The Role of Social Norms in Gender Division of Childcare and Fertility: A Quantitative Analysis of US-Japan Comparison

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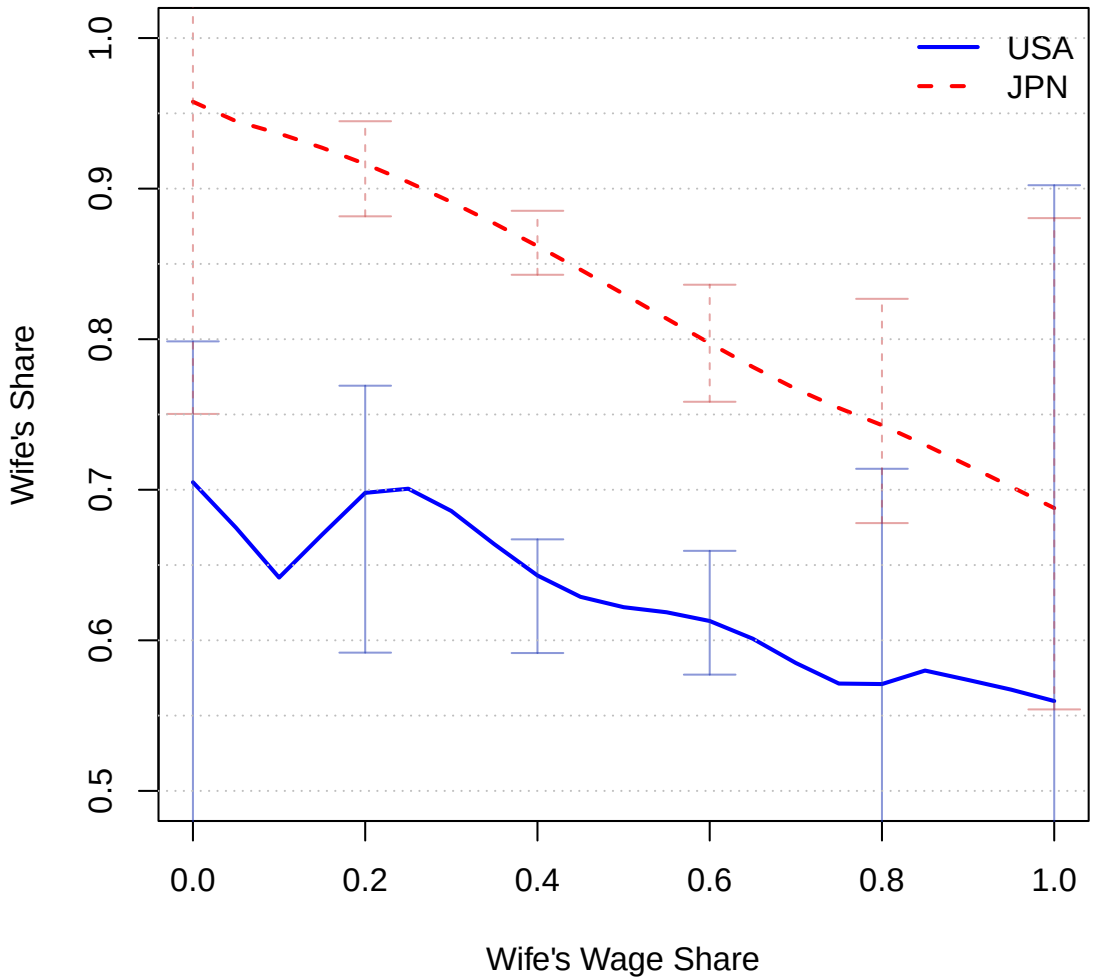
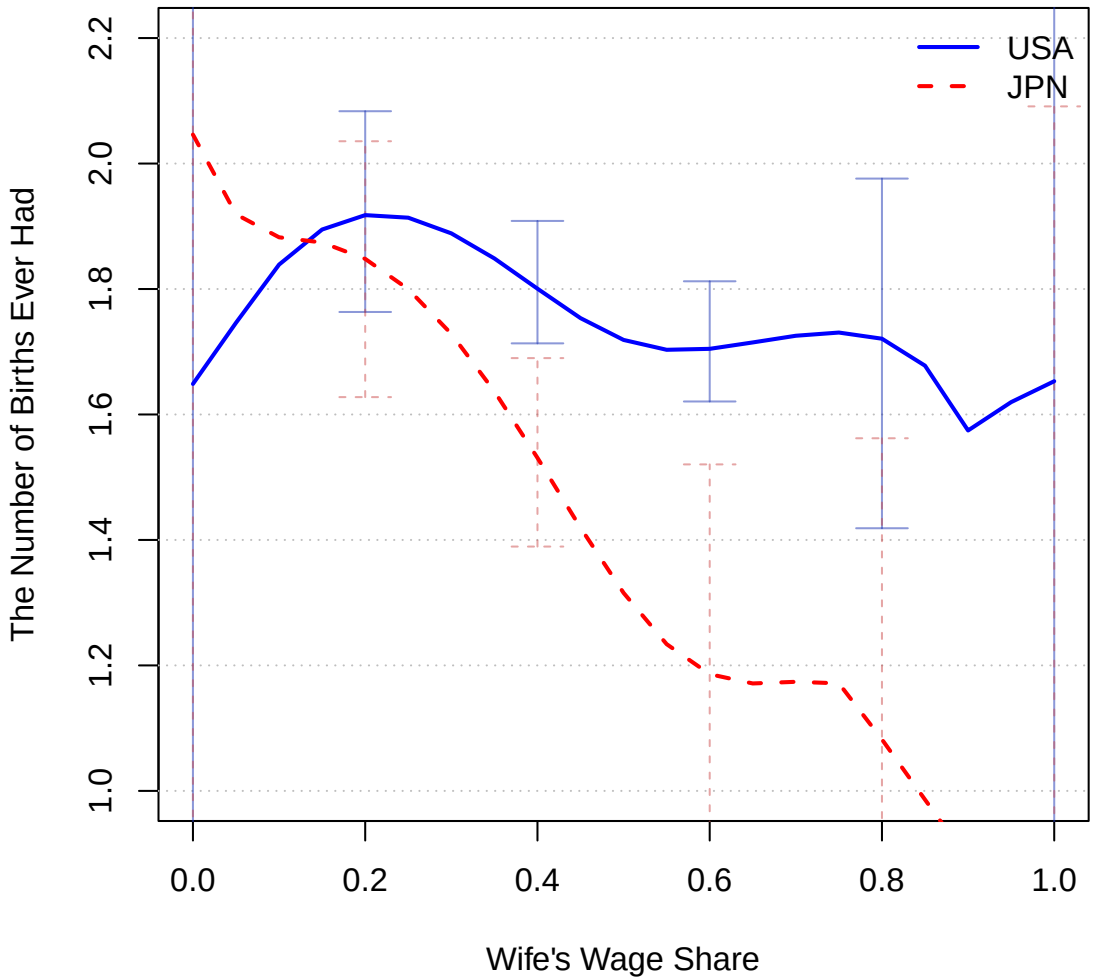
Wife's Share of Domestic Work by Her Wage Share



(Sources: ATUS (US) & JHPS (Japan))

Fertility by Wife's Wage Share



(Sources: CPS (US) & JHPS (Japan))

Motivation & The Goal of This Paper

- **A large gap in wife's share of domestic work b/w the US and Japan**.
  - **Remain evident even when a wife's wage share is high**.
- Literature: Wage ratios b/w couples are a key determinant (Knowles (2013)).
  - **May not fully explain the puzzle**.

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  1. **What factors drive the large gap in the wife's share of domestic work?**
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- **Our argument: The strength of social norms in the gender division of childcare is the key**.

Related Literature & Contribution

- Key determinants of labor supply and fertility decisions.
  - **Wage ratios b/w husbands and wives**: Albanesi and Olivetti (2009); Knowles (2013).
  - **Social norms and culture**: Fernàndez et al. (2004); Fernàndez and Fogli (2006, 2009); de Laat and Sevilla-Sanz (2006); Bertland et al. (2015); de Silva and Tenreyro (2020); Bertland et al. (2021); Myong et al. (2021); Beach and Hanlon (2022); Kim et al. (2024).

★ **This paper**: **Examine how the strength of social norms in the gender division of childcare influences the differences in fertility**.

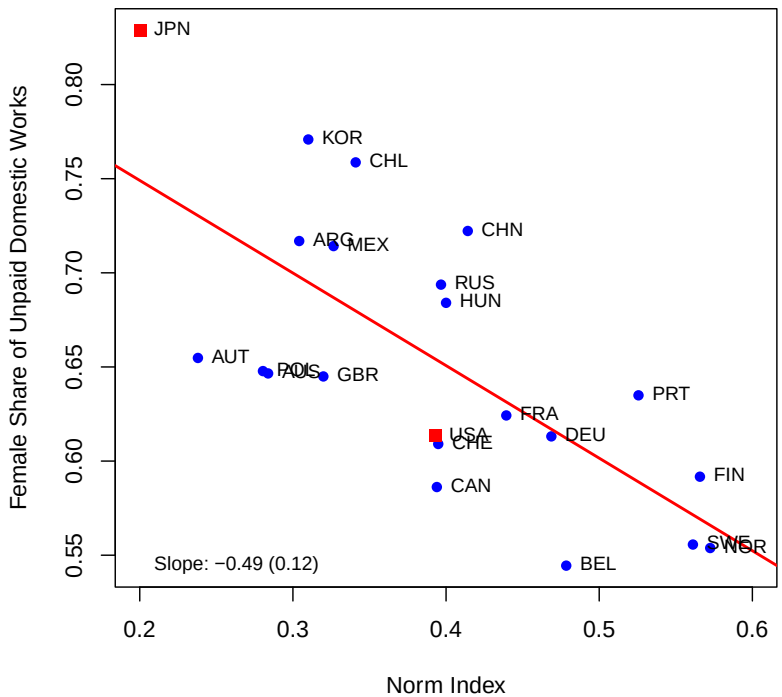
Roadmap

1. Introduction.
2. Motivating Evidence.
3. Quantitative Model.
4. Calibration & Simulations.
5. Conclusion.

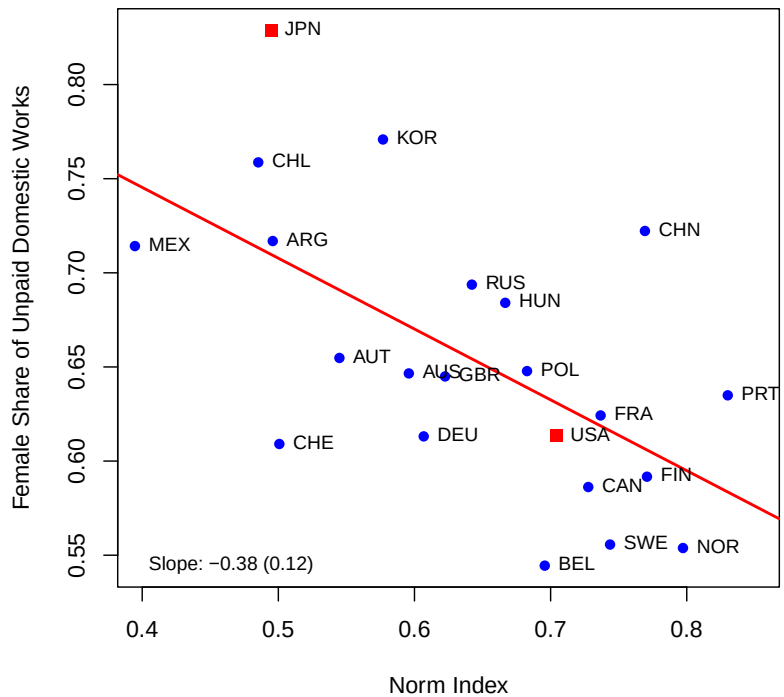
Relationship b/w the Women's Share of Unpaid Domestic Work and Social Norms

- **Cross-country analysis**.
- The women's share of unpaid domestic work.
  - Source: The Minimum set of gender indicators (UN).
- Social norms.
  - Source: ISSP 2012.
    - **Ask whether women with children should work full-time (1), part-time (0.5), or stay home (0) $\Rightarrow$ Compute the averages by country (Norm index)**.
    - Two types of children: below and above school age.

Relationship b/w the Women's Share of Unpaid Domestic Work and Social Norms



(a) The Youngest Kids under School Age



(b) After the Youngest Kids Start School

(Sources: UN & ISSP)

Quantitative Model: Model Environment

- **Model framework: the OLG structure**.
  - Half of the children are females (f), and half are males (m).
    - Randomly matched and become couples.
- Utility of gender j (extended as in Doepke et al. (2023)):

$$U_j = lnc_j + \varsigma_j lnl_j + \gamma_j lnn + \delta logh' - \underbrace{n \cdot \frac{\psi (r - \tilde{r})^2}{2}}_{\text{a loss due to social norms}},$$

  - c_j: consumption.
  - l_j: leisure.
  - n: fertility ($\in (0, \infty)$).
  - h': child's human capital.
  - r: the woman's share of childcare time $\left(\equiv \frac{x_f}{x_f + x_m} \right)$.
    - x_j: childcare time.
  - $\tilde{r}$: **the specific value of r reflected by social norms**.

Quantitative Model: Model Environment

- Production function for childcare:

$$\upsilon n = A\left\{\alpha g^{\rho} + \left[x_m^{\epsilon} + x_f^{\epsilon}\right]^{\frac{\rho}{\epsilon}}\right\}^{\frac{1}{\rho}}$$

  - g: **market childcare services**.
  - A: productivity level.
  - α: weight for market childcare services.
  - υ: a variable cost.

- Child's human capital formation:

$$h' = \kappa\left(\iota + e^{\zeta}\right).$$

  - e: human capital inputs.
  - ι: basic human capital.
  - ζ: a return to education investment.
  - κ: luck shock.
    - Assume $\ln\kappa \sim \mathcal{N}\left(0, \sigma_{\kappa}^2\right)$.

Quantitative Model: Couple's Problem

$$V\left(h_m, h_f\right) =$$

$$\max_{\{n,e,g,c_m,c_f,l_m,l_f,x_m,x_f\}} \theta_m \mathbb{E}_\kappa \left[\ln c_m + \varsigma_m \ln l_m + \gamma_m \ln n + \delta \ln h' - n\frac{\psi\left(r-\tilde{r}\right)^2}{2}\right]$$

$$+ \theta_f \mathbb{E}_\kappa \left[\ln c_f + \varsigma_f \ln l_f + \gamma_f \ln n + \delta \ln h' - n\frac{\psi\left(r-\tilde{r}\right)^2}{2}\right],$$

subject to

$$c_m + c_f + en + g = h_m\left(1 - l_m - x_m\right) + \underbrace{\chi}_{\text{the gender wage gap}} h_f\left(1 - l_f - x_f\right),$$

$$h' = \kappa\left(\iota + e^{\zeta}\right),$$

$$\upsilon n = A\left\{\alpha g^{\rho} + \left[x_m^{\epsilon} + x_f^{\epsilon}\right]^{\frac{\rho}{\epsilon}}\right\}^{\frac{1}{\rho}}.$$

- **Set** $\theta_f = w_f / \left(w_m + w_f\right)$.

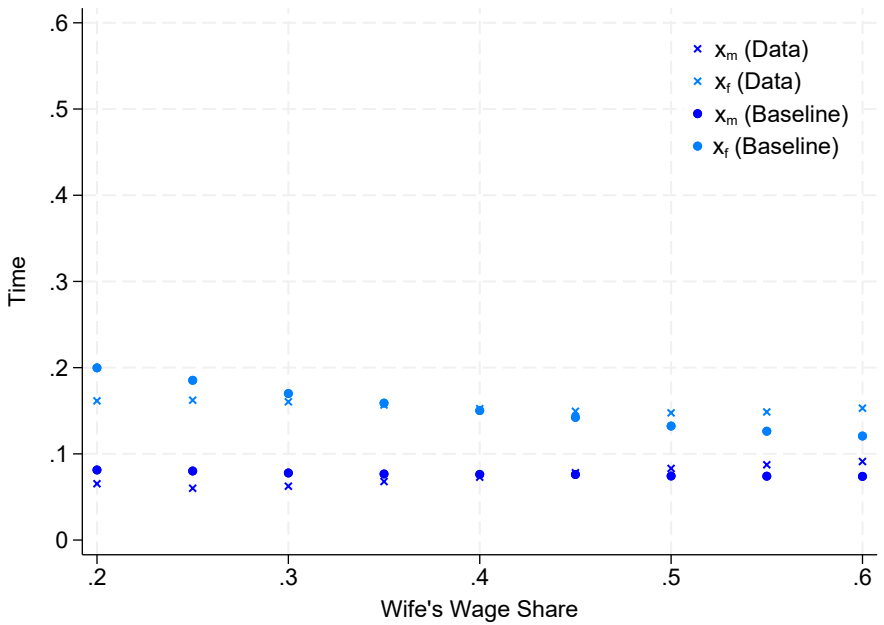
▸ definition of a stationary equilibrium

Calibrated Parameters (US)

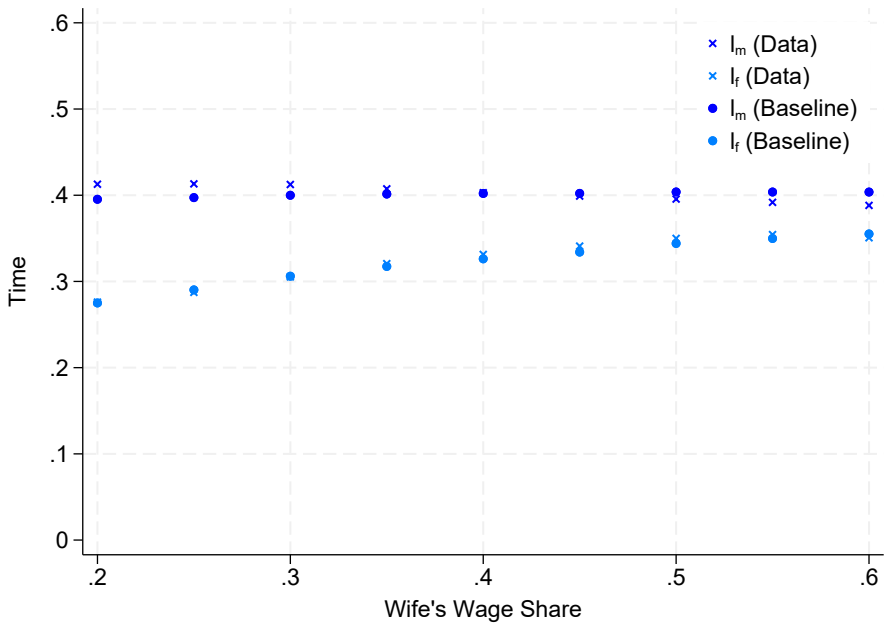
- Fix the two parameters:
  1. χ: Set to 0.833 (Source: OECD).
  2. $\frac{\nu}{A}$: Set to 0.250.

Parameter	Value	Target Moment	Data	Model
γ_m	0.371	Average childcare time (Husband)	0.076	0.079
γ_f	0.370	Average childcare time (Wife)	0.147	0.152
δ	0.999	Average share of education expenditures	0.022	0.022
ς_m	1.498	Average working hours (Husband)	0.402	0.399
ς_f	1.503	Average working hours (Wife)	0.329	0.333
ψ	3.067	Average Fertility	1.771	1.774
$\tilde{r}$	**0.662**	**Wife's share of childcare time at her wage share of 0.5**	**0.643**	**0.643**
ι	2.588	Average income	1.000	1.000
ζ	0.646	Average share of education expenditures (Top household income quintile)	0.047	0.047
σ_k	0.411	Cumulative distribution of her wage share at 0.25	0.067	0.066
ϵ	0.573	Wife's share of childcare time (Her wage share of 0.2 vs. 0.6)	0.089	0.089
α	0.393	Average share of market childcare services	0.037	0.038
ρ	0.688	Average share of market childcare services (Top household income quintile)	0.061	0.062

Non-Targeted Moments (US): Time Allocation



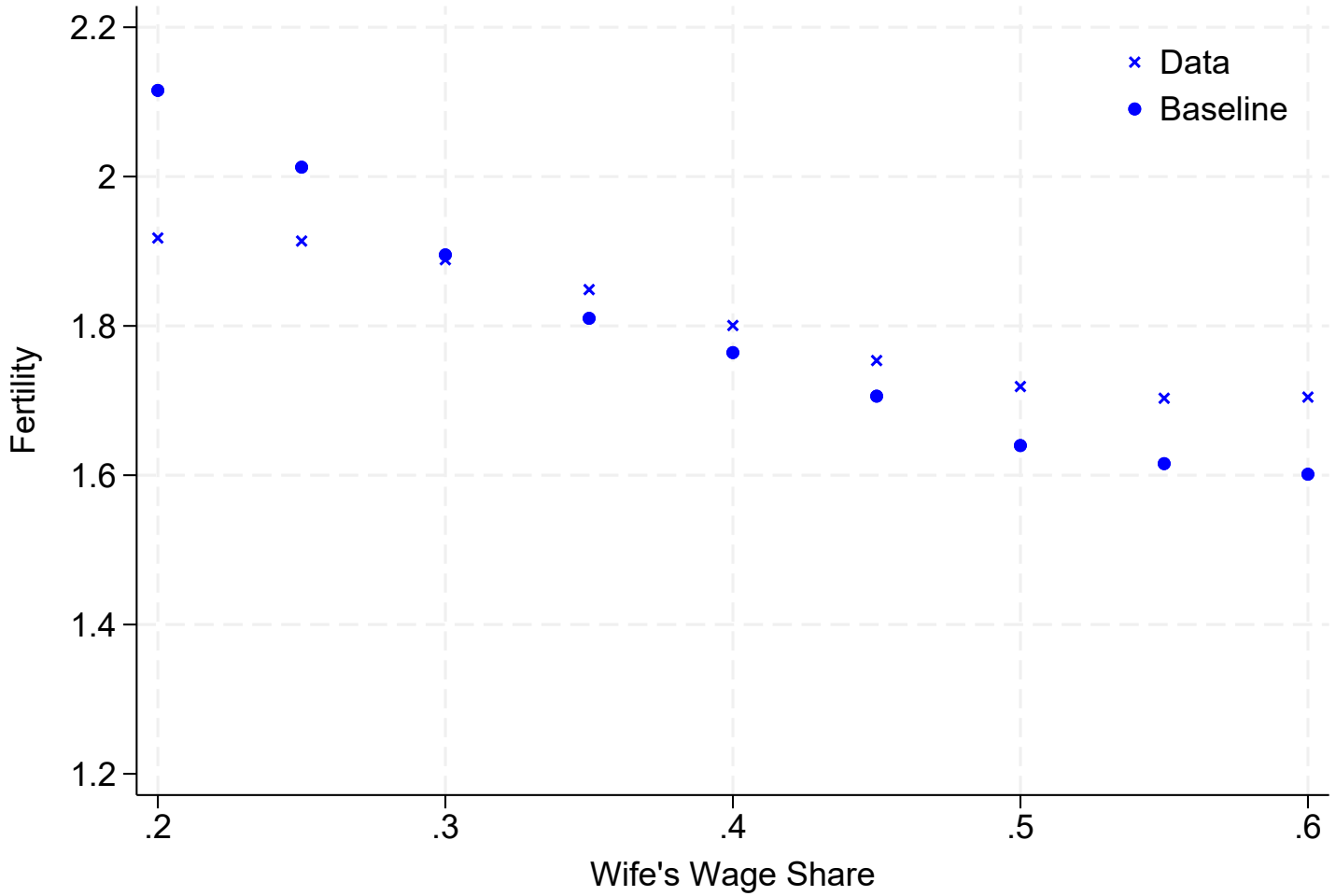
(a) Childcare Time



(b) Working Time

Non-Targeted Moments (US): Wife's Share of Childcare Time & Fertility

- **Slope of fertility w.r.t the wife's wage share: -1.316 (Data: -0.640).**

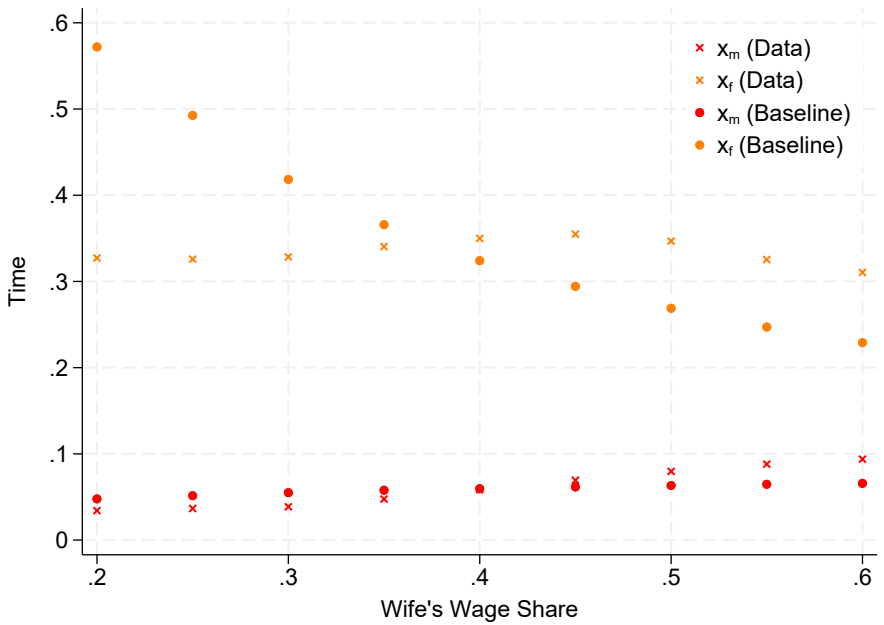


Calibrated Parameters (JP)

- Set $\{\epsilon, \rho, \sigma_k\}$ to the US values.
- χ: Set to 0.730 (Source: OECD).
- α: Set to 0.196 $(= 0.393 \times 0.5)$.

Parameter	Value	Target Moment	Data	Model
γ_m	0.525	Average childcare time (Husband)	0.060	0.059
γ_f	0.606	Average childcare time (Wife)	0.340	0.339
δ	1.206	Average income share spent on education expenditures	0.065	0.065
ς_m	1.309	Average working hours (Husband)	0.468	0.466
ς_f	1.082	Average working hours (Wife)	0.269	0.268
$\tilde{r}$	**0.905**	**Wife's share of childcare time at her wage share of 0.5**	**0.816**	**0.809**
ι	2.039	Average relative wage to the US	0.801	0.807
ζ	0.485	Average share of education expenditures(Top household income quintile)	0.085	0.086
$\frac{\nu}{A}$	0.389	Average Fertility	1.512	1.521

Non-Targeted Moments (JP): Time Allocation



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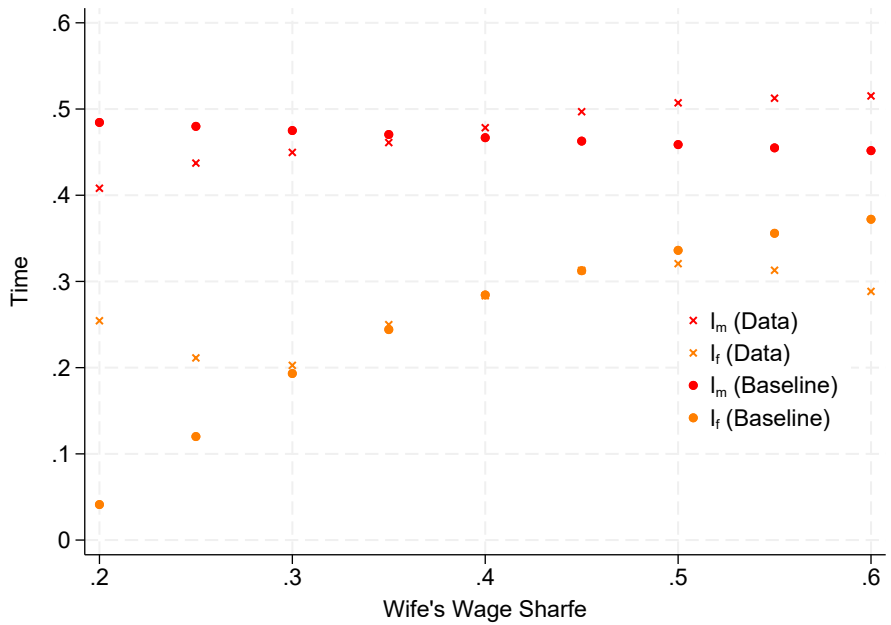
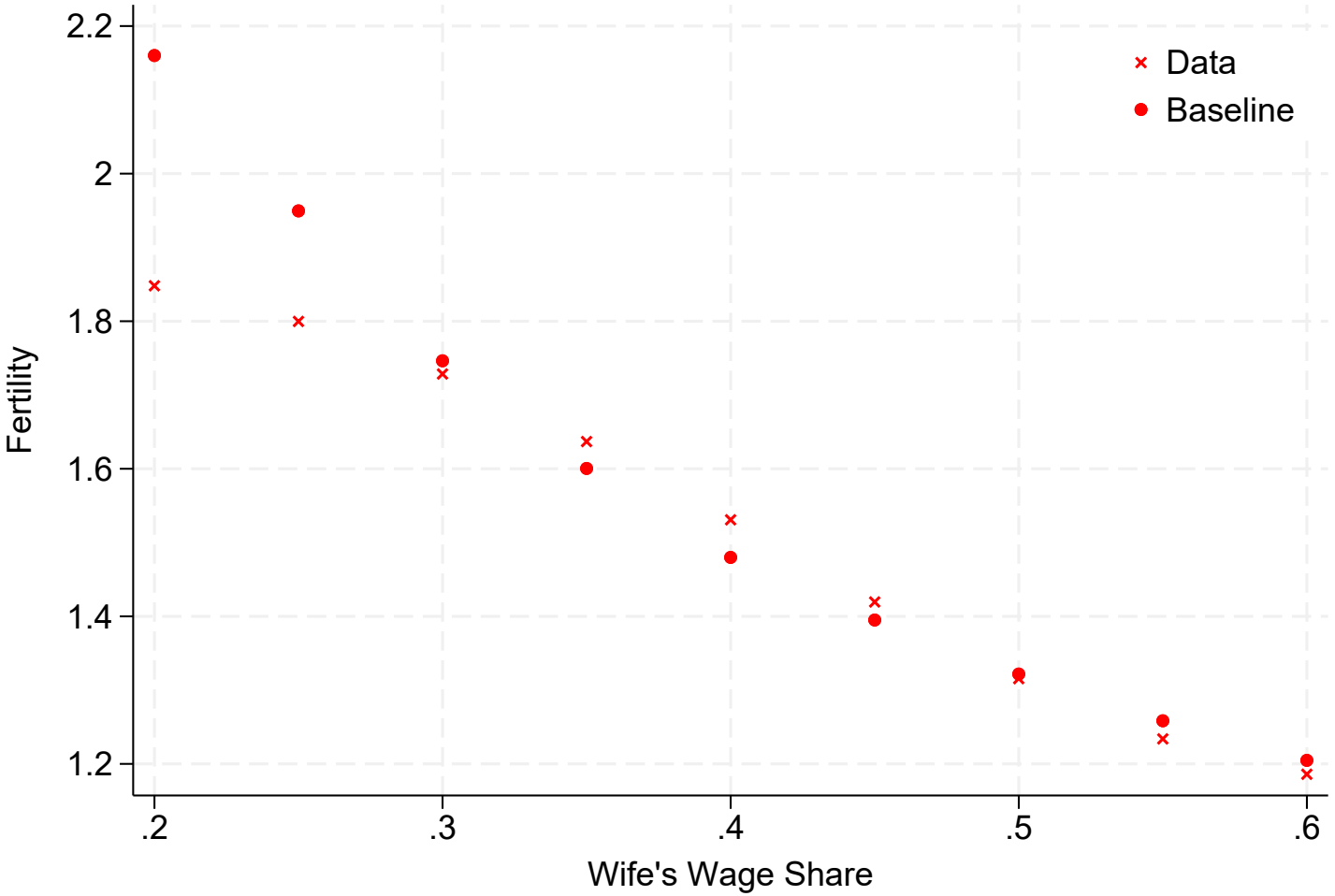


(b) Working Time

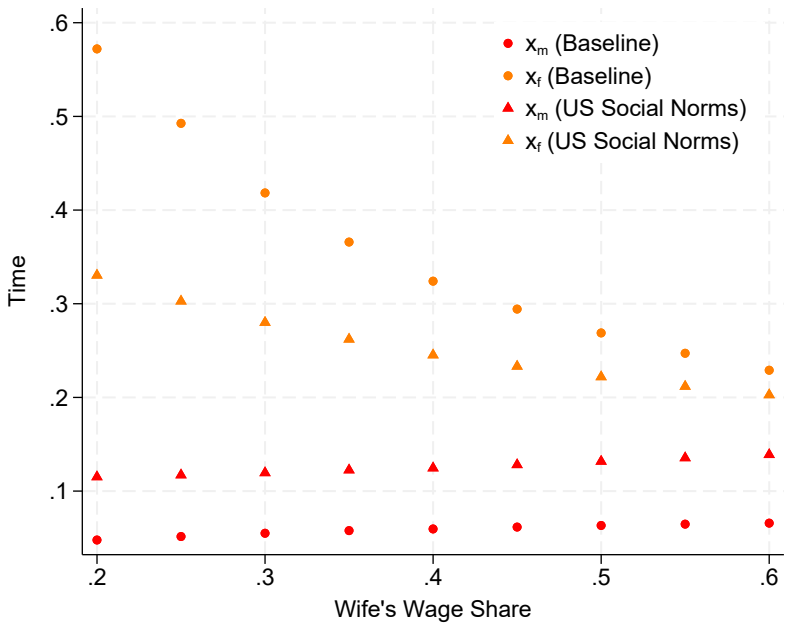
Non-Targeted Moments (JP): Wife's Share of Childcare Time & Fertility

- **Slope of fertility w.r.t the wife's wage share: -2.485 (Data: -1.796).**
  - **Slope in the US: -1.316 (Data: -0.640).**



The Impact of Social Norms on Differences in Fertility

- **Set $\tilde{r}$ to the US values, holding the other parameters for JP fixed.**
  - **$\tilde{r}$: 0.905 $\Rightarrow$ 0.662.**



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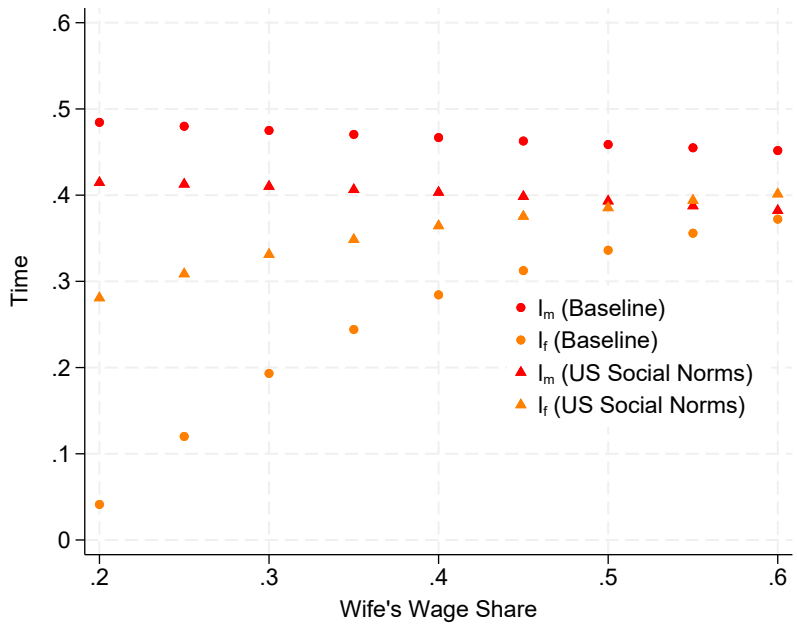
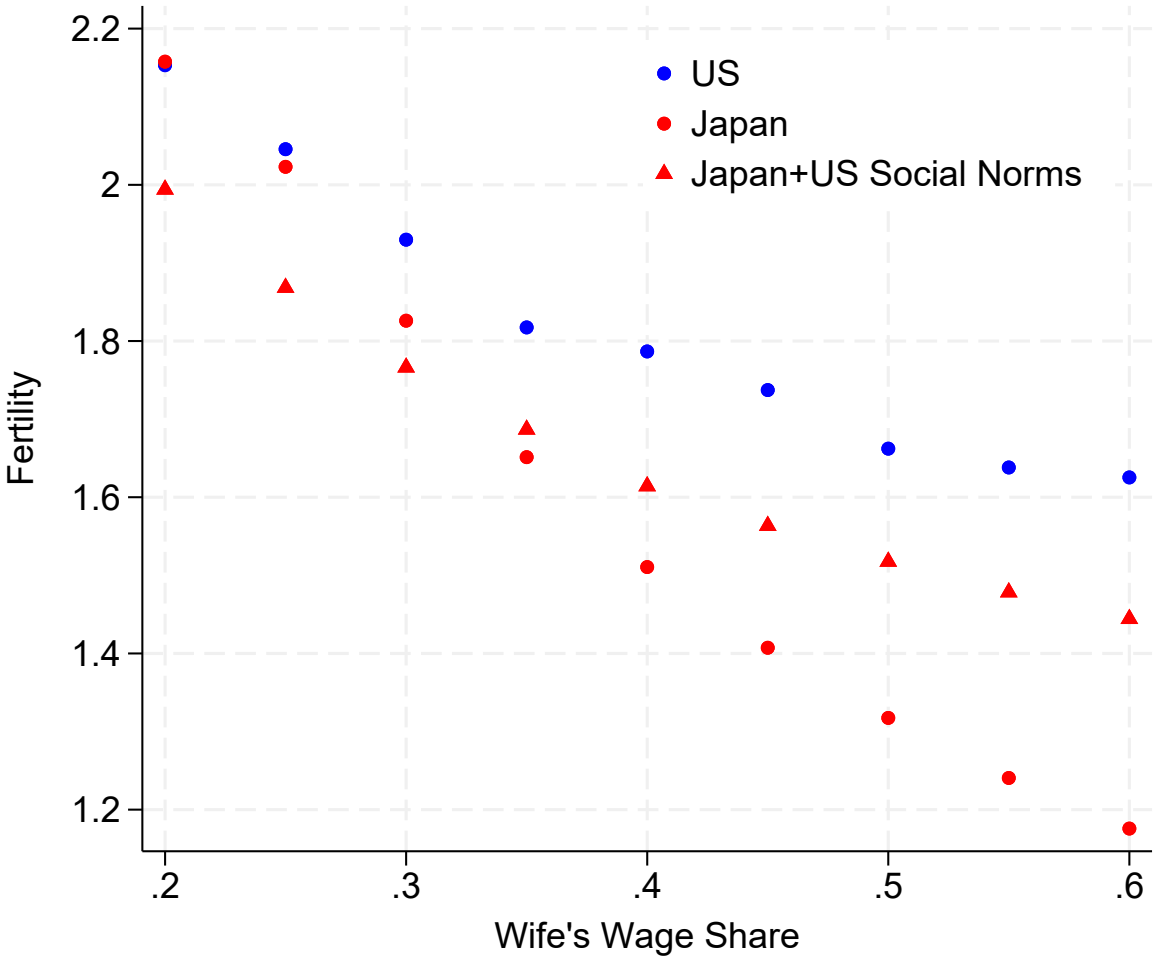


(b) Working Time

The Impact of Social Norms on Differences in Fertility

- **The fertility rate: 1.512 ⇒ 1.612.**
  - **Significant impact for HHs in which the wife's wage share is high.**
    - **Account for 69.98% at the wife's wage share of 0.6.**



Conclusion

- Address two questions:
  1. **Why does the large gap in the wife's share of domestic work exist?**
  2. **What role does the large gap in the wife's share play in explaining the differences in fertility?**

- Main takeaways:
  1. **The strength of social norms in the gender division of childcare matters**.
  2. **Social norms are the key contributor to the differences in fertility for HHs, particularly those with a high wife's wage share**.

Definition of Stationary Equilibrium

Definition

A stationary equilibrium consists of couples' decision rules $\{n, e, g, c_m, c_f, l_m, l_f, x_m, x_f\}$ for each state and the distribution of human capital for men and women $F\left(h_j\right)$ in the next generation that satisfy the following conditions:

- Households' allocation rule solves the optimization problem defined above.
- The stationary distributions of human capital for men and women are fixed points:

$$\int_0^{\bar{h}} F\left(dh_m\right) = \int_0^{\bar{h}} F\left(dh_f\right) = 0.5 \times \frac{\sum_\kappa \pi_\kappa \int \int_{\{h|\mathfrak{h}(h_m,h_f)\leq\bar{h}\}} n\left(h_m, h_f\right) F\left(dh_m\right) F\left(dh_f\right)}{\int \int_h n\left(h_m, h_f\right) F\left(dh_m\right) F\left(dh_f\right)}, \tag{1}$$

where π_κ represents the probability of the ability shock and $\mathfrak{h}\left(h_m, h_f\right)$ is the human capital based on the decision rules $n\left(h_m, h_f\right)$ and $e\left(h_m, h_f\right)$.

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