School Closures and Parental Labor Supply: Differential Effects of Anticipated and Unanticipated Shocks [a]

Sofia Schroeter[b] — *University of Lausanne*

Rafael Lalive[c] — *University of Lausanne, CEPR, IZA*

Kalaivani Karunanethy[d] — *University of Lausanne*

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Abstract

This paper studies how COVID-19 pandemic school closures affected the employment outcomes of parents in Switzerland. We find that men with children increased their hours worked while women with children reduced theirs as compared to men and women without children. This suggests that the burden of increased child care needs due to lack of in-person schooling fell primarily on mothers. And in contrast to earlier recessions where men were more greatly affected, and where women increased their hours worked due to the added worker effect, the reverse is seen in the wake of COVID-19. To show that the effects we find result from the labor supply shock and not from any labor demand shock, we use a novel index of occupations classifying their resiliency to the pandemic measures and estimate our model on different occupational subsamples. Our results are strongest for men and women in the most resilient occupations. In contrast, when we study parental responses to anticipated school closures due to school vacations, we find that fathers decreased hours worked much more than mothers.

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

JEL Codes: D13, J16, J22

[a] This study is part of the NIH funded consortium on COVID-19 mitigation policies and economic behavior.

[b] Contact: sofia.schroeter@unil.ch

[c] Contact: rafael.lalive@unil.ch

[d] Contact: kalaivani.karunanethy@unil.ch

1 Introduction

In early 2020, as the severity of the COVID-19 pandemic became evident, many countries implemented Non-Pharmaceutical Interventions (NPIs) to slow down the spread of the new coronavirus. These NPIs included the closure of many workplaces as well as schools and childcare facilities. According to the European Centre for Disease Prevention and Control, almost all countries in the European Union had closed daycare nurseries, primary and secondary schools in March 2020. Similarly, Switzerland also closed schools and childcare facilities in March 2020 during its first lockdown. We analyze the effects of such unanticipated school closures on employment outcomes of parents in Switzerland, studying adjustments on both the intensive and extensive margins. The increased presence of school-age children at home due to lack of in-person schooling could dramatically affect parents' labor supply.

Using the Swiss Labor Force Survey (SLFS) data as well as original data we collected on COVID-19 pandemic measures affecting schools at the level of Swiss cantons (equivalent to states in the USA) as well as school vacations pre-COVID-19, we find that pandemic school closures increased the hours worked of men with children significantly and in contrast, decreased the hours worked of women with children (as compared to men and women without children). To separate labor demand and labor supply effects, we use data on the resiliency of occupations to the pandemic measures that could have affected labor demand and estimate our model on different occupational subsamples classified by their resiliency. We find the strongest effects among men and women who were employed in the most resilient occupations, indicating that our results are mainly driven by the labor supply effect of school closures and not by any labor demand effect of other pandemic measures. In contrast, school closures due to school vacations in pre-COVID-19 years led to greater decreases in hours worked for fathers than for mothers.

While there is a rapidly growing literature documenting the effects of the COVID-19 pandemic and subsequent lockdown measures on employment outcomes (among others, 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)), 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. In addition, most other papers that study parental labor supply responses to child care shocks focus on the role played by child

care costs and the availability or expansion of child care provision (or early childhood education), rather than K-12 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. Using smartphone data as a proxy for K-12 school closings and reopenings are two papers that look at the impact of COVID-19 school closures in the US 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. 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-aged children with no measurable effects on labor supply of childless women, custodial fathers, or unmarried women. Finally, Amuedo-Dorantes *et al.* (2023) find unanticipated school closures have a long-term negative impact on mothers' labor supply.

Our results show that the burden of increased child care needs due to the lack of in-person schooling fell primarily on mothers. 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) provide novel empirical evidence that the COVID-19 pandemic worsened the gender division of labor in care work and paid 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 partners.

The result we find of women reducing their labor supply due to unanticipated school closures and men increasing theirs to potentially smooth household income is possibly a first reverse case of the Added Worker Effect (AWE). Earlier papers studying the AWE where men lose their jobs and women increase their hours worked to compensate for the reduction in household income only find small effects, which they attribute to strong traditional gender norms, generous social insurance programs and lack of access to affordable child care (Halla *et al.* (2020), Autor *et al.* (2017), and Cullen and Gruber (2000) among others). In our case, these reasons could explain the stronger effects we find.

Finally, regarding anticipated school closures due to school vacations, Ward (2019), Duchini and Effenterre (2022), Cowan *et al.* (2023), and Price and Wasserman (2023) find that mothers reduce hours worked and increase time on care work during school vacations. While we also find similar reductions in hours worked among mothers, we also find greater reductions among fathers.

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 a Confederation of 26 cantons (equivalent to states in the USA) and has three levels of government: federal, cantonal and commune (municipality). Most matters related to health and education are administered at the cantonal level.

In the initial phase of the COVID-19 pandemic, the cantons bordering France and Italy introduced some early NPIs, such as canceling several large public events, while at the federal level, events involving more than 1,000 participants were banned. As the pandemic worsened, the federal government implemented stricter NPIs, termed *lockdown* measures, which all cantons needed to observe. However, they could expand on them further and in certain cases, could also relax them.

Cantons are responsible for the administration and regulation of compulsory (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 comprises of primary education and lower secondary education (middle school). Primary education is divided into lower primary, which starts with kindergarten and is for children ages four to eight, and upper primary for ages eight to 12. Then, children start lower secondary education (middle school), which is for ages 12 to 15. Upper secondary education is another 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.

Switzerland has a flexible, open labor market that is characterized by high labor force participation and employment rates. However, while the female labor force participation and employment rates are high, most women are working part-time (defined as working less than 90 percent of the full-time rate of hours).

According to the Swiss Federal Statistical Office, women accounted for 73 percent of part-time employed persons in 2022 and cited childcare and other family responsibilities as the main reasons for part-time employment. About 57 percent of women work part-time.

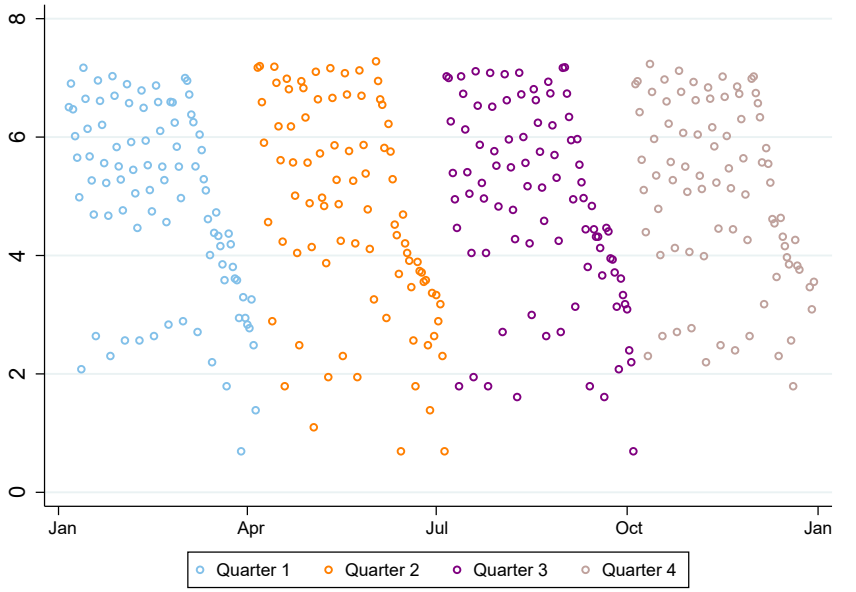
3 Data

3.1 Swiss Labor Force Survey (SLFS)

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). Persons participating 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). Figure 1 shows the number of interviews by day for the year 2020.

Figure 1: Log number of interviews per day



3.2 School closures and school vacations

We collected daily data on pandemic related lockdown measures affecting schools for the years 2020 and 2021 for the 10 largest cantons in terms of population. We collected data separately for the three different school types: primary, middle and high schools. The data collected include information on when schools were completely closed, when schools were re-opened (with or without restrictions), when hybrid options were offered, and when certain types of restrictions were required, such as mask, test or COVID-19 certification, limitations on sports activities (all sports, or only water or contact sports), etc. As cantons bear the primary responsibility for education, we observe regional and time variations in the pandemic measures related to school closures across cantons.

Jack and Oster (2023) review papers examining the impact of school closures and remote learning on student outcomes.

In addition, we collected daily data on school vacations for all cantons from 2005 to 2021. In Switzerland, K-12 schools have regular school vacations outside of the long summer vacations, which vary by canton and commune, and over years.

3.3 Lockdown Index and Home Office Index

We use the *Lockdown Index* compiled by Faber *et al.* (2020). This Index is based on an occupation's need for physical proximity rather than the ability to perform the job from home, which the authors considered more applicable to the Swiss context where the lockdown policy was aimed at enforcing physical distances between people in order to slow down the spread of COVID-19.

Using this Lockdown Index, we create a new measure that we term the Resilience Index as follows: 1 - Lockdown Index. Our Resilience Index's values range between 0 and 1. The higher the value, the more *resilient* we consider the occupation to be to similar lockdown policy shocks.

However, to complement our analyses, we also use the Home Office Index[1] that was created by Dingel and Neiman (2020) and then adapted for Switzerland by Rutzer and Niggli (2020).

3.4 KOF Stringency Index

To account for the variations in how lockdown policies were implemented across cantons and over time in Switzerland, we use the KOF Stringency Index (Pleninger *et al.*, 2022). The values range from 0 (= no measures) to 100 (= full lockdown). This data is available at the national and at the

[1] https://cieb.shinyapps.io/HomeOffice_CH/

cantonal level for all 26 cantons from January 2020 onwards.

The KOF Stringency Index is compiled from nine sub-indices: school closures, workplace closures, 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. It is constructed similarly to the Oxford Stringency Index.

3.5 COVID-19 data

Finally, since Barrero *et al.* (2022) find negative effects of the desire to social distance on labor supply, we also include weekly COVID-19 cases at the cantonal level as a control.

4 Descriptive analysis

4.1 Labor supply

The two key outcome variables that we use to identify the causal impacts of school closures on parental labor supply are *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 are employed. This variable captures adjustments amde at the intensive margin only 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 restrict the sample to individuals who were aged between 20 and 64 years old at the time that they were surveyed. In Table (1) we present summary statistics of the sample, comparing the pre-pandemic and pandemic periods. The pre-pandemic period covers the year 2019, while the pandemic period covers the years 2020 and 2021. In terms of changes in the two outcome variables between these two periods, we see small decreases in the mean of both conditional (from 34.62 to 34.29) and unconditional (from 25.54 to 25.23) hours worked. In addition, about 40 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.

In Table (2) we shed light on some general patterns of the Swiss labor force in terms of gender and individuals with or without children in the household. Men with children work more hours

at the intensive margin and, on average, are 10 percent more likely to be employed. Whereas, women generelly work fewer hours than men, even among those without children in the household. Focusing on conditional hours worked, women with children, on average, work about 6.5 hours less than women without children. We find it interesting that these gender differences are a lot smaller at the extensive margin when looking at the percentage of employed individuals. The employment rates for women with and without children are 80 and 79 percent respectively, while it is 95 and 84 for men.

Finally, when looking at the control variables, we see that almost twice as many 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 (Alon *et al.* (2020), Albanesi and Kim (2021), and Bluedorn *et al.* (2023) among others).

Table 1: Summary statistics before and during the 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.

Table 2: Summary statistics by gender and children

	Men		Women	
	Without children	With children	Without children	With children
Outcome variables				
Conditional working hours	39.29	40.68	31.05	24.54
Unconditional working hours	29.58	35.01	21.32	16.81
Employed (=1)	0.84	0.95	0.79	0.80
WFH at extensive margin (=1)	0.36	0.45	0.31	0.39
Control variables				
Age	44.89	44.41	45.98	41.92
Female (=1)	0.00	0.00	1.00	1.00
Married (=1)	0.43	0.87	0.45	0.82
Swiss (=1)	0.67	0.60	0.73	0.61
Number of children in HH: 0 to 17 years	0.00	1.79	0.00	1.75
Number of people in HH	2.33	4.01	2.31	3.89
Years of education	14.29	14.86	13.88	14.40
Essential sector (=1)	0.15	0.19	0.27	0.27
Short-time work received (=1)	0.03	0.03	0.03	0.03
Observations	83292	44804	87144	51654

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.

4.2 COVID-19 pandemic measures

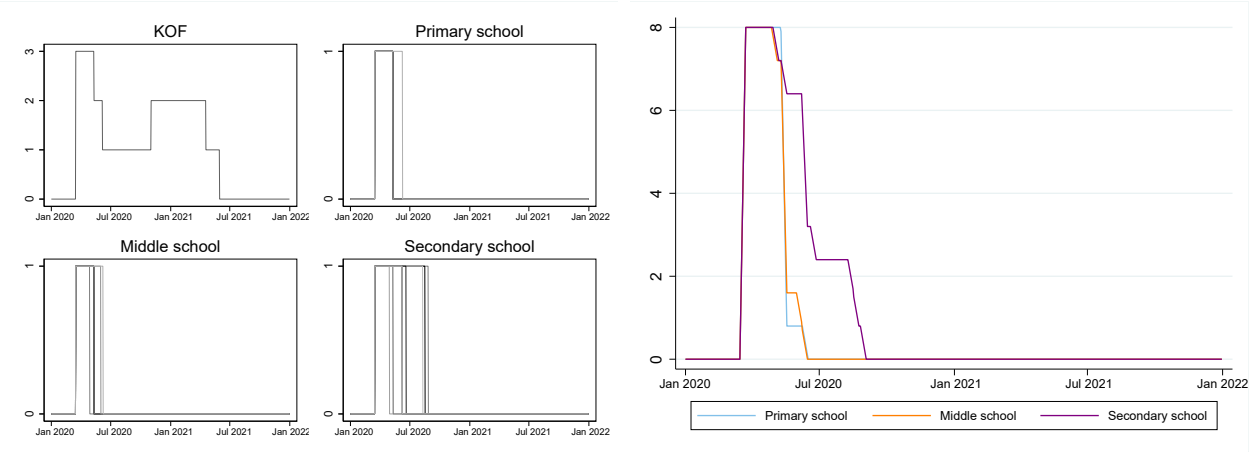
The following figure shows the evolution of various COVID-19 pandemic measures over time. The upper left graph in Figure (2a) displays the KOF stringency index for school closure. The other three graphs show our own collected data for three different school types and highlight the cantonal heterogeneities.

We define a binary variable on school closures that is equal to one if schools have been completely closed or there has been a virtual teaching mandate in place. Compared to KOF data, we uncover cantonal heterogeneities as well as differences among school types that are not captured by the Oxford Stringency Index on which the KOF Stringency Index is based.

In Figure (2b), we calculate a weekly moving sum of the binary variable on school closures and take the average over cantons by type of school (primary, middle and high school). This is a measure of school closure disruption that we use in our model.

Figure 2: Restriction policies on school closures

(a) KOF vs. collected data (b) Weekly moving sum



Notes: Calculations are based on KOF stringency data and own collected data.

4.3 Labor supply and school closures

In the following figures we present descriptive evidence of the evolution of hours worked over the period of school closures at the beginning of the pandemic. We focus on the outcomes conditional and unconditional hours worked. We calculate weekly averages and smooth them with a local polynomial smoother.

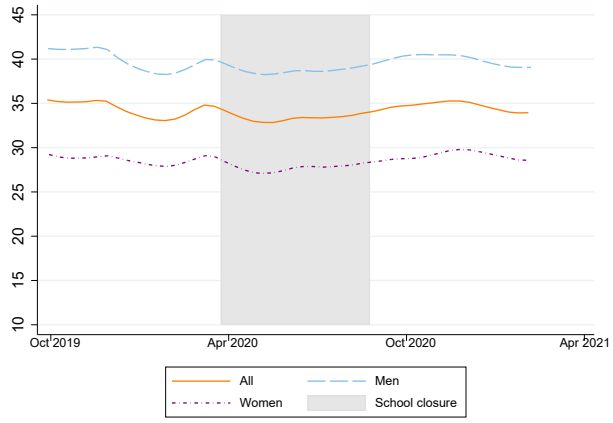
Figure 3 provides weekly time series of conditional and unconditional hours worked, for both women and men, and by whether the respondents have children or not. Overall, the evidence suggests that men work more hours than women, while individuals with children and those without children work around the same number of hours. In comparison with conditional hours, the graphs (b) and (d) reporting unconditional hours show a stronger reduction in labor supply during the lockdown in Spring 2020, than conditional hours. There is more volatility when looking at the graphs on unconditional hours which also capture individuals who leave to unemployment and do not just focus on those who stay employed.

Figure 4 shows labor supply patterns of women and men by children and for conditional and unconditional hours. Conditional hours are about the same for men with children and without children, while unconditional hours are lower for women with children compared to women without children. Turning to unconditional hours reveals that men with children have higher labor supply than men without children, and the reverse is true for women. The evidence in these graphs replicate the descriptive evidence form Table 2.

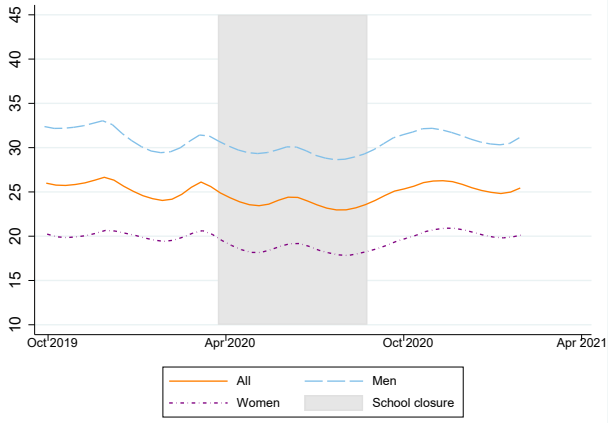
The descriptive analysis suggests that unconditional hours offer an interesting and complementary insight to analyses that focus on hours worked at the intensive margin, and this is true especially for men. Labor supply for women is consistently lower for women with children than for men, irrespective of the measure. For men, the conditional hours measure suggests that labor supply is similar, while in fact, men without children tend to be less attached to the workforce, leading to a lower unconditional labor supply.

Figure 3: Various subsamples

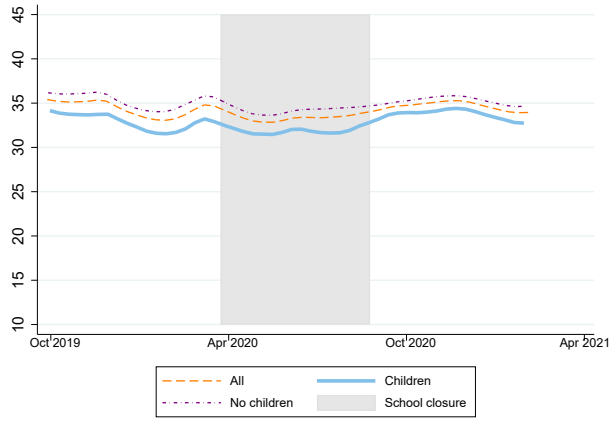
(a) By gender - cond. hours



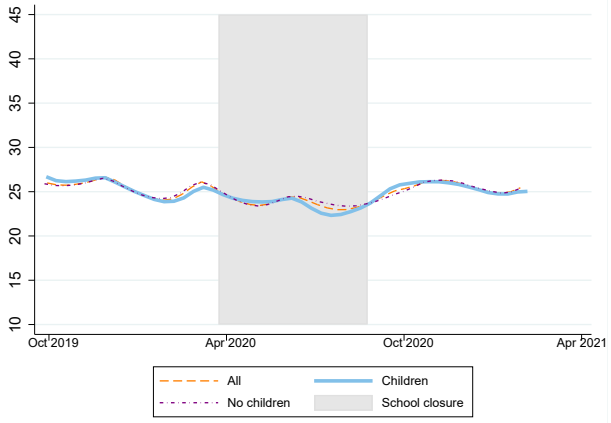
(b) By gender - uncond. hours



(c) By children - cond. hours



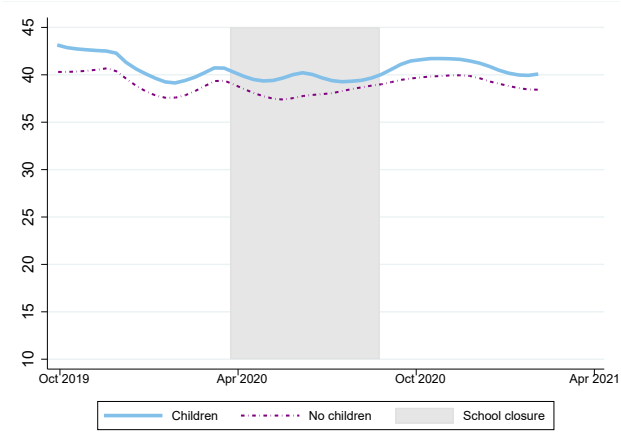
(d) By children - uncond. hours



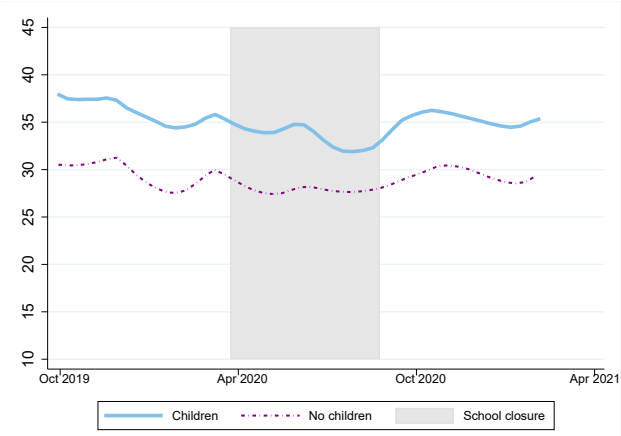
Notes: Calculations are based on the SLFS data. The subsample "children" refers to workers who have children below the age of 18 that live in their household. The subsample "no children" refers to workers who have no children below the age of 18 that live in their household. Weekly averages of the outcome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

Figure 4: Children vs. no children in HH

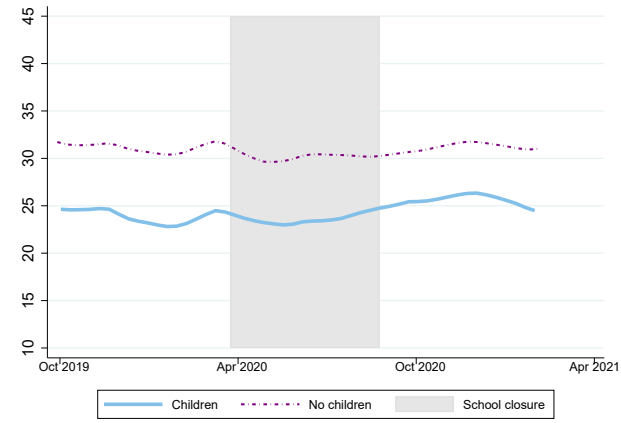
(a) Men - cond. hours



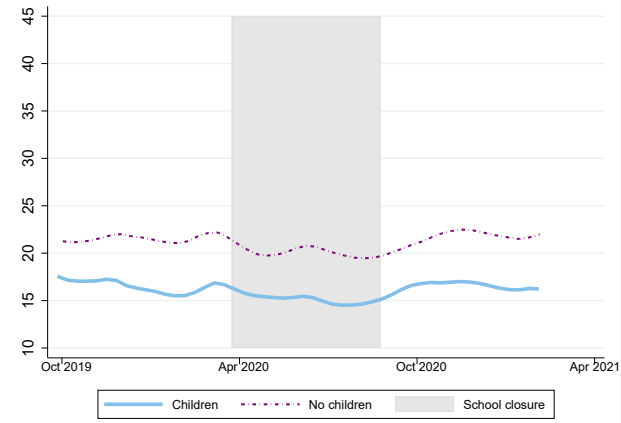
(b) Men - uncond. hours



(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.

5 Model

5.1 Unanticipated shock: pandemic school closures

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

$$\begin{aligned} Y_{it}^{self} = \beta_0 \quad &+ \quad \beta_1 \sum_{k=1}^{7} Disrupt_{it-k} + \beta_2 Essential_{it}^{self} + \beta_3 Y_{it}^{spouse} \\ &+ \quad \beta_4 Trnsfr_{it} + \delta' X_{it} + \gamma' Z_{it} + \tau_i + \tau_m + \epsilon_{it}^{self} \end{aligned} \tag{1}$$

The dependent variable Y_{it}^{self} are the conditional and unconditional hours worked in the past week of the interview date, as described in Section 4. The independent variable $\sum_{k=1}^{7} Disrupt_{it-7}$ is constructed using the collected data on school closures. We compute the total number of days schools were closed in the past week (seven days) for each school type (primary, middle or high school) in each canton. We then take the average of this value for each school type across all cantons. We then merge this data to the SLFS sample using the interview date and the school type of the youngest child in the household. We then interact this variable with a binary variable that is equal to one if there is a youngest child in the household in any of the school type (primary, middle or high school). Therefore, this variable is positive whenever there are school-age children present in the household and zero otherwise.

To separate the 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 for workplace closures.

In addition, we include a binary variable that is equal to one if the individual worked in an essential sector, another binary variable equal to one 1 if the individual received a work subsidy from the government (short-time work subsidy or furlough pay). Other control variables include age, a binary variable for gender (zero for male and one for female), a binary variable equal to one if the partner is employed, marital status (one if married and zero otherwise), nationality (one if Swiss and zero otherwise), the total number of children in the household, the total number of people in the household, and the number of confirmed COVID-19 cases per thousand. We also include individual fixed effects as well as monthly fixed effects to capture seasonal changes. Finally, standard errors are clustered at the individual level. 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 2020 and 2021.

5.2 Anticipated shock: school vacations

To analyse the effect of the anticipated labor supply shock resulting from school vacations, we estimate the following model:

$$Y_{it}^{self} = \beta_0 + \beta_1 \sum_{k=1}^{7} Disrupt_{it-k} + \beta_3 Y_{it}^{spouse} + \delta' X_{it} + \tau_i + \tau_m + \epsilon_{it}^{self} \tag{2}$$

This model is almost identical to the earlier one used to analyze the effect of the unantici-

pated shock from pandemic school closures. The main difference is that the independent variable $\sum_{k=1}^{7} Disrupt_{it-k}$ is the total number of days schools were closed in the past week of the interview date due to school vacations at the cantonal level interacted with a binary variable that is equal to one if there are school-age children present in the household.

We include the same control variables as before except those unique to the pandemic, such as the indicator variable for essential sectors and short-time work subsidies. We again restrict the sample to individuals who were aged between 20 and 64 years old, but this time, the sample covers the pre-pandemic years from 2018 to 2019.

6 Results

6.1 Unanticipated shock: pandemic school closures

The results from estimating Equation 1 on the full sample, which quantifies the impact of the unanticipated labor supply shock resulting from the pandemic school closures, are shown in Tables 3 and 4. We find small and ambiguous effects on both the conditional and unconditional hours worked, suggesting that school closures did not affect parents' labor supply.

However, when we look at the effects on unconditional hours worked separately by gender (Tables 5 and 6), we find instead that men with children increased their hours worked by 0.24 as compared to men without children. While we find the opposite effect for women. Women with children decreased their hours worked by 0.04 relative to women without children, although this becomes imprecisely estimated when including the full set of controls.

Table 3: Conditional hours worked - full sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
School disrupt. # child in HH	-0.120***	-0.114***	-0.112***	-0.050	-0.111***	-0.005	-0.108***	-0.005	0.037
	(0.038)	(0.038)	(0.038)	(0.039)	(0.038)	(0.038)	(0.038)	(0.038)	(0.038)
KOF business closure				-0.557***					-0.383***
				(0.051)					(0.050)
Essential sector (=1)					1.778***			1.521***	1.557***
					(0.589)			(0.583)	(0.583)
Partner employed (=1)								-0.049	0.032
								(0.206)	(0.206)
Short-time work received (=1)						-10.757***		-10.753***	-10.626***
						(0.247)		(0.247)	(0.246)
Covid cases per 1,000							0.043	-0.007	-0.010
							(0.027)	(0.027)	(0.027)
Individual FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Child age controls	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean of dep. var.	34.29	34.29	34.30	34.30	34.30	34.31	34.30	34.31	34.31
Observations	133512	133512	132948	132948	132948	132592	132948	132592	132592
R-squared	0.01	0.01	0.01	0.01	0.01	0.04	0.01	0.04	0.04

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

Table 4: Unconditional hours worked - full sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
School disrupt. # child in HH	-0.088**	-0.070*	-0.064*	-0.022	-0.058	0.029	-0.056	0.041	0.067*
	(0.038)	(0.038)	(0.038)	(0.039)	(0.038)	(0.038)	(0.038)	(0.038)	(0.038)
KOF business closure				-0.402***					-0.251***
				(0.055)					(0.054)
Essential sector (=1)					13.511***			13.552***	13.558***
					(0.451)			(0.451)	(0.451)
Partner employed (=1)								0.173	0.221
								(0.253)	(0.253)
Short-time work received (=1)						-9.279***		-9.295***	-9.206***
						(0.254)		(0.254)	(0.254)
Covid cases per 1,000							0.082***	0.042	0.041
							(0.031)	(0.031)	(0.031)
Individual FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Child age controls	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean of dep. var.	25.23	25.23	25.26	25.26	25.26	25.25	25.26	25.25	25.25
Observations	181496	181496	180499	180499	180499	180139	180499	180139	180139
R-squared	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.04	0.04

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

Table 5: Unconditional hours worked - men

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
School disrupt. # child in HH	0.049	0.058	0.069	0.108*	0.077	0.160**	0.075	0.170***	0.193***
	(0.063)	(0.063)	(0.064)	(0.064)	(0.063)	(0.063)	(0.064)	(0.063)	(0.063)
KOF business closure				-0.374***					-0.222**
				(0.087)					(0.087)
Essential sector (=1)					15.476***			15.467***	15.470***
					(0.873)			(0.873)	(0.873)
Partner employed (=1)								-0.127	-0.083
								(0.378)	(0.378)
Short-time work received (=1)						-10.242***		-10.257***	-10.185***
						(0.415)		(0.416)	(0.415)
Covid cases per 1,000							0.061	0.022	0.021
							(0.049)	(0.049)	(0.049)
Individual FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Child age controls	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean of dep. var.	31.22	31.22	31.25	31.25	31.25	31.25	31.25	31.25	31.25
Observations	87252	87252	86853	86853	86853	86705	86853	86705	86705
R-squared	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.04	0.04

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

Table 6: Unconditional hours worked - women

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
School disrupt. # child in HH	-0.209***	-0.177***	-0.175***	-0.129***	-0.170***	-0.081*	-0.164***	-0.068	-0.039
	(0.044)	(0.045)	(0.045)	(0.046)	(0.045)	(0.045)	(0.045)	(0.044)	(0.045)
KOF business closure				-0.430***					-0.283***
				(0.069)					(0.068)
Essential sector (=1)					12.463***			12.525***	12.532***
					(0.510)			(0.509)	(0.509)
Partner employed (=1)								0.541	0.593*
								(0.333)	(0.333)
Short-time work received (=1)						-8.441***		-8.453***	-8.347***
						(0.312)		(0.311)	(0.312)
Covid cases per 1,000							0.102***	0.059	0.058
							(0.039)	(0.039)	(0.039)
Individual FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Child age controls	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean of dep. var.	19.68	19.68	19.71	19.71	19.71	19.69	19.71	19.69	19.69
Observations	94244	94244	93646	93646	93646	93434	93646	93434	93434
R-squared	0.01	0.01	0.01	0.01	0.03	0.03	0.01	0.05	0.05

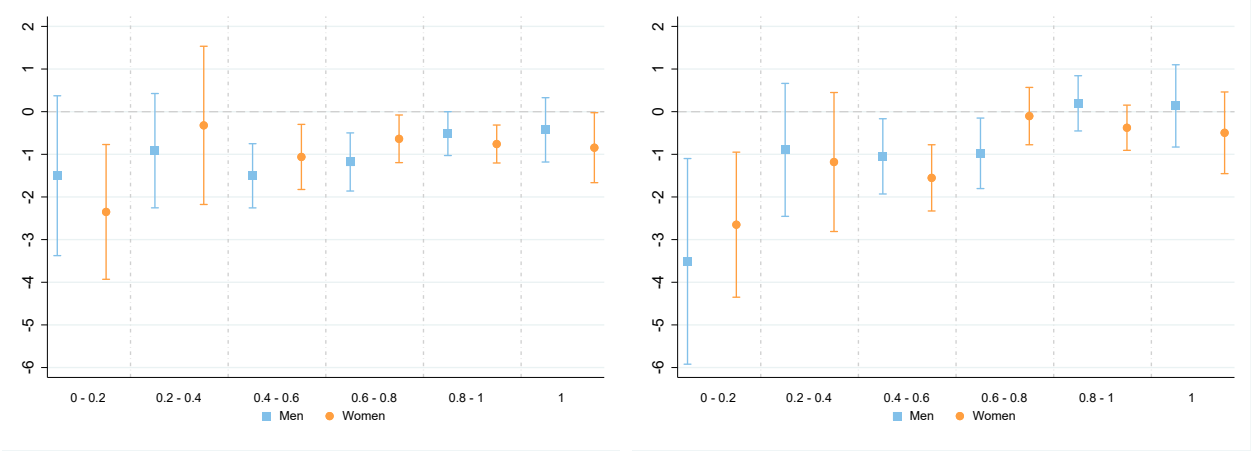
Notes: Robust clustered standard errors.
* 0.1, ** 0.05 and *** 0.01.

As a sensitivity check, we further examine if there are differences in these results over the distribution of the resilience index. We do this in order to clearly disentangle labor supply effects from labor demand effects of the pandemic measures. We estimate 1 separately for men and women

in different occupations according to their resiliency to the pandemic measures. We replace the variables for school closures and the KOF Stringency Index for workplace closures by a binary variable that is equal to one for the first and second lockdown periods (16.03.2020 - 30.06.2020 and 18.01.2021 - 31.05.2021). The two plots of Figure 5 show a higher reduction in hours worked of non-resilient workers, of almost up to -4 hours, compared to the very resilient ones with a coefficient close to zero.

Looking at Figure (6b), which shows the estimates of the school closures on unconditional hours worked, we see that men with children working in occupations with a resilience index above 0.6 actually significantly increased their hours worked. Women, on the other hand, seem to rather reduce their hours. This is in contrast to other recessions where especially men tend to lose their jobs and work less hours as compared to women. This suggests that women's labor supply was negatively affected by the school closures in order to be able to care for young children at home who were unable to attend school in person.

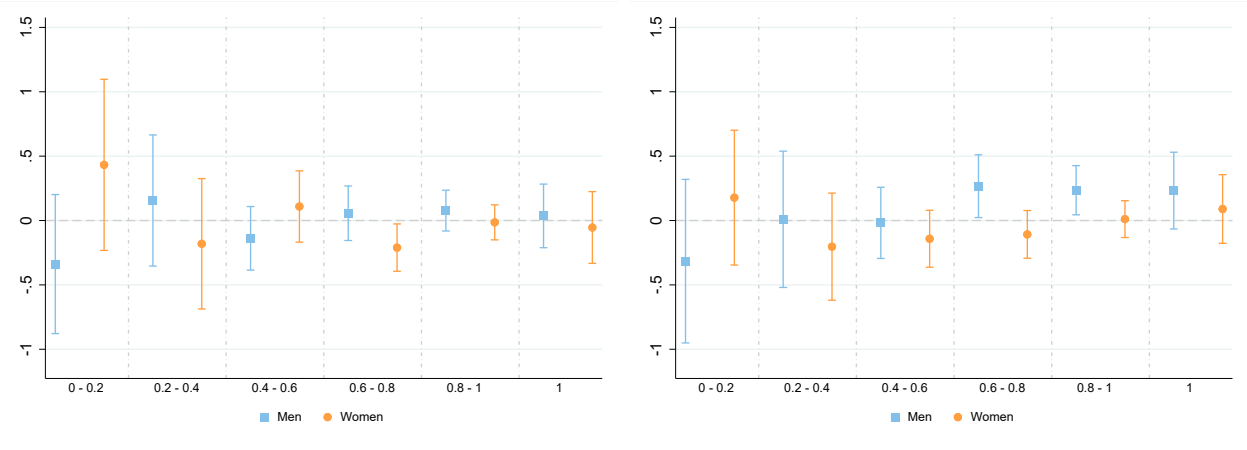
Figure 5: General effect of COVID-19 lockdowns on hours worked by occupation (resilience index)



Notes: The coefficient plot displays the estimates from the same specification used in the main analysis but where the variables for school closures and KOF Stringency Index for workplace closures are replaced by a dummy variable that is equal to 1 for the periods during the first (16.03.2020 - 30.06.2020) and second (18.01.2021 - 31.05.2021) lockdowns and zero otherwise.

Figure 6: Sensitivity analysis - Resilience index

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



Notes: The coefficient plot displays the estimate of the variable on school closure disruption. The specification corresponds to column (8) in the regression tables above.

6.2 Anticipated shock: school vacations

We now study the effects of an anticipated shock to parents' labor supply due to school vacations. Table 7 provides estimates of the impact of school closures due to school vacations. The main effect, shown in row 3, of school vacations is a reduction in the conditional hours worked, for everyone, of around 0.359 hours per day. While this response is not triggered by the presence of children, it may reflect indirect effects of school closures, or the fact that school vacations coincide with periods when people tend to take their vacations. Hence, why the reduction in hours worked is very similar for women (0.339 hours) as for men (0.374 hours).

Whereas, school vacations have specific and additional effects on households with children. Row 1 shows the estimates of the effects of the disruption to labor supply caused by school vacations, which amounts to an additional 0.276 hours for each day school is closed. The effect of vacation related school closures on labor supply of men is larger (0.313 hours) than for women (0.231), but roughly similar in percentage terms.

School vacations lower unconditional labor supply more strongly than conditional labor supply. The effect of school vacations is 0.543 hours for everyone. It amounts to 0.742 hours for men, while it is 0.377 hours for women. Interestingly, the main effects of vacation related school closures, in row 3, are only slightly larger for conditional hours (0.430 hours) compared to unconditional hours (0.359 hours).

What do these estimates of the impact of school closures mean for parents with children? The

effects on parents add up to -0.635 hours per school day closed (- 0.276 - 0.359 = -0.635), which is about 4.5 hours less per week (-0.635* 7 = -4.5). Unconditional hours worked for men decrease by -8.5 hours per week of vacation related school closures, which is roughly one fourth of the baseline labor supply of 32.0 hours per week. For women, the effects of vacation related school closures lead to a reduction in unconditional hours of 5.3 hours per week of school closures, which is also about one fourth of the unconditional labor supply of 19.6 hours. These reductions in unconditional labor supply suggest that adaptations in labor supply are an important source of time for families to be together during vacation.[2]

Table 7: School closure due to holidays

	Cond. hours			Uncond. hours		
	(1)	(2)	(3)	(4)	(5)	(6)
	All	Men	Women	All	Men	Women
School disrupt. # child in HH	-0.276***	-0.313***	-0.231***	-0.543***	-0.742***	-0.377***
	(0.035)	(0.050)	(0.047)	(0.036)	(0.059)	(0.043)
Child in HH (=1)	-0.607	0.230	-1.569	-1.055	0.662	-2.579**
	(0.686)	(0.931)	(1.007)	(0.803)	(1.173)	(1.093)
School disrupt.	-0.359***	-0.374***	-0.339***	-0.430***	-0.479***	-0.382***
	(0.024)	(0.034)	(0.033)	(0.025)	(0.039)	(0.032)
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	40.53	28.63	25.56	32.05	19.58
Observations	126713	65338	61375	172378	82629	89749
R-squared	0.02	0.02	0.02	0.03	0.04	0.02

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

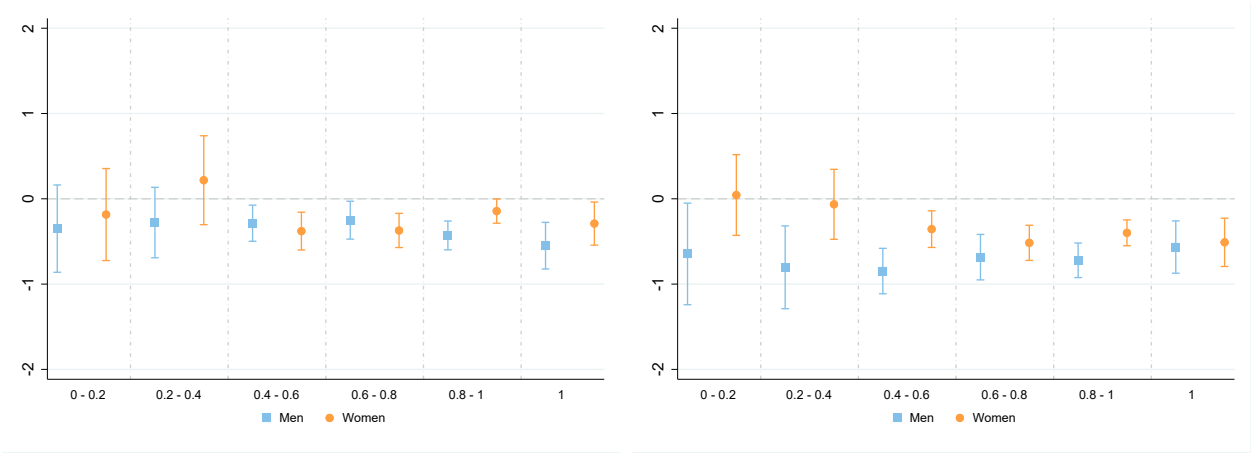
To check the sensitivity of these results, we estimate the same specification for workers in different occupations classified by their resiliency to the pandemic measures as before. Considering the results on unconditional hours worked in Figure (7b), for men we see a homogeneous effect in terms of decrease in hours worked during school vacations 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, compared to men, women decrease their hours worked less when the shock of school closures is anticipated. This is the opposite of what we see in the results for the unanticipated shock caused by pandemic school closures. Women might decrease

[2]School vacations average around 13 weeks in the academic year. In SWitzerland, most workers are eligible for four to six seeks of vacation per year. If reductions in labor supply fully accommodate for vacation induced school closures, the reduction in labor supply would need to be around one third to one half.

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.

Figure 7: 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.

7 Conclusion

We examine the impacts of the pandemic measures related to school closures on workers with children and those without. Our findings suggest that fathers and mothers responded to the unanticipated pandemic school closures differently than to the anticipated school closures due to school vacations. Pandemic school closures led to a larger reduction in labor supply for mothers, rather than for fathers. Whereas school vacation related closures led to larger responses among fathers than mothers. These findings suggest that the pandemic measures led to substantially different labor supply patterns than households are able to accommodate.

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8 Data Appendix

A.1 Summary statistics

Table A1: Summary statistics - Children vs. no children

	Without children		With children	
	Pre-Covid	Covid	Pre-Covid	Covid
Outcome variables				
Conditional working hours	35.61	35.11	33.01	32.93
Unconditional working hours	25.70	25.20	25.25	25.27
Employed (=1)	0.82	0.81	0.87	0.86
WFH at extensive margin (=1)	0.30	0.36	0.38	0.44
Control variables				
Age	45.57	45.39	43.03	43.10
Female (=1)	0.51	0.51	0.54	0.53
Married (=1)	0.46	0.44	0.85	0.84
Swiss (=1)	0.71	0.70	0.62	0.60
Number of children in HH: 0 to 17 years	0.00	0.00	1.78	1.77
Number of people in HH	2.34	2.31	3.96	3.94
Years of education	14.06	14.09	14.61	14.62
Essential sector (=1)	0.22	0.21	0.24	0.23
Short-time work received (=1)	0.01	0.04	0.01	0.03
Observations	54112	116324	31286	65172

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.

Table A2: 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.

Table A3: Summary statistics - Married vs. singles

	Married / partnered parents		Single parents	
	Pre-Covid	Covid	Pre-Covid	Covid
Conditional working hours	33.06	32.99	32.74	32.60
Unconditional working hours	25.21	25.21	25.45	25.57
Employed (=1)	0.87	0.86	0.89	0.89
WFH at extensive margin (=1)	0.38	0.44	0.37	0.44
Control variables				
Age	43.15	43.29	42.35	42.17
Female (=1)	0.52	0.52	0.64	0.60
Swiss (=1)	0.62	0.60	0.59	0.58
Number of children in HH: 0 to 17 years	1.82	1.81	1.52	1.53
Number of people in HH	4.05	4.04	3.40	3.42
Years of education	14.59	14.60	14.75	14.70
Essential sector (=1)	0.23	0.22	0.28	0.25
Short-time work received (=1)	0.01	0.03	0.01	0.03
Observations	26641	54543	4645	10629

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.

Table A4: Summary statistics - 2019
SAKE vs. SHP

	SAKE	SHP
Outcome variables		
Employed (=1)	0.84	0.89
Weekly working hours	34.62	35.67
WFH at extensive margin (=1)	0.33	0.45
Weekly hours WFH	8.41	7.90
Occupational indexes		
Resilience index	0.70	0.70
Homeoffice index	0.44	0.48
HOI index	0.34	0.36
Control variables		
Age	44.64	46.44
Female (=1)	0.52	0.54
Married (=1)	0.60	0.57
Swiss (=1)	0.68	0.93
Number of children in HH: 0 to 17 years	0.65	0.63
Number of people in HH	2.93	2.77
Years of education	14.26	14.82
Essential sector (=1)	0.23	0.27
Observations	85398	5324

Notes: The sample is restricted to individuals who are aged between 20 and 64 years. Weekly working hours are calculated conditional on being employed. 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 sample, not only employed individuals.

B.2 Results

Table A5: Conditional hours worked - men

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
School disrupt. # child in HH	-0.081	-0.079	-0.078	-0.014	-0.078	0.027	-0.077	0.021	0.066
	(0.055)	(0.056)	(0.056)	(0.056)	(0.056)	(0.054)	(0.056)	(0.055)	(0.055)
KOF business closure				-0.575***					-0.410***
				(0.075)					(0.074)
Essential sector (=1)					0.516			0.306	0.327
					(0.994)			(0.978)	(0.978)
Partner employed (=1)								-0.380	-0.289
								(0.289)	(0.290)
Short-time work received (=1)						-11.716***		-11.735***	-11.605***
						(0.383)		(0.383)	(0.381)
Covid cases per 1,000							0.017	-0.028	-0.031
							(0.038)	(0.038)	(0.038)
Individual FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Child age controls	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean of dep. var.	39.56	39.56	39.57	39.57	39.57	39.58	39.57	39.58	39.58
Observations	68841	68841	68591	68591	68591	68446	68591	68446	68446
R-squared	0.01	0.01	0.01	0.01	0.01	0.04	0.01	0.04	0.04

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

Table A6: Conditional hours worked - women

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
School disrupt. # child in HH	-0.169***	-0.154***	-0.151***	-0.091*	-0.150***	-0.041	-0.144***	-0.037	0.002
	(0.051)	(0.051)	(0.051)	(0.052)	(0.051)	(0.051)	(0.052)	(0.051)	(0.052)
KOF business closure				-0.539***					-0.358***
				(0.067)					(0.066)
Essential sector (=1)					2.489***			2.219***	2.262***
					(0.727)			(0.722)	(0.723)
Partner employed (=1)								0.322	0.392
								(0.291)	(0.292)
Short-time work received (=1)						-9.848***		-9.816***	-9.693***
						(0.317)		(0.317)	(0.317)
Covid cases per 1,000							0.071*	0.016	0.014
							(0.039)	(0.039)	(0.039)
Individual FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Child age controls	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean of dep. var.	28.68	28.68	28.68	28.68	28.68	28.69	28.68	28.69	28.69
Observations	64671	64671	64357	64357	64357	64146	64357	64146	64146
R-squared	0.01	0.01	0.01	0.01	0.01	0.04	0.01	0.04	0.05

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

Table A7: WFH extensive margin (conditional on working) - full sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
School disrupt. # child in HH	-0.002***	-0.002***	-0.002***	-0.003***	-0.002***	-0.002***	-0.002***	-0.002***	-0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
KOF business closure				0.010***					0.010***
				(0.001)					(0.001)
Essential sector (=1)					-0.016			-0.016	-0.017
					(0.010)			(0.010)	(0.010)
Partner employed (=1)								0.010	0.008
								(0.009)	(0.009)
Short-time work received (=1)						-0.001		-0.001	-0.005
						(0.004)		(0.004)	(0.004)
Covid cases per 1,000							0.001	0.001	0.001
							(0.001)	(0.001)	(0.001)
Individual FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Child age controls	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean of dep. var.	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39
Observations	131866	131866	131243	131243	131243	130905	131243	130905	130905
R-squared	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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

Table A8: WFH extensive margin (conditional on working) - men

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
School disrupt. # child in HH	-0.003***	-0.002**	-0.002***	-0.003***	-0.003***	-0.003***	-0.002***	-0.002***	-0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
KOF business closure				0.009***					0.009***
				(0.001)					(0.001)
Essential sector (=1)					-0.033*			-0.033*	-0.033*
					(0.018)			(0.018)	(0.018)
Partner employed (=1)								-0.003	-0.004
								(0.013)	(0.013)
Short-time work received (=1)						0.001		0.001	-0.002
						(0.005)		(0.005)	(0.006)
Covid cases per 1,000							0.001	0.001	0.001
							(0.001)	(0.001)	(0.001)
Individual FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Child age controls	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean of dep. var.	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41
Observations	66913	66913	66642	66642	66642	66504	66642	66504	66504
R-squared	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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

Table A9: WFH extensive margin (conditional on working) - women

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
School disrupt. # child in HH	-0.002***	-0.002**	-0.002**	-0.003***	-0.002**	-0.002**	-0.002**	-0.002**	-0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
KOF business closure				0.011***					0.011***
				(0.001)					(0.001)
Essential sector (=1)					-0.007			-0.008	-0.009
					(0.013)			(0.013)	(0.013)
Partner employed (=1)								0.025*	0.023*
								(0.013)	(0.013)
Short-time work received (=1)						-0.003		-0.002	-0.007
						(0.005)		(0.005)	(0.005)
Covid cases per 1,000							0.000	0.000	0.000
							(0.001)	(0.001)	(0.001)
Individual FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Child age controls	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean of dep. var.	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36
Observations	64953	64953	64601	64601	64601	64401	64601	64401	64401
R-squared	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01

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

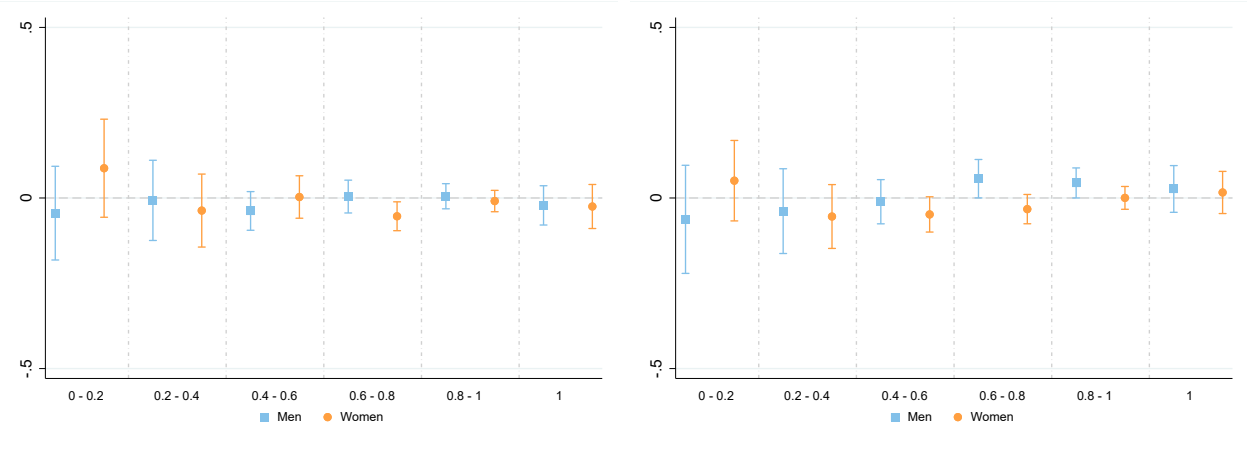
Table A10: Employed - full sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
School disrupt. # child in HH	-0.001**	-0.001*	-0.001*	-0.000	-0.001	-0.001***	-0.001*	-0.001***	-0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
KOF business closure				-0.004***					-0.006***
				(0.001)					(0.001)
Essential sector (=1)					0.509***			0.509***	0.509***
					(0.011)			(0.011)	(0.011)
Partner employed (=1)								0.002	0.003
								(0.003)	(0.003)
Short-time work received (=1)						0.063***		0.062***	0.064***
						(0.003)		(0.003)	(0.003)
Covid cases per 1,000							0.000	0.001	0.001
							(0.000)	(0.000)	(0.000)
Individual FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Child age controls	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean of dep. var.	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Observations	181496	181496	180499	180499	180499	180139	180499	180139	180139
R-squared	0.00	0.00	0.00	0.00	0.11	0.01	0.00	0.11	0.11

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

Figure A1: Resilience index - cumulative measure of last month

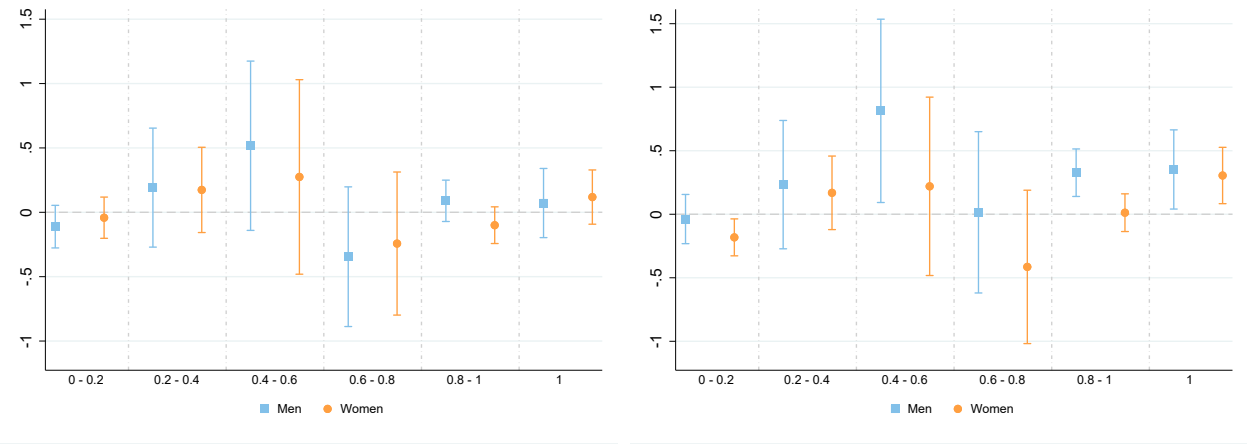
(a) Cond. hours (b) Uncond. hours



Notes: The coefficient plot displays the estimate of the variable on school closure restrictions.

Figure A2: Homeoffice index - cumulative measure of last week

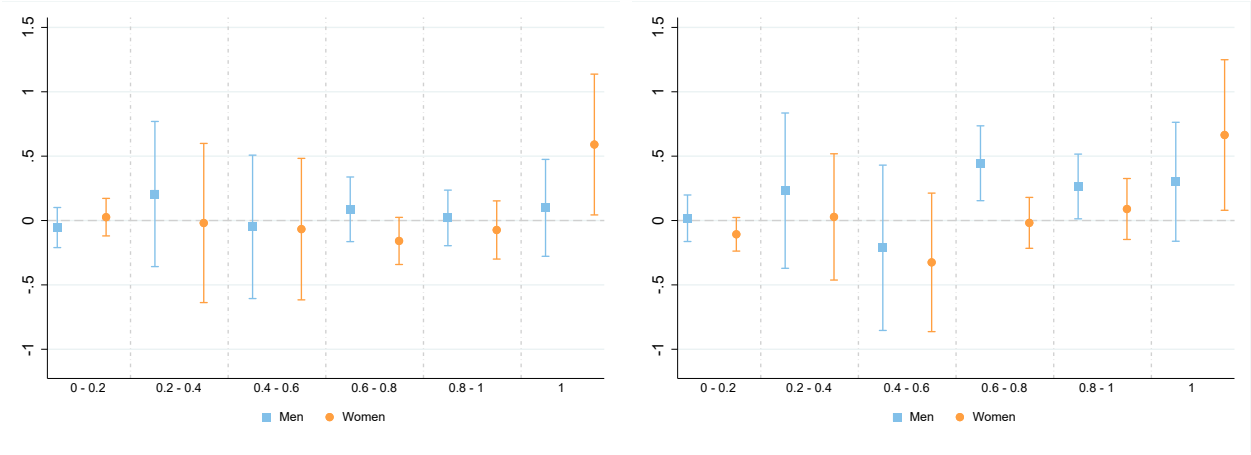
(a) Cond. hours (b) Uncond. hours



Notes: The coefficient plot displays the estimate of the variable on school closure disruptions due to the pandemic.

Figure A3: HOI index - cumulative measure of last week

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



Notes: The coefficient plot displays the estimate of the variable on school closure disruptions due to the pandemic.

Table A11: School closure due to holidays - cumulative days over the last month

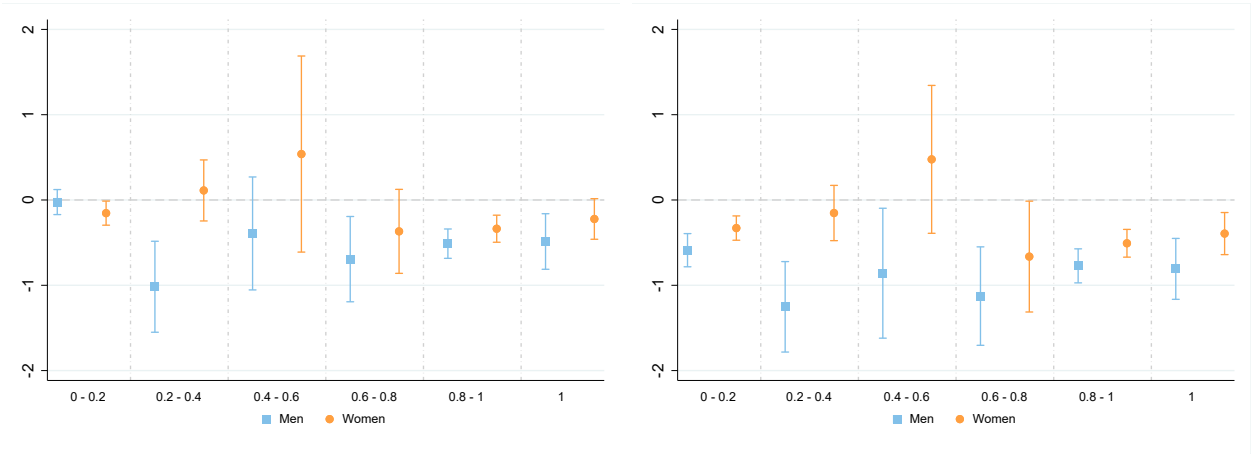
	Cond. hours			Uncond. hours		
	(1)	(2)	(3)	(4)	(5)	(6)
	All	Men	Women	All	Men	Women
School disrupt. # child in HH	-0.076***	-0.080***	-0.070***	-0.127***	-0.182***	-0.084***
	(0.010)	(0.015)	(0.014)	(0.011)	(0.019)	(0.013)
Child in HH (=1)	-0.388	0.415	-1.330	-0.945	1.002	-2.590**
	(0.692)	(0.943)	(1.013)	(0.808)	(1.188)	(1.096)
School disrupt.	-0.081***	-0.094***	-0.066***	-0.109***	-0.128***	-0.089***
	(0.008)	(0.012)	(0.011)	(0.009)	(0.014)	(0.012)
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	40.53	28.63	25.56	32.05	19.58
Observations	126713	65338	61375	172378	82629	89749
R-squared	0.01	0.02	0.01	0.02	0.03	0.02

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

Figure A4: Homeoffice index

(a) Cond. hours

(b) Uncond. hours

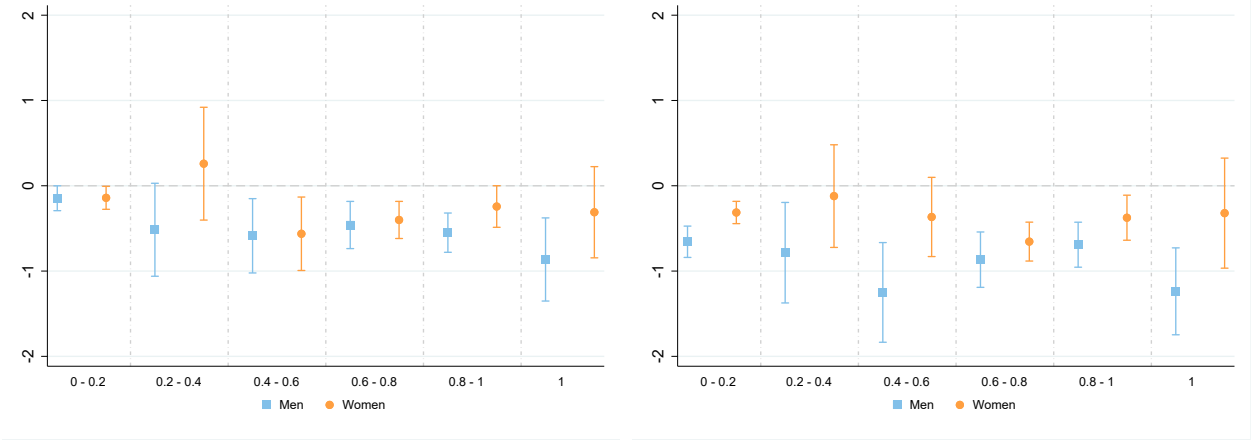


Notes: The coefficient plot displays the estimate of the variable on school closure disruptions due to school holidays.

Figure A5: HOI index

(a) Cond. hours

(b) Uncond. hours



Notes: The coefficient plot displays the estimate of the variable on school closure disruptions due to school holidays.

Construction of Resilience Index and Home Office Index

Both indexes are not available for every 4-digit ISCO code. Additionally, there are some ISCO codes for which only the resilience index is available, and some for which only the homeoffice index is available. 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 resilience is not available for the 4-digit ISCO code 4229 (Berufe im Bereich Kundeninformationen). 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.