

The gendered division of paid and domestic work under lockdown

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Abstract

This paper provides novel empirical evidence on the effects of the COVID-19 pandemic on the division of labour between parents of school-aged children in two-parent opposite-gender families. In line with existing evidence, we find that mothers' paid work took a larger hit than that of fathers, and that mothers spent substantially longer doing childcare and housework than their partners. We go further to show that these gender differences cannot be explained by gender differences in the industries and occupations in which parents worked prior to the lockdown. Nor can they be explained by gender differences in earnings prior to the crisis: independently of which parent earned the most before the pandemic, it tended to be the mothers who adjusted time spent on paid and unpaid work more significantly. This is the case even in households where only one partner remained active in paid work. While we cannot fully rule out that these asymmetric responses are explained by gender differences in productivity in domestic work, our results do suggest that other factors, such as gender norms, may play an important role.

KEYWORDS

time allocation, labour supply, gender inequality, household behaviour, COVID-19

JEL CLASSIFICATION

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1 | INTRODUCTION

The COVID-19 lockdowns disrupted the work and domestic lives of families around the world. They shut down entire sections of the economy and many jobs, and drastically increased demand for unpaid domestic labour with market substitutes for childcare and home services suddenly becoming unavailable. Parents were especially affected by the closure of schools and childcare providers which left them with full responsibility for caring for and educating their children from home. It has been suggested that women – especially mothers – may have been disproportionately affected for two reasons. First, they are over-represented in lockdown sectors, such as hospitality and retail, where the risk of temporary or permanent job-loss was high.¹ Second, the gendered ways in which families tend to divide responsibilities² could have been reinforced if the huge increase in demand for domestic labour during lockdown was mainly shouldered by women at the expense of their market work.

This paper provides novel empirical evidence on the effects of the pandemic on the division of labour between parents of school-aged children. We build on the rapidly growing literature documenting how men and women shared paid and domestic work during the COVID-19 pandemic and showing that women were more likely to stop working for pay and take on the bulk of the additional childcare and housework.³ Our contribution is twofold. We start by documenting that the paid and unpaid work of mothers was more responsive to the pandemic shock than that of fathers. These asymmetries led to an increase in gender inequalities in time use during lockdown relative to what existed before. We then consider the likely drivers of the emerging gender gaps in time use, separating the roles of labour market shocks and decisions made by families when faced with unexpected increases in the demand for domestic work. To better understand the determinants of these intra-household decisions, we investigate how they relate to the characteristics of families and of the jobs that mothers and fathers held before lockdown. Specifically, we examine the hypothesis that ‘who does what’ during the crisis simply reflects a choice to protect the financial well-being of the family, accentuating pre-existing inequalities either because fathers are more likely to be the breadwinner to start with or because of an uneven distribution of employment shocks across genders.

We study the period of the first lockdown in England, which started at the end of March 2020 and lasted until the summer of that year. Over that period, all non-essential shops, services and schools were closed by decree,⁴ and the UK government implemented generous programmes to protect jobs and support the financial circumstances and solvency of families and firms.

To shed light on the evolution of gender gaps in paid work and domestic responsibilities in response to the lockdown, we conducted an online survey between 29 April and 15 May 2020, in which we collected data for families living in England. The data were collected through a reputable online survey company and the resulting sample aligns well across key characteristics with a comparable subsample taken from the nationally representative Labour Force Survey. The data include detailed information about the employment and earnings of parents before and during lockdown, as well as their time use during lockdown. We measure time use by administering a ‘time diary’ instrument, which asks respondents to identify the activities that they were doing in every hour of the preceding 24-hour period. This method is more accurate than the more aggregated data collection employed in other studies of time use during the pandemic asking for number of hours spent on different activities over a given period (for example, a day or a week).⁵ It also allows us to separate undisturbed time from multitasking, thus capturing both the quantity and quality of parents’ work time. We asked respondents

¹ Alon et al., 2020; Hupkau and Petrongolo, 2020.

² Gimenez-Nadal and Sevilla, 2012.

³ These patterns were found in studies for the UK (Biroli et al., 2020; Sevilla and Smith, 2020), the US (Biroli et al., 2020; Adams-Prassl et al., 2020; Collins et al., 2021) and India (Deshpande, 2020). In Germany (Adams-Prassl et al., 2020) and in Australia (Craig and Churchill, 2021), women were no more likely to stop working for pay but did take on a greater share of the childcare.

⁴ Schools remained open only for children of key workers and for those deemed most vulnerable.

⁵ Cornwell, Gershuny and Sullivan, 2019; Gershuny et al., 2020.

about themselves and their partner, which allows us to document gender gaps in responses to the lockdown and to examine behaviour within couples. In this paper, we use the subsample of opposite-gender two-parent households.⁶

We show that while participation in paid work shrank dramatically during the lockdown for fathers, it did even more so for mothers. We also document large gender differences in the paid work hours of parents who remained working. We show that there was an opening up of the gender gap in total and uninterrupted hours that parents devoted to paid work compared with before lockdown. At the same time, mothers shouldered more of the additional housework and childcare than fathers, whether or not they remained active in paid work.

Our results suggest that decisions made within the family are a key driver of gender gaps in time use during the lockdown. We show that gaps in work participation and hours of work are not explained by mothers' jobs being structurally more vulnerable to COVID-related demand shocks, or by mothers working fewer hours before the pandemic and therefore being more dispensable to employers. Furthermore, much of the gender gap in participation in paid work arises from instances where parents had a choice over whether to take furlough. Finally, even among observationally similar mothers and fathers, mothers reduced their working hours more sharply and spent a higher proportion of these combining work activities with other domestic duties.

These patterns are not a simple consequence of families prioritising the paid work of the partner who earned the most before lockdown. Using data on relative earnings before the crisis, we show that couples where the father had earned more before lockdown did not organise their time in the opposite way to couples where the mother earned more. In families where the mother was the main earner, she took on more of the domestic responsibilities and spent less time on paid work than similar fathers in families where the father was the higher earner; this finding holds especially strongly for uninterrupted work time. We see these asymmetries even in the extreme case where one parent stops working for pay entirely during lockdown. While we cannot fully rule out that these asymmetric responses are explained by gender differences in productivity in domestic work, our results suggest that other factors such as gender norms on breadwinner and home-making roles may be important.⁷

These findings have several consequences. First, they highlight important inequalities in men's and women's responses to a large shock. The greater sensitivity of maternal time allocation to changes in home demands suggested by our findings may be an important contributing factor to the magnitude and remarkable persistence of the 'child penalty' that women incur.⁸ While much of the focus has been on how couples deal with increased childcare and domestic demands immediately following a child's birth, our results suggest that at least some of the explanation is likely to lie in how couples with children cope with fluctuations in home demands over the longer term – during childhood and adolescence of their children. Furthermore, by showing that the response patterns do not support existing key hypotheses, our results suggest that important gaps remain in understanding how couples make the decisions that lead to the greater responsiveness of women's time to shocks that we document.

Finally, the evidence in our analysis of very significant gender gaps in pandemic responses, combined with some wider existing literature, suggests that these may have important longer-run consequences. We know that career interruptions can have persistent adverse long-run effects, so the widening gaps we document may translate into a worsening in gender inequality over the longer term. However, these adverse effects may be offset by shifts to more flexible working for both men and women during and since the pandemic, a change in gender attitudes precipitated by increases in

⁶ We might expect results to be different in same-gender couples, especially in light of recent evidence on striking differences in sharing of parenting responsibilities between same-gender and opposite-gender couples (Andresen and Nix, 2022). However, at only 7.8 per cent, the subsample of same-gender couples in our data is too small to conduct meaningful analysis.

⁷ Akerlof and Kranton, 2000; Sevilla-Sanz, 2010; Bertrand et al., 2016.

⁸ Andrew et al., 2021.

domestic and childcare burdens faced by men during lockdown even if they were smaller than those for women, and favourable labour market conditions following the pandemic.

The remainder of this paper is organised as follows. Section 2 describes our data. Section 3 shows how the working status and working hours of mothers and fathers were differentially affected by the lockdown. Section 4 documents the impacts of lockdown on the burden of domestic chores and childcare faced by mothers and fathers. Section 5 considers whether the observed patterns are consistent with families prioritising the paid work of the higher-earning partner. Section 6 concludes.

2 | DATA

2.1 | Survey

Our analysis draws on novel, real-time data collected during the first UK-wide coronavirus lockdown, between 29 April and 15 May 2020. We surveyed 4,925 parents living in England with at least one child aged between 4 and 15 who was in one of eight different school years at the time of the interview.⁹ Participants were recruited through a reputable online survey company and received a small payment in compensation for their time.¹⁰ To improve the representativeness of our sample, we imposed sampling quotas based on gender, education, pre-lockdown employment status, and geographic region. While the resulting sample aligns well across key characteristics with a comparable subsample taken from the nationally representative Labour Force Survey, we constructed weights to replicate the distribution of a wider set of socio-economic characteristics in that subsample, including family structure, mother's and father's education, pre-pandemic employment status, 2019 pre-tax earnings, and indicators of how vulnerable their jobs were to the lockdown. Details are available in Online Appendix A.

2.2 | Sample and key variables

This paper uses the subsample of opposite-gender two-parent households; there are 3,591 such families in our sample. We interviewed one adult per family but collected comparable data for respondents and their partners by asking the respondent to answer the same set of questions for themselves and their partner. Hence, we have a balanced sample of adult parents.¹¹ An adult is defined as a parent if they report that their 'own' child or a child of their partner is in the household today.¹²

The key feature of our survey is a detailed record of how respondents and their partners spent their time on the day before the interview. This information was collected using an online time-use diary and refers to term-time weekdays in all cases.¹³ To keep the survey a manageable length, we used

⁹ We interviewed parents with children entering Reception in September 2020 and those with school-aged children in Reception and Years 1, 4, 5, 8, 9 and 10.

¹⁰ All respondents gave informed consent for us to use the data they provided. We received ethical approval to collect and analyse these data from the UCL Institute of Education Institutional Review Board: Application 1337, 'Time allocation and household routines during the COVID-19 lockdown'.

¹¹ Respondents are a mix of men and women, with a slightly higher proportion of women (60 per cent). This mix reduces concerns that gender differences are driven by reporting differences. We find no systematic differences in reported information by gender of the respondent and our analysis is robust to controlling for the identity of the respondent. Furthermore, we find the same pattern of results when we restrict the sample to respondent mothers and fathers as when we restrict the sample to the partners of respondents.

¹² The exact question asked is 'Do you have any of your own children or children of your partner (if relevant) who are in the following school years in the household today?'. The school years we were particularly interested in included children entering Reception in September 2020; currently (in May 2020) in Year 1; currently in Year 5; and currently in Year 10. This was because, as part of this project, we have also been looking at effects of COVID-19 on children's attainment and wanted to capture children who would be going through national assessments in the near future.

¹³ All interviews were conducted Tuesdays to Saturdays, excluding school holidays and the Tuesdays after bank holidays.

one-hour slots. These are longer than the 10-minute intervals used in finer time-use surveys, such as the 2014–15 UK Time Use Survey. To counterbalance the coarser intervals, we allowed respondents to select more than one activity per slot.¹⁴

Throughout, we study the total number of one-hour slots during which parents are engaged in each activity during the day. For simplicity, we refer to this measure as ‘time’ or ‘hours’ spent on each activity.¹⁵ Our focus is on time spent in paid work, housework and childcare.¹⁶

We also collected detailed socio-economic and demographic information for each family, including family composition, the respondent’s and their partner’s age, gender, education in four levels,¹⁷ pre-pandemic and current employment status, current furlough, normal weekly working hours and who held most responsibility for key household chores in February 2020, and annual gross pay in 2019.¹⁸ Finally, we recorded industry and occupation of the jobs each partner held in February 2020 for 20 different industries and 25 different occupations, a level that is roughly equivalent to but more detailed than the two-digit classification in the official UK SIC and SOC codes.

2.3 | Descriptive patterns

The average family in our sample had two children living in the household, with the youngest being 7 years old. In February 2020, 76 per cent of mothers and 92 per cent of fathers were working for pay. At that point, fathers were much more likely to be in full-time work and to be the higher earner in the family, while mothers did a greater share of the housework than fathers (see Table B1 in Online Appendix B).

Using the data we collected during lockdown in May 2020, the left-hand panel of Figure 1 shows the distribution of domestic and paid work over a day, separately for mothers and fathers. There are stark gender differences in time spent on paid work, housework and childcare. At all points in the day, more fathers than mothers were doing paid work. The reverse is true for housework and childcare; for example, during core working hours, around 70 per cent of mothers were doing childcare compared with 50 per cent of fathers.

The right-hand panel of Figure 1 shows the total amount of time spent on these activities per day in our data from May 2020 and how it compares with pre-lockdown levels reported in the UK Time Use Survey for 2014–15.¹⁹ Compared with 2014–15, we observe a large reduction in working hours for both parents and a compensating increase in domestic work during lockdown. Overall, fathers spent only about a half the amount of time that they spent on paid work in 2014–15, and mothers as little as two-fifths. In the rest of the paper, we study the extent to which these changes in time use are different for mothers and fathers and whether they can be explained by pre-existing differences in the jobs and family roles of each parent.

¹⁴ Our time-use diary instrument asks respondents to select which activities they were doing in each hour of the previous day from a pre-populated list of options and allowing respondents to select multiple activities. The activities included were: sleeping/resting; personal care (e.g. eating, bathing); paid work (including commuting); activities with your child(ren); basic care for child(ren) and keeping an eye on child(ren); housework and errands; leisure; exercising; and volunteering and caring for others (not your children). An alternative approach would have been to ask the respondents how long they spend on each activity per day or week, which would not have captured multitasking and may have resulted in greater reporting error.

¹⁵ Although our measure is not the same as time spent on each of these activities (and might overstate it), this is inconsequential for our purpose of estimating average gender differences in time use as long as the error in measurement affects the reported time of men and women similarly.

¹⁶ Our data provide a more comprehensive and disaggregated description of time use which is described in Figure B1 in Online Appendix B, where leisure, exercising and volunteering are combined under ‘Leisure’.

¹⁷ These correspond to leaving school without qualifications, lower-secondary qualifications (obtained in the UK at age 16), upper-secondary qualifications (obtained in the UK at age 18) and university degree.

¹⁸ Official figures from the Office for National Statistics show that employment rates in February 2020 for men and women were similar to those observed for the prior months.

¹⁹ We use comparable measures constructed from a comparable sample of parents from the 2014–15 Time Use Survey as baselines against which to compare how parents shared responsibilities for domestic and paid work during lockdown.

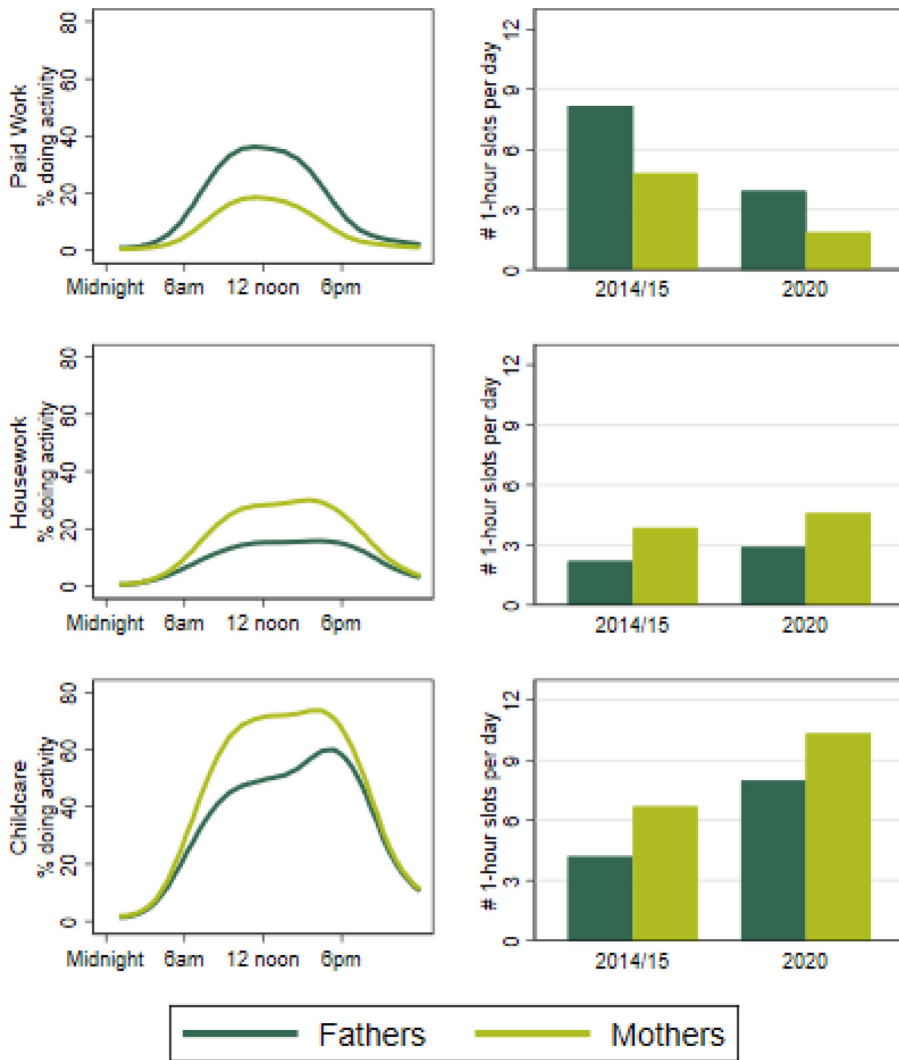


FIGURE 1 Mothers' and fathers' time use: distribution over the day during lockdown in 2020 (on the left) and total daily loads in 2014–15 and during lockdown in 2020 (on the right)

Note: The graphs report, on the left, the percentage of fathers and mothers engaging in each activity in each one-hour slot of the day on weekdays and, on the right, the total number of one-hour time slots spent engaging in each activity. The samples include both one- and two-parent households. *Source:* Left-hand side – authors' own calculations based on the IFS–IoE survey of time use. Right-hand side – authors' own calculations based on the IFS–IoE survey of time use and on the 2014–15 Time Use Survey.

3 | PARENTS' PAID WORK UNDER LOCKDOWN

3.1 | Working status

Our data show that only 55 per cent of parents who had been working in February 2020 were still engaging in paid work during lockdown at the time of our survey, in May 2020. We find significant gender differences in the rates of and reasons for job loss among parents. In order to look at this, we select the subsample of parents who were active in paid work in February 2020, and regress several indicators of working status during lockdown on a female dummy. The working status indicators

TABLE 1 Gender gaps in working status during the lockdown among parents who were active in paid work in February 2020

	(1)	(2)	(3)	(4)	(5)
	Working for pay	Laid off or quit	Furloughed	Furloughed by choice	Furloughed without choice
<i>Panel A. Raw differences</i>					
Female	-0.097*** (0.015)	0.047*** (0.011)	0.050*** (0.013)	0.033*** (0.010)	0.016* (0.010)
Intercept: average for fathers	0.591*** (0.0106)	0.112*** (0.00701)	0.297*** (0.00982)	0.178*** (0.00819)	0.119*** (0.00695)
<i>Panel B. Adding fixed effects for occupation, industry and education</i>					
Female	-0.167*** (0.015)	0.054*** (0.012)	0.113*** (0.015)	0.076*** (0.012)	0.036*** (0.011)
<i>Panel C. Adding fixed effects for pre-COVID daily hours of paid work</i>					
Female	-0.121*** (0.0167)	0.002 (0.012)	0.119*** (0.016)	0.079*** (0.013)	0.038*** (0.012)

Note: The table shows estimates of the coefficient for the female indicator obtained from weighted linear probability models. The weights were constructed to replicate the distribution of socio-economic and demographic characteristics of families in the 2019 UK Labour Force Survey. Regressions use varying sets of regressors, as explained in panel labels. Dependent variables labelled in column headings are indicators for working status at the time of the interview, during the first lockdown period. Column 1 shows estimates for gender differences in whether parents remain active in work. Those who stop work do so permanently ('Laid off or quit' in column 2) or temporarily ('Furloughed' in column 3). Furloughing may happen at the request of workers who need to stop working for personal reasons ('by choice' in column 4) or because employers reduce their economic activity ('without choice' in column 5). Sample includes all parents in two-parent opposite-gender families who were active in paid work in February 2020. Sample: 5,743 observations. Standard errors, shown in parentheses, are clustered at the family level. Stars indicate significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

include whether working for pay, laid off or quit, furloughed, furloughed by choice and furloughed without choice. Overall, mothers were 10 percentage points (ppt) more likely to have stopped working for pay than fathers (column 1, panel A of Table 1). This gender difference is due in equal parts to mothers being more likely to have been laid off or quit and mothers being more likely to have been furloughed (columns 2 and 3, panel A). These effects compound the already unequal employment rates of mothers and fathers: before the crisis, mothers were in paid work at 83 per cent of the rate of fathers; during lockdown, this fell to 70 per cent.

The opening gaps in working status could be partly due to differences in the structural vulnerability to lockdown-induced reductions in labour demand of the jobs worked by mothers and fathers before the crisis. To control for these differences, we add a full set of industry and occupation indicators for pre-pandemic jobs, as well as indicators for educational attainment, in a linear regression model specification.²⁰

Controlling for job characteristics increases the gender difference in how likely individuals were to be in paid work during lockdown by three-quarters, from 9.7ppt to 16.7ppt (column 1, panel B). This suggests that mothers' jobs were *less* structurally vulnerable to the pandemic shock than those of fathers and that, therefore, the decisions made within the family about how to allocate responsibilities during this period are likely to have played an important role in driving the observed gender discrepancies.

This interpretation is consistent with results in columns 3–5, showing gender differences in furloughing rates. Early in the pandemic, the UK government released the Coronavirus Job Retention Scheme, a programme designed to minimise the destruction of jobs during lockdown. The scheme

²⁰ We reproduced all estimates using semi-parametric propensity score matching on the same set of covariates. All results are similar to those reported in this paper.

subsidised up to 80 per cent of the salaries of employees who temporarily interrupted work due to a reduction in the activity of their employers or to their personal circumstances impeding work. No similar subsidy was available for workers only partly reducing their working hours. This provided a strong incentive for specialisation at home in two-earner couples, with one parent requesting a work interruption to care for their children while the other parent could remain active in paid work. Our estimates support the view that the scheme accentuated specialisation in a gendered way. They show that a third of the gender gap in working status, and two-thirds of the gap in furloughing, comes from situations in which the parent had a choice over whether to take furlough, which are likely associated with furloughing for caring reasons.²¹

Estimates in panel C provide further support. Here we control for pre-pandemic paid working hours to assess whether the fact that mothers were working shorter hours before the pandemic could have made them more dispensable to employers and help explain the widening gaps in working status during lockdown. The survey asked about weekly working hours in February 2020, which we used to construct a daily measure of work hours by dividing by 5, capping at 12 and discretising at the hourly level. A full set of hourly indicators were then added to the regression model. While conditioning on pre-COVID working hours results in a collapse of the gender gap in layoffs to zero (column 2), it has no impact on the gender gap in furlough rates (columns 3–5). Overall, it only reduces the gender gap in working status slightly (column 1).

3.2 | Working hours

Next, we examine parents' hours of paid work, focusing on parents who were active in paid work in February 2020 and continued to work for pay during lockdown. We start by showing the unconditional difference in hours worked by these mothers and fathers during lockdown in May 2020 (column 1 of Table 2). These differences combine those that existed before lockdown and any additional ones opening up during lockdown. Row 1 shows that, according to our data, mothers were doing 2.3 fewer hours of paid work, 30 per cent less, than fathers during lockdown (who, on average, were working 7.2 hours per day). Controlling for prior job characteristics and education by adding pre-lockdown occupation, industry and education fixed effects changes the gender difference in working hours only slightly (column 2).

Results in columns 3–6 show that only some of the gap that we observe during lockdown predated it. We first compare mothers and fathers working the *same* hours in similar jobs before the pandemic by controlling for pre-lockdown working hours fixed effects (column 3); we see a new large gap emerging for them, of about 1.2 hours per day (or 70 minutes), which is equivalent to nearly two-thirds (64 per cent) of the total gap observed during lockdown (column 2). We then quantify the gender differences in the *change* in working hours using a difference-in-differences regression model that nets out the pre-pandemic gap (columns 4 and 5); these estimates show that the working hours of women did not drop by more than those of men. To reconcile these results, we notice that many more mothers than fathers already worked very short hours before the pandemic. For instance, 17 per cent of working mothers and 3 per cent of working fathers worked fewer than four daily hours in February 2020. The scope for them to further reduce their hours while remaining active in work is therefore especially limited. We then limit our sample to those parents who had scope to reduce working hours – those who were working at least four hours per day pre-pandemic – in column 6. For this subsample, we see a widening of the gap, with mothers reducing their hours by 0.4 hours (25 minutes) more than fathers.

²¹ To be eligible for furlough during our study period, one had to provide a COVID-related reason which could be inability to work due to caregiving responsibilities. This was a particularly salient constraint for families in our sample who had school-aged children. It was possible to request furlough for other reasons, including own vulnerability or (possibly) that of a household member. The evidence of a large gender gap in being furloughed on request suggests that, in our sample, caregiving responsibilities were an important driver of furlough take-up, since we would not expect to see large gender gaps in COVID vulnerability.

TABLE 2 Gender gap in daily hours of paid work among parents who were working for pay in February 2020 and during the lockdown

	Hours worked in levels			Change in hours worked			Average for fathers	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Total paid work hours	-2.267 ^{***} (0.166)	-1.896 ^{***} (0.182)	-1.214 ^{***} (0.196)	-0.230 (0.165)	-0.191 (0.190)	-0.422 ^{**} (0.187)	7.2	-1.2
(2) Uninterrupted paid work hours	-2.428 ^{***} (0.155)	-2.019 ^{***} (0.173)	-1.440 ^{***} (0.184)	-0.391 ^{**} (0.161)	-0.314 [*] (0.186)	-0.650 ^{**} (0.196)	5.1	-3.3
Observations	3,095	3,095	3,095	3,095	3,095	2,887		
<i>Fixed effects</i>								
Pre-lockdown occupation, industry and education		✓	✓		✓	✓		
Pre-lockdown working hours			✓					
<i>Sample</i>								
Working at least four hours per day pre-lockdown								✓

Note: The table shows estimates of the coefficient for the female indicator obtained from weighted linear regression models. The weights were constructed to replicate the distribution of socio-economic and demographic characteristics of families in the 2019 UK Labour Force Survey. In columns 1–3, the dependent variables are the total number of one-hour slots that respondents record doing paid work (row 1) and *only* paid work (row 2) during the day before the interview. In columns 4–6, we use the constructed measure of pre-pandemic daily working hours (see Section 2.2) to calculate the before–after change in total and uninterrupted hours. Regressions use varying sets of regressors, as indicated towards the bottom of the table. Sample includes all parents in two-parent opposite-gender families who were active in paid work in February 2020 and remained so at the time of the interview. Column 6 further restricts the sample to those working at least four hours per day pre-lockdown. Standard errors, shown in parentheses, are clustered at the family level. Stars indicate significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Not all working time is equally productive, and interruptions can be particularly detrimental for productivity.²² With many parents working from home during lockdown, interruptions were especially frequent. Row 2 in Table 2 reproduces the estimates in row 1 for *uninterrupted* paid working hours, defined as the total number of one-hour slots that were exclusively dedicated to paid work.

We find that parents faced significant disruptions to their working time which compounded their already-reduced schedules: 2.1 and 2.3 of the hours that fathers and mothers, respectively, spent working were combined with other activities (columns 1 and 7). These interruptions were especially significant for mothers, who were left with only about 2.7 hours of uninterrupted work, or about 40 per cent of their average 6.3 pre-lockdown total working hours. Estimates in columns 1–3 show that the gender gaps in uninterrupted work time are, if anything, larger than those in total work time.

By comparison, data from the UK Time Use Survey for 2014–15 show that, before lockdown, the longer working days of fathers were more interrupted than the working days of mothers, at 2 and 1.6 hours respectively.²³ The reversal of this gap during lockdown suggests that gender gaps opened more sharply in uninterrupted than in total work time. To investigate this hypothesis, we look at changes in uninterrupted work time in a difference-in-differences framework. Since pre-pandemic interruptions are not observed in our survey, we proxy uninterrupted work time with total work time in February 2020. Assuming the UK Time Use Survey patterns remain valid in 2020, this procedure will produce upward-biased estimates of the gender gap. In other words, a negative gap will be biased towards zero, underestimating the true extent to which differences opened. Estimates in columns 4 and 5 of Table 2 show that mothers' uninterrupted work hours fell by around a third of an hour, or 20 minutes, more than those of fathers. A larger gap opened among those working at least four daily hours in February 2020, at about 40 daily minutes (column 6). As explained, these are likely lower bounds for the extent to which this gap opened.

4 | CHILDCARE, HOMESCHOOLING AND HOUSEWORK DURING LOCKDOWN

Lockdown vastly increased demands for childcare and domestic work within households. In order to examine gender differences in who shouldered these increased demands, we start by regressing hours spent on housework and childcare on a female dummy. While we have controls for pre-lockdown gender differences in the share of housework, we do not have these for childcare responsibilities. To overcome this, we leverage the granularity of the time-use data to isolate two categories of childcare for which demand increased substantially during lockdown and that can, therefore, be considered as additional load: time spent on childcare during 'school hours' (between 9a.m. and 3p.m.) and on homeschooling (supporting a child doing learning activities).

Estimates in Table 3 show that mothers shouldered a larger proportion of housework during this period than fathers, spending on average 1.7 hours more on it (column 1, row 1). In column 2, we add a full set of indicators for pre-lockdown working hours and share of housework to control for pre-lockdown differences in time use.²⁴ This reduces the gender difference in time spent on housework but suggests that more than half of this difference (1 hour or 58 per cent) represents a widening of the gap that happened during lockdown. This difference persists even when we restrict the sample to those in active paid work pre-lockdown (column 3).

²² Coviello, Ichino and Persico, 2014, 2015; Adams-Prassl, 2020.

²³ Andrew et al., 2020.

²⁴ Pre-lockdown division of housework was captured by asking who within the couple held most responsibility for six key household chores before the pandemic, on a scale from 1 ('mostly me') to 6 ('mostly my partner'). The respondent's share of housework is constructed by taking the ratio of the average of these six variables to their range and discretising this measure into 10 equal-sized intervals. Symmetrically, the share of housework done by the respondent's partner was set to 1 minus the value of that variable for the respondent.

TABLE 3 Gender gap in daily hours of domestic work and childcare during lockdown

	(1)	(2)	(3)	(4)	(5)	Average: fathers in lockdown
(1) Housework	1.654*** (0.0745)	0.956*** (0.0896)	0.907*** (0.101)	0.877*** (0.113)	0.717*** (0.158)	2.2
(2) Childcare during school hours	1.343*** (0.0614)	0.801*** (0.0680)	0.820*** (0.0761)	0.808*** (0.0811)	0.879*** (0.121)	2.9
(3) Homeschooling	0.827*** (0.0477)	0.621*** (0.0579)	0.617*** (0.0657)	0.581*** (0.0704)	0.650*** (0.107)	1.3
Observations	7,152	7,152	5,745	5,743	3,095	
<i>Fixed effects</i>						
Pre-lockdown working hours and housework share		✓	✓	✓	✓	
Pre-lockdown occupation, industry and education				✓	✓	
<i>Sample</i>						
Paid work before lockdown			✓	✓	✓	
Paid work during lockdown					✓	

Note: The table shows estimates of the coefficient for the female indicator obtained from weighted linear regression models. The weights were constructed to replicate the distribution of socio-economic and demographic characteristics of families in the 2019 UK Labour Force Survey. The dependent variables are the total number of one-hour slots that respondents record doing housework (row 1), childcare between 9a.m. and 3p.m. (row 2) and homeschooling (row 3) in the day before the interview. Regressions use varying sets of regressors, as indicated towards the bottom of the table. Sample varies by column: the entire sample of parents in dual-parent opposite-gender families is used in columns 1 and 2; columns 3 and 4 restrict the sample to those parents who were active in paid work in February 2020; and column 5 further restricts the sample to those parents who were still active in work at the time of the interview. Standard errors, shown in parentheses, are clustered at the family level. Stars indicate significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The gaps in domestic work could be explained by fathers being more likely to keep working during the crisis, or their jobs having different demands. However, controlling for the characteristics of jobs parents had pre-lockdown leaves the results unchanged (column 4), as does restricting the sample to parents in paid work during lockdown (column 5). Mothers who continued to work were still doing around 0.7 more hours (40 more minutes) of housework than similar fathers who continued to work.

Estimates in row 2 show that mothers did 1.3 additional hours (80 additional minutes) of childcare during school hours relative to fathers (column 1). This gap is equivalent to 56 per cent of the total gap in time spent on childcare during lockdown (2.4 hours). It remains large at 0.8 hours (50 minutes) when controlling for how partners shared housework responsibilities before the lockdown (column 2) and is not affected by any of the other controls (columns 3–5). Homeschooling was also disproportionately covered by mothers, who did 0.8 more hours (50 more minutes) per day than fathers (row 3, column 1). These hours of childcare and homeschooling represent increasing inequalities in the assignment of domestic responsibilities; they are also most likely to compete with working activities.

5 | WERE HOUSEHOLDS PRIORITISING THE PAID WORK OF THE PARENT WITH THE HIGHER EARNING CAPACITY?

Our findings so far suggest that, faced with new challenges and constraints, adults in two-parent families intensified specialisation in the gendered way that already prevailed before the pandemic. Furthermore, we find that this is unlikely to be entirely driven by gendered patterns in changes in labour demand in response to the pandemic shock. We now consider what might be driving these family decisions. Many economic models of the household predict that couples will prioritise the

paid work of the partner whose employment is more financially valuable relative to the value of them performing domestic work.²⁵ While we cannot measure productivity in domestic work and childcare, we can examine whether the gender gaps in the responses to the lockdown that we found are consistent with behaviour that would protect the financial well-being of the family.

First, we assess whether couples who were both working for pay before lockdown prioritised the paid work of the main earner, regardless of gender. To do this, we regress the amount of time spent on housework, additional lockdown-related childcare (during school hours and on homeschooling) and work hours on a female dummy, restricting the sample to individuals who are the main earner in a couple. This gives us the gender gap in lockdown time use for main earners. The specifications include controls for pre-lockdown own working hours, housework share, occupation, industry and education so that the comparison is between male and female main earners who were working the same number of hours, in similar jobs and taking on a similar proportion of housework before the pandemic.

Overall, the results presented in column 1 of Table 4 are *not* consistent with this hypothesis: couples where the father earned more did not organise their time in the opposite way to couples where the mother earned more. Controlling for the characteristics of the main earner's job, we find that in families where the mother was the main earner, she took on more of the domestic responsibilities (column 1, rows 1–3) and less of the paid work responsibilities (column 1, rows 4 and 5) than similar fathers in families where the father was the higher earner. Indeed, we find gender gaps for main earners that are comparable to those reported for all parents working pre-pandemic. Estimates in rows 6 and 7 restrict the sample to those working at least four hours per day before the pandemic to focus on those working a substantial number of hours. They quantify the change in working hours using a difference-in-differences regression model which nets out the pre-pandemic gap. The results are consistent with the findings for all workers but, due to smaller sample size, are less precisely estimated. While the coefficient for change in uninterrupted hours remains statistically significant, the coefficient for change in total hours is no longer statistically significant – though its magnitude is similar to the work hours coefficient for the whole sample in row 4 and we cannot reject the hypothesis that it is equal to it.

Overall, these results suggest that the choices families made were not entirely consistent with prioritising the work of the partner who earned more. A threat to this interpretation, however, is the possibility that, in fact, both partners did more domestic work and less paid work in families where mothers were the main earner. To check for this, we compare the *within-family difference* in time dedicated to each activity in families where the mother was the main earner and that same difference in families where the father was the main earner. To do this, we regress the difference between the main earner and their partner in time spent on housework, childcare and work-related activities on a female dummy, restricting the sample, as before, to individuals who are the main earner in the couple and including controls for pre-lockdown working hours, housework share, occupation, industry and education. Results are displayed in column 2 of Table 4.

We see that, if anything, the sizes of the gender gaps increase when looking at within-family differences in time allocation across all of the time-use categories. For instance, the difference in time spent on childcare during school hours between higher- and lower-paid partners is 1 hour greater when the higher-paid partner is the mother than when it is the father (row 2, column 2). This reveals that it is not only higher-paid mothers who were doing more childcare than similar higher-paid fathers – lower-paid mothers were also doing more childcare than similar lower-paid fathers. In contrast, the difference in time spent on work hours and uninterrupted work hours between higher- and lower-paid

²⁵ Prioritisation of the job of one partner can take place in couples where both partners work. In the face of competing demands of work for pay and domestic work and/or childcare, the partner whose employment is more financially valuable relative to the value of them performing domestic work would focus on paid work, while the other partner would make the adjustments necessary to also meet the demands of domestic work / childcare. Such adjustments could include, for example, switching to jobs that offer flexibility in working hours, provide a family-friendly environment, involve short commutes or are less demanding overall; they do not necessarily imply stopping paid work altogether. Recent evidence suggests that women, especially mothers, choose jobs with these characteristics more than men do when they have a choice (Mas and Pallais, 2017; Wiswall and Zafar, 2017; Petrongolo and Ronchi, 2020; Le Barbanchon, Rathelot and Roulet, 2020).

TABLE 4 Heterogeneity in the gender gaps in time use during lockdown: couples with both partners working in February 2020

	(1) Partner who earned more	(2) Within-family difference between higher- and lower-paid	(3) Partner who remained in work	(4) Partner who stopped working
(1) Housework	0.365* (0.198)	0.958*** (0.216)	0.377 (0.255)	1.182*** (0.294)
(2) Childcare during school hours	0.548*** (0.141)	1.008*** (0.203)	0.642*** (0.197)	0.685*** (0.171)
(3) Homeschooling	0.540*** (0.130)	0.780*** (0.158)	0.329** (0.157)	0.500*** (0.179)
(4) Paid work hours	-0.577** (0.257)	-0.711** (0.358)	-0.907*** (0.335)	
(5) Uninterrupted paid work hours	-0.653*** (0.211)	-0.762** (0.302)	-0.813** (0.326)	
(6) Change in paid work hours	-0.402 (0.282)		-0.169 (0.346)	
(7) Change in uninterrupted paid work hours	-0.455* (0.246)		-0.237 (0.355)	
Observations	1,921	1,921	884	884
<i>Fixed effects</i>				
Pre-lockdown own working hours, housework share, occupation, industry and education	✓	✓	✓	
Pre-lockdown partner's working hours, occupation, industry and education		✓		✓
<i>Sample</i>				
Worked during lockdown			✓	✗
Partner worked during lockdown			✗	✓

Note: The table shows estimates of the coefficient for the female indicator obtained from weighted linear regression models. The weights were constructed to replicate the distribution of socio-economic and demographic characteristics of families in the 2019 UK Labour Force Survey. The dependent variables are the total number of one-hour slots in which the respondents record doing housework (row 1), childcare between 9a.m. and 3p.m. (row 2), homeschooling (row 3), paid work (row 4) and uninterrupted paid work (row 5). These are used in individual levels for regressions in columns 1, 3 and 4, and as within-family differences for regressions in column 2. In rows 6 and 7, the dependent variable is the change in total and uninterrupted paid work hours using our measure of pre-pandemic daily work hours (see Section 2.2). The sample used to produce the estimates reported in columns 1 and 2 is higher-earning partners in couples where both spouses were working pre-pandemic. The sample used to produce the estimates reported in column 3 is active partners in couples where only one spouse kept working during the lockdown, while the sample used to produce the estimates reported in column 4 is partners who stopped working in these same families. In rows 6 and 7, we further restrict the sample to parents working at least four hours per day pre-pandemic; the total number of observations used in rows 6 and 7 drops to 1,869 and 836 in columns 1 and 3, respectively. To produce the estimates in columns 1 and 3, we control for a full set of indicators for pre-lockdown daily working hours, share of housework, occupation, industry and education of the partner who is the higher earner in the family (column 1) or who is the single partner who remains active in work (column 3). In column 2, we control for the same information for both spouses (although to avoid collinearity we do not control for the second spouse's housework share). Controls for pre-lockdown circumstances are excluded in specifications where the change in work hours or uninterrupted work hours is the dependent variable (rows 6 and 7). Standard errors, shown in parentheses, are clustered at the family level. Stars indicate significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

partners is around 45 minutes smaller when the higher-paid partner is the mother than when it is the father (column 2, rows 4 and 5).

Finally, we look at families in which both parents were working prior to lockdown but one parent stopped working for pay during lockdown (due to being laid off, having quit or having taken furlough). Here too we find several asymmetries in the division of responsibilities depending on whether it was the mother or the father who stopped working for pay. Columns 3 and 4 of Table 4 show that whether or not the mother was the partner who continued to work, she always did more childcare than a father in similar circumstances (rows 2 and 3). Moreover, if the mother was the one remaining active in work, she also did almost 1 hour less paid work than a similar father in a family where only he remained active. If she was the one who stopped work, she did over 1 hour more housework than a similar father in a family where he stopped work. Rows 6 and 7 show the first-difference results for completeness. While the coefficients in the first-difference results remain negative, they are smaller in magnitude and not statistically significant.

6 | CONCLUSION

In this paper, we show large gender gaps in how parents shared paid and domestic work during lockdown. Mothers in England were more likely than fathers to stop working, but not because their jobs were structurally more vulnerable to shocks in labour demand. We document widening gaps in time spent on childcare, housework, total and uninterrupted work. The evidence we present suggests that these gender gaps are unlikely to have been driven solely by families' focusing on immediate financial considerations. We find that they look strikingly similar irrespective of whether a mother earned more or less than her partner before the pandemic, or of whether or not she is the only partner who remains active in work during the lockdown. Finally, our results and related literature suggest that there may be important heterogeneity in these patterns among women of different education levels. This is consistent with findings for the US²⁶ and with investigations of our own data which suggest that, for many of our main estimates, effects were larger among less educated mothers.²⁷

We show that the time use of mothers reacts systematically more sharply than that of fathers to transitory unexpected increases in demands from home, and in ways that affect the reliability and predictability of their work time and productivity. If this finding applies to a wider set of circumstances than this pandemic, it could be an important and yet unexplored factor in explaining gender pay gaps. Specifically, the excess volatility in maternal work time in response to the demands from home will likely have adverse effects on mothers' careers if, as expected, employers value certainty in the production process. Investigating this driver of gender inequalities is an important topic for future research.

Our findings also highlight that we still lack understanding of the key drivers of intra-household divisions of paid and unpaid work, and suggest that the attitudes of mothers, fathers and employers may play an important role. Recent evidence supports this view – for instance, by showing that generous paternity leave policies can lead to persistent increases in fathers' involvement in childcare.²⁸ The pandemic was a much bigger shock to how families organise their lives than any parental leave reform so far. A key question for future research is the extent to which this crisis will have transformative effects on attitudes to gender roles that promote greater gender equality.

A third key open question relates to the long-term effects of the crisis, and of the policies that were enacted to ameliorate its effects, on the careers of women and men. Past research showed that career interruptions are closely linked to large child penalties for mothers.²⁹ The pandemic and the

²⁶ See, for example, Heggeness and Suri (2021).

²⁷ Results available from the authors on request.

²⁸ Farré and González, 2019; Patnaik, 2019; Tamm, 2019.

²⁹ Blundell et al., 2016; Adda, Dustmann and Stevens, 2017; Costa Dias et al., 2020.

lockdowns led to long work interruptions among parents, and to sharp reductions in work time and uninterrupted work time. We show that the working patterns of mothers were more affected than those of fathers. The extent to which these responses may entrench traditional divisions of responsibilities and harm the wages and career prospects of women in the longer term is still unknown.

On the policy side, the furlough policies that protected workers and employers from the sharp reduction in economic activity may have also contributed to the gendered division of responsibilities during the lockdown. In a setting where mothers are disproportionately the main caregiver, a policy that subsidises one of the parents to interrupt work altogether for caring reasons (as the furlough scheme did) can further promote the traditional allocation of responsibilities. Instead, an alternative design that would subsidise both parents to reduce their working hours while remaining actively engaged in paid work could be more gender-neutral. More generally, there is a continuing lack of understanding of how alternative policy designs contribute to reinforce or attenuate gender inequalities, and how responsive the working time of mothers and of fathers is to (expected and unexpected) demands from home.³⁰

Going forward, the unequal responses that we document could be reinforced in a new world of work where flexible work arrangements see mothers disproportionately working from home, in environments that are less conducive to productive work and the rich interactions that workplaces provide. In turn, increased work flexibility and a fundamental change in gender attitudes could counterbalance these new challenges by allowing mothers to remain actively engaged in pursuing their professional careers. The interactions between these various forces will ultimately determine how the pandemic crisis shapes progress towards gender equality.³¹

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³⁰ See discussion in Andrew et al. (2021).

³¹ Alon et al., 2020.

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