Labor-Market Participation of Older Workers in a Life-Cycle Context

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How Do Public Pension Programs Affect Retirement?

- *Substitution effects*: Pension schemes often generate high implicit tax rates on labor income earned after a certain age.
- *Wealth effects*: Public pension programs provide an annuity stream after retirement.
- *Liquidity effects*: Public pension benefits are illiquid – households cannot borrow against future benefits.

Retirement Incentives in the US

- Normal Retirement Age in the US: 65
  - Until recently, Social Security had big incentives to draw benefits by age 65
- After drawing benefits: Earnings test
  - Until recently, high tax rate on earnings
- Medicare (government health insurance after 65)
- Disability insurance
- Private pensions
- Falling wages and declining health

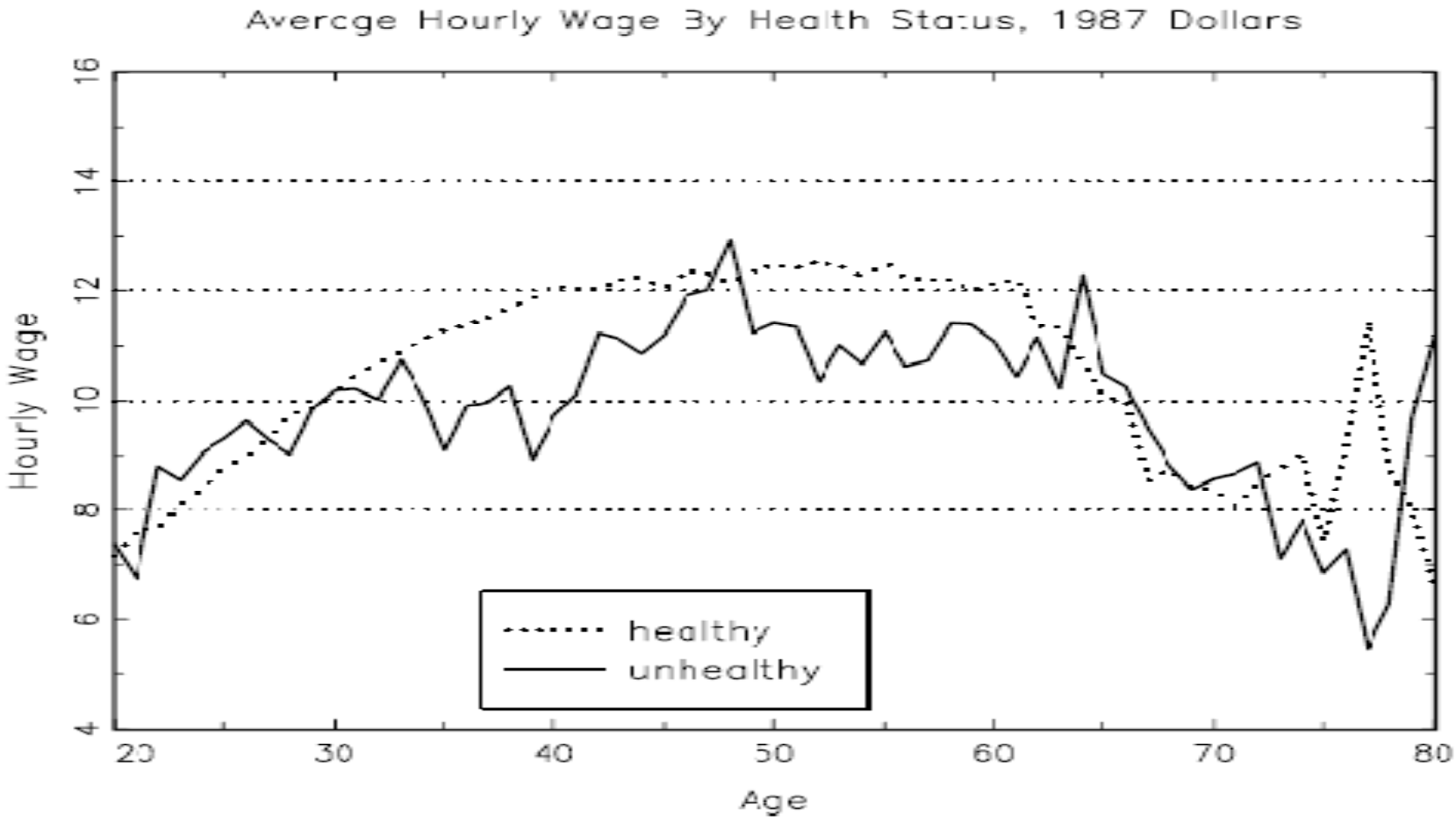
Retirement Incentives in Europe

- Similar to the US, except…
  - Disability benefits a more important pathway to retirement
  - Universal health insurance
  - Public pension schemes provide stronger incentives to retire by normal retirement age
  - Europeans typically retire earlier than Americans
- Reforms are underway: e.g., the Netherlands

Participation Rates by Country, Gender, Age, and Calendar Year								
	2000				2007			
	Men		Women		Men		Women	
	Ages 50-54	Ages 60-64	Ages 50-54	Ages 60-64	Ages 50-54	Ages 60-64	Ages 50-54	Ages 60-64
Netherlands	86%	27%	56%	11%	86%	39%	70%	22%
Spain	83%	40%	35%	15%	85%	46%	53%	21%
UK	82%	47%	70%	25%	85%	57%	75%	33%
US	85%	54%	72%	39%	84%	57%	72%	47%

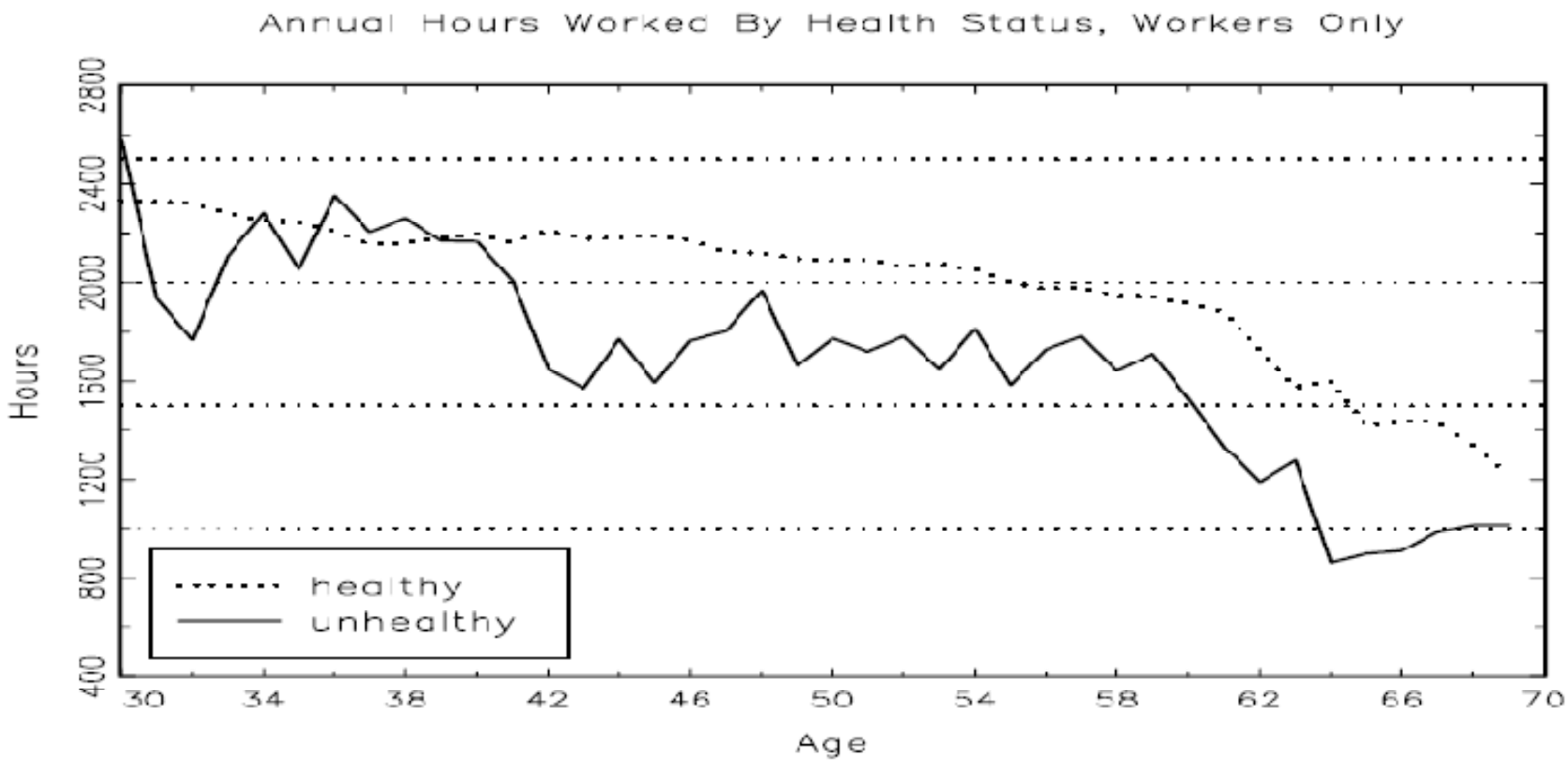
Data Source: OECD

Life Cycle Profiles for Men's Wages in the US, by Health Status



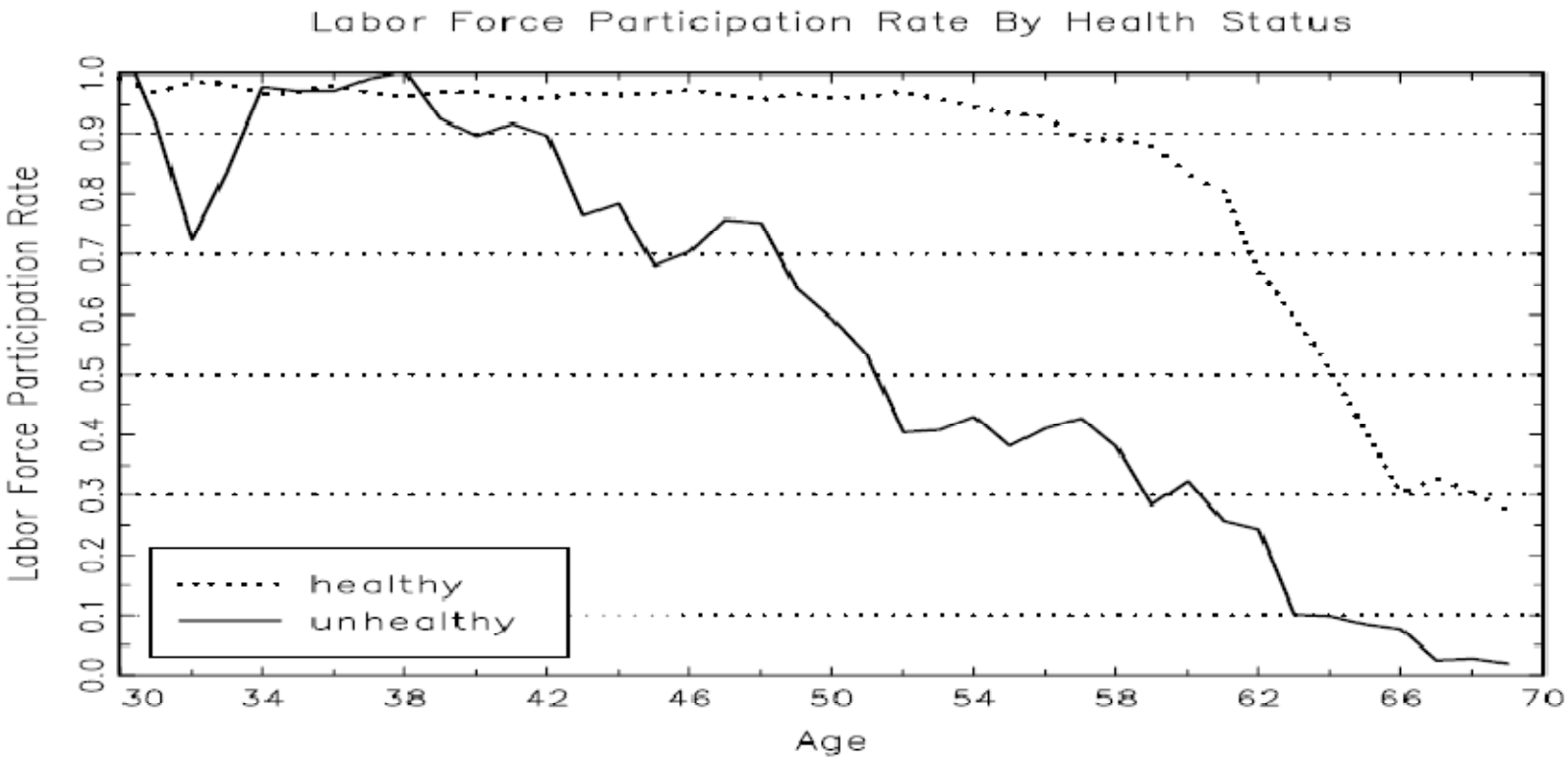
Data Source: PSID

Life Cycle Profiles for Annual Hours Worked by Employed Men in the US



Data Source: PSID

Life Cycle Profiles for Labor Force Participation of Men in the US



Data Source: PSID

Intensive Versus Extensive Margins of Labor Supply

- Intensive margin: number of hours of work, conditional on working
- Extensive margin: whether or not to work
- Extensive margin is more important
  - Most people work full time or not at all
  - Possibly due to fixed costs of work (commuting time, dress clothes, employer training, etc.)

Distribution of Hours Worked in the US, by Age and Gender (fraction of individuals working listed number of hours)				
	Men		Women	
	Ages 50-54	Ages 60-64	Ages 50-54	Ages 60-64
0 hours	16.8%	44.7%	30.8%	59.0%
1-500 hours	0.4%	0.9%	0.9%	1.1%
501-1000 hours	0.9%	2.2%	2.3%	2.4%
1001-1500 hours	1.7%	2.4%	4.2%	3.7%
1501-2000 hours	43.1%	30.0%	40.0%	24.0%
2001-2500 hours	21.1%	12.4%	16.2%	7.8%
2501-5000 hours	15.9%	7.8%	5.5%	2.0%

Data Source: HRS

A Dynamic Model of Labor Supply Over the Life Cycle

- From French (2005)
- Households:
  - Choose consumption (C_t), labor hours (H_t) and Social Security application (B_t)
  - Are uncertain of future health and wages
  - Face borrowing constraints
  - Face a fixed cost of work
  - Face realistic Social Security and pension incentives
- Model estimated from PSID data, using the method of simulated moments

A Dynamic Model of Labor Supply: Recursive Formulation

$$V_t(X_t) = \max_{C_t, H_t, B_t} \left\{ \frac{1}{1-\nu} \left(C_t^{\gamma} \left(L - H_t - \theta_P \cdot \{H_t > 0\} - \phi \cdot 1\{M_t = bad\} \right)^{1-\gamma} \right)^{1-\nu} \right.$$
$$\left. + \beta s_{t+1} E_t \left(V_{t+1}(X_{t+1}) \mid X_t, C_t, H_t, B_t \right) + \beta (1 - s_{t+1}) b(A_{t+1}) \right\}$$

s.t. accumulation equations for wealth and Social Security

The state vector X_t consists of:

A_t = financial wealth

W_t = real wage

M_t = health status

$AIME_t$ = Social Security wealth

B_{t-1} = Social Security application status

A Dynamic Model of Labor Supply: Wage Experiments

- Wage Experiments
  - Temporary changes: wages increase by 20% in year *t*, all other wages unchanged
  - Permanent changes: wages increase by 20% in year *t* and all years that follow
  - Solve model and simulate many life-cycle labor histories for each specification
  - Calculate elasticities for average labor hours

A Dynamic Model of Labor Supply: Wage Experiment Results

- Extensive margin of labor supply important
- Elasticities are higher at older ages
  - At older ages, wealth is higher, wages are lower, health is poorer, and pensions encourage retirement
  - Benefit of work narrowly above or below fixed cost of work
  - Small changes in incentives lead to big changes in participation
- When wages increase in one year, hours in other years are reduced

Labor Supply Responses to a 20 Percent Increase in Wages				
	Temporary wage change		Permanent wage change	
Age	At age 40	At age 60	At age 40	At age 60
	Labor supply elasticity			
Hours in year of wage change	0.36	1.28	0.17	1.17
Hours over entire life	-0.01	0.01	0.11	0.14
Hours in years prior to change	-0.01	-0.01	-0.21	-0.04
Hours after year of change	-0.03	-0.11	0.26	2.24
	Change in hours of work			
Hours in year of wage change	155	377	74	346
Hours over entire life	-183	167	1,432	1,906
Hours in years prior to change	-39	-111	-923	-519
Hours after year of change	-300	-99	2,281	2,079

A Dynamic Model of Labor Supply: Social Security Experiments

- Re-simulate model under different Social Security rules
- Rule changes are known from the beginning of the life cycle
- Reducing benefits leads to lower consumption and more labor hours
- Increasing the early retirement age to 63 has little effect
- Eliminating the earnings test after age 65 has a large effect

Lifetime Responses to Changes in the Social Security Program

	Total years worked	Hours worked per year	PDV of labor income	PDV of consumption	Assets at age 62
Benchmark model	32.60	2,097	$1,781	$1,583	$190
Benefits reduced by 20%	32.83	2,099	$1,789	$1,569	$200
Early retirement age raised to 63	32.62	2,096	$1,781	$1,584	$190
Earnings test eliminated from age 65 onward	33.62	2,085	$1,799	$1,594	$188

PDV denotes present discounted value.
Consumption, labor income, and assets are measured in thousands.

How Should We Set Taxes Over the Life Cycle?

- Optimal tax literature $\Rightarrow$ tax less the more elastically supplied good
- Labor supply more elastic at older ages
- So optimal tax theory suggests that taxes should fall near retirement ages, rather than rise
- Examples of this idea
  - Laitner and Silverman (2009)
  - Goda, Shoven, Slavov (2007)