Childcare Responsibilities and Parental Labor Market Outcomes during the COVID-19 Pandemic

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Abstract

A substantial fraction of k-12 schools and childcare facilities in the United States closed their in-person operations during the COVID-19 pandemic. These closures may have altered the labor supply decisions of parents of affected children due to a need to be at home and take care of their children during the school day. In this paper, we examine the impact of school and childcare facilities closures on parental labor market outcomes. We test whether COVID-19 facilities closures have a disproportionate impact on parents of underage children (ages < 18 years old). Our results show that both women's and men's work lives were affected by school closures, with both groups seeing a reduction in the likelihood of working, work hours and the likelihood of working full-time. We also find that closures had a corresponding negative effect on the earnings of fathers of underaged children, but not on mothers. These effects are concentrated among parents without a college degree and parents working in occupations that do not lend themselves to telework, suggesting that such individuals had a more difficult time adjusting their work lives to school closures.

Keywords: school, closure, labor supply, parent, COVID-19

Declarations of interest: none.

1. Introduction

Childcare challenges have become a significant obstacle to parental employment, disproportionately affecting mothers who often carry the unpaid caregiving responsibilities in the absence of other childcare options. The COVID-19 pandemic further exacerbated these concerns as the closure of in-person operations of schools and childcare facilities necessitated children to remain at home, shifting the responsibility to parents for their care during the day that potentially coincides with work hours. As a consequence, parental labor supply decisions were likely affected.

This paper examines the impact of in-person school and childcare closures in years 2020-21 on the labor market outcomes of parents of underage children (age < 18 years old). In particular, we test whether the closures have a disproportionate impact on parents of pre-kindergarten and school-age children relative to individuals without children in this age range. The literature is rich in studies that focus on childcare for preschool children and their positive impact on maternal employment (e.g. Gelbach, 2002; Lefebvre and Merrigan, 2008; Cascio, 2009,

Fitzpatrick, 2010; Havnes and Mogstad, 2011; Bauernschuster and Schlotter, 2015; and Nollenberger and Rodriguez-Planas, 2015; Gathmann and Sass, 2018). However, there is a notable gap in the analysis of how this impact extends to school-aged children. The need for reliable care is not restricted to early childhood, and do not stop when children enter primary school partly because a full-time working week is not directly compatible with school hours (OECD, 2011). Therefore, working parents of school-age children also have to make arrangements around the usual school day (Paull, 2008; OECD 2011). The literature finds that after-school programs have led to greater labor supply of mothers (e.g. Berthelon et al., 2015; Gambaro et al., 2016; Nemitz, 2015; Felfe et al., 2016; Martinez and Perticara, 2017), as did school schedule extensions (e.g. Contreras and Sepulveda, 2017; Padilla- Romo and Cabrera-Hernandez, 2019; Duchini and Van Effenterre, 2022), and the lowering of mandatory school entry age (Goux and Maurin, 2010; Finseraas et al., 2017).

The massive school and childcare facilities closures during the COVID-19 pandemic as part of the efforts to curb the spread of the virus, provides a unique opportunity to examine how all of these forms of formal childcare and in-person schooling affect the labor market outcomes of parents of underage children. With 40 percent (or 33 million families) of all families having children under 18 years old in 2020 (US Bureau of Labor Statistics, 2021), there is much anecdotal evidence that school closures have affected parental labor supply due to difficulties in balancing work and childcare responsibilities (e.g. Brodeur, 2020; Leonhardt, 2020; Tedeschi, 2020; see also Musaddiq et al., 2021).

Several recent studies have found that women's labor market outcomes were disproportionately harmed by the pandemic relative to men. On one hand, leisure/hospitality and other service industries, which disproportionately employ women, were initially more harmed by the pandemic (e.g. Lee, Park and Shin, 2021; Albanesi and Kim, 2021a). On the other, additional childcare responsibilities owing to closed schools or childcare facilities or parental concerns regarding COVID risk may have exacerbated the gender gap in employment outcomes (Alon et al., 2020; Alon et al., 2021; Heggeness, 2020; Russell and Sun, 2020; Fairlie, Couch and Xu, 2021; Furman, Kearney and Powell, 2021; Barkowski, McLaughlin, and Dai, 2021; and Amuedo-Dorantes et al., 2020). The relative importance of labor supply factors versus demand factors in determining COVID-19 employment outcomes by gender is still not clear.
School and childcare facilities closures arguably represent a shock to parental labor supply. Though pandemic conditions obviously contribute to closures while having a direct effect on labor-market outcomes, we posit it that it is unlikely that such conditions on their own would disproportionately affect the outcomes of those with underage children. Thus, by using individuals without children in these age ranges as a control group, we may be able to tease out the effects of closures on labor-market outcomes.

To date, information on the impact of facilities closures on labor market outcomes has been fragmented, mostly covering the early months of the pandemic in spring 2020 and have focused on school closures. In this paper, we take into account both school and childcare facilities in our measure of closures, and examine the period January 2020 to December 2021, as it covers both early and late periods of the pandemic and the first full academic term in which many schools closed their in-person operations and switched (at least in part) to remote learning. Due to our use of both school and childcare facilities closures and focus on parents of both pre-kindergarten

and school-aged children, we can assess a much fuller understanding of the employment impacts on parents that rely on these formal institutions for childcare. In addition, because we use a longer sample period, we can address both lagged school closure effects as well as how effects change over the course of the pandemic. In addition, along with Hansen, Sabia, and Schaller (2022), we make use of aggregated and anonymized mobile phone data from *Safegraph* to measure school closures locally, which likely allows for a more accurate picture of the in-person activity in a school relative to administrative data sources used in earlier studies, which often only classify schools into in-person, hybrid, and remote categories with possible inconsistencies across place and time.

Moreover, we examine a more comprehensive set of outcomes than other studies, including not only the probability of being at work and work hours but also working remotely due to COVID, being out of the labor force due to family/childcare obligations, and earnings. Lastly, we examine heterogeneity in our results by gender, education level, marital status, race, and occupational classification. This leads to important insights into where school closures had the strongest effects on parents' work lives, which we can then compare to recent evidence on how school closures have affected children's academic achievement.

Our results suggest school closures have affected the labor-market outcomes of both mothers and fathers of underage children. The reduction in weekly hours worked is a little less than 1 hour for women and a little more than 1 hour for men. Men and women experience a reduction in working full-time (at least 35 hours per week), and in their probability of being at work at all (of about 1.8 percentage points for women and 1 percentage point for men). Women are more likely to report being out of the labor force to care for children/family by about the same amount, with no corresponding effect for men. Both men and women with underage children are significantly more likely to report doing remote work due to COVID with school and childcare facilities closures. Thus, although in some ways mothers have been uniquely affected by these closures, the burden of childcare appears to have fallen more equally on mothers and fathers over the full pandemic period than it did in its very early days (see Heggeness, 2020; and Collins et al., 2021). We also measure large economic reductions in weekly earnings among men with children under 18 years old due to school closures, but in the full sample these are somewhat imprecisely estimated. This is likely due in part to earnings only being available for a fraction of our full sample (outgoing rotation groups in the Current Population Survey).

One of our major findings is that effects on any work, full-time work, and work hours are concentrated among women without a college degree rather than women with a degree. The same is true for men. These striking differences by college degree attainment could be due to at least two factors: first, less-educated individuals likely had a harder time arranging a flexible, at-home work schedule than those with more education. This is consistent with the findings of Mongey, Pilossoph, and Weinberg (2020) that 82 percent of individuals with less than college education are in occupations with low ability to work from home. It is also consistent with our findings that college-educated parents see the lion's share of the increase in self-reported remote work when schools and childcare facilities close. Second, less educated parents may have not been able to secure options such as private schooling or alternative childcare arrangements to the degree that more educated parents did (Murnane et al., 2018; Musaddiq et al., 2021).

2. Related Literature

Many studies examining the connection between childcare and workforce participation have predominantly concentrated on maternal employment during a child's early years. Several studies have shown that when mothers gain access to preschool childcare, they tend to enter the labor market or extend their working hours (Shure, 2019). One group of studies highlights the positive impact of childcare availability on maternal employment. These studies utilize regional and temporal variations in childcare supply (e.g., Berlinski and Galiani, 2007; Geyer et al., 2015; and Nollenberger and Rodriguez-Palanas, 2015) or examine the effects of introducing price subsidies for childcare (e.g. Baker et al., 2008; Lefebvre and Merrigan, 2008; Brewer et al., 2022). On the contrary, a second set of research findings suggests that, on average, maternal labor force participation does not significantly change in response to increased childcare availability. Only specific groups of mothers, like single mother or mothers living in economically disadvantaged areas, respond positively to enhanced public childcare access (e.g. Cascio, 2009; Fitzpatrick, 2010; Goux and Maurin, 2010; Havness and Mogstad, 2011). The lack of consensus in this body of literature may be attributed to variations in research methodologies and differences in institutional contexts, such as the initial level of childcare provision and maternal employment rates.

While school-aged children also require considerable need of maternal care, studies on childcare provision for school-aged children and its impact on parents have received limited attention (Nemitz, 2015). The related studies in this literature either examines the impact of lengthened school schedules, or the availability of after-school care programs. Studies for the first set include examining the effects of lengthening the school schedules in France (Duchini and Van Effenterre, 2022), shifting from half-day to full-day school in Chile (Berthelon et al., 2022, Contreras and Sepulveda, 2017) and Mexico (Padilla- Romo and Cabrera-Hernandez, 2019), and lowering the mandatory school-age in Norway (Finseraas et al., 2017). The authors consistently find that the increases in school hours have large positive impact on labor supply. Recent evidence also finds that the availability of after-school care programs have positive effects on mother's employment in Switzerland (Felfe et al.,2016), and Chile (Martinez and Perticara, 2017).

Studies on the impact of in-person schooling on parental labor market outcomes are scarce, however, the recent school closures brought by the pandemic has placed this issue into keen attention. Around the age of six, children typically enroll in a country's education system, with academic instruction as its primary objective, and childcare during parents' working hours becomes an ancillary purpose (Dehos and Paul, 2023). Therefore, although in-person schooling is not a childcare facility per se, its unavailability could impact the labor supply decisions of parents, as what was observed during the years 2020-21 when COVID-19 was at its peak. Related studies prior to the pandemic include Gelbach (2006) that finds that public school enrollment for five-year-olds has positive impact on labor supply of single mothers, Jaume and Willen (2021) that finds that teacher strikes leading to temporary school closures led mothers to drop out of labor force in Argentina, and Price and Wasserman (2022) that finds summer breaks negatively affected total work hours of women in the US. Meanwhile, in the context of COVID-19, several studies have emerged that analyzed how COVID-19 has affected employment

outcomes across gender and parental status. Albanesi and Kim (2021a), Fairlie, Couch, and Xu (2021), and Alon et al. (2021) all find that the pandemic has disproportionately reduced the labor-market activity of women with children. In decomposition analyses, these papers reach different conclusions about the relative importance of occupational characteristics, childcare responsibilities, and other factors in explaining this drop. Furman, Kearney and Powell (2021) quantify the effect of parent-specific issues, such as childcare challenges, on the aggregate employment deficit in early 2021 relative to before the pandemic by constructing counterfactual employment and labor force participation rates that assign the mothers of young children the percentage change in employment and labor force participation rates of comparable mothers without young children. They find that the differential job loss among mothers is not a major driver of the overall decline in employment due to 1) demographically similar women without children also having declines in employment over the pandemic, and 2) the small fraction of mothers of young children in the US workforce. Nevertheless, Furman, Kearney and Powell (2021), Heggeness and Suri (2021), and Lofton, Petrosky-Nadeau, and Seitelman (2021) all find that over the pandemic, mothers' employment has declined at least modestly relative to those of women without children as well as fathers.

Many recent papers have also begun to analyze the impact of school and childcare closures on parental labor market outcomes during the pandemic. Several early papers rely on state-by-state variation in COVID restrictions related to childcare and school closures for identification. Russell and Sun (2020) assess the effects of childcare closures and class size restrictions on employment using a triple-differences approach in which being a mother of a child aged 0-5 is interacted with state-level mandates and time (only women are analyzed in their paper). They find that both restriction types increase the unemployment rate of mothers of young children in the short-run, and the impact persists even after states lift the restrictions (through September 2020, the end of their sample window), consistent with a permanent reduction in childcare centers stemming from initial closure mandates.

Heggeness (2020) uses state-level variation in the timing of shutdowns in the early part of the pandemic and CPS data from January to May of 2019 and 2020 to estimate the immediate impact of school closures on employment. She finds that working mothers of school-age children coped differently than working fathers: while mothers on average took a full week of leave from formal work in the initial phase of the pandemic, there was no corresponding effect for fathers (though full-time fathers did reduce their hours worked by 0.53 hours per week). Similarly, Collins et al. (2021) find that the gender gap in parental labor force participation grew five percentage points (relative to 2019) in states that offered primarily remote elementary instruction in September 2020 but only one percentage point in states that were primarily in-person or hybrid.

Amuedo-Dorantes et al. (2020) exploit local variation to identify the impact of school closures on employment outcomes in the early months of the pandemic. They calculate a daily school closure index (0 to 1) at the district level from *Education Week*. Their findings suggest that school closures primarily affected the labor supply of mothers and fathers of younger school-age children in two-partnered households through the intensive margin (an 11 and 15 percent decline in the weekly hours worked conditional on working at all by men and women, respectively). The authors also only focus on the early months of the pandemic as their dataset runs from January 2019 through May 2020. Meanwhile, Koppa and West (2021) examine how the decision of

whether to *start* the 2020-21 academic year with remote learning affects county-level employment, finding little evidence of a relationship. However, their analysis only considers aggregate employment—for example, neither hours worked nor outcomes of parents specifically are considered.

The paper that most closely resembles our study is that of Hansen, Sabia, and Schaller (2022; hereafter HSS).[1] Those authors also use Current Population Survey (CPS) data to measure labor-market outcomes and *Safegraph* data to measure school closures (or, in their case, the opposite condition of re-opening). However, there are differences in how each paper constructs school closures (re-openings) and in the CPS sample used. We highlight these in the next section. HSS focus on married mothers with school-age children as their treatment group, finding much smaller effects of school closures on other types of women as well as fathers. In our study, however, we find meaningful labor-market effects of school and childcare facilities closures for both married and unmarried women and men with underage (age < 18 years old) children.

Our results also reveal large differences in the effects of school and childcare facilities closures by college degree attainment, while HSS do not find such differences for married women specifically. We augment our analysis by college status by examining how our results vary across industry and occupational characteristics: whether the worker is in a "frontline" industry and whether the worker's occupation has high potential for teleworking. Finally, though several of the labor-market outcomes analyzed across the two studies are similar, ours is the only one to measure the effects of school closures on earnings. We discuss possible reasons for the differences in findings between our two papers below.

3. Data

Our sample includes all individuals age 21 years and over surveyed in the Basic Monthly Current Population Survey (CPS) from January 2020 to December 2021 (Flood et al., 2022). To match individuals to school closures in their area with as much precision as possible, we restrict our sample to the subset of individuals who have non-missing county identifiers (more sparsely populated counties are not identified due to concerns about respondent confidentiality). This is about 40 percent of the full CPS sample over this time period. This is in contrast to HSS, who assign school closures based on MSA or state of residence if county is not available. There is obviously a tradeoff between these choices: closures assigned based on MSA/state will likely contain more error than those based on county, but this also allows for a more representative sample of the entire U.S. population in the analysis. The effects we estimate are local to larger metropolitan areas.

We consider various measures of employment in our analysis. First is the extensive margin of labor supply: whether an individual is "at work," defined as doing any work for pay or profit or working at least fifteen hours without pay in a family business or farm in the previous week. This excludes individuals who are employed but currently absent from work since some may respond to school closures by taking leave. We also consider measures of labor supply that incorporate the intensive margin: whether an individual works "full-time," defined as working at least 35

[1] Our two papers were developed in parallel. First drafts of each paper were posted online in the same week in January 2022 (unbeknownst to either set of authors beforehand).

hours in all jobs in the previous week and "hours worked," defined as the total number of hours worked by the individual in the previous week.[2] Lastly, we examine the individual's self-reported usual weekly earnings (excluding the self-employed).

We also analyze several additional labor-market variables that may be specifically related to COVID and/or school closures. These include whether the individual teleworked or worked from home (for pay) due to COVID in the previous four weeks, whether the individual worked part-time or was absent from work in the previous month due to childcare problems or family/personal obligations, and whether the individual was not in the labor force because they were taking care of house or family.[3]

We utilize the school closures database from Parolin and Lee (2021), which tracks visits to K-12 public schools in 94 percent of school districts spanning 98 percent of counties in the US, and childcare closures database from Lee and Parolin (2021) which tracks visits to childcare centers that belong to the North American Industry Classification System code 62441 covering 78 percent of all licensed childcare centers in the country. Both databases use aggregated and anonymized mobile phone data from *Safegraph*. The authors track year-over-year changes in the number of visitors to each individual school or childcare facility in each month relative to the same month in 2019 (the pre-pandemic baseline). Institutions are considered "closed" if there is at least a 50 percent year-over-year decline in the number of in-person visits; we use this same cutoff in our main analyses and use a more stringent cutoff (75 percent reduction) in robustness checks. Validation checks presented in both Parolin and Lee (2021) and Lee and Parolin (2021) suggest that their estimates of institutional closures are consistent with available alternative data sources including the Census Household Pulse Survey, Education Week, and institutional websites. We use the share of closed institutions in each county in each month to be our measure of the extent of school closures in our analysis (thus, our measure is continuous between zero and one). Data on school and childcare closures are available for all CPS respondents for whom county of residence is identified over our full sample period.

Our use of the Parolin and Lee (2021) differs from HSS, who compute their measures of school foot traffic directly and benchmark them against January and February 2020. Given that the majority of U.S. Schools are closed in June and July, we do not use those months in our analysis.[4] HSS include summer months in their analysis, which means that their definition of school closures includes both COVID-related as well as break/holiday reductions in school foot traffic. Though each type of closure likely affects parental labor-market decisions, it is not clear that those effects are the same given the much more predictable nature of the latter. Our measure of school closures, though imperfect (due to our inability to rule out every other possible reason for large reductions in school visits), should largely be due to COVID.

[2] Our definition is based on the definition of "usual full-time work" in the CPS published by the Bureau of Labor Statistics : https://www.bls.gov/cps/definitions.htm#fullparttime.

[3] The question about COVID-induced telework first appeared in the CPS in May 2020. For months prior to that, we code the variable as zero for all individuals.

[4] Based on our calculations using Safegraph data, foot traffic declines in June and July by about 70% relative to peak school visits in 2019.

As a robustness check, we use another dataset to measure public school closures based on administrative rather than phone traffic data. This is the *Burbio K-12 School Opening Tracker* that covers over 1,200 school districts representing 47 percent of U.S. K-12 student enrollment.[5] The *Burbio* data provides the percentage of public schools in each county fitting various modes of instruction: in-person, virtual (100% online), and hybrid (2-3 days per week in-person). As our measure of school closures with this data, we calculate the percentage of schools that were virtual and hybrid within each county in the second week of each month to match the CPS reference week. *Burbio* has complete information on school closures in all counties identified in the CPS. We use *Safegraph* data in our baseline analyses because of the consistency with which it is collected across location and time, and their extensive validation checks; the *Burbio* only has data for school closures which are collected from various sources such as school district websites, Facebook pages, local news articles and other publicly available sources that could introduce a higher degree of error in measuring school closures.

We also include a set of COVID-19 related variables as controls in our analysis including the number of confirmed COVID-19 cases and deaths at the county level from the database maintained by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (CSSE, 2020), and dummy indicators for state-level COVID-19 policies that include stay-at home orders, non-essential business closures, restaurant limitations, and bar closures from the Kaiser Family Foundation database.[6] [7]

4. Methodology

Our baseline model is shown in Equation (1):

$$Y_{ict} = X_{ict}\alpha + \beta_1(underagechild_{ict} \times aveschoolcareclosure_{ct}) + \omega_t + \theta_c + \varepsilon_{ict} \quad (1)$$

Y_{it} refers to the employment outcome for individual *i* in county *c* in month *t*. X_{ict} is a vector containing both individual and county characteristics including an indicator for whether the individual has at least one child residing in their household and that the oldest or youngest child is under the age of 18 years old (*underagechild*); the average percentage of schools and childcare facilities that are closed in the individual's county of residence as described in the previous section (*aveschoolcareclosure*); individual demographics (age and its square, number of own children residing in the household, dummies for race and Hispanic ethnicity, educational attainment, foreign born, presence of a disability, marital status, and veteran status); individual industry and occupation dummies[8]; county COVID-19-related variables including the cumulative number of confirmed COVID-19 cases and deaths per 100,000 in each county by the second week of the sample survey month (the reference week of CPS), the number of the additional confirmed cases and deaths per 100,000 in the past month, and state-level policy dummy

[5] https://cai.burbio.com/school-opening-tracker/
[6] https://github.com/CSSEGISandData/COVID-19/tree/master/csse_covid_19_data/csse_covid_19_time_series
[7] https://github.com/KFFData/COVID-19-Data/tree/kff_master/State%20Policy%20Actions/State%20Social%20Distancing%20Actions
[8] These include a category for no occupation given. HSS do not include industry and occupation controls in their analysis, but they do exclude workers in the k-12 education sector in their main analysis.

indicators that include stay-at-home orders, non-essential business closures, restaurant limitations, and bar closures. ω_t represents a month-year fixed effect and θ_c represents a county fixed effect.

We exploit within-county, over-time variation of school closures for identification of the coefficient of interest, β_1, which tells us how average school and childcare facilities closures affect the employment outcomes of individuals who live with at least one underage child relative to those who do not. We acknowledge that school closures may be endogenous with respect to COVID and economic conditions in a particular area. Our identifying assumption is that school closures alone should have a disproportionate effect on parents of underage children relative to others. In this case, β_1 is the effect of school and childcare closures on parental labor-market outcomes.

As part of our sensitivity check, we also include the results from the following specification that breaks down the age of children in more detail to identify the effects of school and childcare facilities closure on parents whose children's age belong to the indicated age range.

$$Y_{ict} = X_{ict}\alpha + \beta_1(eldchage4_{ict} \times aveschoolcareclosure_{ct}) + \beta_2(eldchildage12_{ict} \times aveschoolcareclosure_{ct}) + \beta_3(eldchildage17_{ict} \times aveschoolcareclosure_{ct}) + \beta_4(eldchildage18up_{ict} \times aveschoolcareclosure_{ct}) + \omega_t + \theta_c + \varepsilon_{ict} \quad (2)$$

where the same additional control variables are included in X_{ict} as in equation (1) plus the interaction between the number of children and average school and childcare facilities closure to separate the impact of family size during school and childcare facilities closures from the β'_s in equation (2), $eldchage4_{ict}$ that indicates the presence of the eldest child age 0-4, $eldchage12_{ict}$ that indicates the presence of eldest child age 5-12 in the household, $eldchage17_{ict}$ that indicates the presence of eldest child age 13-17, and $eldchildage18up_{ict}$ that indicates the presence of eldest child at least 18 years old. In this equation, the β'_s tell us how average school and childcare closures impact the outcomes of parents whose eldest child falls under the corresponding age range.

Lastly, we include leads and lags of school closures (in the form of 3-6 month average values from before and after the current month) to see 1) if parental labor market outcomes were different even *before* a particular school closure realization, which might suggest that school closures are merely proxying for something else causing relative changes in parental outcomes, and 2) whether closures have effects on outcomes that persist beyond the current period. In this case, the specification becomes:

$$Y_{ict} = X_{ict}\alpha + \beta_1(underagechild_{ict} \times aveschoolcareclosure_{ct}) + \beta_2(underagechild_{ict} \times aveschoolcareclosure\_3\_6\_lead_{ct}) + \beta_3(underagechild_{ict} \times aveschoolcareclosure\_3\_6\_lag_{ct}) + \omega_t + \theta_c + \varepsilon_{ict} \quad (3)$$

In this equation, X_{ict} now also includes the values of a 3-6 month lead and lag of the average school and childcare facilities closure variable.

Because other papers in the literature have found different pandemic-related effects on labor-market outcomes for men and women, we estimate Equations (1)-(3) separately by gender. Later in the paper, we split the sample in other ways as well. Standard errors are clustered at the county level throughout our analysis.

5. Main Results

The COVID-19 pandemic has caused job losses for both men and women. Figure 1 shows that the percentage of men and women who were "at work" dipped in the second quarter of 2020, the pandemic's initial peak. Meanwhile, by the first quarter of 2021, at-work rates of women with at least one underage child (< 18 years old) and those without were still (respectively) 3.9 and 3.1 percentage points lower than the same quarter in 2019; at-work rates of men with at least one underage child were 4.9 and 4.5 percentage points lower, respectively. The larger decline observed in the at-work rates of parents with underage children relative to parents without underage children is consistent with the hypothesis that school and childcare facilities closures have affected the labor market status of parents disproportionately. Figure 2 also supports this hypothesis with the increase in the percentage of mothers with underage children who are not in the labor force due to caregiving responsibilities at the onset of COVID-19 pandemic in second quarter of 2020. In contrast, out of labor force rate among other groups remained fairly constant across this time period. However, these observations may also be due to other factors, such as the pre-pandemic distribution of occupations among these various groups. This leads us to consider the question of how school and childcare facilities closures affect the employment outcomes of women and men in the regression models outlined in Section 4.

Table 1 displays summary statistics for our sample in September 2020 and September 2021. The average share of schools and childcare facilities that were closed in a county declined from 48 percent in September 2020 to 26 percent in September 2021. This partial relaxation of school closures is illustrated in Figure 3 (for April 2020, September 2020, April 2021, and September 2021) and is consistent with the ending of states' stay-at-home orders, non-essential business closures, restaurant limitations, and bar closures over that year. Vaccines were not approved for 12-15 year-olds until May 2021 (Lendon et al., 2021), for 5-11 year-olds until later in the fall of 2021 (American Hospital Association, 2022), and for children between the ages of 6-months and 5 years of age until June 2022 (Kates and Oum, 2022), which is likely a major reason why a smaller share of schools remained closed during the first part of the fall 2021 semester.

I. Impacts of School Closures on Hours and Earnings

Our baseline results for women and men are contained in Table 2. The first row of coefficients shows how school closures are associated with the labor-market outcomes of individuals without underage children. It appears that closures are associated with reductions in any work, and hours for women even if they do not have underage children. This could be because closures are associated with other COVID-related restrictions that affect the labor-market opportunities of all women or attitudes regarding COVID risk that affect the labor supply of all women. It is interesting to note, however, that the same pattern does not hold for men: the coefficients of school closure on the labor-market outcomes of men without underage children are generally

small, positive, and not statistically different from zero. Generally speaking, any unobserved drivers of labor-market outcomes that are correlated with the closures will not be problematic to our identification strategy unless they have a differential impact on parents of underage children.

Presence of underage children without school closure is generally associated with more work and higher earnings for men while the results for women are mixed. Our main effects of interest are those associated with the interaction between our school closure measure and the presence of underage (< 18 year-old) children in the household, which should capture the labor-supply effects of having underage children at home instead of in school or formal childcare facilities.

The first (last) four columns in Table 2 show the impact of school closures on whether women (men) are at work, their probability of working full-time, hours worked, and (log) weekly earnings. The specific effect of school closure for women with underage children is negative 1.8 percentage points (about 3.2 percent decrease relative to the pre-pandemic (2019) mean). That is, going from all schools in the county being open to all being closed (taking our closures measure from 0 to 1) would mean that the probability of being at work would fall by about 1.8 percentage points when women have underage children. For men, the effects are about smaller at negative 1 percentage point (about 1.5 percent decrease relative to the pre-pandemic mean).

Regarding the probability of full-time work, coefficients on interaction terms between school and childcare facilities closure and the presence of underage children is around (negative) 2.3 percentage points for women, and an even larger reduction for men of about 4.8 percentage points (an 8 percent decrease relative to the pre-pandemic mean). Columns 3 and 7 display effects on total hours worked for women and men, respectively, which are about -0.9 hours per week for women (-4.2 percent) and -1.8 hours per week for men (-6.4 percent). All effects are statistically significant at the 1% level. Putting this in perspective, using the average hourly earnings of all employees in total private industries in 2020-21 at $29.99 (Federal Reserve Economic Data, n.d.), the reduction in work hours translates to a $29.99 and $53.98 reduction in the weekly earnings of women and men, respectively.

The last columns of each quadruplet of Table 2 show how school closures affect (log) weekly earnings for women and men.[9] In this case, our sample sizes are greatly reduced because CPS only questions individuals on their earnings in the past week if they are in an outgoing rotation group (that is, if they are in the 4th or 8th month of the survey) and exclude self-employed individuals. Nevertheless, we only see reductions in men's earnings of about 5.7 percent, though these effects are somewhat imprecisely estimated (it is significant at the 10% level), and no discernible effects on women's earning is observed consistent with the findings of Blanden et al. (2021). Of course, such reductions in earnings could be due to a reduction in the likelihood of work or reduced hours, but they could also be due to other changes in parents' work schedules induced by school closures, such as work-from-home arrangements that may generate pay differentials (see Miller, 2021; Dill, 2021). Because the self-employed individuals were excluded in the earnings estimations, we also tested what will happen to the estimates should be exclude self-employed across all the other outcomes in Table 2. We present these results in Appendix Table A1, and find that the estimates are very similar to those of the baseline with the full sample

[9] For those with zero earnings, we assign a value of $1. Alternatively, we transform the data using the inverse hyperbolic sine and find very similar results (available upon request).

except that the negative impact on the likelihood of working of fathers of underage children have disappeared.

To compare the impact of closures on parents of younger children relative to parents of older children, we also estimated equation (2). Table 4 and 5 show the results for women and men, respectively. On average, Table 4 shows that the presence of eldest child aged 4 years old and below negatively affect the work decisions of women, but the presence of older eldest child is positively related with their employment outcomes. This suggests that in the early years of motherhood, mothers are less likely to be at work or work full-time, and more likely to work less hours. The opposite is true for men (Table 5) –first-time fathers or fathers of very young children (<5 years old) appear to be more likely to work full-time and work more hours. However, as their eldest child becomes older (5 years old and up), the mothers of these children become more likely to work, but only mothers of children aged 13 years and above observe increase in their work hours and likelihood to work full-time. These results are generally true for men as well. This is consistent with the findings of Paull (2008) that suggest that women work slightly longer hours as the family ages. In addition, the presence of children is positively correlated with women's and men's earnings.

Looking at the coefficients of the interaction with average closure and the presence of children in different age ranges, the closures negatively impacted mothers of teenagers and older more relative to non-parents, and generally no significant differential impact is observed on fathers of all ages (except for reduction in likelihood of working full-time for fathers of children age 0-4) and mothers of younger kids (children age <13 years old). We hypothesize that this may be because of the increased attention of parents on children during this vulnerable years as their children approach young adulthood.

We also tested the addition of the 3-6 month leads and lags of the school and childcare facilities closure variable to examine 1) whether labor-market outcomes begin changing even before a particular realization of the school closure variable, and 2) whether school closure effects persist beyond the current period. We do not find evidence in favor of either of these as shown in Appendix Table A2. Interactions between the lead of closure and presence of underage children is not statistically significant for any variable for either men or women, and most effects are small in magnitude. This lends confidence to the notion that parental labor-market outcomes are in fact caused by school closures and not due to another co-occurring trend in areas that had a greater degree of closure.

On a related note, we can also examine whether school closure effects vary over different phases of the pandemic. Perhaps, for example, parents became more adept at adapting their work lives to school closures over time. On the other hand, temporary solutions to school closures (such as taking leave from a job) may not have been available to employees as the pandemic wore on. In Appendix Table A3, we divide our sample months into four groups: spring 2020 (January-May 2020, the base group), fall 2020 (August-December 2020), spring 2021 (January-May 2021), and

fall 20201 (August-December 2021).[10] We then modify Equation (1) to also include triple interactions between these "semesters" and the product of our school closure measure and an indicator for the presence of underage children as discussed earlier.

II. Impacts of School Closures on Other Margins of Work

In Table 3, we examine a set of variables that should shed more light on how school closures affect parents. Columns 1 (women) and 4 (men) show how our closure measure affects whether individuals report working from home due to COVID in the previous month. The first row indicates that in areas with a greater degree of school and childcare facilities closure, individuals without underage children are more likely to work from home. This is likely because school closures are correlated with other COVID restrictions and cultural factors that encouraged a greater degree of COVID risk aversion. However, individuals with underage children were significantly more likely to report working from home with closed schools than those without underage children, as indicated by the interaction term effects (row 3). This is in spite of the fact that when schools are completely open, parents of underage children are somewhat *less* likely to work from home (row 2).

Columns 2 (women) and 5 (men) show how the probability of being absent from work or working part-time specifically because of childcare problems or family/personal obligations is affected by school closures. Curiously, school closures are associated with a *reduction* in this likelihood for mothers with underage children. We are not sure of the reasons for this phenomenon, but it is interesting to note that the next column shows effects pertaining to the likelihood of not being in the labor force specifically to care for home/family. For women, the effect of school closure on this variable is positive and close in magnitude to the absent/part-time reduction. Thus, it may be the case that the closures caused women who were underemployed (absent or part-time) due to childcare responsibilities to exit the labor force entirely when schools closed during the pandemic. In other words, there may have been a shift from the former category to the latter. This was also observed by Paull (2008) in Britain noting that women are likely to move from full-time work to part-time work or out of work altogether when they become mothers. For men with underage children, the effects of school closure on these outcomes are small and statistically insignificant.

III. Heterogeneity in Impacts by Education, Marital Status, Race, Occupation, and Industry

We now turn our attention to analyzing how our results differ for various groups. In doing so, we restrict our analysis to estimation of Equation (1) given the robustness of our main results of interest across specification in Table 2. We present only interaction effects between our school and childcare facilities closure measure and presence of underage child(ren) on a limited number of outcomes. Additional results from these specifications are available in the Online Appendix. [11] Table 3 contains results for women, while Table 4 does the same for men.

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[10] Recall that we do not use June and July in our analysis as most U.S. schools are on summer break during those months. However, including summer months in the sample gives similar estimates as the baseline results in Table 2. Results are shown in Appendix Table A4.

[11] See Online Appendix Table here: https://doi.org/10.3886/E182101V1.

A. By Education

First, we examine how parental education mediates our results. Other studies have found a strong relationship between education and labor-market outcomes during the COVID pandemic owing to such differences as the ability to perform work responsibilities from home (e.g. Mongey, Pilossoph, and Weinberg, 2020), propensity to be in occupations designated as "essential," and industry-specific shocks associated with the pandemic and the public health response (e.g. Montenovo et al., 2020). These factors could certainly play a role in how parents respond to school closures specifically. On the one hand, a flexible, at-home work arrangement may allow better educated individuals to maintain their work hours even with children at home (see Zamaro and Prados, 2021) since they can adjust their work hours throughout the day (implying that the response in hours worked would be larger for low-educated parents; see Lofton, Petrosky-Nadeau, and Seitelman, 2021). On the other hand, if there is little flexibility in schedule or location in the work arrangements of less-educated individuals, their supply response to school closures might be smaller than that of the high education group.

It has also been shown that shifting children into private schooling during COVID rises with family income (e.g. Musaddiq et al., 2021), which is of course correlated with parental educational attainment. This would imply seeing a more muted response in labor supply to school closures among college graduates, since they would be better able to afford to send kids to private schools during public school closures.

Panel A of Tables 6 and 7 show how school closures affect the employment outcomes of parents with underage children by college degree status. Considering differences for women first, mothers without a college degree experience a much larger reduction in work outcomes than do mothers with a degree. Women with underage children but without a degree see a reduction in the probability of being at work of 3.1 percentage points (6.4 percent), a reduction in the probability of full-time work of 4.1 percentage points (12 percent), and a reduction in overall work hours of almost 1.6 hours per week (9.2 percent) when schools are closed. On the other hand, effects for mothers with a degree are very small and not statistically different from zero. When it comes to remote work, this pattern flips: it is now college-educated women who see a much larger effect (8.5 vs. 1.4 percentage points). This is expected given the profile of jobs by education: having a college degree improves the likelihood of remote work (Brussevich et al., 2022). There are no significant impact in women's earnings due to school and childcare closures.

B. By Marital Status

The next dimension we analyze is marital status: married parents with a present spouse may respond differently to school closures by dividing responsibilities differently between labor-market and household production relative to single or cohabitating individuals. It is possible that, for example, married couples are better able to share the time burden of additional childcare when schools close. Conversely, married couples may specialize more across paid work/home production relative to cohabitating couples when schools close.[12] Single mothers are also much

[12] See Albanesi and Kim (2021b) and Shore (2010) for evidence on risk-sharing in the labor-market behavior of married couples.

more common than single fathers: 21 percent of children under 18 live only with their mother versus four percent who live only with their fathers (Alon et al., 2020). Thus, the burden of school closures on unmarried women may be especially large.

Panel B of Table 6 displays the results for the same set of dependent variables for married women (with spouse present) and unmarried women (or married but absent spouse) separately. We find that both married and unmarried women with underage children experience reductions in work hours, but no impact earnings, with school closure, though overall effects are somewhat more pronounced among unmarried women (other than with regard to remote work, likely owing to the different occupational profile of these two groups). For men (in Table 7), effects on any work and hours across marital status are even more similar than they are for women, though there is a effect on earnings observed for unmarried men. Once again, it is only married (men) who experience an increase in the likelihood of working from home when schools close.

Overall, we find that married women with underage children do experience reductions in work and hours with school and childcare closures, but their experience is not unique in our sample, which covers people living in larger counties over the full course of the pandemic. Selection into marriage in our more urban/suburban sample may be different than in the general population: for example, 52% of our sample are married with spouse present, but this number is 39% in the full CPS sample.

C. By Race

Panel C of Tables 6 and 7 contain results for whites and non-whites (People of Color) separately (all individuals who do not report their race as "white" are combined due to small sample sizes among each individual group). In the case of women (Table 6), effects on any work, hours, and earnings are only significant for whites (though effects for People of Color are also negative). Both groups experience a similar and significant increase in the likelihood of working from home due to COVID. For men (Table 7), effects across race are quite similar, with both groups seeing a significant reduction in hours due to school and childcare facilities closure. Smaller sample sizes among People of Color make it more difficult to rule out either zero effects or effects that are as large as those for whites.

One potential reason why People of Color may experience smaller effects of school closure on work outcomes than whites is their distribution across industry and occupation relative to whites. In fact, People of Color are much more likely to work in "frontline" industries, which tend to have minimal potential for working from home and which were often designated as "essential" in the early days of the pandemic. Among women, for example, roughly 20% of People of Color work in such industries, while only 15% of white women do (among men, the figures are 13% and 9%, respectively). This leads us to consider how occupation and industry classification mediate our results more generally.

D. By Occupation and Industry Classification

We now turn to investigating how workers' ability to do their job from home change how school closures affect their outcomes. To do so, we rely on an index of occupations: whether there is high potential for telework or not; and an index of industries: whether the industry is "frontline" or not. To designate frontline industries, we follow Rho et al. (2020), who use the same definition as the New York City Comptroller. The six groups in which a particular industry is classified as "frontline" are: (1) Grocery, Convenience, and Drug stores, (2) Public transit, (3) Trucking, Warehouse, and Postal Service, (4) Building Cleaning Service, (5) Health Care, and (6) Childcare and Social Services. 13% of individuals fall into one of these categories. In terms of potential for telework, we follow Dingel and Neiman (2020), who use O*NET occupational surveys to isolate job characteristics that lend themselves to telework. Their index ranges from zero to one; we define an occupation with high telework potential as having a value equal to one (about 25% of the sample); all other occupations are coded as zero. Each of these indices is independently meaningful; the correlation between the two is about -0.03.

Following the findings of Blau, Koebe and Meyerhofer (2021) that frontline workers are disproportionaely comprised of less educated and economically disadvantaged individuals (e.g. Hispanics and immigrants), our hypothesis is that workers in frontline industries would generally not have the ability to adjust their work schedules (at least on the intensive margin) to school and childcare facilities closures relative to those outside of these industries. This hypothesis is consistent with Albanesi and Kim (2021c) that notes that frontline workers are concentrated in inflexible/low-contact occupations.[13] With regard to teleworking, workers in highly telework-compatible occupations likely have more scope for adjusting their work schedules to school closures relative to others given their ability to work from home. However, it may also be the case that such workers experience *larger* reductions in hours when schools close since other workers may not be able to change when or how much they work unless they find a new job. Thus, it is an empirical question how telework potential interacts with closures in affecting work outcomes.

It is clear from the bottom two panels of Tables 6 and 7 that the negative effects of school closures on work/hours of work for parents with underage children are concentrated in 1) occupations in which potential for telework is low, and 2) non-frontline industries, similar to the findings of Dubois et al. (2022) in the Swiss context. This is also consistent with the findings among self-employed individuals presented in Appendix Table A5. We find that school and childcare closures had no statistically significant impact on work outcome of self-employed parents partly owing to the work schedule, hours, and location flexibility available to this group. Effects on earnings for highly telework-compatible occupations are as large or larger as they are for low-telework occupations, however, suggesting that reductions in earnings overall (discussed earlier) may be due in part to the large increases in working from home among the former group. It is difficult to make firm conclusions, however, since none of the individual effects on earnings are statistically different from zero.

[13] According to Albanesi and Kim (2021c), flexible occupations are those that enable their workers to perform their tasks from a remote location, while inflexible occupations involve outdoor tasks or necessitate the use of on-site equipment. Meanwhile, the distinction between high-contact and low-contact occupations is determined by the physical proximity of workers to either customers or colleagues while performing work duties.

6. Sensitivity Analysis

Our analyses thus far have relied on measuring a school closure as a 50 percent year-over-year reduction in phone traffic at that institution using Safegraph data, as recommended in Parolin and Lee (2021) and Lee and Parolin (2021) for schools and childcare facilities closures, respectively. There are two potential issues with this. The first is that the 50 percent cutoff is arbitrary and institutions may erroneously appear to be closed by this measure if significant numbers of parents *chose* to remove their children from a particular public school or childcare facility at some point during the pandemic. The second issue is the extent to which such removals are *endogenous* because parents who reduced their time at work also chose to remove their children from school. We view these possibilities as unlikely given that a 50 percent reduction in visits at a school would require an enormous response from many parents simultaneously. Nevertheless, we think it is worthwhile to explore how sensitive our results are to other measures of school closures. We first use the same Safegraph data but with a more stringent 75% cutoff; next, we employ an entirely different dataset that documents school closures from administrative sources as collected by *Burbio*.

Table 8 contains the results using the alternative 75% cutoff for school closure. These are largely consistent with our baseline results, with effects that are generally somewhat larger than they are in our baseline specifications. This suggests, intuitively, that more stringent closures, in the form of fewer in-person days (for schools that are remote or using a hybrid format), have even stronger effects on labor-market outcomes.

Tables 9 (women) and 10 (men) display results using *Burbio* rather than *Safegraph* closures. Here the results for the full sample are smaller than they are in our baseline analysis. One possible reason why we see a universal reduction in the coefficients with the *Burbio* data is that it measures school closures with a greater degree of error—indeed, the correlation between our primary (Safegraph) school closures measure and the *Burbio* measure is only 0.71. Another is that the *Burbio* data only begin in Fall 2020, so we cannot use the early pandemic months (or the non-pandemic months before that) in this analysis. However, when we restrict the sample to those without a college degree, we observe stronger effects on full-time work and hours that are significant at the 1% level, consistent with the pattern we saw in our *Safegraph* results.

7. Conclusion

We find that school closures over the course of the 2020-21 academic year had a significant effect on the labor-market outcomes of parents with underage children. We find that both women and men are less likely to be at work or to work full-time, and both reduce their hours worked per week in response to these closures. The effects we find are concentrated among individuals without a college degree, likely exacerbating the toll the pandemic has had on lower-income families in the form of student test scores (Goldhaber et al., 2022b) and leading to increases in other forms of inequality (e.g., Adams-Prassl et al., 2020; Bonacini, Gallo and Scicchitano, 2020; Andrasfay and Goldman, 2021; Alsan, Chandra and Simon, 2021). This is in line with our finding that individuals in jobs with high telework potential did not experience reductions in work hours when schools were closed, since those with a college degree are much more likely to

hold such jobs.[14] Though our results with regard to earnings are less precisely estimated (likely due to smaller sample sizes in CPS), we do find economically meaningful reductions in earnings that are unique to fathers of underage children as school and childcare facilities closures rise.

These findings enhance our comprehension of the role of in-person schooling in serving as a form of childcare and its impacts on parental labor market outcomes. While existing literature has predominantly focused on how childcare availability affects maternal employment (e.g., Berlinski and Galiani, 2007; Geyer et al., 2015; and Nollenberger and Rodriguez-Palanas, 2015), it has been limited in its examination of the impact on fathers. These existing studies have noted the the positive effects of the availability of childcare on mothers' employment outcomes. Our results indicate that the absence of in-person schooling negatively affects both mothers and fathers, underscoring the significance of in-person schooling in providing childcare, and that labor market repercussions are not exclusive to mothers, although adverse impact on fathers are relatively smaller.

Our findings also contribute to our understanding of several aspects of how COVID-19 and its fallout have disrupted the lives of working parents. First, the literature on how school and childcare closures has affected economy-wide changes in labor supply have focused on the extensive margin, that is, whether individuals work or are in the labor force (e.g. Albanesi and Kim, 2021a; Furman, Kearney and Powell, 2021). These papers suggest that closures had at most a modest impact on these measures. Our results imply that the intensive margin of labor supply has been affected by school closures; for example, men with underage children see a weak reduction in the likelihood of being at work but do reduce their hours when school and childcare facilities close. Thus, the intensive margin of work appears to be an important dimension for considering how the pandemic has affected labor supply.

Another of our findings that adds to the existing literature on the labor-market effects of the absence of in-person schooling or formal childcare, is that over our full sample period, reductions in work hours in response to school closures are generally similar for women and men. This is in contrast to evidence pre-pandemic or from the very early part of the pandemic that the effects were very different across gender (e.g., Heggeness, 2020). With little anticipation of school closures in spring 2020, it appears that women were more likely to take time out of work to care for children who had to stay home. This is consistent with evidence that other kinds of family shocks affect women's labor supply more than men's (e.g., Van Houtven, Coe, and Skira, 2013; Jeon and Pohl, 2017; Saad-Lessler, 2020). With more time to adjust schedules and anticipate closures starting in fall 2020, we find that the additional childcare burden brought on by school and childcare facilities closures was more balanced across gender.

During the pandemic, policymakers did not have the luxury of many credible estimates of the benefits and costs of closing schools. Several recent papers suggest that the health and human capital of children are harmed by school closures and that these effects are largest for disadvantaged kids (e.g., Kuhfeld et al., 2020; Engzell, Frey and Verhagen, 2021; Larsen, Helland and Holt, 2021; Halloran et al., 2021; Fuchs-Schündeln et al., 2021; Fuchs-Schündeln et al., 2022). Our results suggest that closures carry costs to families in the form of reduced parental

[14] 42% of individuals with at least college degree are in occupations with telework potential, as opposed to only 13% of individuals without college degree.

work hours translating to a $29.99 and $53.98 reduction in the weekly earnings of women and men, respectively using back-of-the-envelope approach, particularly among less-educated mothers and fathers. These factors should be taken into account as policymakers continue to grapple with reducing disease during future pandemics in ways that are least costly to their constituents.

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Figures and Tables

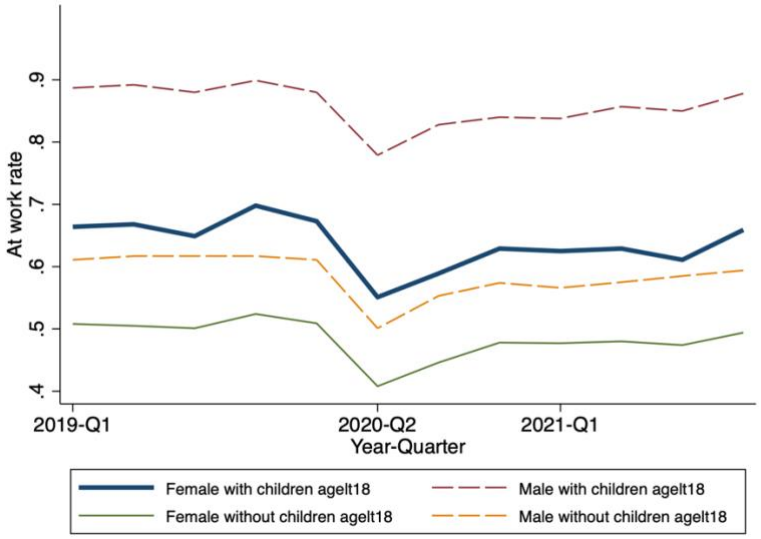


Figure 1. Percentage of individuals "at work", 2019-Q1 to 2021-Q4
Authors calculations based on the Current Population Survey.

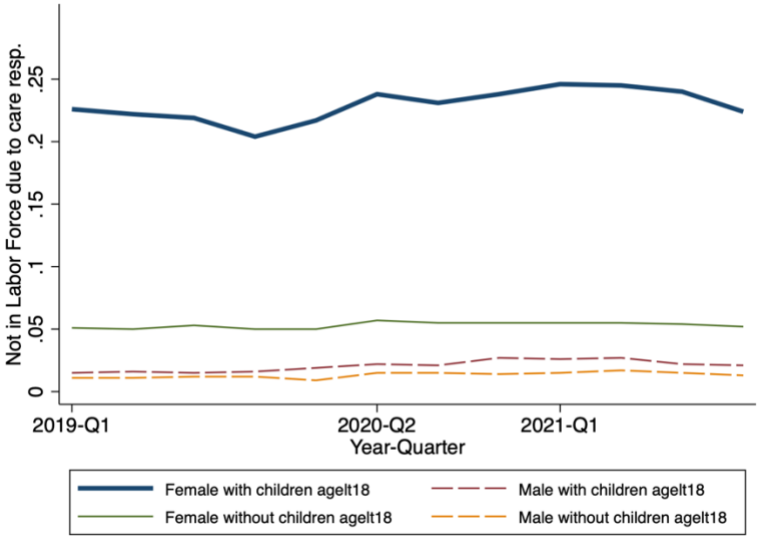
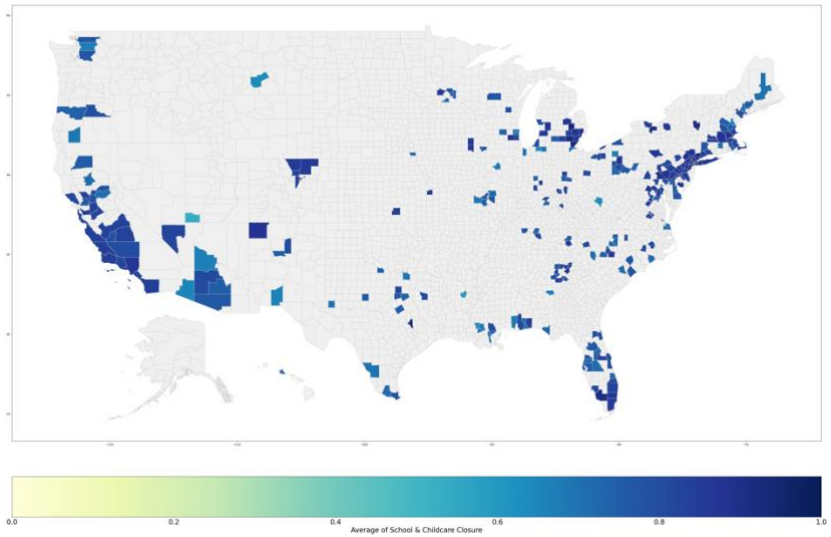


Figure 2. Percentage of individuals "not in labor force"
to take care of house or family, 2019-Q1 to 2021-Q4
Authors calculations based on the Current Population Survey.



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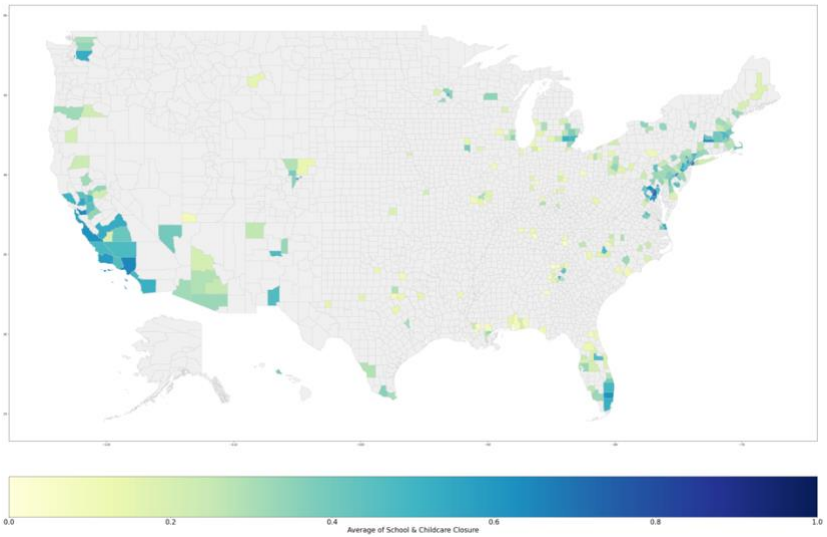

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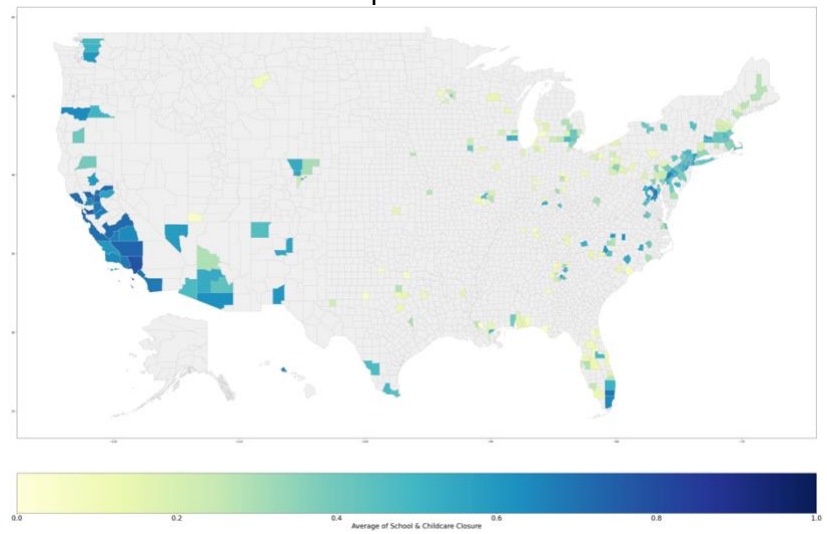

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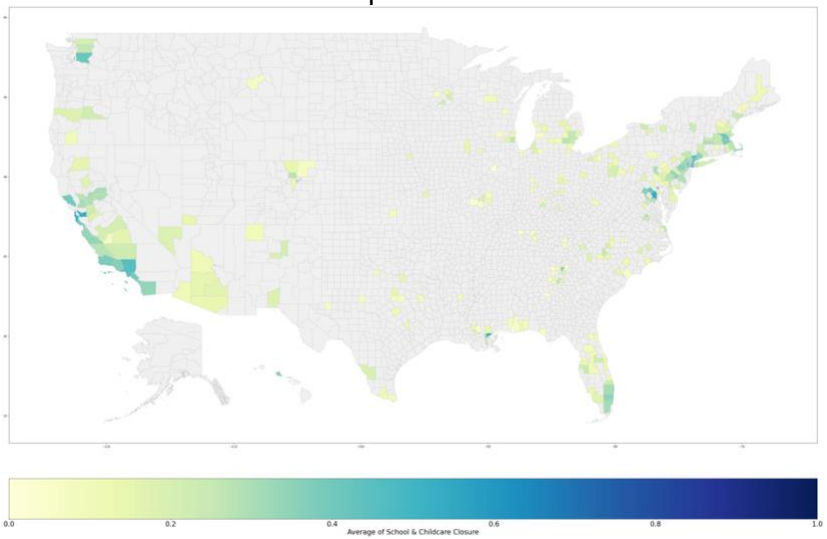

September 2021

Figure 3. Average Percentage of School and Childcare closures in CPS sample with county identifiers based on the data from Parolin and Lee (2021) school closure database and Lee and Parolin (2021) childcare closure database, April 2020 & 2021 and September 2020 & 2021

Table 1. Summary Statistics by survey month

VARIABLES	(1) September 2020	(2) September 2021
Outcome		
In labor force	0.64	0.64
At work	0.57	0.59
Absent from work	0.02	0.02
Unemployed	0.05	0.03
Work hours last week	21.30	23.27
Worked Remotely due to COVID	0.16	0.10
Worked Part-time due to childcare/family reasons	0.02	0.02
Not in the labor force due to family reasons	0.06	0.06
Earnings last week (in January 2020 USD)	708.21	728.96
Control Variables		
Average percentage of school and childcare facilities closed in county	0.48	0.26
Presence of children age <18	0.25	0.25
Female (dummy)	0.52	0.52
Age	49.21	49.29
Number of children in household	0.69	0.69
White race	0.75	0.75
Black race	0.13	0.13
Asian race	0.09	0.09
Other race	0.03	0.03
Married	0.52	0.51
Veteran	0.06	0.06
U.S. born	0.76	0.75
Hispanic ethnicity	0.21	0.20
Presence of disability	0.11	0.11
Less than high school diploma	0.09	0.09
High school diploma	0.27	0.26
Some college	0.25	0.25
College degree	0.25	0.25
Advanced degree	0.15	0.15
New deaths by 2nd week of the month per 100,000	7.58	7.01
Cumulative deaths by 2nd week of the month per 100,000	78.44	206.42
New cases by 2nd week of the month per 100,000	310.60	1,192.49
Cumulative cases by 2nd week of the month per 100,000	2,118.48	12,325.99
Stay-at-home order	0.37	0.00
Non-essential business closure	0.99	0.00
Restaurant limit	0.89	0.00
Bar Closure	0.76	0.00
Observations	33,668	32,085

All numbers displayed are means weighted with final basic CPS person weights. The values for new deaths and new cases by the second week of the month is the month-over-month difference with the 14th day of each month as the reference date. Number of observations for Earnings last week is 7,352 and 7,162 for September 2020 and September 2021, respectively.

Table 2. OLS Regressions on "At Work", "Full-time", "Hours Worked" and "Log of Weekly Earnings"

VARIABLES	(1) At work	(2) Full-time	(3) Hours worked	(4) Log of Real Weekly Earnings	(5) At work	(6) Full-time	(7) Hours worked	(8) Log of Real Weekly Earnings
	Female				Male			
Facilities closure	-0.020***	-0.013	-1.153***	-0.019	0.000	0.008	0.075	0.013
	(0.008)	(0.011)	(0.371)	(0.024)	(0.008)	(0.012)	(0.438)	(0.030)
Presence of child age < 18	-0.008***	-0.024***	-0.872***	0.028***	0.007*	0.029***	1.131***	0.085***
	(0.003)	(0.004)	(0.141)	(0.010)	(0.004)	(0.005)	(0.212)	(0.014)
Facilities closure x presence of child age < 18	-0.018**	-0.023***	-0.881***	-0.013	-0.010*	-0.048***	-1.801***	-0.057*
	(0.007)	(0.008)	(0.311)	(0.018)	(0.006)	(0.007)	(0.307)	(0.029)
Mean outcome (2019)	0.559	0.413	20.76	541.209	0.684	0.585	28.303	836.434
N	348,278	348,278	348,278	80,405	312,703	312,703	312,703	68,597
R-squared	0.768	0.503	0.667	0.980	0.727	0.517	0.622	0.977

*** p<0.01, ** p<0.05, * p<0.1. Standard errors in parentheses. Columns 1-4 are for females, and columns 5-8 are for males. Facilities closures refer to the average share of all schools and childcare facilities in each county that had at least 50 percent year-on-year decline in in-person visits. Controls variables include indicator for whether the individual has at least one child residing in their household and that the oldest or youngest child is under the age of 18 years old (*underagechild*); the average percentage of schools and childcare facilities that are closed in the individual's county of residence (*aveschoolcareclosure*); individual demographics (age and its square, number of own children residing in the household, dummies for race and Hispanic ethnicity, educational status, foreign born, presence of a disability, marital status, and veteran status); individual industry and occupation dummies; county COVID-19-related variables including the cumulative number of confirmed COVID-19 cases and deaths per 100,000 in each county by the second week of the sample survey month (the reference week of CPS), the number of the additional confirmed cases and deaths per 100,000 in the past month, and state-level policy dummy indicators that include stay-at-home orders, non-essential business closures, restaurant limitations, and bar closures, month-year fixed effect and county fixed effects.

Table 3. OLS Regressions on "Remote Work due to COVID", "Part-time or Absent due to childcare or family", and "Not in labor force due to family"

VARIABLES	(1) Remote Work due to COVID	(2) Part-time/ Absent due to childcare/ family	(3) Not in labor force due to childcare/ family	(4) Remote Work due to COVID	(5) Part-time/ Absent due to childcare/ family	(6) Not in labor force due to childcare/ family
	Female			Male		
Facilities closure	0.105***	-0.001	-0.004	0.105***	-0.008***	-0.002
	(0.019)	(0.005)	(0.007)	(0.020)	(0.002)	(0.004)
Presence of child age < 18	-0.013***	0.049***	0.054***	-0.020***	0.009***	0.008***
	(0.003)	(0.003)	(0.004)	(0.004)	(0.001)	(0.002)
Facilities closure x presence of child age <18	0.055***	-0.027***	0.018**	0.086***	-0.001	0.003
	(0.007)	(0.005)	(0.007)	(0.01108)	(0.002)	(0.004)
Mean outcome (2019)	-	0.043	0.097	-	0.009	0.013
R-squared	0.304	0.079	0.399	0.317	0.019	0.085

*** p<0.01, ** p<0.05, * p<0.1. Standard errors in parentheses. Columns 1-3 are for females, and columns 4-6 are for males. Closures refer to the average share of all schools and childcare facilities in each county that had at least 50 percent year-on-year decline in in-person visits. Controls variables include indicator for whether the individual has at least one child residing in their household and that the oldest or youngest child is under the age of 18 years old (*underagechild*); the average percentage of schools and childcare facilities that are closed in the individual's county of residence (*aveschoolcareclosure*); individual demographics (age and its square, number of own children residing in the household, dummies for race and Hispanic ethnicity, educational status, foreign born, presence of a disability, marital status, and veteran status); individual industry and occupation dummies; county COVID-19-related variables including the cumulative number of confirmed COVID-19 cases and deaths per 100,000 in each county by the second week of the sample survey month (the reference week of CPS), the number of the additional confirmed cases and deaths per 100,000 in the past month, and state-level policy dummy indicators that include stay-at-home orders, non-essential business closures, restaurant limitations, and bar closures, month-year fixed effect and county fixed effects.

Table 4. OLS Regressions on "At Work", "Full-time", "Hours Worked" and "Log of Real Weekly Earnings", "Remote Work due to COVID", "Part-time or Absent due to childcare or family", and "Not in labor force due to childcare or family", Female, using eldest child age

VARIABLES	(1) At Work	(2) Full-time	(3) Work Hours	(4) Log of Real Weekly Earnings
Facilities closure	-0.019**	-0.010	-1.023***	-0.018
	(0.008)	(0.011)	(0.372)	(0.024)
Number of child	-0.008***	-0.017***	-0.685***	-0.015***
	(0.002)	(0.003)	(0.098)	(0.006)
Facilities closure x number of child	0.002	0.000	0.156	-0.005
	(0.004)	(0.006)	(0.204)	(0.013)
Presence of eldest child age 0-4	-0.033***	-0.043***	-2.012***	0.043**
	(0.006)	(0.009)	(0.282)	(0.020)
Presence of eldest child age 5-12	0.008*	-0.002	0.117	0.036**
	(0.005)	(0.008)	(0.268)	(0.016)
Presence of eldest child age 13-17	0.020***	0.026***	1.448***	0.062***
	(0.005)	(0.008)	(0.257)	(0.017)
Presence of eldest child age 18 and up	0.023***	0.043***	1.807***	0.032***
	(0.004)	(0.005)	(0.204)	(0.012)
Facilities closure x presence of eldest child age 0-4	-0.018	-0.009	-0.390	0.022
	(0.016)	(0.018)	(0.718)	(0.040)
Facilities closure x presence of eldest child age 5-12	-0.015	-0.020	-0.865	0.006
	(0.011)	(0.018)	(0.591)	(0.035)
Facilities closure x presence of eldest child age 13-17	-0.028**	-0.034*	-2.064***	-0.040
	(0.013)	(0.018)	(0.614)	(0.042)
Facilities closure x presence of eldest child age 18 and up	-0.014	-0.021*	-1.052**	0.004
	(0.009)	(0.012)	(0.457)	(0.027)
Mean outcome (2019)	0.559	0.413	20.76	541.209
N	348,278	348,278	348,278	80,405
R-squared	0.769	0.503	0.668	0.980

*** p<0.01, ** p<0.05, * p<0.1. Standard errors in parentheses. Facilities closures refer to the average share of all schools and childcare facilities in each county that had at least 50 percent year-on-year decline in in-person visits. Controls variables include indicator for whether the individual has at least one child residing in their household and that the oldest or youngest child is under the age of 18 years old (*underagechild*); the average percentage of schools and childcare facilities that are closed in the individual's county of residence (*aveschoolcareclosure*); individual demographics (age and its square, number of own children residing in the household, dummies for race and Hispanic ethnicity, educational status, foreign born, presence of a disability, marital status, and veteran status); individual industry and occupation dummies; county COVID-19-related variables including the cumulative number of confirmed COVID-19 cases and deaths per 100,000 in each county by the second week of the sample survey month (the reference week of CPS), the number of the additional confirmed cases and deaths per 100,000 in the past month, and state-level policy dummy indicators that include stay-at-home orders, non-essential business closures, restaurant limitations, and bar closures, month-year fixed effect and county fixed effects.

Table 5. OLS Regressions on "At Work", "Full-time", "Hours Worked" and "Log of Real Weekly Earnings", "Remote Work due to COVID", "Part-time or Absent due to childcare or family", and "Not in labor force due to childcare or family", Male, using eldest child age

VARIABLES	(1) At Work	(2) Full-time	(3) Work Hours	(4) Log of Real Weekly Earnings
Facilities closure	-0.001	0.010	0.103	0.020
	(0.008)	(0.012)	(0.445)	(0.030)
Number of child	0.002	0.006**	0.331***	0.011
	(0.002)	(0.003)	(0.112)	(0.007)
Facilities closure x number of child	-0.006	-0.009	-0.520**	-0.020
	(0.004)	(0.006)	(0.227)	(0.016)
Presence of eldest child age 0-4	0.003	0.031***	0.843*	0.102***
	(0.006)	(0.009)	(0.343)	(0.023)
Presence of eldest child age 5-12	0.006	0.024***	0.820**	0.092***
	(0.006)	(0.008)	(0.329)	(0.021)
Presence of eldest child age 13-17	0.009	0.028	0.960***	0.070***
	(0.005)	(0.009)	(0.368)	(0.022)
Presence of eldest child age 18 and up	0.001	0.020***	0.365	0.027*
	(0.004)	(0.007)	(0.263)	(0.016)
Facilities closure x presence of eldest child age 0-4	-0.001	-0.052***	-1.298	-0.080
	(0.014)	(0.019)	(0.792)	(0.053)
Facilities closure x presence of eldest child age 5-12	0.004	-0.019	-0.590	-0.047
	(0.012)	(0.016)	(0.674)	(0.048)
Facilities closure x presence of eldest child age 13-17	0.005	-0.020	-0.414	-0.002
	(0.014)	(0.019)	(0.781)	(0.049)
Facilities closure x presence of eldest child age 18 and up	0.014	-0.013	0.094	0.003
	(0.011)	(0.015)	(0.585)	(0.031)
Mean outcome (2019)	0.684	0.585	28.303	836.434
N	312,703	312,703	312,703	68,597
R-squared	0.728	0.517	0.622	0.977

*** p<0.01, ** p<0.05, * p<0.1. Standard errors in parentheses. Facilities closures refer to the average share of all schools and childcare facilities in each county that had at least 50 percent year-on-year decline in in-person visits. Controls variables include indicator for whether the individual has at least one child residing in their household and that the oldest or youngest child is under the age of 18 years old (*underagechild*); the average percentage of schools and childcare facilities that are closed in the individual's county of residence (*aveschoolcareclosure*); individual demographics (age and its square, number of own children residing in the household, dummies for race and Hispanic ethnicity, educational status, foreign born, presence of a disability, marital status, and veteran status); individual industry and occupation dummies; county COVID-19-related variables including the cumulative number of confirmed COVID-19 cases and deaths per 100,000 in each county by the second week of the sample survey month (the reference week of CPS), the number of the additional confirmed cases and deaths per 100,000 in the past month, and state-level policy dummy indicators that include stay-at-home orders, non-essential business closures, restaurant limitations, and bar closures, month-year fixed effect and county fixed effects.

Table 6. OLS Regressions on "At Work", "Full-time", "Hours Worked", "Log of Real Weekly Earnings", "Remote Work due to COVID", Female

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	At Work	Full-time	Work Hours	Log of Real Weekly Earnings	Remote Work due to COVID	At Work	Full-time	Work Hours	Log of Real Weekly Earnings	Remote Work due to COVID
Panel A			College					Less than College		
Facilities closure x presence of child age <18	-0.007	0.001	0.095	0.001	0.085***	-0.031***	-0.041***	-1.622***	-0.020	0.014***
	(0.011)	(0.016)	(0.546)	(0.030)	(0.010)	(0.008)	(0.009)	(0.316)	(0.020)	(0.006)
Mean outcome (2019)	0.672	0.525	25.794	876.366	-	0.488	0.342	17.593	332.884	-
N	143,990	143,990	143,990	33,153	143,990	204,288	204,288	204,288	47,252	204,288
Panel B			Married					Not Married		
Facilities closure x presence of child age <18	-0.020***	-0.030***	-0.966**	-0.016	0.079***	-0.034***	-0.034***	-1.594***	-0.022	-0.006
	(0.007)	(0.011)	(0.379)	(0.023)	(0.009)	(0.013)	(0.012)	(0.456)	(0.028)	(0.009)
Mean outcome (2019)	0.554	0.405	20.39	575.371	-	0.565	0.421	21.118	508.150	-
N	175,245	175,245	175,245	40,096	175,245	173,033	173,033	173,033	40,309	173,033
Panel C			White					Non-white		
Facilities closure x presence of child age <18	-0.019**	-0.031***	-1.124***	0.010	0.056***	-0.006	-0.005	-0.016	-0.054	0.059***
	(0.009)	(0.010)	(0.386)	(0.021)	(0.009)	(0.012)	(0.014)	(0.521)	(0.041)	(0.010)
Mean outcome (2019)	0.553	0.401	20.397	536.452	-	0.576	0.446	21.788	554.506	-
N	263,009	263,009	263,009	60,641	263,009	85,269	85,269	85,269	19,764	85,269
Panel D			Teleworkability = 1					Teleworkability < 1		
Facilities closure x presence of child age <18	0.008	-0.000	0.476	-0.019	0.034**	-0.028***	-0.029***	-1.281***	-0.013	0.025***
	(0.011)	(0.017)	(0.558)	(0.040)	(0.014)	(0.009)	(0.010)	(0.387)	(0.018)	(0.005)
Mean outcome (2019)	0.936	0.748	36.186	1,148.529	-	0.471	0.334	17.139	404.597	-
N	91,363	91,363	91,363	20,514	91,363	256,915	256,915	256,915	59,891	256,915
Panel E			Frontline Industry					Non-frontline Industry		
Facilities closure x presence of child age <18	-0.007	-0.013	-0.092	-0.044	0.024*	-0.019**	-0.022**	-0.945***	-0.011	0.065***
	(0.019)	(0.022)	(0.755)	(0.044)	(0.015)	(0.009)	(0.009)	(0.348)	(0.019)	(0.009)
Mean outcome (2019)	0.931	0.677	34.406	796.850	-	0.515	0.381	19.133	511.680	-
N	54,139	54,139	54,139	12,378	54,139	294,139	294,139	294,139	68,027	294,139

*** p<0.01, ** p<0.05, * p<0.1. Standard errors in parentheses. School closures refer to the share of all schools in each county that had at least 50 percent year-on-year decline in in-person visits. Teleworkability values are based on Dingel and Neiman (2020): https://github.com/jdingel/DingelNeiman-workathome/blob/master/onet_to_BLS_crosswalk/output/onet_teleworkable_blscodes.csv. Frontline industry classification is based on the classification from Rho et al. (2020): https://cepr.net/a-basic-demographic-profile-of-workers-in-frontline-industries/. Control variables are the same as in Table 2, except the controls exclude educational status dummies for the college/no college subgroups, marital status dummy for the married/not married subgroups, and race dummies for white/non-white subgroups.

Table 7. OLS Regressions on "At Work", "Full-time", "Hours Worked", "Log of Real Weekly Earnings", "Remote Work due to COVID", Male

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	At Work	Full-time	Work Hours	Log of Real Weekly Earnings	Remote Work due to COVID	At Work	Full-time	Work Hours	Log of Real Weekly Earnings	Remote Work due to COVID
Panel A			College					Less than College		
Facilities closure x presence of child age <18	0.011	-0.027**	-0.313	0.078**	0.145***	-0.034***	-0.069***	-3.138***	-0.048	0.021***
	(0.008)	(0.013)	(0.458)	(0.039)	(0.015)	(0.010)	(0.011)	(0.442)	(0.039)	(0.006)
Mean outcome (2019)	0.745	0.654	31.643	1,228.51	-	0.648	0.544	26.313	605.527	-
N	125,587	125,587	125,587	27,692	125,587	187,116	187,116	187,116	40,905	187,116
Panel B			Married					Not Married		
Facilities closure x presence of child age <18	-0.028***	-0.060***	-2.521***	-0.017	0.100***	-0.030*	-0.070***	-2.314***	-0.137**	-0.038***
	(0.007)	(0.008)	(0.354)	(0.033)	(0.013)	(0.017)	(0.019)	(0.829)	(0.053)	(0.012)
Mean outcome (2019)	0.703	0.621	29.781	961.224	-	0.662	0.544	26.557	690.487	-
N	173,312	173,312	173,312	37,947	173,312	139,391	139,391	139,391	30,650	139,391
Panel C			White					Non-white		
Facilities closure x presence of child age <18	-0.007	-0.051***	-1.569***	-0.054*	0.082***	-0.010	-0.032*	-1.890***	-0.047	0.098***
	(0.007)	(0.008)	(0.351)	(0.032)	(0.012)	(0.013)	(0.017)	(0.680)	(0.052)	(0.017)
Mean outcome (2019)	0.689	0.590	28.670	859.911	-	0.668	0.572	27.145	764.156	-
N	242,823	242,823	242,823	53,006	242,823	69,880	69,880	69,880	15,591	69,880
Panel D			Teleworkability = 1					Teleworkability < 1		
Facilities closure x presence of child age <18	0.027**	0.007	0.485	-0.093**	0.057***	-0.032***	-0.077***	-3.013***	-0.065**	0.045***
	(0.011)	(0.017)	(0.653)	(0.043)	(0.014)	(0.008)	(0.009)	(0.356)	(0.033)	(0.009)
Mean outcome (2019)	0.949	0.838	40.35	1,553.838	-	0.628	0.531	25.743	690.854	-
N	73,526	73,526	73,526	15,991	73,526	239,177	239,177	239,177	52,606	239,177
Panel E			Frontline Industry					Non-frontline Industry		
Facilities closure x presence of child age <18	0.036**	-0.035	0.063	0.031	0.016	-0.016*	-0.048***	-1.967***	-0.068**	0.097***
	(0.016)	(0.023)	(0.947)	(0.068)	(0.016)	(0.006)	(0.008)	(0.323)	(0.032)	(0.012)
Mean outcome (2019)	0.938	0.813	39.554	1,035.975	-	0.667	0.570	27.537	823.183	-
N	29,902	29,902	29,902	6,788	29,902	282,801	282,801	282,801	61,809	282,801

*** p<0.01, ** p<0.05, * p<0.1. Standard errors in parentheses. School closures refer to the share of all schools in each county that had at least 50 percent year-on-year decline in in-person visits. Teleworkability values are based on Dingel and Neiman (2020): https://github.com/jdingel/DingelNeiman-workathome/blob/master/onet_to_BLS_crosswalk/output/onet_teleworkable_blscodes.csv. Frontline industry classification is based on the classification from Rho et al. (2020): https://cepr.net/a-basic-demographic-profile-of-workers-in-frontline-industries/. Control variables are the same as in Table 2, except the controls exclude educational status dummy for the college/no college subgroups, marital status dummy for the married/not married subgroups, and race dummies for white/non-white subgroups.

Table 8. OLS Regressions on "At Work", "Full-time", "Hours Worked" and "Log of Real Weekly Earnings", "Remote Work due to COVID", "Part-time or Absent due to childcare or family", and "Not in labor force due to childcare or family", using 75% closure cutoff

VARIABLES	(1) At Work	(2) Full-time	(3) Work Hours	(4) Log of Real Weekly Earnings	(5) Remote Work due to COVID	(6) Part-time/ Absent due to childcare/ family	(7) Not in labor force due to Family reasons
Panel A				Female			
Facilities closure	-0.040***	-0.021	-2.243***	-0.019	0.132***	0.001	0.009
	(0.011)	(0.015)	(0.591)	(0.033)	(0.032)	(0.007)	(0.012)
Presence of child age <18	-0.011***	-0.028***	-1.012***	0.028***	0.001	0.044***	0.058***
	(0.003)	(0.004)	(0.125)	(0.008)	(0.003)	(0.003)	(0.003)
Facilities closure x presence of child <18	-0.032**	-0.035**	-1.489**	-0.037	0.053***	-0.044***	0.024**
	(0.013)	(0.014)	(0.580)	(0.033)	(0.011)	(0.009)	(0.011)
Mean outcome (2019)	0.559	0.413	20.76	541.209	-	0.043	0.097
N	348,278	348,278	348,278	80,405	348,278	348,278	348,278
R-squared	0.768	0.503	0.667	0.980	0.304	0.079	0.399
Panel B				Male			
Facilities closure	-0.008	0.020	0.425	0.038	0.136***	-0.009***	-0.000
	(0.012)	(0.017)	(0.638)	(0.046)	(0.033)	(0.003)	(0.006)
Presence of child age <18	0.006*	0.022***	0.877***	0.078***	0.003	0.009***	0.008***
	(0.003)	(0.005)	(0.196)	(0.012)	(0.003)	(0.001)	(0.002)
Facilities closure x presence of child <18	-0.025**	-0.089***	-3.274***	-0.110**	0.077***	-0.004	0.008
	(0.011)	(0.014)	(0.559)	(0.056)	(0.015)	(0.004)	(0.007)
Mean outcome (2019)	0.684	0.585	28.303	836.434	-	0.009	0.013
N	312,703	312,703	312,703	68,597	312,703	312,703	312,703
R-squared	0.728	0.517	0.622	0.977	0.316	0.019	0.085

*** p<0.01, ** p<0.05, * p<0.1. Standard errors in parentheses. Columns 1-4 are for females, and columns 5-8 are for males. Facilities closures refer to the average share of all schools and childcare facilities in each county that had at least 50 percent year-on-year decline in in-person visits. Controls variables include indicator for whether the individual has at least one child residing in their household and that the oldest or youngest child is under the age of 18 years old (*underagechild*); the average percentage of schools and childcare facilities that are closed in the individual's county of residence (*aveschoolcareclosure*); individual demographics (age and its square, number of own children residing in the household, dummies for race and Hispanic ethnicity, educational status, foreign born, presence of a disability, marital status, and veteran status); individual industry and occupation dummies; county COVID-19-related variables including the cumulative number of confirmed COVID-19 cases and deaths per 100,000 in each county by the second week of the sample survey month (the reference week of CPS), the number of the additional confirmed cases and deaths per 100,000 in the past month, and state-level policy dummy indicators that include stay-at-home orders, non-essential business closures, restaurant limitations, and bar closures, month-year fixed effect and county fixed effects.

Table 9. OLS Regressions on "At Work", "Full-time", "Hours Worked" and "Log of Real Weekly Earnings", "Remote Work due to COVID", "Part-time or Absent due to childcare or family", and "Not in labor force due to childcare or family", using *Burbio* data, Female

VARIABLES	(1) At Work	(2) Full-time	(3) Work Hours	(4) Log of Real Weekly Earnings	(5) Remote Work due to COVID	(6) Part-time/ Absent due to childcare/ family	(7) Not in labor force due to Family reasons
Panel A				All			
Facilities closure	-0.001	0.007	0.261	-0.011	0.005	-0.002	-0.000
	(0.003)	(0.006)	(0.191)	(0.011)	(0.004)	(0.003)	(0.004)
Presence of child age < 18	-0.014***	-0.026***	-1.116***	0.025**	-0.004	0.039***	0.062***
	(0.003)	(0.004)	(0.151)	(0.010)	(0.003)	(0.003)	(0.004)
Facilities closure x presence of child age <18	-0.008*	-0.016***	-0.411**	-0.014	0.034***	-0.002	0.001
	(0.004)	(0.005)	(0.197)	(0.013)	(0.005)	(0.004)	(0.006)
Mean outcome (2019)	0.559	0.413	20.76	541.209	-	0.043	0.097
N	260,380	260,380	260,380	59,742	260,380	260,380	260,380
R-squared	0.779	0.505	0.673	0.980	0.337	0.081	0.402
Panel B				Less than college			
Facilities closure	0.002	0.012*	0.390*	-0.004	0.005	-0.002	-0.003
	(0.004)	(0.007)	(0.232)	(0.011)	(0.004)	(0.003)	(0.005)
Presence of child age < 18	-0.012***	-0.016***	-0.693***	0.026**	0.003	0.041***	0.085***
	(0.004)	(0.006)	(0.205)	(0.013)	(0.004)	(0.004)	(0.006)
Facilities closure x presence of child age <18	-0.010*	-0.025***	-0.676***	-0.028**	0.008*	-0.005	-0.003
	(0.005)	(0.007)	(0.227)	(0.014)	(0.005)	(0.004)	(0.007)
Mean outcome (2019)	0.488	0.342	17.593	332.884	-	0.042	0.109
N	152,223	152,223	152,223	35,012	152,223	152,223	152,223
R-squared	0.775	0.497	0.679	0.984	0.237	0.089	0.401

*** p<0.01, ** p<0.05, * p<0.1. Standard errors in parentheses. School closures refer to the share of all schools in each county that went virtual or hybrid in the second week of each month to match the CPS reference week. Controls variables include indicator for whether the individual has at least one child residing in their household and that the oldest or youngest child is under the age of 18 years old (*underagechild*); the average percentage of schools and childcare facilities that are closed in the individual's county of residence as described in the previous section (*aveschoolcareclosure*); individual demographics (age and its square, number of own children residing in the household, dummies for race and Hispanic ethnicity, educational status, foreign born, presence of a disability, marital status, and veteran status); individual industry and occupation dummies; county COVID-19-related variables including the cumulative number of confirmed COVID-19 cases and deaths per 100,000 in each county by the second week of the sample survey month (the reference week of CPS), the number of the additional confirmed cases and deaths per 100,000 in the past month, and state-level policy dummy indicators that include stay-at-home orders, non-essential business closures, restaurant limitations, and bar closures, month-year fixed effects and county fixed effects.

Table 10. OLS Regressions on "At Work", "Full-time", "Hours Worked" and "Log of Real Weekly Earnings", "Remote Work due to COVID", "Part-time or Absent due to childcare or family", and "Not in labor force due to childcare or family", using *Burbio* data, Male

VARIABLES	(1) At Work	(2) Full-time	(3) Work Hours	(4) Log of Real Weekly Earnings	(5) Remote Work due to COVID	(6) Part-time/ Absent due to childcare/ family	(7) Not in labor force due to Family reasons
Panel A				All			
Facilities closure	-0.003	-0.002	-0.316	-0.021**	-0.001	0.001	0.001
	(0.004)	(0.006)	(0.214)	(0.011)	(0.004)	(0.001)	(0.002)
Presence of child age < 18	0.003	0.020***	0.616***	0.058***	-0.005	0.008***	0.007***
	(0.004)	(0.006)	(0.237)	(0.011)	(0.004)	(0.001)	(0.002)
Facilities closure x presence of child age <18	0.001	-0.017***	-0.219	0.014	0.050***	0.001	0.006***
	(0.003)	(0.006)	(0.206)	(0.017)	(0.007)	(0.002)	(0.002)
Mean outcome (2019)	0.684	0.585	28.303	836.434	-	0.009	0.013
N	233,541	233,541	233,541	51,080	233,541	233,541	233,541
R-squared	0.740	0.523	0.630	0.978	0.356	0.023	0.089
Panel B				Less than college			
Facilities closure	0.002	-0.004	-0.087	-0.011	0.004	0.002	0.001
	(0.005)	(0.007)	(0.251)	(0.014)	(0.003)	(0.001)	(0.003)
Presence of child <18	0.003	0.026***	0.954***	0.051***	-0.002	0.008***	0.007**
	(0.005)	(0.007)	(0.279)	(0.016)	(0.003)	(0.002)	(0.004)
Facilities closure x presence of child age <18	-0.006	-0.022***	-0.627**	0.021	0.014***	-0.001	0.009***
	(0.005)	(0.007)	(0.266)	(0.025)	(0.005)	(0.002)	(0.003)
Mean outcome (2019)	0.648	0.544	26.313	605.527	-	0.009	0.016
N	139,663	139,663	139,663	30,458	139,663	139,663	139,663
R-squared	0.725	0.518	0.630	0.980	0.214	0.030	0.097

*** p<0.01, ** p<0.05, * p<0.1. Standard errors in parentheses. School closures refer to the share of all schools in each county that went virtual or hybrid in the second week of each month to match the CPS reference week. Controls variables include indicator for whether the individual has at least one child residing in their household and that the oldest or youngest child is under the age of 18 years old (*underagechild*); the average percentage of schools and childcare facilities that are closed in the individual's county of residence as described in the previous section (*aveschoolcareclosure*); individual demographics (age and its square, number of own children residing in the household, dummies for race and Hispanic ethnicity, educational status, foreign born, presence of a disability, marital status, and veteran status); individual industry and occupation dummies; county COVID-19-related variables including the cumulative number of confirmed COVID-19 cases and deaths per 100,000 in each county by the second week of the sample survey month (the reference week of CPS), the number of the additional confirmed cases and deaths per 100,000 in the past month, and state-level policy dummy indicators that include stay-at-home orders, non-essential business closures, restaurant limitations, and bar closures, month-year fixed effects and county fixed effects.

Appendix

Table A1 . OLS Regressions on "At Work", "Full-time", "Hours Worked" and "Log of Weekly Earnings", excluding self-employed

	(1)	(2)	(3)	(4)	(6)	(6)	(7)	(8)
VARIABLES	At work	Full-time	Hours worked	Log of Real Weekly Earnings	At work	Full-time	Hours worked	Log of Real Weekly Earnings
	Female				Male			
Facilities closure	-0.018**	-0.013	-1.117***	-0.019	0.001	0.008	0.026	0.013
	(0.007)	(0.011)	(0.360)	(0.024)	(0.008)	(0.012)	(0.430)	(0.030)
Presence of child age < 18	-0.009***	-0.021***	-0.820***	0.028***	0.008**	0.031***	1.085***	0.085***
	(0.003)	(0.004)	(0.137)	(0.010)	(0.004)	(0.005)	(0.205)	(0.014)
Facilities closure x presence of child < 18	-0.017**	-0.020**	-0.805***	-0.013	-0.009	-0.047***	-1.602***	-0.057*
	(0.007)	(0.008)	(0.273)	(0.018)	(0.007)	(0.008)	(0.317)	(0.029)
Mean outcome (2019)	0.542	0.408	20.250	541.209	0.660	0.572	27.278	836.434
N	330,965	330,965	330,965	80,405	284,713	284,713	284,713	68,597
R-squared	0.784	0.530	0.694	0.980	0.753	0.559	0.663	0.977

*** p<0.01, ** p<0.05, * p<0.1. Standard errors in parentheses. Columns 1-4 are for females, and columns 5-8 are for males. Facilities closures refer to the average share of all schools and childcare facilities in each county that had at least 50 percent year-on-year decline in in-person visits. Controls variables include indicator for whether the individual has at least one child residing in their household and that the oldest or youngest child is under the age of 18 years old (*underagechild*); the average percentage of schools and childcare facilities that are closed in the individual's county of residence (*aveschoolcareclosure*); individual demographics (age and its square, number of own children residing in the household, dummies for race and Hispanic ethnicity, educational status, foreign born, presence of a disability, marital status, and veteran status); individual industry and occupation dummies; county COVID-19-related variables including the cumulative number of confirmed COVID-19 cases and deaths per 100,000 in each county by the second week of the sample survey month (the reference week of CPS), the number of the additional confirmed cases and deaths per 100,000 in the past month, and state-level policy dummy indicators that include stay-at-home orders, non-essential business closures, restaurant limitations, and bar closures, month-year fixed effects and county fixed effects.

Table A2. OLS Regressions on "At Work", "Full-time", "Hours Worked" and "Log of Weekly Earnings", with leads and lags

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	At work	Full-time	Hours worked	Log of Real Weekly Earnings	At work	Full-time	Hours worked	Log of Real Weekly Earnings
	Female				Male			
Facilities closure	-0.022***	-0.012	-1.112***	-0.016	-0.004	0.003	-0.152	0.007
	(0.008)	(0.011)	(0.397)	(0.025)	(0.009)	(0.013)	(0.483)	(0.028)
Presence of child age <18	-0.009**	-0.021***	-0.822***	0.026	0.008*	0.030***	1.447***	0.085***
	(0.004)	(0.007)	(0.220)	(0.017)	(0.005)	(0.007)	(0.296)	(0.023)
Facilities closure x presence of child age <18	-0.020***	-0.021**	-0.852***	-0.014	-0.009	-0.049***	-1.488***	-0.053*
	(0.008)	(0.008)	(0.322)	(0.020)	(0.007)	(0.008)	(0.353)	(0.031)
Lag closure (past 3-6 months average)	0.007	-0.004	-0.120	-0.010	0.016	0.017	0.664	0.034
	(0.008)	(0.014)	(0.492)	(0.029)	(0.011)	(0.015)	(0.602)	(0.037)
Lead closure (next 3-6 months average)	-0.008	-0.016	-0.524	0.013	-0.025	-0.018	-0.616	-0.084**
	(0.015)	(0.020)	(0.736)	(0.033)	(0.017)	(0.026)	(1.059)	(0.040)
Lag closure x presence of child age <18	0.006	0.009	0.181	-0.005	-0.002	0.018*	-0.319	-0.038
	(0.007)	(0.009)	(0.332)	(0.026)	(0.007)	(0.011)	(0.440)	(0.031)
Lead closure x presence of child age <18	0.001	-0.019	-0.318	0.013	-0.004	-0.018	-0.889	0.031
	(0.008)	(0.012)	(0.383)	(0.033)	(0.008)	(0.013)	(0.548)	(0.042)
Mean outcome (2019)	0.559	0.413	20.76	541.209	0.684	0.585	28.303	836.434
N	348,278	292,865	348,278	80,405	312,703	312,703	312,703	68,597
R-squared	0.768	0.503	0.667	0.980	0.728	0.517	0.622	0.977

*** p<0.01, ** p<0.05, * p<0.1. Standard errors in parentheses. Columns 1-4 are for females, and columns 5-8 are for males. Facilities closures refer to the average share of all schools and childcare facilities in each county that had at least 50 percent year-on-year decline in in-person visits. Controls variables include indicator for whether the individual has at least one child residing in their household and that the oldest or youngest child is under the age of 18 years old (*underagechild*); the average percentage of schools and childcare facilities that are closed in the individual's county of residence (*aveschoolcareclosure*); individual demographics (age and its square, number of own children residing in the household, dummies for race and Hispanic ethnicity, educational status, foreign born, presence of a disability, marital status, and veteran status); individual industry and occupation dummies; county COVID-19-related variables including the cumulative number of confirmed COVID-19 cases and deaths per 100,000 in each county by the second week of the sample survey month (the reference week of CPS), the number of the additional confirmed cases and deaths per 100,000 in the past month, and state-level policy dummy indicators that include stay-at-home orders, non-essential business closures, restaurant limitations, and bar closures, month-year fixed effects and county fixed effects.

Table A3. OLS Regressions on "At Work", "Full-time", "Hours Worked" and "Log of Real Weekly Earnings", "Remote Work due to COVID", "Part-time or Absent due to childcare or family", and "Not in labor force due to childcare or family", with seasonal dummies

VARIABLES	(1) At Work	(2) Full-time	(3) Work Hours	(4) Log of Real Weekly Earnings	(5) Remote Work due to COVID	(6) Part-time/ Absent due to childcare/ family	(7) Not in labor force due to Family reasons
Panel A				Female			
Facilities closure x presence of child <18	-0.021**	-0.025***	-1.005***	0.032	0.025***	-0.030***	0.009
	(0.008)	(0.009)	(0.332)	(0.090)	(0.006)	(0.005)	(0.007)
Facilities closure x presence of child <18 x Fall 2020	0.003	-0.008	-0.076	-0.035	0.064***	0.008	0.011
	(0.009)	(0.012)	(0.421)	(0.028)	(0.012)	(0.007)	(0.011)
Facilities closure x presence of child <18 x Spring 2021	0.009	0.017	0.472	0.006	0.042***	0.002	0.019**
	(0.009)	(0.012)	(0.453)	(0.028)	(0.011)	(0.007)	(0.008)
Facilities closure x presence of child <18 x Fall 2021	0.006	-0.005	-0.295	-0.004	0.026	0.005	-0.005
	(0.012)	(0.020)	(0.713)	(0.047)	(0.016)	(0.013)	(0.016)
Mean outcome (2019)	0.559	0.413	20.76	541.209	-	0.043	0.097
N	348,278	348,278	348,278	80,405	348,278	348,278	348,278
R-squared	0.768	0.503	0.667	0.980	0.305	0.079	0.399
Panel B				Male			
School closure x presence of school-age children	-0.016**	-0.055***	-2.179***	-0.095	0.040***	-0.004	0.000
	(0.008)	(0.010)	(0.434)	(0.100)	(0.007)	(0.002)	(0.004)
School closure x presence of child <18 x Fall 2020	0.011	-0.002	0.397	-0.016	0.094***	0.006	0.004
	(0.010)	(0.015)	(0.574)	(0.040)	(0.019)	(0.004)	(0.005)
School closure x presence of child <18 x Spring 2021	0.013	0.040***	0.839	-0.019	0.083***	0.002	0.003
	(0.011)	(0.014)	(0.605)	(0.036)	(0.016)	(0.003)	(0.005)
School closure x presence of child <18 x Fall 2021	0.010	0.034*	-0.610	-0.072	0.075**	-0.002	-0.008
	(0.014)	(0.020)	(0.856)	(0.051)	(0.017)	(0.005)	(0.010)
Mean outcome (2019)	0.684	0.585	28.303	836.434	-	0.009	0.013
N	312,703	312,703	312,703	68,597	312,703	312,703	312,703
R-squared	0.728	0.518	0.622	0.977	0.318	0.019	0.085

*** p<0.01, ** p<0.05, * p<0.1. Standard errors in parentheses. Facilities closures refer to the average share of all schools and childcare facilities in each county that had at least 50 percent year-on-year decline in in-person visits. Control variables are the same as in Table 2 plus the semestral dummies.

Table A4. OLS Regressions on "At Work", "Full-time", "Hours Worked" and "Log of Weekly Earnings", with summer months

VARIABLES	(1) At work	(2) Full-time	(3) Hours worked	(4) Log of Real Weekly Earnings	(5) At work	(6) Full-time	(7) Hours worked	(8) Log of Real Weekly Earnings
	Female				Male			
Facilities closure	-0.019***	-0.010	-0.961***	-0.021	0.003	0.016	0.287	-0.007
	(0.007)	(0.010)	(0.352)	(0.022)	(0.008)	(0.012)	(0.427)	(0.026)
Presence of child age < 18	-0.010***	-0.026***	-0.937***	0.026***	0.006	0.028***	1.028***	0.073***
	(0.003)	(0.004)	(0.145)	(0.009)	(0.004)	(0.005)	(0.201)	(0.013)
Facilities closure x presence of child < 18	-0.016**	-0.018**	-0.719**	-0.001	-0.007	-0.043***	-1.528***	-0.036
	(0.007)	(0.008)	(0.307)	(0.018)	(0.006)	(0.007)	(0.304)	(0.029)
Mean outcome (2019)	0.554	0.410	20.580	678.502	0.684	0.585	28.266	838.719
N	413,480	413,480	413,480	95,325	370,988	370,988	370,988	370,988
R-squared	0.755	0.498	0.657	0.980	0.719	0.515	0.616	0.977

*** p<0.01, ** p<0.05, * p<0.1. Standard errors in parentheses. Columns 1-4 are for females, and columns 5-8 are for males. Facilities closures refer to the average share of all schools and childcare facilities in each county that had at least 50 percent year-on-year decline in in-person visits. Controls variables include indicator for whether the individual has at least one child residing in their household and that the oldest or youngest child is under the age of 18 years old (*underagechild*); the average percentage of schools and childcare facilities that are closed in the individual's county of residence (*aveschoolcareclosure*); individual demographics (age and its square, number of own children residing in the household, dummies for race and Hispanic ethnicity, educational status, foreign born, presence of a disability, marital status, and veteran status); individual industry and occupation dummies; county COVID-19-related variables including the cumulative number of confirmed COVID-19 cases and deaths per 100,000 in each county by the second week of the sample survey month (the reference week of CPS), the number of the additional confirmed cases and deaths per 100,000 in the past month, and state-level policy dummy indicators that include stay-at-home orders, non-essential business closures, restaurant limitations, and bar closures, month-year fixed effects and county fixed effects.

Table A5. OLS Regressions on "At Work", "Full-time", and "Hours Worked", self-employed

VARIABLES	(1) At work	(2) Full-time	(3) Hours worked	(4) At work	(5) Full-time	(6) Hours worked
	Female			Male		
Facilities closure	-0.100**	-0.016	-2.262	-0.008	0.023	1.225
	(0.043)	(0.062)	(2.170)	(0.028)	(0.047)	(1.795)
Presence of child age < 18	-0.014	-0.092***	-3.606***	-0.017	-0.007	0.310
	(0.015)	(0.023)	(0.930)	(0.012)	(0.017)	(0.723)
Facilities closure x presence of child age < 18	0.003	-0.020	0.245	0.017	-0.035	-1.355
	(0.030)	(0.039)	(1.723)	(0.020)	(0.026)	(1.216)
Mean outcome (2019)	0.910	0.515	31.022	0.929	0.722	38.582
N	17,313	17,313	17,313	27,990	27,990	27,990
R-squared	0.155	0.196	0.208	0.127	0.180	0.199

*** p<0.01, ** p<0.05, * p<0.1. Standard errors in parentheses. Columns 1-3 are for females, and columns 4-6 are for males. Facilities closures refer to the average share of all schools and childcare facilities in each county that had at least 50 percent year-on-year decline in in-person visits. Controls variables include indicator for whether the individual has at least one child residing in their household and that the oldest or youngest child is under the age of 18 years old (*underagechild*); the average percentage of schools and childcare facilities that are closed in the individual's county of residence (*aveschoolcareclosure*); individual demographics (age and its square, number of own children residing in the household, dummies for race and Hispanic ethnicity, educational status, foreign born, presence of a disability, marital status, and veteran status); individual industry and occupation dummies; county COVID-19-related variables including the cumulative number of confirmed COVID-19 cases and deaths per 100,000 in each county by the second week of the sample survey month (the reference week of CPS), the number of the additional confirmed cases and deaths per 100,000 in the past month, and state-level policy dummy indicators that include stay-at-home orders, non-essential business closures, restaurant limitations, and bar closures, month-year fixed effects and county fixed effects.