

# UNDERSTANDING THE RISE IN LABOR SUPPLY OF OLDER WORKERS IN THE UNITED STATES

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## Introduction

### Motivation

- The labor supply of older workers in the United States has been rising dramatically during the last several decades. Data from the Current Population Survey (CPS) show that between 1995 and 2015:
  - labor force participation rates of men aged 65-70 increased 11 pp.
  - annual working hours increased by 23%.
- The Social Security rules in the U.S. underwent some important changes:
  - the normal retirement age (NRA) gradually increased from 65 to 67 for the recent birth cohorts.
  - the Social Security earnings test was removed beyond the NRA for those 65 and older starting from 2000.

### Question Why are older workers working more in the United States?

- Focus on two cohorts: The 1930s and 1950s .
- Develop and estimate a rich dynamic life-cycle model of labor supply and retirement for male household heads who were born in the 1930s.
- Use the estimated model to analyze the effects of the changes in Social Security rules on the increase in the labor supply at older ages between the cohort born in the 1930s and the one born in the 1950s

## A Dynamic Life-Cycle Model

- Based on French (2005), which takes into account intergenerational transfers and the structure of the Social Security and pension systems.
- I incorporate key features of the Social Security disability insurance, health and age dependent medical expenses, and time-varying taxes rates.
- Time is discrete and one period is one year long. Individuals are finitely lived up to a maximum age  $T$ . Male household head chooses the consumption, labor supply, and Social Security benefits application (if eligible) to maximize expected lifetime utility.

- Preference:  $u(c_t, l_t) = \frac{1}{1-\nu} (c_t^\gamma l_t^{1-\gamma})^{1-\nu}$

$$l_t = L - n_t - \theta_p^{h_t} p_t - \phi I_{\{h_t=bad\}}, \quad h_t \in \{good, bad\}$$

- Budget Constraint:

$$a_{t+1} = a_t + \underbrace{y(ra_t + w_t n_t + y s_t + p b_t, \tau)}_{\text{Post-tax income}} + (b_t * s s_t) + (d_t * d b_t) + t r_t - m_t - c_t$$

- Exogenous shocks:

- Health status:  $\pi_{good,bad,t+1} = \text{prob}(h_{t+1} = \text{good} \mid h_t = \text{bad}, t + 1)$
- Survival probability:  $s_{t+1} = s(h_t, t + 1)$
- Wage rate:  $\ln w_t = W(h_t, t) + A R_t, \quad A R_t = \rho A R_{t-1} + \eta_t, \quad \eta_t \sim N(0, \sigma^2)$
- Out-of-pocket medical expenditure:  $m_t = M(h_t, t)$

- Recursive formulation:

$$V_t(X_t) = \max_{c_t, n_t, b_t} \{u(c_t, l_t) + \beta s_{t+1} E_t[V_{t+1}(X_{t+1})] + \beta(1 - s_{t+1})b(a_t)\}$$

- Bequest function:  $b(a_t) = \theta_b \frac{(a_t + \kappa)^{1-\nu}}{1-\nu}$ , follows De Nardi (2004)
- State variables:  $X_t = (a_t, w_t, b_t, h_t, d_t, AIME_t)$

## Estimation Strategy and Results:

Two-step Method of Simulated Moments (MSM) estimation strategy.

- Estimate (or calibrate using existing evidence) those parameters that can be cleanly identified outside of the model.

Tab. 1: First Step Parameters Summary.

Parameter	Description	Source
$\tau$	Income tax structure	Borella, De Nardi and Yang (2019)
$r$	Interest rate	French (2005)
$\rho$	Autoregressive coefficient of wages	PSID
$\sigma_\rho^2$	Variance of innovation in wages	PSID
$\underline{c}$	Consumption floor	French and Jones (2011)
$W(\cdot)$	Deterministic wage profile	PSID
$ys(\cdot)$	Spousal earnings profile	PSID
$ss(\cdot)$	Social Security benefit	SSA
$db(\cdot)$	SS Disability Insurance	SSA
$pb(\cdot)$	Pension benefit	French (2005)
$m(\cdot)$	Medical expense	MEPS
$s(\cdot)$	Survival probabilities	PSID
$\text{prob}(h_{t+1})$	Health status	PSID

- Data: Panel Study of Income Dynamics (PSID) 1968-2015; Medical Expenditure Panel Survey (MEPS) 1995-2012.
- Social Security (SS) benefits calculation: Social Security Administration; AIME  $\Rightarrow$  PIA + Age claiming SS benefits.

- Using GMM technique to estimate the remaining preference parameters

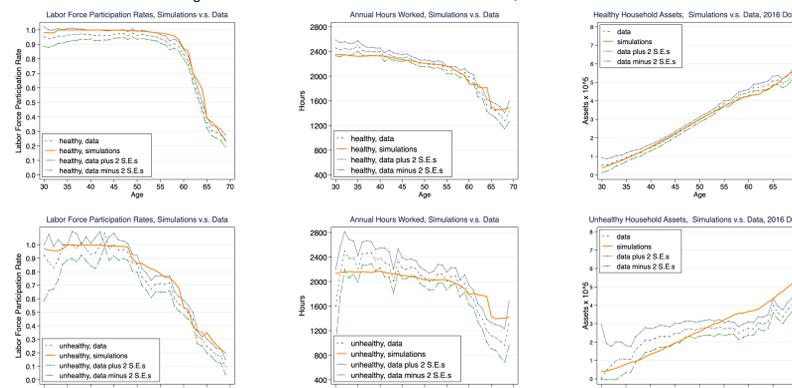
Tab. 2: Preference Parameter Estimates.

Parameter	Description	Value	S.E.
$\gamma$	Consumption weight	0.4859	0.0057
$\nu$	CRRRA for flow utility	3.8261	0.0811
$\beta$	Time discount factor	0.9877	0.0032
$L$	Leisure endowment	5279.2	68.1490
$\theta_p^{Good}$	Fixed cost of work, healthy	677.01	9.8023
$\theta_p^{Bad}$	Fixed cost of work, unhealthy	769.52	11.95
$\phi$	Hours of leisure lost, bad health	145.83	6.9852
$\theta_B$	Bequest weight	0.0483	0.0002
$\kappa$	Curvature of the bequest	228k	6k

matching following life-cycle data profiles:

- Labor force participation profiles by health status
- Hours worked profiles by health status
- Mean household assets profiles by health status

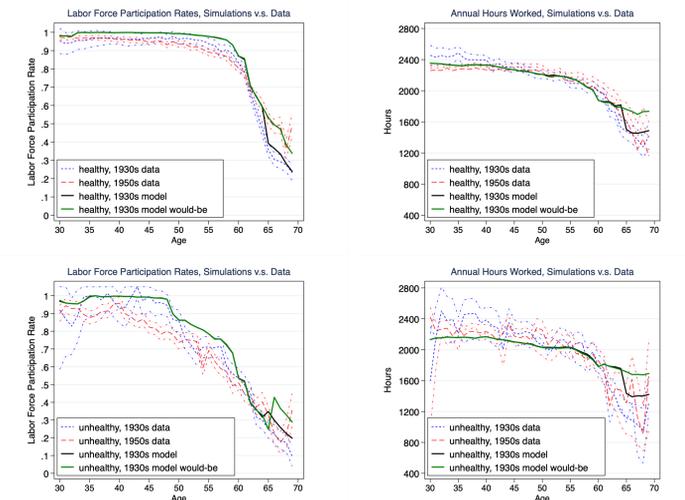
Fig. 1: Simulation Profiles v.s. Estimation Profiles, The 1930s Cohort.



## Effects of Changes in SS Rules

Given the success of my estimated model in fitting the observed profiles of labor supply and savings over the life cycle for the 1930s cohort, I then give the changed Social Security retirement rules faced by the 1950s cohort to the estimated model for the 1930s cohort.

Fig. 2: Effect of eliminating the SS earnings test beyond the NRA



Blue dash lines: the 1930s data profiles with 95% C.I.; Red dash lines: the 1950s data profiles with 95% C.I.

Black solid lines: the 1930s model-generated profiles.

Green solid lines: the 1930s would-be profiles after eliminating the SS earnings test beyond the NRA.

The elimination of the Social Security earnings test beyond the NRA explains the most observed rises in the labor supply at older ages across cohorts, both in terms of participation and working hours.

## Conclusion

- This paper explains the observed changes in the labor supply and retirement behavior across different cohorts using a structural model.
- My model is able to predict individuals' responses to work, retirement, and savings decisions to several policy reforms.
- Future work: use my model to evaluate the behavior responses to SS reforms and their welfare effects.
  - Eliminate the SS earnings test beyond the ERA
  - Change the formula converting earnings history to the PIA
  - Postpone the ERA and NRA

## References

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