Revisiting the Hump-Shaped Wage Profile: Implications for Structural Labor Supply Estimation

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QSPS 2013 Summer Workshop

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What does this profile look like?

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Figure: From Attanasio and Weber (JPE, 1995)

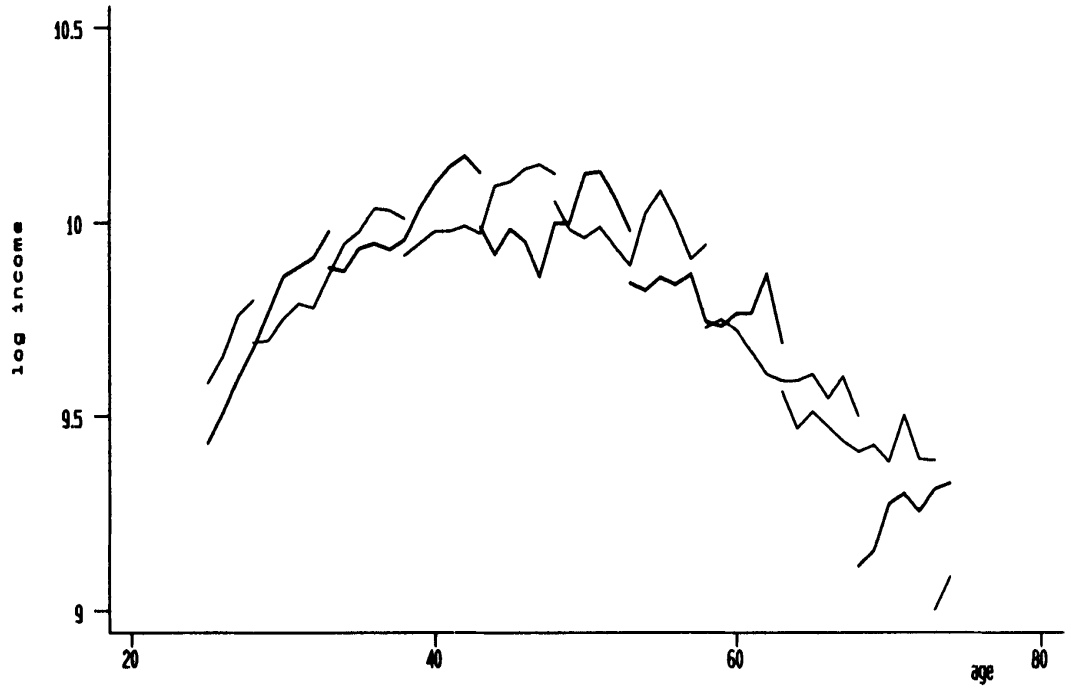
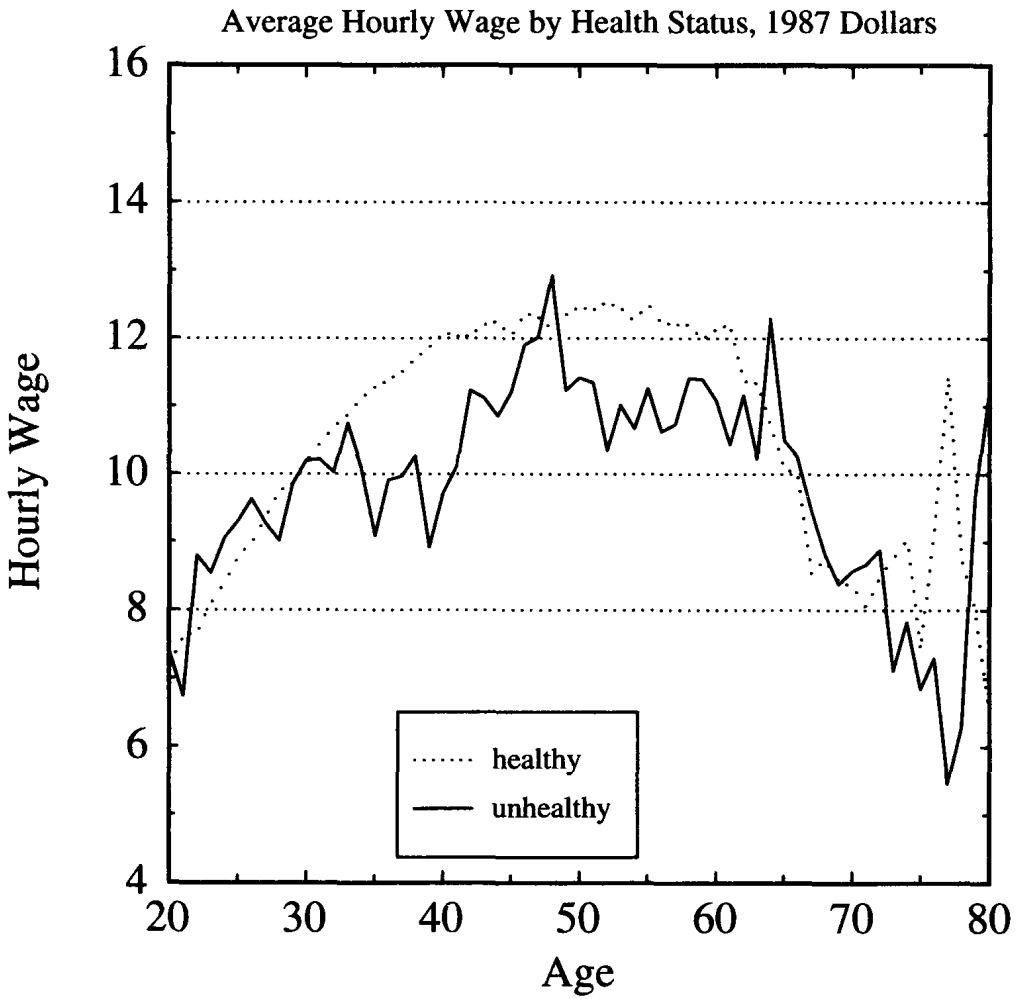


FIG. 1.—*a*, Log of household nondurable consumption. *b*, Log of after-tax household income.

Motivation

Figure: From French (REStud, 2005)



Overview of Results

1. Data Analysis

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- Two thirds of individuals transit from full-time work into retirement
- For individuals who partially retire there is a one-off 34% wage drop at the point of transition from full-time into part-time work. ▸ graph
- The hump-shaped profile often found in the literature is a result of aggregation over workers who transit into partial retirement at different ages.

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- I will test the empirical implications of the 3 models to determine which of them is/are compatible with the data.
- The offered wage profile is nondecreasing in age at older ages.

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- Focus on the intertemporal elasticity of substitution of labor supply (i.e.s.).
- I develop a life cycle model of consumption and labor supply choices to measure the sensitivity of estimates of the i.e.s. to misspecification of the wage profile.
- Using a hump-shaped wage profile as a proxy for the flat offered wage path leads to upward bias in estimates of i.e.s. of 30 to 130%

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Health and Retirement Study

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- An individual becomes partially retired when he is first observed working part-time
- Partial retirement is an absorbing state

Observed Wage Profiles

Log wage profile:

$$w_{it} = W(Age_{it}) + X_{it}\beta_w + u_{it}$$

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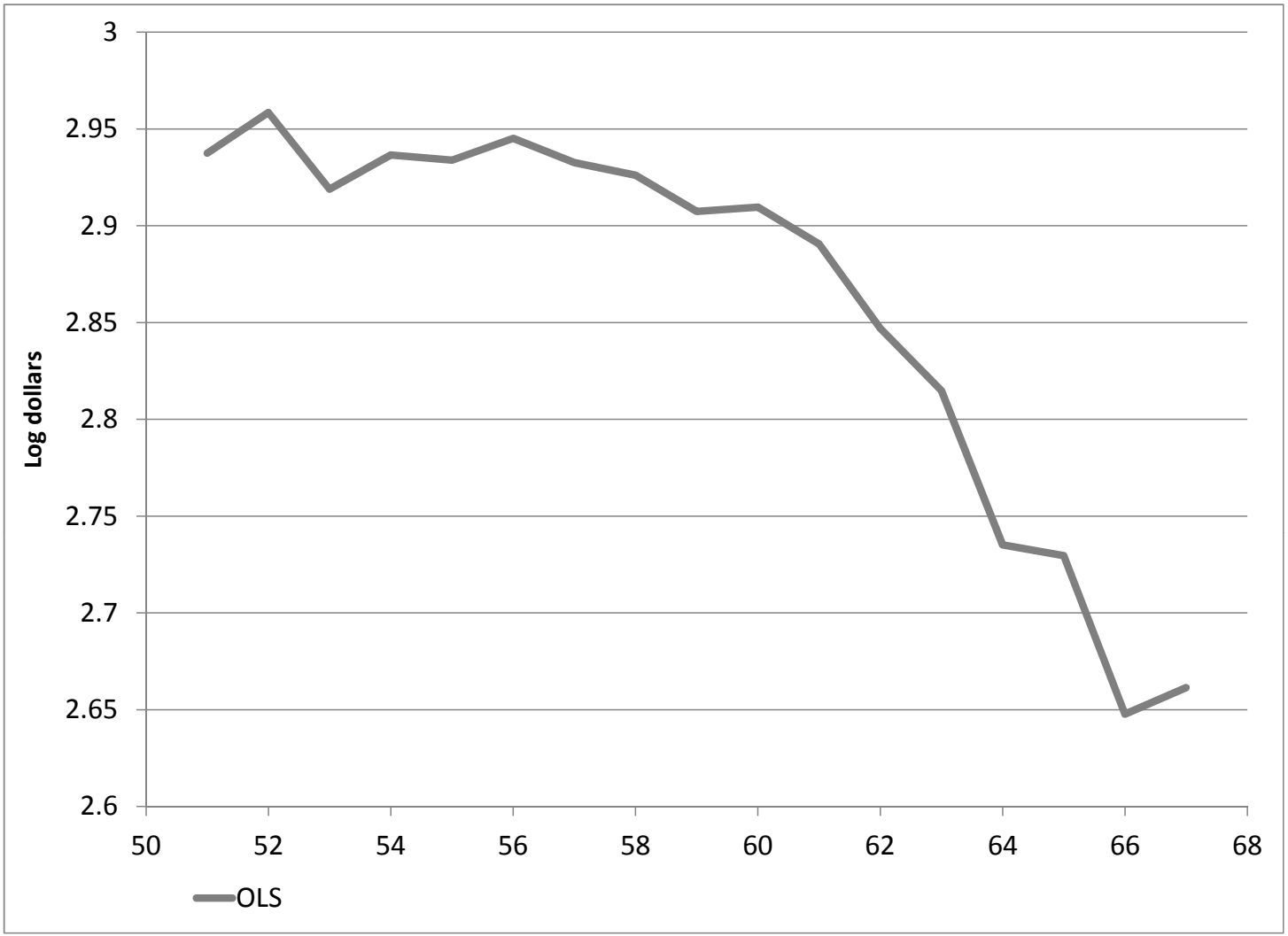
Figure: Average Wage Profile, FE



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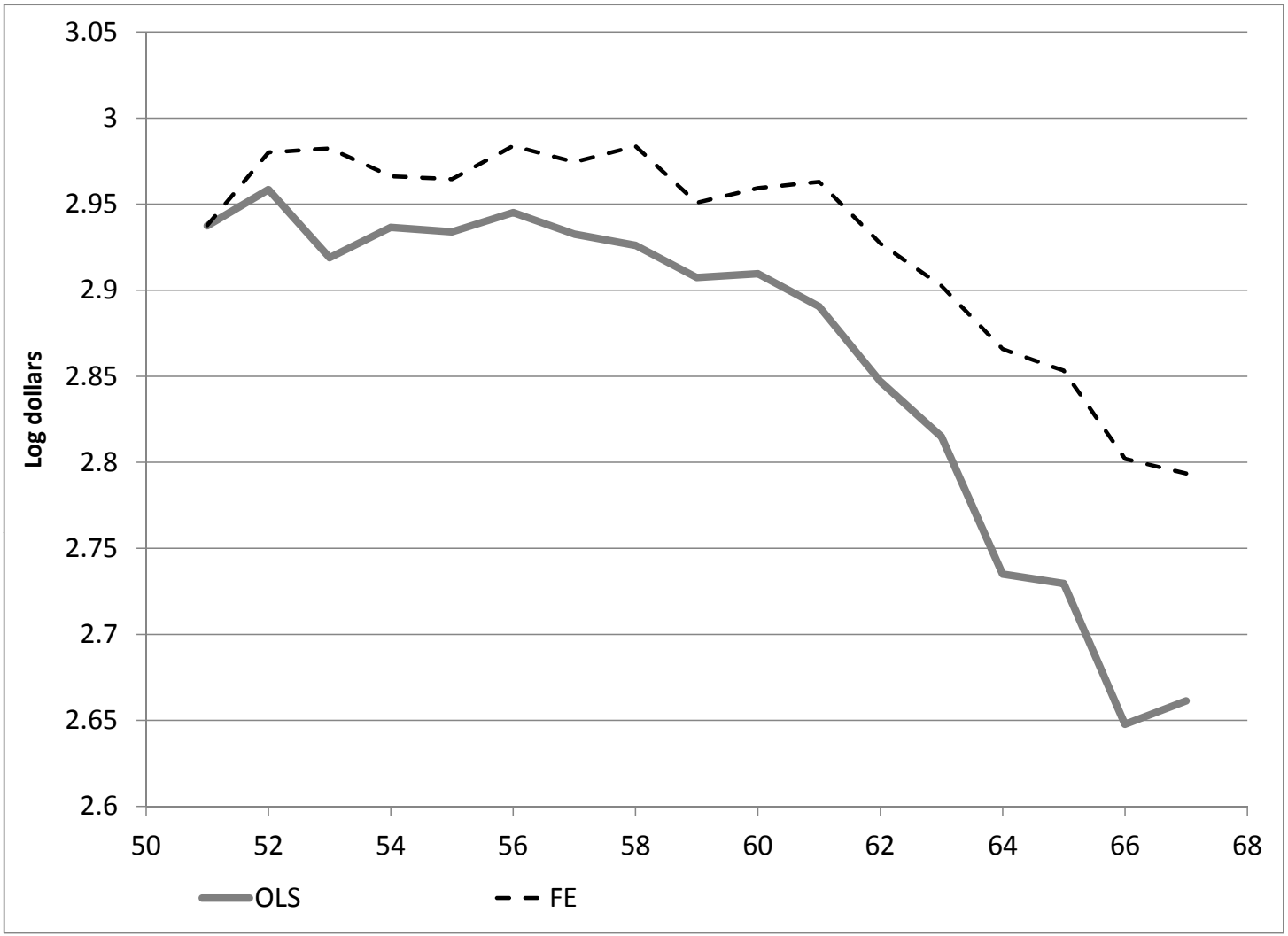

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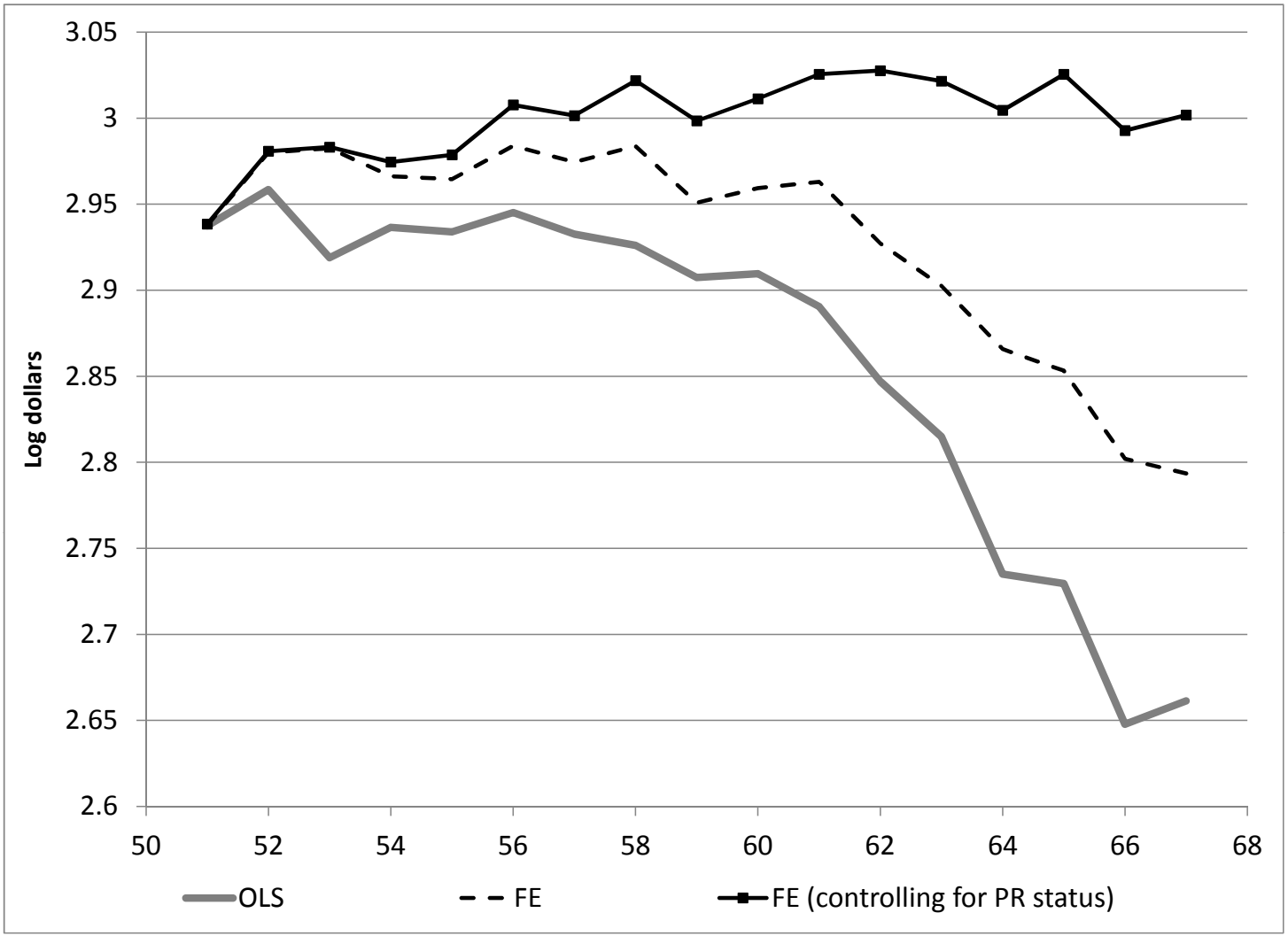

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Table: Dependent variable: log real hourly wages

	OLS	FE	FE
PR=1			
age≥59	-0.019	-0.033**	
	(0.024)	(0.016)	
age≥60	0.002	0.008	
	(0.024)	(0.017)	
age≥61	-0.019	0.004	
	(0.024)	(0.016)	
age≥62	-0.044	-0.036**	
	(0.028)	(0.018)	
age≥63	-0.032	-0.025	
	(0.033)	(0.021)	
age≥64	-0.080**	-0.037	
	(0.036)	(0.022)	
individual-year obs.	7,915	7,500	
# of individuals		1,834	
Tests of Joint Significance (p-value):			
Age≥52-Age≥60			
Age≥61-Age≥67			

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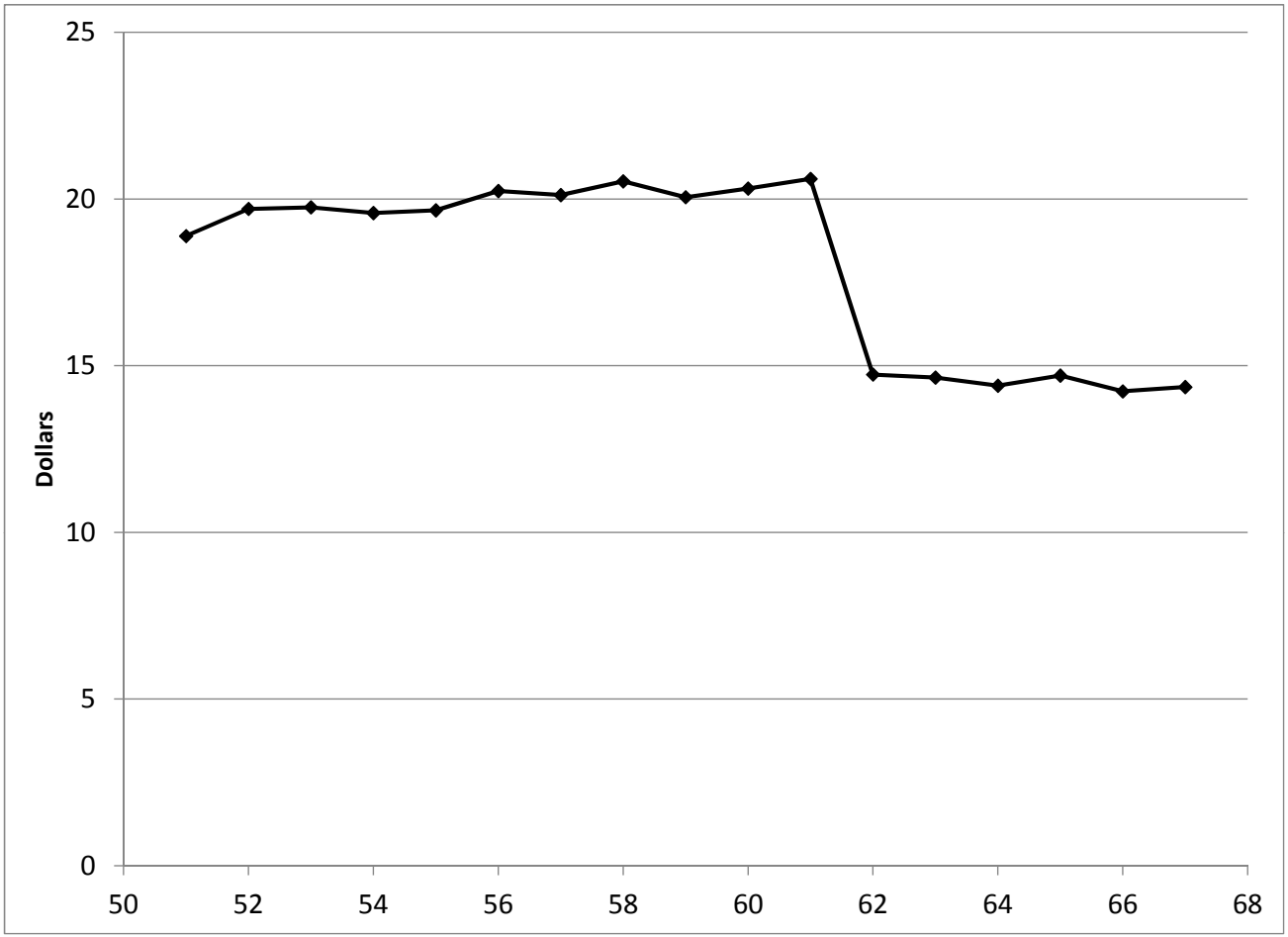
Figure: Predicted wage profile for an individual who enters PR at age 62



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FT and PT Log Wage Profiles

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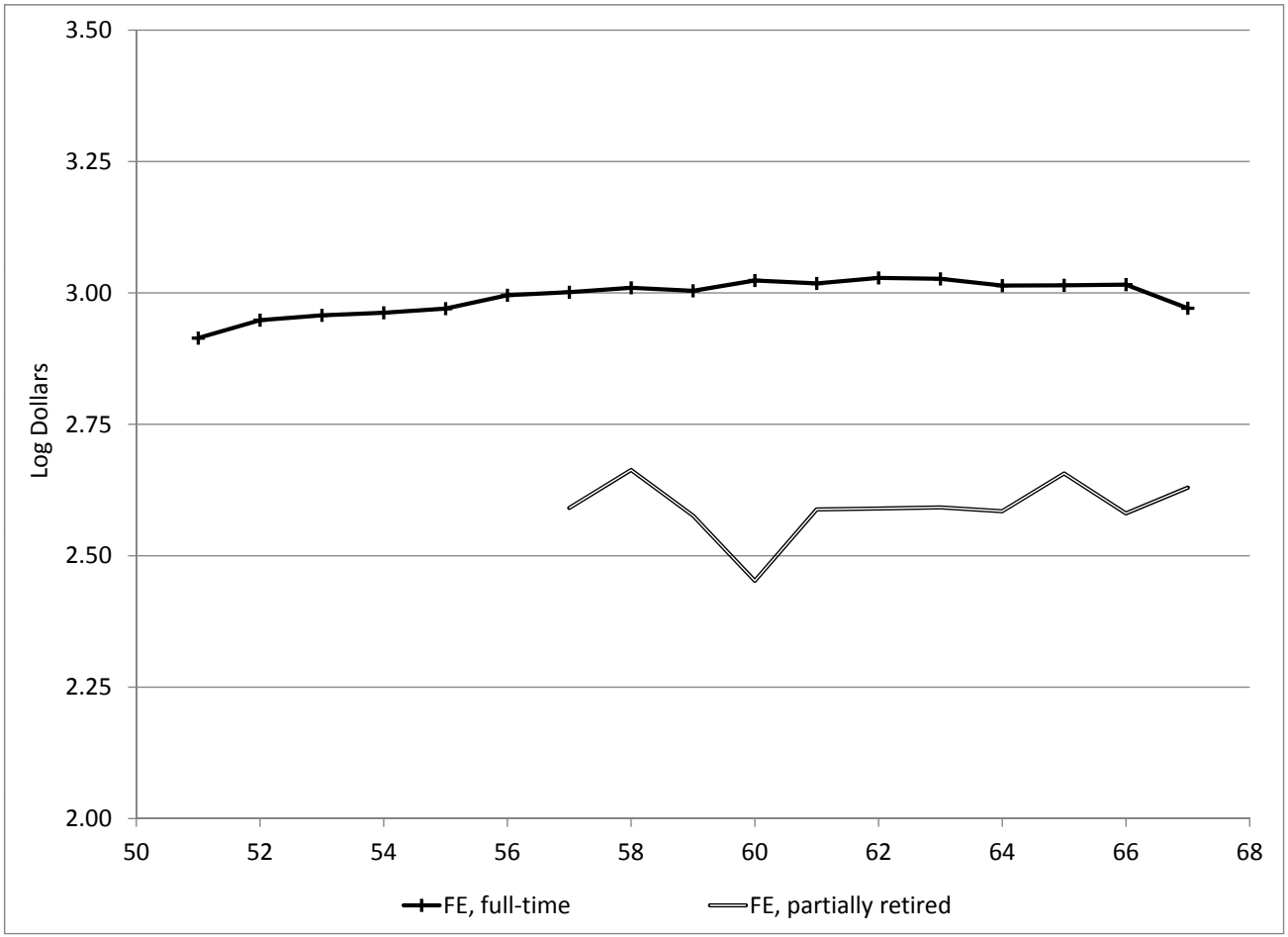
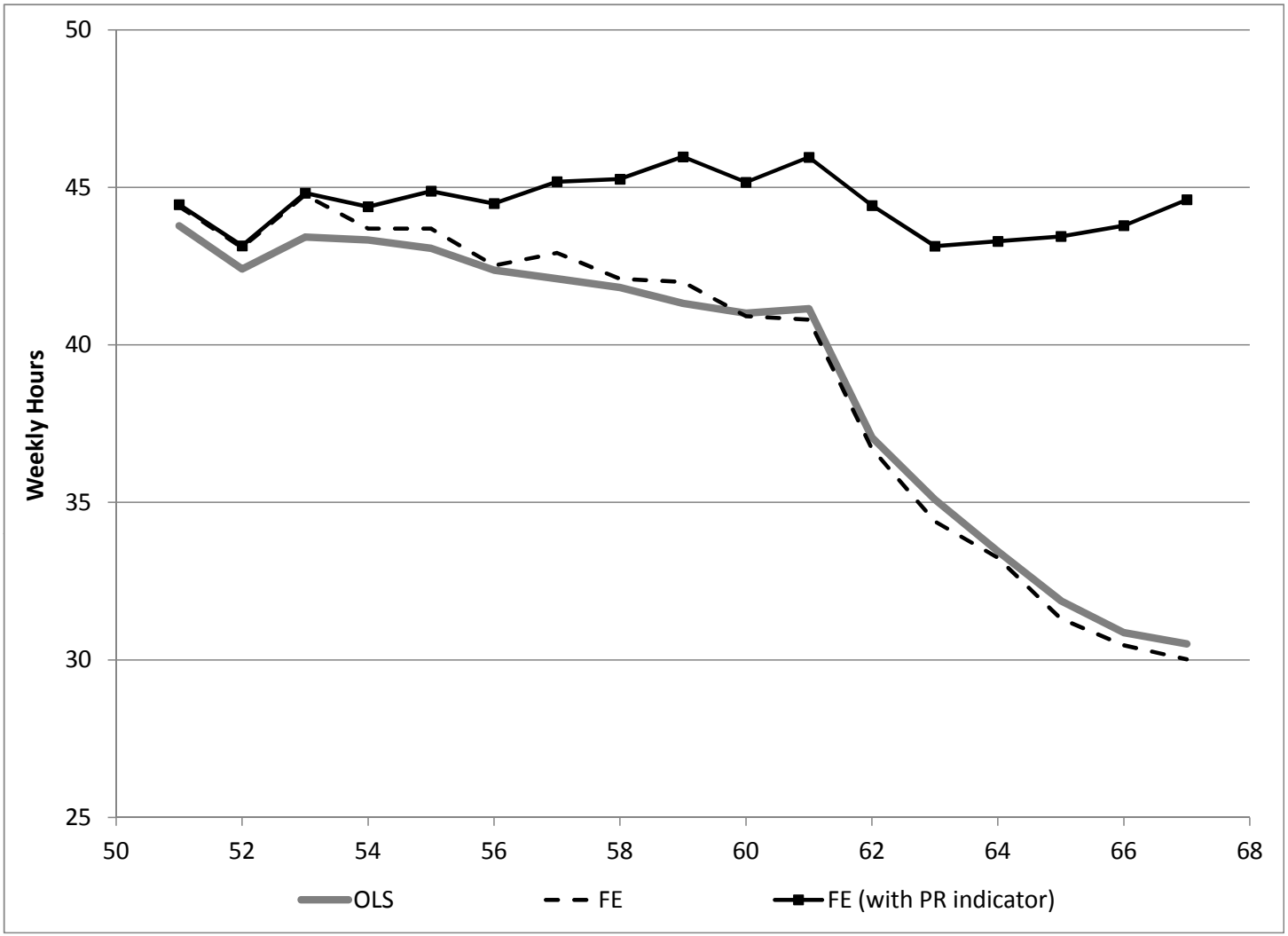


Observed Wage Profiles

Figure: Average Hours Profile, FE, with and without controls for PR status



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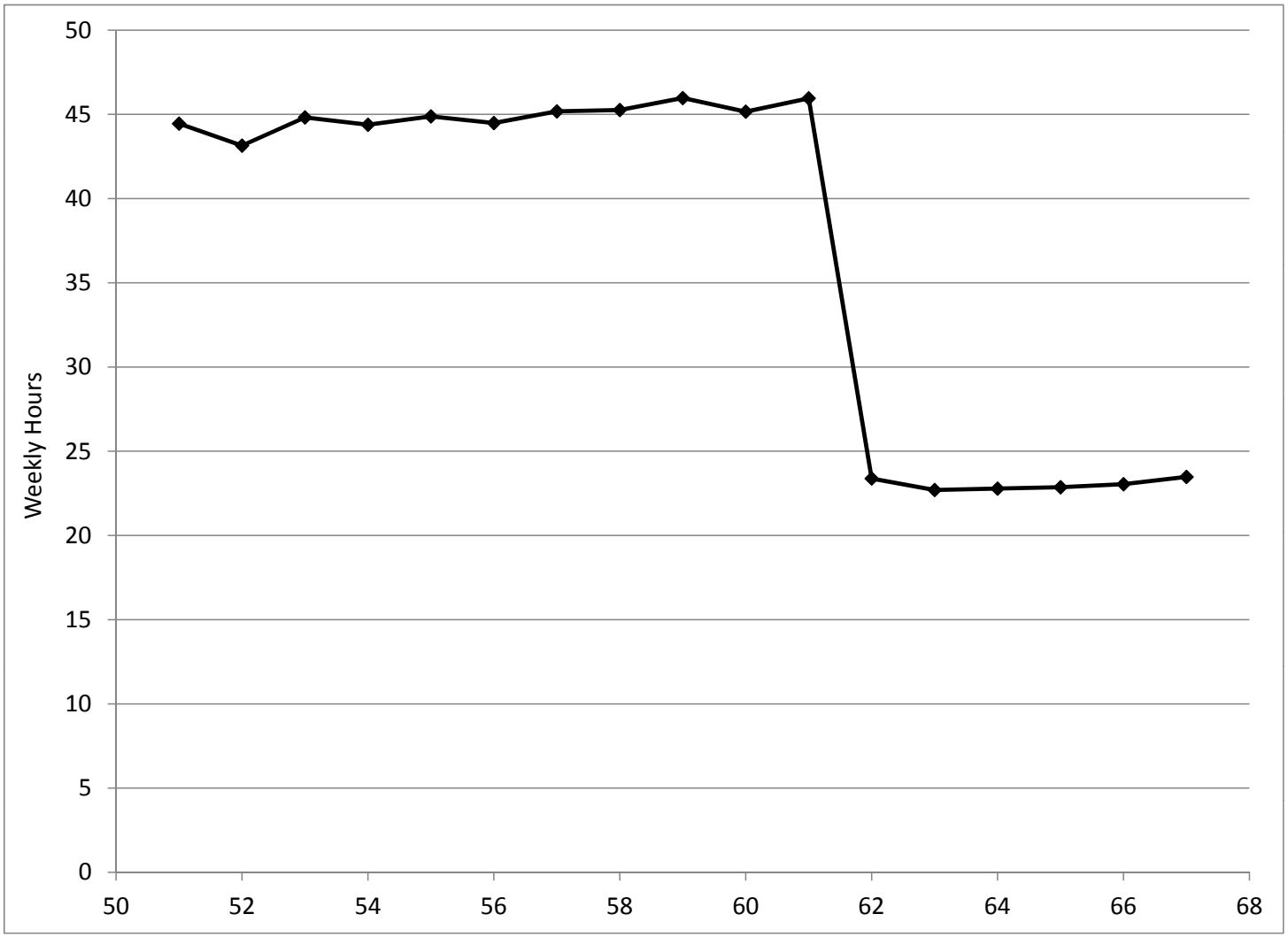

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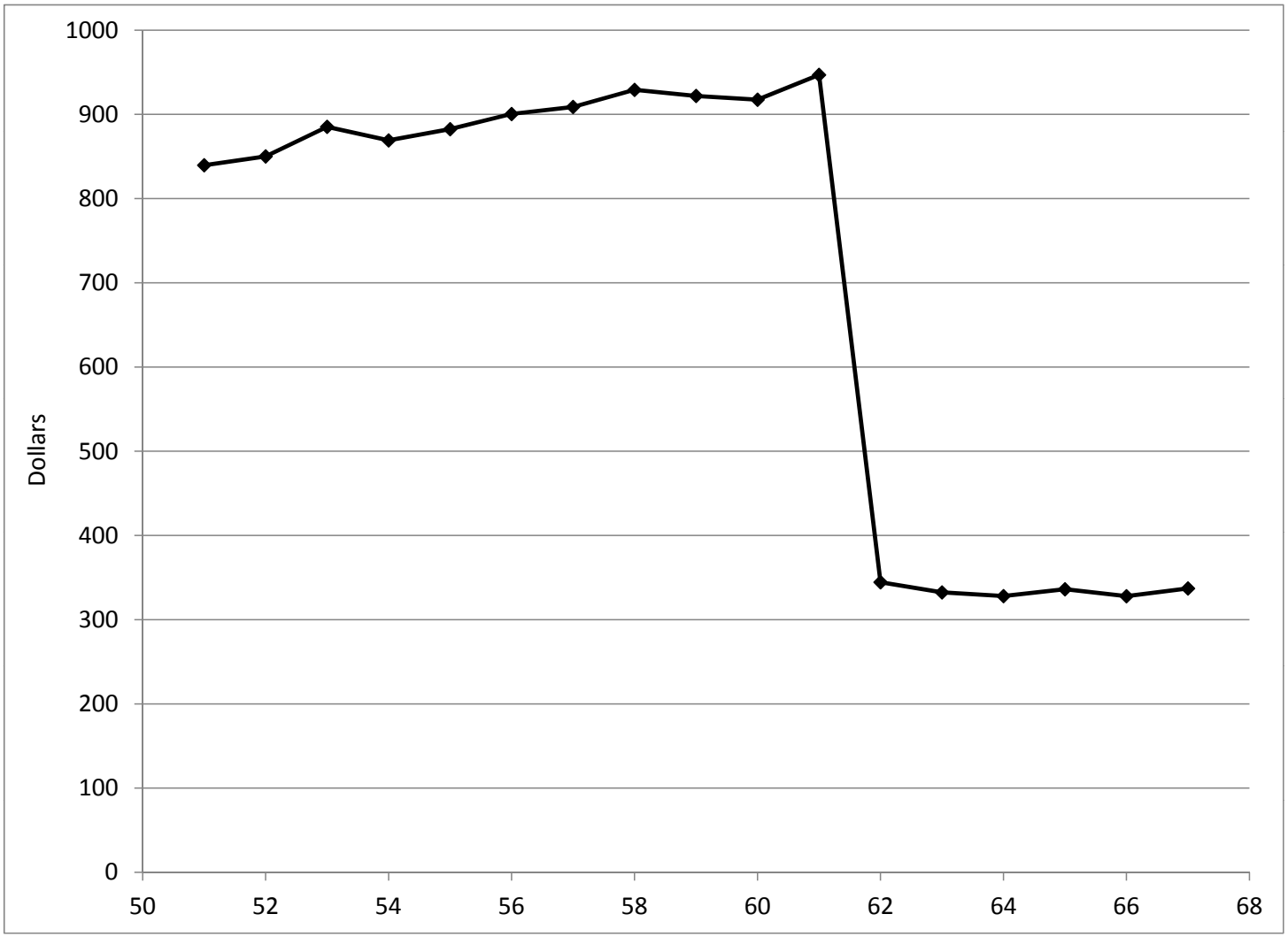

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  - Retirement transitions do not occur in response to declining wages

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Rogerson and Wallenius (AER, forthcoming) have suggested using retirement behavior to estimate i.e.s.

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Agents maximize expected discounted utility:

$$\max_{\{c_t\}_{t=t_0}^{T},\{h_t\}_{t=t_0}^{R<T}} E_{t_0} \sum_{t=t_0}^{T} \beta^{(t-t_0)} \left\{ \frac{c_t^{(1-\rho)}}{1-\rho} + B_t \frac{l_t^{(1-\frac{1}{\gamma})}}{1-\frac{1}{\gamma}} \right\}, \tag{1}$$

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where:

leisure is a linear function of hours worked (h_t)

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where:

leisure is a linear function of hours worked (h_t)

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(1) is maximized subject to:

$$A_{t+1} + c_t = \exp(w_t)h_t + SS_t + (1+r)A_t, \tag{2}$$

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$$w_{it} = f_i + W(t) + u_{it},$$
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Part time workers' hourly wage is $(1 - \alpha)w_{it}$

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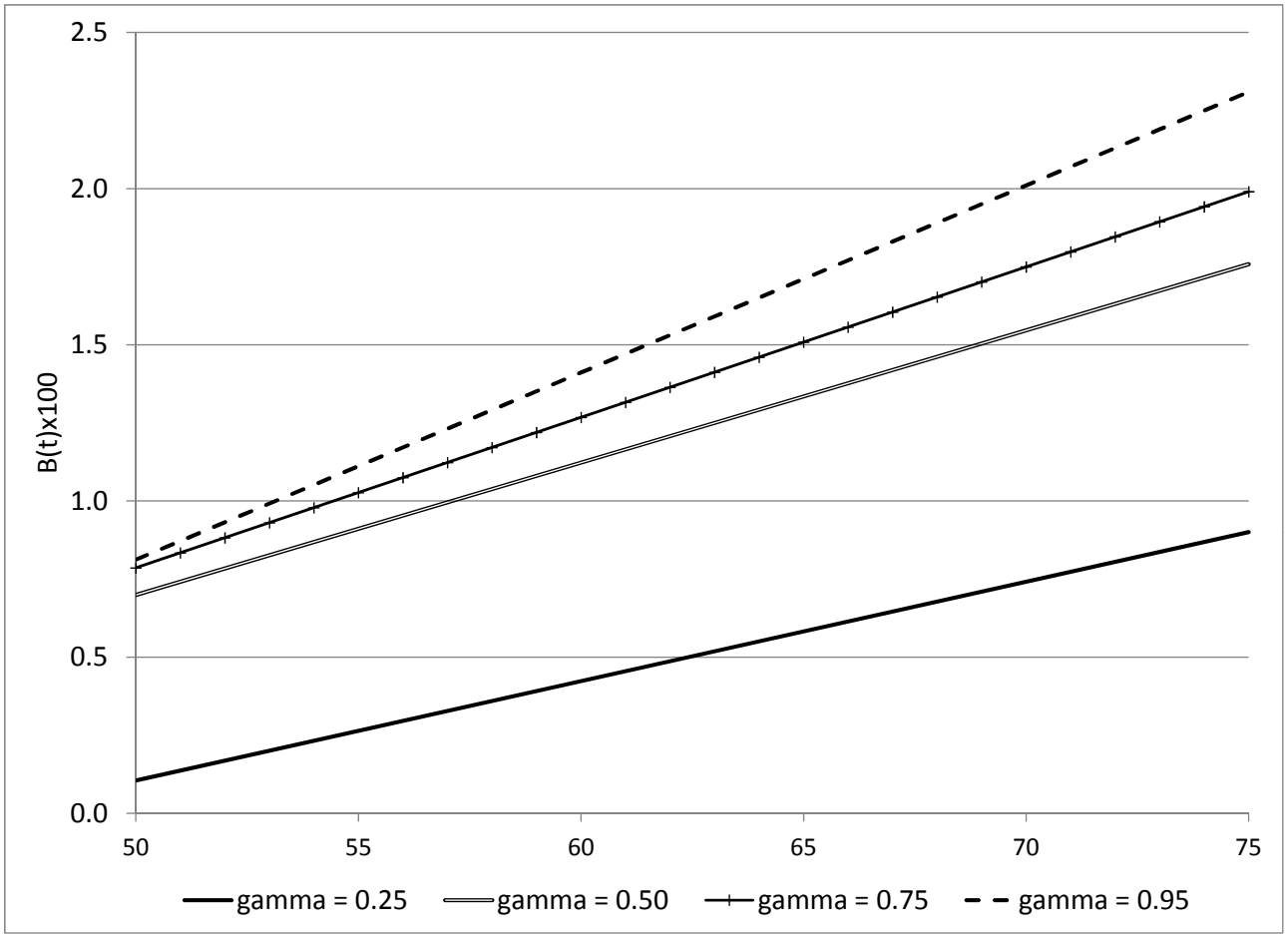
In total, 6 parameters are calibrated.

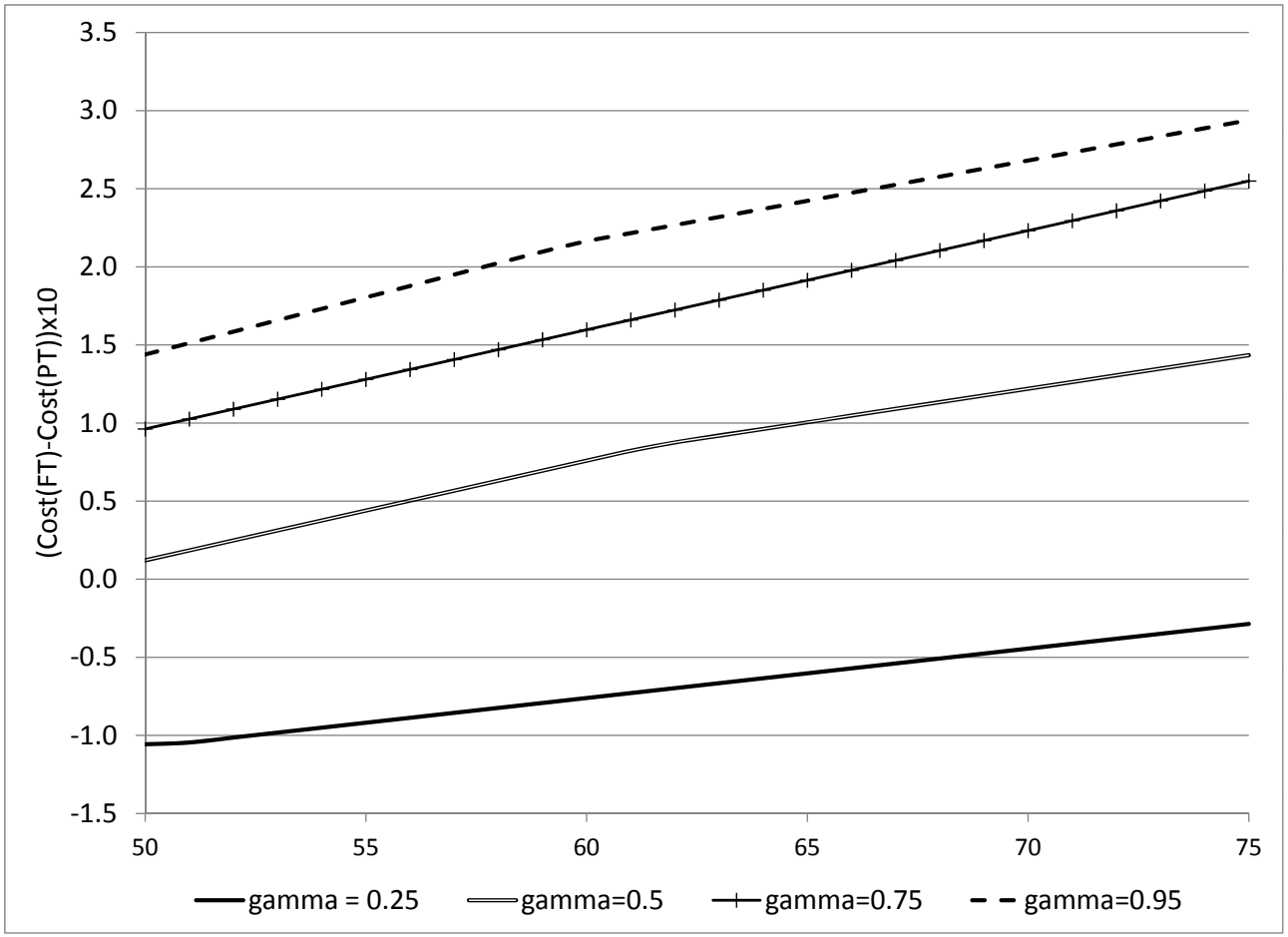
Calibrated Parameters: Taste for Leisure

Figure: Calibrated B(t) for different values of γ



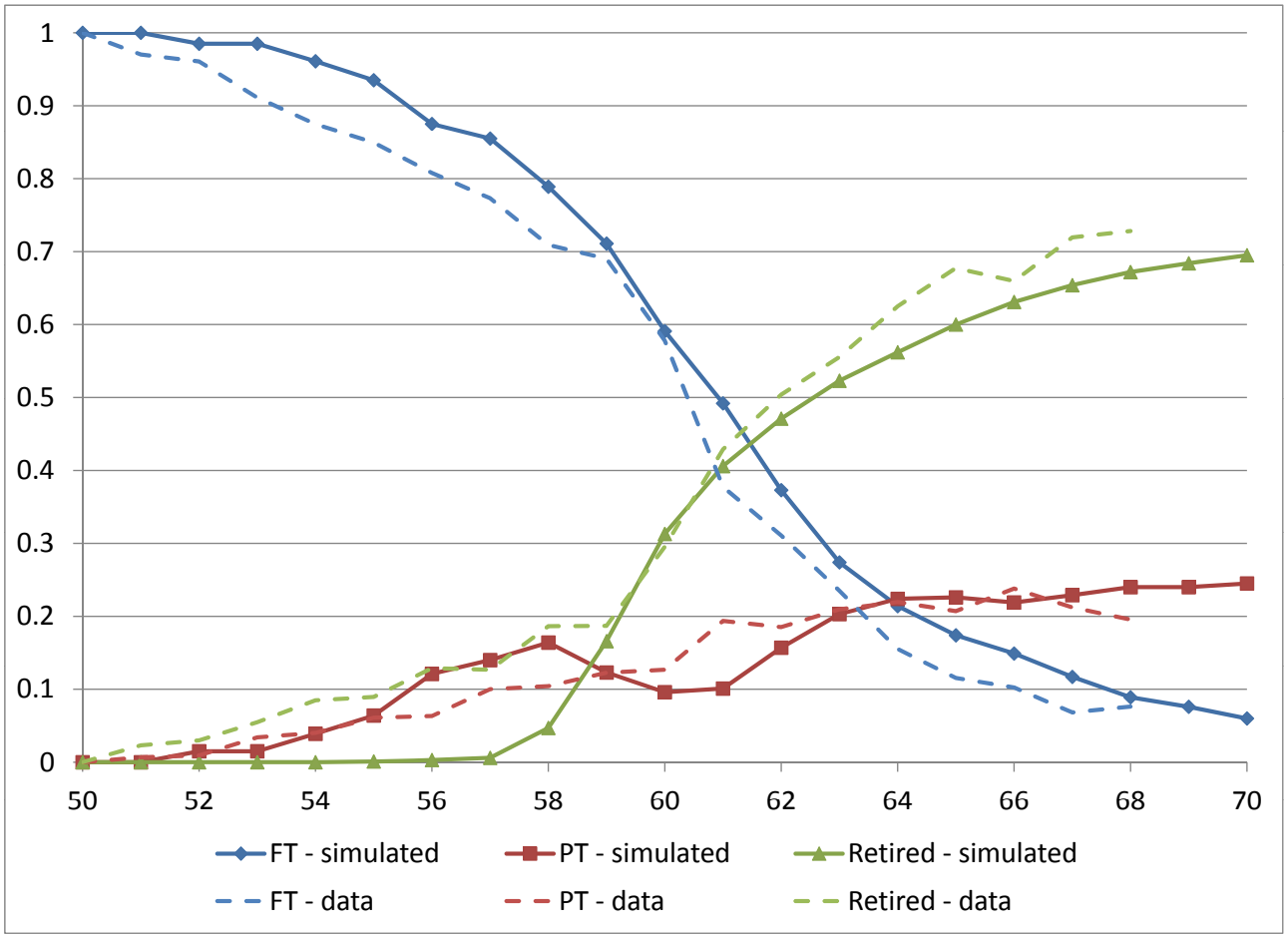
Calibrated Parameters: Relative Cost of FT vs PT Work

Figure: Calibrated $(\phi(FT) - \phi(PT))$ for different values of γ



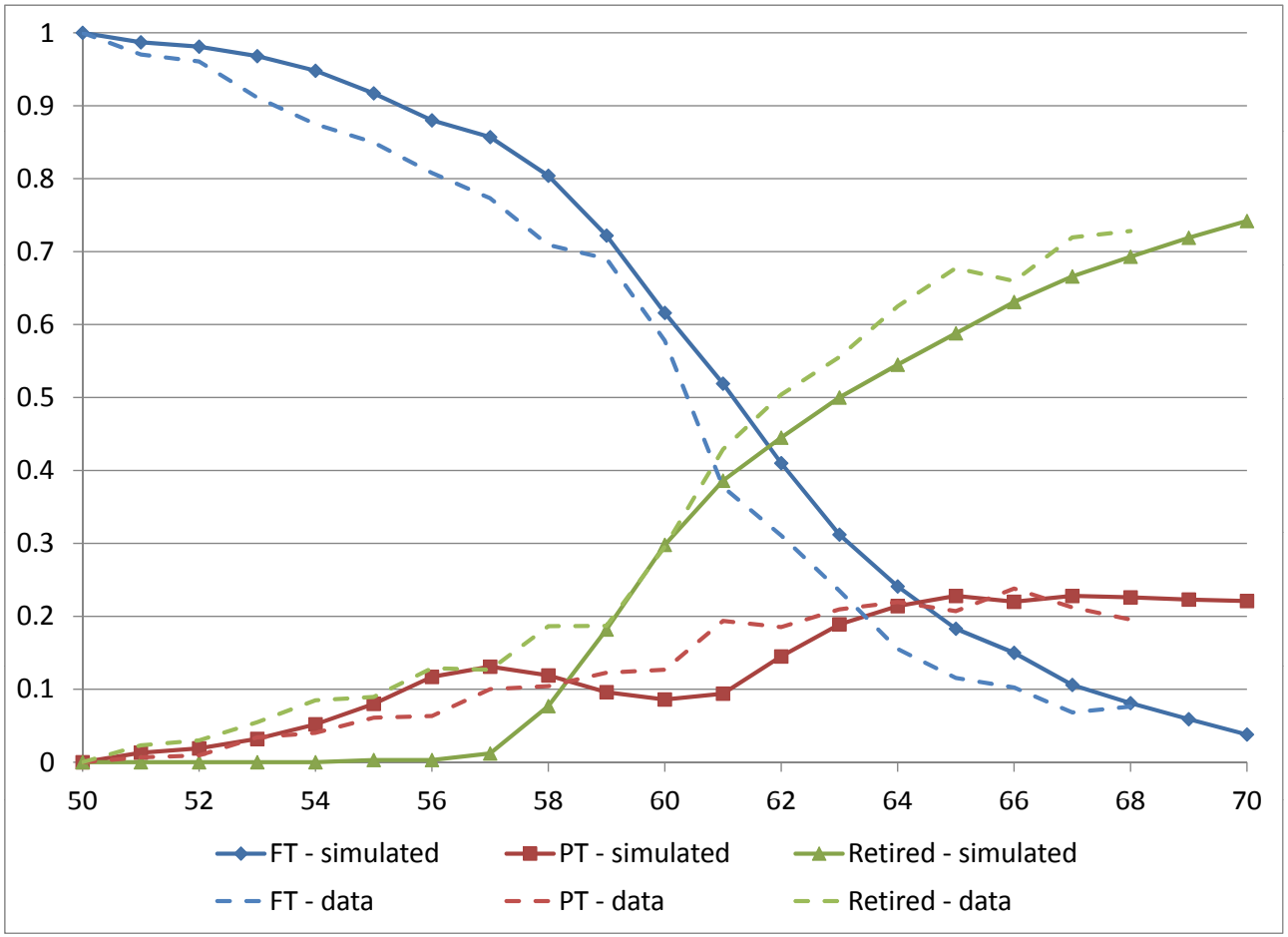
Baseline fit

Figure: Baseline model fit for $\gamma = 0.25$



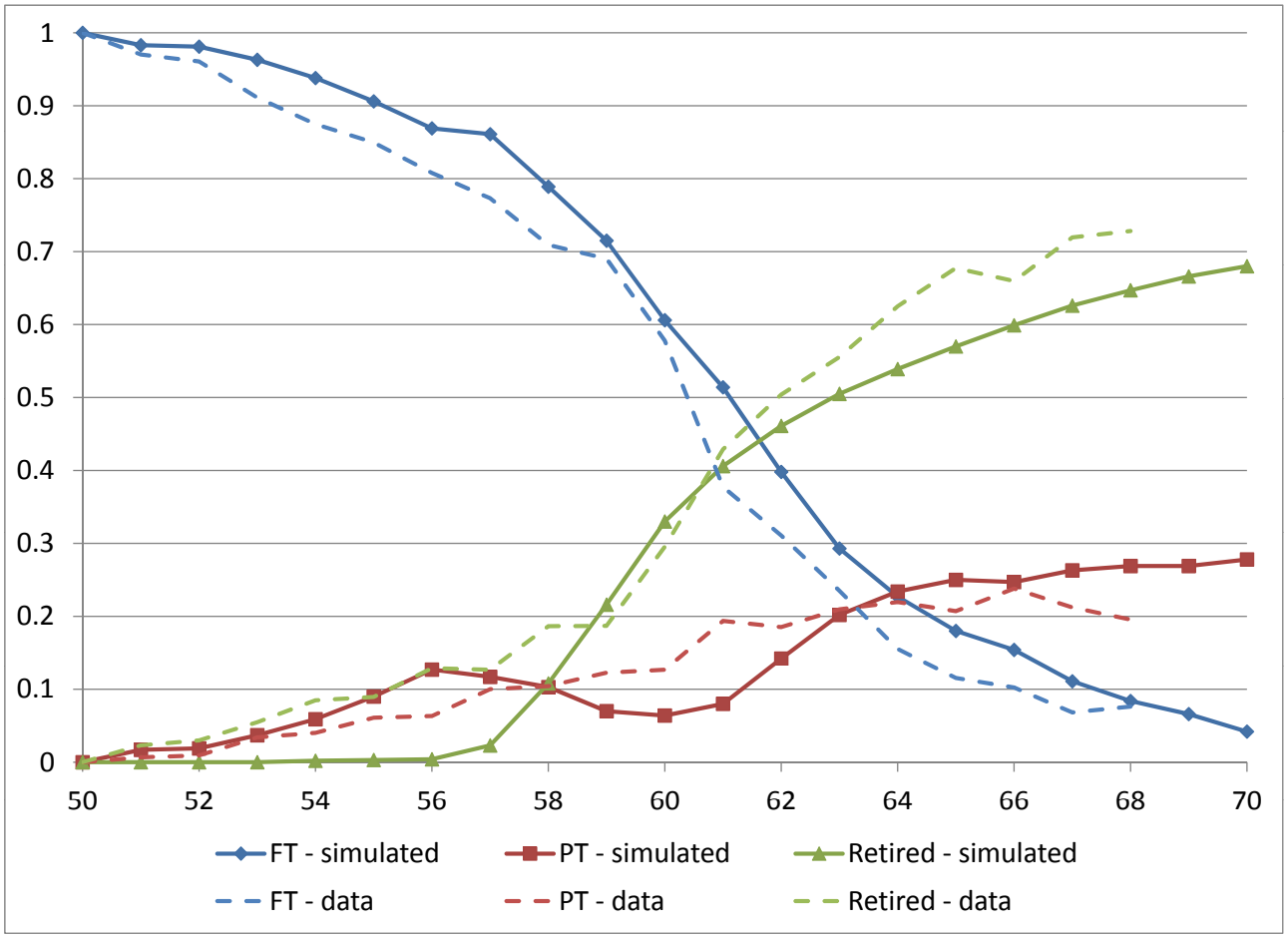
Baseline fit

Figure: Baseline model fit for $\gamma = 0.50$



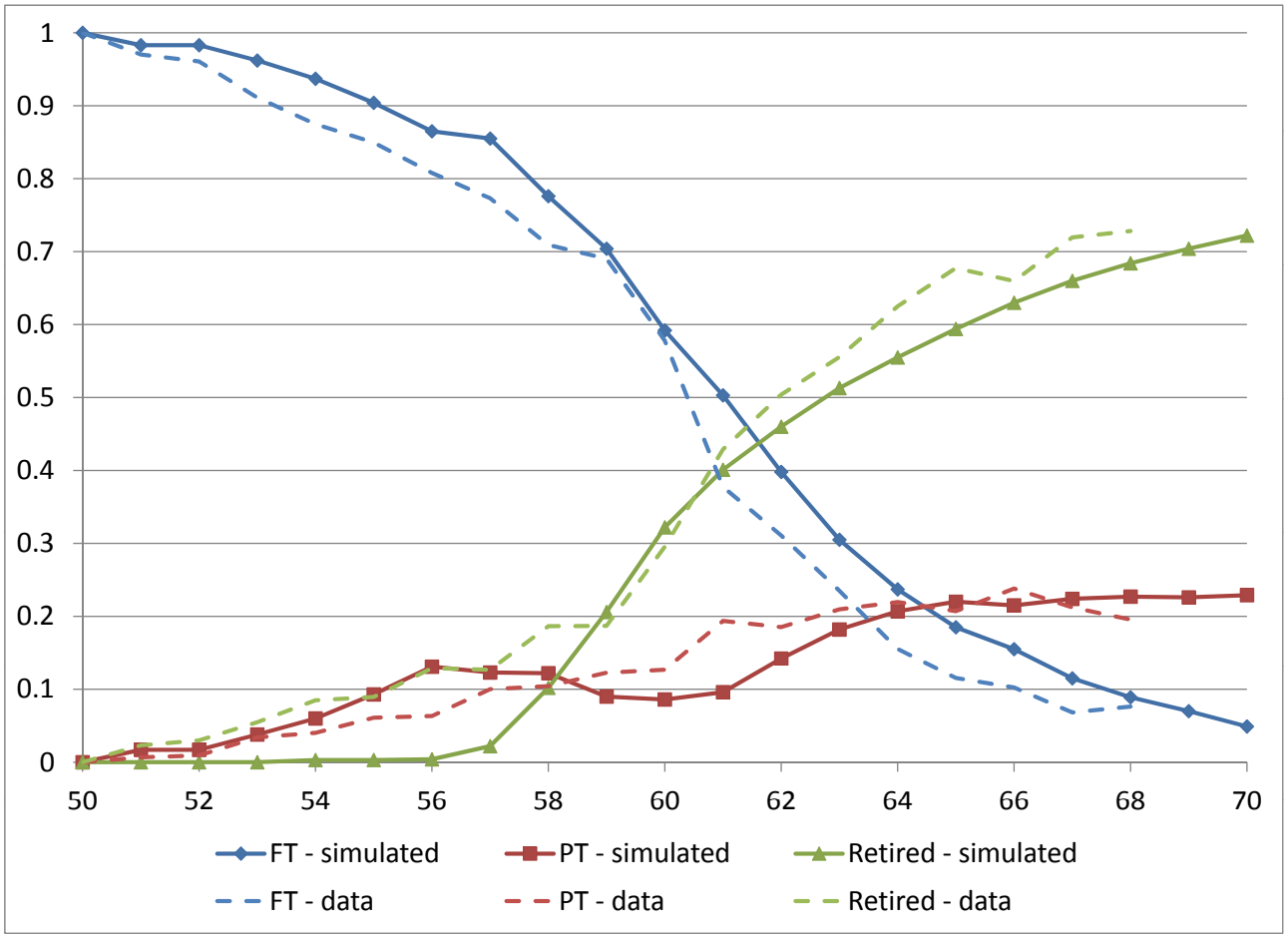
Baseline fit

Figure: Baseline model fit for $\gamma = 0.75$



Baseline fit

Figure: Baseline model fit for $\gamma = 0.95$



Results II

Table: Simulation results

	$\gamma = 0.25$	$\gamma = 0.50$	$\gamma = 0.75$	$\gamma = 0.95$
0. Baseline				
θ_w (Δw_{it} upon PR)				
θ_h (ΔH_{it} upon PR)				
I. Declining age-wage profile				
θ_w (Δw_{it} upon PR)				
θ_h (ΔH_{it} upon PR)				
$\hat{\gamma}$				

Results II

Table: Simulation results

	$\gamma = 0.25$	$\gamma = 0.50$	$\gamma = 0.75$	$\gamma = 0.95$
0. Baseline				
θ_w (Δw_{it} upon PR)	**-0.343**	**-0.341**	**-0.340**	**-0.340**
θ_h (ΔH_{it} upon PR)				
I. Declining age-wage profile				
θ_w (Δw_{it} upon PR)				
θ_h (ΔH_{it} upon PR)				
$\hat{\gamma}$				

Results II

Table: Simulation results

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0. Baseline				
θ_w (Δw_{it} upon PR)	**-0.343**	**-0.341**	**-0.340**	**-0.340**
θ_h (ΔH_{it} upon PR)	**-0.563**	**-0.559**	**-0.556**	**-0.555**
I. Declining age-wage profile				
θ_w (Δw_{it} upon PR)				
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I. Declining age-wage profile				
θ_w (Δw_{it} upon PR)				
θ_h (ΔH_{it} upon PR)	**-0.579**	**-0.576**	**-0.579**	**-0.578**
$\hat{\gamma}$				

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I. Declining age-wage profile				
θ_w (Δw_{it} upon PR)	-0.005	-0.003	-0.004	-0.004
θ_h (ΔH_{it} upon PR)	**-0.579**	**-0.576**	**-0.579**	**-0.578**
$\hat{\gamma}$				

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I. Declining age-wage profile				
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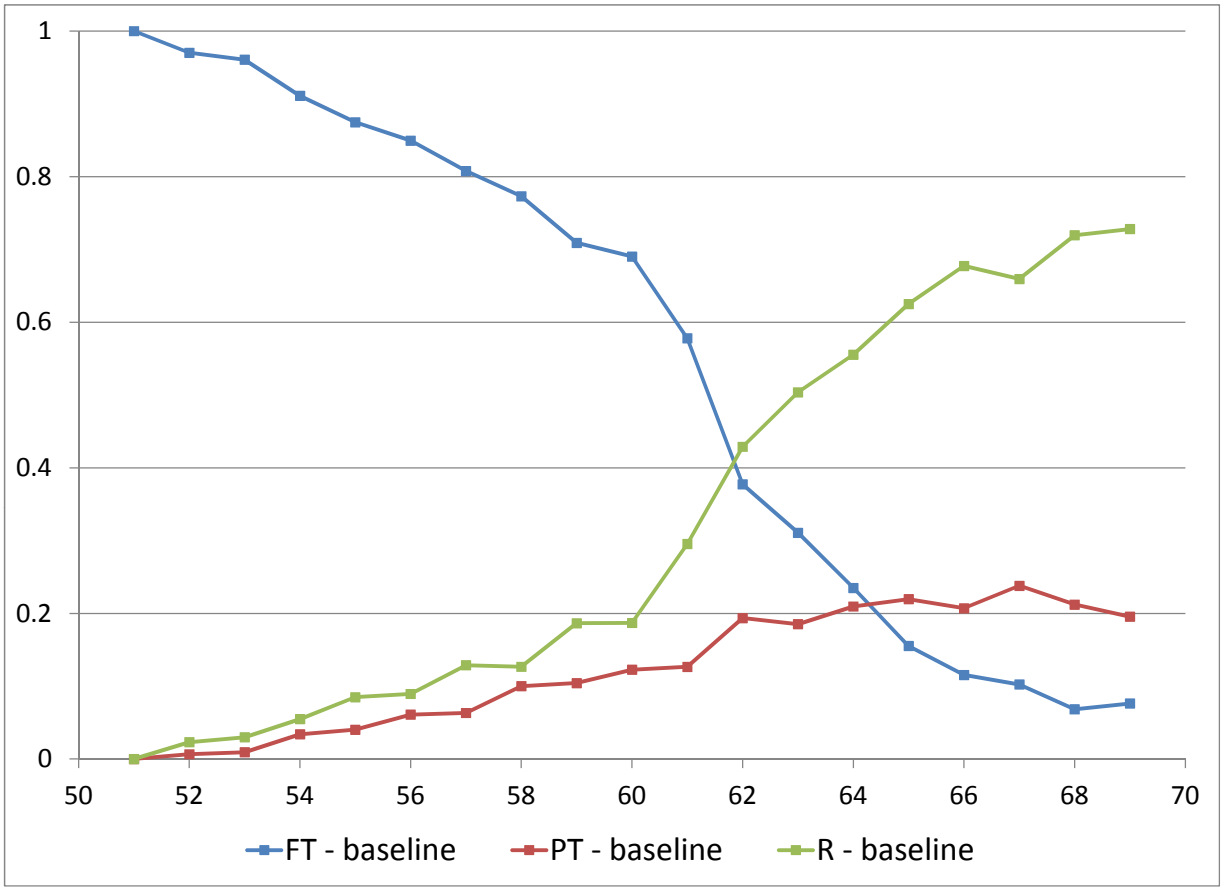
θ_h (ΔH_{it} upon PR)	**-0.579**	**-0.576**	**-0.579**	**-0.578**
$\hat{\gamma}$	0.321	1.00	1.551	2.203

Conclusions

- The offered wage profile is not hump-shaped, but flat, at older ages.
- Wage and hours declines upon partial retirement are *endogenously* determined for most individuals.
- Assuming that hours choices are a response to an exogenously and smoothly declining wage profile leads to severely biased estimates of preference parameters.

Partial Retirement

Figure: Total/FT/PT participation rates by age. HRS.



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FT and PT Log Wage Profiles

Figure: Log Wage Profiles for Different Specifications Using Simulated Data. $\gamma = 0.5$