

Encroaching on the Household Sphere: Husbands' Housework Participation and Changes in Gender Role Attitudes within Couples*

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Abstract

This study investigates how rearrangement of division of labor within a household reshapes gender role attitudes. Using the expansion of remote work as a driver of the increase in husbands' engagement in housework, we analyze how this shift in the division of labor affects gender role attitudes of husbands and wives. The results indicate that when husbands worked from home, husbands' own traditional gender role attitudes weakened; by contrast, wives' traditional attitudes strengthened, an effect primarily driven by those who had held traditional views. These findings suggest that wives who strongly value their role in household production react defensively when husbands encroach on their household sphere, thereby reinforcing their support for traditional gender divisions as a means of preserving role identity.

Keywords: *Work from Home, Household Production, Gender Attitudes*

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1 Introduction

As a fundamental source of gender gaps in labor market outcomes, recent studies focus on the role played by the traditional gender norm. The traditional gender norm that men should engage in market production and women should engage in home production limits the time and effort of women allocated to the market production and entails the disadvantages of women in the labor market [Akerlof and Kranton, 2010; Bertrand et al., 2015,0]. Thus revising the traditional gender norm to the one that requires both men and women to be equally responsible for market and home production is necessary to promote gender equality in the labor market.

Regardless of the pressing need for the understanding of the formation of traditional gender norm, the existing knowledge on the formation of traditional gender norm regarding the division of labor is limited [Alesina et al., 2013; Hara and Rodríguez-Planas, 2021]. In particular, how exogenous change in the gender division of labor affects the gender norm is largely unknown. Grasping the effect is indispensable to predict the long term impact of the policy intervention that aims at changing the division of labor within a couple such as the promotion of paternity leave implemented in many developed countries. The effect of policy intervention to change the gender roles within a couple is amplified if the exogenous change in the division of labor alters the gender norm held by the couple, in contrast, if it does not change the norm, the policy impact disappears once the policy is repealed. This study examines how the shift in the division of labor within a couple, resulting from an increased engagement of husbands in household production due to the spread of work from home (WfH), affected the husbands' and wives's norm of division of labor based on gender. To implement the analysis, we utilize online panel surveys conducted in 2019 and annually from 2021 to 2024, for a total of five survey waves. These surveys cover the period from before the onset of COVID-19, through the pandemic when WfH increased, and after the pandemic subsided when people have become accustomed to living with COVID-19 and WfH has become a common form of working. In each wave, we collected information on the extent of involvement in WFH, the allocation of housework within the household, and attitudes toward traditional gender roles. Notably, the data on

attitudes were collected before the pandemic, too, which prevents any possibility of recall bias, which occurs when survey responses conform to recent experiences and events.

Drawing on this panel data, we regress the allocation of household production and attitudes toward traditional gender norms during the pandemic on the frequency of WfH, conditional on past gender attitudes and WfH experience. We use an instrumental variable (IV) approach to address potential endogeneity in the adoption of WfH, using the WfH penetration rate predicted from occupation and industry as the instrumental variable because it captures the feasibility of WfH by occupation and industry.

The analysis reveals that the COVID-19 significantly drove the penetration of WfH; the fraction of work implemented by WfH was about 4% in 2019, but it skyrocketed to 16% in 2021 and stay as high as 10% in 2024. The penetration of WfH decreases in commuting time and substantially relaxes household time constraints that encourages husbands to engage in household production, which includes housework and childcare. Our results show that both husbands and wives perceive that an increase in the frequency of WfH of husbands increases the husband's involvement in home production. Both effects are statistically significant. In sum, we find that the uptake of WfH by husbands substantially shifts the allocation of household production from wives to husbands.

We further demonstrate that engagement in WfH affects attitudes toward traditional gender roles. The gender attitude is based on a statement about gender role: "A husband's job is to earn money and a wife's job is to look after the home and family". We find that intensive involvement in WfH by husbands leads them to have more neutral attitudes toward traditional gender roles not only soon after the onset of the pandemic but also in three years. In contrast, the husbands' WfH strengthens the wives' support of the traditional gender attitude. We further demonstrate that this negative reaction arose from the wives with traditional gender attitudes, those who were raised by mothers not working full-time when they were 15-years olds. We argue that this defensive reaction among traditional wives arises because they feel that the husbands' engagement in house production as the encroachment on their household sphere. In reaction, they reinforce their support for traditional gender divisions as a means of preserving role identity.

Overall, our analysis shows that a husband’s engagement in WfH, presumably through the intensified engagement in home production, substantially changes the gender attitudes of the couple. However, the way husbands and wives react differs substantially. The WfH penetration neutralize the traditional gender attitudes among husbands but elicit defensive response among wives, particularly among wives with traditional attitudes, and make them support traditional gender attitudes. This complex and nuanced reaction among wives explain why the gender attitudes do not evolve in line with the changes in social environment that equalizes the burden of home production between husbands and wives.

This study contributes to the literature in several ways.

First, this study sheds light on possible determinants of long-term societal gender attitudes. Previous studies such as [Akerlof and Kranton \[2000\]](#) and [Akerlof and Kranton \[2010\]](#) theoretically argue for the significance of self-identity as a determinant of peoples’ behavior, and [Bertrand et al. \[2015\]](#) and [Rodríguez-Planas and Tanaka \[2021\]](#) demonstrate the importance of gender norms in explaining observed gender differences in housework and labor supply behaviors. Regarding the formation of gender norms, [Alesina et al. \[2013\]](#) provide a historical argument that traditional farming practices in ancient times have shaped the evolution of norms and beliefs about appropriate gender roles in society. In the medium term, [Fernández et al. \[2004\]](#) provide evidence that maternal employment affects sons’ preferences about gender roles, and [Hara and Rodríguez-Planas \[2021\]](#) show that gender equality in home economics and industrial arts education in childhood helps to equalize attitudes toward traditional gender roles as adults. Looking at more contemporaneous determinants of gender norms, [Dhar et al. \[2018\]](#) show that classroom discussions about gender equality have a positive impact on gender attitudes and [Dahl et al. \[2021\]](#) find that men forced to work side-by-side with women in the Norwegian military changed their attitudes about gender roles. Our study contributes to this strand of literature by demonstrating that a sudden rearrangement of housework affects gender attitudes and contributes to a shift in gender norms in different ways between husbands and wives. The defensive reaction among wives who hold traditional attitude is novel and

provides important explanation why the gender norm is persistent regardless of the social environmental changes such as technological progress and policy interventions.

Second, it informs a small but growing literature examining the impact of WfH during COVID-19 on the time allocation among couples within a household. A few months after the onset of the pandemic, [Alon et al. \[2020\]](#) predicted that the spread of WfH would fundamentally change the roles of husbands and wives within a household as it would enable fathers to take primary responsibility for child care and thus erode gender norms that have led to an unequal division of labor in housework and child care. A few studies have empirically tested it, and to date, the results have been mixed, with [Del Boca et al. \[2020\]](#), [Inoue et al. \[2024\]](#), and [Sevilla and Smith \[2020\]](#) showing that the husband's adoption of WfH increases his contribution to housework, but [Adams-Prassl et al. \[2020\]](#), [Andrew et al. \[2021\]](#), and [Farré et al. \[2020\]](#) finding that the wives' share of household duties increased during the pandemic. This increase in the role of wives in home production despite a relaxation of the time constraint faced by husbands due to the adoption of WfH poses a puzzle, and [Andrew et al. \[2021\]](#) and [Sevilla and Smith \[2020\]](#) conjecture that this result may be due to traditional attitudes about gender roles. In our context, we find that a husband's adoption of WfH both increases his contribution to housework and child care and also causes his attitudes towards gender roles to become more gender neutral. On the other hand, the defensive reaction among wives with traditional attitudes adds twist to the dynamics of the societal gender norm and support the conjectures by [Andrew et al. \[2021\]](#) and [Sevilla and Smith \[2020\]](#).

Third, our study contributes to the literature on the effect of a significant shock on preferences. While economists generally assume that preferences are stable, [Schildberg-Hörisch \[2018\]](#) reviews numerous studies investigating the stability of risk preferences and finds that a substantial exogenous shock such as an economic crisis or natural disaster can change risk preferences. More recently, [Alsharawy et al. \[2021\]](#) find that COVID-19 altered risk, time, and social preferences, and our study adds to this literature by examining the impact of WfH induced by an exogenous pandemic shock on preferences about gender roles in home production.

Fourth, this study contributes to the extensive literature on the impact of technology on resource allocation within a household. As [Barrero et al. \[2021\]](#) articulates, WfH represents a drastic population-wide adoption of new technology, not unlike past examples such as the adoption of electric appliances induced by electrification that mobilized women from home production to market production [[Greenwood et al., 2005](#); [Dinkelman, 2011](#)], or technological advancements in birth control and maternal health that contributed to women’s career advancement [[Goldin and Katz, 2002](#); [Bailey, 2006](#); [Albanesi and Olivetti, 2016](#)]. Our results suggest that the adoption of WfH could have a similar impact on women’s career advancement by freeing up women from home production through the additional time created by WfH.

2 Data

The data for this study was obtained from the *Lifestyle Survey*, a panel dataset with five waves conducted in July 2019 and in February of each year from 2021 to 2024 by the Rakuten Insight, which is a Japanese online panel survey company. The first wave, conducted in 2019 between July 22 and 27, targeted married men and women born between April 1973 and March 1982 (between 37 and 46 years old) to focus on the generation that is currently in the midst of working and raising children.¹ The target number of respondents was 1,750 individuals for each birth year cohort and gender, and the survey continued until the target number was recovered, leading to responses from 15,750 men and 15,750 women (= 1,750 individuals \times 9 birth cohorts for each gender). This survey method was implemented to maximize precision by guaranteeing sufficiently large gender-cohort sample sizes, and the survey asked respondents about their socio-demographic characteristics and attitudes toward traditional gender roles.

The second wave survey, which occurred in February 2021, again asked about attitudes toward traditional gender roles but also the frequency of WfH, hours worked per week, and share of household production of respondents and their spouses as of July 2019 and

¹In Japan, the fiscal and school year begins in April and ends in March the following year, so the respondents were those who were born between FY1973 and FY1981.

February 2021. In addition, the survey inquired about *changes* in the respondent’s share of housework and childcare within a couple and whether there had been any change in their attitudes about the allocation between husband and wife after the spread of COVID-19. Both the *levels* and the *changes* in housework share were surveyed in order to measure changes in housework before and after the onset of COVID-19 in multiple ways. The third to the fifth wave surveys, which occurred in February of each year from 2022 to 2024, covered content similar to the second survey. With each subsequent wave, attrition occurred, and by the fifth survey in 2024, the number of respondents had decreased to 6,182 men and 4,692 women. In this study, we use all the data from the first to the fifth wave surveys.

It should be noted that in our data, the situation of WfH in 2019 was asked retrospectively in the 2021 survey, which may raise concerns about response errors. Although there are not many datasets in Japan that investigated working from home before the COVID-19 pandemic, the “Japan Panel Study of Employment Dynamics (JPSED),”² a highly representative survey, did include such questions, and we compare our results with theirs. According to the 2019 survey, 11.8% of married employed men aged 35–44 were engaging WfH. In our data, 10% of husbands reported WfH in 2019 (Table 1), which is not substantially different from the results of the JPSED survey. Therefore, the response error is likely to be small, and we consider our data to be reliable.

2.1 Sample Construction

The details of how the analysis samples were constructed are summarized in Table A1 in the Appendix. In this paper, we conduct separate analyses for husbands and wives.

First, we describe the baseline sample for 2019. For the husband’s baseline sample, we restricted the respondents of the first survey to those who were employees, and then excluded observations with missing values in the variables necessary for the analysis. We further limited the sample to those who responded to at least one of the 2021–2024 surveys and were living with their wives in the year they responded. As a result, the analysis

²It has been conducted by the Recruit Works Institute every year since 2016.

sample for husbands consists of 4,952 individuals.

For the wife’s baseline sample, we restricted the sample to those whose husbands were employees and followed the same procedure as for the husband’s sample, resulting in 3,177 individuals.

In the following analysis, the post-pandemic years 2021–2024 are grouped together as “after.” The data for each year from 2021 to 2024 comprise respondents who responded in both 2019 and the corresponding year, with the sample sizes for each year listed in Table A2 in the Appendix. Accordingly, the pooled sample sizes of husbands and wives across 2019 and 2021–2024 are 24,275 and 15,050, respectively.

2.2 Variables and Descriptive Statistics

Table 1 presents the descriptive statistics of the baseline samples separately for the husband sample and the wife sample. It should be noted that the wife sample does not represent the spouses of the husband sample, nor vice versa; rather, they are independent samples.

In 2019, both husbands and wives were about 41 years old on average. The average age of husbands’ spouses (i.e., their own wives) was 41.1 years, while the average age of wives’ spouses (i.e., their own husbands) was slightly higher at 43.95 years. Both husbands and wives had at least one child. The share of university or graduate degree holders was 66% in the husband sample and 40% in the wife sample, indicating that the husband sample was more highly educated.

As for the husbands’ occupations, the proportion in professional and engineering, administrative and managerial, clerical, and sales positions is high, but the proportion of service workers is only 7%.

The survey also inquires about attitudes toward traditional gender roles by asking respondents whether they agree or disagree with the following statement: A husband’s job is to earn money and a wife’s job is to look after the home and family. Respondents choose one of five options: strongly agree, agree, neither agree nor disagree, disagree and strongly disagree. Looking at the distribution of these responses in the baseline husband

sample in Table 1, about half are neutral, 25% strongly agree or agree, and 24% strongly disagree or disagree, making the latter two groups nearly the same in proportion.

The survey asks about engagement in WfH both at the extensive and intensive margins by first asking whether the respondent and his/her spouse engaged in WfH and, if the response was yes, how frequently both the respondent and their spouse engaged in WfH in July 2019 and in February 2021, choosing from among the following options: 1) more than 80%, 2) 50–79%, 3) 20–49%, and 4) 19% or less. A WfH dummy variable taking one if the respondent chose one of the above four WfH frequency options, and zero otherwise. A reassuring point is that the figures reported by wives for their husbands (7%) are broadly consistent with the husbands' own reports (10%).

To capture the intensity of engagement in WfH, we converted the categorical variable of WfH frequency to a continuous measure by using the mid-point of each category.³ Including those who did not engage in WfH, WfH amounted to 4% of total hours worked in 2019 for husbands. Again, reassuring is that the figures for husbands reported by their wives are broadly consistent (3%). To summarize, the consistency of the self-reported and spouse-reported data provide further reassurance that the survey has accurately captured WfH engagement.

Figure 1 illustrates the change in husbands' WfH frequency. The blue line represents the values reported by husbands themselves, which exceeded 15% one year after the outbreak of the pandemic in 2021, reaching a very high level, but then gradually declined. Nevertheless, in 2024 it remains at 10%, more than twice the level in 2019 before the pandemic. The figures reported by wives regarding their husbands' WfH frequency (the red line) are smaller than the husbands' self-reported figures, but they show the same pattern.⁴

³We use 0.9 if 1) more than 80%, 0.65 if 2) 50–79%, 0.35 if 3) 20–49%, 0.10 if 4) 19% or less, and 0 if the respondent did not engage in WfH.

⁴The time series of the WfH incidence by the government statistics well overlap with the trends in our survey. According to the annual Telework Population Survey conducted by Japan's Ministry of Land, Infrastructure, Transport and Tourism (MLIT), the share of employees engaging in telework rose sharply from about 10 percent before the COVID-19 pandemic to 23 percent in 2020, and further to 27 percent in 2021. Thereafter, the rate declined slightly to 26 percent in 2022 and 25 percent in 2023, stabilizing at 25 percent in 2024. These figures suggest that telework implementation, after peaking during the pandemic, has settled at roughly one quarter of the workforce—more than double the pre-pandemic level.

Next, Table 2 presents the average values of the outcome variables from 2021 to 2024, such as variables related to home production and attitudes toward gender roles, by the degree of husbands' feasibility of WfH (high vs. low). A husband's WfH feasibility is based on the share of individuals in the same industry and occupation who enrolled WfH in 2019. Low WfH feasibility indicates a value below the median; high feasibility indicates a value above the median.

The first question asks how the roles of each spouse in household production have changed in the wake of the spread of COVID-19, with the respondent required to answer among five options.⁵ Panel A shows that husbands with a higher feasibility of working from home evaluated themselves as having increased their share of housework more after the pandemic. Panel B also indicates that wives with husbands who had a higher feasibility of working from home reported that their husbands increased their share of housework more after the pandemic.

The second question is what changes you expect to see in the division of household responsibilities after COVID is under control. Panel A shows that husbands with a higher feasibility of WfH expect to increase their share of housework after the pandemic subsides. Panel B also indicates that wives with husbands who have a higher feasibility of WfH expect their husbands to increase their share of housework more after the pandemic.

Finally, looking at attitudes toward gender role division, Panel A shows that there is no major difference in the distribution between husbands with high and low feasibility of WfH. In contrast, Panel B shows that among wives whose husbands have a higher feasibility of WfH, the share of those opposing gender role division has decreased, while the share of those agreeing has slightly increased.

3 Econometric Framework

We explain the econometric model that captures the changes in the household production within a couple and the gender role attitudes caused by the husbands' adoption

⁵They are 1) the husband's role increased, 2) the husband's role increased somewhat, 3) neither the husband's nor the wife's role changed, 4) the wife's role increased somewhat, and 5) the wife's role increased.

of work from home (WfH): these outcome variables for an individual i and in year t ($t = 2021, \dots, 2024$) are denoted by Y_{it} . It should be noted that the WfH variable for an husband i in t (WfH_{it}^m) is endogenous, so we employ a control function approach in which OLS is applied in the first stage, and an ordered probit model with the estimated residual from the first stage in the second stage because the outcome variable is ordinal, as explained in the previous section.

As we are concerned about possible endogeneity in the adoption of WfH after the onset of COVID-19, we address this concern with the control function approach. The concern about endogeneity arises because a shock for household production affects both the share performed by husbands and wives and the adoption of WfH. For example, a school closure can cause a rearrangement in the share of childcare among couples while also encouraging the adoption of WfH to accommodate the increased need for child care. To address this endogeneity, we chose an instrumental variable that exploits the heterogeneity in the adoption of WfH during the pandemic.

Our IV is the share of working hours spent working from home in 2019 by industry and occupation for husbands ($WfHShare_{ind_{2019}(i), occ_{2019}(i), 2019}$). This variable serves as a proxy for the technological feasibility of remote work, since if a husband is employed in an industry or occupation where WfH is technically possible, he is more likely to actually engage in WfH.

Figure A1 in the Appendix illustrates the relationship between the share of individuals working from home in 2019 and the frequency of working from home during 2021–2024, where each circle represents an industry (16 categories) \times occupation (10 categories) combination. The figure shows that individuals employed in industry–occupation cells with a higher share of remote workers in 2019 tended to work from home more frequently in each year from 2021 to 2024. Given the strong correlation between the share of individual’s WfH and the 2019 industry–occupation-level share of working hours spent WfH, we specify

the following equation as the first-stage equation:

$$\begin{aligned}
WfH_{it}^m = & \alpha_1 + \alpha_2 WfHShare_{ind_{2019}(i), occ_{2019}(i), 2019} + \alpha_3 WfH_{i, 2019}^m \\
& + \alpha_4 Y_{i, 2019} + X_{i, 2019} \alpha_5 + \phi_t + e_{it},
\end{aligned} \tag{1}$$

where $t = 2021, \dots, 2024$ using OLS. Our IV for WfH frequency that captures these technological determinants of WfH adoption is *predicted* WfH frequency based on occupation and industry, and individual characteristics (sex, age, whether the person has children aged 7–13, and the number of children aged 7–13) in 2019. Note that the sharing of household production and gender attitudes are likely to be heterogeneous across occupations, industry, and the location of the respondents, but this pre-existing heterogeneity is captured by the lagged dependent variable Y_{i0} . Thus, we may assume that any occupation, industry, or regional heterogeneity in the adoption of WfH is as good as random, conditional on the gender role attitudes and WfH arrangement before COVID-19 (i.e., Y_{i0} and WfH_{i0}), thus satisfying the exclusion restrictions.

The second-stage estimation equation is specified as follows, where the latent variable Y^* is specified as follows:

$$Y_{it}^* = \beta_0 + \beta_1 WfH_{it}^m + \beta_2 WfH_{i, 2019}^m + \beta_3 Y_{i, 2019} + X_{i, 2019} \beta_6 + \beta_7 \hat{e}_{it} + \mu_t + u_{it}, \tag{2}$$

where \hat{e}_{it} is the residual from the first-stage equation. We estimate the Equation (2) using an ordered probit model, and bootstrapped standard errors are estimated. The WfH variable, variables related to home production, and the gender role attitudes variable depend on their previous state; therefore, to capture any pre-existing heterogeneity in the sharing of housework or in gender attitudes, both of which can be correlated with the adoption of the WfH, we control for their state in 2019 ($WfH_{i, 2019}, Y_{i, 2019}$). We also control for basic characteristics in 2019 ($X_{i, 2019}$).

When estimating the effect of the husband’s working from home on the wife’s gender role attitudes, we use the wife’s reports for all variables concerning the husband.

4 Impact of husbands' WfH on their perception

First, we examine the effects of an increase in WfH on the subjective change in the division of household production between husbands and wives, using Equations (1) and (2). The survey asks how the relative share changed during the COVID-19 pandemic, with the respondent choosing one item from the following categories: 1) husband's role increased; 2) husband's role increased somewhat; 3) neither husband's nor wife's roles changed; 4) wife's role increased somewhat; 5) wife's role increased.

To examine the subjective changes in household production, we estimate an ordered Probit model using each response category as the dependent variable and calculate the marginal effect of WfH frequency on the choice probability of each response. Figure 2 shows the results of the ordered probit regression with the control function for husbands, and we see that an increase in WfH by men causes an increase in their likelihood to perceive that they have increased their share of home production. The results using the expected change in the home production share reported in Figure 3 reassure the robustness of the results. In sum, the increased engagement in WfH increases the husbands' share in the household production.

We next examine how the engagement in WfH affect the support for the traditional gender attitude. Figure 4 reports the marginal effect of WfH on the choice probability of the responses to the question whether the respondent agree with the statement that "A husband's job is to earn money, and a wife's job is to look after the home and family." The figure shows that the increase in the WfH engagement increases the choice probability to disagree with the statement and decreases the choice probability to agree with the statement. Therefore, the WfH engagement neutralize the husbands' traditional gender attitude.

To summarize, husbands' engagement in WfH makes them feel that they have increased their share of home production. Also their engagement in WfH makes their gender norm neutral.

5 Impact of husbands' WfH on their wives' perception

We next examine the effects of an increase in husbands' WfH on the subjective change in the division of household production perceived by wives. Figure 5 shows the results of the ordered probit regression with the control function. We find that an increase in WfH by husbands causes an increase in their wives' likelihood to perceive that their husbands' have increased the share of home production. The results using the expected change in the home production share reported in Figure 6 reassure the robustness of the results. In sum, the increased engagement in WfH increases the husbands' share in the household production according to the perception held by wives. This finding reassures the robustness of the results based on the perception of husbands.

We next examine how the husbands' engagement in WfH affect their wives' support for the traditional gender attitude. Figure 7 reports the marginal effect of WfH on the choice probability of the responses to the question whether the respondent agree with the statement that "A husband's job is to earn money, and a wife's job is to look after the home and family." The figure shows that the increase in the husbands' WfH engagement increases the choice probability to agree with the statement and decreases the choice probability to disagree with the statement. Therefore, the husbands' WfH engagement makes their wives' gender attitude more conservative.

6 Why Did Wives Adopt More Traditional Attitudes?

6.1 Heterogeneity Check

When husbands engaged in WfH and took on more housework, why did wives come to hold more traditional gender role attitudes? In this section, to shed light on the underlying mechanism, we conduct an analysis by dividing the sample into those who originally held traditional gender role attitudes and those who did not.

We can assume that gender role attitudes are influenced by how one's parents behaved

during childhood. For example, if someone's mother worked full-time when they were a child, that person is likely to develop a neutral attitude, thinking that it is normal for mothers to work. Conversely, if their mother was a full-time homemaker, the person is likely to develop a traditional attitude, believing that it is natural for mothers to stay at home. Therefore, here we identify a person's baseline attitude by the mother's employment status when the person was 15 years old. Specifically, if the person's mother was employed as a regular worker or an executive officer at that time, we classify the person as having a neutral attitude; otherwise, we assume the person holds a traditional attitude.

To confirm the appropriateness of this grouping, we conducted an ordered probit analysis of the relationship between baseline gender role attitudes and the mother's full-time employment status at age 15, and reported the average marginal effects in Figure 8. The results for the husband sample are in Panel A, and the results for the wife sample are in Panel B. From these results, we can see that for both men and women, the more their mothers were employed full-time when they were 15, the more likely they are to oppose traditional gender roles, that is, to have a neutral view on the division of labor. Furthermore, this tendency is stronger among women. Therefore, we consider it appropriate to use the mother's full-time employment status at age 15 as an identifier for a person's original views.

In Figure 9, Panels A and B show the estimated changes in husbands' gender role attitudes when they work from home (WfH), separated by whether their mothers had full-time employment or not. In both panels, it is clear that WfH leads to a more neutral gender attitude, meaning more husbands develop views that oppose traditional gender roles. The interesting finding, however, is that this shift is more pronounced among husbands who were originally more neutral in their views. In Panel A, husbands who WfH are 34 percentage points more likely to strongly oppose traditional roles, while in Panel B, this increase is only 4 percentage points. Conversely, strong support for traditional roles decreases by 6 percentage points in Panel A but only by 2 percentage points in Panel B. This suggests that husbands' attitudes shift in response to the changes in their own roles.

Next, let's look at the results for the wife sample. When we examine the gender attitudes of wives whose husbands worked from home, we find that for wives who were already neutral in their views (Panel C), their opposition to the traditional division of labor becomes statistically significant when their husbands WfH. This means, similar to the husband sample, wives who were originally neutral in their views become even more neutral in their attitudes toward gender roles when their husbands work from home.

On the other hand, wives with traditional views showed a different outcome. When their husbands worked from home, these wives were more likely to support traditional gender roles (a 6-percentage-point increase for “strongly agree” and a 10-percentage-point increase for “agree”), while those who opposed them decreased significantly (a 13-percentage-point decrease for “strongly disagree” and a 6-percentage-point decrease for “disagree”).

This suggests that wives with traditional views are driving the overall results for the entire wife sample. While others—including wives with neutral views and husbands—changed their attitudes in line with an increase in household chores due to working from home, wives who were originally traditional showed a change in attitude that seems to negate their husbands' increased participation in household tasks.

6.2 Interpretation

Previous research, including historical studies, has made it clear that a person's behavior shapes their attitudes. For example, [Alesina et al. \[2013\]](#) demonstrates that the division of labor in agriculture directly shaped people's attitudes. Therefore, it is expected that husbands' increased participation in housework will neutralize the attitudes of both husbands and wives. Furthermore, a dominant finding in sociological research has been that an increase in husbands' housework makes wives' gender attitudes more egalitarian. For example, it has been shown that people who exhibited traditional attitudes despite having a gender-neutral lifestyle shifted to more neutral attitudes in the following period [[Kroska and Elman, 2009](#)].

In contrast, research in the fields of sociology and social psychology has accumulated

evidence suggesting that this is not always the case. One of the explanations that has been attempted is from the perspective of boundary work or role identity.

Boundary theory posits that people set boundaries for each role, and when a desired boundary is violated, it increases strain. It suggests that an intrusion into one’s “domain,” even within the family sphere, can become a burden [Kreiner et al., 2009]. Identity theory explains that role identity stabilizes when it is “verified,” including through the behavior of others, and that non-verification generates negative emotions [Burke, 2020]. A common implication of both theories is that for a wife who values traditional norms, an increase in her husband’s housework may be experienced as an intrusion of a “role boundary” or a threat to her own role identity. The higher the perceived threat, the more likely a defensive reaction may emerge to restore self-consistency by “more strongly affirming” existing norms (traditional role views).

Secondly, Jost and Banaji [1994] theoretically explains the concept of stereotypes (role identities) from the psychological process of “system justification.” This refers to a psychological process that contributes to maintaining existing social arrangements, even at the expense of individual or group interests. The concept of system justification is argued to be a necessary theoretical hypothesis for explaining why individuals and groups in a disadvantaged position endorse negative stereotypes about themselves.⁶

In short, a wife with traditional views places a high value on her role as the primary manager of the household economy. When she perceives her husband as encroaching upon this role, she may adopt a defensive posture, leading her to endorse a more traditional division of labor as a way of protecting her own role identity.

7 Conclusion

This paper has shown that the rapid spread of working from home during COVID-19 not only shifted the allocation of household production from wives to husbands, but also reshaped gender role attitudes within couples. While husbands’ engagement in housework

⁶Relevant empirical papers that support system justification in relation to the gender division of labor include Verniers et al. [2022], and Jost and Kay [2005].

and childcare led them to adopt more neutral views of gender roles, wives with traditional orientations responded defensively, reinforcing their support for conventional divisions of labor. These asymmetric reactions highlight a key reason why gender norms remain persistent even when social and technological changes relax time constraints and encourage more equal sharing of home production. The findings underscore that the long-term impact of policies promoting gender equality depends critically on whether changes in behavior translate into lasting changes in underlying norms.

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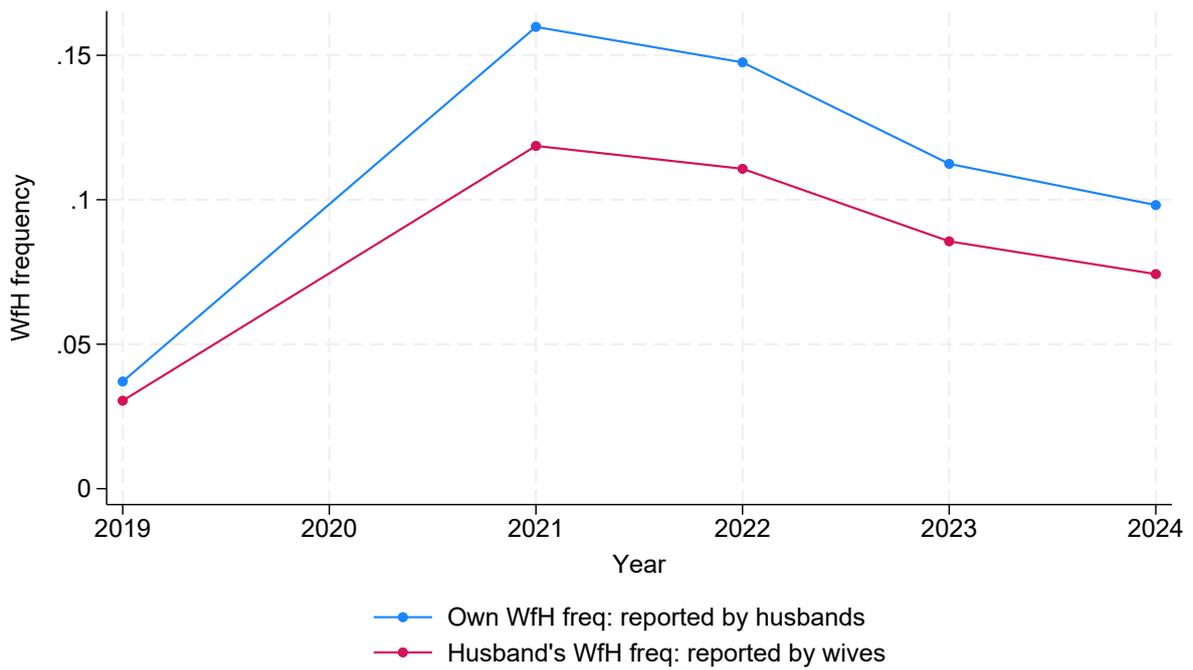


Figure 1: WfH frequency of husbands over time

Notes: These figures present trends in WfH frequency as reported by husbands (blue line) and wives (red line). WfH frequency is the weekly frequency of WfH, converted from responses to how much the husband engages in WfH, with the following options: 1) more than 80%, 2) 50–79%, 3) 20–49%, 4) 19% or less, and 5) 0%. We converted this categorical variable into a continuous measure by using the midpoint of each category: 0.9 for more than 80%, 0.65 for 50–79%, 0.35 for 20–49%, 0.10 for 19% or less, and 0 for those who do not engage in any WfH.

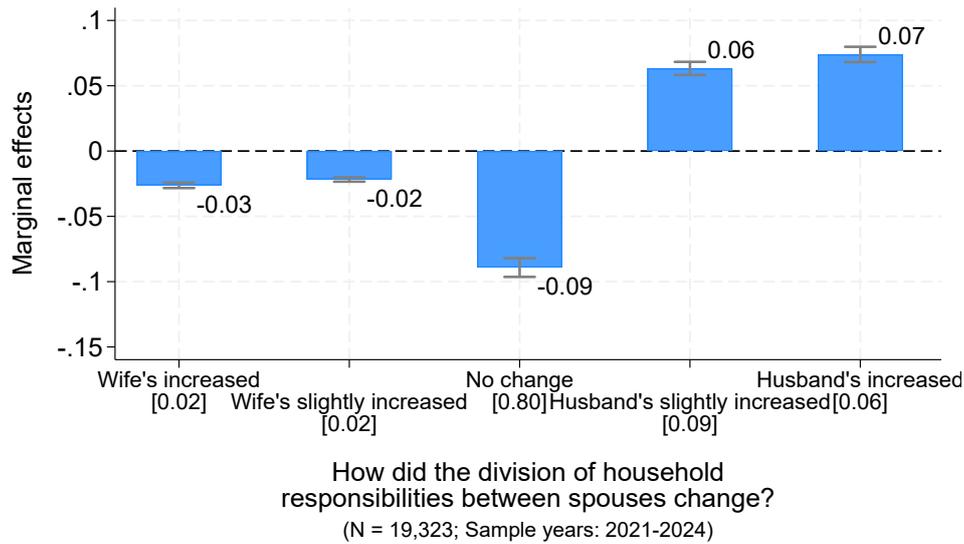


Figure 2: Effects of husband's WfH on his perception of home production share

Notes: This figure displays the average marginal effects and 95% confidence intervals of a husband's WfH frequency on his perception of the home production share (How has the division of household responsibilities between spouses changed?). The marginal effects are derived from ordered probit estimates using a control function approach, of which in the first stage, the husband's actual WfH frequency is regressed on his occupation \times industry average WfH share in 2019, along with the following covariates: husband's home production share in 2019, husband's WfH frequency in 2019, husband's and wife's birth cohort dummies, education dummies (four categories), dummies for 2019 prefecture of residence, number of children in 2019, and year dummies. Shares of each response for husbands who do not engage in any WfH are reported in square brackets. The confidence intervals are based on bootstrap standard errors computed over 50 iterations.

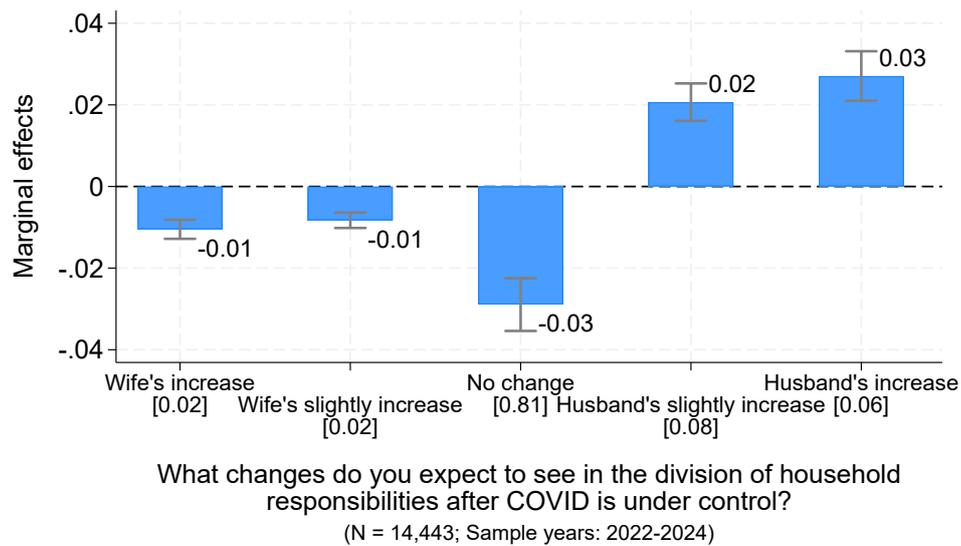


Figure 3: Effects of husband's WfH on his expectation of household responsibilities after COVID

Notes: This figure displays the average marginal effects and 95% confidence intervals of a husband's WfH frequency on his expectation of the home production share after COVID is under control (What changes do you expect to see in the division of household responsibilities after COVID is under control?). The marginal effects are derived from ordered probit estimates using a control function approach, of which in the first stage, the husband's actual WfH frequency is regressed on his occupation \times industry average WfH share in 2019, along with the following covariates: husband's home production share in 2019, husband's WfH frequency in 2019, husband's and wife's birth cohort dummies, education dummies (four categories), dummies for 2019 prefecture of residence, number of children in 2019, and year dummies. Shares of each response for husbands who do not engage in any WfH are reported in square brackets. The confidence intervals are based on bootstrap standard errors computed over 50 iterations.

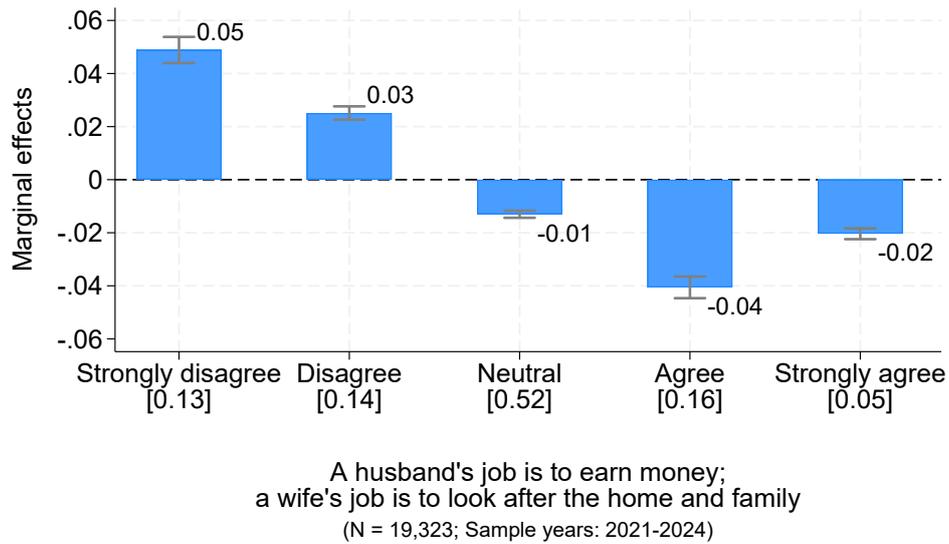


Figure 4: Effects of husband's WfH on his gender norm

Notes: This figure displays the average marginal effects and 95% confidence intervals of a husband's WfH frequency on his gender views (Do you agree/disagree with the following statement: a husband's job is to earn money; and a wife's job is to look after the home and family). The marginal effects are derived from ordered probit estimates using a control function approach, of which in the first stage, the husband's actual WfH frequency is regressed on his occupation×industry average WfH share in 2019, along with the following covariates: dummies of husband's gender view in 2019 (five categories), husband's WfH frequency in 2019, husband's and wife's birth cohort dummies, education dummies (four categories), dummies for 2019 prefecture of residence, number of children in 2019, and year dummies. Shares of each response for husbands who do not engage in any WfH are reported in square brackets. The confidence intervals are based on bootstrap standard errors computed over 50 iterations.

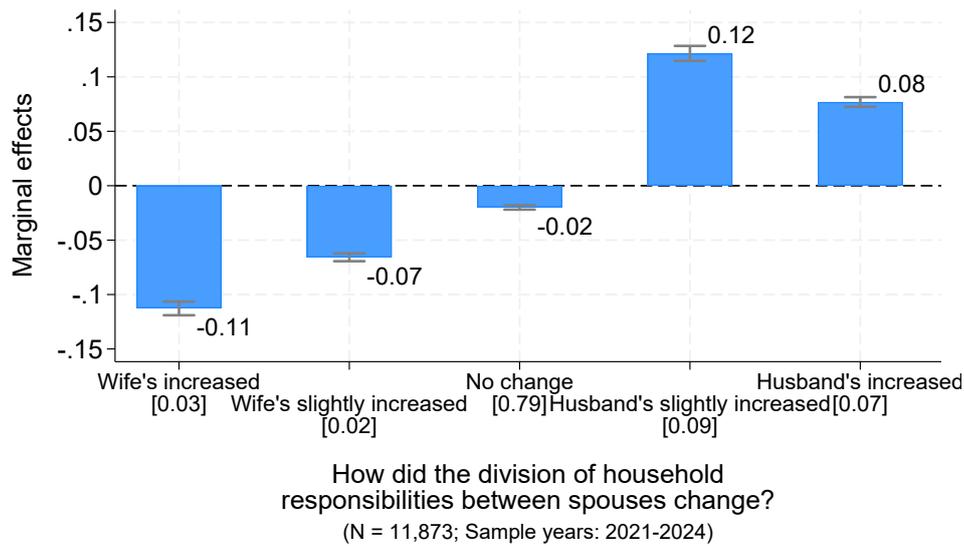


Figure 5: Effects of husband's WfH on wife's perception of home production share

Notes: This figure displays the average marginal effects and 95% confidence intervals of a husband's WfH frequency on wife's perception of the home production share (How has the division of household responsibilities between spouses changed?). The marginal effects are derived from ordered probit estimates using a control function approach, of which in the first stage, the husband's actual WfH frequency is regressed on his occupation×industry average WfH share in 2019, along with the following covariates: wife's home production share in 2019, husband's WfH frequency in 2019, husband's and wife's birth cohort dummies, education dummies (four categories), dummies for 2019 prefecture of residence, number of children in 2019, and year dummies. Shares of each response for wives whose husband does not engage in any WfH are reported in square brackets. The confidence intervals are based on bootstrap standard errors computed over 50 iterations.

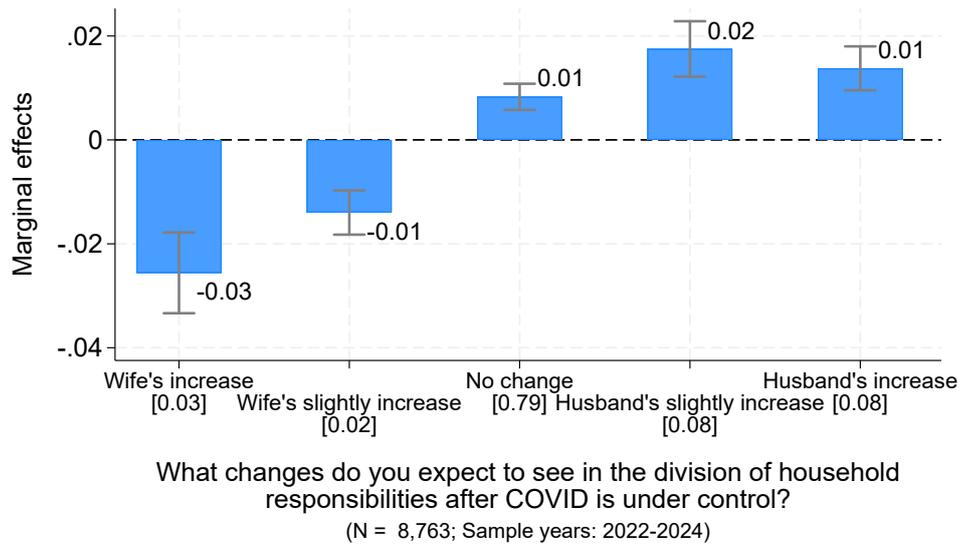
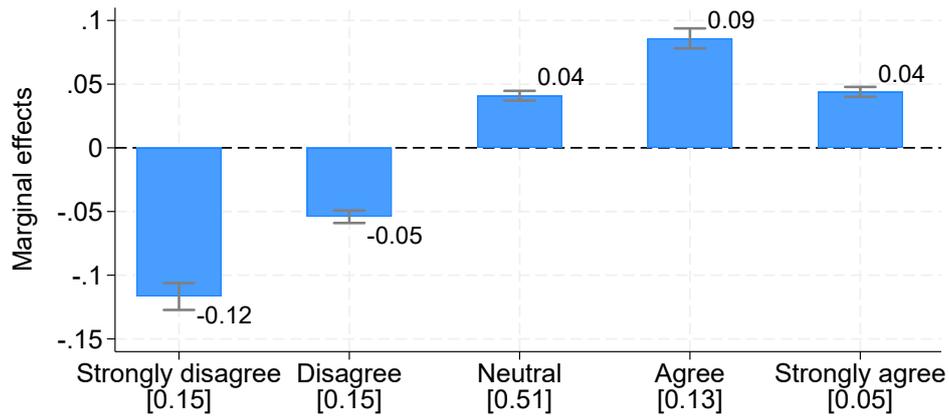


Figure 6: Effects of husband’s WfH on wife’s expectation of household responsibilities after COVID

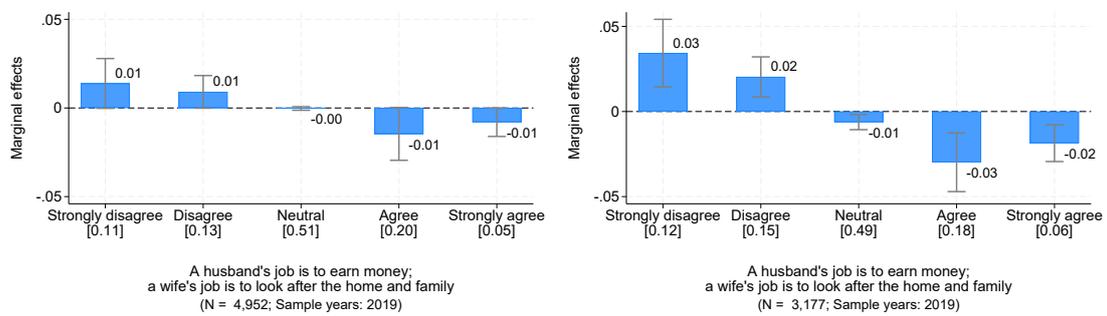
Notes: This figure displays the average marginal effects and 95% confidence intervals of a husband’s WfH frequency on wife’s expectation of the home production share after COVID is under control (What changes do you expect to see in the division of household responsibilities after COVID is under control?). The marginal effects are derived from ordered probit estimates using a control function approach, of which in the first stage, the husband’s actual WfH frequency is regressed on his occupation×industry average WfH share in 2019, along with the following covariates: wife’s home production share in 2019, husband’s WfH frequency in 2019, husband’s and wife’s birth cohort dummies, education dummies (four categories), dummies for 2019 prefecture of residence, number of children in 2019, and year dummies. Shares of each response for wives whose husband does not engage in any WfH are reported in square brackets. The confidence intervals are based on bootstrap standard errors computed over 50 iterations.



A husband's job is to earn money;
a wife's job is to look after the home and family
(N = 11,873; Sample years: 2021-2024)

Figure 7: Effects of husband's WfH on wife's gender norm

Notes: This figure displays the average marginal effects and 95% confidence intervals of a husband's WfH frequency on wife's gender views (Do you agree/disagree with the following statement: a husband's job is to earn money; and a wife's job is to look after the home and family). The marginal effects are derived from ordered probit estimates using a control function approach, of which in the first stage, the husband's actual WfH frequency is regressed on his occupation \times industry average WfH share in 2019, along with the following covariates: dummies of wife's gender view in 2019 (five categories), husband's WfH frequency in 2019, husband's and wife's birth cohort dummies, education dummies (four categories), dummies for 2019 prefecture of residence, number of children in 2019, and year dummies. Shares of each response for wives whose husband does not engage in any WfH are reported in square brackets. The confidence intervals are based on bootstrap standard errors computed over 50 iterations.

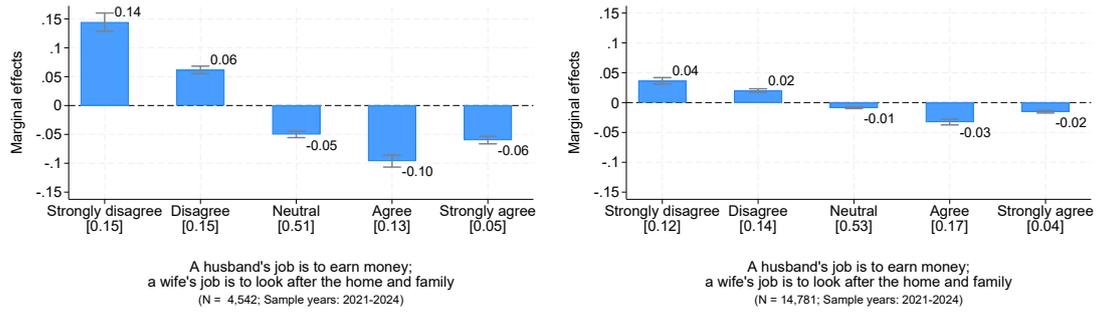


(a) Husband sample

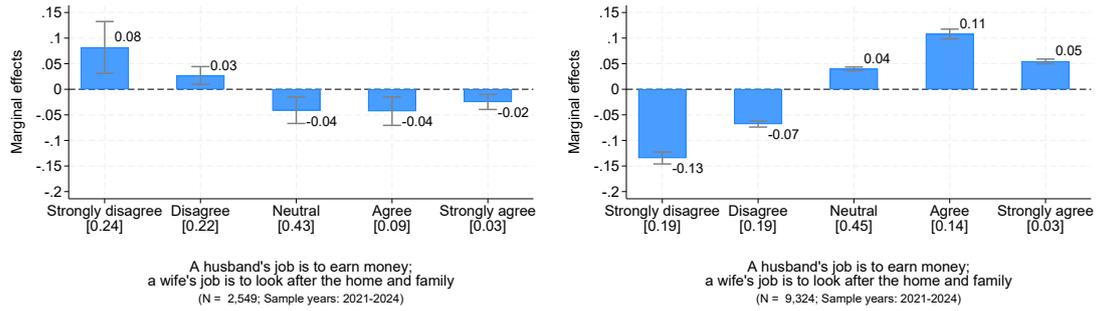
(b) Wife sample

Figure 8: Relationship between mother’s full-time employment status as of age 15 and gender norm in 2019

Notes: These figures show the average marginal effects and 95% confidence intervals of whether their mother was in full-time employment on gender views in 2019 of husbands (Panel a) and wives (Panel b). The person’s mother was in full-time employment if their mother was employed as a regular worker or an executive officer when the person was 15 years old. This excludes self-employment, home-based work, temporary work, non-employment, and cases where the mother’s employment status is unknown. Shares of each response for those whose mother was not in full-time employment are reported in square brackets. The confidence intervals are based on robust standard errors.



(a) Effects of husband's WfH on his gender norm: mother in full-time employment (b) Effects of husband's WfH on his gender norm: mother not in full-time employment



(c) Effects of husband's WfH on wife's gender norm: mother in full-time employment (d) Effects of husband's WfH on wife's gender norm: mother not in full-time employment

Figure 9: Effects of husband's WfH on gender norm: by mother's full-time employment status as of age 15

Notes: These figures display the average marginal effects and 95% confidence intervals of a husband's WfH frequency on his gender views (Do you agree/disagree with the following statement: a husband's job is to earn money; and a wife's job is to look after the home and family) (Figure a), and that of husband's WfH frequency on wife's gender views (Figure b) by mother's employment status when they were 15 years old. The marginal effects are derived from ordered probit estimates using a control function approach, of which in the first stage, the husband's actual WfH frequency is regressed on his occupation \times industry average WfH share in 2019, along with the following covariates: dummies of husband's gender view in 2019 (five categories) for Figure a and dummies of wife's gender view in 2019 (five categories) for Figure b, husband's WfH frequency in 2019, husband's and wife's birth cohort dummies, education dummies (four categories), dummies for 2019 prefecture of residence, number of children in 2019, and year dummies. Numbers in square brackets show the shares of each response for husbands who do not engage in any WfH, and for wives whose husbands do not engage in any WfH. The confidence intervals are based on bootstrap standard errors computed over 50 iterations.

Table 1: Summary statistics at baseline (2019)

	(1)		(2)	
	Husband		Wife	
	Mean	SD	Mean	SD
Age	41.71	2.55	41.61	2.58
Spouse's age	41.10	4.82	43.94	5.13
Number of children	1.55	0.98	1.24	1.02
College graduate	0.66	0.47	0.40	0.49
Mother in full-time employment at age 15	0.24	0.42	0.22	0.41
Own occupation (if husband)/husband's occupation (if wife)				
Service worker	0.07	0.26	0.10	0.30
Security officer	0.02	0.13	0.01	0.09
Agricultural worker	0.00	0.04	0.00	0.05
Logistics and telecom worker	0.04	0.19	0.05	0.23
Production and labor worker	0.08	0.27	0.06	0.25
Manager	0.15	0.36	0.13	0.34
Office clerk	0.16	0.36	0.14	0.34
Salesperson	0.15	0.36	0.14	0.34
Professional/technician	0.30	0.46	0.31	0.46
Others/unknown	0.04	0.19	0.07	0.25
Own industry (if husband)/husband's industry (if wife)				
Agriculture, forestry, and fisheries	0.00	0.05	0.00	0.06
Mining	0.00	0.00	0.00	0.00
Construction	0.06	0.24	0.07	0.25
Manufacturing	0.25	0.43	0.24	0.43
Electricity, gas, heat supply	0.02	0.13	0.03	0.17
Information and communications	0.07	0.26	0.05	0.22
Transportation	0.06	0.24	0.07	0.26
Wholesale and retail trade	0.09	0.28	0.08	0.28
Food and beverage retail	0.00	0.03	0.00	0.06
Finance and insurance	0.04	0.21	0.04	0.20
Real estate	0.02	0.14	0.02	0.14
Restaurants and lodging	0.01	0.11	0.01	0.12
Medical and welfare	0.08	0.27	0.06	0.24
Education	0.05	0.22	0.03	0.18
Service	0.10	0.30	0.10	0.30
Public service	0.10	0.30	0.07	0.26
Others/unknown	0.04	0.21	0.11	0.31
Own (if husband)/Husband's WfH (if wife) (0: No WfH, 1: some WfH)	0.10	0.31	0.07	0.26
Own WfH frequency (if husband)/Husband's WfH frequency (if wife) (0-100%)	0.04	0.15	0.03	0.14
Share of home production (0-100)	27.83	23.07	78.28	27.61
Do you agree/disagree with the following statement: A husband's job is to earn money; a wife's job is to look after the home and family				
Strongly disagree	0.11	0.32	0.13	0.34
Disagree	0.14	0.34	0.16	0.36
Neutral	0.50	0.50	0.48	0.50
Agree	0.19	0.39	0.17	0.38
Strongly agree	0.05	0.23	0.06	0.23
Observations	4,952		3,177	

Notes: This table shows the summary statistics at baseline in 2019. *Mother in full-time employment* equals one if the person's mother was in full-time employment when the person was 15 years old. Full-time employment includes any regular employment and executive officers, excluding self-employment, home-based work, temporary work, non-employment, and cases where the mother's employment status is unknown. *WfH* equals one if the individual reports any WfH. *WfH frequency* is the weekly frequency of WfH, converted from responses to how much the husband engages in WfH, with the following options: 1) more than 80%, 2) 50–79%, 3) 20–49%, and 4) 19% or less. We converted this categorical variable into a continuous measure by using the midpoint of each category: 0.9 for more than 80%, 0.65 for 50–79%, 0.35 for 20–49%, 0.10 for 19% or less, and 0 for those who do not engage in any WfH. *Share of home production* refers to the proportion of home production tasks split between the person and their spouse.

Table 2: Summary statistics (2021–2024)

	(1)	(2)	(3)
	Husband's WfH feasibility		
	High	Low	
	Mean [SD]	Mean [SD]	High - Low (SE)
Panel A: Husband sample			
How has the division of household responsibilities between spouses changed? ($N^{High} = 9,779$; $N^{Low} = 9,544$)			
Wife's has increased	0.02 [0.14]	0.02 [0.15]	-0.00 (0.00)
Wife's has slightly increased	0.02 [0.16]	0.02 [0.15]	0.00 (0.00)
No change	0.73 [0.44]	0.78 [0.41]	-0.06*** (0.01)
Husband's has slightly increased	0.14 [0.34]	0.10 [0.30]	0.04*** (0.00)
Husband's has increased	0.09 [0.29]	0.07 [0.26]	0.02*** (0.00)
What changes do you expect to see in the division of household responsibilities after COVID is under control? ($N^{High} = 7,300$; $N^{Low} = 7,143$)			
Wife's to increase	0.02 [0.15]	0.02 [0.15]	0.00 (0.00)
Wife's to slightly increase	0.03 [0.16]	0.02 [0.15]	0.00 (0.00)
No change	0.76 [0.43]	0.80 [0.40]	-0.04*** (0.01)
Husband's to slightly increase	0.11 [0.31]	0.08 [0.28]	0.02*** (0.00)
Husband's to increase	0.08 [0.27]	0.07 [0.26]	0.01* (0.00)
Do you agree/disagree with the following statement: a husband's job is to earn money; and a wife's job is to look after the home and family ($N^{High} = 9,779$; $N^{Low} = 9,544$)			
Strongly disagree	0.14 [0.35]	0.14 [0.35]	0.00 (0.00)
Disagree	0.15 [0.35]	0.14 [0.34]	0.01* (0.01)
Neutral	0.52 [0.50]	0.53 [0.50]	-0.01 (0.01)
Agree	0.15 [0.36]	0.15 [0.36]	-0.00 (0.01)
Strongly agree	0.04 [0.20]	0.04 [0.21]	-0.00 (0.00)
Panel B: Wife sample			
How has the division of household responsibilities between spouses changed? ($N^{High} = 5,960$; $N^{Low} = 5,913$)			
Wife's has increased	0.06 [0.23]	0.06 [0.24]	-0.00 (0.00)
Wife's has slightly increased	0.05 [0.22]	0.05 [0.21]	0.00 (0.00)
No change	0.74 [0.44]	0.79 [0.41]	-0.04*** (0.01)
Husband's has slightly increased	0.10 [0.30]	0.08 [0.27]	0.02*** (0.01)
Husband's has increased	0.05 [0.22]	0.03 [0.17]	0.02*** (0.00)
What changes do you expect to see in the division of household responsibilities after COVID is under control? ($N^{High} = 4,405$; $N^{Low} = 4,358$)			
Wife's to increase	0.06 [0.23]	0.06 [0.25]	-0.01 (0.01)
Wife's to slightly increase	0.06 [0.23]	0.04 [0.19]	0.02*** (0.00)
No change	0.80 [0.40]	0.83 [0.38]	-0.03*** (0.01)
Husband's to slightly increase	0.05 [0.23]	0.05 [0.21]	0.01* (0.00)
Husband's to increase	0.03 [0.18]	0.02 [0.15]	0.01*** (0.00)
Do you agree/disagree with the following statement: a husband's job is to earn money; and a wife's job is to look after the home and family ($N^{High} = 5,960$; $N^{Low} = 5,913$)			
Strongly disagree	0.15 [0.35]	0.19 [0.39]	-0.04*** (0.01)
Disagree	0.17 [0.37]	0.17 [0.38]	-0.00 (0.01)
Neutral	0.49 [0.50]	0.45 [0.50]	0.03*** (0.01)
Agree	0.16 [0.36]	0.14 [0.35]	0.02** (0.01)
Strongly agree	0.04 [0.20]	0.05 [0.21]	-0.01** (0.00)

Notes: This table compares the distribution of key outcome variables between 2021–2024 in husband and wife samples by husband's WfH feasibility. A husband's WfH feasibility is based on the share of individuals in the same industry and occupation who worked from home in 2019. Low WfH feasibility indicates a value below the median; high feasibility indicates a value above the median. Significance levels are * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

A Appendix

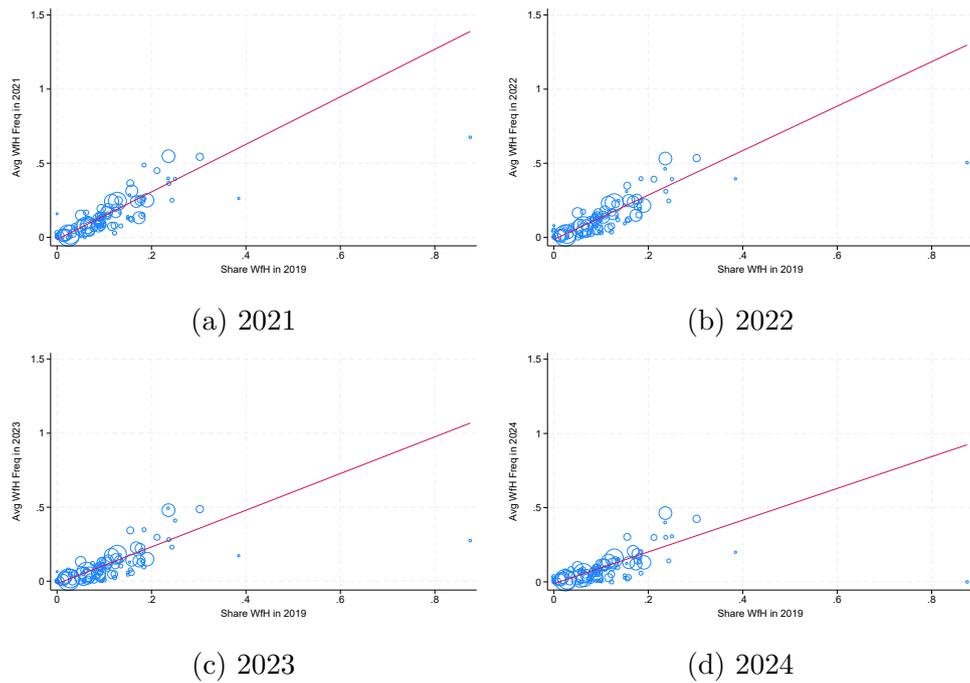


Figure A1: Relationship between the share of individuals working from home in 2019 and WfH frequency during 2021–2024

Notes: These figures display the correlation between the share of individuals working from home in 2019 and WfH frequency during 2021–2024. Each circle represents an industry–occupation cell, with circle size proportional to the number of individuals in the cell. The fitted regression line is estimated using weighted least squares, where the analytic weights are the number of individuals in each cell. Cells with fewer than 10 individuals are excluded.

Table A1: Sample construction

	(1)	(2)
	Husband	Wife
Original sample	15,750	15,750
Drop if one's age - child's age is less than 10	15,741	15,748
Drop if spouse's age in 2019 is missing or smaller than 20	10,285	8,978
Drop if missing educational level	10,268	8,950
Keep cohabiting couples in 2019	10,027	8,717
Keep couples with employed husbands in 2019	9,592	8,324
Drop couples with self-employed husbands in 2019	9,081	7,642
Drop couples of which husband's WfH frequency in 2019 is missing	9,081	7,335
Drop couples of which the husband's WfH share is missing for his occupation and industry	8,946	6,513
Keep if observed in 2019–2024	5,320	3,400
Keep if live with spouse in 2019–2024	4,952	3,177

Notes: This table presents the sample construction process for the husband and wife samples.

Table A2: Data structure of the final sample

	(1)			(2)		
	Husband sample			Wife sample		
	N	Mean of age	SD of age	N	Mean of age	SD of age
2019	4,952	41.71	2.55	3,177	41.61	2.58
2021	4,880	43.30	2.53	3,110	43.22	2.55
2022	4,830	44.28	2.53	2,948	44.22	2.55
2023	4,815	45.31	2.53	2,911	45.25	2.54
2024	4,798	46.30	2.53	2,904	46.22	2.54
Total	24,275	44.16	2.99	15,050	44.05	3.02

Notes: This table shows the mean and standard deviation of age of individuals in the husband sample (Column 1) and the wife sample (Column 2).

Table A3: Coefficients of ordered-probit estimates

	(1)	(2)	(3)	(4)	(5)
	Husband's home prod	Expectation toward husband	Biased norm	Biased norm	Biased norm
Panel A: Husbands					
WfHFreq ^h	0.517*** (0.021)	0.193*** (0.022)	-0.270*** (0.014)	-0.734*** (0.040)	-0.211*** (0.016)
1st stage coef	1.161*** (0.006)	1.134*** (0.007)	1.159*** (0.006)	0.964*** (0.008)	1.224*** (0.006)
Observations	19,323	14,443	19,323	4,542	14,781
Subsample	Full sample	Full sample	Full sample	Mother in full-time work	Mother in non full-time work
Panel B: Wives					
WfHFreq ^h	0.985*** (0.028)	0.219*** (0.034)	0.674*** (0.027)	-0.251** (0.116)	0.701*** (0.027)
1st stage coef	0.851*** (0.005)	0.872*** (0.005)	0.872*** (0.005)	0.480*** (0.012)	1.003*** (0.007)
Observations	11,873	8,763	11,873	2,549	9,324
Subsample	Full sample	Full sample	Full sample	Mother in full-time work	Mother in non full-time work

Notes: This table presents the probit coefficients of the husband's WfH frequency on several outcome variables corresponding to the marginal effects reported in the main text with bootstrapped standard errors in parentheses. The estimates under the column *Husband's home prod* are based on the response to the question: "How has the division of household responsibilities between spouses changed?", where higher values indicate a greater shift of responsibilities toward the husband. The estimates under *Expectation toward husband* use responses to the question: "What changes do you expect to see in the division of household responsibilities after COVID is under control?", where higher values reflect stronger expectations of a shift toward the husband. The estimates under *Biased norm* correspond to responses to the statement: "Do you agree/disagree with the following statement: a husband's job is to earn money; and a wife's job is to look after the home and family?" where higher values indicate stronger agreement. The rows *1st stage coef* reports the coefficients and bootstrapped standard errors from the first-stage regression of the husband's actual WfH frequency on the occupation-by-industry average WfH share in 2019. Significance levels are * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.