THE FUTURE OF REMARRIAGE IN THE UNITED STATES: ITS DETERMINANTS AND MODEL-BASED PROJECTIONS

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The historical rise in divorce in the United States has been well documented among scholars. According to Cherlin (1992), approximately one-third (32%) of all brides in 1987 had been divorced, in stark contrast to nine percent in 1930 and only three percent in 1900. From a cohort perspective, several decades ago, for example, no more than one in ten women in a given marriage cohort would be expected to dissolve their unions. Among recent cohorts, however, it has been estimated that roughly half of all marriages end in divorce.

With this greater incidence of divorce, of course, there has been a concomitant increase in the incidence of remarriage. By 2008, nearly 41 million women and men were married more than once (Elliott and Lewis, 2010).

The greater the presence of remarriage in U.S. society, the more important it is to understand better the factors that underlie remarriage behavior and to establish what may be in store for us in the future. Although much research has been conducted on patterns and trends in first marriage and divorce, little by comparison has been carried out to deepen our understanding of the characteristics that are associated with lower or higher remarriage rates. Further, virtually no work has been done to develop methods of projection that will enable us to estimate future trends of remarriage. If such methods were accurate, we would then have a somewhat clearer notion of future trends concerning stepfamilies, for example (at least independent of any changes in fertility).

Towards this end, in this paper we suggest a parametric model of remarriage. By virtue of its parametric nature, we are able to learn much from divorce cohorts who have yet to complete their remarriage experience. For example, if we were to have data for 15 years beyond the year in which a cohort of women divorced, we would be able to extrapolate the remaining remarriage experience of that divorce cohort and estimate the proportion of that cohort who would be expected eventually to remarry.

Our objective in this paper is not to compile a comprehensive list of a woman's attributes that are associated, either negatively or positively, with her likelihood of remarriage. Rather, we hope to devise a model that accomplishes the more limited goal of fitting the data using a small array of variables and, in addition, of projecting future remarriage behavior with reasonable accuracy.

For this purpose, we analyze data from the first and second waves of the National Survey of Families and Households (NSFH), conducted in 1987-1988 and 1992-1993. The NSFH was chosen because of its substantial sample size as well as its detailed marital histories. In subsequent drafts leading up to the meetings, we expect to expand our analysis to examine data from the National Longitudinal Survey of Youth and the American Community Survey, as well as from the third wave of the NSFH.

Approach to Modeling Remarriage Patterns

Empirically, we find that the hazard of remarriage (specifically, second marriage) begins at some positive value and decreases monotonically with duration since divorce. We posit the following exponential form:

(1) $\mu(t) = a \exp[-bt]$.

The slope of the hazard function is then given by:

(2) $d\mu(t)/dt = -ab \exp[-bt]$.

If b=0, then the hazard would be estimated to be constant at a. Empirically, we find, however, that b is greater than zero.

From (2), we see that the greater the value of b:

- the steeper the negative slope of the hazard function at the outset (i.e., at duration zero), and
- the more rapidly that slope approaches zero as duration since divorce, t, increases.

Given (1), we see that the hazard is assumed or forced to approach zero asymptotically as duration since divorce increases. However, we may loosen that restriction and test whether that is empirically the case by modifying (1) in the following way.

Suppose the hazard were instead the sum of a constant and an exponential function, represented as:

(3) $\mu(t) = c + a^* \exp[-b^* t]$

In such case, the hazard originates at a value of (a^*+c) and then asymptotically approaches c, rather than zero. The slope of the hazard would be the same form as that in (2), namely

(4) $d\mu(t)/dt = -a^* b^* \exp[-b^* t]$.

We can further generalize this model by adding a linear component to the hazard function, such that we have:

(5) $\mu(t) = c^{*} + dt + a^{**}\exp[-b^{**}t]$.

In this form, the hazard originates at duration zero with a value of $(a^{**}+c^{*})$. As seen in (6), it is the slope that asymptotically approaches some value d.

(6) $d\mu(t)/dt = d - a^{*}b^{*}\exp[-b^{*}t]$

If the value of d is estimated to be negative, it is then possible that the hazard function could, at sufficiently long durations, assume a negative value. One would judge whether this is, in practice, a problem – that is, if the function were to turn negative within any reasonable duration – after fitting the model to the observed hazard function.

By estimating the four parameters in (5), we can determine empirically the need for a model as refined as that. In the interest of parsimony, we would prefer a model as simple as that represented in (3) or even (1), as either one would be more readily interpretable than a more complex model. Typically, of course, one makes these judgments based on the statistical significance of the coefficients estimated. In the course of our explorations, we will also evaluate the substantive contribution of these additional parameters, with an eye towards determining whether a parameter's inclusion – given the magnitude of its estimated coefficient – substantively alters our view of the remarriage process.

(VERY) PRELIMINARY RESULTS

Our initial efforts focus upon fitting a model to remarriage history data for women from the NSFH. We do so without incorporating covariates, in order to assess whether the model is appropriate for the aggregate sample and before we refine the model to acknowledge the association the likelihood of remarriage may have with a variety of factors.

In this first pass at modeling the remarriage hazard, we fit the simple two-parameter exponential function shown in (1). Figure 1 displays the raw hazards obtained from the NSFH, which, as would be expected due to sampling variability, show considerable unevenness, although the generally monotonically declining curvilinear pattern is clear. Two models have been estimated: (1) that based on the complete remarriage experience of the cohorts; and (2) that based on the remarriage experience of cohorts artificially truncated at 15 years' duration.

The solid red line, representing results from the model based on the complete data, show a remarkably good fit to the data. However, a major challenge we have posed in this paper is to estimate a model based on truncated data and to see how well the hazards estimated beyond the 15 years' duration approximate the actual hazards or the hazards estimated from the complete data. Thus, to recapitulate, in our out-of-sample forecasting we have truncated our data such that we "pretend" to observe only the first 15 years of remarriage experience for our cohorts. We then project out the remaining remarriage experience beyond that duration and judge how well the model has performed.

The blue line, which consists of dashes for durations beyond 15 years, is almost indistinguishable from the line representing the fit based on the complete data. Consequently, we infer that the model performs extremely well based on limited data, namely only the first 15 years of remarriage behavior.

In Figure 2, we translate these three sets of duration-specific hazards into survivorship curves, illustrating the proportions of women who have yet to remarry by duration t. The story told by this figure is much the same as that in the previous figure. The two-parameter model replicates the actual data with great precision, accurately predicting that about 77 percent of divorced women will remarry (within 30 years of their divorce).

ADDITIONAL WORK FOR THIS PAPER

There is clearly much work to be done. Our apologies for providing merely a taste of the kind of analysis we anticipate conducting for the paper. We expect to accomplish the following prior to PAA:

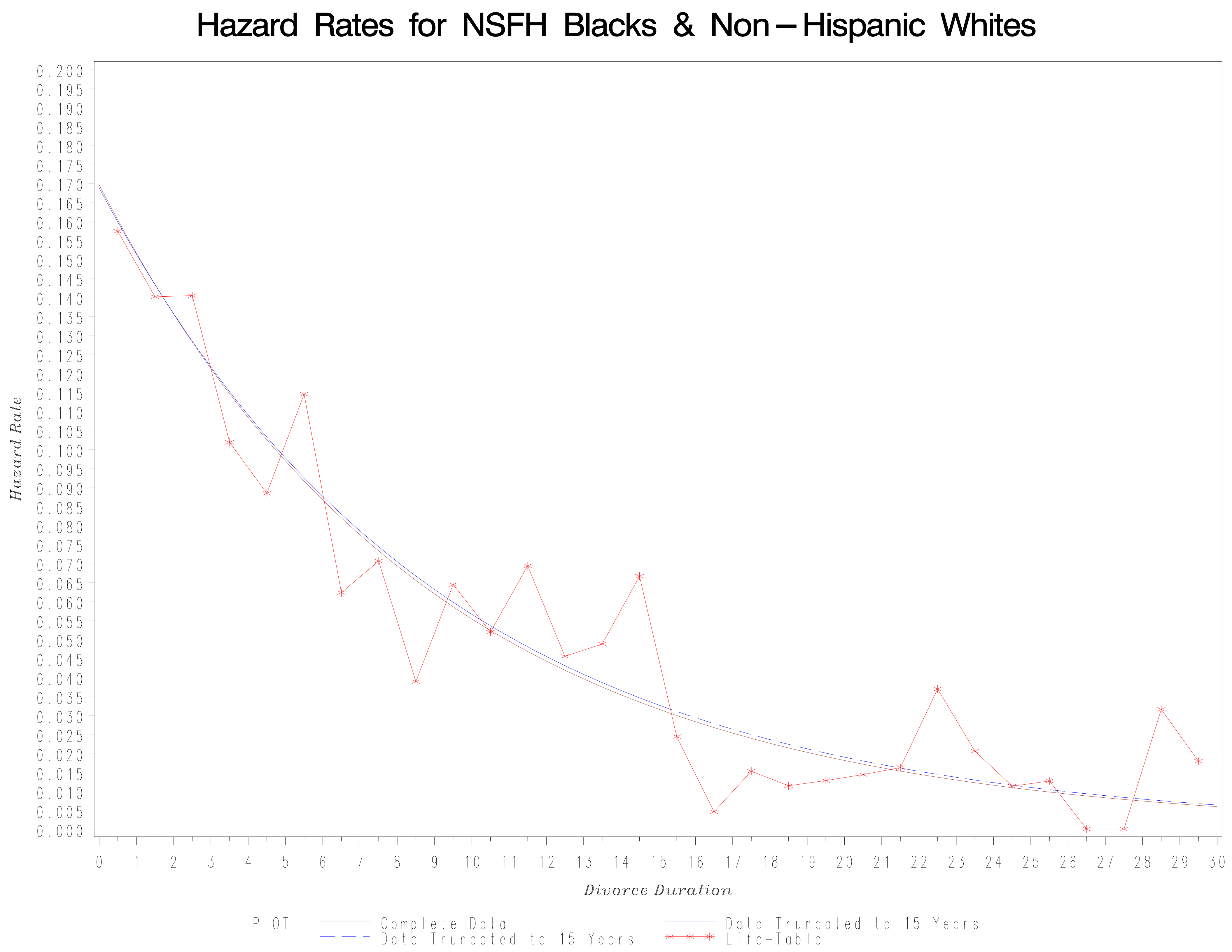
(a) Provide a comprehensive literature review and list of references;

(b) Expand the model to incorporate important covariates, such as age at divorce, education, race, and divorce cohort;

(c) Determine how many parameters are optimal in the basic model (i.e., two, three, or four);

(d) Explore the extent to which we can truncate the data without sacrificing too much precision in projections; and

(e) Conduct our analyses with additional data sets containing data that are sufficiently detailed in marital histories and rich in covariates.


Hazard Rates for NSFH Blacks & Non-Hispanic Whites
Hazard Rate
0.200
0.195
0.190
0.185
0.180
0.175
0.170
0.165
0.160
0.155
0.150
0.145
0.140
0.135
0.130
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0.120
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0.000
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
Divorce Duration
PLOT
Complete Data
Data Truncated to 15 Years
Data Truncated to 15 Years
Life-Table

Survival Rates for NSFH Blacks & Non−Hispanic Whites