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Neither backlash nor convergence: dynamics of intra-couple childcare division during the Covid-19 pandemic in Germany

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Abstract

Using unique (bi)monthly panel data (IAB-HOPP) covering the immediate postlockdown period from June to August 2020, as well as the subsequent period up until the second lockdown in January/February 2021, we investigate opposing claims of widening/closing the gender gap in parental childcare during the Covid-19 pandemic in Germany. We consider prepandemic division as a reference point and provide dynamics rather than snapshots. Our results suggest a slight initial shift toward a more egalitarian division that, however, faded out in subsequent months. Starting from a fairly "traditional" prepandemic childcare division, the lockdown stimulus was not nearly strong enough to level the playing field. Subgroup analysis differentiating between individual lockdown-specific work arrangements shows that the drivers of the observed shift were mothers with relatively intense labor market participation who cannot work from home. Fathers' work arrangement instead did not play a significant role. We conclude that the shift emerged out of necessity rather than opportunity, which makes it likely to fade once the necessity vanishes. Further, a shift is observed only if fathers were to some extent involved in childcare prepandemic, which points to the crucial role of initial conditions.

Keywords Covid-19, Intra-couple division of unpaid work, Childcare, Gender, Working from home, IAB-HOPP

JEL classification D13, J13, J16

1 Introduction

Recent efforts toward gender equality within society at large and the vital debate on digitization as a potential gender equalizer during the pandemic and thereafter stand in stark contrast to the persistent gender inequalities present in the private sphere. The unequal division of childcare attracts particular attention since childcare is—unlike housework—of limited substitutability, scalability and delay. At the same time, locked-down daycare facilities and schools have put parents of young children under particularly high pressure during the ongoing pandemic. Surrounding the effects of the Covid-19 crisis on the childcare division among couples, the scientific debate stretches between two opposed expectations, namely, the 'convergence notion' and the 'backlash notion'. On the one hand, it is hoped that a considerable number of bread-earning fathers will get to know and appreciate family care work at home and thus permanently increase their share of such work (Alon et al. 2020; Arntz et al. 2020; Hupkau and Petrongolo 2020). On the other hand, there are fears of a massive relapse into a traditional pattern of behavior (Allmendinger 2020; Kohlrausch and Zucco 2020; Müller et al. 2020). International empirical evidence so far has found indeed no

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or only small increases in the paternal share of unpaid work (Berghammer 2022; Biroli et al. 2021; Champeaux and Marchetta 2021; Del Boca et al. 2020; Farré et al. 2022; Hank and Steinbach 2021; Mangiavacchi et al. 2021; Sevilla and Smith 2020; Zoch et al. 2021). However, these studies mainly provide snapshots of the acute lockdown situation, often with no account for individual heterogeneity and prepandemic conditions. Our analysis contributes to this strand of literature by examining the medium-term post-lockdown dynamics in Germany up until the second less restrictive Covid-19 lockdown in Germany late 2020 and early 2021. We additionally investigate the role of lockdown-specific work arrangements, in particular work-from-home arrangements of mothers and fathers.

Germany is an interesting case in this regard. In the welfare state comparison, the country's institutional framework favors within-family care more strongly compared to other central-European corporatist countries such as France or Belgium (see e.g. Misra and Moller 2005). This particularly applies to joint taxation and free co-insurance for the non-working or marginally employed spouse in the public health care system, which both impair women's work incentives (Jaumotte 2003; Bettio and Verashchagina 2013). Moreover, the two German parts are still shaped by different gender norms, with less traditional gender roles (Schmitt and Trappe 2014; Wenzel 2010; Cooke 2007) and lesser adherence to the (modernized) male breadwinner model (Pfau-Effinger 2012, Pfau-Effinger and Smidt 2011) in the eastern part. This becomes particularly evident in the presence of children in the household. The employment gap between mothers and fathers amounts to 19.4 (11.4) percentage points in the western (eastern) part (Federal Statistical Office, 2020).

This study provides novel evidence on the effect of the Covid-19 crisis on the medium-term dynamics in intra-couple childcare division. Referring to the theoretical underpinnings of intra-couple bargaining over childcare division, the current study makes three contributions to the literature. First, we use prepandemic childcare division as a reference point to elucidate behavioral changes over time. Second, a high-frequency longitudinal scope allows us to investigate the dynamics and the durability of the observed changes approximately five months beyond the acute lockdown, i.e., until August 2020, and even up until the second—less restrictive—Covid-19 lockdown in early 2021. Third, we are able to investigate the role of lockdown-specific work arrangements of mothers and fathers.

We employ unique monthly panel data covering the period of gradual reopening after Germany's first Covid-19 lockdown in spring 2020 up until August. Based on a sample of 1078 parents, we find an only small and temporary shift toward increased paternal childcare participation. Additional results employing an extended panel period up until the second Covid-19 lockdown confirm that parental childcare division has fully returned to its prepandemic levels in between the two lockdowns[1] and suggest the recurrence of another small shift by January/February 2021. The main driver for the initial shift consists of mothers with relatively intense labor market participation who cannot work from home. The work arrangement of fathers instead does not play a significant role, which suggests that the small shift we observe emerged out of *necessity* (since mothers cannot take over childcare) and not out of *opportunity* (enabling fathers to increase their share). It comes as no surprise that such shift may fade once the necessity vanishes. Further, a shift is observed only if fathers were to some extent involved in childcare prepandemic, which points to the crucial role of initial conditions. Overall, our results support neither the 'backlash' nor the 'convergence' notion put forward in the current debate, but rather evidence a striking degree of stability in intra-couple childcare arrangements, pointing to the importance of prepandemic (initial) conditions.

The paper is structured as follows: Sect. 2 reviews the theoretical background and empirical findings on intra-couple childcare division and develops hypotheses for the pandemic context; Sect. 3 introduces the data used and describes sample selection and variables; Sect. 4 presents the empirical setup; and Sect. 5 reports and discusses the results. The final section concludes.

2 Theories on intra-couple childcare division and empirical findings

Relevant theories for the division of labor in couples documented in the literature refer to partners' time budgets, their relative resources and gender. The time mechanism is grounded in the '*time availability*' approach (Shelton 1992). The higher one's involvement in gainful employment is, the less time one has available for unpaid work. This approach emphasizes the importance of path dependence and the inertia of adjustment mechanisms resulting from habituation to established patterns and adjustment costs (e.g., when changing employment contracts). Partners' relative earnings, in combination with their relative productivity for domestic work, give rise

[1] These results are partly confirmed by recent evidence based on different panel data. Jessen et al. (2022) roughly show the return to prepandemic levels of parental childcare division by Winter 2020/21 (field period November 2020 to April 2021), but cannot distinguish monthly dynamics. Based on such data, the identification of the second smaller shift in January/February 2021 that we find, is not possible.

to the comparative advantage of partners for market or domestic work, based on the *unitary model of New Home Economics* (Becker 1965). *Cooperative bargaining theories* (e.g. McElroy and Horney 1981; Manser and Brown 1980) come to the same conclusion, albeit based on a different rationale; here, higher human capital reflects a higher bargaining position within the couple in regard to (re)negotiations of domestic work. *'Gender display' or 'doing gender' theories* refer to gender as a routine and recurring accomplishment in everyday interaction, constructing gender identity (West and Zimmermann 1987; Berk 1985).

The aforementioned theories differently advocate the arguments exchanged in the current Covid-19 debate that juggle between 'backlash' and 'convergence'. On the one hand, referring to prevalent traditional norms, proponents of the 'backlash' thesis argue that women will be held responsible to address the "sudden spike in childcare needs" (Alon et al. 2020, p. 11f.), which will result in the retraditionalization of formerly egalitarian couples during the lockdown (in a similar vein: Kohlrausch and Zucco 2020). In fact, survey results for Germany from the early phase of the pandemic suggest that working mothers reduced their workload relatively more than did fathers to meet the additional childcare needs caused by the pandemic (Bünning et al. 2020),[2] and that teleworking mothers spent more hours on childcare than did teleworking fathers (Adams-Prassl et al. 2020). Consequently, mothers were more likely (than before the pandemic and more likely than fathers) to feel heavily stressed with childcare tasks (Fuchs-Schündeln and Stephan 2020). Time availability and economic rationales are further plausible explanations for the observed care arrangements; women have been hit harder by employment drops than men in the pandemic crisis (Hammerschmid et al. 2020). Marginal employment (so-called 'Minijobs'), in which women prevail, has been significantly reduced in the pandemic (Deutsche Rentenversicherung Knappschaft Bahn-See and Minijobzentrale 2020b). Depending on the household context, it can be assumed that some women will refrain from a new job search upon economic recovery if the money is not needed to make ends meet (Fuchs et al. 2020). Due to traditional gender roles and related intermittent employment patterns, women are still lagging behind men in terms of career perspectives and earnings (Gangl and Ziefle 2009). Thus, for some couples, having the mother step in seems economically reasonable.[3]

On the other hand, the results from surveys during the first Covid-19 lockdown indicate that fathers also expanded the time they spent with their children (Zinn 2020; Kreyenfeld and Zinn 2021; Hank and Steinbach 2021) and that a higher share of fathers—and a lower share of mothers—saw themselves in the role of primary caregivers compared to the prepandemic period (Kohlrausch and Zucco 2020 for the period April 3-14, 2020). These empirics motivate the 'convergence notion' by suggesting that increased paternal engagement could help to narrow down the gender divide in childcare responsibilities. The related optimism is further grounded in the fact that women are overrepresented in systemically relevant jobs, which cannot be done from home. This holds true for occupations in the health care and social sector, where 77% of the employees are women (Bundesagentur für Arbeit 2019). Based on SOEP 2018 data, the share of couples in which only the mother has a systemically relevant job is approximately 16 percent (Boll and Schüller 2020). It is exactly this situation […] "where the father is able/forced to work from home during the crisis, while the mother is not" […] from which Alon et al. (2020, p. 21f.) expect the biggest impact on the intra-couple labor division. However, though quite optimistic regarding the upward shift in fathers' participation, the authors do not rule out that the phenomenon could be temporary (p. 22).

We argue that the structural and normative factors embodied in the three abovementioned theories (couples' relative income and time resources as well as gender norms) significantly shape couples' initial conditions referring to childcare division prepandemic. Thus, to formulate expectations regarding behavioral change postpandemic requires to take prepandemic constellations into account. Normative change takes time; we do not expect significant (and measurable) gender norm changes within the time horizon of our data. Moreover, behavioral adjustments, i.e., learning new role models within the couple, entails symbolic and/or economic costs (see e.g. Caspi and Moffitt 1993). Paternal agents might avoid those costs and, instead, frame their additional childcare engagement as temporary "emergency care", which ends when the emergency ends, i.e., after the reopening of daycare facilities and schools. It is therefore by no means evident, either in the short-term or the medium-term, that paternal care will increase in cases where there was little involvement prepandemic ('convergence notion') or that paternal care will decrease where childcare arrangements were previously more egalitarian ('retraditionalization notion'). Instead, according to the abovenamed theories, the only reason for a significant and lasting behavioral change is a significant and lasting shift in the

[2] In contrast, the results of other surveys focusing on the first lockdown in Germany show that fathers and mothers reduced their working hours to a similar extent (Knize et al. 2022).

[3] For an evaluation of the economic situation of families between mid-March and mid-May 2020 see, e.g., Boll (2021), and for a discussion of political measures with respect to gender equality e.g. Schmieder and Wrohlich (2020).

couples' structural conditions, i.e. relative resources with respect to time and income.

Hypotheses While the first of our three hypotheses addresses the *specificity of childcare*, the second and third directly follow from the argument outlined above that partners' relative resources—*both prepandemic and during the pandemic*—shape the relative gender asymmetry in childcare division thereafter:

H1. (Childcare specificity) Since childcare is less time-flexible and less reducible than other forms of unpaid work, we suppose that the division of childcare between mothers and fathers is more strongly affected than the parental division in other forms of unpaid work.

H2. (Prepandemic conditions) The more pronounced the gender asymmetry in childcare division was prepandemic, the less likely and the less persistent the change in childcare division should c.p. be thereafter. This also means that there should be no considerable change in parental childcare division for previously egalitarian couples.

H3. (Change in relative resources during the pandemic) In the short term, both a low labor market involvement in terms of employment status and hours and the opportunity to work from home during the lockdown provide additional time resources that should c.p. relate to changes in parental childcare division if relative time budgets between parents change. A persistent change in childcare division would require a permanent change in parents' relative resources.

This study makes a threefold contribution to the literature. First, unlike previous studies, which mostly provide snapshots of the situation during the pandemic, we observe and employ the prepandemic couple division of childcare as a reference point and account for unobserved individual heterogeneity to evaluate the dynamics over time and to scrutinize possible retraditionalization and convergence trends. Second, the high-frequency panel data covering the period of gradual reopening after Germany's first Covid-19 lockdown until August 2020 (and, for the sake of sensitivity checks, an extended panel period up until January/February 2021) allow us to test the sustainability of short-term shifts in the medium term. There are a handful studies accounting for initial conditions and individual heterogeneity (e.g. Farré et al. 2022; Biroli et al. 2021), but their data do not go beyond the first Covid-19 lockdown. Third, we investigate the role of lockdown-specific work arrangements—and in particular work-from-home arrangements—of mothers and fathers. Previous studies analyzing work-from-home arrangements (e.g. Hank and Steinbach 2021; Derndorfer et al. 2021) missed out at least one of the two aforementioned aspects.[4] Thus, to our knowledge our study is the first to provide all three specifics at once. There is only one, more recent, study, Jessen et al. (2022), that is similar to ours in this respect. However, in contrast to Jessen et al. (2022) whose Winter 2020/21 wave is based on a field period that stretches from November 2020 to April 2021, we can distinguish (bi-)monthly dynamics based on the high-frequency HOPP data. This allows us to identify the second smaller shift in childcare division in January/February 2021, which is not possible to be identified based on the more aggregate data in Jessen et al. (2022). Another difference between our study and Jessen et al. (2022) is the measurement of pre-pandemic parental division, which is retrospectively surveyed in the HOPP data by June 2020 while Jessen et al. (2022) can employ contemporaneously collected survey responses of pairfam wave 2018/19. However, the distributions are strikingly similar.

3 Data, sample and variables

3.1 Data

To investigate the postlockdown dynamics of the division of labor within parental couples in Germany, we employ unique data from the IAB High-Frequency Online Personal Panel (HOPP), which is a monthly[5] online panel survey developed by the Institute for Employment Research (IAB). This panel survey has been developed to investigate how the Covid-19 pandemic affects individuals in the German labor market (Sakshaug et al. 2020; Haas et al. 2021). HOPP is based on a random sample of 200,000 individuals, which was drawn from the Integrated Employment Biographies (IEB) of the IAB. The IEB includes the universe of employees subject to social insurance contributions, registered unemployed individuals, unemployment and welfare benefit recipients, and job seekers. Thus, HOPP is representative of the employable population in Germany. Information on stay-at-home parents (mostly mothers) is included in the data via survey questions on intra-couple division of unpaid labor. Furthermore, the survey data can be linked to the administrative data of the IAB if the respondents provided informed consent for such linkage.[6] The data

[4] Other studies looked at different time opportunities which affect the father's involvement in childcare during the pandemic such as short-time work. For Germany, Naujoks et al. (2022) found positive effects of childcare division with a higher paternal involvement which is moderated by father's education.

[5] After the August 2020 wave, the panel became bimonthly.

[6] The administrative data includes information e.g. on place of residence or occupation, which would allow analysis by region or the distinction of systemically relevant professions. However, we decided not to use this infor-

Table 1 Summary statistics. Source: IAB High-Frequency Online Personal Panel (HOPP), own calculations

	Full sample				Mothers				Fathers			
	Unbalanced		Balanced		Unbalanced		Balanced		Unbalanced		Balanced	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Parental division of childcare[a]	3.791	0.941	3.810	0.944	3.895	0.961	3.957	0.951	3.677	0.909	3.626	0.910
Parental division of childcare, dichotomized (in Percent):												
(Almost) entirely father	0.018	0.131	0.014	0.116								
Predominantly father	0.051	0.220	0.056	0.230								
Both parents equally	0.309	0.462	0.308	0.462								
Predominantly mother	0.366	0.482	0.351	0.477								
(Almost) entirely mother	0.256	0.436	0.271	0.445								
Parental division of housework[a]	3.781	0.879	3.799	0.913								
Parental division of shopping[a]	3.268	1.212	3.373	1.232								
Female	0.519	0.500	0.550	0.498								
Lockdown-specific work arrangements (as of HOPP wave May 2020)												
> 20 work hrs, remote work possible					0.358	0.480	0.355	0.479	0.611	0.488	0.626	0.484
> 20 work hrs, remote work not possible					0.127	0.333	0.121	0.326	0.246	0.431	0.243	0.430
≤ 20 work hrs					0.325	0.469	0.312	0.464	0.097	0.297	0.096	0.294
Not employed					0.190	0.392	0.213	0.410	0.046	0.209	0.035	0.183
Age youngest child in household	5.060	3.360	5.202	3.316	5.207	3.330	5.284	3.188	4.884	3.374	5.017	3.432
Child aged 0–3 in household	0.399	0.490	0.384	0.487	0.367	0.482	0.355	0.479	0.434	0.496	0.426	0.495
No. children age < 18 in household	1.737	0.745	1.748	0.695	1.717	0.734	1.723	0.696	1.761	0.758	1.774	0.699
N	2676		1032		1386		564		1272		460	
No. individuals	1078		258		554		141		516		115	

[a] Measured on a 5-point scale from 1 "entirely father" to 5 "entirely mother". Children's age calculated as of 2020 based on annual year-of-birth information

and data documentation are provided internationally at the Research Data Centre (FDZ) of the German Federal Employment Agency (BA) at the Institute for Employment Research (IAB) (Volkert et al. 2021).[7]

For our main analysis, we use the 2020 May, June, July, and August waves, in which approximately 11,500 individuals (mainly employees subject to social insurance contributions) participated at least once in the survey and reported changes in their social, family and working lives in the course of the Covid-19 pandemic. Besides our main analysis, we additionally employ the subsequent bimonthly waves of September/October 2020, November/December 2020, and January/February 2021 to explore longer-term effects in the sense of robustness checks. Note, however, that the numbers of survey participants decline over time and the refreshment sample in wave September/October 2020 cannot be included in our main analysis because of missing information on the first lockdown and prepandemic division of labor. For a second robustness check that explores the impact of responses taken during school vacation, we employ additional information on respondent's federal state, which was collected first in the November/December 2020 wave.

3.2 Sample

We restrict our analysis sample to couples with at least one child below the age of 12 because those children are defined as being necessitative of childcare, according to the Infection Protection Act (§56, Abs.1a). We consider two main subsamples. The first subsample is an unbalanced panel of mothers and fathers who were interviewed at least in May and June 2020, including a total of 2676 person-period observations (1078 individuals). The second subsample is a balanced panel of 258 mothers and fathers, who were interviewed in all waves between May and August, resulting in 1032 person-period observations (see Table 1 for summary statistics). When considering lockdown-specific work arrangements, the sample slightly reduces to 1070 (256) mothers and fathers in the unbalanced (balanced) version. To additionally explore

Footnote 6 (continued)

mation because there is a two-year time gap in the data and also this information is not available for the partners of respondents.

[7] https://doi.org/10.5164/IAB.HOPP_W01-W07.de.en.v2. Earlier versions of this paper employ a preliminary data version before the data have been provided at the Research Data Centre (FDZ).

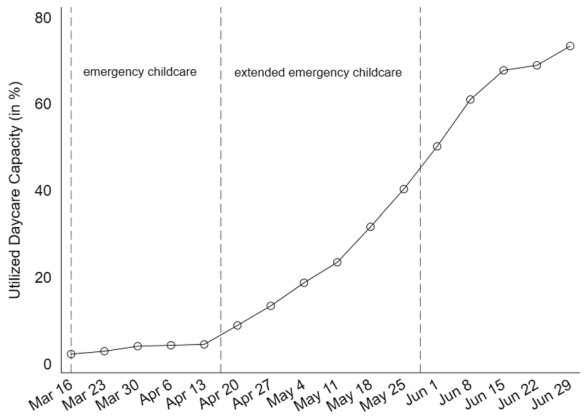

Fig. 1 Utilized daycare capacity in Germany during the first COVID-19 lockdown in early 2020 and the subsequent reopening. Source: DJI-RKI (2020); own calculations. Note: Utilized daycare capacity represents the share of children who are currently attending daycare among those children who were registered in daycare by March 2020. DJI-RKI (2020) reports these shares weekly by federal state based on communications of the respective federal state ministries; we subsequently aggregate those shares to the national level. We define the timing of transition from emergency childcare to extended emergency childcare and from extended emergency childcare to the phase of (restricted) normal operation as the week where more than five observed federal states switch status, based on information from DJI-RKI (2020, Table 1)

longer-term effects, we employ an extended sample including three further waves of the HOPP data including 1147 (182) individuals in the unbalanced (balanced) version.

Appendix Table 9 compares demographic characteristics for the balanced HOPP sample and for the 2019-Microcensus sub-sample of two-parent families with at least one child below age 12 in the household. Overall, the distributions are remarkably similar. HOPP respondents are a bit older, and with slightly older children than 2019 Microcensus respondents. Note that these differences potentially stem from both differences in sampling and pandemic-specific nonresponse behavior, and that these cannot be disentangled.

In line with the literature, we consider the time before March 19, 2020 as the prepandemic period. Although the reopening after the first Covid-19 lockdown started at the end of April 2020, this reopening was gradual, and the reopening of daycare facilities was especially prolonged—in a phase of "extended emergency childcare"—over the entire month of May before most federal states switched to a phase of "restricted normal operation" (see Fig. 1). Thus, we define the period spanning from March 19 to the end of May 2020 as the (extended) lockdown period.

3.3 Dependent variable

Due to the lockdown and associated daycare facility and school closures, parents were more strongly forced to renegotiate how to divide childcare duties between them; thus, compared to other forms of unpaid care, childcare is our main dependent variable. Such care has to be analyzed separately from housework (Sullivan 2013), which we do; we consider housework and (grocery) shopping, which are scaled and recoded in the same way as our main dependent variable. Regarding childcare, the respective survey question has been posed to a subgroup of respondents who state that their partner and at least one child born after 2005, i.e., under the age of 15, live in their household. The question reads as follows: "*How do you and your partner organize childcare at the moment? This question refers to the time when the children are not being looked after at school, kindergarten,* etc.*, but by you and/or your partner.*" Responses are measured on a five-point scale: 1 "(almost) entirely my partner", 2 "mostly my partner", 3 "about half and half", 4 "mostly by me", 5 "(almost) entirely by me". For the purpose of our analysis, we recoded the responses according to the respondent's gender to obtain a measure of the gender pattern in childcare division within the couple.[8] The recoded five-point scale then ranges from 1 "(almost) entirely the father" to 5 "(almost) entirely the mother". We additionally examine dichotomized versions of the outcome. Importantly, only in the June wave were the respondents additionally asked to report the division of unpaid labor in the immediate prepandemic period, which we use as a reference point in our analysis (see Table 2 below). By employing retrospective data, we rely on the assumption that individuals would not have reported systematically different divisions of childcare would they have been asked in the prepandemic period. In our case, the retrospective information concerns a period only three months before the survey interview and the arrangements to which respondents are requested to assign themselves are rather coarse, which is why we assume that participants should be able to recall them correctly.

3.4 Explanatory variables

As we are interested in the post-lockdown dynamics of parental childcare division (and to capture nonlinearities), we employ month dummies for June, July and August 2020 and used the respective prepandemic division as a reference. We consider four types of lockdown-specific work-care arrangements for mothers and fathers

[8] The data does not contain information about the gender of the partner; however, we impose the assumption that there are no same-sex couples in the sample. Furthermore, the data does not distinguish biological and step-parents.

Table 2 Utilized survey information

HOPP wave	May 2020	June 2020	July 2020	August 2020
Prepandemic childcare division		x		
Prepandemic division of housework and doing the errands		x		
Lockdown-specific individual work arrangements of mothers and fathers	x			
Current childcare division		x	x	x
Current division of housework and doing the errands		x	x	x

Prepandemic childcare division: "Thinking about the time before the COVID-19 crisis: How did you and your partner organize childcare? This question refers to the time, when the children were not being looked after at school, kindergarten, etc., but by you and/or your partner."—This was done…[1] (almost) entirely by partner, [2] mostly by partner, [3] about half and half, [4] mostly by me, [5] (almost) entirely by me. Lockdown-specific individual work arrangements of mothers and fathers: "And if you think about your last working week: How many hours did you actually work, including regular overtime, extra work, etc.? Note: If you do not have fixed working hours, enter the average hours over several weeks.", "Do you have the possibility to work from home?". Current childcare division: "How do you and your partner organize childcare at the moment? This question refers to the time when the children are not looked after at school, kindergarten, etc., but by you and/or your partner." Current division of housework and doing the errands: "How do you and your partner currently split the work?—Housework (laundry, cooking, cleaning, tidying) – Shopping (groceries)". Prepandemic division of housework and doing the errands: "Thinking about the time before the COVID-19 crisis: How did you and your partner split the work in the following areas? Housework (laundry, cooking, cleaning, tidying) – Shopping (groceries)"

separately as a combination of individual working hours and the possibility to work from home. The relevant coping strategies that addressed work-care conflicts in the immediate lockdown were (not) working at all, switching to remote work and reducing one's working hours. Specifically, we use information on whether one's employer offered the possibility of working from home (rather than actual usage, preventing potential endogeneity), assuming that anyone with the possibility of working from home did do so in the acute lockdown period when schools and daycare facilities were closed and employees were ordered to work from home whenever possible. Similarly, we rely on information about actual working hours in the work week prior to the interview (including overtime, etc.). Since we do not observe actual work-care arrangements during the acute lockdown in March/April 2020, we employ survey information from the May 2020 HOPP wave for approximation. We thereby assume that individuals tended to maintain their lockdown-specific care-work arrangements in the subsequent phase of stepwise reopening of schools and daycare facilities, which lasted at least until the beginning of June 2020.

We do not distinguish by the possibility of working from home if an individual worked less than or equal to 20 hours weekly, since we assume that leisure time at home is more strongly expected to be devoted to childcare tasks than work time at home. Whether with or without the possibility of working remotely, the parent who reduced their work time was likely the main caregiver. We focus on these four main types of lockdown-specific work-care arrangements since the limited sample size prevents us from a more detailed specification regarding working time. Note that as we do not observe prepandemic work arrangements of both partners, we are unable to measure respective changes.

When analyzing lockdown-specific work arrangements, we show results for mothers and fathers separately because we do not have partner information on employment status, working from home and working hours from the May 2020 HOPP wave. Consequently, the work-care arrangements we can investigate concern the individual and not the couple. That is, we employ the following arrangements for mothers and fathers: (a) more than 20 working hours *without* the possibility of working from home, (b) more than 20 working hours *with* the possibility of working from home, (c) less than or equal to 20 working hours, and (d) not employed.

Overall, we examine the dynamics over three consecutive monthly waves of the HOPP survey (June, July and August) in which questions on the intra-couple division of childcare were included for the first time.[9] Information on the pre-Covid-19 division of childcare is taken from the June survey. The prepandemic period is used as a separate reference period preceding the others; hence, our analysis spans four periods in total. We additionally employ the first HOPP wave administered in May 2020 to examine the division-of-childcare dynamics for subgroups of mothers and fathers according to their lockdown-specific work arrangements. Note also that there is no systematic (household) linkage between the fathers and the mothers in our sample, i.e. mothers and fathers in the HOPP sample are not partnered with each other. Table 2 depicts the information we use and the wave from which it is retrieved.

[9] May is not included since the intra-couple division of childcare was not surveyed in the HOPP May 2020 wave.

4 Empirical setup

Our descriptive investigation of the intra-household division of childcare in the aftermath of Germany's first Covid-19 lockdown in spring 2020 mainly aims to explore two types of research questions. The first question concerns the overall dynamics of the intra-household division of childcare: did the lockdown,—i.e., school and daycare closures—significantly affect the gendered pattern in childcare provision, and if so in what direction? To examine these questions, we run linear regressions of the following type:

$$Y_{it} = \alpha + \beta_1 June_t + \beta_2 July_t + \beta_3 August_t + u_i + \epsilon_{it}, \quad (1)$$

where Y represents the childcare division among parents reported by individual i in period t (with t=["Pre-Covid-19", June 2020, July 2020, August 2020]). $June_t$, $July_t$ and $August_t$ are dummy variables indicating the interview wave. u_i is an individual fixed effect, and ϵ_{it} is a time-varying random error term. Throughout the article, all standard errors are clustered at the individual level and are robust to heteroscedasticity. The parameters β_1, β_2 and β_3 represent the postlockdown changes of the childcare division among parents with respect to the reference period "Pre-Covid-19". Analyses employing an extended panel additionally include indicators of the three bimonthly periods September/October 2020, November/December 2020, and January/February 2021.

The second research question concerns the postlockdown dynamics of parental childcare division across specific subgroups: have changes in the intra-couple childcare division been driven by specific work arrangements during the period where (extended) emergency childcare was in place (termed as "extended lockdown" before)? We run regressions of the following type separately for mothers and fathers:

$$Y_{it} = \theta + \boldsymbol{Wave}'_t \boldsymbol{\delta}_0 + [\boldsymbol{Work}_i \times \boldsymbol{Wave}_t]' \boldsymbol{\delta}_1 + u_i + \epsilon_{it}, \quad (2)$$

where Y represents the intra-couple childcare division reported by mothers or fathers. $Wave_t$ is a vector of dummy variables indicating the interview wave. The equation again includes individual fixed effects (u_i) and a time-varying random error term (ϵ_{it}). The interview wave indicators ($Wave_t$) are now interacted with $Work_i$, which is a vector of mutually exclusive dummy variables for mothers' (fathers') individual lockdown-specific work arrangements (a–d), as delineated in Sect. 3. We provide results on both models (1) and (2), each on the balanced and the unbalanced sample, as well as with and without individual fixed effects.

In the absence of a legitimate and widely accepted individual fixed effects estimator for ordinal data that is implemented in the standard statistical software, we (a) treat the ordinal information on intra-couple childcare division as continuous and (b) collapse it into a dichotomy to explore nonlinearities. We follow Hellevik (2007) in arguing that linear regression analysis of binary variables is preferable to logistic regression for our purposes, since loglinear measures do not provide an accurate decomposition of bivariate associations.

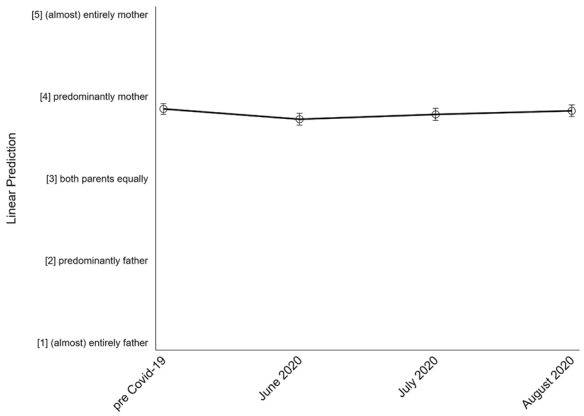

Fig. 2 Overall postlockdown dynamics of parental division of childcare. Source: IAB High-Frequency Online Personal Panel (HOPP), own calculations. Notes: This figure plots period effects based on regression results presented in Column 1 of Table 3

5 Results and discussion

5.1 Overall dynamics: main results

We start with the estimation results of Eq. (1) in Sect. 4. Relative to the precrisis work division, the respondents reported a shift toward a greater paternal share of childcare in these postlockdown months. However, this shift was rather small and decreased over time, as depicted in Fig. 2, where we plot the period effects from a simple OLS model on the unbalanced panel.[10] This fact is evident also from the regression results presented in Table 3 that include individual fixed effects and are based on the balanced panel. Longer-term period effects for July and August 2020 become statistically significant when individual fixed effects are included. Specifically, by August 2020, we observe a shift in parental division of childcare toward fathers that amounts to approximately 0.06–0.11 points on a 6-point scale.[11] Further activities that might

[10] Figure 2 provides simple descriptive statistics by plotting period effects based on OLS regression results presented in Column 1 of Table 3, which correspond to period-specific means of the outcome variable.

[11] The sizeable and significant female respondent coefficient in Table 3 hints at the importance of gendered reporting behavior with respect to the levels of childcare division. Gender biases in childcare levels are, however, fully controlled for in regressions including individual fixed effects, where we look at intrapersonal changes only.

Table 3 Postlockdown dynamics of parental division of childcare (housework, shopping). Source: IAB High-Frequency Online Personal Panel (HOPP), own calculations

Parental division of labor wrt.	Childcare			Housework	Shopping
	(1)	(2)	(3)	(4)	(5)
Pre-Covid-19 (ref.)					
June 2020	− 0.126***	− 0.131***	− 0.167***	− 0.045	− 0.120**
	(0.032)	(0.032)	(0.057)	(0.041)	(0.057)
July 2020	− 0.067	− 0.109***	− 0.143***	0.056	− 0.058
	(0.042)	(0.037)	(0.054)	(0.047)	(0.052)
August 2020	− 0.023	− 0.061*	− 0.109**	0.048	− 0.031
	(0.042)	(0.036)	(0.048)	(0.046)	(0.052)
Female respondent	0.214***				
	(0.053)				
Constant	3.735***	3.866***	3.915***	3.785***	3.425***
	(0.043)	(0.020)	(0.034)	(0.028)	(0.033)
Individual FE	No	Yes	Yes	Yes	Yes
No. individuals	1078	1078	258	258	258
N	2676	2676	1032	1031	1030
Sample	Unbalanced	Unbalanced	Balanced	Balanced	Balanced

Parental division of childcare (housework, shopping) measured on a 5-point scale from 1 "entirely father" to 5 "entirely mother". Cluster-robust standard errors at the individual level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

likewise be subject to intra-couple bargaining, such as housework and shopping, show no significant (housework) or only small and very temporary shifts (shopping), thereby supporting hypothesis H1.

In the following, we take a closer look at where childcare division shifts toward slightly more paternal care originate from, i.e., traditional or rather more egalitarian couples. We rerun fixed-effects regressions on the balanced panel (Column 3 of Table 3) for a variety of dichotomized outcomes. We employ binary variables indicating whether childcare was provided (i) entirely by the mother, (ii) predominantly or entirely by the mother, (iii) by both parents equally, or whether childcare was delivered (iv) predominantly or entirely by the father. We then multiply these binary indicators by 100 for the period effects to represent percentage-point changes. Table 4 presents the results, which indicate that the traditional childcare constellation remained remarkably stable over time. Within the balanced sample, the probability of a mother being entirely responsible for childcare (approximately 29% prepandemic) did not significantly change in the aftermath of the Covid-19 lockdown (Column 3). The small changes we observe instead originate from constellations, in which mothers are still the main caregivers but fathers were already considerably involved in childcare duties prepandemic. The results presented in Column 2 of Table 4 indicate that the probability of predominantly or sole maternal caregiving statistically significantly decreased from approximately 67 percent prepandemic by 6.6 (5.4, 5.8) percentage points in June (July, August) 2020.

On the flipside, this shift led to an increased probability of fathers taking over the main caregiver role rather than to an increased probability of egalitarian care divisions by June 2020. Moreover, the egalitarian constellation was 1.5 percentage points less likely to occur with respect to a 30.2-percent likelihood prepandemic, albeit not statistically significant, whereas the paternal caregiver constellation increased by statistically significant 8.1 percentage points with respect to a prepandemic likelihood of 3.1 percent. These dynamics are still visible and significant in July; with respect to the prepandemic situation, fathers were still 5 percentage points more likely to be in the main caregiver role. By August 2020 the increase amounts to only 2.3 percentage points and is statistically insignificant. Hence, there are obvious backward dynamics over time in this group; moreover, the group is rather small. Given that both egalitarian constellations and sole maternal caregiver constellations lack significant changes in prevalence over time and since maternal main caregiver constellations still constitute the large majority, our hypothesis H2 is fully supported.[12] The dynamics in parental childcare after the first Covid-19 lockdown in Germany seem quite limited in size.

[12] Strikingly, those couples that shift back over time do not seem to readopt maternal main caregiver constellations, but rather remain in an egalitarian division of childcare labor (albeit without statistical significance).

Table 4 Postlockdown dynamics of parental division of childcare. Dichotomized outcome. Source: IAB High-Frequency Online Personal Panel (HOPP), own calculations

Parental division of childcare	Predom./entirely father	Predom./entirely mother	Entirely mother	Both parents equally
	(1)	(2)	(3)	(4)
Pre-Covid-19 (ref.)				
June 2020	8.140***	− 6.589**	0.00000	− 1.550
	(2.176)	(2.691)	(2.580)	(2.909)
July 2020	5.039***	− 5.426**	− 3.488	0.388
	(1.838)	(2.498)	(3.030)	(2.722)
August 2020	2.326	− 5.814**	− 2.713	3.488
	(1.549)	(2.401)	(2.772)	(2.541)
Constant	3.101***	66.667***	28.682***	30.233***
	(1.182)	(1.621)	(1.769)	(1.712)
Individual FE	Yes	Yes	Yes	Yes
No. individuals	258	258	258	258
N	1032	1032	1032	1032
Sample	Balanced	Balanced	Balanced	Balanced

Dichotomized outcomes have been multiplied by 100 for the period effect estimates to display percentage-point changes. Cluster-robust standard errors at the individual level. ***p < 0.01, **p < 0.05, *p < 0.1

However, H2 might not hold in vacations times, where time use might vary from working weeks. To test whether and to what extent our results are affected by responses taken during school vacation, we include an indicator, which is equal to one if the week in which respondents have been invited to participate in the survey contained two or more school vacation days, and zero otherwise. In the HOPP study, respondents were divided into four groups that then were invited to the survey at weekly intervals (during the monthly panel up until August 2020) or bi-weekly intervals (during the subsequent bimonthly waves). The survey invitation week was hence exogenously set. Note also that school vacations in Germany vary by federal state, which introduces another source of exogenous variation. Information on respondents' federal state was collected first in the November/December 2020 wave. Consequently, observation numbers are somewhat lower for this additional robustness exercise. Overall, 34.7 percent of observations in our main sample stem from interviews administered in vacation weeks. Table 5 reproduces our main results, now including the additional indicator of school vacations. We find no relevant or statistically significant effect of being surveyed during school holidays.

Table 5 Postlockdown dynamics of parental division of childcare. School vacation influence. Source: IAB High-Frequency Online Personal Panel (HOPP), own calculations

	(1)	(2)	(3)
Pre-Covid-19 (ref.)			
June 2020	− 0.144***	− 0.151***	− 0.172***
	(0.046)	(0.046)	(0.062)
July 2020	− 0.162**	− 0.095*	− 0.152**
	(0.073)	(0.056)	(0.067)
August 2020	− 0.080	− 0.065	− 0.110*
	(0.059)	(0.049)	(0.059)
Surveyed in school vacation week	0.071	− 0.007	0.003
	(0.061)	(0.043)	(0.050)
Female respondent	0.277***		
	(0.074)		
Constant	3.702***	3.866***	3.900***
	(0.063)	(0.029)	(0.037)
Individual FE	No	Yes	Yes
No. individuals	547	547	221
N	1566	1566	884
Sample	Unbalanced	Unbalanced	Balanced

Parental division of childcare measured on a 5-point scale from 1 "entirely father" to 5 "entirely mother". "Surveyed in school vacation week" is an indicator equal to one if the week respondents have been invited to participate in the survey contained two or more school vacation days, and zero otherwise. Cluster-robust standard errors at the individual level. ***p < 0.01, **p < 0.05, *p < 0.1

5.2 Overall dynamics: extended time period

The analyses employing an extended panel up until January/February 2021 largely confirm our main results,

Table 6 Postlockdown dynamics of parental division of childcare. Extended panel period. Source: IAB High-Frequency Online Personal Panel (HOPP), own calculations

	(1)	(2)	(3)
Pre-Covid-19 (ref.)			
June 2020	− 0.125***	− 0.132***	− 0.220***
	(0.032)	(0.032)	(0.071)
July 2020	− 0.068	− 0.114***	− 0.198***
	(0.042)	(0.038)	(0.065)
August 2020	− 0.023	− 0.044	− 0.115*
	(0.042)	(0.035)	(0.061)
September/October 2020	− 0.043	− 0.026	− 0.082
	(0.044)	(0.037)	(0.057)
November/December 2020	0.015	− 0.030	− 0.071
	(0.043)	(0.037)	(0.061)
January/February 2021	− 0.078	− 0.123***	− 0.154*
	(0.050)	(0.044)	(0.079)
Female respondent	0.255***		
	(0.053)		
Constant	3.714***	3.868***	3.896***
	(0.043)	(0.023)	(0.045)
Individual FE	No	Yes	Yes
No. individuals	1147	1147	182
N	4244	4244	1274
Sample	Unbalanced	Unbalanced	Balanced

Parental division of childcare measured on a 5-point scale from 1 "entirely father" to 5 "entirely mother". Cluster-robust standard errors at the individual level.
***p < 0.01, **p < 0.05, *p < 0.1

albeit based on a more limited sample size in the balanced panel. The results displayed in Table 6 additionally reveal that by September/October 2020, parental division of childcare has fully returned to its prepandemic levels.

Interestingly, by January/February 2021, we observe the recurrence of a small shift toward a greater paternal share of childcare. This shift is clearly associated with Germany's second (less restrictive) Covid-19 lockdown with school and daycare closures in most federal states starting mid-December 2020. There has been a clear and sizeable drop in daycare utilization by January/February 2021 (see Fig. 3). This second shift becomes statistically significant when individual fixed effects are included and is somewhat smaller in size than the shift we observe for June 2020 with respect to the prepandemic situation (0.12–0.15 versus 0.13–0.17 points on a 6-point scale). Overall, these longer-term dynamics underscore the impression that the observed (small) shifts emerge temporarily out of necessity and fade as soon as the necessity vanishes.

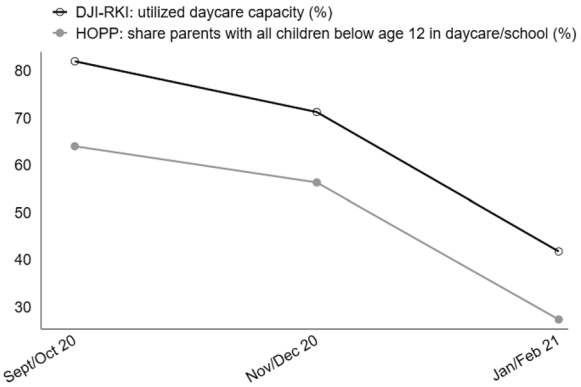

Fig. 3 Daycare/school utilization in Germany in late 2020 and early 2021. Source: DJI-RKI (2021, p.62, Fig. 24); IAB High-Frequency Online Personal Panel (HOPP), own calculations. Notes: Utilized daycare capacity represents the share of children who are currently attending daycare among those children currently registered at daycare facilities. DJI-RKI (2021) reports these shares weekly based on communications of daycare facilities registered in the "KiTa Register" (approximately 3 percent of daycare facilities in Germany); we subsequently aggregate those shares to represent bimonthly averages

5.3 Childcare dynamics by work-care arrangements during the lockdown

We now turn to determining the drivers of the shift toward paternal childcare with respect to lockdown-specific work-care arrangements, as denoted in Eq. (2) in Sect. 4.[13] Tables 5 and 6 show the postlockdown dynamics with respect to the intra-couple division of childcare for mothers and fathers, respectively.

Figure 4 graphically displays the maternal group-specific dynamics in childcare division based on OLS results from the unbalanced panel. As a first result, we identify the group of mothers with more than 20 actual working hours per week who cannot work remotely as potential candidates to show significant shifts toward stronger paternal participation in childcare. From the cross-sectional perspective, it becomes evident that the lower the level of mothers' paid work involvement is, the less symmetrical their pre- and postpandemic childcare division is within the household.

Next, we provide a regression-based test to verify the aforementioned shift. We focus on the individual fixed effects regressions presented in Columns 2 and 3 in Table 7. It becomes evident that the main dynamics indeed stem from the group of mothers who work more than 20 actual working hours per week without any possibility of working from home, while mothers

[13] These analyses are based on our main sample due to the limited group-specific observation numbers in the extended sample.

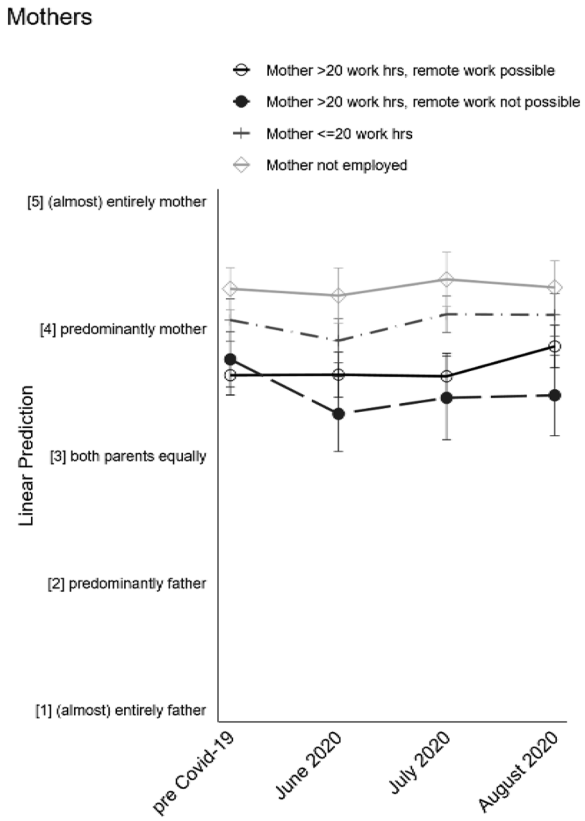

Fig. 4 Overall postlockdown dynamics of the parental division of childcare by mothers' lockdown-specific work arrangements. Source: IAB High-Frequency Online Personal Panel (HOPP), own calculations. Notes: This figure plots group-specific period effects based on regression results presented in Column 1 of Table 7

who work similar hours but *can* work remotely show no significant shifts. That is, H3 is confirmed for mothers. Note that these two groups of mothers are rather similar in their division of childcare prepandemic (see Fig. 4), which indicates that this result is unlikely to be driven by selection into remote work. The shift toward increased paternal caregiving for mothers who *cannot* work from home amounts on average to 0.440 (0.704) points on the 5-point scale (ranging from 1 "*entirely father*" to 5 "*entirely mother*") for the unbalanced (balanced) sample by June 2020 and decreases to 0.252 (0.472) by August (becoming statistically insignificant for the unbalanced sample). None of the remaining groups of mothers shows significant persistent changes in the division of childcare with respect to the prepandemic situation.[14] The indication that working from home does not bring a relief for mothers fits into the results for parental stress based on the first HOPP wave in May, according to which mothers who worked from home in the week before the survey had an above-average likelihood of reporting an increase in parental stress compared to the total of mothers and a higher likelihood of doing so than did fathers who worked from home (Fuchs-Schündeln and Stephan 2020). The OLS regression results on the unbalanced panel (Column 1 of Table 7) support the relevance of maternal time availability for the postpandemic (a)symmetry of childcare division.

Although we cannot accurately model the reduction in working hours before and after the pandemic, it can be assumed that a notable portion of women fell below this hours threshold due to the crisis. According to the *Böckler-Erwerbspersonen-Befragung*, the mean actual working hours of mothers with children in need of care declined from 31 pre-COVID to 24 in April (WSI 2020). In May 2020, 22 percent of male and 19 percent of female employees subject to social insurance contributions were in short-time work (Kruppe and Osiander 2020). Moreover, mothers had higher odds of being suspended from work during the early phase of the lockdown than men (Möhring et al. 2021), and mothers were more strongly affected by the significant decline in marginal employment between 31 March 2019 and 31 March 2020 (Deutsche Rentenversicherung Knappschaft Bahn-See and Minijobzentrale 2020a) and during the second quarter of 2020 (Deutsche Rentenversicherung Knappschaft Bahn-See and Minijobzentrale 2020b).

For fathers, Fig. 5 graphically displays the group-specific dynamics in childcare division based on OLS results from the unbalanced panel. Here, we may tentatively identify the groups of unemployed fathers and fathers with a maximum of 20 actual weekly working hours as the main potential candidates to show significant shifts toward increased male caregiving.

However, the regression results, including individual fixed effects (Columns 2 and 3 of Table 8), reveal that all groups of fathers contribute equally to a shift toward increased male childcare participation. The size of the shift oscillates at approximately 0.2 and seems to be rather stable over time. Temporarily, in June 2020, fathers who worked more than 20 hours weekly but were not able to work from home did not participate in the shift. The fact that a father's work arrangement seems to have played no role in the dynamics over time contradicts hypothesis H3 for fathers. Analogous to mothers, we would have expected a negative association of fathers being offered telework with the maternal share on the overall childcare burden. H3 focuses on these dynamics over time and not on the differences between groups. Note, however, that the OLS results retrieved from the unbalanced panel (Column 1) show that working less

[14] The only temporary and marginally significant improvement—for June only in the unbalanced sample—refers to mothers with less than 20 weekly work hours.

Table 7 Mothers—Postlockdown dynamics in parental division of childcare by lockdown-specific work arrangements. Source: IAB High-Frequency Online Personal Panel (HOPP), own calculations

	(1)	(2)	(3)
Pre-Covid-19 (ref.)			
June 2020	0.004	0.011	− 0.120
	(0.085)	(0.084)	(0.154)
July 2020	− 0.009	0.020	− 0.120
	(0.101)	(0.085)	(0.140)
August 2020	0.227**	0.147*	0.060
	(0.099)	(0.085)	(0.123)
Mother > 20 work hrs, remote work possible (ref.)			
Mother > 20 work hrs, remote work not possible	0.125		
	(0.136)		
Mother ≤ 20 work hrs	0.434***		
	(0.116)		
Mother not employed	0.679***		
	(0.116)		
June 2020 × Mother > 20 work hrs, remote work not possible	− 0.432**	− 0.440**	− 0.704*
	(0.185)	(0.184)	(0.363)
July 2020 × Mother > 20 work hrs, remote work not possible	− 0.294	− 0.321*	− 0.351
	(0.214)	(0.176)	(0.314)
August 2020 × Mother > 20 work hrs, remote work not possible	− 0.510**	− 0.252	− 0.472**
	(0.204)	(0.162)	(0.210)
June 2020 × Mother ≤ 20 work hrs	− 0.166	− 0.186*	− 0.016
	(0.111)	(0.109)	(0.178)
July 2020 × Mother ≤ 20 work hrs	0.054	− 0.104	0.006
	(0.136)	(0.113)	(0.168)
August 2020 × Mother ≤ 20 work hrs	− 0.186	− 0.127	0.054
	(0.144)	(0.117)	(0.155)
June 2020 × Mother not employed	− 0.057	− 0.053	0.253
	(0.120)	(0.120)	(0.197)
July 2020 × Mother not employed	0.083	0.088	0.120
	(0.164)	(0.164)	(0.242)
August 2020 × Mother not employed	− 0.216	− 0.149	− 0.060
	(0.153)	(0.137)	(0.183)
Constant	3.630***	3.926***	4.028***
	(0.079)	(0.029)	(0.048)
Individual FE	No	Yes	Yes
No. individuals	554	554	141
N	1386	1386	564
Sample	Unbalanced	Unbalanced	Balanced

Dependent variable parental division of childcare measured on a 5-point scale from 1 "entirely father" to 5 "entirely mother". Cluster-robust standard errors at the individual level. ***p < 0.01, **p < 0.05, *p < 0.1

than 20 hours a week is significantly associated with higher paternal childcare involvement in the cross-sectional perspective. While this result is in line with that for mothers, things are different for nonemployment. Paternal nonemployment is not significantly associated with parental childcare division.

6 Conclusion

Overall, albeit our findings indicate that childcare arrangements show a striking degree of stability during the pandemic, we can observe at least temporary shifts for childcare but not for other forms of unpaid work. The main driver for the observed small shifts toward

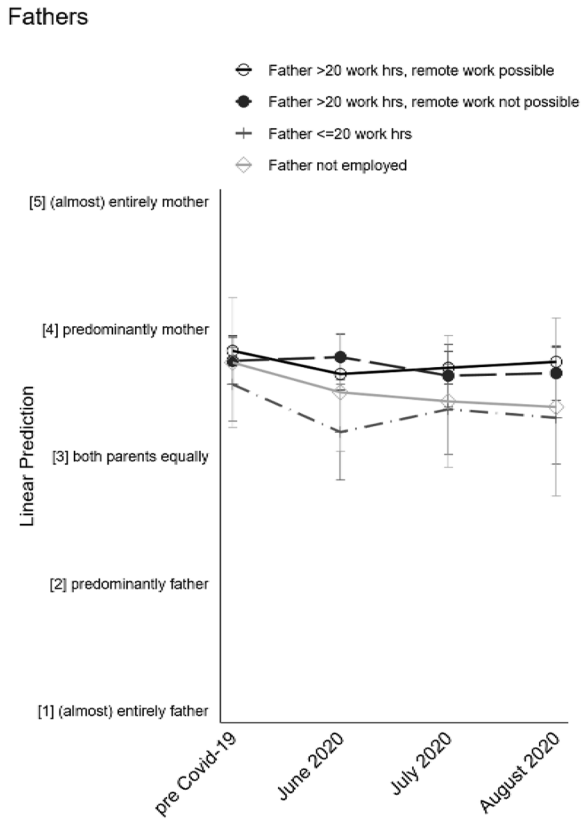

Fig. 5 Overall postlockdown dynamics of parental division of childcare by fathers' lockdown-specific work arrangements. Source: IAB High-Frequency Online Personal Panel (HOPP), own calculations. This figure plots group-specific period effects based on regression results presented in Column 1 of Table 8

increased paternal childcare participation consists of mothers with relatively intense labor market participation who cannot work from home. None of the work-care arrangement groups of fathers can be clearly identified as a main driver. Taken together, our findings suggest that the small shift we observe is a shift that emerged out of *necessity* (since mothers cannot take over childcare) and not out of *opportunity* (of remotely working fathers and/or fathers with reduced hours). Hence, such a shift is likely to fade once the necessity vanishes. That is, in the context of a pronounced asymmetry in childcare division along the lines of prepandemic routines, stimuli are only short-lived. Our results therefore neither support the notion of a retraditionalization nor of an equalization of unpaid work among genders. Rather, they emphasize the overwhelming role of the initial conditions, which force a reset of childcare arrangements as soon as the emergency vanishes.

Our results are in line with some previous findings but different from others. We confirm the 'stability notion' made by Globisch and Osiander (2020) based on the first two waves of our data; however, with our longer time horizon, we are able to trace the fading-out of the stimulus until August 2020. Different from Hank and Steinbach (2021), we do not find shifts at the extremes of the distribution. As expected (H2), neither couples with previously egalitarian arrangements nor those in which the mother was entirely responsible show significant dynamics over time in our study. Furthermore, although our results build on previous findings that observed an increased involvement of fathers during the pandemic, our data indicate that a respective shift in childcare division toward a more equal divide faded out in the months thereafter; with the only group persistently showing a slight shift being the couples in which the mother was previously predominantly responsible but where the father was already somewhat engaged. Apparently, these couples underwent a supportive change in relative resources and/or followed sufficiently egalitarian role models. This once more points to the crucial role of policies supporting an active role of women on the labour market, from the outset and throughout career stages.

Regarding the role of telework, our findings support previous results stating that maternal telework does not decrease the childcare burden for mothers but rather entails an increase (Fuchs-Schündeln and Stephan 2020). The finding that paternal telework is not per se linked to a higher paternal childcare share is in contrast to earlier studies that in this case find a lower likelihood of sole maternal care (Zoch et al. 2021) or a decreased maternal share of the overall childcare burden (Hank and Steinbach 2021). These deviations may be due to methodological differences. However, the finding in Hank and Steinbach (2021) holds only in a situation where it was the father alone who switched to remote work. This is in line with our conclusion that the remote work of fathers plays no role per se but is important only through its association with maternal behavior. Derndorfer et al. (2021) report a similar finding for Austria.

There are some significant limitations of our study. First, due to a lack of information on the couple's work constellation before and during the lockdown, we do not observe parents' relative resources in a direct manner; we are confined to the assumption that they are proxied by the actual childcare division. Second, the results for mothers who worked a high number of hours and had no opportunity to work from home could to some extent be affected by social desirability reporting bias. In the context of

Table 8 Fathers—Postlockdown dynamics in parental division of childcare by lockdown-specific work arrangements. Source: IAB High-Frequency Online Personal Panel (HOPP), own calculations

	(1)	(2)	(3)
Pre-Covid-19 (ref.)			
June 2020	− 0.182***	− 0.185***	− 0.208*
	(0.055)	(0.055)	(0.113)
July 2020	− 0.133*	− 0.192***	− 0.153
	(0.076)	(0.066)	(0.101)
August 2020	− 0.087	− 0.181***	− 0.222**
	(0.070)	(0.065)	(0.096)
Father > 20 work hrs, remote work possible (ref.)			
Father > 20 work hrs, remote work not possible	− 0.078		
	(0.111)		
Father ≤ 20 work hrs	− 0.263*		
	(0.159)		
Father not employed	− 0.092		
	(0.266)		
June 2020 × Father > 20 work hrs, remote work not possible	0.211**	0.205**	0.173
	(0.085)	(0.084)	(0.157)
July 2020 × Father > 20 work hrs, remote work not possible	0.016	− 0.007	− 0.026
	(0.147)	(0.132)	(0.145)
August 2020 × Father > 20 work hrs, remote work not possible	− 0.010	− 0.015	− 0.135
	(0.127)	(0.117)	(0.152)
June 2020 × Father ≤ 20 work hrs	− 0.193	− 0.190	− 0.246
	(0.200)	(0.200)	(0.265)
July 2020 × Father ≤ 20 work hrs	− 0.063	0.039	− 0.029
	(0.202)	(0.171)	(0.156)
August 2020 × Father ≤ 20 work hrs	− 0.176	− 0.064	0.040
	(0.223)	(0.186)	(0.201)
June 2020 × Father not employed	− 0.051	− 0.077	− 0.042
	(0.260)	(0.265)	(0.437)
July 2020 × Father not employed	− 0.172	− 0.175	− 0.347
	(0.358)	(0.313)	(0.578)
August 2020 × Father not employed	− 0.262	0.059	− 0.278
	(0.407)	(0.463)	(0.577)
Constant	3.826***	3.804***	3.783***
	(0.060)	(0.029)	(0.049)
Individual FE	No	Yes	Yes
No. individuals	516	516	115
N	1272	1272	460
Sample	Unbalanced	Unbalanced	Balanced

Dependent variable parental division of childcare measured on a 5-point scale from 1 "entirely father" to 5 "entirely mother". ***p < 0.01, **p < 0.05, *p < 0.1

traditional gender roles, this is the only work arrangement in which a decreased level of maternal childcare involvement might be socially tolerated. The insensitivity of paternal work arrangements with respect to childcare involvement perfectly fits into this notion.

Appendix

See Table 9.

Table 9 Demographic characteristics of two-parent families with at least one child below age 12 in the household in our balanced HOPP sample and in the German Microcensus 2019. Source: 2019 German Microcensus SUF (https://doi.org/10.21242/12211.2019.00.00.3.1.0). IAB High-Frequency Online Personal Panel (HOPP), own calculations

	(1) MZ, weighted	(2) HOPP, balanced sample, unweighted	(3) Difference (2)-(1)
Female	0.501 (0.500)	0.550 (0.498)	0.049
Age 18–29	0.103 (0.303)	0.038 (0.192)	− 0.065***
Age 30–39	0.492 (0.450)	0.513 (0.500)	0.021
Age 40–49	0.354 (0.478)	0.376 (0.485)	0.022
Age 50 +	0.051 (0.220)	0.073 (0.260)	0.022
Age youngest child in household	4.478 (3.481)	5.202 (3.316)	0.724***
Child aged 0–3 in household	0.473 (0.450)	0.384 (0.487)	− 0.089***
No. children age < 18 in household	1.831 (0.845)	1.748 (0.695)	− 0.083
N (individuals)	60,580	258[a]	

Children's age in HOPP data calculated as of 2020 based on annual year-of birth information

[a] Age information is only available for $N = 234$ individuals. The p-value of the two-sample t-test for equal means (Column 3) is indicated as: ***p < 0.01, **p < 0.05, *p < 0.1

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Declarations

Competing interests
The authors declare that they have no competing interests.

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