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# Workin' moms ain't doing so bad: Evidence on the gender gap in working hours at the outset of the COVID-19 pandemic

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**Abstract**

**Objective:** In this project, we study changes in the working hours of men and women with and without children in the early phase of the COVID-19 crisis in Germany until August 2020.

**Background:** The COVID-19 outbreak in Europe led to a sharp decrease in economic activity, along with temporary closures of childcare facilities and schools. Subsequent changes in working hours in the early phase of the pandemic and during summer 2020 may have contributed to inequalities between men and women or parents and non-parents respectively.

**Method:** We use a unique panel dataset containing monthly survey data of the Institute for Employment Research (the IAB-HOPP) combined with administrative data of the German Federal Employment Agency. We run regression models with the change in working hours (before the crisis vs. working time at each panel wave) as the dependent variable and gender, parental status, and childcare arrangement as the main independent variables.

**Results:** We observe a comparable reduction in working hours for both men and women during the spring lockdown. However, only the working hours of women recover and return to their pre-crisis level in summer 2020. Most surprisingly, having children has an accelerating effect on recovery for mothers but not for fathers. At the end of the observation period, fathers do not recover as fully as mothers do.

**Conclusion:** These results challenge concerns about a temporary or possibly persistent 're-traditionalisation' of gender roles during the COVID-19 crisis.

**Key words:** IAB-HOPP, corona, labour market participation, gender, motherhood penalty

## 1. Introduction

In Germany, as in most countries, COVID-19 has led to a sharp drop in economic activity and working hours. This decrease was due to lower labour demand, as public and private life was considerably restricted. For example, in the first so-called 'lockdown' from mid-March to mid-May, there were restrictions in many spheres of economic life. Non-essential shops, restaurants, and bars as well as personal services, such as hairdressers, had to close. In addition, families faced an increase in childcare responsibilities, as schools and day care facilities also had to close for several weeks in spring 2020.

Previous findings regarding the impact of the COVID-19 crisis on the working hours of men and women—or mothers and fathers respectively—in Germany are ambiguous regarding the effect of these restrictions. Early studies using non-representative samples indicate that mothers reduced their working hours during the spring lockdown to a greater extent than men (Allmendinger 2020; Bünning et al. 2020; Möhring et al. 2020a; Hammerschmid et al. 2020). However, other studies report that fathers reduced their working hours more strongly than mothers (Frodermann et al. 2020; Globisch & Osiander 2020; see also Fuchs-Schündeln & Stephan 2020; Bujard et al. 2020).

Most of the aforementioned research has been limited to the period during the lockdown and shortly thereafter. In contrast, in this paper, we use a unique panel dataset containing monthly survey data on a random sample drawn from the social security data of the Federal Employment Agency (the IAB High-frequency Online Personal Panel—HOPP). We compare the working hours of men and women—or mothers and fathers respectively—before, during, and after the spring 2020 lockdown in Germany, with our most recent data covering August 2020. In doing so, we are particularly interested in the recovery phase after the first lockdown, thereby going beyond previous research on gender and family differences in working hours, which was limited to the spring lockdown.

In our analyses, we find that working hours initially dropped for men and women with and without children. However, during summer, women recovered more rapidly than men did, with mothers even returning to their pre-crisis level of working hours. In contrast, until August 2020, fathers' average working hours did not fully recover. Hence, the gender gap in working hours decreased. This is true notwithstanding the fact that, on average, men still work substantially more hours than women do.

## 2. Background

### *2.1 The so-called spring lockdown 2020 in Germany and labour market policies*

Immediately after the World Health Organization declared the COVID-19 outbreak a global pandemic on March 11, 2020, the German federal and state governments introduced several measures to reduce the further spread of the coronavirus, which profoundly restricted public and private life. The government introduced social distancing regulations and closed schools and childcare facilities on March 12. However, for workers in so-called 'essential occupations', emergency childcare was provided with strict eligibility criteria. The German

government further tightened social distancing regulations. These included restrictions of public life, such as the closure of most shops, the closure of public spaces, and the (re-)introduction of controls at the national borders. In addition, the government introduced strong contact restrictions in public and private life, which affected citizens' leisure activities and restricted meeting with others. The government extended these initial measures twice until the beginning of May. After seven weeks, the government lifted the first restrictions. As of May 4, hairdressers and shops re-opened, and schools started restricted on-site teaching, e.g., teaching in rotating classes. The common term in Germany for this period from mid-March 2020 to mid-May 2020 is the first 'lockdown'—a terminology we also apply in this paper.[1]

In summer 2020, many of the previous restrictions were relaxed step by step. Thus, the government lifted restrictions, such as restrictions regarding the workplace or regarding gatherings with larger numbers of people, restaurants, bars, and hotels re-opened, and people were able to resume many sports and leisure activities.

Concomitant with the restrictions, the government applied several policy measures to buffer the economic shock in spring 2020. The most prominent among these is the short-time work allowance ('Kurzarbeitergeld'), which has played a particularly important role in preserving employment during the COVID-19 crisis. Applying this measure, companies might reduce their employees, working hours in part or in full without changing or terminating their employment contract. Companies apply for this benefit at the employment agency, and—if granted—it replaces 60% (or 67% for employees with dependent children) of the net income lost. Diverging from the usual regulation, the replacement rate for those drawing on short-time work allowance for a longer period of time was increased to 70%/77% from month four and 80%/87% from month seven onwards.

After the beginning of the COVID-19 crisis, many companies applied for short-time work allowance, with a peak in April, with 6.0 million people covered, and 5.7 million people in May. Numbers were particularly high in strongly affected industries, e.g., the airline industry, travel agencies, and the hotel and catering industries, where the number of affected employees peaked at 60% to 70% in April and May 2020. Numbers dropped in summer to 4.5 million in June, 3.3 million in July, and 2.6 million in August (Destatis 2021a). Possibly due to the generous provision and uptake of short-time work allowance, registered unemployment during the first lockdown until summer 2020 remained low, between 5.8% in April and 6.4% in August 2020 (up from 5.3% in March; Destatis 2021b). Beyond the possibility of applying for short-time work allowance, employers and employees could agree to reduce working hours in different ways. These include reductions in overtime or of remaining leave accumulated before the lockdown or a temporary reduction in working time without applying for short-time work allowances. Moreover, not all companies monitor working time, implying that it is possible that employees have worked less hours without official agreements with their employer.

1 Given the type and extent of the German measures, one may rather use the term 'shutdown'. However, in the German public and political discourse, the term 'lockdown' became widely accepted and was also used to refer to later measures, e.g., shop, childcare and school closures, and the strict contact restrictions during winter and spring 2020/2021.

## 2.2 Theoretical considerations and hypotheses

Public discourse and early research on gender inequalities created by the pandemic argued that women and mothers are hit harder by the crisis and take longer to recover than men (and fathers) (e.g., for Germany: Allmendinger 2020; Kohlrausch & Zucco 2020; Rude 2021; Lott & Zucco 2021). There are several explanations for this pattern. The two main types of explanations are (1) labour market and employment-related explanations and (2) explanations referring to increased childcare duties. In addition, we discuss another perspective, referring to (3) changing working conditions (which may actually exert a stronger effect on men's working hours).

*Labour market and employment-related explanations* usually argue that the lockdown had a more severe effect on women than it had on men due to women's overrepresentation in the service sector, hospitality, and retail (Hammerschmid et al. 2020). As the social distancing measures during the spring lockdown severely affected these sectors, women may have lost more working hours than men. Moreover, women were not substantially more often affected by short-time work or unemployment in the time between March and June 2020. Rather, continuous furlough—i.e., a temporary suspension from work by the employer—was more common among women (Möhring et al. 2021).

However, females also work more often in so-called 'system-relevant occupations', e.g., in the food-retail or health sector, which implies that they might actually have had to extend their working hours. Should this be the predominant effect, we would observe a smaller reduction in working hours for women than for men.

*Explanations referring to increased childcare duties* draw on the fact that having children is a major factor that influences working hours. This is particularly relevant for women, who—due to the 'traditional' distribution of childcare duties in many families—are still responsible for the greater share of domestic and care work. Consequently, even before the pandemic, mothers worked fewer hours than did childless women, whereas fathers worked more hours than did childless men (e.g., Aisenbrey et al. 2009).

Hence, due to the increased childcare and home-schooling commitments for both younger and older children as well as the substantial increase in housework during the COVID-19 lockdown (e.g., Hudde et al. 2021), women—and mothers, in particular—may have reduced their working time more than men.

The effects of the COVID-19 shock might outlast the immediate lockdown situation, resulting in a permanent reduction in working hours for women—either because they themselves decide not to return to their pre-crisis working time or because employers are not willing to re-adjust women's working hours to their earlier level. If this should occur, the gender gap that increased during the early pandemic would remain stable thereafter, and men would recover more quickly from reduced working hours. However, such a re-traditionalisation might be less likely to occur for parents who, before the crisis, were already pursuing a less gendered, less traditional childcare arrangement, e.g., one relying on full-time childcare, allowing both parents to work full-time.

Finally, *changing working conditions* may also explain changes in working hours. The most obvious change in working conditions is that working from home has become more common. In April 2020, 26% of German workers were entirely working from home, while 35% worked either from home or combined remote work and on-site work (Schröder et al.

2020, Möhring et al. 2020b) compared to less than 4% working fully from home and 12% frequently doing so in 2018 (Alipour et al. 2020). Zoch et al. (2021) report that in April 2020, fathers were far more likely to work from home than mothers. In addition, as men on average spend more time commuting than women (e.g., Nisic & Abraham 2015), they should have gained more time by working from home than women. Due to more flexible and autonomous work and less commuting, overtime hours might be avoided, and as a result, actual working hours of men may decrease to a greater extent than those of women.

In addition to employees' decisions regarding how to allocate working hours, we have to consider the employer side as well, as the pandemic did not affect all industries in the same way, and many firms introduced short-time work. However, we refrain from forming hypotheses on these issues but rather include information about previous and current employment in the empirical analyses.

## *2.3 Previous research*

Previous research regarding the impact of the COVID-19 crisis on working hours in Germany is ambiguous. Early studies using non-representative samples indicate that the increasing demand for childcare and domestic work generated by the crisis had a stronger impact on the working hours of women and mothers (Allmendinger 2020; Bünning et al. 2020; Möhring et al. 2020a; Hammerschmid et al. 2020). In contrast, Reichelt et al. (2020) found no gender difference in the reduction of working hours in Germany using YouGov data.

Other researchers analysed survey data on employees in the IAB-Linked Personnel Panel (LPP), which was conducted online in April and May 2020, and found a reduction in working hours for both genders (Frodermann et al. 2020). Surprisingly, they found the strongest reduction for fathers, who reduced their working hours from 42 to 36 hours, while mothers reduced their working time from 31 to 28 hours (Frodermann et al. 2020: 8).

Early results from the IAB-HOPP, the same dataset we use in our analyses, which were limited to observations until June 2020, also show that both men and women reduced their working hours in spring. However, these results also indicate that the reduction was greater for men than for women (Globisch & Osiander 2020: 3; see also Fuchs-Schündeln & Stephan 2020). The results of another study confirm this greater loss in working hours for men in the early phase of the COVID-19 crisis: Bujard et al. (2020) compare average working hours (including commuting time) from the German Internet Panel (GIP) conducted in 2018 with data from the Mannheim Corona Study (MCS) gathered in April 2020. They report that men's daily working hours decreased from 9.6 to 7.4 hours, whereas women's working time fell from 8.3 to 7.0 hours. For fathers, the reduction was even higher, with 2.4 hours less than before COVID-19, compared to mothers, who worked only 0.8 hours less than before (Bujard et al. 2020: 36ff).

A recent study goes beyond these snapshot measures of working hours in April and May 2020 and covers working hours until October 2020 (Lott & Zucco 2021). Lott and Zucco use data from the HBS labour force survey conducted in April, June, and November 2020. The survey gathers retrospective information on working hours. Before the COVID-19 crisis, fathers reported the highest working hours (41 hours), followed by men without children (40 hours), women without children (36 hours) and mothers, who reported the

lowest working hours (31 hours). For all groups, working hours decreased substantively during the spring lockdown, and there was a recovery over the summer. However, Lott and Zucco do not observe a full recovery for any of these groups by October 2020: fathers reported 39 working hours, men without children 38, women without children 33, and mothers 28.

Nevertheless, we can conclude that forecasts predicting that gender inequality would increase during the course of the pandemic and that mothers, in particular, would withdraw from the labour market did not receive consistent empirical support in the literature. Therefore, we look more closely at how working hours changed from the immediate shock in spring 2020 until the relaxation of the lockdown during summer 2020. In doing so, we conduct multivariate analyses to consider differences in the employment situations of men and women with and without children under age 15 in Germany.

## 3. Data and methods

### *3.1 Data and sample*

In this study, we use the High-frequency Online Personal Panel '*Life and Work Situations in Times of Corona*' (IAB-HOPP; Haas et al. 2021) conducted by the Institute for Employment Research (IAB). For this dataset, IAB researchers drew a random sample from the Integrated Employment Biographies (IEB)[2], using the end of 2018 as the sampling date. We employ the first four waves of the IAB-HOPP, which include monthly data gathered between May and August 2020. The data cover information on topics such as employment, family life, life satisfaction, and their development during the COVID-19 pandemic. To provide information on the situation prior to the COVID-19 outbreak, the questionnaires included retrospective questions. Moreover, the survey asked respondents to provide consent to link the survey information to administrative data from the IEB. The IEB covers detailed individual-level information on (un)employment history from social security records. Information in the IEB data is currently available for the period until the end of 2018.

As we used some of the IEB variables for our analyses (e.g., to obtain information on employment history), we constrained our sample to people who gave their consent to this type of data linkage. We also excluded individuals with missing information on important covariates. Moreover, we use data only from persons who participated in all four panel waves and were employed before the lockdown, working at least one hour per week. We

2 The IEB covers all persons to whom one of the following applies: persons employed in a job in which they were subject to social security contributions or were marginally employed; persons who received unemployment benefit I or unemployment benefit II; persons who were registered as jobseekers with the Federal Employment Agency; or persons who participated in an active labour market policy measure. Therefore, civil servants and self-employed persons are underrepresented in the data (self-employed persons might be included in the data if they were registered either as unemployed or as jobseekers or were in dependent employment on the sampling date). Regarding consequences of the COVID 19-crisis for atypical workers, such as solo self-employed, see Sperber et al. (2021).

trimmed the sample to exclude outliers who reported working more than sixty hours per week (less than 3% of the sample). As we are interested in the working population, we further restricted the sample to people who were sixty-five years old or younger and to people who were not on parental leave at any point during our period of observation. The latter would, due to reasons unrelated to the COVID-19 crisis, result in a reduction in working time that might affect our results. These restrictions leave us with a sample of 1,411 persons. The loss of cases in comparison to the full sample is mostly due to panel attrition over the four waves.

We apply weighted analyses to reduce potential bias resulting from panel attrition and the sample selection processes. As the standard weights would not be ideal for this aim, we apply specifically tailored weights. These weights were calculated following the procedures described in Volkert et al. (2021) and cover three different factors: inclusion probabilities, participation probabilities, and calibration. However, in contrast to calculating specific participation probabilities in each wave in the second weighting step, our weights were calculated by modelling a single selection step, modelling the specific probability to be part of our analysis sample.

As the restrictions we apply to our sample also exclude persons who lost their job during the early phase of the COVID-19 crisis, the analyses might be subject to a sample selection issue, particularly if our variables of interest influence the likelihood of leaving the sample due to unemployment. However, the share of respondents in our sample that became unemployed during the first four panel waves is low—approximately 3%. Nevertheless, we examine this issue as part of our sensitivity analyses (see section 3.3 below).

## *3.2 Variables*

As a measure of economic activity, we use individual self-reported working hours, i.e., actual working time including overtime.[3] To assess the development of working time—i.e., the lockdown-induced initial drop in working hours in spring 2020 and the subsequent development until August 2020—we calculate the difference between each of the four waves and the pre-COVID-19 level. Consequently, the dependent variable is the wave-specific difference between current working hours and those before COVID-19. Negative values indicate a reduction in working hours, and positive values indicate an increase in working hours.

The main independent variables are gender and being a parent, which we defined as having at least one child under the age of 15.[4] As only 22% of the persons in our sample are

3 Wording in the questionnaire: '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.' (Original question in German: 'Und wenn Sie an Ihre letzte Arbeitswoche denken: Wie viele Stunden haben Sie tatsächlich gearbeitet, einschließlich regelmäßig geleisteter Überstunden, Mehrarbeit usw.? Hinweis: Wenn Sie keine feste Arbeitszeit haben, geben Sie die durchschnittlichen Stunden über mehrere Wochen ein.'). For the question about working time before COVID-19, the questionnaire wording was very similar. Wording of the question taken from wave 1.

4 To improve readability of the paper, we use the terms 'mothers' and 'women with children under 15 years of age' as well as 'fathers' and 'men with children under 15 years of age' interchangeably. Likewise, on occasion,

parents of children younger than 15, we do not further differentiate by the number of children or between different age groups. The average age of the youngest child is approximately 8 years for women and 7 years for men. 9% of our respondents have a youngest child that is 6 years old or younger. 13% of our respondents have a youngest child that is 7 to 14 years old.

Another key factor involves the use of external childcare. Actually, the use of external childcare might indicate two things. For one, it might indicate an increase in childcare duties during the lockdown, as parents had to take care for their children themselves since nurseries, after-school day care facilities or comparable institutions had to close. Moreover, we might also interpret the extent to which a family relies on external childcare as an indicator of how non-traditional the care arrangement is. After all, people rely on childcare for a reason, and thus, we would assume the percentage of dual-earner families to be substantially higher among those relying on full-time childcare than among those that do not.

To measure the use of external childcare, we employ pre-COVID-19 information. The data cover different types of childcare arrangements by grandparents, schools, day care centres, or others. The IAB-HOPP collected this information using a summary-question referring jointly to all children of the respondent under the age of 15. We distinguish between no use or only part-time use of childcare on the one hand and full-time use of childcare during all five days of the working week on the other. As the information is from before the COVID-19 pandemic, it is a pre-crisis measure. In addition, we control for other sociodemographic variables, namely, for having a partner in the first wave, age and age squared, migration background (defined as having at least one parent who was born abroad), and education. For the education measure, we used the 2011 International Standard Classification of Education (ISCED). As 51% of the persons in our sample have a high education level (ISCED level 6 or higher), we created the following categories: 1-3 (lower education), 4-5 (intermediate-high education) and 6 or higher (high education).

As we analyse an employment-related research question, we control for people's employment histories using IEB records. We include the number of years a person spent in contributory employment (including apprenticeship) between 2014 and 2018 as well as the number of years he or she spent in marginal employment during this time. In addition, we also included a dummy variable indicating whether someone ever registered as unemployed between 2014 and 2018.

As the influence of the COVID-19 pandemic on the employment situation varied substantially across industries—and with men and women often working in different industries—controlling for the industry effect is crucial. To this end, we use the share of employees in short-time work in a particular industry and in a particular wave to control for this industry-specific influence. We calculated this share using information on employment in two-digit industries of the Classification of Economic Activities (WZ-08; StatBA 2021a) and short-time work in two-digit industries provided by the Statistics Department of the Federal Employment Agency (StatBA 2021b). We drew information on the industry that

we use the term 'non-mothers' to refer to 'women without children or with children that are 15 years or older' and the term 'non-fathers' to refer to 'men without children or with children that are 15 years or older'.

respondents were working in before COVID-19 from the IEB records using information on respondents' last job (in 2017 or 2018).

In addition, we account for home-office work before COVID-19. As this information is only available in waves one and four and only from those who responded that they currently had the option to work from home, we assume that those without such an option during the crisis would not have had the option before either.

We present descriptive statistics for all variables in Table A.1 in the Appendix.

### *3.3 Methods*

Throughout our analyses, we employ different model specifications. To analyse the development of working hours, i.e., the initial drop and the recovery period, we run separate OLS regressions on the specific working hour differences in each wave. Even though the analysis relies on longitudinal data, we decided not to use fixed effects models, as our variables of interest are time-invariant.

Using robust standard errors, we regress the difference in working hours on gender and being a parent of a child under 15 as well as on the control variables. These are age, age squared, educational attainment, migration background, having a partner, working from home before COVID-19, share of employees in short-time work in a particular industry, and several indicators of respondents' employment history (2014-2018). Moreover, we add an interaction term between gender and the parent variable to assess potential differences in the gender effect for people with and without children under 15.

In a further step, we calculate a second set of models. In these models, we distinguish between those with children under 15 that did not use childcare or did use it only part-time on the one hand and those that relied on full-time childcare on the other. Moreover, to examine gender-specific effects of childcare, we include interaction terms between gender and childcare use.

Finally, in our sensitivity analyses, we account for potential sample selection issues that might result from respondents losing their job (instead of merely reducing working hours). To do so, we run a Heckman selection model (Heckman 1976) without exclusion restrictions, as variables that influence the likelihood of job loss but do not influence working hours are hard to find.[5] The models in Table A.2 do not show sample selection to be an issue.

## 4. Results

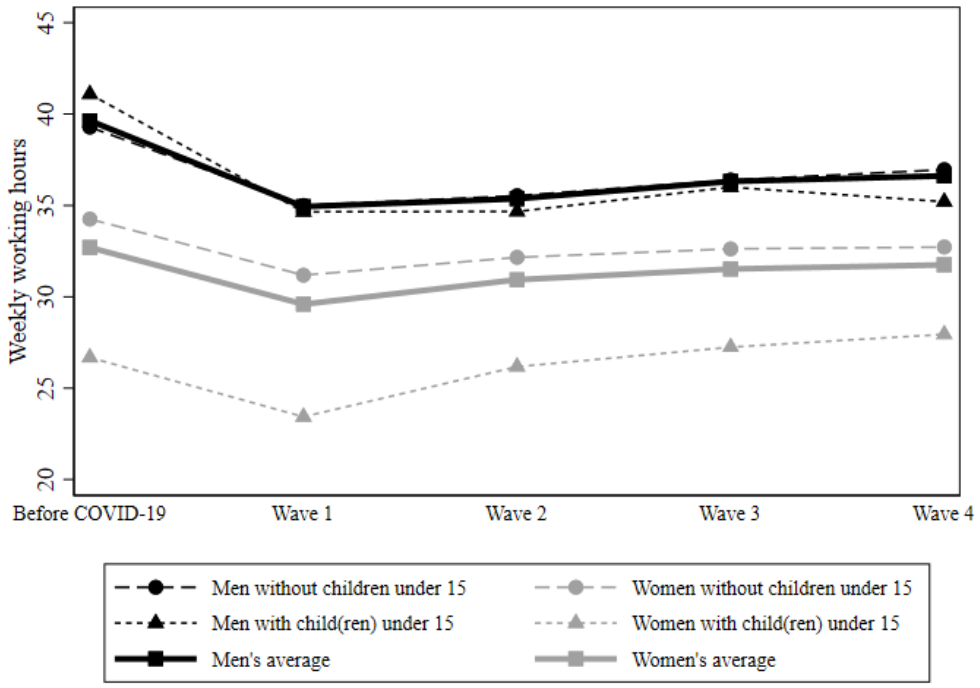
### *4.1 Working hours over time by gender and parental status*

As a first step, we provide a descriptive overview of the average working hours of men and women and their development over the spring 2020 lockdown. We present overall graphs

5 We employ the `heckman` command in Stata 16.0 using the default maximum likelihood estimator (`mle`).

and graphs that differentiate by whether respondents have children under 15 or not. We present the descriptive results in *Figure 1*. Considering the gender differences in average working hours, men consistently work more hours than women. The lockdown in spring 2020 affected men and women to a similar degree as for both genders, average working hours decreased substantially during the early phase of the COVID-19 crisis (solid lines). For men, this reduction was from 39.6 hours before the pandemic to 34.9 hours in wave 1. For women, the corresponding figures are 32.7 hours before the pandemic and 29.6 hours in wave 1. However, during the summer, women's average working hours recovered to a greater extent than did men's—to 31.7 hours (women) and 36.6 hours (men) in wave 4.

*Figure 1*: Development of working hours over time by gender and parental status




*Source:* IAB-HOPP (2020), authors' calculations, weighted results.
*Note:* Wave 1: May, Wave 2: June, Wave 3: July, Wave 4: August

Moreover, having young children who require attendance during the lockdown seems to have different effects for men and women. The pre-crisis working hours of men with children under 15 ('fathers') were somewhat higher than those of men without children or with only older children ('non-fathers') (41.1 hours, dotted black line, compared to 39.3 hours, dashed black line). In the first three waves, both groups of men reported similar working hours. However, at the end of our observation period, fathers had substantially reduced their working hours, while the working hours of non-fathers decreased to a lesser extent (35.2 hours for fathers vs. 37.0 hours for non-fathers in wave 4). This implies that the fatherhood premium was lost during the crisis.

In contrast, being a mother of young children has a substantial effect on women's working hours (grey lines): while women without children under 15 ('non-mothers'; dashed grey line) on average worked for 34.3 hours per week, the average working time of women with children under 15 ('mothers') was only 26.7 hours (dotted grey line). However, their summer recovery pattern was much better, with them actually being the only group that recovered completely by wave 4 (to 28.0 hours).

In sum, these descriptive findings do not support the hypothesis that the crisis has hit mothers hardest. While mothers worked the lowest average number of hours before the crisis, they showed the fastest recovery thereafter. While these results are of high relevance for both, policy-makers and labour market research, we want to point out that they are inherently descriptive, with the causal mechanisms behind these developments being difficult to assess. To address this limitation to some extent, we conducted supplementary analyses that regress an individual-level indicator of being on short-time work on gender, having children and all individual-level controls (compare Table A.3 in the appendix). This follows the argument that men might be on short-time work more often, suggesting that the higher reduction was mostly involuntary. However, while we do see these differences at the descriptive level, our results from a linear probability model (LPM) reveal that there is no difference once we control for the industry-specific percentages of short-time work. In this regard, the gender difference we observe in our multivariate analyses cannot be explained by the higher share of men being forced to work short-time.

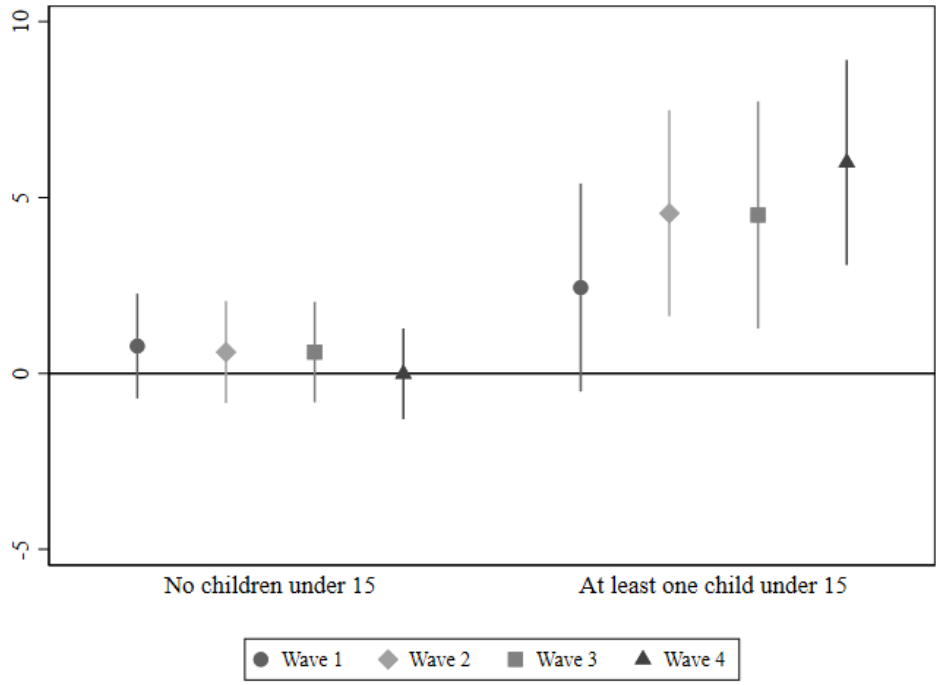
In a second step, we analyse gender differences in multiple regression models including the aforementioned control variables. *Figure 2* shows marginal gender effects from these regressions.[6] The figure shows the effect of being female on the difference in working hours from the pre-crisis level in each wave.

The results in Figure 2 correspond to the patterns we found in our descriptive analyses. The figures display marginal effects, i.e., the effect of being female given that the person belongs to the respective group (no child under 15, children under 15). There is no significant effect for women without children under 15 years compared to men without children under 15 (left panel). This is with regard neither to the initial drop in wave 1 nor to later recovery (waves 2 to 4). In contrast, we observe a significant positive effect for mothers of children under 15 compared to fathers for waves 2 to 4 (right panel). The absolute effects are non-negligible in size. For waves 2 and 3, they suggest that women with

6 Table A.4 in the appendix displays the full models. For comparative purposes, we also calculated unweighted models, presented in Table A.5. As a sensitivity check, we calculated models for men and women separately. Results showed similar patterns to those presented in this paper. These results are available upon request.

at least one child below 15 have reduced their working time by five hours less compared to men with at least one child below 15.

*Figure 2*: Marginal effects and 95% confidence intervals of being female on the difference in working hours in a particular wave compared to pre-COVID-19 working hours by parental status



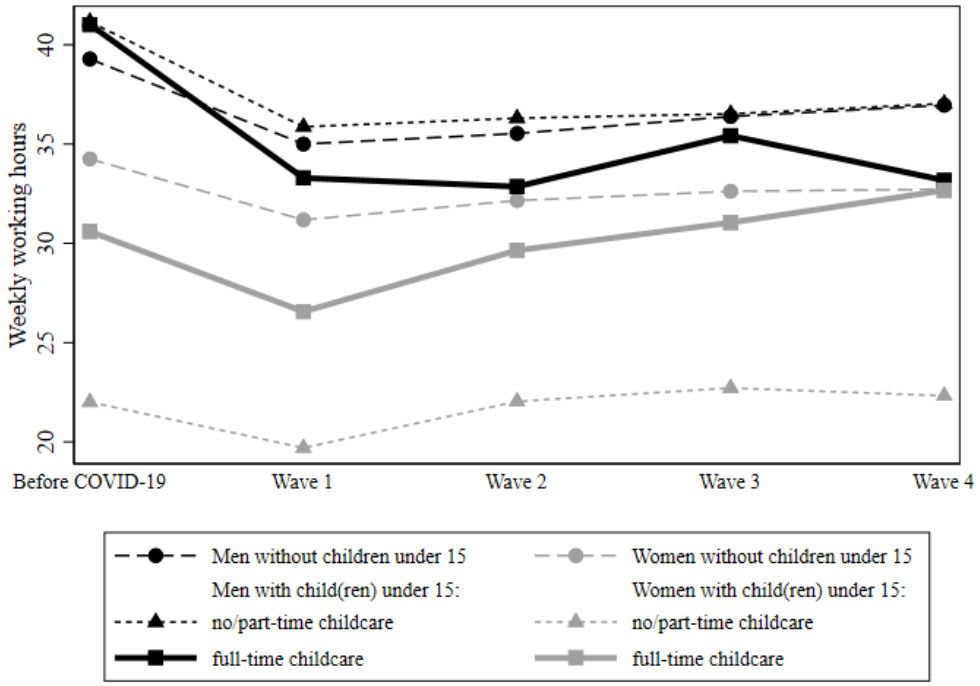

*Source:* IAB-HOPP (2020), authors' calculations, weighted results.
*Note:* Wave 1: May, Wave 2: June, Wave 3: July, Wave 4: August
All models control for age, squared age, education, migration background, having a partner, working from home before COVID-19, short-time work share across industries, and respondents' employment history (2014-2018).

In other words, the gender gap remained unchanged for people without young children, but gender inequality in the working hours of people with young children decreased during the pandemic due to the significantly better recovery of mothers. The similarity between the descriptive and multivariate findings suggests that the observed patterns are not driven by observable differences between men and women, such as the possibility of working from home or the industry sector.

## 4.2 *Working hours over time by gender, parental status and pre-crisis childcare*

In our conceptual discussion in section 2, we assumed that previous childcare arrangements play a role in parents' working time adjustments during the course of the COVID-19 crisis. *Figure 3* shows the average working hours of men and women by pre-crisis childcare arrangements.

*Figure 3*: Development of working hours over time by gender, parental status and pre-crisis childcare arrangement




*Source:* IAB-HOPP (2020), authors' calculations, weighted results.
*Note:* Wave 1: May, Wave 2: June, Wave 3: July, Wave 4: August

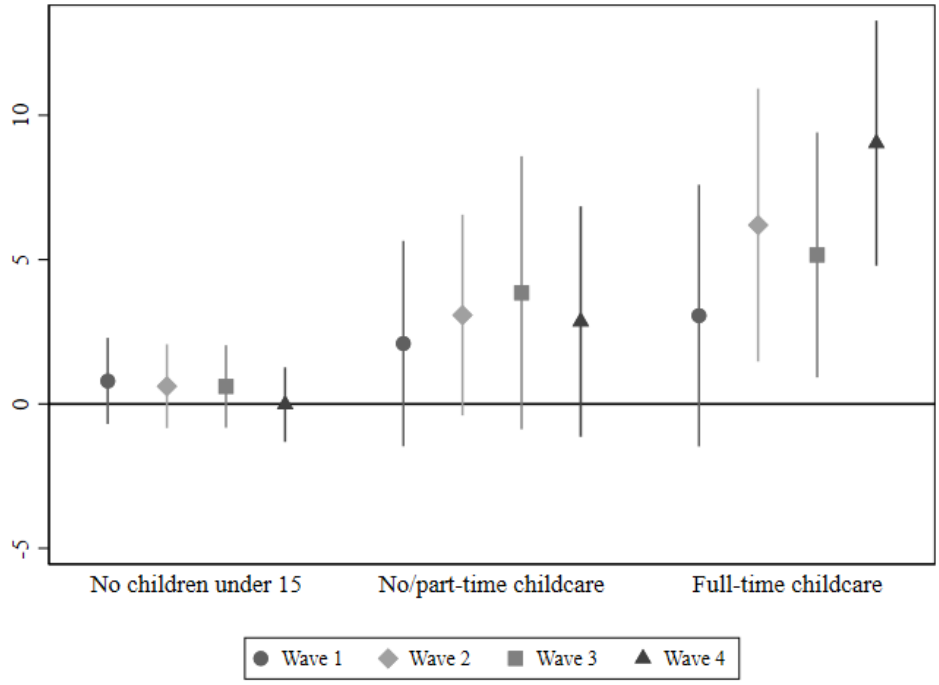
First, looking at fathers and mothers of children under 15 who used full-time childcare before the COVID-19 crisis (solid lines), we find considerable differences: men using full-time childcare substantially reduced their working hours over time (from 41.0 hours before the crisis to 33.2 in wave 4) and did not recover to their pre-crisis level. In contrast, for women who relied on full-time childcare before the crisis, average working hours also decreased in spring. However, after the spring lockdown was relaxed, their average hours quickly returned to their pre-crisis level (from on average 30.6 hours before the crisis to 26.6, 29.7, 31.0, and 32.7 hours in waves 1, 2, 3, and 4, respectively).

The reduction in working hours in wave 1 is less pronounced for fathers who used no or part-time childcare (dotted black line) and men without children under 15 (dashed black

line) than for fathers relying on full-time childcare. After wave 1, their working time increases during summer without returning to the original working hours level. Women without children under 15 show a similar pattern: after an initial drop, the average working time stabilises over the summer but does not return to its original level (34.3 hours before the crisis, 32.7 hours in wave 4).

In contrast, mothers with no or part-time childcare (dotted grey line) work the fewest hours. However, they also fully recover by August 2020 (22.0 before COVID-19, 22.3 in wave 4).

*Figure 4*: Marginal effects and 95% confidence intervals of being female on the difference in working hours in a particular wave compared to pre-COVID-19 working hours by parental status and pre-crisis childcare arrangement




*Source:* IAB-HOPP (2020), authors' calculations, weighted results.
*Note:* Wave 1: May, Wave 2: June, Wave 3: July, Wave 4: August
All models control for age, age squared, education, migration background, having a partner, working from home before COVID-19, short-time work share across industries, and respondents' employment history (2014-2018).

*Figure 4* supports these descriptive results with regression results showing the differences between current and pre-COVID-19 working hours separately for each wave,

including several control variables.[7] The figure presents marginal effects for the gender difference in the three groups distinguished above (no children under 15, children under 15 with no or part-time childcare, children under 15 with full-time childcare). As the left panel of Figure 4 shows, there are no significant gender differences for those without or with only older children. The same holds for gender differences among those with children under 15 and no or part-time childcare (middle panel), even though effect sizes are considerably larger. In contrast, among those with children under 15 who used full-time childcare before the COVID-19 crisis (panel on the right), males and females differ significantly and consistently over the entire recovery period (waves 2 to 4).

As with our earlier results, these positive effects for females arise from two parallel processes: a substantial and consistent reduction in working hours among fathers and a quick recovery of initial losses in working hours for mothers. These processes are particularly pronounced among parents who relied on full-time childcare, i.e., in families in which mothers most likely had a strong affiliation with the labour market before the outset of the pandemic.

There are at least two potential explanations for such a pattern. One is that men's and women's jobs were differently affected by the crisis, and as a result, women were able to return to their workplace earlier. This would also be consistent with results reporting that while women entered short-time work earlier than men, for them, it had a more transitional character (Möhring et al. 2021). While our models include some variables to control for such differences, we cannot be sure whether there are other relevant differences that we are unable to control.

A second—and not necessarily alternative—explanation is that in these households, which, for the most part, should be dual earner families, men assumed responsibility for a larger part of family duties over the course of the lockdown, thus allowing women to resume working earlier.

Based on our data, it is hard to judge which of these explanations is responsible for the patterns observed and to what degree. In any case, given these results, it is difficult to argue that, with respect to working time, the pandemic affected women more strongly than men.

## 5. Summary and conclusions

Our results confirm previous research indicating that working hours decreased remarkably for men and women during the COVID-19 lockdown in spring 2020. Going beyond previous research, our results also show that women—and mothers, in particular—recovered more quickly, with mothers even returning to their pre-crisis employment level in summer 2020. Most surprisingly, while having children has an accelerating impact on recovery for mothers, the opposite seems to be true for fathers, who do not recover as fully as mothers do.

7 Table A.6 in the appendix displays the full models. For comparative purposes, we also calculated unweighted models, presented in Table A.7. Sensitivity analyses calculated for men and women separately show patterns that are similar to the ones found in the models presented in this paper. The models calculated for the sensitivity analyses are available from the authors upon request.

Both the drop in average working hours for both genders and the female recovery pattern indicate that employers' and employees' flexible adjustments of working time have been successful in buffering the unforeseen lockdown situation in spring 2020. This also allowed women to return to their previous level of working hours. For men, we do not observe the same recovery. However, given their overall high working hours (on average approximately 40 hours per week) before the COVID-19 pandemic, at least part of men's reduction in working hours could result from a cut in overtime work and a reduction in actual working hours to the contractually fixed hours.

In summary, these results challenge concerns about a temporary or possibly even a persistent 're-traditionalisation' of gender roles during the COVID-19 crisis. Thus, in Germany, the notion that the recession caused by the pandemic mainly comes at the expense of females ('shecession', cf. Alon et al. 2021) does not hold true, at least during the early phase of the pandemic that we examined here.

With regard to the gender gap in working hours, our results instead indicate that the pandemic has *decreased* gender inequality among parents due to a greater reduction in fathers' than in mothers' working hours and due to fathers' slower recovery of working hours until August 2020. This pattern was particularly pronounced for those who used full-time childcare before the COVID-19 crisis. Hence, fathers may have scaled back their working hours to meet new and greater caregiving demands due to the closure of schools as well as kindergartens, nurseries, and other childcare facilities. Fathers may also have maintained this new arrangement of working hours after these facilities reopened. Thus, if the possibility of working from home should persist after the pandemic, it may have long-lasting effects on gender inequalities in couples' work and childcare arrangements. However, our results are fairly general and consider all children under 15, regardless of their exact age. Future research might further investigate whether these results apply to all age groups in the same way or whether there are more fine-grained gender differences with respect to the age of children.

While these findings seem to be quite optimistic from a gender perspective, it is hard to predict whether the COVID-19 crisis will lead to a persistent change in gender roles and altered working conditions. First, it must be considered that the crisis is not even over yet. At the end of our observation period, there was still an exceptionally high number of employees who received short-time work allowance, and further COVID-19 waves were anticipated. Second, in contrast to previous developments in male and female employment participation, the developments discussed in this paper do not arise from structural changes, e.g., changing gender roles or advances in the availability of childcare facilities. Instead, they arise from a temporary and historically unique situation. With levels of economic activity returning to their pre-crisis levels, it seems at least possible that families may return to their pre-crisis arrangements and that there will again be a more gendered division of paid and unpaid labour. Third, and relatedly, the causal mechanisms behind the reduction in gender inequality remain unclear. While the multivariate results do not appear to be driven by the higher share of men being forced to work short-time, it is still possible that the causal mechanisms are connected to the special situation of the lockdown and lose their relevance afterwards.

However, the COVID-19 crisis may still become a milestone in the pursuit of gender equality, creating opportunities for sustainable change in gendered employment patterns.

In short, our results challenge concerns about a short-term or medium-term increase in gender inequalities, but the long-term consequences are still an open question that we must leave for future research.

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# Appendix

*Table A.1*: Descriptive statistics of the analysis sample (unweighted, N= 1,411)

| Variable | mean/share | standard dev. | minimum | maximum |
|---|---|---|---|---|
| Working hours per week (pre-crisis) | 36.70 | 9.93 | 3 | 60 |
| Working hours per week (Wave 1) | 33.04 | 12.65 | 0 | 60 |
| Working hours per week (Wave 2) | 33.93 | 11.71 | 0 | 60 |
| Working hours per week (Wave 3) | 34.60 | 11.71 | 0 | 60 |
| Working hours per week (Wave 4) | 34.58 | 11.85 | 0 | 60 |
| Short-time work share in industry (Wave 1) | 15.96 | 14.70 | 0.09 | 72.08 |
| Short-time work share in industry (Wave 2) | 13.10 | 12.70 | 0.06 | 66.76 |
| Short-time work share in industry (Wave 3) | 10.13 | 10.73 | 0.08 | 63.60 |
| Short-time work share in industry (Wave 4) | 10.13 | 10.73 | 0.08 | 63.60 |
| Female | 0.51 | 0.50 | 0 | 1 |
| Age | 47.47 | 10.90 | 19 | 65 |
| Age squared | 2372.53 | 993.81 | 361 | 4225 |
| Migration background | 0.11 | 0.31 | 0 | 1 |
| Education: ISCED 1-3 | 0.27 | 0.44 | 0 | 1 |
| Education: ISCED 4-5 | 0.23 | 0.42 | 0 | 1 |
| Education: ISCED 6 or higher | 0.51 | 0.50 | 0 | 1 |
| Partner | 0.71 | 0.45 | 0 | 1 |
| Child(ren) under 15 | 0.22 | 0.42 | 0 | 1 |
| No or part-time use of childcare | 0.11 | 0.32 | 0 | 1 |
| Full-time use of childcare | 0.11 | 0.32 | 0 | 1 |
| Worked from home before COVID-19 | 0.32 | 0.47 | 0 | 1 |
| Emp. hist.: Duration in employment (2014-2018) | 4.36 | 1.27 | 0 | 5 |
| Emp. hist.: Duration in marginal employment (2014-2018) | 0.34 | 1.01 | 0 | 5 |
| Emp. hist.: Registered as unemployed (2014-2018) | 0.11 | 0.31 | 0 | 1 |

*Source:* IAB-HOPP (2020), authors' calculations.

*Table A.2*: Heckman selection model and OLS regression with dependent variable 'difference in working hours between the time before COVID-19 and the respective wave'

| | Wave 1 | | Wave 2 | |
|---|---|---|---|---|
| | Heckman | OLS | Heckman | OLS |
| Observations | 1,457 | 1,411 | 1,457 | 1,411 |
| Main | | | | |
| Female | 0.680 | 0.655 | 1.299* | 1.275* |
| | (0.515) | (0.533) | (0.507) | (0.518) |
| Pre-COVID-19 use of childcare (ref. no children under 15) | | | | |
| No or part-time access to childcare | 0.790 | 0.833 | 0.254 | 0.298 |
| | (0.866) | (0.791) | (0.850) | (0.736) |
| Full-time access to childcare | -1.071 | -1.005 | -0.594 | -0.527 |
| | (0.872) | (0.858) | (0.856) | (0.971) |
| Partner | 0.091 | 0.060 | 0.065 | 0.034 |
| | (0.585) | (0.601) | (0.573) | (0.587) |
| Age | 0.100 | 0.074 | 0.245 | 0.219 |
| | (0.218) | (0.231) | (0.214) | (0.203) |
| Age squared | -0.001 | -0.001 | -0.003 | -0.003 |
| | (0.002) | (0.003) | (0.002) | (0.002) |
| Education (ref. ISCED 1-3) | | | | |
| ISCED 4-5 | 1.499* | 1.460* | 0.641 | 0.601 |
| | (0.721) | (0.722) | (0.707) | (0.720) |
| ISCED 6 or higher | 1.584** | 1.556* | 0.625 | 0.596 |
| | (0.611) | (0.664) | (0.599) | (0.641) |
| Migration background | 0.107 | 0.145 | 0.697 | 0.735 |
| | (0.796) | (0.807) | (0.781) | (0.768) |
| Short-time work share in industry | -0.181*** | -0.179*** | -0.201*** | -0.200*** |
| | (0.017) | (0.022) | (0.020) | (0.024) |
| Duration in employment (2014-2018) | -0.045 | -0.090 | -0.291 | -0.337 |
| | (0.254) | (0.247) | (0.249) | (0.215) |
| Duration in marginal employment (2014-2018) | -0.049 | -0.033 | 0.069 | 0.085 |
| | (0.282) | (0.281) | (0.277) | (0.245) |
| Registered as unemployed (2014-2018) | -0.256 | -0.152 | -1.898* | -1.790* |
| | (0.834) | (0.814) | (0.819) | (0.832) |
| Constant | -4.411 | -3.665 | -4.648 | -3.884 |
| | (4.456) | (4.661) | (4.379) | (4.054) |

*Table A.2*: Heckman selection model and OLS regression with dependent variable 'difference in working hours between the time before COVID-19 and the respective wave' (continued)

| | Wave 3 | | Wave 4 | |
|---|---|---|---|---|
| | Heckman | OLS | Heckman | OLS |
| Observations | 1,457 | 1,411 | 1,457 | 1,411 |
| Main | | | | |
| Female | 1.234* | 1.215* | 1.113* | 1.084* |
| | (0.522) | (0.532) | (0.512) | (0.514) |
| Pre-COVID-19 use of childcare (ref. no children under 15) | | | | |
| No or part-time access to childcare | 0.254 | 0.288 | 0.864 | 0.916 |
| | (0.875) | (0.899) | (0.858) | (0.786) |
| Full-time access to childcare | 0.064 | 0.115 | 0.398 | 0.476 |
| | (0.882) | (0.953) | (0.865) | (0.923) |
| Partner | 0.344 | 0.319 | 0.114 | 0.076 |
| | (0.590) | (0.598) | (0.579) | (0.594) |
| Age | 0.030 | 0.010 | -0.063 | -0.094 |
| | (0.221) | (0.227) | (0.216) | (0.203) |
| Age squared | -0.000 | -0.000 | 0.001 | 0.001 |
| | (0.002) | (0.002) | (0.002) | (0.002) |
| Education (ref. ISCED 1-3) | | | | |
| ISCED 4-5 | -0.578 | -0.610 | -1.107 | -1.155+ |
| | (0.728) | (0.720) | (0.714) | (0.690) |
| ISCED 6 or higher | -0.057 | -0.080 | -1.096+ | -1.130+ |
| | (0.618) | (0.606) | (0.606) | (0.594) |
| Migration background | 1.046 | 1.075 | 1.232 | 1.278+ |
| | (0.804) | (0.736) | (0.789) | (0.690) |
| Short-time work share in industry | -0.185*** | -0.184*** | -0.186*** | -0.184*** |
| | (0.024) | (0.028) | (0.024) | (0.028) |
| Duration in employment (2014-2018) | -0.437+ | -0.473* | -0.221 | -0.276 |
| | (0.258) | (0.224) | (0.252) | (0.213) |
| Duration in marginal employment (2014-2018) | -0.348 | -0.335 | -0.007 | 0.012 |
| | (0.285) | (0.296) | (0.280) | (0.222) |
| Registered as unemployed (2014-2018) | -0.813 | -0.731 | -0.218 | -0.091 |
| | (0.845) | (0.937) | (0.828) | (0.736) |
| Constant | 0.537 | 1.120 | 2.188 | 3.095 |
| | (4.523) | (4.563) | (4.429) | (4.038) |

(continued)

*Table A.2*: Heckman selection model and OLS regression with dependent variable 'difference in working hours between the time before COVID-19 and the respective wave' (continued)

| | Wave 1 | | Wave 2 | |
|---|---|---|---|---|
| | Heckman | OLS | Heckman | OLS |
| Selected into sample | | | | |
| Female | 0.225 | | 0.221 | |
| | (0.163) | | (0.162) | |
| Pre-COVID-19 use of childcare (ref. no children under 15) | | | | |
| No or part-time access to childcare | -0.551+ | | -0.556+ | |
| | (0.314) | | (0.315) | |
| Full-time access to childcare | -0.771** | | -0.770** | |
| | (0.279) | | (0.279) | |
| Partner | 0.315+ | | 0.332+ | |
| | (0.181) | | (0.183) | |
| Age | 0.231*** | | 0.229*** | |
| | (0.058) | | (0.059) | |
| Age squared | -0.003*** | | -0.003*** | |
| | (0.001) | | (0.001) | |
| Education (ref. ISCED 1-3) | | | | |
| ISCED 4-5 | 0.349 | | 0.368 | |
| | (0.233) | | (0.232) | |
| ISCED 6 or higher | 0.178 | | 0.187 | |
| | (0.174) | | (0.175) | |
| Migration background | -0.371+ | | -0.367+ | |
| | (0.210) | | (0.210) | |
| Short-time work share in industry | -0.011* | | -0.013* | |
| | (0.005) | | (0.006) | |
| Duration in employment (2014-2018) | 0.227*** | | 0.228*** | |
| | (0.058) | | (0.059) | |
| Duration in marginal employment (2014-2018) | -0.100 | | -0.103 | |
| | (0.067) | | (0.067) | |
| Registered as unemployed (2014-2018) | -0.794*** | | -0.789*** | |
| | (0.188) | | (0.187) | |
| Constant | -2.922** | | -2.918** | |
| | (1.078) | | (1.080) | |
| athrho | 0.128 | | 0.133 | |
| | (0.135) | | (0.144) | |
| lnsigma | 2.238*** | | 2.218*** | |
| | (0.019) | | (0.019) | |
| sigma | 9.376 | | 9.192 | |
| lambda | 1.192 | | 1.216 | |
| rho | 0.127 | | 0.132 | |

*Table A.2*: Heckman selection model and OLS regression with dependent variable 'difference in working hours between the time before COVID-19 and the respective wave' (continued)

| | Wave 3 | | Wave 4 | |
|---|---|---|---|---|
| | Heckman | OLS | Heckman | OLS |
| Selected into sample | | | | |
| Female | 0.218 | | 0.228 | |
| | (0.163) | | (0.163) | |
| Pre-COVID-19 use of childcare (ref. no children under 15) | | | | |
| No or part-time access to childcare | -0.531+ | | -0.544+ | |
| | (0.315) | | (0.314) | |
| Full-time access to childcare | -0.758** | | -0.755** | |
| | (0.278) | | (0.279) | |
| Partner | 0.324+ | | 0.333+ | |
| | (0.181) | | (0.182) | |
| Age | 0.228*** | | 0.226*** | |
| | (0.058) | | (0.059) | |
| Age squared | -0.003*** | | -0.003*** | |
| | (0.001) | | (0.001) | |
| Education (ref. ISCED 1-3) | | | | |
| ISCED 4-5 | 0.362 | | 0.371 | |
| | (0.232) | | (0.232) | |
| ISCED 6 or higher | 0.179 | | 0.192 | |
| | (0.174) | | (0.175) | |
| Migration background | -0.377+ | | -0.370+ | |
| | (0.210) | | (0.210) | |
| Short-time work share in industry | -0.013* | | -0.013* | |
| | (0.007) | | (0.007) | |
| Duration in employment (2014-2018) | 0.227*** | | 0.228*** | |
| | (0.059) | | (0.059) | |
| Duration in marginal employment (2014-2018) | -0.101 | | -0.102 | |
| | (0.067) | | (0.067) | |
| Registered as unemployed (2014-2018) | -0.788*** | | -0.796*** | |
| | (0.187) | | (0.187) | |
| Constant | -2.918** | | -2.908** | |
| | (1.077) | | (1.077) | |
| athrho | 0.098 | | 0.156 | |
| | (0.154) | | (0.151) | |
| lnsigma | 2.248*** | | 2.229*** | |
| | (0.019) | | (0.019) | |
| sigma | 9.465 | | 9.286 | |
| lambda | 0.924 | | 1.438 | |
| rho | 0.098 | | 0.155 | |

Standard errors in parentheses; OLS: robust standard errors. *Source:* IAB-HOPP (2020), authors' calculations, unweighted results.

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

*Note:* We do not control for 'working from home before COVID-19' in this model because due to filtering it includes valid values only for those who are selected into the sample.

*Table A.3*: Linear probability model with dependent variable 'on short-time work allowance' (individual level)—weighted

| | Wave 1 | Wave 2 | Wave 3 | Wave 4 |
|---|---|---|---|---|
| Female | -0.007 | 0.008 | 0.007 | -0.002 |
| | (0.027) | (0.026) | (0.023) | (0.021) |
| Child(ren) under 15 | 0.044 | 0.068+ | 0.090* | 0.066+ |
| | (0.039) | (0.039) | (0.037) | (0.034) |
| R2 | 0.165 | 0.162 | 0.174 | 0.169 |
| Observations | 1,323 | 1,323 | 1,323 | 1,323 |

Standard errors in parentheses. *Source:* IAB-HOPP-(2020), authors' calculations.
+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
*Note:* Only selected results shown. Controls: Age, age squared, education, migration background, having a partner, working from home before COVID-19, short-time work share across industries, and respondents' employment history (2014-2018).

*Table A.4*: OLS regression with dependent variable 'difference in working hours between the time before COVID-19 and the respective wave'—weighted

| | Wave 1 | Wave 2 | Wave 3 | Wave 4 |
|---|---|---|---|---|
| Female | 0.780 | 0.607 | 0.608 | -0.012 |
| | (0.760) | (0.739) | (0.728) | (0.657) |
| Child(ren) under 15 | -2.171 | -2.675* | -2.131 | -2.881* |
| | (1.329) | (1.362) | (1.354) | (1.336) |
| Female x child(ren) under 15 | 1.661 | 3.945* | 3.898* | 6.007*** |
| | (1.658) | (1.658) | (1.772) | (1.596) |
| Age | 0.066 | 0.321 | 0.141 | 0.036 |
| | (0.273) | (0.237) | (0.281) | (0.216) |
| Age squared | -0.000 | -0.004 | -0.002 | -0.000 |
| | (0.003) | (0.003) | (0.003) | (0.002) |
| Education (ref. ISCED 1-3) | | | | |
| ISCED 4-5 | 1.803* | 0.489 | -0.613 | -1.303 |
| | (0.884) | (0.896) | (0.908) | (0.826) |
| ISCED 6 or higher | 1.079 | 0.862 | 0.453 | -0.920 |
| | (0.840) | (0.779) | (0.706) | (0.703) |
| Migration background | 0.081 | 0.455 | 1.093 | 0.733 |
| | (1.142) | (0.978) | (0.939) | (0.816) |
| Partner | 0.017 | -0.405 | 0.219 | -0.544 |
| | (0.755) | (0.765) | (0.742) | (0.681) |
| Worked from home before COVID-19 | 1.839** | -0.453 | 0.546 | 0.146 |
| | (0.662) | (0.713) | (0.763) | (0.662) |
| Short-time work share in industry | -0.140*** | -0.189*** | -0.172*** | -0.167*** |
| | (0.027) | (0.031) | (0.033) | (0.035) |
| Duration in employment (2014-2018) | -0.168 | -0.436+ | -0.558* | -0.312 |
| | (0.260) | (0.242) | (0.252) | (0.238) |
| Duration in marginal employment (2014-2018) | 0.186 | 0.217 | -0.241 | 0.224 |
| | (0.291) | (0.278) | (0.301) | (0.234) |
| Registered as unemployed (2014-2018) | -0.228 | -2.186* | -0.413 | 0.064 |
| | (0.960) | (1.089) | (1.188) | (0.897) |
| Constant | -4.467 | -5.565 | -1.798 | 0.826 |
| | (5.260) | (4.722) | (5.595) | (4.250) |
| $R^2$ | 0.067 | 0.094 | 0.061 | 0.074 |
| Observations | 1,411 | 1,411 | 1,411 | 1,411 |

Standard errors in parentheses. Source: IAB-HOPP-(2020), authors' calculations, weighted results.
+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

*Table A.5*: OLS regression with dependent variable 'difference in working hours between the time before COVID-19 and the respective wave'—unweighted

| | Wave 1 | Wave 2 | Wave 3 | Wave 4 |
|---|---|---|---|---|
| Female | 0.300 | 0.657 | 0.616 | 0.294 |
| | (0.613) | (0.585) | (0.594) | (0.578) |
| Child(ren) under 15 | -1.100 | -1.433 | -1.336 | -1.120 |
| | (0.969) | (0.976) | (0.971) | (0.958) |
| Female x child(ren) under 15 | 1.840 | 2.587* | 2.913* | 3.518** |
| | (1.177) | (1.206) | (1.296) | (1.175) |
| $R^2$ | 0.087 | 0.091 | 0.060 | 0.062 |
| Observations | 1,411 | 1,411 | 1,411 | 1,411 |

Standard errors in parentheses. *Source:* IAB-HOPP-(2020), authors' calculations.
+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
*Note:* Only selected results shown. Controls: Age, age squared, education, migration background, having a partner, working from home before COVID-19, short-time work share across industries, and respondents' employment history (2014-2018).

*Table A.6*: OLS regression with dependent variable 'difference in working hours between the time before COVID-19 and the respective wave'—weighted

| | Wave 1 | Wave 2 | Wave 3 | Wave 4 |
|---|---|---|---|---|
| Female | 0.795 | 0.616 | 0.608 | -0.021 |
| | (0.761) | (0.740) | (0.729) | (0.659) |
| Pre-COVID-19 use of childcare (ref. no children under 15) | | | | |
| No or part-time use of childcare | -1.091 | -1.230 | -1.721 | -1.262 |
| | (1.618) | (1.488) | (1.853) | (1.561) |
| Full-time use of childcare | -3.367$^{+}$ | -4.277$^{*}$ | -2.587 | -4.674$^{*}$ |
| | (1.876) | (2.080) | (1.676) | (1.984) |
| Female x no or part-time use of childcare | 1.299 | 2.464 | 3.245 | 2.877 |
| | (1.941) | (1.887) | (2.461) | (2.088) |
| Female x full-time use of childcare | 2.266 | 5.581$^{*}$ | 4.555$^{*}$ | 9.055$^{***}$ |
| | (2.416) | (2.533) | (2.302) | (2.253) |
| Age | 0.051 | 0.316 | 0.143 | 0.054 |
| | (0.274) | (0.237) | (0.282) | (0.217) |
| Age squared | -0.000 | -0.003 | -0.002 | -0.000 |
| | (0.003) | (0.003) | (0.003) | (0.002) |
| Education (ref. ISCED 1-3) | | | | |
| ISCED 4-5 | 1.769$^{*}$ | 0.429 | -0.633 | -1.393$^{+}$ |
| | (0.883) | (0.900) | (0.910) | (0.820) |
| ISCED 6 or higher | 1.062 | 0.827 | 0.440 | -0.979 |
| | (0.842) | (0.783) | (0.710) | (0.700) |
| Migration background | 0.089 | 0.444 | 1.085 | 0.687 |
| | (1.147) | (0.978) | (0.942) | (0.814) |
| Partner | 0.014 | -0.416 | 0.214 | -0.567 |
| | (0.756) | (0.769) | (0.743) | (0.680) |
| Worked from home before COVID-19 | 1.892$^{**}$ | -0.406 | 0.554 | 0.164 |
| | (0.663) | (0.711) | (0.768) | (0.669) |
| Short-time work share in industry | -0.140$^{***}$ | -0.189$^{***}$ | -0.172$^{***}$ | -0.168$^{***}$ |
| | (0.027) | (0.031) | (0.033) | (0.035) |
| Duration in employment (2014-2018) | -0.164 | -0.447$^{+}$ | -0.565$^{*}$ | -0.347 |
| | (0.261) | (0.242) | (0.255) | (0.239) |
| Duration in marginal employment (2014-2018) | 0.150 | 0.179 | -0.250 | 0.194 |
| | (0.290) | (0.277) | (0.300) | (0.232) |
| Registered as unemployed (2014-2018) | -0.282 | -2.244$^{*}$ | -0.427 | 0.019 |
| | (0.962) | (1.094) | (1.192) | (0.900) |
| Constant | -4.101 | -5.346 | -1.799 | 0.673 |
| | (5.256) | (4.728) | (5.601) | (4.252) |
| $R^2$ | 0.069 | 0.096 | 0.061 | 0.079 |
| Observations | 1,411 | 1,411 | 1,411 | 1,411 |

Standard errors in parentheses. *Source:* IAB-HOPP-(2020), authors' calculations.
$+ p < 0.10$, $* p < 0.05$, $** p < 0.01$, $*** p < 0.001$

*Table A.7*: OLS regression with dependent variable 'difference in working hours between the time before COVID-19 and the respective wave'—unweighted

| | Wave 1 | Wave 2 | Wave 3 | Wave 4 |
|---|---|---|---|---|
| Female | 0.312 | 0.659 | 0.619 | 0.294 |
| | (0.614) | (0.586) | (0.595) | (0.579) |
| Pre-COVID-19 use of childcare (ref. no children under 15) | | | | |
| No or part-time use of childcare | -0.140 | -0.289 | -1.120 | 0.147 |
| | (1.222) | (1.106) | (1.319) | (1.173) |
| Full-time use of childcare | -2.249$^{+}$ | -2.794$^{+}$ | -1.595 | -2.624$^{+}$ |
| | (1.288) | (1.454) | (1.124) | (1.344) |
| Female x no or part-time use of childcare | 1.866 | 1.212 | 2.835$^{+}$ | 1.550 |
| | (1.432) | (1.327) | (1.681) | (1.415) |
| Female x full-time use of childcare | 2.133 | 4.127$^{*}$ | 3.050$^{+}$ | 5.600$^{***}$ |
| | (1.615) | (1.819) | (1.688) | (1.665) |
| $R^2$ | 0.089 | 0.093 | 0.060 | 0.065 |
| Observations | 1,411 | 1,411 | 1,411 | 1,411 |

Standard errors in parentheses. *Source:* IAB-HOPP-(2020), authors' calculations.
$+ p < 0.10$, $* p < 0.05$, $** p < 0.01$, $*** p < 0.001$
*Note:* Only selected results shown. Controls: Age, age squared, education, migration background, having a partner, working from home before COVID-19, short-time work share across industries, and respondents' employment history (2014-2018).

# Information in German

**Deutscher Titel**

Läuft bei Müttern: Zur Entwicklung der Geschlechterunterschiede in der Arbeitszeit während der Anfangsphase der COVID-19-Pandemie

**Zusammenfassung**

**Fragestellung:** Wir analysieren die Entwicklung der Arbeitszeit von Männern und Frauen mit und ohne Kinder in der Anfangsphase der COVID-19 Krise in Deutschland. Dabei vergleichen wir Arbeitsstunden vor und nach dem Lockdown im Frühjahr 2020.

**Hintergrund:** Der Ausbruch von COVID-19 in Europa führte zu einem erheblichen Rückgang ökonomischer Aktivitäten, der mit einer temporären Schließung von Schulen und Kindertagesstätten einherging. Die in der Folge eingetretenen Arbeitszeitveränderungen in der Anfangsphase der Pandemie und während des Sommers 2020 könnten dabei zu den Ungleichheiten zwischen Männern und Frauen bzw. Vätern und Müttern beitragen.

**Methode:** Wir verwenden einen Paneldatensatz des IAB mit monatlich erhobenen Befragungswellen (das IAB-HOPP) dessen Befragungsdaten mit Registerdaten der Bundesagentur für Arbeit verknüpft wurden. Wir schätzen Regressionsmodelle mit der Arbeitszeitdifferenz (vor der Krise vs. jeweiliger Erhebungszeitpunkten) als abhängiger Variable und mit Geschlecht, Elternschaft, und der Art der Kinderbetreuung als unabhängigen Variablen.

**Ergebnisse:** Während des Lockdowns im Frühjahr beobachten wir eine vergleichbare Reduktion der Arbeitsstunden für Männer und Frauen. Bis zum Sommer 2020 kehrt allerdings nur die Arbeitszeit der Frauen zu ihrem Vorkrisenniveau zurück. Besonders überraschend ist, dass für Mütter die Elternschaft die Rückkehr zur ursprünglichen Arbeitszeit beschleunigt, für Väter hingegen nicht. Entsprechend hat sich der Arbeitszeitumfang der Väter am Ende unseres Beobachtungszeitraums nicht im gleichen Umfang erholt wie derjenige der Mütter.

**Schlussfolgerung:** Unsere Ergebnisse stellen Befürchtungen hinsichtlich einer im Zuge der COVID-19 Krise erfolgten zeitweisen oder möglicherweise sogar dauerhaften Re-Traditionalisierung der Geschlechterrollen in Frage.

**Schlagwörter:** IAB-HOPP, Corona, Erwerbsbeteiligung, Geschlechterunterschiede, Motherhood Penalty

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