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Abstract

This study examines how the Covid-19 pandemic-induced shift towards remote work has influenced parents' allocation of non-market and market work. Utilizing a probability-based panel survey and comprehensive administrative records from the Netherlands covering the years 2014 to 2021, we demonstrate that the potential for remote work has been significantly realized only after the onset of the pandemic. Simultaneously, following a brief period of school and daycare closures, the total time parents spent on childcare returned to pre-pandemic levels. Notably, while the potential for remote work was associated with reduced childcare provision before the pandemic, this relationship reversed post-pandemic onset. We interpret this shift as an indication of increased flexibility for parents, with fathers experiencing greater gains than mothers. Consequently, the division of childcare duties has become more equitable, and mothers have increased their working hours. Our findings suggest that broader acceptance of remote work by employers could foster greater gender convergence in the intra-household division of labor.

Keywords: job flexibility, remote work, childcare, division of labor, time-use data

JEL Classification: J13, J16, J22

In most countries, the traditional division of labor between mothers and fathers involves the mother taking on a larger share of childcare responsibilities. At the same time, the father works more outside of the home. The Netherlands are a typical case. Figure 1a shows that in 2019, among parents living in two-parent heterosexual households, the mother-father gap in weekly time spend on childcare was 14 hours in families with one child aged 7 years. At the same time, the gap for weekly market hours was -10 hours and 40 minutes. (Figure 1a).

Both of these gaps shrank substantially during the pandemic. The childcare gap fell by 3 hours and 20 minutes between late 2019 and late 2021; the combined childcare of both parents was the same at these points in time. Over the same period, the gap in market hours fell by almost an hour, which corresponds to 15 minutes over the linear trend that fit near-perfectly before the pandemic. This paper explores the extent to which the increase in remote work led to this more equal division of labor within couples.

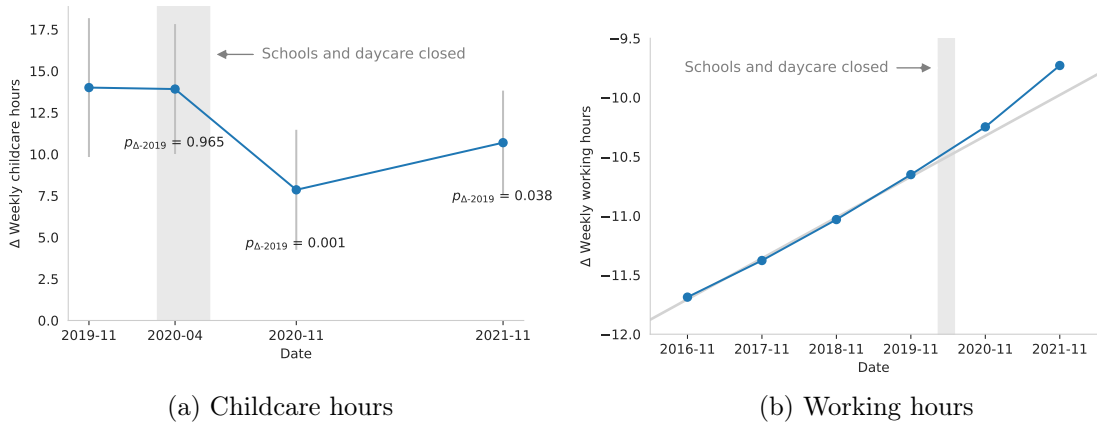(a) Childcare hours   (b) Working hours

Figure 1: Mother-father differences in childcare and working hours

Notes: Both figures show differences between female and male weekly hours among heterosexual couples with at least one child below the age of 16 in the household. Both figures show 95% confidence intervals; in Panel b they are hidden by the circles marking the regression coefficients. Family composition is held constant by controlling for the number of children and the age of the youngest child, both interacted with a gender dummy. Values are shown for families with one child of average age (approximately 7 years). Regressions underlying Panel a are run on pooled time use data from the LISS panel, weighted . See Column (1) of Table **??** for the coefficients shown here and Appendix Table B.1 for the full set of coefficients. We report p-values of tests for equality of coefficients at t compared to 2019-11 in the figure as $p_{\Delta\text{-}2019}$. Regressions underlying Panel b are based on administrative data. These are run for each year separately and additionally control for the composition of the workforce by education $\times$ sector dummies, measured in year $t-2$. We set hours of individuals who are not working in t to zero and exclude the self-employed because we do not observe their hours. The full set of coefficients is shown in Appendix Table A.9.

We make use of customized survey data and administrative records covering the entire Dutch population. Both datasets are linked at the individual level. In the survey data from the LISS

panel, we observe time use and a direct a measure of remote work potential at several points during the period November 2019–November 2021. For our analyses of working hours, we employ administrative data covering the entire population over the years 2014–2021. These data contain detailed information on actual working hours, family composition, the highest educational degree, and industry sector.

In November 2019, the world was unaware of SARS-CoV-2's (possible) existence. Our second observation of time use is from April 2020, roughly the middle of the 2-3-months-interval when schools and daycare centers were closed (see Figure 1a). Total childcare provided increased by almost 13 hours; the additional amount was covered in equal shares by mothers and fathers. The third and fourth observations are from November 2020 and 2021, respectively. Schools and daycare were open. Crucially for our paper, total childcare hours were back to their pre-pandemic levels. However, the gap between mothers and fathers was reduced by roughly 6 hours and 3 hours and 20 minutes, respectively. Note that this setting differs sharply to what was seen in many other countries—for example large parts of the U.S. or Germany—where additional childcare needs persisted for a much longer period of time.

In order to link the changes in time use to work from home, the first step of our analysis is to construct a measure of remote work *potential*. In the survey data, this is a time-constant characteristic of the job held just before the pandemic started. It is based on a direct question and, hence, tailored to the individual. Its realization saw drastic changes over the period we observe in the LISS sample.. Before the pandemic, for every hour of directly measured remote work potential, less than 13 minutes were actually spent working from home. For the two observations in 2020, each potential hour translated into about 50 minutes work from home. In November 2021, the number was still three times as high as before the pandemic at 39 minutes..

Consistent with evidence reported in Harrington and Kahn (2023) for the U.S., we find that parents in jobs with higher remote work potential spent *less* time on childcare before the pandemic. This relationship flipped during the pandemic. While the strongest relation between work from home potential and childcare is found during lockdown, even in November 2021 an additional hour of remote work potential is associated with 14 minutes more childcare

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than before the pandemic. This is true for both mothers and fathers and quantitatively very similar.

This changing nature of the relation between remote work potential and working from home implies a more equal division of childcare duties across parents. Two reasons are behind this. First, fathers tend to work in jobs with a higher degree of remote work potential. Second, they work more hours, which is more important quantitatively. In sum, these differential changes in working from home explain more than half of the change in the gender care gap.

We interpret these results as a causal effect of schedule flexibility on the division of childcare within couples. That is, we argue that working from home reduces frictions that otherwise would have prevented parents from sharing childcare duties more equally. For example, working from home may free up time through reduced commuting, through having an eye on the children while working at the same time, or by making an existing schedule effectively more flexible for childcare.[1]

This interpretation rests on a few assumptions. First, we require that changes in parental childcare provision were not driven by unobserved factors correlated with the regressors we employ (work from home potential, gender, family structure, and interactions). We think this is plausible in the Dutch context. As discussed before, total childcare provision was the same in November 2019 and November 2021. Furthermore, generous wage-support schemes were in place, which left income unchanged for most households irrespective of labour supply and presumably slowed down job switching. Even if parents changed jobs because of labour demand[2] or in order to meet childcare needs, this would only reduce the magnitude of our estimates. Second and contrary to many other countries, there was no evidence of a gendered labor market impact of the pandemic in the Netherlands (Alon, Coskun, et al., 2022). All this said, there might be a possible overstatement of our effects because of pre-existing trends. It might be that well-educated couples were on faster trajectory in terms of gender convergence, which would imply a correlation of changes in childcare allocation with work from home potential. Unfortunately, we do not have data to assess pre-existing trends in the allocation of childcare across parents. It seems unlikely, however, that think this plays a large role in

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[1]For example, many white-collar jobs allow to freely shift hours within a day. However, when working from the office, travel times will often be too large in order to use that time to pick up children from school or daycare. This changes when working from home.

[2]Reductions in labor demand were largest in occupations with little potential to work from home.

quantitatively. First, the convergence in the time allocation of parents has slowed down in recent decades and was generally slow in Western European countries like the Netherlands (Altintas and Sullivan, 2017). Second, the magnitude of our estimates is so large that in case existing trends were the main factor, full gender convergence would have taken place within a few years and in all likelihood, the literature would have taken notice.

The second part of our analysis focuses on the effect of fathers' remote work potential on the working hours of mothers. We find that mothers' labor supply increases in the remote work potential of their partners. For every ten hours in remote work potential of fathers, their partners' labor supply increases by about an hour in late 2021. There are similar effects for fathers when their partners gain flexibility through changed realisations of remote work. The higher level of remote work potential among fathers means that this effect contributes to the faster convergence in working hours for the years 2020 and 2021, which is visible from Figure 1b.

We arrive at that conclusion using a differences-in-differences design augmented by an event study. This allows us to isolate the differential trend in working hours caused by partners' remote work potential in 2020 and 2021, controlling for any trends in the six years before. The identifying assumption is that trends in mothers' working hours conditional on own and partner's remote work potential along with other characteristics would have continued in the same way as in previous years.

Our paper is related to several strands in the literature. Most closely related is Harrington and Kahn (2023), which demonstrates a direct effect of work from home potential on the employment share of mothers in the U.S. in the 2010s. The results are very consistent with ours and the mechanism may well contribute to the overall trend seen in Figure 1b. Our paper focuses on a causal analysis of one aspect of the definition of workplace flexibility found, e.g., in Goldin and Katz (2011),. One way to view our paper is that it makes predictions about the lasting impacts of the pandemic, e.g., Alon, Doepke, et al. (2020) on long-term gendered macroeconomic consequences or Davis, Ghent, and Gregory (2024) on the effects of working from home.. Aksoy et al. (2023) analyse how working from home yields time savings; we show one dimension of how this time is used. Finally, we relate to a large literature documenting time-use patterns of parents during the pandemic. Some specific examples include Heggeness

and Suri (2021) for the U.S., Sevilla and Smith (2020) for the U.K., or Jessen et al. (2022) for Germany. Due to the short lockdowns, the Netherlands are quite different from many other countries, however. Comparing several countries, Alon, Coskun, et al. (2022) find that there was not show that there was no differential impact on female labor supply in the Netherlands, making it a useful laboratory for the questions we are interested in.

In the next section, we describe the setting of our analysis and the main features of our data. Section 2 presents our empirical strategy and results. We conclude in Section 3.

1 Setting and Data

Our study is based on customized survey data from the Longitudinal Internet Studies for the Social Sciences (LISS) panel, population-wide administrative records from Statistics Netherlands, and the Dutch national working conditions survey (NEA). Both survey data sets are linked to the population registers at the individual level. We observe household members' time use only in the LISS data, consequently we will use it for all analyses regarding the division of childcare tasks. For the analysis of labor supply behavior we can recur to the population registers.

The LISS panel is based on a probability sample of individuals registered by Statistics Netherlands; it has been running since 2007 and comprises about 7000 individuals in 4000 households. The LISS panel is administered by CentERdata, a survey research institute affiliated with Tilburg University. Annual core surveys in the LISS panel cover a wide range of topics. These background data are comparable in scope to popular datasets like the Panel Study of Income Dynamics (U.S.), Understanding Society (U.K.), or the Socio-Economic Panel (Germany). On top of that, the LISS panel allows researchers to implement their own questionnaires. In this paper, we make use of two sets of surveys that we ran ourselves or helped design: Time use data for the period 2019–2021 and real-time questions related to the socio-economic consequences of the Covid-19 pandemic in the year 2020. More than 80% of LISS respondents gave their consent to linking their data to population registers from Statistics Netherlands (CBS). We use the latter source to verify information on family composition and working hours.

In order to analyze labor supply, we use the CBS records directly, which contain detailed information on contractual as well as actual working hours. The data do not, however, contain direct information on remote work. Hence, we impute remote work ability based on the NEA data, which are also linked at the individual level.[3]

Throughout our analysis, we consider heterosexual couples where both partners are between 18 and 55 years of age and who have at least one child below the age of 16 in the household. Our LISS sample consists of 1,190 (1,044) mothers (fathers) × year observations, respectively. For each gender, the administrative data include more than 13 million person × year observations. The average age of our sample members is a little above forty years, with a difference of two years between fathers and mothers. The mean number of children is about two; the average age of the youngest child is about 7 years.

In the remainder of this section, we first sketch the policy environment in the Netherlands during the years 2020 and 2021. We then describe the Dutch setting when it comes to market and non-market work. Finally, we explain in detail how we measure the potential for remote work.

1.1 The Covid-19 Pandemic in the Netherlands

From mid-March 2020 until the end of the our data collection in November 2021, a set of measures were in place to slow the spread of the SARS-CoV-2 virus in the Netherlands. We will describe key features of the policy environment that are relevant for our analysis (Zimpelmann et al., 2021, provides a detailed description with a focus on labor market issues). In general, measures were more lenient than in many other countries. In particular, no general curfew or stay-at-home mandate was in place at any point in time.

In mid-March 2020, the Dutch government imposed limits on social gatherings and ordered that many businesses involving personal contacts remain closed, such as restaurants, bars, and hairdressers. Others like stores for clothes or utilities remained open if they were able to maintain the social distancing rules. Public locations were accessible and the use of public transportation was possible. Many of these restrictions were lifted over the summer of 2020.

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[3]A detailed description of the LISS, NEA, and CBS datasets along with the precise source of all variables can be found in Online Appendix A.

The majority, however, were in place again during November 2020. After the winter, they were eased again and much milder measures came back in the subsequent fall/winter.

With the onset of the initial restrictions, schools and childcare facilities were closed for a period of two (daycare, primary schools) to three (secondary schools) months. During and after the reopening phase, policymakers made very clear that schools and childcare facilities would be the last institutions to close in case of renewed tightening of restrictions. Except for slightly prolonged vacations around Christmas 2020, this promise was kept. Actual closures were thus very limited in comparison to many other countries.

A comprehensive set of economic support measures accompanied the social distancing restrictions. The largest and most influential policy was the short-term allowance (Noodmaatregel Overbrugging voor Werkgelegenheid, NOW), which subsidized labor hoarding with a 100% wage replacements rate. Hence, dependent employees did not see their incomes drop regardless of hours worked during lockdown (Zimpelmann et al., 2021). Starting in March 2020, the government strongly encouraged remote work.

1.2 Market and Non-Market Work of Parents

Parents' labor force participation was high in 2019 and increased even further during the pandemic. Before the pandemic, the unemployment rate—as measured by the receipt of unemployment benefits—was at one percent or below for both genders. One in five mothers and one in ten fathers was outside the labour force; the larger value among women is largely driven by mothers of very young children. The self-employment rate was about 11% for mothers and 17% for fathers.

The largest gender differences can be found in the distribution of full-time versus part-time employment. In 2019, only 10% of mothers worked full-time while 58% worked part-time. For fathers, these shares are just about opposite at 62% and 11%, respectively. Conditional on dependent employment, mothers worked 26 hours per week on average, fathers 38. The high part-time share of women is a long-standing feature of the Dutch labor market and rather similar to countries like Germany, Italy, or the U.K. (see Bick et al., 2019).

In the 2014–2019 period, employment had increased among both genders, though faster among mothers (5.2 percentage points vs. 2.5 for fathers). Over the same horizon, conditional hours

of mothers had increased by almost two per week, while fathers' hours had stayed roughly constant. These trends imply the decrease in the gender gap visible in Figure 1b.[4]

By the end of 2021, mothers' employment had risen by another 1.7 percentage points, while fathers' employment had increased by 0.7 percentage points. Mothers' hours conditional on working had increased by another 0.8 per week, while fathers' hours had remained the same. These results are in line with the findings of Alon, Coskun, et al. (2022), who show based on LISS data and contrary to many other countries, there was no differentially negative impact of the pandemic on female labor market outcomes in the Netherlands. Importantly for our purposes, there is no evidence that parents dropped out of the labor force to take care of their children. This stands in stark contrast to countries where schools and daycare facilities were closed for prolonged periods of time (e.g., Heggeness and Suri, 2021).

The flipside of the distribution of market hours is that mothers take on a much larger share of childcare work than men. Mothers of a single child aged 7 years spent 31 hours per week on childcare in 2019, fathers 17. Each year of age of the youngest child in the household is associated with mothers spending about 2.5 hours less on childcare per week. The same number is 1.4 hours for fathers, so the gender gap is largest for the youngest children and smallest for the oldest. Both total number of hours spend on childcare and the gender gap increase in the number of children.[5]

During lockdown, time spent on childcare increased by almost 13 hours for each parent. The total increase is plausible given typical times spent at school/daycare and the fact that emergency childcare was available for parents working in essential occupations.[6] As previously described, by November 2020, total childcare hours had returned to their pre-pandemic levels (see the first column of Table 1). However, its distribution across genders changed markedly. On average, mothers' childcare hours decreased by just over six hours, while fathers' hours increased by approximately three hours. A year later, in November 2021, these figures were

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[4]Quantitatively there are small differences because in Figure 1b and in all regression analyses below, we condition on working two years before a measurement in order to control for the sector of work.

[5]Numbers on total hours can be found in the first column of Table 1, the associations with family structure are based on the first column of Table B.1.

[6]Easier access to formal childcare was the most important feature of essential worker status during March-May 2020. After this period, there were no relevant differences; hence, they are not mentioned elsewhere. For a more detailed analysis of essential worker status, see Zimpelmann et al. (2021).

-3.3 hours and +1.5 hours, respectively. Consequently, the initial gap of 14 hours had reduced to 10 hours and 40 minutes.

1.3 Work from home: Potential and realization

We measure remote work potential based on direct questions in the LISS panel, which are part of a series of CoViD-19 questionnaires (documented in von Gaudecker et al., 2021, and fielded in March–December 2020, also see Online Appendix A.1.2 for more details). In May 2020, we asked participants "What percentage of your normal work *prior to the CoVid-19 outbreak* can you do while working from home?". We interpret the resulting answers to measure remote work potential, which had been present before the pandemic already. That is, the question explicitly abstracts away from potential changes in jobs or task content due to the pandemic.[7] At the same time, workers knew at that point what was possible for them to do from home *in principle*. That is, we assume that the situation during the initial phase of the pandemic led to maxing out of work from home potential because typical concerns by employers about remote work (shirking, increased information frictions, etc.) played a minor role during this period. This can also be seen in the fact that the technology enabling remote work like videoconferencing only saw widespread adoption after the government strongly encouraged remote work in March 2020.

Because we hypothesize that of flexibility gains are the driving force behind potential changes in the division of labor, our analysis centers on the potential *hours* of remote work. We obtain this metric by multiplying the remote work potential of a job by the number of working hours prior to the pandemic, resulting in a time-invariant variable specific to individuals. This approach distinguishes our study from others that examine remote work potential at the broader occupation or sector level.[8] By focusing on job-specific variables, we aim to provide a more granular understanding of how remote work capabilities influence labor division changes on an individual basis.

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[7]We repeated the question in December 2020, except that we asked for the present job. Both measures are highly correlated ($\rho = 0.82$). In order to include as many respondents in our sample as possible, we take the mean of the individual-level data.

[8]E.g., Dingel and Neiman (2020) and Hansen et al. (2023). (Adams-Prassl et al., 2022) use a similar measure to ours and show that there is considerable heterogeneity in remote work potential within occupations. Our results are robust to using a measure defined at the sector $\times$ education level.

(a) Potential remote working hours   (b) Potential hours of remote work (CBS)
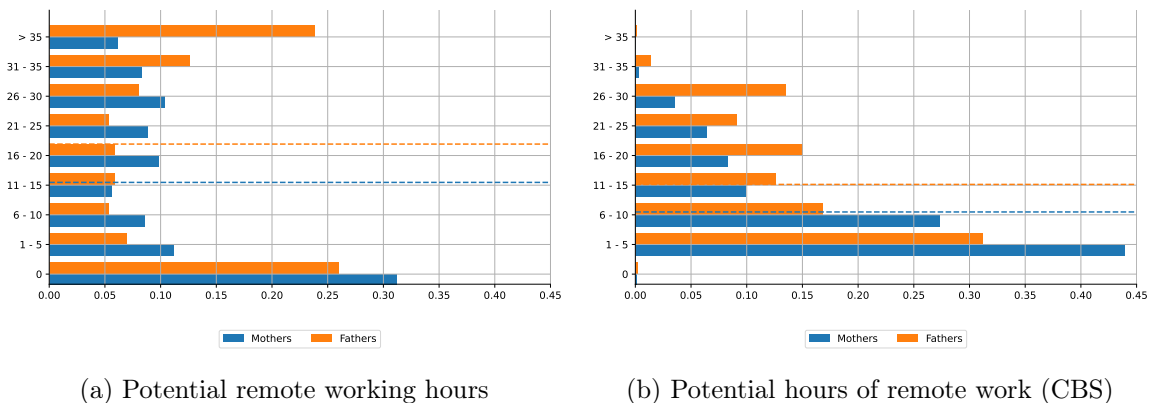
Figure 2: Remote working potential by gender

Notes: Panel a shows the distribution of the variable potential remote work hours by gender in the LISS sample. Potential remote working hours are calculated by multiplying the share of tasks that can be done from home with the pre-covid (November 2019) working hours of an individual. Dashed lines display the gender-specific means (13 hours for mothers and 19.4 hours for fathers). Samples conditional on working before the pandemic. Panel b shows the distribution of the potential hours of remote work by gender in the CBS in the year 2019. Dashed lines indicate the mean for each gender (8 hours for mothers and 12.6 hours for fathers). For the imputation we calculate the average remote work capability by sector and education in the NEA and impute the remote work capability in the CBS with the help of those two variables. The imputed remote work capability is then multiplied with the working hours two years ago to obtain the potential hours of remote work.

We depict its distribution in Figure 2a. Mothers have a 31%-chance of not being able to work from home at all, which is 3 percentage points more than the chance of being able to work from home for at least 25 hours per week. In contrast to this, distributions for fathers are much more polarized. They have a 26%-chance of not being able to work from home at all, just 2 percentage points more than the chance of being able to work from home for at least 35 hours per week. The mean potential hours of remote work are 13 for mothers and 19.4 for fathers. The difference in means is driven by two factors: First, a higher share of tasks that can be performed from home among fathers (49% vs. 45% for mothers). Second, the higher working hours of fathers.

As described in the introduction, every hour of remote work potential translated into about 50 minutes work from home during April and November 2020 (see Online Appendix Table A.7). Hence, the potential was used to a very large extent. We use this pattern in order to construct a measure of remote work potential in the CBS data. In order to do so, we first divide remote

working hours by total working hours in the 2020 wave of the NEA survey. We then obtain predictions for sector $\times$ education cells using the variables from the linked CBS data.[9]

Figure 2b shows the distribution of potential working hours for mothers and fathers using their labor supply choices in 2019. Naturally, the distributions have much more mass in the centers. They are also somewhat lower, even beyond the effect that only 80-85% of remote work potential were realized. However, the basic patterns differentiating genders are the same: Mothers have a much higher chance of being hardly able to work from home at all and fathers average potential hours of remote work are 50-60% higher than mothers'.

2 Empirical Strategy and Results

We present our empirical results in two stages. First, we analyze the division of childcare work using the survey data with time use information. Subsequently, we highlight the effects of increased work from home potential on labor supply using the administrative data.

2.1 Childcare

Our main specification to study the division of childcare work is the following:

$$
\begin{aligned}
(1) \qquad \text{childcare hours}_t =\ & \alpha_0 + \alpha_t \cdot I_t \\
& + \beta_0 \cdot I_{\text{mother}} + \beta_t \cdot I_t \cdot I_{\text{mother}} \\
& + \gamma_0 \cdot \text{wfh potential}_t + \gamma_t \cdot I_t \cdot \text{wfh potential}_t \\
& + \nu_0 \cdot I_{\text{mother}} \cdot \text{wfh potential}_t + \nu_t \cdot I_t \cdot I_{\text{mother}} \cdot \text{wfh potential}_t \\
& + \delta \cdot X_t + \delta_{\text{mother}} \cdot X_t \cdot I_{\text{mother}} + \varepsilon_{i,t}
\end{aligned}
$$

where I_t are indicators for April 2020, November 2020, and November 2021 and X_t includes dummies for the number of children and the age of the youngest child. We demean all non-dummy variables to facilitate comparisons across specifications with interaction terms. We estimate this model for all parents in our sample regardless of whether we observe both parents or just one.

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[9]See Online Appendix A.2.2 for more details, including comparisons to the LISS data and predictions by sector.

Equation 1 constitutes a difference-in-differences design with a continuous treatment variable. The basic assumption is that in the absence of the pandemic and conditional on all other characteristics, hours spent on childcare would have evolved independently from remote work ability. While this assumption is unlikely to hold precisely (e.g., Harrington and Kahn (2023) demonstrate for the U.S., there has been a steady rise in the employment of mothers for degrees with a high remote work potential in the decade before the pandemic), the magnitude of changes that we will find is so dramatic that pre-existing trends are unlikely to be the main driver of our results.

The coefficients of interest are γ_t, which capture the effect of an additional hour of remote work potential on childcare hours at different points after the onset of the pandemic relative to November 2019. These can be interpreted as intention-to-treat effects of an hour of remote work, when the extent to which work from home potential is realized changes exogenously to childcare needs. The fact that total childcare hours are constant is crucial for this interpretation. If these hours and potentially the intensity of childcare (e.g., because of home schooling) had remained elevated for an extended period of time, very likely the same forces of specialization would have been at play that lead to gendered childcare patterns during normal times. The ν-terms measure the extent to which the impact of work from home differs by gender.

Table 1 shows the results of estimating equation 1 on the LISS data. The specification in the first column excludes remote work potential; these results underlie Figure 1a. It shows the average weekly hours spent on childcare by fathers (17.3) and the additional hours spent by mothers (14) in November 2019. These levels refer to a single child of average age in our sample (about 7 years). During the initial lockdown in spring 2020, they increased in lockstep by 12.8 hours (the interaction term for mothers is very small and not statistically significant). In the November 2020 and 2021 waves, fathers' childcare hours had increased by 3 and 1.5 hours, respectively. The interaction terms between the dummies for waves and mothers are approximately twice these amounts, meaning that total hours remained roughly constant and mothers' hours decrease by about the same amount that fathers' hours rose.

Our key specifications are columns (2) and (3), which add potential hours of remote work interacted with wave dummies. Column (3) additionally includes interactions of remote work potential with dummies for wave and gender. In 2019, an additional hour of work from home

Table 1: Evolution of the gender care gap and potential hours of remote work

| | Hrs childcare | | |
	(1)	(2)	(3)
Constant	17.28***	18.05***	17.75***
	(1.41)	(1.43)	(1.44)
2020-04	12.8***	10.49***	10.49***
	(1.53)	(1.46)	(1.46)
2020-11	2.96**	1.20	1.69
	(1.29)	(1.29)	(1.26)
2021-11	1.55	0.31	0.36
	(1.19)	(1.20)	(1.23)
Mother	14.01***	12.44***	12.67***
	(2.13)	(2.13)	(2.14)
Mother × 2020-04	−0.09	3.85**	3.74*
	(1.99)	(1.94)	(1.94)
Mother × 2020-11	−6.15***	−3.29*	−3.36*
	(1.84)	(1.87)	(1.86)
Mother × 2021-11	−3.31**	−1.46	−1.34
	(1.60)	(1.63)	(1.62)
Pot. hours remote work (demeaned)		−0.16***	−0.1**
		(0.05)	(0.05)
Pot. hours remote work (demeaned) × 2020-04		0.52***	0.55***
		(0.07)	(0.09)
Pot. hours remote work (demeaned) × 2020-11		0.36***	0.26***
		(0.07)	(0.08)
Pot. hours remote work (demeaned) × 2021-11		0.23***	0.21***
		(0.06)	(0.07)
Pot. hours remote work (demeaned) × Mother			−0.16
			(0.10)
Pot. hours remote work (demeaned) × Mother × 2020-04			−0.05
			(0.14)
Pot. hours remote work (demeaned) × Mother × 2020-11			0.24*
			(0.13)
Pot. hours remote work (demeaned) × Mother × 2021-11			0.04
			(0.13)
Observations	2,234	2,234	2,234
R^2	0.324	0.347	0.349

Notes: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$. Standard errors obtained by clustering on the household level. The potential hours of remote work are demeaned to facilitate comparison of coefficients across columns. Observations are weighted to keep the composition with respect to the age of the youngest child constant over time. All specifications control for the (demeaned) age of the youngest child interacted with gender, as well as indicator variables indicating number of children interacted with gender, the left-out category is a single child. Hence, the regressions in columns (1) and (3) are fully satiated. Potential remote work hours are set to zero if the individual did not work before the pandemic. The full set of coefficients can be found in Appendix Table B.1.

potential is associated with about 10 minutes less time spent on childcare. If anything, this effect is somewhat stronger for mothers. These results are consistent with the findings of Harrington and Kahn (2023) for the U.S..

In April 2020, during the first lockdown in which childcare facilities and schools were closed, the relation between potential remote hours and childcare hours turns strongly positive. The differential is about half an hour. On net, one hour of potential remote work translates into 22 minutes of childcare.

In November 2020, when childcare facilities and schools were open again, the relationship becomes somewhat weaker but stays significantly positive. This is the only case where we can detect a clear difference between mothers and fathers, i.e., a difference between the results in columns (2) and (3). Here, the difference relative to baseline is stronger for mothers. In November 2021, each hour of potential remote work translates into 14 more minutes of childcare than in November 2019, or 4 minutes on net.

Because fathers have more potential hours of remote work, these effects mean that remote work potential explains a substantial share of the decrease in the gender childcare gap that is evident from Column (1). Both original coefficients (6.2 hours in November 2020 and 3.3 hours in November 2021) are reduced to roughly half their size.

These basic conclusions hold up to a variety of specification choices. Estimating everything separately by gender means that some standard error get wider, but coefficients are very similar. This should not be a surprise given the small differences between columns (2) and (3) in Table 1. When we use the measure of remote work potential by sector and education that we impute from the NEA data, the results are very similar (Online Appendix Table B.2). This is reassuring because that measure is the only one that is available in the CBS data that we will use in the next section.

It would be interesting to analyze how, within-couple, potential remote working hours of the partner affect childcare hours. Unfortunately, we only have 1617 observations on remote work ability of both partners spread across all waves. When estimating equation 1 and adding partners' remote work potential, the coefficient on the latter has the expected negative sign (see Online Appendix Table B.3). It does come with a large standard error, so we cannot draw any conclusion from it. As an alternative, we classify couples based on relative remote work

ability: Whether the father can work more hours from home, whether it is roughly the same among both partners (defined to be within XX hours of each other), or whether the mother can do more work from home. We then compare the outcomes in November 2019 with the average of November 2020 and 2021 (Figure B.1 in the Online Appendix). In the first group, the average gap in childcare hours between mothers and fathers reduces from 18 to 9 hours, this effect is highly significant. The differences in the other two groups are much smaller (2 and -4 hours, respectively) and not significantly different from each other at any conventional cutoff. We take this as further evidence in support of our hypothesized mechanism.

2.2   Labor Supply

We have shown that the greater realization of remote work potential after the pandemic is associated with an increase in childcare provision on the individual level. Because work from home potential is larger for fathers, the effect is stronger among them. The most likely mechanism behind this is that it reduces frictions, e.g. through reduced commuting or the possibility to switch instantly between work and childcare tasks. For a given amount of working hours and childcare needs, these mechanisms will free up time in the couple. Most utility functions would predict that part of this will be spent in part on market work. In this section, we employ a within-couple analysis using administrative records to explore this mechanism.

Our interpretation focuses on how the partner's potential gains in flexibility affect working hours. While own flexibility gains are undoubtedly important, too, it is likely that labor demand plays an important role during the years 2020 and 2021 (e.g., the catering sector was not back to normal levels yet). Remote work ability might have contributed to the convergence in working hours between genders (see Figure 1b) already before the pandemic. We thus augment the differences-in-differences design from the previous section by an event study, which allows us to control for such trends.

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We estimate the following equation separately for mothers and fathers:

$$
\begin{aligned}
\text{(2)} \quad \text{Hours Worked}_{i,t} = \\
\alpha_0 + \sum_{t\in\{-1,1,2\}} \alpha_t \cdot I_t + \alpha_P \cdot I_P + \sum_{t\in\{-1,1,2\}} \alpha_{t,P} \cdot I_t \cdot I_P \\
+ \beta_0 \cdot \text{wfh potential}_{i,t-2} + \gamma_0 \cdot \text{wfh potential partner}_{i,t-2} \\
+ \sum_{t\in\{-1,1,2\}} (\beta_t \cdot \text{wfh potential}_{i,t-2} + \gamma_t \cdot \text{wfh potential partner}_{i,t-2}) \cdot I_t \\
+ \sum_{t\in\{-1,1,2\}} (\beta_{t,P} \cdot \text{wfh potential}_{i,t-2} + \gamma_{t,P} \cdot \text{wfh potential partner}_{i,t-2}) \cdot I_t \cdot I_P \\
+ v_0 \cdot \text{pot. comm. gains}_{i,t-2} + \nu_0 \cdot \text{pot. comm. gains partner}_{i,t-2} \\
+ \sum_{t\in\{-1,1,2\}} (v_t \cdot \text{pot. comm. gains}_{i,t-2} + \nu_t \cdot \text{pot. comm. gains partner}_{i,t-2}) \cdot I_t \\
+ \sum_{t\in\{-1,1,2\}} (v_{t,P} \cdot \text{pot. comm. gains}_{i,t-2} + \nu_{t,P} \cdot \text{pot. comm. gains partner}_{i,t-2}) \cdot I_t \cdot I_P \\
+ \delta \cdot X_t + \varepsilon_{i,t}
\end{aligned}
$$

where $t = 0$ refers to the years 2015, 2016, 2017, and 2019; I_P takes on the value 1 when $t = 0$ refers to 2019, i.e., the pandemic hits in the subsequent period. All measures of working hours refer to the month of November and are thus comparable to the previous section. X_t includes own and partner's age along, dummies for the number of children and for the age of the youngest child (single ages up to and including age 5, and categories for age groups 6-11 and 12-15), all measured concurrently to working hours. We measure remote work potential and the potential commuting gains in $t - 2$, thus abstracting from any changes in industry and/or education that may happen in the meantime, mirroring our specification for childcare hours.

Our coefficients of interest in equation 2 are the $\gamma_{t,P}$ and $\nu_{t,P}$. These measure the change in working hours due to the remote work potential (respectively commuting gains) after the pandemic-related lockdowns, controlling for any such trends in previous periods.

We present the estimates in Table 2. In columns (1) and (3), we do not include potential commuting gains of either partner. For mothers, ten hours of partners' remote work potential lead to an increase in their working hours by 4.8 minutes in late 2020 and 6 minutes in 2021. For fathers, the effect is about half the size in 2020 and similar to mothers in 2021. Again,

since fathers' remote work potential is larger than mothers, these patterns imply a bigger aggregate effect on female labor supply.

Table 2: The effect of partners' potential remote working hours on working hours

	Mothers		Fathers	
	(1)	(2)	(3)	(4)
Part: Pot hrs wfh $\times$ t = -1 $\times$ Pand	0.00	-0.0	-0.002	-0.005^{**}
	(0.002)	(0.002)	(0.002)	(0.002)
Part: Pot hrs wfh $\times$ t = 1 $\times$ Pand	0.008^{***}	0.005^{**}	0.004^{**}	0.002
	(0.002)	(0.002)	(0.002)	(0.002)
Part: Pot hrs wfh $\times$ t = 2 $\times$ Pand	0.01^{***}	0.005^{**}	0.009^{***}	0.007^{***}
	(0.002)	(0.002)	(0.002)	(0.003)
Part: Pot comm gain $\times$ t = -1 $\times$ Pand		0.00		0.004^{***}
		(0.001)		(0.001)
Part: Pot comm gain $\times$ t = 1 $\times$ Pand		0.003^{***}		0.00
		(0.001)		(0.001)
Part: Pot comm gain $\times$ t = 2 $\times$ Pand		0.004^{**}		0.001
		(0.001)		(0.002)
R^2	0.175	0.193	0.015	0.018

Notes: This table reports a subset of coefficients of the event study Diff-in-Diff regression. The dependent variable is unconditional working hours, i.e., the variable is zero if the individual does not work. The event study is run on the period from 2014 to 2021 on sets of four years (i.e., 2014 to 2017, 2015 to 2018, 2016 to 2019, and 2018 to 2021). Only for the last set of years, the dummy I_P in Equation 2 is set to one. As before, we use data from November in each year. We control for the number of children, age, and age of the partner. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. Standard errors obtained by clustering on the individual level. Full list of coefficients in Table B.4.

Columns (2) and (4) of Table 2 add own and partners' potential commuting gains. For mothers, this reduces the coefficients on partners' remote work potential after the pandemic by about half their amount in Column (1). At the same time, working hours increase substantially in the partners' potential commuting gain. For fathers, their partners' potential commuting gains do not have an own effect and the coefficients from Column (3) remain largely unchanged.

3   Conclusion

We have shown that the sudden increase in the realization of work from home potential brought about by governmental responses during the Covid-19 pandemic had important consequences for parents in the Netherlands. In particular, in two-parent families with high remote work potential of fathers, we find quantitatively important increases in their time spent on childcare and on mothers' labor supply. The effects are large enough be visible in decreased gender gaps on aggregate. As working from home will very likely continue to be an important feature of developed labor markets, these results offer a hopeful outlook for some dimensions of gender equality.

Nevertheless, our analysis leaves open various questions. For one thing, even more detailed time use data than the weekly records at our disposal would be important to assess the mechanisms more precisely. In particular, for the ability to provide childcare it would make a large difference for whether 8 hours of working from home are comprised of a fixed day of the week spent working remotely, whether the precise day will be decided ad hoc every week by the employer, or whether a few hours doing e-mails each evening add up to a workday.

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