Happy Together: A Structural Model of Couples’ Joint Retirement Choices

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- Elimination of spousal benefit.

Main contribution of the paper is analysis of retirement at the couple level.
Introduction

Structural models of individual retirement

Wealth

Income

Health Status

Health Insurance

Private Pensions

Social Security
Introduction

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- Individuals respond to incentives from
  - Wealth
  - Income
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▶ Each spouse’s preferences represented by a separate utility function.
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   Gustman and Steinmeier (2000, 2004), Maestas (2001)
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This paper aims to bridge the gap between the two strands
Dynamic, stochastic model of labor supply and saving choices
Model

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- Agents maximize expected discounted utility
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Benefit receipt is an absorbing state
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Model

CHOICE SET

Discrete choices: \( d_j \in \{ R, PT, FT \} \), for \( j = m, f \)

Continuous choices: \( s_t \in C_t(z_t, \epsilon_t; d_t) \)

STATE SPACE

Observable variables: \( z_t = \{ A_t, E_m t, E_f t, w_m t, w_f t, B_m t, B_f t, agediff \} \)

Unobservable variables: \( \epsilon_t = \{ \epsilon_t(d_t) | d_t \in D \} \)
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PREFERENCES

Household utility

$$U(d_t, s_t; z_t, \epsilon_t, \theta_1) = \phi U_m(c_t, l_m) + (1 - \phi) U_f(c_t, l_f) + \epsilon_t(d_t)$$

Individual utility

$$U_j = \frac{1}{1 - \rho (c_{\alpha_j1} l_t \alpha_j)} l_j t - h_j(t) + \alpha_2 I(d_{mR}, d_{fR})$$

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Couple's Joint Retirement Choices
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Individual utility

\[ U^i = \frac{1}{1 - \rho} \left( c_{t1}^{\alpha_i} (l^i_t)^{1 - \alpha_i} \right)^{1-\rho} \]
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\[ U(d_t, s_t; z_t, \varepsilon_t, \theta_1) = \phi U^m(c_t, l^m_t) + (1 - \phi) U^f(c_t, l^f_t) + \varepsilon_t(d_t) \]

Individual utility

\[ U^j = \frac{1}{1 - \rho} \left( c_t^{\alpha_1^j}(l^j_t)^{1-\alpha_1^j} \right)^{1-\rho} \]

\[ l^j_t = L - h^j_t(d^j_t) + \alpha_2 l(d^m_t = R, d^f_t = R) \]
Model

BUDGET CONSTRAINT

\[ ct + st = At + Y(rAt, wm, wh, wft, τ) + Bm × ssbmt + Bf × ssbft + Tt \]

Next period's asset:

\[ A_{t+1} = st + hc \]

Liquidity constraint:

\[ st ≥ 0 \]
Model

BUDGET CONSTRAINT

\[ c_t + s_t = A_t + Y(rA_t, w^m_t h^m_t, w^f_t h^f_t, \tau) + B^m_t \times ssb^m_t + B^f_t \times ssb^f_t + T_t \]
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Next period’s asset:

\[ A_{t+1} = s_t + h c_t \]

Liquidity constraint:

\[ s_t \geq 0 \]
Social Security Function:

- Entitlement is a function of accumulated earnings ($E_t$).
- A step formula is applied to $E_t$ to obtain PIA.
- Workers retiring at 65 receive full PIA.
- Workers retiring at 62 receive 80% of PIA.
- Workers retiring after 65 receive 5.5% increase per year.
- Benefits are indexed to CPI.
- Earnings test.
- Dependent spouse benefit.
- Surviving spouse benefit.
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STOCHASTIC PROCESSES
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Wage:

\[ \ln w_{it} = W(\text{age}_{it}) + \varsigma I\{d_{it} = PT\} + \nu_{it} \]

where:

\[ \nu_i \sim N(0, \sigma_{\nu}^2) \]

For estimation purposes, \( \nu_{i0} \) is a fixed effect:

\[ \ln w_{it} = \nu_{i0} + W(\text{age}_{it}) + \varsigma I\{d_{it} = PT\} + \nu^{*}_{it} \]
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\[ \nu_{it} = \nu_{it-1} + \xi_{it} \]
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Wage:

\[ \ln w_{it} = \mathcal{W}(\text{age}_{it}) + \varsigma I\{d_{it} = PT\} + \nu_{it} \]

\[ \nu_{it} = \nu_{it-1} - \delta_R I(d_{it-1} = R) - \delta_{PT} I(d_{it-1} = PT) + \xi_{it} \]
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STOCHASTIC PROCESSES (contd.)
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\[ E(hc_t | age_t^m, age_t^f) = E(hc_t | age_t^m, age_t^f, hc > 0) P(hc_t > 0 | age_t^m, age_t^f) \]
STOCHASTIC PROCESSES (contd.)

\[ E(hc_t|age_t^m, age_t^f) = E(hc_t|age_t^m, age_t^f, hc > 0)P(hct > 0|age_t^m, age_t^f) \]

\[ \ln hc_t = h(age_t^m, age_t^f) + \psi_t, \]
STOCHASTIC PROCESSES (contd.)

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\]

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\]

\[
\psi \sim N(0, \sigma^2_\psi)
\]
STOCHASTIC PROCESSES (contd.)

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Survival:
Model

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Survival:

\[ s_{t+1}^j = s(age_t^j) \]
Model Solution


Extend framework in order to account for continuous decisions.

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Households choose a series of decision rules $\Pi = \{\pi_0, \pi_1, \ldots, \pi_T\}$, where $\pi_t(z_t, \varepsilon_t) = (d_t, s_t)$, to maximize:
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$$E_t \left\{ \sum_{i=t}^{T} \beta^{i-t} S_{i-t} U_t(\theta_1) \right\}$$
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The expectation is taken with respect to the controlled stochastic process $\{z_t, \varepsilon_t\}$ with probability distribution:
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The expectation is taken with respect to the controlled stochastic process $\{z_t, \varepsilon_t\}$ with probability distribution:

$$f(z_{t+1}, \varepsilon_{t+1}| d_t, s_t, z_t, \varepsilon_t, \theta_2, \theta_3) =$$
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The expectation is taken with respect to the controlled stochastic process $\{z_t, \varepsilon_t\}$ with probability distribution:

$$f(z_{t+1}, \varepsilon_{t+1}|d_t, s_t, z_t, \varepsilon_t, \theta_2, \theta_3) =$$

$$q(\varepsilon_{t+1}|z_{t+1}, \theta_2)g(z_{t+1}|z_t, d_t, s_t, \theta_3)$$
The Bellman equation can be written as:

\[ V_t(z_t, \varepsilon_t, \theta) = \max_d \left\{ \max_s \left\{ u(k, s_t, z_t, \theta_1) + \beta E_t V_{t+1}(z_{t+1}, k, s_t, \theta) \right\} \mid d_t = k \right\} + \varepsilon_t \]
The Bellman equation can be written as:

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\]

Inner maximization yields choice-specific value functions:
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\[ V_t(z_t, \varepsilon_t, \theta) = \max_{d_t} \left\{ \max_{s_t} \left\{ u(k, s_t, z_t, \theta_1) + \beta E_t V_{t+1}(z_{t+1}, k, s_t, \theta) | d_t = k \right\} + \varepsilon_t \right\} \]

Inner maximization yields choice-specific value functions:

\[ r(k, z_t, \theta) = \max_{s_t} \left\{ [u(k, s_t, z_t, \theta_1) + \beta E_t V_{t+1}(z_{t+1}, k, s_t, \theta)] | d_t = k \right\} \]
The Bellman equation can be written as:

\[ V_t(z_t, \varepsilon_t, \theta) = \max_{d_t} \left\{ \max_{s_t} \left\{ u(k, s_t, z_t, \theta_1) + \beta E_t V_{t+1}(z_{t+1}, k, s_t, \theta) \mid d_t = k \right\} + \varepsilon_t \right\} \]

Inner maximization yields choice-specific value functions:

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Outer maximization is random-utility model:

\[ \max_{d_t} \{ r(z_t, d_t, \theta) + \varepsilon_t(d_t) \} \]
Assumption: $\varepsilon$ follows multivariate extreme value distribution
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Conditional choice probabilities:
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Conditional choice probabilities:

$$P(k|z_t, \theta) = \frac{\exp\{r(z_t, k, \theta)\}}{\sum_{k \in D} \exp\{r(z_t, k, \theta)\}}$$
Vectors of parameters to be estimated: $\theta_1$ and $\theta_3$
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Estimation takes place in two stages:
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This yields $\hat{\theta}_3$. 
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Estimation takes place in two stages:

- **First stage:**
  
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Estimation takes place in two stages:

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- **Second stage:**
  Estimate $\theta_1$ using method of simulated moments.
Data

Health and Retirement Study (HRS)
- Panel data on households where at least one member is aged 51 to 61 in initial wave.
  - Extensive information on:
    - Wealth and Income
    - Health
    - Retirement
    - Demographics
  - HRS data can be linked to Social Security Administration records which provide information on covered earnings and benefits.
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Couple’s Joint Retirement Choices
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- For individuals with no private pension, Social Security provides main age-specific incentives for retirement.
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- The same is true for individuals with defined contribution pensions.

- Defined benefit pensions give very strong incentives for retirement at particular ages, usually different from the Social Security ages.
**Table: Preference and Wage Process Parameter Estimates**

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Couple’s Joint Retirement Choices
Figure: Simulated vs. actual age profiles for total participation, men.
Figure: Simulated vs. actual age profiles for total participation, women.
**Figure:** Simulated vs. actual age profiles for FT/PT participation, men.
Figure: Simulated vs. actual age profiles for FT/PT participation, women.
Figure: Simulated vs. actual retirement frequencies, men.
**Figure:** Simulated vs. actual retirement frequencies, women.
**Figure**: Simulated vs. actual joint retirement frequencies.

![Joint Retirement Frequencies. Actual vs. Simulated](image)
Figure: Simulated vs. actual joint retirement frequencies.
I develop a life-cycle model of couples’ choices which carefully models shared budget constraint and allows for leisure complementarities.
Conclusions

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- Results show that positive complementarity parameters explain 8% of joint retirements...
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▶ I develop a life-cycle model of couples’ choices which carefully models shared budget constraint and allows for leisure complementarities.

▶ Results show that positive complementarity parameters explain 8% of joint retirements...

▶ ...while social security’s spousal benefit accounts for another 13%.
Figure: Retirement frequencies for married men and women

- Men - N=2,818
- Women - N=2,339
Figure: Optimal participation choices as a function of $E^m$, $E^f$
Figure: Differences in retirement dates by age difference between spouses

- Agediff < 0, N = 247
- Agediff in [0,1], N = 382
- Agediff in [2,3], N = 397
- Agediff > 5, N = 359

Maria Casanova UCLA
Couple’s Joint Retirement Choices
Introduction

Leisure Complementarities

A significant fraction of spouses retires together. Hurd (1990), Blau (1998), Gustman and Steinmeier (2000) have shown that joint retirements of spouses with different ages may be partly explained by interactions in spouses' preferences. Complementarity of spouse's leisure: one (or both) spouses enjoy their leisure more if this is shared with their partner. Reduced-form studies provide evidence that spouses enjoy their retirement more if their partner is retired too. ◀ Coile (2004) ▶ Banks, Blundell and Casanova (2010) back
Leisure Complementarities

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Joint retirements of spouses with different ages may be partly explained by interactions in spouses’ preferences.
**Leisure Complementarities**


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