

Are marriage-related taxes and Social Security benefits holding back female labor supply?

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U.S. marriage-related policies

- Taxes and old age Social Security benefits depend on marital status
 - Joint income tax
 - Social Security spousal benefit
 - Social Security survival benefit

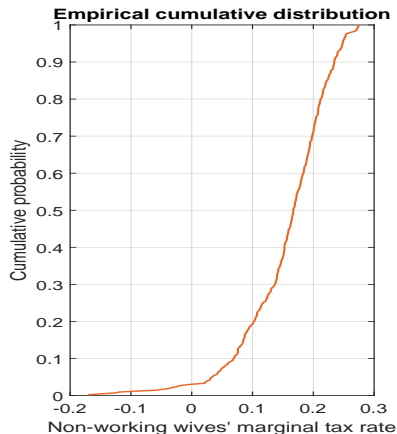
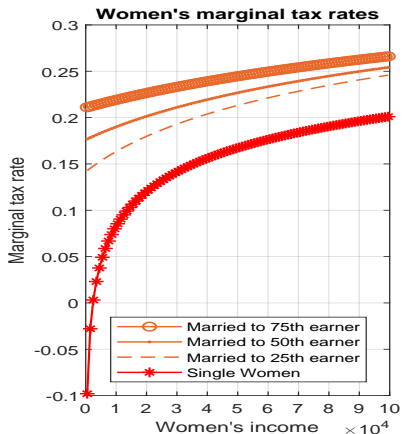
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- Question: how do marriage-related policies affect
 - Labor supply of women
 - Labor supply of men
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 - Welfare

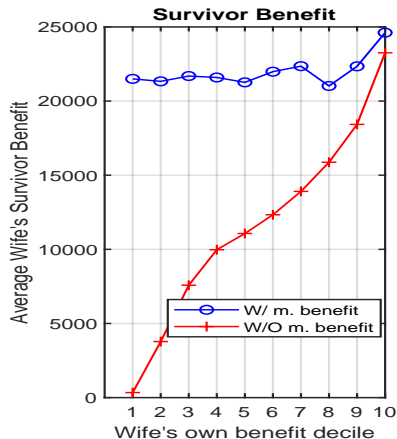
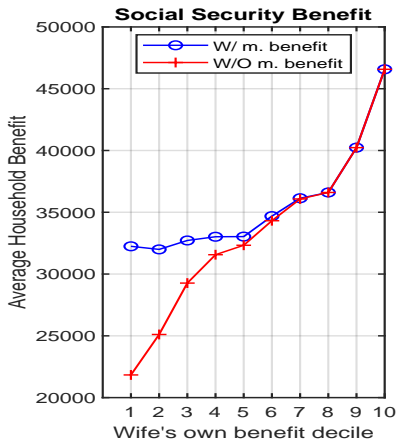
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- Question: how do marriage-related policies affect
 - Labor supply of women
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 - Savings
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- Labor supply of married women has been changing over time. Do the effects of these policies depend on the cohort?
 - Two cohorts (1945 cohort and 1955 birth cohorts)

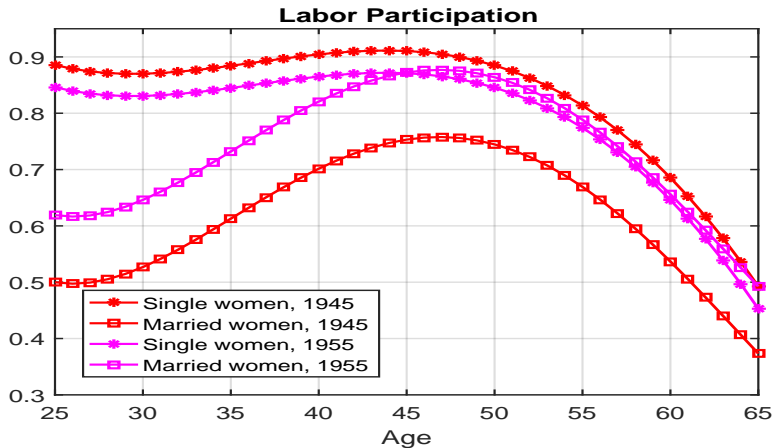
Why might they matter? Marginal tax rate for women



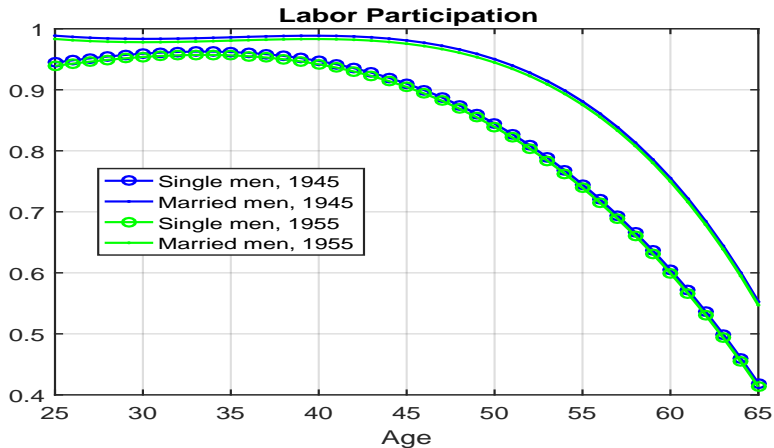
Why might they matter? Social Security benefits



Participation for women, 1945 and 1955 cohorts



Participation for men, 1945 and 1955 cohorts



Approach

- Partial equilibrium, cohort level analysis

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- Data
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 - Health and Retirement Study (HRS): retirement period

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- Partial equilibrium, cohort level analysis
- Data
 - Panel Study of Income Dynamics (PSID): working period
 - Health and Retirement Study (HRS): retirement period
- Estimate model on each cohort using the Method of Simulated moments (MSM)
- Counterfactuals: eliminate marriage-related provisions

Model's key features

- Single and married people
- Endogenous human capital
- Risks during working period and retirement
- Self-insurance: saving and labor supply (hours)

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- Single and married people
- Endogenous human capital
- Risks during working period and retirement
- Self-insurance: saving and labor supply (hours)
- Government
 - Taxes married and single people + tax progressivity
 - Social Security payments (survival and spousal benefits)
 - Old-age means-tested transfer programs

Model's key features

- Lifecycle model, period length: one year
- Working stage ($t_0=25$ to 61)
 - Alive for sure
 - Labor productivity shocks
 - Might get married if single
 - Risk divorce if married
 - Both spouses can work

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- Lifecycle model, period length: one year
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 - Both spouses can work
- Early retirement stage (62 to 65)
 - Can retire and claim Social Security. Couples retire at the same time.
 - No marriage and divorce risk
- Retirement stage (66 to $T=99$)
 - Health shocks
 - Medical costs
 - Exogenous probability of death → married people might lose their spouse

Wages

- Functions of
 - Human capital, measured as average past earnings
 - Wage shocks which follow an AR(1) that depends on gender

Marriage and divorce

- Marriage
 - Probability of marrying: function of age, gender, and wage shock
 - Conditional on getting married, probability of meeting with a partner with a certain wage shock depends on your wage shock
 - Conditional partner's productivity, distribution of partner's characteristics are assets and human capital
- Divorce probability: function of age and wage shocks of both spouses

Children

- Exogenous fertility
- Number and age structure of children depends on maternal age and marital status
- Time costs of raising children
- Monetary costs of raising children

Health risks (after age 66)

- Age, gender, marital status, and current health affect evolution of
 - Health
 - Medical expenses
 - Survival

Government

- Taxes income, progressive taxation of couples and singles

$$T(Y, i, j, t) = (1 - \lambda_t^{i,j} Y^{-\tau_t^{i,j}}) Y.$$

- Taxes labor income, up to Social Security cap \tilde{y}_t , at rate τ_t^{SS} to finance old-age Social Security
- Old age means-tested cons. floor $\underline{c}(j)$ (Medicaid and SSI)

Household preferences

- β = discount factor, i = gender, j = marital status
- Time endowment: $L^{i,j}$
- Leisure $l_t^{i,j} = L^{i,j} - n_t^{i,j} - \phi_t^{i,j} l_{n_t^{i,j}}$

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- Singles

$$v(c_t, l_t) = \frac{((c_t/\eta_t^{i,j})^\omega l_t^{1-\omega})^{1-\gamma} - 1}{1-\gamma}$$

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$$v(c_t, l_t) = \frac{((c_t/\eta_t^{i,j})^\omega l_t^{1-\omega})^{1-\gamma} - 1}{1 - \gamma}$$

- Couples

$$w(c_t, l_t^1, l_t^2) = \frac{((c_t/\eta_t^{i,j})^\omega (l_t^1)^{1-\omega})^{1-\gamma} - 1}{1 - \gamma} + \frac{((c_t/\eta_t^{i,j})^\omega (l_t^2)^{1-\omega})^{1-\gamma} - 1}{1 - \gamma}$$

Value functions for couples and people in couples

- ▶ Working period
- ▶ Early retirement
- ▶ Retirement
- ▶ People in couples

- ▶ Working period
- ▶ Early retirement
- ▶ Retirement

Two-step estimation strategy

- First step inputs for each cohort
 - Estimate from data directly (taxes, demographics, wage risk, health risk, human capital accumulation function...)
 - Fix some parameters to calibrated or estimated values (externally to model)

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 - Estimate from data directly (taxes, demographics, wage risk, health risk, human capital accumulation function...)
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- Second step, 1945 cohort
 - Estimate other parameters matching data targets for 1945 cohort
- Second step, 1955 cohort
 - Fix preference parameters and use rest of parameters to match data targets for 1955 cohort

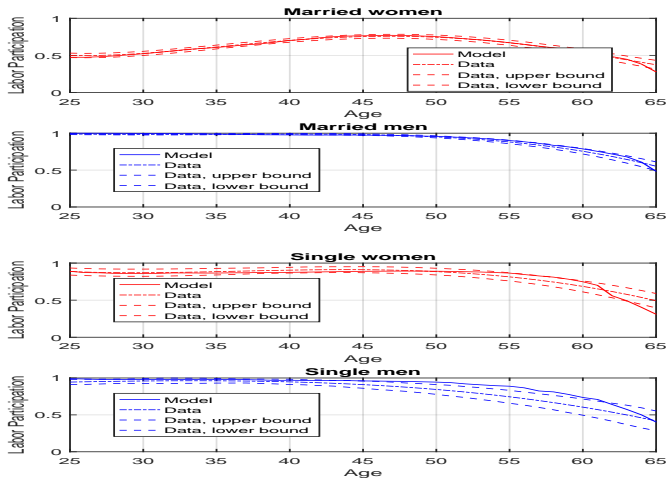
Other first-step inputs

- ▶ Marriage
- ▶ Divorce
- ▶ Children
- ▶ Health transitions
- ▶ Health cost
- ▶ Survival
- ▶ Calibrated parameters

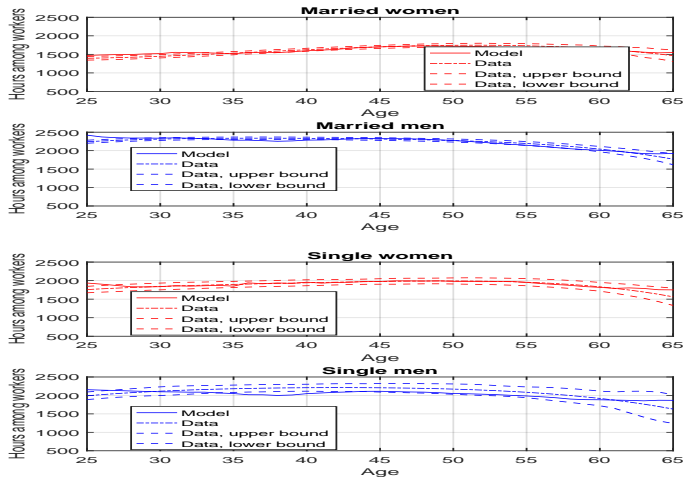
| Estimated parameters | 1945 cohort | 1955 cohort |
|---|-------------|-------------|
| β : Discount factor | 0.990 | 0.990 |
| ω : Consumption weight | 0.406 | 0.406 |
| $L^{2,1}$: Time endowment (weekly hours), single women | 107 | 112 |
| $L^{1,2}$: Time endowment (weekly hours), married men | 107 | 101 |
| $L^{2,2}$: Time endowment (weekly hours), married women | 88 | 88 |
| $\tau_c^{0,5}$: Prop. child care cost for children age 0-5 | 30% | 25% |
| $\tau_c^{6,11}$: Prop. child care cost for children age 6-11 | 7% | 19% |
| $\Phi_t^{i,j}$: Partic. cost | Fig. 27 | Fig. 27 |

Table: Second-step estimated model parameters

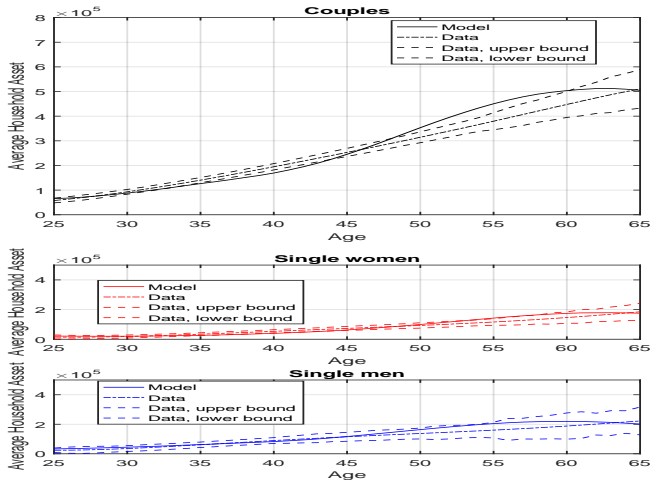
Participation. 1945 cohort



Hours. 1945 cohort



Savings. 1945 cohort

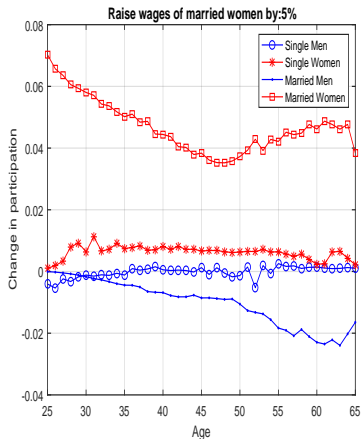
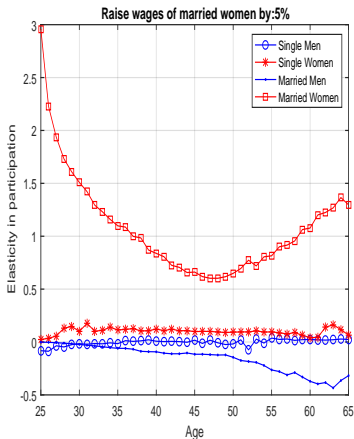


Labor supply elasticity, temporary wage change

| | Participation | | | | Hours among workers | | | |
|----|---------------|-----|--------|-----|---------------------|-----|--------|-----|
| | Married | | Single | | Married | | Single | |
| | W | M | W | M | W | M | W | M |
| 30 | 1.0 | 0.0 | 0.5 | 0.2 | 0.2 | 0.3 | 0.4 | 0.3 |
| 40 | 0.7 | 0.1 | 0.4 | 0.2 | 0.3 | 0.5 | 0.5 | 0.5 |
| 50 | 0.6 | 0.2 | 0.4 | 0.5 | 0.5 | 0.5 | 0.8 | 0.5 |
| 60 | 1.1 | 0.8 | 1.4 | 2.0 | 0.4 | 0.2 | 0.5 | 0.3 |

Table: Labor supply elasticity, temporary wage change, 1945 cohort

Labor supply elasticity, permanent wage change, 1945 cohort



What is the effect of marriage-related policies?

In all cases, adjust the proportional component of the income tax to maintain revenue neutrality

- ▶ Eliminating Social Security marital benefits, 1945 cohort
- ▶ Taxing everyone as singles, 1945 cohort
- ▶ Eliminating Social Security marital benefits and taxing everyone as singles, 1945 cohort
- ▶ Eliminating Social Security marital benefits and taxing everyone as singles, 1955 cohort

Welfare, 1945 cohort

| | All | | | Winners | | | Losers | | |
|--|---------|-------|------|---------|------|-------|---------|-------|-------|
| | Couples | SW | SM | Couples | SW | SM | Couples | SW | SM |
| Remove Social Security spousal benefits, unbalanced budget | | | | | | | | | |
| Avg | -0.25 | -0.23 | 0.31 | 0.00 | 0.00 | 0.31 | -0.25 | -0.23 | -0.02 |
| % | | | | 0.0 | 0.0 | 100.0 | 100.0 | 100.0 | 0.0 |
| Remove Social Security spousal benefits, balanced budget | | | | | | | | | |
| Avg | 0.71 | 0.20 | 1.30 | 0.71 | 0.22 | 1.30 | 0.00 | -0.04 | 0.00 |
| % | | | | 100.0 | 93.4 | 100.0 | 0.0 | 6.6 | 0.0 |
| Remove joint income taxation, balanced budget | | | | | | | | | |
| Avg | 0.33 | -0.10 | 1.25 | 0.45 | 0.11 | 1.25 | -0.09 | -0.15 | 0.00 |
| % | | | | 78.5 | 17.9 | 100.0 | 21.5 | 82.1 | 0.0 |
| Remove all marital related polices, balanced budget | | | | | | | | | |
| Avg | 0.83 | 0.03 | 2.24 | 0.84 | 0.31 | 2.24 | -0.04 | -0.13 | 0.00 |
| % | | | | 98.9 | 35.8 | 100.0 | 1.1 | 64.2 | 0.0 |

Welfare, remove all marital related polices, balanced budget, 1945 and 1955 cohorts

| | | All | | | Winners | | | Losers | | |
|-------------|---------|------|------|---------|---------|-------|---------|--------|-------|--|
| | Couples | SW | SM | Couples | SW | SM | Couples | SW | SM | |
| 1945 cohort | | | | | | | | | | |
| Avg | 0.83 | 0.03 | 2.24 | 0.84 | 0.31 | 2.24 | -0.04 | -0.13 | 0.00 | |
| % | | | | 98.9 | 35.8 | 100.0 | 1.1 | 64.2 | 0.0 | |
| 1955 cohort | | | | | | | | | | |
| Avg | 0.75 | 0.21 | 1.31 | 0.77 | 0.31 | 1.31 | -0.05 | -0.05 | -0.02 | |
| % | | | | 97.2 | 70.9 | 100.0 | 2.8 | 29.1 | 0.0 | |

Conclusions

- Estimate a rich life-cycle model of couples and singles with marriage-related policies:
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 - Increases participation of married women over their life cycle
 - Reduces participation of married men after age 55
 - Increases savings of couples
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 - Reduces participation of married men after age 55
 - Increases savings of couples
 - Is welfare improving for most
- Effects are also large for the 1955 cohort, who had much higher labor market participation of married women to start with

Contributions

- First estimated structural model of couples and singles with participation and hours decisions (both men and women) and savings
- Study all marriage-related taxes and benefits in a unified framework
- Study two different cohorts
- Rich framework
 - Labor market experience can affect wages
 - Survival, health, and medical expenses in old age, heterogeneous by marital status and gender
 - Fit data for participation, hours worked, savings, and labor supply elasticities

Recursive problem for working-age singles

$$W^s(t, i, a_t^i, \epsilon_t^i, \bar{y}_t^i) = \max_{c_t, a_{t+1}, n_t^i} \left(v(c_t, l_t^{i,j}) + \right. \\ \left. \beta(1 - \nu_{t+1}(\cdot)) E_t W^s(t+1, i, a_{t+1}^i, \epsilon_{t+1}^i, \bar{y}_{t+1}^i) + \right. \\ \left. \beta \nu_{t+1}(\cdot) E_t \xi_{t+1}(\cdot) \theta_{t+1}(\cdot) \hat{W}^c(t+1, i, a_{t+1}^i + a_{t+1}^p, \epsilon_{t+1}^i, \epsilon_{t+1}^p, \bar{y}_{t+1}^i, \bar{y}_{t+1}^p) \right)$$

- t : Age
- i : Gender
- a_t : Net worth from previous period
- ϵ_t^i : Current productivity shock
- \bar{y}_t^i : Annual accumulated Social Security earnings

Recursive problem for retired singles

$$Y_t^i = SS(\bar{y}_r^i)$$

$$T(\cdot) = \tau\left(Y_t^i + ra_{t,j}\right)$$

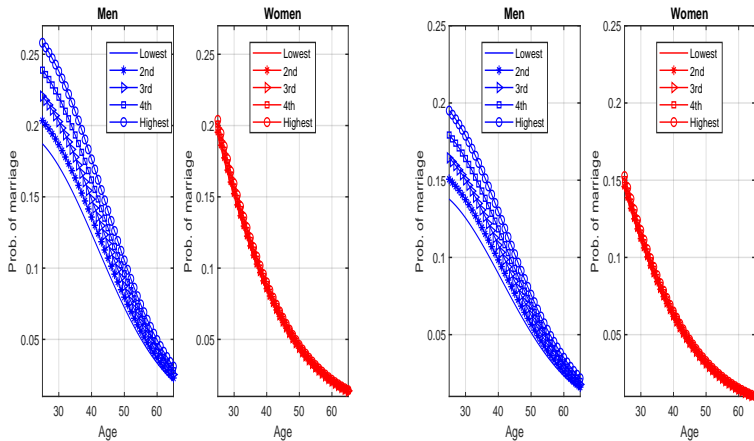
$$B(a_t, Y_t, \psi_t^i, \underline{c}(j)) = \max \left\{ 0, \underline{c}(j) - \left\{ (1+r)a_t + Y_t - m_t^{ij}(\psi_t^i) - T(\cdot) \right\} \right\}$$

$$c_t + a_{t+1} = (1 + r)a_t + Y_t + B(a_t, Y_t^i, \psi_t^i, \underline{c}(j)) - m_{tj}^i(\psi_t^i) - T(\cdot)$$

$$a_{t+1} \geq 0, \quad \forall t$$

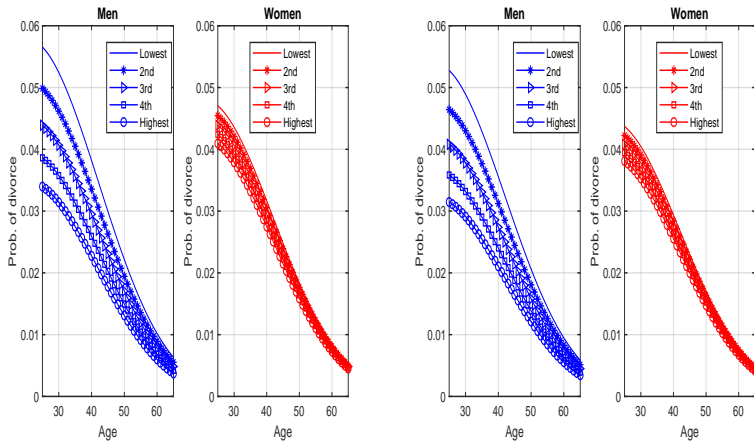
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PSID: Marriage, 1945 and 1955 cohorts



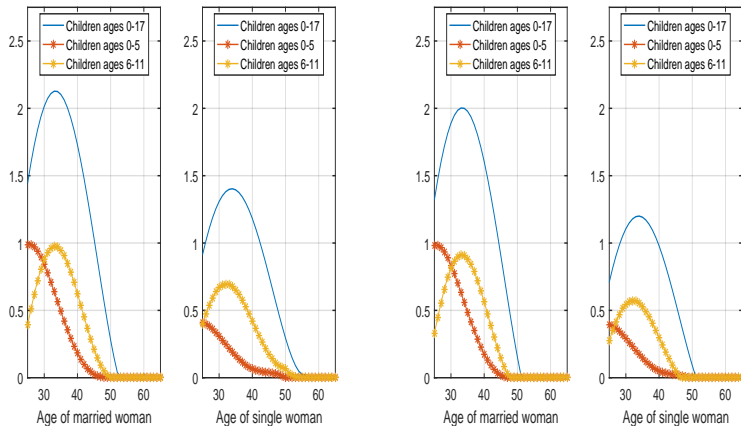
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PSID: Divorce, 1945 and 1955 cohorts



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PSID: number of children, 1945 and 1955 cohorts

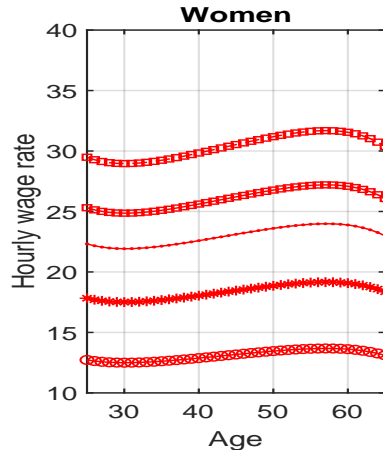
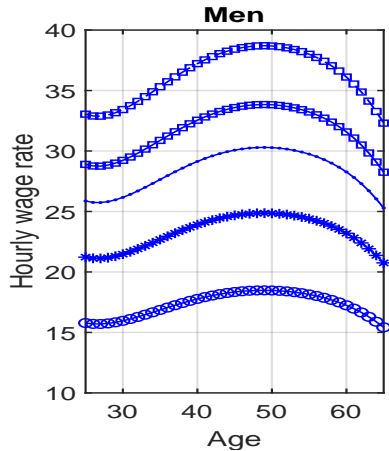


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Recursive problem for working-age couples

$$Y_t^i = e_t^i(\bar{y}_t^i)\epsilon_t^i n_t^i,$$
$$T(\cdot) = \tau(ra_t + Y_t^1 + Y_t^2, j)$$

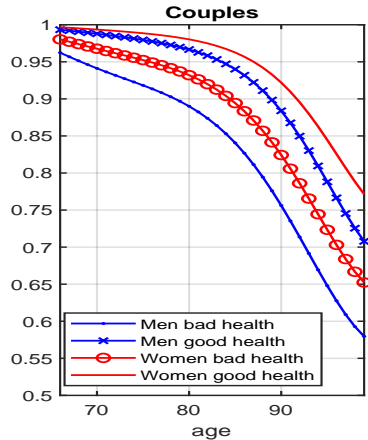
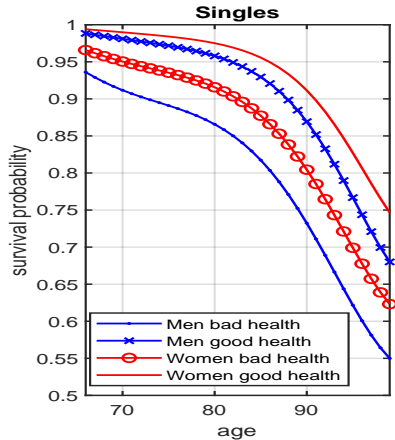
PSID: Wage profiles, 1945 cohort



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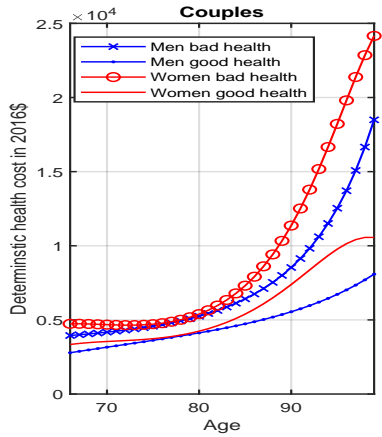
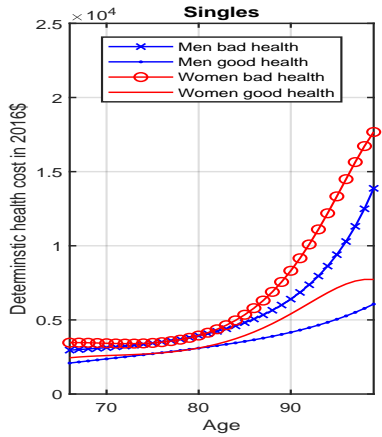


HRS: Survival rates



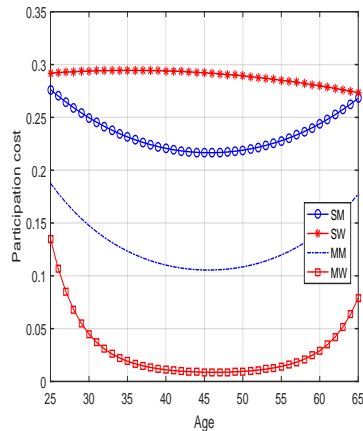
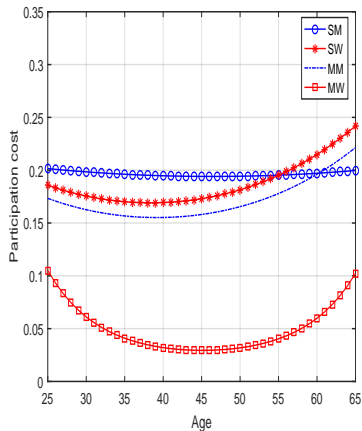
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HRS: Health costs

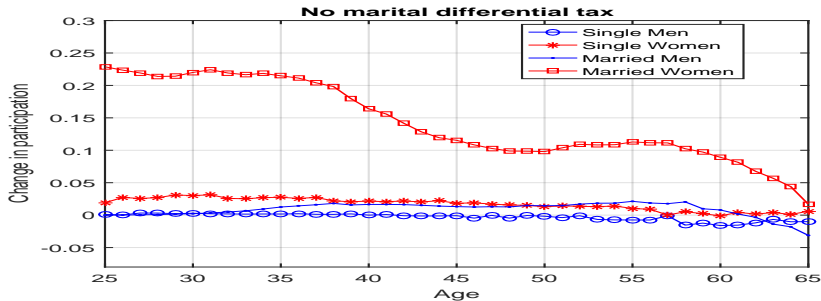


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Second-step participation cost estimates



Taxing everyone as singles, 1945 cohort



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