Barriers to Gender Convergence

The Interactive Effects of Job Inflexibility and Social Norms

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Gender Convergence and Social Norms

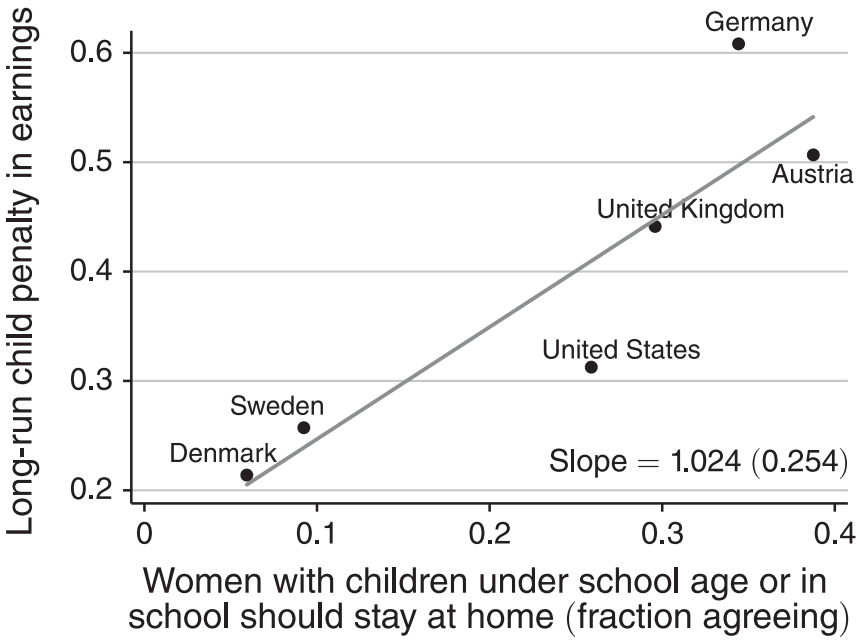


Figure 4 of Kleven et al. (2019)

- Gender convergence has been substantial, yet incomplete
- Recent studies argues that remained gaps are due to “Child Penalty”
  → Kleven, Landais, and Søgaard (2019); Kleven, Landais, and Leite-Mariante (2025)
- Kleven et al. (2019) points out its correlation with social norms on gender roles

Job flexibility and Gender Gaps

Goldin (2014) classifies jobs into two types by their wage schedules:

- **Non-linear**: High wage, long hours, inflexible (e.g., MBA, Lawyer)
- **Linear**: Low wage, short hours, flexible (e.g., Pharmacist)

She argues

- Trade-off between wage and flexibility
- Wage penalty in flexibility should be eliminated for gender convergence

Where do the gender differences in demand for flexibility come from?

- Job characteristics are ostensibly equal between men and women
- What encourages women to choose flexible jobs?
  - → Responsibility in home production (**Social Norms**)

Japan as an Ideal Laboratory

In Japanese statistics, a definition is used: *Regular* and *Non-regular* jobs

- Based on “how their occupations are classified in the company”
- There is no precise definition, but *typically*,

	Regular	**Non-regular**
Contract Type	Permanent	Temporary
Hours (week)	40/40+	Lower and Dispersed
Wage	High	Low

- R and NR jobs correspond to Non-linear and Linear jobs of Goldin (2014)
- Clear trade-off between job flexibility and wage
- Social norms on gender roles are strong in Japan
  - → Regional variations also exist (c.f., Abe (2013))

Outline

Document female employment in Japan

- **Regular** vs. **Non-regular** jobs
- Social norms on gender roles

Build a structural model

- Choices on occupations, working hours, domestic labor hours
  - $\rightarrow$ Occupations differ in how hours map into earnings (Non-linear vs. Linear)
- Utility costs associated with wives' higher earnings

Model explains

- Gender gaps in participation, occupation, working hours, and wages
- Regional variations in gender gaps
- Interaction effects of job inflexibility and social norms

Facts

Data

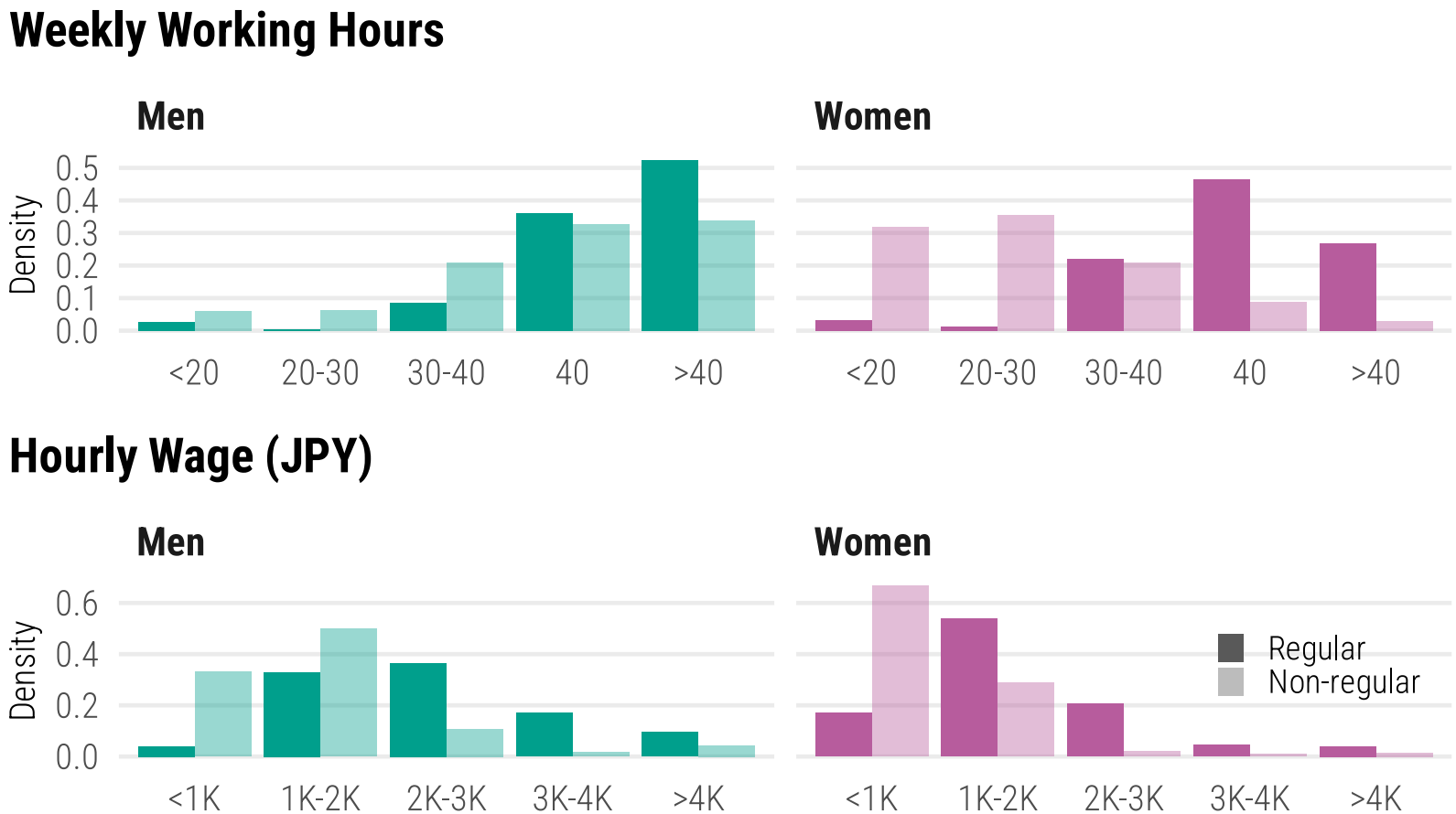
Japan Panel Study of Employment Decisions (JPSED)

- 57,284 men and women older than 15 in Japan
- Panel data of individual workers since 2015
- Demographic data, employment status, and information on working conditions

Sample

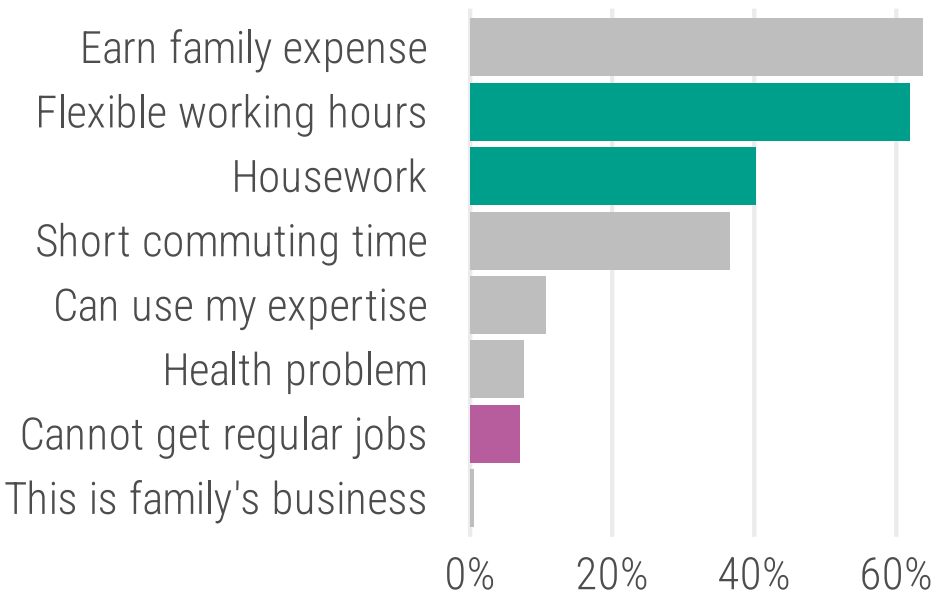
- Married people aged 25-59
- Employed either in regular or non-regular jobs
- Sample period from 2016 to 2019 (before COVID-19)

Regular and Non-regular Jobs

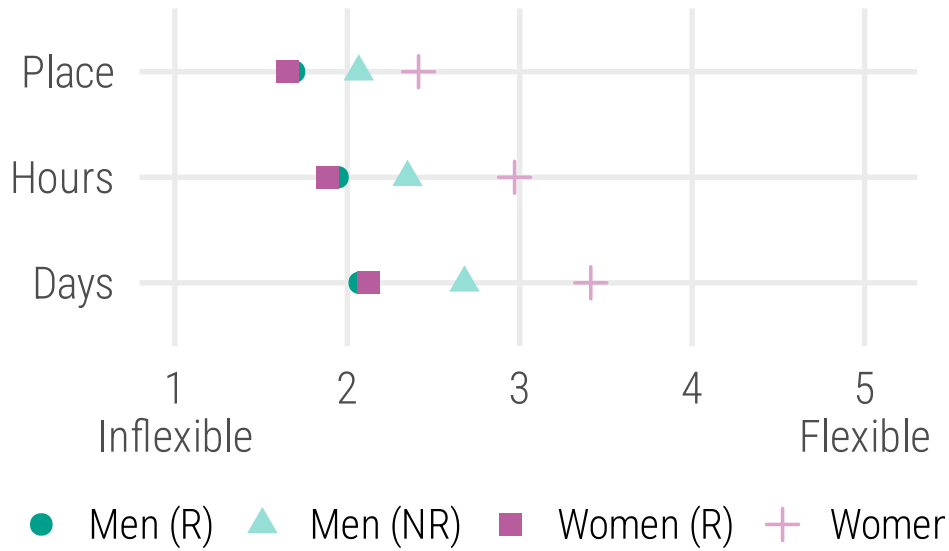


Trade-off between Wage and Flexibility

Reasons for Non-regular Jobs, Women

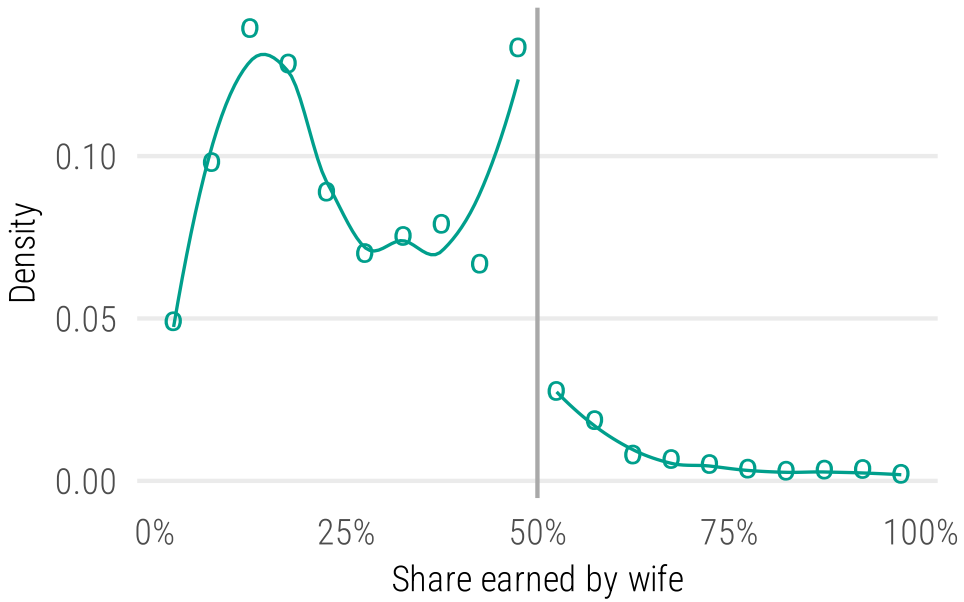


Flexibility of Jobs



- Flexibility is the main reason for women choosing non-regular jobs
- Non-regular jobs are more flexible than regular jobs

Social Norms



- Similar to Bertrand, Kamenica, and Pan (2015)
  - → A gap in the density of the wife's share of earnings at 50%
  - → Interpreted as the existence of social norms
- Japan has one of the strongest social norms against wives' higher earnings

Takeaways for the Model

Social norms on wives' relative earnings

- Existence of utility costs when wives earn more than husbands
- Flip side of female responsibility in home production
- Origin of gender different demands for job flexibility

Job inflexibility in regular jobs

- Trade-off between wage and flexibility
- Women choose non-regular jobs to accommodate domestic labor responsibilities

"Social norms create gender gaps and job inflexibility amplifies them"

Model

Settings

- Economy consists of married couples (male $g = m$ and female $g = f$)
- A couple is endowed with
  - $\rightarrow$ productivities $\log(a_m, a_f) \sim \mathcal{N}(\mu, \Sigma)$
  - $\rightarrow$ joint domestic labor requirements $D \sim Beta(\alpha, \beta)$
- Couple's decisions have two layers:
  1. Occupational choices $j_g \in \{R, NR\}$ or not to work $j_g = NW$
  2. Working hours h_g and domestic labor d_g and consumption c_g

Utility Function

$$u(c, h + d) = \log c - \phi \frac{(h + d)^{1+\gamma}}{1 + \gamma}$$

Settings

Productivity

$$\log\begin{pmatrix}\alpha_m \\ \alpha_f\end{pmatrix} \sim \mathcal{N}\left(\begin{pmatrix}0 \\ 0\end{pmatrix}, \begin{pmatrix}\sigma^2 & \rho\sigma^2 \\ . & \sigma^2\end{pmatrix}\right).$$

- No gender differences in productivity
  - $\rightarrow$ All the gender gaps emerge from the model structure
- $\rho > 0$ suggests positive assortative matching

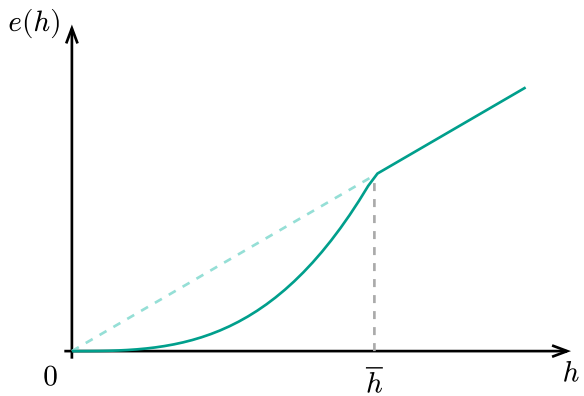
Home Requirements

$$\left(d_m^{\xi} + d_f^{\xi}\right)^{\frac{1}{\xi}} = D \sim Beta(\alpha, \beta).$$

- No gender differences in home production
- $\xi > 0$ suggests domestic labor is substitutable between spouses

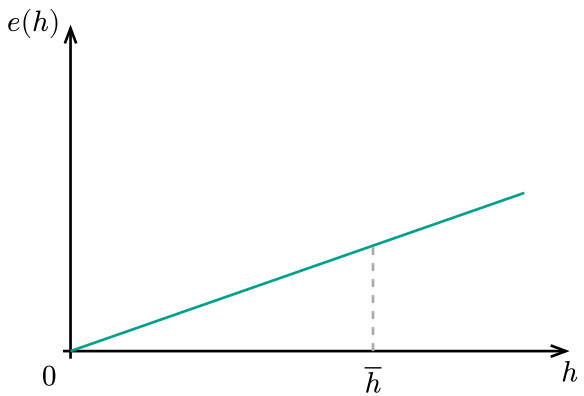
Convex Wage Schedule

Regular Jobs



$$e(h, a, j = R) = \begin{cases} ah^{1+\theta} & \text{if} \quad h \leq \overline{h} \\ a\overline{h}^{\theta} h & \text{if} \quad h > \overline{h} \end{cases}$$

Non-Regular Jobs



$$e(h, a, j = NR) = \psi a\overline{h}^{\theta} h$$

- Reducing working hours in regular jobs is costly
- ψ: Wage penalty in non-regular jobs

Household Decisions

Stage 1: Occupational Choices

Discrete Choice

$$\left(j_m, j_f\right) = \arg\max_{j_m, j_f} U^{j_m, j_f} + \varepsilon^{j_m, j_f}$$

- U^{j_m, j_f}: Utility from occupational choices of $\left(j_m, j_f\right)$
- $\varepsilon^{j_m, j_f} \sim \text{Type-I } (\eta)$: Idiosyncratic shock

Minimum Working Hours

To prevent trivial solutions (e.g., $h_g = 0$ for $j_g = R$), I impose minimum working hours:

- $\underline{h}_R$: Set to 20 hours per week for regular jobs
- $\underline{h}_{NR}$: Set to 10 hours per week for non-regular jobs

Household Decisions

Stage 2: Household Allocations

$$U^{j_m,j_f} = \max_{c_m,c_f,h_m,h_f,d_m,d_f} u(c_m, h_m + d_m) + u\big(c_f, h_f + d_f\big) - \delta \cdot \mathbb{1}\big\{e_f > e_m\big\},$$

subject to

$$c_m + c_f = e(h_m, a_m, j_m) + e\big(h_f, a_f, j_f\big),$$

$$D = \left(d_m^{\xi} + d_f^{\xi}\right)^{\frac{1}{\xi}}.$$

- δ: Utility costs when wife's earnings exceed husband's (*Breadwinner Norm*)

Model Recaps

Married couples decide

- Occupations $(j_m, j_f) \in \{R, NR, NW\}^2$
- Working hours (h_m, h_f), domestic labor (d_m, d_f), consumption (c_m, c_f)

Regular vs. Non-Regular Jobs

- Regular jobs have a convex wage schedule. High wages and long hours
- Non-regular jobs have a linear wage schedule. Low wages and flexible hours

Gender gaps come from

- Social norms on wives' relative earnings δ
- No other structural asymmetries

Estimation

Calibration Strategy

Exogenous Parameters

- $\gamma = 3$: Frisch elasticity = $\frac{1}{3}$ (Erosa et al. 2022)
- $\xi = 0.67$: Intra-household ES of domestic labor = 3 (Knowles 2013)
- $\overline{h} = 40/(16 \times 7)$: 40 hours per week

Endogenous Parameters

$$\min_{\Pi} \sum_{i} \left[\frac{\text{Data}_i - M_i(\Pi)}{\text{Data}_i} \right]^2.$$

$$\Pi = \left(\underbrace{\theta, \psi}_{\text{production}} \;,\; \underbrace{\eta}_{\text{shock}} \;,\; \underbrace{\phi}_{\text{preference}} \;,\; \underbrace{\sigma, \rho,}_{\text{productivity}} \; \underbrace{\alpha, \beta,}_{\text{domestic labor}} \; \underbrace{\delta}_{\text{social norm}} \right).$$

Estimated Parameters

Parameter	Value	Target	Data	Model
θ	2.62	Share of $j_m = R$	0.90	0.87
η	0.17	Share of $j_m = NR$	0.09	0.09
ψ	0.59	$\overline{\log w_{m,R}} - \overline{\log w_{m,NR}}$	0.64	0.68
ϕ	12.00	$\overline{h_{m,R}}$	0.40	0.40
σ	0.64	$sd(\log w_{m,R})$	0.62	0.63
ρ	0.53	$\overline{\text{Corr}(\log e_{m,R}, \log e_{f,R})}$	0.21	0.21
α	0.08	$\overline{d_{f,R}}$	0.22	0.22
β	0.43	$sd(d_{f,R})$	0.14	0.14
δ	0.79	Share of $e_f > e_m$	0.07	0.07

- Estimated parameters closely match the data moments

Estimated Parameters

Parameter	Value	Target	Data	Model
$\boldsymbol{\theta}$	**2.62**	Share of $j_m = R$	0.90	0.87
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- High convexity in regular jobs

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- Estimated parameters closely match the data moments
- High convexity in regular jobs
- Wage penalty in non-regular jobs

Estimated Parameters

Parameter	Value	Target	Data	Model
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- Estimated parameters closely match the data moments
- High convexity in regular jobs
- Wage penalty in non-regular jobs
- Positive assortative matching

Untargeted Moments

Occupational Choices

Data

	Wife		
Husband	R	NR	NW
R	0.35	0.38	0.17
NR	0.01	0.07	0.01
NW	0.01	0.01	0.00

Model

	Wife		
Husband	R	NR	NW
R	0.17	0.33	0.37
NR	0.04	0.04	0.02
NW	0.04	0.00	0.00

- Wives' occupational choices are untargeted but closely match the data

Untargeted Moments

Allocation of Working Hours

		Data		Model	
Husband	Wife	Husband	Wife	Husband	Wife
Regular	Regular	44.4	39.7	45.8	34.6
Regular	Non-regular	45.4	23.5	42.3	14.1
Non-regular	Regular	37.0	39.7	23.1	39.9
Non-regular	Non-regular	39.8	25.5	36.5	19.1

- Replicates characteristic patterns of working hours
  - → Husbands work longer than wives
  - → Regular workers work longer than non-regular workers

Gender Gaps

	Data	Model	Model / Data
Participation	0.16	0.34	208%
Occupation	0.53	0.62	118%
Labor Hours	0.49	0.77	158%
Wage	0.76	0.37	48%

- Four measurements of the gender gaps
  - → *Participation*: diff. in labor force participation rates
  - → *Occupation*: diff. in the share of regular jobs
  - → *Labor Hours*: diff. in log working hours conditioned by working
  - → *Wage*: diff. in log wages conditioned by working
- Model replicates all types of gender gaps **without**
  - → Targeting them in the estimation
  - → Assuming exogenous gender differences in productivity

Regional Variations in Social Norms

Social Norms and Gender Gaps

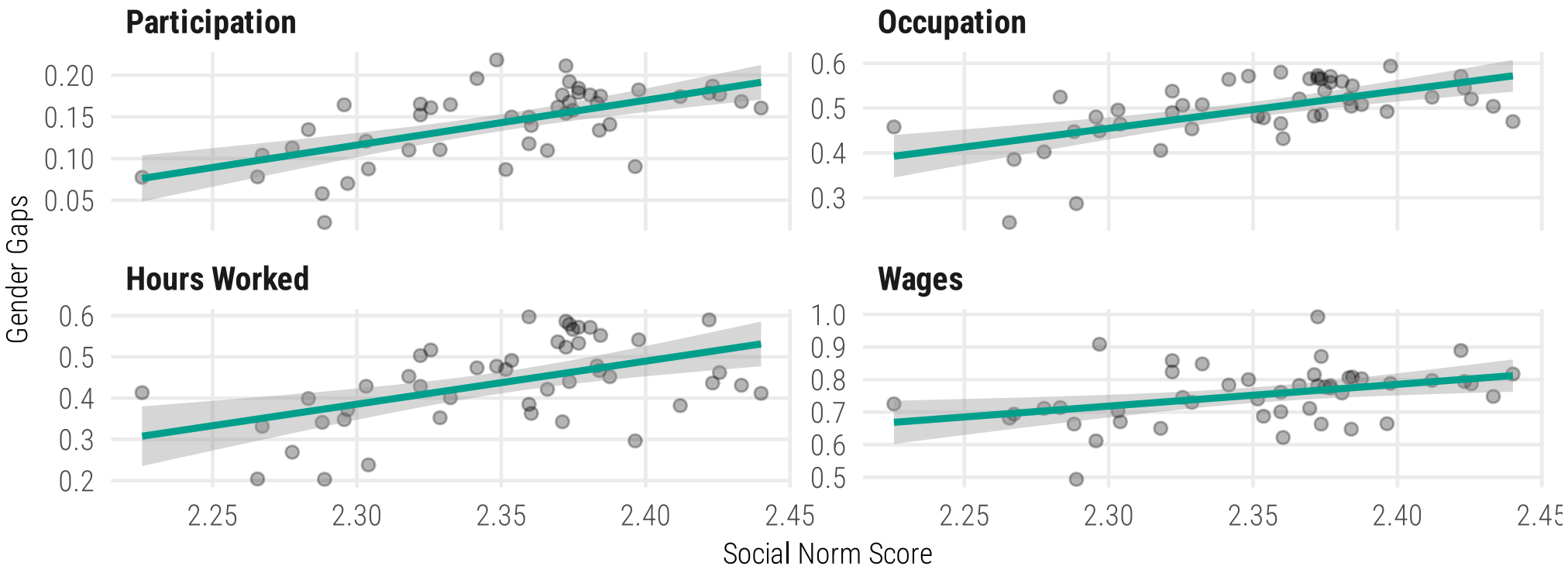
Motivation

- Kleven et al. (2019) shows the correlation between social norms on gender roles and the size of child penatlys across countries
- Abe (2013) suggests regional variations in social norms in Japan

Social Norm Score

- “Survey on Awareness of Women’s Participation and Advancement in Regional Areas” (SAWPARA) conducted in 2015
- 4-point Likert scale on attitudes toward gender roles in 47 prefectures
  → Higher scores indicate more traditional views on gender roles

Social Norms and Gender Gaps



Data: SAWPARA (2015) and JPSED (2016-2019).

- Clear correlation between social norms and gender gaps
- Can the model replicate the relationship?

Model Prediction

Assume the four gender gaps measurments $\mathbf{g}_p = \left(g_{1,p}, g_{2,p}, g_{3,p}, g_{4,p}\right)$ are

$$\mathbf{g}_p = G\left(\delta_p; X\right) + \mathbf{g}_0 + \Xi_p.$$

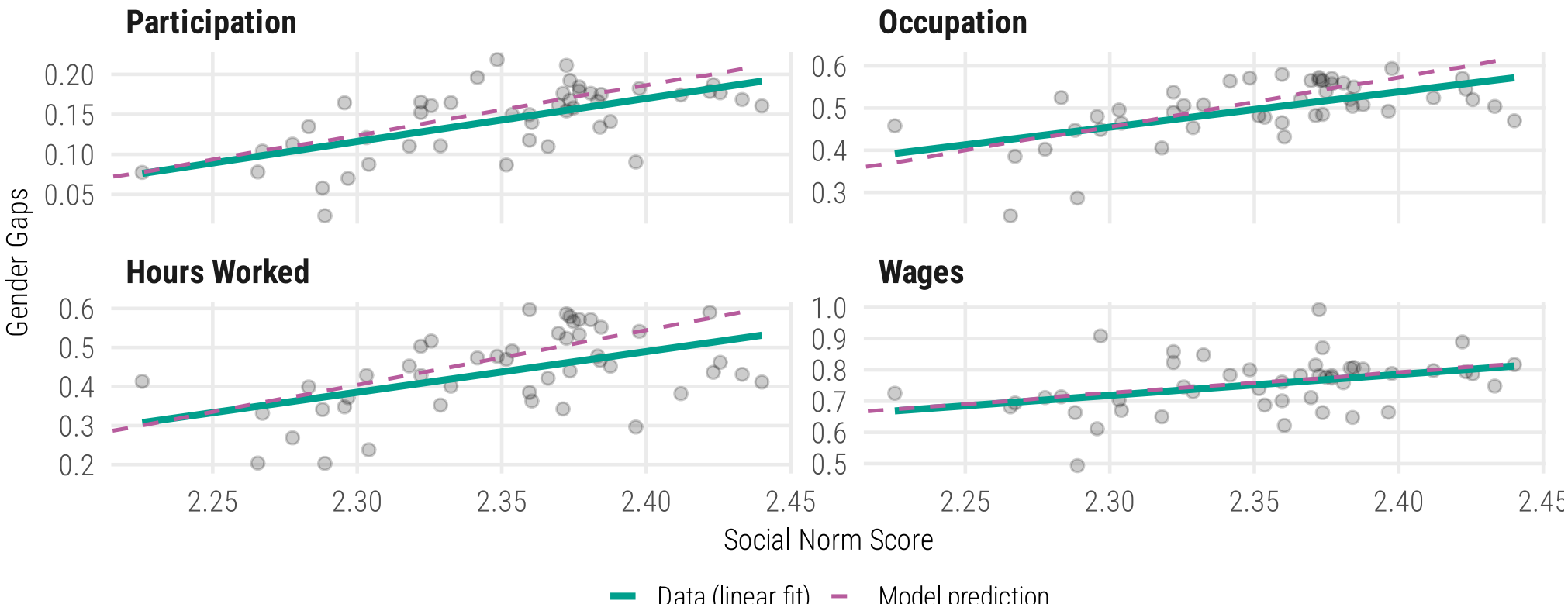
- $G\left(\delta_p; X\right)$: Model-predicted gaps given δ_p and other parameters X
- $\mathbf{g}_0 := \mathbf{g}_{\text{JPN}} - G\left(\hat{\delta}; \hat{X}\right)$: Baseline gaps not explained by the model
- Ξ_p: Idyosyncratic error term

The social norms score is mapped into δ_p by the two steps:

1. $f\left(\delta_p; X\right)$: Model-predicted share of wives earning more than husbands
2. Linear mapping between $f\left(\delta_p; X\right)$ and the social norms score s_p ▸ data

Varying δ, we obtain a model predicted relatinships of $\left(s_p(\delta), \mathbf{g}_p(\delta)\right)$

Model Prediction



- Model predictions closely match the data patterns
- Social norms δ are a key determinant of regional variations in gender gaps

Counterfactual Simulations

Flexible Regular Jobs

$$e(a,h,j=R)=\begin{cases}0 & \text{if } \; h<\underline{h}_R\\ a\overline{h}^{\theta}h & \text{if } \; h\geq \underline{h}_R\end{cases}$$

Baseline

	Wife		
Husband	R	NR	NW
R	0.17	0.33	0.37
NR	0.04	0.04	0.02
NW	0.04	0.00	0.00

Flexible Regular Jobs

	Wife		
Husband	R	NR	NW
R	0.40	0.23	0.25
NR	0.05	0.02	0.01
NW	0.03	0.00	0.00

- Increase in wives choosing regular jobs
- Consistent with job inflexibility as a main reason for non-regular jobs

Flexible Regular Jobs

Time Allocations

Working Hours

		Baseline		Flexible	
H	W	H	W	H	W
R	R	45.8	34.6	37.6	24.0
R	NR	42.3	14.1	40.7	16.0
NR	R	23.1	39.9	31.1	29.9
NR	NR	36.5	19.1	38.0	19.5

Domestic Labor Hours

		Baseline		Flexible	
H	W	H	W	H	W
R	R	19.0	25.6	26.6	36.5
R	NR	23.7	46.4	24.1	43.6
NR	R	38.4	23.9	32.1	32.1
NR	NR	27.9	41.7	26.0	40.3

- Wives can choose lower working hours
- Domestic labor hours do not change much (except for $NR \times R$ couples)

Outsourcing of Housework

- Marketization of housework is a key determinant of Female Labor Supply
  - → Cortés and Pan (2019); Duval-Hernández, Fang, and Rachel Ngai (2023); Cortés and Tessada (2011)
- Limited availability in Japan

Counterfactual simulations

$$c_m + c_f + pd = e_m\left(h_m, a_{m,j}, j_m\right) + e_f\left(h_f, a_{f,j}, j_f\right),$$

$$D = \left(d_m^{\xi} + d_f^{\xi} + d^{\xi}\right)^{\frac{1}{\xi}}.$$

- d: Purchasable domestic labor hours. p is its price
- Assume $p = \psi \overline{h}^{\theta}$ as the mean wage of non-regular jobs

Outsourcing of Housework

Time Allocations

Working Hours

		Baseline		Outsourcing	
H	W	H	W	H	W
R	R	45.8	34.6	55.1	41.4
R	NR	42.3	14.1	54.3	25.6
NR	R	23.1	39.9	32.0	50.3
NR	NR	36.5	19.1	48.8	29.7

Domestic Labor Hours

		Baseline		Outsourcing	
H	W	H	W	H	W
R	R	19.0	25.6	5.8	12.4
R	NR	23.7	46.4	6.8	25.3
NR	R	38.4	23.9	20.6	7.7
NR	NR	27.9	41.7	11.9	24.0

- Both husbands and wives increase market work hours
- Outsourcing largely eliminates the need for couples to work for domestic labor

Outsourcing of Housework

Occupational Choices

Baseline

	Wife		
Husband	R	NR	NW
R	0.17	0.33	0.37
NR	0.04	0.04	0.02
NW	0.04	0.00	0.00

Outsourcing

	Wife		
Husband	R	NR	NW
R	0.52	0.23	0.15
NR	0.04	0.01	0.00
NW	0.03	0.00	0.00

- Increase in wives choosing regular jobs
- Consistent with housework as a reason for choosing non-regualr jobs

Gender Gaps

	Baseline	Flexible	Outsourcing
Participation	0.34	0.23	0.13
Occupation	0.62	0.40	0.32
Labor Hours	0.77	0.65	0.42
Wage	0.37	0.10	0.10

Gender Gaps

	Baseline	Flexible	Outsourcing
Participation	0.34	**0.23**	**0.13**
Occupation	0.62	**0.40**	**0.32**
Labor Hours	0.77	0.65	0.42
Wage	0.37	**0.10**	**0.10**

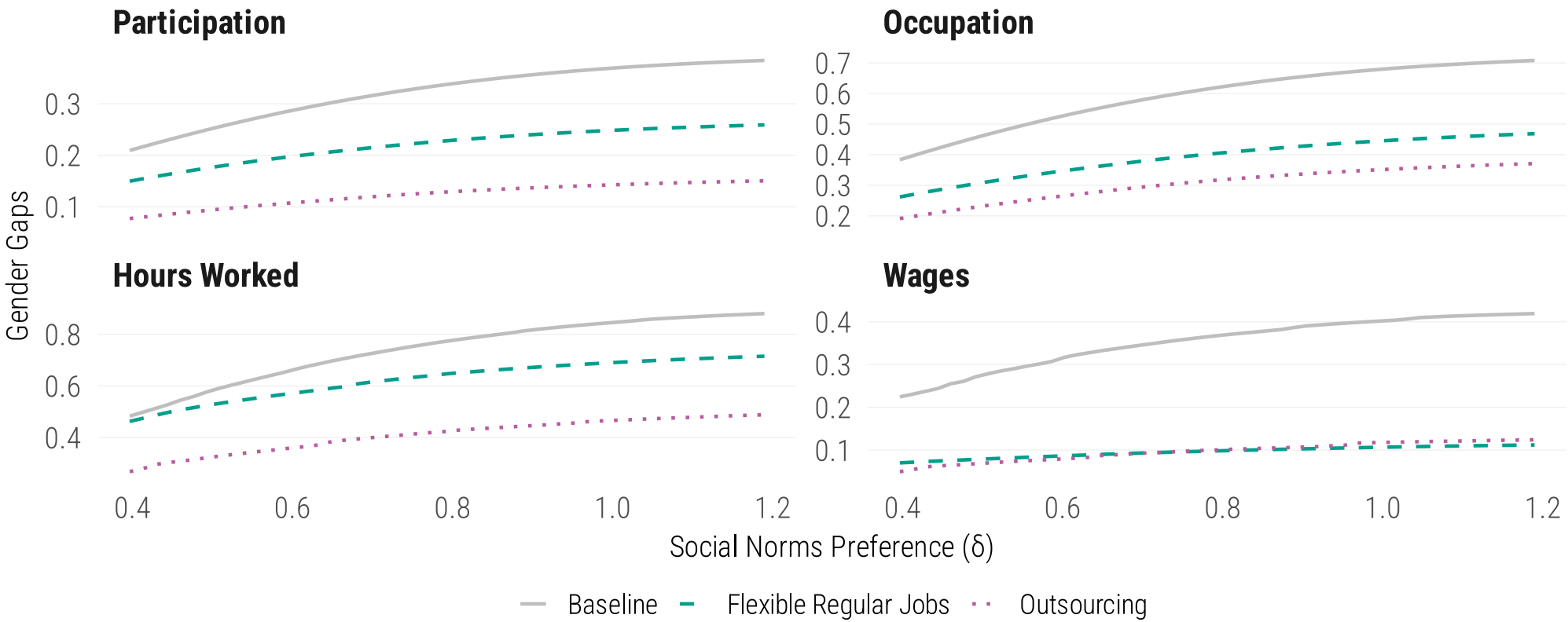
- Both flexible regular jobs and outsourcing significantly reduce gender gaps

Gender Gaps

	Baseline	Flexible	Outsourcing
Participation	0.34	0.23	0.13
Occupation	0.62	0.40	0.32
Labor Hours	**0.77**	**0.65**	**0.42**
Wage	0.37	0.10	0.10

- Both flexible regular jobs and outsourcing significantly reduce gender gaps
  - → Women can choose regular jobs more easily
- Outsourcing has more impact on the gap in working hours
  - → Domestic labor burdens does not change by the flexibility of the jobs

Interctive Effects of Job Flexibility and Social Norms



- Policies reduce gender gaps more effectively when social norms are stronger

Conclusion

Key Elements for Gender Convergence

- **Job flexibility** trade-off: Regular vs Non-regular jobs
- **Social norms** on wives' relative earnings

Model Explains

- Gender gaps in participation, occupation, working hours, and wages
- Regional variations in gender gaps
- Interaction effects of job inflexibility and social norms

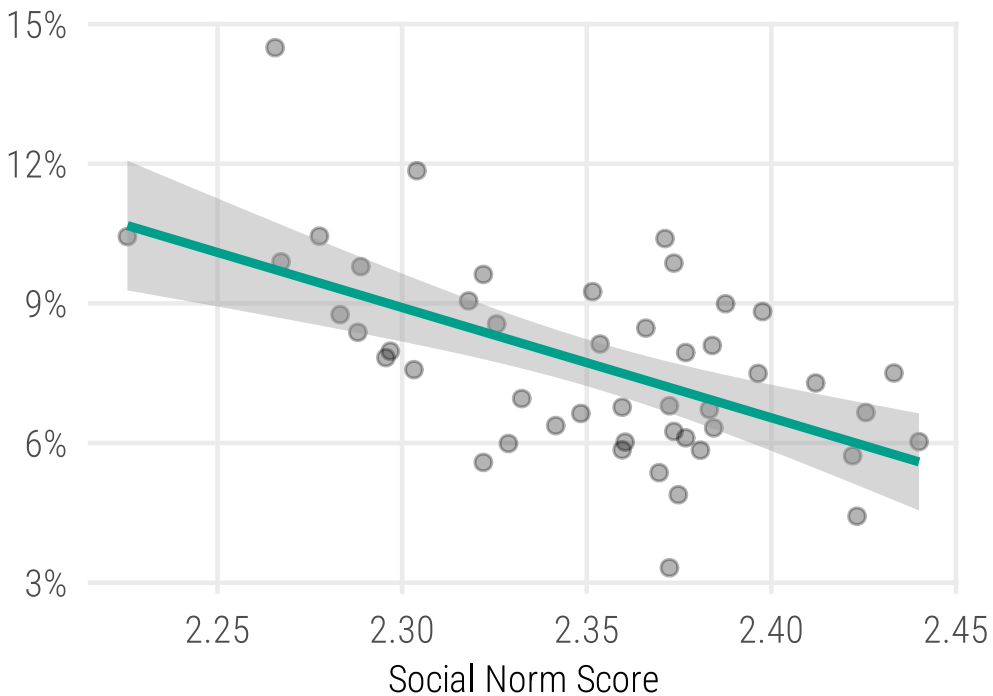
Policy Implications

- Enhancing job flexibility in regular jobs mitigates gender gaps
  → Gender roles in domestic labor remain a barrier (esp. working hours)
- Marketization of housework reduces all types of gender gaps
  → reduces domestic labor burdens directly

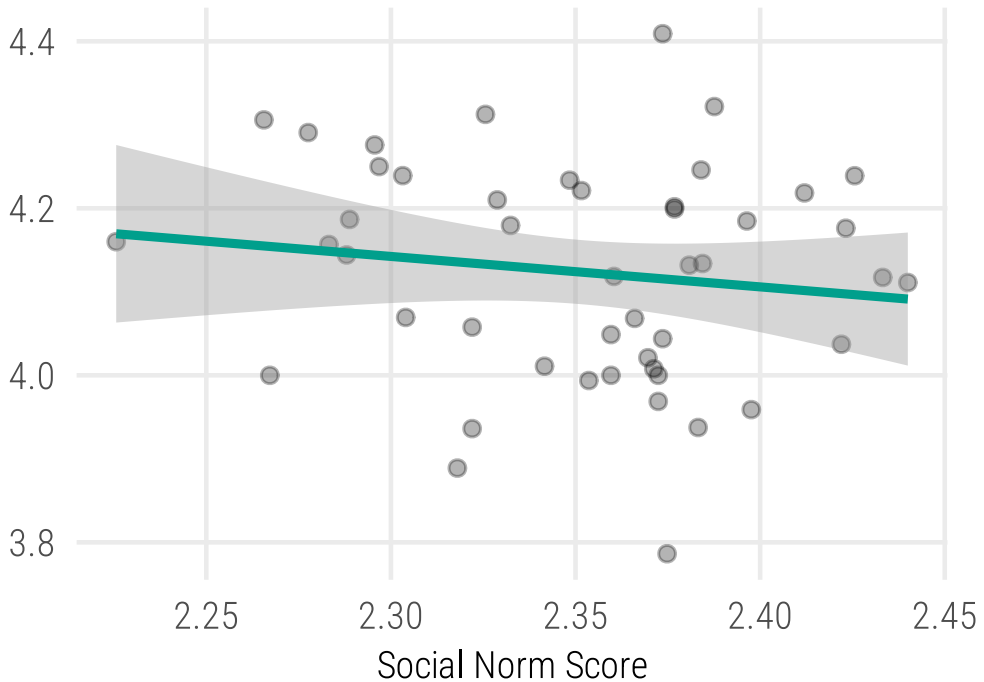
Appendix

Social Norms Score with Other Outcomes

Wives Earning More than Husbands



Flexibility in Working Time



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