly helped mitigate the labor market crisis and reduced both its severity and duration.

Heterogeneity by Child Age and Home Office Index. The extent to which parents can work while children are home arguably depends on the age of the youngest child, and on the nature of work. We now provide separate estimates of the impact of school closures for women and men, by whether their youngest child is 12 years old or older, and by whether their work could be more easily done from home. To assess whether work could be done from home, we rely on an index of home office suitability, which varies at the occupational level, and split it at the median. Recall that parents with low home office suitability, indicated by low HO, are marginal parents, while parents in occupations with high home office suitability, indicated by high HO, are non-marginal parents.

Results in Table A16 show estimates for women and men, by age of the youngest child and home office suitability of their occupation. In general, mothers and fathers in occupations with higher home office suitability tend to show positive but small and insignificant responses to school closures. However, mothers in occupations with higher home office suitability but with a youngest child that has not yet turned 12 years old do not show significant expansions of labor supply. Fathers who can work from home show much smaller decreases in labor supply when schools are closed. Effects are particularly strong for fathers whose youngest child is older than 12 years. In Table A17, we do not find any effects of school closures at the intensive margin, when looking at conditional hours,

suggesting that the difference we document is mostly operating at the extensive margin.

We also show in the appendix, for completeness, results for resilient workers, by age of the youngest child, and find that men with children older than 12 years decreased unconditional hours worked much less, while women and men with children below 12 years do not (Table A18).

In addition, we also estimate an alternative model, similar to Jaume and Willén (2021), where we compare parents of children younger than 12 years old with parents whose children are all older than 12 years old in resilient occupations (Table **??** provides the summary statistics for this group of parents and Tables A19 and A20 present the estimates). Again, even for mothers with young school-age children, for whom we expect to see the greatest impact of unanticipated school closures, we find no significant differences in their labor supply at both the intensive and extensive margins. While among fathers, we find that men with younger children decreased their labor supply much more than men with older children at the extensive margin while we see no effect on the intensive margin.

Also, splitting results by home office suitability, we find that men with occupations that allow work to be done from home decreased their labor supply much less, while women and men who can not work from home do not (Table A21).

6.3 Mechanisms

Our main results suggest no negative effects of pandemic school closures on labor supply of parents. This finding is somewhat at odds with findings from other contexts. We now discuss aspects of the Swiss labor market and society that could help explain our findings.

Switzerland has a flexible, open labor market that is characterized by high labor force participation and employment rates. While the female, including maternal, labor force participation and employment rates are high, most women work part-time (defined as working less than 90 percent of the full-time rate of hours). According to the Swiss Federal Statistical Office, about 57 percent of women work part-time and women accounted for 73 percent of part-time employed persons in 2022. Women cited childcare and other family responsibilities as the main reasons for part-time employment.[15] In addition, there is a lower employment rate among women with children compared to those without in 2019. Therefore, mothers' labor supply decisions seem to have already internalized child care responsibilities, and they were able to absorb the unexpected increased child

[15] Formal child care places in Switzerland are both limited in supply and costly while there is also limited informal child care (grandparents often do not live in the same household for example. See Tables A8 and A9).

care demands from the unanticipated pandemic school closures.

Tables A6 and A7 compare statistics on time use for men and women before and after the start of the pandemic. We see a notable shift towards a more equal distribution of childcare and household responsibilities between partners, particularly marked by significant changes in the categories of "illness" and "taking to school." These areas have seen a robust increase in both partners jointly participating in the care of their children, signaling a move away from traditional roles towards more shared responsibilities. While there has also been an uptick in equal task-sharing across other categories, this increase is less pronounced when compared to the substantial growth observed in managing child illness and school-related activities. This trend reflects evolving societal norms and the growing recognition of the importance of both parents' involvement in all aspects of childcare, suggesting a positive direction towards gender equality in domestic spheres and which may also have reduced the impact of school closures on mothers.

7 Conclusion

We examine parents' labor supply responses to anticipated school holiday closures and to the unanticipated COVID-19 pandemic school closures. Our findings suggest that fathers and mothers responded differently to the anticipated school holiday closures as compared to the unanticipated pandemic school closures. While both types of school closures reduced the labor supply of both mothers and fathers, school holiday closures reduced parents' labor supply much more than the pandemic school closures. And fathers' labor supply decreased much less in response to the pandemic school closures as compared to mothers and workers without children, especially among fathers with children aged older than 12 years old and working in pandemic resilient occupations that offered a higher opportunity to work from home. While fathers' labor supply decreased much more in response to the school holiday closures. The effects on fathers seem to operate mainly at the extensive margins. Most importantly, mothers seem to have been little affected by the pandemic school closures.

We find evidence that flexible labor markets, notably the availability of part-time work, as well as the ability to work from home generally allow parents, and especially mothers, to better balance paid work and care work. The provision of short-time work (furlough pay) and reduced commuting due to increased remote work helped reduce the parents' labor supply impact of the unanticipated pandemic school closures on in Switzerland, which were also of much shorter duration

than elsewhere. These findings are in contrast to the findings in the current literature, which are mostly from the US and the UK, and which find overall negative effects on mothers' labor supply and labor force attachment.

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8 Appendix

A.1 Variable and sample construction

A.1.1 Definition of variables

Concerning the variables from the SLFS, we list the variable name from the original questionnaire in parenthesis and specify whether the variable was taken from the annual or the quarterly questionnaire.

Occupation (BFU5I, Q): Occupation according to the international classification (ISCO-08 4-digit). The variable refers to the current occupation for employed individuals and to the previous occupation for unemployed and inactive ones. Individuals who have been inactive for more than 8 years or who have never been active do not answer this question.

Sector (EM03, Q): Sector according to the General Classification of Economic Activities (NOGA-08), 4-digits. The variable refers to the current sector for employed individuals and to the previous sector for unemployed and inactive ones. Individuals who have been inactive for more than 8 years or who have never been active do not answer this question.

Canton (B017, Q): Canton of residence.

Age of youngest child in household, Age of oldest child in household, Number of children in household, Dummies for child present in household that is in primary, middle or high school (IT01B - IT01I, BB03B - BB03I, A): The variables IT01* are used to determine if the respondent has an own child or if the child of the partner is living in the household. The variables BB03* are used to identify the age of the child. The variable *number of children in HH* is constructed based on children below the age of 18. The age of each child is then used to determine to what type of school they go to.

Hours worked in the last week (EK08, Q): Actual working hours in the week prior to the interview. For the variable unconditional working hours, hours are set to 0 for everyone who is not working. For the variable conditional working hours, hours are set to missing for those who are not working.

Employed (B0000, Q): Variable on labor market status which is coded to 1 if the individual is employed or an apprentice.

WFH at extensive margin (EI04, A): The variable is 1 if the respondent answers yes when asked if he or she worked from home in the last four weeks. This variable is only available in the

yearly questionnaire and for employed workers. Thus, we only keep a non-missing observation if the individual filled out the yearly questionnaire in the same quarter as the quarterly questionnaire.

KOF workplace closure: The variable is a sub-index of the KOF stringency index. The categories are the same as in the Oxford Stringency Index.0 = no measure, 1 = recommend closing (or working from home) or significant alterations to business, 2 = require closing (or working from home) for some sectors or categories of workers, 3= require closing (or working from home) for all-but-essential workplaces.

Essential sector: On March 16, 2020, the Federal Council declared an "extraordinary situation" and indicated the essential sectors that were excluded from the lockdown measures [16]. We code these sectors through the NOGA-08 classification: food stores, takeaway businesses, company canteens, and food home delivery services (4631-4639); pharmacies (4773); petrol stations (4730); banks (6419); post offices (5310-5320); public administrations and social institutions (8411-8430); railway stations and means of transport (4520, 4540); and hospitals, clinics, and medical practices (8610-8899).

Short-time work (EK101, Q): Individuals who worked less hours in the last week compared to their contractual working hours, provide a reason for their reduced working hours. One response possibility is that they were placed on short-time work by their employer.

Age (BB03A, Q): We include age in bins of below 25, 25 to 34, 35 to 44, 45 to 54 and above 54.

Female (BB04A, Q): female, male.

Married (IS03, Q): The variable is coded to 1 if the individual is married or in a registered partnership, 0 otherwise.

Swiss (IS051, Q): The variable is coded to 1 if the individual is Swiss or a dual citizen.

Years of education (BQU2I, Q): Highest completed education according to ISCED-11 classification. We translate the ISCED categories to years of education: ISCED 1 = 4 years, ISCED 2 = 10 years, ISCED 3 = 13 years, ISCED 6 = 15 years, ISCED 7 = 18 years and ISCED 8 = 22 years.

Number of people in HH (BB02, A): Size of the household.

Covid incidence 0 to 19 years old, 20 to 60 years old: Weekly incidence of Covid-19 among those aged 0 to 19 and those aged 20 to 60 per 1000 population.

Definition of samples with different household compositions:

- The samples of single and married are based on a variable that asks the individual about their

[16] https://www.admin.ch/gov/en/start/documentation/media-releases.msg-id-78454.html

civil status. We code them as married if they say that they are married or in an registered partnership. In all other cases, the individual is classified as single.

- In the SLFS there is a variable on the size of the household. We also construct a variable on the number of children in the household based on the variables that show the relationship of the other household members with the target individual that fills out the survey. By simply subtracting the number of children from the size of the household, we construct the variable on number of adults in the household. In this way we construct the samples on 1 adult in HH, 2 adults in HH or more than 2 adults in household.
- The samples 2 adults in household and married seem to be very similar.
- There are many individuals in the sample Single than in one adult in the household as a single adult may well live with other people in the same household. Results are, however, not very different.

A.1.2 Construction of Resilience Index and Home Office Index

We use the lockdown index that is adjusted for essential sectors. The index is not available for every 4-digit ISCO code. We assume that a lower ISCO level is a good approximation to impute the missing 4-digit values. We can illustrate this with an example: the index is not available for the 4-digit ISCO code 4229 (Occupations in the field of customer information). There are, however, values for the codes 4221 to 4227. We calculate the mean of the resilience index for all those codes having as first three digits the values 422 and use it to impute the missing value for 4229. In other cases, if no information is available for occupations having the same first three digits, we go down to two or one to impute the missing value. We use the same procedure to impute missing values of the Home Office Index so that in the end we have a common set of non-missing entries for the 4-digit ISCO codes.

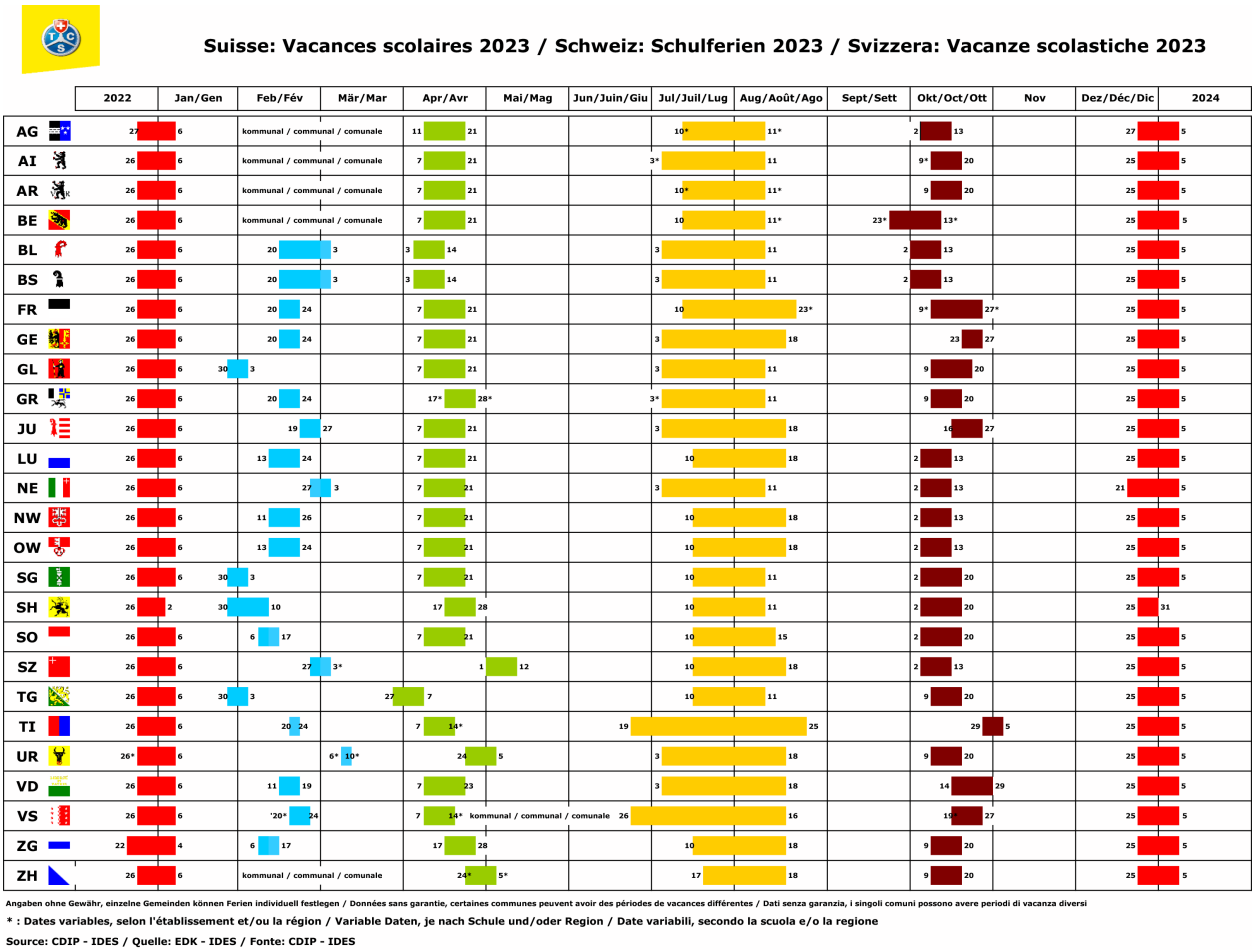
A.1.3 Data on school holidays

Whenever there are heterogeneities within a canton concerning school types or language region (Bern, Wallis), we code all of the holidays (said in other words, the maximum). In some cantons ski holidays are municipality specific, in these cases we take the holidays of the capital city or

municipality: Aargau (city of Aaurau), Appenzell Ausserrhoden (city of Herisau), Bern (city of Bern), St. Gallen (municipality of St. Gallen), Zürich (city of Zürich). Holidays are coded to start on Mondays and end on Sundays whenever the full week is off.

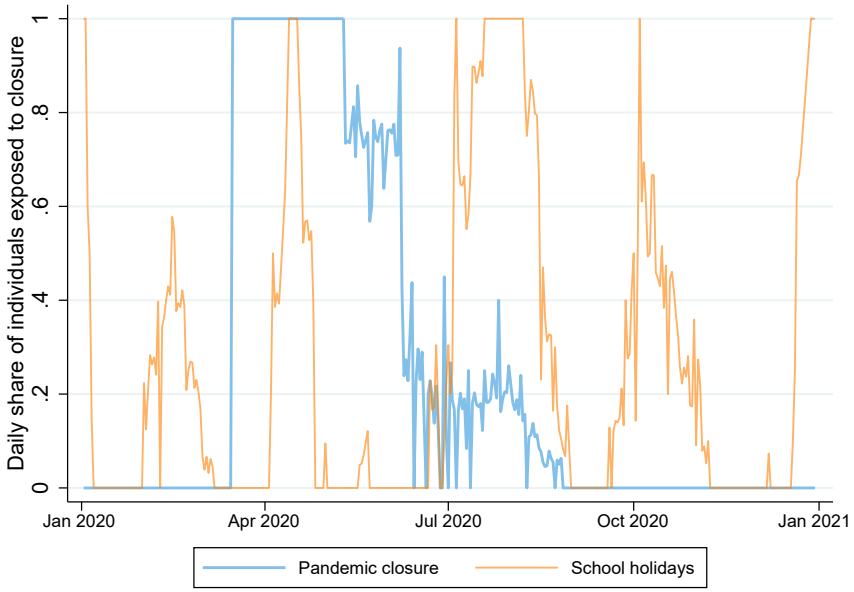
B.2 Additional summary statistics

Figure A1: School holidays in Switzerland



Note: This table shows school vacations (in columns) across Swiss cantons (in rows, e.g. ZH refers to Zurich, VD refers to Vaud, GE refers to Geneva) for the school year 2023/2024. Colors indicate the type of vacation (red: Christmas and end of year, blue: ski vacation, green: spring break, yellow: summer break, brown: fall break.) Source: Swiss Touring Club.

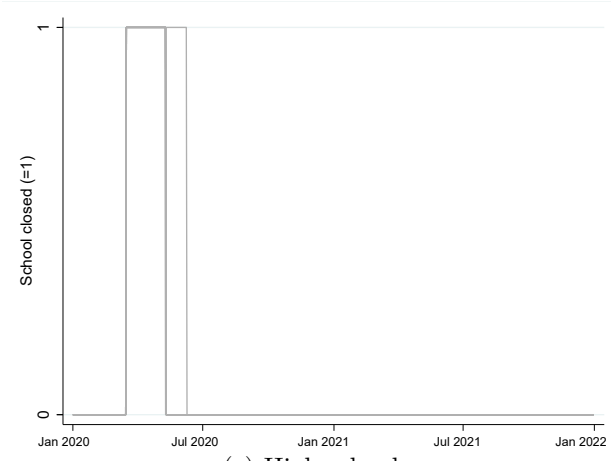
Figure A2: Pandemic school closures and school holidays



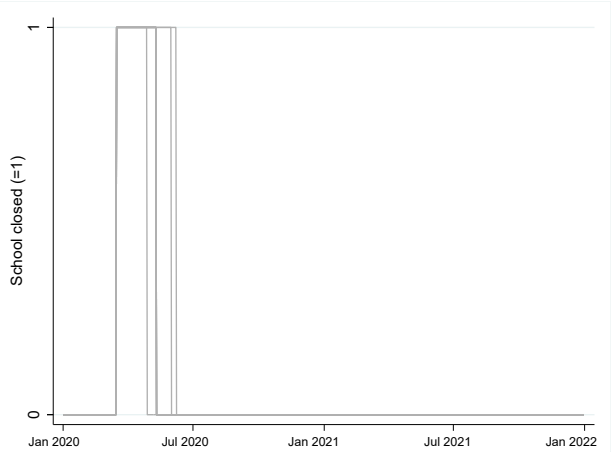
Notes: Calculations are based on data collected on cantonal school holidays, pandemic closures and the SLFS. For the purpose of this graph we keep the 10 largest cantons in terms of population size for which we have also collected data on pandemic related school closures. We then calculate the daily share of individuals exposed to pandemic or holiday closure for the year 2020, across cantons. In terms of pandemic closure, we take the maximum level of closure among the three school types.

Figure A3: Pandemic school closures by school type

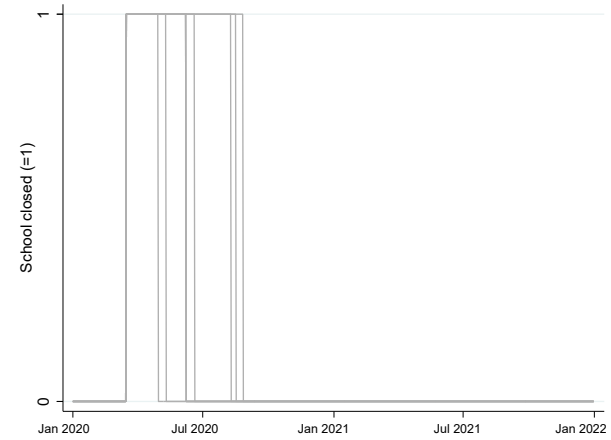
(a) Primary school



(b) Middle school

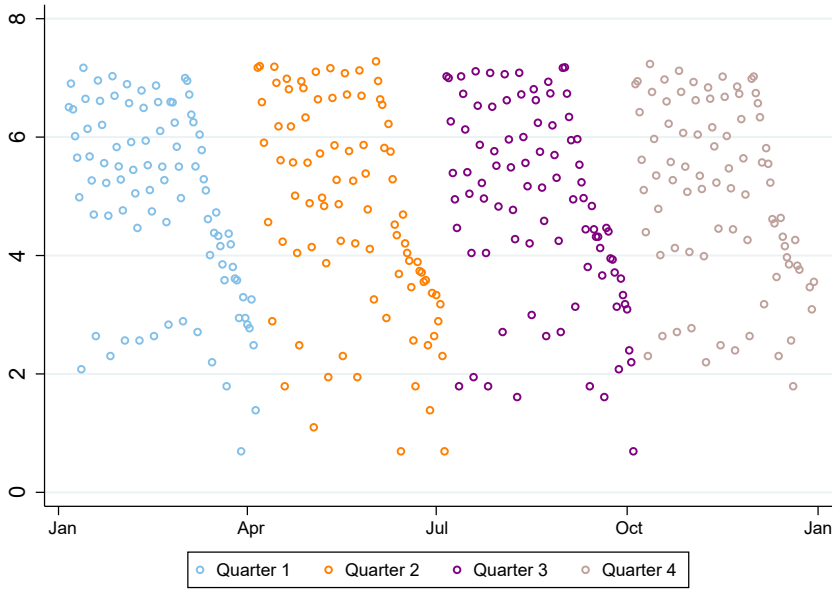


(c) High school



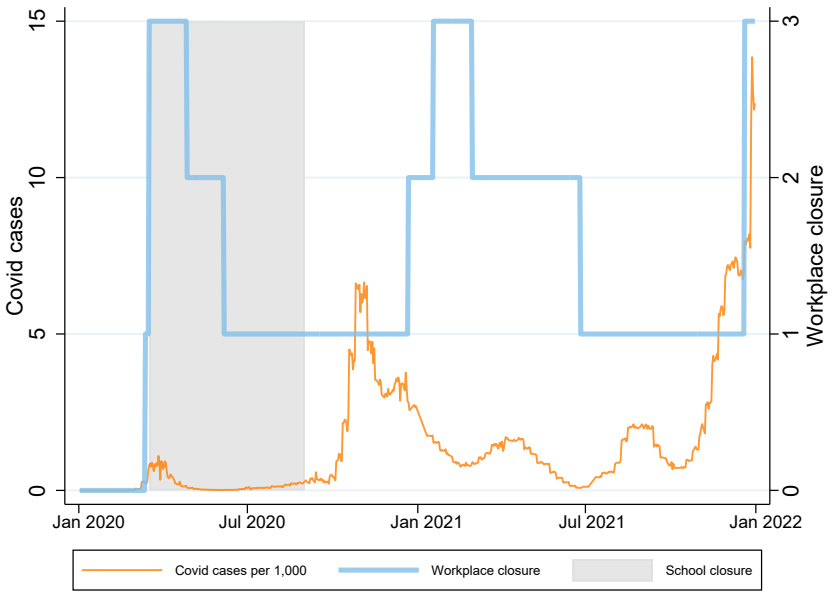
Notes: Calculations are based on our own collected data. Panels (a), (b) and (c) are based on a binary variable that is equal to one when schools have been closed completely or there was a virtual teaching manadate. The variable is plotted in three different graphs for the three different school types. Within each graph, one line corresponds to one canton.

Figure A4: Log number of interviews per day



Note: Distribution of interviews by day over the year 2020.

Figure A5: COVID-19 cases and workplace closures



Notes: KOF workplace closure subindicator: 0 = no measure, 1 = recommend closing (or working from home) or significant alterations to business, 2 = require closing (or working from home) for some sectors or categories of workers, 3= require closing (or working from home) for all-but-essential workplaces. School closure refers to the period March to August 2020, when schools were closed or only virtual teaching was allowed.

Table A1: Summary statistics before and during the COVID-19 pandemic

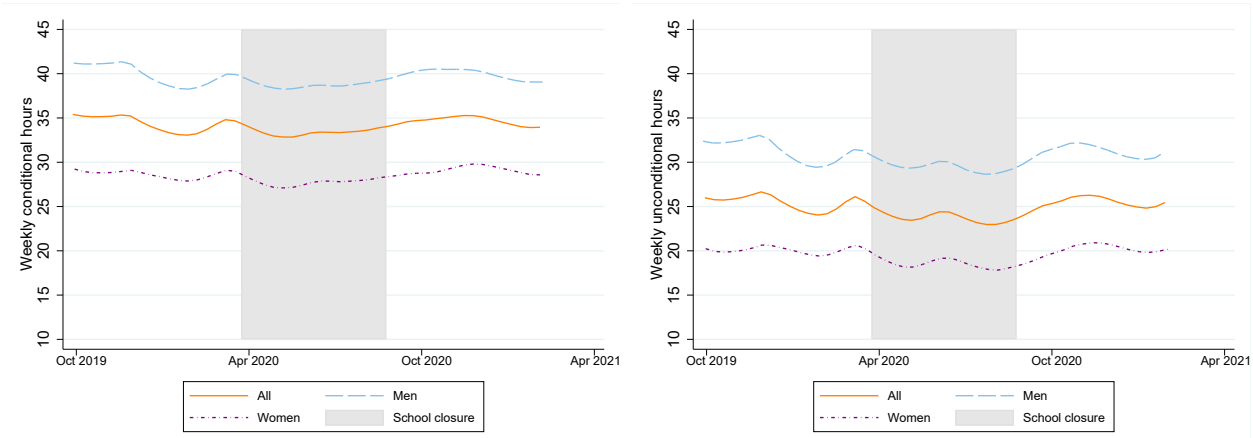
	Pre-COVID	COVID
Outcome variables		
Conditional working hours	34.62	34.29
Unconditional working hours	25.54	25.23
Employed (=1)	0.84	0.83
WFH at extensive margin (=1)	0.33	0.39
School disruption over last week in ...		
... in primary school	0.00	0.55
... in middle school	0.00	0.56
... in secondary school	0.00	0.95
Youngest child in ...		
... primary school or younger (=1)	0.26	0.26
... middle school (=1)	0.07	0.07
... high school (=1)	0.03	0.03
Occupational index		
Resilience index	0.70	0.70
Control variables		
Age	44.64	44.57
Female (=1)	0.52	0.52
Married (=1)	0.60	0.58
Swiss (=1)	0.68	0.66
Number of children in HH: 0 to 17 years	0.65	0.63
Number of people in HH	2.93	2.90
Years of education	14.26	14.28
Essential sector (=1)	0.23	0.21
Short-time work received (=1)	0.01	0.03
Observations	85398	181496

Notes: Means are calculated using the Swiss Labor Force Survey (SLFS) data. The sample is restricted to individuals who were aged between 20 and 64 years. The pre-pandemic period refers to the year 2019, while the pandemic period covers the years 2020 and 2021. The binary variable married is equal to 1 if the individual is married or in a registered partnerhsip, 0 otherwise. The number of observations refers to the total population in the sample and not only employed individuals.

Figure A6: Labor Supply by Gender and Children

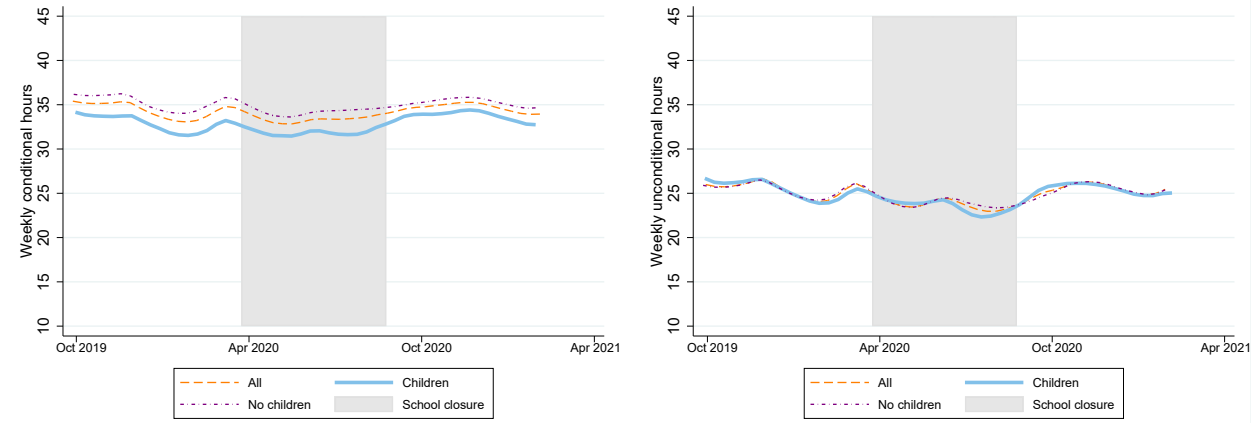
(a) By gender - cond. hours

(b) By gender - uncond. hours



(c) By children - cond. hours

(d) By children - uncond. hours

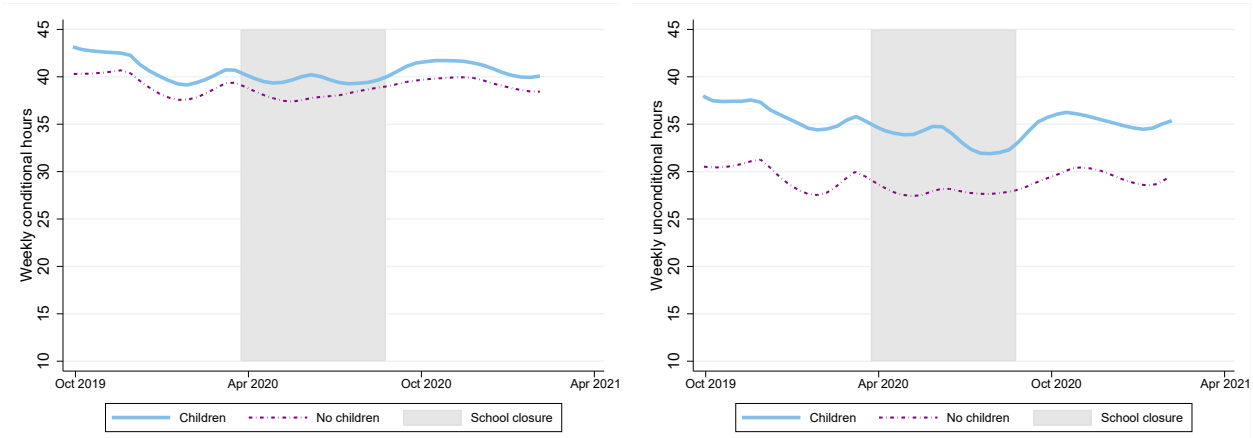


Notes: Calculations are based on the SLFS data. The subsample "children" refers to workers who have children below the age of 18 that live in their household. The subsample "no children" refers to workers who have no children below the age of 18 that live in their household. Weekly averages of the outcome are calculated and then smoothed with a local polynomial smoother. The period of school closure refers to complete closures or when virtual teaching mandates were in place.

Figure A7: Labor Supply of Parents vs Nonparents

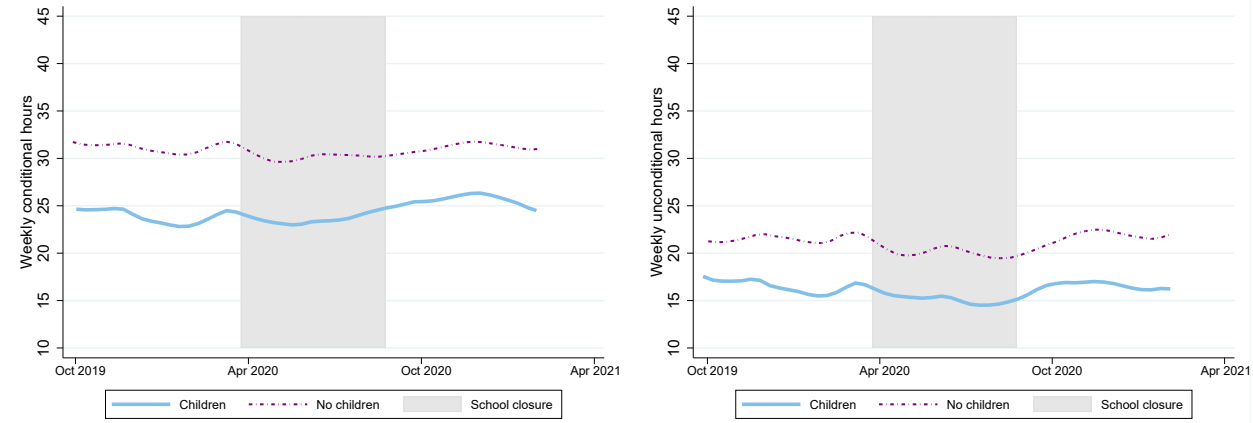
(a) Men - cond. hours

(b) Men - uncond. hours



(c) Women - cond. hours

(d) Women - uncond. hours



Notes: Calculations are based on the SLFS data. The subsample "children" refers to workers who have children below the age of 18 that live in their household. The subsample "no children" refers to workers who have no children below the age of 18 that live in their household. Weekly averages of the outcome are calculated and then smoothed with a local polynomial smoother. The period of school closure refers to complete closures or virtual teaching mandates.

Table A2: Labor supply during school holidays (marginal workers)

	School open (1)	School closed (2)	Difference (2) - (1)	
A. Women				
With children	18.90	15.69	-3.212***	(0.345)
Without children	23.09	20.87	-2.218***	(0.305)
Difference	-4.187***	-5.180***	-0.994***	
	(0.209)	(0.383)	(0.299)	
B. Men				
With children	39.17	32.03	-7.139***	(0.497)
Without children	32.39	30.79	-1.604***	(0.397)
Difference	6.782***	1.250***	-5.536***	
	(0.390)	(0.540)	(0.337)	
Observations	28278	17367	45645	

Notes: Means of unconditional hours worked are calculated using the Swiss Labor Force Survey (SLFS) data. The sample is restricted to individuals who were aged between 20 and 64 years. The years 2018 and 2019 are included. Standard errors in parenthesis: * 0.1, ** 0.05 and *** 0.01. The standard errors of the diff-in-diff estimates are calculated as follows: $\frac{diff_1 - diff_2}{\sqrt{\frac{(sd_{1,post})^2}{n_1} + \frac{(sd_{2,post})^2}{n_2}}}$.

Table A3: Labor supply during pandemic related school closures

	Before Covid (1)	During Covid (2)	After Covid (3)	Diff. (2) - (1)		Diff. (3) - (2)	
A. Women							
With children	17.05	15.28	18.14	-1.777***	(0.269)	2.864***	(0.269)
Without children	21.69	19.04	22.25	-2.654***	(0.247)	3.208***	(0.241)
Difference	-4.641***	-3.764***	-4.108***	0.877***		-0.344**	
	(0.172)	(0.332)	(0.162)	(0.143)		(0.140)	
B. Men							
With children	36.32	33.88	36.44	-2.445***	(0.336)	2.559***	(0.315)
Without children	30.26	27.35	30.22	-2.906***	(0.280)	2.867***	(0.268)
Difference	6.064***	6.525***	6.217***	0.461***		-0.308**	
	(0.204)	(0.404)	(0.183)	(0.176)		(0.158)	
Observations	90662	22886	103160	113548		126046	

Notes: Means of unconditional hours worked are calculated using the Swiss Labor Force Survey (SLFS) data. The sample is restricted to individuals who were aged between 20 and 64 years. Before Covid: 01.01.2019 - 15.03.2020. During Covid: 16.03.2020 - 30.06.2020. After Covid: 01.09.2020 - 31.12.2021. The months July and August are not included. Standard errors in parenthesis: * 0.1, ** 0.05 and *** 0.01. The t-statistic of the diff-in-diff estimates are calculated as follows: $\frac{diff_1 - diff_2}{\sqrt{\frac{(sd_{1,post})^2}{n_1} + \frac{(sd_{2,post})^2}{n_2}}}$.

Table A4: Detailed summary statistics of all variables

	Mean	SD	Min	Max	N
Outcome variables					
Conditional working hours	34.4	15.5	0	99	196497
Unconditional working hours	25.3	20.2	0	99	266894
Employed (=1)	0.83	0.37	0	1	266894
WFH at extensive margin (=1)	0.37	0.48	0	1	199356
School disruption over last week in ...					
... in primary school	0.37	1.51	0	7	266894
... in middle school	0.38	1.48	0	7	266894
... in secondary school	0.64	1.78	0	7	266894
Youngest child in ...					
... primary school or younger (=1)	0.26	0.44	0	1	266894
... middle school (=1)	0.069	0.25	0	1	266894
... high school (=1)	0.032	0.17	0	1	266894
Occupational index					
Resilience index	0.70	0.24	0	1	248285
Control variables					
Age	44.6	12.2	20	64	266894
Female (=1)	0.52	0.50	0	1	266894
Married (=1)	0.59	0.49	0	1	266894
Swiss (=1)	0.67	0.47	0	1	266894
Number of children in HH: 0 to 17 years	0.64	0.97	0	7	266894
Number of people in HH	2.91	1.31	1	9	266894
Years of education	14.3	3.08	0	22	265618
Essential sector (=1)	0.22	0.41	0	1	266894
Short-time work received (=1)	0.027	0.16	0	1	266262

Notes: The sample includes the years 2019, 2020 and 2021.

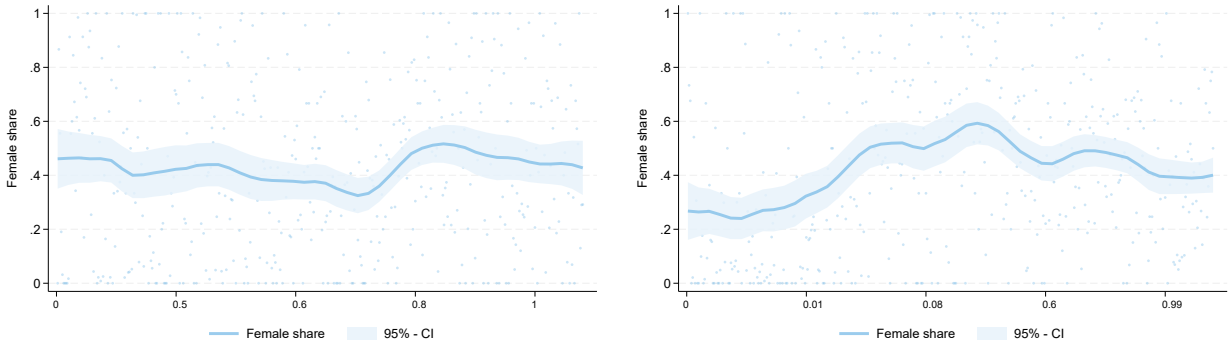
Table A5: Summary statistics - Children (0-11) vs. children (12-18)

	Children (0-11)		Children (12-18)	
	Pre-Covid	Covid	Pre-Covid	Covid
Conditional working hours	32.80	32.64	33.36	33.22
Unconditional working hours	24.97	24.80	25.59	25.82
Employed (=1)	0.87	0.86	0.87	0.87
WFH at extensive margin (=1)	0.39	0.45	0.37	0.42
Control variables				
Age	40.64	40.70	47.35	47.57
Female (=1)	0.53	0.53	0.54	0.54
Married (=1)	0.85	0.83	0.87	0.87
Swiss (=1)	0.59	0.57	0.66	0.65
Number of children in HH: 0 to 17 years	1.93	1.91	1.83	1.83
Number of people in HH	4.01	3.98	4.14	4.14
Years of education	14.80	14.80	14.21	14.25
Essential sector (=1)	0.23	0.22	0.24	0.24
Short-time work received (=1)	0.01	0.03	0.01	0.03
Observations	22487	46968	14269	29225

Notes: The sample is restricted to individuals who are aged between 20 and 64 years. The pre-covid period includes the year 2019, the post-covid period includes the years 2020 and 2021. The variable married is equal to 1 if the individual is married or in a registered partnerhsip, 0 otherwise. The number of observations refers to the total population in the subsample, not only employed individuals.

Figure A8: Share of female workers per occupation over indexes

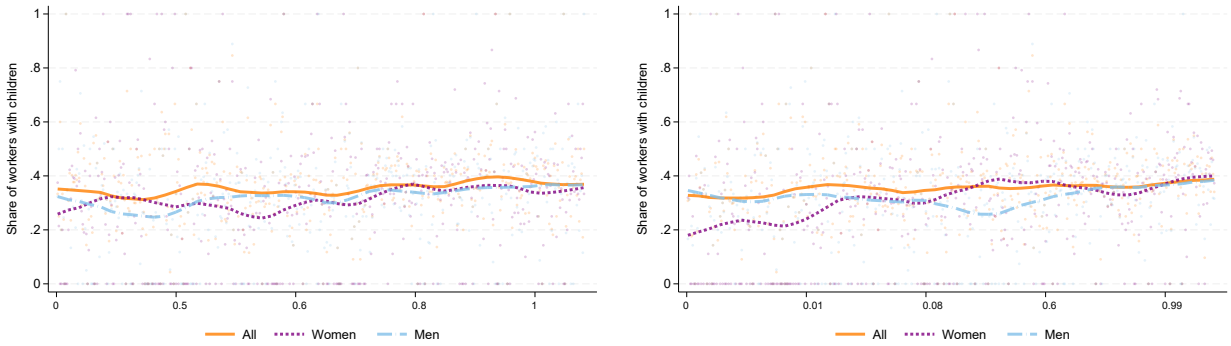
(a) Resilience (b) Homeoffice



Notes: Calculations are based on the 2019 SLFS data, on employed and unemployed individuals for which the indexes are available. The sample does not include essential sectors. One observation corresponds to female share in one ISCO code (4-digit). Observations are sorted by the index in ascending order. The bandwidth used for smoothing with a local polynomial smoother is 18.

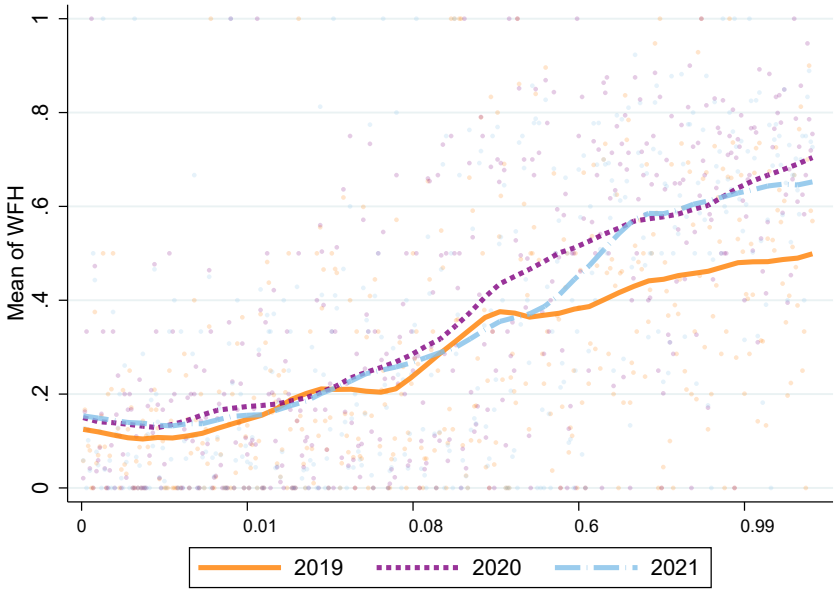
Figure A9: Share of workers with children per occupation over indexes

(a) Resilience (b) Homeoffice



Notes: Calculations are based on the 2019 SLFS data, on employed and unemployed individuals for which the indexes are available. The sample does not include essential sectors. One observation corresponds to the share of individuals with children in one ISCO code (4-digit) over all individuals. For women, it is the share of women with children over all women. For men, it is the share of men with children over all men. Observations are sorted by the index in ascending order. The bandwidth used for smoothing with a local polynomial smoother is 18.

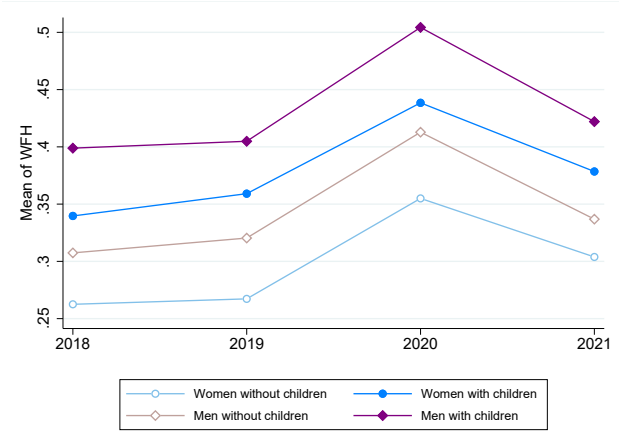
Figure A10: Correlation between WFH at extensive margin and homeoffice index



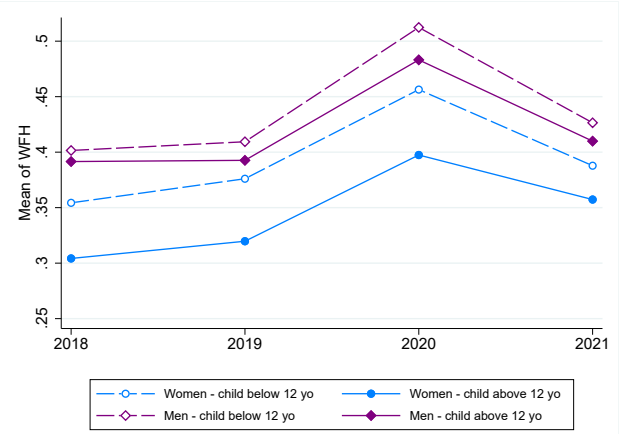
Notes: Caluclations are based on the SLFS data, on employed workers. One observation corresponds to the average of WFH at extensive margin in one ISCO code (4-digit). Observations are sorted by the homooffice index in ascending order. The bandwidth used for smoothing with a local polynomial smoother is 18.

Figure A11: WFH at the extensive margin

(a) Children vs. not



(b) Younger vs. older children



Notes: Calculations are based on the SLFS data, on employed workers. Means of the variable "Have you worked at home in the last four weeks?" are calculated based on the analytical sample, including resilient and non-resilient workers but restricting to individuals between 20 and 64 years old.

Table A6: Summary statistics on time use from SHP

	2019	2020	2021
Women - housework			
With children	15.89	16.04	15.49
With child below 12 yo	16.48	16.47	16.43
With child above 12 yo	14.98	15.41	14.19
Without children	10.46	11.07	10.64
Men - housework			
With children	6.37	6.75	6.60
With child below 12 yo	6.55	7.06	6.99
With child above 12 yo	6.05	6.28	6.00
Without children	5.61	6.42	6.08
Women - carework			
With children	25.74	26.20	24.77
With child below 12 yo	39.52	40.10	39.44
With child above 12 yo	4.99	6.39	4.92
Without children	0.90	0.97	0.77
Men - carework			
With children	11.42	11.75	11.33
With child below 12 yo	16.21	17.28	17.13
With child above 12 yo	2.83	3.33	2.60
Without children	0.60	0.71	0.64
Observations	5737	13537	8228

Notes:

Table A7: Distribution of childcare tasks from SHP

	2018	2019	2020	2021
Illness - women				
Mainly myself	0.51	0.51	0.48	0.46
Mainly my partner	0.24	0.24	0.22	0.22
Both equally	0.24	0.25	0.29	0.32
Illness men				
Mainly myself	0.34	0.34	0.34	0.30
Mainly my partner	0.38	0.39	0.34	0.33
Both equally	0.28	0.27	0.32	0.37
Play - women				
Mainly myself	0.29	0.27	0.30	0.27
Mainly my partner	0.09	0.09	0.11	0.09
Both equally	0.62	0.63	0.60	0.64
Play - men				
Mainly myself	0.19	0.16	0.20	0.17
Mainly my partner	0.13	0.14	0.15	0.13
Both equally	0.68	0.71	0.65	0.69
Take to school - women				
Mainly myself	0.49	0.47	0.44	0.42
Mainly my partner	0.20	0.21	0.21	0.18
Both equally	0.31	0.32	0.35	0.40
Take to school - men				
Mainly myself	0.35	0.32	0.32	0.29
Mainly my partner	0.29	0.33	0.30	0.28
Both equally	0.36	0.34	0.39	0.43
Homework - women				
Mainly myself	0.48	0.48	0.44	0.44
Mainly my partner	0.14	0.17	0.16	0.17
Both equally	0.38	0.34	0.40	0.39
Homework - men				
Mainly myself	0.33	0.35	0.34	0.33
Mainly my partner	0.21	0.24	0.22	0.24
Both equally	0.46	0.41	0.44	0.43
Observations	1728	1571	3036	2334

Notes: Percentage of categorical answer is computed by gender. Example: 53% of women in 2019 say that when their child is ill, they mainly take care of the child themselves.

Table A8: Distribution of adult HH members for HH with more than 2 adults

Relationship	Frequency	Percent
Spouse	4857	19.82
Life partner	388	1.58
Son / daughter	9569	39.05
Father / mother	5099	20.81
Brother / sister	2421	9.88
Brother / sister in law	92	0.38
Granddaughter / son	125	0.51
Grandfather / mother	46	0.19
Uncle / aunt, Nephew / niece, Cousin	142	0.58
Other relatives	92	0.38
Life partner of father / mother	29	0.12
Son / daughter of life partner	106	0.43
Not relative	1541	6.29

Notes: Year 2020.

In the table below, we restrict the age of the target individual to 30 or above. We see that now only 5.5% have a father or mother living in the same household (potentially grandparents).

Table A9: Distribution of adult HH members for HH with more than 2 adults
target individual is 30 or older

Relationship	Frequency	Percent
Spouse	4803	28.04
Life partner	361	2.11
Son / daughter	9521	55.58
Father / mother	964	5.63
Brother / sister	238	1.39
Brother / sister in law	64	0.37
Granddaughter / son	125	0.73
Grandfather / mother	7	0.04
Uncle / aunt, Nephew / niece, Cousin	75	0.44
Other relatives	72	0.42
Life partner of father / mother	7	0.04
Son / daughter of life partner	103	0.60
Not relative	790	4.61

Notes: Year 2020.

C.3 Additional results

Table A10: School closures due to holidays (excluding July and August)

	Cond. hours			Uncond. hours		
	(1) All	(2) Women	(3) Men	(4) All	(5) Women	(6) Men
School disrupt. × child in HH	-0.336***	-0.295***	-0.376***	-0.658***	-0.525***	-0.830***
	(0.049)	(0.065)	(0.073)	(0.052)	(0.061)	(0.086)
Child in HH (=1)	-1.005	-0.778	-1.076	-1.196	-1.334	-1.039
	(0.713)	(1.048)	(0.970)	(0.847)	(1.194)	(1.192)
School disrupt.	-0.490***	-0.422***	-0.552***	-0.493***	-0.374***	-0.624***
	(0.032)	(0.045)	(0.045)	(0.033)	(0.042)	(0.050)
Individual FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Child age controls	No	No	No	No	No	No
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Mean of dep. var	34.91	28.71	40.79	26.13	20.04	32.77
Observations	105029	51094	53935	140362	73213	67149
R-squared	0.02	0.02	0.03	0.02	0.02	0.03

Notes: Robust clustered standard errors.
* 0.1, ** 0.05 and *** 0.01.

Table A11: School closures due to holidays (marginal workers)

	Cond. hours			Uncond. hours		
	(1) All	(2) Women	(3) Men	(4) All	(5) Women	(6) Men
School disrupt. × child in HH	-0.186***	-0.156*	-0.230**	-0.652***	-0.466***	-0.942***
	(0.065)	(0.080)	(0.105)	(0.074)	(0.084)	(0.129)
Child in HH (=1)	0.932	1.436	0.657	-0.420	-0.641	0.034
	(1.440)	(1.806)	(2.212)	(1.703)	(2.201)	(2.673)
School disrupt.	-0.259***	-0.160***	-0.374***	-0.367***	-0.234***	-0.537***
	(0.044)	(0.057)	(0.067)	(0.050)	(0.062)	(0.082)
Individual FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Child age controls	No	No	No	No	No	No
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Mean of dep. var	34.02	27.82	41.70	26.06	20.57	33.41
Observations	34792	19245	15547	45431	26027	19404
R-squared	0.01	0.01	0.02	0.03	0.02	0.04

Notes: Robust clustered standard errors.
* 0.1, ** 0.05 and *** 0.01.

Table A12: Unconditional hours worked - women (marginal workers)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
School disrupt. × child age	-0.260***	-0.002	-0.139	-0.010	0.000	0.022	-0.002	0.016	0.016
	(0.082)	(0.099)	(0.086)	(0.099)	(0.098)	(0.098)	(0.099)	(0.097)	(0.097)
Primary school disrupt.		1.221		0.982	1.321	1.070	1.030	0.809	0.805
		(0.867)		(0.866)	(0.852)	(0.866)	(0.871)	(0.854)	(0.857)
Middle school disrupt.		-1.533		-1.308	-1.630*	-1.303	-1.287	-1.015	-1.010
		(0.978)		(0.977)	(0.962)	(0.977)	(0.984)	(0.965)	(0.968)
Secondary school disrupt.		-0.064		-0.052	-0.063	-0.049	-0.140	-0.086	-0.082
		(0.135)		(0.135)	(0.133)	(0.135)	(0.139)	(0.136)	(0.145)
KOF workplace closure			-0.545***						-0.017
			(0.130)						(0.185)
School holidays				-0.435***				-0.432***	-0.432***
				(0.040)				(0.040)	(0.040)
Essential sector (=1)					13.738***			13.825***	13.825***
					(0.690)			(0.690)	(0.690)
Short-time work received (=1)						-6.808***		-6.942***	-6.940***
						(0.513)		(0.505)	(0.505)
Covid incidence 0 to 19 yo							0.223***	0.144*	0.139
							(0.081)	(0.080)	(0.093)
Covid incidence 20 to 69 yo							-0.172**	-0.113	-0.109
							(0.080)	(0.078)	(0.090)
Individual FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Child age controls	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean of dep. var.	20.84	20.88	20.88	20.88	20.88	20.87	20.88	20.87	20.87
Observations	39420	39172	39172	39172	39172	39117	39172	39117	39117
R-squared	0.01	0.01	0.01	0.02	0.04	0.02	0.01	0.05	0.05

Notes: Robust clustered standard errors.
* 0.1, ** 0.05 and *** 0.01.

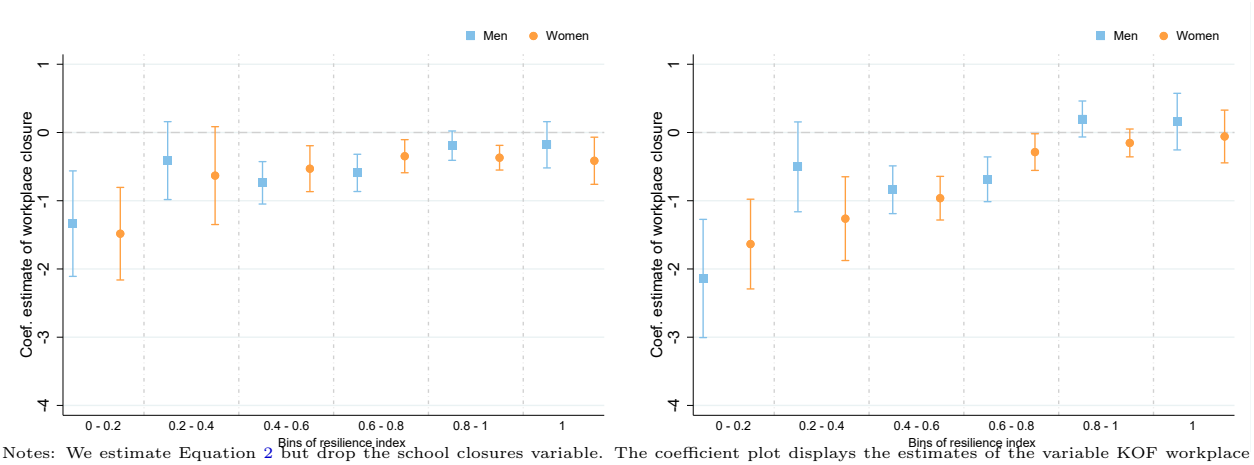
Table A13: School closures due to pandemic

	Conditional hours		Unconditional hours	
	Women	Men	Women	Men
School disrupt. × child age	0.113**	0.124**	0.088*	0.246***
	(0.055)	(0.058)	(0.049)	(0.066)
KOF workplace closure	-0.065	-0.123	-0.077	0.058
	(0.091)	(0.099)	(0.094)	(0.119)
School holidays	-0.446***	-0.591***	-0.551***	-0.816***
	(0.022)	(0.024)	(0.020)	(0.027)
Essential sector (=1)	1.677***	0.074	11.720***	14.354***
	(0.521)	(0.695)	(0.396)	(0.680)
Short-time work received (=1)	-9.091***	-11.248***	-7.481***	-9.606***
	(0.268)	(0.334)	(0.266)	(0.363)
Covid incidence 0 to 19 yo	0.040	-0.041	0.049	0.003
	(0.045)	(0.044)	(0.046)	(0.056)
Covid incidence 20 to 69 yo	-0.020	0.027	-0.007	0.014
	(0.047)	(0.047)	(0.046)	(0.058)
Individual FE	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
School disrupt. controls	Yes	Yes	Yes	Yes
Child age controls	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Mean of dep. var.	28.65	39.84	19.66	31.51
Observations	94453	100700	137645	127342
R-squared	0.05	0.05	0.05	0.05

Notes: Robust clustered standard errors.
* 0.1, ** 0.05 and *** 0.01.

Figure A12: Effect of workplace closures on hours worked by occupation (Resilience Index)

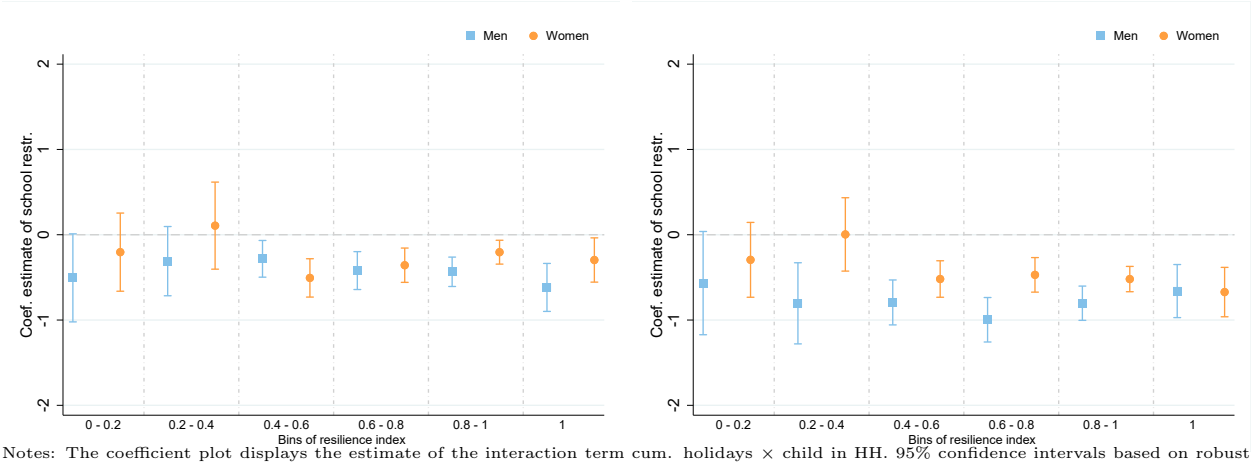
(a) Cond. hours (b) Uncond. hours



Notes: We estimate Equation 2 but drop the school closures variable. The coefficient plot displays the estimates of the variable KOF workplace closure.

Figure A13: Sensitivity analysis - Resilience index

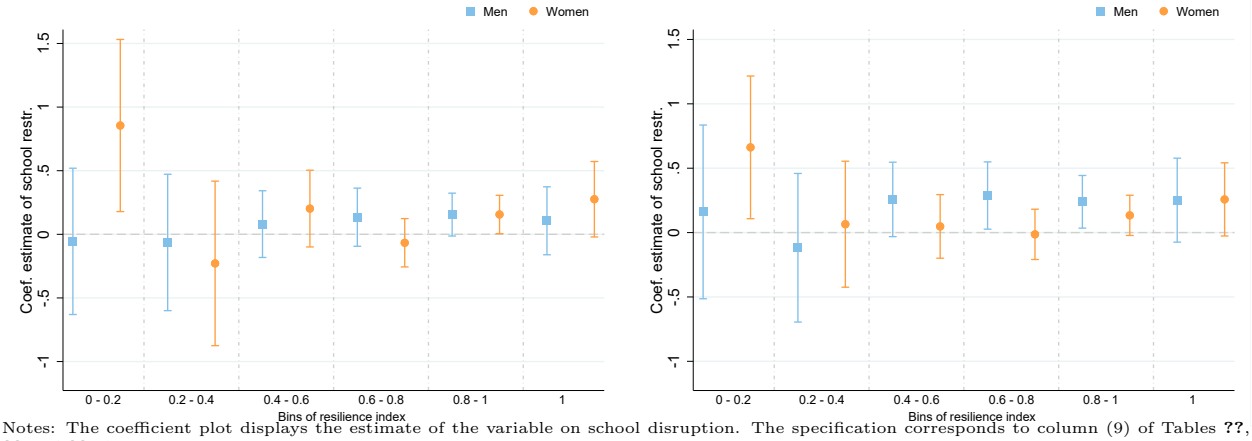
(a) Cond. hours (b) Uncond. hours



Notes: The coefficient plot displays the estimate of the interaction term cum. holidays × child in HH. 95% confidence intervals based on robust clustered standard errors (at individual level) are reported.

Figure A14: Effect of school closures on hours worked by occupation (Resilience Index)

(a) Cond. hours (b) Uncond. hours



Notes: The coefficient plot displays the estimate of the variable on school disruption. The specification corresponds to column (9) of Tables **??**, **??** and **??** above.

Table A14: Unconditional hours worked - (resilient workers only)

	Women			Men		
	(1)	(2)	(3)	(4)	(5)	(6)
School disrupt. × child age	0.075	0.075	0.069	0.268***	0.268***	0.256***
	(0.055)	(0.055)	(0.056)	(0.080)	(0.080)	(0.081)
KOF workplace closure		0.078	0.008		0.178	0.129
		(0.109)	(0.109)		(0.143)	(0.144)
School holidays	-0.470***	-0.469***	-0.466***	-0.848***	-0.847***	-0.842***
	(0.023)	(0.023)	(0.023)	(0.033)	(0.033)	(0.033)
Essential sector (=1)	12.781***	12.782***	12.704***	15.506***	15.506***	15.473***
	(0.477)	(0.477)	(0.478)	(0.862)	(0.862)	(0.859)
Short-time work received (=1)	-7.198***	-7.206***		-8.804***	-8.816***	
	(0.348)	(0.348)		(0.464)	(0.464)	
Covid incidence 0 to 19 yo	0.034	0.054	0.071	-0.076	-0.031	-0.009
	(0.046)	(0.054)	(0.054)	(0.056)	(0.067)	(0.067)
Covid incidence 20 to 69 yo	-0.006	-0.024	-0.031	0.135**	0.092	0.078
	(0.046)	(0.053)	(0.053)	(0.059)	(0.070)	(0.070)
Individual FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
School disrupt. controls	Yes	Yes	Yes	Yes	Yes	Yes
Child age controls	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Mean of dep. var.	20.02	20.02	20.03	32.18	32.18	32.19
Observations	99561	99561	99707	85755	85755	85862
R-squared	0.05	0.05	0.04	0.05	0.05	0.04

Notes: Robust clustered standard errors.
* 0.1, ** 0.05 and *** 0.01.

Table A15: Summary of results - women and men (resilient workers only)

	Conditional hours		Unconditional hours	
	Women	Men	Women	Men
School disrupt. × child age	0.072	0.160**	0.075	0.268***
	(0.060)	(0.069)	(0.055)	(0.080)
KOF workplace closure	0.017	-0.082	0.078	0.178
	(0.102)	(0.117)	(0.109)	(0.143)
School holidays	-0.351***	-0.615***	-0.469***	-0.847***
	(0.024)	(0.029)	(0.023)	(0.033)
Essential sector (=1)	1.869***	-1.335	12.782***	15.506***
	(0.621)	(0.874)	(0.477)	(0.862)
Short-time work received (=1)	-8.868***	-10.616***	-7.206***	-8.816***
	(0.346)	(0.410)	(0.348)	(0.464)
Covid incidence 0 to 19 yo	0.067	-0.090*	0.054	-0.031
	(0.050)	(0.053)	(0.054)	(0.067)
Covid incidence 20 to 69 yo	-0.062	0.082	-0.024	0.092
	(0.051)	(0.056)	(0.053)	(0.070)
Individual FE	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
School disrupt. controls	Yes	Yes	Yes	Yes
Child age controls	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Mean of dep. var.	29.63	40.62	20.02	32.18
Observations	67272	67945	99561	85755
R-squared	0.04	0.05	0.05	0.05

Notes: Robust clustered standard errors.
* 0.1, ** 0.05 and *** 0.01.

Table A16: Age of youngest child and home office suitability - resilient workers (unconditional hours)

	Marginal (low HO) - below 12 yo		Marginal (low HO) - above 12 yo		Non-marginal (high HO) - below 12 yo		Non-marginal (high HO) - above 12 yo	
	Women	Men	Women	Men	Women	Men	Women	Men
School disrupt. × child in HH	-0.026	0.177	0.105	0.252	0.089	0.213**	0.110	0.546***
	(0.112)	(0.177)	(0.146)	(0.224)	(0.076)	(0.108)	(0.096)	(0.141)
KOF workplace closure	-0.056	0.088	-0.061	-0.055	0.172	0.205	0.048	0.186
	(0.198)	(0.284)	(0.222)	(0.308)	(0.144)	(0.178)	(0.162)	(0.199)
School holidays	-0.383***	-0.610***	-0.325***	-0.541***	-0.437***	-0.840***	-0.417***	-0.710***
	(0.042)	(0.061)	(0.048)	(0.066)	(0.030)	(0.042)	(0.034)	(0.045)
Essential sector (=1)	13.957***	17.229***	14.865***	17.672***	11.933***	13.911***	12.640***	14.273***
	(0.726)	(1.520)	(0.819)	(1.659)	(0.842)	(1.229)	(0.925)	(1.355)
Short-time work received (=1)	-7.024***	-7.924***	-7.578***	-8.200***	-7.448***	-8.960***	-7.758***	-9.919***
	(0.558)	(0.840)	(0.603)	(0.935)	(0.514)	(0.600)	(0.556)	(0.678)
Covid incidence 0 to 19 yo	0.125	-0.008	0.149	-0.151	0.005	-0.036	-0.028	-0.058
	(0.099)	(0.129)	(0.110)	(0.140)	(0.069)	(0.086)	(0.079)	(0.095)
Covid incidence 20 to 69 yo	-0.050	-0.075	-0.131	0.011	0.041	0.157*	0.088	0.182*
	(0.094)	(0.145)	(0.110)	(0.157)	(0.069)	(0.086)	(0.078)	(0.095)
Individual FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
School disrupt. controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Child age controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean of dep. var.	20.97	32.79	22.15	32.11	19.65	31.23	20.84	30.20
Observations	34795	26414	29165	22043	54214	50971	44142	41800
R-squared	0.05	0.04	0.05	0.04	0.04	0.05	0.04	0.05

Notes: Robust clustered standard errors.
* 0.1, ** 0.05 and *** 0.01.

Table A17: Age of youngest child and home office suitability - resilient workers (conditional hours)

	Marginal (low HO) - below 12 yo		Marginal (low HO) - above 12 yo		Non-marginal (high HO) - below 12 yo		Non-marginal (high HO) - above 12 yo	
	Women	Men	Women	Men	Women	Men	Women	Men
School disrupt. × child in HH	0.122	0.159	0.127	0.189	-0.011	0.098	0.157	0.159
	(0.112)	(0.143)	(0.143)	(0.189)	(0.089)	(0.094)	(0.111)	(0.130)
KOF workplace closure	-0.025	-0.104	-0.008	-0.138	-0.046	-0.112	0.036	-0.071
	(0.172)	(0.218)	(0.188)	(0.240)	(0.143)	(0.152)	(0.161)	(0.174)
School holidays	-0.238***	-0.379***	-0.188***	-0.364***	-0.399***	-0.659***	-0.391***	-0.597***
	(0.041)	(0.050)	(0.045)	(0.056)	(0.033)	(0.038)	(0.037)	(0.042)
Essential sector (=1)	1.601	-3.116*	2.157**	-3.524*	1.467	0.383	1.634	1.047
	(1.026)	(1.726)	(1.088)	(1.995)	(0.994)	(1.207)	(1.053)	(1.378)
Short-time work received (=1)	-8.004***	-9.410***	-8.458***	-9.373***	-9.550***	-10.927***	-10.058***	-11.668***
	(0.543)	(0.691)	(0.585)	(0.767)	(0.519)	(0.553)	(0.556)	(0.623)
Covid incidence 0 to 19 yo	0.213**	-0.084	0.271***	-0.108	-0.044	-0.123*	-0.039	-0.056
	(0.089)	(0.097)	(0.100)	(0.105)	(0.067)	(0.070)	(0.076)	(0.079)
Covid incidence 20 to 69 yo	-0.137	-0.006	-0.209**	-0.046	0.020	0.145*	0.040	0.142*
	(0.086)	(0.102)	(0.097)	(0.110)	(0.071)	(0.076)	(0.079)	(0.081)
Individual FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
School disrupt. controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Child age controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean of dep. var.	28.30	40.96	29.44	40.80	31.26	40.17	32.75	40.15
Observations	25783	21147	21940	17347	34079	39626	28087	31443
R-squared	0.03	0.03	0.03	0.04	0.05	0.06	0.05	0.06

Notes: Robust clustered standard errors.
* 0.1, ** 0.05 and *** 0.01.

Table A18: Age of youngest child - resilient workers only (unconditional hours)

	Youngest child below 12		Youngest child above 12	
	Women	Men	Women	Men
School disrupt. × child age	0.053	0.189**	0.111	0.443***
	(0.064)	(0.094)	(0.082)	(0.120)
KOF workplace closure	0.070	0.194	-0.009	0.145
	(0.117)	(0.152)	(0.131)	(0.168)
School holidays	-0.418***	-0.753***	-0.379***	-0.646***
	(0.025)	(0.034)	(0.028)	(0.037)
Essential sector (=1)	12.959***	15.952***	13.895***	16.712***
	(0.504)	(0.882)	(0.560)	(0.965)
Short-time work received (=1)	-7.125***	-8.397***	-7.551***	-9.118***
	(0.378)	(0.491)	(0.410)	(0.549)
Covid incidence 0 to 19 yo	0.059	-0.007	0.054	-0.078
	(0.057)	(0.072)	(0.065)	(0.078)
Covid incidence 20 to 69 yo	0.004	0.066	0.006	0.122
	(0.056)	(0.074)	(0.065)	(0.082)
Individual FE	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
School disrupt. controls	Yes	Yes	Yes	Yes
Child age controls	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Mean of dep. var.	20.17	31.76	21.36	30.86
Observations	89009	77385	73307	63843
R-squared	0.05	0.05	0.05	0.05

Notes: Robust clustered standard errors.
* 0.1, ** 0.05 and *** 0.01.

Table A19: Subsample of parents - resilience index over 0.6 - unconditional hours

	Women	Men
School disrupt. × child age	-0.038	-0.328**
	(0.096)	(0.144)
Primary school disrupt.	-0.135	0.185
	(0.095)	(0.140)
KOF workplace closure	0.025	-0.025
	(0.140)	(0.206)
School holidays	-0.768***	-1.501***
	(0.036)	(0.057)
Essential sector (=1)	9.046***	10.062***
	(0.740)	(1.759)
Short-time work received (=1)	-6.840***	-8.842***
	(0.524)	(0.766)
Covid incidence 0 to 19 yo	-0.030	-0.042
	(0.071)	(0.099)
Covid incidence 20 to 69 yo	-0.054	0.177*
	(0.070)	(0.103)
Individual FE	Yes	Yes
Month FE	Yes	Yes
Year FE	Yes	Yes
School disrupt. controls	Yes	Yes
Child age controls	Yes	Yes
Controls	Yes	Yes
Mean of dep. var.	17.01	36.05
Observations	36790	30267
R-squared	0.06	0.09

Notes: This table presents results for parents, and comparing parents with youngest child is less than 12 years old to those parents with youngest child 12 years old or older. To perform this comparison, the variable 'restriction of school closure' is set to zero (even though children aged 12 or older also experienced school closure). This set-up effectively identifies the differential effects of schools closing for parents with young children, compared to parents whose youngest child is aged 12 or older. Robust clustered standard errors.
* 0.1, ** 0.05 and *** 0.01.

Table A20: Subsample of parents - resilience index over 0.6 - conditional hours

	Women	Men
School disrupt. × child age	-0.071	-0.106
	(0.103)	(0.123)
Primary school disrupt.	-0.121	0.065
	(0.099)	(0.119)
KOF workplace closure	-0.109	-0.210
	(0.139)	(0.164)
School holidays	-0.507***	-0.947***
	(0.039)	(0.048)
Essential sector (=1)	1.435	-1.995
	(0.979)	(1.398)
Short-time work received (=1)	-7.770***	-10.117***
	(0.508)	(0.654)
Covid incidence 0 to 19 yo	-0.060	-0.098
	(0.068)	(0.075)
Covid incidence 20 to 69 yo	0.008	0.160*
	(0.072)	(0.082)
Individual FE	Yes	Yes
Month FE	Yes	Yes
Year FE	Yes	Yes
School disrupt. controls	Yes	Yes
Child age controls	Yes	Yes
Controls	Yes	Yes
Mean of dep. var.	25.39	41.47
Observations	24651	26317
R-squared	0.04	0.07

Notes: This table presents results for parents, and comparing parents with youngest child is less than 12 years old to those parents with youngest child 12 years old or older. To perform this comparison, the variable 'restriction of school closure' is set to zero (even though children aged 12 or older also experienced school closure). This set-up effectively identifies the differential effects of schools closing for parents with young children, compared to parents whose youngest child is aged 12 or older. Robust clustered standard errors.
* 0.1, ** 0.05 and *** 0.01.

Table A21: Home Office Index - resilient workers only (unconditional hours)

	Low HO index		High HO index	
	Women	Men	Women	Men
School disrupt. × child age	0.016	0.190	0.100	0.322***
	(0.097)	(0.150)	(0.066)	(0.092)
KOF workplace closure	-0.017	-0.056	0.168	0.256
	(0.185)	(0.265)	(0.134)	(0.169)
School holidays	-0.432***	-0.706***	-0.493***	-0.934***
	(0.040)	(0.058)	(0.028)	(0.040)
Essential sector (=1)	13.825***	16.910***	11.604***	13.279***
	(0.690)	(1.478)	(0.799)	(1.198)
Short-time work received (=1)	-6.940***	-8.244***	-7.621***	-9.428***
	(0.505)	(0.790)	(0.478)	(0.571)
Covid incidence 0 to 19 yo	0.139	-0.088	-0.010	-0.028
	(0.093)	(0.120)	(0.065)	(0.081)
Covid incidence 20 to 69 yo	-0.109	-0.019	0.028	0.162**
	(0.090)	(0.131)	(0.064)	(0.082)
Individual FE	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
School disrupt. controls	Yes	Yes	Yes	Yes
Child age controls	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Mean of dep. var.	20.87	33.19	19.47	31.66
Observations	39117	29331	60444	56424
R-squared	0.05	0.04	0.04	0.06

Notes: Robust clustered standard errors.
* 0.1, ** 0.05 and *** 0.01.