

# Retirement Behavior in the U.S. and Europe

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January 2015

# Motivation

Research question: **how do incentives in social insurance programs affect retirement behavior?**

- *Retirement around the world* (Gruber and Wise, 1999)
  - Reduced-form models
  - Clear link between behavior and incentives
  - Do not fit spikes in retirement hazard
  - Difficult to disentangle preferences from constraints
- Structural retirement models
  - Allow evaluation of effects of policy changes
  - Estimation limited to single country (often U.S.)

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# Contribution

## Goal: **understand preferences and constraints as drivers of international differences in retirement**

- Structural retirement model that captures international institutional differences
  - Decisions: labor supply, claiming and saving
  - Exit routes: public pension, private pension, unemployment and disability
- *Estimate* preference parameters using comparable longitudinal data
  - U.S.: Health and Retirement Study (HRS)
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# Preliminary results

- Model with common preferences does *not* fit data
  - Institutional differences not enough to explain variation in saving and labor supply
- Counterfactual simulation: what if Europeans would have U.S. preferences?
  - They would save less (generous pensions)
  - Dutch and Spanish would work more

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# Roadmap

- 1 Introduction
  - Motivation
  - Contribution
  - Results
- 2 Model
- 3 Data
  - Data
  - Auxiliary processes
- 4 Results
  - Estimates
  - Model fit
  - Counterfactual simulations
- 5 Conclusion

# Overview of model

Dynamic structural model of employment with different exit routes:

- Unitary; discrete time; finite horizon (age 50-100)
- Pay-As-You-Go public pension in all countries (different incentives)

	United States	The Netherlands	Spain	Germany
Wealth ( $w_t$ )	$[0; 10^6]$	$[0; 10^6]$	$[0; 10^6]$	$[0; 10^6]$
Wage ( $j_t$ )	$[5; 100]$	$[5; 100]$	$[5; 100]$	$[5; 100]$
Health ( $m_t$ )	{1 = poor, 2 = good}	{1 = poor, 2 = good}	{1 = poor, 2 = good}	{1 = poor, 2 = good}
DB pension ( $db_t$ )	{1 = no DB scheme, 2 = DB scheme}	{1 = no DB scheme, 2 = DB scheme}		
Benefit level	$AIME_t$	$yrswrk_t$ , $prevearn_t$	$yrswrk_t$ , $prevearn_t$	$points_t$
DI ( $di_t$ )	{1 = not eligible, 2 = eligible}	{1 = not eligible, 2 = eligible}	{1 = not eligible, 2 = eligible}	{1 = not eligible, 2 = eligible}
UI ( $ui_t$ )	{1 = not eligible, 2 = eligible}	{1 = not eligible, ... 4 = fully eligible}	{1 = not eligible, ... 7 = fully eligible}	{1 = not eligible, ... 7 = fully eligible}

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# Preferences

$$u(c_t, l_t, t) = n_t \frac{\left(\left(\frac{c_t}{n_t}\right)^\kappa l_t^{1-\kappa}\right)^{1-\sigma} - 1}{1-\sigma}$$

- Utility derived from consumption ( $c_t$ ) and leisure ( $l_t$ )

$$l_t = L_{\max} - h_t - \gamma \mathbf{1}\{h_t > 0\} \\ - \phi \text{claimd}_t - \xi \text{claimu}_t$$

$$h_t \in \{0, 1500, 2000, 2500\}$$

$$L_{\max} = 4000$$

- Bequest utility (French, 2005):

$$b(w_t) = \theta \frac{(w_t + K)^{\kappa(1-\sigma)}}{1-\sigma}$$

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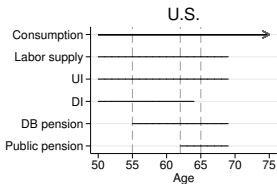
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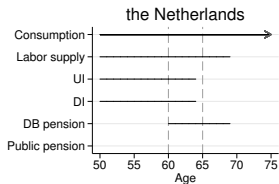
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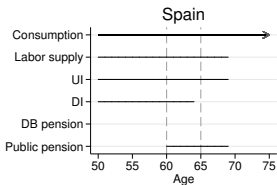
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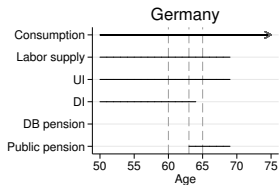
55 ERA DB; 62 NRA DB and ERA SS; 65 NRA SS.



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# Budget constraint

$$x_t = w_t + y_t^n - oop_t$$

$x_t$  cash-on-hand;  $w_t$  wealth;  $y_t^n$  net income;  $oop_t$  out-of-pocket medical expenditures

- Income from 6 sources:

$$y_t^n = \tau(y_t^e, y_t^{di}, y_t^{db}, y_t^{ui}, y_t^{ss}, y_t^w)$$

- Transfers:

$$tr_t = \max\{n_t c_{\min} - x_t, 0\}$$

- Law of motion of wealth:

$$w_{t+1} = w_t + y_t^n + tr_t - c_t - oop_t$$

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# Health and mortality

- Future health is uncertain
  - Health determines out-of-pocket expenditures
- First-order Markov process:

$$p_m(m_t, t) = \frac{\exp(\gamma_0 + \gamma_t t + \gamma_m \mathbb{I}\{m_t = 2\})}{1 + \exp(\gamma_0 + \gamma_t t + \gamma_m \mathbb{I}\{m_t = 2\})}$$

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  - Certain death at age  $t = 100$

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## Maximization problem

Value conditional on discrete choice  $d$  (claiming and labor supply):

$$V^d(s_{t,k}, m_t) = \max_{c_t} \left\{ u(c_t; d_k, t) \right. \\ \left. + \beta \left[ p_s^k(m_t, t) \mathbb{E} [V(s_{t+1,k})] + (1 - p_s^k(m_t, t)) b(w_{t+1}) \right] \right\}$$

s.t. budget constraints

Unconditional value:

$$V(s_{t,k}, m_t) = \max_{d_k \in \mathcal{D}_k(s_{t,k}, m_t)} (V^1(s_{t,k}, m_t), \dots, V^{D_k}(s_{t,k}, m_t))$$

- Model solved by backward induction on discretized state space
- Common or heterogenous preferences across countries
- Choice sets and constraints vary across countries

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# Data

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  - 1992-2010
- Europe: Survey of Health, Aging and Retirement in Europe (SHARE)
  - 2004-2011
- Estimation sample:
  - Auxiliary processes:
    - Men age 50-110
  - Initial conditions:
    - Age 50-56, wage worker in first interview
    - Germany: only non-civil servants
  - Data moments:
    - All individuals from initial conditions
    - Older men who worked at age 50



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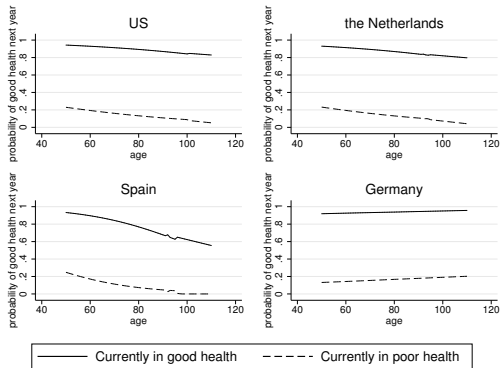
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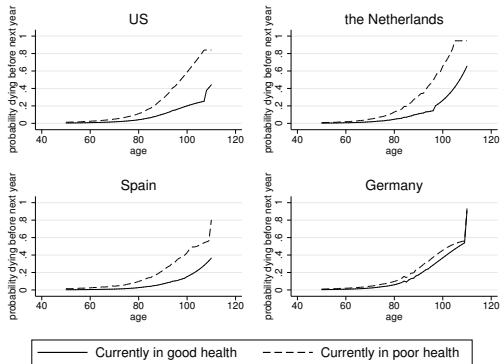
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# Health



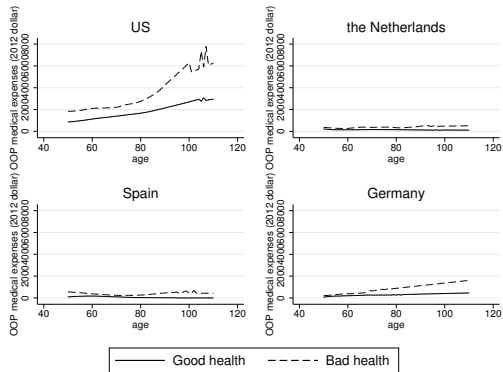
**Figure:** Estimated health processes – the probability of being in good health next year as a function of age and current health

# Mortality



**Figure:** Estimated mortality processes – the probability of dying before next year as a function of age and current health

# Out-of-pocket health costs



**Figure:** Estimated out-of-pocket medical spending – average expenditures as a function of age and current health



# Estimates of preference parameters

	Common preferences	Country-specific preferences			
		United States	the Netherlands	Spain	Germany
$\sigma$ – concavity utility	3.85	4.95	4.99	4.55	4.53
$\gamma$ – fixed cost work (hrs)	628.4	669.7	1715.6	1179.7	12.4
$\kappa$ – consumption share	0.52	0.72	0.46	0.57	0.71
$\phi$ – stigma DI (hrs)	3546.1	3779.9	3451.9	1192.8	3411.6
$\xi$ – stigma UI (hrs)	3695.1	3999.6	4000.0	2785.8	3568.3
$\beta$ – discount factor	0.50	0.86	0.50	0.52	0.998
$\theta$ – bequest weight	753.8	2099.8	14.0	571.8	2681.3
$K$ – beq. concavity (10,000 \$)	144.3	39.6	56.0	166.4	2.63
Number of individuals	10,866	7,727	1,432	1,219	488
Number of observations	42,749	37,833	2,348	1,729	839
Objective function	4,736.5	221.0	103.7	99.8	200.5

ESTIMATES ARE PRELIMINARY – PLEASE DO NOT QUOTE  
Standard errors to be added.

# Model fit – net wealth quartiles

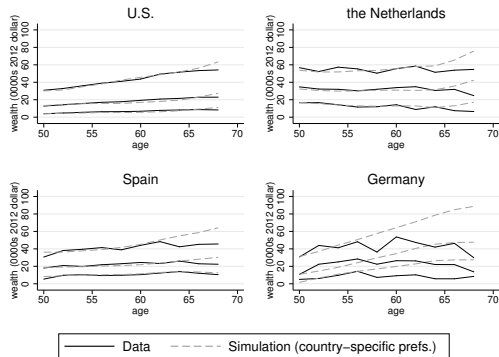


Figure: Data and simulated moments – net wealth

# Model fit – average hours worked

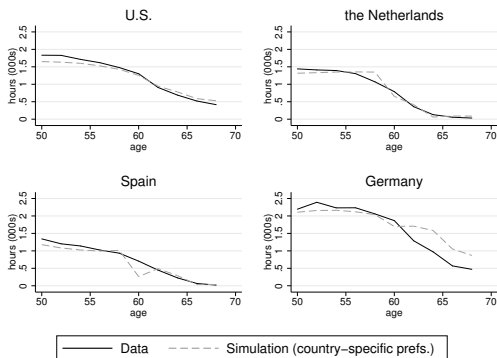


Figure: Data and simulated moments – hours worked

# U.S. preferences in all countries

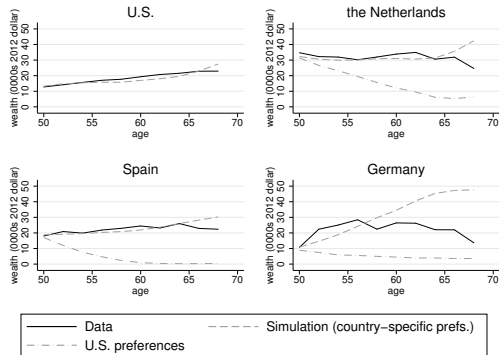
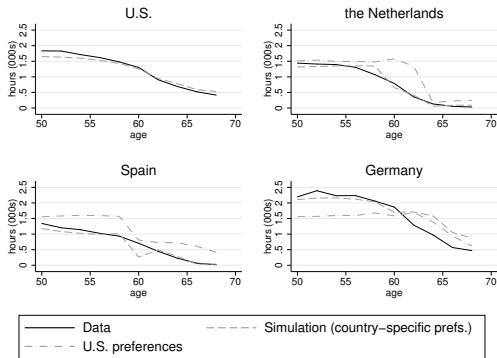


Figure: Counterfactual simulations – U.S. preferences (median wealth)

# U.S. preferences in all countries



**Figure:** Counterfactual simulations – U.S. preferences (mean hours worked)

## Conclusion (preliminary)

- Model with common preferences does not fit data
  - Institutions not enough to explain variation in saving and labor supply
- Models with country-specific preferences do provide good fit
  - Exception: Germany (hard to rationalize high labor supply)
- If Europeans would have U.S. preferences they would...
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- Add exogenous income of spouse
- Analyze identification
  - Estimate model for different risk aversions
  - Estimate model for different discount factors
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