

Examining Patterns in Divorced Life Expectancy by Race: An Application of a Bayesian Approach to Sullivan's Method

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A long history of research has examined issues surrounding marriage and divorce, with much of this work focused on the dramatically rising rates of divorce which occurred during the later half of the twentieth century. Indeed, with the notable exception of a spike in divorce rates following World War II, annual divorce rates in the 1980's and 1990's were more than double the rates from the middle of the century. Over this same period, the percentage of marriages begun each year that ended in divorce increased to more than 50% (Cherlin 1995), with estimates from different datasets ranging from nearly half to almost 65% ending in divorce (Martin and Bumpass 1989; Schoen 1987). More recently, rates have reached a plateau such that the divorce rate over the last two decades has remained relatively stable, though still relatively high (Goldstein 1999; Raley and Bumpass 2003).

While extensive work has examined several issues surrounding these divorce rate patterns, less work has examined racial differences in these patterns due in large part to issues of sample size (e.g., Ruggles 1997). In this study, we use a new Bayesian approach to life table estimation that provides stable estimates with smaller samples and includes both the ability to incorporate unlimited numbers of covariates into demographic life tables and the ability to produce empirical confidence intervals around life table quantities. In doing so, we are able to examine divorced life expectancy differences

between black and whites across a wide range of birth cohorts. The use of ‘expectancies’ also adds a new metric to the literature on marriage and divorce.

Our data come from the General Social Survey (GSS), a repeated cross-sectional survey collected from 1972 to 2004 that has previously been used in longitudinal analyses of divorce issues (e.g., Wolfinger 1999). We limit our analyses to those waves that were collected beginning in 1982 due to measurement differences of race that prevent comparisons between whites and blacks in the data from the 1970’s (only white to non-white comparisons are possible for those years). We also exclude the two most recent waves of the GSS because matching vital statistics data on mortality in the United States are available up to the year 2000. Divorce is measured dichotomously via a self-report of current marital status where all persons who report being divorced or separated are coded into one group with all others (i.e., never married, married, and widowed) included in a second group. Persons who are missing on marital status (n=8) are excluded from the analyses. We also include measures of age, gender, region, and education as control variables in our analyses. The total analytic sample size is n=21,288.

Divorced life expectancies are calculated using a Bayesian extension of Sullivan’s method. Sullivan’s original method (1971), developed to examine active life expectancy using cross-sectional data, is an adaptation of standard single-decrement life tables via the incorporation of data from a health survey. Though used widely in active life expectancy research, this method has at least two notable limitations. First, Sullivan’s method ignores important and extensive heterogeneity in state experience across subpopulations. Thus, Sullivan’s method is often applied to disaggregated data (e.g.,

specifically by sex and race) in order to produce subpopulation-specific estimates.

However, the level at which disaggregation can be performed is limited by two factors:

(1) the level of disaggregation possible in mortality data, and (2) cell sizes. The second important limitation of Sullivan's method is that, in its original form, it did not provide a method to construct interval estimates.

The Bayesian method that we use reformulates Sullivan's method in a true multi-state framework that allows for the inclusion of covariates and the construction of interval estimates and then modifies the method presented in the work of Lynch and Brown (2005) to accommodate the ecological problems inherent in the process of combining independent sets of cross-sectional data. The method involves the following steps:

1. Construct data in a suitable fashion
2. Estimate a bivariate "hazard model" using Gibbs sampling
3. Specify a covariate profile and compute transition probabilities for each iteration of the Gibbs sampler. At this stage, build in uncertainty induced by the ecological problem inherent in the combination of two cross-sectional data sets.
4. Generate multi-state life tables using each transition probability matrix
5. Summarize the distributions of life table quantities

In this study, we apply this method and include, in addition to the indicators for race, divorce, and age-specific mortality probabilities, control measures for gender, region, and education.

Initial results are reported for blacks and whites, holding age constant at 30 years, from three different birth cohorts: 1900, 1930, and 1960. Mean divorced life

expectancies are reported. For the 1900 cohort, 30 year-old whites could expect to live 2.41 years in the divorced state compared to 4.4 years divorced for blacks of the same age. For the 1930 cohort, 30 year-olds of both race groups have higher divorced life expectancies: 6.22 years for whites and 10.02 years for blacks. It is also notable that the gap in divorced life expectancies between these two groups approximately doubles. By 1960, the white divorced life expectancy increases to 13.20 years while the black divorced life expectancy mushrooms to 18.85 years.

Though a portion of these increases may be attributed to increases in total life expectancy, most of these changes result from the increasing instability in marriage across cohorts. One of our more interesting initial findings is that blacks, despite being less likely to marry, can expect to spend both more years, and a higher proportion of their remaining years, in a divorced state. The results also suggest that the racial gap in divorced life expectancy has expanded across birth cohorts born from 1900 to 1960. Our continuing analyses will expand the cohorts examined and focus on gender differences.

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