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
  - Savings
  - Welfare

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)
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• Labor supply of married women has been changing over time. Do the effects of these policies depend on the cohort?
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Why might they matter? Marginal tax rate for women

![Women's marginal tax rates graph](image-url)
Why might they matter? Social Security benefits

**Social Security Benefit**

- Average Household Benefit
- W/ m. benefit
- W/O m. benefit

**Survivor Benefit**

- Average Wife’s Survivor Benefit
- W/ m. benefit
- W/O m. benefit

Graphs show the relationship between Social Security and Survivor benefits based on the wife's own benefit decile.
Participation for women, 1945 and 1955 cohorts

![Labor Participation Graph]

- Single women, 1945
- Married women, 1945
- Single women, 1955
- Married women, 1955
Hours for women, 1945 and 1955 cohorts

Average Working Hours (Workers)

- Single women, 1945
- Married women, 1945
- Single women, 1955
- Married women, 1955
Participation for men, 1945 and 1955 cohorts

Labor Participation

- Single men, 1945
- Married men, 1945
- Single men, 1955
- Married men, 1955
Hours for men, 1945 and 1955 cohorts
Related literature

- Female labor supply: Attanasio et al. (2008), Eckstein and Lifhitz (2012), Eckstein, Keane, and Lifhitz (2016)...

Approach

- Partial equilibrium, cohort level analysis
Approach

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- Data
  - Panel Study of Income Dynamics (PSID): working period
  - Health and Retirement Study (HRS): retirement period
Approach

• 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)
Model’s key features

• 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

• 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 ($T=99$)
  • Health shocks
  • Medical costs
  • Exogenous probability of death → married people might lose their spouse
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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 \( \tau_t^{SS} \) to finance old-age Social Security
- Old age means-tested cons. floor \( c(j) \) (Medicaid and SSI)
Household preferences

- $\beta =$ discount factor, $i =$ gender, $j =$ marital status
- Time endowment: $L^{i,j}$
- Leisure $l^{i,j}_t = L^{i,j} - n^{i,j}_t - \phi^{i,j}_t I^{n^{i,j}}_t$
Household preferences

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

\[ v(c_t, l_t) = \left( \frac{(c_t/\eta_t^{i,j})^{\omega} l_t^{1-\omega})^{1-\gamma}}{1-\gamma} - 1 \right) \]
Household preferences

- $\beta =$ discount factor, $i =$ gender, $j =$ marital status
- Time endowment: $L^{i,j}$
- Leisure $l^{i,j}_t = L^{i,j} - n^{i,j}_t - \phi^{i,j}_t l^{i,j}_{n_t}$
- Singles
  
  $$v(c_t, l_t) = \frac{\left(\frac{c_t}{\eta^{i,j}_t} \omega l^{1-\omega}_t\right)^{1-\gamma} - 1}{1 - \gamma}$$

- Couples
  
  $$w(c_t, l^{1}_t, l^{2}_t) = \frac{\left(\frac{c_t}{\eta^{i,j}_t} \omega (l^{1}_t)^{1-\omega}\right)^{1-\gamma} - 1}{1 - \gamma} + \frac{\left(\frac{c_t}{\eta^{i,j}_t} \omega (l^{2}_t)^{1-\omega}\right)^{1-\gamma} - 1}{1 - \gamma}$$
Recursive problem for working-age singles

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

- \( t \): Age
- \( i \): Gender
- \( a_t \): Net worth from previous period
- \( \epsilon_t^i \): Current productivity shock
- \( \bar{y}_t^i \): Annual accumulated Social Security earnings
Recursive problem for working-age singles

\[ Y^i_t = e^i_t \tilde{y}^i_t \epsilon^i_t n^i_t \]

\[ T(\cdot) = \tau(ra_t + Y^i_t, j) \]

\[ \tau_c(i, j, t) = \tau^0_c 0.5 f^0.5(i, j, t) + \tau^6_c 6.11 f^{6,11}(i, j, t) \]

\[ c_t + a_{t+1} = (1 + r)a^i_t + Y^i_t(1 - \tau_c(i, j, t)) - \tau^{SS}_t \min(Y^i_t, \tilde{y}_t) - T(\cdot) \]

\[ \tilde{y}^i_{t+1} = (\tilde{y}^i_t(t - t_0) + (\min(Y^i_t, \tilde{y}_t)))/(t + 1 - t_0), \]

\[ a_t \geq 0, \quad n_t \geq 0, \quad \forall t \]
Early retirement stage, singles

- Single individuals don’t get married anymore.
- Decide whether to retire or not.

\[
V^s(t, i, a^i_t, \epsilon^i_t, \bar{y}^i_t) = \max_{D^i_t} \left( (1 - D^i_t) N^s(t, i, a^i_t, \epsilon^i_t, \bar{y}^i_t) + D^i_t S^s(t, i, a^i_t, \bar{y}^i_t, t) \right)
\]

- If retire, no longer able to work.
Early retirement stage, singles who decided not to claim SS

\[ N^s(t, i, a_i^t, \epsilon_i^t, \bar{y}_i^t) = \max_{c_t, a_{t+1}, n_i^t} \left( v'(c_t, l_i^{j,t}) + \beta E_t V^s(t + 1, i, a_{t+1}^i, \epsilon_{t+1}^i, \bar{y}_{t+1}^i) \right) \]

\[ Y_t = e_t^i(j(\bar{y}_t^i)\epsilon_t^i n_t^i, \]

\[ T(\cdot) = T(Y_t + ra_t, j) \]

\[ \bar{y}_{t+1}^i = (\bar{y}_t^i(t - t_0) + (\min(Y_t^i, \tilde{y}_t)))/(t + 1 - t_0), \]

\[ c_t + a_{t+1} = (1 + r) a_t^i + Y_t^i - \tau_t^{SS} \min(Y_t, \tilde{y}_t) - T(\cdot), \]

\[ a_{t+1} \geq 0. \]
Early retirement stage, singles who have claimed SS

$$S^s(t, i, a_t, \bar{y}_r, tr) = \max_{c_t, a_{t+1}} \left( v^i(c_t, L^i,j) + \beta E_t S^s(t + 1, i, a_{t+1}, \bar{y}_r, tr) \right)$$

$$Y_t = SS(\bar{y}_r, tr)$$

$$T(\cdot) = T(Y_t + ra_t, j)$$

$$c_t + a_{t+1} = (1 + r)a_t + Y_t - T(\cdot)$$

$$a_{t+1} \geq 0.$$
Recursive problem for retired singles

$$R^s(t, i, a_t, \psi^i_t, \bar{y}^i_r, tr) = \max_{c_t, a_{t+1}} \left( v(c_t, L^{i,j}) + \beta s^i_j(\psi^i_t) E_t R^s(t + 1, i, a_{t+1}, \psi^i_{t+1}, \bar{y}^i_r, tr) \right)$$

- $t$: Age
- $i$: Gender
- $a_t$: Net worth from previous period
- $\bar{y}^i_r$: Annual accumulated social security earnings (PI)
- $\psi^i_t$: Health status (good or bad)
- $tr$: Retirement age
Recursive problem for retired singles

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

\[ T(\cdot) = \tau(Y_t^i + ra_t, j) \]

\[ B(a_t, Y_t, \psi_t^i, c(j)) = \max \left\{ 0, c(j) - \left\{ (1 + r)a_t + Y_t - m^{i,j}_t(\psi_t^i) - T(\cdot) \right\} \right\} \]

\[ c_t + a_{t+1} = (1 + r)a_t + Y_t + B(a_t, Y_t^i, \psi_t^i, c(j)) - m^{i,j}_t(\psi_t^i) - T(\cdot) \]

\[ a_{t+1} \geq 0, \quad \forall t \]
Recursive problem for working-age couples

\[ W^c(t, a_t, \epsilon^1_t, \epsilon^2_t, \bar{y}^1_t, \bar{y}^2_t) = \max_{c_t, a_{t+1}, n^1_t, n^2_t} \left( w(c_t, l^1_t, l^2_t) 
+ (1 - \zeta_{t+1}(\cdot)) \beta E_t W^c(t + 1, a_{t+1}, \epsilon^1_{t+1}, \epsilon^2_{t+1}, \bar{y}^1_{t+1}, \bar{y}^2_{t+1}) 
+ \zeta_{t+1}(\cdot) \beta \sum_{i=1}^{2} \left( E_t W^s(t + 1, i, a_{t+1}/2, \epsilon^i_{t+1}, \bar{y}^i_{t+1}) \right) \right) \]

- \( t \): Age
- \( a_t \): Net worth from previous period
- \( \epsilon^i_t \): Current productivity shock for each spouse
- \( \bar{y}^i_t \): Annual accumulated SS earnings for each spouse
- Divorce probability \( \zeta_t(\cdot) = \zeta_t(\epsilon^1_t, \epsilon^2_t) \)
Recursive problem for working-age couples

\[ Y_t^i = e_t^i(\bar{y}_t^i)c_t^i n_t^i, \]

\[ T(\cdot) = \tau(ra_t + Y_t^1 + Y_t^2, j) \]

\[ \tau_c(i, j, t) = \tau_0^{0.5} f^{0.5}(i, j, t) + \tau_6^{6.11} f^{6.11}(i, j, t), \]

\[ c_t + a_{t+1} = (1 + r)a_t + Y_t^1 + Y_t^2 (1 - \tau_c(2, 2, t)) \]

\[ -\tau_{t}^{SS} (\min(Y_t^1, \tilde{y}_t) + \min(Y_t^2, \tilde{y}_t)) - T(\cdot) \]

\[ a_t \geq 0, \quad n_t^1, n_t^2 \geq 0, \quad \forall t \]
Early retirement stage, couples

- Couples don’t get divorced anymore.
- Decide whether to retire or not at the same time.
- If retire, no longer able to work.

\[
V^c(t, a_t, \epsilon_1^t, \epsilon_2^t, \bar{y}_1^t, \bar{y}_2^t) = \max_{D_t}(1 - D_t)N^c(t, a_t, \epsilon_1^t, \epsilon_2^t, \bar{y}_1^t, \bar{y}_2^t) + D_tS^c(t, a_t, \bar{y}_1^t, \bar{y}_2^t, t)
\]
Early retirement stage, couples who decided not to claim SS

\[ N^c(t, a_t, \epsilon_1^t, \epsilon_2^t, \bar{y}_1^t, \bar{y}_2^t) = \max_{c_t, a_t+1, n_1^t, n_2^t} \left( w(c_t, l^1_t, l^2_t) \right. \]

\[ + \beta E_t V^c(t + 1, a_{t+1}, \epsilon_{t+1}^1, \epsilon_{t+1}^2, \bar{y}_{t+1}^1, \bar{y}_{t+1}^2) \],

\[ l_t^{i,j} = L_t^{i,j} - n_t^i - \Phi_t^{i,j} l_t^i, \]

\[ Y_t^i = e_t^{i,j}(\bar{y}_t^i)\epsilon_t^i n_t^i, \]

\[ T(\cdot) = T(ra_t + Y_1^t + Y_2^t, i, j, t) \]

\[ c_t + a_{t+1} = (1 + r)a_t + Y_1^t + Y_2^t - \tau_{t}^{SS} (\min(Y_1^t, \bar{y}_t^1) + \min(Y_2^t, \bar{y}_t^2)) - T(\cdot) \]

\[ \bar{y}_{t+1}^i = (\bar{y}_t^i(t - t_0) + (\min(Y_t^i, \bar{y}_t^i)))/(t + 1 - t_0), \]

\[ a_t > 0, \quad n_1^t, n_2^t > 0 \]
Early retirement stage, couples who decided to claim SS

\[ S^c(t, a_t, \tilde{y}_r^1, \tilde{y}_r^2, tr) = \max_{c_t, a_{t+1}} \left( w(c_t, L^1j, L^2j) + \beta E_{t}S^c(t + 1, a_{t+1}, \tilde{y}_r^1, \tilde{y}_r^2, tr) \right), \]

\[ Y_t = \max \left\{ (SS(\tilde{y}_r^1, tr) + SS(\tilde{y}_r^2, tr), \frac{3}{2} \max(SS(\tilde{y}_r^1, tr), SS(\tilde{y}_r^2, tr)) \right\} \]

\[ T(\cdot) = T(Y_t + r a_t, i, j, t) \]

\[ c_t + a_{t+1} = (1 + r) a_t + Y_t - T(\cdot) \]

\[ a_{t+1} \geq 0. \]
Recursive problem for retired couples

\[ R^c(t, a_t, \psi^1_t, \psi^2_t, \bar{y}^1_r, \bar{y}^2_r) = \max_{c_t, a_{t+1}} \left( w(c_t, L^1_j, L^2_j) + \right. \\
\beta s^1_j(\psi^1_t) s^2_j(\psi^2_t) E_t R^c(t + 1, a_{t+1}, \psi^1_{t+1}, \psi^2_{t+1}, \bar{y}^1_r, \bar{y}^2_r) + \\
\beta s^1_j(\psi^1_t)(1 - s^2_j(\psi^2_t)) E_t R^s(t + 1, 1, a_{t+1}, \psi^1_{t+1}, \bar{y}^1_r) + \\
\left. \beta s^2_j(\psi^2_t)(1 - s^1_j(\psi^1_t)) E_t R^s(t + 1, 2, a_{t+1}, \psi^2_{t+1}, \bar{y}^2_r) \right) \]

- **t**: Age.
- **a_t**: Net worth from previous period.
- **\bar{y}^1_r**: PI for men.
- **\bar{y}^2_r**: PI women.
- **\psi^i_t**: Health status (good or bad) for each spouse.
Recursive problem for retired couples

\[ \bar{y}^i_r = \max(\bar{y}^1_r, \bar{y}^2_r), \]

\[ Y_t = \max \left\{ (SS(\bar{y}^1_r) + SS(\bar{y}^2_r), \frac{3}{2} \max(SS(\bar{y}^1_r), SS(\bar{y}^2_r)) \right\} \]

\[ T(\cdot) = \tau(Y_t + ra_t, j) \]

\[ B(a_t, Y_t, \psi^1_t, \psi^2_t, c(j)) = \max \left\{ 0, c(j) - \right\} \]

\[ \left[ (1 + r)a_t + Y_t - m^1_j(\psi^1_t) - m^2_j(\psi^2_t) - T(\cdot) \right] \]

\[ c_t + a_{t+1} = (1 + r)a_t + Y_t + B(\cdot) - m^1_j(\psi^1_t) - m^2_j(\psi^2_t) - T(\cdot) \]

\[ a_{t+1} \geq 0, \quad \forall t \]
Individual’s Discounted Present Value of Being in a Marriage

Evaluated under optimal policies

\[
\hat{W}^c(t, i, a_t, \epsilon^1_t, \epsilon^2_t, \bar{y}_t^1, \bar{y}_t^2) = \nu(\hat{c}_t(\cdot)/\eta^i_j, \hat{\nu}^i_j) + \\
\beta(1 - \zeta(\cdot))E_t \hat{W}^c(t + 1, i, \hat{a}_{t+1}(\cdot), \epsilon^1_{t+1}, \epsilon^2_{t+1}, \bar{y}_{t+1}^1, \bar{y}_{t+1}^2) + \\
\beta\zeta(\cdot)E_t W^s(t + 1, i, \hat{a}_{t+1}(\cdot)/2, \epsilon^i_{t+1}, \bar{y}_{t+1}^i)
\]

\[
\hat{R}^c(t, i, a_t, \psi^1_t, \psi^2_t, \bar{y}^1_r, \bar{y}^2_r) = \nu(\hat{c}_t(\cdot)/\eta^i_j, L^i_j) + \\
\beta s^i_j(\psi^i_t)s^p_j(\psi^p_t)E_t \hat{R}^c(t + 1, i, \hat{a}_{t+1}(\cdot), \psi^1_{t+1}, \psi^2_{t+1}, \bar{y}^1_r, \bar{y}^2_r) + \\
\beta s^i_j(\psi^i_t)(1 - s^p_j(\psi^p_t))E_t R^s(t + 1, i, \hat{a}_{t+1}(\cdot), \psi^i_{t+1}, \bar{y}^i_r)
\]
Individual’s Discounted Present Value of Being in a Marriage

Evaluated under optimal policies

\[ \hat{N}_c(t, i, a_t, \epsilon_1^t, \epsilon_2^t, \bar{y}_1^t, \bar{y}_2^t) = v^i(\hat{c}_t(\cdot), \hat{l}_t^{i,j}) \]
\[ + \beta E_t \hat{V}_c(t + 1, i, \hat{a}_{t+1}(\cdot), \epsilon_1^{t+1}, \epsilon_2^{t+1}, \bar{y}_1^{t+1}, \bar{y}_2^{t+1}) \]
\[ \hat{S}_c(t, i, a_t, \bar{y}_r^1, \bar{y}_r^2, tr) = v^i(\hat{c}_t(\cdot), L^{i,j}) + \beta E_t S_c(t + 1, i, \hat{a}_{t+1}(\cdot), \bar{y}_r^1, \bar{y}_r^2, tr) \]
\[ \hat{V}_c(t, i, a_t, \epsilon_1^t, \epsilon_2^t, \bar{y}_1^t, \bar{y}_2^t) = (1 - \hat{D}_t(\cdot)) \hat{N}_c(t, i, a_t, \epsilon_1^t, \epsilon_2^t, \bar{y}_1^t, \bar{y}_2^t) + \]
\[ \hat{D}_t(\cdot) \hat{S}_c(t, i, a_t, \bar{y}_r^1, \bar{y}_r^2, t) \]
Two-step estimation strategy

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

- First step inputs for each cohort
  - Fix some parameters to calibrated or estimated values (externally to model)
  - Estimate from data directly (taxes, demographics, wage risk, health risk, human capital accumulation function...)
- Second step, 1945 cohort
  - Estimate other parameters matching data targets for 1945 cohort
Two-step estimation strategy

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

<table>
<thead>
<tr>
<th>Fixed parameters</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preferences and returns</td>
<td></td>
</tr>
<tr>
<td>$r$ Interest rate</td>
<td>4% De Nardi et al. (2016)</td>
</tr>
<tr>
<td>$\gamma$ Utility curvature parameter</td>
<td>2.5 see text</td>
</tr>
<tr>
<td>$\eta_t$ Equivalence scales</td>
<td>PSID</td>
</tr>
<tr>
<td>Government policy</td>
<td></td>
</tr>
<tr>
<td>$\lambda_t^{i,j}, \tau_t^{i,j}$ Income tax</td>
<td>See text</td>
</tr>
<tr>
<td>$SS(\tilde{y}_t^{i})$ Social Security benefit</td>
<td>See text</td>
</tr>
<tr>
<td>$\tau_t^{SS}$ Social Security tax rate</td>
<td>See text</td>
</tr>
<tr>
<td>$\tilde{y}_t$ Social Security cap</td>
<td>See text</td>
</tr>
<tr>
<td>$c(1)$ Minimum consumption, singles</td>
<td>$8,687, De Nardi et al. (2016)</td>
</tr>
<tr>
<td>$c(2)$ Minimum consumption, couples</td>
<td>$8,687*1.5 Social Security rules</td>
</tr>
</tbody>
</table>
PSID: Wage profiles, 1945 and 1955 cohorts
PSID: Wage profiles, 1945 cohort

**Men**

- Age: 30, 40, 50, 60
- Hourly wage rate: 10, 15, 20, 25, 30, 35, 40

**Women**

- Age: 30, 40, 50, 60
- Hourly wage rate: 10, 15, 20, 25, 30, 35, 40
PSID: Wage processes

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persistence</td>
<td>0.941</td>
<td>0.946</td>
</tr>
<tr>
<td>Variance prod. shock</td>
<td>0.026</td>
<td>0.015</td>
</tr>
<tr>
<td>Initial variance</td>
<td>0.114</td>
<td>0.095</td>
</tr>
</tbody>
</table>

Table: Estimated processes for the wage shocks for men and women, PSID data
PSID: Marriage, 1945 and 1955 cohorts
PSID: Divorce, 1945 and 1955 cohorts
PSID: number of children, 1945 and 1955 cohorts
HRS: Health transition probabilities
HRS: Survival rates

Singles

Couples

survival probability

age

Men bad health
Men good health
Women bad health
Women good health

0.5
0.55
0.6
0.65
0.7
0.75
0.8
0.85
0.9
0.95
1

70 80 90

HRS: Health costs

**Singles**

- Men bad health
- Men good health
- Women bad health
- Women good health

**Couples**

- Men bad health
- Men good health
- Women bad health
- Women good health

Deterministic health cost in 2016$
### Second-step estimated model parameters

<table>
<thead>
<tr>
<th>Estimated parameters</th>
<th>1945 cohort</th>
<th>1955 cohort</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \beta ): Discount factor</td>
<td>0.990</td>
<td>0.990</td>
</tr>
<tr>
<td>( \omega ): Consumption weight</td>
<td>0.406</td>
<td>0.406</td>
</tr>
<tr>
<td>( L^{2,1} ): Time endowment (weekly hours), single women</td>
<td>107</td>
<td>112</td>
</tr>
<tr>
<td>( L^{1,2} ): Time endowment (weekly hours), married men</td>
<td>107</td>
<td>101</td>
</tr>
<tr>
<td>( L^{2,2} ): Time endowment (weekly hours), married women</td>
<td>88</td>
<td>88</td>
</tr>
<tr>
<td>( \tau_{c}^{0,5} ): Prop. child care cost for children age 0-5</td>
<td>30%</td>
<td>25%</td>
</tr>
<tr>
<td>( \tau_{c}^{6,11} ): Prop. child care cost for children age 6-11</td>
<td>7%</td>
<td>19%</td>
</tr>
<tr>
<td>( \Phi_{t}^{ij} ): Partic. cost</td>
<td>Fig. 47</td>
<td>Fig. 47</td>
</tr>
</tbody>
</table>
Second-step participation cost estimates
Participation, 1945 cohort

Married women

Married men

Single women

Single men
Hours, 1945 cohort

- Married women
- Married men
- Single women
- Single men

[Graphs showing hours among workers for different marital statuses and genders, with model and data representations and upper/lower bounds.]
Savings. 1945 cohort
### Labor supply elasticity, temporary wage change

<table>
<thead>
<tr>
<th></th>
<th>Participation</th>
<th>Hours among workers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Married</td>
<td>Single</td>
</tr>
<tr>
<td></td>
<td>W  M</td>
<td>W  M</td>
</tr>
<tr>
<td>30</td>
<td>1.0 0.0</td>
<td>0.5 0.2</td>
</tr>
<tr>
<td>40</td>
<td>0.7 0.1</td>
<td>0.4 0.2</td>
</tr>
<tr>
<td>50</td>
<td>0.6 0.2</td>
<td>0.4 0.5</td>
</tr>
<tr>
<td>60</td>
<td>1.1 0.8</td>
<td>1.4 2.0</td>
</tr>
</tbody>
</table>

**Table:** Labor supply elasticity, temporary wage change, 1945 cohort
Labor supply elasticity, permanent wage change, 1945 cohort
Remove both Social Security benefits, 1945 cohort

Percentage asset change

<table>
<thead>
<tr>
<th>Balanced government budget</th>
<th>Couples</th>
<th>Single men</th>
<th>Single women</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>14.9%</td>
<td>7.8%</td>
<td>11.2%</td>
</tr>
</tbody>
</table>
Taxing everyone as singles, 1945 cohort
Remove Social Security benefits + joint tax, 1945 cohort

<table>
<thead>
<tr>
<th>Percentage asset change</th>
<th>Couples</th>
<th>Single women</th>
<th>Single men</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balanced government budget</td>
<td>20.3%</td>
<td>14.8%</td>
<td>8.8%</td>
</tr>
</tbody>
</table>
Remove Social Security benefits + joint tax, 1955 cohort

<table>
<thead>
<tr>
<th>Age</th>
<th>Change in participation</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>0.3</td>
</tr>
<tr>
<td>35</td>
<td>0.25</td>
</tr>
<tr>
<td>40</td>
<td>0.2</td>
</tr>
<tr>
<td>45</td>
<td>0.15</td>
</tr>
<tr>
<td>50</td>
<td>0.1</td>
</tr>
<tr>
<td>55</td>
<td>0.05</td>
</tr>
<tr>
<td>60</td>
<td>0</td>
</tr>
</tbody>
</table>

% asset change

<table>
<thead>
<tr>
<th></th>
<th>Couples</th>
<th>Single women</th>
<th>Single men</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balanced government budget</td>
<td>19.7%</td>
<td>14.9%</td>
<td>8.4%</td>
</tr>
</tbody>
</table>
Remove Social Security benefits + joint tax, 1945 cohort

- Left: ↓ the marriage prob. and ↑ the divorce rate by 20%
- Middle: benchmark
- Right: ↑ the marriage prob. and ↓ the divorce rate by 20%
### Welfare, 1945 cohort

<table>
<thead>
<tr>
<th>Policy Changes</th>
<th>All Couples</th>
<th>Win Couples</th>
<th>Losers Couples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remove Social Security spousal benefits, unbalanced budget</td>
<td>-0.25</td>
<td>0.00</td>
<td>-0.25</td>
</tr>
<tr>
<td>Avg</td>
<td>-0.23</td>
<td>0.00</td>
<td>-0.23</td>
</tr>
<tr>
<td>%</td>
<td>0.31</td>
<td>0.31</td>
<td>0.02</td>
</tr>
<tr>
<td>Remove Social Security spousal benefits, balanced budget</td>
<td>0.71</td>
<td>0.71</td>
<td>-0.04</td>
</tr>
<tr>
<td>Avg</td>
<td>0.20</td>
<td>0.22</td>
<td>0.00</td>
</tr>
<tr>
<td>%</td>
<td>1.30</td>
<td>1.30</td>
<td>0.00</td>
</tr>
<tr>
<td>Remove joint income taxation, balanced budget</td>
<td>0.33</td>
<td>0.45</td>
<td>-0.09</td>
</tr>
<tr>
<td>Avg</td>
<td>-0.10</td>
<td>0.11</td>
<td>-0.15</td>
</tr>
<tr>
<td>%</td>
<td>1.25</td>
<td>1.25</td>
<td>0.00</td>
</tr>
<tr>
<td>Remove all marital related polices, balanced budget</td>
<td>0.83</td>
<td>0.84</td>
<td>-0.04</td>
</tr>
<tr>
<td>Avg</td>
<td>0.03</td>
<td>0.31</td>
<td>-0.13</td>
</tr>
<tr>
<td>%</td>
<td>2.24</td>
<td>2.24</td>
<td>0.00</td>
</tr>
</tbody>
</table>
Welfare, remove all marital related polices, balanced budget, 1945 and 1955 cohorts

<table>
<thead>
<tr>
<th></th>
<th>All Couples</th>
<th>Winners Couples</th>
<th>Losers Couples</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SW</td>
<td>SM</td>
<td>SW</td>
</tr>
<tr>
<td>1945 cohort</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avg</td>
<td>0.83</td>
<td>0.03</td>
<td>2.24</td>
</tr>
<tr>
<td>%</td>
<td>98.9</td>
<td>35.8</td>
<td>100.0</td>
</tr>
<tr>
<td>1955 cohort</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avg</td>
<td>0.75</td>
<td>0.21</td>
<td>1.31</td>
</tr>
<tr>
<td>%</td>
<td>97.2</td>
<td>70.9</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Conclusions

• Estimate a rich life-cycle model of couples and singles with marriage-related policies:
  • Marital income tax,
  • Social Security spousal benefits
  • Social Security survival benefits
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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
  - 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.
Conclusions

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- 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