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1C-2

Work, Family Life and Well-being of Couples during COVID-19

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Outline

1. Research Background and Questions of This Study
2. Data
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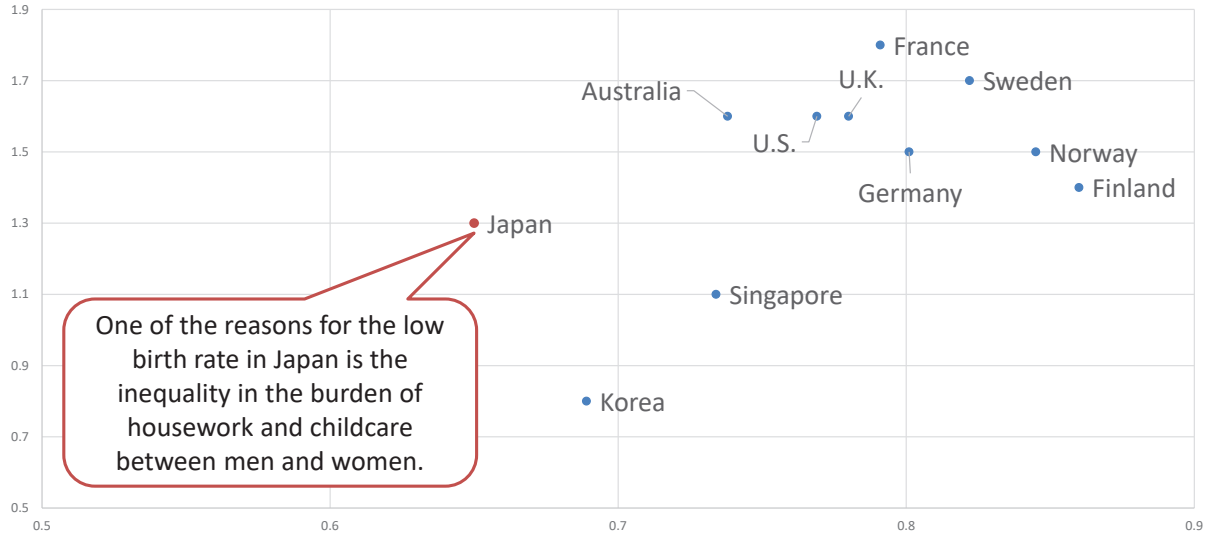
1. Research Background and Questions of This Study

Motivation: Fertility Rate and Gender Equality Index

Fertility Rate (Birth per Woman) (2020)



Gender Gap Index (2022)

Source: World Bank and World Economic Forum

Motivation: Fertility Rate and Gender Equality Index

- This study focus on time and wellbeing of households raising children
- Japan ranks 116th out of 146 countries in the Global Gender Gap Index (World Economic Forum, 2022)
- The lower the gender gap, the higher the fertility rate (next page)

→ Analyzing the impact of "time" related to housework and childcare on wellbeing is also important for measures to combat declining birthrates.

→ Not only "money" but also "time" related to child rearing is important

Motivation: Lifestyle Changes During the Covid-19 Pandemic

- Changes in the way people spend their time during COVID-19 pandemic (work from home, school closures, grandparents and other childcare providers are no longer available, reduced or closed office hours).
- Increased housework and childcare burden worldwide, much of it skewed toward mothers
- Unpaid work is a matter of adjustment between husband and wife, so it is thought to be affected by the way both parties work

  Example:
  - When fathers (mothers) started working from home,
    - their time for housework and childcare increased and mother's time for housework and childcare may decreased, or
    - the mother's time for housework and childcare did not change or even increase if father's time for housework and childcare did not change
  - The same is true for a decrease in the working hours of either the husband or wife.

Guiding Questions

- The way family members spend their time and the burden of housework and childcare at home are thought to have changed during the pandemic dramatically (which rarely occurred around the world at the same time).
- These changes are expected to have affected family member's life satisfaction and couple's relationship.
- How are couples -mother and father- in the household coping with(responding to) this crisis in terms of childcare and housework provisions?
- Is life satisfaction affected by housework responsibilities and changes in spouse's behavior?
- Are couple's relationships improved if she/he can cooperate with her/his spouse?

Literature on Housework and Childcare during COVID-19 pandemic

- Increased housework and childcare burden worldwide due to school closure and lockdown ⇒ Much of it skewed toward mothers
  - The United States: Zamarro and Prados (2021)
  - Germany: Huebener et al. (2021)
  - UK: Sevilla and Smith (2020); Davillas and Jones (2020); Etheridge and Spantig (2020)
  - Italy: Mangiavacchi et al. (2020) , Del Boca et al. (2020)
  - Spain: Farre et al. (2021)
- On the other hand, changes in the way of working (introduction of remote work and changes in working hours) changed the amount of time spent doing housework and childcare.
  - Work from home increased father's time devoted to housework and childcare
  - Japan (Inoue, et al., 2021), (Hara&Kawaguchi, 2022)
  - UK (Sevilla and Smith, 2020)
  - EU and US (Biroli et al, 2020

Literature on Housework and Childcare during COVID-19 pandemic

■Women have a greater reduction in well-being than men during the crisis (De Pedraza et al. 2020; Niedzwiedz et al. 2021).

- Using Japanese data from mid-March to mid-April 2020, FE estimation indicates that school closures have a negative impact on mothers' mental health. (Yamamura and Tsutsui, 2021b)

■They are more likely to be worried about economic prospects than men, feel fear of infection (Oreffice and Quitana-Domeque 2021), feel loneliness under the lockdown measures, and even be worried about domestic violence (Brodeur, 2020; Brodeur, 2021).

Bridging the Gap between Existing Literature

- Few studies have been accumulated on the adjustment of housework and childcare sharing between married couples and its impact on wellbeing during the COVID-19 pandemic
  - Italy (Del Boca et al., 2020): housework increased disproportionately for wives, childcare was shared by couples. Husbands did more housework when wives worked outside the home, but wives' housework burden did not depend on where husbands worked.
  - United States (Zamarro and Prados, 2021): women increased their childcare burden as their working hours decreased, exposing mothers with children below elementary school age to higher stress
  - Spain (Farre et al., 2022): Housework and childcare burden is disproportionately borne by women regardless of working hours
- In a country with a large gender gap like Japan, how was the division of housework and childcare responsibilities adjusted when the time spent at home increased due to the pandemic?
- Would they change depending on the working style of the couple?
- Furthermore, how did the increase in housework and childcare time affect the couple's wellbeing and marital relationship?
  - Predicted negative effect: if the increased time spent on housework and childcare reduces the amount of leisure time
  - Positive effect expected: If people who originally liked to clean or wanted to take care of children but could not due to time constraints increased their time for housework and childcare due to the increased time at home.

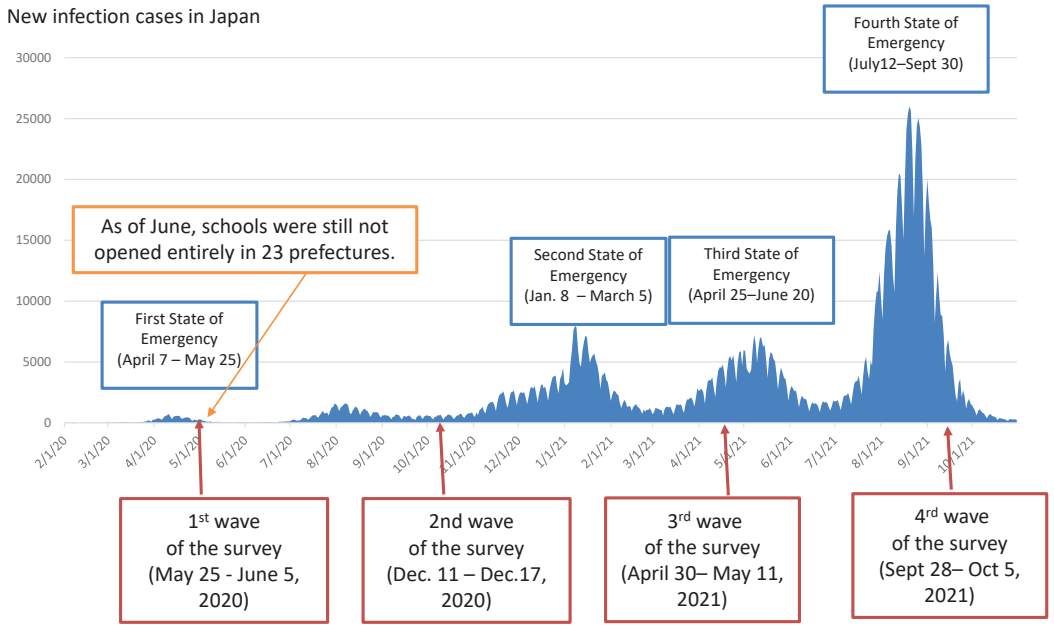
2. Data

Data

- "The Survey on Changes in Attitudes and Behaviors Resulting from the Effects of the COVID-19 Pandemic" (hereafter, SCAB)
  - conducted online by Cabinet Office, Government of Japan.
  - https://www5.cao.go.jp/keizai2/wellbeing/covid/index.html
  - Nationally representative data
- Timing of survey
  - 1st wave of survey: between May 25 and June 5, 2020, immediately following the nationwide lifting of the state of emergency
  - 2nd wave : between December 11 and December 17, 2020.
  - 3rd wave : between April 30 and May 11, 2021.
  - 4th wave : between September 28 and Oct 5, 2021.

  ※ Unbalanced panel data：Because some but not all respondents answered consecutively.：
- Supplementary data: "Well-being Survey and Quality of Life(WSQL)", again conducted by the Cabinet Office, Government of Japan in 2019.

Timing of the Survey and New Infection Cases



Data source of new infection cases: NHK news

Data

	1st wave May 2020	2nd wave Dec. 2020	3rd wave May 2021	4th wave Sept. 2021
N of respondents	10,092	10,091	10,126	10,121
（Continuation Samples from previous survey）		(5192)	(7371)	(5907)
N of respondents with children up to age 18	2162	2079	2063	1952
at least one child age 6-12	(775)	(714)	(722)	(693)
at least one child age 0-5	(1176)	(1161)	(1123)	(1090)

- There are approximately 2,000 households raising children in each wave, 90% of which have children of elementary school age or younger.
- 2,779 respondents completed all four surveys, of which 506 were households with children
- Since the questions about housework and childcare were asked only of households raising children, the analysis of household is limited to only parents who are married and living with children under 18 years old.

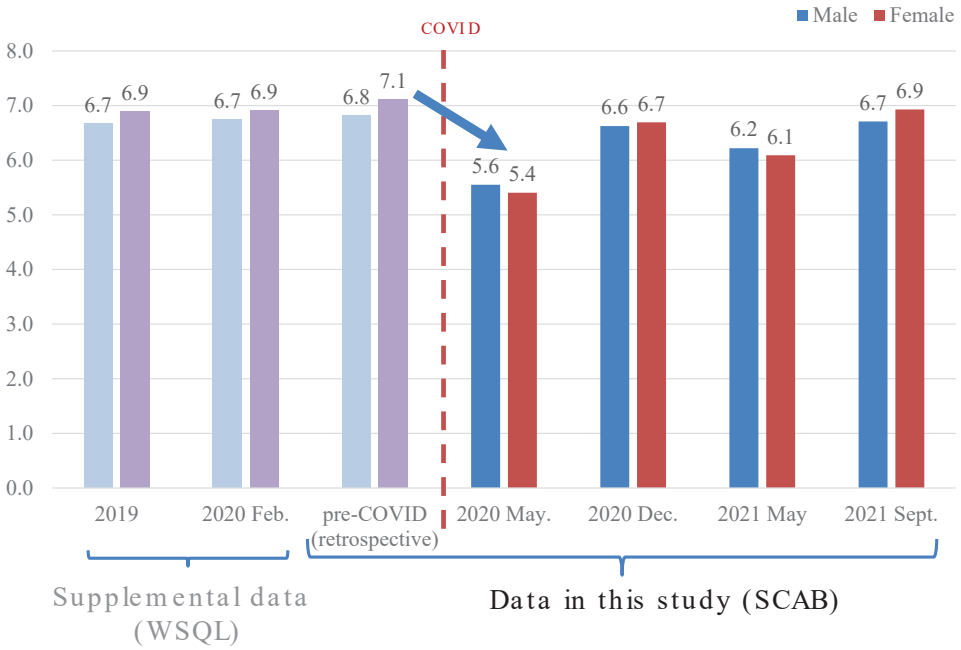
Analytical Advantage of This Data

With the spousal information below, it is possible to analyze whether both spouses cooperate based on the way they work.

- Spouse employment status
  - Full-time employment
  - Non-full-time employment, i.e., part-time job
  - Self-employee or company officer
  - Not employed (seeking employment)
  - Not employed (not seeking employment)
- [Only for households with children and spouses working] Change in spouses' work style compared to before COVID (December 2019)
  - Work from home
  - Flextime
  - Decrease in working hours
  - Increase in working hours
  - Other changes
  - No change

3. What the Data Tell Us

Wellbeing Life Satisfaction (1-11)



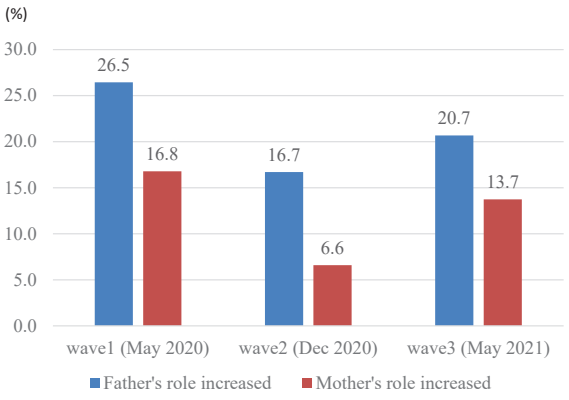
Change in Role regarding Housework and Childcare

"Compared to December 2019 (before the pandemic), how has the division of roles between spouses regarding housework and childcare *changed*?"

1. Father's role has increased.
2. Father's role has increased somewhat.
3. Mother's role has increased
4. Mother's role has increased somewhat..
5. Both of father and mother role has increased.
6. Both of father and mother role has decreased.
7. No change.

➢When fathers answered 1, 2 or 5, "father's role increase dummy" takes 1, and otherwise 0.

➢When mothers answered 3, 4 or 5, "mother's role increase dummy" takes 1, and otherwise 0.



Change in hours devoted to housework and childcare by type of work in dual-earner couples with children under 18 years old

"Compared to December 2019 (before the pandemic), how much has your time for housework and childcare *changed*?" Before the Pandemic = 100

Two-income parents with children up to 18 years old

		Spouses	
		Work from home	Work outside the home
Fathers	Work from home	+23.7%	+11.1%
	Work outside the home	+4.6%	+1.7%

		Spouses	
		Work from home	Work outside the home
Mothers	Work from home	+14.9%	+9.3%
	Work outside the home	+16.3%	+10.0%

Two-income parents with children ages 6-12

		Spouses	
		Work from home	Work outside the home
Fathers	Work from home	+14.1%	+11.5%
	Work outside the home	-3.3%	+1.8%

		Spouses	
		Work from home	Work outside the home
Mothers	Work from home	+12.8%	+12.0%
	Work outside the home	+16.1%	+11.0%

5. Estimation

Estimation Strategy

When looking at the relationship between household chore burden and life satisfaction, I use questions about how many housework and childcare time, the division of roles in housework, work style, and life satisfaction have *changed* since before the pandemic.

- If I regress *the level* of life satisfaction on the time spent of housework, there will be an omitted variable bias in the results because of the time-invariant unobserved characteristics which are related to both variables.
- People who originally would like to clean home and to take care of children spend more time doing housework, and they also increase their well-being.
- Changes of these variables allow me to use the first-difference estimation to avoid an omitted variable bias from time invariant unobserved individual characteristics.

Estimation 1 Gender Differences in Wellbeing

Q1. During the pandemic, did the mothers lower their wellbeing compared to the fathers?

DID(Baseline)

δ estimates gender differences in wellbeing

$$Wellbeing_{it} = \alpha + \gamma COVID_t + \beta_2 Female_i + \boldsymbol{\delta} COVID_{it} * Female_i + \boldsymbol{\gamma x_{it}} + \varepsilon_{it}$$

- $\boldsymbol{Wellbeing_{it}}$: general life-satisfaction(1-11)
- $\boldsymbol{COVID_{it}}$ = 1 If the survey was conducted after May 2020 SCAB w1 w4
  = 0 If the survey was conducted in 2019 WSQL
  Pool the two data as in Huebener et al., 2021
- $\boldsymbol{Female_i}$ = 1 If the respondent is female
- Other variables ($\boldsymbol{x_i}$): age-group 5 years old , employment status fulltime/part time Self-employee or company officer/Not employed (seeking employment/Not employed (not seeking employment) education household income 3category , prefecture

Gender Differences in Wellbeing (DID)

	(1) parents with ages 0-5 children	(2) parents with ages 6-15 children	(3) parents with 15 years old above children	(4) respondents without children under 18 years old
Panel A				
Female	0.22**	0.13	0.13	0.41***
	[2.01]	[1.06]	[0.64]	[9.34]
After COVID	-0.98***	-0.80***	-0.86***	-0.62***
	[-10.57]	[-7.65]	[-5.08]	[-15.58]
After COVID* Female	-0.28**	-0.2	0.08	-0.31***
	[-2.28]	[-1.40]	[0.36]	[-5.70]
Observations	5,797	4,102	2,058	32,588
R-squared	0.08	0.08	0.11	0.08
Panel B				
Female	0.23**	0.13	0.13	0.42***
	[2.21]	[1.05]	[0.68]	[9.66]
May 2020	-1.50***	-1.29***	-1.46***	-1.27***
	[-12.64]	[-9.68]	[-7.36]	[-25.57]
Dec. 2020	-0.57***	-0.24*	-0.44**	-0.12**
	[-4.77]	[-1.72]	[-2.09]	[-2.40]
May 2021	-0.88***	-0.80***	-0.59***	-0.53***
	[-7.26]	[-5.88]	[-2.88]	[-10.94]
Sept. 2021	-0.38***	-0.33**	-0.22	-0.09*
	[-3.15]	[-2.34]	[-1.08]	[-1.81]
May 2020 * Female	-0.37**	-0.28	0.06	-0.40***
	[-2.33]	[-1.46]	[0.23]	[-5.80]
Dec. 2020 * Female	-0.14	-0.33*	0.24	-0.13*
	[-0.89]	[-1.66]	[0.82]	[-1.89]
May 2021 * Female	-0.32**	-0.07	-0.11	-0.36***
	[-2.00]	[-0.34]	[-0.40]	[-5.39]
Sept. 2021 * Female	0.09	0.47**	0.37	-0.03
	[0.58]	[2.35]	[1.25]	[-0.42]
Observations	6,884	4,795	2,464	39,939
R-squared	0.1	0.1	0.14	0.11

t-statistics in brackets, *** p<0.01, ** p<0.05, * p<0.1

Estimation 2: Change in Wellbeing and Lifestyle

Change in type of paid work **Remote work** **Change in hours of work**

Remote work

Respondents were asked about the frequency of remote work and commuting

1. teleworking (almost 100%) -> the variable ***Remote*** = 100%
2. mainly teleworking (more than 50%) with periodic telecommuting -> ***Remote*** = 75%
3. mainly teleworking (more than 50%), but also teleworking on a regular basis -> ***Remote*** = 50%
4. mainly commuting, but teleworking is used irregularly -> ***Remote*** = 10%
5. Not teleworking -> ***Remote*** = 0%

(following Inoue, Ishihata & Yamaguchi, 2020)

Change of work style before the pandemic and at the time of the survey:

$$\Delta Remote_t = Remote_t - Remote_{bef}\ ,\ t = 1,2,3,4$$

– Ex) If the respondents were not working remotely before the pandemic, and then they started working remotely at the time t = 1, their ***Change of Remote***$_1$=100 – 0 = 100

Change in hours of work

Respondents were asked change in paid work hours compared to pre-COVID (no change = 100)

Estimation 2 : Change in Wellbeing and Lifestyle

Is wellbeing affected by the changes in unpaid work and paid work?

$$\Delta Wellbeing_i = \boldsymbol{\beta}\Delta Unpaid_i + \boldsymbol{\mu_1}\Delta Remote_{it} + \boldsymbol{\mu_2}\Delta h_{it} + \boldsymbol{\mu_3}\Delta family_{it} + \boldsymbol{\gamma X_{it}} + wave_t + \varepsilon_{it}$$

t = 1,2,3,4 ⋯(2)

- Outcome variable ($\Delta Wellbeing_i$): Change in wellbeing compared to pre-COVID (-10 ~ 10, no change = 0)
- Main parameter to estimate is β which are the effects of $\Delta Unpaid_i$, changes in ① **unpaid work within the couple, ② time spent doing unpaid work**.
  - ① Change in housework roles within the couple (father's or mother's role increase dummy)
  - ② Change in time doing housework and childcare compared to pre-COVID (no change = 100)
- $\Delta Remote_{it}$: Change in remote work frequency
- Δh_{it} : Change in paid work hours compared to pre-COVID (no change = 100)
- $\Delta family_{it}$: Change in time spent with family compared to pre-COVID (0, 13.5, 35.5, 63.75, -13.5, -35.5 or -63.75%)

Dep. var = change in wellbeing compared to pre-COVID

	(1)	(2)	(3)	(4)	(5)	(6)
	Father			Mother		
with child	ages 0-5	ages 6-12	over age 13	ages 0-5	ages 6-12	over age 13
Panel A						
Own role increase	0.66***	0.59***	0.2	-0.65***	-0.24	-0.60*
	[3.98]	[2.90]	[0.69]	[-3.00]	[-0.81]	[-1.65]
Observations	996	766	472	1,102	531	323
R-squared	0.09	0.13	0.21	0.11	0.21	0.27
Number of id						
Panel B						
Change in remote work frequency	0.00	0.01***	0.01	0.01	0.00	0.01
	[0.38]	[3.11]	[1.53]	[0.81]	[0.41]	[0.62]
Change in hours of work	-0.01	-0.01*	0.01*	0.00	0.00	-0.01
	[-1.56]	[-1.68]	[1.81]	[0.85]	[0.25]	[-1.51]
Observations	586	460	289	341	245	168
R-squared	0.17	0.26	0.36	0.28	0.45	0.54
Number of id						
Panel C						
Own role increase	0.56*	0.69**	0.24	0.11	1.27	-0.81
	[1.91]	[2.03]	[0.48]	[0.17]	[1.42]	[-0.93]
Change in remote work frequency	0.00	0.01*	0.00	0.00	0.01	0.03
	[0.39]	[1.81]	[0.51]	[0.20]	[0.58]	[1.16]
Change in hours of work	0.00	-0.01	0.01	0.00	0.00	-0.01
	[-0.76]	[-1.36]	[1.03]	[0.92]	[-0.36]	[-0.92]
Observations	442	333	203	246	152	92
R-squared	0.18	0.26	0.37	0.3	0.55	0.69
Number of id						
Panel D						
Own role increase	0.67***	0.60***	0.21	-0.71***	-0.11	-0.52
	[3.85]	[2.83]	[0.67]	[-3.19]	[-0.35]	[-1.32]
Change in time spent with family	0.00	0.00	0.00	-0.01***	-0.01*	0.00
	[0.99]	[-0.29]	[-0.76]	[-2.87]	[-1.82]	[-0.79]
Observations	952	740	444	1,049	511	298
R-squared	0.09	0.13	0.21	0.12	0.22	0.28
Number of id						

t-statistics in brackets, *** p<0.01, ** p<0.05, * p<0.1

Is wellbeing affected by the changes in unpaid work and paid work?

Unpaid work within the couple

- Fathers who increased their unpaid work role compared to pre-COVID, especially those with younger children up to 12 years old, increased their wellbeing by 0.6 points.
- On the other hand, mothers with preschoolers (ages 0-5) decreased in wellbeing when they increased housework and childcare burden.
- Even after accounting for changes in working habits, fathers with small children increased their wellbeing by 0.6 to 0.67 percentage points when they increased their household responsibilities; conversely, mothers decreased their wellbeing by 0.71 percentage points when they increased their household responsibilities.

Dep. var = change in wellbeing compared to pre-COVID

	(1)	(2)	(3)	(4)	(5)	(6)
	Father			Mother		
with child	ages 0-5	ages 6-12	over age 13	ages 0-5	ages 6-12	over age 13
Panel A						
Change in time doing housework and childcare	0.00	0.00	0.01***	-0.01***	-0.01***	-0.01**
	[0.13]	[0.06]	[2.65]	[-2.99]	[-2.90]	[-2.12]
Observations	882	690	442	1,003	525	357
R-squared	0.11	0.19	0.29	0.13	0.27	0.3
Number of id						
Panel B						
Change in time doing housework and childcare	0.00	0.00	0.01*	-0.01	0.00	0.00
	[-0.36]	[-0.10]	[1.89]	[-1.63]	[-0.20]	[-0.54]
Change in remote work frequency	0.00	0.01***	0.01	0.01	0	0.01
	[0.44]	[2.98]	[1.28]	[1.00]	[0.37]	[0.59]
Change in hours of work	-0.01	-0.01	0.01	0	0	-0.01
	[-1.50]	[-1.59]	[1.59]	[1.06]	[0.26]	[-1.52]
Observations	586	460	289	341	245	168
R-squared	0.17	0.26	0.37	0.28	0.45	0.55
Number of id						
Panel C						
Change in time doing housework and childcare	0.00	0.00	0.01***	-0.01*	-0.01**	-0.01
	[-0.14]	[-0.65]	[2.78]	[-1.75]	[-2.45]	[-1.64]
Change in time spent with family	0.01*	0.01	0	-0.01**	-0.01	-0.01
	[1.65]	[1.24]	[-0.74]	[-2.54]	[-1.34]	[-0.78]
Observations	816	650	407	919	495	321
R-squared	0.1	0.2	0.3	0.14	0.28	0.31
Number of id						

t-statistics in brackets, *** p<0.01, ** p<0.05, * p<0.1

Is wellbeing affected by the changes in unpaid work and paid work?

- **time spent doing unpaid work**

- Fathers who increased their time doing housework and childcare compared to pre-COVID by 1%, especially those with older children over 13 years old, increased their wellbeing by 0.01 points.
- On the other hand, mothers with all age child decreased in wellbeing by 0.01 points when they increased in time doing housework and childcare.

Estimation 3 : Change in Wellbeing and Spouse's Lifestyle

Is wellbeing affected by the change in spouse's work style?

$$\Delta Wellbeing_i = \boldsymbol{\beta}\Delta Unpaid_i + \boldsymbol{\mu_1}\Delta Remote_{it} + \boldsymbol{\mu_2}\Delta h_{it} + \boldsymbol{\mu_3}\Delta Family_{it} + \boldsymbol{\mu_4}\Delta Spouse_{it} + \boldsymbol{\gamma X_{it}} + wave_t + \varepsilon_{it}$$

$$t = 1,2,3,4 \quad \cdots (3)$$

- Main parameter to estimate is β which are the effects of $\Delta Unpaid_i$, changes in ① **unpaid work within the couple, ② time spent doing unpaid work**.
- The Spouse work style variables ($\Delta Spouse_{it}$) are are added to equation (2).

  $\Delta Spouse_{it}$:
  - ➢ Started or increased the frequency of remote work dummy
  - ➢ Decreased in working hours dummy
  - ➢ Increased in working hours dummy
  - ➢ Started or increased flex work dummy

Dep. var = change in wellbeing compared to pre-COVID

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Father			Mother			Father			Mother		
with child	ages 0-5	ages 6-12	over age 13	ages 0-5	ages 6-12	over age 13	ages 0-5	ages 6-12	over age 13	ages 0-5	ages 6-12	over age 13
Change in time doing housework and childcare							0.00	0.00	0.00	-0.01	0.00	-0.02
							[-1.19]	[-0.08]	[0.35]	[-1.47]	[-0.40]	[-1.33]
Change in remote work frequency	0.00	0.01*	0.02**	0.00	0.01	0.00	0.00	0.01*	0.02**	0.01	0.01	0
	[0.32]	[1.86]	[2.34]	[0.50]	[0.55]	[0.19]	[0.50]	[1.81]	[2.22]	[0.64]	[0.49]	[0.01]
Change in hours of work	-0.01	-0.01***	0.02**	0.00	-0.00	-0.02**	0.00	-0.01**	0.02**	0.00	0.00	-0.02**
	[-1.29]	[-2.65]	[2.16]	[0.53]	[-0.16]	[-2.06]	[-1.15]	[-2.56]	[2.02]	[0.61]	[-0.16]	[-2.17]
Spouse: remote work	-0.47	-0.13	-0.10	0.62	-0.17	-1.05	-0.45	-0.13	-0.09	0.56	-0.18	-1.03
	[-1.24]	[-0.31]	[-0.13]	[1.53]	[-0.31]	[-1.51]	[-1.18]	[-0.31]	[-0.11]	[1.40]	[-0.32]	[-1.49]
Spouse: decrease in working hours	0.13	-0.46	0.16	0.62	-1.17**	-1.30*	0.12	-0.47	0.16	0.62	-1.20**	-1.40*
	[0.35]	[-1.11]	[0.29]	[1.36]	[-1.99]	[-1.70]	[0.33]	[-1.11]	[0.28]	[1.36]	[-2.02]	[-1.84]
Spouse: increase in working hours	-1.00*	2.11***	-0.03	-0.21	1.34	-0.03	-0.99*	2.11***	-0.08	-0.27	1.32	0.09
	[-1.82]	[2.68]	[-0.03]	[-0.25]	[1.12]	[-0.02]	[-1.81]	[2.67]	[-0.07]	[-0.32]	[1.10]	[0.07]
Spouse: flex work	0.00	0.33	-0.50	0.29	0.06	1.62	0.02	0.33	-0.47	0.32	0.06	1.68
	[0.01]	[0.63]	[-0.75]	[0.52]	[0.07]	[1.21]	[0.04]	[0.63]	[-0.69]	[0.57]	[0.07]	[1.26]
Observations	410	341	215	321	200	118	410	341	215	321	200	118
R-squared	0.24	0.36	0.44	0.29	0.49	0.69	0.24	0.36	0.44	0.3	0.49	0.69

t-statistics in brackets, *** p<0.01, ** p<0.05, * p<0.1

Is wellbeing affected by the change in spouse's work style?

- Remote work only affected significantly on father's wellbeing, not mothers.
- Increase in spouses' working hours showed mixed results: father with child ages 0-5 decreased wellbeing, but fathers with child ages 6-12 increased wellbeing.
- Decrease in spouses' working hours show negative effects on wellbeing of mothers who have older child because it is thought that it induces economic anxiety for mothers.
- **time spent doing unpaid work did not show significant effects on wellbeing.**

Estimation 4: Couple's cooperation in doing housework and childcare

How do fathers and mothers set the time allocation for housework and childcare?

$$\Delta y_i = \beta_0 + \boldsymbol{\mu_1}\Delta Remote_{it} + \boldsymbol{\mu_2}\Delta h_{it} + \boldsymbol{\delta}\Delta Spouse_{it} + \boldsymbol{\gamma x_{it}} + wave_t + \varepsilon_{it} \quad \text{t} = 1,2,3,4 \cdots (4)$$

- Outcome variable (Δy_i): Change in father's/mother's role doing housework and childcare compared to pre-COVID19
- Main parameters to estimate were
  - $\boldsymbol{\mu_1}$ and $\boldsymbol{\mu_2}$ which are the effects of lifestyle change (i.e., remote work and paid work hours)
  - $\boldsymbol{\delta}$ which is the effects of spouse's lifestyle change (i.e., remote work and paid work hours)
- I used wave 1 to 3 surveys, because wave 4 did not have information on change in roles.
- Since outcome variable is dummy, I estimated using the Probit model.

Dep. var = Change in Roles for Housework and Childcare Increased Dummy (Probit)

	(1)	(2)	(3)	(4)	(5)
	Both role's increase	Father's role increase			Mother's role increase
		Spouse=All	Spouse =Full-time job	Spouse =Part-time job	Spouse=All
Panel A: wave 1-3					
Female	-0.25*				
	[-1.90]				
with 0-5 years old children	0.45***	0.19*	0.18	0.14	-0.02
	[3.48]	[1.65]	[0.81]	[0.84]	[-0.12]
with 6-12 years old children	0.17*	0.03	0.15	0.13	0.09
	[1.68]	[0.38]	[0.87]	[0.96]	[0.60]
Change in remote work frequency	-0.00	0.01***	0.01**	0.01***	0.00
	[-1.14]	[5.16]	[2.48]	[3.80]	[1.07]
Change in time spent with family	0.00**	0.01***	0.01***	0.01***	0.00*
	[2.48]	[4.48]	[2.73]	[4.27]	[1.70]
Spouse: remote work	0.47***	0.33***	0.23	0.23	0.03
	[4.25]	[2.81]	[1.42]	[1.04]	[0.21]
Spouse: decrease in working hours	0.32***	0.11	0.21	0.02	0.22
	[2.92]	[1.00]	[1.13]	[0.13]	[1.55]
Spouse: increase in working hours	0.40**	0.50***	0.02	0.87***	0.82***
	[2.18]	[2.79]	[0.06]	[3.10]	[3.51]
Spouse: flex work	0.55***	0.45***	0.30	0.59**	0.12
	[4.47]	[3.45]	[1.57]	[2.52]	[0.75]
Observations	2,304	1,318	520	583	902

z-statistics in brackets *** p<0.01, ** p<0.05, * p<0.1

How do fathers and mothers set the time allocation for housework and childcare?

- Parents who have 0-5 years old and 6-12 years old child increased their roles for housework and childcare compared to pre-COVID
- Fathers working remotely increased their roles for housework and childcare by 1%
- When spouse worked remotely and/or spouse increased their working hours, fathers increased roles for housework and childcare by 33 or 50%.
- Mothers increase their role for housework and childcare when their husband increased in working hours.

Dep. Var = Change in fathers' time doing housework and childcare

	(1)	(2)	(3)	(4)	(5)	(6)
		Father			Father	
with child	ages 0-5	ages 6-12	over age 13	ages 0-5	ages 6-12	over age 13
Change in remote work frequency	0.12***	0.13***	0.05	0.10*	0.12***	0.12*
	[2.61]	[3.59]	[0.96]	[1.96]	[2.64]	[1.88]
Change in hours of work				0.17***	0.13***	0.17***
				[3.60]	[2.59]	[3.02]
Change in time spent with family	0.38***	0.40***	0.16**	0.51***	0.53***	0.19**
	[7.21]	[8.45]	[2.11]	[8.47]	[9.26]	[2.08]
Spouse: remote work	5.51	-8.65**	4.39	4.20	-8.08**	5.23
	[1.56]	[-2.51]	[0.79]	[1.07]	[-2.07]	[0.81]
Spouse: decrease in working hours	0.18	1.33	-4.12	1.07	-0.67	0.03
	[0.05]	[0.45]	[-1.00]	[0.27]	[-0.18]	[0.01]
Spouse: increase in working hours	4.82	6.63	7.36	4.75	8.16	9.48
	[0.85]	[1.13]	[1.07]	[0.77]	[1.29]	[1.09]
Spouse: flex work	-2.67	0.08	-9.82*	0.97	-0.32	-7.03
	[-0.63]	[0.02]	[-1.69]	[0.20]	[-0.08]	[-1.13]
Observations	763	650	373	606	509	298
R-squared	0.24	0.31	0.22	0.29	0.36	0.27

t-statistics in brackets, *** p<0.01, ** p<0.05, * p<0.1

- Fathers working remotely increased their time doing housework and childcare by about 0.12~0.13.
- When spouse worked remotely, fathers with 6-12 years old children decreased their time doing housework and childcare by about 8%.
- Fathers increased their time doing housework and childcare even as they work more compared to pre-DOVID.

Estimation 5□ How Work Type Affects the Marital Relationship

Q□. Did the division of housework and childcare and the way couples worked affect their marital relationship?

$$\Delta y_i = \beta_0 + \boldsymbol{\mu_1}\Delta Remote_{it} + \boldsymbol{\mu_2}\Delta h_{it} + \boldsymbol{\delta}\Delta Spouse_{it} + \boldsymbol{\gamma x_{it}} + wave_t + \varepsilon_{it}$$

t = 1,2,3,4 ⋯(5)

- Outcome variable (Δy_i): Change of marital relationship compared to before COVID-19
- Δy_i = 1 if Marital relationship improved, 0 otherwise.

Dependent variable=Couple's relationship improved (Probit)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		Father				Mother		
	Children	ages 0-5	ages 6-12	over age 13	Children	ages 0-5	ages 6-12	over age 13
Part A								
Change in time doing housework and childcare	0.00*	0.00	0.00	-0.00	-0.00	0.00	-0.03**	-24.56
	[1.72]	[1.04]	[0.09]	[-0.08]	[-0.04]	[0.13]	[-2.16]	[.]
Change in remote work frequency	0.00	-0.00	0.00	0.00	-0.00	-0.00	0.08**	-52.38
	[0.48]	[-1.12]	[1.23]	[0.39]	[-0.46]	[-0.83]	[2.22]	[.]
Change in hours of work	0.00	0.00	0.01*	-0.00	-0.00	0.00	-0.01	-18.66
	[0.29]	[0.41]	[1.79]	[-0.26]	[-0.13]	[0.52]	[-0.75]	[.]
Observations	518	284	195	60	210	127	41	18
Part B								
Father's role increase	0.21	-0.07	-0.08	15.47	1.10***	1.06***		51.55
	[1.37]	[-0.32]	[-0.31]	[0.01]	[3.71]	[2.71]		[.]
Mother's role increase	-0.38	-0.35	-0.76		0.20	-0.37		-10.06
	[-1.64]	[-1.17]	[-1.53]		[0.62]	[-0.83]		[.]
Change in remote work frequency	0.00	-0.00	0.00	-0.02	-0.00	-0.01		-0.50
	[0.35]	[-0.83]	[1.09]	[-1.04]	[-0.55]	[-1.24]		[.]
Change in hours of work	0.00	0.00	0.01*	-0.01	-0.00	-0.00		-0.49
	[0.49]	[0.59]	[1.94]	[-1.30]	[-0.95]	[-0.29]		[.]
Observations	518	284	195	51	210	127		18

z-statistics in brackets *** p<0.01, ** p<0.05, * p<0.1

- Fathers working remotely increased their time doing housework and childcare by about 0.12~0.13.
- An increase in the father's role (especially with children aged 0-5) appears to be helpful in improving the marital relationship.

5. Conclusion

Conclusion

This study analyzed the effects on wellbeing of changes in the share of housework and childcare among Japanese married couples and their mutual work style during COVID-19.

- Compared to the pre-corona period, women showed a greater reduction in wellbeing than men.
  - This trend was stronger for mothers with preschool children aged 0-5
- For fathers, increased time spent on housework and childcare led to increased wellbeing
- Remote work only affected significantly on father’s wellbeing, not mothers.
- When spouse worked remotely and/or spouse increased their working hours, fathers increased roles for housework and childcare by 33 or 50%. →Ccooperation was observed between couples.
- An increase in the father's role (especially with children aged 0-5) appears to be helpful in improving the marital relationship.

Conclusion and Future Research

- Fathers reduce their time for housework and childcare when their spouses work fewer hours, but mothers were not affected by their spouses' work status → same results as in Italy (Del Boca, 2020). In a country with a large gender gap to begin with, is there a sense that it is natural for mothers to do housework and childcare?
- Both couples reported that their marital relationship improved when "the father's role in housework and childcare increased"→ happiness for family
- If fathers increase their time for housework and childcare through remote work, etc., and if the burden of mothers' housework and childcare work decreases, this will be effective not only in terms of the wellbeing of both spouses, but also in terms of measures to combat the declining birthrate.
- Future research: What will happen to housework and childcare time when remote work is over?
- I would like to examine whether or not there are long-term effects.

Thank you for your attention!

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