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THE LONGEVITY OF OLDER WIVES AND THEIR HUSBANDS: COMPARING ACTUAL COUPLES WITH SYNTHETIC COUPLES

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ABSTRACT

Using data from the National Health Interview Survey (NHIS), we construct two measures of the longevity of older wives and husbands. For definiteness, we focus on couples in which the wife was 60 and the husband 62 in 1988. Our first measure utilizes a 4 x 4 "longevity matrix" in which the bins correspond to the decades in which the spouses died. For example, an entry in the (3,2) bin indicates that the wife died in the 3rd decade (between ages 80 and 89) and the husband in the second decade (between ages 72 and 81). Our second measures use the Gompertz distribution to estimate the censored observations from the NHIS. We use the Gompertz estimates of age-specific mortalities to construct joint and survivor life expectancies for the couples in our working sample. We compare the longevity estimates based on actual couples from the NHIS with estimates based on synthetic couples constructed from the 1988 CDC life tables. Research based on randomly formed synthetic couples constructed from CDC life table data shows that the randomness of mortality and the overlap between spouses' age-specific mortality distributions imply dramatically long life spans for surviving spouses. The 4 x 4 longevity matrices show that longevity effects are magnified at the level of the couple by assortative marriage.

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1. Introduction

In this paper we use data on actual couples from the National Health Interview Survey (NHIS) for 1986-1990 to investigate the longevity of older wives and their husbands. Policy makers as well as researchers such as demographers, economists, and sociologists want to know about older couples and surviving spouses. And older couples making savings, investment, and retirement decisions need information about how many years both spouses are likely to remain alive; about the wife's remaining life expectancy if she is the surviving spouse; and about the husband's remaining life expectancy if he is the surviving spouse.

The answers to these and other questions about health and longevity depend on the ages of the wife and the husband and on the "focal" year or years in which these questions are posed. We take 1988 as our focal year and assume that the wife is 60 and her husband is 62; hence, the wife belongs to the 1928 birth cohort and her husband to the 1926 birth cohort. We choose these ages because they often coincide with the ages at which couples are making crucial decisions about retirement.

To illustrate the mortality realizations experienced by actual couples, we introduce the "longevity matrix" which shows the timing of mortality for both spouses. We focus on the 4 x 4 longevity matrix in which the bins correspond to the number of decades each spouse lived beyond his or her age in the focal year. For example, an entry in the (3,2) bin indicates that the wife died in the 3rd decade (between ages 80 and 89) and the husband in the second decade (between ages 72 and 81).

To calculate joint and survivor life expectancies requires additional assumptions because the NHIS mortality data are censored. Using the Gompertz distribution we estimate the longevity of the NHIS respondents who were alive at the most recent linking of the NHIS with the National Death Index. Combining these Gompertz-estimated death dates with the actual death dates that we do observe, we estimate joint and survivor life expectancies. We compare these estimates with estimates obtained by using "synthetic couples" that we formed from CDC life tables.

If actual marriages reflected random marriages of women and men in the marriage market and if divorce were random, then we could use the distribution of age-specific mortalities for 60 year old women and 62 year old men reported in the 1988 CDC life tables to calculate joint and survivor life expectancies for these synthetic couples. The CDC data imply a joint life expectancy of 14.9 years; that the probability that the surviving spouse will be the wife is .65; and, if the wife is the surviving spouse, her life expectancy as a widow is 13.2 years. If the husband is the surviving spouse, his life expectancy as a widower is 9.6 years. These survivor life expectancies for both wives and husbands are dramatically greater than might have been anticipated based on the spouses' individual life expectancies (e.g,. about 24 years for women and about 20 years for men).

Schoen and Nelson (1974) constructed a "life status table" consisting of four increment-decrement life tables that allowed them to include not only death but also divorce and remarriage in their analysis. Although they repeatedly emphasized the central role of cohort measures, data limitations required them to base their estimates on period measures. Goldman and Lord (1983) constructed synthetic couples in which the wife was 23 and the husband 25 by assuming random marriage and using age-specific mortalities from a period life table to calculate joint and survivor life expectancies. Compton and Pollak (2019, 2021) made the corresponding calculation for couples in which the wife was 60 and the husband 62 using CDC life table data to create synthetic couples for which they calculated joint and survivor life expectancies.

To estimate joint and survivor life expectancies using synthetic couples constructed from standard period life tables requires resolving three major difficulties.

First, although it is well known that on average married individuals live substantially longer than unmarried individuals, standard period life tables reflect the mortality experience of individuals without regard to their marital status.

Second, joint and survivor life expectancies are cohort measures while standard life tables provide the raw material for period measures. Although longevity has increased substantial over the past century, period measures and cohort measures constructed from period measures ignore future increases in longevity. (But as the ads remind us, "Past performance is no guarantee of future results.")

Third, standard life tables reflect the longevity of individuals, while we are interested in the longevity of wives and their husbands -- that is, of married couples and surviving spouses. This raises questions about the appropriate definition of "marriage" and the treatment of divorce, remarriage, and cohabitation.

Standard US life tables distinguish among individuals on the basis of sex, race, and ethnicity but include all individuals in these categories regardless of marital status. Using data from the NHIS, we find that 60 year old married women born in 1928 live about 1.5 years longer than 60 year old unmarried women; 62 year old married men born in 1926 live about 1.7 years longer than 62 year old unmarried men. Using data from the Medicare Health Outcome Survey (HOS), Jia and Lubetkin (2020, p. 1) estimate that at age 65 married men born in 1947 live 2.2 years longer than unmarried men, and married women live 1.5 years longer than unmarried women. Using data from the National Center for Health Statistics, Curtin and Tejada-Vera (2019) report age-adjusted death rates by marital status for individuals 25 and over, between 2010-2017. They report that married individuals live longer than widowed, divorced, and never married individuals. Their calculations are based on "marital status at the time of death" which is "collected on the death certificate from an informant, usually the next of kin." Using data from these nonstandard life tables to calculate life expectancies yields estimates but the interpretation of these estimates differs from that of life expectancies calculated from standard life tables that ignore marital status. More specifically, estimates of life expectancy based on marital status at death are estimates of "joint life expectancy" -- that is, the life expectancy of the first spouse to die.

Jia and Lubetkin (2020, p. 1) begin their abstract by drawing attention to an assumption they claim is made implicitly if not explicitly by researchers who focus on individuals who were married when they died. They write, "Previous investigations of the relationship between marital status and the life expectancy...rely on the assumption that participants will remain in a given marital status until death." This mischaracterizes the assumption because, unless spouses die simultaneously, the death of one spouse automatically changes the marital status of the other from "married" to "widow" or "widower." The life expectancy calculated from marital status at death is an easily misinterpreted statistic.

Considering women aged 60 married to men aged 62 in a focal year commits us not only to focus on married couples but to rely on cohort rather than period measures and to define "marriage" in a way that is consistent with a cohort approach. In contrast, measures based on marital status at death are consistent with both period and cohort approaches. The couples in our analysis were respondents to the NHIS in 1988 and indicated in their responses that they were married to each other. Thus, the wife belongs to the 1928 birth cohort and the husband to the 1926 birth cohort.

In 2019, the year before the Covid-19 pandemic, CDC period life tables show that more than 91% of females reached age 60 and more than 83% of males reached age 62. Thus, mortality for both women and men is highly concentrated among those age 60 and older. (About 3.0% of females and 1.1% males reach age 100.) Because fertility is almost entirely concentrated among women younger than age 50, the standard model of classical stable population theory is "nearly separable" into "fertility ages" and "mortality ages."[1]

Table 1 shows the decade-by-decade increases in period life expectancy for 60 year old men and women since 1930. Longevity in the United States has increased for both women and men in each decade since 1920s, with average increases of 0.99 years for women and of 0.80 years for men - essentially the century between the 1918-19 flu pandemic and the 2020-23 Covid-19 pandemic.[2] The increase in period life expectancy between 2000 and 2019 illustrates the point: in 2000 a 60 year old American woman had a period life expectancy of 23.2 years; in 2019, the corresponding life expectancy was 24.9 years, an increase of 1.7 years over 2 decades. Similarly, a 60 year old American man had period life expectancies of 20.0 years in 2000 and 21.9 years in 2019, and increase of 1.9 years over 2 decades.

Although our paper is short, a roadmap is useful as well as customary. In section 2 we show that individuals' life expectancies do not provide enough information to estimate joint or survivor life expectancies. In section 3 we describe the data on married couples and unmarried individuals from the National Health Interview Survey (NHIS). In section 4 we introduce the "longevity matrix." Specifically, we use a 4 x 4 longevity matrix to display the distribution of the timing of spouses' deaths in our working sample of married couples in which the wife was 60 and the husband

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[1] Coale (1972, Chapter 5) discusses a generalization of classical stable population theory that allows mortality rates to change for the pre-reproductive and the post-reproductive populations. At the end of the chapter, Coale cites his 1963 paper on "quasi-stable" age distributions.

[2] This average is calculated using the 2010-2019 range, rather than 2010-2020 in order to avoid the decline in period life expectancy for 2020 due to the Covid-19 pandemic.

62 in 1988. Because not all of the NHIS respondents in our working sample had died before the most recent matching of NHIS respondents with the National Death Index, we face a censoring problem. Censoring prevents us from calculating means (e.g., joint and survivor life expectancies) because the calculations require death dates for all individuals in our working sample. The longevity matrix finesses the censoring problem by classifying deaths by the decade in which they occur: all of the censored deaths are those of individuals who lived at least into the 4th decade beyond the year in which they responded to the NHIS and hence fall into bins in which at least one spouse dies in the fourth or fifth decade beyond age 60 or 62 (i.e., at ages 90 or 92 or after). In section 5 we "solve" the censoring problem in a different way, using the Gompertz distribution to estimate the death dates that are censored and using these Gompertz-estimated dates, together with the actual dates reporting by the NDI, to estimate joint and survivor life expectancies. Section 6 is a brief conclusion.

2. Individuals' Life Expectancies and Couples' Joint and Survivor Life Expectancies

Intuition suggests that individuals' life expectancies provide enough information to estimate the longevity of a couple ("joint life expectancy") and the longevity of wife and the husband if they are the surviving spouse ("survivor life expectancies"). Using CDC life tables, we find that in 1988 the life expectancy of a 60 year old woman was 23.3 years and the life expectancy of a 62 year old man was 18.2 years. Intuition suggests that the couple's joint life expectancy is about 18 years (the minimum of the spouses' life expectancies) and that the wife can expect to live about 5 years after the death of her husband (the difference in their life expectancies). These intuitions are wrong. Individuals' life expectancies do not provide theoretically defensible or empirically satisfactory answers to our questions. The joint and survivor life expectancies that intuition incorrectly infers from individuals' life expectancies substantially overstate joint life expectancy and dramatically understate survivor life expectancies.

An alternative approach is to assume random marriages between 60 year old women and 62 year old men and use CDC period life tables to construct synthetic couples. Then, following Goldman and Lord (1983) and Compton and Pollak (2019, 2021), we could use the CDC age-specific mortalities to calculate joint and survivor life expectancies. We argue that this approach also fails to provide either theoretically or empirically appropriate answers to our questions and that we need data on actual couples.

To challenge the tempting but misleading intuition that we can infer joint and survivor life expectancies from individual life expectancies, consider a same-sex couple. Suppose Gertrude and Alice were both age 60 in 1988, so that each spouse had a life expectancy of almost 25 years. Does intuition tell you that the couple's joint life expectancy is almost 25 years and that survivor life expectancy is 0?

Gertrude and Alice remove the age and sex differences -- two bright, shiny objects that distract our attention and mislead our intuition. By removing age and sex differences, Gertrude and Alice discredit the intuition that we can infer joint and survivor life expectancies from individual life expectancies. Without these distractions, the primary importance of the randomness of mortality and the overlap between the spouses' age-specific mortality distributions become clear. Thus, Gertrude and Alice focus our attention on the life expectancy of the first spouse to die (joint life expectancy) and the (remaining) life expectancy of the second spouse to die (survivor life expectancy).

The age-specific mortalities reported in standard period life tables offer an alternative approach. Using the 1988 CDC life tables, we calculate that our same-sex couple's joint life expectancy is about 20 years (one spouse or the other is likely to die before his or her life expectancy) and that Gertrude and Alice each have a survivor life expectancy of about 12 years (the surviving spouse is likely to live longer than his or her life expectancy.) Our same-sex couple demonstrates that we cannot infer joint and survivor life expectancies from individuals' life expectancies. We need more information. But data from CDC life tables are not what we need. We need data on actual couples.

3. **Data**

The National Health Interview Survey (NHIS) is an annual cross section survey of a representative sample of about 35,000 US households providing data on both married couples and unmarried individuals. To estimate the longevity of spouses, we need a working sample that is large, lets us identify women and men who are married to each other in our focal year or years, and includes both spouses' death dates. The NHIS satisfies most but not all of our desiderata. For those who responded after 1985, the NHIS reports year of birth and, for respondents who died on or before December 31, 2019, it reports quarter of death.

Two problems remain. The first is sample size. If we had enough data, we would restrict our attention to white couples in which the wife was 60 and the husband 62 when they responded to the NHIS survey in our focal year (i.e., 1988).[3] To compensate for the relatively small annual

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[3] We did not pool white couples with black couples because longevity matrices based on synthetic couples created from pooled data would be inconsistent with the high degree of racial sorting of older Americans in the marriage market. (Such pooling would yield synthetic couples with substantially more dispersion in spouses' longevity than experienced by actual couples.) Our focus on white couples allows us to calculate statistics using bootstrapping rather than parametric assumptions; in effect, we use "synthetic couples" to investigate the patterns in the data on actual couples. Restricting ourselves to non-Hispanic white couples is not an option because CDC did distinguish between Hispanics and non-Hispanics in 1988.

NHIS sample sizes, we expand our focus from the year 1988 to the five years 1986-1990. We include all couples in which both spouses are alive at ages 60 and 62. For example, a couple who is 56 & 58 in 1986, both of whom survive past 1990 are included in the sample, with 1990 being set as year 0.[4] (see Appendix 1) These expansions give us a working sample of 478 couples.[5]

We treat as "married" respondents who reported themselves to be "Currently Married." We treat respondents who reported themselves to be in the other three categories (i.e., "Widowed"; "Separated or Divorced"; and "Never Married") as unmarried. The NHIS asked respondents about their current marital status but never asked about marital status in any other year, and never about cohabitation.

The second problem with NHIS is right censoring: some individuals in our working sample had not died by December 31, 2019, the most recent date at which NHIS respondents were matched with the National Death Index (NDI). Hence, all respondents alive on January 1, 2019 are right censored – all of them survived at least three full decades beyond ages 60 and 62, and, hence, they will die in the fourth or fifth decade after responded to the NHIS.[6] For our sample of 478 couples, 28.9% of wives, 14.3% of husbands, and 4.4% of couples are right censored. As we explained in the introduction, the longevity matrix and the Gompertz distribution finesse the problem posed by right censoring in different ways.

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[4] This construction assumes that observed couples remain married to ages 60 & 62.

[5] Even with this wider net, our sample is still too small to allow us to analyze black couples separately.

[6] We ignore the possibility that the NDI failed to report some deaths that occurred on or before December 31, 2019.

4. Longevity Matrices

We first calculate a 4 x 4 “longevity matrix” in which the bins correspond to the decades in which the spouses died. For example, an entry in the (3,2) bin indicates that the wife died in the 3rd decade (between ages 80 and 89) and the husband in the second decade (between ages 72 and 81). These matrices (see Figure 1) show the distribution of couples by the decade of death for both spouses.[7] These longevity matrices have two main advantages over life expectancy as summary measures. First, and most important, they provide readily digested information about the distribution of joint and survivor longevity. Life expectancy, on the other hand, provides no information about the distribution of longevity, as Gertrude and Alice clearly demonstrate. Second, the longevity matrix finesses the problem of estimating joint and survivor life expectancies using censored data.

In Figure 1, we compare the longevity matrix constructed using the CDC life table mortality rates in 1988 with the longevity matrix for our NHIS sample of couples aged 60 & 62. The CDC life table matrix is calculated for randomly constructed couples and assumes independence of mortality. That is, if i is the proportion of women who die within the first decade, and j is the proportion of men who die within the first decade, then the upper left bin is the product ij. For actual couples, we observe the proportion of couples in each bin. Comparing the two longevity matrices, two things stand out. First, for both men and women, the CDC matrix shows a much higher proportion dying in the second decade and a much lower proportion dying in the third decade. Second, the NHIS matrix shows higher proportions in the extreme diagonal bins, where both die in the first decade (4.4 percent vs. 1.8 percent), or both die after 20 years,

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[7] Decades are years forward from aged 60-62. For a couple in which both spouses survived 0-9 years (the upper left bin), she died between the ages of 60-69, and he died between the ages of 62-71.

the sum of deaths in bins {(3,3), (3,4), (4,3), (4,4)}, (43.9 percent vs. 32.4 percent). These patterns reflects many differences between the samples – administrative vs. survey data, period vs. longitudinal mortality, and sampling women and men vs. married couples.

In Figure 2 we illustrate how the distribution changes as we narrow the sample by presenting longevity matrices for four NHIS samples. The top matrix shows the longevity matrix for the bootstrapped sample of all white women aged 60 and all white men aged 62. When we restrict the sample to married individuals (second panel), we find a decrease in proportions in the upper left quadrants (those dying in the first two decades) and an increase in the proportions in the lower right quadrants (those surviving to at least age 80 & 82). When we further restrict the sample to married couples with a 2-year age gap – women aged 60 whose husband is 62, and men aged 62 whose wife is 60), we see a further decline in the proportions in the upper left quadrant, and an increase in the proportions in the lower right quadrant. Note that this (third) panel presents the matrix for synthetic couples within this sample. Comparing the matrix for the randomly matched spouses with the matrix for actual couples in panel four highlights the role of assortative marriage on mortality. Relative to the synthetic couples, actual couples are less likely to be in the upper right and lower left quadrants (with long years of widow(er)hood) and more likely to be in the upper left and lower right quadrants (where spouses are likely to either both die early or both die late).

5. Life Expectancy Summary Measures

To calculate life expectancies from censored data requires parametric assumptions about the distribution of age-specific mortalities. Because of its preeminence in the demographic literature, the Gompertz distribution is the obvious choice.[8] The Gompertz distribution implies that for individuals older than age 30, age-specific mortalities increase at a constant rate. Under the assumption that the age-specific mortalities of women over 60 and of men over 62 obey the Gompertz distributions, then we can use the censored NHIS mortality data to estimate the deaths of NHIS respondents who were still alive (or, more precisely, not reported dead) as of December 31, 2019. Table 2 reports life expectancies for our six samples, using Gompertz estimation and synthetic couples.[9] Moving across the columns from left (CDC life table mortality rates) to right (Gompertz estimated mortality rates for couples) we find very similar patterns with slightly higher figures across the board for the sample of actual couples. The differences across the columns arise due to survey sampling, sampling married vs. all men and women, and assortative marriage.

The calculations in columns A and B are both based on 1988 age-specific mortality rates of all men and women. The higher figures for the NHIS estimates may be due to higher response rates for healthy individuals in the survey data. Column C uses the actual death ages for individuals who died prior to 2019, and Gompertz estimates for the censored sample. Since these estimates would reflect rising health over time, the lower estimates for this sample are somewhat surprising. We suspect that the Gompertz estimation may underestimate longevity of those over 90 years of age. Columns D and E separates the NHIS sample by marital status at

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[8] Benjamin Gompertz was a British actuary who, in 1825, published "On the Nature of the Function Expressive of the Law of Human Mortality and on a New Model of Determining Life Contingencies" in the *Phil Trans of the Royal Society of London*.

[9] The methodology is described more expansively in Compton and Pollak (2021, 2019). We estimate age-specific mortality rates to calculate individual life expectancies. Joint life expectancies are based on joint mortality of the spouses and estimates the expected length of time for both spouses to be alive. Survivor life expectancies are the weighted age-specific life expectancies, with weights being the probability of becoming a widow(er) at that age. Estimations are bootstrapped to calculate standard errors.

ages 60 and 62. As expected, we find lower life expectancies for unmarried individuals and synthetic couples, relative to those who are married. The samples in column E includes all married women aged 60, and all married men aged 62, regardless of the ages of their spouses. In Column F, we limit the samples to married couples – so that the married women aged 60 are married to men aged 62. This change increases all the calculated life expectancies. We suspect that the couples in sample F, with a two-year age gap are more likely to be in long-term marriages compared to those in column E as age differences among spouses increase with age at marriage.

Across all samples, survivor life expectancy is strikingly greater than one would expect from individuals' life expectancies. While these figures are calculated for a very specific sample – white married couples who are aged 60 & 62 between 1986-1990 – this conclusion holds even when we extend the sample to all men and women of these ages.

6. Conclusion

Intuitions based on the relatively small difference between the life expectancies of older wives and their husbands suggest that spouses will have similar longevities. Synthetic couples constructed from individual life table data suggest that joint longevity is substantially shorter than intuitions based on individuals' life expectancies suggest, and the longevity of surviving spouses dramatically longer. At a purely descriptive level, the differences are consequences of the randomness of mortality and the overlap between women's and men's age-specific mortalities.

Synthetic couples constructed from life table data have three serious weaknesses. First, they are based on period rather than cohort mortalities and thus fail to reflect the secular increase in the life expectancy of older women and men. Data on actual couples, not synthetic couples constructed from period life tables, are needed to study the longevity of older couples. Second, period life tables such as those published by the CDC typically reflect the mortality experiences unmarried as well as married individuals, although married women live substantially longer than unmarried women and married men live substantially longer than unmarried men. Third, the independence assumption used to construct synthetic couples fails to account for assortative marriage or for the protective effects of particular marriages which, taken together, may be responsible for much of the observed correlation between marriage and longevity.

This paper is descriptive. We do not have an identification strategy for analyzing why some individuals and some couples live longer than others or for distinguishing between selection into marriage, assortative marriage, and the protective effects of marriages. Thus, the differences we observe between the longevity of married and unmarried individuals reflects the sum of the effects of selection into marriage (i.e., being married at 60/62). Our strategy for estimating couples' longevity relies on actual couples, not synthetic couples constructed from individual life table data.

Policy makers and couples as well as researchers need information about the distribution of longevities as well as about their means. We use a 4 x 4 longevity matrix to provide a transparent display of the distribution of mortality risks facing older couples. For policy makers and for couples, the provision of this type of easily understood information about the distribution of mortality risks is low hanging fruit. The unexpected longevity of surviving spouses – husbands as well as wives -- suggests that informal and formal insurance arrangements, especially those involving annuities, deserve more attention – hardly a new idea as Kotlikoff and Spivak (1981) and Brown and Poterba (2000) suggested decades ago. For demographers the longevity of surviving spouses suggests that the usual focus on individuals' life expectancy is too restrictive and that couples – both married and cohabiting -- warrant more attention. For economists our findings challenge the relevance of standard individual life cycle models of labor supply, saving, and retirement which resolve all problems related to couples by assuming them away.

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Figure 1: 4 X 4 Longevity Matrices

CDC All Women 60, All Men 62

		Men				
		0-9	10-19	20-29	30+	
Women	0-9	1.8	3.3	3.4	1.2	9.7
	10-19	4.2	7.6	8.0	2.8	22.6
	20-29	6.8	12.3	12.9	4.6	36.6
	30+	5.7	10.5	11.0	3.9	31.1
	All	18.4	33.7	35.3	12.5	100.0

Actual Couples Aged 60 & 62

		Husbands				
		0-9	10-19	20-29	30+	
Wives	0-9	4.4	3.9	3.2	0.8	12.3
	10-19	3.5	4.2	5.3	2.6	15.5
	20-29	6.1	11.2	19.6	6.6	43.4
	30+	4.3	6.9	13.3	4.4	28.9
	Total	18.2	26.2	41.3	14.3	100.0

Difference

	0-9	10-19	20-29	30+	
0-9	2.6	0.7	-0.3	-0.5	2.6
10-19	-0.7	-3.4	-2.7	-0.3	-7.1
20-29	-0.7	-1.1	6.6	2.0	6.8
30+	-1.4	-3.6	2.4	0.5	-2.2
Total	-0.2	-7.5	6.0	1.7	

Figure 2: Longevity Matrices

All Women 60, All Men 62

		Men				
		0-9	10-19	20-29	30+	All
Women	0-9	2.7	3.7	3.7	1.6	11.6
	10-19	5.3	7.3	7.3	3.1	22.9
	20-29	8.3	11.5	11.6	4.9	36.2
	30+	6.7	9.3	9.3	4.0	29.3
	All	22.9	31.7	31.9	13.5	100.0

All Married Women 60, All Married Men 62

		Men				
		0-9	10-19	20-29	30+	All
Women	0-9	2.4	3.4	3.6	1.5	10.9
	10-19	4.9	6.9	7.3	3.1	22.2
	20-29	7.9	11.3	12.0	5.0	36.2
	30+	6.7	9.6	10.1	4.2	30.7
	All	21.9	31.2	33.0	13.9	100.0

Difference from previous

	0-9	10-19	20-29	30+	All
0-9	-0.3	-0.2	-0.1	0.0	-0.6
10-19	-0.4	-0.3	0.0	0.0	-0.7
20-29	-0.4	-0.2	0.4	0.1	0.0
30-39	0.0	0.3	0.8	0.3	1.4
All	-1.0	-0.4	1.1	0.4	

All Married Women 60, All Married Men 62 (Spouses 2Year)

		Men				
		0-9	10-19	20-29	30+	All
Women	0-9	2.2	3.2	5.1	1.7	12.3
	10-19	2.8	4.1	6.4	2.2	15.5
	20-29	7.9	11.4	17.9	6.2	43.4
	30+	5.3	7.6	11.9	4.1	28.9
	All	18.2	26.2	41.3	14.3	100.0

	0-9	10-19	20-29	30+	All
0-9	-0.2	-0.2	1.5	0.2	1.3
10-19	-2.0	-2.9	-0.9	-0.9	-6.7
20-29	0.0	0.1	6.0	1.2	7.2
30-39	-1.5	-2.0	1.8	-0.1	-1.8
All	-3.7	-5.0	8.3	0.4	

Actual Couples

		Husbands				
		0-9	10-19	20-29	30+	Total
Women	0-9	4.4	3.9	3.2	0.8	12.3
	10-19	3.5	4.2	5.3	2.6	15.5
	20-29	6.1	11.2	19.6	6.6	43.4
	30+	4.3	6.9	13.3	4.4	28.9
	Total	18.2	26.2	41.3	14.3	100.0

	0-9	10-19	20-29	30+	All
0-9	2.2	0.7	-1.9	-1.0	
10-19	0.6	0.1	-1.1	0.3	
20-29	-1.9	-0.2	1.6	0.4	
30-39	-1.0	-0.7	1.4	0.2	
All					

Table 1: Life Expectancy of 60 year old men and women.

Year	Men	10 year change	Women	10 year change
1930	14.7		16.1	
1940	15.1	0.3	17.0	1.0
1950	15.8	0.7	18.6	1.6
1960	16.0	0.3	19.7	1.1
1970	16.1	0.1	20.8	1.1
1980	17.5	1.4	22.4	1.6
1990	18.7	1.2	23.0	0.6
2000	20.0	1.3	23.2	0.2
2010	21.5	1.6	24.4	1.3
2019	21.9	0.4	24.9	0.5
2020	20.5	-1.0	23.8	-0.6

Source: CDC life tables

Table 2: Gompertz Life Expectancies for different samples, synthetic couples

	CDC ALL 60, 62 (1988)		NHIS All 60,62 Period (1988)		NHIS All 60,62 Longitudinal		NHIS All Unmarried 60,62 Longitudinal		NHIS All Married 60,62 Longitudinal		NHIS All Married (2 year gap) 60,62 Longitudinal	
	A		B		C		D		E		F	
	Women	**Men**	**Women**	**Men**	**Women**	**Men**	**Women**	**Men**	**Women**	**Men**	**Women**	**Men**
Life Expectancy	23.3	18.2	24.99	17.98	22.60	17.35	21.54	15.93	23.08	17.67	24.17	19.16
			(0.70)	(0.56)	(0.23)	(0.27)	(0.42)	(0.52)	(0.28)	(0.28)	(0.77)	(0.65)
Joint Life Expectancy	14.9		14.83	(0.42)	13.69	(0.23)	12.22	(0.40)	14.10	(0.24)	15.27	(0.57)
Survivor (Hers)	13.2		15.18	(0.62)	14.18	(0.26)	14.66	(0.37)	14.16	(0.25)	14.38	(0.61)
Survivor (His)	9.6		10.22	(0.40)	10.47	(0.17)	10.74	(0.37)	10.35	(0.25)	10.82	(0.55)
Prob (She Dies First)	0.652		0.68	(0.02)	0.64	(0.01)	0.65	(0.02)	0.65	(0.01)	0.63	(0.03)
Sample Size			10011	6448	5859	5305	1597	808	4191	4464	478	478

Appendix 1: Data Construction

The NHIS is not longitudinal. Individuals are picked up in only one of the five years (1986-1990) and linked to their year of death (censored in 2019). We know the initial information on the individuals, and the year they die, or that they are still alive in 2019.

Women are included in the sample if they turn 60 within the five sample years, men are included if they turn 62. We set as year 0 the year that they turn 60 (women) or 62 (men).

WOMEN

	1986	1987	1988	1989	1990
A	56	57	58	59	60
B	57	58	59	60	
C	58	59	60		
D	59	60			
E	60				

MEN

	1986	1987	1988	1989	1990
A	58	59	60	61	62
B	59	60	61	62	
C	60	61	62		
D	61	62			
E	62				