# Why not Choose a Better Job? 

Flexibility, Social Norms, and Gender Gaps in Japan
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## Japan ranks 116th in 2022 gender gap, worst in East Asia, Pacific

$\underset{\text { кrooo }}{\circ}$ KYODO NEWS - Jul 13, 2022-18:37 | All, Japan

## ( $\because$ ค $(\rightarrow$

GENEVA - Japan ranked 116th among 146 countries in the gender gap rankings this year, at the bottom of the East Asia and Pacific group, and the Group of Seven major economies, a Swiss-based think tank said Wednesday.

The report by the World Economic Forum showed women's participation in the political and economic arenas remains particularly low in Japan. The country, however, attained high scores in access to education and health.

Japan ranked 120th among 156 countries in last year's rankings.

## Female Workers in Japan

Gap in Median Earnings of Full-time Workers in 2019


Fraction of Part-time in Female Workers in 2019


Female Laborforce Participation in 2019


- Large gap in earnings and high ratio of part-time jobs
- Female participation is not low

Why is the gender wage gap large in Japan?
Why is the fraction of part-time workers large for women in Japan?

## What Do I Do?

Document Female Employment in Japan

- Large gender diff. in participation, occupations, working hours, and wage
- Regular vs Non-regular job \& Social norms on gender roles

Build a model

- Choices on occupations and working hours
$\rightarrow$ Occupations differ in the way hours map into earnings (linear vs. convex)
- Utility cost associated to social norms
$\rightarrow$ Wives earnings more than husbands
Model explains
- All gender gaps in participation
- 33\% in occupational choices, $74 \%$ in labor hours, and 34\% in wage

Facts

## Data

Japan Panel Study of Employment Dynamics (JPSED)

- 57,284 men and women older than 15 in Japan
- Panel data 2015-2019
- Earnings, working hours, housework, labor contracts
- Use samples aged 25-59

Survey on Dual-Income Couples' Household Economy and Attitudes

- 2200 couples, women (men) aged 35-49 (30-55), in the Greater Tokyo Area
- One-year survey in 2014
- Earnings, working hours, housework, types of contracts


## Regular and Non-regular Jobs

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 | Permanent | Temporary |
| Hours (week) | 40/40+ | Lower and Dispersed |
| Wage | High | Low |

In JPSED,

- 92 \% (91 \%) of male (female) regular workers have permanent contracts
- 13 \% (14 \%) of male (female) non-regular workers have permanent contracts


## Weekly Working Hours

Men


Women


## Hourly Wage



## Occupational Choices of Married Men and Women

Men


25-29 30-34 35-39 40-44 45-49 50-54 55-59 Total
Women


25-29 30-34 35-39 40-44 45-49 50-54 55-59 Total

## Why Do Women Choose Non-regular Jobs?

Flexibility of the Job


Reasons for Choosing Non-regular Job, Women


## Job Flexibility and Convex Earning

Goldin (2014) defines the two types of jobs by earning schedule

- Linear jobs are lower wages and high flexibility
- Non-linear (convex) jobs are high wage and low flexibility


These characteristics correspond to Regular and Non-regular jobs! $\qquad$

## Social Norms

## Bertrand, Kamenica, and Pan (2015)

- A gap in the density of the wife's share of earnings at 50\% in US
- Interpreted as the existence of social norms


## Japanese Data

- A stark gap is seen in Japanese data
- Rising pattern just before 50\%
- Marriage penalty Mariage enaly



## Before Going to the Model...

Key Features

1. Job Flexibility (Regular vs. Non-regular)
2. Social Norm on Wife's Earnings cascsountry coparison

Gender Gaps

|  | Description | Gap | Men | Women |
| :--- | :--- | ---: | ---: | ---: |
| Partcipation | Participation rate | 0.27 | $98 \%$ | $70 \%$ |
| Ocuupation | Fraction of regular workers | 0.59 | $89 \%$ | $32 \%$ |
| Labor Hours | Mean of log weekly working hours | 0.49 | 44.2 h | 20.3 h |
| Wage | Mean of log hourly wage | 0.76 | 2958 JPY | 1534 JPY |
| Data: married, 25-59 aged in JPSED2016-2020 |  |  |  |  |

Model

## Households' Problem

- Economy consists of couples, including husbands $(g=m)$ and wives $(g=f)$
- choose an occupation $j_{g}$ from regular $R$, non-regular $N R$, not-working $N W$
- Endowed one unit of time, and choose working hours $h_{m}, h_{f}$, home hours $T_{m}, T_{f}$, and leisure $1-h_{m}-T_{m}, 1-h_{f}-T_{f}$

$$
\max _{h_{m}, h_{f}, T_{m}, T_{f}, j_{m}, j_{f}} U=\log c+\gamma \log H\left(1-h_{m}-T_{m}, 1-h_{f}-T_{f}\right)-\delta 1\left\{e_{m}<e_{f}\right\}
$$

subject to

$$
\begin{aligned}
c & =e\left(h_{m}, j_{m}\right)+e\left(h_{f}, j_{f}\right) \\
T & =T_{m}+T_{f}
\end{aligned}
$$

$H(\cdot)$ : Joint leisure function
$e(h, j)$ : Earning
$T$ : Home hours requirement
$\delta$ : Utility cost

## Productivity

Each husband and wife is endowed job specific productivity:

$$
\left(\begin{array}{c}
a_{m, R} \\
a_{f, R} \\
a_{m, N R} \\
a_{f, N R}
\end{array}\right) \sim \log \mathcal{N}\left(\left(\begin{array}{c}
0 \\
0 \\
\mu_{N R} \\
\mu_{N R}
\end{array}\right),\left(\begin{array}{cccc}
\sigma^{2} & \rho_{m f} \sigma^{2} & \rho_{R, N R} \sigma^{2} & \rho_{R, N R} \rho_{m f} \sigma^{2} \\
\cdot & \sigma^{2} & \rho_{R, N R} \rho_{m f} \sigma^{2} & \rho_{R, N R} \sigma^{2} \\
\cdot & \cdot & \sigma^{2} & \rho_{m f} \sigma^{2} \\
\cdot & \cdot & \cdot & \sigma^{2}
\end{array}\right)\right)
$$

- $\mu_{N R}<0 \Rightarrow$ Non-regular workers earns less than regular worker
- $\rho_{m f}>0 \Rightarrow$ Assortative Mating
- $\rho_{R, N R}>0 \Rightarrow$ Regular and Non-regular abilities are linked


## No Gender Difference in Productivity

## Convex Wage Schedules

Regular Jobs
$e(h, R)= \begin{cases}a_{R} h^{1+\theta} & h<\bar{h} \\ a_{R}\left(\bar{h}^{1+\theta}+\lambda_{R} \bar{h}^{\theta}(h-\bar{h})\right) & h>\bar{h}\end{cases}$

Non-regular Jobs
$e(h, N R)= \begin{cases}a_{N R} h & h \leq \bar{h} \\ a_{N R}\left(\bar{h}+\lambda_{N R}(h-\bar{h})\right) & h>\bar{h}\end{cases}$

Leisure Function

$$
H=\left(\nu\left(1-h_{m}-T_{m}\right)^{\xi}+(1-\nu)\left(1-h_{f}-T_{f}\right)^{\xi}\right)^{1 / \xi}
$$

$\nu$ : share parameter. Each household is endowed $\nu \sim \operatorname{Beta}\left(\alpha_{\nu}, \beta_{\nu}\right)$ $\xi$ : complementarity. $\xi<0 \Rightarrow$ complement
Home Hours Requirement

$$
\begin{aligned}
T & =T_{m}+T_{f} \\
\frac{1}{2} T & \sim \operatorname{Beta}\left(\alpha_{T}, \beta_{T}\right)
\end{aligned}
$$

- Households has a home hours requirement $T \in[0,2]$
- $T$ does not increase the utility
- captures the heterogeneity of home hours requirements (children)


## Estimation

## Calibration Strategy

15 Parameters

$$
\{\underbrace{\lambda_{R}, \lambda_{N R}, \theta,}_{\text {production function }} \underbrace{\mu_{N R}, \sigma^{2}, \rho_{R, N R}, \rho_{m f}}_{\text {productivity }}, \underbrace{\gamma, \xi, \alpha_{\nu}, \beta_{\nu}}_{\text {leisure }}, \underbrace{\alpha_{T}, \beta_{T}}_{\text {home hours }}, \underbrace{\alpha_{\delta}, \beta_{\delta}}_{\text {social norm }}\}
$$

## Method of Simulated Moments

1. Model produces occupations, working hours, and wages of household
2. Compute 15 moments (e.g. ratio of regular workers, mean of working hours, gender correlation of wage...)
3. Minimize the distance between moments from data and model

## Estimation

| Parmeter | Value Target | Data | Model |
| :--- | :--- | :--- | :--- |
| $\lambda_{R}$ | 0.57 mean of $h_{f}$ for regular workers | 0.50 | 0.48 |
| $\lambda_{N R}$ | 0.63 mean of $h_{f}$ for NR workers | 0.30 | 0.27 |
| $\theta$ | 2.96 share of regular workers, females | 0.32 | 0.37 |
| $\mu_{N R}$ | -3.15 share of NR workers, females | 0.38 | 0.28 |
| $\sigma$ | 1.03 s.d. of In $w_{f}$ for R workers | 0.72 | 0.72 |
| $\rho_{R, N R}$ | 0.14 mean diff. of In $W_{f, R}$ and In $W_{f, N R}$ | 0.62 | 0.62 |
| $\rho_{m f}$ | 0.01 corr. of log wages, R $\times R$ couples | 0.49 | 0.50 |
| $y$ | 0.84 s.d. of $h_{f}$ for regular workers | 0.11 | 0.11 |
| $\xi$ | -8.29 s.d. of $h_{f}$ for NR workers | 0.14 | 0.15 |
| $a_{v}$ | 13.04 mean of $T_{m}$ for regular workers | 0.14 | 0.13 |
| $\beta_{v}$ | 1.15 mean of $T_{m}$ for NR workers | 0.13 | 0.14 |
| $a_{T}$ | 1.59 mean of $T_{f}$ for regular workers | 0.28 | 0.21 |
| $\beta_{T}$ | 3.57 mean of $T_{f}$ for NR workers | 0.32 | 0.37 |
| $a_{\delta}$ | 0.59 share of couples with em < e | 0.07 | 0.08 |
| $\beta_{\delta}$ | 11.81 corr. of working hours, couples | 0.19 | 0.18 |

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| $\sigma$ | 1.03 s.d. of In $\mathrm{w}_{\mathrm{f}}$ for R workers | 0.72 | 0.72 |
| $\rho_{\text {R, }}$ NR | 0.14 mean diff. of $\ln \mathrm{W}_{\mathrm{f}, \mathrm{R}}$ and $\ln \mathrm{W}_{\mathrm{f}, \mathrm{NR}}$ | 0.62 | 0.62 |
| Pmf | 0.01 corr. of log wages, $\mathrm{R} \times \mathrm{R}$ couples | 0.49 | 0.50 |
| Y | 0.84 s.d. of $h_{f}$ for regular workers | 0.11 | 0.11 |
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| $a_{\delta}$ | 0.59 share of couples with $\mathrm{e}_{\mathrm{m}}<\mathrm{e}_{\mathrm{f}}$ | 0.07 | 0.08 |
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$\xi<0$

- Leisure by husband and wife is complement


## Estimation

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| $\rho_{\text {R, }}$ NR | 0.14 mean diff. of $\ln W_{f, R}$ and $\ln W_{f, ~ N R}$ | 0.62 | 0.62 | $\alpha_{\nu}=13.04, \beta_{\nu}=1.15$ |
| Pmf | 0.01 corr. of log wages, $\mathrm{R} \times \mathrm{R}$ couples | 0.49 | 0.50 | - $E[\nu]=0.92>0.5$ |
| y | 0.84 s.d. of $h_{f}$ for regular workers | 0.11 | 0.11 |  |
| $\xi$ | -8.29 s.d. of $\mathrm{hff}_{\text {f }}$ for NR workers | 0.14 | 0.15 | - Husbands have a higher |
| $a_{v}$ | 13.04 mean of $\mathrm{T}_{\mathrm{m}}$ for regular workers | 0.14 | 0.13 | weight on joint leisure |
| $\beta$ | 1.15 mean of $T_{m}$ for NR workers | 0.13 | 0.14 |  |
| ${ }_{\text {a }}^{\text {T }}$ | 1.59 mean of $\mathrm{T}_{\mathrm{f}}$ for regular workers | 0.28 | 0.21 |  |
| $\beta_{T}$ | 3.57 mean of $T_{f}$ for NR workers | 0.32 | 0.37 |  |
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$\xi<0$

- Leisure by husband and wife is complement

$$
\alpha_{\nu}=13.04, \beta_{\nu}=1.15
$$

- $E[\nu]=0.92>0.5$
- Husbands have a higher weight on joint leisure

$$
\alpha_{T}=1.59, \beta_{T}=3.57
$$

- Home hours requirement is 49 hours per week


## Occupational Choices (Not-Targeted)

## Data

| $30 \%$ | $31 \%$ | $28 \%$ |
| :---: | :---: | :---: |
| $1 \%$ | $6 \%$ | $2 \%$ |
| $1 \%$ | $1 \%$ | $0 \%$ |

## Model

| $26 \%$ | $16 \%$ | $28 \%$ |
| :---: | :---: | :---: |
| $5 \%$ | $11 \%$ | $6 \%$ |
| $6 \%$ | $2 \%$ | $0 \%$ |

Regular Non-regular Not-work Regular Non-regular Not-work Wife

## Time Allocations (Not-Targeted)

Hours Worked
Husband
Wife


Home Hours


## Social Norms



## Gender Gaps

|  | Data | Model Model / Data | Pct. |
| :--- | :---: | :---: | :---: |
| Participation | 0.27 | 0.27 | $99 \%$ |
| Occupation | 0.59 | 0.19 | $33 \%$ |
| Labor Hours | 0.49 | 0.36 | $74 \%$ |
| Wage | 0.76 | 0.26 | $34 \%$ |

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| :--- | :---: | :---: | :---: |
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Model explains

- Almost all the gap in the participation rate


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Model explains

- Almost all the gap in the participation rate
- Significant proportion of other gender gaps

Mechanism

## Roles of Job Inflexibility \& Social Norms

1. Inflexibility of Regular Job $\theta$

Given a large amount of housework, women might not choose regular jobs
2. Social Norms $\delta$

Social norms might lead wives to work less or not

To verify these arguments, I conduct experiments of $\theta=0$ and $\delta=0$

## Flexible Regular Job: Occupational Choices



Eliminating inflexibility encourages wives to have regular jobs

## No Social Norm: Occupational Choices



- More wives choose regular job
- More husbands choose not to work


## Mechanism

|  | Baseline | $\boldsymbol{\theta}=0.0$ | $\boldsymbol{\delta}=0.0$ Gap $\boldsymbol{\theta}$ | Gap $\boldsymbol{\delta}$ |
| :--- | ---: | ---: | ---: | ---: |
| Participation | 0.27 | 0.14 | -0.04 |  |
| Occupation | 0.19 | 0.01 | 0.18 |  |
| Labor Hours | 0.36 | 0.64 | 0.17 |  |
| Wage | 0.26 | -0.03 | 0.22 |  |

## Mechanism

|  | Baseline | $\boldsymbol{\theta}=0.0$ | $\boldsymbol{\delta}=0.0$ Gap $\boldsymbol{\theta}$ | Gap $\boldsymbol{\delta}$ |
| :--- | ---: | ---: | ---: | ---: | ---: |
| Participation | 0.27 | 0.14 | -0.04 |  |
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Job inflexibility $\theta$

- The main element prevents women from having regular jobs
- Wage gap comes from occupational differences


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Job inflexibility $\theta$

- The main element that prevents women from having regular jobs
- Wage gap comes from occupational differences


## Social Norms $\delta$

- Explains intensive and extensive margin of male and female participation


## Conclusion

## Build a Model

- Regular (inflexible, high wage) vs. Non-Regular (flexible, low wage)
- Social Norms (wives' higher earnings)

Model Explains the Gender Gaps

- Almost all of participation rate
- 33\% in occupational choices, 74\% in labor hours, and 34\% in wage Mechanism
- Job flexibility and social norm play an important role in gender gaps
- Housework services could reduce the gaps under job inflexibility and social norm 1 Appenadx


## Outsourcing of Housework

## Outsourcing of Housework

Outsourcing housework could increase women's labor supply
Raz-Yurovich and Marx (2019), Halldén and Stenberg (2014)
Also discussed as the impact of low-skilled immigrants
Cortés and Tessada (2017), Barone and Mocetti (2017), Farré, González, and Ortega (2011)
However, those housework services are rarely used in Japan

- Japan has a restrictive policy on immigration
- 2+ member households pay 7.3 EUR per YEAR on average


## Baseline Model with Housework Service

$$
\max _{h_{m}, h_{f}, j_{m}, j_{f}} U=\log c+\gamma \log H-\delta 1\left(e_{m}<e_{f}\right)
$$

subject to

$$
\begin{aligned}
c+p t & =e\left(h_{m}, j_{m}\right)+e\left(h_{f}, j_{f}\right) \\
H & =\left(\nu\left(1-h_{m}-T_{m}\right)^{\xi}+(1-\nu)\left(1-h_{f}-T_{f}\right)^{\xi}\right)^{1 / \xi} \\
T & =T_{m}+T_{f}+t
\end{aligned}
$$

$t$ : housework service
$p$ : price of housework service

## Experiment

- Fix parameters in the baseline model
- Set price as the median wage of non-regular job $\left(p=\exp \left(\mu_{a_{N R}}\right)\right)$


## Outsourcing T: Home Hours



Workers use outside services to do most of the home work

## Outsourcing T: Gender Gaps

|  | Base | Outsourcing $t$ Gap remained | Pct. |
| :--- | :---: | :---: | :---: |
| Participation | 0.27 | -0.02 | $-7 \%$ |
| Occupation | 0.19 | 0.03 | $15 \%$ |
| Labor Hours | 0.36 | 0.06 | $17 \%$ |
| Wage | 0.26 | 0.25 | $97 \%$ |

Given social norms, housework services

## Outsourcing T: Gender Gaps

|  | Base | Outsourcing $t$ Gap remained | Pct. |
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Given social norms, housework services

- Reduce gender gaps in participation, occ. choices, and labor hours


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Given social norms, housework services

- Reduce gender gaps in participation, occupational choices, and labor hours
- Do not reduce wage gap

[^0]Appendix

## Related Literature

Home Hours and Gender Gaps

- Erosa et al. (2022)
$\rightarrow$ Models couples' decisions on occupations with different job flexibility
- Cubas, Juhn, and Silos (2019)
$\rightarrow$ Women are penalized for the lack of work in the peak hours (8am-5pm)
Social Norms and Occupational Choices
- Bertrand, Kamenica, and Pan (2015)
$\rightarrow$ A sharp gap in the wife's earnings relative to the husband's earnings
Gender Gaps in Japan
- Kitao and Mikoshiba (2022)
$\rightarrow$ Role of fiscal policies on female labor force participation and occ. choices


## Job Flexibility and Convex Earning

To see the convex and linear wage schedules, run

$$
y_{i t}=a_{i}+\lambda_{t}+\left(\sum_{h \in H, h \neq 40} \beta_{h} I_{i t h}\right)+\gamma X_{i t}+\varepsilon_{i t}
$$

$y_{i t}$ : yearly earnings of individual $i$ at time $t$
$a_{i}$ : individual fixed effect
$\lambda_{t}$ : time fixed effect
$X_{i t}$ : age, age-square, educational attainment, industry
$H=\{20-24,25-29, \ldots, 60-64\}: 5$ hour bins for weekly working hours $I_{i t h}$ : indicator if $i$ 's working hours in the bin $h \in H$ at time $t$

This is in the line of Bick, Blandin, and Rogerson (2022)

## Earning Curves



- Regular Jobs
$\rightarrow$ Convexity before 40 hours $\Rightarrow$ Concentration at 40 hours
$\rightarrow$ After 40 hours, the slope is different from the below-40-hour
- Non-regular Jobs
$\rightarrow$ Almost linear relationship


## Marriage Penalty

If there are social norms regarding wives earning more than husbands, after the marriage, women might choose: lower working hours or changing/quitting jobs

Yearly Earnings (JPY)
Using JPSED2016-2020, I see

- Men and Women married at 2018
- Change in market outcomes in 2017
- Child Penalty as in Kleven et al. (2019)
- Female earnings decline by $4600 € 1$ year after the marriage



## Marriage Penalty

Participation Rate


Weekly Working Hours


Ratio of Regular Workers


Hourly Wage (JPY)


## Key Features

1. Job Flexibility (Regular vs. Non-regular)
2. Social Norm on Wife's Earnings

## Persons in employment by level of difficulty

 to take one or two days of leave at short notice.

## Key Features

## 1. Job Flexibility (Regular vs. Non-regular)

2. Social Norm on Wife's Earnings

## If a woman earns more money than her husband,

it's almost certain to cause problems.


## References

Barone, Guglielmo, and Sauro Mocetti. 2011. "With a Little Help from Abroad: The Effect of Low-Skilled Immigration on the Female Labour Supply." Labour Economics 18 (5): 664-75. https://doi.org/10.1016/j.labeco.2011.01.010.
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