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Parents' Time Allocation in Different Phases of the Covid-19 Pandemic: Evidence from the UK and Implications for Gender Equality

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Parents' Time Allocation in Different Phases of the Covid-19 Pandemic:

Evidence from the UK and Implications for Gender Equality

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Abstract[3]

We exploit the changes in the distancing measures instituted by the UK government in the different phases of the pandemic to identify the impact on the daily lives of couples with children and gender equality within the household. We estimate a weighted tobit simultaneous system of market, housework and child care hours of parents and correct for possible endogeneity of the wages. We find that once the restrictive measures were lifted there was a significant increase in the hours of paid work and decrease in the hours of housework and childcare of both parents. The changes were not significantly different among the two parents. These findings confirm previous evidence that access to market childcare services increases the working hours of mothers. They also indicate that the initial pandemic shock did not eliminate pre-pandemic inequalities in the labour market and division of housework and childcare among parents with underage children. The evidence tends to suggest that changes in gender norms for more equality within the family are more likely to occur when the shock is enforced by law or has a long enough duration to change the behaviour of men and women and shape the norms of the next generation.

JEL: D13, J16, J21, J22

Keywords: time allocation, COVID-19, gender equity, labour supply, housework, childcare

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1. Introduction

The Covid-19 pandemic swept the globe in early 2020 and caused governments around the world to devise measures to fight the spread of the novel virus and reduce transmission of the disease. The focus of a lot of research has been on the impact of the initial strict lockdown on the gender division of paid and unpaid work and gender inequality in various countries. Adams-Prassl et al. (2020), showed how different crisis-related government measures could either counter or enhance already present inequalities in labour market outcomes in Germany, US and UK. Alon et al. (2020) demonstrated that the pandemic differed to a large extent from previous recessions in the US since the job loss was mostly related to the ability to work from home and hold a job in key sectors, which put women at a higher risk of unemployment compared to usual recession patters. At the same time, the initial pandemic shock could change cultural norms and lead to a more permanent increase in father's involvement with housework and childcare in families with children Hupkau and Petrongolo (2020) found that there was a substantial redistribution of childcare in nearly a fifth of UK households during the first lockdown in the UK. As noted by Alon et al. (2020), there are two channels through which the pandemic could accelerate changing gender norms. First through the adaptation of more flexible working schedules and telecommuting by employers and second through the change in gender norms. Based on previous evidence from the post WWII and other shocks to the family, it has been suggested in the literature that the changing norm observed in the initial pandemic lockdown may persist even after the restrictions are lifted and could lead to greater gender equality within the household.[4] Nevertheless, there has been limited research on whether the initial pandemic shock pushed the norms toward greater gender equality in the family.

In this paper, we exploit the changes in the distancing measures instituted by the UK government to handle the different phases of the pandemic to identify the impact on the daily lives of UK mothers and fathers and gender equality in the labour market and within

[4] The initial effects of the pandemic were investigated by a number of studies including Andrew et al. (2020), Biroli et al. (2020), Boca et al. (2021), Sevilla and Smith (2020), Kreyenfeld and Zinn (2021), Zoch et al. (2021), Farre et al. (2021).

the family. We exploit the initial closing down of schools and childcare centres and the restrictions to work from home between April-May 2020 but also the subsequent relaxation of these measures between June-September 2020 followed by their re-introduction in January 2021. We estimate parents' joint time allocation decisions over the different phases of the pandemic based on Becker's model of time allocation. Having access to market childcare services is expected to cause parents to decrease the time they spend taking care of their children and reallocate their time to other activities in the home or offering paid work or leisure. Similarly, restricting access to market childcare services is expected to put greater pressure on parents to increase the time they devote to the care of their children. Hence, they are expected to reallocate their time away from paid work and/or other household activities to childcare.

We estimate a weighted tobit simultaneous system of labour, housework and childcare hours of partnered parents to take into consideration the simultaneity in their decisions and also allow for corner solutions. We use the Understanding Society UK study COVID-19 supplement data to conduct the estimations. Our estimation also corrects for possible endogeneity of the wages of the two parents and attrition bias. Our aim is to identify who was the parent that mostly benefited from/was burdened by the restrictions/relaxations of the distancing measures including access to childcare and schooling of the children. We also assess whether the initial large and abrupt pandemic shock, which increased the involvement of fathers in housework and childcare, led to a greater gender equality within the family once the restrictive measures were relaxed or lifted.

We contribute to the literature on how access to childcare can affect gender outcomes within the household. In general, childcare has been recognised as an important factor in removing disincentives to female labour participation and gender outcomes (Olivetti and Petrongolo, 2017). Empirical research conducted prior to the pandemic focused on how increased access to childcare affects mother's labour supply. Most work exploited policy reforms which increased the availability of childcare either through subsidization of childcare prices or increased spaces and studied mainly the effect on the time the mother devotes to paid labour market. For example, Bick (2016) and Bauernschuster and Schlotter (2015) found that provision of childcare in Germany increased mother's labour force participation. Brilli et al. (2016) found a positive and significant effect of the availability

of childcare services on the mother's work status in Italy. Lefebvre and Marrigan (2008) analysed the effects of a new childcare policy for children in the province of Quebec in Canada. Specifically, licensed and regulated providers of childcare services began offering day care spaces at the subsidized fee per child for children aged 4. In successive years, the government reduced the age requirement, created new childcare facilities and spaces, and paid for the additional costs entailed by this low-fee policy. The difference-in-difference estimates suggested that the policy had long-term labour supply effects on mothers who benefited from the program when their child was less than 6. However, Havnes and Mogstad (2011) analysed the increase in scope of subsidized child care in Norway and estimated that this policy mostly crowded out informal child care arrangements instead of increasing mothers' labour supply.

The policy reforms due to the pandemic also allow us to contribute to the literature on whether large shocks, which may lead to the establishment of new norms, could also lead to greater gender equality in the labour market and within the family. Previous evidence has shown that changes in gender roles due to war or policy reforms had more permanent effects on gender equality. For example, Fernandez et al. (2004) showed that the mobilisation of men during to the Second World War prompted more US women to enter the labour market and, thereby, shaped the norms and preferences for women's labour force participation of younger generations. Also, there is evidence that the introduction of fathers' quotas of parental leave allowed them to spend more time with their children at least in some cases (see Farre et al., 2020; Patnaik, 2019; Tamm, 2019). However, Ekberg et al. (2013) did not find such an effect.

We use data from the UK Understanding Covid-19 monthly and bimonthly surveys. We estimate a weighted tobit simultaneous system of working, housework and child care hours and correct for possible endogeneity of partners' wages. In the present context, there is an advantage in implementing the econometric analysis since the number of children and working conditions (i.e. work from home, etc.) can be expected to be exogenous to parents' choice of how to allocate their time across the different uses. Our findings confirm previous evidence that access to childcare increases the paid working hours of mothers. The paid working hours of fathers also increased. However, we do not find evidence that the increased equality in the family, which was observed at the initial stages of the pandemic,

persisted once the restrictive measures were lifted. This evidence tends to suggest that changes in gender norms towards more equality within the family are more likely to occur when the shock is enforced by law or has a long enough duration to make people change their behaviour and also influence the behaviour of the next generation.

In section 2, we briefly describe the timeline of the UK Coronavirus reforms and, in section 3, we describe the data. In section 4, we present the framework and its implications. Section 5 presents the empirical results and in section 6 we conclude.

2. Timeline of the UK Coronavirus Reforms

We next briefly describe the timeline of the UK government Coronavirus lockdowns and measures instituted to curb the different phases of the pandemic over the period that we study.[5]

The first strict lockdown was introduced on March 26th 2020. The UK government put in place restrictions on activities in the form of "stay-at-home" instructions, which imposed work at home for those who can telecommute and very limited travel to and from work for those who cannot. All schools were closed on March 26th for most population, except vulnerable children and children of key sector workers. Also, all non-essential shops, libraries, places of worship, playgrounds, etc. were closed. In some economic sectors, such as Construction and Hospitality, activities nearly came to a halt, while others, like Health, were faced with lack of infrastructure and (wo)manpower. Based on ONS statistics, in April 2020, an estimated 8.8 million UK employees were furloughed under the Coronavirus Job Retention Scheme (CJRS). Moreover, full-time workers suffered a decline of average hours of work from 36.9 in January 2020 to 34 in March and further 30.6 in May. At the same time, part-time employees experienced an even bigger drop in average hours worked, from 16.2 in January to 14.4 in March and 11.7 in May 2020. On the other hand, hourly wage for the full-time employed increased by 0.7% in annual terms compared to 2019, while the

[5] he timeline of the UK Coronavirus reforms are described in the following website: https://www.instituteforgovernment.org.uk/charts/uk-government-coronavirus-lockdowns.

weekly wage fell by 0.9% as workers who were not furloughed were doing less paid jobs than in 2019. [6]

There was an easing of the restrictions that started on June 1st 2020 with some schools opening for Reception, Year 1 and Year 6, while most schools remained closed until the end of term. In early August the government started a campaign Eat Out to Help Out, urging citizens to support local food and catering businesses. By mid-August, closed public spaces such as theatres and bowling allies were reopened. On September 1st, after the summer vacation, the majority of schools in England, Wales and Northern Ireland opened for the autumn term. In September, life went back to normal, with schools, restaurants and public spaces operating regularly. As the number of new COVID-19 cases steadily increased, a tier system, with three standardized Local COVID Alert Levels – medium, high and very high – was introduced in England in mid-October.

On November 5th 2020 another lockdown came into force. On December 19th a new tier was introduced – level 4: Stay at Home and was soon replaced by a tier-3 restriction until January 6th when England entered the third lockdown. After the Christmas break schools did not reopen until March 8th and it was not a rare occurrence that groups of pupils, whole classes, or even in some cases whole schools, were put in quarantine.

After the summer of 2020, Scotland, Wales and Northern Ireland were issuing their own measures for preventing the spread of the novel virus, and though these measures did not entirely coincide with those in England, they loosely followed the same trend, as in none of the 4 countries that make up the UK the disease was successfully contained. In our analysis we control for those different measures, as we will demonstrate in the Data section of this paper.

The lockdown orders and easing of the restrictive measures is of special interest to us since they provide exogenous changes to the working and family environment of parents. Schools and childcare centres were closing and then reopening, employees were asked to work from home and then encouraged to return to their offices, people were furloughed

[6] These statistics can be found in the ONS website www.ons.gov.uk.

and subsequently some returned to their workplace.[8,] We are making use of these external shocks to study the impact on parents' daily life within and outside their homes and gender equality within the family.

3. Data

Our empirical analysis uses the data of the UK Understanding Society COVID-19 monthly and bi-monthly surveys over the period April 2020 to January 2021. Understanding Society is a panel survey that replaced the British Household Panel Survey, enhancing the size and range of the study. It is published yearly and follows the same representative sample of individuals from 250 areas of Great Britain, interviewing each adult member of the sampled household. In the summer of 2020, the first wave of a special monthly pandemic-related edition of the study was published, focusing on topics that captured the most significant impact of the pandemic on the daily lives of people. The first wave of the Understanding Society COVID-19 supplement refers to the month of April and also entails questions on baseline labour market circumstances, pertaining to January and February. After the July wave, surveys became bi-monthly (i.e. September 2020, November 2020, January 2021 and March 2021). The surveys were filled out online and those who failed to fill them out were contacted by phone. For the sake of comparison, we use only the data gathered in the online surveys.

Our analysis focuses on three indicators: hours worked in a paid job, hours spent doing housework and hours spent in childcare or home schooling. While variables pertaining to paid work appear in all eight monthly surveys, questions regarding time spent in housework and childcare can be found in five waves: April, May, June, September and January. It is the data from these five surveys that we use to conduct our empirical analysis.

For employed individuals, there is information to compute their hourly wage and whether they are self-employed, keyworkers, furloughed, work from home, their industry of employment. There is also information on the age of each partner, number of children in different age groups (0-4, 5-15 and 16-18), housing tenure, country of residence (England, Scotland, Wales or Northern Ireland), living in an urban area. We extract the information on the level of education and ethnicity from the yearly data provided in the monthly

supplement, referring to waves 10 and 11. Since our aim is to study the simultaneous allocation of parents' time to paid and unpaid work, our sample is composed of households with both partners responding to the survey, of age 18-65 and with at least one child under the age of 18. In total, across the five waves, the sample is composed of 3013 observations. The data is an unbalanced panel since female respondents in our sample and/or their male partners may have dropped out or not completed the questionnaires in each of these five months. To deal with attrition and ensure representativeness of the sample, we use the inverse-probability weights provided in the survey data that correct for non-response by modelling response probability based on a rich set of information from the past surveys (Crossley et al., 2021).

Table 1 reports the weighted summary statistics of key variables used to conduct the empirical analysis. Relative to the baseline (January-February), mothers decreased their weekly market hours by 40% in the initial lockdown in April. Over the pandemic sample period, mothers market hours were about 17 weekly hours and remained about the same across the various phases of the pandemic, except in September when they increased to 20 weekly hours. Fathers' labour supply was almost double that of mothers over the pandemic months that we study. On average, fathers worked in the labour market about 29 weekly hours. In the beginning of the pandemic, fathers decreased their working hours by 27% relative to their baseline working hours. Subsequently, in September 2020, the weekly working hours of fathers increased to 34 and in January 2021 they decreased to 31 weekly hours. Figure 1 plots the distribution of the hours of paid work of parents over different months of the pandemic and whole sample period. The percentage of mothers that reported 0 hours of paid work went from 43% in April 2020 to 31% in September 2020 and then increased to 42% in January 2021. The corresponding percentages for male partners were lower: 32.3 %, 14.3% and 20%.

Over the 1st lockdown period, mothers' weekly hours of doing housework and childcare were double that of fathers. Similarly, the share of childcare and household chores done by mothers was, on average, about double that of fathers. By January 2021, this gender gap in non-paid work widened relative to April 2020. Figures 2-3 also show that housework responsibilities were unequally shared by the two parents during the initial strict lockdown

and afterwards. This gender difference in housework and childcare indicates why it is misleading to treat all non-market time as leisure, as it has been noted by many researchers. But the openings of schools and childcare centres and easing of other distancing measures in September 2020, led to a doubling of the percent of women with zero hours of housework and childcare. The percentage of men with zero hours of childcare was larger in September 2020 and January 2021 than in April 2020. The percentage of men who did no housework was lower after April 2020 but increased during the lockdown of January 2021.

Over the sample period, the employment rate among female respondents was lower than that of male ones and decreased over the COVID months. In contrast, the employment rate of fathers increased, especially in June and September. Among those employed, the probability to be furloughed under the Coronavirus Job Retention Scheme was more or less similar for both partners with the exception of January 2021 when there was a decrease in the percentage of furloughed male respondents.[7] A comparison across sexes shows that a higher percentage of employed mothers are keyworkers and a higher percentage of employed fathers are working from home. The percentage of employed mothers and fathers working from home decreased substantially in September 2020 when there was a relaxation of the distancing measures and increased in January 2021 when the distancing measures were reintroduced.

The statistics in Table 1 also show that, on average, about 88% of couples live in England, 77% live in urban areas, 66% are paying off the mortgage of their house. On overage, the number of children age 0-4 was 0.35, age 5-15 was 1.41 and age 16-18 was 0.17. Sampled parents are in their early forties and women are slightly younger than their male partners. Mothers are slightly better educated than their male partners. About 16% of female respondents and 13% of male respondents are non-British.

[7] In April 2020, 8.8 million UK employees were furloughed with a half receiving 80% of their normal pay. Workers in lower paying jobs were more likely to experience reduced pay.

4. Framework and Empirical Implications

Our aim is to identify the effects of the restrictions and relaxations of the UK government measures to deal with the Covid-19 pandemic on the time allocation decisions of couples with children. The empirical specification is based on the theoretical framework of Becker (1965) and Gronau (1977) that allows for a trade-off between domestic work, market work and leisure assuming household decisions are pareto efficient.[8] Similar to Bloemen and Stancanelli (2008), we assume that each household consists of a female partner and male partner. Each couple partner derives utility from leisure, private consumption and public consumption of housework and childcare. The individual utility function of each partner k in household i in month s is given by,

$$U_{iks} = U(1 - t_{ilks} - t_{ihks} - t_{icks}, C_{iks,} C_{ihs}, C_{ics}),$$

where s denotes the month (i.e. April, May, June, September 2020 and January 2021), k denotes either the female (f) or male (m) partner. C_{iks} denotes the private consumption of partner k in month s and t_{ilks}, t_{ihks} and t_{icks} denote the time spent in market work, household and childcare by partner k in month s. Assuming that the total time endowment of partner k is 1, his/her leisure is given by $1 - t_{ilks} - t_{ihks} - t_{icks}$.

C_{ihs} and C_{ics} are the consumption of housework and childcare services respectively that are produced with the time inputs of the two parents and are public goods for them:[9]

$$C_{ihs} = f(t_{ihfs}, t_{ihms})$$

$$C_{ics} = f(t_{icfs}, t_{icms})$$

[8] This framework was extended by Apps and Rees (1997) to incorporate household production and childcare and Chiappori (1997) to allow for home production in a collective model of household behaviour.

[9] The assumption is that household and childcare services cannot be bought in the market since the data do not allow us to consider market childcare and housework services. But, the model can be extended to include demand for market childcare and household services.

The household's budget constrain is given by,

$$w_{ifs}\, t_{ilfs} + w_{ims}\, t_{ilms} + Y_{is} = C_{ifs} + C_{ims}$$

where w_{ifs} and w_{ims} are the hourly market wages of the female partner and male partner in month s respectively and Y_{is} is the other income of the household (besides labour income).

The household's welfare function V_i is a Pareto weighted average of the individual utility functions of each partner,

$$V_i = \mu_i U_{ifs}(1 - t_{ilfs} - t_{ihfs} - t_{icfs}, C_{ifs}, C_{ihs}, C_{ics}) +$$

$$(1 - \mu_i) U_{ims}(1 - t_{ilms} - t_{ihms} - t_{icms}, C_{ims}, C_{ihs}, C_{ics}),$$

where $0 \leq \mu_i \leq 1$ and can be thought to denote the bargaining power the female partner.[10] Assuming that the household maximizes the welfare function V_i subject to the budget constrain, each partner's optimal time-choice equations are given by,

$$t^*_{ijks} = t_{ijks}(w_{ims}, w_{ifs}, Y_{is}),$$

where $j = l, h, c$. The own wage effects for all time uses depends on whether the substitution effect is larger than the income effect. The cross-wage effects depend on whether the time inputs of the spouse are complements or substitutes in household production.

[10] In the unitary model, μ is constant whereas in the collective model μ may depend on distributional factors such as the sex ratio (Chiappori et al., 2002), the share of lump sum non-means-tested child benefit payments paid to the mother in the household's unearned income and the share of the wife's other unearned income in the household's unearned income (among others, Lyssiotou, 2017).

4.1 Empirical Model and Econometric Considerations

We estimate the following parametric specification of the above system of simultaneous equations of parents' hours of market work, housework and childcare:

$$t^*_{ijks} = \alpha_{jk} + \alpha^f_{jk} lnw_{ifs} + \alpha^m_{jk} lnw_{ims} + \omega_{jk} Y_{is} + X'_{iks}\beta_{jk} + \sum_{jks} \gamma_{jks} month_s + \sum_{jks} \delta_{jks} month_s \, Key_{iks} + \varepsilon_{ijks} \quad (1)$$

$$t_{ijks} = t^*_{ijks} \quad if \;\; t^*_{ijks} > 0$$

$$t_{ijks} = 0 \;\; \text{otherwise,}$$

where $j = l, h, c$, lnw_{ifs} and lnw_{ims} are the log real hourly wages of the female and male partner respectively.

Vector X'_{iks} includes individual and household characteristics that are expected to affect preferences like age and education level of the female partner and male partner, the number of children age 0-4 and number of children age 5-15. We allow these child effects to be different between keyworkers and non-keyworkers. In estimating the partners' hours equations, usually children need to be instrumented since they are expected to be simultaneously determined with parents' time allocation decisions (Lyssiotou, 2017). However, during the pandemic period that we study, children can be expected to be exogenous to parents' time allocation decisions. This is an advantage in implementing the econometric analysis. We also condition on self-employment status since the self-employed have been found to have different preferences than employees (Lyssiotou et al., 2004). Also, Graeber et al. (2021) found that during the pandemic among the self-employed, women were affected more than their male counterparts. In addition, we include interactions of self-employment status with keyworker status, interactions of self-employment status with working from home. Vector X'_{iks} also contains dummies for the type of housing tenure, living in an urban area and country of residence within the UK. Furthermore, it includes interactions of the monthly dummies with country of residence dummies in order to allow for the effect of policies to be different in Wales, Scotland and Northern Ireland relative to England. The reference household lives in England and has children aged 16 to18.

The parameters of interest are β_{jk} and δ_{jks}. The β_{jk} estimates capture the effect of the restrictions/relaxations instituted by the government in pandemic month s on the hours of the j^{th} activity of parent k. The δ_{jks} parameters capture any difference in the behaviour of keyworker relative to non-keyworker mothers/fathers since the children of keyworkers could attend schools and kindergartens even in the strict lockdowns.

We estimate a weighted tobit simultaneous system of the hours equations (1) to take into consideration the simultaneity in the decisions of the two parents, allow for zero time to be allocated to any given activity and capture the left censoring in the dependent variables, as exhibited in Figures 1-6, and correct for possible attrition bias.[11] We also address the issue of endogeneity of the wages. First, the wages of nonworking individuals are not observed in the above system of hours equations (1). So, we impute them from a wage equation. In order to reduce the potential endogeneity, however, we predict the wages for all the individuals and not only for nonworking individuals. We apply the Heckman (1979) procedure to predict the log real wages of female and male partners. We simultaneously estimate a wage equation and an employment equation to allow for selectivity.

The estimation of the Heckman regressions was carried out separately for female and male partners. In order to identify the real hourly wages of men and women, we use as identifying restrictions in the wage equation the individual's sector of employment. Our choice of exclusion restrictions is based on the exogenous variation in the wages of individuals working in different sectors due to the imposition and relaxation of the distancing measures in the different phases of the pandemic. For example, the Coronavirus Job Retention Scheme announced by the government on 20th March 2020 to support through the COVID-19 period caused an exogenous variation in the wages of the individual's being furloughed.[14] The likelihood to be furloughed depended on the occupation sector and level of education.[12] Those employed in Accommodation and Food Services, Wholesale and

[11] If it is the case that everyone in the sample allocates positive hours of time to a given activity, then the Tobit estimator is reduced to a traditional OLS regression. Hence, our empirical model (1) represents a gender-specific system of generalized linear equations for different time uses, combining Tobit and OLSbased estimates.

[12] The primary objective of the CJR scheme was to retain employer–employee links as businesses experienced temporarily low demand because of public health restrictions. Through this, the government wanted to allow for a

Retail, Manufacturing, Construction, Education and Other Service Activities were most likely to become furloughed. Among the additional variables that are included in the wage equation are whether the family lives in an urban area and its interactions with monthly dummies, the country of residence in the UK of the family and its interactions with monthly dummies, the number of children in different age groups and their interaction with country of residence as well as their interaction with monthly dummies, age and age squared of the mother and father and whether the individual is non-British, furloughed, keyworker, self-employed.

Table 1A in the Appendix reports the Heckman estimates of the participation and wage equations of female and male partners. The own log real hourly wage of each partner varies with the industry of employment. The estimates suggest that there are larger fluctuations in the wages of women than there are for men across the different sectors of employment. The work participation of fathers is more influenced by their partner's education level than the work participation of mothers'. While there were some fluctuations across observed periods, men with university degree were on average better paid than the rest of the sample. The country dummy estimates in the wage equation are significantly different from zero for both mothers and fathers. Both men and women were paid less in Scotland and Northern Ireland compared to England, and there was a significantly higher labour market participation among men in Northern Ireland and Wales compared to England over the pandemic period. Male residents of urban areas witnessed large fluctuations in their wage rate throughout the sample period.

The rest of the parameter estimates indicate that the number of children under the age of 16 affect negatively mother's work participation and the effects are not significantly different across the pandemic months. Over the sample period, mothers whose partner was non-British were more likely to be working. Mothers of non-British ethnicity living in England and Northern Ireland were less likely to be in paid employment compared to their

stronger recovery when the restrictions were lifted. In April 2020, 8.8 million UK employees were furloughed, with a half receiving 80% of their normal pay. ONS statistics show that workers in lower paying jobs were more likely to experience reduced pay. The CJR scheme ended on 30th September 2021: https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/articles/anoverviewofworkerswhowerefurloughedintheuk/october2021

British counterparts. Also, those living in Scotland and Wales were more likely to be in paid employment compared to their British counterparts. Fathers of non-British ethnicity living in Northern Ireland and Wales were less likely to be in paid employment than their counterparts living in England. Also, those living in Scotland had higher probability to be working than their counterparts living in England. The wages of non-British males living in England and Scotland (Northern Ireland) were higher (lower) than their British counterparts. The wages of non-British females living Wales (Scotland) were lower (higher) than their counterparts living in England.

We use the selectivity corrected parameter estimates of the wage equations to predict the log real hourly wage of female and male partners in our sample.

5. Empirical Results of the System of Parents' Time Use Equations

Table 2 reports the weighted tobit parameter estimates of the simultaneous system of parents' time use equations. The estimates of interest regarding the effects of distancing measures and their relaxation and lifting are very stable to alternative specifications. The tobit regression coefficients are interpreted in a similar way as the OLS regression coefficients.[13]

In the strict lockdown of April 2020, mothers employed in key sectors worked in the market 7.4 weekly hours more and provided 16.7 weekly hours less of childcare hours than mothers employed in other sectors. Also, sampled female keyworkers with a keyworker male partner worked 2 hours less than those whose partner was not a keyworker. At the 5% significance level, the hours of work, housework and childcare of key working fathers was not significantly different from that of non-key working fathers in April 2020. However, keyworker fathers with a keyworker partner worked 17 weekly hours more in the labour market than those with a non-key working female partner.

In June 2020, when there was some relaxation of the distancing measures and some students could return back to school, men increased their weekly working hours by 5.5

[13] The linear effect is on the uncensored latent variable, not the observed outcome (see McDonald and Moffitt, 1980).

hours and decreased childcare by 4 weekly hours relative to April. In contrast, male keyworkers in our sample worked 4.4 weekly hours less and provided 5.8 more weekly hours of childcare than fathers employed in non-keywork sectors. Thus, male keyworkers did not significantly change their weekly hours of work, housework and childcare in June relative to the strict lockdown of April. Also, in June 2020, mothers provided 2.34 weekly hours less of housework and 9 weekly hours less of childcare relative to April 2020. In contrast, keyworker mothers provided 3.5 weekly hours more of housework relative to non-key working mothers in June 2020. This suggests that in June 2020, female keyworkers did not change their hours of housework and childcare relative to April 2020.

In September 2020, when schools and childcare centres opened for all the children, both parents started to work significantly more hours and provided less hours of housework and childcare relative to April 2020**.** Specifically, in September 2020, mothers and their male partners increased their labour supply by about 15 and 10 weekly hours respectively. At the 5% significance level, we cannot reject that the increase is significantly different among the two parents. These findings are in line with previous findings that access to formal childcare increases the working hours of the mother. The increase in the labour hours of mothers employed in keywork sectors was significantly smaller than that of mothers who work in other sectors possibly because parents who are keyworkers had access to market childcare even during the strict lockdown and/or there may have been less of a need for them to work extra hours.

As expected, in September 2020, both mothers and fathers decreased significantly the time they devote to taking care of their children and doing household chores by 8 and 2 weekly hours respectively. With regard to housework, Rodríguez Sánchez et al. (2021) also found that, after the initial shock, couples with children went back to their pre-pandemic gender division of housework. Relative to non-key workers, parents who are keyworkers provided more hours of housework and childcare in September 2020, which suggests that they did not change their non-paid hours relative to the strict lockdown of April 2020. Overall, the above findings suggest that the initial pandemic shock did not change pre-pandemic gender inequalities in non-paid work. During the second lockdown in January 2021, fathers worked more hours whereas mothers provided less housework relative to April 2020.

The estimates also suggest that the allocation of time across paid work, housework and childcare was not significantly different across the different phases of the pandemic in the various countries of the UK, with the exception of January 2021 when fathers in Northern Ireland provided less childcare compared to their counterparts in England. This evidence provides additional identification restrictions and robustness of our estimates of interest.

Other findings presented in Table 2 include the following. Over the sampled period non-British mothers worked about 3.5 weekly hours more than British mothers. The opposite applies for non-British fathers who worked about 3 weekly hours less than their British counterparts. In urban areas, females worked in the labour market about 5 weekly hours more than those living in non-urban areas. Mothers with very young children, aged 0-4, worked significantly less hours in the market and provided more hours of childcare than those with children in the 16-18 age group. Similarly, but to a lesser extent, female respondents with children 5 to 15 years old worked fewer hours in the market but provided 3 weekly hours less of childcare per child than those with children aged 16-18. Fathers with small children, 0 to 4 years of age, provided more housework and childcare per week than those with children in the 16-18 age group. Female keyworkers with children under 16 years old worked more hours in the market and provided more childcare hours than their non-key working counterparts. Self-employed mothers working from home worked significantly fewer hours in the market whereas the opposite applies for self-employed fathers who worked from home. Women with university education worked on average about 9 hours more than those with other qualifications. Women whose husband had higher than O-level education worked fewer hours. Overall, the paid working hours of men do not significantly vary with their education level or the education level of their female partner.

We estimate a significantly positive own wage labour supply elasticity for females. The cross-wage effects indicate that an increase in the wage of the female partner affects negatively the working hours of the male partner. Other income affects negatively the working hours of both mothers and fathers and positively the hours of housework of female respondents.

6. Conclusion

In this paper, we exploit the policy changes in the distancing measures and access to childcare and schooling instituted by the UK government at the various phases of the pandemic to estimate the causal effect on parents' time allocation and gender equality within the family.

We find that when the government started to relax the strict lockdown measures in June, and subsequently in September 2020 when all parents had access to childcare services and schooling, the working hours of both parents increased. Although the increase in the paid working hours of the two parents was not statistically different, it was larger for mothers. This evidence is in line with previous research that access to childcare increases the working hours of the mother.

We also find that with the lifting of the restrictions in September 2020, there was a decrease in the hours of childcare and housework that was not significantly different across male and female partners with children. Given the existing pre-pandemic gender inequalities in non-paid work in the UK, as documented by other studies including Hupkau and Petrongolo (2020), this implies that the initial pandemic shock did not lead to a more egalitarian division of housework and childcare in families with underage children.

The above findings tend to suggest that the initial pandemic shock and initial strict lockdown measures forced parents for a few months to divide their parenting and household chore responsibilities more equally. However, we do not find evidence that the initial adaptation of couples to the strict lockdown measures led to a more permanent change in their daily lives and in gender norms. This finding is different from the previous findings based on the experience of World War II and father's parental leave schemes and tends to suggest that a change in gender norms aiming at more equality within the family is more likely to occur when the change is either enshrined in a statutory way and/or has a long enough duration to change the behaviour of men and women and shape the norms of the next generation.

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Table 1: Summary Statistics

	APRIL 20 mean/sd	MAY 20 mean/sd	JUNE 20 mean/sd	SEPT. 20 mean/sd	JAN. 21 mean/sd	All Sample mean/sd
FEMALE:						
Weekly paid hours	16.076	16.019	16.821	20.196	16.606	16.975
	16.75	**16.74**	**16.93**	**16.91**	**17.19**	**16.92**
Weekly baseline paid hours	28.273	28.283	28.187	28.119	28.109	28.212
	11.09	**11.49**	**11.68**	**11.88**	**11.96**	**11.53**
Weekly Housework wours	15.656	17.241	14.935	13.723	14.062	15.327
	9.98	**12.96**	**11.26**	**10.23**	**10.05**	**11.08**
Weekly Childcare hours	23.268	23.313	20.783	20.32	22.088	22.122
	28.72	**29**	**26.82**	**28.49**	**28.74**	**28.38**
Weekly total paid hours	55	56.572	52.539	54.238	52.756	54.424
	32.14	**33.58**	**31.73**	**33.86**	**32.62**	**32.75**
Weekly total non-paid hours	-38.924	-40.553	-35.718	-34.042	-36.15	-37.449
	31	**32.5**	**30.19**	**32.5**	**32.3**	**31.67**
Weekly leisure hours	113	111.428	115.461	113.762	115.244	113.576
	32.14	**33.58**	**31.73**	**33.86**	**32.62**	**32.75**
MALE:						
Weekly paid hours	24.849	27.082	30.408	34.213	31.417	28.92
	20.02	**19.79**	**18.08**	**16.81**	**19.44**	**19.28**
Weekly baseline paid hours	40.113	39.586	39.809	39.903	40.197	39.906
	9.68	**10.25**	**8.78**	**8.87**	**8.21**	**9.32**
Weekly Housework wours	9.236	9.246	8.04	6.824	7.226	8.323
	8.58	**7.8**	**7.06**	**5.9**	**7.62**	**7.63**
Weekly Childcare hours	11.799	12.917	8.745	8.338	8.712	10.437
	17.61	**20.12**	**12.93**	**16.02**	**17.07**	**17.15**
Weekly total paid hours	45.884	49.244	47.193	49.375	47.355	47.68
	27.77	**27.63**	**23.72**	**24.71**	**27.76**	**26.48**
Weekly total non-paid hours	21.035	22.163	16.785	15.162	15.938	18.76
	21.97	**23.78**	**16.86**	**18.12**	**20.86**	**20.89**
Weekly leisure hours	122.116	118.756	120.807	118.625	120.645	120.32
	27.77	**27.63**	**23.72**	**24.71**	**27.76**	**26.48**
FEMALE:						
Zero Paid Hours (frequency)	0.429	0.424	0.415	0.308	0.422	0.404
	0.5	**0.49**	**0.49**	**0.46**	**0.49**	**0.49**
Zero Housework hours (frequency)	0.034	0.029	0.036	0.06	0.047	0.039
	0.18	**0.17**	**0.19**	**0.24**	**0.21**	**0.19**
Zero Childcare hours (frequency)	0.153	0.136	0.134	0.276	0.191	0.171
MALE						
	-0.36	-0.34	-0.34	-0.45	-0.39	-0.38
Zero Paid Hours (frequencey)	**0.323**	**0.27**	**0.211**	**0.143**	**0.201**	**0.242**
	0.47	0.44	0.41	0.35	0.4	0.43
Zero Housework hours (frequency)	0.121	0.085	0.106	0.105	0.145	0.111
	0.33	**0.28**	**0.31**	**0.31**	**0.35**	**0.31**
Zero Childcare hours (frequency)	0.279	0.242	0.27	0.325	0.326	0.283
	0.45	**0.43**	**0.44**	**0.47**	**0.47**	**0.45**
Female: employment rate	0.797	0.814	0.803	0.81	0.775	0.757

Table 1: Summary Statistics

	APRIL 20 mean/sd	MAY 20 mean/sd	JUNE 20 mean/sd	SEPT. 20 mean/sd	JAN. 21 mean/sd	All Sample mean/sd
	0.4	**0.39**	**0.4**	**0.39**	**0.42**	**0.43**
Male: employment rate	0.946	0.935	0.953	0.958	0.951	0.935
	0.23	**0.25**	**0.21**	**0.2**	**0.22**	**0.25**
Employed						
Female: working from home	0.467	0.45	0.409	0.313	0.421	0.42
	0.5	**0.5**	**0.49**	**0.46**	**0.49**	**0.49**
Male: working from home	0.473	0.449	0.444	0.374	0.471	0.444
	0.5	**0.5**	**0.5**	**0.48**	**0.5**	**0.5**
Female: Keyworker	0.443	0.487	0.465	0.524	0.476	0.476
	0.5	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**
Male: Keyworker	0.411	0.423	0.425	0.464	0.474	0.434
	0.49	**0.49**	**0.49**	**0.5**	**0.5**	**0.5**
Female: furloughed	0.165	0.196	0.214	0.204	0.128	0.184
	0.37	**0.4**	**0.41**	**0.4**	**0.33**	**0.39**
Male: furloughed	0.188	0.183	0.179	0.231	0.068	0.177
	0.39	**0.39**	**0.38**	**0.42**	**0.25**	**0.38**
Female: Self-employed	0.102	0.091	0.098	0.128	0.108	0.104
	0.3	**0.29**	**0.3**	**0.33**	**0.31**	**0.3**
Male: Self-employed	0.114	0.11	0.105	0.12	0.098	0.11
	0.32	**0.31**	**0.31**	**0.33**	**0.3**	**0.31**
Female: Log real hourly wage	2.572	2.597	2.498	2.335	2.451	2.502
	0.69	**0.6**	**0.52**	**0.52**	**0.75**	**0.62**
Male: Log real hourly wage	2.762	2.728	2.647	2.53	2.62	2.668
	0.59	**0.54**	**0.46**	**0.49**	**0.48**	**0.53**
Other Demographics						
Number of children 0-4	0.34	0.346	0.383	0.353	0.348	0.354
	0.59	**0.59**	**0.61**	**0.6**	**0.62**	**0.6**
Number of children 5-16	1.44	1.417	1.364	1.423	1.402	1.411
	0.85	**0.88**	**0.85**	**0.93**	**0.83**	**0.87**
Number of Children 16-18	0.171	0.168	0.162	0.141	0.225	0.171
	0.4	**0.39**	**0.39**	**0.36**	**0.43**	**0.39**
Number of additional adults	0.16	0.155	0.169	0.148	0.134	0.155
	0.49	**0.45**	**0.48**	**0.45**	**0.4**	**0.46**
Urban	0.764	0.77	0.766	0.761	0.777	0.767
	0.42	**0.42**	**0.42**	**0.43**	**0.42**	**0.42**
England	0.881	0.873	0.874	0.905	0.896	0.884
	0.32	**0.33**	**0.33**	**0.29**	**0.31**	**0.32**
Wales	0.035	0.04	0.04	0.036	0.023	0.036
	0.18	**0.2**	**0.2**	**0.19**	**0.15**	**0.19**
Scotland	0.065	0.067	0.067	0.046	0.063	0.062
	0.25	**0.25**	**0.25**	**0.21**	**0.24**	**0.24**
Northern Ireland	0.018	0.02	0.019	0.014	0.018	0.018
	0.13	**0.14**	**0.14**	**0.12**	**0.13**	**0.13**
Owned House Outright	0.107	0.099	0.102	0.096	0.098	0.1
	0.31	**0.3**	**0.3**	**0.29**	**0.3**	**0.3**
Owned House with Mortgage	0.687	0.661	0.661	0.657	0.644	0.664
	0.46	**0.47**	**0.47**	**0.48**	**0.48**	**0.47**

Table 1: Summary Statistics

	APRIL 20 mean/sd	MAY 20 mean/sd	JUNE 20 mean/sd	SEPT. 20 mean/sd	JAN. 21 mean/sd	All Sample mean/sd
Partly Owned House	0.012	0.02	0.026	0.037	0.021	0.023
	0.11	**0.14**	**0.16**	**0.19**	**0.14**	**0.15**
Rent Free House	0.188	0.209	0.207	0.197	0.132	0.191
	0.39	**0.41**	**0.41**	**0.4**	**0.34**	**0.39**
Female: Age	41.638	41.13	40.932	40.813	41.434	41.216
	7.25	**6.65**	**6.93**	**6.99**	**6.56**	**6.92**
Male: Age	43.166	42.935	42.516	42.299	42.122	42.697
	7.21	**7.13**	**7.25**	**7.07**	**6.84**	**7.13**
Female: Non-British	0.163	0.163	0.156	0.131	0.154	0.155
	0.37	**0.37**	**0.36**	**0.34**	**0.36**	**0.36**
Male: Non-British	0.129	0.139	0.128	0.138	0.138	0.134
	0.34	**0.35**	**0.33**	**0.35**	**0.35**	**0.34**
University	0.415	0.405	0.407	0.385	0.382	0.402
	0.49	**0.49**	**0.49**	**0.49**	**0.49**	**0.49**
Higher_Degree	0.111	0.097	0.1	0.114	0.113	0.107
	0.31	**0.3**	**0.3**	**0.32**	**0.32**	**0.31**
A_Level	0.241	0.255	0.257	0.28	0.269	0.258
	0.43	**0.44**	**0.44**	**0.45**	**0.44**	**0.44**
O_Level	0.089	0.096	0.087	0.082	0.071	0.087
	0.28	**0.29**	**0.28**	**0.27**	**0.26**	**0.28**
Other qualifications	0.08	0.08	0.082	0.078	0.087	0.081
	0.27	**0.27**	**0.28**	**0.27**	**0.28**	**0.27**
University	0.388	0.372	0.38	0.343	0.368	0.372
	0.49	**0.48**	**0.49**	**0.48**	**0.48**	**0.48**
Higher_Degree	0.081	0.091	0.086	0.078	0.091	0.085
	0.27	**0.29**	**0.28**	**0.27**	**0.29**	**0.28**
A_Level	0.251	0.249	0.241	0.257	0.242	0.248
	0.43	**0.43**	**0.43**	**0.44**	**0.43**	**0.43**
O_Level	0.103	0.11	0.107	0.135	0.103	0.111
	0.3	**0.31**	**0.31**	**0.34**	**0.3**	**0.31**
Other qualifications	0.119	0.115	0.122	0.129	0.122	0.121
	0.32	**0.32**	**0.33**	**0.34**	**0.33**	**0.33**
Other real household income/1000	0.05	-0.015	-0.035	0.014	0	0.006
	0.42	**0.49**	**0.44**	**0.5**	**0.51**	**0.47**
Number of Observations	891	696	599	471	356	3013

Note : Bold numbers denote standard deviation.

Figure 1: Distribution of Parent's Paid Work Hours

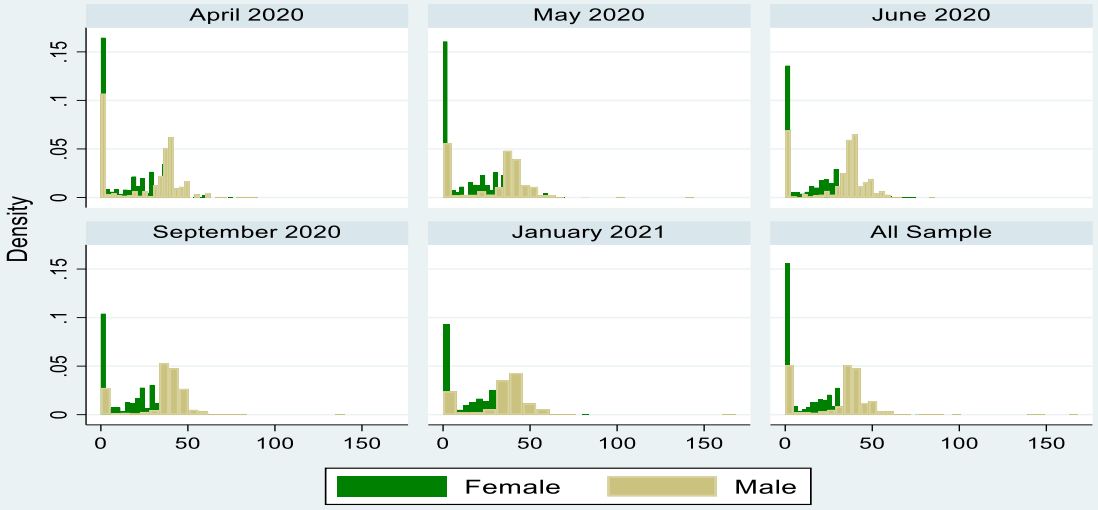

Figure 2: Distribution of Parents' Housework Hours

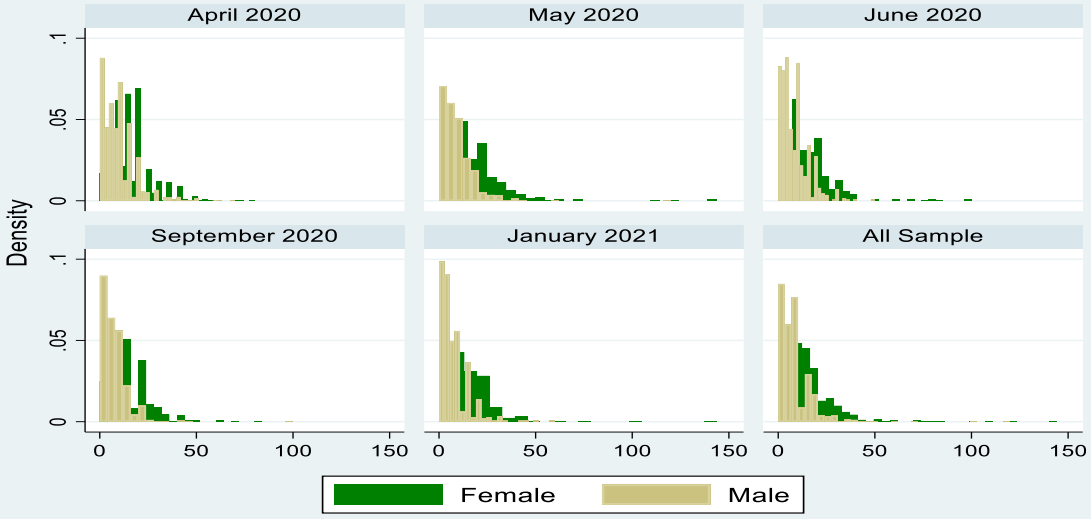

Figure 3: Distribution of Childcare Hours of Parents

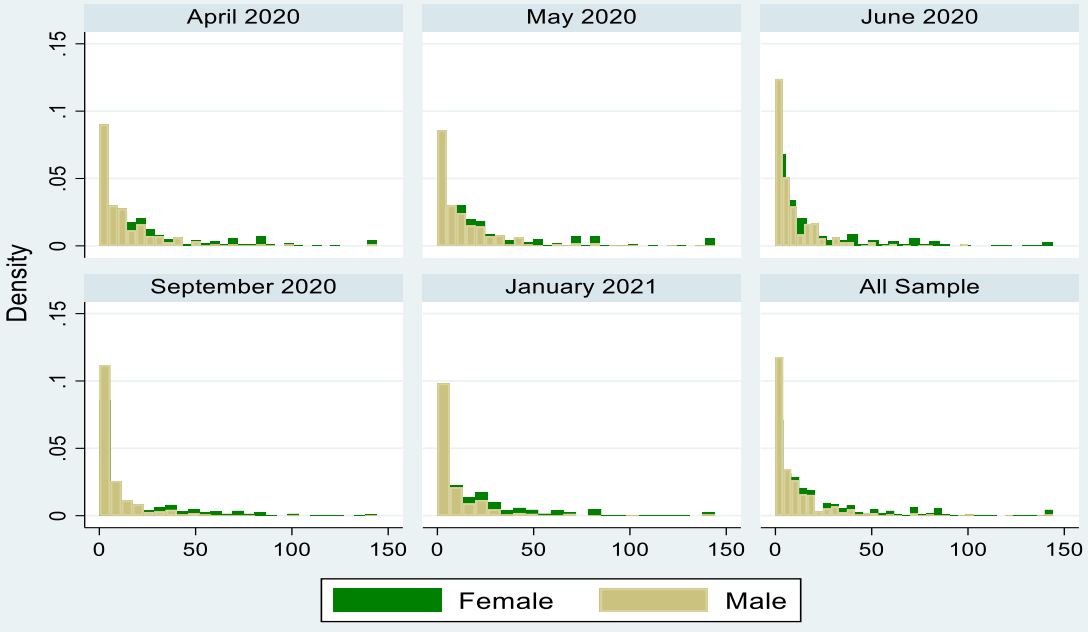

Table 2: Parameter Estimates of the Tobit Simultaneous System of Hours Equations

	PAID WORK				HOUSEWORK				CHILDCARE OR HOMESCHOOLING			
	MOTHER		FATHER		MOTHER		FATHER		MOTHER		FATHER	
DESCRIPTION	Estimate	t Value	Estimate	t Value	Estimate	t Value	Estimate	t Value	Estimate	t Value	Estimate	t Value
May 2020	-1.6519	-0.87	2.4151	1.44	1.5028	1.55	-0.2712	-0.39	-4.6278	-1.55	-2.5667	-1.54
June 2020	1.2227	0.65	5.5049	3.24	-2.3400	-2.41	-0.9427	-1.35	-8.9744	-3.02	-4.1039	-2.44
September 2020	14.9589	7.37	10.8669	5.74	-2.8185	-2.62	-2.8100	-3.58	-9.8565	-2.95	-8.9113	-4.61
January 2021	1.2711	0.57	9.3232	4.64	-4.0019	-3.49	-1.1728	-1.41	-3.9834	-1.13	-3.0087	-1.49
May*Keyworker Mother/Father	2.1875	0.88	-1.9763	-0.83	0.1433	0.11	-1.1231	-1.14	5.3871	1.35	3.4434	1.46
June*Keyworker Mother/Father	2.0193	0.80	-4.4110	-1.85	3.5999	2.67	0.5229	0.53	5.7831	1.41	5.8068	2.45
September*Keyworker Mother/Father	-9.1734	-3.39	-6.3450	-2.42	0.9094	0.61	1.9294	1.76	8.0313	1.78	8.7442	3.30
January*Keyworker Mother/Father	3.1178	1.06	-6.2508	-2.22	1.7299	1.10	-0.1969	-0.17	-0.9129	-0.19	2.7620	0.98
Keyworker Mother	7.4082	2.34	-0.4139	-0.46	-8.6386	-5.08	-0.3680	-0.98	-16.6647	-3.19	-1.5613	-1.69
Keyworker Father	-2.1998	-2.29	17.7424	5.79	1.6625	3.20	2.2142	1.73	2.4787	1.55	-3.6901	-1.20
Keyworker Mother/Father interacted with:												
Work from Home*Number of Children 0-4	0.5301	0.19	-1.6626	-0.51	-6.4488	-4.24	1.0729	0.78	6.2680	1.36	9.1033	2.78
Work from Home*Number of Children 5-15	-0.7698	-0.40	2.1618	1.22	-1.5438	-1.46	-0.5172	-0.69	0.6048	0.19	2.6011	1.44
Self-Employed*Number of Children 0-4	9.6710	1.20	-16.5374	-1.72	-0.8817	-0.21	11.2205	2.56	19.3400	1.47	8.9734	0.90
Self-Employed*Number of Children 5-15	-11.3730	-2.38	8.4019	1.10	-0.0446	-0.02	-2.4632	-0.77	15.9119	2.03	-8.6211	-1.17
Work from Home Individual	3.5062	1.08	-5.4185	-1.64	2.5184	1.39	1.1650	0.84	1.9033	0.34	-5.5969	-1.65
Self employed Mother/Father interacted with:												
Number of Children Age 0-4	-0.0524	-0.01	14.1142	2.43	3.9708	2.34	-11.5990	-3.98	-9.6858	-1.65	-16.3051	-2.62
Number of Children Age 5-15	-1.8356	-0.54	-7.8109	-1.33	0.6180	0.39	2.4315	1.01	2.5967	0.48	7.3700	1.34
Work from Home*Number of Children 0-4	9.1211	1.69	-29.8842	-3.15	0.5941	0.20	7.4460	1.75	3.3498	0.39	11.1706	1.15
Work from Home*Number of Children 5-15	24.7374	4.18	1.2038	0.17	1.4914	1.24	-3.8134	-1.29	1.5592	0.16	-4.7052	-0.68
Work from Home Individual	-24.0849	-2.55	25.0965	2.09	2.0339	1.01	-2.3150	-0.45	-29.1420	-1.85	-4.1001	-0.34

Table 2: Parameter Estimates of the Tobit Simultaneous System of Hours Equations

	PAID WORK				HOUSEWORK				CHILDCARE OR HOMESCHOOLING			
	MOTHER		FATHER		MOTHER		FATHER		MOTHER		FATHER	
DESCRIPTION	Estimate	t Value	Estimate	t Value	Estimate	t Value	Estimate	t Value	Estimate	t Value	Estimate	t Value
Keyworker Individual	6.3775	0.68	13.6668	0.98	-2.0772	-0.40	-8.8950	-1.50	-40.4891	-2.62	-3.3826	-0.25
Number of Children Age 0-4	-9.6843	-5.27	1.5548	1.17	0.1681	0.18	1.9764	3.60	12.3022	4.39	6.8124	5.14
Number of Children Age 5-15	-6.7834	-6.65	0.3325	0.38	0.5662	1.10	0.8029	2.19	-3.3681	-2.15	-1.1240	-1.26
Number of Children 0-4*Keyworker Individual	4.7578	1.95	-1.2590	-0.50	6.5924	5.04	-2.6841	-2.56	-1.8682	-0.47	-3.5086	-1.40
Number of Children 5-15 *Keyworker Individual	4.9793	3.25	-2.1597	-1.45	3.2157	3.93	-1.0660	-1.71	4.7672	1.91	0.4782	0.32
Number of Additional Adults	-7.1969	-2.80	4.8010	1.57	2.8564	2.01	-2.6194	-2.45	-4.2701	-0.96	-4.2560	-1.62
Number of Additional Adults Square	4.2722	2.92	-3.2188	-1.60	-0.9375	-1.15	2.0606	3.36	0.8930	0.36	0.9227	0.62
Age -30	-0.2502	-2.07	0.1121	1.11	0.0818	1.26	0.0691	1.64	-0.5368	-2.62	-0.3141	-3.05
Age of Partner -30	0.3522	3.38	0.0775	0.65	-0.0347	-0.61	-0.0077	-0.16	-0.4908	-2.78	-0.0438	-0.36
House Owned Outright	1.8233	0.65	6.6641	2.41	2.0624	1.37	-1.5891	-1.39	-2.4194	-0.52	1.7118	0.60
House Owned with Mortgage	4.7564	2.09	5.7773	2.57	2.3393	1.92	-0.4646	-0.50	3.2775	0.87	3.4071	1.48
House Rent Free	-0.0034	0.00	6.2457	2.52	1.8341	1.37	0.9120	0.89	5.0989	1.23	6.7253	2.67
Living in Urba Area	5.5466	4.87	-0.7500	-0.69	-0.2335	-0.39	-0.8171	-1.81	-3.0152	-1.60	1.5809	1.44
Non-British	2.7888	1.95	-4.6162	-3.18	2.0984	2.70	0.6354	1.06	-2.9284	-1.24	-0.6850	-0.48
Individual is Self-Employed	-2.3901	-0.42	-11.2783	-1.46	-3.2241	-1.15	3.6020	1.08	24.9970	2.69	3.9909	0.52
Partner is Self-Employed	0.4985	0.23	-3.4090	-2.02	-2.3265	-1.76	1.2662	1.81	-6.4032	-1.79	1.8819	1.11
Mother's Education Level:												
University	8.6320	4.76	1.8885	1.13	-2.4539	-2.58	0.7278	1.06	6.8734	2.31	0.7906	0.47
Higher_Degree	4.1236	1.97	-1.1348	-0.60	-0.3698	-0.34	2.2311	2.83	1.3117	0.38	9.5361	4.97
A_Level	3.0261	1.41	-2.9722	-1.66	-2.2004	-1.97	-1.9167	-2.58	-0.0980	-0.03	2.0391	1.12
O_Level	-0.4207	-0.23	-2.4015	-1.46	0.1743	0.18	0.3054	0.45	-3.0337	-1.02	-0.0392	-0.02
Father's Education Level:												
University	-3.9674	-2.31	1.7629	1.02	0.5204	0.57	0.2360	0.33	1.3807	0.49	1.5420	0.88
Higher_Degree	-10.0204	-4.99	1.3297	0.66	2.9313	2.79	-0.9306	-1.12	8.4711	2.61	-4.4075	-2.16
A_Level	-3.2115	-1.71	-3.5953	-1.81	-0.1568	-0.16	-0.3273	-0.40	7.1397	2.30	-2.1862	-1.09
O_Level	-1.3526	-0.80	-1.3641	-0.80	-2.6801	-2.93	-1.5607	-2.20	-0.0178	-0.01	-5.4773	-3.17

Table 2: Parameter Estimates of the Tobit Simultaneous System of Hours Equations

	PAID WORK				HOUSEWORK				CHILDCARE OR HOMESCHOOLING			
	MOTHER		FATHER		MOTHER		FATHER		MOTHER		FATHER	
DESCRIPTION	Estimate	t Value	Estimate	t Value	Estimate	t Value	Estimate	t Value	Estimate	t Value	Estimate	t Value
Mother's log real hourly wage	5.3742	2.32	-5.8758	-3.55	-0.6342	-0.59	0.9191	1.34	-2.4456	-0.66	1.0363	0.62
Father's log real hourly wage	-2.2633	-0.98	1.5646	0.67	-2.2427	-1.81	-1.4233	-1.49	-2.7624	-0.73	0.7678	0.33
Other Real Household Income/1000	-3.7744	-4.01	-12.1764	-13.12	1.3577	2.67	0.1170	0.31	-0.9440	-0.59	0.9568	1.03
Wales	0.0189	0.00	0.2745	0.06	2.2993	0.97	7.0266	3.96	0.3295	0.05	3.2949	0.76
Scotland	2.9318	0.79	-6.0951	-1.61	-0.7756	-0.38	0.7599	0.49	11.9069	1.89	0.9895	0.26
Northern Ireland	10.8666	1.44	-2.0550	-0.27	-2.4937	-0.60	0.3223	0.10	18.0538	1.42	15.4274	2.05
May*Scotland	-0.9222	-0.19	-4.0946	-0.82	-1.6985	-0.63	-0.2297	-0.11	-7.3752	-0.89	6.2662	1.27
June*Scotland	-4.8652	-1.00	3.4395	0.70	-1.2162	-0.46	1.5024	0.75	-2.0498	-0.25	-0.8008	-0.16
September*Scotland	2.3419	0.41	0.7812	0.14	0.0644	0.02	-2.4947	-1.04	-8.3914	-0.87	-3.0133	-0.51
January*Scotland	-4.3146	-0.70	2.0420	0.35	0.5164	0.16	-0.6140	-0.26	-4.7417	-0.48	2.4633	0.42
May*Wales	5.8897	0.95	-5.0406	-0.86	-3.1202	-0.96	-3.2804	-1.35	-6.9177	-0.69	-3.4577	-0.58
June*Wales	-4.0570	-0.67	5.1494	0.89	-0.4557	-0.14	-5.9633	-2.48	0.1307	0.01	2.2844	0.39
September*Wales	-3.3471	-0.45	-1.7304	-0.24	-1.2061	-0.30	-7.0313	-2.31	-12.9645	-1.02	-4.7893	-0.65
January*Wales	-2.5429	-0.30	1.9385	0.25	-3.5146	-0.80	-7.3310	-2.23	-5.4599	-0.41	-4.9942	-0.63
May*NorthernIreland	-3.8936	-0.36	1.3716	0.13	-4.4444	-0.74	-2.6359	-0.58	-21.7947	-1.19	-4.5828	-0.42
June*NorthernIreland	-16.7519	-1.56	1.8687	0.18	-2.8673	-0.48	-2.6193	-0.59	-27.0405	-1.50	-8.9820	-0.85
September*NorthernIrel	-14.6439	-1.24	-3.2382	-0.27	0.1947	0.03	-2.4793	-0.50	-0.6133	-0.03	-6.5973	-0.56
January*NorthernIreland	-20.2238	-1.45	4.1236	0.31	3.2016	0.43	-0.9818	-0.18	-26.4472	-1.17	-27.8536	-2.06
Intercept	3.1411	0.33	27.6613	3.15	21.4589	4.37	9.1188	2.52	47.0811	3.03	6.3228	0.72

Note : The reference month is April 2020. The reference country is England.

Appendix

Table 1A: Selected Heckman Coefficient Estimates of the Work Participation and Wage Equations

	MOTHER		FATHER	
VARIABLE	LOG WAGE	PARTICIPATION	LOG WAGE	PARTICIPATION
	0.267	0.325	-0.192	0.576
Month of May indicator	(1.524)	(0.629)	(-1.262)	(0.911)
	-0.0652	-0.0109	-0.405***	2.619***
Month of June indicator	(-0.379)	(-0.0183)	(-2.889)	(3.357)
	-0.277	-0.251	-0.362**	0.222
Month of September indicator	(-1.549)	(-0.412)	(-2.429)	(0.248)
	-0.149	-0.733	-0.469***	0.864
Month of January indicator	(-0.698)	(-1.147)	(-3.136)	(0.927)
	0.217**	-0.687***	0.0229	-0.331
Number of own children under 5 yo	(2.375)	(-3.666)	(0.549)	(-1.311)
	0.0869	-0.525***	-0.0192	-0.105
Number of own children 5-16 yo	(1.488)	(-4.000)	(-0.698)	(-0.605)
		0.0219		0.153
Number of children 0-4 * May		(0.0910)		(0.446)
		-0.106		-0.132
Number of children 5-16 *May		(-0.643)		(-0.582)
		-0.0606		-0.240
Number of children 0-4* June		(-0.253)		(-0.693)
		0.0351		-0.392
Number of children 5-16*June		(0.209)		(-1.625)
		0.154		-0.0283
Number of children 0-4*September		(0.576)		(-0.0626)
		0.174		0.246
Number of children 5-16 * September		(0.972)		(0.823)
		0.0724		-0.356
Number of children under 0-4*January		(0.276)		(-0.887)
		0.230		-0.393
Number of children 5-16 yo in January		(1.304)		(-1.427)
	0.0887	0.486		-0.366
Mother has university degree	(0.953)	(1.616)		(-1.024)
	-0.0533	-0.197		-0.348
Mother has university degree*May	(-0.494)	(-0.590)		(-0.770)
	-0.0814	-0.0563		-1.372**
Mother has university degree*June	(-0.712)	(-0.132)		(-2.258)
	0.00555	0.146		-0.860
Mother has university degree*September	(0.0475)	(0.323)		(-1.325)
	0.00853	0.108		-0.399
Mother has university degree*January	(0.0438)	(0.202)		(-0.779)
	-0.0464	0.323		0.0188
Mother has higher degree	(-0.712)	(0.818)		(0.0495)
	-0.326	0.825		-0.342
Mother has higher degree*May	(-1.257)	(1.614)		(-0.636)
	0.134	-0.835		-0.689
Mother has higher degree*June	(0.494)	(-1.395)		(-0.949)
	0.283	-0.516		-0.782
Mother has higher degree*September	(1.025)	(-0.675)		(-0.934)
	0.478*	-0.379		5.820***
Mother has higher degree*January	(1.781)	(-0.511)		(5.127)
	0.468	-1.004		4.937***
Mother has A-level degree	(1.090)	(-1.296)		(5.239)

Table 1A: Selected Heckman Coefficient Estimates of the Work Participation and Wage Equations (continued)

	MOTHER		FATHER	
VARIABLE	LOG WAGE	PARTICIPATION	LOG WAGE	PARTICIPATION
Mother has A-level degre*May	-0.164*	-0.204		0.207
	(-1.852)	(-0.844)		(0.426)
Mother has A-level degre*June				-0.746
				(-1.305)
Mother has A-level degre*September	0.0322	0.219		-1.572**
	(0.310)	(0.575)		(-2.087)
Mother has A-level degre*January	0.243**	0.0433		-1.353*
	(1.989)	(0.107)		(-1.840)
Mother has O-level degree	0.0309	0.259		
	(0.134)	(0.481)		
Mother has O-level degree*May		0.259		
		(0.513)		
Mother has O-level degree*June		0.445		-1.877***
		(0.850)		(-2.791)
Mother has O-level degree*September		0.345		-0.193
		(0.624)		(-0.274)
Mother has O-level degree*January		0.259		4.703***
		(0.421)		(8.582)
Father has university degree		-0.150	0.148**	0.0152
		(-0.521)	(2.117)	(0.0468)
Father has university degree*May		-0.0205	0.000474	0.200
		(-0.0599)	(0.00520)	(0.512)
Father has university degree*June		0.0609	0.101	-0.354
		(0.153)	(1.069)	(-0.593)
Father has university degree*September		-0.150	0.0708	0.939
		(-0.351)	(0.713)	(1.378)
Father has university degree*January		-0.138	0.0944	-0.0930
		(-0.329)	(0.907)	(-0.150)
Father has Higher degre*May		-0.291	0.112*	0.128
		(-1.505)	(1.808)	(0.302)
Father has Higher degre*June		-5.774***	-0.257	-2.539***
		(-14.76)	(-1.387)	(-2.731)
Father has Higher*September			-0.470***	-3.766***
			(-2.786)	(-3.826)
Father has Higher degre*January			0.0288	-2.274**
			(0.145)	(-2.270)
Father has A-level degree		0.0607	-0.118	0.150
		(0.204)	(-1.364)	(0.365)
Father has A-level degree*May		-0.0887	0.0727	-0.0573
		(-0.235)	(0.663)	(-0.103)
Father has A-level degree*June		-0.125	0.0875	-0.616
		(-0.281)	(0.707)	(-0.887)
Father's A-level degree*September		0.176	0.236**	2.704***
		(0.382)	(2.061)	(3.412)
Father's A-level degree*January		0.0281	0.0583	0.0917
		(0.0504)	(0.389)	(0.126)
Father has O-level degree		-0.00413	-0.0800	0.106
		(-0.0194)	(-1.262)	(0.363)
Father has O-level degree*June		-0.0117	0.0208	-0.972
		(-0.0323)	(0.201)	(-1.625)
		0.151	0.0915	0.494

Table 1A: Selected Heckman Coefficient Estimates of the Work Participation and Wage Equations (continued)

	MOTHER		FATHER	
VARIABLE	LOG WAGE	PARTICIPATION	LOG WAGE	PARTICIPATION
Father has O-level degree*September		(0.413)	(0.936)	(0.806)
		-0.522	0.0880	-1.145*
Father has O-level degree*January		(-1.509)	(0.767)	(-1.662)
	-0.255**	0.598	-0.318***	0.0479
Scotland	(-2.502)	(1.597)	(-3.272)	(0.117)
	-0.305**	-0.0878	-0.517***	5.289***
Northern Ireland	(-2.008)	(-0.184)	(-2.724)	(11.60)
	0.0926	0.255	-0.131	5.761***
Wales	(0.479)	(0.573)	(-0.974)	(9.835)
	-0.176*	-0.190	-0.345***	-0.333
Urban	(-1.743)	(-0.703)	(-2.929)	(-0.986)
	0.00179	0.0543	0.213	0.103
Urban*May	(0.0133)	(0.154)	(1.435)	(0.215)
	0.174	0.106	0.286**	0.226
Urban*June	(1.466)	(0.279)	(2.021)	(0.468)
	0.0944	0.149	0.312**	-0.345
Urban*September	(0.717)	(0.404)	(2.132)	(-0.481)
	-0.00164	0.455	0.360***	0.580
Urban*January	(-0.0117)	(1.190)	(2.620)	(1.117)
Sector of Employment:				
	1.253***		0.317	
Agriculture	(4.936)		(1.562)	
	1.640***		0.162**	
Mining	(6.642)		(2.126)	
	1.649***		0.0231	
Manufacturing	(6.942)		(0.445)	
	1.791***		0.338***	
Electricity supply	(7.246)		(2.760)	
	1.706***		-0.0756	
Water supply	(6.717)		(-1.432)	
	1.676***		0.206***	
Construction	(6.357)		(3.105)	
	1.315***		0.0516	
Trade	(5.226)		(0.800)	
	1.354***		-0.0705	
Transportation	(5.150)		(-1.100)	
	1.203***		-0.0588	
Accommodation	(4.433)		(-0.708)	
	1.816***		0.0958*	
Information and Communication	(7.923)		(1.706)	
	1.687***		0.161***	
Finance	(7.172)		(2.939)	
	1.231***		0.471***	
Real Estate	(5.340)		(3.445)	
	1.738***		0.171***	
Scientific and Technical services	(7.494)		(2.816)	
	1.341***		0.0209	
Administration	(5.666)		(0.173)	
	1.591***		0.0104	
Public Administration	(6.728)		(0.179)	
	1.569***		0.00836	

Table 1A: Selected Heckman Coefficient Estimates of the Work Participation and Wage Equations (continued)

	MOTHER		FATHER	
VARIABLE	LOG WAGE	PARTICIPATION	LOG WAGE	PARTICIPATION
Education sector	(6.758)		(0.122)	
	1.528***		-0.0759	
Health and Social Work	(6.477)		(-1.426)	
Arts, Entertainment and Recreation	1.739***		0.372***	
	(7.022)		(2.794)	
			-0.141	
Motor Repair			(-1.390)	
	1.603***			
Other services	(7.568)			
Mother's age	0.00427	-0.0927		0.0274
	(0.135)	(-0.983)		(1.440)
Mother's age squared	7.72e-05	0.001000		
	(0.205)	(0.885)		
Father's age		0.0510	0.0670***	-0.225
		(0.703)	(3.021)	(-1.498)
Father's age squared		-0.000538	-0.000741***	0.00171
		(-0.662)	(-2.976)	(1.112)
	0.0589	-0.622***	0.0616	0.102
Mother Non-British	(0.822)	(-4.120)	(1.284)	(0.501)
		0.294**	0.115**	-0.0888
Father Non-British		(2.024)	(2.240)	(-0.407)
	-0.141	-0.275	-0.394***	-1.042*
N.Ireleland*Non_British	(-0.898)	(-0.471)	(-2.785)	(-1.733)
	-0.397***	4.393***	0.153	-6.652***
Wales *Non_British	(-2.593)	(5.850)	(0.856)	(-7.871)
	0.526*	4.379***	0.423***	3.955***
Scotland *Non-British	(1.884)	(4.938)	(4.095)	(6.146)
	0.00736	-0.492*	-0.0952	-0.210
House owned outright indicator	(0.0711)	(-1.729)	(-1.020)	(-0.434)
	-0.232**	0.269	-0.00729	0.425
House owned on morgage indicator	(-2.387)	(1.008)	(-0.0846)	(0.921)
House rented indicator	-0.165*	-0.709**	-0.200**	-0.825*
	(-1.748)	(-2.418)	(-2.055)	(-1.826)
Non-labour income		-0.448***		-0.179
		(-3.890)		(-1.390)
Non-labour income squared		0.164***		
		(3.265)		
Constant	1.100**	1.306	3.358***	1.165
	(2.182)	(1.307)	(13.11)	(0.833)
Observations	1,592	1,592	1,428	1,428

Note : The reference month is April 2020. The reference sector of employment of the mother is Repair of Motor vehicles industry and father is Other Services. Robust z-statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1.