Recessions, Social Security and Retirement

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Introduction

- Social Security accounts for more than 50% of income for 2/3 of retirees, almost 100% of income for 1/3 of elderly households
- 3 main incentives affect retirement decision
  - Substitution effect: year of work $\uparrow \Rightarrow$ tax contribution $\uparrow$, benefits $\uparrow$ or $\downarrow \Rightarrow$ LF participation $\uparrow$ or $\downarrow$
  - Wealth effect: assuming leisure is normal good, $\uparrow$ SS benefit $\Rightarrow$ LF participation $\downarrow$
  - Liquidity effect: cannot borrow against SS $\Rightarrow$ LF participation $\uparrow$ or $\downarrow$
- **This project:** Model retirement decision to conduct policy experiments such as shift in NRA

Overview

- Question: **what is the effect of Social Security benefit on labor supply of older workers?**
- Approach:
  1. Empirical model to estimate intensive and extensive margin of older workers' labor supply
     - SS benefit is a function of year of birth
     - RDD: exploit the discontinuous relationship between date of birth and benefits at the boundary (Jan 2 vs. Jan 1)
  2. Structural model to understand mechanism through which labor supply responds to changes in SS pension rules; policy experiments
- Results (using public data):
  - Labor supply responds to changes in SS benefits

Motivation: how does SS work?

$$Benefit_i = PIA_i^{b} \times DRC^{b} \times \prod_{j=b+62}^{t} COLA_j$$

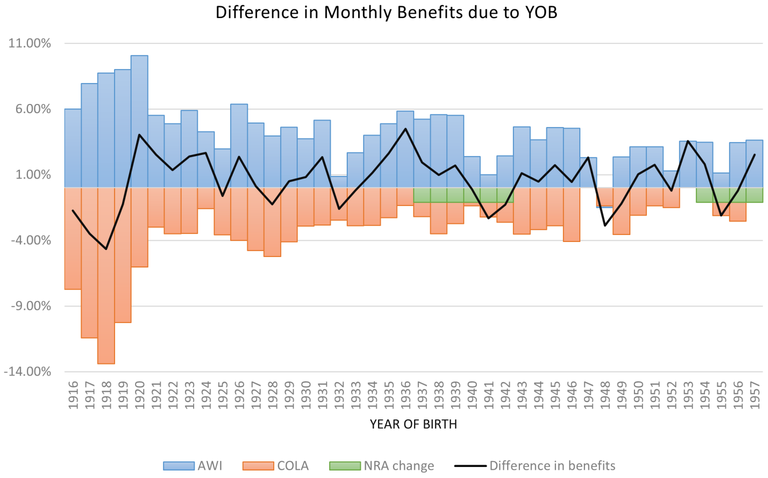
where

- PIA (Primary Insurance Amount) - benefit amount if retire at NRA; depends on lifetime earnings and economy wage at age of 60
- DRC (Delayed Retirement Credit) - depends on benefit claiming date; amount was changing over time for several cohorts
- COLA (Cost-of-living Adjustment) - inflation adjustment, applied only after age of 62

Details

Motivation: How important is YOB?

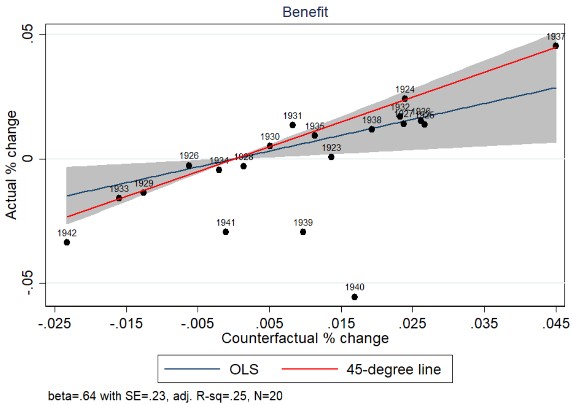
- Consider 2 workers:
  - Alice born in Jan of year b, Bob born in Dec of year $b-1$
  - Alice and Bob have identical history of earnings, retire at same age



Data

1. **SS public use files:** SSA public benefit file + SSA public earnings file
   - Sample: 1% anonymized extract from SSA records that provides year of birth, sex, benefit amount for the year 2004, annual wages from 1951 to 2003
   - Focus on people born in 1922 or later, who receive only retirement benefits based on AIME (no spouse benefits, no dual benefits) yields 193,214 individuals
2. **Health and Retirement Survey:** nationally representative bi-annual panel survey of Americans aged 50+ and their spouses (starting from cohort of 1931)
   - Contains variables associated with retirement such as self-reported retirement date, hours worked per week, retirement income including SS and demographic characteristics
   - Can be linked to SS earnings history: access pending

SSA EPUF Data: Actual vs. Counterfactual Changes



- y-axis: annual % difference in benefits between cohort b and $b-1$
- x-axis: counterfactual % difference implied by SS benefit formula assuming two identical earners born in b and $b-1$
  - SS formula explains significant portion of cohort benefit differences

Public Data: Effect of SS Benefit on Labor Supply

$$\text{Total Income} = \underbrace{\{\text{Average Income}|\text{Income}>0\}}_{\text{intensive margin}} \times \underbrace{\{\#\text{ of years with Income}>0\}}_{\text{extensive margin}}$$

$$log(Y_i) = \alpha + \beta log(Ben_i) + \gamma \mathbb{1}\{male\}_i + \sum_{j=1}^{10} \delta_j \mathbb{1}\{Inc_i \in bin_j\} + \varepsilon_i \quad (1)$$

- Y_i - dependent variable: Total Income, Average Income if Income > 0, $\#$ of years with Income > 0 between ages 61 and 70
- Ben_i - i's SS benefit
- $\mathbb{1}\{male\}_i$ - equals 1 if i is a male
- $\mathbb{1}\{Inc_i \in bin_j\}$ - equals 1 if i total earnings between ages 56 and 60 belong to the income decile j

- All dollar figures are in real 2012 dollars
- Instrument Ben_i by YOB dummy

$$log(Y_i) = \alpha + \beta log(Ben_i) + \gamma \mathbb{1}\{male\}_i + \sum_{j=1}^{10} \delta_j \mathbb{1}\{Inc_i \in bin_j\} + \varepsilon_i$$

Y	Total Inc		Average Inc		# of yrs with Inc > 0	
	(1)	(2)	(3)	(4)	(5)	(6)
$log(Ben)$	-0.112	-0.601**	-0.812***	-0.827***	0.700***	0.225
	(0.246)	(0.282)	(0.220)	(0.210)	(0.117)	(0.144)
$\mathbb{1}\{male\}$	0.223**	-0.030	0.451***	0.040	-0.228***	-0.070**
	(0.076)	(0.049)	(0.067)	(0.037)	(0.036)	(0.025)
past inc controls	no	yes	no	yes	no	yes
FS F_{st}	20.22	25.04	20.22	25.04	20.22	25.04
FS R^2	0.12	0.54	0.12	0.54	0.12	0.54

$N = 77,545$, standard errors in parentheses
$^{*} p < 0.10, ^{**} p < 0.05, ^{***} p < 0.01$

- Elasticity of earnings with respect to the benefits is -0.6
- Labor supply is responsive on intensive margin: elasticity of average earnings is -0.8

Additional Control: Business Cycle Around Retirement

- Estimates are unbiased if excluded determinants of labor supply are uncorrelated with YOB
- Labor market conditions around retirement affect decision to retire
  - add $u_{i,R-1}$ to the list of controls - aggregate unemployment rate in a year before i's retirement
- Measures of R
  1. Age of benefit claiming
  2. Age at which $w_{it} > 0$ switches to $w_{it} = 0$ and does not increase
  3. Age at which $w_{it} \geq 2,500$ switches to $w_{it} < 2,500$ and does not increase

$$log(Y_i) = \alpha + \beta log(Ben_i) + \gamma \mathbb{1}\{male\}_i + \sum_{j=1}^{10} \delta_j \mathbb{1}\{Inc_i \in bin_j\} + \zeta u_{i,R-1} + \varepsilon_i$$

Y	Total Inc	Average Inc	# of yrs with Inc > 0	1-PR
	(1)	(2)	(3)	(4)
	Measure of R: Claiming Age, N=77,545			
$log(Ben)$	-0.280	-1.167***	0.887***	-0.516***
	(0.203)	(0.170)	(0.118)	(0.054)
	Measure of R: Age at which $\{w_{it} = 0\}$, N=58,265			
$log(Ben)$	-1.385***	-0.101	-1.284***	0.624***
	(0.267)	(0.185)	(0.159)	(0.070)
	Measure of R: Age at which $\{w_{it} < 2500\}$, N=62,274			
$log(Ben)$	-2.305***	-1.056***	-1.248***	0.598***
	(0.291)	(0.206)	(0.158)	(0.070)

Standard errors in parentheses
$^{*} p < 0.10, ^{**} p < 0.05, ^{***} p < 0.01$

- Labor supply is responsive on extensive margin: 1 st. dev. benefits ↑ is associated with retiring ≈ 2.4 years earlier

SSA data: Effect of SS Benefit on Labor Supply

$$\text{Total Income} = \underbrace{\{\text{Average Income}|\text{Income}{>}0\}}_{\text{intensive margin}} \times \underbrace{\{\#\text{ of years with Income}{>}0\}}_{\text{extensive margin}}$$

$$log(Y_i) = \alpha + \beta log(Ben_i) + \gamma RA_i + \delta u_{i,R-1} + \zeta RA_i \times u_{i,R-1} + \sum_{j=1}^{5} \eta_j \mathbb{1}\{Inc_i \in bin_j\} + X_i \Gamma + \varepsilon_i$$

- Y_i - dependent variable: Total Income, Average Income if Income > 0, $\#$ of years with Income > 0 between ages 61 and 70
- Ben_i - sum of i's SS benefit between ages 61 and 70
- RA_i - i's retirement age (age at which earnings decline to less than 50% of lifetime maximum annual earnings)
- $u_{i,R-1}$ -unemployment in the year before i's retirement
- X_i - i's gender, race, education level, lifetime earnings at age 55
- $\mathbb{1}\{Inc_i \in bin_j\}$ - income quintile dummy

$$log(Y_i) = \alpha + \beta log(Ben_i) + \gamma RA_i + \delta u_{i,R-1} + \zeta RA_i \times u_{i,R-1} + \sum_{j=1}^{5} \eta_j \mathbb{1}\{Inc_i \in bin_j\} + X_i \Gamma + \varepsilon_i$$

- All dollar figures are in real 1984 dollars, except benefits
- Instrument Ben_i by YOB and MOB dummies
- SE are clustered on DOB level

Y	Total Inc	Average Inc	# of yrs with Inc > 0
	(1)	(2)	(3)
$log(Ben_i)$	-0.751***	-0.572***	-0.192***
	(0.177)	(0.143)	(0.048)
$u_{i,R-1}$	-1.336***	-0.325*	0
	(0.222)	(0.170)	(0.013)
$RA_i \times u_{i,R-1}$	0.020***	0.005**	0.0004***
	(0.032)	(0.024)	(0.0001)

$N = 2,514$, standard errors in parentheses

$^{*} p < 0.10, ^{**} p < 0.05, ^{***} p < 0.01$

Conclusion and Next Steps

- **Conclusion:** labor supply is responsive to SS benefits
- Next step
  - Model with savings and uncertainty to conduct policy experiments such as shift in NRA

Motivation: how does SS work?

Step 1. Let w_{it} be earnings by i in year t

$$y_{it}^{b} = \begin{cases} w_{it}\frac{AWI_{b+60}}{AWI_t}, & t \leq b+60 \\ w_{it}, & t > b+60 \end{cases} \Rightarrow AIME_i^b = \frac{1}{35 \times 12} \sum_{t \in i\text{'s best 35 years}} y_{it}^{b}$$

Step 2. k_1^b, k_2^b - kink points: $k_1^b = 180\frac{AWI_{b+60}}{AWI_{1977}}, k_2^b = 1085\frac{AWI_{b+60}}{AWI_{1977}}$

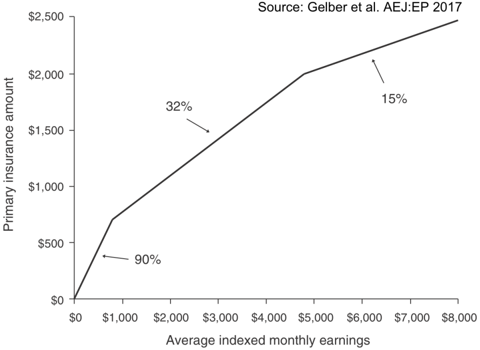


Figure 1. Primary Insurance Amount as a Function of Average Indexed Monthly Earnings

Step 3. COLA (wage inflation)

$$COLA_t = \max\left(\frac{CPI_t}{\max_{\tau<t} CPI_\tau}, 1\right)$$

Step 4 DRC (delayed retirement credit)

$$Benefit_{it} = PIA_i^b \times DRC^b \times \prod_{j=b+62}^{t} COLA_j$$

Back