Why Women Work the Way They Do in Japan: Roles of Fiscal Policies

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Background

- Japan ranks 116th among 146 countries in the Global Gender Gap Report 2022 (WEF).
  - High scores in education (1st) and health. Low scores in economic participation and political empowerment.
  - Participation rates are not too low (women 73% vs men 87%, OECD average at 61%), but women's average earnings are far below men's.

	Overall Ranking	Economic Participation	Educational Attainment	Health and Survival	Political Empowerment
Japan	**116**	0.564	1.000	0.973	0.061
U.S.	**27**	0.778	0.996	0.970	0.332
Australia	**43**	0.741	0.985	0.968	0.258

Source: World Economic Forum (2022), Sub-index in the 0-1 range

Background

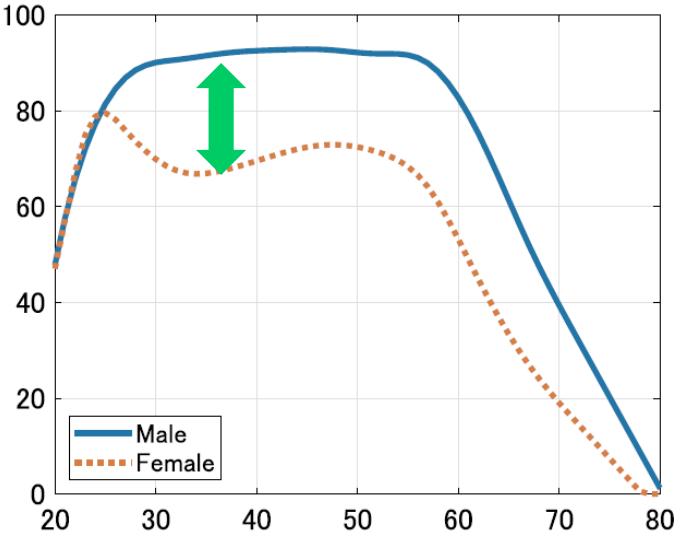


Fig. 1. Labor force participation rates in 2015 (%).

Labor Force Participation Rates (2015)

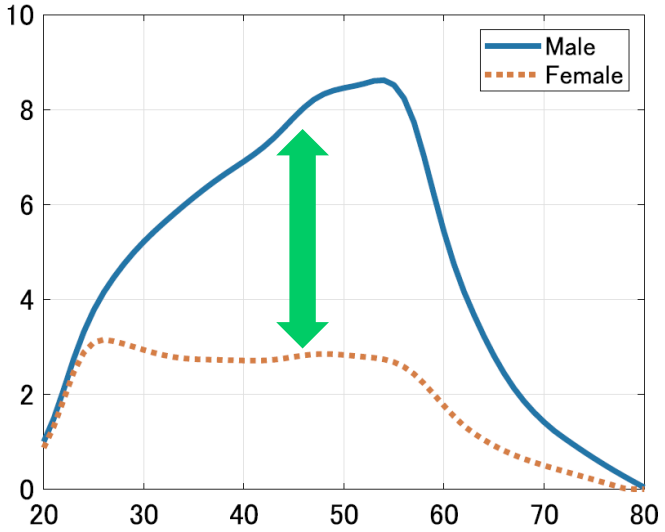
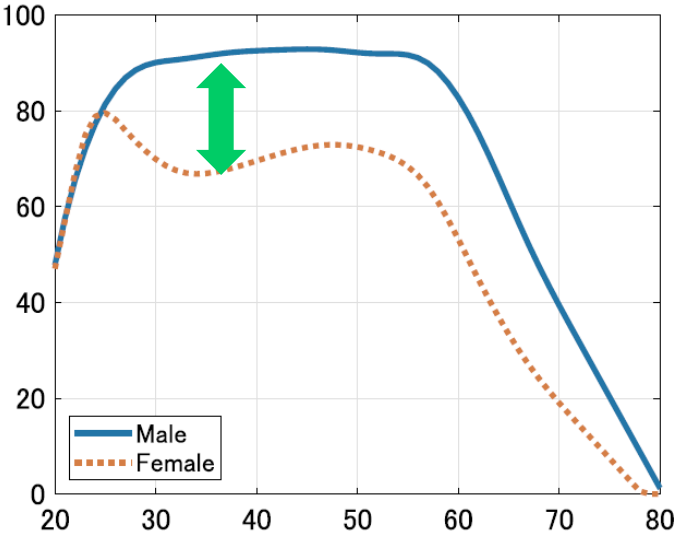


Fig. 4. Efficiency profiles $\varepsilon_{i,g,t}$ (Normalized by the level of males aged 20).

Average Earnings
(2015, Men at 20 = 1.0)

Source: Kitao and Mikoshiba (2020)

Background



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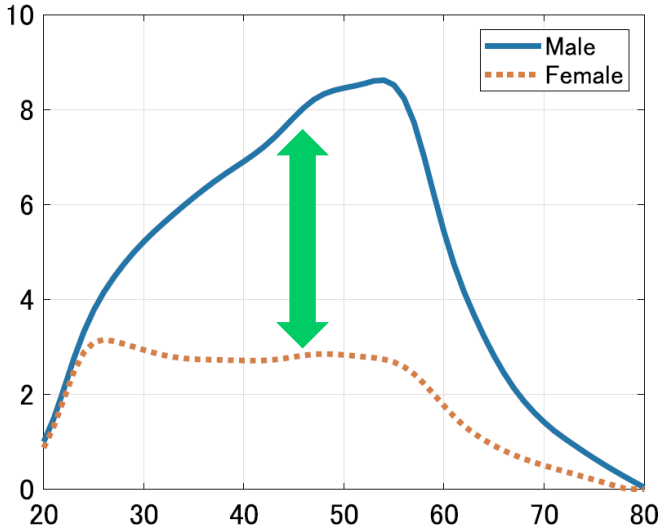

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Average Earnings
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→ **This project**

Build a model to explain women's labor supply and earnings and understand roles of fiscal policies.

Research Questions

- **Why women work and earn the way they do in Japan?**
  - Use the panel data (JPSC) following a cohort of women born in the 1960s (50s in 2018) and build a model that explains their behavior.
  - Build a model that distinguishes between men/women, singles/couples, and between employment types, regular and contingent jobs.

- **What are the roles of fiscal policies?**
  - Focus on three policies: spousal deductions, exemptions from social insurance premiums, and survivors' pension benefits ← Originally introduced to support low-income dependent spouses

Literature: Related Paper

- **Borella, De Nardi and Yang (REStud, forthcoming)**
  - Study effects of joint taxation and social security's survivors' benefits in the U.S.
  - A life-cycle model with marriage dynamics and a household structure, endogenous human capital accumulation.
  - Focus on cohort born around 1950. Without two policies, participation rates of married women up by 20ppt, savings higher and a large welfare gain.

  - **Our model**
    - Tailored to a two-tiered/dual labor market (regular and contingent jobs) with different fiscal treatment, earnings level and growth.
    - A rich human capital accumulation process that depends on skills (education) and experience in different types of jobs, years of no-employment, current and previous employment.

1. **Data and institutional background**
2. Model & calibration
3. Numerical analysis

Japan Panel Survey of Consumers (JPSC)

- Annual panel survey of Japanese women and their household members.
  - Information on women's employment (emp. types, experience by emp. type, education, marital status, husbands' information, number and ages of children, etc.)
  - Started with 1,500 women aged 24-34 in 1993; about 500 samples added every 5 yrs.

- Use data of the survey's first cohort born in the 1960s (up to 2018)
  - Mainly focus on behavior of women aged 25-50.
  - Employment type is based on self-reported answers to a question whether they work on a regular or contingent job.

Two-tiered Labor Market in Japan

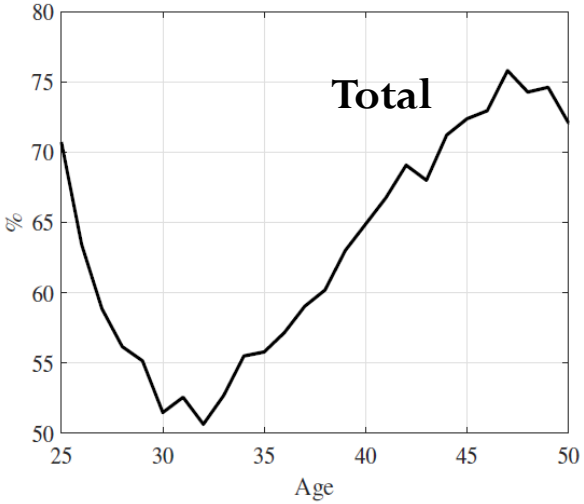
- **Regular workers**

  Typically full-time, directly hired by an employer, more stable, higher salary, expected to flexibly engage in different tasks assigned to them.

- **Contingent workers**

  Share some characteristics of regular workers but not all. Typically on a fixed-term contract, include part-time and temporary workers and dispatched workers, more susceptible to layoffs.

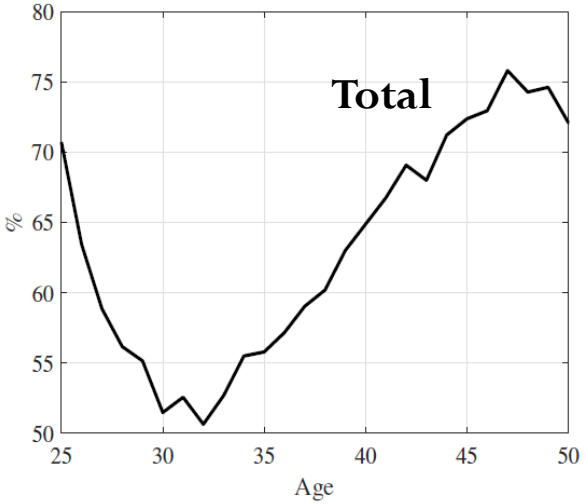
Women's Participation Rates



(a) Total (Regular+Contingent)

Figure 1: Women's Labor Force Participation Rates: JPSC Data

Women's Participation Rates



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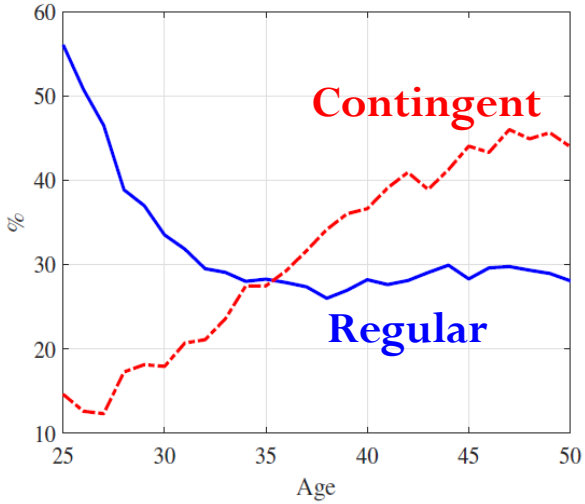
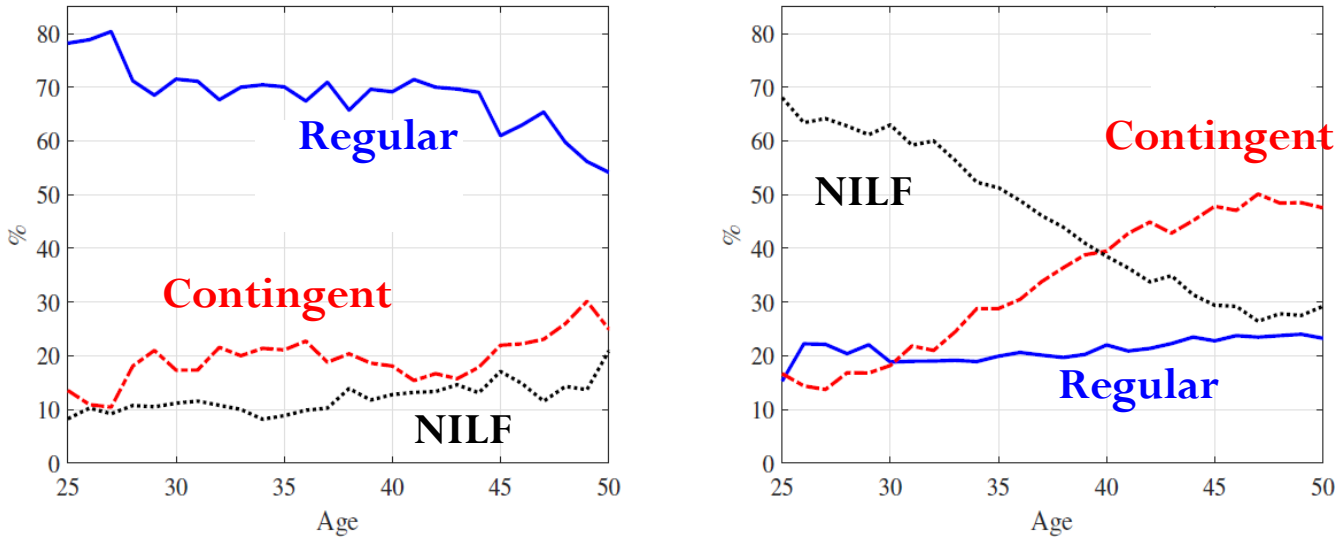


(b) By Employment Type

Figure 1: Women's Labor Force Participation Rates: JPSC Data

Women's Participation Rates by Marital Status



(a) Single

(b) Married

Figure 2: Women's Participation Rates by Marital Status: JPSC Data

Women's Earnings

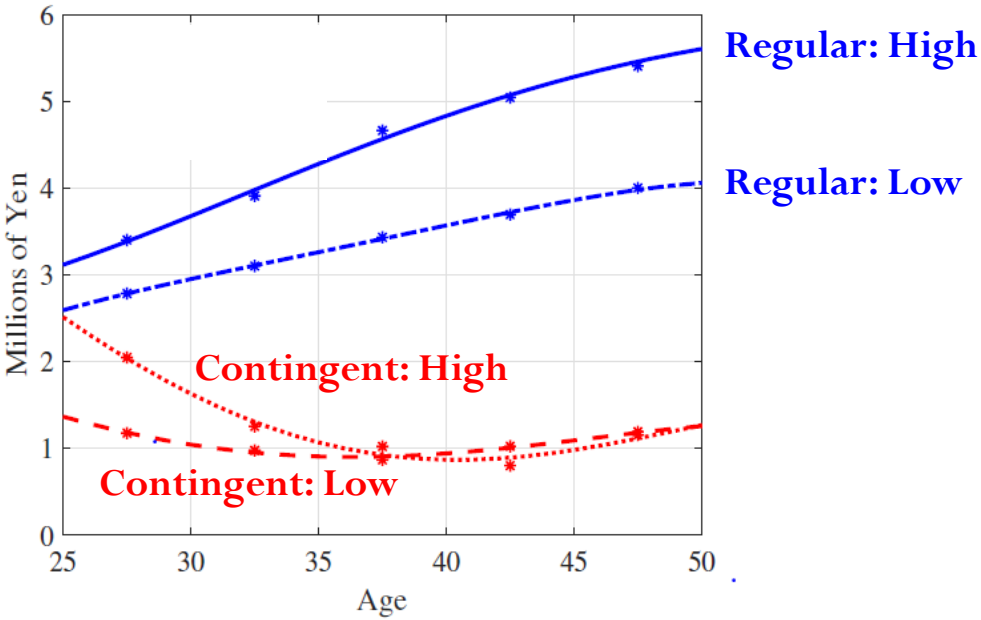


Figure 3: Women's Earnings by Skill and Employment Type: JPSC Data

Fiscal Policies: Institutional Background

- **Social Insurance System**
  - Universal coverage: pension, medical and long-term care insurance.
  - Social insurance taxes depend on employment and marital status
    - Most regular workers are covered through employment. Pay approx. 30% of earnings shared equally by employer and employee.
    - **Exemption of SI taxes:** spouses of those covered at work pay none, provided earnings <1.3mm yen
    - All others including those NILF pay on their own
- **Pension Benefits**
  - Lump-sum basic part + employment-based part that increases in contributions
  - **Survivors' benefits:** up to 75% of employment-based part of a deceased spouse's benefits
- **Labor Income Tax**
  - Individual-based and progressive
  - **Spousal deductions:** max deductions of 760,000 yen (reduced to 380,000 yen in 2004) subject to earnings cutoffs

1. Data and institutional background

2. **Model & calibration**

3. Numerical analysis

Model Overview

- Life-cycle model of men and women, singles and married couples.

- **Individual heterogeneity**
  - Age, gender, marital status, presence of a young child
  - Skill (education), work experience (years of regular and contingent employment), previous employment status, assets, average past earnings

- **Endogenous choice variables**
  - Consumption, saving, women's employment (regular, contingent, or NILF). Assume exogenous labor supply of men.
  - Human capital endogenously accumulated on the job – function of past employment, experience in regular and contingent jobs, years of NILF, estimated with the JPSC data.

Labor Supply Decisions

1. **Positives of working more**
   - Earnings today (regular or contingent)

2. **Negatives of working more**
   - Participation cost and lost leisure today;
   - Increasing marginal tax under progressive income tax, social insurance premiums

Labor Supply Decisions of Our Model

In a **dynamic** model with **endogenous human capital**, **work and retirement phases**, and a **family structure and related policies**.

1. **Positives of working more**
   - Earnings today (regular or contingent)
   - **Human capital accumulation today → earnings growth in the future**
   - **Public pension benefits in the future (employment-based part, own/spouse's)**
   - **Lower cost of returning to work/switching emp. types in the future**

2. **Negatives of working more**
   - Participation cost and lost leisure today; additional **cost for childcare**
   - Increasing marginal tax under progressive income tax, social insurance premiums
   - **Lost benefits for low-income dependents (spousal deductions, social insurance premium exemptions)**

Women's Employment

- Women's employment status: $e = \{R, C, N\} = \{$regular, contingent, NILF$\}$.
- Earnings of a woman: $y_f = h \cdot I_e$, where $I_e = 1$ if employed.
- Human capital h evolves as $h = f^h(s, e, e_{-1}, \mathbf{x})$ where $\mathbf{x} = \{x_R, x_C, x_N\}$ is a vector of work experience in each employment status. The function estimated with the JPSC data.

Preferences

- Individuals derive utility from household consumption and leisure.
  - Singles

$$u^S(c, l_g) = \frac{\left[(c/\eta)^\omega l_g^{1-\omega}\right]^{1-\sigma}}{1-\sigma}$$

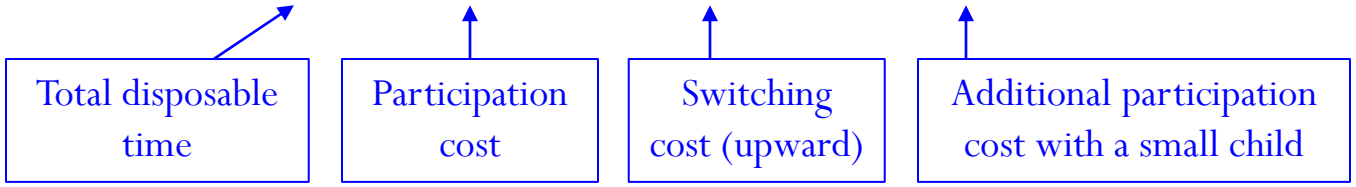
  - Married couples

$$u^M(c, l_m, l_f) = \frac{\left[(c/\eta)^\omega l_m^{1-\omega}\right]^{1-\sigma}}{1-\sigma} + \frac{\left[(c/\eta)^\omega l_f^{1-\omega}\right]^{1-\sigma}}{1-\sigma}$$

Preferences

- Leisure of a woman

$$l_f = L - \phi_{q,e} - \chi_{e_{-1},e} - \nu_k$$



- Calibrate a set of eight disutility/leisure parameters to fit participation rates by employment type over the life-cycle (age 25-49)
  - Disutility of participation by employment type and marital status (4), and presence of a small child (1), cost of switching employment types "upward" (3).

Government

- All policies vary over time, following policy paths that the cohort born in the 1960s faces over the life-cycle

- Policies include
  - **Spousal deductions from income tax:** if a spouse earns less than the cutoff
  - **Exemption of social insurance premiums:** dependent spouses who earn less than the cutoff and are married to covered individuals
  - **Survivors' pension benefits:** provided upon death of a spouse. Full benefits for those with own benefits below their spouse's

Households' Problem

- Solve the recursive problem in blocks of "young" (25-64) and "retired" (65+)

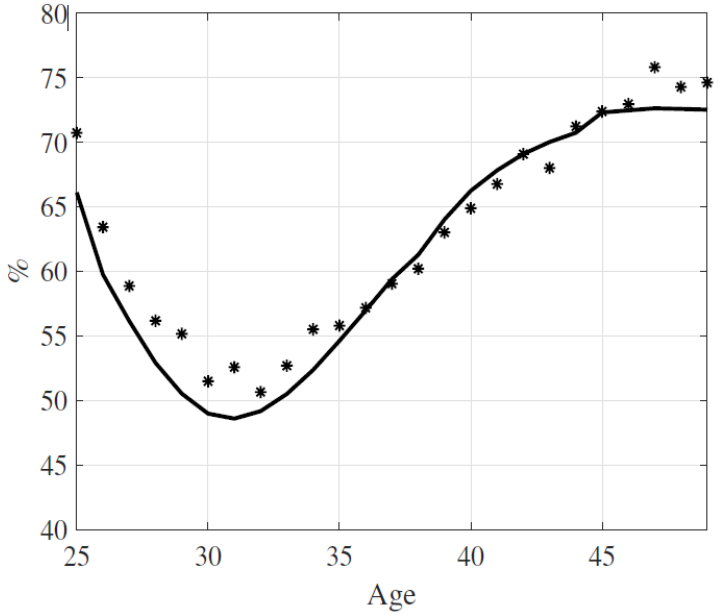
- Value functions for single men, single women and married couples of the two age groups (6 in total).

1. Data and institutional background

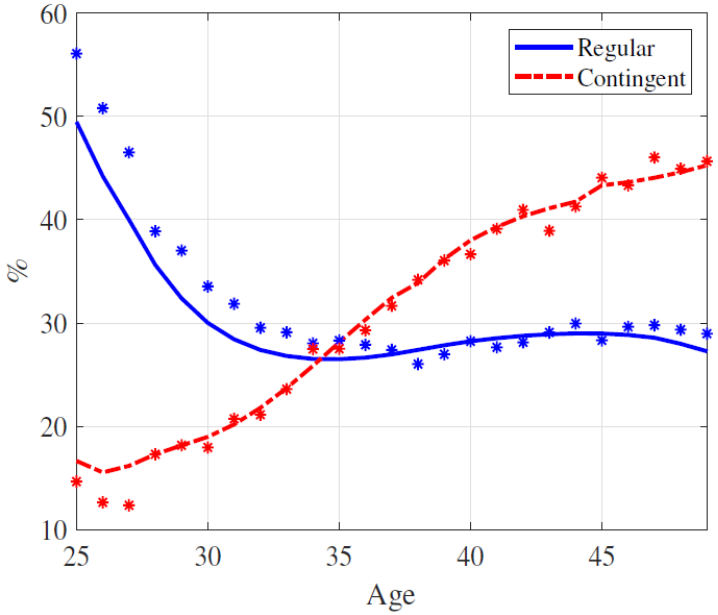
2. Model & calibration

3. **Numerical analysis**

Women's Employment: Model vs JPSC Data



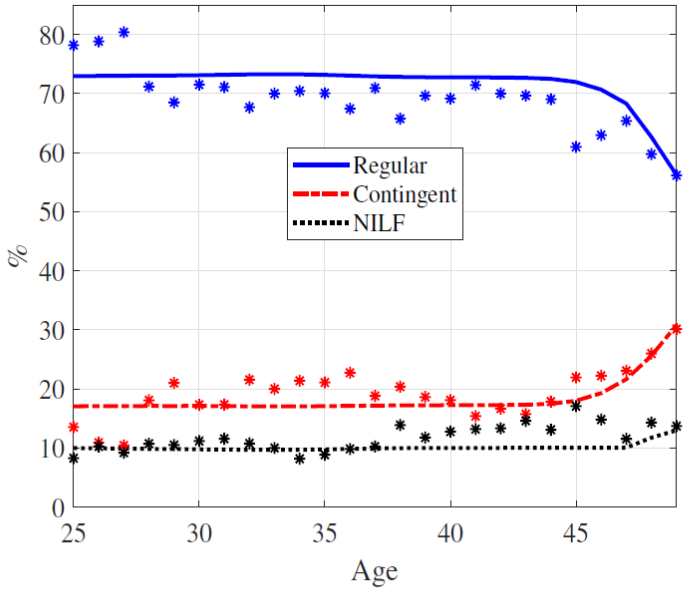
(a) Total (Regular+Contingent)



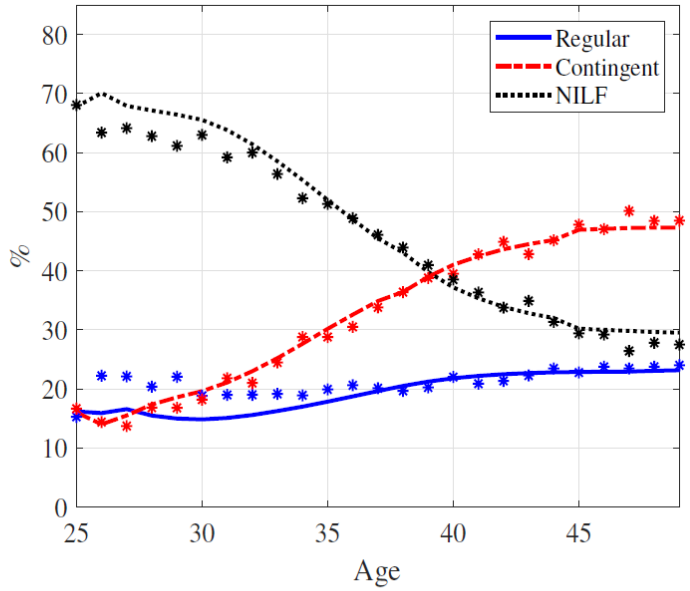
(b) By Employment Type

Women's Employment Rates: All and by Employment Types
Model (solid and dashed lines) and JPSC Data (dots)

Women's Employment by Marital Status



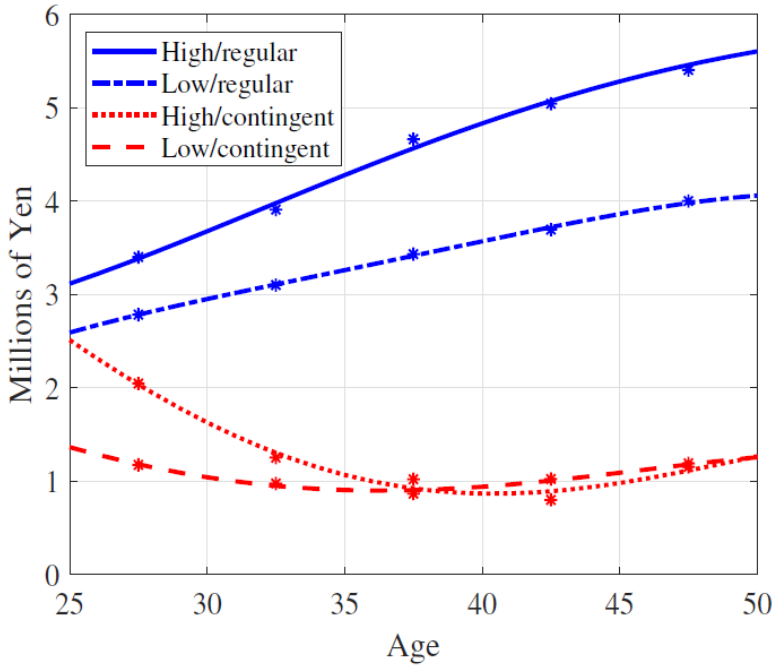
(a) Single



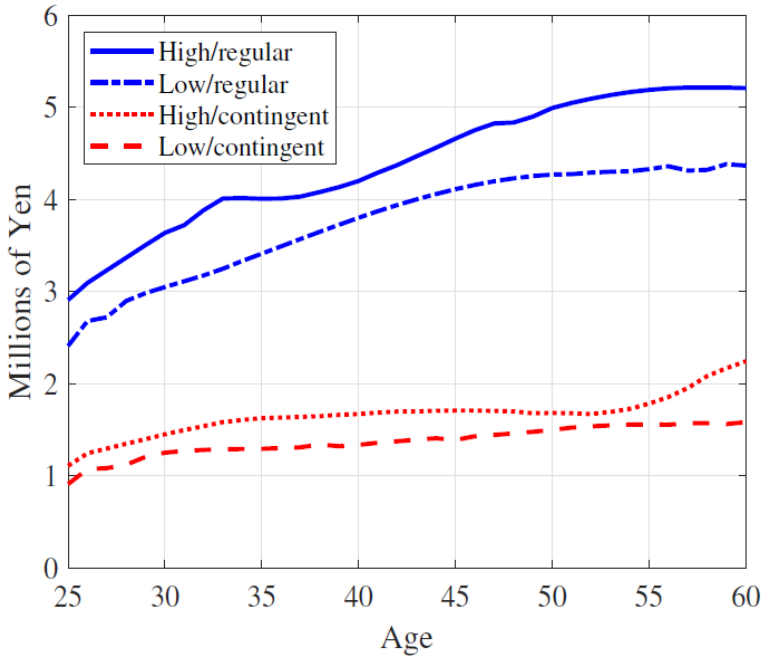
(b) Married

Women's Employment Rates by Marital Status and Employment Types
Model (solid and dashed lines) and JPSC Data (circle dots)

Women's Earnings by Skill and Employment Type



JPSC Data



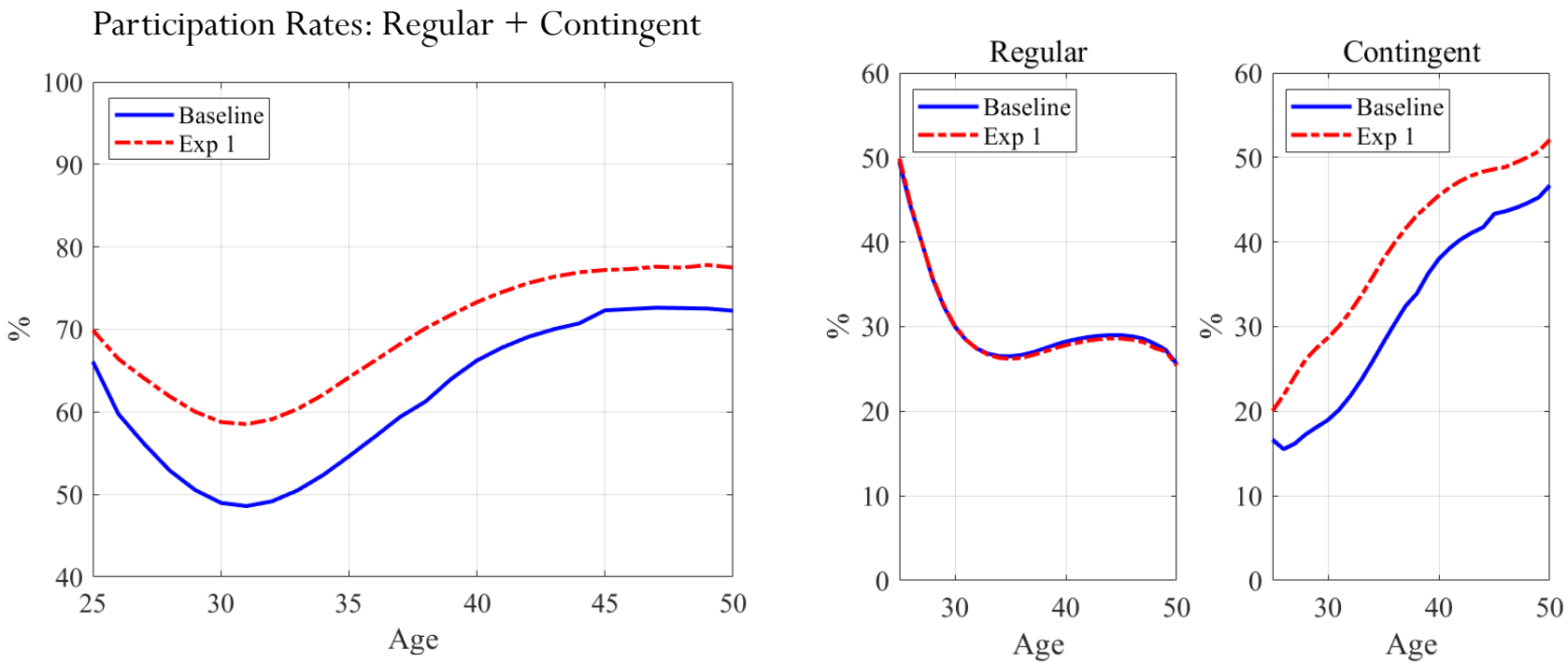
Model

- Earnings grow faster among regular workers.
- Very flat profiles of contingent workers.

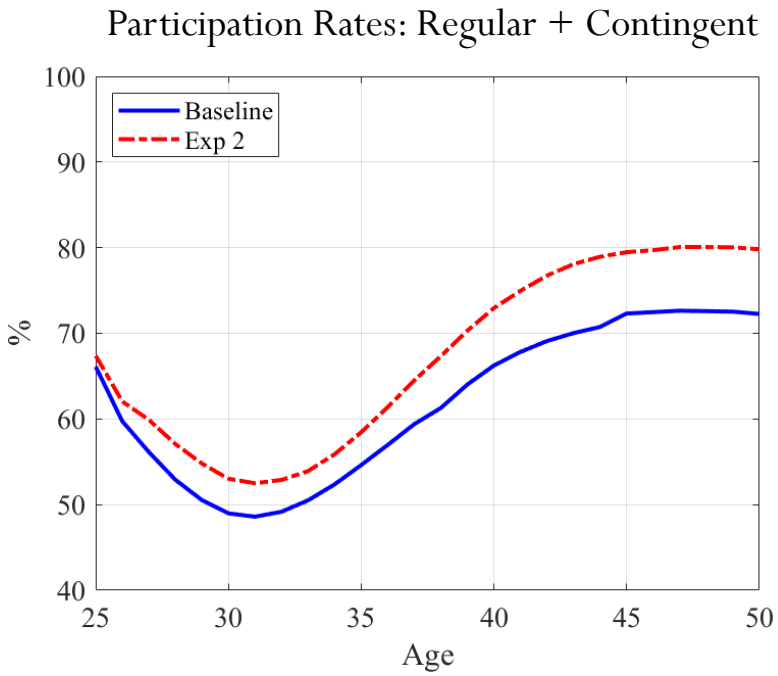
Policy Experiments

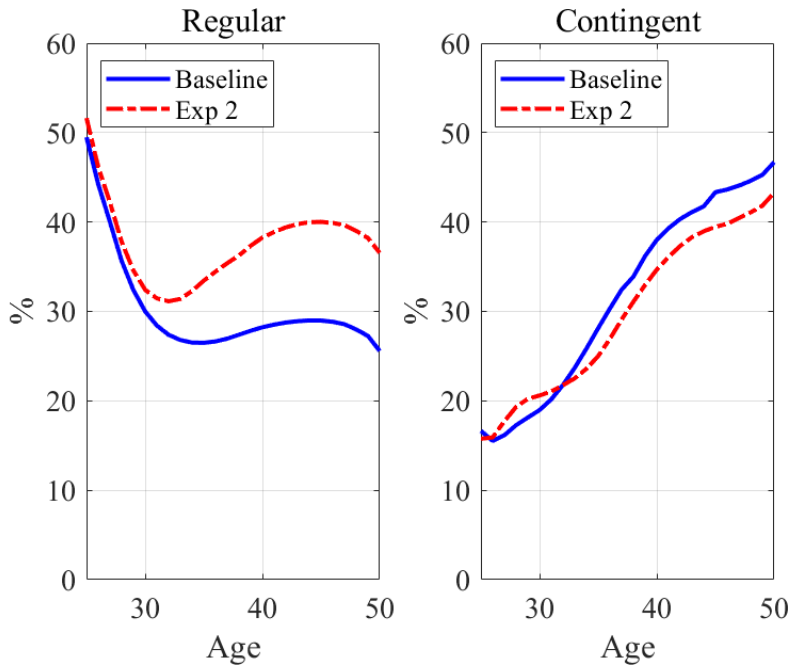
1. No spousal deductions
2. No exemption of social insurance premiums
3. No survivors' pension benefits
4. Exp 1-3 combined

Exp 1 : No Spousal Deductions

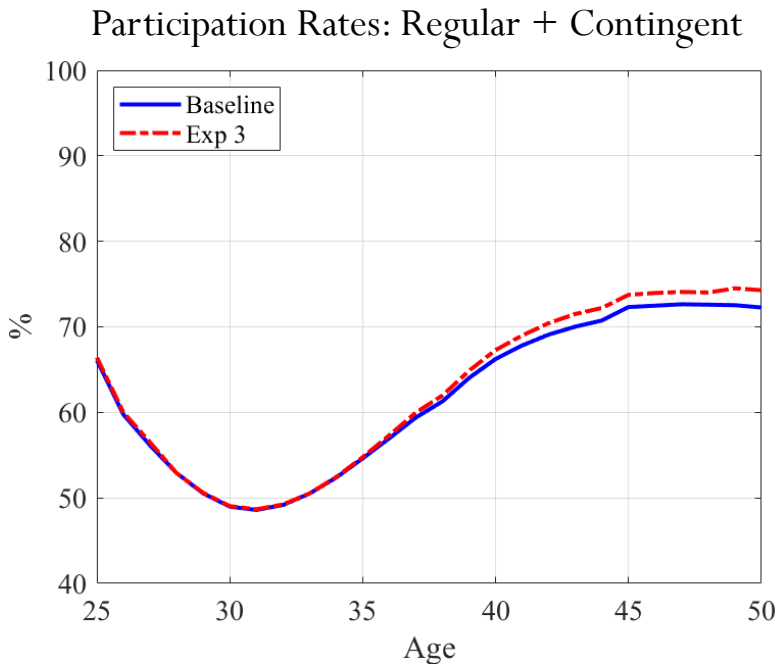


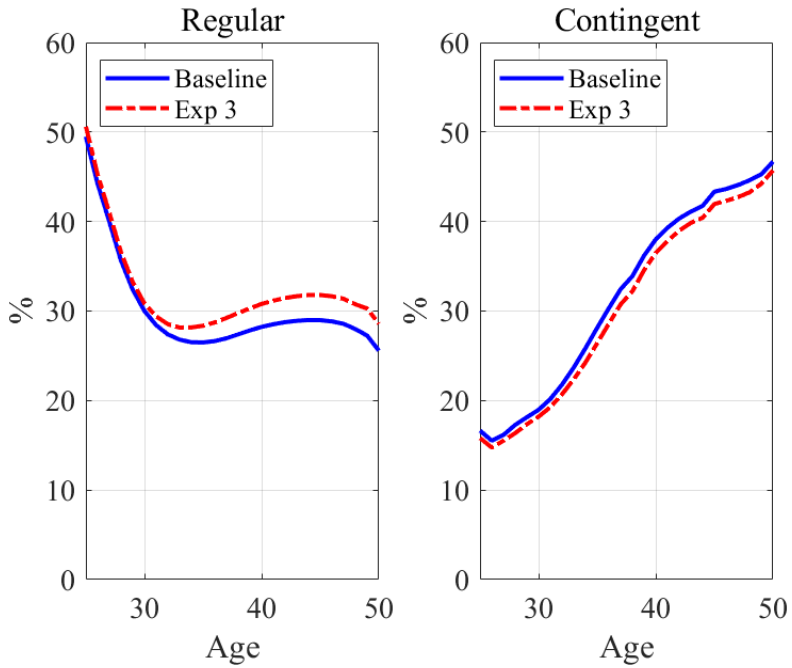
Exp 2 : No Social Ins. Premiums Exemption





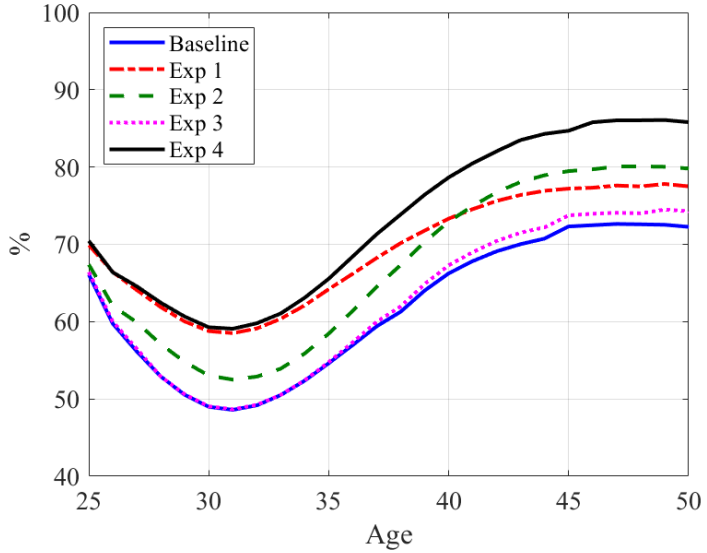
Exp 3 : No Survivors' Benefits





Summary: Participation and Earnings

Participation Rates : Regular + Contingent



Exp 1: no spousal deductions

Exp 2: no social insurance premium exemptions

Exp 3: no survivors' benefits

Exp 4: Exp 1-3 combined

Summary: Participation and Earnings

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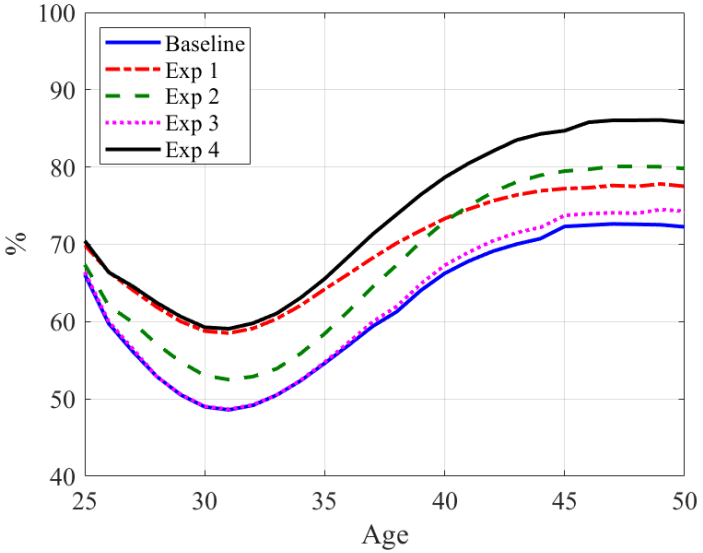
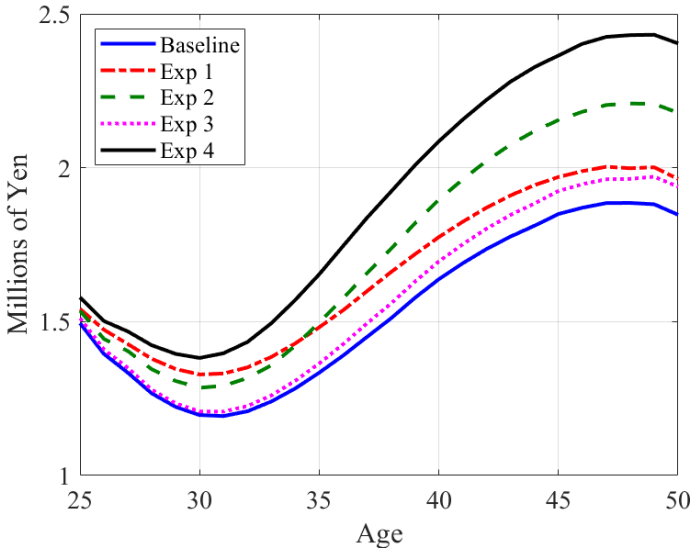


Average Earnings (All Women)



Exp 1: no spousal deductions

Exp 2: no social insurance premium exemptions

Exp 3: no survivors' benefits

Exp 4: Exp 1-3 combined

Summary: Participation Rates

	Baseline	Exp 1 No spouse deduction	Exp 2 No ins. prem. Exemption	Exp 3 No survivors' benefits	Exp 4 All combined
All Employed	**64.6**	71.1	71.2	65.9	**77.1**
- Regular	**26.8**	26.6	35.6	29.2	**40.2**
- Contingent	**37.8**	44.5	35.6	36.7	**36.9**

- Removal of spousal deductions induces more participation of contingent workers.
- Removal of the insurance premiums exemptions induces a shift from contingent and NILF to regular employment.
- The policies distort participation decisions and choices of employment types, discouraging human capital accumulations and lowering women's earnings.

Summary: Earnings (age 25-64)

(% change relative to baseline)

	Exp 1 No spousal deduction	Exp 2 No ins. prem. Exemption	Exp 3 No survivors' benefits	Exp 4 All combined
All Women	+7.0%	+16.3%	+4.1%	**+27.7%**
- Single	+1.4%	+1.3%	+1.2%	**+2.9%**
- Married	+9.2%	+22.3%	+5.3%	**+37.7%**

Taxes, Premiums and Pension Benefits

Taxes and Social Insurance Premiums Paid by Women Aged 25-64 (%-changes Relative to Baseline)

	Exp 1 No spousal deduction	Exp 2 No ins. prem. Exemption	Exp 3 No survivors' benefits	Exp 4 All combined
All	+4.8%	+13.9%	+1.4%	**+19.5%**
By marital status				
- Single	+0.4%	+1.1%	+0.9%	**+1.6%**
- Married	+5.1%	+15.0%	+1.4%	**+21.0%**

Consumption

Women's Consumption
(%-changes Relative to Baseline)

	Exp 1 No spousal deduction	Exp 2 No ins. prem. Exemption	Exp 3 No survivors' benefits	Exp 4 All combined
All	+0.8%	+2.0%	−0.2%	**+3.0%**
By age group				
- 25-64	+1.1%	+2.4%	+0.5%	**+4.2%**
- 65-95	+0.4%	+1.2%	−1.6%	**+0.7%**

Welfare Analysis

- Evaluate the welfare effects of alternative policies in terms of consumption equivalence for a new-born (entrant).
- Consider welfare without tax rebate (baseline) and with tax rebate (net revenues are transferred back).

Welfare Effects (% in Consumption Equivalence)

	Exp 1 No spousal deduction	Exp 2 No ins. prem. Exemption	Exp 3 No survivors' benefits	Exp 4 All combined
Without Tax Rebates	−1.0%	−2.2%	−0.7%	**−3.7%**
With Tax Rebates	+0.3%	+1.1%	+1.4%	**+2.1%**

Conclusion

- There are sizeable distortions on women's participation, choice of employment types, and earnings growth, caused by policies that provide benefits for low-income dependent spouses.

- Removal of the policies also raises net tax revenues, and generates a welfare gain, when additional revenues are transferred back.

- Considering the removal of the policies would be even more important in an economy facing rapid demographic aging and shortage of skilled workers.

Additional Slides

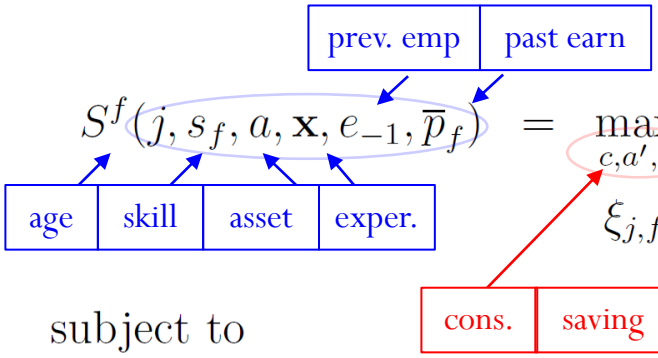
Young Single Women

$$
\begin{aligned}
S^f(j, s_f, a, \mathbf{x}, e_{-1}, \overline{p}_f) \;=\; & \max_{c,a',e} \Big\{ u^S(c/\eta, l_f) + \beta \left[(1 - \xi_{j,f,s_f}) S^f(j+1, s_f, a', \mathbf{x}', e, \overline{p}'_f) + \right. \\
& \left. \xi_{j,f,s_f} EM(j+1, s_m, s_f, a' + \tilde{a}', \mathbf{x}', e, \overline{p}'_f, i'_k) \right] \Big\}
\end{aligned}
$$

subject to

$$
\begin{aligned}
(1 + \tau^c)c + a' + o_{j,f} &= Ra + y_f - T^S(y_f) + tr \\
a' &\geq 0
\end{aligned}
$$

Young Single Women



$$S^f(j, s_f, a, \mathbf{x}, e_{-1}, \overline{p}_f) = \max_{c,a',e} \left\{ u^S(c/\eta, l_f) + \beta \left[(1 - \xi_{j,f,s_f}) S^f(j+1, s_f, a', \mathbf{x}', e, \overline{p}'_f) + \right. \right.$$
$$\left. \left. \xi_{j,f,s_f} EM(j+1, s_m, s_f, a' + \tilde{a}', \mathbf{x}', e, \overline{p}'_f, i'_k) \right] \right\}$$

subject to

$$(1+\tau^c)c + a' + o_{j,f} = Ra + y_f - T^S(y_f) + tr$$
$$a' \geq 0$$

Young Single Women

remain single

$$S^f(j, s_f, a, \mathbf{x}, e_{-1}, \overline{p}_f) = \max_{c,a',e} \left\{ u^S(c/\eta, l_f) + \beta \left[(1 - \xi_{j,f,s_f}) S^f(j+1, s_f, a', \mathbf{x}', e, \overline{p}'_f) + \right. \right.$$
$$\left. \left. \xi_{j,f,s_f} EM(j+1, s_m, s_f, a' + \tilde{a}', \mathbf{x}', e, \overline{p}'_f, i'_k) \right] \right\}$$

marry

subject to

$$(1+\tau^c)c + a' + o_{j,f} = Ra + y_f - T^S(y_f) + tr$$
$$a' \geq 0$$

Young Single Women

$$S^f(j, s_f, a, \mathbf{x}, e_{-1}, \overline{p}_f) = \max_{c,a',e} \{u^S(c/\eta, l_f) + \beta [(1 - \xi_{j,f,s_f}) S^f(j+1, s_f, a', \mathbf{x}', e, \overline{p}'_f) + \xi_{j,f,s_f} EM(j+1, s_m, s_f, a' + \tilde{a}', \mathbf{x}', e, \overline{p}'_f, i'_k)]\}$$

skill of two

assets of husband to marry

child

subject to

$$(1+\tau^c)c + a' + o_{j,f} = Ra + y_f - T^S(y_f) + tr$$

$$a' \geq 0$$

OOP of health and LTC

labor income tax and social insurance premiums

Young Married Couples

$$M(j, s_m, s_f, a, \mathbf{x}, e_{-1}, \overline{p}_f, i_k) = \max_{c,a',e} \left\{ u^M(c/\eta, l_m, l_f) + \beta EM(j+1, s_m, s_f, a', \mathbf{x}', e, \overline{p}'_f, i'_k) \right\}$$

subject to

$$\begin{aligned} (1+\tau^c)c + a' + \sum_g o_{j,g} &= Ra + \sum_g y_g - T^M(y_m, y_f) + tr \\ a' &\geq 0 \end{aligned}$$

OOP of two

earn. of two

labor income tax and social insurance premiums of two

Retired Married Couples

$$\widetilde{M}(j,a,\overline{p}_m,\overline{p}_f) = \max_{c,a'}\left\{u^M(c/\eta,l_m,l_f)+\beta\left[\mu_{j,m}\mu_{j,f}\widetilde{M}(j+1,a',\overline{p}_m,\overline{p}_f)+\right.\right.$$

$$\left.\left.\mu_{j,m}(1-\mu_{j,f})\widetilde{S}^m(j+1,a',\overline{p}'_m)+\mu_{j,f}(1-\mu_{j,m})\widetilde{S}^f(j+1,a',\overline{p}'_f)\right]\right\}$$

both survive

wife dies

husband dies

subject to

$$(1+\tau^c)c+a'+\sum_g o_{j,g} = Ra+\sum_g p_g+tr$$

$$a' \geq 0$$