The Welfare Cost of Retirement Uncertainty

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- Our analysis provides insights on the extent to which social insurance programs hedge this risk, and suggests policy adjustments.
- Uncertainty about the date of retirement helps to explain consumption spending near retirement and precautionary saving behavior.

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3. It assesses how well existing social insurance programs mitigate retirement uncertainty.

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  Having a component of retirement benefits that is not tied to earnings provides partial insurance coverage.

1. Measuring Retirement Timing Uncertainty

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  - For a young worker, overall retirement uncertainty can come as much from the type of shocks that will lead to involuntary retirements as from those that will lead to voluntary ones.
- The concept of retirement timing uncertainty we are after encompasses all stochastic life events that will eventually trigger the exit from the labor force.

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- Use standard deviation of X as measure of retirement timing uncertainty.
  - Assume that individuals use all private information at their disposal when reporting $Eret$.
  - A growing literature has ratified the validity of retirement expectations.

Data

- The data come from the HRS, a nationally-representative panel of households headed by an individual above age 50.
- Individuals are followed for a maximum of 11 waves (from 1992 to 2012).
- Sample: 3,251 males aged 51 to 61, employed, and with non-missing retirement expectations on wave 1.

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- *Ret* is constructed using information on the last month/year the individual worked before first wave observed retired.

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- Likely presence of measurement error in *Eret*.
  - We allow for +/-1 measurement error in expected retirement age.

Distribution of Expected and Actual Retirements Ages

	All	
	Eret	
Age $\leq$ 60	11.84	
Age $=$ 61	2.77	
Age $=$ 62	18.33	
Age $=$ 63	8.74	
Age $=$ 64	1.48	
Age $=$ 65	16.98	
Age $=$ 66	7.72	
Age $>$ 66	8.00	
Never	14.61	
DK	9.54	

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Age $=$ 62	18.33	25.30	16.96
Age $=$ 63	8.74	12.15	7.40
Age $=$ 64	1.48	1.85	6.29
Age $=$ 65	16.98	21.45	8.40
Age $=$ 66	7.72	9.93	4.23
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Standard Deviation of $X = Eret - Ret$

	Sample	Standard Deviation	N
1	*Eret* and *Ret* observed	4.28	1,903
2	1 + Work past *Eret*, *Ret* not observed	5.05	2,147
3	2 + *Eret* after sample period, *Ret* not observed	5.04	2,152
4	3 + Will never retire, *Ret* observed	6.54	2,476
5	4 + Will never retire, *Ret* not observed	6.35	2,627
6	5 + DK when they will retire, *Ret* observed	6.92	2,840
7	6 + DK when they will retire, *Ret* not observed	6.82	2,937

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2. Quantifying the Welfare Cost of Retirement Timing Uncertainty

Optimal Decision Making Under Retirement Timing Risk

As long as he is not retired, the individual follows a contingent plan $(c_1^*(t), k_1^*(t))_{t \in [0,t']}$ that solves:

$$\max_{c(t)_{t\in[0,t']}} : \int_0^{t'} \left\{ [1-\Phi(t)] e^{-\rho t} \Psi(t) \frac{c(t)^{1-\sigma}}{1-\sigma} + \sum_d \theta(d|t)\phi(t) S(t,k(t),d) \right\} dt$$

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$$k(0) = 0, \qquad k(t') \quad \text{free}$$

Optimal Decision Making Under Retirement Timing Risk

As long as he is not retired, the individual follows a contingent plan $(c_1^*(t), k_1^*(t))_{t\in[0,t']}$ that solves:

$$\max_{c(t)_{t\in[0,t']}} : \int_0^{t'} \left\{ [1-\Phi(t)]e^{-\rho t}\Psi(t)\frac{c(t)^{1-\sigma}}{1-\sigma} + \sum_d \theta(d|t)\phi(t)S(t,k(t),d) \right\} dt$$

subject to

$$S(t,k(t),d) = \int_t^T e^{-\rho z}\Psi(z)\frac{c_2^*(z|t,k(t),d)^{1-\sigma}}{1-\sigma} dz$$

$$\frac{dk(t)}{dt} = rk(t) + (1-\tau)w(t) - c(t)$$

$$k(0) = 0, \qquad k(t') \quad \text{free}$$

Optimal Decision Making Under Retirement Timing Risk (cont.)

$c_2^*(z|t, k(t), d)$ solves the post-retirement problem:

$$\max_{c(z)_{z\in[t,T]}} : \int_t^T e^{-\rho z}\Psi(z)\frac{c(z)^{1-\sigma}}{1-\sigma}dz$$

subject to

$$\frac{dK(z)}{dz} = rK(z) - c(z)$$

$$t \text{ and } d \text{ given, } K(t) = k(t) + B(t,d) \text{ given, } K(T) = 0$$

Optimal Decision Making Under Retirement Timing Risk (cont.)

$c_2^*(z|t, k(t), d)$ solves the post-retirement problem:

$$\max_{c(z)_{z\in[t,T]}} : \int_t^T e^{-\rho z}\Psi(z)\frac{c(z)^{1-\sigma}}{1-\sigma}dz$$

subject to

$$\frac{dK(z)}{dz} = rK(z) - c(z)$$

$$t \text{ and } d \text{ given, } K(t) = k(t) + B(t,d) \text{ given, } K(T) = 0$$

Optimal Decision Making Under Retirement Timing Risk (cont.)

$c_2^*(z|t, k(t), d)$ solves the post-retirement problem:

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subject to

$$\frac{dK(z)}{dz} = rK(z) - c(z)$$

$$t \text{ and } d \text{ given, } K(t) = k(t) + B(t, d) \text{ given, } K(T) = 0$$

Optimal Decision Making Under Retirement Timing Risk (cont.)

$c_2^*(z|t, k(t), d)$ solves the post-retirement problem:

$$\max_{c(z)_{z\in[t,T]}} : \int_t^T e^{-\rho z}\Psi(z)\frac{c(z)^{1-\sigma}}{1-\sigma}dz$$

subject to

$$\frac{dK(z)}{dz} = rK(z) - c(z)$$

$$t \text{ and } d \text{ given, } K(t) = k(t) + B(t,d) \text{ given, } K(T) = 0$$

$B(t, d)$: PDV of social security retirement benefits, SSDI, and post-retirement work earnings.

No Risk Benchmark

- Individual faces no risk (NR) about retirement.
- Individual is endowed at $t = 0$ with the same expected future income as in the world with uncertainty.

$$c^{NR}(t) = \arg\max \left(\int_0^T e^{-\rho t} \Psi(t) \frac{c(t)^{1-\sigma}}{1-\sigma} dt \right), \quad \text{subject to}$$

$$\frac{dk(t)}{dt} = rk(t) - c(t), \qquad k(T) = 0$$

$$k(0) = \int_0^{t'} \left(\sum_d \theta(d|t)\phi(t) \left(\int_0^t e^{-rv}(1-\tau)w(v)dv + B(t,d)e^{-rt} \right) \right) dt$$

Welfare: Full Insurance

Baseline welfare cost Δ is the share of lifetime consumption the individual would be willing to pay at time 0 in order to live in NR world.

$$\int_0^T e^{-\rho t}\Psi(t)\frac{[c^{NR}(t)(1-\Delta)]^{1-\sigma}}{1-\sigma}dt$$

$$= \int_0^{t'}\left(\sum_d \theta(d|t)\phi(t)\int_0^t e^{-\rho z}\Psi(z)\frac{c_1^*(z)^{1-\sigma}}{1-\sigma}dz\right)dt$$

$$+\int_0^{t'}\left(\sum_d \theta(d|t)\phi(t)\int_t^T e^{-\rho z}\Psi(z)\frac{c_2^*(z|t,k_1^*(t),d)^{1-\sigma}}{1-\sigma}dz\right)dt.$$

Full Information Benchmark

- Individual learns at $t = 0$ the retirement date t.
- In model with disability, individual learns at $t = 0$ the disability indicator d.

$$\max_{c(z)_{z\in[0,T]}} : \int_0^T e^{-\rho z}\Psi(z)\frac{c(z)^{1-\sigma}}{1-\sigma}dz, \quad \text{subject to}$$

$$\frac{dk(z)}{dz} = rk(z) - c(z),$$

$$k(0|t,d) = \int_0^t e^{-rv}(1-\tau)w(v)dv + B(t,d)e^{-rt}, \;\; k(T) = 0.$$

Welfare: Timing Premium

Alternative welfare cost Δ_0 is the share of lifetime consumption the individual would be willing to pay at time 0 to know his retirement date t and future disability status d.

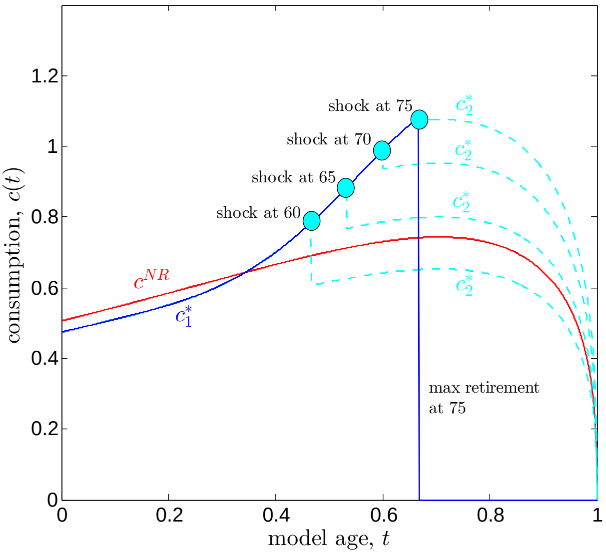
$$\int_0^{t'} \left(\sum_d \theta(d|t)\phi(t) \left(\int_0^T e^{-\rho z} \Psi(z) \frac{[c(z|t,d)(1-\Delta_0)]^{1-\sigma}}{1-\sigma} dz \right) \right) dt$$

$$= \int_0^{t'} \left(\sum_d \theta(d|t)\phi(t) \int_0^t e^{-\rho z} \Psi(z) \frac{c_1^*(z)^{1-\sigma}}{1-\sigma} dz \right) dt$$

$$+ \int_0^{t'} \left(\sum_d \theta(d|t)\phi(t) \int_t^T e^{-\rho z} \Psi(z) \frac{c_2^*(z|t, k_1^*(t), d)^{1-\sigma}}{1-\sigma} dz \right) dt.$$

Part 3: Quantitative Results and Policy Experiments

Life-Cycle Consumption with Retirement Timing Uncertainty



Welfare Cost and Policy Analysis

	Full Insurance (Δ)	Timing Premium (Δ_0)
Timing Risk Only		
Baseline: No SS		

First Best graph

Welfare Cost and Policy Analysis

	Full Insurance (Δ)	Timing Premium (Δ_0)
Timing Risk Only		
Baseline: No SS	4.26%	

First Best graph

Welfare Cost and Policy Analysis

	Full Insurance (Δ)	Timing Premium (Δ_0)
Timing Risk Only		
Baseline: No SS	4.26%	2.95%

First Best graph

Welfare Cost and Policy Analysis

	Full Insurance (Δ)	Timing Premium (Δ_0)
Timing Risk Only		
Baseline: No SS	4.26%	2.95%
SS: OASI only	4.05%	2.80%
Simple policy rule	2.74%	1.84%
50-50 policy rule	3.34%	2.27%
Calculator		

First Best graph

Welfare Cost and Policy Analysis

	Full Insurance (Δ)	Timing Premium (Δ_0)
Timing Risk Only		
Baseline: No SS	4.26%	2.95%
SS: OASI only	4.05%	2.80%
Simple policy rule	2.74%	1.84%
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Calculator		

First Best graph

Welfare Cost and Policy Analysis

	Full Insurance (Δ)	Timing Premium (Δ_0)
Timing Risk Only		
Baseline: No SS	4.26%	2.95%
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Simple policy rule	2.74%	1.84%
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Calculator		

First Best graph

Welfare Cost and Policy Analysis

	Full Insurance (Δ)	Timing Premium (Δ_0)
Timing Risk Only		
Baseline: No SS	4.26%	2.95%
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Simple policy rule	2.74%	1.84%
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Calculator		

First Best graph

Welfare Cost and Policy Analysis

	Full Insurance (Δ)	Timing Premium (Δ_0)
Timing Risk Only		
Baseline: No SS	4.26%	2.95%
SS: OASI only	4.05%	2.80%
Simple policy rule	2.74%	1.84%
50-50 policy rule	3.34%	2.27%
Calculator		

First Best graph

Welfare Cost and Policy Analysis

	Full Insurance (Δ)	Timing Premium (Δ_0)
Timing Risk Only		
Baseline: No SS	4.26%	2.95%
SS: OASI only	4.05%	2.80%
Simple policy rule	2.74%	1.84%
50-50 policy rule	3.34%	2.27%
Calculator		

First Best graph

Welfare Cost and Policy Analysis

	Full Insurance (Δ)	Timing Premium (Δ_0)
Timing Risk Only		
Baseline: No SS	4.26%	2.95%
SS: OASI only	4.05%	2.80%
Simple policy rule	2.74%	1.84%
50-50 policy rule	3.34%	2.27%
Calculator		

First Best graph

Welfare Cost and Policy Analysis

	Full Insurance (Δ)	Timing Premium (Δ_0)
Timing Risk Only		
Baseline: No SS	4.26%	2.95%
SS: OASI only	4.05%	2.80%
Simple policy rule	2.74%	1.84%
50-50 policy rule	3.34%	2.27%
Calculator		
Timing Risk and Disability Risk		
SS: OASI and SSDI	3.94%	2.27%

First Best graph

Welfare Cost and Policy Analysis

	Full Insurance (Δ)	Timing Premium (Δ_0)
Timing Risk Only		
Baseline: No SS	4.26%	2.95%
SS: OASI only	4.05%	2.80%
Simple policy rule	2.74%	1.84%
50-50 policy rule	3.34%	2.27%
Calculator		
Timing Risk and Disability Risk		
SS: OASI and SSDI	3.94%	

First Best graph

Welfare Cost and Policy Analysis

	Full Insurance (Δ)	Timing Premium (Δ_0)
Timing Risk Only		
Baseline: No SS	4.26%	2.95%
SS: OASI only	4.05%	2.80%
Simple policy rule	2.74%	1.84%
50-50 policy rule	3.34%	2.27%
Calculator		
Timing Risk and Disability Risk		
SS: OASI and SSDI	3.94%	2.72%

First Best graph

Welfare Cost and Policy Analysis

	Full Insurance (Δ)	Timing Premium (Δ_0)
Timing Risk Only		
Baseline: No SS	4.26%	2.95%
SS: OASI only	4.05%	2.80%
Simple policy rule	2.74%	1.84%
50-50 policy rule	3.34%	2.27%
Calculator		
Timing Risk and Disability Risk		
SS: OASI and SSDI	3.94%	2.27%

First Best graph

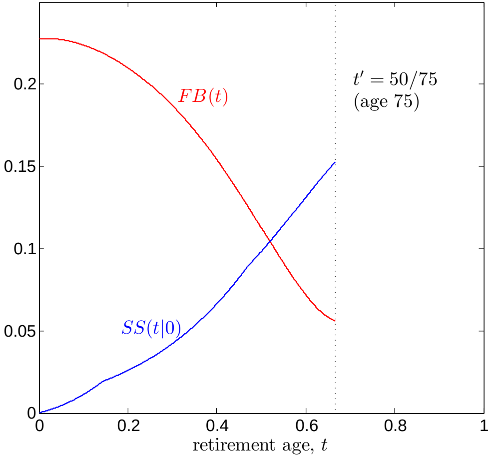
Welfare Cost and Policy Analysis

	Full Insurance (Δ)	Timing Premium (Δ_0)
Timing Risk Only		
Baseline: No SS	4.26%	2.95%
SS: OASI only	4.05%	2.80%
Simple policy rule	2.74%	1.84%
50-50 policy rule	3.34%	2.27%
Calculator		4.17%
Timing Risk and Disability Risk		
SS: OASI and SSDI	3.94%	2.27%

First Best graph

U.S. Social Security vs. First-Best Insurance

Figure:



$FB(t)$ and $SS(t|0)$ are lump-sum payments at the date of retirement, t.

back

Conclusions

- Uncertainty about the retirement date is major financial risk that has received relatively less attention than other major sources of earnings risks.
- Retirement timing uncertainty is large and costly:
  - Individuals would be willing to pay 4% of their total lifetime consumption to fully insure themselves against retirement timing risk, and 3% just to know their date of retirement.
- Existing social insurance programs provide little insurance against retirement timing risk.