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Working Paper

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GLO Discussion Paper, No. 1563

Provided in Cooperation with:
Global Labor Organization (GLO)

Suggested Citation: Marcén, Miriam; Morales, Marina (2025) : The post-COVID-19 gender gap in the division of household labor, GLO Discussion Paper, No. 1563, Global Labor Organization (GLO), Essen

This Version is available at:
https://hdl.handle.net/10419/310925

The post-COVID-19 gender gap in the division of household labor

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Abstract

This study provides a thorough examination of the evolving gender gap in time allocated to housework in the aftermath of the COVID-19 crisis. With data from the American Time Use Survey (2015–2022), our findings reveal a significant trend towards greater equality in the allocation of household tasks among couples, extending beyond the initial stages of COVID-19. Although the immediate response post-pandemic was not substantial, the subsequent period witnessed a sizable decrease of 16 minutes, representing 57% of the pre-pandemic gender gap related to housework time. Our research demonstrates an increase in men's domestic contributions, particularly in tasks related to interior cleaning. The pandemic's impact on housework time varied across personal characteristics, with younger individuals without a college degree and those without school-aged children making significant strides in closing the gender gap. Further results show that parents maintained a similar share of childcare responsibilities as before the pandemic, which may suggest that mothers mistrust fathers' ability to provide the same standard of care. This is also reflected by the fact that men have increased their participation in housework with their partner present. A supplementary analysis highlights the intensity of non-pharmaceutical interventions (NPIs) as a potential mechanism for changing gender roles. We show a more significant closure of the gender gap in household labor in areas with more intense NPIs. Our study presents suggestive evidence indicating that the ability to telework is also reducing the gender gap in domestic labor among couples.

Keywords: COVID-19, housework, gender, American Time Use Survey (ATUS)

JEL Codes: D13, J16, J22

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1. Introduction

Is the time dedicated to household chores distributed equally between men and women? Pre-COVID-19, empirical evidence leaned towards a negative response, indicating a higher involvement of women in domestic work (Dilli et al., 2019). The implementation of non-pharmaceutical interventions (NPIs) during the first wave of the pandemic forced many people to work remotely, leading to an increased demand for household tasks. There has been an extensive literature focusing on that period of time, yielding mixed results across countries such as Italy, Germany, Spain, the United Kingdom, and the United States (US). Some studies suggest a more equitable division of household labor during the implementation of NPIs (Carlson & Petts, 2022; Del Boca et al., 2021; Farré et al., 2022; Larraz et al., 2023; Sánchez et al., 2021; Sevilla & Smith, 2020). Conversely, other research indicates no clear convergence in the division of household labor (Hank & Steinbach, 2021; Hernández-Albújar et al., 2023). Two years after the lockdowns, the time spent on housework is 4% higher than in the pre-COVID period in the US.[1] To our knowledge, it has not been empirically tested whether gender differences within housework time have increased after the early stages of the pandemic in the US. Three scenarios remain open: the gender gap could have maintained, increased, or reduced. Since women have traditionally shouldered most of the work at home, they are likely to bear the additional burden. However, it is also possible to argue that the COVID-19 social disruption provided an opportunity to increase men's participation in family life, thus rebalancing traditional family arrangements. The long-term consequences of the pandemic for gender equality will likely depend on how couples adapted to changing conditions in the first years after the pandemic. In this paper, we explore the evolution of the gender gap in household labor division and the mechanisms underlying the possible changes in the gender gap.

The allocation of time to household chores constitutes 7% (equivalent to almost 2 hours) of the daily schedule in the US. In this context, the enduring imbalance in the division of household labor is not a trivial matter, as it has been recognized as a determinant of gender disparities in labor market outcomes (Becker, 1985; Hersch & Stratton, 1994, 2002; Polachek & Xiang, 2014; Waldfogel, 1998). Moreover, it is associated with adverse effects on women's life satisfaction (De Rock & Périlleux, 2023; Foster & Stratton, 2019) and fertility (Sevilla & Smith, 2020), among others. Knowing that previous economic crises, predating the pandemic, influenced gendered behaviors in society (Heathcote et al., 2010; Perri & Joe, 2012), comprehending the impact of the current health, social, and economic crisis, such as the COVID-19 pandemic, on American households is crucial. Exploring the extent to which men assume additional household responsibilities post-COVID-19 can contribute to the broader discussion on the gender distribution of both paid and unpaid work, shedding light on its implications for gender equality.

We utilize data from the 2015–2022 American Time Use Survey (ATUS) (Flood et al., 2023) to address the following two main research questions: (1) Have the differences between men and women in the time devoted to household tasks been reduced after the hard lockdowns? (2) Does the intensity of NPIs play a role? Our paper is innovative because we examine an extended period, enabling us to conduct a dynamic analysis and study the long-term effects of NPIs. We leverage the substantial variations in approaches taken by US states to mitigate the spread of the COVID-19 virus. The US presents an intriguing case study as, unlike many other countries, each state acts

[1] This is obtained using data from the American Time Use Survey for a sample of individuals devoting time to housework in 2022. The pre-COVID period is defined from 2015 to mid-March 2020 (pre-lockdowns).

autonomously in its response. It is also an attractive framework to study housework time due to the sizable impact of the COVID-19 pandemic, which reduced the likelihood of being employed (at work) by 5% with respect to the pre-COVID period and the hours worked by 1.3% in a typical state during the early months of the pandemic (Marcén & Morales, 2021). Additionally, mothers became 8 percentage points less likely to be employed as schools closed their doors, though fathers did not (Amuedo-Dorantes et al., 2023).

Our paper contributes, first and foremost, to an emerging and fast-growing literature on the effects of COVID-19 on socio-economic variables. Specifically, it is related to the literature that emphasises the heterogeneous effects of the pandemic on the labor market in various countries (Adams-Prassl et al., 2020a; Alon et al., 2020; Amuedo-Dorantes et al., 2023; Beland et al., 2023; Hanzl & Rehm, 2023; Hapucheck & Petrongolo, 2020; Kalenkoski & Pabilonia, 2022; Marcén & Morales, 2021; Tribin et al., 2023) and mental health (Adams-Prassl et al., 2020b; Oreffice & Quintana-Domeque, 2021; Pedraza et al., 2020). Regarding gender imbalances within the household, research from several countries, including the US, suggests that both women and men increased their time in housework during the early days of the COVID-19 pandemic, but most of the burden fell on women (Carlson et al., 2022; Carlson & Petts, 2022; Craig & Churchill, 2021; Farré et al., 2022; Sevilla & Smith, 2020; Van Tienoven et al., 2023). There is also one recent paper examining the gender division of household labor during the first year after the COVID-19 pandemic (Carlson & Petts, 2022). These authors found a reversion toward pre-pandemic gendered divisions of domestic labor by the end of 2020. However, it is yet to be determined whether these shifts in domestic labor are temporary or if the pandemic could potentially lead to long-term effects on gender equality. In comparison to these studies, our contribution is to provide insights into the long-lasting effects, specifically in the case of the US. We observed that the distribution of time spent on housework remained highly unbalanced against women during the first wave. However, the gender gap was less pronounced after two years from the onset of COVID-19. Additionally, we explore heterogeneity by examining responses based on age, level of education, class of worker, and parenthood. We examine the differential responses by household tasks.

We also add to a vast literature aiming to understand the gendered division of labor. Prior scholars have demonstrated the impact on the gender division of household labor of women's participation in the labor force (Bianchi et al., 2000; Ruppanner, 2010; Suen, 1994), employment policies (Fuwa & Cohen, 2007), and gender norms (Fuwa, 2004; Marcén & Morales, 2022), among others. Furthermore, our findings indicate that interior cleaning emerged as the primary housework activity where the gender gap has closed. Our conclusions hold even after accounting for the working arrangements of both partners. Supplementary analysis also showed no significant changes in the gender division of childcare during the post-COVID period, which may imply a lack of confidence among mothers in fathers' ability to provide an equivalent level of care. Interestingly, this is further underlined by the discernible increase in men's participation in household chores when their partner is present.

To understand the mechanisms behind the reduction in the gender gap in housework, we consider the intensity of the NPIs and telework. Social distancing measures and stay-at-home orders could present an opportunity for changing traditional family roles through an increase in men’s involvement in family life and/or a reduction for women. The COVID-19 crisis could likely have a major impact on the gender division of those households more exposed to NPIs. Our work fills this gap by merging individual ATUS data with an index capturing the intensity of NPIs at the state level. We find that

the exposure to social distancing measures at the beginning of the pandemic has a lasting effect, reducing the gender gap in housework. The second possible driver of the gender gap reduction considered here is the ability to telework. Work conditions have changed toward more individuals of both genders working from home (WFH) than before the pandemic (Marcén & Morales, 2024), which offer a new scenario that can alter the status quo of the traditional gender division of domestic chores or, on the contrary, reinforce gender roles.

This paper is organized as follows. Section 2 describes the data used. The methodology is described in section 3, and the results are presented in section 4. Section 5 concludes.

2. Data

In our baseline analysis, we utilize data from the 2015–2022 ATUS (Flood et al., 2023). The ATUS is a nationally representative survey administered by the Bureau of Labor Statistics. This survey captures detailed information about individuals' activities over the span of 24 hours, from 4:00 am to 4:00 am of the previous day. A designated individual from each selected household participates in a single-day interview. During the interview, respondents are prompted by a computer-assisted telephone interviewer to report their own activities. The ATUS aims to provide comprehensive information on how people allocate their time, offering a valuable resource for studying various aspects of daily life and social trends. The data collected cover a wide range of activities, including work, household chores, leisure, and childcare, contributing to a better understanding of individuals' time use patterns. This database represents an enhancement compared to studies that concentrated on small surveys in the initial months of the pandemic (Carlson & Petts, 2022), owing to its detailed and extensive information, along with a well-executed sample selection.

We limit our sample to working-aged individuals (18 to 64 years old) who reported engaging in any housework episode on the day of the survey and have a married or unmarried partner. Housework, in our main analysis, encompasses interior cleaning, laundry, sewing, repairing, and maintaining textiles, as well as storing interior household items, including food.[2] The total time spent on these activities provides a measure of overall housework time. One advantage of using ATUS for our study is its capability to provide information about the specific date respondents completed the survey, enabling us to distinguish individuals responding during the pre- and post-COVID-19 periods. We designate all responses after mid-May 2020 as post-COVID-19 answers.[3] Our main sample comprises 12,624 individuals interviewed from January 2015 through December 2022.

Table 1 illustrates the variations in housework time by gender during both the pre- and post-COVID-19 periods. The summary statistics reveal an important reduction in the gender gap in housework time by almost 27% (6.5 minutes per day from a gender gap of 26.61 to 20.12 minutes) after the pandemic outbreak. While men increased the time devoted to housework by 10% (8 minutes per day), the time spent by women slightly increased by 1% (or 1.5 minutes per day). To better understand the evolution of housework over time, we have divided the post-COVID period into three sub-periods: initial stage (from May 2020 to December 2020), middle stage (from January 2021 to December 2021), and last stage (from January 2022 to December 2022). There are no

[2] Activity codes from "20100" to "20199."

[3] Data collection was suspended in 2020 from mid-March to mid-May for the safety of ATUS staff. For more information, please see https://www.bls.gov/tus/covid19.htm.

differences in the total time between the initial and final periods, but there are differences in the distribution between men and women. Although initially women increased their dedication to these tasks by 8 minutes compared to 5.5 for men, in the subsequent periods, women regress towards values closer to the pre-COVID stage. Men increased their time devoted to these tasks by 11.5 minutes in the final period compared to pre-COVID. This represents a 14% increase for men, while women only dedicated 1.6% more in the year 2022 than in the pre-COVID period defined here. The raw data indicate a reduction in the gender gap of approximately 10 minutes in 2022 compared to the pre-COVID period, nearly 38% of the total (from 26.61 to 16.72), with the differences by gender being statistically significant in all subperiods (see Table 1). This analysis is not conclusive, and additional work is needed to disentangle the COVID-19 impact from that of other factors.

Table B1 in Appendix B presents the descriptive statistics for the remaining variables. The average age in our sample is approximately 48 years, with 27% of respondents being male.[4] In terms of ethnicity, 84% of individuals in the sample identify as white, and 74% have completed college education. Additionally, 70% of respondents have children living in the household, and 35% of them live with a child aged 6 to 12 years. In relation to employment, 69% of respondents are currently employed, and 82% of them have a partner who is also employed.

3. Empirical strategy

To gauge the presence of gender differences in the impact of COVID-19 on housework, we employ the following equation:

$$Y_{ikt} = \beta_0 + \beta_1 Male_i + \beta_2\, PostCovid_t + \beta_3 (Male_i * PostCovid_t) + \\ + \boldsymbol{X'_{ikt}}\boldsymbol{\mu} + (Male_i * \boldsymbol{X'_{ikt}})\boldsymbol{\rho} + \boldsymbol{\delta_k} + \boldsymbol{\theta_t} + \varepsilon_{ikt} \quad (1)$$

with Y_{ikt} being the reported housework time (minutes per day) by individual *i* living in state *k* in period *t*.[5] The explanatory variables include a gender indicator, the variable $Male_i$, which is a dummy variable taking the value of one if the individual is male and zero otherwise. $PostCovid_t$ is a dummy variable taking the value of one after mid-May 2020, and zero otherwise. Our coefficient of interest is β_3, which is the coefficient capturing the impact of the interaction between the gender dummy and the post-COVID indicator. This interaction term captures the differential effect of COVID-19 across genders on housework. A positive β_3 would indicate that the post-first-wave COVID period is associated with a lower gender gap in housework time. The vector $\boldsymbol{X_{ikt}}$ includes a set of individual characteristics of respondent *i*. These individual controls are age, educational level (more college or not), and race (white or not), which may affect the time individuals devote to housework.[6] These individual characteristics are also interacted with the male indicator. Controls for unobserved characteristics of the place of residence are added by using state fixed effects, denoted by $\boldsymbol{\delta_k}$.[7] To capture the time-variant unobserved characteristics, we add time (year, month) fixed effects, $\boldsymbol{\theta_t}$.[8]

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[4] Note that we are focusing on those individuals reporting at least a housework episode on the day of the survey. This can explain the low percentage of males in the sample.

[5] We compute the total time of housework as the sum of all housework episodes reported throughout the day. We revisit this below.

[6] We enlarge the set of socio-demographic characteristics, and our results are maintained. See the results below.

[7] Our results are maintained when using MSA fixed effects.

[8] All the estimates are repeated with/without weights. The results do not vary.

Our study is expanded by exploring the differential gender response over time. Specifically, we investigate whether there are any changes in gender differences in housework (from May 2020 to December 2020) and the subsequent years 2021 and 2022. This dynamic analysis not only allows us to scrutinize gender differences at different stages but also addresses concerns about the plausible exogeneity of measures implemented after COVID-19 by presenting an event study. While our empirical strategy assumes exogeneity, considering that COVID-19 was unexpected, we acknowledge that policies are not adopted arbitrarily. There may also be concerns about whether changes in housework predated COVID-19. We aim to address all these concerns through the analysis of an event study.

Our analysis extends to examine gender differences in childcare after the pandemic. We also consider the intensity of NPIs and the ability to telework as potential mechanisms influencing the differential gender response to housework during COVID-19.

4. Results

4.1. Main results

Table 2 presents the estimates of Equation (1). In column (1), it is observed that men spend 26 minutes less per day on housework compared to women, constituting 26% of the average housework time. The estimated coefficient on the *PostCovid* dummy is also positive and statistically significant, indicating an increase in housework time by approximately 19 minutes per day during the post-COVID period. To further investigate gender differences in housework time after the first wave of COVID-19, we introduce the interaction term between the Male and the *PostCovid* dummies in the subsequent columns. The estimated coefficient for the interaction term is positive and statistically significant, suggesting a narrower gender gap during the post-COVID period. Specifically, gender differences in housework time decrease by almost 16 minutes per day after the end of the first wave until December 2022. This reduction represents a 57% decrease in the pre-COVID gender gap.

A concern regarding these estimates pertains to the employment status of individuals. Early shifts in the gender division of domestic labor appear to be influenced by individuals' employment conditions during the lockdowns (Carlson et al., 2022). Moreover, the least pronounced gender specialization in housework is observed when both spouses are employed full time (Hook, 2010). Therefore, employment status may significantly impact decisions related to housework. To address this concern, we present the estimates in column (3) after controlling for both partners' employment status, and the results remain consistent. Furthermore, to delve deeper into this issue, we rerun our analysis using a sample of full-time workers who have employed partners. Additionally, we include controls for respondents' occupation and industry categories. The results, presented in Table A1 in Appendix A, continue to support our earlier conclusions. Even with this refined sample and the inclusion of additional employment-related controls, a statistically significant reduction in the housework gender gap is observed. It is noteworthy that the reduction in magnitude is smaller than previously reported, but remains similar in percentage terms when measured relative to the pre-COVID period.

Heterogeneous analysis suggests variations in the response to the unexpected shock of COVID-19 among different subgroups of individuals. The results presented in Table 3 examine whether COVID-19 has a differential effect based on respondents' age (above and below the average age), parenthood status (with or without school-aged children), and educational level (with or without college). The findings reveal that younger individuals, those without college education, and those without school-aged children experienced a more significant reduction in the gender gap in housework time

after the pandemic. Specifically, for individuals aged 18 to 43, the decrease in the gender gap in time devoted to housework represents approximately 82% of the pre-COVID gap.[9] Similarly, this decrease accounts for 53% for non-parents, and notably higher is the effect for those without a college education, representing almost 68.8% of the housework gender gap. We also separate the sample by class of worker category in Table 4. The gender gap in housework time significantly decreases, representing 72% of the pre-COVID period for those in the private sector, and the gender gap can even be reversed for those unemployed.

4.2. Dynamic response and identification

In this subsection, we aim to differentiate the gender response in housework during the initial post-COVID stage from the response observed in the later periods. It can be argued that individuals may have altered their behavior in the first months following May 2020 and subsequently readjusted over time. The trajectory of gender differences in housework during this post-COVID period is not clear, and it remains uncertain whether these differences increased, decreased, or remained unchanged after a certain number of months. We adopt an alternative methodology to assess the dynamic impact of COVID-19 (Wolfers, 2006). Formally, we estimate the following model:

$$Y_{ikt} = \alpha + \sum_{j=0}^{2} \pi_j 1\{t^p = \text{j}\} + \sum_{j=0}^{2} \beta_j 1\, Male_i\{t^p = \text{j}\} + Male_i + \boldsymbol{X'_{ikt}}\mu + \\ +(Male_i * \boldsymbol{X'_{ikt}})\boldsymbol{\rho} + \boldsymbol{\delta_k} + \boldsymbol{\theta_t} + \\ +\varepsilon_{ijkt} \qquad (2)$$

where the indicator function $1\{t^p = \text{j}\}$ denotes the *t*th periods after the event, with period 0 encompassing from mid-May to December 2020. The subsequent periods refer to the years 2021 and 2022, respectively. Equation (2) incorporates dummies indicating whether COVID-19 has influenced housework for each of the t*th* periods. The interaction term with $Male_i$ allows us to examine the dynamic effect of COVID-19 on gender differences in housework during each sub-period defined above. Here, β_j parameters indicate whether COVID-19 had an impact on the gender gap in housework in the periods following the pandemic hit. The rest of the variables are defined as in Equation (1).[10] Results are presented in Table 5. Consistent with findings from Carlson and Petts (2022), our analysis indicates that there is no significant shift in the housework gender gap during period 0, from mid-May to December 2020. However, the estimated coefficient on the interaction term suggests a reduction in the gender gap in housework time during the years 2021 and 2022. Although this reduction is slightly less pronounced in 2022, it remains statistically significant. This evidence may imply that men's increased contribution to household labor is not a temporary change but rather the result of a broader shift towards more gender-equal roles.

A valid concern regarding the results presented in Table 2 is the potential bias in the estimated impacts due to pre-existing trends in the reduction of the gender gap in housework. Additionally, one might speculate that the observed changes predated the

[9] Our coefficient of interest is not statistically significant when using a sample of individuals aged 65 or older (see Table A2 in Appendix A).

[10] We only include month fixed effects. Year fixed effects cannot be included.

unexpected COVID-19 pandemic (Goodman-Bacon & Marcus, 2020). To tackle this, we initiate event studies to assess whether the estimated impacts occurred before the onset of the pandemic. This can provide a more comprehensive understanding of the observed effects. To conduct the event study, we adopt the following form:

$$Y_{ikt} = \alpha + \sum_{j=-2}^{-5} \tau_j 1\{t^p = \text{j}\} + \sum_{j=0}^{2} \gamma_j 1\{t^m = \text{j}\} + \sum_{j=-2}^{-5} \beta_j Male_i 1\{t^p = \text{j}\} + \\ + \sum_{j=0}^{2} \eta_j Male_i 1\{t^p = \text{j}\} + Male_i + \boldsymbol{X'_{ikt}}\mu + (Male_i * \boldsymbol{X'_{ikt}})\boldsymbol{\rho} + \boldsymbol{\delta_k} + \boldsymbol{\theta_t} + \\ + \varepsilon_{ijkt} \quad (3)$$

where Y_{ikt} is the housework measure defined above. The indicator function $1\{t^m = \text{j}\}$ represents the *t*th period before or after our period of interest. The reference period in all event studies is the period before the event occurred when $\text{j} = -1$. The parameters provide insights into how the impact evolves over time relative to the event. We examine the existence of pre-trends during the years prior, as captured by coefficients τ_j. The length of the event-time "window" is similar to those papers using data since 2015 or 2016 (Beland et al., 2023). The rest of the variables have been previously defined.

Figure 1 presents the coefficients from the event study, along with 95% confidence intervals.[11] Notably, all the estimated parameters for the years prior to the COVID-19 outbreak are not statistically significant. This finding strongly supports the assumption of no differential pre-trends, suggesting that the observed impacts are more likely attributed to the unique circumstances surrounding the COVID-19 pandemic rather than pre-existing dynamics. Furthermore, in alignment with the conclusions drawn earlier, the event study underscores a clear break in the gender gap in housework time after the year 2020. This temporal shift provides additional confidence in attributing the changes in household dynamics to the specific influence of the COVID-19 pandemic. The lack of statistically significant coefficients in the pre-pandemic period enhances the robustness of our findings and reinforces the causal link between the pandemic and the observed shifts in gender roles within households.

4.3. Housework by categories

This study extends its examination to explore which specific housework activities witnessed a reduction in the gender gap after the onset of the pandemic. Leveraging the detailed information provided by the ATUS, we scrutinize various housework sub-activities. The estimates are rerun, replacing the dependent variable with housework time calculated for each of the three sub-activities: "interior cleaning," "laundry," and "sewing, repairing, and maintaining textiles, and storing interior household items, including food." The corresponding estimated coefficients are presented in Table 6. In all cases, we limit the sample to those devoting time to each of these specific activities. The findings highlight that changes in gender differences after COVID-19 are primarily driven by an increase in the time men allocate to interior cleaning compared to women.[12] Results in column (1) reveal an approximately 19-minute per day increase in men's time spent on interior cleaning tasks relative to women after the pandemic. The results also indicate a minor gender gap in laundry chores, although this effect is less precisely estimated. These insights provide a nuanced understanding of how gender dynamics within specific housework activities have shifted in response to the COVID-19 pandemic, emphasizing the importance of considering the variability in different household tasks.

[11] The estimated coefficients are presented in Table A3 in Appendix A.

[12] This is also observed in the dynamic analysis (see Table A4 in Appendix A).

4.4. The share of housework time with the partner

In this subsection, we delve into a detailed examination of how households are navigating the division of housework in the aftermath of the COVID-19 crisis. Prior research suggests that women may not always welcome a more equal division of household responsibilities. For instance, some authors argue that mothers may limit fathers' involvement in childcare due to mistrust in fathers' ability to provide the same standard of care (Bianchi & Milkie, 2010). Similarly, it is suggested that mothers often perform childcare solo more frequently than fathers do (Craig, 2006). This raises the question of whether men's engagement in housework after the pandemic was conducted in the company of a spouse. It is plausible that men might avoid solo engagement in activities where they do not feel proficient, or women may encourage joint participation in housework for the same reason.

To address this issue, we utilize information provided by respondents to ATUS questions regarding *with whom* they spend their time. Specifically, we redefine the dependent variable as the proportion of time devoted to housework when accompanied by the married/unmarried partner over the total housework time.[13] The results are presented in Table 7. Consistent with the literature mentioned earlier, the estimated coefficient for the Male dummy is positive and statistically significant, indicating that men tend to overperform women in housework when it is done in the company of a spouse (see column [1]). Furthermore, with the introduction of the interaction term between the Male and *PostCovid* dummies in column (2), we find that these gender differences have increased after the pandemic. Overall, the reduction in the gender gap in domestic chores following the social disruption of COVID-19 appears to be partially offset by an increase in men's housework time when the spouse is present. This exploration sheds light on the complexities of gender dynamics within households.

4.5. Mechanisms

4.5.1.1. Mechanism 1: The intensity of COVID-19 non-pharmaceutical interventions

We now examine whether the intensity of NPIs plays a role in the reduction of the gender gap in housework time. NPIs were implemented at various geographic levels, such as county or state, and for different durations. Consequently, variations in the exposure to NPIs across US states may be associated with diverse gender responses to housework chores. To capture the intensity of NPIs, we utilize the novel weighted index known as COVINDEX (Marcén & Morales, 2021). This index captures both the timing and intensity of NPIs by state and month in a straightforward manner. It utilizes daily information on the announcement and expiration, if any, of five key NPIs at the state level, and the Google Mobility data. The NPIs include state of emergency declarations, school closures, partial business closures, stay-at-home orders, and closures of non-essential businesses. We estimate the following equation:

$$Y_{ikt} = \beta_0 + \beta_1 Male_i + \beta_2 COVINDEX_k^{2020} + \beta_3 (Male_i * COVINDEX_k^{2020}) + \\ + \boldsymbol{X'_{ikt}}\boldsymbol{\mu} \quad + (Male_i * \boldsymbol{X'_{ikt}})\boldsymbol{\rho} \quad + \boldsymbol{\theta_t} + \varepsilon_{ikt} \quad (4)$$

[13] We calculate the proportion of housework with the partner present as the total housework time done with the partner present divided by the total housework time calculated as the sum of all housework episodes throughout the day.

where $COVINDEX_k^{2020}$ is the average of the COVINDEX presented by Marcén and Morales (2021) for the months of March, April, and May in state k.[14] The more intense (effective) the NPIs are at reducing social interactions, the closer the value that the COVINDEX is to -5. The interaction term $Male_i * COVINDEX_k^{2020}$ allows us to explore the response of gender differences in housework time to the intensity of the NPIs. The rest of the variables have been previously defined. We now limit our analysis to the post-COVID period to mitigate any concerns on the possible role of the COVID-19 evolution during the whole 2020 year. Table 8 presents the results. The estimated coefficient on the interaction term between the *Male* dummy and *COVINDEX* is negative and statistically significant, suggesting that the intensity of the NPIs that occurred from March to May 2020 did significantly affect household labor division, through a reduction in the gender gap in those areas with more intense NPIs. These results are also maintained in the over-time analysis (see Table A5).

4.5.1.2. Mechanism 2: The ability to telework

Due to the COVID-19 crisis, a notable shift has occurred, with more workers of both genders opting to work from home compared to the period before March 2020. The implications of this change for the gender balance in the division of household labor are not entirely clear. One plausible scenario is that the increased time availability afforded by remote work, coupled with the elimination of commuting time as a constraint, may lead to greater male involvement in household tasks. It is conceivable that women may welcome this increased contribution from men in sharing domestic responsibilities (Carlson, 2021; Holmes et al., 2020; Shafer et al., 2020). On the contrary, WFH may act as a mechanism that reinforces gender-based roles within the household. A recent study indicates a higher prevalence of telework among women compared to men in the aftermath of the COVID-19 crisis (Marcén & Morales, 2024). Thus, remote work could be considered a puzzle piece that allows women to engage in paid labor while simultaneously continuing to bear a heavier burden than men in unpaid labor, thereby reinforcing traditional gender roles. In this subsection, we delve into the impact of WFH on reducing the gender gap in housework time and how this dynamic has evolved after the initial wave of the pandemic.

We observe parallel shifts between the evolution of gender equality in household labor and the capacity for WFH during the second and third years after the COVID-19 pandemic. The effect size of our main estimated coefficient, as mentioned earlier, moderates over the course of the period under consideration, particularly as some workers transition back to in-person work. To explore deeper into this issue, we utilize ATUS information regarding the location of activities and calculate the time that employed individuals in our sample dedicate to work at home.[15] Then, we re-run our main analysis by including respondents' WFH time and its interaction with the gender dummy as explanatory variables. Table 9 shows the estimated coefficients. Our results are consistent with recent papers supporting the idea that more available time at home due to telework

[14] The COVINDEX over the post-COVID period (March, April, and May 2020) averaged -1.02 and fluctuated between 0.05 and -2.6

[15] Regarding the time devoted to WFH, we consider the activities "working" and "work-related activities." We compute the total WFH time as the sum of all working episodes located in the respondent's home reported throughout the day.

is associated with increased time in household tasks among men.[16] Overall, remote work may subsequently contribute to facilitate more egalitarian divisions of domestic labor.

4.6. Other household activities: Childcare

Until now, we have demonstrated that the pandemic significantly reduces the gender gap in housework time. In this subsection, we extend our investigation to study the potential differential effects of COVID-19 across genders on childcare. Similar to what has been documented in housework, evidence from the early months of the pandemic in the US suggests an increase in fathers' shares of childcare (Carlson et al., 2022; Chung et al., 2021; Craig & Churchill, 2021; Shafer et al., 2020; Yerkes et al., 2020). Yet, women continued doing the majority of domestic care (Adams-Prassl et al., 2020a). Thus, how gender differences in time taking care of children have evolved is an empirical issue that needs to be explored. Following Guryan et al. (2008), we define "child care" as the sum of three primary time use components: *basic child care* is time spent on the basic needs of children, *educational child care* includes reading to/with children and helping children with homework, and *recreational child care* involves playing with children and attending children's events.[17] Table 10 presents OLS regression models of parental time (measured in minutes per day). Our results indicate that there are no changes in the gender gap in response to the pandemic, as shown in column (1). Similar findings emerge when focusing on the impact of COVID-19 on each of the childcare activities defined above. We observe a significant reduction in the gender gap in time spent on basic childcare, albeit only at the 10% significance level, and no effect is found among the other sub-activities (see columns [2] to [4]).

5. Conclusions

The socially disruptive event of the COVID-19 pandemic may have induced a shift in gender roles, particularly in the division of household tasks. This study contributes to this exploration by examining the evolution of the gendered division of household labor post-pandemic. Using data from the ATUS, we observe a substantial reduction in the gender gap in housework time after COVID-19. The post-first-wave COVID period is linked to an increase in the time men devote to housework relative to women, representing 57% of the pre-pandemic gender gap. This reduction in gender differences persists even two years after the pandemic. However, additional findings reveal an increase in the proportion of time men spend on housework in the presence of a spouse, suggesting that men may not be taking on as much responsibility for housework as might be desirable.

This article also confirms that the pandemic has differentially impacted the gender division of household labor, with young individuals, those without a college degree, and those without school-aged children significantly reducing the gender gap in housework time. Heterogonous analysis across different groups of class of workers also suggests that our results are driven by unemployed individuals and workers in the private sector. Interior cleaning emerges as the primary housework activity where the gender gap has closed. Furthermore, the study provides evidence of the absence of post-COVID changes in the gender gap in other household activities, specifically childcare. The identification analysis contributes to the overall validity and reliability of our conclusions by addressing

[16] This is also observed in the dynamic analysis (see Table A6 in Appendix A).

[17] See Table B1 in Appendix B for a detailed description of each category.

concerns related to pre-existing trends and changes that might have occurred before the onset of the COVID-19 pandemic.

A supplementary analysis explores differences in the timing and duration of NPIs across US states to investigate whether higher exposure to social distancing measures at the beginning of the pandemic could lead to a greater evolution of men relative to women in housework activities post-pandemic. Interestingly, the study finds that the gender gap in housework time decreases in areas with more intense NPIs. Additionally, the study explores the possible role of telework in explaining the evolution of gender differences in housework after the pandemic. COVID-19 has ushered in a new era of teleworking, traditionally sought by women to facilitate a balance between career and family. The findings underscore that the ability to telework may contribute to reducing the gender gap. These results emphasize the importance of implementing policies to provide men with greater opportunities for involvement at home.

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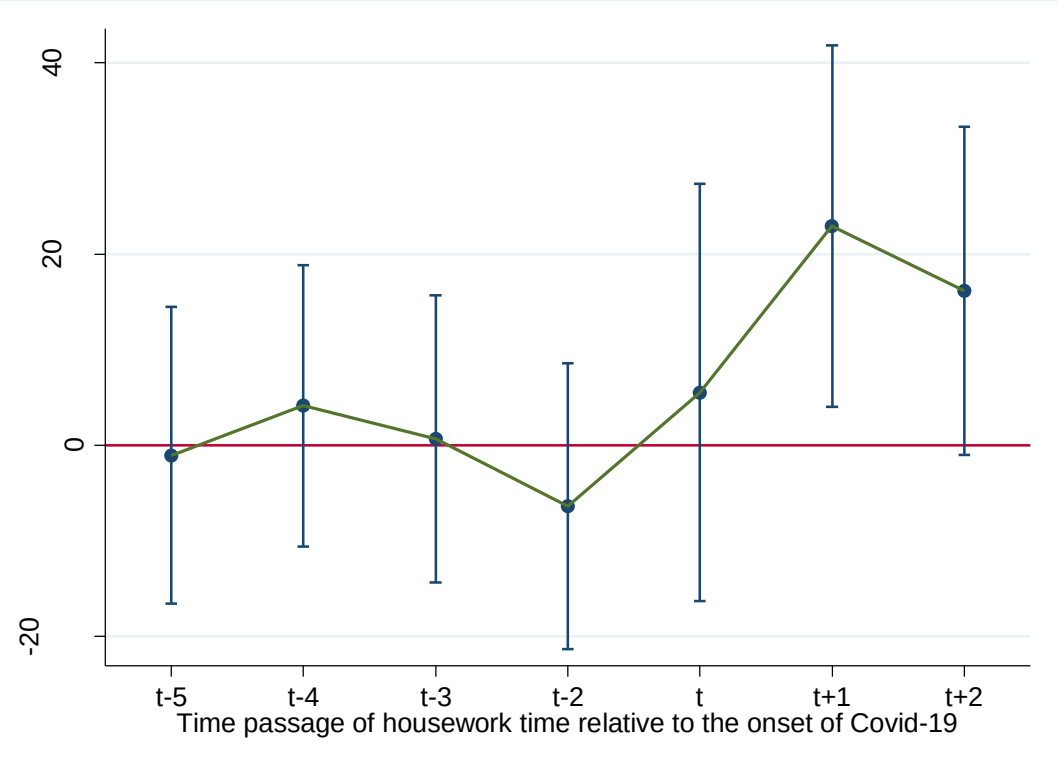
Figure 1: Event study (gender gap in housework time)



Notes: This figure displays the coefficients from the event study for our main sample, along with 95% confidence intervals. We estimate Equation (3). Estimated coefficients are provided in Appendix A in Table A3.

Table 1: Summary statistics of housework time by gender

Variable: Housework time	Female	Male	Diff (Female-Male)
Pre-Covid (from Jan 2015 to mid-March 2020)	106.96	80.35	26.61***
Post-Covid (from mid-May 2020 to Dec 2022)	108.47	88.35	20.12***
Initial stage of post-COVID (from mid-May 2020 to Dec 2020)	114.75	85.88	28.88***
Middle stage of post-COVID (from Jan 2021 to Dec 2021)	103.68	86.60	17.08***
Last stage of post-COVID (from Jan 2022 to Dec 2022)	108.67	91.95	16.72***

Notes: Data come from the 2015–2022 ATUS. We use a sample of individuals between 18 and 64 years old who have a different sex married/unmarried partner present in the household and who report any housework episode on the day of the survey to analyze the housework time and the proportion of housework time with the partner present. The pre-COVID period includes the pre-lockdown period. Data from mid-March 2020 to mid-May 2020 were not collected.

Table 2: Main results

D.V: Housework time	(1)	(2)	(3)
Male----------	-26.411***	0.984	9.737
	(2.319)	(14.177)	(16.513)
Post Covid	19.148**	14.882*	14.418*
	(8.444)	(8.487)	(8.368)
Post Covid x Male		15.877***	15.605***
		(5.427)	(5.332)
Age	0.027	0.175	0.170
	(0.105)	(0.121)	(0.127)
Age x Male		-0.469**	-0.610**
		(0.238)	(0.242)
White	2.243	4.604	5.348*
	(2.742)	(3.220)	(3.192)
White x Male		-8.378	-7.428
		(5.987)	(5.873)
College	-22.358***	-22.758***	-18.275***
	(2.523)	(2.634)	(2.588)
College x Male		2.530	2.767
		(3.979)	(3.983)
Children	-0.867	2.538	1.488
	(2.529)	(3.079)	(3.027)
Children x Male		-9.931*	-6.269
		(5.313)	(5.203)
Employed			-25.954***
			(2.718)
Employed x Male			-0.040
			(7.649)
Partner Employed			3.528
			(4.365)
Partner Employed x Male			-0.438
			(6.318)
Observations	12,624	12,624	12,624
R-squared	0.040	0.043	0.057
D.V. Mean	100.71	100.71	100.71
D.V. Std. Dev.	97.51	97.51	97.51
Pre Covid D.V. diff (Female-Male)	26.61***	26.61***	26.61***
State FE	Yes	Yes	Yes
Month FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Notes: Data come from the 2015–2022 ATUS. We use a sample of individuals between 18 and 64 years old who have a different sex married/unmarried partner present in the household and who report any housework episode on the day of the survey. We estimate Equation (1). The dependent variable is housework time in all columns. The *PostCovid* dummy takes the value 1 from mid-May 2020 to December 2022, and 0 for the rest. All regressions include a constant, as well as demographic controls for age, race, educational attainment (college or not), and parenthood status (children in the HH or not). Column (3) also adds controls for the employment status of both partners (employed or not). The controls are interacted with the male dummy in columns (2) and (3). Estimates are weighted using ATUS weights. Robust standard errors are clustered at the state level and reported in parentheses. *** Significant at the 1% level, ** significant at the 5% level, * significant at the 10% level.

Table 3: Heterogeneity analysis by age, parenthood, and educational level

D.V: Housework time	(1) *Aged 18 to 43*	(2) *Aged 44 to 64*	(3) *With school-aged children*	(4) *Without school-aged children*	(5) College	(6) Non-college
Post Covid	9.316	18.970	18.950*	12.798	15.573**	12.970
	(12.108)	(11.609)	(11.184)	(10.972)	(7.500)	(19.358)
Post Covid x Male	18.828**	11.379	14.619	16.112**	9.931*	28.867**
	(7.713)	(7.438)	(8.905)	(6.389)	(5.488)	(11.603)
Observations	6,626	5,998	4,544	8,080	9,372	3,252
R-squared	0.074	0.070	0.077	0.065	0.047	0.088
D.V. Mean	98.85	102.77	100.23	101.84	95.44	115.86
D.V. Std. Dev.	93.81	101.41	95.05	103.13	93.37	107.12
Pre Covid D.V. diff (Female-Male)	22.97***	30.82***	25.10***	30.56***	20.65***	41.93***
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: We use a sample of individuals between 18 and 64 years old who have a different sex married/unmarried partner present in the household and who report any housework episode on the day of the survey. We estimate Equation (1). The dependent variable is housework time in all columns. The *PostCovid* dummy takes the value 1 from mid-May 2020 to December 2022, and 0 for the rest. All regressions include a constant, as well as demographic controls for age, race, educational attainment (college or not), parenthood status (children in the HH or not), and employment status of both partners (employed or not). The controls are interacted with the male dummy. Estimates are weighted using ATUS weights. See Table B1 in Appendix B for a detailed description of all subsamples. Robust standard errors are clustered at the state level and reported in parentheses. *** Significant at the 1% level, ** significant at the 5% level, * significant at the 10% level.

Table 4: Heterogeneity analysis by class of worker

	(1)	(2)	(3)	(4)
D.V: Housework time	*Public employee*	*Private employee*	*Self-employed*	*Unemployed and without pay*
Post Covid	36.528*	7.021	51.175**	8.177
	(19.696)	(11.968)	(22.710)	(16.482)
Post Covid x Male	-0.016	15.061**	16.092	33.347**
	(10.873)	(6.384)	(16.147)	(16.429)
Observations	1,768	6,142	896	3,818
R-squared	0.073	0.032	0.172	0.058
D.V. Mean	93.41	95.29	89.57	115.40
D.V. Std. Dev.	95.68	94.93	92.09	101.98
Pre Covid D.V. diff (Female-Male)	19.95	21.03	29.98	28.80
State FE	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Notes: We use a sample of individuals between 18 and 64 years old who have a different sex married/unmarried partner present in the household and who report any housework episode on the day of the survey. We estimate Equation (1). The dependent variable is housework time in all columns. The *PostCovid* dummy takes the value 1 from mid-May 2020 to December 2022, and 0 for the rest. All regressions include a constant, as well as demographic controls for age, race, educational attainment (college or not), parenthood status (children in the HH or not), and employment status of both partners (employed or not). The controls are interacted with the male dummy. Estimates are weighted using ATUS weights. See Table B1 in Appendix B for a detailed description of all subsamples. Robust standard errors are clustered at the state level and reported in parentheses. *** Significant at the 1% level, ** significant at the 5% level, * significant at the 10% level.

Table 5: The effect of COVID-19 on the gender gap in housework over time

D.V: Housework time	(1)
The period of the event (May20-Dec20) x Male	4.852
	(10.077)
1 period after the event (2021) x Male	22.192***
	(8.507)
2 periods after the event (2022) x Male	15.559**
	(7.510)
Observations	12,624
R-squared	0.057
State FE	Yes
Month FE	Yes

Notes: This table presents the estimated coefficients of the dynamic response of the gender gap in housework time to COVID-19. We use a sample of individuals between 18 and 64 years old who have a different sex married/unmarried partner present in the household and who report any housework episode on the day of the survey. We estimate Equation (2). The dependent variable is housework time in all columns. The period of the event dummy takes the value 1 from mid-May 2020 to December 2020, and 0 for the rest. The dummy for one period after the event takes the value 1 for the year 2021, and 0 for the rest. The dummy capturing two periods after the event takes the value 1 for the year 2022, and 0 for the rest. All regressions include a constant, as well as demographic controls for age, race, educational attainment (college or not), parenthood status (children in the HH or not), and employment status of both partners (employed or not). This controls are interacted with the male dummy. Estimates are weighted using ATUS weights. Robust standard errors are clustered at the state level and reported in parentheses. *** Significant at the 1% level, ** significant at the 5% level, * significant at the 10% level.

Table 6: The effect of COVID-19 on the gender gap in each housework activity

D.V:	(1) *Time devoted to interior cleaning*	(2) *Time devoted to laundry*	(3) *Time devoted to storing and sewing*
Post Covid	10.999	2.846	17.459*
	(10.044)	(7.341)	(10.342)
Post Covid x Male	19.612***	9.301*	8.325
	(6.800)	(5.494)	(6.010)
Observations	8,353	6,354	2,330
R-squared	0.035	0.051	0.108
D.V. Mean	93.81	63.72	35.57
D.V. Std. Dev.	89.33	62.25	63.38
Pre Covid D.V. diff (Female-Male)	22.80***	15.88***	3.19***
State FE	Yes	Yes	Yes
Month FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Notes: We use a sample of individuals between 18 and 64 years old who have a different sex married/unmarried partner present in the household and who report any housework episode on the day of the survey in each specific task. We estimate Equation (1). In column (1), the dependent variable is time devoted to "interior cleaning." The dependent variable in column (2) is time devoted to "laundry." We consider time spend in the activities "sewing, repairing, and maintaining textiles" and "storing interior household items, including food" when calculating the dependent variable in column (3). The *PostCovid* dummy takes the value 1 from mid-May 2020 to December 2022, and 0 for the rest. All regressions include a constant, as well as demographic controls for age, race, educational attainment (college or not), parenthood status (children in the HH or not), and employment status for both partners (employed or not). The controls are interacted with the male dummy. See Table B1 in Appendix B for a detailed description of all subsamples. Estimates are weighted using ATUS weights. Robust standard errors are clustered at the state level and reported in parentheses. *** Significant at the 1% level, ** significant at the 5% level, * significant at the 10% level.

Table 7: The effect of COVID-19 on the gender gap in the proportion of time devoted to housework accompanied by the married/unmarried partner

D.V: Prop of housework time with partner	(1)	(2)
Post Covid	0.014	0.005
	(0.036)	(0.034)
Post Covid x Male		0.051**
		(0.024)
Observations	12,624	12,624
R-squared	0.055	0.085
D.V. Mean	0.29	0.29
D.V. Std. Dev.	0.43	0.43
Pre Covid D.V. diff (Female-Male)	-0.2***	-0.2***
State FE	Yes	Yes
Month FE	Yes	Yes
Year FE	Yes	Yes

Notes: Data come from the 2015–2022 ATUS. We use a sample of individuals between 18 and 64 years old who have a different sex married/unmarried partner present in the household and who report any housework episode on the day of the survey. We estimate Equation (1). The dependent variable is the proportion of time devoted to housework accompanied by the married/unmarried partner over the total housework time. The *PostCovid* dummy takes the value 1 from mid-May 2020 to December 2022, and 0 for the rest. All regressions include a constant, as well as demographic controls for age, race, educational attainment (college or not), parenthood status (children in the HH or not), and employment status of both partners (employed or not). The controls are interacted with the male dummy in column (2). Estimates are weighted using ATUS weights. Robust standard errors are clustered at the state level and reported in parentheses. *** Significant at the 1% level, ** significant at the 5% level, * significant at the 10% level.

Table 8: Mechanism 1. The role of NPIs in reducing the gender gap in housework

D.V: Housework time	(1)
COVINDEX	-91.083
	(204.298)
COVINDEX x Male	-32.602**
	(15.804)
Observations	3,787
R-squared	0.070
Year FE	Yes
Month FE	Yes

Notes: We limit the sample to the post-COVID period, that is, from mid-May 2020 to December 2022. We use a sample of individuals between 18 and 64 years old who have a different sex married/unmarried partner present in the household. We estimate Equation (4). The dependent variable is the total housework time. The more intense (effective) the NPIs are at reducing social interactions, the closer the value of the COVINDEX to -5. We include a constant, as well as demographic controls for age, race, educational attainment (college or not), parenthood status (children in the HH or not), and employment status of both partners (employed or not). The controls are also interacted with the male dummy. Results on the intensity of COVID-19 NPIs and the gender gap in housework over time are presented in Table A5 in Appendix A. Estimates are weighted using ATUS weights. Robust standard errors are clustered at the state level and reported in parentheses. *** Significant at the 1% level, ** significant at the 5% level, * significant at the 10% level.

Table 9: Mechanism 2. Technological progress: WFH time among workers

D.V: Housework time	(1)	(2)	(3)
WFH time	-0.088***	-0.094***	-0.072***
	(0.006)	(0.007)	(0.012)
WFH time x Male		0.018	-0.001
		(0.011)	(0.016)
Post Covid			29.086***
			(9.588)
Post Covid x WFH time			-0.039***
			(0.015)
Post Covid x WFH time x Male			0.028
			(0.019)
Observations	8,811	8,811	8,811
R-squared	0.043	0.044	0.048
State FE	Yes	Yes	Yes
Month FE	Yes	Yes	Yes

Notes: Data come from the 2015–2022 ATUS. We use a sample of workers between 18 and 64 years old who have a different sex married/unmarried partner present in the household and who report any housework episode on the day of the survey. The dependent variable is the total housework time. We compute the total WFH time as the sum of all working episodes located in the respondent's home reported throughout the day. We include a constant, as well as demographic controls for age, race, educational attainment (college or not), parenthood status (children in the HH or not), and partner's employment status (employed or not). The controls are also interacted with the male dummy. Results on the proportion of time WFH over the total work time and the gender gap in housework over time are presented in Table A6 in Appendix A. Estimates are weighted using ATUS weights. Robust standard errors are clustered at the state level and reported in parentheses. *** Significant at the 1% level, ** significant at the 5% level, * significant at the 10% level.

Table 10: The effect of COVID-19 on the gender gap in childcare

D.V:	(1) *Total time devoted to childcare cleaning*	(2) *Time devoted to basic care*	(3) *Time devoted to recreational activities*	(4) *Time devoted to educational activities*
Post Covid	14.025	-3.743	13.057	35.782***
	(9.127)	(6.425)	(11.422)	(10.961)
Post Covid x Male	3.136	6.628*	7.470	-7.076
	(5.289)	(3.929)	(6.746)	(4.736)
Observations	12,987	11,484	5,117	4,757
R-squared	0.132	0.116	0.036	0.093
D.V. Mean	131.53	75.11	117.49	51.37
D.V. Std. Dev.	123.21	82.16	95.66	56.04
Pre Covid D.V. diff (Female-Male)	37.11***	29.47***	4.14	6.72***
State FE	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Notes: Data come from the 2015–2022 ATUS. We use a sample of individuals between 18 and 64 years old who have a different sex married/unmarried partner and any children living in the household and who report spending any time in the corresponding childcare activity analyzed in each column. We include a constant, as well as demographic controls for age, race, educational attainment (college or not), and employment status for both partners (employed or not). The controls are also interacted with the male dummy. See Table B1 in the Appendix B for a detailed description of all subsamples. Estimates are weighted using ATUS weights. Robust standard errors are clustered at the state level and reported in parentheses. *** Significant at the 1% level, ** significant at the 5% level, * significant at the 10% level.

Appendix A

Table A1: Main results using a sample of dual-earned households

D.V: Housework time	(1)	(2)
Post Covid	22.427*	19.883
	(12.752)	(12.838)
Post Covid x Male		12.272**
		(6.202)
Observations	5,898	5,898
R-squared	0.043	0.044
D.V. Mean	93.50	93.50
D.V. Std. Dev.	95.14	95.14
Pre Covid D.V. diff (Female-Male)	20.76***	20.76***
State FE	Yes	Yes
Month FE	Yes	Yes
Year FE	Yes	Yes

Notes: Data come from the 2015–2022 ATUS. We use a sample of individuals between 18 and 64 years old who have a different sex married/unmarried partner present in the household and who report any housework episode on the day of the survey. We estimate Equation (1). The dependent variable is housework time in all columns. The *PostCovid* dummy takes the value 1 from May 2020 to December 2022, and 0 for the rest. All regressions include a constant, as well as demographic controls for age, race, educational attainment (college or not), parenthood status (children in the HH or not), and occupation and industry categories. The controls are interacted with the male dummy. Estimates are weighted using ATUS weights. Robust standard errors are clustered at the state level and reported in parentheses. *** Significant at the 1% level, ** significant at the 5% level, * significant at the 10% level.

Table A2: Main results using a sample of older individuals

	(1)
D.V: Housework time	*Aged 65 and older*
Post Covid	25.996**
	(13.119)
Post Covid x Male	-6.047
	(8.548)
Observations	3,536
R-squared	0.064
D.V. Mean	102.59
D.V. Std. Dev.	105.35
Pre Covid D.V. diff (Female-Male)	36.18
State FE	Yes
Month FE	Yes
Year FE	Yes

Notes: We use a sample of individuals aged 65 and older who have a different sex married/unmarried partner present in the household and who report any housework episode on the day of the survey. We estimate Equation (1). The dependent variable is housework time in all columns. The *PostCovid* dummy takes the value 1 from May 2020 to December 2022, and 0 for the rest. All regressions include a constant, as well as demographic controls for age, race, educational attainment (college or not), parenthood status (children in the HH or not), and employment status of both partners (employed or not). The controls are interacted with the male dummy. Estimates are weighted using ATUS weights. See Table B1 in Appendix B for a detailed description of all subsamples. Robust standard errors are clustered at the state level and reported in parentheses. *** Significant at the 1% level, ** significant at the 5% level, * significant at the 10% level.

Table A3: Event study (gender gap in housework time)

D.V: Housework time	(1)
5 periods before the event (2015)	-1.039
	(7.928)
4 periods before the event (2016)	4.142
	(7.503)
3 periods before the event (2017)	0.649
	(7.658)
2 periods before the event (2018)	-6.378
	(7.613)
The period of the event (May20-Dec20)	5.520
	(11.135)
1 period after the event (2021)	22.894**
	(9.639)
2 periods after the event (2022)	16.134*
	(8.744)
Observations	12,272
R-squared	0.058
State FE	Yes
Month FE	Yes

Notes: This table presents the estimated coefficients of the event study for the gender gap in housework time. We use a sample of individuals between 18 and 64 years old who have a different sex married/unmarried partner present in the household. We estimate Equation (3). The period from January 2020 to March 2020 has been dropped from the sample. The dependent variable is the total housework time. We include a constant, as well as demographic controls for age, race, educational attainment (college or not), parenthood status (children in the HH or not), and employment status of both partners (employed or not). The controls are also interacted with the male dummy. Estimates are weighted using ATUS weights. Robust standard errors are clustered at the state level and reported in parentheses. *** Significant at the 1% level, ** significant at the 5% level, * significant at the 10% level.

Table A4: The effect of COVID-19 on the gender gap in each housework activity over time

D.V:	(1) *Time devoted to interior cleaning*	(2) *Time devoted to laundry*	(3) *Time devoted to storing and sewing*
The period of the event (May20-Dec20) x Male	2.382	2.549	7.953
	(11.853)	(7.456)	(12.144)
1 period after the event (2021) x Male	26.605**	8.600	14.590*
	(11.648)	(9.056)	(8.314)
2 periods after the event (2022) x Male	24.727***	12.495	1.743
	(9.264)	(8.098)	(9.027)
Observations	8,353	6,354	2,330
R-squared	0.034	0.051	0.105
State FE	Yes	Yes	Yes
Month FE	Yes	Yes	Yes

Notes: This table presents the estimated coefficients of the dynamic response of the gender gap in housework time to COVID-19. We use a sample of individuals between 18 and 64 years old who have a different sex married/unmarried partner present in the household and who report any housework episode on the day of the survey. We estimate Equation (2). In column (1), the dependent variable is time devoted to "interior cleaning." The dependent variable in column (2) is time devoted to "laundry." We consider time spent on the activities "sewing, repairing, and maintaining textiles" and "storing interior household items, including food" when calculating the dependent variable in column (3). The period of the event dummy takes the value 1 from May 2020 to December 2020, and 0 for the rest. The dummy for one period after the event takes the value 1 for the year 2021, and 0 for the rest. The dummy capturing two periods after the event takes the value 1 for the year 2022, and 0 for the rest. All regressions include a constant, as well as demographic controls for age, race, educational attainment (college or not), parenthood status (children in the HH or not), and employment status of both partners (employed or not). The controls are interacted with the male dummy. Estimates are weighted using ATUS weights. Robust standard errors are clustered at the state level and reported in parentheses. *** Significant at the 1% level, ** significant at the 5% level, * significant at the 10% level.

Table A5: The intensity of COVID-19 NPIs and the gender gap in housework over time

D.V: Housework time	(1)
The period of the event (May20-Dec20) x COVINDEX x Male	-6.880
	(8.352)
1 period after the event (2021) x COVINDEX x Male	-21.191***
	(8.218)
2 periods after the event (2022) x COVINDEX x Male	-12.518**
	(6.156)
Observations	12,624
R-squared	0.057
State FE	Yes
Month FE	Yes

Notes: Data come from the 2015–2022 ATUS. We use a sample of individuals between 18 and 64 years old who have a different sex married/unmarried partner present in the household. The dependent variable is the total housework time. The more intense (effective) the NPIs are at reducing social interactions, the closer the value of the COVINDEX to -5. All regressions include a constant, as well as demographic controls for age, race, educational attainment (college or not), parenthood status (children in the HH or not), and employment status of both partners (employed or not). The controls are interacted with the male dummy. Estimates are weighted using ATUS weights. Robust standard errors are clustered at the state level and reported in parentheses. *** Significant at the 1% level, ** significant at the 5% level, * significant at the 10% level.

Table A6: WFH time and the gender gap in housework over time

D.V: Housework time	(1)
WFH time	-0.073***
	(0.009)
The period of the event (May20-Dec20)	23.158***
	(6.127)
1 period after the event (2021)	4.564
	(3.842)
2 periods after the event (2022)	8.177**
	(4.089)
The period of the event (May20-Dec20) x WFH time	-0.042**
	(0.019)
1 period after the event (2021) x WFH time	-0.032**
	(0.016)
2 periods after the event (2022) x WFH time	-0.042**
	(0.018)
The period of the event (May20-Dec20) x WFH time x Male	0.008
	(0.021)
1 period after the event (2021) x WFH time x Male	0.053***
	(0.018)
2 periods after the event (2022) x WFH time x Male	0.008
	(0.018)
Observations	8,811
R-squared	0.046
State FE	Yes
Month FE	Yes

Notes: Data come from the 2015–2022 ATUS. We use a sample of workers between 18 and 64 years old who have a different sex married/unmarried partner present in the household and who report any housework episode on the day of the survey. The dependent variable is the total housework time. We compute the total WFH time as the sum of all working episodes located in the respondent's home reported throughout the day. All regressions include a constant, as well as demographic controls for age, race, educational attainment (college or not), and parenthood status (children in the HH or not). The controls are interacted with the male dummy in columns (2) and (3). Estimates are weighted using ATUS weights. Robust standard errors are clustered at the state level and reported in parentheses. *** Significant at the 1% level, ** significant at the 5% level, * significant at the 10% level.

Appendix B

Table B1. Summary statistics and definitions of ATUS variables

Name	CPS variable	Definition	Mean	S.D.
Outcomes				
Housework time	ACTIVITY reports the respondent's activity. DURATION reports the length of the activity in minutes. The sum of duration for all activities results in one 24-hour period (1440 minutes).	Dummy variable taking value 1 if the respondent devotes any time in the activities "interior cleaning", "laundry", "sewing, repairing, and maintaining textiles", and "storing interior household items including food" with the activity codes from "20100" to "20199"	100.71	97.51
Time devoted to Interior cleaning	See ACTIVITY and DURATION above.	Dummy variable taking value 1 if the respondent devotes any time in the activity "interior cleaning" with the activity code "20101"	93.81	89.32
Time devoted to Laundry	See ACTIVITY and DURATION above.	Dummy variable taking value 1 if the respondent devotes any time in the activity "laundry" with the activity code "20102"	63.71	62.24
Time devoted to storing and Sewing	See ACTIVITY and DURATION above.	Dummy variable taking value 1 if the respondent devotes any time in the activities "sewing, repairing, and maintaining textiles" and "storing interior hh items, including food" with the activity codes "20103" and "20104" and "20105"	35.56	63.38
Prop of housework time with partner	See ACTIVITY and DURATION above. RELATEW reports the relationship to the respondent of the individual with whom the activity was performed.	Dummy variable taking value 1 if the respondent devotes any time in the activities with the activity codes from "20100" to "20199" performed with the "spouse" or "unmarried partner"	0.29	0.43

Total time devoted to childcare	See ACTIVITY above.	Dummy variable taking value 1 if the respondent devotes any time in the activities “caring for and helping household children”, “activities related to household Children's education”, “activities related to household children's health ”with codes from “30101” to “30399”	131.52	123.20
Total time devoted to basic care	See ACTIVITY above	Dummy variable taking value 1 if the respondent devotes any time in the activities “physical care for hh children”, “organization and planning for hh children”, “looking after hh children (as a primary activity)”, “waiting for/with hh children”, “picking up/dropping off hh children”, “caring for and helping hh children (n.e.c.)”, “activities related to hh children's health”, “providing medical care to hh children”, “obtaining medical care for hh children”, waiting associated with hh children's health”, and “activities related to hh child's health (n.e.c.)”	75.10	82.15
Total time devoted to recreational activities	See ACTIVITY above	Dummy variable taking value 1 if the respondent devotes any time in the activities “playing with hh children (not sports)”, “arts and crafts with hh children”, “playing sports with hh children”, and “attending hh children's events”.	117.48	95.65

Total time devoted to educational activities	See ACTIVITY above		Dummy variable taking value 1 if the respondent devotes any time in the activities "reading to/with hh children", "talking with/listening to hh children", "activities related to hh children's education", "homework (hh children)", "meetings and school conferences (hh children)", "home schooling of hh children", "helping or teaching hh children", "waiting associated with hh children's education", and "activities related to hh child's education (n.e.c.)"	51.37	56.04
Individual controls					
Age	AGE gives each person's age at last birthday		Years	43.70	11.08
Male	SEX gives each person's sex. Values of this variable:		Dummy variable equal to 1 if SEX==1	0.27	0.44
	Male	1			
	Female	2			
College	EDUC reports the respondent's highest completed level of education		Dummy variable equal to 1 if EDUC>=30	0.74	0.43
	Less than 1st grade	10			
	1st, 2nd, 3rd, or 4th grade	11			
	5th or 6th grade	12			
	7th or 8th grade	13			
	9th grade	14			
	10th grade	15			
	11th grade	16			
	12th grade - no diploma	17			
	HS diploma, no college				

	High school graduate - GED	20			
	High school graduate diploma	21			
	Some college				
	Some college but no degree	30			
	Associate degree occupational vocational	31			
	Associate degree - academic program	32			
	College degree +				
	Bachelor's degree (BA, AB, BS, etc.)	40			
	Master's degree (MA, MS, MEng, MEd, MSW, etc.)	41			
	Professional school degree (MD, DDS, DVM, etc.)	42			
	Doctoral degree (PhD, EdD, etc.)	43			
White	RACE reports the racial category of all household members		Dummy variable equal to 1 if race=100	0.84	0.35
	White only	100			
	Black only	110			
	American Indian, Alaskan Native	120			
	Asian or Pacific Islander	130			
	Asian only	131			
	Hawaiian Pacific Islander only	132			
	Two or more races	>132			
Children	See RELATE and AGE above		Dummy variable equal to 1 if any of the members in the household reports relate=22	0.70	0.45
Additional variables used in the heterogeneity analysis					

School-aged children	See RELATE and AGE above	Dummy variable equal to 1 if any of the members in the household reports relate=22 and AGE>=6 & AGE<=12	0.35	0.48
Work variables				
Fulltime worker (using a sample HH with both partners employed)	FULLPART indicates whether the individual usually works full time or part time. Full time employment is considered to be 35 or more hours per week Full time 1 Part time 2	Dummy variable equal to 1 if FULLPART=1	0.77	0.51
Employed	EMPSTAT indicates whether persons were part of the labor force--working or seeking work--and, if so, whether they were currently unemployed Employed - at work 1 Employed – absent 2 Unemployed - on layoff 3 Unemployed – looking 4 Not in labor force 5	Dummy variable equal to 1 if EMPSTAT=1 or EMPSTAT==2	0.69	0.45
Partner employed	SPEMPNOT reports whether the respondent's spouse or unmarried partner is employed Not employed 0 Employed 1	Dummy variable equal to 1 if SPEMPNOT=1	0.82	0.37
Occupation (using a sample HH with both partners employed)	OCC reports the four-digit Census occupational code for the respondent's main job. "occupation" relates to the worker's specific technical function. IND reports the four-digit Census industry code. More than 250 industries are represented. Management, Business, Science, and Arts Occupations 0010-3540	Dummy variable equal to 1 if OCC>=0010 and OCC<=3540	0.57	0.49

	Service Occupations	3600-4650	Dummy variable equal to 1 if OCC>=3600 and OCC<=4650	0.12	0.32
	Sales and Office Occupations	4700-5940	Dummy variable equal to 1 if OCC>=4700 and OCC<=5940	0.20	0.40
	Natural Resources, Construction, and Maintenance Occupations	6005-7630	Dummy variable equal to 1 if OCC>=6005 and OCC<=7630	0.03	0.18
	Production, Transportation, and Material Moving Occupations	7700-9750	Dummy variable equal to 1 if OCC>=7700 and OCC<=9750	0.06	0.24
	IND reports the type of industry in which the person performed his or her primary occupation. "Industry" refers to the work setting and economic sector.				
	Agriculture, Forestry, Fishing, Hunting, and Mining	0170-0490	Dummy variable equal to 1 if IND>=0170 and IND<=0490	0.01	0.12
	Construction	770	Dummy variable equal to 1 if IND=770	0.03	0.17
Industry (using a sample HH with both partners employed)	Manufacturing	1070-3990	Dummy variable equal to 1 if IND>=1070 and IND<=3990	0.08	0.28
	Wholesale Trade	4070-4590	Dummy variable equal to 1 if IND>=4070 and IND<=4590	0.02	0.14
	Retail Trade	4670-5790	Dummy variable equal to 1 if IND>=4670 and IND<=5790	0.07	0.25
	Transportation	6070-6390, 0570-0690	Dummy variable equal to 1 if (IND>=6070 and IND<=6390) or (IND>=0570 and IND<=0690)	0.03	0.18
	Information	6470-6780	Dummy variable equal to 1 if IND>=6470 and IND<=6780	0.01	0.13
	Financial activities	6870-7190	Dummy variable equal to 1 if IND>=6870 and IND<=7190	0.08	0.27

	Professional and business	7270-7790	Dummy variable equal to 1 if IND>=7270 and IND<=7790	0.13	0.33
	Educational, Health and Social Assistance	7860-8470	Dummy variable equal to 1 if IND>=7860 and IND<=8470	0.34	0.47
	Arts, Entertainment, Recreation, Accommodation and Food Services	8560-8690	Dummy variable equal to 1 if IND>=8560 and IND<=8690	0.05	0.22
	Other Services	8770-9290	Dummy variable equal to 1 if IND>=8770 and IND<=9290	0.04	0.20
	Public Administration	9370-9590	Dummy variable equal to 1 if IND>=9370 and IND<=9590	0.05	0.23
WFH time (using a sample of workers)	See ACTIVITY and DURATION above. WHERE reports the location of the activity		Sum of all minutes per day reported by a respondent in the activities "working" and "work-related activities", with the activity codes from "50101" to "50299" located in "Respondent's home or yard" with where code "101"	34.59	105.86
Public employee	CLWKR reports the worker classification for the respondent's main job Government, federal 1 Government, state 2 Government, local 3 Private, for profit 4 Private, nonprofit 5 Self-employed, incorporated 6 Self-employed, unincorporated 7 Without pay 8 NIU (Not in universe) 99		Dummy variable equal to 1 if CLWKR=1 or CLWKR=2 or CLWKR=3	0.14	0.34
Private employee	See CLWKR above		Dummy variable equal to 1 if CLWKR=4 or CLWKR=5	0.49	0.50
Self-employed	See CLWKR above		Dummy variable equal to 1 if CLWKR=7 or CLWKR=7	0.07	0.26
Unemployed and without pay	See CLWKR above		Dummy variable equal to 1 if CLWKR=99	0.30	0.46