Baby steps: the gender division of childcare during the COVID-19 pandemic

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Abstract: The nature and scale of the shocks to the demand for, and the supply of, home childcare during the COVID-19 pandemic provide a unique opportunity to increase our understanding of the division of home labour and the determinants of specialization within the household. We collected real-time data on daily lives to document the impact of measures to control COVID-19 on UK families with children under the age of 12. We document that these families have been doing the equivalent of a working week in childcare, with mothers bearing most of the burden. The additional hours of childcare done by women are less sensitive to their employment than they are for men, leaving many women juggling work and (a lot more) childcare, with likely adverse effects on their mental health and future careers. However, some households, those in which men have not been working, have taken greater steps towards an equal allocation, offering the prospect of sharing the burden of childcare more equally in the future.

Keywords: COVID-19, gender, childcare, Coronavirus

JEL classification: J21, J22, J24, J33, J63

I. Introduction

Since the COVID-19 pandemic struck, governments around the world have introduced a range of social-distancing interventions in order to slow down the rate of transmission of the disease. In the UK, self-isolation measures for those with symptoms were imposed on 12 March 2020, followed by social-distancing measures encouraged for everyone on 16 March, school and nursery closures on 20 March and a general lockdown on 23 March. These measures have brought about rapid and profound changes to people's everyday lives. For families with children, there have been major shocks both to the demand for home childcare and also to the supply of home childcare. Work life has changed beyond recognition. Wherever possible, people have been asked to work from home. With the required closure of most places of work, an estimated one-quarter of the UK workforce is on furlough (i.e. temporarily laid off and paid by the government

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at 80 per cent of their wages up to £2,500), while an estimated 3 per cent have lost their jobs altogether.[1] As a result, there are now many parents who are not working and who have more potential childcare time on their hands. The magnitude and nature of the potential shocks to childcare caused by the measures introduced to stop the spread of COVID-19 are unprecedented.

Using new survey data, this paper documents the effects of these shocks on the allocation of childcare within couples with young children (aged <=12). Specifically, we present new evidence on how additional childcare is shared between women and men and the interaction between childcare and women's and men's employment. We document the sheer magnitude of additional childcare done by families with young children, equivalent to a working week. We show that women bear most of the burden of childcare and that the division is very similar to that before the crisis. Pre-COVID-19, in our survey, women did 65 per cent of childcare[2] on average; they have done a very similar share of the additional hours during the pandemic. There is a small (c. 10 per cent) reduction in the gender childcare gap (the difference between the share done by women and the share done by men) but this is not statistically significant. Women have been more likely than men to lose employment as a result of the pandemic, but this does not explain all the post-COVID-19 gender gap. Indeed, the amount of additional childcare provided by women is less sensitive to their own employment than it is for men, leaving many women to juggle work with (a lot of) childcare.

There is more variation in hours' additional childcare done by men according to their employment status—there is a small step towards a more equal allocation when men work from home; there are greater steps when men are furloughed/not working. In these cases, men do an equal share, but moves towards a more equal allocation of childcare are driven by the supply-side shock (more time not working) rather than (just by) the demand-side shock (the increase in childcare need). The additional burden of childcare is only shared more equally when men have more time on their hands.

Overall our findings suggest a persistence of an unbalanced division of childcare within couples in the face of a huge shock to the demand for home childcare, characterized by women specializing in caring activities regardless of changes in their employment status. For example, when both partners work (out of the home) the share of the additional childcare done by women is 65.5 per cent (compared to 59.2 per cent of childcare done pre-COVID-19). Only supply shocks affecting men's time lead to substantial changes in the allocation of childcare. These patterns are hard to fit with standard economic models of the household which would suggest symmetric responses. Instead, they can be rationalized in light of social norms that see women as having primary responsibility for children (Akerlof and Kranton, 2000; Sevilla, 2010; Bertrand *et al.*, 2016).

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[1] Government figures indicate that 7.5m workers had been furloughed by 13 May 2020 out of a total workforce of 33m (28m employed and 5m self-employed) as of January 2020. The number of people claiming unemployment benefit increased by 865,000 in April 2020.

[2] This is similar to other estimates. Own calculations using evidence from the 2015 UK Time Use Survey (TUS) shows that mothers of young children (aged <=12) spend about 2 hours per day in childcare during a normal weekday or weekend day, whereas fathers spend around 45 minutes on a weekday and about 1 hour and 15 minutes on a weekday day.

Documenting the effects of the COVID-19-related shocks on childcare is important for at least two reasons. From a policy perspective it is important to understand the impact of COVID-19 on the within-household allocation of childcare in order to mitigate potentially negative adverse effects on future careers. The literature has long documented that the inherent incompatibilities between childcare commitments on the one hand, and job requirements on the other, carry a direct penalty on women's earnings and careers as women reduce the hours of work to look after children (Hersch and Stratton, 2002; Sigle-Rushton and Waldfogel, 2007; Bryan and Sevilla, 2011; Kleven *et al.*, 2019). In the longer term, gendered norms can also deter girls from acquiring human capital, perpetuating an inefficient equilibrium (Mincer, 1974; Becker, 1985).

There is also an opportunity to add to an existing theoretical and empirical literature that seeks to understand the determinants of domestic labour. Evidence from previous recessions characterized by increases in unemployment, particularly for men, do not seem to suggest a more equal division of household labour as a result. Aguiar *et al.* (2013) study the effect of the recession following the financial crisis on time use. Using the American Time Use Survey (ATUS), they find that men and women increase their non-market work as the probability of unemployment increases. About 5 per cent of forgone market work is reallocated to childcare, and women tend to reallocate more of forgone market work to core production activities (e.g. cooking, cleaning, laundry), whereas in the sample of men forgone market work hours are relatively more likely to be reallocated to watching TV. This study cannot explicitly study the within-household allocation as the ATUS survey only asks one member of the household about their use of time.

This paper is closely related to recent studies that have discussed the gender impacts of the COVID-19 pandemic. Some of these focus on the effects on male/female employment. Alon *et al.* (2020) and Hapucheck and Petrongolo (2020) study pre-COVID-19 employment and childcare in the US and UK and make predictions about the likely impact of the pandemic. They predict that the negative employment effects of the pandemic for women are likely to be worse than those of a typical recession because of the impact of lockdown on retail and leisure industries, sectors that have a high female share. Analysing data from the early days of the pandemic, Adams-Prassl *et al.* (2020*a*) confirm that women experienced a bigger drop in employment in the US, Germany, and the UK. In particular, by mid-April women were 5 percentage points more likely than men to lose their jobs in the UK. In the US the gap was 8 percentage points. We find a gap of a similar magnitude.

Other studies use real-time data to document that women do more childcare and housework than men during the pandemic. Adams-Prassl *et al.* (2020*a*) asked men and women to report hours spent looking after children and home-schooling during lockdown in the UK. They find that women do approximately an hour and a half more childcare per workday than men, but there is no analysis of the relationship with employment. Andrew *et al.* (2020) analyse time-use data and find that women are doing childcare during more hours of the day than men (during ten of the hour-long slots compared to eight). They also look at how childcare relates to employment and find that men's childcare is more sensitive to their employment. Unlike these studies, which only collect information on childcare during COVID-19, we can directly compare the allocation of childcare within the same households before and after lockdown, allowing us to control for unobserved heterogeneity (e.g. preferences for allocating childcare)

that may be correlated with childcare and employment outcomes. We show that this heterogeneity is important—women who do a greater share of home childcare pre-COVID-19 are more likely not to be working during COVID-19. Our paper is most closely related to preliminary work by Farré *et al.* (2020). Using a self-selected sample of Spanish households, they show that there has been a shift to a more equal distribution of housework (driven mainly by men taking responsibility for shopping) and childcare. Compared to this study, our contribution is to provide complementary analysis for a different country (UK not Spain) and to analyse a representative sample of households (Farré *et al.* analyse a self-selected sample).

The paper is organized as follows. Section II describes our survey, section III describes the main employment results, and section IV documents childcare results. Section V concludes.

II.   Sample and variables

(i)   Sample

The questions were asked by Ipsos MORI as part of its regular omnibus survey. Interviews were conducted online and targeted respondents aged 18–60 between 5 and 11 May 2020. To ensure enough respondents within the timeframe, there were three launches of the survey that reached around 51,000 invitations, with a large proportion of these sent on the third launch to close fieldwork as quickly as possible. Out of the 4,881 individuals who entered the survey, 4,361 completed and 520 did not. Quota controls were set upon the interviews achieved and the resultant survey data are weighted to the known offline population profile of this audience (18–60). (See on-line appendix for a full data description.)

The total sample with non-missing gender is 4,250 individuals. In section III we analyse the employments effects of COVID-19, testing to see whether the impact has been the same for men and women, following Adams-Prassl (2020*a*). For this analysis, we focus on a sub-sample of 2,782 respondents who were employed prior to 23 March and with non-missing information on employment characteristics. For the analysis of the gender childcare gap we focus on a smaller subsample of respondents who are in couples and who have children aged <=12.

(ii)   Key variables

In order to capture changes pre- and post-COVID-19, we asked respondents about their work arrangements before and after the lockdown on 23 March, the allocation of childcare within couples pre-COVID-19, and about the number of additional hours, as well as their allocation, post-COVID-19. As part of the omnibus survey, we have general demographics such as age and gender, as well as household socio-economic characteristics such as the number of children in the household below the age of 18, the age of children, respondent's educational attainment, and occupation categories.

We briefly summarize the questions used to elicit the key employment and childcare variables. Summary responses are in Table 1.

Table 1: Summary statistics

	Full sample		Couples with young children (aged <=12)	
	Men	**Women**	**Men**	**Women**
Age	41.6	37.5	37.0	36.3
Degree (0/1)	0.446	0.478	0.529	0.490
Pre-COVID				
Working	0.639	0.592	0.806	0.502
of whom, WFH	0.411	0.391	0.431	0.429
Self-employed	0.077	0.066	0.074	0.056
Not working	0.232	0.272	0.090	0.385
Other	0.053	0.080	0.031	0.056
Post-COVID				
At work	0.197	0.135	0.265	0.115
WFH	0.330	0.315	0.441	0.269
Furloughed	0.186	0.197	0.155	0.141
Not employed	0.287	0.353	0.140	0.457
N	1,983	2,267	207	263

Notes: 'Degree' includes NVQ4/HNC/HND/Bachelor's degree or similar/NVQ5 or post-graduate diploma. Current and retrospective employment status collected post-COVID-19. For further information on the questions asked, see section II. WFH is working from home.

Employment status and working from home
Pre-COVID-19:

> *Which of the following best applied to your [and your partner's] employment status **before** the coronavirus pandemic measures came into effect (prior to 23 March 2020)?*
> *Responses are: In (full or part time) employment; Self-employed; Not in (full or part time) employment; Other.*
> *Still thinking about your employment **before** the coronavirus pandemic measures came into effect (prior to 23 March 2020). In general, during the times you were working, how frequently, if at all, did you work from home?*
> *We group the responses (Working from home all the time; Working from home at least once a week; Working from home at least once a month; and Working from home less often) to create a single, ever-worked-from-home indicator.*

Post-COVID-19

> *Which of the following, if any, best describes your [and your partner's] employment status after measures against the coronavirus came into effect on 23 March 2020?*
> *Responses are: In employment, working from home all of the time; In employment, working from home some of the time; In employment, working in a workplace elsewhere all of the time (not working from home); Furloughed (temporarily laid off with pay); Not employed; Other. We group the two working from home responses in our analysis.*

Childcare

Pre-COVID-19

> *Now thinking about childcare arrangements while education and childcare settings were* still open *(that is, during term times before 20 March 2020) for your children aged 17 and under. Who took care of your children when they were not in an education or childcare setting?*
>
> Each respondent with a partner was asked to choose one option out of the following, for each of self, partner, and other: All or almost all of the time; Most of the time (about three-quarters); About half of the time; Less than half of the time (about a quarter); None or almost none of the time; Don't know. We use this information to calculate the allocation of childcare within couples (excluding other) pre-COVID using values of 0.9 for all or almost all of the time, 0.75 for most of the time, 0.5 for about half of the time. 0.3 for less than half of the time, and 0.1 for none or almost none of the time. Men's share is equal to the share reported for men (whether self or partner) divided by the sum of the shares reported for men and women (whether self or partner), omitting the share done by other.

Post-COVID-19

> *Thinking now about the education and/or childcare that education and childcare settings normally provided for your children (e.g. schools/colleges, nurseries, after school clubs, childminders, etc.): How many* extra hours*, if any, are* you (and partner) *personally having to look after your children on each day during* a typical week? *Please give your answer to the nearest hour and if unsure, please give your best estimate. If not spending any extra time, please put '0'.*
>
> This question is asked for each day of the week, including weekends. We sum over all days to obtain total additional hours done by men and done by women within couples. The share done by men is then calculated as the total additional hours done by men (whether reported directly for self or reported by partner) divided by the sum of the total additional hours for self and partner within the household.

Because the two measures of within-household shares are calculated on a different basis and the pre-COVID-19 measure refers to approximate shares of childcare in the household, the quantitative results on changes in shares should therefore be interpreted with some care but the comparison of changes in shares across employment status is valid.

III. Employment changes since COVID-19

We first look at changes in employment. Focusing on the early phase of the pandemic, Adams-Prassl *et al.* (2020*a*) report that 15 per cent of their sample of UK workers lost their jobs (they do not differentiate furlough from no longer working). In our survey we distinguish between those who are on furlough (i.e. who are employed but temporarily not working and paid by the government at 80 per cent of their wages up to £2,500), and those who report that they are not working and not on furlough.

Table 1 reports summary statistics on levels of employment among the whole sample (i.e. not conditioning on pre-COVID-19 employment). The numbers highlight the reduction in employment that has occurred and the increase in the number of people who are not working, whether on furlough or out of work. Within those who are working, there has been a shift from working in the workplace to working from home. Before the pandemic, around 40 per cent of people in work (employed and self-employed) said that they ever worked from home. Of those who were previously employed but had never worked from home, more than one-quarter (28 per cent) are now working from home. This shift to home-working during the crisis is likely to have long-term implications for working arrangements in the future.

As in Adams-Prassl *et al.* (2020*a*), we find that women are more likely than men to have stopped working during lockdown. Table 2 reports estimated marginal effects from a multinomial logit regression on four possible employment outcomes (1 = still at work, 2 = working from home, 3 = on furlough, and 4 = not employed). This is estimated on the sample of everyone (with/without kids) who reports that they are working (employed or self-employed) pre-COVID-19. Column 1 shows the raw differences (without controls). Women are nearly 7 percentage points less likely than men to still be at work. They are 4 percentage points more likely to be furloughed [p=0.020] and 2 percentage points more likely to be not working [p=0.011]. The estimated magnitudes change little when we add controls (in column 2), including a full set of occupational dummies (column 3): women are 5 percentage points less likely to be in work than men, the same magnitude as Adams-Prassl *et al.* (2020*a*) found for the UK.

One possible hypothesis for the gender gap is that, where there was an element of choice, women may have been more likely to stop working in order to meet the increased demand for home childcare. To explore this, we split the sample into men/women with and without kids. Results in Table 2, panel B show that there is a bigger gender gap among men/women with kids. Women with kids are 10 percentage points less likely to work than men with kids (this is similar to the 9 percentage point gap found by Andrew *et al.* (2020)). However, there is also a significant gender gap for women without kids, indicating that other (non-child-related) factors account for at least some of the (unexplained) gender gap.

Even so, we cannot rule out that employment changes are endogenous with respect to childcare arrangements. Results in Table 2, panel B, column 3 include as an additional control in the regression the pre-COVID-19 childcare gap, measured by the within-household difference between the share of childcare done by women and the share of childcare done by men (a higher gap implies that women do a greater share than men). We interact the childcare gap with gender. The results show that the allocation of childcare (pre-COVID-19) is correlated with employment outcomes (post-COVID-19). Specifically, men who do less childcare are more likely to work from home and are less likely to be furloughed than men who do a greater share. Similarly, women who do more childcare are less likely to work from home and are more likely to be furloughed than women who do a smaller share. This endogeneity motivates our within-household, difference-in-differences estimates of changes in the gender childcare gap in section IV, allowing us to control for unobserved household-level heterogeneity. If men working from home post-COVID-19 are observed to do less additional childcare than, for example, men who are not working post-COVID-19, at least part of this may be explained by less childcare, pre-COVID.

Table 2: Estimated marginal effects (multinomial logit), post-COVID employment status

A: Sample of individuals working pre-COVID

	(1)		(2)		(3)	
	Marginal effect	p-value	Marginal effect	p-value	Marginal effect	p-value
Female						
At work	−0.066	0.000	−0.059	0.000	−0.052	0.001
WFH	0.004	0.838	0.003	0.879	−0.001	0.951
Furloughed	0.039	0.020	0.028	0.086	0.032	0.058
Not employed	0.023	0.011	0.028	0.006	0.021	0.039
Kids (0/1)						
At work			0.026	0.110	0.023	0.143
WFH			0.023	0.216	0.025	0.162
Furloughed			−0.021	0.250	−0.021	0.216
Not employed			−0.029	0.013	−0.026	0.020
Degree (0/1)						
At work			−0.104	0.000	−0.076	0.000
WFH			0.217	0.000	0.128	0.000
Furloughed			−0.103	0.000	−0.051	0.003
Not employed			−0.009	0.313	0.000	0.982
Self-employed (0/1)						
At work			0.003	0.917	−0.008	0.767
WFH			−0.049	0.151	−0.018	0.576
Furloughed			−0.121	0.001	−0.133	0.000
Not employed			0.167	0.000	0.161	0.000
Pre-WFH (0/1)						
At work			−0.107	0.000	−0.075	0.000
WFH			0.241	0.000	0.189	0.000
Furloughed			−0.108	0.000	−0.081	0.000
Not employed			−0.025	0.016	−0.031	0.002
Age = 30s						
At work			0.010	0.618	0.020	0.308
WFH			0.033	0.149	0.010	0.654
Furloughed			−0.028	0.212	−0.029	0.184
Not employed			−0.015	0.230	0.000	0.948
Age = 40s						
At work			0.030	0.163	0.033	0.116
WFH			0.033	0.185	0.015	0.519
Furloughed			−0.043	0.062	−0.041	0.081
Not employed			−0.019	0.160	−0.008	0.564

Table 2: Continued

	(1)		(2)		(3)	
	Marginal effect	p-value	Marginal effect	p-value	Marginal effect	p-value
Age = 50s						
At work			0.045	0.037	0.046	0.030
WFH			−0.003	0.898	−0.015	0.540
Furloughed			−0.065	0.005	−0.066	0.004
Not employed			0.022	0.127	0.035	0.020
Occupation			No		Yes	
N			2,782		2,782	

BWith/ without kids

	(1) No kids		(2) Kids <=12		(3) Kids <=12	
	Marginal effect	p-value	Marginal effect	p-value	Marginal effect	p-value
Female						
At work	−0.069	0.000	−0.101	0.032	−0.043	0.693
WFH	0.023	0.283	−0.010	0.846	−0.003	0.966
Furloughed	0.025	0.219	0.055	0.195	0.025	0.669
Not employed	0.021	0.113	0.056	0.044	0.021	0.648
Childcare gap (pre)						
At work					−0.059	0.390
WFH					0.224	0.004
Furloughed					−0.130	0.080
Not employed					−0.034	0.561
Gap x Female						
At work					−0.043	0.693
WFH					−0.235	0.052
Furloughed					0.168	0.116
Not employed					0.110	0.174
Other controls						
Degree						
Self-employed						
WFH (pre)						
Ageband						
N	1,845		312		312	

Notes: Marginal effects estimated at mean values of co-variates. The sample includes only those respondents who reported that they were working (employed/self-employed) pre-COVID-19. 'Degree' includes NVQ4 / HNC / HND / Bachelor's degree or similar/ NVQ5 or post-graduate diploma. 'Self-employed' and 'pre-WFH' (= ever worked from home) refer to pre-COVID-19 status. 'Childcare gap (pre)' refers to the within-household difference between the share of childcare done by the woman and the share of childcare done by the man, prior to COVID-19 (retrospectively reported). It takes possible values between 1 and −1. A positive 'gap' indicates that the woman does a greater share of childcare than the man.

Before moving on, we briefly comment on the correlation between other characteristics and employment outcomes. Our findings broadly mirror those found by Adams-Prassl *et al.* (2020*a*). Table 2, panel A, shows that having a degree is associated with working from home (rather than at work) and being furloughed rather than being out of work. Those who were self-employed were more likely not to be working and less likely to be furloughed, possibly reflecting the fact that the UK government's furlough support for self-employed workers did not come into effect until 13 May, after our data collection. Not surprisingly, those who had previously worked from home, were more likely to report working from home and were less likely to be furloughed and not working. Pre-COVID-19, 40 per cent of people in work reported that they occasionally/ sometimes/always worked from home (41 per cent of men and 39 per cent of women). But there are also many who are working from home for the first time. Of those who reported that they previously never worked from home, 28 per cent are now doing so. This move to home-working may lead to longer-term changes in working arrangements.

IV. Childcare changes since COVID-19

The closure of UK schools and other childcare providers to all but the children of key workers and vulnerable children from Friday 20 March left millions of children requiring home childcare.

Prior to COVID-19, the allocation of childcare within households was uneven, with women bearing the greater share. Focusing only on the childcare done within the household (i.e. ignoring external childcare), the average share of childcare done by women was 65.3 per cent.

The magnitude of the estimated gap from our survey (pre-COVID-19) is similar to that observed in the UK 2014–15 Time Use Survey (UKTUS). The UKTUS collects diary information at the household level on 10-minute intervals for a 24-hour period during weekdays and weekend days for a representative sample of individuals in the UK. We calculate an equivalent share of childcare done by women in this sample by dividing the daily minutes in childcare by the women over the daily minutes in childcare by the man in a given household. Daily minutes of childcare for every respondent are calculated by adding up the minutes reported in childcare as the primary activity in a given day. Childcare includes physical care and supervision, feeding, teaching, reading, talking, and accompanying the child to do activities among others. Women spend an average of 126 minutes per weekday and 113 minutes per weekend day, whereas men spend an average of 46 minutes during a weekday and 72 minutes during a weekend day. These figures result in a share of childcare by women (men) between 60 (40) per cent during weekdays and 73 (27) per cent during the weekend.

Post-COVID-19, there have been several dramatic changes to home childcare that we summarize below.

There has been a *sizeable increase in the total amount of home childcare* provided. Couples with young children (aged 12 or under) self-report doing an average of 40 (median)/49.7 (mean) hours of additional childcare per week.[3] In other words, families are

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[3] As a check on the data we confirm that the number of additional hours is increasing in the number of children. It is also (generally) decreasing in the age of the youngest child.

taking on the equivalent burden of a working week in additional childcare. This figure is more than double the time spent on childcare prior to COVID-19. Evidence from the 2014–15 UKTUS reveals weekly time spent in childcare by households to be around 20 hours per week.[4] Note that these are self-reported additional hours of childcare—there may be a concern that they are over-estimates. However, previous studies have shown that estimates on housework from stylized questions (such as how much housework you do per week) are meaningfully associated with actual housework measures derived from diaries (Hill, 1985; Robinson, 1985; Borra *et al.*, forthcoming). Similarly, for childcare Del Bono *et al.* (2016) validate frequency in childcare activities from the Millennium Cohort Survey and show that these measures are meaningfully associated with actual maternal time in childcare in the 2014–15 UKTUS survey.

Women are doing the majority of the additional home childcare. Table 3 summarizes additional hours of childcare post-COVID-19 by gender. On average, women have been doing 30 (median)/30.3 (mean) additional hours' childcare per week, compared to 15 (median)/19.4 (mean) done by men. The gender childcare gap is large in absolute number of hours. Comparing median hours, the gender childcare gap equates to an additional 10 hours done by the 'typical' mother compared to the 'typical' father each week. It is important to emphasize, however, that these figures suggest a substantial increase in childcare (in absolute number of hours) done by men. 2014–15 UKTUS estimates indicate that, in 'normal' (pre-COVID-19) times, women do an average of 15 hours per week and men do an average of 6 hours per week. The difference between the mean and median for men indicates a skewed distribution. There are many men who are doing a relatively small number of additional hours' childcare and a smaller number who are doing substantially more hours. We return to this below.

The amount of additional childcare that is done by men and women is correlated with their post-COVID-19 employment. This is shown in Figure 1, panel A, which

Table 3: Allocation of childcare between women and men

	Women		Men	
Post-COVID-19: **Additional hours per person**	**Median**	**Mean**	**Median**	**Mean**
Total per week (7 days)	30	30.3	15	19.4
Total, weekdays (5 days)	28	25.4	10	15.2
Average per day (7 days)	4.3	4.5	2.4	2.9
Average per weekday (5 days)	6	5.2	2.4	3.2
Within-household share of childcare:				
Mean, pre-COVID-19 (%)	65.3		34.7	
Mean, post-COVID-19 (%)	63.6		36.4	
N	290		290	

Notes: Additional hours of childcare refer to the (self-reported) additional hours done by men and women each day (compared to pre-COVID-19). Respondents are asked to report the hours done by themselves and their partners each day. These are aggregated to produce weekly total hours for both partners within households and to calculate the shares done by men and women. By contrast, the pre-COVID shares are based directly on self-reported shares for respondents and their partners (pre-COVID). For further information on questions asked, see section II.

[4] As is standard in the literature, we calculate the weekly time in housework by adding up daily childcare for the couple. To that end, we multiply daily weekday numbers by five and daily weekend numbers by two for each individual in a couple.

Figure 1: Additional hours' childcare (total per week), by post-COVID-19 employment status
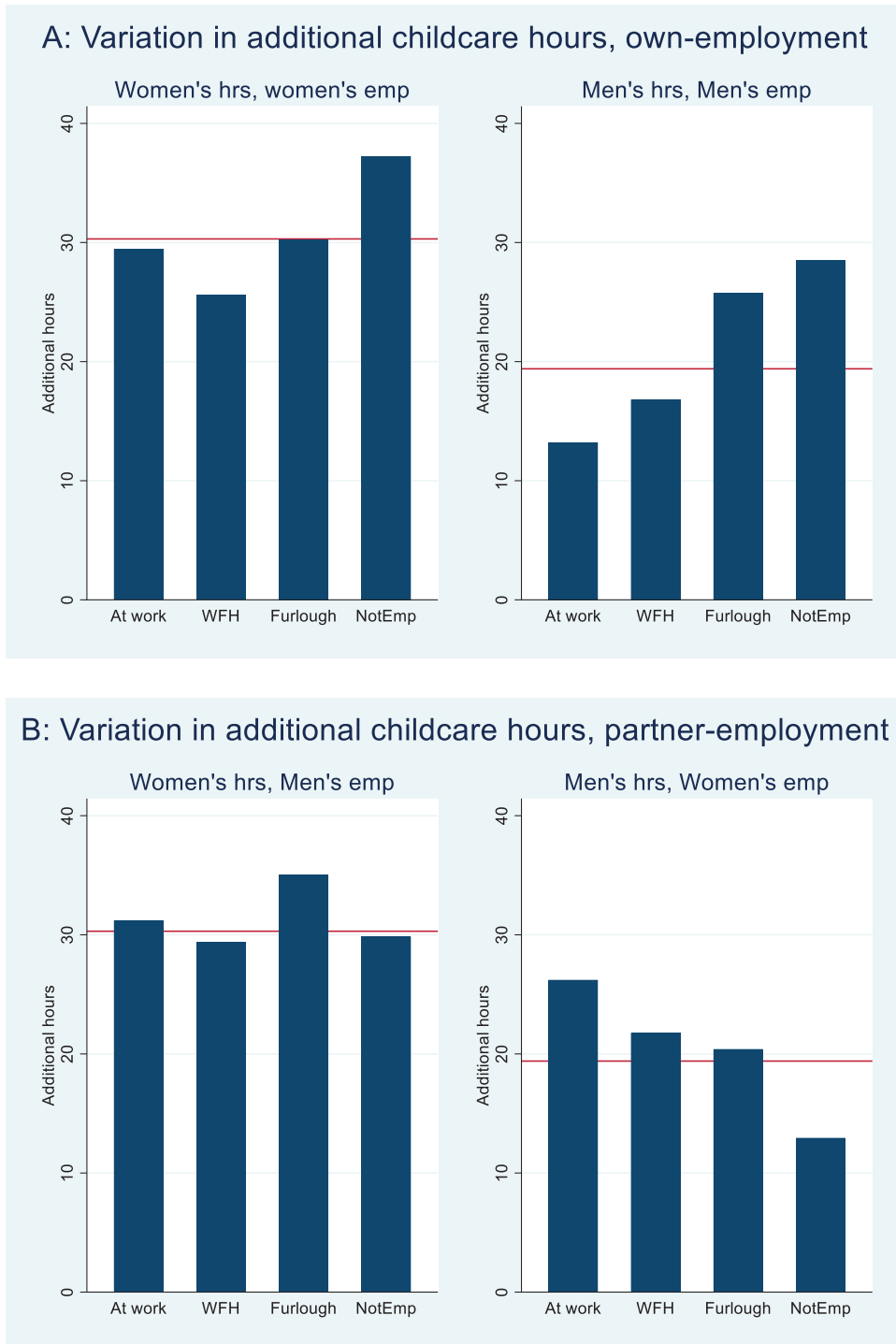
Notes: The figure shows average self-reported total hours additional childcare done by men and women post-COVID-19. For further information on questions asked, see section II.

Table 4: OLS regression results Outcome = total hours additional childcare per week (post-COVID-19)

	(1)	(2)	(3)
Female	11.834	7.248	14.074
	(1.649)	(1.732)	(4.350)
WFH		1.337	3.247
		(2.373)	(2.867)
Female_WFH			–6.836
			(4.953)
Furloughed		8.539	13.038
		(2.797)	(3.663)
Female_Furloughed			–11.568
			(5.802)
NotEmployed		13.471	15.868
		(2.663)	(3.882)
Female_Not employed			–7.408
			(5.638)
Partner_WFH		–1.595	–1.130
		(2.373)	(2.383)
Partner_Furloughed		–1.355	–1.198
		(2.797)	(2.796)
Partner_NotWorking		–8.705	–8.419
		(2.663)	(2.665)
Constant	18.938	19.003	16.756
	(1.166)	(2.663)	(2.952)
N	580	580	580

Notes: Table reports estimated coefficients and standard errors. Additional hours of childcare refer to the (self-reported) additional hours done by men and women each day (compared to pre-COVID-19). Respondents are asked to report the hours done by themselves and their partners each day. These are aggregated to produce weekly totals. For further information on questions asked, see section II.

plots average total additional hours for men and women according to their own employment. The figure indicates that the amount of additional *childcare is more sensitive to own-employment in the case of fathers than it is in the case of mothers*. Total hours of additional childcare per week vary by employment status for both men and women but to a greater extent in the case of men.

Although women are more likely not to work than men, *lower levels of employment do not account for all of women's higher number of childcare hours*. Figure 1, panel A, shows that mothers are doing more childcare than fathers, irrespective of their employment. Indeed, women who are at work/working from home are doing as many additional hours of childcare as men who are furloughed. One possibility is that partner's employment status (which is correlated with own-employment status) might also drive variation in the amount of childcare by own-employment status. However, Figure 1, panel B, suggests that there is less sensitivity to partner's employment status than to own-employment status, particularly in the case of women.

To explore the relationship between childcare hours and own- and partner-employment more systematically, we run an OLS regression of total additional hours on indicators for own- and partner's employment. We also allow the correlation with own-employment to differ for men and women. The results are reported in Table 4. Comparing the results in columns (1) and (2) shows that there is a gender gap in additional childcare, conditional on own- and partner's employment. Including employment controls reduces the gender gap (from 11.8 hours to 7.2 hours) but it remains statistically significant. The coefficients

on partner's employment in column (2) are economically small and statistically insignificant, with the exception of not employed, confirming findings in previous studies, (e.g. Giminez-Nadal and Molina, 2014) that the number of hours of additional childcare is less sensitive to partner's employment than to own-employment. The results in column (3), including interactions between own-employment and gender, confirm that the number of additional hours' childcare is less sensitive to women's own-employment than it is to men's. Compared to being at work (the omitted category), being furloughed increases men's childcare by 13.0 hours, but increases women's childcare by only one and a half hours (13.0 – 11.6). Being out of work increases men's childcare by 15.9 hours but increases women's childcare by 8.5 hours (15.9 – 7.4).

The share of childcare done by women during COVID-19 is very similar to the share that they did pre-COVID-19—63.6 per cent compared to 65.3 per cent (see Table 3). However, some households have taken greater steps towards a more equal allocation (see Figure 2). We show this by means of a 'difference-in-differences' analysis of the effect of COVID-19 on the within-household childcare allocation. Specifically, we estimate the effect of COVID-19 on the difference in the within-household (female/male) shares before/after lockdown. Our outcome variable (Gap_change_i), which takes values

Figure 2: Changes in the within-household gender childcare gap
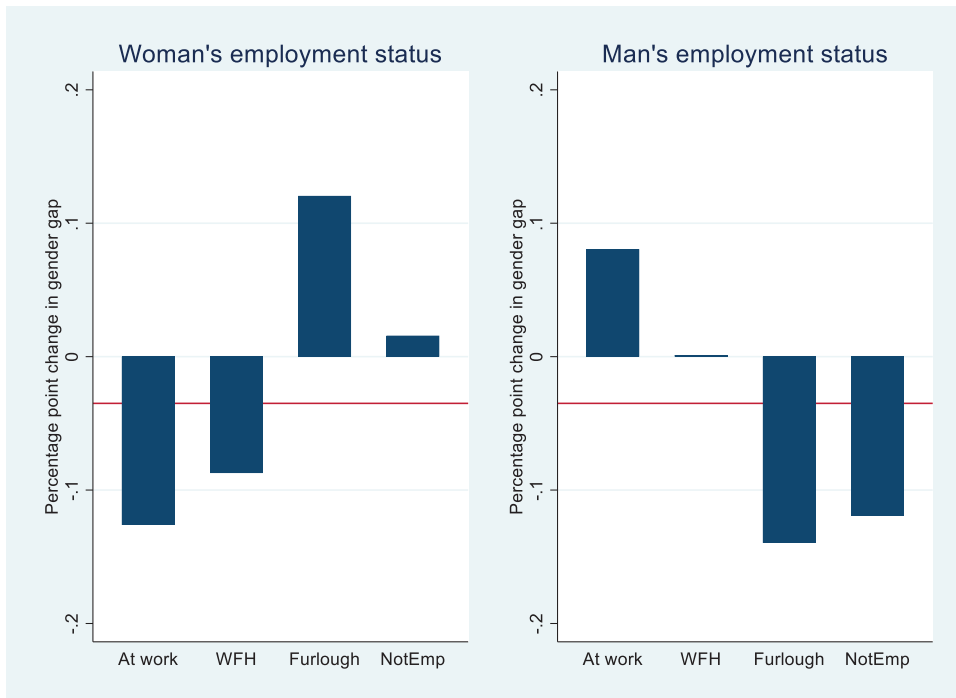
Notes: The gap change refers to the within-household change before/after COVID-19 in the gender childcare gap, where the gender childcare gap is defined as the difference between the share of childcare done by women and the share of childcare done by men. Pre-COVID refers to all childcare; post-COVID-19 refers to the additional hours of childcare. The pre-COVID gender gap is 30.4. A negative number corresponds to a narrowing of the gender childcare gap. For further information on questions asked, see section II.

from –1 to 1, is the change before/after COVID-19 in the gender childcare gap for household *i* where the gap measures the percentage point difference in the share of childcare done by women and the share of childcare done by men, within the same household, i.e.:

$$Gap\_change_{i1} = Gap_{i1} - Gap_{i0}$$

where $Gap_{it} = Share\_f_{it} - Share\_m_{it}$, $t = 0, 1$

We calculate this *Gap_change* measure directly using our survey data, exploiting the fact that we observe the reported childcare allocation pre-COVID-19 and the allocation of reported additional hours post-COVID-19 *for the same household*. The starting point, i.e. the pre-COVID-19 gap, was 30.6 percentage points. Table 5 shows that, averaging over all families, the gap has narrowed by 3.3 percentage points [p=0.278].

Table 5 reports results from regressing the household-level *Gap_change* measure on indicators for men's and women's employment status and additionally (in column 3) the pre-COVID-19 household childcare gap. The results in column 3 show that there has been a 12.6 percentage point narrowing of the childcare gap when men work from home [p=0.089] and even greater changes when men have been furloughed or lost their jobs. The magnitudes of the changes in the gap in these cases when men are furloughed/ not employed are big enough to close the gap and move men to doing a majority share of the additional childcare. On the flipside, when women have lost their jobs, they have taken on an even greater share of the additional childcare than pre-COVID-19. In these cases, the childcare gender gap has widened, moving women close to a 100 per cent share of the additional childcare.

V. Discussion

For families with young children, the months of lockdown have meant providing many additional hours of childcare—equivalent to a full-time working week. Women have done more of this childcare than men (roughly 10 hours a week more). Partly, this is because they are less likely to be working, but that does not account for all the difference. It could also be that women are cutting down the number of hours they work, which we do not collect in our data. However, we show that the quantity of the additional childcare done by women is much less sensitive to their employment status than it is for men. Only when comparing women working from home with men in furlough and unemployed do women engage in relatively less additional childcare. Otherwise, women do more of the additional childcare than men, independently of their work status. This means that many women are left juggling work with (a lot of) childcare.

In the short term this may negatively impact on their mental health; there is preliminary evidence that women have experienced a bigger deterioration in their mental health than men during the pandemic (see Adams-Prassl *et al.*, 2020*b*). Labour productivity is also likely to suffer, ultimately reducing earnings and career progression and adding to existing gender pay gaps. Coviello *et al.* (2015) show that judges who juggle more trials at once instead of working sequentially on a few of them at each unit of time take longer in closing a case. Evidence from on-line job markets shows that women earn 20 per cent less per hour on average, which can partly be explained by women with

Table 5: OLS regression results Outcome = $Gap\_change_{i1} = Gap_{i1} - Gap_{i0}$

	(1)	(2)	(3)
Constant	−0.033	−0.023	0.083
	(0.030)	(0.103)	(0.098)
Man_WFH		−0.076	−0.126
		(0.078)	(0.074)
Men_Furloughed		−0.253	−0.317
		(0.097)	(0.091)
Man_NotWorking		−0.221	−0.372
		(0.103)	(0.099)
Woman_WFH		0.014	0.043
		(0.111)	(0.103)
Women_Furloughed		0.255	0.290
		(0.120)	(0.112)
Woman_NotWorking		0.136	0.338
		(0.110)	(0.108)
Pre_gap			−0.476
			(0.074)
N	290	290	290

Notes: The gap change refers to the within-household change before/after COVID-19 in the gender childcare gap, where the gender childcare gap is defined as the difference between the share of childcare done by women and the share of childcare done by men. A smaller gap indicates a more equal allocation. Pre-COVID gap refers to the self-reported allocation of childcare; Post-COVID-19 gap refers to allocation of self-reported additional hours of childcare. The Pre-COVID gender gap is 30.6. For further information on questions asked, see section II.

young children having more fragmented work patterns that affect their ability to complete a task (Adams, 2020). There is emerging evidence that, in the academic community, women's productivity has suffered more than men's since the current crisis began. Looking at submissions to prominent working paper series, there is a smaller share of women (particularly mid-career women) among authors of COVID-19 papers (Amano-Patino *et al.*, 2020; see also Shurchkov, 2020). In the immediate future, as workplaces reopen before childcare centres and schools do, couples will have to make tough decisions as to who stays at home to look after the children and who goes to work. Our evidence suggests that women may be more likely to take on even more of the burden.

There is, as yet, no direct evidence on the impact of COVID-19 on gender norms. In many households the higher burden of additional childcare done by women may entrench pre-existing gender norms. However, in other families, where men are not working, the allocation of the additional hours of childcare is now more equal. The existing literature on the long-term effects of changes in domestic labour as a result of shocks is mixed, and it remains to be seen whether any changes are permanent. Recent evidence from paternity leave policies aimed at fathers' involvement with children is inconclusive. Ekberg *et al.* (2013) do not find an effect of 'daddy months' in Sweden in fathers' likelihood to take medical leave to care for children. However, Farré and González (2019), Patnaik (2019), and Tamm (2019) show that paternity leave leads to a persistent increase in fathers' involvement in childcare in the cases of Spain, Canada, and Germany, respectively.

Several things are different about the current situation compared to the context of previous studies. The first is the scale of the demand-side shock. The changes have been profound. The total amount of childcare being done at home completely dwarfs usual

amounts because of the closure of almost all formal childcare. Second, unlike previous economic crises where the losses in employment are focused in particular sectors and occupations, the supply-side effects have also been widespread, magnified in the UK by government furlough schemes. The third difference from, for example, the effect of paternity leave mandates is that this is not a deliberate policy to promote a more equal distribution of childcare, but an unintended consequence of measures to stop a virus spreading.

In the longer term, COVID may have changed the way in which we organize work. Firms have made investments to make it possible for workers to work from home, and in many cases the concept has been proven. In the university setting, academics have had to adapt to deliver lectures on-line. In corporate settings, meetings are now run live via on-line platforms and many services, such as fitness classes, are now being offered on-line as effectively. The ability to work from home in the future may sound like good news for mothers, but can be a double-edge sword if they continue to juggle work with family care. It is unclear whether, as schools reopen, the ability of men and women to be able to work from home may generate further change in the division of household labour. Policy-makers should be thinking about implementing policies that encourage the on-going technological investments made by the private sector that COVID has spurred to support more work flexibility, while at the same time fostering a more equal division of childcare responsibilities within the household. Policies that specifically incentivize fathers to work from home may constitute a good starting-point for successfully reinforcing the modest shift towards a more egalitarian direction started with COVID documented here.

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