

The importance of modeling couples and singles

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Modeling couples and singles

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- Is **not just for those studying family economics or gender**
- Rather, it is **important for many more questions**

Why model couples and singles? Part 1

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 - Couples and singles might react differently to reform
 - Program rules affect primary and secondary earner differently

Why model couples and singles? Part 2

- Couples and singles behave differently (savings, labor supply...)

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- Couples and singles behave differently (savings, labor supply...)
- This heterogeneity might matter even for questions that do not target couples and singles differently

Turning to a couple of papers to make the point

- Borella, De Nardi, Yang (BDY) 2018
 - **What do we miss by ignoring couples and singles?**

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- Borella, De Nardi, Yang (BDY) 2018
 - **What do we miss by ignoring couples and singles?**
- De Nardi, French, Jones, and McGee (DFJM) 2024
 - **What do we learn by modeling couples and singles in retirement?**

Borella De Nardi Yang 2018

What do we miss by ignoring couples and singles?

Borella, De Nardi, Yang 2018

- What do many papers do?
- **Only use data on men (women are “complicated”)**
- **Do not model couples**

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- What do many papers do?
- **Only use data on men (women are “complicated”)**
- **Do not model couples**
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- **Could this possibly be a problem?**

Data and Methodology

- **Data**
 - PSID: working period
 - HRS: retirement period

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- **Methodology**
 - Pick the 1941-1945 birth cohort and follow it over their life cycle
 - **Document some key facts**
 - **Use a structural model to match key features of the data**
 - What can the model match?
 - What does the model imply?

Fraction of couples and single men and women by age

Age Group	25	35	45	55	65
Fraction of married women	0.43	0.42	0.40	0.39	0.37
Fraction of married men	0.43	0.46	0.44	0.43	0.44
Fraction single women	0.07	0.07	0.10	0.12	0.13
Fraction of single men	0.07	0.05	0.06	0.06	0.06

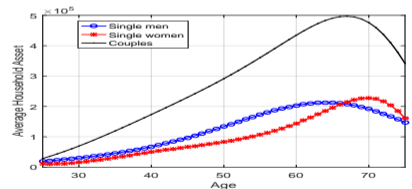
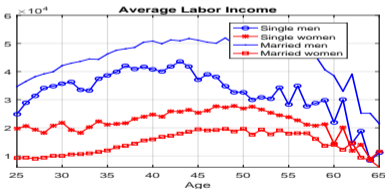
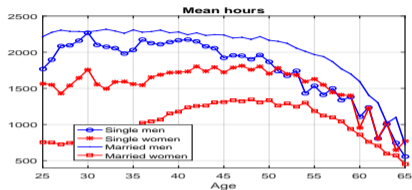
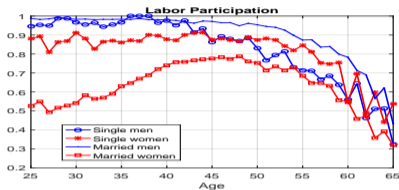
- **Single decision makers are a minority in the data**
- **Among people of working age, single men are only 6%**

Women and people in couples as a fraction of workers, hours, earnings

Age Group	25	35	45	55	65
Fract. women among workers	0.37	0.40	0.46	0.46	0.44
Fract. hours worked by women	0.28	0.31	0.39	0.40	0.40
Fract. earnings by women	0.24	0.22	0.30	0.27	0.27
Fract. in couples among workers	0.86	0.85	0.84	0.82	0.78
Fract. hours worked by couples	0.86	0.86	0.84	0.83	0.80
Fract. earnings by couples	0.88	0.87	0.86	0.87	0.85

- **Aggregates: large fraction of women and people in couples**

Heterogeneity in behavior over the life cycle



- Single and married men and women behave very differently

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- **Aggregates: large fraction of women and people in couples**
- **Behavior by gender and marital status is very heterogeneous**

BDY, 2018

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 - Labor market participation
 - Hours worked
 - Labor income
 - Net worth

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 - We ignore gender and couples in both model and data and only consider men
 - We use all data on both men and women
 - We use a simple model with couples and singles

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- **Check both aggregates and labor supply elasticities**
- **If we ignore something in our model, can we just drop it from the data?**

Compare the implications of three versions of a life-cycle model

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 - **Model:** single decision maker (labor supply and savings)
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 - **Model:** single decision maker (labor supply and savings)
 - **Calibration:** individual-level data on men and women
- **Economy 3: “Couples and singles”**
 - **Model:** Couples and singles. Everyone chooses labor. Spouses also save and consume jointly
 - **Calibration:** data for couples and single men and women

Model with both couples and singles

- Life cycle model

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 - Singles and people in couples can choose whether to work and hours
 - Fixed cost of working

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 - People are alive for sure
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 - Are either in a couple or single
 - Singles and people in couples can choose whether to work and hours
 - Fixed cost of working
- Retirement stage (t_r to T)
 - Exogenous probability of death. Thus, people in couples might lose their spouse.

Household preferences

- Discount factor: β .
- Singles:

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

- Couples:

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

- Labor participation cost (time cost): ϕ_t^{ij} .
- j = marital status, i = gender.

Recursive problem for working-age singles

$$W_t^{s,i}(a_t^i, \epsilon_t^i) = \max_{c_t, a_{t+1}, n_t} \left[v(c_t, 1 - n_t - \phi_t^{i,1} l_{n_t}) + \beta E_t W_{t+1}^{s,i}(a_{t+1}^i, \epsilon_{t+1}^i) \right]$$

$$Y_t = e_t^{i,j} \epsilon_t^i n_t \quad (1)$$

$$c_t + a_{t+1}^i = (1 + r)a_t^i + (1 - \tau_{SS})Y_t \quad (2)$$

$$a_t \geq 0, \quad n_t \geq 0, \quad \forall t \quad (3)$$

Recursive problem for working-age couples

$$W_t^c(a_t, \epsilon_t^1, \epsilon_t^2) = \max_{c_t, a_{t+1}, n_t^1, n_t^2} \left[w(c_t, 1 - n_t^1 - \phi_t^{1,2} l_{n_t^1}, 1 - n_t^2 - \phi_t^{2,2} l_{n_t^2}) + \beta E_t W_{t+1}^c(a_{t+1}, \epsilon_{t+1}^1, \epsilon_{t+1}^2) \right] \quad (4)$$

$$Y_t^i = e_t^{i,j} \epsilon_t^i n_t^i \quad i = 1, 2 \quad (5)$$

$$c_t + a_{t+1} = (1 + r)a_t + (1 - \tau_{SS})(Y_t^1 + Y_t^2) \quad (6)$$

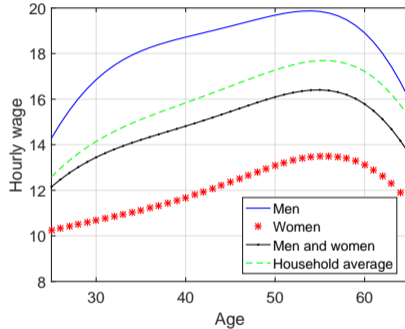
$$a_t \geq 0, \quad n_t^1, n_t^2 \geq 0, \quad \forall t \quad (7)$$

Exogenous parameters common across economies

Parameters		Value
r	Interest rate	4%
γ	risk aversion coefficient	2
τ_{SS}	Social Security tax rate on employees	3.8%

Table: Calibration of the interest rate, risk aversion, and Social Security tax rate

PSID: Wages over the life cycle (in \$1998)



- Different ways of using the data depending on the model and our strategy

Results

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 - Only heterogenous by age and realized earnings shocks
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 - Only labor supply and saving decisions of one decision maker
 - Calibrated using data on both men and women

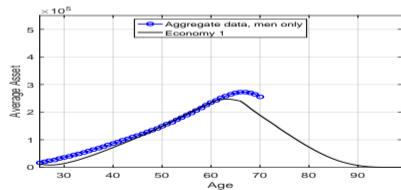
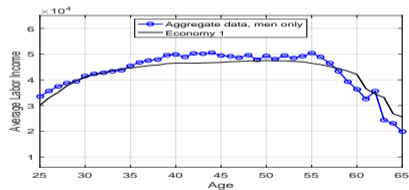
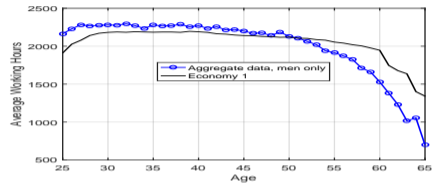
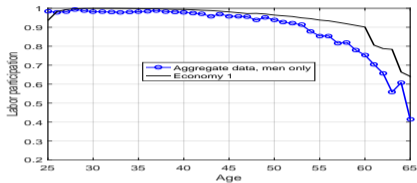
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- **Economy 3. Model:** Singles and couples. **Data:** men and women, each their own data
 - Heterogeneous by gender, marital status, wages, and life expectancy
 - Everyone can choose to supply labor, and spouses also save and consume jointly
 - Calibrated using data for married and single men and women

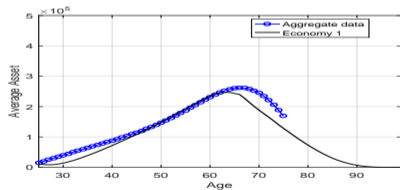
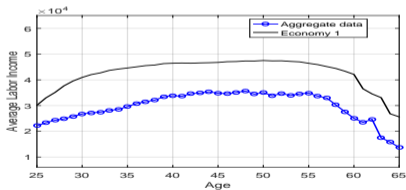
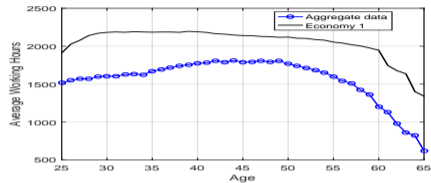
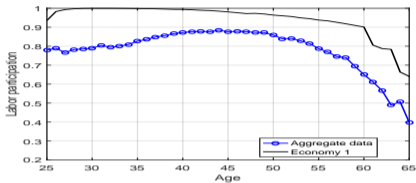
Economy 1

- Model: single decision maker
- Calibration: data on men only
- Calibrated parameters: discount factor, weight on consumption, participation cost, Social Security benefit
- Targets: SS budget balance, participation and average assets and hours at age 50

The singles economy, profiles fit



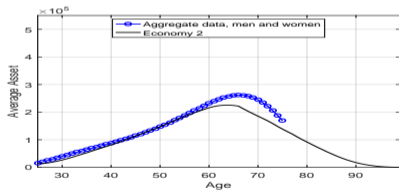
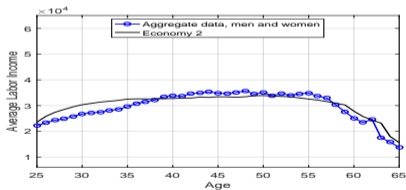
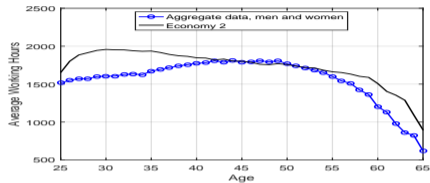
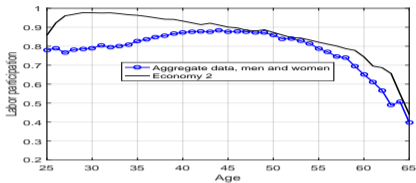
Economy 1: comparison with the aggregates



Economy 2

- Model: single decision maker
- Calibration: data on men and women together
- Calibrated parameters: discount factor, weight on consumption, participation cost, Social Security benefit
- Targets: SS budget balance, participation and average assets and hours at age 50

Aggregating up the profiles by gender and marital status



Economy 3

- Model: couples and singles
- Calibration: data on men and women

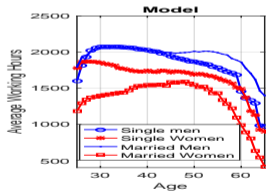
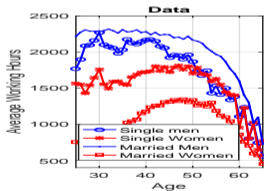
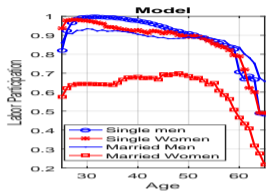
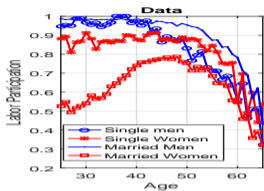
Economy 3

- Model: couples and singles
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- Targets: participation, hours, and savings for couples and singles, men and women
- Outcomes: Model fits profiles by subgroup quite well

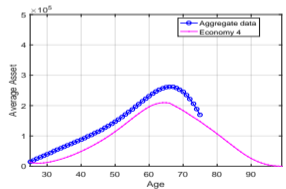
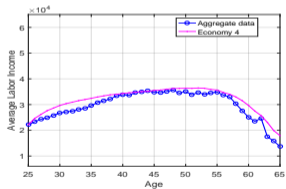
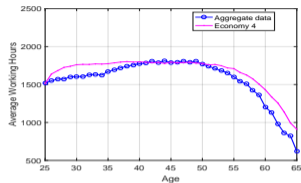
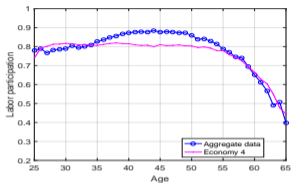
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- Calibrated parameters: discount factor, weight on consumption, participation cost (men, single women, and married women), Social Security benefit
- Targets: SS budget balance, participation and average hours (single and married men and women) at age 50 and average assets at 50 (couples, single men and women)

The couples and singles economy, profiles fit



Aggregating up the profiles by gender and marital status



Aggregating up the profiles, what have we learned?

- The economy with only men, calibrated using men
 - Overestimates participation by 10 percentage points
 - Overestimates average hours by about 500 hours
 - Overestimates average earnings by age
- Adding women in the calibration helps in fitting the aggregates.
- The couples economy does a much better job of fitting aggregate behavior by age

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Compensated elasticities by age (singles economies)

Age	Participation in economy		Hours in economy	
	1	2	1	2
30	0.01	0.25	0.49	1.13
40	0.06	0.58	0.47	1.59
50	0.24	0.53	0.73	1.75
60	0.36	2.68	0.74	1.87

- Economy 1 (data on men only) has the lowest elasticity
- Economy 2 (data on men and women) has higher elasticity

Compensated elasticity by age (couples economy)

	Participation					Hours				
	Single		Married		All	Single		Married		All
	M	W	M	W		M	W	M	W	
30	0.02	0.23	0.07	1.02	0.39	0.11	0.75	0.37	1.01	0.59
40	0.34	0.54	0.22	1.85	0.86	0.67	0.99	0.66	2.26	1.29
50	0.99	1.50	0.49	1.76	1.06	1.40	1.96	0.95	2.14	1.49
60	0.83	3.42	0.91	1.59	1.30	1.68	3.57	1.42	2.14	1.80

- Large heterogeneity in elasticities
- Larger elasticity for women

Conclusions from BDY 2018

- Most people are in couples and much labor market activity is done by women
- Dropping data on women and ignoring couples has consequences both in terms of aggregates and elasticities

Conclusions from BDY 2018

- Most people are in couples and much labor market activity is done by women
- Dropping data on women and ignoring couples has consequences both in terms of aggregates and elasticities
- Better to include data on both men and women
- Even better to model them

De Nardi, French, Jones, McGee 2024

What do we learn by modeling couples and singles during retirement?

De Nardi, French, Jones, McGee (DFJM) 2024

- Can we better understand retirement savings by modeling couples and singles?

De Nardi, French, Jones, McGee (DFJM) 2024

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- Role of bequest motives?
- Role of medical expenses?

Data and novelty

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- Households heads age 72 or older in 1996, data every 2 years until 2016

Data and novelty

- AHEAD Cohort of the HRS
- Households heads age 72 or older in 1996, data every 2 years until 2016
- Model “side bequests”: bequests distributed at death of first spouse
- Detailed information from “exit interviews”
 - Estates
 - End-of-life expenses
 - Wealth transfers to spouse+other heirs

Facts about savings during retirement

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- Higher-income couples accumulate wealth for much of the retirement period
- Wealth drops \$160,000 around first spousal death. Medical spending jumps \$27,000
- Transfers to non-spousal heirs average \$79,000

Model Overview

- Family structure: couples and singles. They consume, save, and leave bequests

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- Bequest motives
 - When first household member dies
 - When last one dies

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- Medical spending
 - End-of-life expenses
- Health and longevity: Rich, married, healthy live longer

Two-step Estimation Strategy

- First step: estimate parameters of income, health, mortality, and medical expense processes.
- Second step: choose preference parameters and consumption floor using the method of simulated moments (MSM) to match
 - Wealth and Medicaid

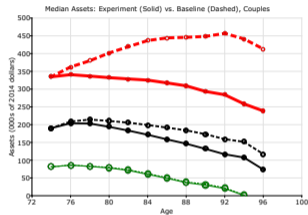
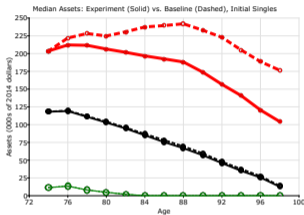
Model Fit and Validation

- Model fits targets well: wealth holdings and Medicaid
- Model also fits well other key moments at death of first spouse: jump in medical expenses, side bequests, and drops in wealth

Understanding Savings Motives

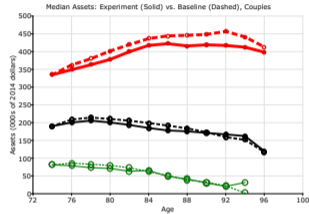
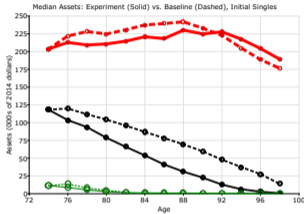
- Experiments: **re-solve and re-simulate model**
 1. Eliminate bequest motives
 2. Set medical spending to zero
 3. No medical spending and no bequest motives
- **Fix** age-74 distribution of **state variables, utility parameters**

What is the Role of Bequest Motives?



- Singles: bequest motives more important for high income
- Couples: important for middle income as well
- ⇒ Bequest motives more important for couples than singles

What is the Role of Medical Spending?



- Singles: medical spending most important for middle income
- Couples: less important
- ⇒ Medical expenses more important reason to save for singles than couples

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- We establish the following facts
 - Singles decumulate wealth as they age
 - Couples accumulate wealth as they age
 - Wealth drops significantly at the death of a spouse

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- We establish the following facts
 - Singles decumulate wealth as they age
 - Couples accumulate wealth as they age
 - Wealth drops significantly at the death of a spouse
- Estimate a rich model of savings and find that
 - Medical expenses key reason to save for low- and middle-income singles
 - Bequest motives key for richer couples and singles
 - Overall, most retirement wealth is kept for bequest motives, but interaction with medical expenses is important

Conclusions

- Studying couples and singles allows us to also better understand aggregate savings, including during retirement
- Modeling both singles and couples is important for many questions, not only to understand policies that target them differently