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The gendered consequences of the COVID-19 lockdown on unpaid work in Swiss dual earner couples with children

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"The gendered consequences of the COVID-19 lockdown on unpaid work in Swiss dual earner couple households" (GWO-21-228)

Response from Authors

We are very grateful for the valuable and detailed comments of the Co-Editor and Reviewers. Responding to all comments and following the suggestions, we substantially revised our paper. We believe that this led to a considerable improvement of the paper. In the following, we first respond to the general comment of the co-editor, and second we explain in detail how we responded to the comments and suggestions.

A General Response to the Co-Editor

We are very thankful that the associate editors of the special issue offered us the possibility to submit a revised version of the manuscript. Based on the comments and very helpful suggestions, we revised the manuscript substantially. This concerns:

a) *a clearer focus of our paper on parents only and an adaption of our theoretical framework including a detailed elaboration of underlying assumed mechanisms;*

b) *the concerns expressed with regard to the imputation of missing values, especially with respect to the dependent variables and the variables measured in the second (COVID-19) wave. After a long discussion in our research team, we decided that, following the suggestion of the associate editor, it would be most convincing to drop cases with missing values. Hence, for the revision of our paper, we refrained from imputing any values;*

c) *the results section. As the N of the sample was reduced and the focus of the analysis shifted to parents only, we rewrote the results section taking into account the request of the reviewers for more clarity with regard to the interpretation of our results. For that purpose, we included several figures which hopefully ease the interpretation of the coefficients; and*

d) *the conclusion which we adapted to our new findings to ensure consistency.*

Please also note that we have slightly modified the title of the paper from "The gendered consequences of the COVID-19 lockdown on unpaid work in Swiss dual earner couple households" to "The gendered consequences of the COVID-19 lockdown on unpaid work in Swiss dual earner couple households with children".

Reviewer 2

1. The manuscript is in clear need of polishing. There are many words with no spaces in between, which clearly demonstrates that the author(s) has(have) not done a final reading of the manuscript. The paper needs to be polished, and many many typos be changed.

Revising the paper, we have carefully proof-read and polished the paper.

2. Regarding the empirical analysis, after reading several times the final paragraph of page 9 about imputation of variables, I have not understood if they are imputing or not the variables of housework/care time. Please, explain it better, because if in any of the waves these variables are

fully imputed (from other waves), the analysis presented here is clearly very limited as they would not be using real data.

As already emphasized in our correspondence with the co-editor, we see the concerns raised with imputation of missing values, especially with respect to the dependent variables and the variables measured in the second (COVID-19) wave. Moreover, we realized that we did not describe the procedure well, nor specified how many cases it concerned (often only a few). We have debated this issue at length in our research team. In the end, we felt that the option suggested by the editor of dropping cases with missing values was the most convincing strategy. Hence, for the revision of our paper, we have decided to refrain from imputing any values (see section 4, p. 8).

3. Furthermore, given that they are using imputed data, the use of plain OLS models are just not correct. The author(s) need(s) to apply some type of bootstrapping to correct for imputation biases in estimations.

Given that we do not use imputed data any longer in the revised version, we saw no need for applying bootstrapping.

4. I do not understand (or the author(s) do(es) not explain properly) why in the sample of all couples they analyze care and housework together (unpaid work), while for the sample of parents care and housework are analyzed separately.

We agree with the reviewer that the approach, which we applied in the models to all couples and parents was not explained properly in the paper. In response to suggestions received from all reviewers, we have revised the paper fundamentally. In the new version, we have decided to focus only on parents as those have been affected most severely in their paid/unpaid work division due to school and childcare closures. In this context, we also dropped the analysis focusing on unpaid work as a combined measure, as this might blur possible differences between changes in time spent on housework and care work.

5. In the contribution, the author(s) highlight(s) the analysis of couples in Switzerland as a novelty in studies analyzing this topic. Given that Switzerland has traditional gender roles and attitude in society, it could be applicable in Mediterranean countries, for instance, but not for Anglo-Saxon countries, for instance. So the author(s) should indicate that their results are not of general application.

We agree with the reviewer that our results cannot be taken as universally applicable. We included a section on the context of Switzerland in our paper so that the reader can place the findings in the country context in which they were obtained. In the revised paper we explicitly underline that the findings for Switzerland cannot be generalized to all welfare systems (see section 6, p. 15).

However, we also would like to underline that although our study is based on data from only one country (with its own country characteristics), it remains the only analysis so far examining the impact of the COVID-19 lockdown measures on changes in time spent on household and care tasks among couples with children using unique prospective longitudinal data that avoid the pitfall of recall bias. To our knowledge, no other studies have been published yet in and beyond the Swiss context that examine those changes combining a pre-corona wave with a corona wave prospective data collection. In that respect we are confident that the research design of the paper contributes

to this growing research body with insight into how parents, and particularly mothers, reacted to the first lockdown measures.

6. It is not correct to assume that those who become unemployed or inactive have the same status than those working short-time of working from home. I would like to see how robust their results are if they change this assumption.

For our analyses we have discussed this issue extensively. In total only 4 respondents became unemployed and 18 inactive. As this was such a small number, it did not matter for the results whether we combined them with a group, or dropped them. Yet, we agree with the reviewer that the status of working from home / short-time is conceptually very different from being unemployed or inactive. Therefore, we decided to exclude these cases from our analyses, focusing now only on respondents who were employed in both waves.

7. In a similar way, I would like to see how robust the results are regarding the consideration of essential workers/occupations.

We share the reviewer's doubts about the essential occupation variable. In the framework of revising the paper, we also changed the focus from being in an essential occupation to working overtime. This fitted much better in our theoretical concept of lockdown measures affecting in particular the time availability of individuals. On the one hand people might have had more time available due to changes in their work status to short-time work (which might have freed rather a lot of time) or remote work (which at least saved for some people commuting time). On the other hand, we argue that people might have had less time available - in particular people working in essential occupations related to the health sector. Therefore, we decided to replace the variable of essential occupations with a self-reported measure of overtime work because of the COVID-19 pandemic.

8. Outsourcing is computed according to whether respondents received any help from outside the household. What about grandparents (a point raised in the introduction). Those receiving help from grandparents in pre-corona wave are considered as outsourcing activities.

In the paper we have clarified this issue (see section 4, p. 9). Outsourcing includes any help received from outside the household for children, housework, handicapped or elderly persons. Indeed help from outside the household includes also grandparents.

9. In Table 2 the R-squared is very low, and in Table 3 the number of observations is also low. So I am a bit skeptical about the results.

We agree with the reviewer that the number of observations in our models is limited, especially with respect to the number of variables in the model. In the revised paper we reduced the number of independent variables substantially.

Reviewer: 3

Comments to the Author

1. I have read the manuscript "The gendered consequences of the Covid-19 lockdown on unpaid work in Swiss dual earner couple households". The paper brings up a topic frequently analyzed in various countries today. Here, the focus is on the Swiss context and the authors argue that they contribute to earlier research with a more thorough test of the theories. Still, the theoretical frameworks are not discussed in detail and economic dependency, the relative resource/bargaining approach and time availability is lumped together and mentioned in passing. If the authors are serious about their theoretical contribution, a more thorough discussion would be needed here.

In the revision of our paper we address this issue by integrating the theoretical elaborations with the resulting hypothesis (see section 3, which has been completely revised). As already explained in our answer to reviewer 2 (comment 4), we also refocused our paper. Theoretically, we continue to focus on time availability and bargaining theories as well as doing gender approaches. We are now asking a) in how far the implemented lockdown measures (measured as changes in time availability) have contributed to changes in time spent on housework and care work and b) whether those effects have been different for mothers and fathers. We also develop now hypotheses separately for whether changes in time availability concern the respondent or the partner of the respondent.

2. The theoretical contribution should also be more clear in the hypotheses. In the current version, the authors set up five hypotheses, some of which seems more or less self-evident. The fact that some still are not supported is likely due to the small sample and raises more questions than it answers.

We agree with the reviewer and, as already mentioned, revised the theoretical part thoroughly. This led to the exclusion of self-evident hypotheses. Accordingly, we focus now on parents only when we can clearly assume that parents have been hit harder by the lockdown measures than non-parents. Moreover, we simplified the analyses by reducing the amount of variables and categories within variables. This partly solved the issue with respect to a small N per category. Nevertheless, our analyses remain based on a rather small sample, which reduces the statistical power. Therefore, we also consider in the discussion of our results the effect sizes of the coefficients.

3. When it comes to the data, the authors estimate two analyses, one on all couples in the data (N=1119 from 626 households) and one on parents (N=464 from 265 households). If I understand this correctly, the authors estimate the analyses on all individuals, not on households. Hence, they do not take into account that the standard errors will be biased as the similarities between two individuals from the same household is greater than what they would be in a random sample of individuals (see the N's in Table 1 and 2). In order to correct for this, the authors should either estimate a multi-level model (or minimum, use robust standard errors) or estimate the models for women and men separately. For ease of interpretation, I would suggest the latter approach.

We agree with the reviewer. In the revised version of the paper the analyses are now based on cluster-robust standard errors which takes into account that standard errors are correlated within couples.

4. When it comes to the data, it is not clear what information actually exist from the second wave; the Covid wave. Instead, it seems a lot of values are imputed and the share imputed and a clearer description of the technique used is needed in order to understand and estimate how reasonable this approach is. As an example, on p. 9, the authors say that they "imputed all independent variables using chained equations". What does this mean? Do they not have any information on the independent variables in the Covid wave? Second, they say that they "logically imputed the original time use variables from both waves using auxiliary variables from the 2019 and 2018 waves". If this means that also the values for the dependent variable is imputed for a fair share of respondents, I am not sure we have much of an analysis left and whether we can trust the results. The situation during Covid is different from a lot of things we have experienced so far and making too many assumptions about variables and their values significantly lowers the contribution here.

As the imputation has been a major concern also for reviewer 2 (see answer to point 2 of reviewer 2), we have decided to not impute any values of the dependent and independent variable in the analyses. We hope that some of the concerns of the reviewer regarding the reliability of our results can be resolved in this way. Moreover, given that we have also revised our theoretical focus of the paper in combination with a rather small N of our samples, we have also reduced the amount of variables included in the analyses.

5. When it comes to relative income, an important independent variable in the analyses, the authors use income as measured before the pandemic. This is problematic given that the relative income can have change quite substantially during the pandemic.

We agree with the reviewer that a measurement of relative income during the lockdown would have provided interesting additional information, but unfortunately, this variable was not available for the corona-wave. Nonetheless, we believe that the relative income, as measured just before the start of the pandemic, is a useful indicator: first, because measuring relative income in the corona-wave is also not ideal as the timing of the measure of relative income would coincide with the measure of housework and care time during the corona-wave. It would have made it rather difficult to interpret the analyses because of the possibility of reverse causality. Second, the measure is likely to be relatively stable given that we focused on individuals who remained employed, or moved to short-time work. The high unemployment benefits in Switzerland will have compensated loss of income due to short-time work at the onset of the pandemic. In effect, the majority of employed respondents did not indicate a change in their financial situation. Finally, for our indicator of bargaining power, we are not necessarily interested in recent pandemic-induced income fluctuations but in an indicator of the earning power, and therefore the bargaining power of the individual within the couple context. For these reasons, we think that the income measure of the pre-corona wave is appropriate for our theoretical frame and analysis.

6. Another problem is how the unemployed are categorized. They are now included in the category of short-time work or working from home. The authors argue that this should have the same effect

with respect to time-availability, an assumption that is not reasonable as working from home can consume a lot of time and even take longer (than working at the workplace) if parents are interrupted by kids who are at home for instance.

This issue has also been criticized by reviewer 2. Please see our answer to reviewer 2 point 6.

7. The indicator of gender role attitudes is measured in 2017 and builds on a somewhat strange question. I would suggest excluding this indicator, I am not sure if it is ever discussed in the results section (or maybe I just missed it).

We agree with the reviewer and have deleted this indicator from the analyses.

8. The authors discuss and include a variable for short-time work. This term needs to be defined. How many hours are short-time work? I am used to the term part-time but am assuming that short-time means something else here?

We realized that this term might be less used in the Anglo-Saxon context where the use of the term "furlough schemes" might be more common. In the context of this paper we define short-time work (also called short-time compensation) as a subsidy for temporary reductions in the number of hours worked in firms affected by temporary shocks. Short-time work programmes allow employers who experience temporary drops in demand or production to reduce their employees' hours instead of laying them off. The government compensates for 80% of the loss of pay due to reduced work hours. In the SHP corona wave a question was included asking the respondents about changes in their work situation due to the implemented lockdown measures. One answer category was short-time work without a clear indication of how many hours have been reduced. For the reader we have included a footnote on page 2. where we provide a definition of the term.

9. The descriptive section 4.1 is too thorough and long. The authors also seem to discuss a number of findings in detail that are not significant (judging from the overlapping lines in Figures 2 and 3).

We agree with the reviewer. As we focus now on parents only and two outcome variables, the section has considerably been reduced. Moreover, we explicitly mention statistical significance when interpreting the findings.

10. The discussion of the results in Tables 1 and 2 is at times difficult to follow. I suggest the authors refer to actual coefficients and rows as they discuss the models. In addition, few coefficients are significant and given the small samples, I am not sure we can trust the null-findings here.

In the framework of revising the whole paper, we have also rewritten the results section. Given that the amount and complexity of the models have been reduced, some of the difficulties in following the elaboration of the results might have been resolved as well. However, following the recommendation of the reviewer, we also refer whenever possible to the relevant model and the coefficient we are interpreting. Moreover, for the ease of interpretation, we also include visualizations of the main and interaction effects (see section 5.2, Figures 3-8 as well as Figures A1-A3 in the appendix) based on linear prediction (marginal effects).

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Keywords: gender, division of labor, COVID-19, unpaid work, family

Abstract

This article assesses the gendered impact of COVID-19 measures on changes in time, which Swiss dual earner couples spent on unpaid work, focusing on families with children. Overcoming some of the methodological shortcomings of previous studies, high-quality representative panel data allow us to examine the change in time invested in housework and childcare before and during the pandemic, and test theoretical assumptions as to the mechanisms underlying the observed patterns. Gender inequalities are explained by the couple's work division prior to, and at the onset of, the pandemic and interpreted in the light of key theoretical approaches (economics of the family, bargaining and time availability, doing gender). Our results imply that only changes in the time availability of the partner are relevant. If the spouse changed to short-time or remote work, the time investment of the respondent in housework decreased significantly. In the case of care work, the own time availability matters. In particular, parents who worked overtime did not increase the time spent on care work as other parents did. This is in line with other studies showing that the involvement in essential occupations (which often required an increase in working time) was accompanied by less time investment in unpaid work. Finally, the implemented COVID-19 measures did neither lead to an increase in patriarchal power structures nor did they foster an increase in equality for unpaid work among women and men. Instead, the results show that changes in time availability due to short-time, remote or overtime working schemes determined changes in time spent on unpaid care to a larger extent than gender alone.

1. Introduction

The division of labor between women and men is often the result of a complex and challenging negotiation process in couple households. With the underlying normative national context shaping perceptions of the appropriate role of women and men in society, the division of tasks is not an isolated process. Although research has identified a general trend towards a more equal division of labor among couples, inequality persists (Altintas and Sullivan, 2016; England, 2010; FSO, 2017; Leopold et al., 2018). Changes towards a more equal division take time. Even if women and men are willing to share tasks more equally, well-established habits,

organizational practices and social policies might hinder progress. In this context, the outbreak of the COVID-19 pandemic with its measures seeking to curtail the spread of the virus transformed social and economic life in an unprecedented fashion within a few days. In particular, couples with children at home experienced massive and rapid shifts in their established division of labor. Sudden school and daycare closures led to increased childcare duties. Moreover, couples faced reductions in working time and obligations to work from home. The disruptive effect was exacerbated by the unavailability of outsourcing options, such as the involvement of grandparents, nannies and domestic helpers who normally reduce the gender gap in labor division (e.g., Craig et al., 2016; Muth and Bondolfi, 2020; Raz-Yurovich and Marx, 2019). Due to these major disruptions and new responsibilities, families were forced to adapt and renegotiate their work and family roles.

In the scientific and public debate, two contrasting hypotheses about the impact of the COVID-19 pandemic on couple's division of labor have emerged. The *'re-traditionalization hypothesis'* claims that the pandemic is a 'patriarchal pandemic' (Allmendinger, 2020; Kreyenfeld and Züll, 2021). It is assumed that the pandemic and its accompanying measures led many couples to regress towards traditional gender roles, whereby women, and in particular mothers, are more inclined to shoulder additional housework and childcare responsibilities (Chemaly, 2020; Gonalons-Pons, 2020; Lewis, 2020; Morse and Anderson, 2020). In contrast, the *'equalizing hypothesis'* claims that the COVID-19 crisis promoted a more equal division of labor between men and women. On the one hand, this assumption rests on women's overrepresentation in essential occupations, which played a crucial role in society's response to the pandemic. On the other hand, it is pointed out that the pandemic forced many workers into short-time work[1] and required working from home. As a result, also men and fathers might have had more time at their disposal or may have spent more time at home. Considering this increased exposure to family life and the potential unavailability of the female spouse for additional domestic work, the involvement of men (and in particular fathers) in childcare and household tasks might have increased (Carlson et al., 2020; Yerkes et al., 2020; Sevilla and Smith, 2020).

While the body of research on this topic is increasing, the findings for unpaid work are inconclusive. There is some evidence that women's and particularly mothers' engagement in unpaid work has increased (Del Boca et al., 2020; Farré et al., 2020; Giurge et al., 2020; Shafer

[1] Short-time work (furlough schemes) – also called short-time compensation– is a subsidy for temporary reductions in the number of hours worked in firms affected by temporary shocks. Short-time work programs allow employers who experience temporary drops in demand or production to reduce their employees' hours instead of laying them off. The government compensates for 80% of the loss of pay due to reduced work hours.

et al. 2020). At the same time, other studies showed that the gender gap did not increase or even narrowed. While women still took on the lion's share of unpaid work, men and particularly fathers became more involved in unpaid work during the first COVID-19 lockdown (Carlson et al. 2020; Craig and Churchill, 2020; Herzberg-Druker et al., 2020; Kohlrausch and Zucco, 2020; Kreyenfeld et al., 2020). These diverse and sometimes contradictory results may be due to various factors, such as the exact population under study, the country's cultural context and its pandemic response, as well as the type of data used. The first year of the pandemic has instigated the collection of a huge amount of ad-hoc data of varying quality, from highly selective convenience samples to probability-based panel data. A crucial point of critique is that a majority of the aforementioned studies do not allow for a thorough examination of the consequences of the introduced COVID-19 measures because they lack solid pre-corona information. In the absence of comparable pre-corona data, a retrospective measurement may suffer from recall bias (Scott & Alwin, 1998). Other studies lacked the data necessary to base their analyses on explicit questions about respondent's time use. Instead, they relied on relational and retrospective questions (who did/does more childcare/housework before and during the pandemic), which are more prone to bias due to their subjective nature. Finally, and importantly, previous studies often lack information to test underlying mechanisms in the light of theoretical approaches of economic bargaining, time availability and doing gender. These parameters, however, are crucial for a better understanding of gender (in)equality arising from COVID-19 and lockdown periods.

Against this background, this article aims to assess the gendered impact of the first lockdown measures on the time spent on unpaid work in dual earner couples with children. More concretely, we examine the extent to which the bargaining position within the couple prior to the pandemic, and changes in time availability during the lockdown, affected men's and women's unpaid working time differently. The paper contributes to the literature in three ways: first, it assesses how heterosexual dual-earner couples with children have adjusted their unpaid working time during the first lockdown using high-quality representative panel data from Switzerland. The comparison of results from a pre-corona and a corona wave allows us to measure actual changes in time investment of respondents and their partners. Hence, we are able to overcome methodological shortcomings of previous studies. From a theoretical perspective, the research design allows us, second, to test more rigorously the mechanisms that determine the extent of change in unpaid work due to changes in time availability and pre-existing bargaining power, and to link them to pre-corona and corona work patterns and the

division of labor in the household (see also: Carlson et al. 2020 for the US, Jessen et al., 2021 for Germany). Finally, this is the first study for Switzerland, a country that started only recently its shift towards a more egalitarian division of labor and might therefore be more volatile after the external shock posed by the COVID-19 pandemic. The pandemic might destabilize the fragile progress made in terms of gender equality and trigger a backlash towards a more traditional division of labor. As people's usual working patterns had to be adapted quickly to public health measures and work-from-home requirements, however, it might also offer unforeseen opportunities for more profound structural changes towards a more gender-equal division of labor.

2. Switzerland – an interesting case study

The first infection with the corona virus SARS-CoV-2 was detected in Switzerland on 25 February 2020. The government immediately decreed the first measures to limit the spread of the virus and, three weeks later, declared the 'state of emergency'. All but the most essential shops (such as grocery shops and pharmacies) were closed. Furthermore, employees were obliged to work from home unless the tasks made that impossible (Kuenzi, 2020). In fact, 50% of employees worked from home at least partially (Bosshardt et al., 2020). As an additional measure to limit the spread of the virus, all schools and universities were closed. Some Cantons also shut down nurseries and daycare centers. As a result, the pandemic led to a strong recession, unprecedented levels of short-time work and increased unemployment (2.5% in January, 3.4% in September 2020 with women being more affected than men, SECO, 2020a). Nonetheless, the decline of the gross domestic product by 10.5 percent in the first six months of 2020 was lower than the EU average (-16.5%, Eurostat, 2020).

Due to limited welfare state support for parents and scarce work-family reconciliation policies (Bertozzi and Gilardi, 2008), Switzerland is an interesting case to analyze the gendered impact of the COVID-19 pandemic on time spent on unpaid work. After relatively slow progress towards gender equality, recent positive developments might more easily be affected, or even reversed, by an external shock, such as the pandemic. Switzerland still stands out with a rather traditional division of paid and unpaid work between men and women. Although the female labor force participation is amongst the highest in Europe (76% compared with 64% in the EU28, FSO, 2020b), a majority of women work part-time. In 2019, 59% of female workers against 17% of male workers were in part-time employment (FSO, 2020a) Amongst all OECD countries, this rate comes second only after the Netherlands (OECD, 2020). Though men and

women slowly converge in their time spent on paid and unpaid work (FSO, 2021), to date the 'one-and-a-half earner' model (Lewis, 2001) prevails in Switzerland and perpetuates a traditional work division within couples. Coupled mothers of children below the age of 15 on average spent more than 52 hours per week on unpaid and 16 hours on paid work, while fathers spent 32 hours on unpaid and 35 hours on paid work (FSO, 2021). As mentioned above, the burden of childcare was already high for Swiss parents before the pandemic. Many of them lack access to affordable formal daycare, especially those with lower levels of education and income (Stern et al., 2018), and rely on informal childcare provided by grandparents (before the pandemic, 33% of the children below the age of 13 were regularly looked after by their grandparents FSO, 2020d). Yet, the first COVID-19 lockdown made it impossible for many families to use their usual formal or informal childcare arrangements.

3. Theoretical framework and hypotheses

While research has already demonstrated that economic shocks, such as unemployment, can affect the division of paid and unpaid labor between women and men, the COVID-19 pandemic is rather special. In particular, the lockdown restrictions changed the demand for paid and unpaid work profoundly. Central modalities of paid work, such as the place and way of providing the work, were altered. A major shift was the unprecedented increase in work-from-home arrangements, which saved commuting time and freed up time for other tasks. At the same time, the demand for unpaid work increased substantially, particularly for couples with small and school-aged children. However, working from home was a mixed blessing for parents because children had to be home-schooled and cared for in parallel. While there is no doubt that the COVID-19 measures had a particularly strong impact on parents, the question remains whether the restrictions have reinforced or mitigated a pre-existing gendered division of unpaid work at the couple level. In this regard, empirical evidence consistently shows that although gender equality in the division of labor has increased over time (Altintas and Sullivan, 2016; Bianchi et al., 2012), women, and in particular mothers, remain the main providers of unpaid work (Doucet, 2015; Nomaguchi and Milkie, 2020; Guppy et al., 2019; Moyser and Burlock, 2018, Van der Lippe et al., 2011).

Drawing on the notion of rational time allocation, *time availability theories* would lead us to expect that the amount of time freed up due to the lockdown measures would be the most important determinant of whether a person increased domestic work, regardless of gender. Following this line of argument couples rationally allocate time in housework based on spouses'

relative hours in the paid labor market and the amount of housework to be done (Bianchi et al., 2000; Coverman, 1985; England and Farkas, 1986). Therefore, the person with the most time available would increase the time spent on unpaid work. Existing research on some countries points in this direction (Andrew et al., 2020; Biroli et al., 2020; Carlson et al., 2020; Craig and Churchill, 2020; Farré et al., 2020; Fodor et al., 2020; Hank and Steinbach, 2020; Hipp and Bünning, 2020; Kreyenfeld et al. 2020; Seiz 2020; Sevilla and Smith 2020; Zhou et al., 2020). Against this background, we argue that working short-time, from home or overtime impacts the decision on an increase of unpaid work. We expect that short-time work and working from home will generally increase the time spent on unpaid work (H1a), while working overtime will reduce the time investment (H1b). In relation to changes in the work status, however, we expect that a partner's switch to short-time work and work from home will generally decrease the other partner's the time spent on unpaid work (H1c), whereas if one's partner works overtime this will increase the other partner's time spent on unpaid work (H1d). In addition, *bargaining theories* underline the importance of individual earning power. Bargaining theory assumes that a) individuals regard domestic work as unattractive and will try to negotiate in order to reduce it, and that b) those with the highest earning power are better able to negotiate out of unpleasant tasks, such as domestic work. More specifically, earnings provide a spouse marital power, and this power gives the spouse more ability to exchange for what (s)he prefers. (Blood andWolfe, 1960; Lundberg and Pollak, 1996; Kamo, 1988). Therefore, we expect that the partner with higher earnings has the stronger bargaining position and will invest less in unpaid work while the opposite holds for the partner with less economic resources (H1e).

While the described changes in work status due to COVID-19 measures should in principle be gender neutral, a gender-biased precondition of society and the desire of individuals to reaffirm gender-conform behavior may imply different effects for mothers and fathers. According to the *doing gender approach* the gendered division of labor is profoundly embedded in the normative perceptions of appropriate gender roles in society (West and Zimmerman 1987). In this regard, housework and care duties still confirm femaleness, while maleness is related to avoidance of those tasks and a focus on paid work (Berk, 1985). Moreover and more importantly, people react with gender-typical behavior in domestic work if they find themselves in a gender-atypical situation in the labor market (West and Zimmerman 1987). In other words, individuals compensate for gender atypical behavior by displaying exaggerated gender adequate behavior. For instance, research on dual earner couples shows that men do fewer household activities even when they work less in paid employment than their partners (Hook,

2010), or are unemployed. In contrast, women with an unemployed partner tend to increase their time spent on unpaid work (Gough and Killewald, 2011; van der Lippe et al., 2018). In that regard, and following the *doing gender approach* it can be expected that mothers will react to changes in their own but also their partner's time availability. More concretely, changes in mothers' time availability due to short-time work and work from home will increase the time spent on unpaid work to a larger extent than in the case of fathers working from home or short-time (H2a). Following the overcompensation argument based on the doing gender approach, it can also be expected that a mother's switch to overtime work will decrease her time spent on unpaid work to a lower extent than in the case of a father changing to overtime work (H2b). However, the doing gender approach, as indicated, also supports the assumption that a mother's reaction to a change in the partner's time availability differs from the reaction of fathers. In this respect, we expect that if a mother's partner changes to short-time or remote work, her time spent on unpaid work will decrease less than in the case of a father whose partner changes to short-time or remote work (H2c). Moreover, if the partner of a mother changes to overtime, it will increase her time spent on unpaid work more than in case of a father whose partner changes to overtime work (H2d). Finally, the doing gender approach would lead us to expect with respect to economic bargaining power that, regardless of a low or high contribution to the household income, mothers will increase unpaid work, whereas fathers will on average decrease their share in unpaid work (H2e).

4. Data and methods

Data

We use data from the Swiss Household Panel (SHP; SHP Group 2021; Tillmann et al., 2016). The SHP is a longitudinal multi-topic survey annually interviewing all members of sampled households aged 14 and older, predominantly by telephone. It is based on a probability-based, random sample, which is representative for the Swiss residential population. The SHP started in 1999, with refreshment samples added in 2004 and 2013. We rely on two waves of data: first, the regular 2019 annual wave of data collection that was conducted between 2 September 2019 and 3 March 2020. With 95% of individual interviews completed before 17 December 2019, this wave qualifies as the 'pre-corona wave'. Second, the SHP embarked on a COVID-19 study which generated additional data on the consequences of the pandemic. This 'corona wave' was conducted between 12 May 2020 and 30 June 2020, by means of web questionnaires with a paper version sent to web non-respondents. The fieldwork for the corona wave was carried out

during the period when the strictest measures were slowly eased. Classroom teaching at primary and lower secondary school resumed and most shops reopened on 11 May, whereas a number of measures, such as the ban on large gatherings and the home schooling obligation for upper secondary and vocational schools, were still in place. Most measures had been lifted by 22 June.

Based on the information of eligible respondents in 2019 from the 2018 wave, the individual response rate amounted to 83% in the 2019 wave. With the few exceptions of those who requested to be taken out after completion of the individual questionnaire, all respondents from the pre-corona wave were invited to complete the SHP corona questionnaire (N = 8,772 from 5,540 households; see Voorpostel et al. 2020 for more details on the SHP COVID-19 study). In total, 5,843 individuals responded (response rate 66.6%, two-third by web, one third by postal interview). There was no evidence of strong selection bias (Voorpostel et al, 2020). In both waves, our two analytical samples focus on respondents living with a partner and at least one child under 18 years, working in dual-earner households in both waves. Item non-response on at least one of the independent variables accounted for 5.2% of the observations. Depending on validly reported independent variables, 13.5% of the observations were dropped in the analyses due to missings on change in housework hours and 14.0% due to missings on change in care work hours. The final analytical N for the analyses of changes in housework hours was 377 respondents from 228 households. For the analyses of changes in care work we had 375 respondents from 230 households.

Measures

Dependent variables

In our analyses, we focused on two dependent variables to examine changes in unpaid work between the pre-corona and the corona wave: a) *time spent on housework* and b) *time spent on unpaid care*. We defined their change score as the difference between the corona wave and the pre-corona wave. Time spent on housework was measured based on reported hours spent on housework in a normal week (pre-corona wave) and a lockdown week (corona wave), mentioning washing, cooking and cleaning as examples. Time spent on care was measured based on the reported average hours per week spent '…to care for children, elderly or disabled people living in your own household'. Furthermore, we bottom- and top-coded all time-related change scores irrespective of original values in the interval ranging from -45h to 45h, with 45h/week constituting the maximum of paid working time in Switzerland.

Independent variables

To test our hypotheses in relation to time availability, we included the answer of the respondent and his/her partner to the following variable "Were there any short-term changes to your work situation that are due to the Corona crisis?". We included the following three characteristics for the respondent and the partner: *short-time work, working entirely or partially from home; and working overtime*. The six variables were transformed in dummy variables with the categories 1 if the respondent/partner worked short-time, from home or overtime and 0 if that was not the case. To account for the bargaining position in the couple, we included a measure of the relative earning power of the partners. We operationalized this through the *relative contribution of the respondent to the couple's income* at our baseline time point (pre-corona wave). In this way, we were able to measure changes in unpaid working time and could avoid reverse causality effects. The corresponding variable was defined as the gross annual individual income divided by the sum of the individual and the partner's income. We used the gross salary before deduction of payroll taxes for insurances (old age, invalidity, unemployment, accidents) as well as compulsory pension plans. We used income values that were imputed during data processing (Lipps, 2010). The variable was recoded into three categories (respondent earns 0-44%, >44-56% (ref.) or >56-100% of the couple's income). *Gender* was measured with a dummy variable (1=female).

Control variables

Highest level of education was measured with 11 categories and recoded into a dummy variable differentiating tertiary education from other types (higher education (1) vs. no higher education (0)). We also controlled for nationality of the respondent (Swiss are coded 0, non-Swiss 1). As outsourcing opportunities may be related to changes in unpaid work, we included *outsourcing* prior to the pandemic with a dummy variable (outsourcing (1) vs. no outsourcing (0)), indicating whether somebody had received help for housework, childcare, care for handicapped or elderly persons from someone not being part of the household (e.g. a specialized service, grandparents). Finally, we also controlled for monthly working hours of the respondent and the partner (both centered at their respective mean) to account for income differences due to different working time patterns of women and men. In addition, this allowed us to measure the bargaining power more directly through the relative income variable. Table A1 in the annex presents the summary statistics of all variables by samples.

Method and analytical strategy

The panel design allowed us to estimate change score models (Morgan and Winship 2015, chapter 11.3). We used OLS regression models of the change score of our dependent variables (Glymour et al. 2005). To control for selective non-response and attrition, we used cross-sectional survey weights. As standard errors are correlated within couples, we applied cluster-robust standard errors. With respect to the analytical strategy, we tested our hypotheses for the two outcomes separately following the same logic: first, we examined how the lockdown measures related to short-time work, working from home and overtime, and how the individual's relative income contribution had changed the time spent on housework and care work (see Table 1, M1a-M2a). Second, we examined via the inclusion of interactions in how far those changes were more pronounced for mothers than for fathers (see Table 1, M1b-M2b). As our sample size was small, we limited the analyses to a minimal set of independent and control variables. Moreover, to ease the interpretation of the coefficients we use visualizations based on linear predictions.

5. Results

5.1. How did unpaid work change during the lockdown for dual-earner couples with children - a descriptive exploration

Figures 1 and 2 provide a first overview of how Swiss parents changed the division of unpaid work, i.e. housework and care work, during the lockdown period. Starting with the change in housework (Figure 1), we observe strong gender differences before the pandemic. While fathers spent around 6 hours per week on domestic tasks, mothers engaged for an average of 16 hours per week in this type of work. With the lockdown, only a modest increase can be observed for both fathers (by 1 hour) and mothers (by 2 hours). This increase was not statistically significant and the gendered pattern remained the same.

FIGURES 1 and 2 - about here

Turning to care work (Figure 2), we can observe that the strong gendered division known from the pre-corona wave persisted during the lockdown. While both partners increased their care time, mothers (from 28 to 35 hours per week) did this to a larger extent than fathers (from 15 to 16 hours per week). The increase, however, was not statistically significant.

On balance, it seems that the gendered patterns for unpaid work persisted during the lockdown. While both - mothers and fathers - increased the average time spent on housework and care work, mothers remained the main provider of unpaid work.

5.2. Multivariate findings

Starting with the question whether the observed changes in time spent on unpaid work are related to *changes in time availability due to the lockdown measures* and/or the *relative income position* within the couple, Table 1 presents the OLS coefficients of our multivariate analyses for housework (M1a) and care work (M2a) separately. In this regard, we expected that changing to short-time or remote work would generally increase the time spent on unpaid work (H1a), while working overtime would lead to a time reduction (H1b). Moreover, we hypothesized that having a partner who changed to short-time, remote or overtime work would have the opposite effect (H1c and H1d).

TABLE 1 – about here

The results for Model 1a (housework) show no support for hypothesis 1a and 1b. It seems that any changes in time availability (increase as well as decrease) of a respondent did not lead to changes in the investment in housework. However, changes in the partners' work status impact the involvement in housework significantly. Figure 3 shows the linear predictions of changed hours of housework on the basis of Model 1a. We can observe that if a respondent has a partner who changed to short-time work, the average time which the respondent spent on housework is reduced by around 1.8 hours, whereas the respondent increased the time spent on housework by 1.5 hours when the partner did not change to short-time work. However, Figure 4 shows no significant changes with respect to the time invested in housework for respondents whose partner shifted to remote work (the confidence intervals include the 0 point of no change). The average time which the respondent spent on housework increased by 1.9 hours when the partner did not change to remote work. Overall, this is only partly in line with our hypotheses 1c. Moreover, our results indicate that having a partner who has changed to overtime work has no significant impact on changes in hours spent on housework, which leads us to reject hypothesis 1d.

FIGURE 3 and 4 - about here

Turning to the results for changes in care work (Table 1, M2a), we do not find strong evidence for hypothesis 1a assuming that changes in time availability due to short-time or remote work would considerably change the investment of Swiss couples in care work. However, we find

support for our hypothesis 1b. Figure 5 indicates that respondents who changed to overtime work during the first lockdown did not significantly change the time they spent on care work, whereas those who did not change to overtime work display a significant increase in time spent on care work (on average 4.4 hours). Turning to the role of the partner, however, we do not find any indication that changes in the partner's time availability - either due to short-time, remote or overtime work - have a significant effect on the respondent's involvement in care work. Therefore, we must reject hypotheses 1c and 1d.

As to changes in time investment in unpaid work, we also argued that economic bargaining power could change the equation. In this respect, we assumed that the partner with more economic resources would invest less, while the partner with less economic resources would invest more time in unpaid work (H1e). Model 1a shows that the relative bargaining power within a couple has no overall significant impact on the changes in hours spent on housework. On balance, we have to reject hypothesis 1e. Relative bargaining power, however, affects the investment in care work, albeit not in the expected direction. Figure 6 indicates that the partner with the lowest contribution to the household income does not significantly change the involvement in care work. This can be deduced from the confidence intervals that include the 0 point of no change. In contrast, a primary earner increases the time investment significantly by 6.2 hours. Equal earners show the highest increase with an average addition of 8.6 hours spent on care work. This contradicts our hypothesis 1e.

FIGURE 5 and 6 - about here

Turning to the question whether the lockdown measures affected mothers and fathers differently, the results based on the interaction effects reveal that most of the above-described effects do not significantly differ between mothers and fathers (Table 1, Models 1b and 2b). The only significant gender effects can be observed for changes in mothers' time availability due to working from home. Here we hypothesized that mothers would increase the time spent on unpaid work stronger than fathers (H2a). Our results partly confirm this hypothesis. It seems that mothers increase their housework time significantly when changing to working from home. To illustrate this effect, Figure 7 shows again the predicted linear effects for mothers who changed to remote work. While fathers changing to remote work do not change the time spent on housework, mothers increase their time in housework by around 2.5 hours. For the other borderline significant effect in Model 1b (for short-time work), the regression model does not show a significant change in the fitted values based on the model (see Figures A1 in the appendix).

FIGURE 7 - about here

Looking at the findings for care work (see Table 1, Model 2b), the insignificant effects imply that changes in time availability of the respondent as well as of the partner had a similar impact on mothers and fathers. Overall, this leads to the rejection of our hypotheses 2a to 2d.

Finally, examining how much each partner has been contributing to the household income prior to the pandemic, we expected in light of the doing gender approach that in particular male secondary earners would decrease the hours of unpaid work, while women with both - a lower or higher contribution to the couple's income - would increase their time investment (H2e). However, also in this case the borderline significant effect of Models 1b of the regression model did not show significant changes in the fitted values based on the model (see Figure A2 in the appendix). The only significant, but not gender-related change could be observed for care work. Here, Figure 8 shows the linear predictions for changes in care work. Equal earner mothers increase the time spent on care work on average by 5.9 hours while equal earner fathers increase their time investment by 10.1 hours. No significant changes could be observed for primary and secondary earners. However, as already indicated, we cannot observe any significant difference between mothers and fathers. This leads to a rejection of our hypothesis 2e.

FIGURE 8- about here

6. Conclusion and discussion

In this paper, we discussed the extent to which COVID-19-induced measures, such as different working patterns and school and daycare closures, affected the time use of parents. Two contrasting scenarios featured prominently in the media. Optimistic views suggested an increase in gender equality because men, and in particular fathers, had more time to engage in household and childcare tasks. Pessimistic views stressed that the lockdown did not alter the traditional task division in a household and that women had to shoulder extra care tasks due to school and childcare closures. The discussion has intensified research in this area. The findings, however, remain inconclusive, not least because of data quality issues. Using three main explanatory dimensions related to time availability, bargaining power and doing gender, our findings for Switzerland are based on high-quality panel data, which allow us to examine in a more systematic way changes in time spent on housework and care tasks before and during the first lockdown. In this way, we can overcome some of the methodological shortcomings of previous studies.

Overall, our multivariate findings reveal that the implemented lockdown measures affected the time investment in unpaid work, but to a lesser extent than expected. For housework, our results imply that only changes in the time availability of the partner are relevant. If the spouse changed to short-time or remote work, the time investment of the respondent in housework decreased significantly. This is partly in line with time availability theories, which assume that the spouse with the most time available will increase the time spent on unpaid work. In the case of care work, the own time availability matters. In particular, parents who worked overtime did not increase the time spent on care work as other parents did. This is also in line with other studies (e.g. Bell et al., 2021) showing that the involvement in essential occupations (which often required an increase in working time) was accompanied by less time investment in unpaid work. Moreover, for both outcomes we tested the relevance of respondents' economic bargaining power within the couple. While the earnings position in the couple does not matter much for changes in time spent on housework, the results for care work show - in contrast to our expectations - that secondary earners saw the least increase in time spent on care work. Dual earner couples, by contrast, saw the largest increase in time spent on care work. A possible explanation could be that secondary earners were outsourcing childcare less prior to the pandemic and, hence, experienced no strong increase in care work at the onset of the pandemic. In addition, for both outcomes we did not find any clear indication that the lockdown measures affected mothers and fathers differently. Although some of the effect of changes in time availability and the relative economic bargaining power showed some borderline significant effects, the regression models did not show significant changes in the fitted values.

Reflecting on the results in general, the small sample size and lacking statistical power may explain part of the null findings in our analyses. In addition, it must be noted in particular with regard to the findings for care work that the data have been collected during a period where the severest lockdown measures had been partly released. The questions itself referred to the time during the lockdown. The effects may nonetheless reflect part of this reopening effect, even though not all children could immediately return to a normal school routine.

In sum, this paper offers some novel evidence regarding the gendered impact of the lockdown measures in Switzerland. While the results are not generalizable to other country contexts, at least for Switzerland, the implemented COVID-19 measures did neither lead to an increase in patriarchal power structures nor did they foster an increase in equality for unpaid work among women and men. Instead, the results show that changes in time availability due to short-time, remote or overtime working schemes, of both the respondent and the partner, determined

changes in time spent on unpaid care to a larger extent than gender alone. Overall, it seems that the gendered impact of the COVID-19 pandemic was less pronounced than in other countries, particularly in the area of care work. This might be partly because for the majority of couples, the changes did not affect the pre-existing gender division of unpaid work which strongly shaped the division of housework and care tasks already before the pandemic.

Data availability statement

This study has been realized using data collected by the Swiss Household Panel (SHP), which is based at the Swiss Centre of Expertise in the Social Sciences FORS. The project is supported by the Swiss National Science Foundation. The SHP data are deposited at FORSbase and available at https://forsbase.unil.ch/project/study-public-overview/17411/0/

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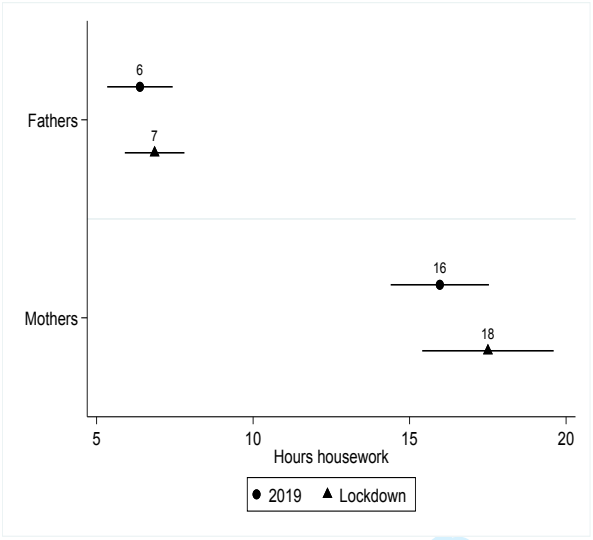
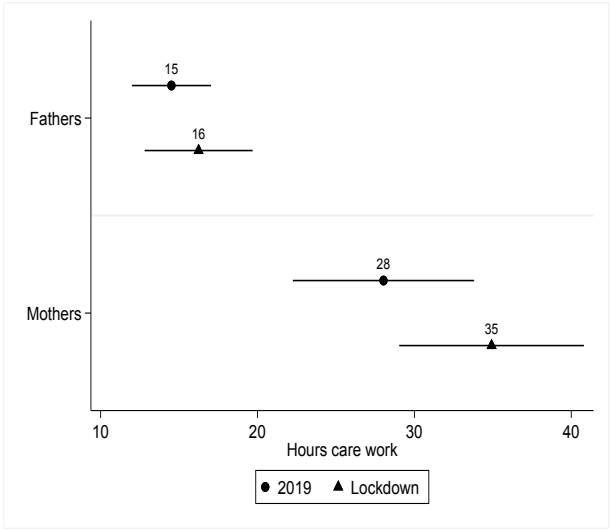
Due to the fact, that we had major revisions and rewrote the complete paper, the previous manuscript with all track changes became unreadable. Therefore, we did not include it in the up-load. However, if you think it is helpful, we can still provide parts of it.

FIGURES

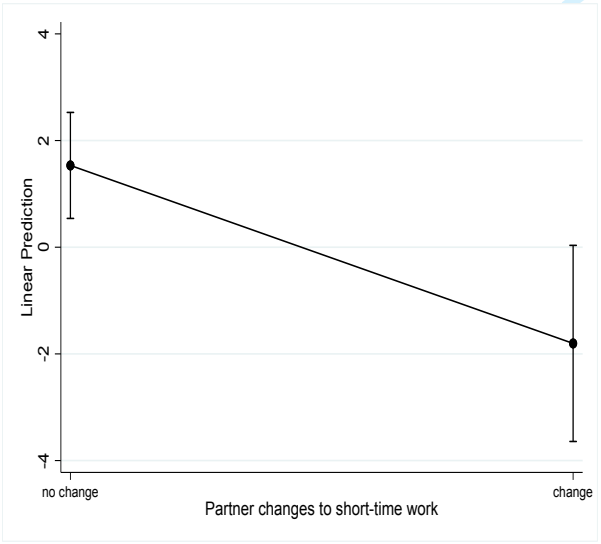
Figures 1 and 2: Weekly housework (Figure 1) and care work (Figure 2) hours of dual-earner couples with children by gender, before and during the lockdown

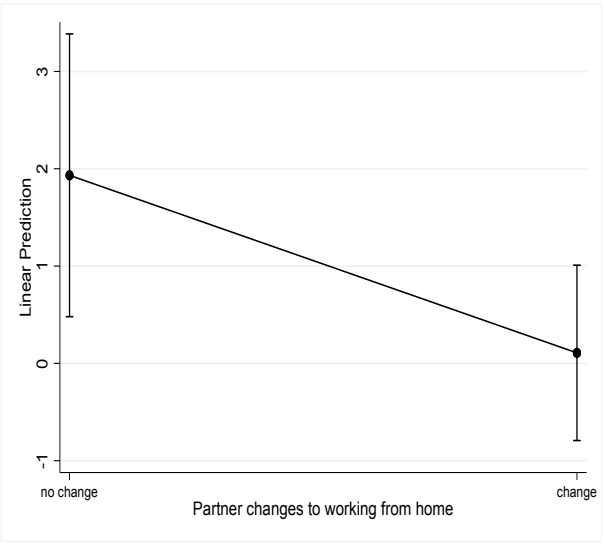




Source: Two SHP waves (pre- and corona wave), own calculations, weighted

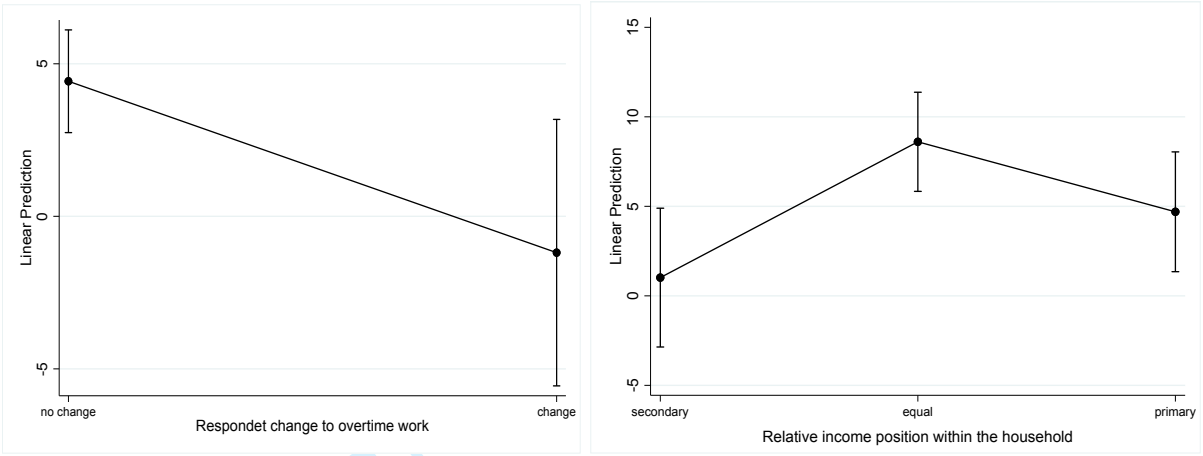
Figures 3 and 4: Linear predictions of changes in housework due to changes in partners time availability – short-time work (Figure 3) and working from home (Figure 4)





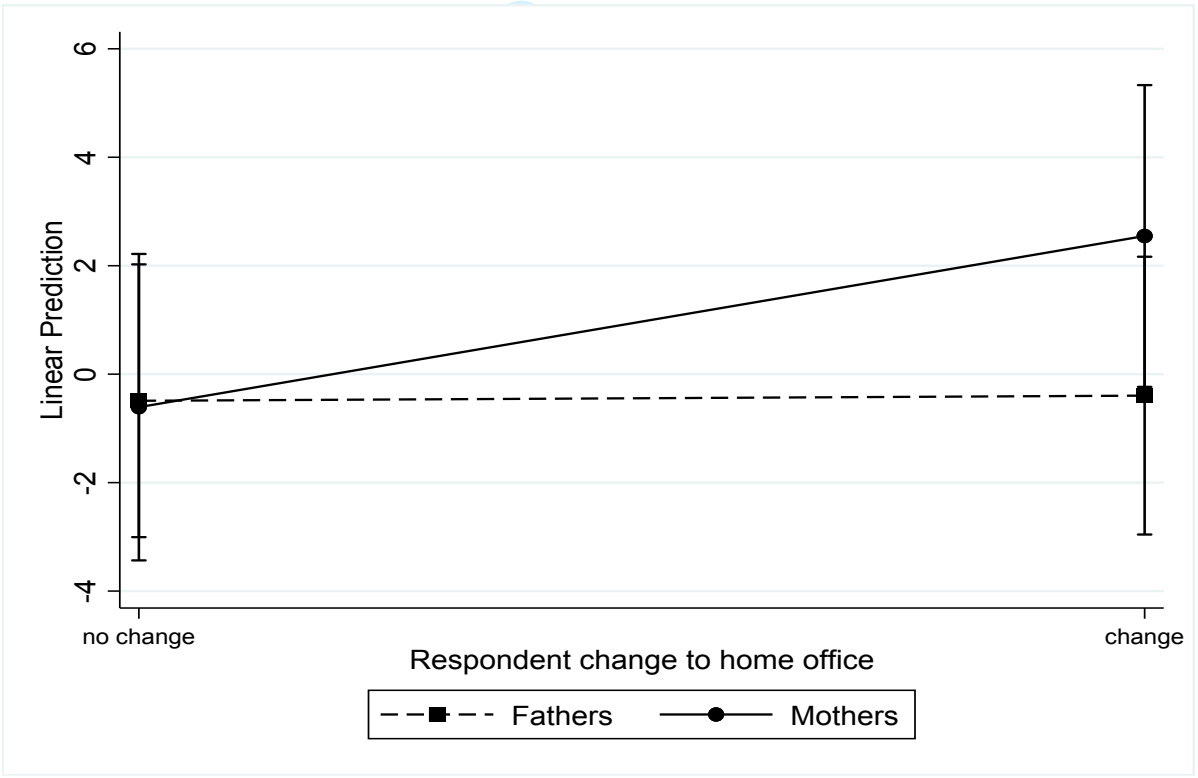
Source: Two SHP waves (pre- and corona wave), own calculations, weighted
Note: confidence intervals are set at 90%

Figures 5 and 6: Linear predictions of changes in care work due to changes in respondents time availability – overtime (Figure 5) and the relative income position within the household (Figure 6)



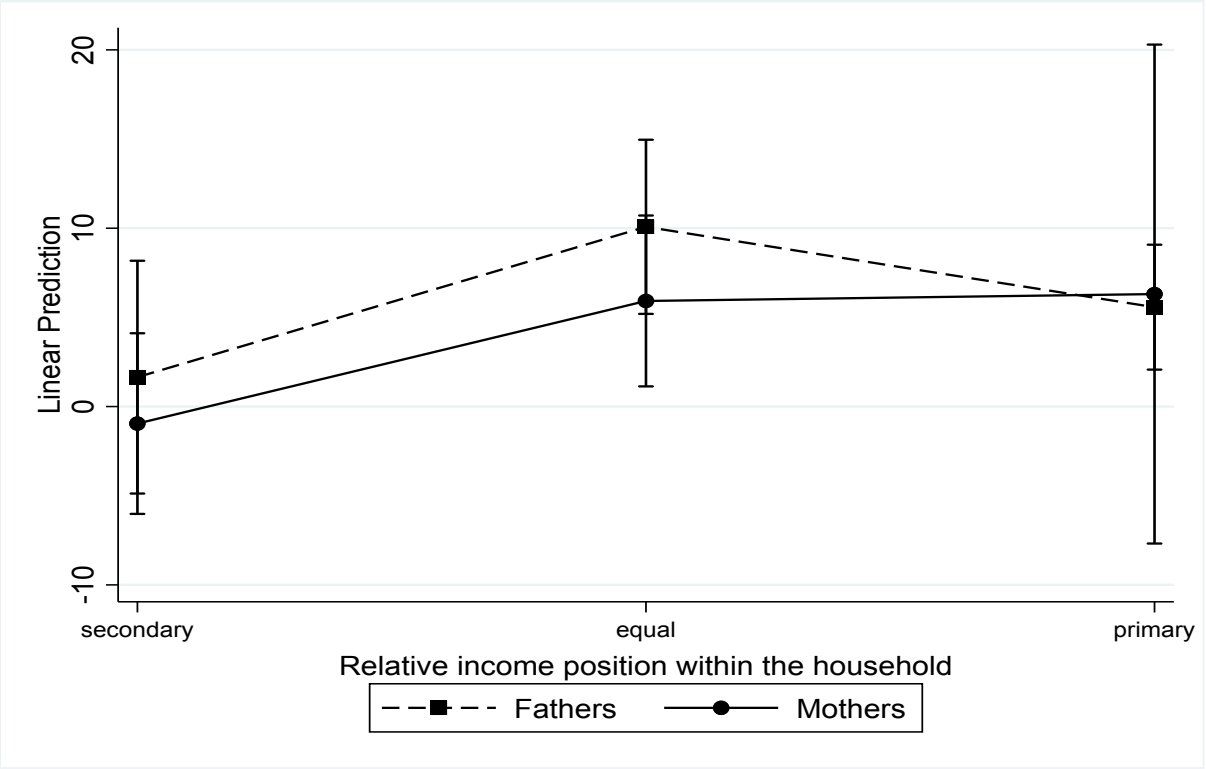
Source: Two SHP waves (pre- and corona wave), own calculations, weighted
Note: confidence intervals are set at 90%

Figure 7: Linear predictions of changes in housework due to changes in short-time work, by gender



Source: Two SHP waves (pre- and corona wave), own calculations, weighted
Note: confidence intervals are set at 90%

Figure 8: Linear predictions of changes in care work due to differences in relative income contribution, by gender



Source: Two SHP waves (pre- and corona wave), own calculations, weighted
Note: confidence intervals are set at 90%

TABLE

Table 1: Change scores for housework and care work, OLS coefficients, parents only

	Change HOUSEWORK		Change CARE WORK	
VARIABLES	**M1a**	**M1b**	**M2a**	**M2b**
Shorttime_Resp. *(ref. no)*	1.92	2.67+	-2.38	-1.91
Shorttime_Partner *(ref. no)*	-3.34*	-2.30+	1.68	-0.60
Homeoffice_Resp. *(ref. no)*	1.41	0.09	0.73	3.30
Homeoffice_Partner *(ref. no)*	-1.82+	-1.95+	-2.21	-0.95
Overtime_Resp. *(ref. no)*	-0.36	-0.50	-5.62*	-2.92
Overtime_Partner *(ref. no)*	-0.86	0.21	2.87	2.03
Ref. Rel_Income_45-55%				
Rel_Income_0-44%	-3.05	-6.24*	-7.59**	-8.43+
Rel_Income_56-100%	-0.07	-1.40	-3.91	-4.51
Women *(ref. men)*	2.12	-1.30	-3.08	0.49
Interactions				
Women#Shorttime_Resp.		-1.43		-1.37
Women#Shorttime_Part.		-2.44		5.02
Women#Homeoff_Resp.		3.06+		-6.17
Women#Homeoff_Part		-0.37		-2.02
Women#Overtime_Resp.		0.60		-9.05
Women#Overtime_Part		-2.21		1.78
Women#Rel_Income_0-44%		5.09		1.55
Women#Rel_Income_56-100%		-0.01		4.89
HigherEducation *(ref. low/med.)*	-1.00	-0.66	-1.67	-1.71
Migrant *(ref. Native)*	-1.82	-1.33	2.58	1.79
Having a child in HH *(ref. no)*	0.17	0.15	-0.38*	-0.33+
Outsourcing before *(ref. no)*	2.11	2.19	2.72	3.00
Monthly working hours *(mean cent.)*	-0.36+	-0.34+	-1.23***	-1.21***
Monthly working hours partner *(mean cent.)*	-0.15	-0.14	0.11	0.07
Constant	0.96	2.62	13.85***	11.79**
Observations	377	377	375	375
R-squared	0.12	0.15	0.12	0.14
Ll	-1280	-1274	-1548	-1543

$^{+}p < 0.1$, $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

Source: Two SHP waves (pre- and corona wave), own calculations, weighted

ANNEX

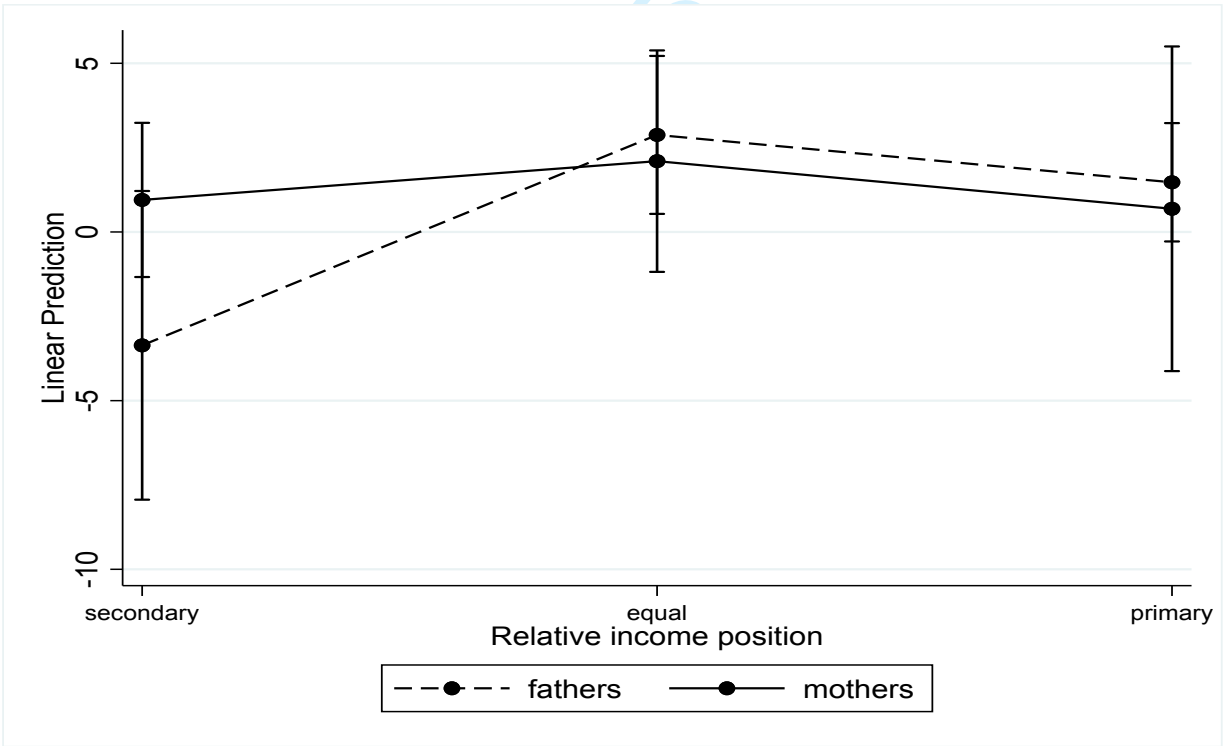
Table A1: Descriptive statistics for time spent on housework and care, parents only

Variables	Mean/Share	SD	Min	Max
Change Housework time	1.9	7.8	-28	41
Change Care time	3.3	16.6	-45	45
Women Men	50.9 49.1		0	1
Shorttime_Resp Yes No	 18.3 81.7		0	1
Shorttime_Partner Yes No	 17.2 82.8		0	1
HomeOffic _Resp Yes No	 55.4 44.6			
HomeOffice_Partner Yes No	 54.6 45.4			
Overtime_Resp Yes No	 13.3 86.7		0	1
Overtime_Partner Yes No	 12.2 87.8			
Rel_Income_0-44% Rel_Income_44-56% Rel_Income_56-100%	46.2 11.1 42.7		0	1
Higher Educated Low/med. Educated	48.3 51.7		0	1
Child below 18 in HH No child below 18 in HH	35.3 39.2		0	1
Migrant Native	06.1 93.9		0	1
Outsourcing Yes Outsourcing No	45.4 54.6		0	1

Figure A1: Linear predictions of changes in housework due to changes in short-time work, by gender

Source: Two SHP waves (pre- and corona wave), own calculations, weighted
Note: confidence intervals are set at 90%

Figure A2: Linear predictions of changes in housework due the relative income position, by gender



Source: Two SHP waves (pre- and corona wave), own calculations, weighted
Note: confidence intervals are set at 90%