Center for Demography and Ecology

University of Wisconsin-Madison

Subjective Survival Expectations and Observed Survival: How Consistent Are They?

Beatriz Novak

Alberto Palloni

CDE Working Paper No. 2013-08

SUBJECTIVE SURVIVAL EXPECTATIONS AND OBSERVED SURVIVAL: HOW CONSISTENT ARE THEY?

BEATRIZ NOVAK

CENTER FOR DEMOGRAPHIC, URBAN AND ENVIRONMENTAL STUDIES

EL COLEGIO DE MÉXICO

ALBERTO PALLONI

CENTER FOR DEMOGRAPHY AND ECOLOGY

UNIVERSITY OF WISCONSIN-MADISON

INTRODUCTION

Survival expectations are responses to questions about probabilities of surviving age that could be attained in the future by respondents. Strategies to elicit probabilistic appraisals from individuals are heterogeneous across studies but the standard tool rests on variants of a question such as this: "Using a number between 0 and 1, where 0 is lowest and 1 is highest, what would you say is the probability that you will survive to age X (or Y more years)?" Work on survival expectations is relatively new and part of a larger literature on individual expectations (Manski, 2004). Its importance has been growing rapidly as researchers uncover patterns, determinants and remarkable consistency with individual health status and changes thereof (Liu et al., 2007), past and current health-related behaviors (Falba & Busch, 2005; Khwaja et al., 2006 and 2007, Scott-Sheldon et al. 2010), experiences of health shocks and individual self-reported health (Smith, Taylor, & Sloan, 2001a)

We have three main goals. First, to demonstrate empirically the degree of consistency between life tables' estimates obtained from subjective survival expectations and those from life tables obtained from observed mortality. Second, to compare objective mortality differentials by Body Mass Index (BMI)[1] and smoking behaviors with differentials associated with subjective expectations. Third, to assess the magnitude and direction of effects of health shocks on subjective survival expectations.

The paper contains a number of innovations. First, we use newly developed modeling techniques to capture subjective expectations, the effects of covariates on such expectations and the impact of health shocks on individual updating of subjective expectations. We also perform extensive sensitivity analysis to check the performance of alternative tools to attenuate effects of individuals' propensity to lump survival expectations around preferred scores ("focal responses"). Finally, we highlight the analyses of a rarely studied phenomenon, namely, the age-progression of effects on subjective expectations leading to lower survival levels.

In section I we review extant findings. Section II describes the data and methods. Section III reviews results and tests conjectures. The final section concludes.

---

[1] BMI= (weight in kilograms / (height in meters)^2)

SECTION I

SUBJECTIVE SURVIVAL EXPECTATIONS AND INDIVIDUAL HEALTH AND MORTALITY

While self-rated health status (SRH) reflects a combination of specific information and knowledge about recent or current health problems, physical functioning, and health-related behaviors (Quesnel-Vallée, 2007), subjective survival expectations may capture something much richer that is unlikely to be reflected on self-rated health (Popham & Michell, 2007). These expectations may reflect information about genetic or hereditary susceptibilities (Hurd & McGarry, 1995; Perozek, 2008), knowledge of parental, sibling or other kin health conditions (Zick et al., 2013), assessments of exposures to environmental and behavioral risk factors not made evident by surveys questionnaires (Perozek, 2008), and experiences of health trajectories over time (Benítez & Ni, 2008). Self-rated health status has shown to be a remarkably good independent predictor of mortality in many studies even when including other relevant covariates like objective health status indicators (Idler & Benyamini, 1997; Singh-Manoux et al., 2007; Young et al., 2010). Because research on subjective survival expectations is a newcomer, it is much less widely known that they too are a remarkably robust predictor of individual mortality even after controlling for sociodemographic factors and health-related conditions (Elder, 2007; Hurd, McFadden, & Merril, 1999; Hurd & McGarry, 2002; Smith, Taylor, & Sloan, 2001b). More surprisingly, although subjective survival expectations are empirically related to self-rated health and are roughly consistent with each other, they tap different dimensions of individual health vulnerabilities (Hurd & McGarry, 1995) so much so that they have shown to be independent predictors of both individual and aggregate mortality while controlling for self-rated health (Siegel, Bradley, & Kasi, 2003; van Doorn & Kasl, 1998).

Individual subjective probabilities of survival behave as objective population-based probabilities do and covary as expected with variables such as socioeconomic status and smoking (Hudomiet and Willis, 2012; Hurd and McGarry, 1995) and are consistent with population-based observed survival patterns (Smith et al., 2001b). Thus, in an analysis of the first (1992) and second (1994) Health and Retirement Study (HRS) waves, Hurd and McGarry (1995 and 2000) found that on average the probabilities of living to age 75 and 85 were close to the corresponding averages from the US 1990 life table. Hurd and MCGarry (2002) show that those who survive to the second HRS wave report in the first wave probabilities of surviving to age 75 that were about 50% greater than those who died between waves. Smith et al. (2001b) also found that subjective survival probabilities elicited in the first four waves of HRS predict mortality experiences reasonably well. They show that subjective survival expectations among those who died between waves three and four decreased monotonically from the first wave until death. Similar results were obtained among those who died between the second and third waves whereas among those who survived the elicited probabilities were steady during the first three waves but, on average, higher than the average probabilities reported by those who died. The authors concluded that the “evolution of subjective probabilities does appear to include an expectational component that may incorporate unobservable features of personal circumstances that bear on survival to age 75” (Smith et al., 2001b, p. 1131).

Hamermesh (1985) shows that individuals slightly underestimate short-term survival probabilities and overestimate long-term survival probabilities when compared with actuarial life table estimates. Hamermesh suggests that when estimating their subjective survival people extrapolate changes in life tables because they are vaguely aware of current mortality levels and about potential health advances and improvements. Similarly, Elder (2007) found that 1992-2004 HRS respondents aged 50-64 were too pessimistic about their survival chances to young old ages but optimistic regarding their survival to more advanced ages (particularly 85 and more) when compared to actuarial estimates. However, this same study shows that survival probabilities predicted in-sample mortality well at ages less than 65 but less so at ages past 65. Taking a different approach Post and Hanewald (2010) found a significant and positive relationship between the dispersion in objective survival probabilities and subjective estimates. Their results suggest that higher age leads to more optimism about survival prospects. The authors also showed that awareness of stochastic mortality translated into saving behaviors, resulting in higher savings when uncertainty is higher.

Subjective survival probabilities are not only in reasonable agreement with objective actuarial life tables but there is also empirical evidence from HRS and other nationally based data sets suggesting that they must contain information captured neither by self-reported health status nor by objective measures of health limitations (Popham & Mitchell, 2007). Thus, Hurd and McGarry (2002) found that self-rated health status and subjective survival expectations among individuals aged 46-65 were *independently associated with individual mortality experiences between the first and second HRS waves*. Their models accounted for the effects of confounders such as sex and other sociodemographic characteristics and objective measures of health. These findings are somewhat fragile since they do not seem to apply to younger respondents. Indeed, Siegel and colleagues (2003) show that subjective survival probabilities do not predict well the risk of individual deaths when controlling for self-rated health in a small group of HRS respondents aged 51-61 in the first wave who were followed first for a period of three years.

Other data sets containing information on subjective expectations also support the idea that these are good gauges of objective conditions that affect mortality. Using data from the first wave of the Assets and Health Dynamics among the Oldest Old (AHEAD) study (individuals 70 years or older) with a follow-up period of two years, Siegel and colleagues found that among females as well as among males the relationship between both subjective survival expectations and self-rated health status and mortality was statistically significant when one or both measures were in the model. Van Doorn and Kasl (1998) used data drawn from the Australian Longitudinal Study of Aging (ALSA) to examine the effects of parental longevity, self-rated health and subjective survival probabilities on individual mortality risks. Among males at least their findings replicate those obtained by Siegel and colleagues (2003) with AHEAD data among individuals aged 70 or older.

This brief review of previous findings about subjective survival probabilities reveals some intriguing regularities and relations but also conflicting findings. These are to be expected in a nascent field of research for there is less agreements about concept definitions, measurements and indicators and treatment of missing or incomplete responses. But there is also the problem generated when using disparate samples and data sets as well as inadequate models and estimation techniques. Below we define new and more suitable models to study subjective survival probabilities and their determinants and propose to estimate them using the most complete data set available to us.

SECTION II

DATA and METHODS

Data

Data from this study is drawn from the Health and Retirement Study (HRS).[2] The HRS is a longitudinal survey that was designed to gather information on persons from pre-retirement into retirement in the US. The first wave's (1992) target population includes individuals aged 51-61 living in households. Including spouses or partners regardless of their age, 15,497 individuals were eligible for interviews in 1992 from whom 12,654 respondents were finally interviewed. Since then, individuals in this initial cohort, individuals who were born between 1931 and 1941, have been reinterviewed every two years. The entire survey consists of five birth cohorts that have been incorporated to the study over time; the first one is the initial HRS cohort. Data for the present study includes the first, forth, and fifth HRS cohorts. The fourth cohort is the War Baby (WB) cohort. The WB cohort consists of 2,529 individuals born between 1942 and 1947. The WB cohort was first interviewed in 1998 and after that every two years. Finally, the fifth cohort, the Early Baby Boomer cohort (EBB), consisting of 3,340 individuals was first interviewed in 2004 and subsequently every two years. Individuals in this cohort were born between 1948 and 1953. The HRS provides information not only for the target individuals, individuals that were age-eligible, but also for their spouses regardless of their age. Hispanics, Blacks, and Florida

[2] For a detailed description of the HRS refer to: Juster and Suzman (1995).

residents were over-sampled.[3] The HRS also provides survival information of respondents. Confirmation of the deceased status of respondents includes consulting the Social Security Death Index. Data for the present study was drawn from the first eight HRS waves (1992-2006).

Subjective Expectations in the HRS

The HRS includes since 1992 a number of questions that allow the direct measurement of respondents' subjective expectations, or more precisely subjective probability distributions, on a range of future events. In 1992, the questions on subjective survival probabilities were as follows: "Using any number from zero to ten, 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?" "And how about the chances that you will live to be 85 or more?" From 1994 on the questions changed their wording to: "Please answer the questions in terms of percent chance. Percent chance must be a number from 0 to 100, where "0" means there is absolutely no chance, and "100" means that it is absolutely certain." Besides this change, the 1994 HRS wave was the first one restricting the age for asking the first of the above-mentioned questions (survival to age 75) to individuals 65 years old or younger and the second one to individuals 75 years old or younger. This format was maintained for the 1996 and 1998 HRS waves. In 2000, the question took the following format: "How sure are you that you are going to live to be… 75 years or more (if the respondent's age is less than or equal to 65 years)?; 80 years or more (age 69 years or less)?; 85 years or more (age between 70 and 74 years)?; 90 years or more (age between 75 and 79 years)?; 95 years or more (age is 80 and 84 years)?; and 100 years or more (age between 85 and 90 years)?" As before, zero representing "Absolutely no chance" and one hundred "Absolutely certain." Subjective survival questions were not asked to proxies.

Methods

We use Non Linear Square (NLS) methods to estimate subjective life tables fitting a range of mortality functions: Gompertz, Weibull, logistic, and log logistic. Estimations of subjective survival were done using the answer to survival questions to ages 75 and 85 (or 80 depending on the wave) with clustering corrections. In contrast with previous research (like the above-

---

[3] The present study uses RAND version of the HRS: RAND HRS Data File Version "H" Available at: http://hrsonline.isr.umich.edu/modules/meta/rand/index.html

mentioned study by Perozek (2008), for example), we assume that individuals adopt the same age pattern of mortality to assess expectations but allow them to differ in terms of the levels of mortality they express: subjective expectations of individuals the same age help identify mortality levels, whereas the shape of the mortality curve is identified using individuals with different ages. Using mortality information retrieved from 1992 through 2006 for individuals aged 50-61 in 1992 we obtained observed survival estimates that were then used as input for NLS methods to calculate the parameters of the mentioned survival functions.

For studying the process of updating survival expectations we use proportional hazard models. The assumption is that subjective survival expectations are shifted or altered within a proportional hazard model. That is, the subjective probability of surviving to a target age *y* elicited from an individual aged *x+k*, $S_{t+k}(x+k,y)$, at time *t+k* is a power function of a standard probability of surviving from *x+k* to *y*:

$$S_{t+k}(x+k,y)=[S_s(x+k,y)]^{\exp(\beta z)} \qquad (1)$$

where $S_s(x+k,y)$ is a standard used by the individual, in our case the probability predicted by the parameters estimated at time *t* (1992), Z is a covariate vector containing fixed covariates at time *t* (gender, race, obesity and smoking conditions) and time varying covariates between times *t* and *t+k* (like health shocks). We estimate model (1) by means of an OLS regression:

$$\ln(-\ln(S_{t+k}(x+k,y)))=\beta Z+\ln(-\ln(S_s(x+k,y))) \qquad (2)$$

Note that departures of the slope of regression line from unity suggest: (a) A non proportional hazard context or (b) A shift in the standard used to evaluate mortality.

SECTION III

RESULTS

Descriptive Analysis

From the 9,746 individual (52.97% females) in age group 50-61 in 1992, 9,049 answered the questions on subjective survival to ages 75 and 85. As of 2006 there were 1,570 deaths registered among individual in this population (860 individuals were lost to follow-up). Figures 1.1 and 1.2 show the distribution, by gender and race, of focal responses given in 1992 to the questions on subjective survival to ages 75 and 85 respectively.

The prevalence of focal answers is not trivial. For the different gender and race groups, heaping on the answer reflecting 0% chance of surviving range from 7.8% to 9.5% and from 15.9% to 21.3% for ages 75 and 85 respectively. Heaping on the answer 50% chance ranges from 18.4% to 22.7% and from 15.0% to 17.3% for ages 75 and 85 respectively. Finally, heaping on the answer 100% survival chance ranges from 18.5% to 29.4% and from 6.9% to 18.5% for ages 75 and 85 respectively. Answers are consider inconsistent when the implied probability of surviving to age 75 is lower or equal to the implied probability of surviving to age 85 (or 80). The larger fraction of inconsistent responses is found among focal answers and is dominated by cases where the elicited probability of surviving to age 75 is equal to the elicited probability of surviving to age 85 (or to age 80 depending on the HRS wave). The percentage of inconsistent responses, given by each gender and race group, where the elicited probabilities of surviving to ages 75 and 85 were equal ranges from 17.7% (White males) to 33.6% (Black males) of the total amount of responses.

There were no differences between the subsamples that include inconsistent answers and those that do not include them in the proportion of obese individuals and in the proportion of individuals that were current smokers in 1992. In general, the distribution by educational attainment is the same for both subsamples, the one that includes inconsistent answers and the one that do not include them, except for both White males and females who in the second subsample include a statistically significantly lower proportion of individuals with less than high school education. Also in the case of White males, the proportion of individuals with at least college education was statistically significantly higher in the subsample that does not include inconsistent answers than in the other one (Table 1). As of 2006 there were 981 deaths registered among individuals aged 50-61 in 1992 that provided consistent answers to the subjective survival questions. The proportion of deaths occurred among this population is statistically significantly lower than the proportion of death occurred among individuals the same age that provided inconsistent answers (589); however, the proportion of individuals lost to follow up is not statistically different between these two subgroups.

Choosing a Model to Impose on Subjective Expectations

As described in the Methods section, we used the answers to the probability of surviving to ages 75 and 85 elicited in 1992 to estimate, by means of NLS models, the parameters of Gompertz, Weibull, logistic, and log-logistic survival functions.[4] We found that the observed 14-year mortality experience of the HRS respondents reflects quite well the 1992 US mortality experience and that both are well represented by a Gompertz or a logistic model and not so by the other two functions.[5] The left panel of Figures 2.1.1 to 2.1.4 shows the Kaplan-Meier survival function corresponding to the observed 14-year HRS mortality (1992 to 2006), the fitted Gompertz subjective survival function, the fitted Gompertz survival function based on observed mortality, and US 1992 life table estimates for White males and females and Black males and females respectively including all cases where both questions, survival to ages 75 and 85, were answered. Although the Gompertz function adjusts reasonably well the mortality experience of the HRS respondents the curve implied by subjective expectations falls off too steeply and its contour departs excessively from observed values. The left panel of Figures 2.2.1 to 2.2.4 shows that the logistic model has a better fit than the Gompertz in all cases. Table 2.1 lists the parameters of the Gompertz and logistic functions obtained in each case. The best fit was invariably obtained with the logistic function. In order to analyze the effect of inconsistent answers and focal point responses on the estimation of the parameters of the survival functions our strategy was to estimate the parameters alternatively including and excluding these types of answers. The right panel of figures 2.1.1 to 2.1.4 and 2.21 to 2.2.4 shows the survival functions when inconsistent answers were excluded from the samples, while Table 2.2 lists the parameters of the Gompertz and logistic functions obtained in each case. In this case also the best fit is obtained with the logistic function. Therefore, in what follows survival estimations were calculated based on the parameters of a logistic function.

Results on subjective survival expectations calculated including inconsistent responses and focal answers of all types show that at age 50 the observed mortality experience from HRS White males is lower than the 1992 US life table estimates: about a 3.5 years discrepancy between one and the other, that is, a marginal error of 11.8%. Subjective values of the survival

---

[4] We avoided logarithm's specification problems replacing survival probabilities of zero by .001. Similarly we replaced survival probabilities of one by .999

[5] Results for the Weibull and log-logistic models are not shown.

curve were always below the observed HRS values. The difference in life expectancy at age 50 between observed and subjective estimates are equivalent to 2 years, about 9.6% error. In general, subjective estimates deviate from official estimates as much as the observed estimates deviate from the official ones. For White females, HRS observed life expectancy at age 50 are 2.5 above US life expectancy, however, subjective life expectancy is about 2.5 years below the US life expectancy at that age, therefore we found that females are more pessimistic than males, or more so.[6] For Black males, life expectancies at age 50 observed and subjective are identical. However, the observed HRS life expectancy at age 50 is higher than the 1992 US life expectancy at that age. In general, subjective survival expectations mirror observed survival more than US life tables. Subjective life expectancies in the case of Black females are below both the observed HRS and the US survival experiences, which are close together.[7]

Among White males the exclusion of inconsistencies does not change the result that subjective expectations are always below the HRS survival experience, however closer than when the inconsistencies were included. When excluding inconsistencies as well as all focal responses life expectancies from observed HRS mortality is higher (about 2 years higher at age 50). Subjective life expectancies are also higher (by about one year) and more different from the US mortality experience than from the HRS mortality experience. Among White females the exclusion of inconsistencies results in very little changes,[8] while excluding both inconsistencies and focal answers even though subjective, observed, and US estimations are close to each other subjective estimations are bellow the observed and the US estimations. Excluding inconsistent answers among Black males results in substantial increase in subjective survival which moves away from HRS experience (about 5 years at age 50) and both move a little bit upward and away from US life expectancies, although trivially. Excluding both inconsistencies and focal answers results in HRS observed mortality closer to US mortality experience but different from subjective estimates (by around 5 years at age 50). In general, Black males are more optimistic

---

[6] Life expectancy at age 50: 1992 US 27.1; observed HRS 30.5; subjective estimate 27.7 and 1992 US 31.9; observed HRS 34.6; subjective estimate 29.2 for White males and females respectively

[7] Life expectancy at age 50: 1992 US 23.0; observed HRS 25.8; subjective estimate 25.6 and 1992 US 28.5; observed HRS 30.2; subjective estimate 26.8 for Black males and females respectively

[8] Excluding inconsistencies, life expectancy at age 50 White females: observed HRS 31.2; subjective estimate 28.8 and observed HRS 35.3; subjective estimate 30.1 for White males and females respectively.

than White males regarding their future survival. Among Black females, excluding inconsistencies produces subjective estimates that are closer to US estimates, whereas HRS estimates moves up a little bit (around 1.5 years).[9] Excluding both inconsistencies and focal responses results in subjective estimations closer to US ones but below HRS estimations. Generally, Black females are also pessimistic but not as much as Whites but not as either males or females.

As results show the exclusion of inconsistent answers dramatically improves the fitting. However, completely excluding focal answers not only do not improve the fitting but also reduces the size of the samples unnecessarily. While the results summarized before refer to subjective life expectancies elicited in 1992, an important feature found when analyzing subjective survival over time is the declining trend in mean subjective survival to age 75 from around the 2002 HRS wave until at least the 2006 HRS wave (Figure 3). This feature was among all race and gender groups (mean subjective survival expectations elicited in 1992 are statistically significantly higher than in 2006 among males both White and Black; among Black and White women, mean subjective survival expectations in 2006 went back to their 1992 values). Of course, this declining trend goes counter observed survival in the US. Why should this trend take place? To address this issue we followed different approaches.

First, we compared subjective and US life table differences in life expectancy at ages 50 and 75 between 1992 and 2004 (Figure 4). The cohort of individuals aged 50-61 in 2004 is of interest because it is a completely different birth cohort than the one composed of individuals aged 50-61 in 1992 in that it already includes a large fraction of Baby Boomers. For White males, while life expectancy at age 50 observed in the US between 1992 and 2004 increased almost 2 years, subjective life expectancy shows more than a year decrement between the same years. For White females, US life expectancy increased in around a year, however subjective life expectancy decreased around a year. Similar results were obtained for Black females. For Black males differences were more dramatic. At age 50, an increment in US life expectancy of 2 years was expressed as a decrement of almost 2.5 years by subjective expectations. Differences between 1992 and 2004 in life expectancy at age 75 follow the same pattern than differences in life expectancy at age 50 for all gender and race groups. The mortality experience of HRS

---

[9] Excluding inconsistencies, life expectancy at age 50: observed HRS 25.6; subjective estimate 29.5 and observed HRS 31.8; subjective estimate 29.6 for Black males and females respectively.

respondents is not unusually high, not high enough as to justify these results. In fact as was already noticed by other authors it is lower. Life expectancy at age 50 observed for 1992 HRS respondents is higher than life expectancy at the same age obtained from both 1992 and 2004 US life tables. At age 60 this remark is still true with respect to 1992.

Therefore we wanted to investigate if it is possible that subjective expectations in 2004 were driven by the influx of new cohorts who for some reason are more pessimistic.[10] To respond to this, first we compared the life expectancy estimated by individuals who were 50-61 years old in 1992 and survived to 2004 with the life expectancy estimated by all individuals in 1992 regardless of their survivorship status. In all cases, differences in life expectancies were negligible (Figure 5). Among other things this results suggests that it is not quite possible to improve mortality predictions between these two periods based only on survival expectations elicited in 1992. Because the cohort composition changed over time, those who were 50-61 in 1992 and survived to 2004 may be different to the others. Figure 6 shows that subjective life expectancies elicited by the respondents who survived the 12-year window period are in fact lower in 2004 than subjective life expectancies elicited from responses given by those same individuals in 1992. For White males, this difference was almost eight years. This result suggests that as individuals age they become more pessimistic regarding their future survival.

In order to analyze differences due to cohort composition we pooled together the 1992 and 2004 HRS datasets for individuals aged 50-61. The 2004 sample has statistically significant larger proportions of Whites, females, as well as individuals with at least some college education; while the 1992 sample has a statistically significant larger proportion of individuals with only high school diploma or less. As it could be expected, the 1992 sample includes a statistically larger proportion of current smokers than the 2004 sample, while among individuals in this last sample the proportion of obese is statistically significantly larger than the proportion of obese individuals among the 1992 respondents (Table 3). Using the pooled sample we estimated effects of covariates on the parameters of a logistic function. These the covariates were gender, race, a dummy for HRS wave (1992 versus 2004), a dummy for age group (50-55 versus

[10] While individuals aged 50-61 in 1992 were almost 100% born between 1931 and 1941 (HRS birth cohort), this composition was changing over time. In 2000, around 50% of the sample was composed of individuals born between 1942 and 1947 (WB birth cohort) and 7% were born between 1948 and 1953 (EBB birth cohort). By 2004 over 55% of the sample belonged to the EBB birth cohort and the rest to the WB birth cohort.

56-61), and interactions between gender and race with age group and the dummy for HRS wave. The level parameter in the logistic function is the one affected by the mentioned covariates. Changes in mortality with the passing of age should be reflected by changes predicted by the slope and not by an adjustment of the level. Table 4 shows that all except the variable associated with the race and all the interactions were highly statistically significant. These results show that younger individuals are more optimistic than older ones and males more pessimistic than females. They also show that individuals in 1992 were more optimistic regarding their future survival than in 2004.[11]

Multivariate models that include health-related behaviors (Table 5) confirm previous results, individuals in the 1992 HRS wave were more optimistic regarding their future survival than those the same age in the 2004 HRS wave. The behavior of the rest of the covariates is as expected. The coefficient associated with the educational attainment variable shows the gradient relating education and mortality. In addition, behaviors such as being a current smoker and being obese[12] as opposed to being normal weight or overweight decrease survival estimations as it would be expected.

Mortality Differentials by BMI and Smoking

To facilitate comparisons we calculated life expectancies at different ages and compared observed survival and subjective estimates for non-obese (normal weight and overweight) and obese individuals by gender, race, and current smoker status as of 1992. Tables 6.1 and 6.2 show differences in life expectancy at ages 50, 60, and 70, both observed and subjective, between non-obese and obese for White and Black individuals respectively. At age 50 the difference in observed life expectancy between non-obese and obese non-smoking White males is around 1.5 years, while the subjective expected difference is around 1 year. Therefore, non-smoking obese White males are quite accurate regarding their future survival when compared with their non-

---

[11] Results in Table 4 were obtained using the restricted samples, that is, the samples that do not include inconsistent answers. Results using the whole sample are quantitatively and qualitatively similar. However, the size of the coefficients is somehow bigger and the coefficient associated with race is statistical significant as well as the ones associated with the interaction terms. The level parameter is slightly lower and the shape parameter bigger reflecting the higher mortality expectations of this group that we already mentioned.

[12] Normal Weight: $18.5 \leq BMI < 25$; Overweight: $25 \leq BMI < 30$; Obese: $30 \leq BMI$

obese counterparts. However, among smokers, while the obese White males show an observed survival around 2 years greater than non-obese ones, probably because of a higher smoking intensity among non-obese ones, the subjective difference in survival expectations between non-obese and obese is almost cero. Observed mortality is lower among the obese, probably due to differences in intensity of smoking; however, they expect similar survival to the survival of non-obese smoking individuals. So, in a sense they are pessimistic regarding their future survival prospects.

Among non-smoking White females, at age 50 the difference in observed life expectancy between non-obese and obese is almost negligible, while the subjective expected difference is around 2 year. This result is pointing out to a higher pessimism among obese non-smoking women respect to their non-obese counterparts. However, among smokers, while the obese show an observed survival around 2 years below the survival of non-obese ones, their subjective difference in survival expectations is negligible denoting an underestimation of the mortality risk among obese smoking females, although both obese and non-obese are pessimistic taking into account their observed mortality experience.

Unlike White non-smoking males, Black non-smoking males are less accurate. The observed difference in life expectancy at age 50 between non-obese and obese is around 4 years, while the subjective expected difference is around 1 year, showing a higher optimism among obese non-smoking Black males respect to their non-obese counterparts. Among smokers the optimism is even greater. Results for Black non-smoking females are more or less similar to those for Black non-smoking males. However, among smokers, obese ones are more optimistic than observed survival suggests they should. Smoking obese Black females overestimate their survival expectations by around 2 years.

Updating Survival Expectations

For studying the process of updating survival expectations, we assume as it was stated in the Methods section that survival probabilities are altered within a proportional hazard context. The covariate vector Z in models (1) and (2) contain fixed covariates (dichotomous indicators for gender, race, obese (versus normal weight or overweight) at baseline (1992), and current smoker, also at baseline). Vector Z also contains a time varying covariate (dichotomous indicator that flags the occurrence of any health shock between waves).[13]

Table 7 shows the results of estimating the proposed model. Note that the slope coefficient exceeds one. This implies that individuals may be using a mortality curve that rises more rapidly with age than in the standard. Results also show that the health shocks that may occur to individuals between waves affect subjective survival probabilities as expected. Similarly, obese and smokers adjust negatively their survival expectations, which means that updating effects are particularly strong among those who are at higher risk.

SECTION IV
DISCUSSION

A potential use of data that elicits information on subjective probabilities of surviving which has been much less studied than, for example, predicting retirement or saving decisions, is to contrast expected and observed survival probabilities to assess overall differences between underlying mortality risks and those perceived by individuals. As mentioned earlier, in this paper we use newly developed modeling techniques to capture subjective expectations, the effects of covariates on such expectations and the impact of health shocks on individual updating of subjective expectations. Our main results show that: 1.Subjective probabilities are remarkably close to actual life tables; 2. Whites are more pessimistic than Blacks and women more pessimistic than men; 3. Pessimism increases with age; 4. There is an unexplained pessimism in more recent cohorts (1992 versus 2006); and finally that updating effects are strong particularly among those at higher health-related risk.

In general, these results are in accordance with the literature (Bulanda and Zhang, 2009; Irby-Shasanmi, 2013; Zick et al., 2013). Our model fits considerably well the in-sample mortality like different models do (Hudomiet and Willis, 2012; Ludwig and Zimper, 2012) despite Elder's (2013) remark that subjective forecasts performs poorly explaining in-sample survival due to "the tendency of individuals to understate the likelihood of living to relatively young ages while overstating the likelihood of living to ages beyond 80."

---

[13] It is consider a health shock the diagnosis of health conditions that were not present in the previous wave like heart disease, diabetes, cancer, lung diseases and stroke

Estimating cohort life tables Perozek (2008) found that subjective life expectancies for men were higher than SSA life tables' estimates, while for women they were lower. Similar results were obtained by Peracchi and Perotti (2012) drawing subjective survival data from the Survey of Health, Aging and Retirement in Europe (SHARE) and constructing cohort life tables from the sequence of period life tables that were available in the Human Mortality Database. Perozek's (2008) subjective life tables suggested a further narrowing of the gender gap in longevity, with men living longer and women dying earlier. According to Perozek, subjective expectations elicited from 1992 HRS predicted the direction of revisions to the SSA life tables between 1992 and 2004. However, Elder (2013) disagrees with Perozek's (2008) suggestion that subjective survival forecasts outperform population life tables in predicting age- and gender-specific mortality rates. Elder notices that respondents younger than 65 years of age are pessimistic regarding their survival prospects and found, as we did, that subjective survival decreased with time despite its steady increase between 1992 and 2004. As Elder did, we showed that as individuals age they become more pessimistic regarding their future survival and that individuals in 1992 were more optimistic regarding their future survival than in 2004.

We still need to have a better understanding of subjective survival expectations. Why? Mainly because: 1. They reflect beliefs that influence strategic behaviors (like: savings, retirement, exposure to risks, adherence to medical treatment); 2. They are a yardstick to assess behavioral or belief adjustments in response to occurrence of significant events (health shocks and the like); 3. They may reflect actual mortality; if so mortality differentials could be studies in considerable more detail than when one has to construct life tables for various groups; and 4. Because they are intrinsically interesting: how are these expectations created and sculpted? How is it that different groups harbor different expectations?

Our future research includes to model simultaneously Sx(y) and uncertainty (focal responses), compare subjective with cohort life tables, use non proportional hazard models (accelerated time failure models), and compare predicted values from updating models with behavioral changes.

REFERENCES

Benítez-Silva, Hugo and Ni, Huan. 2008 "Health Status and Health Dynamics in an Empirical Model of Expected Longevity." Journal of Health Economics 27 (3): 564 – 584

Bulanda, Jennifer Roebuck and Zhang, Zhenmei (2009) Racial-Ethnic Differences in Subjective Survival Expectations for the Retirement Years. Research on Aging; 31 (6): 688 - 709

Elder, Todd E. 2007 "Subjective Survival Probabilities in the Health and Retirement Study: Systematic Biases and Predictive Validity." MRRC Working Paper WP 2007- 159. Michigan Retirement Research Center (MRRC). University of Michigan. Available at: http://www.mrrc.isr.umich.edu

_______________ 2013. "The Predictive Validity of Subjective Mortality Expectations: Evidence From the Health and Retirement Study." Demography 50: 569-589

Falba, Tracy A. and Susan H. Busch. 2005. "Survival Expectations of the Obese: Is Excess Mortality Reflected in Perceptions?" Obesity Research 13 (4): 754 - 761

Hamermesh, Daniel S. 1985. "Expectations, Life Expectancy, and Economic Behavior." The Quarterly Journal of Economics; 100 (2): 389 - 408

Hudomiet, Péter, and Robert J. Willis. 2012. "Estimating Second Order Probability Beliefs from Subjective Survival Data." NBER Working Paper 18258. National Bureau of Economic Research (NBER), Cambridge, MA. Available at: http://www.nber.or/papers/w18258

Hurd, Michael D., Daniel McFadden; and Angela Merrill 1999. "Predictors of Mortality among the Elderly." NBER Working Paper 7440. National Bureau of Economic Research (NBER), Cambridge, MA. Available at: http://www.nber.or/papers/w7440

Hurd, Michael D. and Kathleen McGarry. 2002. "The Predictive Validity of Subjective Probabilities of Survival." The Economic Journal 112: 996 - 985

___________________________________1995. “Evaluation of the Subjective Probabilities of Survival in the Health and Retirement Study.” Journal of Human Resources 30 (0 Special Issue on the Health and Retirement Study: Data Quality and Early Results): S268 - S292

Irby-Shasanmi, Amy. 2013. “Predictors of Subjective Life Expectancy among African American.” Research on Aging 35: 322-347

Idler, Ellen L. and Benyamini, Yael. 1997. “Self-Rated Health and Mortality: A Review of Twenty-Seven Community Studies.” Journal of Health and Social Behavior 38: 21 - 37

Juster, F. Thomas and Richard Suzman. 1995. “An Overview of the Health and Retirement Study.” Journal of Human Resources 3 (Special Issue on the Health and Retirement Study: Data Quality and Early Results): S7 - S56

Khwaja, Ahmed, Frank Sloan, and Sukyung Chung. 2007. “The Relationship between Individual Expectations and Behaviors: Mortality Expectations and Smoking Decisions.” Journal of Risk and Uncertainty 25: 179 - 201

____2006. “Learning about Individual Risk and the Decision to Smoke.” International Journal of Industrial Organization 24: 683 – 699

Ludwig, Alexander and Alexander Zimper. 2012. “A Parsimonious Model of Subjective Life Expectancy.”

Liu, Jin-Tan, Meng-Wen Tsou, and James Hammit. 2007. “Health Information and Subjective Survival Probability: Evidence form Taiwan.” NBER Working Paper 12864. NBER Working Paper Series. National Bureau of Economic Research (NBER), Cambridge, MA. Available at: http://www.nber.org/papers/w12684

Manski, Charles F. 2004. “Measuring Expectations.” Econometrica 5(9): 1329 - 1376

Peracchi, Franco and Valeria Perotti. 2010. "Subjective Survival Probabilities and Life Tables: Evidence from Europe." Einaudi Institute for Economics and Finance (EIEF) Working Paper 10/16. Available at: http://www.eief.it/files/2010/10/wp-16-subjective-survival-probabilities-and-life-tables_evidence-from-europe.pdf

Perozek, Maria. 2008. Using Subjective Expectations to Forecast Longevity: Do Survey Respondents Know Something We Don't Know? Demography. 45 (1): 95 – 113

Popham, Frank and Mitchell, Richard. 2007. "Self-Rated Life Expectancy and Lifetime Socio-Economic Position: Cross-Sectional Analysis of the British Household Panel Survey." International Journal of Epidemiology 36: 58 - 65

Post, Thomas and Katja Hanewald. 2010. "Stochastic Mortality, Subjective Survival Expectations, and Individual Saving Behavior." Sonderforschungsbereich 649, Humboldt University, Berlin, Germany. SFB 649 Discussion Paper 2010-040. Available at: http://ideas.repec.org/p/hum/wpaper/sfb649dp2010-040.html

Quesnel–Vallée, Amélie. 2007. "Self-Rated Health: Caught in the Crossfire of the Quest for 'True' Health?" International Journal of Epidemiology 36:1161–1164

Scott-Sheldon, Lori A. J., Michael P. Carey, Peter A. Vanable, and Theresa E. Senn. 2010. "Subjective Life Expectancy and Health Behaviors among STD Clinic Patients." American Journal of Health Behavior 34 (3): 349-361

Siegel, Michele, Elizabeth H. Bradley, and Stanislav V. Kasi. 2003. "Self-Rated Life Expectancy as a Predictor of Mortality: Evidence from the HRS and AHEAD Surveys." Gerontology 49:265 – 271

Singh-Manoux, Archana, Alice Gueguen, Pekka Martikainen, Jane Ferrie, Michael Marmote, and Martin Shipley. 2007. "Self-Rated Health and Mortality: Short- and Long-Term Associations in the Whitehall II Study." Psychosomatic Medicine 69: 138-143

Smith, Kerry V., Donald H. Taylor, Frank A. Sloan, F. Reed Johnson, and William H. Desvousges. 2001a. "Do Smokers Respond to Health Shocks?" The Review of Economics and Statistics 83 (4): 675 - 687

Smith, Kerry V., Donald H. Taylor, and Frank A. Sloan. 2001b. "Longevity Expectations and Death: Can People Predict Their Own Demise?" The American Economic Review 91 (4): 1126 - 1134

van Doorn, Carol and Stanislav V. Kasl. 1998. "Can Parental Longevity and Self-Rated Life Expectancy Predict Mortality Among Older Persons? Results from an Australian Cohort." Journal of Gerontology 53B (1): S28 - S34

Young, Harriet; Emily Grundy; Dermot O'Reilly; and Paul Boyle. 2010. "Self-Rated Health and Mortality in the UK: Results from the First Comparative Analysis of the England and Wales, Scotland, and Northern Ireland Longitudinal Studies." Office for National Statistics. Population Trends 139: 11-36

Zick, Cathleen D., Ken R. Smith, Robert N. Mayer and Lorayne B. Taylor. 2013. "Family, Frailty, and Fatal Futures? Own-Health and Family-Health Predictors of Subjective Life Expectancy." Research on Aging 00 (0): 1-23. DOI: 10.1177/0164027513482948

Figure 1.1 **HRS 1992 - Focal Responses - Percentages by Age, Gender, and Race - Subjective Survival to 75**

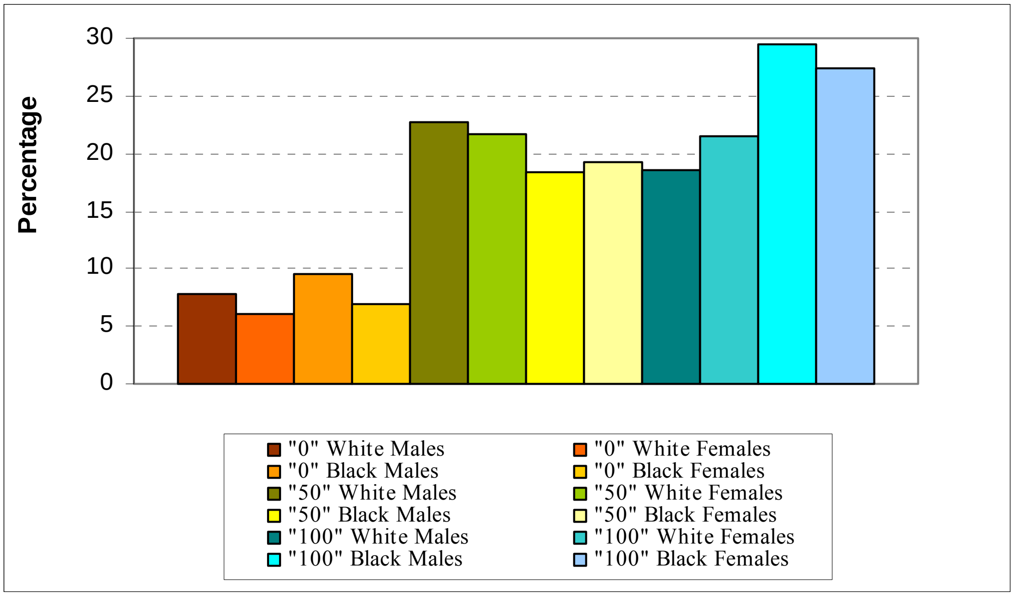


Figure 1.2 **HRS 1992 - Focal Responses - Percentages by Age, Gender, and Race - Subjective Survival to 85**

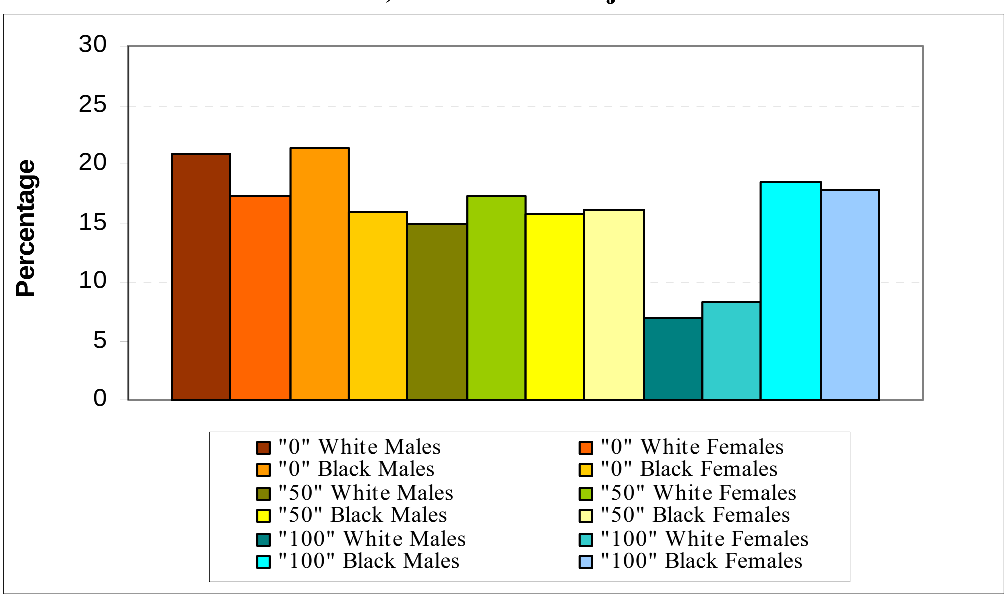


Figure 1.3 **HRS 1992 – Inconsistent Responses - Percentages by Race and Gender**

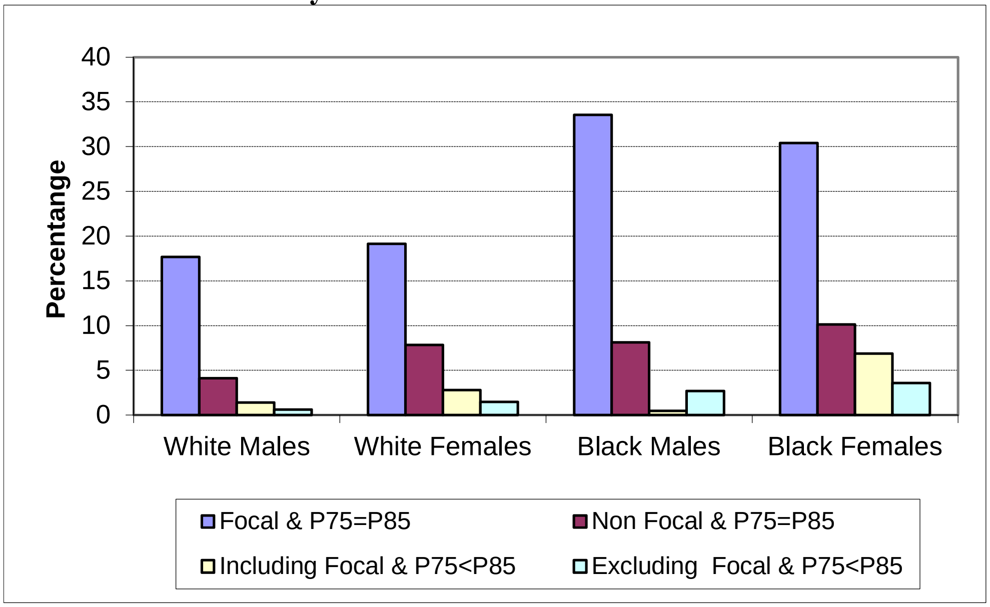
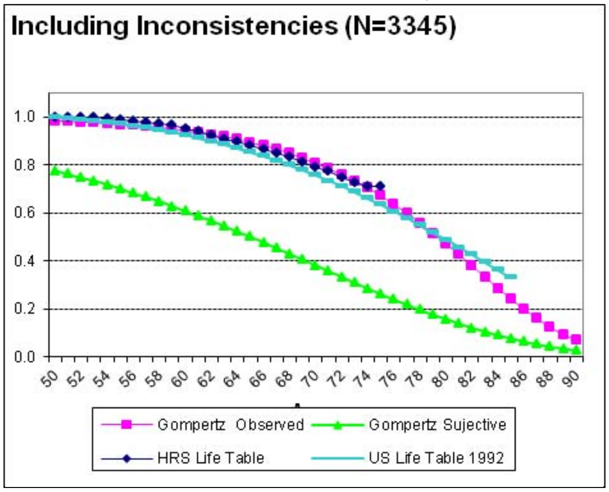


Figure 2.1.1 **White Males' Survival Functions – Kaplan-Meier Estimates: HRS 1992-2006 and Gompertz Models: Subjective and Observed Estimates, and US 1992 Life Tables**



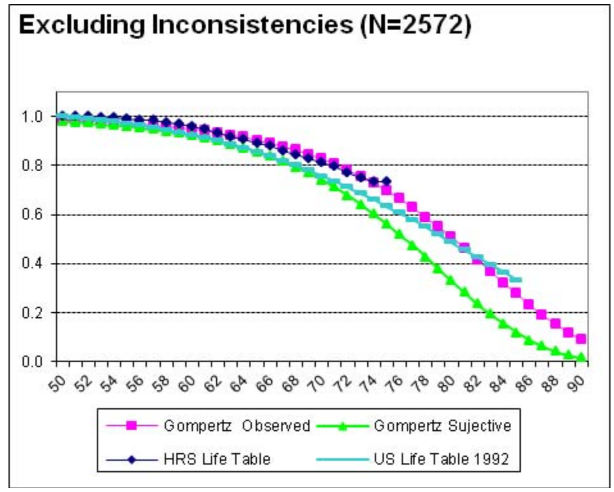
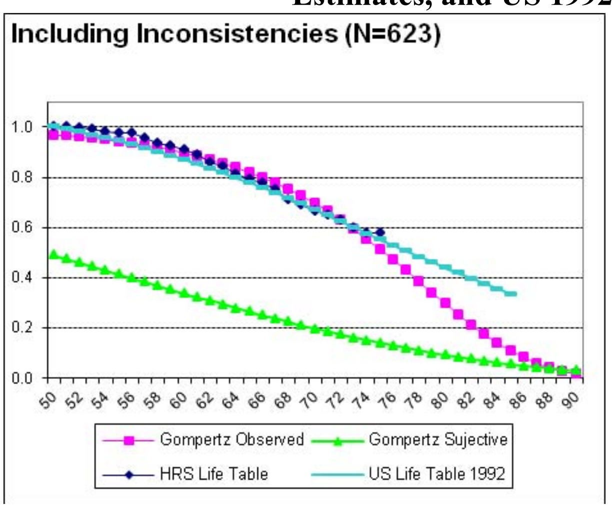


Figure 2.1.2 **Black Males' Survival Functions – Kaplan-Meier Estimates: HRS 1992-2006 and Gompertz Models: Subjective and Observed Estimates, and US 1992 Life Tables**



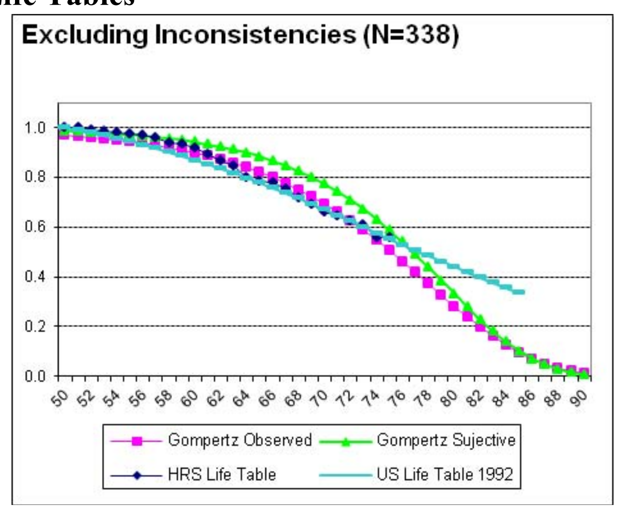


Figure 2.1.3 **White Females' Survival Functions – Kaplan Meier Estimates: HRS 1992-2006 and Gompertz Models: Subjective and Observed Estimates, and US 1992 Life Tables**

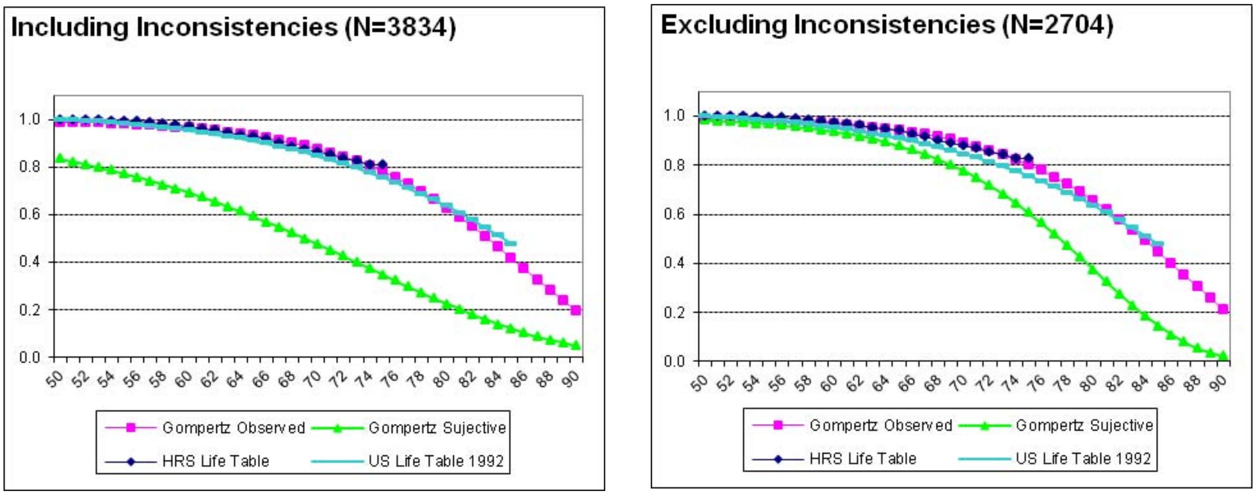


Figure 2.1.4 **Black Females' Survival Functions – Kaplan-Meier Estimates: HRS 1992-2006 and Gompertz Models: Subjective and Observed Estimates, and US 1992 Life Tables**

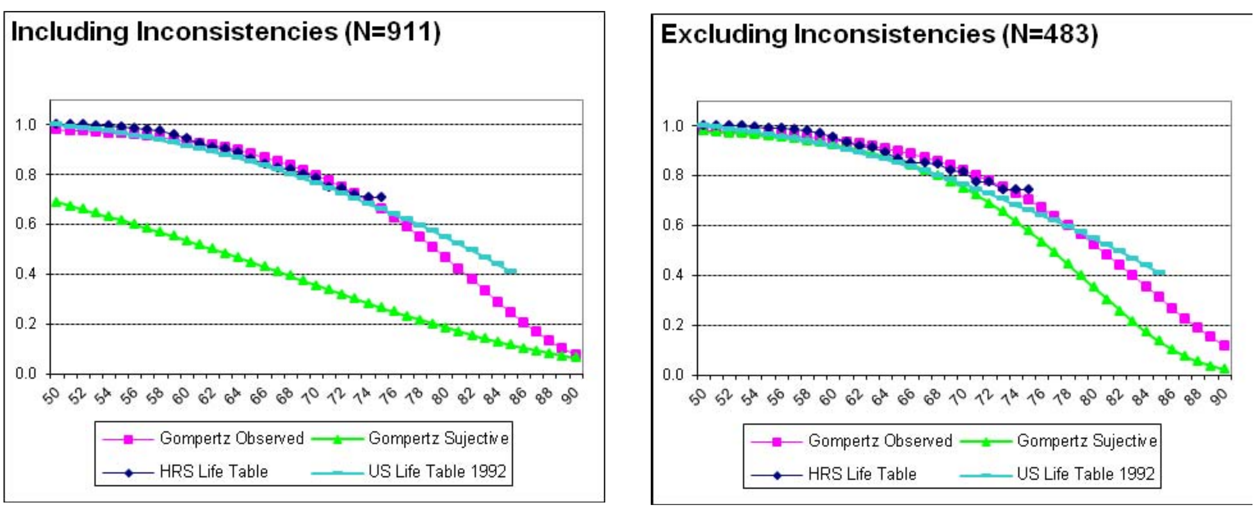


Figure 2.2.1 **White Males' Survival Functions – Kaplan-Meier Estimates: HRS 1992-2006 and Logistic Models: Subjective and Observed Estimates, and US 1992 Life Tables**

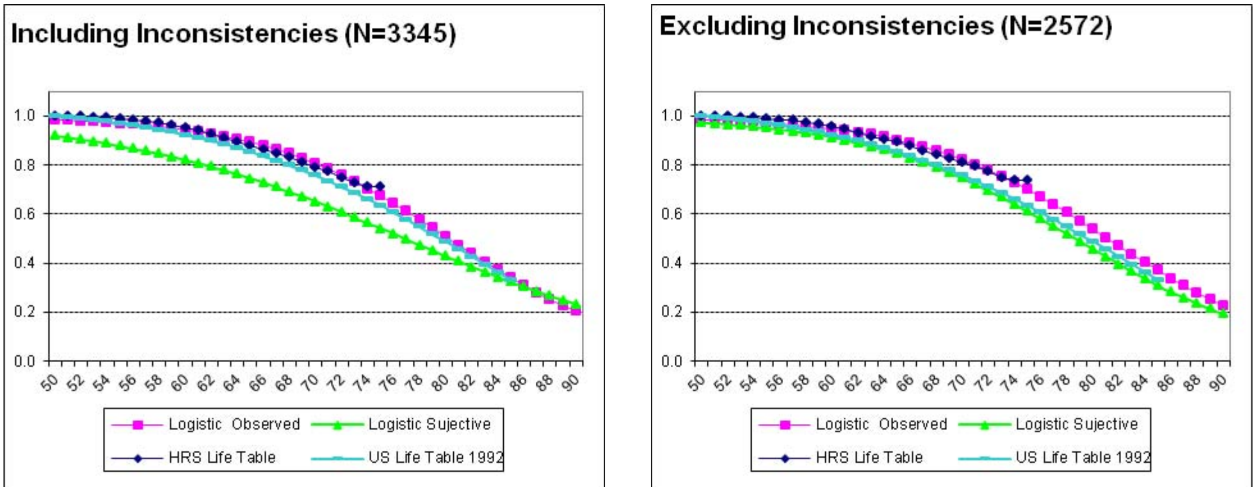


Figure 2.2.2 **Black Males' Survival Functions – Kaplan-Meier Estimates: HRS 1992-2006 and Logistic Models: Subjective and Observed Estimates, and US 1992 Life Tables**

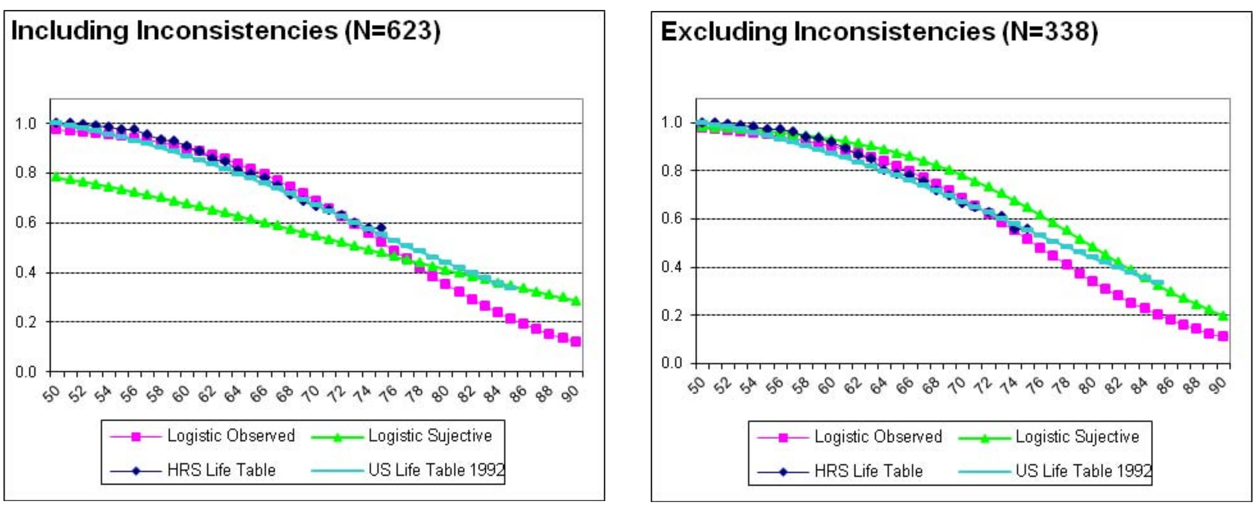


Figure 2.2.3 **White Females' Survival Functions – Kaplan-Meier Estimates: HRS 1992-2006 and Logistic Models: Subjective and Observed Estimates, and US 1992 Life Tables**

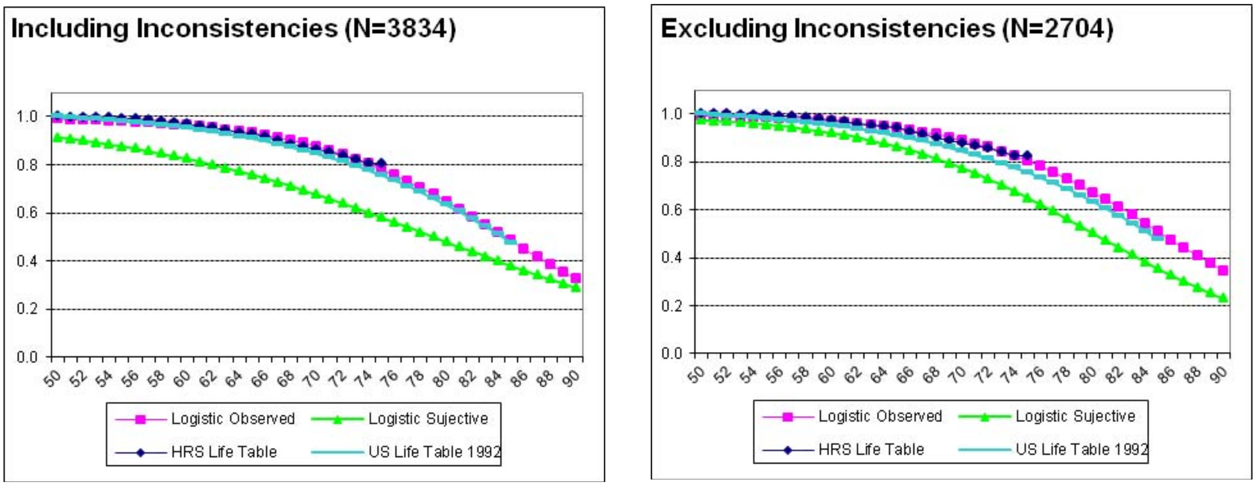


Figure 2.2.4 **Black Females' Survival Functions – Kaplan-Meier Estimates: HRS 1992-2006 and Logistic Models: Subjective and Observed Estimates, and US 1992 Life Tables**

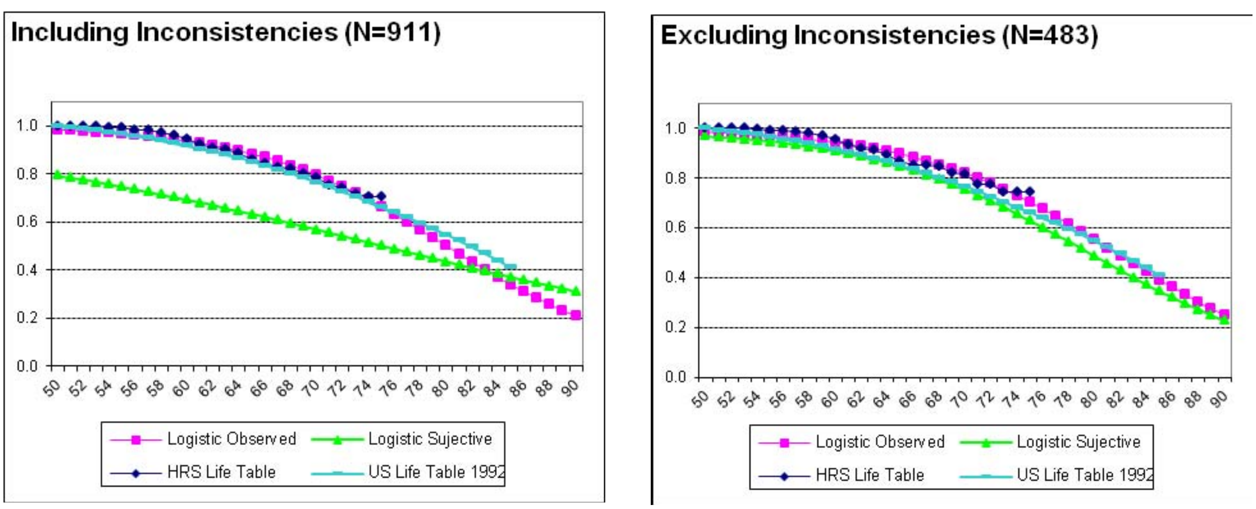


Figure 3 **Survival to Age 75 – Mean Subjective Probability by Race and Gender – Individuals Aged 50-61**

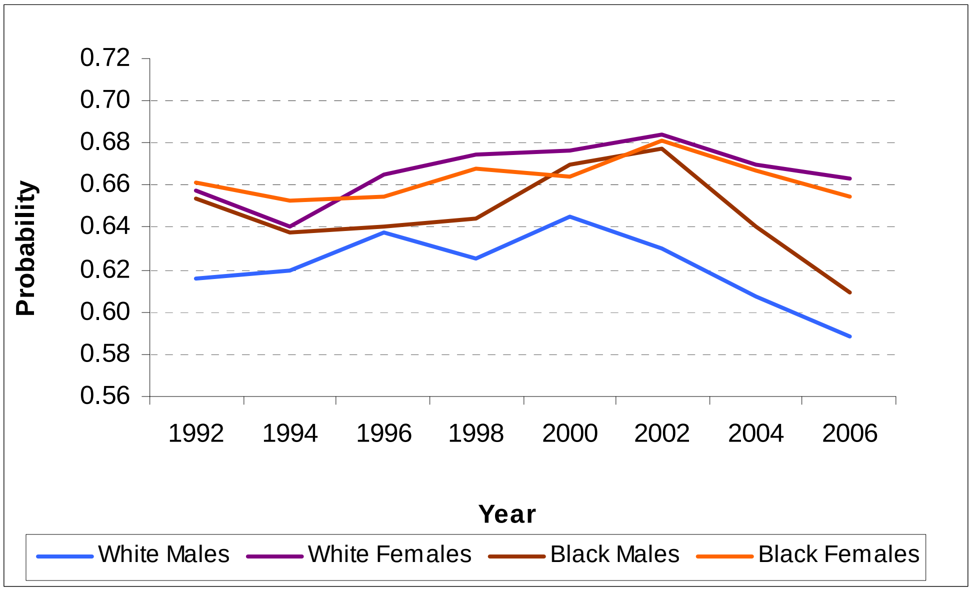


Figure 4 **Differences between 1992 and 2004 in Life Expectancy at Ages 50 and 75 by Race and Gender**

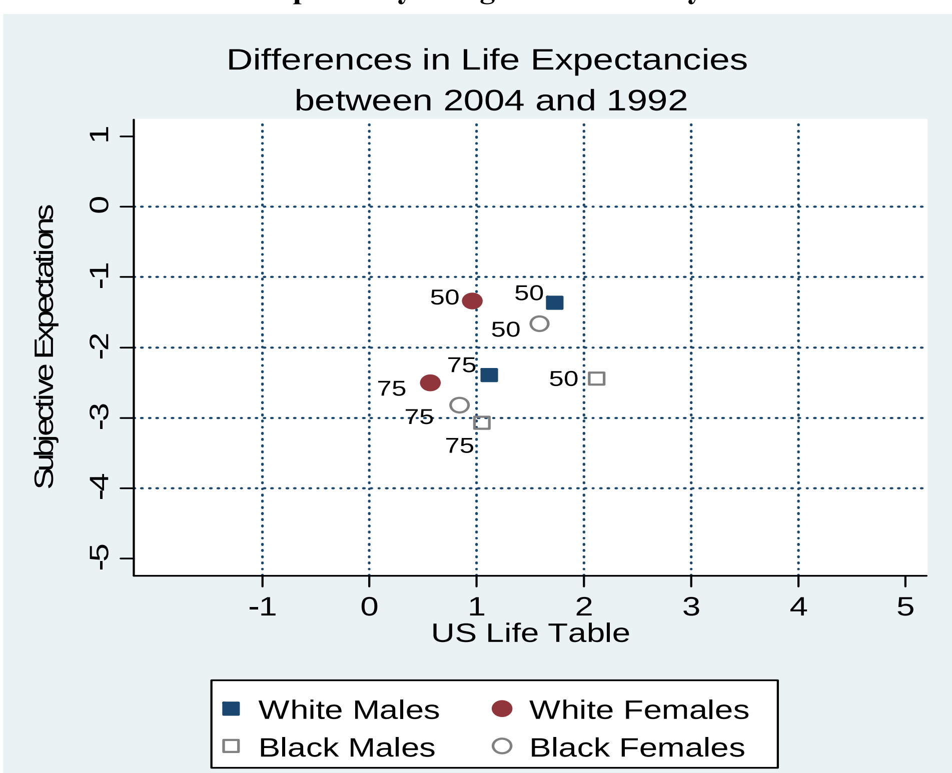


Figure 5 **Difference in Subjective Life Expectancy Estimated in 1992 by those Aged 50-61 in 1992 Who Survived to 2004 and by all those Aged 51-61 in 1992 Regardless of Survivorship Status in 2004**

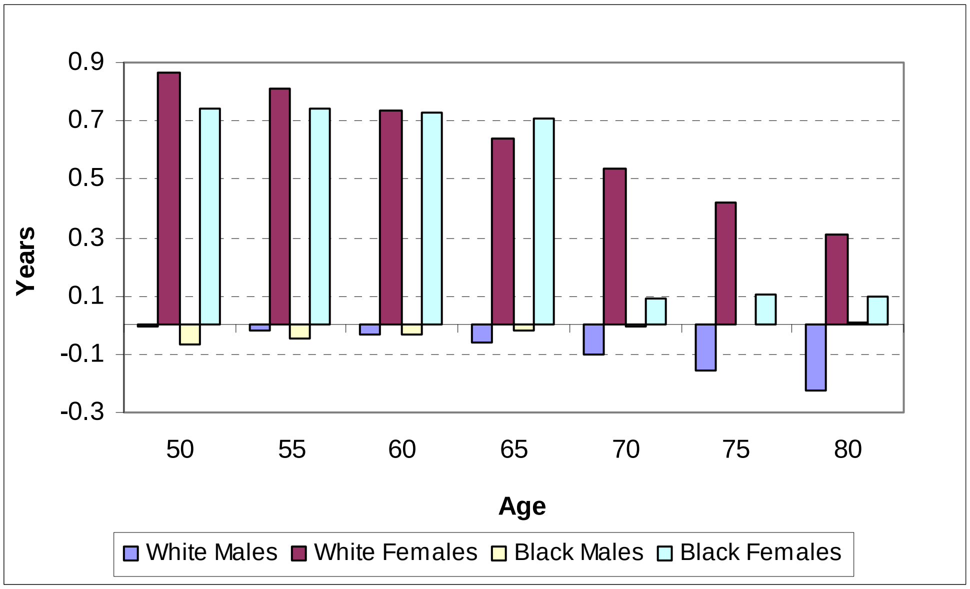


Figure 6 **Difference in Subjective Life Expectancy between Estimations done in 2004 by those Aged 62-73 in 2004 who were 50-61 in 1992 and Estimations done in 1992 by the Same Individuals**

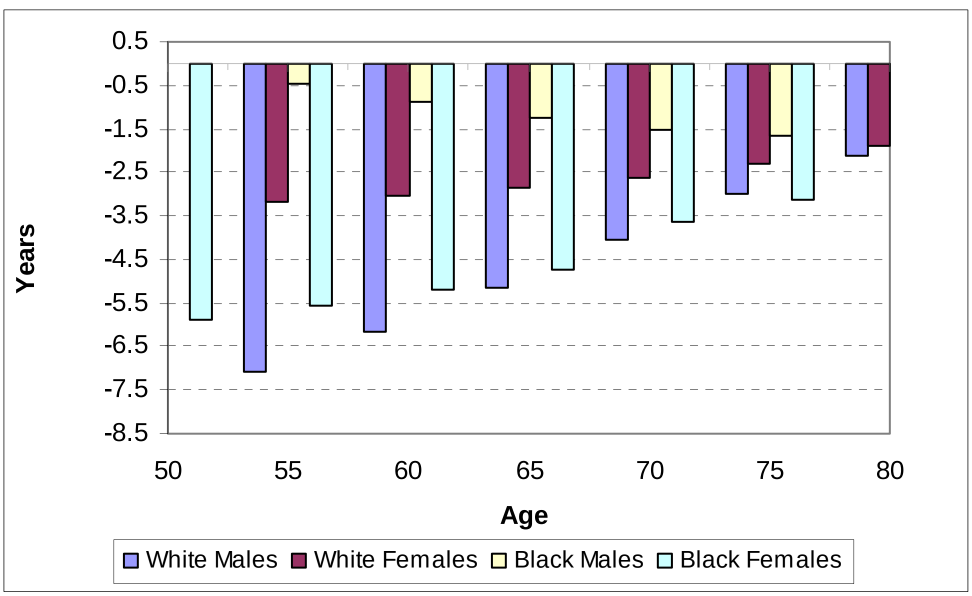


Table 1 HRS 1992 – Descriptive Statistics

	Whites				Blacks			
	Males		Females		Males		Females	
	Include Incons.	Exclude Incons.	Include Incons.	Exclude Incons.	Include Incons.	Exclude Incons.	Include Incons.	Exclude Incons.
Obese (%)	21.20	21.01	23.04	22.49	26.43	28.83	42.84	43.82
Smoker (%)	27.59	26.00	25.28	25.31	38.99	38.44	23.53	23.90
Education (%)								
Less than HS	20.33	17.86*	22.91	19.74**	41.44	40.84	40.29	37.11
HS	36.20	35.71	43.50	45.58†	32.95	29.73	32.74	34.17
Some College	20.48	21.09	19.69	20.49	16.48	18.02	15.76	15.30
College and Above	23.00	25.34*	13.91	14.20	9.14	11.41***	11.21	13.42
N	3335	2565	3754	2655	613	333	901	477

Proportion Differences between Samples Including and Excluding Inconsistent Answers – Statistical Significance:
†: p<0.1; *: p<0.05; **: P<0.01; ***: p<0.001

Table 2.1 Parameters of Survival Functions – All Cases

	Gompertz $S(x)=\exp((-A/B).(\exp(Bx)-1))$				Logistic $S(x)=1/(1+\exp((x-\eta)/\tau))$			
	Observed		Subjective		Observed		Subjective	
	A (SE)	B (SE)	A (SE)	B (SE)	η (SE)	τ (SE)	η (SE)	τ (SE)
Whites								
Males	3.8E-06* (1.5E-6)	.1268*** (.0065)	.0007*** (.0002)	.0650*** (.0036)	80.2205*** (.4906)	7.1777*** (.3283)	76.8384*** (.3614)	11.0047*** (.2725)
	N = 26 R^2 = .9996		N = 6690 R^2 = .3780		N = 26 R^2 =.9997		N = 6690 R^2 =.7375	
Females	2.5E-06* (1.0E-6)	.1256*** (.0062)	.0004*** (.0001)	.0693*** (.0036)	84.5552*** (.6613)	7.4933*** (.3458)	78.9970*** (.3713)	12.2543*** (.3266)
	N = 26 R^2 = .9999		N = 7668 R^2 = .3271		N = 26 R^2 =.9999		N = 7668 R^2 =.7752	
Blacks								
Males	9.3E-06* (4.0E-6)	0.1208*** (.0069)	.0051 (.0039)	.0362** (.0106)	75.6482*** (.3904)	7.1244*** (.3492)	73.4219*** (4.1697)	18.2136*** (2.5548)
	N = 26 R^2 = .9988		N = 1246 R^2 =.3203		N = 26 R^2 = .9992		N = 1246 R^2 =.7366	
Females	5.4E-06* (2.6E-6)	.1219*** (.0076)	.0018† (.0011)	.0480*** (.0081)	80.0507*** (6129)	7.4322*** (.4199)	75.1395*** (3.0257)	18.5990*** (2.0409)
	N = 26 R^2 =0.9994		N = 1822 R^2 =0.2875		N = 26 R^2 = .9995		N = 1822 R^2 =.7643	

†: p<0.1; *: p<0.05; **: P<0.01; ***: p<0.001

Table 2.2 Parameters of Survival Functions – Cases Excluding Inconsistencies

	Gompertz $S(x) = \exp((-A/B).(\exp(Bx)-1))$				Logistic $S(x) = 1/(1+\exp((x-\eta)/\tau))$			
	Observed		**Subjective**		**Observed**		**Subjective**	
	A (SE)	**B (SE)**	**A (SE)**	**B (SE)**	**η (SE)**	**τ (SE)**	**η (SE)**	**τ (SE)**
Whites								
Males	3.4E-06* (1.4E-06)	.1268*** (.0066)	4.2E-06*** (6.9E-07)	.1308*** (.0023)	81.1378*** (.5407)	7.2394*** (.3421)	78.5990*** (.1789)	7.9553*** (.1170)
	N = 26 R^2 = .9997		N = 5144 R^2 = .4635		N = 26 R^2 = .9997		N = 5144 R^2 = .8123	
Females	1.7E-06* (7.1E-07)	.1299*** (.0066)	2.6E-06*** (4.5E-07)	.1356*** (.0024)	85.2718*** (.7014)	7.2950*** (.3473)	80.0851*** (.1770)	8.1838*** (.1274)
	N = 26 R^2 = .9999		N = 5408 R^2 = .4218		N = 26 R^2 = .9999		N = 5408 R^2 = .8294	
Blacks								
Males	7.9E-06* (3.2E-06)	.1236*** (.0066)	1.4E-06* (6.9E-07)	.1461*** (.0068)	75.4094*** (.3456)	6.9550*** (.3126)	79.5029*** (.4683)	7.5175*** (.3465)
	N = 26 R^2 =.9990		N = 676 R^2 =0.4523		N = 26 R^2 = .9993		N = 676 R^2 = .8075	
Females	5.4E-06† (2.0E-06)	.1195*** (.0085)	4.3E-06* (1.9E-06)	.1296*** (.0061)	81.6336*** (.8108)	7.6730*** (.5097)	79.5593*** (.4610)	8.5454*** (.3706)
	N = 26 R^2 =.9994		N = 966 R^2 =0.4285		N = 26 R^2 = .9995		N = 966 R^2 = .8170	

†: p<0.1; *: p<0.05; **: P<0.01; ***: p<0.001

Table 3 HRS 1992 and 2004 - Descriptive Statistics

	1992	2004
Females (%)	51.94	55.72***
Whites (%)	86.57	88.36*
Obese (%)	23.90	34.31***
Smoker (%)	26.22	20.96***
Education (%)		
Less than HS	21.48	8.30***
HS	39.60	32.33***
Some College	20.20	28.49***
College and Above	18.72	30.88***
N	6030	3049

Proportion Differences between Samples Including and Excluding Inconsistent Answers – Statistical Significance: †: p<0.1; *: p<0.05; **: P<0.01; ***: p<0.001

Table 4 **Subjective Survival – NLS – Dependent Variable: Subjective Survival Probability – Logistic Function – Pooled HRS 1992 and 2004 – Excluding Inconsistent Answers - Individuals 50-61**

N = 18976 **Clusters = 9488**	**M1**	**M2**	**M3**	**M4**	**M5**
Level Parameter	79.46 (0.13)***	78.35 (0.16)***	78.87 (0.17)***	77.86 (0.19)***	78.02 (0.50)***
Shape Parameter	8.01 (0.08)***	7.56 (0.08)***	8.18 (0.08)***	7.70 (0.20)***	7.70 (0.07)***
Gender (1=Male; 0=Female)	-1.53 (0.18)***	-1.50 (0.17)***	-1.56 (0.19)***	-1.52 (0.17)***	-1.64 (0.35)***
Race (1=Black; 0=White)	-0.22 (0.28)	-0.28 (0.40)	-0.23 (0.29)	-0.28 (0.27)	-0.54 (0.59)
Survey (1=HRS 1992; 0=HRS 2004)		2.01 (0.18)***		2.01 (0.18)***	1.55 (0.31)***
Age Group (1= 50-55; 0=56-61)			1.01 (0.19)***	0.85 (0.17)***	0.89 (0.60)**
Race* Survey					1.05 (0.59)†
Race* Age Group					-0.79 (0.53)
Gender* Survey					0.39 (0.37)
Gender* Age Group					-0.22 (0.35)
Survey*Age Group					0.28 (0.36)
R^2	0.8179	0.8200	0.8184	0.8204	0.8205

†: p<0.1; *: p<0.05; **: P<0.01; ***: p<0.001

Table 5 **Subjective Survival – NLS – Dependent Variable: Subjective Survival Probability – Excluding Inconsistent Answers - Individuals 50-61**

	1992 & 2004 (N= 18652; Clusters = 9326)	
	M1	**M2**
Level Parameter	79.40 (0.52)***	78.08 (0.22)***
Shape Parameter	7.49 (0.07)***	7.49 (0.07)***
Gender (1=Male; 0=Female)	-1.49 (0.18)***	-1.78 (0.17)***
Race (1=Black; 0=White)	0.07 (0.26)	0.48 (0.26)
Smoker (1= Yes; 0=No)	-2.69 (0.20)***	-2.04 (0.20)***
Obese (1=Yes; 0=No)	-1.63 (0.19) ***	-1.32 (0.19)***
Less than HS (1= Yes; 0=No)		-1.32 (0.26)***
Some College (1= Yes; 0=No)		1.53 (0.22)***
College /More (1= Yes; 0=No)		2.80 (0.22)***
Survey (1992=1; 2004=0)	2.01 (0.18)***	2.67 (0.18)***
R^2	0.8239	0.8282

†: p<0.1; *: p<0.05; **: P<0.01; ***: p<0.001

Table 6.1 Differences in Life Expectancy by Age between Non-Obese and Obese White Individuals

Age	Observed				Subjective			
	Males		Females		Males		Females	
	Non-Smoker	Smoker	Non-Smoker	Smoker	Non-Smoker	Smoker	Non-Smoker	Smoker
50	1.53	-2.29	0.15	1.26	1.13	0.40	2.19	0.30
60	1.41	-2.52	0.07	1.23	1.06	0.37	2.06	0.28
70	1.09	-2.61	-0.12	1.10	0.87	0.29	1.72	0.23

Table 6.2 Differences in Life Expectancy by Age between Non-Obese and Obese Black Individuals

Age	Observed				Subjective			
	Males		Females		Males		Females	
	Non-Smoker	Smoker	Non-Smoker	Smoker	Non-Smoker	Smoker	Non-Smoker	Smoker
50	3.55	4.80	4.92	-0.89	1.13	0.40	0.80	-2.43
60	3.79	4.41	4.75	-1.01	1.06	0.37	0.75	-2.28
70	3.94	3.17	4.22	-1.11	0.87	0.29	0.62	-1.88

Table 7 **Updating Survival Expectations – Linear Regression – Dependent Variable: ln(-ln(Subjective Probability of Surviving from Age x to Target Age in Current Wave))**

N= 29890 Clusters: 5725	**M1**	**M2**	**M3**	**M4**
Health Shock (1=Yes; 0=No)	0.34 (0.05) ***	0.34 (0.05) ***	0.29 (0.06) ***	0.28 (0.06) ***
ln(-ln(Subjective Prob. of Surviving from Age x to Target Age Estimated from Logistic Parameters of 1992 Wave))	1.57 (0.05) ***	1.57 (0.05) ***	1.58 (0.05) ***	1.57 (0.05) ***
Race (1=Black; 0=White)	-0.44 (0.08) ***	-0.47 (0.08) ***	-0.46 (0.08) ***	-0.49 (0.08) ***
Race*Health Shock	-0.16 (0.13)	-0.16 (0.13)	-0.15 (0.13)	-0.15 (0.13)
Gender (1=Male; 0=Female)	-0.06 (0.05)	-0.06 (0.05)	-0.06 (0.05)	-0.06 (0.05)
Gender*Health Shock	0.01 (0.07)	0.01 (0.07)	0.01 (0.07)	0.01 (0.07)
Obese (1=Yes; 0=No)		0.20 (0.05) ***		0.22 (0.05) ***
Obese*Helath Shock		-0.02 (0.08)		-0.00 (0.08)
Smoker (1=Yes; 0=No)			0.30 (0.05) ***	0.31 (0.05) ***
Smoker*Health Shock			0.11 (0.08)	0.11 (0.08)
Constant	-0.12 (0.05) **	-0.17 (0.05) **	-0.19 (0.05) ***	-0.24 (0.05) ***
R^2	0.0427	0.0439	0.0462	0.0477

†: p<0.1; *: p<0.05; **: P<0.01; ***: p<0.001

Center for Demography and Ecology
University of Wisconsin
1180 Observatory Drive Rm. 4412
Madison, WI 53706-1393
U.S.A.
608/262-2182
FAX 608/262-8400
comments to: palloni@ssc.wisc.edu
requests to: cdepubs@ssc.wisc.edu