Identifying Roles of Preferences and Shocks in Labor Supply using Retirement Decisions

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Introduction

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New: use retirement decisions and how they interact with assets and labor history

- retirement and assets – choice variables $\rightarrow$ reflect preferences
- labor history reflects both preferences and constraints

Main Idea

Two key moments to look at:

1. correlation between retirement hazard and assets
   - no preference heterogeneity: > 0 (wealth effect)
   - preference heterogeneity: < 0 for higher asset quartiles intuition
2. correlation between retirement hazard and cumulative work history
   - no preference heterogeneity: ≥ 0
   - preference heterogeneity
     - no employment constraints: < 0 intuition
     - employment constraints: ambiguous

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> setup a life-cycle model with heterogeneity and constraints

> calibrate to match standard moments + key moments from above

> perform counterfactuals with constraints and preferences shut down

> welfare implications of the constraints (partial equilibrium)

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> welfare implications of the constraints (partial equilibrium)
  - shutting down the constraints is equivalent to 13% increase in consumption

Literature

> preference heterogeneity and labor supply

Heathcote et al. (2014), Mustre-Del-Rio (2015), Heathcote et al. (2017), Kaplan and Sam Schulhofer-Wohl (2018)

> employment constraints

Low et al. (2010), Krusell et al. (2020), Mukoyama et al (2021)

> retirement decisions

French (2005), Rogerson and Wallenius (2013), Fan et al. (2022)

→ in this paper:

- combine theoretical implications from these literatures
- propose a novel approach to disentangle preferences and constraints

Specification

- relationship between retirement, assets and work history
- right-censored data: some people leave the sample without retiring
- use Cox model from survival analysis to retain all the information

$$h(t) = h_0(t) exp(\beta_1 wkhist_i + \beta_2 logwage_{i,t-1} + \sum_{j=2}^{4} \beta_j assets_{i,t}^j + \gamma X_{i,t})$$

- t: age
- $h_0(t)$: baseline hazard function
- X – family status, health, birth year

Data and Variable Definitions

- SOEP – survey panel data for Germany
  - allows to construct labor histories spanning over 30 years
  - can be merged to administrative data: SOEP-RV

constructing work history

- retrospective history: whether works full-time, part-time or not working
- generate cumulative history at ages 30-49 by summing imputed hours
  - 2000 hrs if worked full-time
  - 1000 hrs if worked part-time
- very concentrated distribution $\rightarrow$ create a dummy variable:
  - $wkhist = 1$ if on average work more than 1800 hrs
  - $wkhist = 0$ if on average work less than 1800 hrs

graph

Results: Men

	retirement hazard
more than 1800hrs	0.18+
	(0.11)
log past wage	0.11*
	(0.05)
2nd quart assets	0.10
	(0.09)
3rd quart assets	0.00
	(0.09)
4th quart assets	-0.20*
	(0.09)
bad health	0.32***
	(0.07)

> negative coefficient on assets
> marginally positive coefficient on work history

Setup

- life-cycle model with endogenous retirement
- uncertainty in wages and employment constraints
- labor supply $\in \{0, 0.25, 0.5, 0.75, 1\}$
- labor history dependent pension pension
- permanent heterogeneity in **disutility of labor**
- permanent heterogeneity in **bequest motives**
  - key for matching relationship b/w assets and retirement

Household Problem

$$\max_{\{c_j,h_j,R_j\}_{j=t}^{T}} u_i(c_t,h_t) + E_t\left[\sum_{j=t+1}^{T} \beta^j u_i(c_j,h_j) + b_i(a_{T+1})\right]$$

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$$c_{it} = a_{it}(1+r) + w_{it}h_{it} + p\mathbb{1}(t \geq \bar{t}) - a_{i,t+1},\ a_{i,t+1} \geq 0$$

$$h_j = 0\ \forall j \geq t,\ \text{if } R_{it} = 1$$

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$$u_i(c_t,h_t) = \frac{c_t^{1-\sigma}}{1-\sigma} - \frac{\phi_h^i}{1+\sigma_h}(h_t + \theta_h \mathbb{1}_{h\geq 0})^{1+\sigma_h}\left[1 + \mathbb{1}_{t\geq\bar{t}}\left(\frac{t-\bar{t}}{\xi_2}\right)^{\xi_1}\right]$$

$$b_i(a_{t+1}) = \phi_b^i\left(1 + \frac{a_{t+1}}{\gamma_2}\right)^{1-\sigma_b}$$

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$> \phi_h^i$: disutility of labor, ϕ_b^i: bequest motive

Employment Constraints vs Preferences

- **employment constraints**
  - three realizations:
    - no wage draw $\rightarrow$ unemployment
    - at most part-time employment ($h \leq 0.5$)
    - full choice
  - follow Markov process

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- **preferences**
  - two values of disutility of labor (ϕ_h^1, ϕ_h^2)
  - two values of bequest motives (ϕ_b^1, ϕ_b^2)

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$\rightarrow$ the goal of the paper: which part of employment variation can be explained by preferences (ϕ^h, ϕ^b) vs employment constraints

Calibration

- four types of people: (ϕ_h^1, ϕ_b^1), (ϕ_h^1, ϕ_b^2), (ϕ_h^2, ϕ_b^1), (ϕ_h^2, ϕ_b^2)
- each type is a fraction π_{ij}
- transition probabilities for labor market constraints

  $\rightarrow$ calibrate 15 parameters using SMM

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Table: calibrated parameters

	ϕ_1^h	ϕ_2^h	ϕ_1^b	ϕ_1^b	p_{11}	p_{21}	p_{12}	p_{22}	ψ_2	c_h
params	2.07	2.45	1499.87	2.89	0.28	0.02	0.05	0.65	16.15	0.09

takeaway:

- 28% of population has very strong bequest motive, 65% - very weak
- correlation b/w bequest and disutility of labor = -0.85

Results

	data	full model	model w/o constr	w/o constr and pref
more than 1800hrs	0.18	0.14	-0.45	0.12
	(0.11)	(0.02)	(0.04)	(0.06)
log past wage	0.11	0.63	0.68	-0.54
	(0.05)	(0.02)	(0.02)	(0.03)
2nd quart assets	0.10	0.14	0.02	0.02
	(0.09)	(0.03)	(0.03)	(0.03)
3rd quart assets	0.00	-0.01	-0.11	0.23
	(0.09)	(0.03)	(0.03)	(0.03)
4th quart assets	-0.20	-0.35	-0.49	1.30
	(0.09)	(0.03)	(0.03)	(0.03)

takeaways:

- shutting down the constraints $\rightarrow$ negative corr b/w retirement and work history
- shutting down preferences $\rightarrow$ standard wealth effect

Counterfactual

> look at variation in hours defined as: std(log(ave hours 30-49))

	full model	no constr	no constr and no pref
variation in hours	0.10	0.05	0.04

takeaway: constraints explain 83% of the variation unexplained by wages and assets, while preference heterogeneity explains the remaining 17%.

Welfare Implications of Employment Constraints

How costly are the constraints in terms of welfare?

> by what percentage Δ_i should consumption of individual i increase in the presence of labor market constraints to make them as happy as if they did not face those constraints:

$$\sum_{j=1}^{T} \beta^{j-1} \frac{[c_{it}(1+\Delta_i)]^{1-\sigma}}{1-\sigma} - V_i^h + V_i^{beq} = V_i',$$

takeaway:

> on average consumption should increase by 13%

> for a median individual consumption should increase by 6%

Conclusion

What I do in the paper:

- a new method to identify roles of preferences and constraints in labor supply
  - retirement decisions and their interactions with assets and labor history are KEY
- document:
  - positive relationship between retirement hazard and work history
  - negative – between assets and retirement
- quantitatively disentangle the two channels through the lens of the model

Main takeaways:

- heterogeneity in bequest motives is needed to explain retirement vs assets
- employment constraints are needed to explain retirement vs work history
- constraints are responsible for 82% of unexplained employment variation

German Pension System

1. three pillars
   - statutory (PAYGO)
   - occupation
   - private

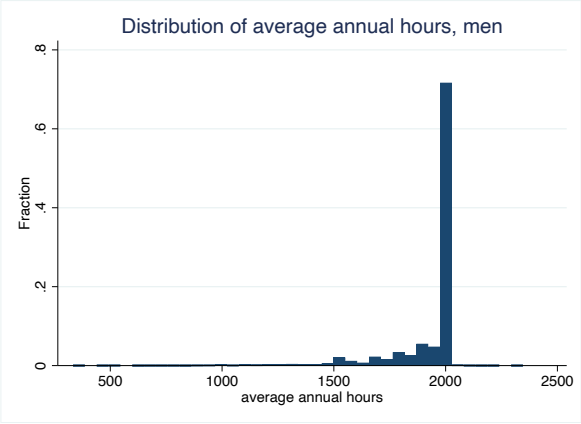
2. age of eligibility for pension benefit
   - currently 65 y.o.
   - early claim at 63 y.o. if contributed for more than 35 years
   - can get higher pension if postpone the claim
   - do not have to stop working or reduce hours

Pension:

> depends on accumulated pension points
> get 1 pension point from 1 year of average annual earnings
> if lower or higher than average – get less or more than 1 pension point
> pension $= \Sigma$ pension points $\times$ "pension-point value"

back

Work History



back

Assets vs Retirement

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- for each type: positive corr (ceteris paribus)
- "low bequest" more likely to retire

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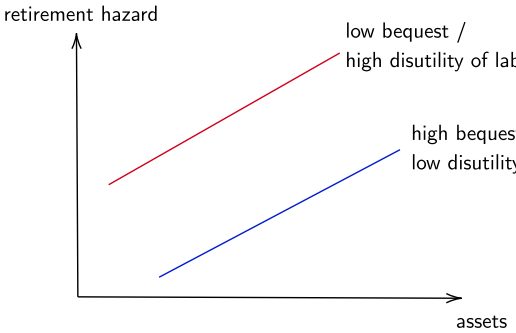

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- "low bequest" more likely to hold little assets
- how does weighted average look like?

Assets vs Retirement

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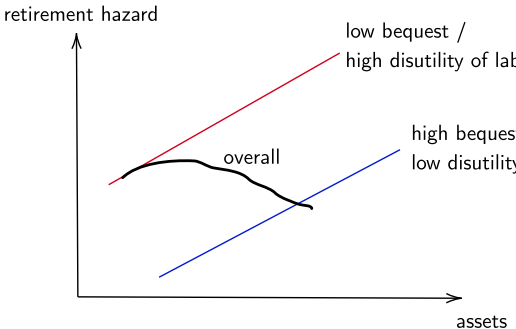

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Work History vs Retirement

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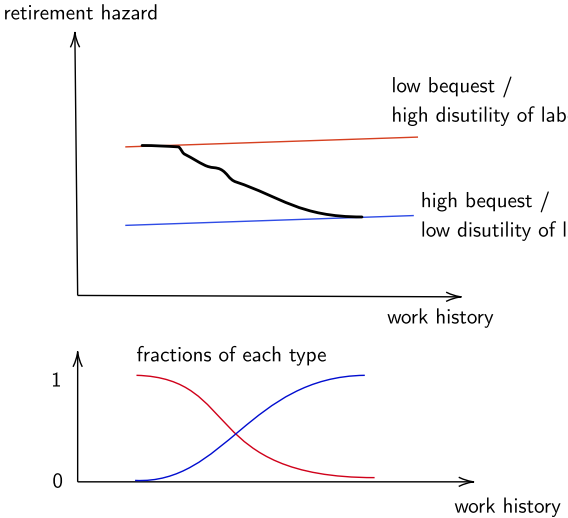

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