Why Are Older Men Working More? The Role of Social Security

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Motivation Backup

Over the past several decades

- The labor supply of men aged 60-69 has been rising dramatically
  - Participation rates: 47% in 1995 $\rightarrow$ 57% in 2015
  - Annual hours per worker: 1,748 in 1995 $\rightarrow$ 1,909 in 2015
- Social Security rules have undergone several changes
  - Normal retirement age: 65 $\rightarrow$ 67 for the recent cohorts
  - Delayed retirement credits: 3% $\rightarrow$ 8% for new cohorts
  - Retirement earnings test: removed for workers older than the normal retirement age

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Question: To what extent do the past changes in the Social Security rules account for the rise in the labor supply of older workers?

What I Do

Two birth cohorts: the 1930s and 1950s, disaggregated by health status

1. Develop a structural model of labor supply, savings, and Social Security claiming that incorporates social insurance programs

2. Estimate model to match observed life-cycle profiles of labor force participation, hours per worker, and savings by health for the 1930s cohort

3. Study the role of past changes in Social Security rules on the rise in labor supply between two cohorts

4. Investigate the labor responses to these Social Security reforms by health status

What I Find

1. Changes in Social Security rules jointly explain most of the labor dynamics of older men
   - Over three-fourths of the observed increases in the labor force participation rates
   - Nearly 90% of the observed increases in annual hours per worker
   - Elimination of the earnings test beyond the normal retirement age contributes the most, driving over 70% of changes along both margins

2. New insights through the disability insurance margin:
   - The labor responses to the NRA and DRC reforms are smaller for unhealthy men
   - These disparities arise from the work disincentives provided by disability benefits
   - Disability insurance policy experiments highlight the strong labor responses for recipients before reaching the NRA

Related Literature

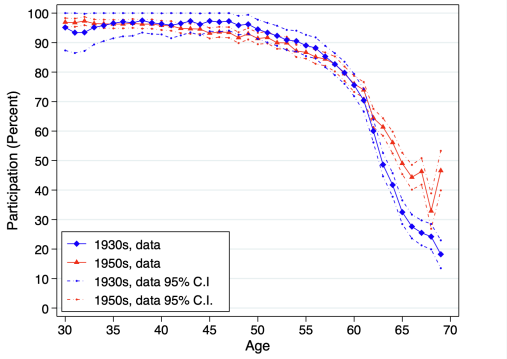
My paper: analyze contribution of Social Security (SS) changes across different cohorts on the observed changes in the labor supply of older men along both margins in a structural framework including disability insurance (DI)

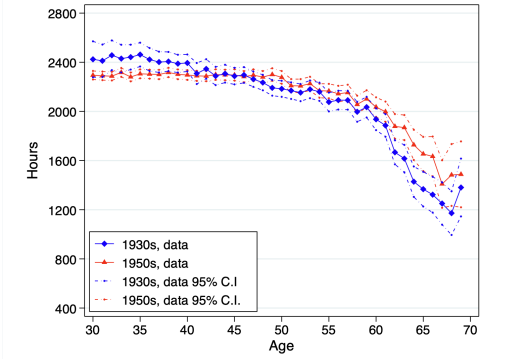
- Labor supply trends and impact of factors in a reduced form framework
  - Schirle (2008); Maestas and Zissimopoulos (2010); Rogerson and Wallenius (2021)
  - My contribution: the increases mainly result from people who were in good health; perform my analysis in the contribution of SS policy changes using a structural model
- Labor supply and retirement with social insurance programs using structural models
  - French (2005); French and Jones (2011); Braun et al. (2017); Li (2018); Fan et al. (2019)
  - My contribution: a richer model that includes heterogeneity in health and disability and DI benefits; provides new insights into the labor responses to SS reforms
- Changes across cohorts using structural models
  - Attanasio et al. (2008); Park (2018); Bairoliya (2019); Borella et al. (2019)
  - My contribution: demographic groups, other impact factor

Roadmap

- **Facts and Changes in Social Security Rules**
- Structural Model
- Estimation
- Effects of Changes in Social Security Rules
- Effects of Disability Insurance and Other Contributing Factors

Labor Supply: 1930s vs. 1950s; Data: PSID Backup

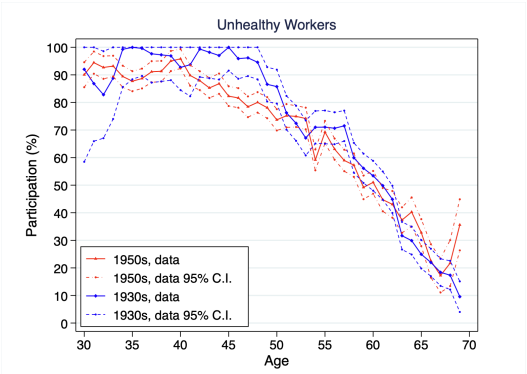




- Decline steeply after age 60 for both cohorts
- The 1950s cohort supplied more labor at ages 60-69

Participation by Health Status: 1930s vs. 1950s

Hours by workers



- The effects of health status on labor supply are sizable over the life cycle
- The increases mainly resulted from people who were in good health

Changes in Social Security Rules: 1930s vs. 1950s
Retirement Benefits

- Average Indexed Monthly Earnings (AIME): average income, highest 35 years of earnings
- Primary Insurance Amount (PIA): amount to be received, normal retirement age (NRA)
- Begin receiving benefits after the early retirement age (ERA) of 62
  - Benefits will be lower if claim at [ERA-NRA)
  - Benefits will be higher (by delayed retirement credit (DRC)) if claim at (NRA-70]
- Retirement earnings test (RET): Prevent workers from collecting retirement benefits while earning money
  - Before 2000, workers at [62-70] were subject to the RET
    Income tax rate: 50% at [62-NRA) and 33% at [NRA-70]
  - After 2000, workers at [62-NRA) are subject to the RET

Changes in Social Security Rules: 1930s vs. 1950s Table

Compared to the 1930s cohort, the 1950s cohort faced different Social Security rules

- NRA was postponed from 65 to 66
- DRC was raised from around 4.5% to 8%
- RET was eliminated for individuals at the NRA or older

			Effects of Applying for Benefits at Ages 62-70, % of PIA								
Cohort	NRA	DRC	62	63	64	65	66	67	68	69	70
1930s	**65**	**4.5%**	**80**	86.67	93.33	**100**	104.5	109	113.5	118	**122.5**
1950s	**66**	**8%**	**75**	80	86.67	93.33	**100**	108	116	124	**132**

Roadmap

- Facts and Changes in Social Security Rules
- **Structural Model**
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- Effects of Disability Insurance and Other Contributing Factors

Model

Innovation

- Model of male household heads
- Time is discrete. One period is one year long
  Enter the model at 25 and live up to the maximum age of 95
- Choice: consumption, labor supply (including participation and working hours), and SS benefits application (if eligible)
- Uncertainty: health and disability status, mortality risk, wages, and medical expenditure

Preference and Constraint

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

- $l_t = L - n_t - \theta_p^{h_t} p_t - \phi \mathbb{1}_{\{h_t \neq 0\}}$

  $\theta_p^{h_t}$ = fixed cost of working, ϕ = leisure loss from bad health

  $h \in \{0, 1, 2\} \rightarrow$ health $\in$ {good (healthy), bad, disabled (unhealthy)}

Budget Constraint: $a_{t+1} = a_t + Y_t(y_t, \tau_t, \tau_t^{ss}) + (b_t * ss_t) + db_t + tr_t - m_t - c_t$

- Disability benefits: $db_t = \pi^{db} PIA_t \mathbb{1}_{\{h_t=2\}} \mathbb{1}_{\{w_t n_t \leq y_{db}\}}$ if age $<$ *NRA*
- Pre-tax income: $y_t = ra_t + w_t n_t + ys_t + pb_t$
- Post-tax income: $Y_t(y_t, \tau_t, \tau_t^{ss}) = y_t - T_t(y_t, \tau_t) - T_t^{ss}(w_t n_t, \tau_t^{ss})$
- Borrowing constraint: $a_{t+1} \geq 0$
- Government transfers: $tr_t = \min\{0, \underline{c} + m_t - (a_t + Y_t + ss_t + db_t)\}$

Shocks and Value Function

Exogenous Shocks

- Health status: $\pi_{j,i,t+1} = Pr(h_{t+1} = j | h_t = i, t+1), \qquad i, j \in \{0, 1, 2\}$
- Survival probability: $s_{t+1} = s(h_t, t+1)$
- Wages: $\ln w_t = W(h_t, t) + \omega_t$
  $\omega_t = \rho \omega_{t-1} + \eta_t, \quad \eta_t \sim N(0, \sigma^2)$
- Out-of-pocket medical expenditure: $m_t = M(h_t, t)$

Recursive Formulation

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

- The state variables: $X_t = (a_t, w_t, h_t, b_{t-1}, aime_t)$
- Bequest function: $b(a_t) = \theta_b \frac{(a_t + \kappa)^{(1-\nu)}}{1-\nu}$

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Estimation Approach MSM Profiles

Two-step Method of Simulated Moments (MSM):

1. Estimate the parameters that can be identified outside of the model
   - Data: Panel Study of Income Dynamics (PSID);
     Medical Expenditure Panel Survey (MEPS)

2. Estimate the remaining model parameters using the GMM technique
   - Parameters to be estimated:

$$\Theta = (\gamma, \nu, \theta_p^{h=0}, \theta_p^{h=1,2}, \phi, L, \beta, \theta_b, \kappa)$$

   - Match for life-cycle labor force participation, hours per worker, household assets profiles by health status, over ages 30-69 (240 moment conditions)

Parameter	Description	Value	Source
	Income-Related Parameters		
$W(\cdot)$	Deterministic wages	text	PSID
ρ	Autoregressive coefficient	0.981	PSID
σ^2_ρ	Variance of innovation	0.0157	PSID
$ys(\cdot)$	Spousal earnings		PSID
	Mortality and Health Transitions		
s_{t+1}	Survival probabilities	text	PSID
$\pi_{h_t,h_{t-1},t}$	Health transitions	text	PSID
$m(\cdot)$	Out-of-pocket medical expenses	text	MEPS
	Fixed Parameters		
r	Real interest rate	4%	French (2005)
$\underline{c}$	Consumption floor	\$3,500	French and Jones (2011)
π^{db}	discount factor for average DI benefits	0.63	Low and Pistaferri (2015)

Table: First Step Parameters Summary (Part 1) back

Parameter	Description	Value		Source
	Tax Related Parameters			
τ_t, λ_t	Income tax structure	text		PSID
τ_t^{ss}	Payroll tax rate	text		SSA
$\bar{y}_t^{ss}$	Threshold, payroll tax			SSA
	Social Security Rules Related Parameters			
$aime_t$	SS wealth	text		SSA
ss_t	SS retirement benefits			SSA
db_t	SS disability benefits			SSA
$pb(\cdot)$	Pension benefit			French (2005)
	Retirement Earnings Test	62-NRA	NRA-69	
τ_{ret}	Tax rate	50%	33%	SSA
y_{ret}	Threshold	\$6,000	\$8,186	SSA

Table: First Step Parameters Summary (Part 2) back

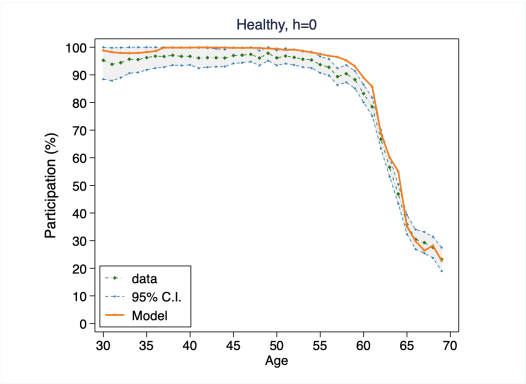
Estimation Results

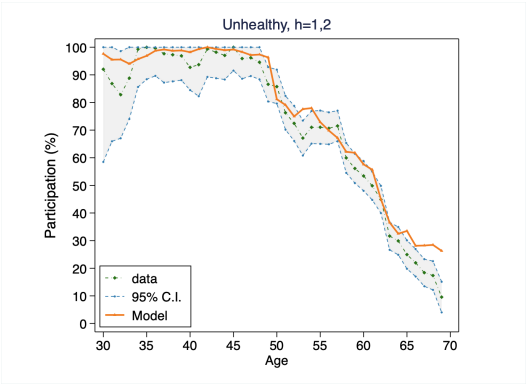
Elasticity

Table: Preference Parameter Estimates

Parameter	Definition	Estimates	S.E.
γ	Consumption weight	0.53	0.0039
ν	CRRA for flow utility	4.75	0.0560
β	Time discount factor	0.95	0.0031
L	Leisure endowment	5268	50.30
ϕ	Hours of leisure lost, unhealthy	105	6.31
$\theta_p^{h=0}$	Fixed cost of work, healthy	936	14.68
$\theta_p^{h=1,2}$	Fixed cost of work, unhealthy	755	14.87
θ_B	Bequest weight	0.039	0.0001
κ	Curvature of the bequest	45k	2k

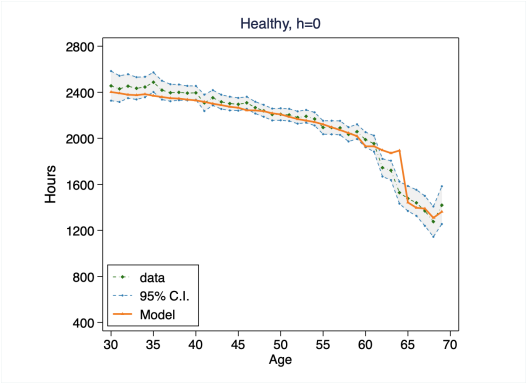
Targeted Moments - Participation

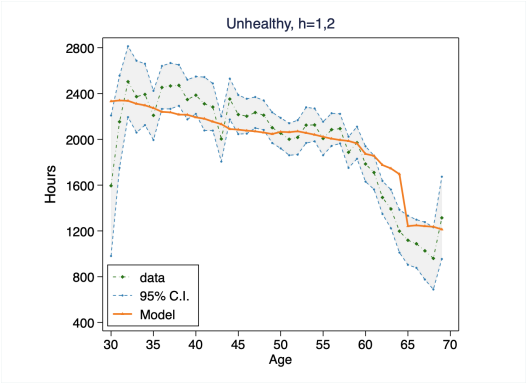




- Very good fits of participation, both for healthy and unhealthy
- Modeling disabled state and disability insurance is crucial

Targeted Moments - Hours Per Worker

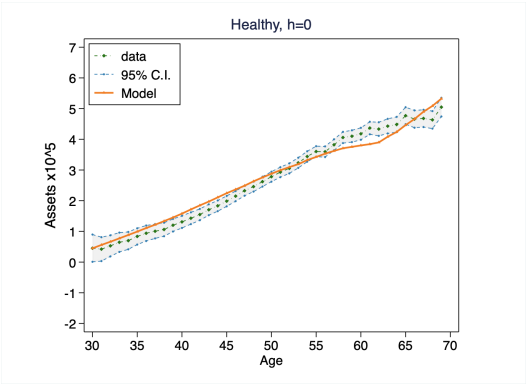


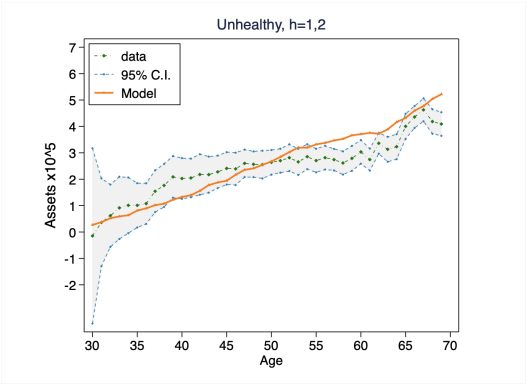


- Very good fits of hours worked, both for healthy and unhealthy
- Modeling disabled state and disability insurance is crucial

Targeted Moments - Assets

PEA Backup





- Matching assets by health status is important

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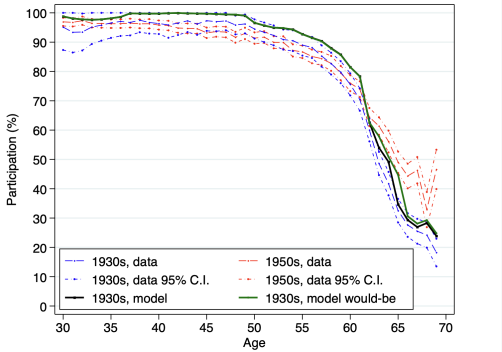
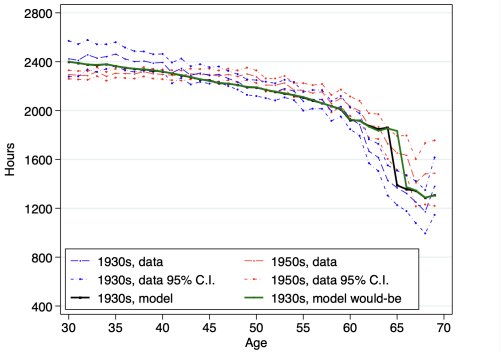
Effects of Changed SS Rules

- NRA was postponed from age 65 to age 66
- DRC was raised from around 4.5% to 8%
- RET was eliminated for individuals at the NRA or older

Effects of Changed SS Rules: NRA 65 → 66

- A decline in retirement benefits – modest labor effect





Effects of Changed SS Rules: NRA 65 $\rightarrow$ 66

- A decline in retirement benefits – modest labor effect
- Smaller labor force participation response for unhealthy men

	h=0	h≠0	h=1	h=2
60-69:	2.57	0.46	1.64	-0.90
60-64:	1.25	0.64	1.72	-0.50
65-69:	3.88	0.28	1.56	-1.30

Effects of Changed SS Rules: NRA 65 → 66

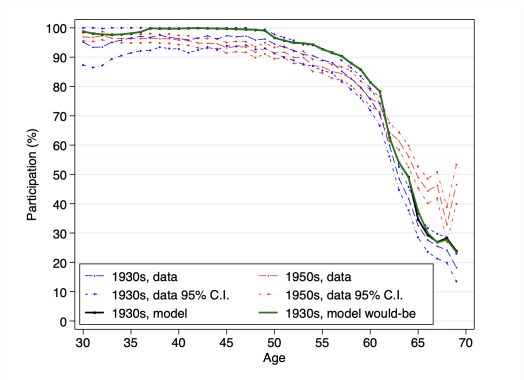
- A decline in retirement benefits – modest labor effect
- Smaller labor force participation response for unhealthy men (disabled people)
  - Disability benefits become more attractive prior to the new NRA

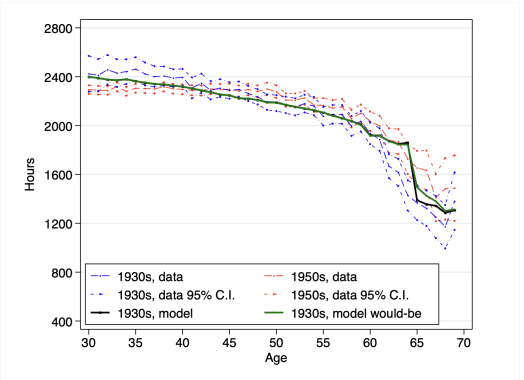
	h=0	h≠0	h=1	h=2
60-69:	2.57	0.46	1.64	-0.90
60-64:	1.25	0.64	1.72	-0.50
65-69:	3.88	0.28	1.56	-1.30

Effects of Changed SS Rules: DRC 4.5% → 8%

Backup

- Results in about 7% of individuals delaying benefit claims
- Labor effects mostly fall on the intensive margin





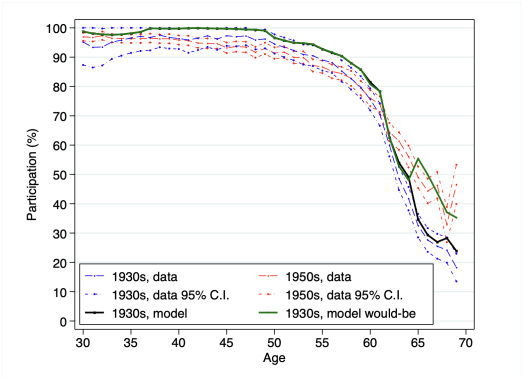
Effects of Changed SS Rules: DRC 4.5% → 8%

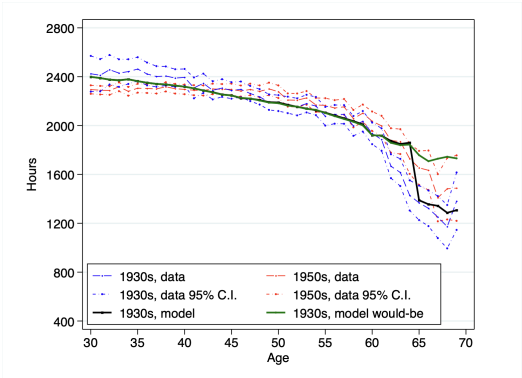
Backup

- Results in about 7% of individuals delaying benefit claims
- Labor effects mostly fall on the intensive margin
- Healthy individuals respond more to the DRC in participation

	h=0	h≠0	h=1	h=2
60-69:	0.33	-0.05	0.10	-0.20
60-64:	0.02	-0.19	0.21	-0.62
65-69:	0.65	0.10	-0.02	0.22

Effects of Changed SS Rules: Removing RET Beyond NRA





- Incentivize the elderly to claim benefits once they reach the NRA and work more thereafter
- More patient individuals respond less in benefit claiming and older-age labor supply
- Labor responses are similar across health groups

Effects of Changed SS Rules claiming

- Three changes jointly explain the majority of labor dynamics at older ages
  - 77.5% of the observed rise in labor force participation
  - 89.8% of the observed increase in hours per worker
- The elimination of the RET beyond the NRA is the main contributor
- Labor supply elasticities are high for men in their 60s →Large labor impact of SS

Roadmap

- Facts and Changes in Social Security Rules
- Structural Model
- Estimation
- Effects of Changes in Social Security Rules
- **Effects of Disability Insurance and Other Contributing Factors**

Effects of Disability Insurance

- Work disincentives provided by disability insurance (DI) lead to a smaller labor supply response to Social Security reforms for unhealthy individuals
- Important to employ a model that includes DI when evaluating policy reforms
  - Model without DI overestimates participation responses for unhealthy workers

Effects of Disability Insurance

- Model without DI overestimates participation responses for unhealthy workers

Model w/ DI	NRA 65 → 66		DRC 4.5% → 8%		RET 70 → 65	
	h=0	h≠0	h=0	h≠0	h=0	h≠0
60-69:	2.57	0.46	0.33	-0.05	8.56	5.14
60-64:	1.25	0.64	0.02	-0.19	-0.66	-0.40
65-69:	3.88	0.28	0.65	0.10	17.78	10.68

Model w/o DI	NRA 65 → 66		DRC 4.5% → 8%		RET 70 → 65	
	h=0	h≠0	h=0	h≠0	h=0	h≠0
60-69:	2.74	2.80	0.54	0.50	7.59	8.59
60-64:	1.12	2.01	-0.38	0.27	-1.02	-0.90
65-69:	4.37	3.59	1.47	0.73	16.20	18.80

Effects of Disability Insurance

- Work disincentives provided by disability insurance (DI) lead to a smaller labor supply response to Social Security reforms for unhealthy individuals
- Important to employ a model that includes DI when evaluating policy reforms
  - Model without DI overestimates participation responses for unhealthy workers
- The labor impact of altering DI program rules
  - Increasing the benefit receipt difficulty $\pi^{db}/2$
  - Raising the income threshold for qualification $y_{db} \times 2$
  - Addressing moral hazard concern within the program $db\mathbb{1}_{\{h \neq 2\}}$

The labor impact of altering DI program rules

- Doubling DI receipt difficulty or income thresholds significantly raises the participation rates of disabled individuals aged 50-64
- A higher threshold allows more DI recipients to work but restricts the ability to work longer hours, reducing hours per worker

	DI Receipts Difficulty $\pi^{db}/2$				Income Threshold $y_{db} \times 2$				Moral Hazard $db\mathbb{1}_{\{h\neq 2\}}$			
	h=0 (1)	h=1 (2)	h=2 (3)	All (4)	h=0 (5)	h=1 (6)	h=2 (7)	All (8)	h=0 (9)	h=1 (10)	h=2 (11)	All (12)
Change in Participation (p.p.)												
50-59:	-0.06	0.36	24.44	1.99	0.02	0.00	31.14	2.61	-0.08	-3.36	0.20	-0.45
60-64:	0.16	-0.08	18.92	2.31	0.09	0.04	22.02	2.61	-0.33	-9.40	0.06	-1.53
65-69:	-0.15	0.87	0.78	0.14	0.03	0.08	0.44	0.10	-0.03	-0.18	0.51	0.03
Change in Hours Worked (%)												
50-59:	-0.04	0.00	-1.96	-0.26	-0.01	0.02	-22.65	-1.49	0.05	-0.54	-0.08	0.00
60-64:	-0.05	-0.22	-3.95	-0.44	0.03	0.08	-25.94	-1.78	0.07	1.84	-0.13	0.37
65-69:	-0.40	-1.01	-0.68	-0.62	-0.25	-0.24	-0.53	-0.30	0.07	-0.16	0.01	0.01

The labor impact of altering DI program rules Backup

- The presence of moral hazard leads non-disabled workers to exit the labor market for benefit eligibility

	DI Receipts Difficulty $\pi^{db}/2$				Income Threshold $y_{db} \times 2$				Moral Hazard $db\mathbb{1}_{\{h\neq 2\}}$			
	h=0 (1)	h=1 (2)	h=2 (3)	All (4)	h=0 (5)	h=1 (6)	h=2 (7)	All (8)	h=0 (9)	h=1 (10)	h=2 (11)	All (12)
Change in Participation (p.p.)												
50-59:	-0.06	0.36	24.44	1.99	0.02	0.00	31.14	2.61	-0.08	-3.36	0.20	-0.45
60-64:	0.16	-0.08	18.92	2.31	0.09	0.04	22.02	2.61	-0.33	-9.40	0.06	-1.53
65-69:	-0.15	0.87	0.78	0.14	0.03	0.08	0.44	0.10	-0.03	-0.18	0.51	0.03
Change in Hours Worked (%)												
50-59:	-0.04	0.00	-1.96	-0.26	-0.01	0.02	-22.65	-1.49	0.05	-0.54	-0.08	0.00
60-64:	-0.05	-0.22	-3.95	-0.44	0.03	0.08	-25.94	-1.78	0.07	1.84	-0.13	0.37
65-69:	-0.40	-1.01	-0.68	-0.62	-0.25	-0.24	-0.53	-0.30	0.07	-0.16	0.01	0.01

Effects of Disability Insurance

- Work disincentives provided by disability insurance (DI) lead to a smaller labor supply response to Social Security reforms for unhealthy individuals
- Important to employ a model that includes DI when evaluating policy reforms
  - Model without DI overestimates participation responses for unhealthy workers
- The labor impact of altering DI program rules
  - Increasing the benefit receipt difficulty $\pi^{db}/2$
  - Raising the income threshold for qualification $y_{db} \times 2$
  - Addressing moral hazard concern within the program $db\mathbb{1}_{\{h\neq 2\}}$
- From a policy perspective, raising the DI income threshold or implementing stricter screening processes would increase labor supply before the NRA

Other Contributing Factors

- Reduced mortality rate
  - 60-69 participation ↑ 2.3 p.p. and claiming beyond the NRA ↑ 6.5 p.p.
  - Accounting for 21% of the labor dynamics
- Changed health dynamics Graph
  - 60-69 participation ↑ 0.7 p.p. and hours worked ↑ 2.4%
- Changed marginal tax rates: (e.g., Borella et al. (2019))
  - 60-69 participation ↑ 1.65 p.p.
- Effects of pension plans:
  - Bairoliya (2019): a 24% shift from Defined Benefit to Defined Contribution accounts for 14% of the increases in older-age participation
- Effects of occupation, education, and spousal employment status:
  - Cajner et al. (2021): play no statistically significant role in explaining the increase in participation of older men across cohorts

Conclusion

- Facts
  - The labor supply of older men increased from the 1930s to the 1950s cohort

    The increases mainly resulted from people who were in good health
  - Social Security rules faced by two cohorts changed: NRA, RET, DRC
- Develop and estimates a structural model
  - Fits the life-cycle profiles of the 1930s cohort well
  - Eliminating the RET beyond the NRA provided the greatest contribution to these increases
  - Labor response is smaller for unhealthy individuals due to the work disincentives provided by disability benefits before the NRA
- Highlight the importance of accounting for the impact of DI when evaluating policies addressing SS solvency issues

Thank You!

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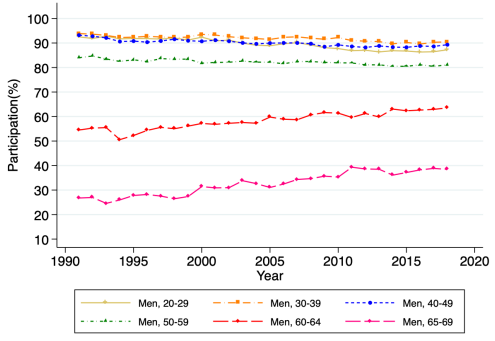
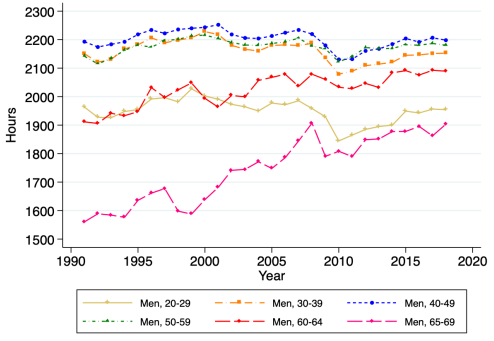
Labor Supply Trends of Men by Age Groups; Data: CPS

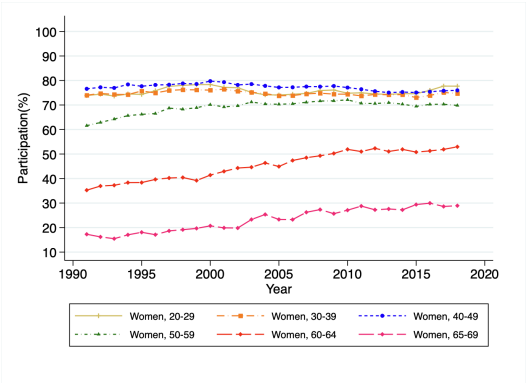
Back

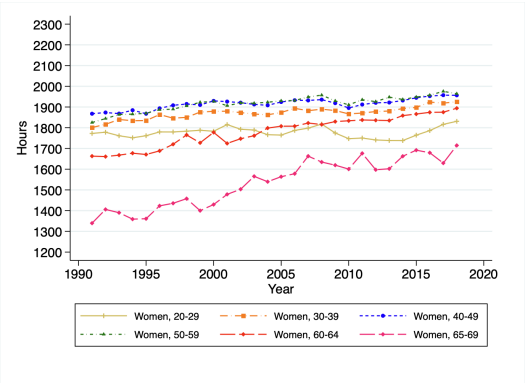




Labor Supply Trends of Women by Age Groups; Data: CPS

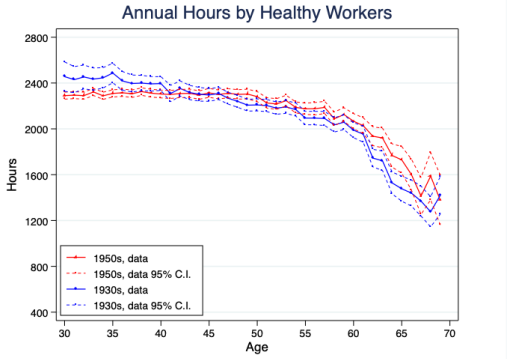
Back

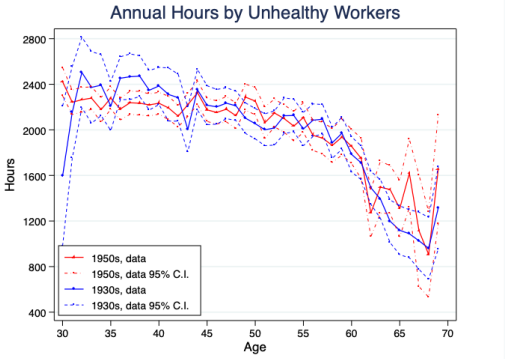




Hours per Worker by Health Status: 1930s vs. 1950s

Back





- The effects of health status on labor supply are sizable over the life cycle
- The increases mainly resulted from people who were in good health

Target Profiles

$$
\begin{aligned}
Z_{it} = f_i + & \sum_{k=1}^{T} B_{gk} I\{age_{it} = k\} \times I\{h_{it} = 0\} \\
& + \sum_{k=1}^{T} B_{bk} I\{age_{it} = k\} \times I\{h_{it} \neq 0\} \\
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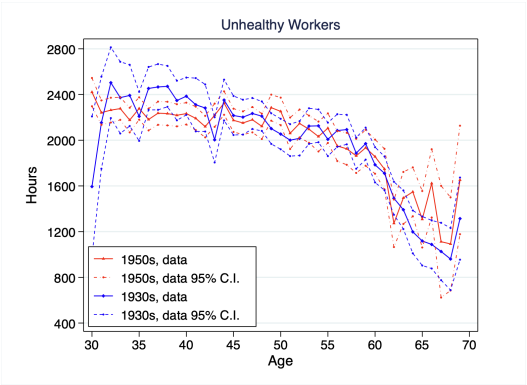
\end{aligned}
$$

Back

Hours per Worker by Health Status: 1930s vs. 1950s

Back



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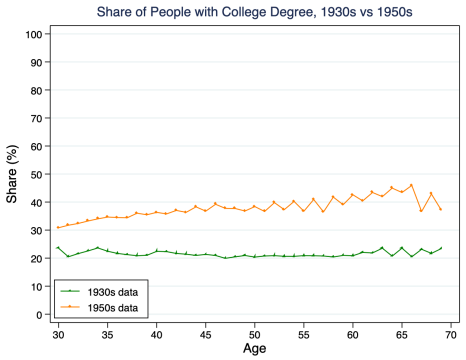
Education: 1930s vs. 1950s

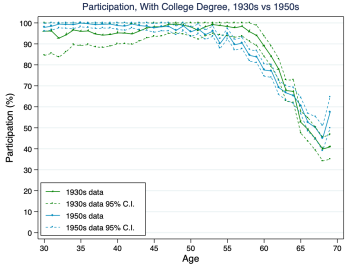
Back

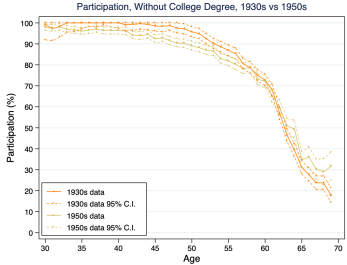


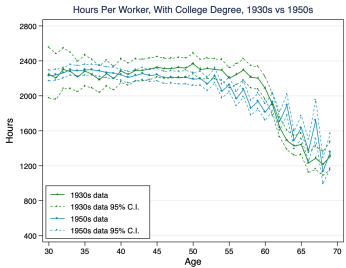
- 20 p.p. more with college degree

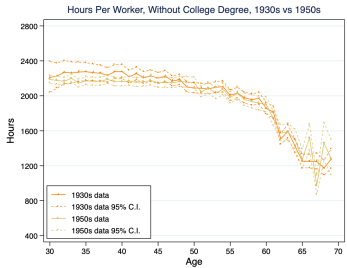
Labor Supply by Education: 1930s vs. 1950s

Back









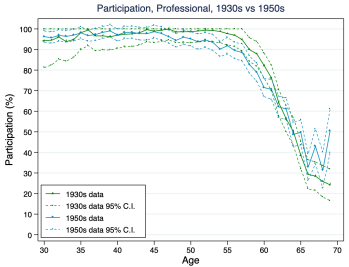
Occupation: 1930s vs. 1950s

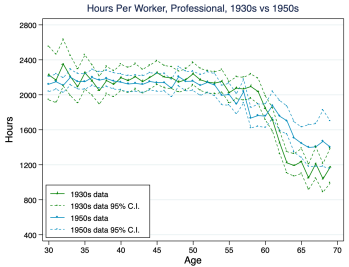
Back

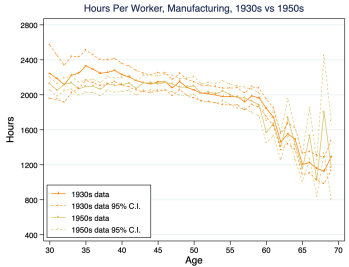
Occupation Category	Ages 60-70		Ages 30-70	
	1930s (%)	1950s (%)	1930s (%)	1950s (%)
1. Professional, technical and kindred workers	17.82	20.57	17.30	17.01
2. Managers, officials and proprietors	17.84	17.08	16.32	15.75
3. Self-employed businessmen	18.73	19.94	18.39	18.58
4. Clerical and sales workers	10.40	9.31	8.66	10.12
5. Craftsmen, foremen, and kindred workers	20.42	17.94	21.33	21.68
6. Operatives and kindred workers	10.76	10.81	13.40	12.87
7. Laborers and service workers, farm laborers	3.92	4.36	4.33	3.86
8. Farmers and farm managers	0.10	0.00	0.28	0.13

Labor Supply by Occupation: 1930s vs. 1950s

Back







Birth Year	NRA	DRC(%)	Birth Year	NRA	DRC(%)
1920-24	65	3	1940	65, 6 mo.	7
1925-26	65	3.5	1941	65, 8 mo.	7.5
1927-28	65	4	1942	65,10 mo.	7.5
1929-30	65	4.5	1943-54	66	8
1931-32	65	5	1955	66, 2 mo.	8
1933-34	65	5.5	1956	66, 4 mo.	8
1935-36	65	6	1957	66, 6 mo.	8
1937	65	6.5	1958	66, 8 mo.	8
1938	65, 2 mo.	6.5	1959	66, 10 mo.	8
1939	65, 4 mo.	7	1960	67	8

Back

Model - What's New

Back

- Framework is built on French (2005)
  - Labor supply and retirement; social insurance programs
  - uncertainty regarding health status (healthy vs. unhealthy)
- Disabled state and disability benefits
  - Distinguish between unhealthy individuals as either temporarily sick or disabled
  - Disabled and non-disabled people face different economic environments over their lifetime, e.g., disability benefits
- Out-of-pocket medical expenditure, depending on age and health
  - Unhealthy individuals need to spend much more on medical services over their lifespan (e.g., De Nardi et al. (2018))
- Time-varying sequence of income tax (Borella et al. (2019)) and payroll tax rates faced by a specific cohort at each age
  - Instead of using tax structures in one particular year (e.g., French and Jones, 2011)

Income tax rates (Borella et al. (2019)):

$$T_t(y_t, \tau_t) = (1 - \lambda_t y_t^{-\tau_t}) * y_t$$

Payroll tax rates (SSA):

$$T_t^{ss}(w_t n_t, \tau_t^{ss}) = \tau_t^{ss} * \min[w_t n_t,\ \bar{y}_t^{ss}]$$

Back

$$aime_{t+1} = \begin{cases} \max\{aime_t + \frac{w_t n_t}{35}, aime_{max}\} & \text{if age} < 60 \\ \max\{aime_t + \max\{0, \frac{w_t n_t - aime_t}{35}\}, aime_{max}\} & \text{if age} \geq 60 \end{cases}$$

$$\begin{aligned} PIA_t = & 0.9 * \min\{aime_t, aime_0\} \\ & + 0.32 * \min\{\max\{aime_t - aime_0, 0\}, aime_1 - aime_0\} \\ & + 0.15 * \max\{aime_t - aime_1, 0\} \end{aligned}$$

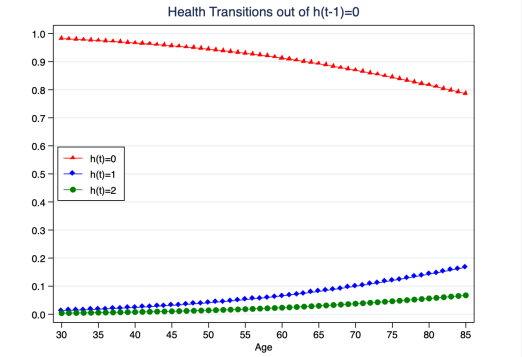
$$ss_t = \begin{cases} 0.8 * PIA_t & \text{if age at application} = \text{FRA-3} \\ 0.867 * PIA_t & \text{if age at application} = \text{FRA-2} \\ 0.933 * PIA_t & \text{if age at application} = \text{FRA-1} \\ PIA_t & \text{if age at application} = \text{FRA} \\ 1.03 * PIA_t & \text{if age at application} = \text{FRA+1} \end{cases}$$

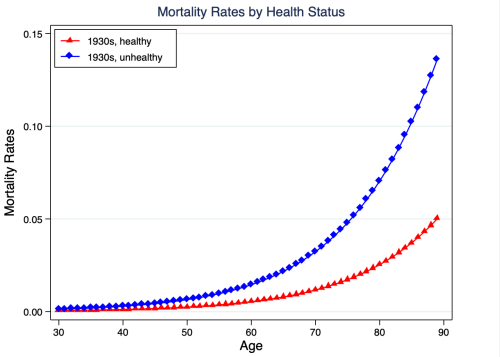
$$ss_t = \max\{0, ssb_t - \tau_{ret} * \max\{0, (w_t n_t - y_{ret})\}\} \quad \text{if age} < 70$$

Back

Health Transitions and Survival Rates by Health Status

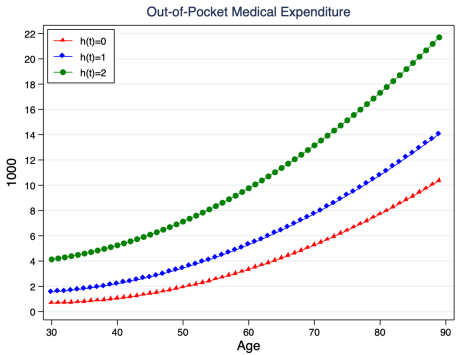
Back

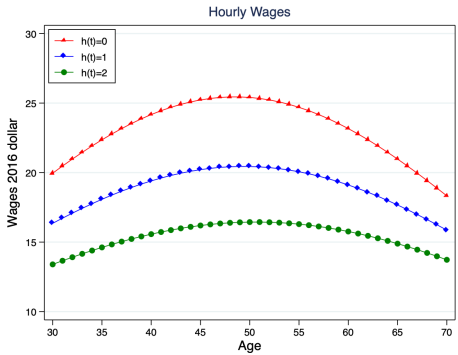




Hourly Wages and Medical Spending by Health Status

Back





Target Profiles

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& + \sum_{f=1}^{F} B_f \text{familysize}_{it} + B_u U_t + u_{it}
\end{aligned}
$$

Back

MSM

$$\hat{\Theta} = \arg\min_{\Theta} \frac{I}{1+\tau} \hat{\varphi}(\Theta;\chi)' \hat{\mathbf{W}}_I \hat{\varphi}(\Theta;\chi)$$

- τ = ratio of the number of observations to the number of simulated observations
- $\hat{\varphi}(\Theta;\chi)$ = $6\mathbb{T}$-element vector of moment conditions

$$\hat{\varphi}(\Theta;\chi) = \begin{bmatrix} E[p_{iht}|h,t] - \int p_t(X,\Theta,\chi) dF_{h,t}(X|h,t) \\ E[n_{iht}|h,t] - \int n_t(X,\Theta,\chi) dF_{h,t}(X|h,t) \\ E[a_{iht}|h,t] - \int a_t(X,\Theta,\chi) dF_{h,t-1}(X|h,t) \end{bmatrix}_{t\in\{30,\ldots,69\}, h\in\{healthy, unhealthy\}}$$

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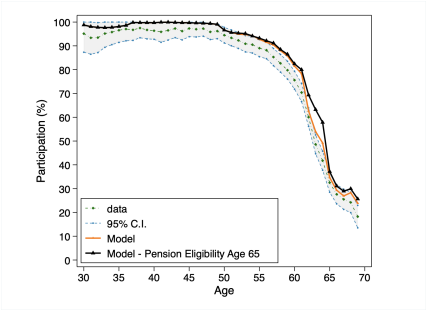
Elasticities

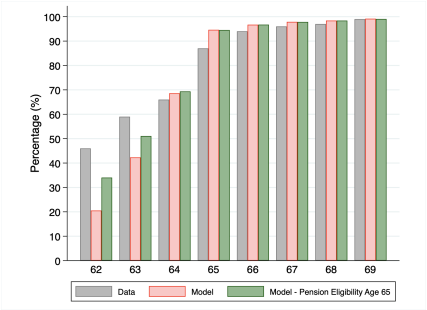
Back

	Age 40	Age 50	Age 60	Age 65
Average Hours				
Overall	0.43	0.60	1.16	3.97
Healthy	0.42	0.49	1.00	4.03
Unhealthy	0.52	1.35	1.98	3.80
Participation				
Overall	0.01	0.12	0.56	3.12
Healthy	0.01	0.02	0.39	3.20
Unhealthy	0.05	0.79	1.35	2.91

Effects of Increasing Pension Eligibility Age

Back





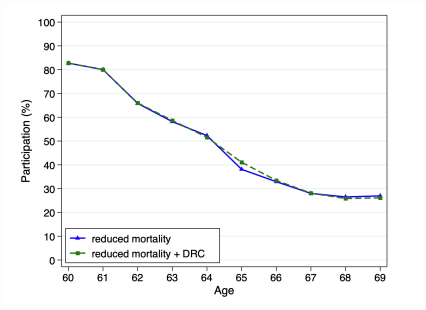
Savings Back

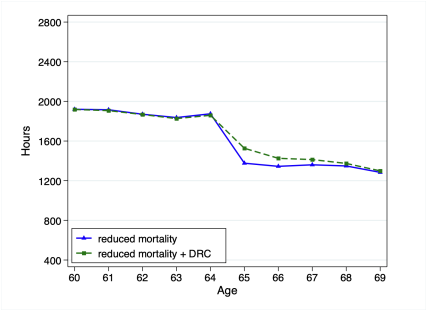
The measurement of assets includes:

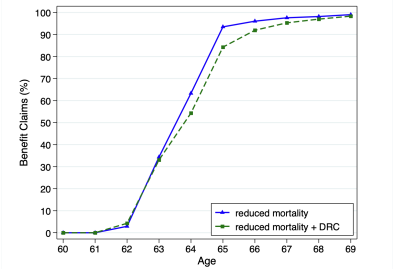
- real estate, the value of a farm or business, vehicles,
- stocks, mutual funds, IRAs, Keoghs, liquid assets, bonds, and investment trusts,
- net of mortgages and other debts,
- plus the value of home equity.

Effects of Increasing DRC When Mortality Rates Decline

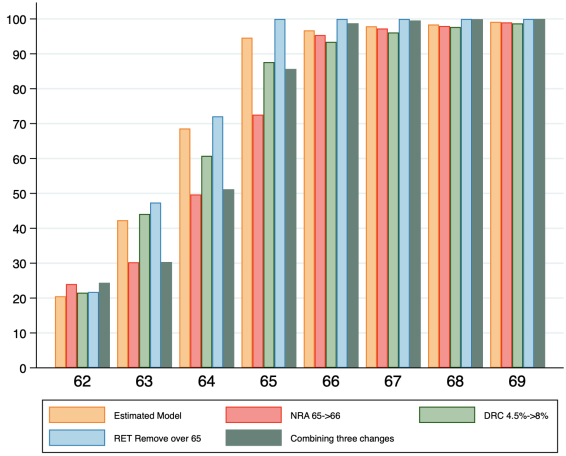
Back







Impacts on Social Security Claiming



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Changes in Disability Benefit Program Across Cohorts

Back

	Income Threshold		Disability Rolls		Moral Hazard			
	Overall y_{db}		Disabled $\pi^{db}_{h=2}$		Healthy $\pi^{db}_{h=0}$		Bad Health $\pi^{db}_{h=1}$	
Age	40-50	50-65	40-50	50-65	40-50	50-65	40-50	50-65
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1930s	0	3600	0	0.63	0	0.014	0	0.16
1950s	4125	4125	0.33	0.58	0.003	0.013	0.09	0.15

Health Dynamics Across Cohorts

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