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Abstract:
This study examines the initial impact of COVID-19 on the employment and hours of unincorporated self-employed workers using data from the Current Population Survey. Random-effects and difference-in-difference-in-differences models are estimated and differential impacts by gender, marital status, and parental status are examined. Although employment and hours decreased for all groups due to the response to the health threat posed by the pandemic differential impacts by gender, marital status, and parental status exist. Married women were less likely to be working than married men, while single women were more likely to be working than single men. However, fathers of school-age children who remained employed were working reduced hours compared to men without children. Remote work and working in an essential industry mitigated some of the negative effects on employment and hours.

Keywords: COVID-19, coronavirus, self-employment, entrepreneurship, gender, remote work

JEL codes: D1, J1, J16, J2, J23

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1. Introduction

The government shutdowns of businesses and schools in response to the COVID-19 pandemic have led to serious disruptions in work, schooling, and family life around the world. However, the ability of many Americans to work at home has dampened the resulting economic crisis (Barrero, Bloom, and Davis 2020; Bick, Blandin, and Mertens 2020; Brynjolfsson, Horton, Ozimek, Rock, Sharma, and Ye 2020; Montenovo, Jiang, Rojoas, Schmutte, Simon, Weinberg, and Wing 2020). This paper focuses on self-employed workers because they were already more likely to be working from home pre-pandemic than wage and salary workers and they are also more likely to have greater flexibility in scheduling their work hours than wage and salary workers (U.S. Bureau of Labor Statistics, 2019). According to the 2018 American Time Use Survey (ATUS), which showed time use one to two years prior to the shutdowns, 51 percent of unincorporated self-employed workers in the United States worked at home on their main job on an average day, while only 21 percent of wage and salary workers did so (U.S. Bureau of Labor Statistics 2019). Therefore, the effects of the shutdowns on self-employed workers who could work at home were likely to be less than those of wage and salary workers.

However, self-employed workers who worked from home were also affected by school and day-care shutdowns, with children now being thrust into their work environment. These shutdowns probably affected female self-employed parents more than male self-employed parents because of gender norms within the home that result in women doing the majority of child care (Burda, Hamermesh, and Weil 2008; Sent and van Staveren 2019; Sevilla and Smith 2020). In addition, because women are more likely than men to become self-employed to better balance work and family demands (Budig 2006; Gimenez-Nadal, Molina, and Ortega 2012), there may be differential impacts by marital and parental status.

Another issue is that the shutdowns affected "essential" and "nonessential" industries differently. Thus, one's own industry as well as the employment status and industry of a spouse also may impact a self-employed worker's employment and hours as families juggle household and child-care responsibilities. However, if a mother's spouse loses his job, the mother may work extra hours to compensate for the lost income while the father cares for the children or vice versa.

The magnitude of the overall effect of the U.S. response to the health threat posed by the pandemic on the total number of self-employed workers is large. U.S. Bureau of Labor Statistics news releases (2020a and 2020b) state that between February and April 2020, the number of unincorporated self-employed workers fell by 12 percent, not seasonally adjusted, from 9.3 million workers to 8.2 million workers. These figures include those who reported being employed but absent, which rose substantially over the pandemic for all groups of workers. Over the same period, Fairlie (2020b) found that the number of actively working unincorporated self-employed workers fell by 28 percent.

This paper examines the early impacts of the response to the COVID-19 pandemic on the employment and hours of unincorporated self-employed workers using monthly panel data from the Current Population Survey (CPS) for February–May of 2020 for those initially self-employed and at work in February 2020. Differential impacts by gender, marital and parental status are examined.[1] February 2020 is considered a normal month and March, April, and May of 2020 are months affected by the COVID-19 shutdowns. Social distancing policies and shutdowns began in March, were widespread by April, and began being relaxed in some locations in May. The school closures for primary and secondary students occurred for the most part after the March

[1] Parental status is defined as there being a child in the household.

CPS reference week. All states had adopted some form of social distancing measures by March 23rd (Adolph, Amano, Bang-Jensen, Fullman, and Wilkerson 2020). Given the sequence of events, the negative effects of the shutdowns should be larger in April than in March and smaller in May than in April.

To determine how the employment and hours of unincorporated self-employed workers were affected differently across the months as the nature of the shutdowns changed, indicators for month are included as explanatory variables in the random-effects models. Separate models are estimated by marital status and gender. To determine the differential impacts for different groups of self-employed workers, the month variables are interacted with parental status, whether one's industry is deemed "essential," whether one's occupation could plausibly allow remote work, and whether there are extra adults in the household.

While these month dummies and interactions in the random-effects models can be treated as exogenous regressors, as the shutdowns are a natural experiment and a host of control variables also are included to control for heterogeneity, any remaining unobserved heterogeneity could cause omitted variable bias. Therefore, we also estimate difference-in-difference-in-differences (DDD) models which net out these potentially omitted variables. For these models, respondents to the February and April CPS in 2019 comprise the control group and respondents from the February and April CPS in 2020 comprise the treatment group. Treatment is assumed to occur in April 2020.

The results show that, although the shutdowns decreased employment and hours for all groups of self-employed workers, there were differential effects by gender, marital status, and parental status. Effects were larger for April than for March, as expected, and the loosening of restrictions in May did not yet have much of a moderating effect. Married women were less

likely to be working than married men, while single women were more likely to be working than single men. However, fathers of school-age children who remained employed were working reduced hours compared to men without children. Having a job that could possibly be done remotely or working in an essential industry mitigated some of the negative labor market effects of the shutdowns. Having an extra adult in the household had additional negative effects on employment.

2. Related Literature

This paper contributes to several strands of literature, including the burgeoning literature on the labor-market effects of COVID-19 in general (see Brodeur, Gray, Islam, and Bhuiyan 2020 for a review). More specifically, this paper is related to the literature on the effects of the business cycle on the unincorporated self-employed, the effects of economic downturns in general, and the unprecedented effects of the simultaneous health shock on households and families.

The unincorporated self-employed have unique characteristics. One is their tendency to remain self-employed for relatively short durations, which is dependent on macroeconomic conditions (Rissman 2006). In addition, compared to the incorporated self-employed, they tend to engage in work activities that demand relatively low levels of cognitive skills and high levels of manual coordination (Levine and Rubinstein 2017). Although many of the self-employed may do some work from their home, a significant portion of unincorporated self-employed work in construction, including small, home-construction activities whose services were in lower demand during the COVID-19 pandemic while households were social distancing (Hipple and Hammond 2016). Because they can control their work hours to a greater extent than wage and

salary workers, self-employed parents may have more flexibility to work reduced hours rather than stopping work altogether to provide more child care.

Prior research on the effects of macroeconomic conditions on the unincorporated self-employed in the United States finds that their total hours are procyclical (Carrington, McCue, and Pierce 1996; Pabilonia 2014); however, higher unemployment rates are associated with an increase in entry rates, often due to a lack of alternatives (Fairlie 2013; Fairlie and Fossen 2019), even at potentially reduced hours. To date, only Fairlie (2020a; 2020b) has examined effects of the COVID-19 pandemic on this group of workers in the U.S. Using the CPS and examining small business owners (many of whom are classified as unincorporated self-employed workers), Fairlie (2020a) found that between February and April 2020, the number of working business owners dropped by 22 percent. In addition, African-American, immigrant, and female business owners were especially hard hit by the shutdown of nonessential activities. In further work, Fairlie (2020b) examined the partial rebound in May 2020 as businesses reopened, resulting in a net 15 percent decline between February and May 2020. Over the same period, but for Canadian self-employed workers, Beland et al. (2020) document a 10.1 percent decrease in ownership of unincorporated entities. They also find a substantial decrease in ownership and aggregate hours for women, immigrants, and less-educated people.

In married households, members of a couple jointly decide how much time to devote to market work, household production, and their children, which may depend on relative income, social norms, productivity differences in time inputs, and bargaining power (Schoonbroodt 2018). As a result of the closure of schools and child-care facilities in response to the COVID-19 pandemic, there was an increased demand for household child care. In a married family, this increased responsibility could be shared. In a single-parent family, the burden likely fell

completely on the parent unless there was an extra adult in the household such as an unmarried partner, grandparent, aunt, or college student (informal care coming from outside the household was discouraged due to calls for social distancing). Although women spend more time caring for children than do men even among dual-earner couples (Alon, Doepke, Olmstead-Rumsey, and Tertilt 2020), Aguiar, Hurst, and Karabarbounis (2013) found that during the Great Recession, men reallocated time to child care as the unemployment rate increased, while women increased their housework time. More recently, Pabilonia and Vernon (2020) find that, when working remotely, fathers shift some of the reduction in their commute time to primary child care, while there is no change in primary child-care time for mothers. Some of that increase in time is during typical working hours. There is prior evidence from time-use surveys that a reduction in work-related activities leads to men shifting relatively more daily hours toward their children. In addition, in the Great Recession, when male-dominated sectors such as manufacturing and construction were especially hard-hit, there was evidence that women worked more hours on weekends to compensate for lost income (Morrill and Pabilonia 2015).

Concurrent research on the early effects of the pandemic on the labor market finds that women, particularly those with young children, are more affected than men on average (Montenovo, Jiang, Rojoas, Schmutte, Simon, Weinberg, and Wing 2020; Zamarro, Perez-Arce, and Prados 2020). This is partly due to women's employment being concentrated in service-oriented sectors of the economy classified as "nonessential" (Alon, Doepke, Olmstead-Rumsey, and Tertilt 2020). However, it is also due to the increase in child-care responsibilities as schools and child-care facilities closed, affecting parents' ability to work outside (and sometimes inside) the home. Sevilla and Smith (2020), however, found a drop in the gender child-care gap in the U.K., as furloughed men picked up some of the increase in household-provided child care.

Using the CPS and focusing on couples, Heggeness (forthcoming) compares labor market effects in states with early and late school closures. She found that mothers in early closure states were 53 percent more likely than mothers in late closure states to be employed but absent from work. Of those remaining active at their job, she found that mothers in early closure states had higher average weekly hours than mothers in late closure states, while fathers worked fewer hours. Descriptive analyses based on the Understanding Coronavirus in America Tracking Survey indicate that 33 percent of working mothers in two-parent households provided all of the care for children while schools were closed in early April, while only ten percent of males provided all of the care (University of Southern California Center for Economic and Social Research 2020; Zamarro, Perez-Arce, and Prados 2020). Roughly twenty-five percent of parents shared care.

3. Data

This paper examines changes in the employment and work hours of unincorporated self-employed workers, using data from the CPS basic monthly files for February–May of 2020 for those initially self-employed in February 2020. February 2020 is considered a normal month and March, April, and May of 2020 were affected by the COVID-19 shutdowns. The school closures for primary and secondary students occurred for the most part after the March CPS reference week. The reference week typically includes the 12th of the month and ended in March on the 14th. The World Health Organization (WHO) did not announce the pandemic until March 11th, although media coverage picked up in early March after several cases were identified in Washington State and people had already started to change their behavior in response to the

news reports. Therefore, the effects are expected to be smaller in March than in April. If the re-openings were effective, the effects might be smaller in May than in April as well.[2]

The CPS interviews a panel of individuals/households for four months, then does not interview them for eight months, then re-interviews them again for four months. Each month there are eight rotation groups of households. Those households which are in their first or fifth month in the sample plausibly can be followed each month from February to May while those in their second and sixth month in the sample can be followed from February to April, and so forth. Thus, each subsequent month, the sample of potential continuers falls (approximately 75 percent in the second month of the panel, 50 percent in the third month, and 25 percent in the fourth month). However, in any given month, a household may also choose not to respond. For example, there may be a response in February and in April, but not in March and May for an individual interviewed for the first time in February.

The sample for this analysis includes civilian adults aged 18 and older who were unincorporated self-employed workers on their main job and at work in February 2020.[3] The analysis follows them from February through May 2020 (for the random-effects models) and from February to April 2020 (for the DDD models).[4] The unbalanced panel includes 3,403, 2,302, 1,515, and 776 individuals in the months of February, March, April, and May, respectively. For the DDD analyses, we use a balanced panel of individuals who were self-employed and at work in February 2019 or 2020 and subsequently interviewed in April of 2019 or 2020 (excluding March). Comparing the same months across 2019 and 2020 controls for

[2] The May CPS reference week was March 8th through 14th. The April CPS reference week was April 12th through 18th. The May CPS reference week was May 10 through 16th.
[3] We drop a small number of workers who can be matched on CPS identifying variables (HHRID HHRID2 PULINENO) but do not match on age and sex.
[4] May is not included in the DDD models, because there was a different treatment in May as the country began reopening.

seasonal differences. In 2019, our sample includes 1,510 individuals. In 2020, our sample includes 1,515 individuals.

A general concern about the CPS data collected during the pandemic has been a spike in those reporting employed but absent for "other reasons." Respondents who reported not working due to efforts to contain the spread of COVID-19 should have been classified as unemployed on temporary layoff, but many were misclassified as employed but absent (U.S. Bureau of Labor Statistics 2020b and 2020c). For this reason, this analysis focuses on the change in employment status for those who were self-employed and at work in February, i.e. those with positive hours.

Additional information included in the analysis concerns the plausibility that an individual's job (or their spouse's job, if applicable) can be done entirely remotely. This is referred to in the analysis as a remote job. In addition, information about whether an individual (or spouse, if applicable) worked in an essential industry is used. The remote-job variable is based on Dingel and Neiman (2020) who measured the feasibility of a job being done entirely at home based upon job tasks reported in the Occupational Information Network (O*NET) surveys, with some additional tweaks to match the change from the 2010 Census codes to the 2018 Census codes in the 2020 CPS.[5] In most cases, the remote-job variable takes a value of 0 for not being able to be done remotely, and 1 for being able to be done entirely remotely. However, in several cases, only part of any occupation in the CPS could be classified as being done remotely and so the value reflects the share employed in the occupation who can work remotely. The essential industry variable is based upon Delaware's nonessential closed business criteria, which is reported at the 4-digit NAICS level (Delaware Division of Public Health, Coronavirus

[5] Additional research by Bick, Blandin, and Mertens (2020) using the Real-Time Population Survey (a CPS-like questionnaire) shows that about 72 percent of workers (or 35.2 percent of the workforce) who could work at home as defined by Dingel and Neiman (2020) actually worked entirely at home in May 2020.

Response 2020). For three detailed CPS industries (Charter Bus Industry, Cable and Other Subscription Programming, and Real Estate), the September 2019 Quarterly Census of Employment and Wages (QCEW) is used to record the nonessential employment share.

4. Descriptive Statistics: Labor Market Differences by Gender, Marital Status, and Parental Status

Figure 1 shows the decline in employment by gender for unincorporated self-employed workers who were at work in February 2020.[6] Of these self-employed workers, over 86 percent were still at work in March, with a negligible gender difference. This is not unexpected, as shutdowns had not occurred widely until after the March CPS reference week. However, in April, only 65 percent of the men and 58 percent of the women remained at work. Thus, while both men and women among the self-employed suffered reduced employment in April, the shutdown had a statistically significant larger effect on women.[7] In May, given the partial re-openings, about 74 percent of self-employed men and just over 61 percent of women were working.[8] Thus, men appear to be bouncing back to a greater degree than women. This may be due to gender roles, where the man is expected to be the breadwinner in the family (Allred 2018; Betrand, Kamenica, and Pan 2015), and the fact that schools and many child-care facilities had not yet re-opened.

[6] CPS final weights are used in the descriptive analyses.
[7] T-tests for all the employment and hours differences by gender, couple status and parental status reported in this descriptive section are statistically significant at the 10 percent level unless otherwise stated.
[8] Although our main analyses examine whether self-employed workers are doing any work in subsequent months compared to self-employment in February, some of the self-employed reported that they had transitioned into wage-and-salary employment. Of those actively working in March, 5 percent of men and 4 percent of women switched to wage-and-salary employment. In April, 6 percent of men and 7 percent of women switched to wage-and-salary employment. By May, 11 percent of men and 16 percent of women switched to wage-and-salary employment. The latter finding is not statistically significantly different.

Figure 2 shows the decline in the average weekly hours worked by gender for unincorporated self-employed workers who were at work in February 2020. In February, self-employed men worked approximately 37 hours per week and women worked approximately 30 hours per week. In March, hours declined to 32 hours per week for men, on average, and to 26 hours per week for women. In April, hours fell even further, to 23 hours per week for men and 16 hours for women. In May, hours started to bounce back for men (back to 28 hours per week) but there was little change for women.

Figure 3 shows how gender and parental status are related to employment for married individuals. Married couples can trade off housework and child-care tasks with their partner and so individuals in these households have greater flexibility than those in single-parent households, all else equal. Again, we see a decline in employment for everyone from February through April and an increase from April to May. However, the declines are much larger for women, especially those with children (though the difference between women with children and those without children is not statistically significant at conventional levels). Having children does not make any difference for men's employment.

Figure 4 shows how gender and parental status are related to employment for single individuals. These individuals do not necessarily have a partner to help with household tasks such as caring for children.[9] Single men had larger declines in employment from February through April than married men. There is an especially large drop for single fathers with household children in April. However, single fathers experienced a large increase in employment in May, getting them almost to the same employment level as single men without children. Single women also experienced a drop in employment in March and April, with a

[9] Approximately 19 percent of single individuals are living with an unmarried partner.

slightly larger drop for single mothers than for non-parents in April (though the results were not statistically significant at conventional levels). However, single women, with or without children, did not experience a rebound in employment in May as married individuals or single men did.

Figure 5 shows how gender and parental status are related to average weekly hours for married individuals by month. In February, men without children worked approximately 37 hours, while men with children worked over 40 hours. However, in April, men worked only 25 hours, regardless of parental status. Women worked substantially less than men in all months, and women with children worked fewer hours than women without children, although the latter differences were not statistically significantly in April and May. Women with children were the only group not to rebound at all in May.

Figure 6 shows how single workers' average weekly hours were affected, by parental status and gender. Theirs is a similar story to that for married workers, but there is a huge drop in hours for single fathers in April compared to married fathers. Single fathers in April have an even lower number of work hours, on average, than single mothers, though the difference is not statistically significant. However, single fathers rebound in May, while single mothers do not. Appendix Table A1 provides greater detail about the descriptive statistics of the sample, including a breakdown by the presence and age of children given the different amounts of supervision and help with online schooling that were necessary during the shutdowns.

5. Models Used to Show Initial COVID-19 Impacts

Two types of models are estimated to examine the initial differential impacts of the COVID-19 pandemic shutdowns (a natural experiment) on the employment and work hours of the unincorporated self-employed. The first type of models, random-effects models, exploit the

richness of the data to examine how employment and hours changed as shutdowns began to occur in March, were more widespread in April, and partial re-openings began in May. Month dummy variables capture the effects of the shutdown and reopening, and they are interacted with parental status, industry type (essential or not), occupation type (remote work possible or not), and number of extra household adults to determine whether the effects differ by the presence of children, work situation of the respondent, and the presence of extra adults. The random-effects models are estimated separately for respondents who are married and those who are single, and also for men and women separately, as married couples may be better able to juggle responsibilities than singles, and there are different cultural expectations for men and women. Models that pool men and women are also presented. These include a gender dummy and a gender dummy interacted with the month variables.

The second type of models, difference-in-difference-in-differences (DDD) models, do not examine the evolution of employment changes as the shutdowns began, became complete, and then began being rescinded. Instead, it considers the change from February to April as a single "treatment" and examines the effect of this treatment on employment and hours. While these models do not make full use of the richness of the data as the random-effects models do, they are preferred when there is a concern about omitted variable bias due to unobserved heterogeneity. Although we do not expect this to be an issue given our extensive set of controls, we also estimate DDD models because they difference out time-invariant unobserved heterogeneity.

5.1 Random-Effects Models

We estimate several random-effects models as follows:

$$(1) \qquad Y_{it} = \beta_0 + \beta_1 W_i + \beta_2 M_t + \beta_3 W_i * M_t + \gamma X_i + \mu_i + \varepsilon_{it}$$

where Y_{it} is one of three outcomes examined for individual i in year t. The first is employment status, a variable which takes a value of 1 if the respondent was employed and at work during the reference week and 0 otherwise.[10] The second is hours worked last week. The third is hours worked conditional on being employed and at work. W_i is a vector of key regressors measured in February 2020 (to avoid changes potentially caused by the treatment/shutdowns) that include dummies for gender (for those analyses that pool men and women), any household child age <6, any household child age 6–17, respondent's job is a remote job, respondent's job is in an essential industry, and a continuous measure of the number of extra adults (besides self and partner) in the household. M_t is a vector of month dummy variables for March, April, and May of 2020. W_i*M_t are the interactions between the key regressors included in W_i and month. The matrix X_i includes additional control variables measured as of February 2020. These include age and age squared and indicators for education (high school degree, some college, bachelor's degree, advanced degree), race (African-American, other race), Hispanic ethnicity, cohabitation status, immigrant status, living in an MSA, state of residence, own industry, spouse's industry, and indicators for whether a respondent's spouse is employed, in a remote job, and in an essential industry. μ_i is the unobserved, person-specific effect, assumed to be uncorrelated with the other included regressors, and ε_{it} is the random noise error term. The coefficients β_0, β_1, β_2, β_3, and the vector γ are to be estimated. The key coefficients are β_2 and β_3, as these give the level and interaction effects of the treatment (i.e. shutdowns). The models control for clustering by household, because in some cases both the respondent and spouse are self-employed.

5.2 Difference-in-Difference-in-Differences Models

[10] Logit or probit random-effects models would be appropriate due to the dichotomous nature of the first dependent variable. However, the models would not converge. Robust standard errors adjust for heteroscedasticity.

In order to identify the causal effects of the shutdowns following the WHO announcement of the COVID-19 pandemic on March 11th, we estimate DDD models where the control group includes those sampled in both February and April 2019 and the treated group includes those sampled in both February and April 2020. We examine the initial differential effects of the shutdowns on employment and hours in April by estimating several models of the following form:

$$(2)\ Y_{it} = \beta_0 + \beta_1 April_t + \beta_2 Year_i + \beta_3 h_i + \beta_4 April_t * h_i + \beta_5 Year_i * h_i + \beta_6 April_t * Year_i + \beta_7 h_i * April_t * Year_i + \gamma X_{it} + \varepsilon_{it}$$

where Y_{it} is one of three outcomes for individual i in year t: (a) employment status, (b) hours worked last week, or (c) hours worked last week conditional on being employed and at work. An $April_t$ dummy is included to control for the second time period. $Year_i$ equals 1 if the individual is in the treated group (interviewed in 2020) and 0 otherwise. h_i is an indicator variable for a particular subgroup of self-employed workers (i.e., females, parents, those with a remote job, those in an essential industry, and those with extra adults in the household) who may be differentially affected by the shutdowns. Our models allow only one differential to be explored at a time. The product of $April_t$ and $Year_i$, equals 1 in April 2020 (when the COVID-19 shutdowns were complete) and 0 otherwise. The vector X_{it} includes the individual, spatial, and job characteristics controls specified above, which improves the model precision, and ε_{it} is the error term.[11] The effect of COVID-19 for those not in the subgroup of interest, non-parents for example, is β_6. The differential effect for those in the subgroup of interest, parents for example,

[11] An alternative model including individual fixed effects could also be estimated. Results are similar and available upon request.

is β_7. We estimate these models with ordinary least squares and clustering by household-year pair cluster.

6. Initial Differential Impacts of COVID-19

6.1 Random-Effects Models Results

Table 1 shows the results from the random-effects models for employment.[12] Looking at the "All" columns, it can be seen that employment was lower for everyone in March, April, and May compared to February. In April 2020, the unincorporated self-employed were much less likely to still be employed and at work than in February (married individuals were 48 percentage points less likely while single individuals were 57 percentage points less likely). However, the negative effects appear to be smaller in May, as businesses reopened, than in April, except for single women. Again examining the "All" columns, we can see that, compared to married men, married women were 7 percentage points less likely to be employed in April than in February and 11 percentage points less likely to be employed in May than in February. However, compared to single men, single women were 11 percentage points more likely to be employed in April than in February.

Now looking at the other columns that show results by marital status and gender, it is seen that having young children increases the probability that married men are employed in May compared to February. Having school-age children increases the probability that they are employed in March compared to February. On the other hand, single men with school-age children are less likely to be employed in April compared to February. Having a remote job increases April employment for married men and for both single men and women, relative to

[12] Summary statistics for the estimated models are included in Appendix Tables A2 and A3. Across months in 2020, demographics are similar, suggesting that the results should not suffer from nonresponse bias due to any differential reduction in nonresponse. Samples in February 2019 and 2020 indicate that our control group and treatment group are fairly similar.

February. Being in an "essential industry" increases the probability of being employed for married men in March, for all in April, and for all singles in May, compared to February. It also increases the probability for married women in May.

Having an extra adult in the household (not a spouse, but perhaps a young adult child or parent) decreases the probability that married women are employed in May compared to February. It also decreases the probability that single men are employed in March through May compared to February. One plausible explanation for the negative effects are that the extra adult may require care that had previously been provided by the market. A related explanation may be that the respondent did not want to return to work to prevent exposure of the extra adult to COVID-19. In addition, the extra adult may have been ill with COVID-19 and thus everyone was quarantined.

Table 2 shows the results from the random-effects models for hours worked. Work hours were reduced substantially for all groups in April and May compared to February, with the effects larger in April than May (hours were also slightly reduced in March). Single women experienced smaller reductions than single men, however, in March and April. Married women experienced a larger reduction than married men in May compared to February. Married men with young children worked more hours in May than in February, compared to men without young children, while married men with school-age children worked fewer hours in May than in February compared to married men without school-age children. Single men with school-age children worked fewer hours in April than in February compared to single men without school-age children.

Being in a remote job increased only the hours of work of single women in April compared to February. This also appears to be true for May as the coefficient is similar but

estimated imprecisely. Working in an essential industry increased hours in April and May compared to February for all groups.

For married women, having an extra adult in the household reduced their hours of work in April compared to February. Although estimated imprecisely, this may also have been the case for May compared to February, as the size of the coefficient is similar. Again, this negative impact may be because the extra adult was at risk for COVID-19. For single men and women, having an extra adult in the household decreased their work hours in April compared to February, and possibly also for May.

Table 3 shows the impact of the COVID shutdowns on hours worked by those remaining employed and at work. These estimates show that most of the impacts of COVID on hours are coming through the extensive margin (i.e., the reduction in employment). However, there are still some impacts on the intensive margin. There are reductions in hours for everyone still working in April compared to February and in May for married women. In addition, there is an additional 4 to 5-hour reduction in working hours in May for those with school-aged children compared to non-parents (estimates are similar in Table 2). For single women, having a remote job also moderates the impact of the shutdowns in April on the intensive margin.

6.2 Difference-in-Difference-in-Differences Models Results

Table 4 shows the results from the DDD models for employment. Each panel is a separate regression. Panel A shows the effects of the COVID shutdowns on several groups of self-employed workers, all married, married men, married women, all single, single men, and single women. Compared to the random-effects models, the effects appear somewhat smaller in magnitude, with married individuals being 23 percentage points less likely and single individuals being 24 percentage points less likely to be employed and at work due to COVID. In Panel B,

we examine whether there are different group effects by gender. Among married individuals, women were less likely to be employed and at work due to COVID than men, but the estimate was imprecise. However, among single individuals, the reductions in employment were larger for men than for women. We found this with the random-effects models as well. Also similar to the estimates from the random-effects models, single fathers of school-age children (Panel E) were significantly less likely to be employed in April 2020 due to COVID compared to single men without school-age children (a 17-percentage-point difference). Having a remote job does not have a protective effect on the probability of employment as hypothesized. More important appears to be working in an essential industry. Working in an essential industry compared to a non-essential industry substantially increased the probability of being employed for all groups with the exception of single women, 16 percentage points for married men, 32 percentage points for married women, and 23 percentage points for single men. Having an extra adult in the household decreases the probability of being employed during the COVID shutdowns by 8 percentage points for single men.

Table 5 shows the results from the DDD models for hours worked last week. The effect of the shutdowns in April 2020 is a reduction of 11 hours per week, on average, which is smaller than what we found using the random-effects model. We do not find statistically significant gender differences in the reduction in hours due to COVID, although the coefficient in the singles regression is positive as in the random-effects model. Hours for single fathers of school-age children are disproportionately negatively affected compared to men without school-age children (almost 10 fewer hours for fathers, which is slightly larger than what we found using the random-effects model).

Again, as in the previous table, we do not find that having a remote job changes the effect of COVID on hours. However, working in an essential industry has a statistically significant positive effect on hours for married individuals, with married women working 13.5 hours more than married women not in an essential industry and married men working 9.8 hours more. Thus, being in an essential industry reduces the effects of the shutdowns on married individuals substantially. In addition, being in an essential industry reduces the effects of the shutdowns on the hours of single men. Having an extra adult in the household increased the hours single women worked compared to single women without an extra adult in the household, but the result is imprecise.

Table 6 presents the results from the DDD models for hours worked by those remaining employed and at work. These estimates show that most of the effects of COVID on hours are coming through the extensive margin (i.e., the reduction in employment). However, even those remaining employed and at work worked fewer hours, with married and single individuals working 5 fewer hours as a result of the shutdowns. We did not find significant gender differences in the effects. However, we did find that having a remote job mitigated the negative effects of the shutdowns for single women on the intensive margin. Working in an essential industry had a protective effect on hours for married individuals.

7. Conclusion

The initial impacts of COVID-19 on the employment and hours worked of the unincorporated self-employed indicate differential effects by gender, marital status, and parental status. The negative effects were largest in April 2020, with a small rebound in May 2020. As a result of the response to the COVID-19 pandemic, married women were less likely to be employed and at work than married men, while single women were more likely to be employed

and at work than single men. Both single and married fathers with school-age children spent fewer hours working than men without children, suggesting that they may have been spending more time on household or child-care responsibilities. Negative effects were mitigated if they worked in an essential industry. Only minimal evidence of mitigation through having a remote job was found (random-effects model only). Having an extra adult in the household had additional negative effects on employment for single males and additional negative effects on hours for all groups with the exception of married men.

The stronger rebound in work for married men than for married women suggests that self-employed women may remain out of the labor force longer as men resume their role as the family breadwinner and women maintain their primary role as caregiver, especially as schools are engaging in online rather than in-person learning. This could have serious long-term negative implications for female labor force participation, the gender wage gap, and household income.

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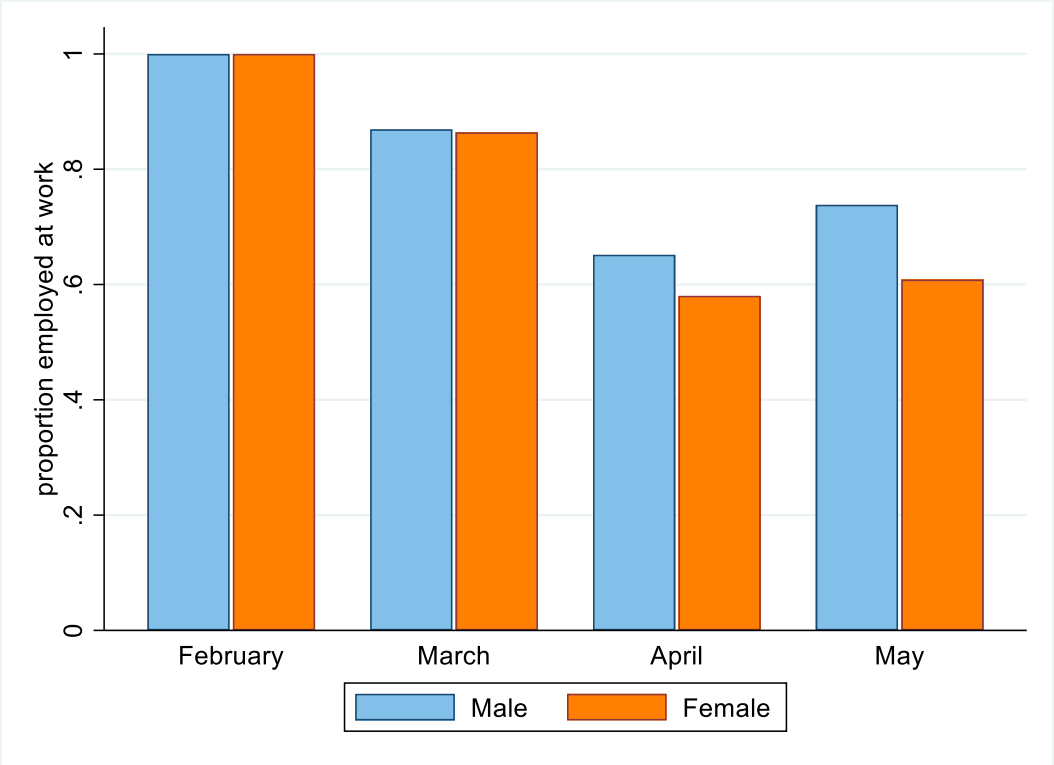
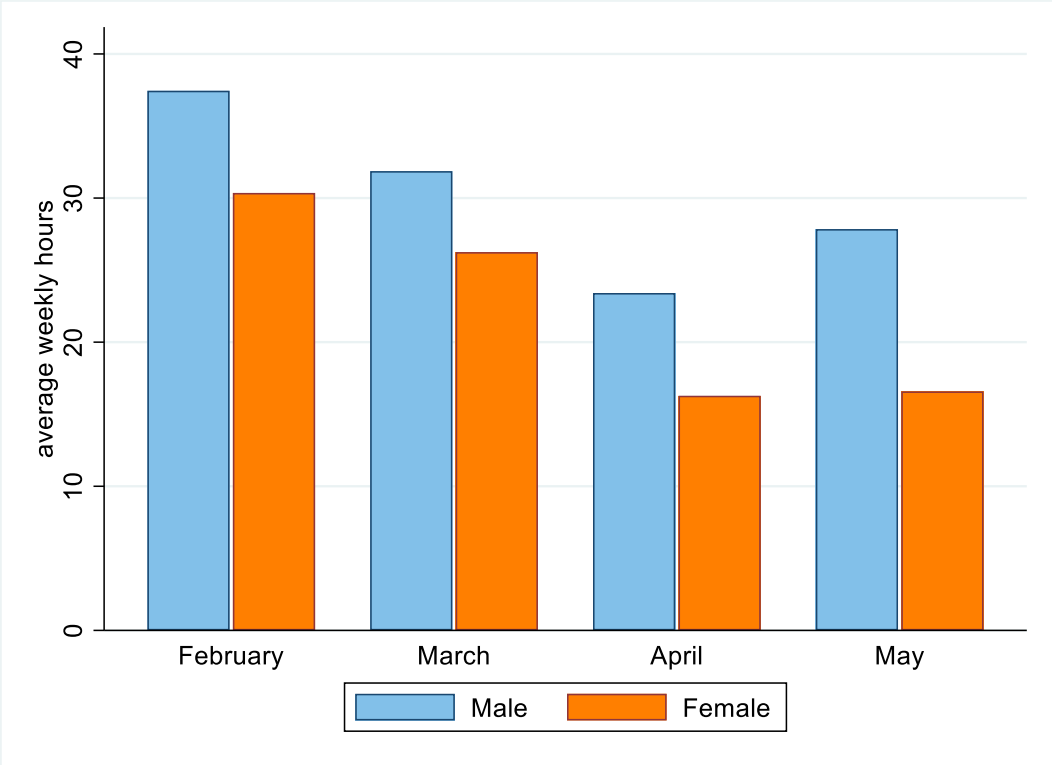
Fig.1 Unincorporated self-employed who were at work in 2020



Note: All workers were self-employed and at work in February 2020. For males, N = 2,056, 1,366, 861, 442 for consecutive months. For females, N = 1,347, 936, 654, 334 for consecutive months.

Source: Current Population Survey

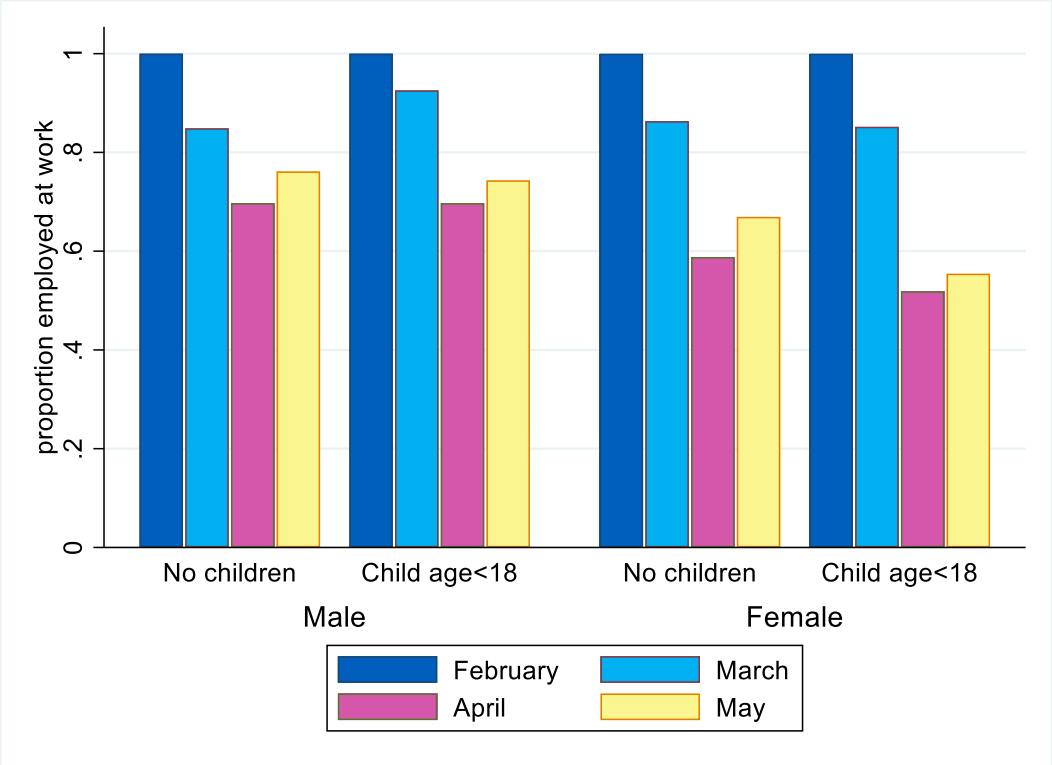
Fig.2 Average weekly hours worked by the unincorporated self-employed in 2020



Note: All workers were self-employed and at work in February 2020. For males, N = 2,056, 1,366, 861, 442 for consecutive months. For females, N = 1,347, 936, 654, 334 for consecutive months.

Source: Current Population Survey

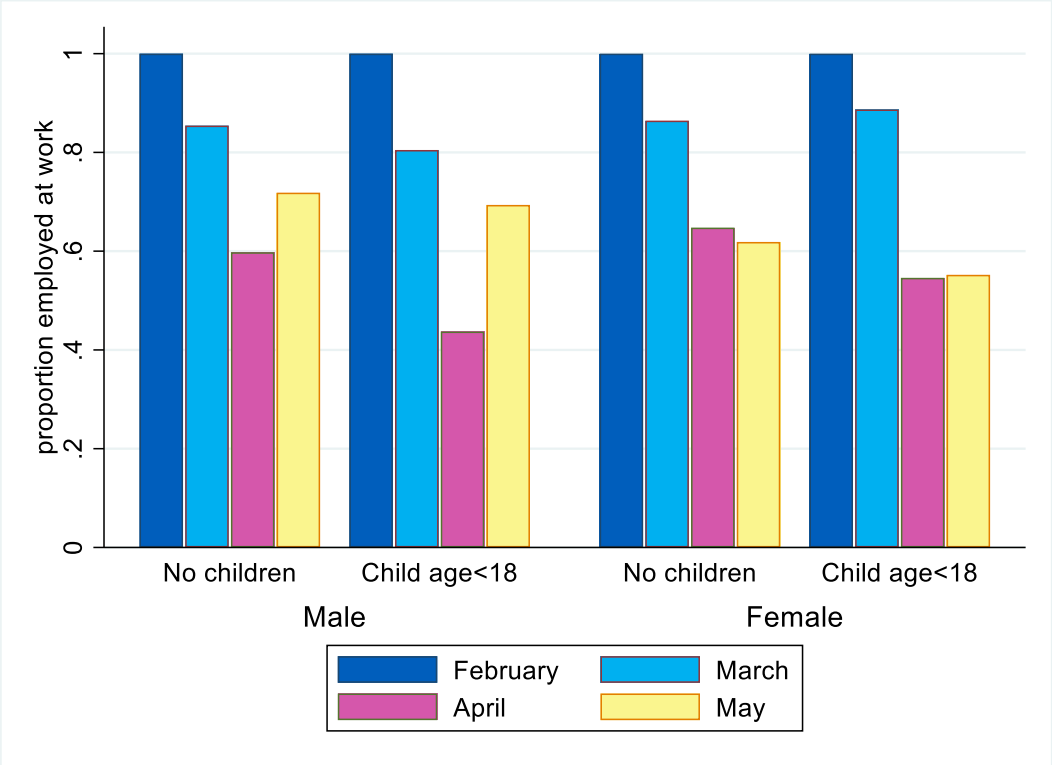
Fig.3 Unincorporated self-employed who were at work (married individuals, by parental status)



Note: All workers were self-employed and at work in February 2020. For males, N =1,334, 905, 573, and 287. For females, N = 841, 573, 417, and 214.

Source: Current Population Survey

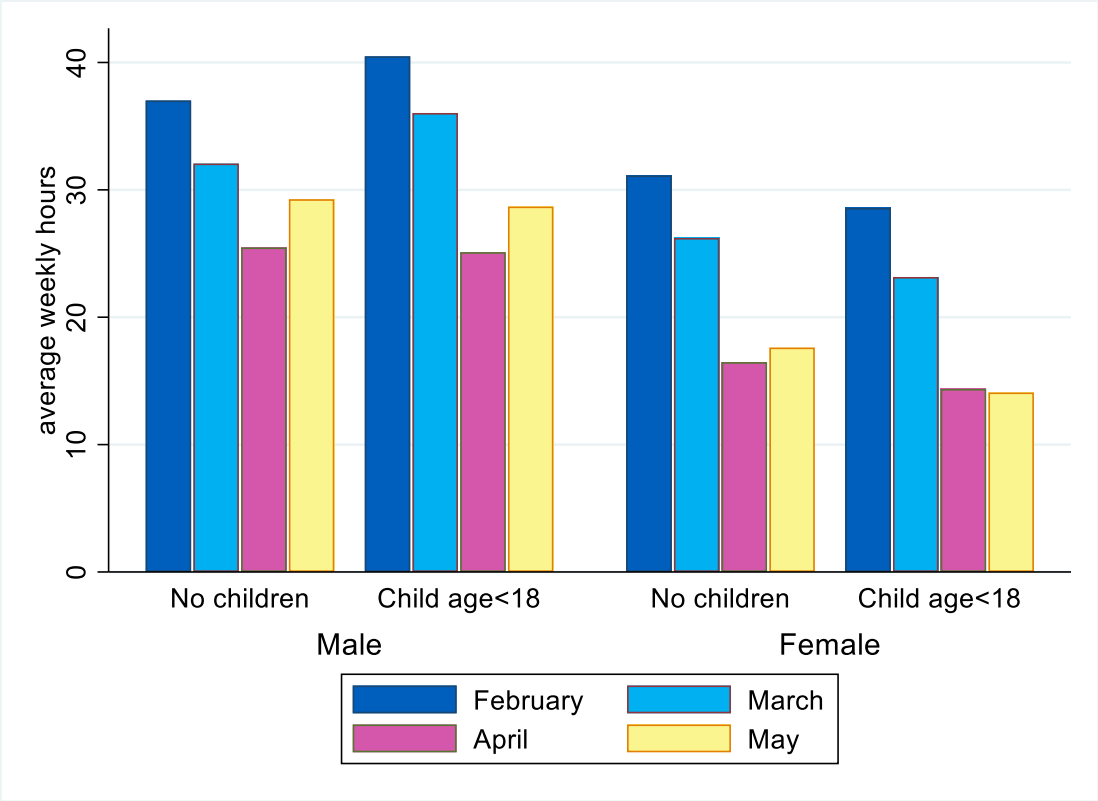
Fig.4 Unincorporated self-employed who were at work (single individuals, by parental status)



Note: All workers were self-employed and at work in February 2020. For males, N =722, 461, 288, and 155. For females, N = 506, 363, 237, and 120.

Source: Current Population Survey

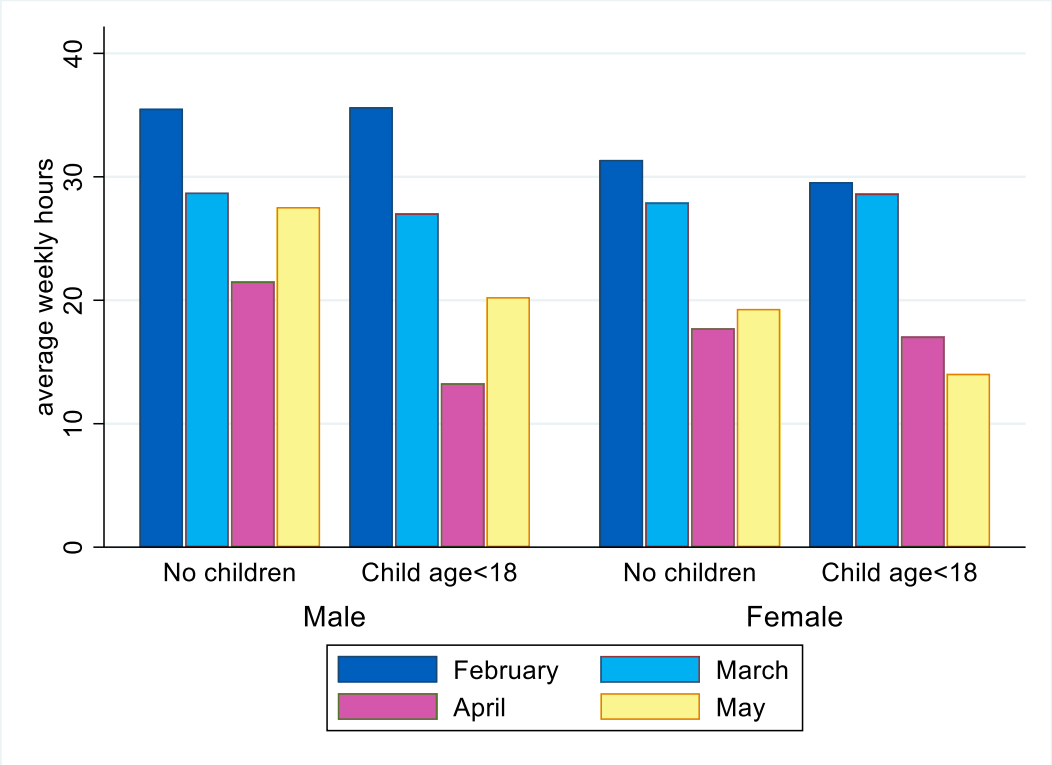
Fig.5 Average weekly hours worked by married individuals, by parental status



Note: All workers were self-employed and at work in February 2020. For males, N =1,334, 905, 573, and 287. For females, N = 841, 573, 417, and 214.

Source: Current Population Survey

Fig.6 Average weekly hours worked by single individuals, by parental status



Note: All workers were self-employed and at work in February 2020. For males, N =722, 461, 288, and 155. For females, N = 506, 363, 237, and 120.

Source: Current Population Survey

Table 1. Differential Effects of COVID on Employment Status (Random-Effects Models)

		Married			Single	
	All	Men	Women	All	Men	Women
Female	-0.01			-0.00		
	(0.01)			(0.01)		
Child age<6	-0.01	-0.02**	0.00	-0.02	-0.00	-0.03
	(0.01)	(0.01)	(0.02)	(0.01)	(0.02)	(0.03)
Child age 6-17	-0.01	-0.01	0.01	-0.01	-0.02	0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
Remote job	-0.01	0.00	-0.03**	-0.02**	-0.01	-0.05***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
Essential industry	-0.02**	-0.01	-0.04**	-0.01	0.04	-0.04**
	(0.01)	(0.02)	(0.02)	(0.01)	(0.03)	(0.02)
Extra adults	0.01*	0.01**	0.01	0.01*	0.00	0.01**
	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)	(0.01)
March	-0.15***	-0.21***	-0.13***	-0.16***	-0.11***	-0.17***
	(0.03)	(0.04)	(0.03)	(0.03)	(0.04)	(0.04)
April	-0.48***	-0.47***	-0.54***	-0.57***	-0.56***	-0.50***
	(0.04)	(0.06)	(0.05)	(0.05)	(0.07)	(0.06)
May	-0.31***	-0.29***	-0.41***	-0.49***	-0.42***	-0.56***
	(0.05)	(0.07)	(0.07)	(0.07)	(0.08)	(0.08)
March X Female	-0.03			0.03		
	(0.02)			(0.03)		
April X Female	-0.07**			0.11**		
	(0.03)			(0.04)		
May X Female	-0.11***			0.02		
	(0.04)			(0.06)		
March X Child age<6	-0.02	0.01	-0.06	0.02	0.00	0.02
	(0.03)	(0.03)	(0.05)	(0.05)	(0.08)	(0.06)
April X Child age<6	-0.05	-0.04	-0.06	0.09	0.15	0.01
	(0.04)	(0.05)	(0.06)	(0.07)	(0.10)	(0.10)
May X Child age<6	0.03	0.11*	-0.05	0.07	0.11	-0.01
	(0.05)	(0.06)	(0.08)	(0.09)	(0.13)	(0.12)
March X Child age 6-17	0.06***	0.07***	0.04	-0.01	-0.00	-0.00
	(0.02)	(0.02)	(0.03)	(0.03)	(0.05)	(0.04)
April X Child age 6-17	0.01	0.03	-0.02	-0.10*	-0.15*	-0.06
	(0.03)	(0.04)	(0.05)	(0.06)	(0.08)	(0.07)
May X Child age 6-17	0.01	0.00	0.01	0.03	-0.03	0.08
	(0.04)	(0.05)	(0.07)	(0.07)	(0.12)	(0.09)
March X Remote job	-0.02	0.00	-0.03	0.01	-0.01	0.05
	(0.02)	(0.02)	(0.03)	(0.03)	(0.04)	(0.04)
April X Remote job	0.07**	0.08**	0.06	0.11**	0.10*	0.13**
	(0.03)	(0.04)	(0.05)	(0.04)	(0.06)	(0.07)
May X Remote job	0.02	-0.03	0.07	0.08	-0.01	0.18**
	(0.04)	(0.06)	(0.07)	(0.06)	(0.08)	(0.08)
March X Essential industry	0.03	0.08**	-0.02	-0.00	-0.04	0.02
	(0.02)	(0.03)	(0.03)	(0.03)	(0.04)	(0.04)
April X Essential industry	0.23***	0.20***	0.26***	0.24***	0.26***	0.20***
	(0.04)	(0.06)	(0.05)	(0.05)	(0.07)	(0.06)
May X Essential industry	0.10**	0.06	0.11*	0.27***	0.23***	0.31***
	(0.05)	(0.07)	(0.06)	(0.06)	(0.09)	(0.08)

Table 1 Continued. Differential Effects of COVID on Employment Status (Random-Effects Models)

		Married			Single	
	All	Men	Women	All	Men	Women
March X Extra adults	0.01	0.02	-0.01	-0.01	-0.03*	0.01
	(0.01)	(0.01)	(0.02)	(0.01)	(0.02)	(0.01)
April X Extra adults	-0.01	-0.01	-0.03	-0.04**	-0.09***	0.03
	(0.02)	(0.03)	(0.04)	(0.02)	(0.02)	(0.03)
May X Extra adults	-0.04	-0.01	-0.10*	-0.07**	-0.07*	-0.04
	(0.03)	(0.04)	(0.06)	(0.03)	(0.04)	(0.04)
Observations	5,144	3,099	2,045	2,852	1,626	1,226
Between R^2	0.24	0.21	0.31	0.27	0.30	0.35

Notes: Standard errors in parentheses are clustered by household. Control variables also include a quadratic in age, education, race, Hispanic ethnicity, immigrant status, own major industry, spouse major industry, MSA status, and state fixed effects. Controls in married regressions include spouse employed, spouse major industry, spouse remote job, and spouse essential industry. Control variables in single regressions include cohabiter. The all regressions include female. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: Current Population Survey, February – May 2020

Table 2. Differential Effects of COVID on Hours (Random-Effects Models)

		Married			Single	
	All	Men	Women	All	Men	Women
Female	-10.585***			-3.027***		
	(0.846)			(1.126)		
Child age<6	-2.947***	-1.897	-5.662***	0.579	3.824	-2.268
	(1.049)	(1.223)	(1.843)	(1.954)	(2.852)	(2.774)
Child age 6-17	-0.654	0.365	-1.437	-0.770	-1.264	-0.171
	(0.819)	(1.016)	(1.305)	(1.145)	(1.620)	(1.859)
Remote job	0.597	1.490	-0.573	2.347*	1.596	2.776
	(0.894)	(1.196)	(1.361)	(1.257)	(1.528)	(2.017)
Essential industry	-1.480	1.756	-4.101***	-0.005	2.877	-2.751
	(1.101)	(1.583)	(1.534)	(1.378)	(2.045)	(1.993)
Extra adults	1.571***	1.668***	1.906**	0.091	-0.867	1.682**
	(0.508)	(0.574)	(0.897)	(0.475)	(0.578)	(0.858)
March	-4.942***	-4.804***	-4.889***	-5.395***	-4.622**	-2.140
	(1.098)	(1.548)	(1.226)	(1.442)	(1.880)	(1.807)
April	-20.145***	-18.966***	-19.114***	-20.464***	-18.906***	-18.868***
	(1.690)	(2.462)	(1.792)	(2.067)	(2.512)	(2.522)
May	-12.816***	-10.836***	-17.416***	-14.490***	-13.839***	-15.723***
	(2.200)	(2.999)	(2.852)	(2.946)	(4.028)	(3.041)
March X Female	-0.253			3.785***		
	(0.839)			(1.224)		
April X Female	1.784			4.593***		
	(1.170)			(1.711)		
May X Female	-2.936*			0.502		
	(1.519)			(2.418)		
March X Child age<6	-0.171	1.541	-2.929	-2.228	-0.607	-3.194
	(1.150)	(1.453)	(1.809)	(2.286)	(3.254)	(3.209)
April X Child age<6	-1.590	-1.381	-1.537	3.450	4.146	1.806
	(1.625)	(2.238)	(2.188)	(2.822)	(3.807)	(4.420)
May X Child age<6	2.513	4.949*	0.138	4.068	5.097	2.504
	(2.021)	(2.830)	(2.519)	(3.128)	(4.386)	(4.774)
March X Child age 6-17	0.121	0.433	-0.461	0.041	0.405	0.047
	(0.966)	(1.209)	(1.386)	(1.491)	(2.301)	(1.981)
April X Child age 6-17	-1.286	-2.222	0.025	-4.802**	-7.468**	-1.910
	(1.403)	(1.806)	(1.873)	(2.208)	(3.361)	(2.871)
May X Child age 6-17	-3.029*	-5.534**	-0.084	-4.702*	-6.334	-3.308
	(1.764)	(2.232)	(2.341)	(2.778)	(4.968)	(4.166)
March X Remote job	-0.576	-0.537	-0.239	-0.990	-0.029	-1.378
	(0.907)	(1.189)	(1.297)	(1.269)	(1.745)	(1.825)
April X Remote job	2.017	1.539	2.751	2.378	0.523	5.326**
	(1.265)	(1.736)	(1.816)	(1.817)	(2.559)	(2.603)
May X Remote job	0.064	-2.959	3.343	1.503	-1.275	5.320
	(1.694)	(2.298)	(2.483)	(2.417)	(3.387)	(3.418)
March X Essential industry	1.377	0.619	2.045	-0.562	-1.822	0.411
	(1.037)	(1.553)	(1.269)	(1.278)	(1.821)	(1.844)
April X Essential industry	10.963***	9.669***	12.016***	8.436***	9.082***	8.095***
	(1.488)	(2.348)	(1.732)	(1.786)	(2.631)	(2.539)
May X Essential industry	7.027***	5.764**	7.625***	6.428***	7.192*	5.921*
	(1.888)	(2.856)	(2.392)	(2.493)	(3.838)	(3.417)

Table 2 Continued. Differential Effects of COVID on Hours (Random-Effects Models)

		Married			Single	
	All	Men	Women	All	Men	Women
March X Extra adults	-0.130	0.099	-0.648	-0.608	-0.994	-0.130
	(0.616)	(0.730)	(1.030)	(0.510)	(0.640)	(0.616)
April X Extra adults	-1.629*	-0.728	-3.293**	-0.882	-2.399**	-1.629*
	(0.989)	(1.119)	(1.615)	(0.905)	(1.055)	(0.989)
May X Extra adults	-0.749	0.466	-3.165	-1.575*	-1.537	-0.749
	(1.454)	(1.523)	(2.578)	(0.909)	(1.148)	(1.454)
Observations	5,144	3,099	2,045	2,852	1,626	1,226
Between R^2	0.22	0.20	0.20	0.16	0.24	0.22

Notes: Standard errors in parentheses are clustered by household. Control variables also include a quadratic in age, education, race, Hispanic ethnicity, immigrant status, own major industry, spouse major industry, MSA status, and state fixed effects. Controls in married regressions include spouse employed, spouse major industry, spouse remote job, and spouse essential industry. Control variables in single regressions include cohabiter. The all regressions include female. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: Current Population Survey, February – May 2020

Table 3. Differential Effects of COVID on Hours for those Remaining Employed (Random-Effects Models)

		Married			Single	
	All	Men	Women	All	Men	Women
Female	-10.561***			-2.757**		
	(0.826)			(1.101)		
Child age<6	-2.943***	-1.574	-6.034***	1.012	3.963	-1.313
	(1.035)	(1.182)	(1.858)	(1.967)	(2.850)	(2.769)
Child age 6-17	-0.926	0.210	-1.901	-0.808	-1.148	-0.602
	(0.808)	(0.998)	(1.315)	(1.141)	(1.585)	(1.840)
Remote job	0.855	1.548	-0.116	3.003**	1.788	4.023**
	(0.878)	(1.165)	(1.369)	(1.235)	(1.510)	(1.977)
Essential industry	-0.801	2.480	-3.226**	0.067	1.934	-2.111
	(1.066)	(1.520)	(1.551)	(1.339)	(1.994)	(1.987)
Extra adults	1.341***	1.388**	1.705*	-0.123	-1.027*	1.342
	(0.504)	(0.567)	(0.903)	(0.466)	(0.556)	(0.855)
March	-0.084	1.474	-1.629	-1.695	-1.500	1.280
	(0.897)	(1.237)	(1.047)	(1.383)	(1.754)	(1.883)
April	-7.653***	-6.847***	-7.243***	-6.550***	-2.704	-12.485***
	(1.880)	(2.631)	(2.078)	(2.177)	(2.404)	(3.284)
May	-3.474	-2.187	-7.864**	-0.308	-0.107	-4.068
	(2.192)	(2.590)	(3.235)	(2.979)	(4.005)	(3.502)
March X Female	-0.703			2.860**		
	(0.739)			(1.122)		
April X Female	1.714			-0.862		
	(1.120)			(1.768)		
May X Female	-2.008			-1.629		
	(1.533)			(2.560)		
March X Child age<6	-0.227	1.127	-2.705	-2.847	-0.905	-3.573
	(1.049)	(1.297)	(1.763)	(2.069)	(2.653)	(3.191)
April X Child age<6	0.046	0.024	-0.017	0.178	-4.372	4.010
	(1.519)	(1.807)	(2.593)	(2.900)	(3.903)	(4.148)
May X Child age<6	2.853*	3.725*	1.400	0.873	-3.704	3.819
	(1.669)	(2.058)	(2.649)	(2.689)	(3.863)	(4.937)
March X Child age 6-17	-1.011	-1.279	-0.650	0.792	1.004	0.822
	(0.848)	(1.053)	(1.277)	(1.250)	(1.673)	(1.815)
April X Child age 6-17	-1.287	-2.131	-0.090	-1.293	-2.678	0.387
	(1.320)	(1.563)	(2.072)	(2.361)	(3.887)	(2.923)
May X Child age 6-17	-3.371**	-5.362***	-0.585	-4.790**	-1.874	-5.940
	(1.620)	(1.877)	(2.405)	(2.397)	(4.322)	(4.750)
March X Remote job	-0.412	-0.904	0.316	-1.136	-0.046	-1.840
	(0.793)	(1.009)	(1.213)	(1.154)	(1.503)	(1.781)
April X Remote job	-1.167	-2.341	0.585	0.901	-3.042	5.524**
	(1.227)	(1.562)	(2.011)	(1.863)	(2.503)	(2.795)
May X Remote job	-1.215	-4.215**	2.614	0.559	-2.150	3.814
	(1.599)	(1.988)	(2.654)	(2.592)	(3.378)	(3.661)
March X Essential industry	0.285	-1.579	1.832	0.021	-0.965	0.622
	(0.873)	(1.213)	(1.166)	(1.204)	(1.660)	(1.829)
April X Essential industry	6.013***	5.495**	6.782***	3.953**	2.405	6.555**
	(1.648)	(2.448)	(1.970)	(1.889)	(2.758)	(2.785)
May X Essential industry	4.048**	3.920	4.188*	-1.076	-0.367	-0.007
	(1.827)	(2.428)	(2.532)	(2.448)	(3.869)	(3.403)

Table 3 Continued. Differential Effects of COVID on Hours for those Remaining Employed (Random-Effects Models)

		Married			Single	
	All	Men	Women	All	Men	Women
March X Extra adults	-0.342	-0.261	-0.506	-0.271	-0.308	-0.210
	(0.583)	(0.671)	(0.996)	(0.465)	(0.576)	(0.764)
April X Extra adults	-0.736	-0.112	-1.744	0.785	-0.622	1.549
	(0.992)	(1.003)	(1.704)	(0.978)	(1.648)	(1.182)
May X Extra adults	1.224	1.691	0.208	-0.065	-0.056	-0.593
	(1.453)	(1.359)	(2.662)	(0.795)	(1.076)	(1.608)
Observations	4,482	2,773	1,709	2,446	1,389	1,057
Between R^2	0.18	0.16	0.16	0.12	0.18	0.19

Notes: Standard errors in parentheses are clustered by household. Control variables also include a quadratic in age, education, race, Hispanic ethnicity, immigrant status, own major industry, spouse major industry, MSA status, and state fixed effects. Controls in married regressions include spouse employed, spouse major industry, spouse remote job, and spouse essential industry. Control variables in single regressions include cohabiter. The all regressions include female. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: Current Population Survey, February – May 2020

Table 4. Differential Effects of COVID on Employment Status (Difference-in-Difference-in-Differences Models)

Panel		MARRIED			SINGLE		
		ALL (N = 3,888)	MEN (N = 2,242)	WOMEN (N = 1,646)	ALL (N = 2,162)	MEN (N = 1,236)	WOMEN (N = 926)
A	COVID	-0.23***	-0.21***	-0.26***	-0.24***	-0.29***	-0.18***
		(0.02)	(0.02)	(0.03)	(0.03)	(0.04)	(0.04)
B	COVID	-0.21***			-0.29***		
		(0.02)			(0.03)		
	COVID X Female	-0.06			0.10*		
		(0.03)			(0.05)		
C	COVID		-0.19***	-0.21***		-0.26***	-0.17***
			(0.03)	(0.04)		(0.04)	(0.05)
	COVID X Child age<18		-0.03	-0.12*		-0.12	-0.04
			(0.04)	(0.06)		(0.09)	(0.09)
D	COVID		-0.20***	-0.25***		-0.30***	-0.18***
			(0.02)	(0.03)		(0.04)	(0.04)
	COVID X Child age<6		-0.06	-0.08		0.12	-0.08
			(0.06)	(0.08)		(0.12)	(0.14)
E	COVID		-0.19***	-0.24***		-0.26***	-0.17***
			(0.03)	(0.04)		(0.04)	(0.05)
	COVID X Child age 6-17		-0.04	-0.07		-0.17*	-0.03
			(0.04)	(0.06)		(0.09)	(0.10)
F	COVID		-0.22***	-0.24***		-0.29***	-0.22***
			(0.03)	(0.05)		(0.05)	(0.06)
	COVID X Remote job		0.05	-0.03		-0.01	0.08
			(0.05)	(0.06)		(0.08)	(0.09)
G	COVID		-0.34***	-0.43***		-0.46***	-0.24***
			(0.06)	(0.04)		(0.08)	(0.06)
	COVID X Essential industry		0.16**	0.32***		0.23***	0.11
			(0.07)	(0.06)		(0.09)	(0.08)
H	COVID		-0.21***	-0.27***		-0.23***	-0.20***
			(0.02)	(0.03)		(0.04)	(0.05)
	COVID X Extra adults		0.01	0.03		-0.08***	0.03
			(0.03)	(0.05)		(0.03)	(0.04)

Notes: Each panel is a separate regression. Standard errors in parentheses are clustered by household-year. Control variables in all regressions also include a quadratic in age, education, race, Hispanic ethnicity, immigrant status, own major industry, MSA status, state, month and year fixed effects. Controls in married regressions include spouse employed, spouse major industry, spouse remote job, and spouse essential industry. Control variables in single regressions include cohabiter. The all regressions include female. Regressions include interactions of the subgroup with month and year. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ Source: Current Population Survey, February and April 2019–2020

Table 5. Differential Effects of COVID on Hours (Difference-in-Difference-in-Differences Models)

Panel		MARRIED			SINGLE		
		ALL (N = 3,888)	MEN (N = 2,242)	WOMEN (N = 1,646)	ALL (N = 2,162)	MEN (N = 1,236)	WOMEN (N = 926)
A	COVID	-11.26***	-10.92***	-11.73***	-10.52***	-11.53***	-9.30***
		(0.88)	(1.10)	(1.25)	(1.17)	(1.61)	(1.75)
B	COVID	-10.92***			-11.53***		
		(1.09)			(1.58)		
	COVID X Female	-0.81			2.23		
		(1.50)			(2.31)		
C	COVID		-10.47***	-10.74***		-9.88***	-8.88***
			(1.44)	(1.68)		(1.82)	(2.07)
	COVID X Child age<18		-1.24	-2.28		-8.17**	-1.41
			(2.23)	(2.50)		(3.82)	(3.87)
D	COVID		-10.58***	-11.16***		-11.66***	-9.28***
			(1.21)	(1.38)		(1.69)	(1.81)
	COVID X Child age<6		-1.90	-3.23		1.82	-0.42
			(2.90)	(3.18)		(5.07)	(6.43)
E	COVID		-10.20***	-11.14***		-9.83***	-9.00***
			(1.36)	(1.54)		(1.76)	(2.05)
	COVID X Child age 6-17		-2.10	-1.68		-10.11**	-1.44
			(2.32)	(2.63)		(4.18)	(3.99)
F	COVID		-11.20***	-12.32***		-11.48***	-11.77***
			(1.42)	(1.94)		(1.99)	(2.44)
	COVID X Remote job		0.79	1.13		-0.21	5.57
			(2.31)	(2.60)		(3.61)	(3.61)
G	COVID		-19.19***	-18.46***		-17.27***	-10.64***
			(3.03)	(1.70)		(3.07)	(2.44)
	COVID X Essential industry		9.81***	13.48***		7.58**	2.79
			(3.25)	(2.41)		(3.61)	(3.47)
H	COVID		-10.33***	-10.78***		-10.40***	-11.28***
			(1.25)	(1.39)		(1.83)	(2.00)
	COVID X Extra adults		-1.57	-3.18		-1.71	3.11
			(1.45)	(2.25)		(1.41)	(1.95)

Notes: Each panel is a separate regression. Standard errors in parentheses are clustered by household-year. Control variables in all regressions also include a quadratic in age, education, race, Hispanic ethnicity, immigrant status, own major industry, MSA status, state, month and year fixed effects. Controls in married regressions include spouse employed, spouse major industry, spouse remote job, and spouse essential industry. Control variables in single regressions include cohabiter. The all regressions include female. Regressions include interactions of the subgroup with month and year. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ Source: Current Population Survey, February and April 2019–2020

Table 6. Differential Effects of COVID on Hours of those Remaining Employed (Difference-in-Difference-in-Differences Models)

Panel		MARRIED			SINGLE		
		ALL (N = 3,042)	MEN (N = 1,858)	WOMEN (N = 1,184)	ALL (N = 1,624)	MEN (N = 932)	WOMEN (N = 692)
A	COVID	-5.05***	-4.79***	-5.45***	-5.04***	-3.92**	-6.51***
		(0.86)	(1.03)	(1.30)	(1.15)	(1.57)	(1.73)
B	COVID	-4.79***			-3.92**		
		(1.02)			(1.54)		
	COVID X Female	-0.66			-2.59		
		(1.49)			(2.25)		
C	COVID		-5.48***	-5.31***		-3.16*	-7.02***
			(1.40)	(1.73)		(1.77)	(2.07)
	COVID X Child age<18		1.34	-0.35		-3.97	1.85
			(2.07)	(2.64)		(3.88)	(3.79)
D	COVID		-4.98***	-5.21***		-3.32**	-6.96***
			(1.16)	(1.42)		(1.66)	(1.79)
	COVID X Child age<6		1.07	-1.38		-6.99	4.70
			(2.55)	(3.52)		(4.88)	(6.54)
E	COVID		-5.15***	-5.01***		-3.39**	-7.08***
			(1.30)	(1.60)		(1.71)	(2.06)
	COVID X Child age 6-17		0.77	-1.23		-3.59	2.38
			(2.14)	(2.77)		(4.61)	(3.82)
F	COVID		-3.76***	-5.49***		-3.55*	-9.47***
			(1.35)	(2.08)		(1.88)	(2.58)
	COVID X Remote job		-3.15	-0.12		-0.93	6.37*
			(2.14)	(2.76)		(3.63)	(3.57)
G	COVID		-12.40***	-9.48***		-4.85	-8.46***
			(3.00)	(2.02)		(3.54)	(2.60)
	COVID X Essential industry		8.73***	6.48**		1.11	3.35
			(3.20)	(2.62)		(3.98)	(3.50)
H	COVID		-3.97***	-4.78***		-4.89***	-8.00***
			(1.17)	(1.45)		(1.81)	(2.06)
	COVID X Extra adults		-2.24	-2.20		1.86	2.20
			(1.42)	(2.46)		(1.89)	(1.76)

Notes: Each panel is a separate regression. Standard errors in parentheses are clustered by household-year. Control variables in all regressions also include a quadratic in age, education, race, Hispanic ethnicity, immigrant status, own major industry, MSA status, state, month and year fixed effects. Controls in married regressions include spouse employed, spouse major industry, spouse remote job, and spouse essential industry. Control variables in single regressions include cohabiter. The all regressions include female. Regressions include interactions of the subgroup with month and year. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ Source: Current Population Survey, February and April 2019–2020

Appendix A

Table A1. Mean Employment and Hours in 2020 by Marital and Parental Status

Sample	February	March	April	May
Panel A. Employed at Work				
Married				
Males	1.00	0.88	0.70	0.75
No children	1.00	0.85	0.70	0.76
Child age<6	1.00	0.91	0.66	0.81
Child age 6–17	1.00	0.92	0.69	0.73
Females	1.00	0.86	0.56	0.61
No children	1.00	0.86	0.59	0.67
Child age<6	1.00	0.76	0.48	0.57
Child age 6–17	1.00	0.87	0.54	0.59
Single				
Males	1.00	0.84	0.56	0.71
No children	1.00	0.85	0.60	0.72
Child age<6	1.00	0.85	0.61	0.94
Child age 6–17	1.00	0.79	0.37	0.67
Females	1.00	0.87	0.62	0.60
No children	1.00	0.86	0.65	0.62
Child age<6	1.00	0.89	0.60	0.55
Child age 6–17	1.00	0.90	0.57	0.64
Panel B. Average Weekly Hours				
Married				
Males	38.55	33.84	25.30	29.00
No children	37.02	32.07	25.48	29.26
Child age<6	39.18	35.57	24.54	31.41
Child age 6–17	40.52	35.94	24.10	27.84
Females	30.04	24.90	15.52	15.93
No children	31.13	26.22	16.48	17.62
Child age<6	25.79	18.01	11.89	13.12
Child age 6–17	29.45	24.64	15.34	15.40
Single				
Males	35.54	28.39	19.77	25.87
No children	35.52	28.72	21.51	27.55
Child age<6	37.82	30.62	18.81	27.75
Child age 6–17	36.00	26.72	11.15	19.17
Females	30.85	28.14	17.54	17.69
No children	31.38	27.91	17.73	19.30
Child age<6	25.57	24.81	20.49	15.30
Child age 6–17	30.60	29.66	17.21	15.67
Observations	3,403	2,302	1,515	776

Note: CPS final weights used. Sample restricted to those who were unincorporated self-employed and at work in February.

Source: Current Population Surveys

Table A2. Means for Random Effects Sample (2020)

Variable	February	March	April	May
Employed at work	1.00	0.87	0.62	0.68
Hours on main job	34.65	29.60	20.32	22.96
Female	0.39	0.40	0.43	0.44
Age	49.44	49.36	49.33	48.91
High school degree	0.27	0.27	0.25	0.27
Some college	0.28	0.28	0.29	0.29
Bachelor's degree	0.23	0.24	0.24	0.24
Advanced degree	0.12	0.12	0.13	0.13
Black	0.08	0.08	0.07	0.07
Other race	0.07	0.07	0.08	0.07
Hispanic	0.18	0.18	0.18	0.20
Any child age<6	0.14	0.14	0.15	0.16
Any child age 6–17	0.30	0.31	0.31	0.32
Married	0.62	0.62	0.64	0.63
Number of extra HH adults	0.53	0.54	0.51	0.52
Cohabiter	0.06	0.06	0.06	0.07
Immigrant	0.22	0.22	0.22	0.21
Remote Job	0.38	0.39	0.40	0.42
Essential Industry	0.68	0.68	0.67	0.66
Own Industry				
Agriculture and mining	0.07	0.07	0.07	0.06
Construction	0.18	0.17	0.16	0.16
Manufacturing	0.03	0.03	0.03	0.03
Trade, transportation, and utilities	0.14	0.14	0.14	0.13
Information	0.02	0.02	0.02	0.02
Financial activities	0.08	0.08	0.08	0.10
Professional and business services	0.20	0.20	0.20	0.20
Educational and health services	0.11	0.11	0.12	0.12
Leisure and hospitality	0.07	0.07	0.08	0.08
Other services/Public administration	0.11	0.11	0.10	0.08
Spouse – Employed	0.47	0.46	0.48	0.48
Spouse - Remote job	0.22	0.22	0.24	0.25
Spouse - Essential industry	0.34	0.34	0.36	0.35
Spouse Industry				
Agriculture and mining	0.03	0.03	0.03	0.04
Construction	0.04	0.03	0.03	0.04
Manufacturing	0.04	0.04	0.04	0.04
Trade, transportation, and utilities	0.08	0.08	0.09	0.08
Information	0.01	0.01	0.02	0.01
Financial activities	0.04	0.04	0.04	0.05
Professional and business services	0.06	0.07	0.08	0.08
Educational and health services	0.10	0.10	0.09	0.08
Leisure and hospitality	0.03	0.02	0.02	0.03
Other services/Public administration	0.05	0.05	0.05	0.05
Observations	3,403	2,302	1,515	776

Note: CPS final weights used. Sample restricted to those who were unincorporated self-employed and at work in February.

Source: Current Population Surveys

Table A3. Means for Difference-in-Difference-in-Differences Sample

Variable	Feb 2019	April 2019	Feb 2020	April 2020
Employed at work	1.00	0.90	1.00	0.62
Hours on main job	34.66	32.99	34.36	20.32
COVID	0	0	0	1
Female	0.42	0.41	0.44	0.43
Age	49.36	49.37	49.70	49.33
High school degree	0.26	0.26	0.25	0.25
Some college	0.28	0.28	0.29	0.29
Bachelor's degree	0.23	0.23	0.24	0.24
Advanced degree	0.12	0.12	0.13	0.13
Black	0.07	0.06	0.07	0.07
Other race	0.09	0.09	0.07	0.08
Hispanic	0.18	0.17	0.16	0.18
Any child age<6	0.16	0.16	0.15	0.15
Any child age 6–17	0.33	0.33	0.31	0.31
Married	0.61	0.61	0.64	0.64
Number of extra HH adults	0.52	0.52	0.50	0.51
Cohabiter	0.07	0.07	0.06	0.06
Immigrant	0.22	0.22	0.21	0.22
Remote Job	0.41	0.41	0.40	0.40
Essential Industry	0.69	0.69	0.67	0.67
Own Industry				
Agriculture and mining	0.08	0.08	0.07	0.07
Construction	0.16	0.16	0.16	0.16
Manufacturing	0.03	0.03	0.03	0.03
Trade, transportation, and utilities	0.12	0.12	0.14	0.14
Information	0.01	0.01	0.02	0.02
Financial activities	0.07	0.07	0.08	0.08
Professional and business services	0.21	0.21	0.19	0.20
Educational and health services	0.12	0.12	0.12	0.12
Leisure and hospitality	0.06	0.06	0.08	0.08
Other services/Public administration	0.13	0.12	0.10	0.10
Spouse – Employed	0.47	0.47	0.48	0.48
Spouse - Remote job	0.23	0.23	0.24	0.24
Spouse - Essential industry	0.35	0.35	0.36	0.36
Spouse Industry				
Agriculture and mining	0.04	0.04	0.03	0.03
Construction	0.03	0.03	0.03	0.03
Manufacturing	0.03	0.03	0.04	0.04
Trade, transportation, and utilities	0.07	0.07	0.09	0.09
Information	0.01	0.01	0.02	0.02
Financial activities	0.04	0.04	0.04	0.04
Professional and business services	0.06	0.06	0.08	0.08
Educational and health services	0.11	0.11	0.09	0.09
Leisure and hospitality	0.02	0.02	0.02	0.02
Other services/Public administration	0.06	0.06	0.05	0.05
Observations	1,510	1,510	1,515	1,515

Note: CPS final weights used. Some differences are due to different weights. Restricted to respondents who could be matched between February and April and who were working in February.

Source: Current Population Surveys, 2019–2020