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Labour Market Shocks and Parental Investments during the Covid-19 Pandemic☆

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ABSTRACT

This paper studies spill-over effects of parental labour market shocks at two time points in the Covid-19 crisis: right after its onset in April 2020, and in January 2021. We use rich data from the UK to look at the consequences of immediate and persistent shocks that hit parents' economic livelihoods. These negative labour market shocks have substantially larger impacts when suffered by fathers than by mothers. Children of fathers that suffered the most severe shocks - earnings dropping to zero - are the ones that are consistently impacted. In April 2020, they were 10 percentage points less likely to have received additional paid learning resources, but their fathers were spending about 30 more minutes per day helping them with school work. However, by January 2021, this latter association switches sign, as the negative spill-over onto children's education occurred for those fathers facing more persistent, negative labour market shocks as the crisis progressed. The paper discusses potential mechanisms driving these results, finding a sustained deterioration of household finances and a worsening of father's mental health to be factors at play.

1. Introduction

Labour market shocks do not only entail economic costs for the affected individual, for example losses in earnings, health or well-being. They might also induce significant spill-overs to other members of the family. When parents lose their jobs or suffer earnings losses, this can negatively impact their offspring's well-being (Nikolova and Nikolaev, 2018; Powdthavee and Vernoit, 2013), health (Lindo, 2011), educational success (Rege et al., 2011; Ruiz-Valenzuela, 2020a; Stevens and Schaller, 2011) and even long-term career outcomes (Fradkin et al., 2019; Hilger, 2016). There are also damaging effects of father's job insecurity on children's educational outcomes (Ruiz-Valenzuela, 2020b).[1] Affected children might be scarred far beyond the contemporary labour market shock. During the labour market crisis following the spread of Covid 19, extensive closures of schools and nurseries have likely aggravated these spillovers.

Against this background, this paper analyses spill-over effects of parental labour market shocks at two different points in time during the pandemic: right after its onset in April 2020, and then again in January 2021, almost a year into the Covid-19 pandemic. We analyse spill-over effects on parental investments, time devoted by the child to school work, and child-parent interactions. We further ask whether the effects of negative labour market shocks have changed as the crisis unfolded. We analyse changes in financial difficulties and mental health as mechanisms through which negative parental labour market shocks translate into changes in the investments in children.

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[1] See Ruiz-Valenzuela (2021) for a review on the effects of parental job loss on child outcomes.

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We base our estimations on UK data from the Understanding Society Covid-19 Surveys (University of Essex Institute for Social and Economic Research, 2021), which provide information on parental labour market experiences during and before the pandemic. The data further provides detailed information on child level parental investments. From the data, we classify parents into a hierarchy of three mutually exclusive categories based on how the pandemic changed their earnings: (1) earnings remained constant/increased, (2) earnings reduced or (3) earnings reduced to zero. We relate this hierarchy of labour market experiences to outcomes describing parental investments and parental and offspring well-being.

To mitigate the influence of unobservable differences between workers who suffer negative labour market shocks during the Covid-19 pandemic and those who do not, we exploit two features of the data: First, we include lagged dependent variables, constructed with pre-pandemic information from the regular Understanding Society Survey (University of Essex Institute for Social and Economic Research, 2021). These control for pre-pandemic differences in outcomes between individuals experiencing different adverse labour market effects during the crisis. Second, we use the wealth of information of the USoC data on predetermined child and parental background characteristics, and firm characteristics. We do so in a sequential manner, in order to check the stability of the coefficients to the inclusion of these covariates and potential confounders. Finally, we show that pre-pandemic levels of parental investments are unrelated to pandemic-related negative shocks, further alleviating concerns about selection into adverse labour market shocks driving our results. Yet, we acknowledge that the Covid-19 crisis does not provide scope for fully-fledged quasi-experimental approaches given the lack of unaffected control groups. As a result, causal interpretations of the results should be made with caution.

The results on the intergenerational impacts of negative labour market shocks during the Covid-19 pandemic suggests that negative labour market shocks have substantially larger impacts when suffered by fathers than by mothers. We find that children of fathers that suffered the most severe labour market shocks (i.e. earnings dropping to zero) are the ones that are consistently impacted. During April 2020, children of fathers whose earnings dropped to zero were 10 percentage points less likely to have received additional paid learning resources. Also, and perhaps due to families compensating for this drop in paid resources, fathers whose earnings dropped to zero were spending about 30 more minutes per day helping their children with school work (always compared with those not suffering negative labour market shocks). However, nearly one year into the pandemic, this association turned negative: Children whose fathers' earnings had dropped to zero in January 2021 were receiving about 25 minutes less help per day, which translates into a lower overall amount of time spent by these children doing school work.

This sign reversal might be due to the fact that those (still) suffering negative labour market shocks in January 2021, when things were getting better for most, may have faced persistently worse consequences than those hit by negative labour market shocks only at the onset of the pandemic, in April 2020. In our analysis of potential mechanisms, we find that from May through November 2020, households in which the father has zero earnings are almost 20 percentage points more likely to experience financial difficulties. We also see a worsening of mental health for those fathers whose earnings dropped to zero. Perhaps as a result, the initial reduction in quarrelling with children that we see at the beginning of the pandemic for fathers whose earnings dropped to zero is reversed by January 2021.

These results connect to four strands of the literature. First, to a growing literature that describes the scope of job loss and reduced hours and earnings worldwide as a consequence of the Covid-19 pandemic, e.g. for the US by Adams-Prassl et al. (2020); Bartik et al. (2020), Cajner et al. (2020), Chetty et al. (2020), for Germany by Adams-Prassl et al. (2020); Bauer and Weber (2020). For the UK, Witteveen (2020) and Blundell et al. (2020) describe economic hardship experienced during the pandemic across different socio-economic groups, the former using the same data as our study. We show that the profile of those suffering negative labour market shocks changes as the pandemic evolves.

Second, we relate to an extensive literature documenting how parental job loss and job insecurity transmits to children's well-being and educational outcomes, as reviewed by Ruiz-Valenzuela (2021). Our results are in line with this broad literature, showing that negative labour market shocks borne by fathers (as opposed to mothers) are more consistently related to parental investments and child outcomes during a pandemic.

Third, we add to the literature on the importance and determinants of parental inputs. Parental involvement is a major determinant of children's academic achievement (Houtenville and Conway, 2008). Meta studies have shown that parental involvement at home plays an especially influential role (Hill and Tyson, 2009), leading to potential long-term effects on performance (Barnard, 2004). Our results complement those in Agostinelli et al. (2022), who find that the support parents can offer during periods of school closures varies dramatically across families' socioeconomic status.[2]

Finally, we connect to other recent contributions that describe the unequal experiences of children during school closures. Werner and Woessman (2021) review this emerging literature and find substantial losses in cognitive skills, particularly for students from disadvantaged backgrounds. For the UK, Andrew et al. (2020) report inequalities in children's time use during the first national lockdown in the first half of 2020. We contribute to this literature by exploring impacts across two lockdown periods where schools remained closed (i.e. the lockdown starting in March 2020, and the one imposed in January 2021).

The results have important implications for the economic evaluation of the costs of lockdowns. On the one hand, lockdowns induce direct costs through reduced economic activity and related labour market disruptions. On the other hand, they imply indirect costs through school closures. These have negative consequences in the long run, as learning losses negatively affect expected life-long income. Our results suggest that these negative effects might be further aggravated by the interaction between parents experiencing economic distress and having to simultaneously care for their children when formal care is shut down.

The rest of the paper is structured as follows: Section 2 describes the data. Section 3 presents the empirical strategy. In Section 4 we describe the results. The paper concludes in Section 5.

2. Data

We use data from Understanding Society (University of Essex Institute for Social and Economic Research, 2021a,b), a UK longitudinal household study that was initiated in 2009. We use data both from the regular annual surveys, as well as from the special Covid-19 surveys, in order to study the immediate and medium term impact of the pandemic.[3] The data contain information on current and pre-Covid employment and earnings, physical and mental health, time use and parent-

[2] Earlier studies had already found that parental involvement may differ strongly by socio-economic status, with parents from a higher socio-economic status spending more time with their children on educationally productive activities (Fiorini and Keane, 2014; Guryan et al., 2008).

[3] Response rates for the special Covid-19 surveys are lower than for regular waves. The retention rates in the first two waves of the special Covid-19 surveys were 46 per cent and 48.5 per cent, respectively, compared to approximately 86 per cent in wave nine of the regular USoc waves. Retention rates measure the response rates among the population of individuals who gave a full or partial interview at the last regular USoc wave. See University of Essex Institute for Social and Economic Research, 2019, 2020 for more information. Respondents in the first Covid-19 wave were slightly older, more likely to be female, British, college educated, employed at wave nine and from households with higher incomes (Hupkau and Petrongolo, 2020). To adjust for unequal selection probabilities and differential non-response, cross-sectional weights are provided in each of the Covid-19 waves, which we use for all descriptive statistics and re-

child interactions, for respondents aged 16 and above. The questionnaire is organised into different modules, with the core modules implemented in each of the waves (such as the employment or the General Health Questionnaire modules), and some other modules appearing only in specific waves. When defining our outcome and potential mechanisms variables, we make use of as much information as possible.

2.1. Outcome measures

We use the home schooling modules included in Wave 1 and Wave 7 of the Covid-19 surveys (April 2020 and January 2021, respectively) to define parental investment variables: whether the child received additional paid learning resources and the amount of hours devoted to help each child with school work on an average weekday. The data do not include direct measures of school performance. However, with the information provided in the home schooling module we can also construct a variable indicating the amount of time the child devoted to schoolwork on an average weekday. These three variables are measured at the child level and asked to parents for each of their children aged four to 18.

In Waves 2, 5 and 7 (May 2020, September 2020, and January 2021, respectively), adults with dependent children aged four to 18 were also asked about their interactions with their children. We define two variables to assess the extent to which parent-child relationships were affected by negative labour market shocks during the pandemic. The first is an indicator ('Quarrelling'), which equals one if the responding parent states that they quarrelled with their children more than once a week, or most days, and zero if they do so less than once a week or hardly ever. The second is an indicator ('Talking matters'), which equals one if the responding parent states that they talk about important matters with their children more than once a week or most days, and zero if they do so less than once a week or hardly ever. These two variables are measured at the parent level.

We use the finance module to construct an indicator of family financial difficulties.[4] This variable takes a value of one if the responding parent states to be behind with some or all household bill payments, and zero otherwise.

Mental health is measured using the General Health Questionnaire module, available throughout all the nine Covid-19 waves. We use the GHQ scale, which is computed by summing the scores in 12 mental health questions, with a higher score implying a worse mental health state.[5] To ease the interpretation of coefficients, we standardise the GHQ scale using the mean and standard deviation of the population of respondents, separately by gender. We use an indicator of alcohol consumption as a measure of engaging in potential risky behaviour.[6]

Parents suffering negative labour market shocks might spend more time searching for alternative work arrangements. We construct a job search indicator using the information in the job search module.[7] This indicator is equal to one if the responding parent is searching for a job in a given wave.

For variables measured at the child level, we restrict the sample to children whose parents were employed at baseline (during January and February 2020) and drop individuals for whom relevant control variables, such as age, gender, ethnicity, and education, were not available. The same applies for variables measured at the parent level, such as parent child interactions, parental mental health, alcohol consumption, being behind with bill payments and job search. The exact sample sizes differ depending on the outcome used and whether outcomes are measured at the child or parent level.

Finally, we construct lagged dependent variables and other predetermined characteristics using information from Wave 10 of the regular Understanding Society survey.[8] Only for the amount of time that the child devotes to schoolwork on an average weekday we do not have access to a similar baseline measure.

2.2. Descriptive Statistics

Table 1 shows summary statistics for our sample of children in April 2020 (Wave 1, Column 1) and January 2021 (Wave 7, Column 5). Additional columns describe differences between samples by whether the respondents were fathers or mothers, which we discuss below.

Panel A describes child characteristics, while Panels B and C describe household characteristics and parental investments in children at baseline, respectively (i.e. in Wave 10 of the regular USoc survey). Column 1 in Panel A shows that in April 2020, the children in the sample are on average just over 11 years old, 47 percent of them are females and 13 per cent were eligible to receive free school meals (FSM). Average weekly household earnings at baseline were about £747 and average family size was just over 4. Using data from the last available regular wave, we see that prior to the pandemic, 6 per cent of children (of those observed in April 2020) received some additional paid resources, and that 60 per cent of them received help with homework at least once or twice a week, 24 per cent received help at most once a month, and 4 per cent of children did not have any homework at all.[9]

While we observe substantial attrition between April 2020 and January 2021, the Understanding Society survey provides cross-sectional weights that adjust for unequal selection probabilities and differential non-response. Using these weights, pre-pandemic covariates and parental investments do not significantly differ across the two periods (p-values in Column 9), except for the (expected) significant difference in age, and a significant (though small in magnitude) difference in family size (households in January 2021 are slightly smaller). We further check differences in predetermined and baseline characteristics in Table A1, between those parents that responded in April 2020 (Column 1), and those that responded both in April 2020 and January 2021 (Column 5).[5] The p-values displayed in Column 9 show that there are no significant differences in predetermined and baseline characteristics between these two samples (except for a very small difference in family size).

Panel C of Table 1 describes children's resources and parental investments during school closures. These are the main outcomes of our analysis. We do observe a significant change in the rate of school attendance and parental time devoted to help children with school work, as more children were making use of *emergency* school provision by January 2021. Note that during both periods, schools were closed for most pupils. About three per cent of the children in our sample were still attending school in April 2020. This number grew to 5 percent in January 2021. School attendance during closures was possible for specific vulnerable groups and children of key workers. No significant differences emerge between April 2020 and January 2021 in terms of the percent of children receiving additional paid resources: Nine per cent of the children in both samples received additional paid resources (e.g. additional learning resources such as online tutoring, educational apps, website subscriptions or exercise books). We do see a significant decrease in the

sults presented in this paper. We also run several robustness checks to examine in how far selective attrition between waves contributes to our results.

[4] The finance module is available in Waves 1, 2, 4, 6, 8 and 9 - corresponding to April, May, July and November 2020; and March and September 2021, respectively.

[5] The number of observations in Column 5 of Table A1 is smaller than that in Column 5 of Table 1 because new households not in Wave 1 (April 2020) responded to the survey in Wave 7 (January 2021).

[6] This is available in Waves 1, 5 and 7; or April 2020, September 2020 and January 2021, respectively.

[7] This is available in Waves 3, 5, 7 and 9 (June and September 2020, and January and September 2021).

[8] The fieldwork for this survey was done prior to the pandemic for 99.6% of the observations. However, to reduce the amount of missing information, we complement this information with the one in Wave 9 (January 2017-May 2019).

[9] We do not have data for parental investments pre-pandemic for 12 per cent of the sample.

Table 1
Summary statistics for children by responding parent's gender.

	(1) All Apr 20'	(2) Mothers Apr 20'	(3) Fathers Apr 20'	(4) p-value (3)-(2)	(5) All Jan 21'	(6) Mothers Jan 21'	(7) Fathers Jan 21'	(8) p-value (7)-(6)	(9) p-value (5)-(1)
Panel A: Child characteristics:									
Child age	11.22	11.26	11.14	(0.29)	11.60	11.63	11.65	(0.90)	(0.00)
Share female	0.47	0.47	0.49	(0.25)	0.49	0.48	0.50	(0.53)	(0.19)
FSM	0.13	0.14	0.12	(0.05)	0.14	0.13	0.13	(0.99)	(0.45)
Panel B: Household characteristics (Baseline):									
Weekly household earnings	746.65	752.09	815.00	(0.00)	746.96	759.36	791.09	(0.11)	(0.98)
Family size	4.30	4.22	4.41	(0.00)	4.11	4.03	4.21	(0.00)	(0.00)
Panel C: Children's resources (Baseline):									
Use additional paid resources	0.06	0.06	0.06	(0.78)	0.06	0.06	0.06	(0.85)	(0.73)
How often helped with homework									
Once or twice a week or more	0.60	0.61	0.60	(0.42)	0.61	0.62	0.60	(0.29)	(0.35)
At most once a month	0.24	0.26	0.22	(0.00)	0.25	0.27	0.23	(0.02)	(0.32)
No homework	0.04	0.04	0.04	(0.85)	0.04	0.04	0.05	(0.34)	(0.67)
Panel D: Children's resources (Covid):									
Child still attending school	0.03	0.04	0.03	(0.31)	0.06	0.04	0.06	(0.00)	(0.00)
Use paid additional resources	0.08	0.08	0.09	(0.23)	0.09	0.08	0.10	(0.11)	(0.52)
Hours helped with homework per day	2.94	2.89	2.96	(0.08)	2.78	2.71	2.85	(0.03)	(0.00)
Panel E: Parental labour market outcomes (Covid):									
Ever furloughed		0.25	0.23	(0.15)		0.24	0.21	(0.09)	
Change in weekly working hours		-10.23	-12.61	(0.00)		-4.03	-4.05	(0.97)	
Change in weekly earnings		-28.20	-82.96	(0.00)		-3.73	-13.47	(0.39)	
Panel F: Hierarchy of labour market shocks:									
Earnings dropped to zero		0.07	0.11	(0.00)		0.06	0.05	(0.13)	
Reduced earnings wrt baseline		0.19	0.21	(0.06)		0.23	0.26	(0.17)	
Same or higher earnings wrt baseline		0.66	0.61	(0.00)		0.60	0.55	(0.01)	
Earnings change not known		0.08	0.07	(0.07)		0.10	0.14	(0.00)	
N	3,539	2,750	1,876		2,053	1,574	1,113		

Source: USoc COVID-19 Study Waves 1 (April 2020) and 7 (January 2021), and USoc Waves 9-10 (2017-2020). Sample of children whose mothers and/or fathers responded to the first or seventh wave of the USoc COVID-19 Study. The numbers of observations reported refer to the number of unique individuals in each sample. Because for some children both the mother and father responded to the survey, the number of observations in Columns 2 and 3 (6 and 7) do not add up to those in Column 1 (5). We only provide summary statistics on parental labour market shocks when reporting samples of mothers' and fathers' responses separately. Summary statistics derived using cross-sectional child weights. *Baseline* corresponds to USoc Wave 10 when available (and 9 otherwise), whereas *Covid* refers to April 2020 (W1) or January 2021 (W7). FSM: Free School Meals; wrt: with respect to.

amount of time devoted to help children with school work as the pandemic progresses.

We also see significant differences in parental labour market outcomes between both waves in Panel D. Economic activity had recovered substantially by January 2021 compared to April 2020. This is reflected in a smaller decrease in weekly working hours and weekly earnings.[10]

Finally, Panel E of Table 1 describes the hierarchy of labour market shocks that serves as our main variable of interest affecting the outcomes. We focus on parents that were employed at baseline (i.e. January-February 2020). We classify these parents into three mutually exclusive categories depending on how earnings in April 2020 (or January 2021) had changed with respect to the pre-pandemic baseline levels. The first category is defined as having experienced an earnings drop to zero. The second category is defined as having experienced reductions in earnings with respect to the baseline, but not to zero. The third category is defined as having the same or higher earnings during the respective Covid-19 wave, compared to the baseline.[11] These three mutually exclusive categories have a clear ranking in terms of what the Covid-19 labour market shock implies for earnings. For each wave, we summarise variables by who the responding parent is. A limitation of the data is that in many two-parent households only one parent responded, and for many children we therefore only have data for one parent and not both. It is important to understand whether families in which the mother responded are different from those families in which the father responded. Some significant differences appear in April 2020, though small in magnitude (see Columns 2, 3 and 4 in Panels A, B and C of Table 1). For instance, households in which the mother responded seem to be a bit more disadvantaged, as shown by a higher fraction of them having their children classified as receiving Free School Meals, and lower mean weekly household earnings. But because families in which the father responded are slightly bigger, the per person weekly family income is very similar among families, independently of the responding parent's gender. Moreover, there are almost no significant differences between responding mothers and fathers in January 2021 in terms of predetermined and baseline characteristics (see Columns 6, 7 and 8 in Panels A, B and C of Table 1). Overall, we think these small differences in magnitude are not a serious concern when comparing mother's and father's impacts coming from negative labour market shocks. As we will see in Section 4, adding a rich array of family and (responding) parent's characteristics does not significantly alter our main estimates.

All in all, within both waves fathers and mothers do not differ much in pre-pandemic variables (panels A, B and C). However, fewer mothers suffered negative labour market shocks in April 2020. By January 2021, though, a higher fraction of mothers (6 per cent) was classified as having lost all their earnings (compared to 5 per cent of fathers).[12]

We now analyse whether the characteristics of parents affected by negative labour market shocks has changed between April 2020 and January 2021. To this end, we regress a dummy variable equal to one

[10] We can see this with the variables 'Change in working hours' and 'Change in weekly earnings'. These variables show the difference with respect to the baseline weekly hours and earnings, measured in January-February 2020.

[11] There are some individuals we cannot categorise (because they didn't respond in the specific wave, or because they did not respond to the specific question in the wave). In order not to lose those observations, we include a forth category to cover those individuals where the hierarchy is unknown.

[12] Some of these differences might be picking up 'voluntary' changes in working hours. We take this into account in our empirical strategy.

Table 2
Regressions of negative labour market shocks on individual characteristics.

	Zero earnings				Reduced earnings			
	(1) Apr 20'	(2) Jan 21'	(3) Apr 20'	(4) Jan 21'	(5) Apr 20'	(6) Jan 21'	(7) Apr 20'	(8) Jan 21'
				Panel A: Mothers				
Age	-0.002	-0.010**	-0.001	-0.008**	0.001	0.003	-0.000	0.003
	(0.002)	(0.004)	(0.002)	(0.004)	(0.003)	(0.004)	(0.003)	(0.004)
British	-0.021	-0.054	-0.027	-0.035	0.022	-0.003	0.041	0.002
	(0.025)	(0.048)	(0.026)	(0.045)	(0.043)	(0.068)	(0.037)	(0.069)
Lives with partner	-0.005	-0.034	-0.019	-0.027	-0.062	0.029	-0.046	0.027
	(0.025)	(0.056)	(0.024)	(0.056)	(0.046)	(0.058)	(0.042)	(0.061)
College degree	-0.043***	0.002	-0.042***	0.013	-0.096***	0.017	-0.064**	0.016
	(0.016)	(0.036)	(0.016)	(0.037)	(0.030)	(0.044)	(0.030)	(0.045)
Age youngest child	-0.003	0.009	-0.004	0.010	-0.010*	-0.010	-0.008	-0.008
	(0.003)	(0.007)	(0.003)	(0.008)	(0.006)	(0.008)	(0.005)	(0.007)
Self-Employed at Baseline	0.543***	0.346***	0.374***	0.294***	0.305***	0.223**	0.190**	0.144
	(0.067)	(0.124)	(0.086)	(0.102)	(0.073)	(0.111)	(0.087)	(0.129)
Sometimes (or more) Worked from Home at Baseline	0.005	-0.030	0.016	-0.018	0.008	-0.036	0.005	-0.056
	(0.017)	(0.033)	(0.017)	(0.033)	(0.030)	(0.041)	(0.030)	(0.044)
Constant	0.180**	0.468***	0.216**	0.312*	0.233*	0.134	0.127	0.433
	(0.083)	(0.176)	(0.108)	(0.186)	(0.126)	(0.207)	(0.144)	(0.391)
Observations	1038	536	1038	536	1206	691	1206	691
				Panel B: Fathers				
Age	-0.003	0.002	-0.003	-0.000	-0.007**	-0.002	-0.007*	-0.002
	(0.005)	(0.003)	(0.004)	(0.003)	(0.004)	(0.006)	(0.003)	(0.005)
British	-0.012	-0.166***	-0.008	-0.120**	-0.099	-0.041	-0.065	-0.009
	(0.050)	(0.061)	(0.047)	(0.061)	(0.067)	(0.087)	(0.058)	(0.078)
Lives with partner	0.038	0.113**	0.078	0.089	-0.117	-0.098	-0.104	-0.122
	(0.111)	(0.051)	(0.096)	(0.056)	(0.131)	(0.105)	(0.137)	(0.105)
College degree	-0.022	-0.069	-0.027	-0.102**	-0.031	0.000	-0.005	0.038
	(0.027)	(0.043)	(0.030)	(0.042)	(0.041)	(0.060)	(0.040)	(0.056)
Age youngest child	-0.004	0.000	-0.002	0.004	0.013*	-0.008	0.012*	-0.004
	(0.005)	(0.006)	(0.005)	(0.005)	(0.007)	(0.010)	(0.007)	(0.009)
Self-Employed at Baseline	0.672***	0.263**	0.560***	0.348**	0.141	0.046	0.178*	0.056
	(0.062)	(0.107)	(0.083)	(0.134)	(0.091)	(0.097)	(0.099)	(0.129)
Sometimes (or more) Worked from Home at Baseline	-0.061**	-0.095***	-0.040	-0.060	-0.022	-0.154***	0.017	-0.045
	(0.029)	(0.037)	(0.029)	(0.039)	(0.039)	(0.059)	(0.039)	(0.057)
Constant	0.096	0.138	-0.026	-0.297	0.683***	0.929***	0.282	0.832**
	(0.165)	(0.204)	(0.200)	(0.219)	(0.221)	(0.353)	(0.227)	(0.397)
Observations	680	332	680	332	811	454	811	454
Firm Size and Industry dummies	No	No	Yes	Yes	No	No	Yes	Yes

Notes: Robust standard errors clustered at the parent level in parentheses. Significance levels are indicated by * < .1, ** < .05, *** < .01. Source: USoc COVID-19 Study Waves 1 (April 2020) and 7 (January 2021), and USoc Waves 9-10 (2017-2020). The dependent variable in Columns (1) to (4) is a dummy variable equal to one if the individual's earnings have dropped to zero with respect to baseline, and zero if the individual has the same or higher earnings than at baseline. The dependent variable in Columns (5) to (8) is a dummy variable equal to one if the individual's earnings have been reduced with respect to baseline, and zero if the individual has the same or higher earnings than at baseline. *Baseline* corresponds to the period January/February 2020.

if the individual experienced zero earnings, and zero if the individual's earnings were the same or higher compared to baseline, separately for April 2020 and January 2021. The results are summarised in Table 2, columns (1) to (4). We also regress a dummy of having experienced earnings reductions to a level above zero. Columns (5) to (8) summarise the results, separately for April 2020 and January 2021, and for different specifications with and without industry dummies.

In general, we see larger differences in Columns 1 through 4, that is, between parents in the omitted category (same or higher earnings) and those parents classified in the zero earnings category. This result holds for both April 2020 and January 2021.

In line with Blundell et al. (2021), one of the characteristics that consistently predicts suffering negative labour market shocks in our sample of parents is being self-employed at baseline. For both fathers and mothers, this is significantly correlated with suffering earnings drops to zero in both waves. However, the magnitude of the coefficient decreases substantially in January 2021 compared to April 2020 for both genders. As the crisis progressed, the self-employed apparently recovered from the initially severe negative earnings shocks. This is also seen for the category of reduced earnings, though the associations are less precise.

The level of education of the parents is also associated with experiencing negative labour shocks. Interestingly, the pattern is different across genders and waves. While having a college degree was negatively associated with suffering zero or reduced earnings in April 2020, this association was no longer present for mothers in January 2021, indicating less negative selection into these categories later on in the crisis. However, this is reversed for fathers: The initially weaker negative association of holding a college degree with zero earnings has become more negative by January 2021, indicating more negative selection into this category as the crisis progressed.

3. Empirical Strategy

Workers who suffer negative labour market shocks during the Covid-19 pandemic are different from those who do not. Observed and unobserved differences associated to negative labour market shocks during

Covid-19 may also be correlated with parental investments and child outcomes.[13] Omitted variable bias poses a challenge to obtaining causal estimates of parental negative labour market shocks.

We exploit two features of the data in order to mitigate this potential source of selection bias as much as possible. First, we include lagged dependent variables, constructed with pre-pandemic information from the regular Understanding Society Survey in the spirit of a value-added specification.[14] To further reduce the scope for omitted variable bias, we additionally control for a large set of child and parental background and firm characteristics. We later analyse the stability of our estimates when introducing different sets of control variables to assess the probability of remaining confounders affecting our results.

We estimate equations of the following form:

$$Y_{i,CW_j} = \alpha_0 + \sum_{H=1}^{N} \alpha_{1,H} \times HIER_{p,H,CW_j} + \alpha_2 \times Y_{i,lag} + \alpha_3 \times \mathbf{X_{i,pre}} + \alpha_4 \times \mathbf{X_{p,pre}} + \sum_{H=1}^{N} \alpha_{5,H} \times HIER_{part,H,CW_j} + \alpha_6 \times \mathbf{S_{i,CW_j}} + \epsilon_{i,CW_j} \quad (1)$$

where Y_{i,CW_j} denotes an outcome measured for child i during Understanding Society Covid-19 wave CW_j, where $j \in \{1,7\}$, corresponding to April 2020 and January 2021, respectively. Our main explanatory variables of interest are given by $HIER_{p,H,CW_j}$. These are dummy variables capturing the H mutually exclusive categories in the hierarchy of labour market shocks described in Section 2.2, and are defined at the parent level (p). In the regressions, we omit the category representing those who have the same or higher earnings compared to baseline. Following the job loss literature, we estimate this equation separately for mothers and fathers.

Lagged dependent variables are denoted by $Y_{i,lag}$, and the set of child and parental background characteristics is denoted by the vector $\mathbf{X_{i,pre}}$, and $\mathbf{X_{p,pre}}$, respectively. The sub-index *pre* indicates that these variables are measured pre-pandemic. We describe these controls in Panel A of Table 3. We first show the results of a regression in which we only introduce the hierarchy dummies in Column (1). We then take into account the fact that changes in the labour market might be due to voluntary reasons, by adding a dummy variable that captures whether any changes in working hours are due to voluntary reasons (Column 2).[15] Column (3) adds the variables capturing the respective lagged outcome (except for the variable measuring the amount of time that the child devotes to schoolwork on an average weekday, for which a lagged outcomes is not available). In Column (4), we add child characteristics: age, whether receiving Free School Meals (an indicator of socioeconomic background) and gender. Parent characteristics are added in Column (5). These are defined for the responding mother/father depending on the regression and comprise: region dummies, age, a dummy indicating whether the parent is of black, Asian or another ethnic minority (BAME), a dummy for whether the parent has college education (or above), and a dummy indicating whether the parent is married. Because certain industries have been affected more than others by the economic shock posed by the Covid-19 pandemic, we control in Column (6) for job characteristics of the parent, namely, 1-digit industry dummies, and dummies for firm size, measured pre-pandemic. We further control for the partner's hierarchy, $HIER_{part,H,CW_j}$, in Column (7).[16]

During our period of analysis, schools were closed (i.e., both in April 2020 and January 2020), except for a small percentage of vulnerable children and children of key workers. Children were home schooled and the quality of education provided by their schools could vary greatly depending on the school attended. Home school quality may or may not be correlated with socioeconomic characteristics of the family, and therefore, with our hierarchy of labour market shocks. We therefore control in Column (8) for the number of online and offline lessons provided by the school, as well as a dummy variable capturing whether the teacher was checking the children's homework. We denote this by $\mathbf{S_{i,CW_j}}$.

Finally, when analysing the effect of adverse labour market shocks in later stages of the pandemic in January 2021, we control for earlier adverse labour market shocks in January 2020 (Column 9).

Equation (1) is estimated by Ordinary Least Squares when the outcome is paid additional tutoring. We use interval regressions for outcomes of parental and children's time investment into school work.[17] Standard errors are clustered at the parent level. For specifications aiming at potential mechanisms (parent-child interactions, financial difficulties, mental health, alcohol consumption and job search indicators), we estimate Equation (1) at the parent level. Controls are specified in Panel B of Table 3.

Estimation of causal impacts in this setting relies on the following hypothesis: once lagged dependent variables and other important background characteristics are controlled for, negative labour market shocks during the Covid-19 crisis are as good as randomly assigned. This is a strong assumption. We acknowledge that our estimation strategy may not capture all remaining confounders. To assess and mitigate the role of selection bias, we check the stability of coefficients by sequentially introducing controls, and run placebo type regressions on pre-pandemic levels of outcomes. That is, we regress the hierarchy of labour market outcomes in April 2020 (and January 2021) on past children's outcomes, measured pre-pandemic. We use a very similar specification, where we control for the lagged dependent variable, and a rich set of predetermined child and parent characteristics (similar to Column (6) in Table 3).

4. Results

We first show results for the relationship between parental labour market shocks and investments in children, and the overall amount of time devoted to school work on an average day. Next, we show results on parent-child interactions. Finally, we look at potential mechanisms through which negative labour market shocks affect child investments and interactions.

4.1. Parental investments in children during Covid-19

We first assess how parental investments are affected by adverse labour market shocks occurring during the Covid-19 crisis. The outcomes we consider are whether parents paid for additional learning resources during the pandemic, such as tutoring or learning apps, and the amount of time parents spent helping their children with homework on an average day. We also summarise in this section the impact of negative labour market shocks during the Covid-19 pandemic on the total

[13] See Ruiz-Valenzuela (2021) for a discussion of the methodological challenges that arise when trying to estimate the impact of parental job losses on child outcomes, and how they have been dealt with in the literature.

[14] We opt for value added specifications, rather than individual fixed effect strategies, for two main reasons: (1) Individual fixed effect strategies would only rely on variability coming from parents suffering labour market shocks, and in the absence of a long panel, this strategy is quite stringent for our sample; (2) the pre-pandemic child level outcomes are not asked in the exact same way. Still, they are very good proxies capturing the levels of parental investments prior to the Covid-19 pandemic.

[15] In alternative specifications we instead drop observations where the parent responds that the change in hours worked was voluntary. Results remain virtually the same.

[16] We do so by including the same categories as for the parent whose labour market shocks are analysed, as well as two additional categories for when (1) there is no partner living in the same household; (2) the hierarchy for the partner is unknown. This allows us to keep the number of observations constant to compare the results across specifications.

[17] The type of answers given to these questions range from 0 hours, 0-1 hours, 1-2 hours,..., to 5 or more hours.

Table 3
Control variables used in regressions.

	(1) NoCont	(2) +Volunt	(3) +VA	(4) +Child	(5) +Parents	(6) +JobChar	(7) +Partner	(8) +School	(9) +HW1
Panel A: Child level									
Voluntary characteristics:									
Voluntary reduction hours parent		✓	✓	✓	✓	✓	✓	✓	✓
Value Added:									
Mother is 1st guardian			✓	✓	✓	✓	✓	✓	✓
Outcome baseline			✓	✓	✓	✓	✓	✓	✓
Child characteristics:									
Age				✓	✓	✓	✓	✓	✓
FSM				✓	✓	✓	✓	✓	✓
Gender				✓	✓	✓	✓	✓	✓
Parent characteristics:									
Region					✓	✓	✓	✓	✓
Age					✓	✓	✓	✓	✓
BAME (baseline)					✓	✓	✓	✓	✓
College and above (baseline)					✓	✓	✓	✓	✓
Married (baseline)					✓	✓	✓	✓	✓
Job characteristics:									
Firm size						✓	✓	✓	✓
Industry						✓	✓	✓	✓
Partner characteristics:									
Voluntary reduction hours partner							✓	✓	✓
Partner hierarchy							✓	✓	✓
School characteristics:									
Number of offline lessons								✓	✓
Number of online lessons								✓	✓
Homework checked by teacher								✓	✓
Past labour market shocks:									
Wave 1 hierarchy (only for Wave 7 outcomes)									✓
Panel B: Parent level									
Voluntary characteristics:									
Voluntary reduction hours parent		✓	✓	✓	✓	✓	✓		✓
Value Added:									
Mother is 1st guardian			✓	✓	✓	✓	✓		✓
Outcome baseline			✓	✓	✓	✓	✓		✓
Child characteristics:									
Age of youngest child				✓	✓	✓	✓		✓
Any child with FSM				✓	✓	✓	✓		✓
Has girl				✓	✓	✓	✓		✓
Has boy				✓	✓	✓	✓		✓
Parent characteristics:									
Region					✓	✓	✓		✓
Age					✓	✓	✓		✓
BAME (baseline)					✓	✓	✓		✓
College and above (baseline)					✓	✓	✓		✓
Married (baseline)					✓	✓	✓		✓
Job characteristics:									
Firm size						✓	✓		✓
Industry						✓	✓		✓
Partner characteristics:									
Voluntary reduction hours partner							✓		✓
Partner hierarchy							✓		✓
Past labour market shocks:									
Wave 1 hierarchy (only for Wave 7 outcomes)									✓

Notes: Table describing the control variables used in each specification. Source: USoc COVID-19 Study Waves 1-9 and USoc Waves 9-10 (2017-2020). Abbreviations: *baseline* indicates that variables come from Wave 10 when available (and 9 otherwise) from the USoc dataset, *Outcome baseline* represents the value observed in Wave 10 or 9 for each correspondent dependent variable; FSM indicates Free School Meals, BAME: Black, Asian, and Minority Ethnicity.

amount of time children spent on school work per day. Results are summarised in Table 4, where we only show the coefficients with the full set of controls described in Table 3.[18]

Panel A shows the impacts of negative labour market shocks when those suffering them are mothers, whereas Panel B shows the results when negative labour market shocks are borne by fathers. Columns (1), (3) and (5) show results for April 2020 (Wave 1), while Columns (2), (4) and (6) show results for January 2021 (Wave 7).

Two main results emerge from this table. First, our results show much smaller impacts of mothers' negative labour market shocks than of fathers' labour market shocks. This is in line with the parental job loss literature, which typically finds negative impacts on child schooling and health outcomes stemming from fathers' job losses, and mixed results for mothers' job losses (see Ruiz-Valenzuela (2021) for a review).

[18] Tables A2 through A7 show that, as further controls are added, estimates remain robust across specifications. The stability of coefficients towards the introduction of further family, parent, and job control variables alleviates concerns about the gender of the respondent: Despite the fact that responding mothers and fathers display some differences in baseline statistics, adding these characteristics does not significantly alter the magnitude of the estimates.

Table 4
The effect of parental labour market shocks on child investments.

	Tutoring paid		Hours helped with homework		Time taken for schoolwork	
	(1) Apr 20'	(2) Jan 21'	(3) Apr 20'	(4) Jan 21'	(5) Apr 20'	(6) Jan 21'
			Panel A: Mothers			
Zero earnings	-0.003	0.051	-0.099	0.278	0.158	0.243
	(0.030)	(0.058)	(0.112)	(0.218)	(0.134)	(0.170)
Reduced earnings	0.005	0.052**	-0.099	0.083	0.029	-0.079
	(0.019)	(0.023)	(0.094)	(0.089)	(0.081)	(0.099)
Constant	0.102	0.129	2.594***	1.385**	-0.155	-1.152*
	(0.101)	(0.155)	(0.419)	(0.678)	(0.432)	(0.600)
Observations	2,750	1,557	2,433	1,334	2,425	1,330
			Panel B: Fathers			
Zero earnings	-0.101***	-0.012	0.534***	-0.401	0.508**	-0.409*
	(0.027)	(0.055)	(0.181)	(0.297)	(0.198)	(0.230)
Reduced earnings	-0.005	-0.052*	-0.007	0.006	-0.039	0.056
	(0.024)	(0.027)	(0.087)	(0.122)	(0.098)	(0.115)
Constant	0.495**	0.014	2.977***	1.717*	1.047**	0.083
	(0.239)	(0.238)	(0.439)	(0.889)	(0.481)	(0.00)
Observations	1,875	1,092	1,699	962	1,696	962

Notes: Robust standard errors clustered at the parent level in parentheses. Significance levels are indicated by * < .1, ** < .05, *** < .01. Source: USoc COVID-19 Study Waves 1 (April 2020) and 7 (January 2021), and USoc Waves 9-10 (2017-2020). Columns (1), (3) and (5) correspond to specification (8) in Panel A of Table 3. Columns (2), (4) and (6) correspond to specification (9) in Panel A of Table 3. The dependent variables are defined as follows: *"Tutoring paid"* is a dummy variable taking on value one if the child received additional paid learning resources, such as tutoring, educational apps, website subscriptions or exercise books, and zero otherwise. *"Hours helped with homework"* is a categorical variable taking on values from 1 (no time taken by parents) to 7 (5 or more hours of time taken by parents for helping with homework) and refers to time taken on an average weekday. *"Time taken for schoolwork"* is a categorical variable taking on values from 1 (less than an hour of time taken for schoolwork by the kid) to 6 (5 or more hours devoted to schoolwork) and refers to time taken on an average weekday. Regressions for the latter two outcomes are estimated using interval regressions.

For mothers, the magnitudes of the coefficients (where the omitted variable is same or higher earnings than in the baseline) are generally small (especially so in April 2020), and the estimates rather imprecise.[19]

Second, children of fathers in the zero earnings category are most affected. For the three variables, though, results change as the pandemic advances. During April 2020, children of fathers whose earnings dropped to zero were 10 percentage points less likely to have received additional paid learning resources. This is a big effect compared to an average of six per cent of children receiving additional paid resources in the sample. By January 2021, we no longer observe this association (though we do observe it for children whose fathers experience a reduction in earnings).

The changing impact as the pandemic evolves is even more pronounced in parental time devoted to school work. While in April 2020 having experienced an earnings drop to zero for fathers was associated with children receiving more than 30 minutes extra help with school work on an average day, by January 2021 this association, though more imprecise, turned negative, with children receiving about 25 minutes less help. This latter result is more in line with the job loss literature, that has consistently found negative impacts of father's job loss on child educational outcomes. Coefficients in Columns (5) and (6) show that the increases or reductions in the amount of time fathers spend helping with school work directly translate into how much time children spent overall doing school work.

We assess the robustness of these results in Table 5. We run several placebo tests in which the parental investment variables, measured pre-pandemic, are regressed separately against the Covid-19 hierarchies of negative labour market shocks (in April 2020 and January 2021, respectively). The specifications shown correspond to Column (6) of Table 3, but results are similar across specifications. Except for one of the eight estimates, we see no significant associations between future labour market shocks during Covid-19 and parental investments pre-pandemic.

In Table 6 we assess whether attrition between April 2020 and January 2021 could be explaining some of these differential results across time periods. To do that, we restrict the overall samples used in Table 4 to use only those observations that appeared in both waves. For the parental investment variables (Columns 1 to 4) that use value-added regressions, our main results hold: We see an (imprecise) decrease in the probability to receive paid tutoring in April 2020 when fathers are seen in the zero earnings category, and no impact in January 2021. Also, similarly to the results found in Table 4, fathers in the zero earnings category devote more time to help their children with homework in April 2020, and this relationship changes sign in January 2021. Thus, results do not seem to be driven by differential attrition.

Only the impact of the fathers moving into the zero earnings category in April 2020 on the time the child devotes to school work (see the results in Panel B, Column 5) changes significantly. We cannot use a value-added specification for this variable, as we cannot construct a lagged value of the dependent variable with the regular USoc survey. This pattern reinforces the importance of having value-added specifications to mitigate as much as possible selection bias concerns. Effects on the time the child devotes to school work should therefore be interpreted with caution.

[19] If one were to stress some findings, one could say that the results suggest an (imprecise) increase in the time that 'zero earning' mothers helped children with school work in January 2021. This is reflected also in the time taken for school work by the children (given that this includes the amount taken by the children themselves, as well as the amount of time the parent(s) helped with school work). There is also a rather contradictory finding: children whose mothers saw their earnings reduced in January 2021 were five percentage points more likely to receive additional paid learning resources.

Table 5
The effect of parental labour market shocks on child investments - placebo test.

	Tutoring paid		Hours helped with homework	
	(1) Apr 20'	(2) Jan 21'	(3) Apr 20'	(4) Jan 21'
		Panel A: Mothers		
Zero earnings	-0.052	-0.092**	0.413	-0.551
	(0.041)	(0.040)	(0.368)	(0.429)
Reduced earnings	-0.003	0.008	0.080	0.044
	(0.015)	(0.021)	(0.200)	(0.235)
Observations	1288	809	1314	826
		Panel B: Fathers		
Zero earnings	-0.042	0.031	0.024	0.592
	(0.051)	(0.028)	(0.380)	(0.491)
Reduced earnings	0.025	0.004	0.158	-0.157
	(0.021)	(0.019)	(0.205)	(0.257)
Observations	820	529	837	537

Notes: Robust standard errors clustered at the parent level in parentheses. Significance levels are indicated by * < .1, ** < .05, *** < .01. Source: USoc COVID-19 Study Waves 1 (April 2020) and 7 (January 2021), and USoc Waves 9-10 (2017-2020). All columns correspond to specification (6) in Panel A of Table 3. The dependent variables are defined as follows: *"Tutoring paid"* is a dummy variable taking on value one if the child received additional paid learning resources in USoc Wave 10, such as tutoring, educational apps, website subscriptions or exercise books, and zero otherwise. *"Hours helped with homework"* is a categorical variable taking on values from 1 (no time taken by parents) to 7 (5 or more hours of time taken by parents for helping with homework) and refers to time taken on an average weekday in USoc Wave 10.

Table 6
The effect of parental labour market shocks on child investments: sample who is observed both in wave 1 and wave 7.

	Tutoring paid		Hours helped with homework		Time taken for schoolwork	
	(1) Apr 20'	(2) Jan 21'	(3) Apr 20'	(4) Jan 21'	(5) Apr 20'	(6) Jan 21'
			Panel A: Mothers			
Zero earnings	0.001	0.056	0.050	0.302	0.173	0.264
	(0.047)	(0.059)	(0.152)	(0.225)	(0.163)	(0.172)
Reduced earnings	-0.031	0.050**	-0.084	0.080	-0.091	-0.099
	(0.024)	(0.023)	(0.104)	(0.091)	(0.093)	(0.100)
Constant	0.275*	0.168	2.278***	1.492**	0.210	-0.821
	(0.156)	(0.158)	(0.544)	(0.697)	(0.551)	(0.594)
Observations	1,475	1,464	1,355	1,261	1,352	1,258
			Panel B: Fathers			
Zero earnings	-0.044	-0.001	0.418**	-0.409	-0.059	-0.401*
	(0.033)	(0.065)	(0.197)	(0.303)	(0.213)	(0.213)
Reduced earnings	-0.017	-0.048	-0.007	0.044	-0.138	0.055
	(0.037)	(0.030)	(0.109)	(0.128)	(0.116)	(0.119)
Constant	0.316*	0.136	3.367***	3.774***	1.329**	1.521*
	(0.181)	(0.247)	(0.640)	(0.843)	(0.614)	(0.766)
Observations	967	949	895	841	894	842

Notes: Robust standard errors clustered at the parent level in parentheses. Significance levels are indicated by * < .1, ** < .05, *** < .01. Source: USoc COVID-19 Study Waves 1 (April 2020) and 7 (January 2021), and USoc Waves 9-10 (2017-2020). Columns (1), (3) and (5) correspond to specification (8) in Panel A of Table 3. Columns (2), (4) and (6) correspond to specification (9) in Panel A of Table 3. Sample of parents in Wave 1 who are also observed in Wave 7. Observations differ slightly across waves because some parents who responded the survey did not respond to the specific child investment question. The dependent variables are defined as follows: *"Tutoring paid"* is a dummy variable taking on value one if the child received additional paid learning resources, such as tutoring, educational apps, website subscriptions or exercise books, and zero otherwise. *"Hours helped with homework"* is a categorical variable taking on values from 1 (no time taken by parents) to 7 (5 or more hours of time taken by parents for helping with homework) and refers to time taken on an average weekday. *"Time taken for schoolwork"* is a categorical variable taking on values from 1 (less than an hour of time taken for schoolwork by the kid) to 6 (5 or more hours devoted to schoolwork) and refers to time taken on an average weekday. Regressions for the latter two outcomes are estimated using interval regressions.

The fact that an initial positive impact on the amount of time fathers devote to help their children with schoolwork turned negative as the pandemic advanced can have several explanations. First, it could be explained by the presence of heterogeneous effects of negative labour market shocks, and the fact that selection into the zero earnings category has changed throughout the pandemic. The literature on parental job loss has identified that negative impacts of father's job loss on children's educational outcomes are concentrated on those from a low socioeconomic background. We saw in Section 2.2 that fathers that fell into the zero earnings category in January 2021 had lower educational attainment than those in the same category in April 2020. Unfortunately, our sample sizes prevent us from saying something meaningful in this respect: Further splitting our hierarchy dummies by father's education level leaves us with too small categories. The suggestive evidence from running that

Table 7
The impact of parental labour market shocks on parent-child relationships.

	Quarreling			Talking matters		
	(1) May 20'	(2) Sept 20'	(3) Jan 21'	(4) May 20'	(5) Sept 20'	(6) Jan 21'
			Panel A: Mothers			
Zero earnings	0.073	0.111*	-0.050	-0.014	0.029	-0.014
	(0.062)	(0.057)	(0.048)	(0.073)	(0.074)	(0.087)
Reduced earnings	0.008	0.043	-0.015	-0.001	0.076*	-0.003
	(0.025)	(0.030)	(0.034)	(0.034)	(0.040)	(0.054)
Constant	0.422***	0.269	0.493**	1.122***	1.147***	0.706**
	(0.154)	(0.164)	(0.204)	(0.293)	(0.319)	(0.295)
Observations	1,630	1,327	711	1,631	1,328	711
			Panel B: Fathers			
Zero earnings	-0.108*	-0.076***	0.189	-0.331***	0.009	-0.094
	(0.059)	(0.027)	(0.140)	(0.091)	(0.130)	(0.139)
Reduced earnings	0.014	0.040*	0.035	-0.080*	0.013	-0.137*
	(0.029)	(0.024)	(0.042)	(0.044)	(0.045)	(0.072)
Constant	0.418**	0.184	-0.084	0.711**	0.870***	0.249
	(0.173)	(0.163)	(0.321)	(0.296)	(0.287)	(0.455)
Observations	1,174	923	460	1,173	922	461

Notes: Robust standard errors clustered at the parent level in parentheses. Significance levels are indicated by * < .1, ** < .05, *** < .01. Source: USoc COVID-19 Study Waves 2 (May 2020), 5 (September 2020) and 7 (January 2021), and USoc Waves 9-10 (2017-2020). Columns (1), (2), (4) and (5) correspond to specification (7) in Panel B of Table 3. Columns (3) and (6) correspond to specification (9) in Panel B of Table 3. The dependent variables are defined as follows: *"Quarreling"* is an indicator equal to one if the person quarrelled most days or more than once a week with child(ren) in the household, and zero if they did so less than that or not at all. *"Talking matters"* is an indicator equal to one if the person talks about important matters most days or more than once a week with child(ren) in the household, and zero if they did so less than that or never.

exercise, though, does not seem to indicate that this could be the main explanation.

A second explanation could be related to the fact that those suffering negative labour market shocks in January 2021 (or still suffering them by January 2021), when things were getting better for most, could suffer worse individual and family consequences than those suffering negative labour market shocks at the onset of the pandemic. With this in mind, we turn to analysing the relationship between negative labour market shocks and parent-child relationships, financial difficulties, mental health, alcohol consumption and job search throughout the pandemic.

4.2. Parent-child relationships

Table 7 shows the impact of negative labour market shocks on two variables measuring parent-child relationships: an indicator for quarrelling (that equals one if the responding parent quarrelled with their children at least once a week) in Columns (1) to (3), and an indicator for whether parents talked about things that matter with their children at least once a week in Columns (4) to (6).[20] Panel A shows results for mothers, whereas Panel B shows results for fathers. We show all Covid-19 periods where data is available, but focus our attention on waves corresponding to April 2020 and January 2021. Those two periods are more comparable, as schools were closed, and there were lockdowns imposed in England in both periods.

The overall patterns of Section 4.1 are reproduced here. First, we see stronger associations between fathers' negative labour market shocks and parent-child relationships than for mothers'. Second, within the hierarchy of negative labour market shocks occurring to fathers, the strongest impacts seen in April 2020 and January 2021 are for children whose parents where reporting zero earnings in each period. Again, the results suggest a different impact of having a father in the zero earnings category if this occurred in April 2020 than if it occurred in January 2021. During the first lockdown, fathers in the zero earnings category were less likely to quarrel and to engage in conversations that mattered with their children. By the third national lockdown, in January 2021, these associations disappear, and even if imprecise, the results point to an increase in quarrelling instead. For the reduced earnings group, there's evidence of a decrease in the indicator capturing whether parents and children talked frequently about things that matter.[21]

4.3. Financial difficulties, parental well-being and job search

While parental investments and child outcomes can be directly affected by the pandemic labour market shocks borne by parents, it could be that there are indirect effects on these outcomes through changes in household finances, parental well-being and behaviour. Thus, we follow the related job loss literature and explore the impact of negative labour market shocks during the Covid-19 pandemic on indicators capturing financial difficulties, parents' mental health, engagement in risky behaviour (measured through alcohol consumption) and job search behaviour. These indicators are available in several of the Covid-19 survey waves. We make use of all the potential waves available to have a picture as complete as possible, and following the previous structure, we present results separately for fathers and mothers.[22]

Financial difficulties

Negative labour market shocks during the Covid-19 pandemic can impact household finances. In Table 8 we summarise the size of the earnings shock in proportion to household earnings, for both mothers (Panel A) and fathers (Panel B). We do so by calculating the change in weekly earnings that the responding parent suffers, and what proportion this change represents over total weekly household earnings measured

[20] The information is at the parent level, hence the reduction in the number of observations with respect to the child level regressions.

[21] Tables A8 through A11 show that the coefficients are rather stable across different specifications, for both outcome variables and waves.

[22] We use specification (7) of Table 3, Panel B, to summarise findings. However, results are very similar if we use instead the specification described in Column (9).

Table 8
Change in weekly earnings as a proportion of household earnings at baseline.

	Winsorized		Non-winsorized	
	(1) Apr 20'	(2) Jan 21'	(3) Apr 20'	(4) Jan 21'
		Panel A: Mothers		
Zero earnings	-0.485	-0.507	-0.472	-0.507
Reduced earnings	-0.155	-0.110	-0.147	-0.106
Observations	1,492	810	1,486	809
		Panel B: Fathers		
Zero earnings	-0.664	-0.689	-0.636	-0.689
Reduced earnings	-0.218	-0.157	-0.205	-0.153
Observations	1,040	546	1,029	545

Notes: This table shows the change in weekly earnings as a share of total household earnings at baseline. Source: USoc COVID-19 Study Waves 1 (April 2020) and 7 (January 2021), and USoc Waves 9-10 (2017-2020). In Columns (1) and (2), we winsorize negative values at -1. In Columns (3) to (4), we remove the observations for which the change in weekly earnings is larger than household earnings at baseline.

Table 9
Job search.

	(1) June 20'	(2) Sept 20'	(3) Jan 21'	(4) Sept 21'
		Panel A: Mothers		
Zero earnings	0.122	0.221***	-0.166**	0.119*
	(0.054)	(0.074)	(0.067)	(0.070)
Reduced earnings	-0.004	0.074***	-0.028	-0.005
	(0.014)	(0.023)	(0.019)	(0.020)
Constant	0.099	0.016	2.037***	0.094
	(0.057)	(0.144)	(0.085)	(0.105)
Observations	1,763	1,531	792	1,512
		Panel B: Fathers		
Zero earnings	0.175	0.356***	-0.199**	0.115
	(0.077)	(0.109)	(0.083)	(0.092)
Reduced earnings	0.021	-0.020	-0.048	-0.021
	(0.015)	(0.015)	(0.033)	(0.029)
Constant	-0.003	0.064	1.902***	-0.012
	(0.076)	(0.088)	(0.140)	(0.084)
Observations	1,237	1,090	532	1,116

Notes: Robust standard errors in parentheses. Significance levels are indicated by * < .1, ** < .05, *** < .01. Source: USoc COVID-19 Study Waves 3 (June 2020), 5 (September 2020), 7 (January 2021), 9 (September 2021) and USoc Waves 9-10 (2017-2020). The dependent variable is an indicator equal to one if the individual was searching for a job in a given wave. Reported coefficients correspond to specification (7) in Panel B of Table 3.

at baseline (January/February 2020). In columns 1 and 2, we winsorize relative changes at -1 in case changes exceed baseline household earnings. In Columns 3 and 4 we instead remove these excess changes from the data. Results are robust to these changes. As expected, we observe that the size of the earnings shock for the household is bigger when the mother or father moves into the zero earnings category than when they suffer reduced earnings. We also see that for both categories, the size of the earnings shock represents a higher fraction of household earnings when it is the father suffering it. For instance, at the beginning of the pandemic, the household loses 66.4% of their baseline earnings when the father is classified as moving into the zero earnings category (column 1). This number stands at -48.5% for mothers. The size of the shock is slightly larger for both in January 2021 (-68.9% and -50.7% for fathers and mothers, respectively).

Decreases in earnings can result in unpaid bills if households do not hold enough savings. We capture these potential financial difficulties through an indicator that measures whether the household is behind with some or all of their household bill payments. We offer the full results in Table A12. Because most of the action is concentrated on the zero earnings category, we summarise those findings in Figure 1.

There are no significant differences between mothers in the zero earnings category and mothers who do not suffer negative labour market shocks when it comes to the ability of the household to pay bills throughout the pandemic. However, the story is different when fathers' earnings drop to zero (always with respect to the baseline earnings in January-February 2020): they are about 18 to 20 percentage points more likely to be behind with bills in May, July and November 2020; and about 8 percentage points more likely in March 2021, though this effect is imprecise and it has disappeared by September 2021.

All in all, these gender differences are probably related to the fact that men are still predominantly the main breadwinner in UK households, and therefore, negative labour market shocks affecting fathers, rather than mothers, have a higher likelihood of impacting household finances.

Parents' mental health and alcohol consumption Existing evidence from the job loss literature suggests that individuals might suffer from poorer

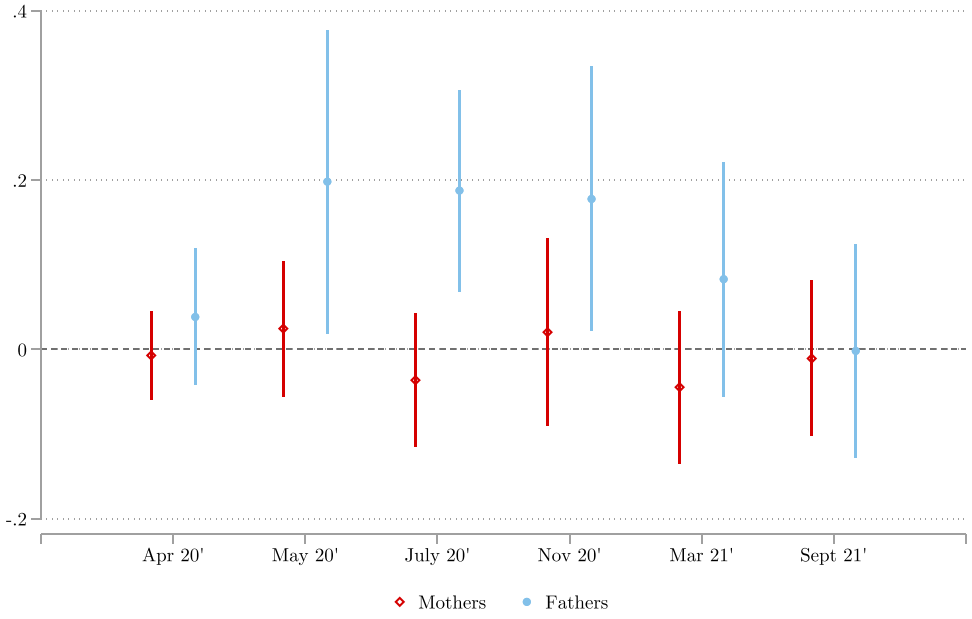

Fig. 1. Behind with bills - estimated coefficients for zero earnings **Notes:** This figure shows the estimated coefficients for the zero earnings category, where the omitted category is same or higher earnings. Source: USoc COVID-19 Study Waves 1 (January 2021), 2 (May 2020), 4 (July 2020), 6 (Nov 2020), 8 (Mar 2021), 9 (Sept 2021), and USoc Waves 9-10 (2017-2020). The dependent variable is an indicator equal to one if the person is behind with some or all household bill payments. The specification corresponds to Column (7) in Panel B of Table 3.

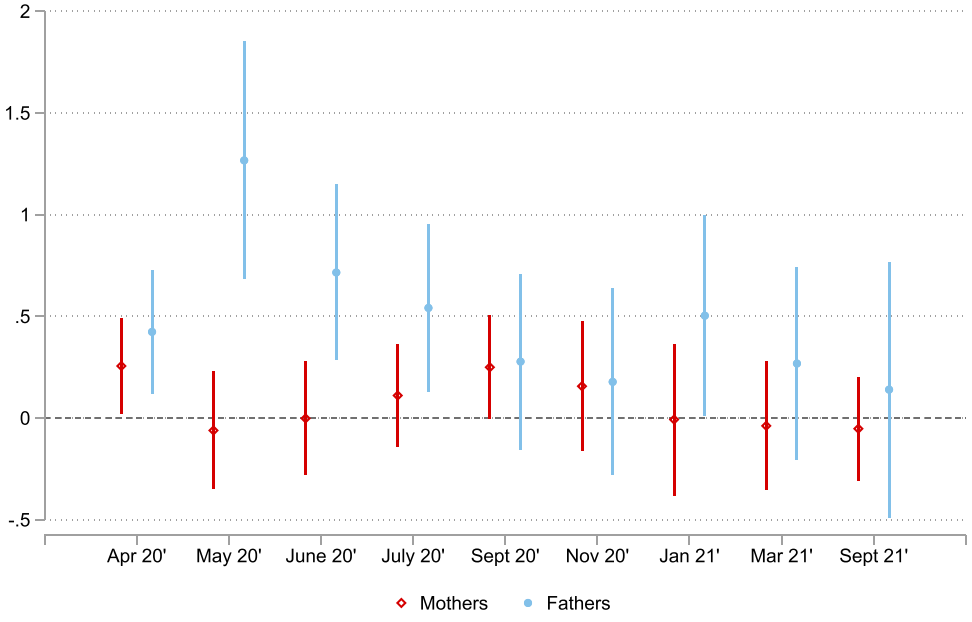

Fig. 2. GHQ score (standardised) - estimated coefficients for zero earnings **Notes:** This figure shows the estimated coefficients for the zero earnings category, where the omitted category is same or higher earnings. Source: USoc COVID-19 Study Waves 1 (January 2021), 2 (May 2020), 3 (June 2020), 4 (July 2020), 5 (September 2020), 6 (November 2020), 7 (January 2021), 8 (March 2021), 9 (September 2021) and USoc Waves 9-10 (2017-2020). The dependent variable is the GHQ score (standardised). The specification corresponds to Column (7) in Panel B of Table 3.

mental health after job loss occurs or when job insecurity increases (see, for instance, Kuhn et al. (2009)). Our data allows to check whether parents facing negative labour market shocks show lower levels of self-reported mental health. We look at the overall score in the General Health Questionnaire, where a higher score reflects worse mental health. Table A13 shows results for all available months. Once more, significant impacts are concentrated on those losing all their earnings, and this is especially the case when those falling in the zero earnings category are fathers. We summarise those coefficients in Figure 2. Compared to those that did not suffer negative labour market shocks, both mothers and fathers in the zero earnings category suffer a deterioration of their mental health at the beginning of the pandemic, of about 25 per cent and 42 per cent of a standard deviation, respectively. Whereas mothers in the zero earnings category seem to recover after the initial shock (we only see a borderline significant deterioration of their mental health in September 2020), fathers in the zero earnings category show consistently worse mental health in May, June and July 2020. The coefficients, though still positive and sizeable, become imprecise during September and November 2020. However, the coefficient becomes significant again in January 2021, by the time of the third national lockdown in England.[23]

Following the literature on the consequences of job loss and job insecurity on affected individuals (see Eliason and Storrie (2009), for instance), and given the results on both increased financial difficulties and mental health deterioration, especially for fathers, we next try to under-

[23] Figure B.1 summarises the results of placebo tests in which we regress the GHQ score measured pre-pandemic on the hierarchy of future negative labour market shocks in April 2020 and January 2021, respectively. We plot coefficients of the impact of mothers and fathers receiving zero earnings. We do not find any association between future negative labour market shocks occurring in April 2020 and pre-pandemic GHQ scores. For mothers, this also holds for future shocks in January 2021. However, there is a positive association between father's negative labour market shocks in January 2021 and their pre-pandemic mental health. Those fathers were already doing worse in terms of self-reported mental health prior to the pandemic. These findings caution against causal interpretations of the results and show that particularly disadvantaged families faced the most persistent negative labour market shocks until January 2021.

stand whether affected parents engaged in more risky behaviours, like excessive alcohol consumption, when faced with a negative labour market shock. Table A14 summarises the results. The dependent variable is the average number of drinks that the person has consumed in a typical week within the last month. The mostly positive coefficients, both for mothers and fathers, and across categories of the hierarchy, are highly imprecise. Though only suggestive, the results would imply that mental health deterioration for those parents in the zero earnings category did probably not lead to increased alcohol consumption compared to other individuals who did not suffer a negative labour market shock.

Job search The amount of time available to help children with their schoolwork might have been affected for those parents suffering negative labour market shocks, if they engaged in active job search as a result. We check this in Table 9, for both mothers (Panel A) and fathers (Panel B). The results are very similar for both genders. There is a non-significant positive impact in June 2020, as the economy started recovering following the end of the first national lockdown, and a clear positive and significant impact in September 2020. However, by January 2021, when England was going through the third national lockdown, those in the zero earnings category reduced their active job search, and it picked up again by September 2021. Therefore, these results would rule out that time invested in job search during the January 2021 lockdown could have crowded out time to help children with schoolwork.

5. Conclusion

There is mounting evidence that the Covid-19 crisis has had an unequal impact on the employment prospects and earnings of different groups in society. Similarly, the costs of school closures were unequally distributed, with children from disadvantaged backgrounds experiencing larger learning losses. These matter, and are likely to matter in the future for the Covid generation, because the twin drivers of low social mobility are higher education inequalities and higher income inequalities (Elliot Major and Machin, 2018; Elliot Major et al., 2021). The inequalities in labour market experiences and home schooling environments interacted during the Covid-19 crisis, widening and exacerbating already existing gaps in child outcomes by socio-economic status. Against this background, this paper contributes to the understanding of the intergenerational consequences of the negative labour market shocks borne by parents during the Covid-19 crisis.

Using data from the UK, we first document significant impacts on parental investment variables, as well as on the overall time children devote to school work during two periods when schools were closed in the UK: April 2020 and January 2021. We then look at impacts on variables capturing parent-child relationships, as well as other potential mechanisms that could be mediating effects throughout the pandemic, such as household financial difficulties and a worsening of parent's mental health.

Two main conclusions follow from our analysis of intergenerational impacts of negative labour market shocks during the Covid-19 pandemic. First, there are larger impacts when fathers are affected by negative labour market shocks than when mothers are affected. The fact that effects on child investments are driven mainly by fathers is in line with the existing literature analysing the impact of job loss on children's school performance (Ruiz-Valenzuela, 2021). Rege et al. (2011) argue that the disparate effect of job loss across fathers and mothers is consistent with empirical studies documenting that the mental distress experienced by displaced workers is generally more severe for men than for women, which is in line with what is reported here.

Second, it is children of those fathers that suffered the most severe labour market shocks (i.e. earnings dropping to zero) that are consistently impacted. During April 2020, children of fathers whose earnings dropped to zero were 10 percentage points less likely to have received additional paid learning resources. Also, and perhaps due to families compensating for this drop in paid resources, fathers whose earnings dropped to zero were spending 30 more minutes on an average day helping their children with school work (always compared with those not suffering negative labour market shocks). However, by January 2021, this association turned negative, with children receiving about 25 minutes less help when their fathers suffered an earnings drop to zero. This reduction in the amount of time helped with school work translates into a lower overall amount of time doing school work.

These damaging impacts on parental time investments and school work found later in the pandemic are more in line with the job loss literature, that has consistently found negative impacts of father's job loss on child educational outcomes. The sign reversal might be due to the fact that those suffering negative labour market shocks in January 2021 (or still suffering them by January 2021), when things were getting better for most, might be suffering worse consequences than those suffering negative labour market shocks at the onset of the pandemic, in April 2020. In our analysis of potential mechanisms we see that from May through November 2020, households in which the father is classified as having zero earnings are almost 20 percentage points more likely to experience financial difficulties. We also see a worsening of mental health for those fathers whose earnings dropped to zero, especially during the periods when schools were closed. Potentially as a result, the initial reduction in quarrelling with children that we see at the beginning of the pandemic is reversed by January 2021.

Ultimately, it will be important to understand whether, and if so to what extent, the negative intergenerational effects on parental investments and school work seen during the periods of school closures during the pandemic translate into worse school performance in the future. This is important because education and labour market scarring can have damaging long run economic consequences as they translate into subsequent lessened access to higher education opportunities, and in worse employment, earnings and other economic outcomes at the time when young people enter the labour market (Elliot Major et al., 2021; Von Wachter, 2020; Stuart, 2022).

Data availability

The authors do not have permission to share the data but the Understanding Society data used in this article can be obtained from the UK Data Service.

Appendix A. Additional Tables

Table A1
Attrition checks: Summary statistics for children by responding parent's gender.

	Observed in Wave 1				Observed in Wave 1 and 7				
	(1) All Apr 20'	(2) Mothers Apr 20'	(3) Fathers Apr 20'	(4) p-value (3)-(2)	(5) All Apr 20'	(6) Mothers Apr 20'	(7) Fathers Apr 20'	(8) p-value (7)-(6)	(9) p-value (5)-(1)
Panel A: Child characteristics:									
Child age	11.23	11.26	11.16	(0.38)	11.09	11.04	11.15	(0.47)	(0.20)
Share female	0.47	0.47	0.49	(0.27)	0.49	0.49	0.49	(0.94)	(0.17)
FSM	0.13	0.14	0.12	(0.06)	0.14	0.13	0.12	(0.59)	(0.72)
Panel B: Household characteristics (Baseline):									
Weekly household earnings	745.39	752.09	815.00	(0.00)	737.84	755.11	807.95	(0.01)	(0.63)
Family size	4.30	4.22	4.41	(0.000)	4.22	4.13	4.38	(0.00)	(0.01)
Panel C: Children's resources (Baseline):									
Use additional paid resources	0.06	0.06	0.06	(0.78)	0.06	0.06	0.06	(0.67)	(0.80)
How often helped with homework									
Once or twice a week or more	0.60	0.61	0.60	(0.41)	0.62	0.63	0.61	(0.22)	(0.14)
At most once a month	0.24	0.26	0.22	(0.00)	0.26	0.27	0.24	(0.05)	(0.13)
No homework	0.04	0.04	0.04	(0.86)	0.04	0.04	0.05	(0.07)	(0.42)
Panel D: Children's resources (Covid):									
Child still attending school	0.03	0.04	0.03	(0.31)	0.03	0.03	0.03	(0.67)	(0.16)
Use paid additional resources	0.08	0.08	0.09	(0.23)	0.10	0.09	0.11	(0.22)	(0.02)
Hours helped with homework per day	2.94	2.89	2.96	(0.08)	2.87	2.84	2.92	(0.14)	(0.08)
Panel E: Parental labour market outcomes (Covid):									
Ever furloughed		0.25	0.23	(0.15)		0.23	0.25	(0.54)	
Change in weekly working hours		-10.23	-12.62	(0.00)		-10.08	-11.69	(0.02)	
Change in weekly earnings		-28.20	-82.96	(0.00)		-29.91	-58.77	(0.00)	
Panel F: Hierarchy of labour market shocks:									
Earnings dropped to zero		0.07	0.11	(0.00)		0.06	0.07	(0.58)	
Reduced earnings wrt baseline		0.19	0.22	(0.06)		0.19	0.21	(0.23)	
Same or higher earnings wrt baseline		0.66	0.61	(0.00)		0.68	0.65	(0.18)	
Earnings change not known		0.08	0.07	(0.05)		0.07	0.07	(0.96)	
N	3,538	2,750	1,875		1,789	1,471	959		

Source: USoc COVID-19 Study Waves 1 (April 2020) and 7 (January 2021), and USoc Waves 9-10 (2017-2020). Sample of children whose mothers and/or fathers responded to the first Covid-19 Survey in April 2020; and those that responded also in January 2021. The numbers of observations reported refer to the number of unique individuals in each sample. Because for some children both the mother and the father responded to the survey, the number of observations in Columns 2 and 3 (6 and 7) do not add up to those in Column 1 (5). We only provide summary statistics on parental labour market shocks when reporting samples of mothers' and fathers' responses separately. Summary statistics derived using cross-sectional child weights. *Baseline* corresponds to USoc Wave 10 when available (and 9 otherwise), whereas *Covid wave* refers to April 2020 (W1) or January 2021 (W7). FSM indicates Free School Meals; and wrt indicates with respect. All summary statistics report averages except for weekly household earnings, where we report the median value.

Table A2
Child receives paid additional learning resources (April 2020).

	(1) NoCont	(2) +Volunt	(3) +VA	(4) +Child	(5) +Parents	(6) +JobChar	(7) +Partner	(8) +School
				Panel A: Mothers				
Zero earnings	-0.017	-0.021	-0.027	-0.030	-0.020	-0.007	-0.011	-0.003
	(0.027)	(0.026)	(0.025)	(0.026)	(0.027)	(0.030)	(0.030)	(0.030)
Reduced earnings	-0.003	-0.004	-0.005	-0.009	-0.002	0.002	0.001	0.005
	(0.020)	(0.020)	(0.020)	(0.020)	(0.021)	(0.020)	(0.020)	(0.019)
Constant	0.084***	0.080***	0.190***	0.227***	0.158**	0.064	0.091	0.102
	(0.010)	(0.010)	(0.036)	(0.045)	(0.072)	(0.081)	(0.090)	(0.101)
Observations	2750	2750	2750	2750	2750	2750	2750	2750
				Panel B: Fathers				
Zero earnings	-0.084***	-0.079***	-0.071***	-0.078***	-0.081***	-0.090***	-0.092***	-0.101***
	(0.016)	(0.015)	(0.015)	(0.017)	(0.023)	(0.027)	(0.026)	(0.027)
Reduced earnings	-0.015	-0.016	-0.015	-0.015	-0.012	-0.007	-0.007	-0.005
	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)	(0.024)	(0.024)	(0.024)
Constant	0.101***	0.086***	0.213***	0.263***	0.228**	0.412*	0.513**	0.521**
	(0.014)	(0.018)	(0.056)	(0.071)	(0.109)	(0.214)	(0.238)	(0.242)
Observations	1876	1876	1876	1876	1876	1876	1876	1876

Notes: Robust standard errors clustered at the parent level in parentheses. Significance levels are indicated by * < .1, ** < .05, *** < .01. Source: USoc COVID-19 Study Waves 1 (April 2020) and USoc Waves 9-10 (2017-2020). The dependent variable is a dummy variable equal to one if the child was receiving paid additional learning resources. Controls are described in Panel A of Table 3.

Table A3
Child receives paid additional learning resources (January 2021).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	NoCont	+Volunt	+VA	+Child	+Parents	+JobChar	+Partner	+School	+HW1
					Panel A: Mothers				
Zero earnings	0.063	0.063	0.044	0.040	0.036	0.044	0.053	0.051	0.051
	(0.053)	(0.053)	(0.057)	(0.057)	(0.055)	(0.055)	(0.056)	(0.056)	(0.058)
Reduced earnings	0.040	0.041*	0.039*	0.040*	0.040*	0.041*	0.041*	0.042*	0.052**
	(0.025)	(0.025)	(0.023)	(0.022)	(0.023)	(0.022)	(0.022)	(0.022)	(0.023)
Constant	0.071***	0.072***	0.335***	0.274***	0.187	0.096	0.131	0.170	0.129
	(0.011)	(0.012)	(0.069)	(0.086)	(0.119)	(0.119)	(0.126)	(0.160)	(0.155)
Observations	1557	1557	1557	1557	1557	1557	1557	1557	1557
					Panel B: Fathers				
Zero earnings	-0.037	-0.034	-0.021	-0.022	-0.030	-0.014	-0.009	-0.017	-0.010
	(0.050)	(0.052)	(0.047)	(0.048)	(0.046)	(0.046)	(0.044)	(0.047)	(0.055)
Reduced earnings	-0.060**	-0.063**	-0.067***	-0.073***	-0.067***	-0.056**	-0.053**	-0.053**	-0.050*
	(0.024)	(0.024)	(0.025)	(0.025)	(0.026)	(0.026)	(0.025)	(0.025)	(0.027)
Constant	0.111***	0.118***	0.362***	0.285**	0.206	0.152	0.041	0.038	0.034
	(0.019)	(0.032)	(0.095)	(0.130)	(0.153)	(0.173)	(0.184)	(0.240)	(0.237)
Observations	1092	1092	1092	1092	1092	1092	1092	1092	1092

Notes: Robust standard errors clustered at the parent level in parentheses. Significance levels are indicated by * < .1, ** < .05, *** < .01. Source: USoc COVID-19 Study Wave 7 (January 2021) and USoc Waves 9-10 (2017-2020). The dependent variable is a dummy variable equal to one if the child was receiving paid additional learning resources. Controls are described in Panel A of Table 3.

Table A4
Number of hours spent by parents helping with homework (interval regression) (April 2020).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	NoCont	+Volunt	+VA	+Child	+Parents	+JobChar	+Partner	+School
				Panel A: Mothers				
Zero earnings	0.025	-0.037	-0.074	-0.028	0.001	-0.112	-0.087	-0.099
	(0.112)	(0.116)	(0.119)	(0.102)	(0.105)	(0.116)	(0.115)	(0.112)
Reduced earnings	0.005	0.001	-0.028	-0.083	-0.078	-0.088	-0.081	-0.099
	(0.108)	(0.107)	(0.101)	(0.094)	(0.088)	(0.096)	(0.096)	(0.094)
Constant	1.449***	1.392***	0.805***	2.880***	3.188***	2.696***	2.827***	2.594***
	(0.066)	(0.068)	(0.088)	(0.190)	(0.409)	(0.448)	(0.429)	(0.419)
Observations	2433	2433	2433	2433	2433	2433	2433	2433
				Panel B: Fathers				
Zero earnings	0.832	0.797	0.716	0.599	0.460**	0.534***	0.527**	0.533***
	(0.632)	(0.608)	(0.468)	(0.368)	(0.198)	(0.204)	(0.206)	(0.180)
Reduced earnings	-0.067	-0.051	-0.118	-0.079	-0.046	-0.045	-0.051	-0.008
	(0.099)	(0.098)	(0.098)	(0.085)	(0.085)	(0.087)	(0.089)	(0.087)
Constant	1.438***	1.482***	0.820***	2.952***	3.460***	3.320***	3.344***	3.039***
	(0.055)	(0.146)	(0.135)	(0.239)	(0.390)	(0.431)	(0.479)	(0.428)
Observations	1700	1700	1700	1700	1700	1700	1700	1700

Notes: Robust standard errors in parentheses. Significance levels are indicated by * < .1, ** < .05, *** < .01. Source: USoc COVID-19 Study Wave 1 (April 2020) and USoc Waves 9-10 (2017-2020). The dependent variable is the number of hours spent by parents helping with homework on an average weekday. Controls are described in Panel A of Table 3.

Table A5
Number of hours spent by parents helping with homework (interval regression) (January 2021).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	NoCont	+Volunt	+VA	+Child	+Parents	+JobChar	+Partner	+School	+HW1
					Panel A: Mothers				
Zero earnings	0.331	0.333	0.350*	0.211	0.276	0.248	0.255	0.175	0.278
	(0.232)	(0.232)	(0.200)	(0.198)	(0.188)	(0.200)	(0.207)	(0.215)	(0.218)
Reduced earnings	0.064	0.061	0.046	0.071	0.093	0.077	0.077	0.062	0.083
	(0.125)	(0.125)	(0.110)	(0.095)	(0.094)	(0.091)	(0.090)	(0.087)	(0.089)
Constant	1.278***	1.273***	0.666***	1.266***	1.142***	1.213**	1.529***	1.424**	1.385**
	(0.071)	(0.071)	(0.105)	(0.229)	(0.401)	(0.528)	(0.529)	(0.647)	(0.678)
Observations	1334	1334	1334	1334	1334	1334	1334	1334	1334
					Panel B: Fathers				
Zero earnings	-0.450	-0.439	-0.580*	-0.512	-0.418	-0.460	-0.469	-0.422	-0.401
	(0.302)	(0.305)	(0.341)	(0.380)	(0.307)	(0.347)	(0.343)	(0.323)	(0.297)
Reduced earnings	0.167	0.169	0.113	-0.019	-0.003	-0.041	-0.029	-0.017	0.006
	(0.182)	(0.182)	(0.166)	(0.154)	(0.144)	(0.124)	(0.122)	(0.115)	(0.122)
Constant	1.337***	1.341***	0.898***	1.315***	2.459***	2.097**	2.745***	1.715**	1.717*
	(0.094)	(0.094)	(0.172)	(0.356)	(0.612)	(0.820)	(0.956)	(0.846)	(0.889)
Observations	962	962	962	962	962	962	962	962	962

Notes: Robust standard errors in parentheses. Significance levels are indicated by * < .1, ** < .05, *** < .01. Source: USoc COVID-19 Study Wave 7 (January 2021) and USoc Waves 9-10 (2017-2020). The dependent variable is the number of hours spent by parents helping with homework on an average weekday. Controls are described in Panel A of Table 3.

Table A6
Time taken for schoolwork by child (April 2020).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	NoCont	+Volunt	+Child	+Parents	+JobChar	+Partner	+School
				Panel A: Mothers			
Zero earnings	0.088	0.060	-0.011	0.054	0.082	0.090	0.158
	(0.140)	(0.144)	(0.134)	(0.143)	(0.155)	(0.152)	(0.134)
Reduced earnings	-0.086	-0.088	-0.063	-0.033	0.030	0.032	0.029
	(0.106)	(0.105)	(0.100)	(0.095)	(0.099)	(0.099)	(0.081)
Constant	1.739***	1.713***	0.521***	0.006	-0.504	-0.084	-0.155
	(0.058)	(0.060)	(0.135)	(0.398)	(0.599)	(0.618)	(0.432)
Observations	2425	2425	2425	2425	2425	2425	2425
				Panel B: Fathers			
Zero earnings	0.284	0.268	0.286	0.307	0.494**	0.491**	0.511**
	(0.402)	(0.372)	(0.376)	(0.258)	(0.246)	(0.249)	(0.200)
Reduced earnings	-0.174	-0.178	-0.185	-0.133	-0.146	-0.141	-0.037
	(0.119)	(0.118)	(0.114)	(0.114)	(0.113)	(0.113)	(0.098)
Constant	1.868***	1.960***	0.901***	0.890*	0.974*	1.338**	0.960**
	(0.059)	(0.120)	(0.194)	(0.476)	(0.525)	(0.553)	(0.474)
Observations	1697	1697	1697	1697	1697	1697	1697

Notes: Robust standard errors in parentheses. Significance levels are indicated by * < .1, ** < .05, *** < .01. Source: USoc COVID-19 Study Wave 1 (April 2020) and USoc Waves 9-10 (2017-2020). The dependent variable is the number of hours spent by parents helping with homework on an average weekday. Controls are described in Panel A of Table 3.

Table A7
Time taken for schoolwork by child (January 2021).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	NoCont	+Volunt	+Child	+Parents	+JobChar	+Partner	+School	+HW1
				Panel A: Mothers				
Zero earnings	0.238	0.232	0.280	0.289	0.229	0.221	0.253	0.243
	(0.226)	(0.224)	(0.201)	(0.193)	(0.188)	(0.197)	(0.162)	(0.170)
Reduced earnings	0.004	0.016	-0.018	-0.065	-0.075	-0.079	-0.056	-0.079
	(0.129)	(0.130)	(0.130)	(0.128)	(0.118)	(0.117)	(0.096)	(0.099)
Constant	2.997***	3.015***	-0.436***	-1.093**	-1.061*	-0.491	-1.139*	-1.152*
	(0.072)	(0.069)	(0.081)	(0.446)	(0.616)	(0.654)	(0.589)	(0.600)
Observations	1330	1330	1330	1330	1330	1330	1330	1330
				Panel B: Fathers				
Zero earnings	-0.605**	-0.604**	-0.599***	-0.561***	-0.546**	-0.487*	-0.449*	-0.409*
	(0.256)	(0.258)	(0.211)	(0.202)	(0.257)	(0.252)	(0.238)	(0.230)
Reduced earnings	-0.096	-0.096	-0.021	0.011	0.004	0.025	0.028	0.056
	(0.161)	(0.162)	(0.152)	(0.142)	(0.137)	(0.135)	(0.112)	(0.115)
Constant	2.939***	2.939***	-0.465***	-0.349	-0.159	0.306	-0.010	0.083
	(0.083)	(0.083)	(0.087)	(0.540)	(.)	(.)	(.)	(.)
Observations	962	962	962	962	962	962	962	962

Notes: Robust standard errors in parentheses. Significance levels are indicated by * < .1, ** < .05, *** < .01. Source: USoc COVID-19 Study Wave 7 (January 2021) and USoc Waves 9-10 (2017-2020). 1 The dependent variable is the number of hours spent by parents helping with homework on an average weekday. Controls are described in Panel A of Table 3.

Table A8
Quarrels most days with child(ren) (May 2020).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	NoCont	+Volunt	+VA	+Child	+Parents	+JobChar	+Partner
				Panel A: Mothers			
Zero earnings	0.068	0.066	0.063	0.082	0.083	0.074	0.073
	(0.061)	(0.061)	(0.059)	(0.056)	(0.057)	(0.062)	(0.062)
Reduced earnings	0.015	0.015	0.014	0.005	0.009	0.010	0.008
	(0.027)	(0.027)	(0.026)	(0.026)	(0.025)	(0.025)	(0.025)
Constant	0.131***	0.130***	0.312***	0.414***	0.425***	0.385***	0.422***
	(0.016)	(0.016)	(0.046)	(0.061)	(0.120)	(0.130)	(0.154)
Observations	1630	1630	1630	1630	1630	1630	1630
				Panel B: Fathers			
Zero earnings	-0.113***	-0.119***	-0.077*	-0.082**	-0.069	-0.109*	-0.108*
	(0.034)	(0.035)	(0.041)	(0.039)	(0.048)	(0.057)	(0.059)
Reduced earnings	-0.005	-0.005	0.009	0.004	0.008	0.013	0.014
	(0.035)	(0.035)	(0.032)	(0.032)	(0.032)	(0.029)	(0.029)
Constant	0.159***	0.158***	0.405***	0.653***	0.407***	0.357**	0.418**
	(0.020)	(0.021)	(0.056)	(0.093)	(0.151)	(0.157)	(0.173)
Observations	1174	1174	1174	1174	1174	1174	1174

Notes: Robust standard errors in parentheses. Significance levels are indicated by * < .1, ** < .05, *** < .01. Source: USoc COVID-19 Study Wave 2 (May 2020) and USoc Waves 9-10 (2017-2020). The dependent variable is an indicator equal to one if the person quarrelled most days or more than once a week with child(ren) in the household. Controls are described in Panel B of Table 3.

Table A9
Quarrels most days with child(ren) (January 2021).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	NoCont	+Volunt	+VA	+Child	+Parents	+JobChar	+Partner	+HW1
				Panel A: Mothers				
Zero earnings	-0.051	-0.049	-0.047	-0.045	-0.041	-0.046	-0.048	-0.050
	(0.041)	(0.041)	(0.038)	(0.038)	(0.045)	(0.047)	(0.049)	(0.048)
Reduced earnings	-0.014	-0.016	-0.022	-0.021	-0.007	-0.005	-0.012	-0.015
	(0.038)	(0.037)	(0.037)	(0.036)	(0.034)	(0.036)	(0.035)	(0.034)
Constant	0.105***	0.103***	0.219***	0.167**	0.406*	0.406**	0.493**	0.492**
	(0.025)	(0.026)	(0.048)	(0.085)	(0.218)	(0.200)	(0.201)	(0.203)
Observations	711	711	711	711	711	711	711	711
				Panel B: Fathers				
Zero earnings	0.126	0.126	0.131	0.100	0.136	0.166	0.159	0.189
	(0.150)	(0.151)	(0.128)	(0.136)	(0.126)	(0.139)	(0.136)	(0.140)
Reduced earnings	0.014	0.016	0.025	0.030	0.027	0.028	0.026	0.035
	(0.060)	(0.060)	(0.052)	(0.056)	(0.044)	(0.039)	(0.039)	(0.042)
Constant	0.093***	0.091***	0.296***	0.203*	-0.472**	-0.174	-0.086	-0.057
	(0.031)	(0.032)	(0.090)	(0.113)	(0.217)	(0.317)	(0.317)	(0.320)
Observations	461	461	461	461	461	461	461	461

Notes: Robust standard errors in parentheses. Significance levels are indicated by * < .1, ** < .05, *** < .01. Source: USoc COVID-19 Study Wave 7 (January 2021) and USoc Waves 9-10 (2017-2020). The dependent variable is an indicator equal to one if the person quarrelled most days or more than once a week with child(ren) in the household. Controls are described in Panel B of Table 3.

Table A10
Talks with children about things that matter most days (May 2020).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	NoCont	+Volunt	+VA	+Child	+Parents	+JobChar	+Partner
				Panel A: Mothers			
Zero earnings	-0.016	-0.017	-0.048	-0.042	-0.023	-0.012	-0.014
	(0.080)	(0.080)	(0.074)	(0.074)	(0.076)	(0.075)	(0.073)
Reduced earnings	-0.006	-0.007	-0.001	-0.006	-0.001	0.002	-0.001
	(0.038)	(0.038)	(0.036)	(0.036)	(0.035)	(0.034)	(0.034)
Constant	0.611***	0.609***	0.725***	0.725***	0.630***	0.916***	1.122***
	(0.022)	(0.022)	(0.025)	(0.078)	(0.164)	(0.280)	(0.293)
Observations	1631	1631	1631	1631	1631	1631	1631
				Panel B: Fathers			
Zero earnings	-0.280***	-0.267***	-0.270***	-0.281***	-0.298***	-0.333***	-0.331***
	(0.083)	(0.085)	(0.083)	(0.083)	(0.090)	(0.093)	(0.091)
Reduced earnings	-0.076	-0.076	-0.096*	-0.100**	-0.076*	-0.083*	-0.080*
	(0.051)	(0.051)	(0.050)	(0.049)	(0.044)	(0.044)	(0.044)
Constant	0.520***	0.523***	0.665***	0.859***	0.785***	0.554**	0.711**
	(0.029)	(0.029)	(0.040)	(0.099)	(0.212)	(0.282)	(0.296)
Observations	1173	1173	1173	1173	1173	1173	1173

Notes: Robust standard errors in parentheses. Significance levels are indicated by * < .1, ** < .05, *** < .01. Source: USoc COVID-19 Study Waves 2 (May 2020) and USoc Waves 9-10 (2017-2020). The dependent variable is an indicator equal to one if the person talks about important matters most days or more than once a week with child(ren) in the household. Controls are described in Panel B of Table 3.

Table A11
Talks with children about things that matter most days (January 2021).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	NoCont	+Volunt	+VA	+Child	+Parents	+JobChar	+Partner	+HW1
				Panel A: Mothers				
Zero earnings	-0.013	-0.012	0.025	0.017	0.025	0.031	0.036	-0.014
	(0.109)	(0.109)	(0.086)	(0.091)	(0.095)	(0.085)	(0.085)	(0.088)
Reduced earnings	-0.010	-0.012	-0.024	-0.033	-0.026	-0.011	-0.005	-0.004
	(0.055)	(0.055)	(0.052)	(0.053)	(0.051)	(0.051)	(0.051)	(0.053)
Constant	0.587***	0.585***	0.681***	0.744***	0.688***	0.848***	0.772***	0.724**
	(0.033)	(0.033)	(0.034)	(0.123)	(0.235)	(0.289)	(0.296)	(0.294)
Observations	711	711	711	711	711	711	711	711
				Panel B: Fathers				
Zero earnings	-0.106	-0.106	-0.205	-0.197	-0.156	-0.126	-0.142	-0.092
	(0.179)	(0.180)	(0.186)	(0.182)	(0.153)	(0.141)	(0.137)	(0.139)
Reduced earnings	-0.081	-0.080	-0.115	-0.130*	-0.135*	-0.170**	-0.169**	-0.139*
	(0.090)	(0.091)	(0.084)	(0.077)	(0.071)	(0.068)	(0.067)	(0.071)
Constant	0.483***	0.483***	0.637***	0.940***	0.279	0.098	0.176	0.274
	(0.045)	(0.046)	(0.052)	(0.175)	(0.361)	(0.438)	(0.449)	(0.448)
Observations	462	462	462	462	462	462	462	462

Notes: Robust standard errors in parentheses. Significance levels are indicated by * < .1, ** < .05, *** < .01. Source: USoc COVID-19 Study Wave 7 (January 2021) and USoc Waves 9-10 (2017-2020). The dependent variable is an indicator equal to one if the person talks about important matters most days or more than once a week with child(ren) in the household. Controls are described in Panel B of Table 3.

Table A12
Behind with bills.

	(1) Apr 20'	(2) May 20'	(3) July 20'	(4) Nov 20'	(5) Mar 21'	(6) Sept 21'
			Panel A: Mothers			
Zero earnings	-0.007	0.025	-0.036	0.020	-0.045	-0.011
	(0.027)	(0.041)	(0.040)	(0.056)	(0.046)	(0.047)
Reduced earnings	0.058**	0.005	-0.001	-0.016	-0.020	-0.008
	(0.024)	(0.020)	(0.018)	(0.019)	(0.020)	(0.018)
Constant	0.120	0.213*	0.294*	0.041	0.004	-0.095
	(0.100)	(0.117)	(0.160)	(0.125)	(0.119)	(0.116)
Observations	1,718	1,887	1,704	1,359	1,365	1,506
			Panel B: Fathers			
Zero earnings	0.039	0.198**	0.188***	0.178**	0.083	-0.002
	(0.041)	(0.091)	(0.061)	(0.80)	(0.071)	(0.064)
Reduced earnings	-0.026	0.023	0.062*	-0.005	0.049	-0.014
	(0.022)	(0.025)	(0.032)	(0.022)	(0.030)	(0.028)
Constant	0.295*	0.388**	0.408**	0.240	0.134	0.013
	(0.175)	(0.194)	(0.169)	(0.184)	(0.144)	(0.122)
Observations	1,167	1,393	1,228	982	1,003	1,122

Notes: Robust standard errors in parentheses. Significance levels are indicated by * < .1, ** < .05, *** < .01. Source: USoc COVID-19 Study Waves 1 (January 2021), 2 (May 2020), 4 (July 2020), 6 (Nov 2020), 8 (Mar 2021), 9 (Sept 2021), and USoc Waves 9-10 (2017-2020). The dependent variable is an indicator equal to one if the person is behind with some or all household bill payments. Reported coefficients correspond to specification (7) in Panel B of Table 3.

Table A13
GHQ score (standardised).

	(1) Apr 20'	(2) May 20'	(3) June 20'	(4) July 20'	(5) Sept 20'	(6) Nov 20'	(7) Jan 21'	(8) Mar 21'	(9) Sept 21'
					Panel A: Mothers				
Zero earnings	0.254**	-0.061	-0.001	0.111	0.250*	0.157	-0.013	-0.038	-0.052
	(0.120)	(0.147)	(0.142)	(0.129)	(0.130)	(0.162)	(0.208)	(0.161)	(0.130)
Reduced earnings	0.123	-0.003	-0.031	0.023	0.074	0.072	0.112	-0.003	-0.020
	(0.078)	(0.067)	(0.065)	(0.070)	(0.070)	(0.076)	(0.102)	(0.078)	(0.080)
Constant	0.773	0.340	0.701*	-0.598*	-0.664	0.286	-0.476	0.152	0.312
	(0.587)	(0.499)	(0.369)	(0.334)	(0.511)	(0.485)	(0.628)	(0.693)	(0.457)
Observations	1,680	1,860	1,725	1,659	1,456	1,333	781	1,348	1,496
					Panel B: Fathers				
Zero earnings	0.428***	1.267***	0.716***	0.542**	0.278	0.178	0.556**	0.268	0.140
	(0.155)	(0.298)	(0.220)	(0.210)	(0.220)	(0.233)	(0.269)	(0.241)	(0.320)
Reduced earnings	-0.034	0.066	0.075	0.085	0.012	0.056	0.123	0.090	0.022
	(0.088)	(0.065)	(0.078)	(0.112)	(0.082)	(0.096)	(0.135)	(0.092)	(0.095)
Constant	1.110	0.833	0.235	0.715	0.242	0.107	-0.603	0.378	0.080
	(0.747)	(0.537)	(0.485)	(0.623)	(0.615)	(0.709)	(0.653)	(0.547)	(0.546)
Observations	1,134	1,370	1,223	1,205	1,055	963	533	984	1,110

Notes: Robust standard errors in parentheses. Significance levels are indicated by * < .1, ** < .05, *** < .01. Source: USoc COVID-19 Study Waves 1 (January 2021), 2 (May 2020), 3 (June 2020), 4 (July 2020), 5 (Sept 2020), 6 (Nov 2020), 7 (Jan 2021), 8 (Mar 2021), 9 (Sept 2021) and USoc Waves 9-10 (2017-2020). The dependent variable is the GHQ score (standardised). Reported coefficients correspond to specification (7) in Panel B of Table 3.

Table A14
Alcohol consumption.

	(1) Apr 20'	(2) May 20'	(3) Jan 21'
		Panel A: Mothers	
Zero earnings	0.852	-0.579	2.168
	(1.124)	(0.719)	(1.770)
Reduced earnings	0.296	-0.213	1.070**
	(0.622)	(0.247)	(0.524)
Constant	10.327**	-1.602	-0.914
	(4.509)	(2.244)	(5.506)
Observations	1,199	901	509
		Panel B: Fathers	
Zero earnings	1.152	0.989	1.496
	(1.214)	(1.198)	(2.147)
Reduced earnings	-0.454	0.087	-0.331
	(0.710)	(0.413)	(0.607)
Constant	8.635**	1.232	-5.903
	(3.820)	(3.351)	(3.668)
Observations	817	682	345

Notes: Robust standard errors in parentheses. Significance levels are indicated by * < .1, ** < .05, *** < .01. Source: USoc COVID-19 Study Waves 1 (January 2021), 5 (Sept 2020), 7 (Jan 2021) and USoc Waves 9-10 (2017-2020). The dependent variable is a continuous indicator reflecting the average number of drinks that the person has consumed in a typical week within the last month. Reported coefficients correspond to the specification displayed in Column (7) of Panel B in Table 3.

Appendix B. Additional Figures

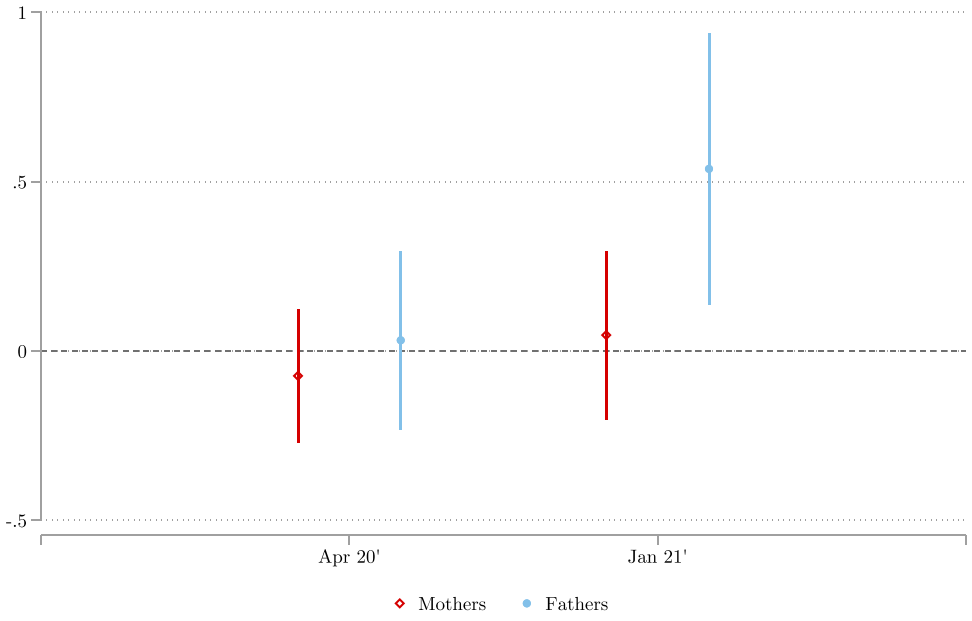

Fig. B.1. GHQ score (standardised) measured pre-pandemic, estimated coefficients for zero earnings. Placebo test. **Notes:** This figure shows the estimated coefficients for the zero earnings category, where the omitted category is same or higher earnings. Source: USoc COVID-19 Study Waves 1 (January 2021) and, 7 (January 2021). The dependent variable is the GHQ score (standardised) measured in regular USoc Wave 10, pre-pandemic. The earnings categories are measured during the pandemic, well after the dependent variable is measured. The specification corresponds to Column (6) in Panel B of Table 3.

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