# SUBJECTIVE SURVIVAL EXPECTATIONS AND OBSERVED SURVIVAL: HOW CONSISTENT ARE THEY? ALBERTO PALLONI BEATRIZ NOVAK

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## WHAT ARE SUBJECTIVE SURVIVAL EXPECTATIONS?

• Responses to questions about probabilities of surviving at ages that respondents could attain in the future

## WHAT DO WE KNOW ABOUT INDIVIDUALS' SUBJECTIVE SURVIVAL EXPECTATIONS? HEALTH

- May capture something richer and unlikely to be contained in self-rated health status:
  - Genetic or hereditary susceptibilities
  - Knowledge of parental, sibling or other kin health conditions
  - Assessments of past or current exposures to environmental and behavioral risk factors not retrieved by surveys questionnaires
  - Experiences over time

# WHAT DO WE KNOW ABOUT INDIVIDUALS' SUBJECTIVE SURVIVAL EXPECTATIONS? MORTALITY

• Remarkably good predictors of individual mortality

• Independent predictors of both individual and aggregate mortality net of the effects of self-rated health

• In reasonable agreement with objective actuarial life tables

# **TWO MAIN OBJECTIVES**

- Assess the degree of consistency between survival probabilities obtained from subjective survival expectations and estimated survival probabilities estimated from observed mortality
- Estimate effects that selected individual characteristics and experiences have on subjective survival probabilities

# THE DATA: HEALTH AND RETIREMENT STUDY (HRS)

- Individuals aged 50-61 in 1992
- 1992 HRS Sample composition

#### **Whites**

Males N = 3345 Females N = 3834

**Blacks** 

Males N = 623 Females N = 630

- Individuals aged 50-61 in 2004
- 2004 HRS Sample composition
  <u>Whites</u>

Males N = 1213 Females N = 1594

#### **Blacks**

Males N = 150 Females N = 218

# **HRS SUBJECTIVE SURVIVAL QUESTIONS**

#### HRS 1992

"Using any number from 0 to 10, where 0 equals absolutely no chance and 10 equals absolutely certain,

What do you think are the chances that you will live to be 75 or more?" To be 85 or more?"

#### HRS 2000 on

"Using any number from 0 to 100, where 0 equals absolutely no chance and 100 equals absolutely certain,

What do you think are the chances that you will live to be 75 or more?" (younger than 66)

To be 80 or more?" (aged 65-69)

To be 85 or more?" (aged 70-74)

To be 90 or more?" (aged 75-79)

# **METHODS**

- Retrieve mortality information up to 2006 of individuals aged 50-61 in 1992
- Retrieve expected survival information from questions on subjective survival to ages 75 and 85 (or 80 depending on the particular HRS wave)
- Assume that individuals use same age pattern of mortality to assess expectations but differ in terms of the levels of mortality they are expressing
- Non Linear Squares methods to estimate observed and subjective life tables fitting a range of mortality functions: Gompertz, Weibull, logistic and log logistic

## SUBJECTIVE SURVIVAL QUESTIONS: FOCAL POINT ANSWERS: "0", "0.5" & "1"

- Coarseness of the Scale
- Greater Uncertainty
- Rounding Mechanisms
- Cognition Problems

#### PERCENTAGE FOCAL ANSWERS "0" BY RACE & SEX (1992)



#### PERCENTAGE FOCAL ANSWERS "50" BY RACE & SEX (1992)



#### PERCENTAGE FOCAL ANSWERS "100" BY RACE & SEX (1992)



#### PERCENTAGE OF INCONSISTENT ANSWERS (P75≤P85) BY RACE & SEX (1992)



### PERCENTAGE OF INCONSISTENT ANSWERS (P75≤P85) BY RACE & SEX (1992)



### HRS 1992-2006 (14-YEAR MORTALITY): GOMPERTZ FUNCTION WHITE MALES





### HRS 1992-2006 (14-YEAR MORTALITY): LOGISTIC FUNCTION WHITE MALES





# ESTIMATED LIFE EXPECTANCY AT AGE 50 (HRS COHORT 1992)

	Whites		Blacks	
	Males	Females	Males	Females
U.S. 1992 Life Table 3	<u>4 (°</u> 27.1 2	.6 ( <sup>3</sup> 1.9 2	.8 ( 23.0	.7 ( 28.5
HRS	s 30.5	<b>34.5</b>	25.8	30.2
Subjective Unrestricted		.8 ) 5	.3	3.2 $3.4$
Sample	Z1./ ¥	L7.L #	23.0 🦊	20.0 🧳
Subjective Restricted	200	20 1	20 E	20 4
Sample	20.0	30.1	27.5	27.0

## SUBJECTIVE & OBJECTIVE SURVIVAL: DOES CONSISTENCY PERSIST ACROSS SUBGROUPS & EXPERIENCES?

- Are expectations of individuals with different behaviors and/or health status consistent with their objective experiences?
- Do individuals update their expectations in accordance with past experiences?
- Do younger birth cohorts form expectations that reflect mortality improvements at older age's time?

**Parameters** Male \*\*\* Level: 78.02 Shape: 7.70 \*\*\* Black **HRS 1992** \*\*\* **Age Group (50-55) Race\*Survey** +**Race\*Age Group Gender\*Survey Gender\*Age Group** Survey\* Age Group -2,00 -1,50 -1.00 -0.50 0,00 0,50 1.00 1.50 2,00 Coefficients





Coefficients



Coefficients





# UPDATING SURVIVAL EXPECTATIONS: PROPORTIONAL HAZARD MODEL

$$S_{ix}(x+k,t) = \left[S_{ix}^{S}(x+k)\right]^{exp(\beta Z_i)}$$

 S<sup>s</sup>, the standard, is the <u>Subjective Probability of Surviving from Age x</u> to x+k at time t Estimated from Logistic Parameters obtained of Wave <u>1992</u>

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$$ln(-ln(S_{ix}(x+k,t))) = \beta Z_i + ln(-ln(S_{ix}(x+k)))$$

## OLS DEPENDENT VARIABLE: LN(-LN(SUBJECTIVE PROB. OF SURVIVING FROM AGE X TO TARGET AGE: CURRENT WAVE))



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### **MAIN RESULTS**

- 1. Subjective probabilities are remarkably close to actual life tables and preserve basic observed differentials across groups
- 2. Whites are more pessimistic than blacks and women more than men
- 3. Pessimism increases with age
- 4. Surprising & unexpected contrast between the original and more recent HRS cohorts
- 5. Objective, observed differentials between smokers & non-smokers, obese & non-obese, highly educated & low educated individuals are estimated remarkably well by differential in the corresponding subjective survival expectations
- 6. Large updating effects that become stronger among those exposed to high risks