The Effect of Expected Longevity on Retirement and Social Security Claiming

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Abstract

This study examines the effect of expected longevity on older American's decisions of retirement and Social Security benefits claiming. Instead of using self-rated survival probabilities as the measure of longevity expectations, which suffer from measurement errors, I predict expected longevity from a Gompertz survival model with a rich set of variables such as parental mortality information, current health and socioeconomic variables for the respondents in Health and Retirement Study. The survival model incorporates the nature of the aging process and reflects the deteriorating health stock at older ages. By inserting the predicted longevity as one of the independent variables in equations for the joint decisions to retire and claim Social Security benefits, I find that the longer a person expects to live, the later he/she retires. The effect on claiming Social Security is not significant because of the maximum age cap of delaying benefit take-up.

Introduction

Life expectancy in United States has grown dramatically. It grows from 44.4 in 1900 to 74.8 in 2005 for men and is projected to be 83 in 2100 (Bell and Miller, 2005). As people are living longer, sufficient and efficient provisions for retirement are more important. A good retirement plan therefore requires a precise prediction of one's own longevity. It could save one from outliving his or her retirement wealth, or not able to collecting enough Social Security benefits before death. From the point of view of public policy, increasing life expectancy at older ages impose extra challenge on the financial liability of the Social Security system, which also depends on the life expectancy of beneficiaries and on their choices in response to greater life expectancy.

Main Objectives

- Do people really delay retirement and Social Security benefit take-ups if they expect to live longer?
- Motivations of Later Retirement
  - Longer retirement life to finance.
  - Better health and working environment of older workers.
  - Higher Social Security benefit levels.

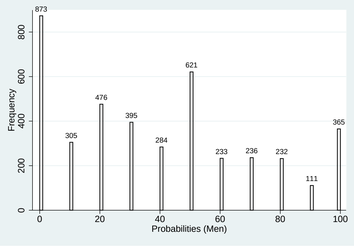
How to Measure Expected Longevity?

- Actual observed longevity is endogenous to health, wealth, retirement decisions, and other unobserved factors, such as genetic factors, life styles, etc.
- Subjective survival rate is endogenous too. It is correlated with age, education, cognitive abilities, social isolations, etc.(Kaplan and Camocho, 1983) and peer comparisons. (Benítez -Silva and Ni, 2007).
- Measurement errors in subjective survival rates: focal points (Figure 1.) and conflicting reports (Table 1.)

Table 1. Inconsistent reports of subjective survival rates

P(live75)<P(live85)	Number of misreporting	HRS population	Percentage of misreporting
Wave 1992	262	9763	2.68%
Wave 1994	455	9415	4.83%
Wave 1996	567	9165	6.19%
Wave 1998	1466	8935	16.41%

Figure 1. Probabilities of Living to 85+ in 1992



My Approach

Two steps:

1. Use the survival curve Health and Retirement Study respondents are experiencing to predict their **"objective" longevity** based on their parents' mortality information, their own time-varying health, wealth and social-economic variables.
2. Insert this predicted longevity in the retirement and Social Security take-up equations.

Advantages:

- Survival Model reflects the dynamic of aging process in the population.
- Predicted longevity near retirement ages is relevant for retirement decisions and not subject to the respondents' manipulations.

Data

Health and Retirement Study (HRS)

- Health and Retirement Study (HRS) is a longitudinal panel study that surveys a national representative sample of older Americans who were born in 1931-1941 every two years since 1992 (still ongoing). I use all 10 waves from 1992 to 2010.
- Among 9763 HRS core respondents, 2211 people died during 18 interview years.

Model Specifications

Step 1. Gompertz Survival Model (See Table. 2)

Instantaneous hazard:

$$h(t_i, X_i, \alpha_i) = \alpha_i e^{\gamma t_i} e^{X_i \beta}$$

where α_i is the individual heterogeneity (frailty), which follows inverse-Gaussian distribution with mean 1 and variance θ. γ is the shape parameter.

Survival function:

$$S(t_i, X_i, \alpha_i) = \int_0^\infty [S(t_i, X_i)]^{\alpha_i} g(\alpha_i) d\alpha_i$$

where $S(t_i, X_i) = e^{-\frac{1}{\gamma} e^{X_i\beta}[e^{\gamma t_i} - 1]}$.

Predicted Longevity/Median Survival Time: The T_i which makes $S(T_i, X_i, \alpha_i) = 0.5$

Definition of durations: Number of years currently survived. For people who are still alive in the last interview, they are right-censored.

Step 2. Bivariate Probit for 62-year-old workers (See Table. 3)

Latent Variable Setup for joint decisions of retirement and Social Security Claiming:

$$\begin{cases} Claim^*_{it+1} = \alpha_0 + \alpha_1 X_{1it} + \gamma_1 \hat{Longevity}_{it} + \delta_1 Ret_{it} + u_{1it} \\ Ret^*_{it+1} = \beta_0 + \beta_1 X_{2it} + \gamma_2 \hat{Longevity}_{it} + \delta_2 Claim_{it} + u_{2it} \end{cases}$$

$$Claim_{it} = \begin{cases} 1 & \text{if } Claim^*_{it} > 0 \\ 0 & \text{if } Claim^*_{it} \le 0 \end{cases} \quad Ret_{it} = \begin{cases} 1 & \text{if } Ret^*_{it} > 0 \\ 0 & \text{if } Ret^*_{it} \le 0 \end{cases}$$

where u_1 and u_2 follow joint standard normal distribution with correlation coefficient ρ. $Claim_{it}$ is absorbing status, while Ret_{it} is non-absorbing.

Definition of Retirement:

- Departure from labor market
- Not actively looking for jobs or work in any form (different from unemployment).
- Allow individuals to go back to work after initial retirement, i.e., non-absorbing retirement status.

Definition of Claiming Social Security:

- Age eligible: reach 62.
- Currently receiving Social Security paychecks.
- Self-reported age of starting collecting Social Security no younger than 62.
- Not on Social Security Disability Insurance (SSDI) and Supplemental Security Income (SSI) programs.

Figure 2. Age distribution of SS Claiming and Frist-time Retirement

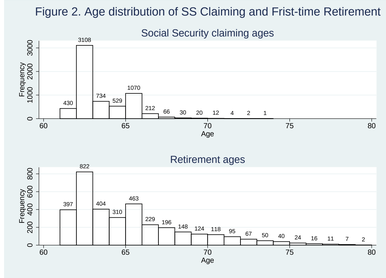


Figure 3. Predicted longevity vs. Actual ages at death

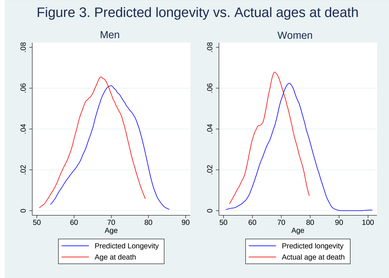


Table 2. First Stage Survival with Frailty

	Men	Women
Mom died before 50	-0.0184	0.571**
	(0.245)	(0.240)
Dad died before 50	0.707***	0.118
	(0.200)	(0.191)
Height(m)	24.36	-9.065
	(19.61)	(10.6)
Height square	-5.836	3.052
	(5.506)	(3.234)
Weight(kg)	-0.107***	-0.0894***
	(0.0183)	(0.0155)
Weight square	0.000492***	0.000445***
	(9.26e-05)	(8.95e-05)
Smoking now	0.934***	1.021***
	(0.122)	(0.138)
Passed mom's age at death	-0.415***	-0.538***
	(0.148)	(0.156)
Passed dad's age at death	-0.614***	-0.242**
	(0.130)	(0.127)
γ	0.236***	0.209***
	(0.0172)	(0.0170)
θ	8.807***	3.5604***
	(2.8102)	(1.592)
Join test of excluded IVs: $\chi^2(15)$	121.26***	141.6***
LR test of θ=0:	54.64***	37.94***
Individuals	3919	4339

Other Controls: Prerants' Education*, Censored Regions*, Marital status, Education, Ethnicity, Year of Birth, Health and Wealth

Table 3. Bivariate Probit with Non-Absorbing Retirement

	Men		Women	
	Retire	Social Security	Retire	Social Security
Expected Longevity	-0.0212***	-0.00103	-0.00679*	0.00158
	(0.00549)	(0.00854)	(0.00384)	(0.00546)
Have Retired		0.368***		0.158***
		(0.0600)		(0.0506)
Have Claimed SS	0.0826		-0.0500	
	(0.0512)		(0.0513)	
N	2426		2472	

Conclusions

- Strong same-gender parental link of mortality.
- Weights and heights have non-linear effect on the risk of mortality. Smoking will significantly increase the risk of mortality. Parents' educational level are not affecting individuals' mortality significantly.
- Expected longevity has significant effect on retirement decisions. The longer a person expects to live, the less likely he/she would retire in the next two years.
- People who have retired will claim Social Security very soon. But not vice versa.
- The effect of expected longevity on Social Security is not very significant maybe because of the maximum age cap of claiming Social Security is 70, and there is little incentive to delay beyond Full Retirement Ages

Future Research Directions

- Block bootstrap two steps to get unbiased standard errors.
- Second stage model: Simultaneous Hazard model or simultaneous equations of duration and discrete choice model.