LINKING BENEFITS TO MARITAL STATUS: RACE AND DIMINISHING ACCESS TO SOCIAL SECURITY SPOUSE AND WIDOW BENEFITS IN THE U.S.

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Abstract

Social Security retirement benefits have been noted for their capacity to redistribute benefits from higher to lower lifetime earners. However, two-thirds of older women receive spouse and widow benefits and the distributional impact of those benefits has not been well studied. Spouse and widow benefits are distributed on the basis of marital rather than employment status and generally require recipients to be either currently married or to have had a ten-year marriage. The unprecedented retreat from marriage, particularly among black women, means the distributional impact of these benefits changes dramatically for each cohort that enters old age. This paper uses June 1985, 1990 and 1995 CPS supplement data to trace the decline in marital rates for women for five cohorts. The main question is what proportion of women in each cohort will reach age 62 without a ten-year marriage and thus be ineligible for spouse and widow benefits. We find that the proportion who will not be eligible as spouses or widows is increasing modestly for whites and Hispanics but dramatically for African Americans. The growing race gap in marital rates means that older black women will be particularly unlikely to qualify for these benefits.

Introduction

Even though many are eligible for retired worker benefits, most older women actually receive non-contributory Social Security spouse or widow benefits. In 1998, 64 percent of women aged 62 and older received spouse or widow benefits (Social Security Administration 2002). This makes marital status more important than employment status in shaping old age financial security for many older women. But marital rates are declining, especially for black women. In this paper we explore the implication of linking benefits to marital status in the face of an unprecedented retreat from marriage.

Marriage and Social Security Benefits

Welfare state literature wrestles non-stop with the merits, or demerits, of linking benefits to citizenship, work, poverty, marital status or parental status (McKay 2001; Korpi and Palme 1998; Harrington Meyer 1996; Quadagno 1994; Orloff 1993; Acker 1988). In the case of Social Security, retired worker benefits are linked to employment history, but spouse and widow benefits are linked to marital history. The Social Security system is the single largest social transfer program in the U.S and roughly 97 percent of all older persons receive monthly income through the program. Social Security is well-known for redistributing resources and reducing inequality in old age (Walzer 1988; Burkhauser and Warlick 1981; Ozawa 1976). A high wage earner receives benefits that replace 28 percent of pre-retirement income while a low wage earner receives benefits that replace 78 percent (Koitz 1996; Century Foundation 1998). But research demonstrating the redistributive impact of Social Security benefits has been based solely on retired worker benefits. Thus, while retired worker benefits redistribute from higher to lower lifetime earners, spouse and widow benefits redistribute from single to married persons, from employed to not-employed persons, and from lower earners to higher earners (Harrington

Meyer 1996). These benefit features are at odds with the otherwise redistributive impact of the program.

Initially only those who contributed to Social Security through their employment were eligible to receive benefits. The retirement test was strict; retirees who earned more than $15 a month lost all benefits (Berkowitz 2002; Harrington Meyer 1996). But expansion of the program began before the first benefits were distributed. By 1939, spouse and widow benefits were granted, but only to those who were currently married. Even though they had not contributed, wives received what was called a spousal allowance equal to 50 percent of the benefit the husband was receiving (Harrington Meyer 1996; Berkowitz 2002; SSA 2002). Widows received a benefit equal to 75, later raised to 100, percent of the benefit their husband was receiving prior to his death.[1] As divorce became more common, Congress created a requirement that divorcees must have been married for at least 20 years to subsequently claim a spouse or widow benefit. By 1977, the marriage requirement had been reduced to 10 years (SSA 2002). Currently, those who are married when taking benefits face no length-of-marriage requirements. Those who are divorced must have had a ten-year marriage. If divorcees are remarried at the time of eligibility for benefits, they forfeit claims on earlier spouses. Those who are widowed receive a widow benefit as long as they were married to a worker who was fully insured at the time of death. If widows remarry, they forfeit claims on earlier partners, unless they delay the remarriage until age 60. The age of eligibility for widows is age 60. For retired worker and spouse beneficiaries, it is age 62 for early benefits and between age 65 and age 67 for full benefits, depending on year of birth (U.S. House of Representatives 2000).

One might argue that declining eligibility for spouse and widow benefits is inconsequential given the overall economic improvement the elderly experienced in the second half of the 20th Century. But pockets of poverty among the elderly persist; older women, older blacks and Hispanics, and single older persons have poverty rates in excess of 20 percent. At the

intersection of those three variables, older single black women have poverty rates near 50 percent. Despite advances in the labor market, Social Security remains the leading source of income in old age for women (Glasse, Estes, and Smeeding 1999; Harrington Meyer 1990). Women's increased employment and higher wages have helped to raise women's retired worker average monthly benefits, but it is not clear whether these increases will offset possible declines in access to spouse and widow benefits. The national average for women's wages remains below 75 percent of men's, and average earnings for black and Hispanic women tend to be substantially lower than for white women (Glasse, Estes, and Smeeding 1999; Hooyman and Gonyea 1995).

Moreover, significant portions of women continue to take time away from paid work to care for young children or frail older relatives. The Social Security Administration (1998) benefit calculator disregards the five lowest years of earnings, but those with more than five years out of the labor force will have zeros entered into their benefit formulas. Because of intermittent employment and the gender gap in wages, two-thirds of older women currently receive benefits as wives or widows rather than as retired workers. The Social Security Administration estimates that even among women retiring in 2020, only 30 percent will have been employed for enough years to eliminate all of the zeros from their benefit formulas (Boskin and Puffert 1987; Shaw, Zuckerman, and Hartmann 1998). The remaining 70 percent will continue to have at least some zeros and their benefits will be smaller as a result. The impact of these zero- or low-earnings years may become more severe as fewer women rely on spouse and widow benefits; the Social Security Administration estimates that between 1990 and 2020, the proportion of women taking retired worker benefits will rise from one-third to one-half (Glass, Estes, and Smeeding 1999).

The legacy of distributing social benefits on the basis of marital status is based on the outdated traditional breadwinner model. In 1939 when spouse and widow benefits were created,

roughly 85 percent of married women were in single earner marriages (Berkowitz 2002). Since the middle 1800s, more than 90 percent of every female birth cohort in the U.S. has married (Goldstein and Kinney 2001). But since the 1960s, the U.S has undergone a pronounced retreat from marriage. The percent of women ever marrying dropped, age at first marriage rose, the tendency to divorce rose, and the tendency to remarry dropped (Castro Martin and Bumpass 1989; Schoen and Weinick 1993; Goldstein 1999; Goldstein and Kenney 2001). After decades of increase, divorce rates have stabilized (Ruggles 1997; Goldstein 1999). Indeed, divorce rates rose steadily through the 1960s and 1970s, and then stabilized in the mid-1980s. But the tendency to divorce peaks in the fourth year of both marriages and remarriages (Goldstein 1999). Since 1988, the average age at first marriage and first divorce have been less than 10 years apart (Schoen and Weinick 1993). Many demographers suggest that marriage will remain nearly universal, that perhaps 90 percent of American women will be married at some point in their lives (c.f. Goldstein and Kenney 2001). But this does not mean they will have marriages lasting the ten years needed to qualify for Social Security spouse and widow benefits. Moreover, the Social Security Administration does not acknowledge same-sex partnerships, thus no matter how long-lasting a homosexual partnership, neither partner may make non-contributory spouse or widow claims.

The use of marital status as an eligibility requirement is becoming increasingly controversial and in this paper we focus on two main reasons. First, there is a well-documented retreat from marriage (Schoen and Weinick 1993). Table 1 reports U.S. Census Data for currently married by age group in 1970, 1980, 1990 and 2000. For example, among white women ages 45 to 54, 82 percent were married in 1970, compared to only 69 percent in 2000. One consequence of this retreat is that with each successive cohort we may expect fewer women to be eligible for spouse or widow benefits. As a result, more women may rely solely on retired worker benefits. This is problematic to the extent that women's Social Security benefits based

on their own work records are often smaller than those they receive as spouses or, more often, widows (Burkhauser and Duncan 1989). Thus, reduced reliance on spouse and widow benefits may lead to increased *gender inequality* in old age income.

Second, there is a much more substantial retreat from marriage among black women than among white and Hispanic women (Schoen and Weinick 1993). For example, Goldstein and Kenney (2001) project that among women born between 1960 and 1964, 93 percent of whites, but only 64 percent of blacks, will ever marry. Table 1 shows that, in 1998, black women aged 25 to 34 were only 52 percent as likely as whites of the same age to be married; similarly, black women aged 35 to 44 were only 54 percent as likely as whites of the same age to be married. One consequence of the growing race gap in martial rates is that with each successive cohort we may expect even fewer black women to be eligible for spouse or widow benefits. Thus, the safety net provided by non-contributory benefits may become increasingly irrelevant, and therefore ineffective, for older black women. The greater reduction in reliance on spouse and widow benefits among older black women may lead to increased *race inequality* in old age income.

Our research question is located at the intersection of Social Security eligibility rules and socio-demographic trends in marital rates. What proportion of women born in the 1920s and 1930s entered old age without being eligible for spouse and widow benefits? How is the picture changing for those born in the 1940s, 1950s, and 1960s? To what extent does declining eligibility for spouse and widow benefits vary by race?

Data and Methodology

The analysis is based on pooled data from the June 1985, 1990 and 1995 Current Population Survey supplementary questions on self-reported retrospective marital histories. Sample sizes were 50,115 in 1985, 48,444 in 1990 and 44,944 in 1995. In each year of data collection, women ages 15-65 were asked a series of questions about their current marital status

and previous marital history. We classified the women into five birth cohorts: 1920-1929, 1930-1939, 1940-1949, 1950-1959, and 1960-1969. For each woman, we calculated the exact age at which she reached a ten-year marriage. Then, using weighted data so that the sample is nationally representative, we plotted these trends. In a series of charts, we show the cumulative percentage of each cohort that had at least a ten-year marriage by age and by race and ethnicity.

The CPS provides self-reported race and ethnicity. We coded everyone who said they were Hispanic as Hispanic, regardless of what they indicated about race. Therefore the white and black categories are non-Hispanic.

We underreport eligibility for SS widow benefits slightly using this method. Widows are eligible at age 60 as long as they were married to a worker who was fully insured at the time of death. There may be women with less than 10 years of marriage, but who were married briefly to fully qualified workers and then never remarried, who would qualify as widows. We are not able to capture those women as eligible. This bias is consistent across all five cohorts, however, so our findings about the trends are accurate.

We present our results in two parts. First, in Figures 1-6, we present the actual proportion of each of five birth cohorts with a ten-year marriage, by race. Second, in Figures 7-9, we present the projections for the latter three cohorts, estimating the proportion of each that will qualify for spouse and widow benefits, by race.

Results

Our purpose is to track by cohort the proportion of women who reach old age with a qualifying marriage, paying careful attention to race and ethnic differences in the trends. Figure 1 shows the cumulative percentage of women with a ten-year marriage, by age, for each of the five birth cohorts. For those women in the oldest three cohorts, between 80 and 90 percent had a ten-year marriage by age 42. For those women born between 1950 and 1959, only 60 percent had a ten-year marriage by age 42. The youngest cohort, born between 1960 and 1969, can only

be traced to age 32, so we can make no conclusions about their chances of reaching old age without a qualifying marriage. However, the slope of their line is remarkably flatter than that for the preceding 4 cohorts, indicating an ongoing retreat from marriage.

The next five figures look at each cohort individually, showing the cumulative percentage of women with a ten-year marriage by race and ethnicity. Figure 2 depicts women born between 1920 and 1929 and shows very similar marital trajectories for white, Hispanic and black women. By the time they reach old age, 94 percent of the white, 90 percent of the black and 80 percent of the Hispanic women had been married for at least ten years and would be qualified for Social Security spouse or widow benefits.

Figure 3 depicts women born between 1930 and 1939 and shows a pattern very similar to the earlier cohort. The marital trajectories are similar to those in the previous birth cohort, and similar for white, black and Hispanic women. By the time they reach old age, 93 percent of white, 84 percent of black and 87 percent of Hispanic women have had a ten-year marriage.

Figure 4 depicts women born between 1940 and 1949. The oldest of these women were only age 55 in the 1995 CPS, so we can only chart their marital patterns through their early fifties. The marital trajectories are similar to trajectories for the earlier two cohorts, though the curves flatten out earlier and the race gap is beginning to be apparent. By age 54, 85 percent of whites and 81 percent of Hispanics, compared to only 72 percent of blacks, had a ten-year marriage. Looking back to those born between 1930-1939, by age 54, 92 percent of whites, 86 percent of Hispanics and 84 percent of blacks had a ten-year marriage. Thus by the 1940-1949 cohort, we see rising marital rates for Hispanics and declining rates for everyone else. The retreat from marriage is underway for whites, and in full force for blacks.

Figure 5 depicts women born between 1950 and 1959. The oldest of these women were only age 45 in the 1995 CPS, so we can only chart their marital patterns through their early forties. In this figure we see the race gap in marriage most clearly. Hispanics are marrying

earliest and most often, though whites catch up by their mid-forties. The pattern of marital uptake is slightly lower for Hispanics and dramatically lower for whites and African Americans when compared to the earlier cohorts. The slope of the lines flattens earlier and at a lower point for all three race and ethnic groups. By age 42, 63 percent of whites and Hispanics, compared to 44 percent of blacks, have a ten-year marriage. Looking back to those born between 1940 and 1949, 80 percent of whites, 75 percent of Hispanics and 67 percent of blacks had a ten-year marriage by age 42. The most dramatic decline is among middle-aged black women; in a single decade, the proportion of black women who were qualified for Social Security spouse and widow benefits by age 42 dropped by nearly one-fourth, from 67 to 44 percent.

The proportion who are either currently married or have had at least a ten-year marriage at some point in their lives will surely be somewhat higher by the time this 1950s birth cohort reaches old age, but there is no reason to believe that the increase will be more than a few percent. If we look at past cohorts to see what percentage of women became eligible for spouse and widow benefits after the age of 42, we find that figure is dropping rapidly. In the 1920s cohort, 13 percent of blacks became eligible between ages 42 and 62. In the 1930s cohort, only 8 percent of blacks became eligible between ages 42 and 62. In the 1940s birth cohort, less than 6 percent of black women became eligible between the ages of 42 and 53.

Finally, Figure 6 depicts women born between 1960 and 1969. The oldest of these women was only age 35 during the 1995 CPS, therefore we can only chart their marital histories through age 32. The delay in marriage is dramatic. Just a decade earlier, by age 32, 44 percent of Hispanic, 37 percent of white and 24 percent of black women had a ten-year marriage. But among women born between 1960 and 1969, 19 percent of Hispanic, 16 percent of white and only 8 percent of black women had a ten-year marriage by age 32. Divorce rates have stabilized (Goldstein 1999) and most people are marrying at some point in their lives. But for the purposes of gaining eligibility to Social Security spouse and widow benefits, it is a ten-year marriage that

is required. When this group of women reaches old age, what proportion will be qualified for spouse or widow benefits? It is clear that the overall proportion will be lower than ever in the history of the program.

In the next section we project ahead for the cohorts born in the 1940s, 1950s and 1960s. We focus on the impact of race differences in the retreat from marriage. We estimate the proportion of each birth cohort that will reach old age without a qualifying marriage, and thus be unable to claim spouse or widow benefits. Our method for making these projections is complex and is laid out in detail in Appendix A.

Figure 7 provides estimates for white women and shows a modest decline in the eligibility for each successive cohort. Figures 2 and 3 showed that among white women born in the 1920s and 1930s, about 94 percent reached age 62 with a ten-year marriage. But among latter cohorts, a smaller proportion will reach old age qualified for spouse or widow benefits. Among those born in the 1940s about 88 percent, among those born in the 1950s, about 85 percent, and among those born in the 1960s, about 82 percent will reach old age qualified for spouse and widow benefits.

Figure 8 shows that while there was some decline for Hispanic women, the proportion who will reach old age qualified for spouse and widow benefits will stabilize for the next three cohorts. Figure 2 showed that among Hispanic women born in the 1920s, just under 80 percent reached old age qualified for spouse and widow benefits. Among those born in the 1930s, nearly 87 percent reached old age qualified for these non-contributory benefits. Then, as Figure 8 shows, among those born in the 1940s, 1950s and 1960s, about 85 percent will qualify.

Finally, Figure 9 shows that the proportion of black women who will reach old age qualified for spouse and widow benefits has fallen dramatically and will reach just 50 percent. Figure 2 showed that among those born in the 1920s, nearly 90 percent of black women reached old age qualified for Social Security spouse and widow benefits. Among those born in the

1930s, about 84 percent. But Figure 9 shows that the projections for subsequent cohorts are dramatically lower. Among those born in the 1940s, about 67 percent will reach old age qualified for spouse or widow benefits. Among those born in the 1950s, just 58 percent. And for those born in the 1960s, we expect only 50 percent of black women to reach old age having had a marriage that qualifies them for spouse or widow benefits.

Discussion

Many proposals to reform Social Security emphasize increasing the widow benefit or implementing earnings sharing (c.f. Burkhauser and Smeeding 1994; Burkhauser and Holden 1982). Such proposals are aimed at increasing benefits to women with lengthy marriages. What these proposals fail to take into account is the economic well-being of women without lengthy marriages, which is often more dire.

The retreat from marriage is pronounced, particularly for African American women. Marriages occur later, end sooner, and often do not take place at all. That pattern is well documented, but the implications for Social Security spouse and widow benefits are only beginning to be explored. The distributional effects of Social Security spouse and widow benefits are already in opposition to the redistributional efforts of the larger program and will only become more so as the next cohorts enter old age. Instead of reducing old age inequality, as retired worker benefits do, spouse and widow benefits increase old age inequality. Women with lengthy marriages, particularly if they are not employed, are increasingly disproportionately rewarded while those without lengthy marriages and those who work throughout their life course are not. Changing trends in marriage and employment are causing Social Security policy to exaggerate, rather than alleviate, inequality between different groups of older women. Given that the decline in marriage is so much more pronounced among black women, Social Security spouse and widow benefits are increasing rather than decreasing racial inequality in old age. What was once an important safety net for lower income retirees has emerged as a marriage

bonus with the greatest value for traditional -- and predominately white -- single bread-winner married couples in higher income brackets. Moreover, the decision to distribute non-contributory benefits on the basis of marital status means that gay and co-habitating relationships, as well as marriages lasting 9 years and 11 months or less, remain unrecognized and can not be used to gain eligibility for these benefits. Benefits based on contributions or citizenship have much more egalitarian outcomes (Korpi and Palme 1998; Harrington Meyer 1996).

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Table 1. Percent of Married Women by Age among Whites and Blacks 1970, 1980, 1990, and 2000

	Age						
	Total	**15 to 24**	**25 to 34**	**35 to 44**	**45 to 54**	**55 to 64**	**65 and Over**
1970[a]							
White	62	35	86	87	82	69	37
Black	53	29	74	76	71	57	32
Black as percent of White	85	83	86	87	87	84	87
1980[b]							
White	60	28	75	82	81	71	38
Black	44	17	56	66	64	56	31
Black as Percent of White	73	61	75	80	79	79	82
1990[c]							
White	56	19	65	73	74	70	40
Black	31	9	34	42	45	42	25
Black as Percent of White	55	47	52	58	61	60	63
2000 [d]							
White	54	14	62	70	69	68	43
Black	29	5	31	41	40	39	25
Black as Percent of White	54	36	50	59	58	57	58

[a]U.S. Bureau of the Census (1973a), Table 203, pp. 6543-643, married.
[b]U.S. Bureau of the Census (1984a), Table 264, pp. 70-72, married.
[c]U.S. Bureau of the Census (1992), Table 34, pp. 45-46, married except separated.
[d]U.S. Bureau of the Census (2000), Marital Status of People 15 Years and Over, by Age, Sex, Personal earnings, Race an Hispanic Origin/March 1, 2000. Table A1, married spouse present.
Source: Calculated by author based on Bureau of the Census figures.

Figure 1: Cumulative Percentage of Women With 10-Year Marriage, By Age and Birth Cohort

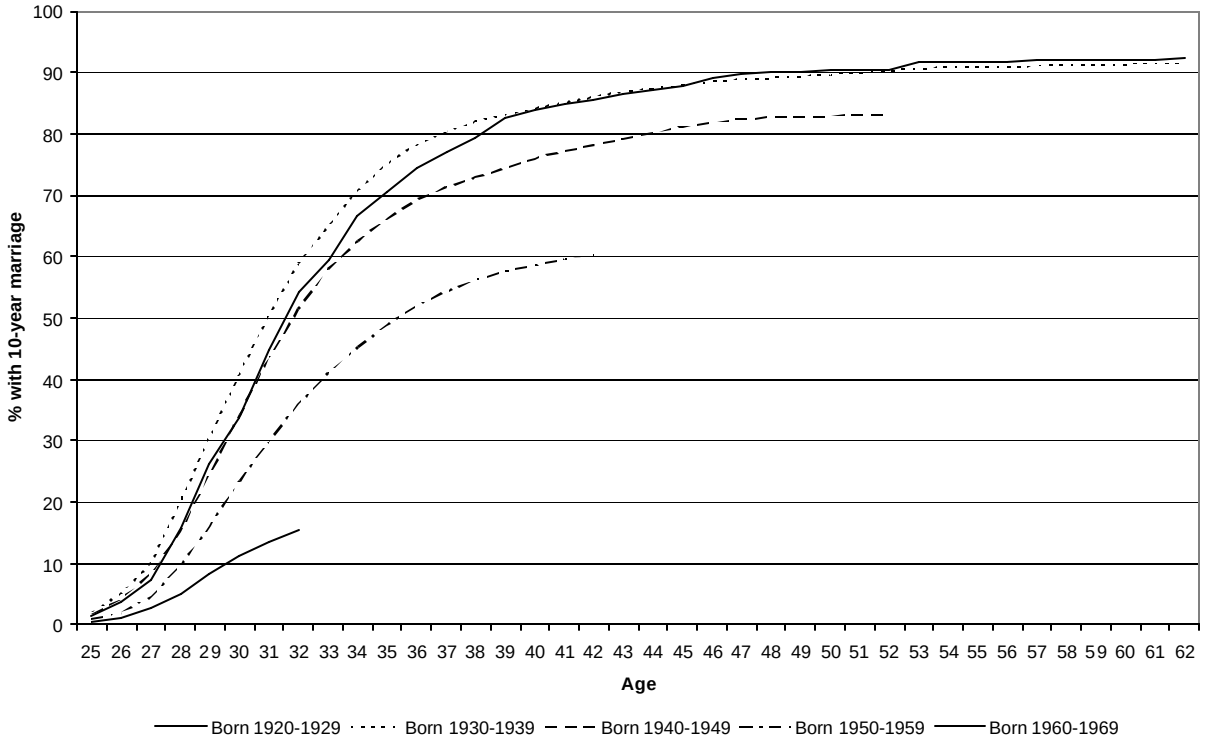


Figure 2: Cumulative Percentage of Women Born 1920-1929 With 10-Year Marriage, by Race

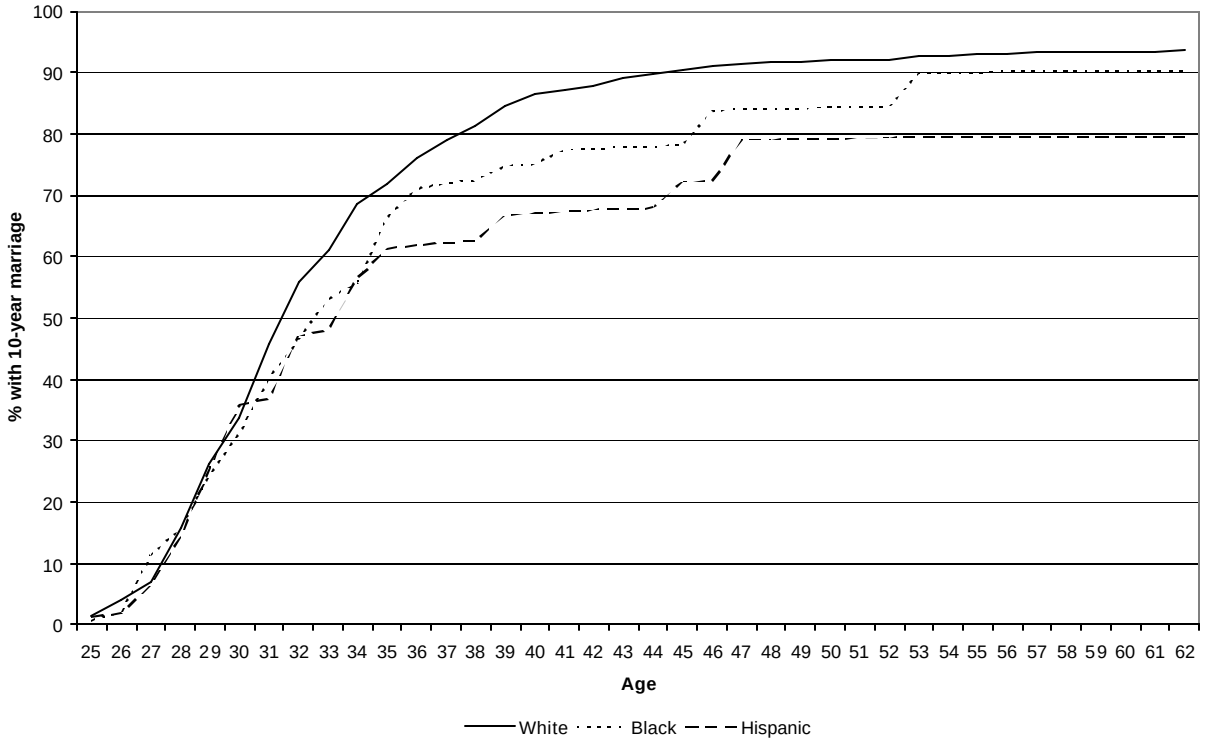


Figure 3: Cumulative Percentage of Women Born 1930-1939 With 10-Year Marriage, by Race

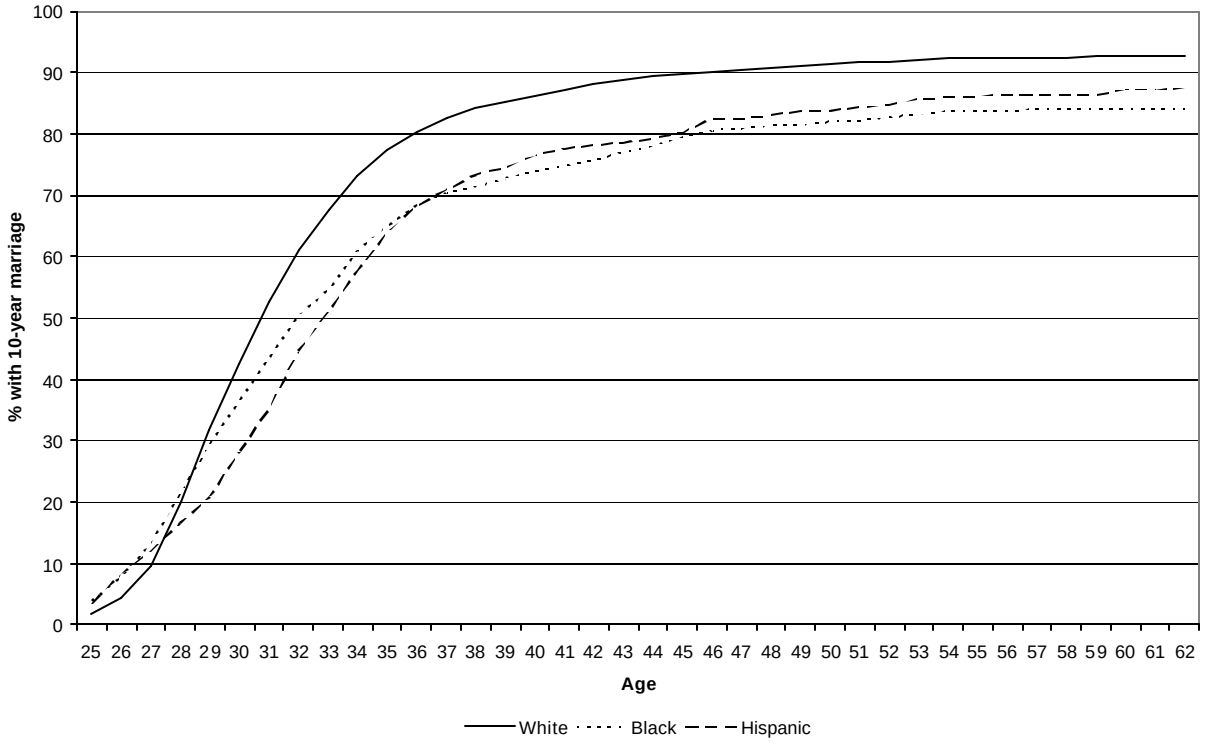


Figure 4: Cumulative Percentage of Women Born 1940-1949 With 10-Year Marriage, by Race

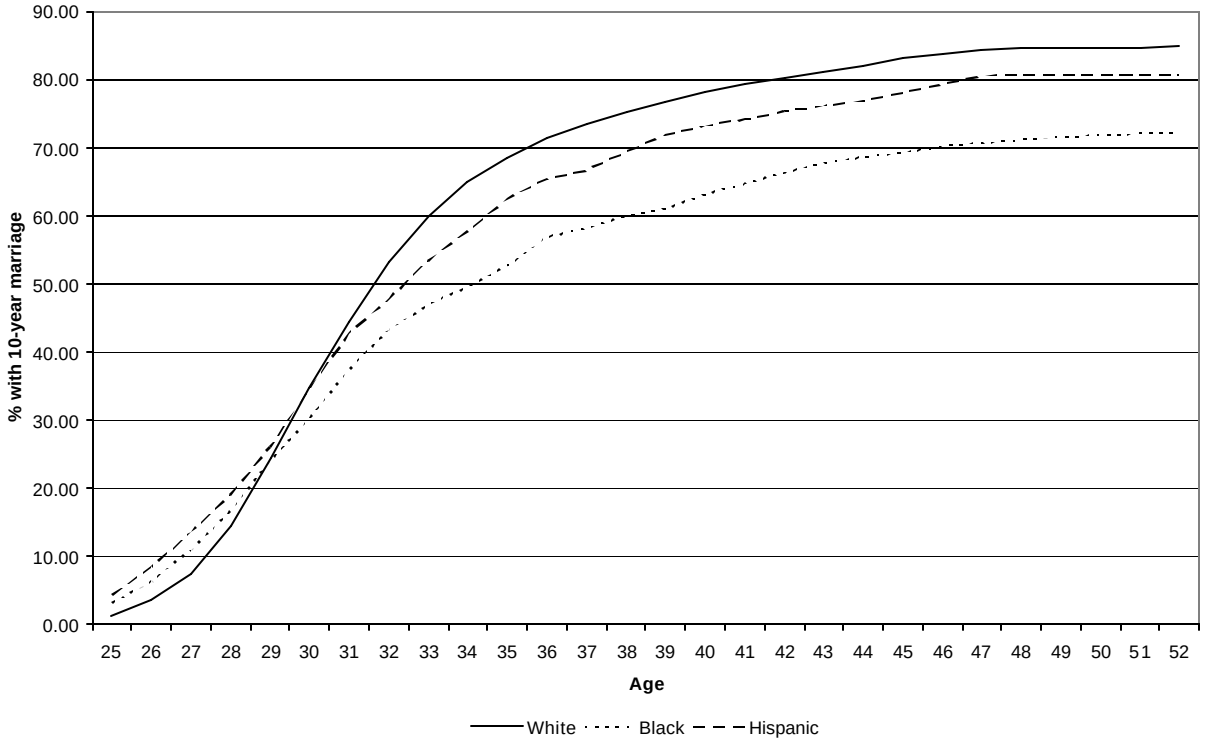


Figure 5: Cumulative Percentage of Women Born 1950-1959 With 10-Year Marriage, by Race

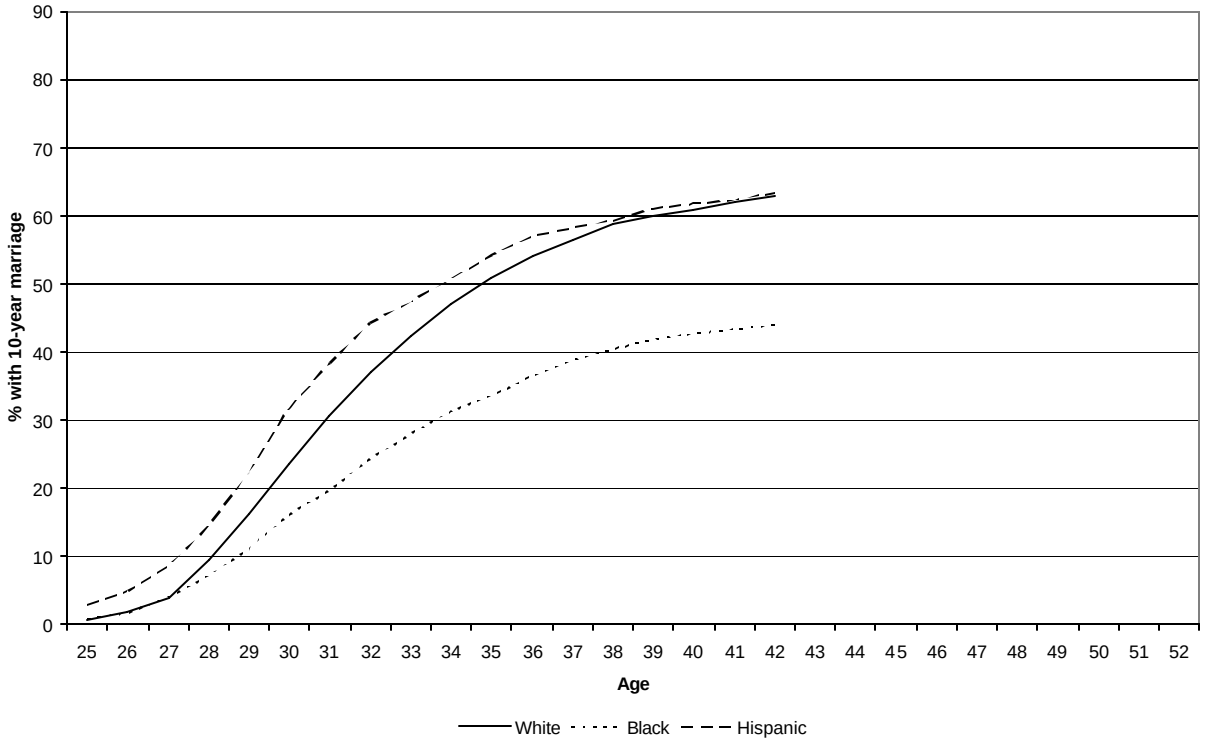


Figure 6: Cumulative Percentage of Women Born 1960-1969 With 10-Year Marriage, by Race

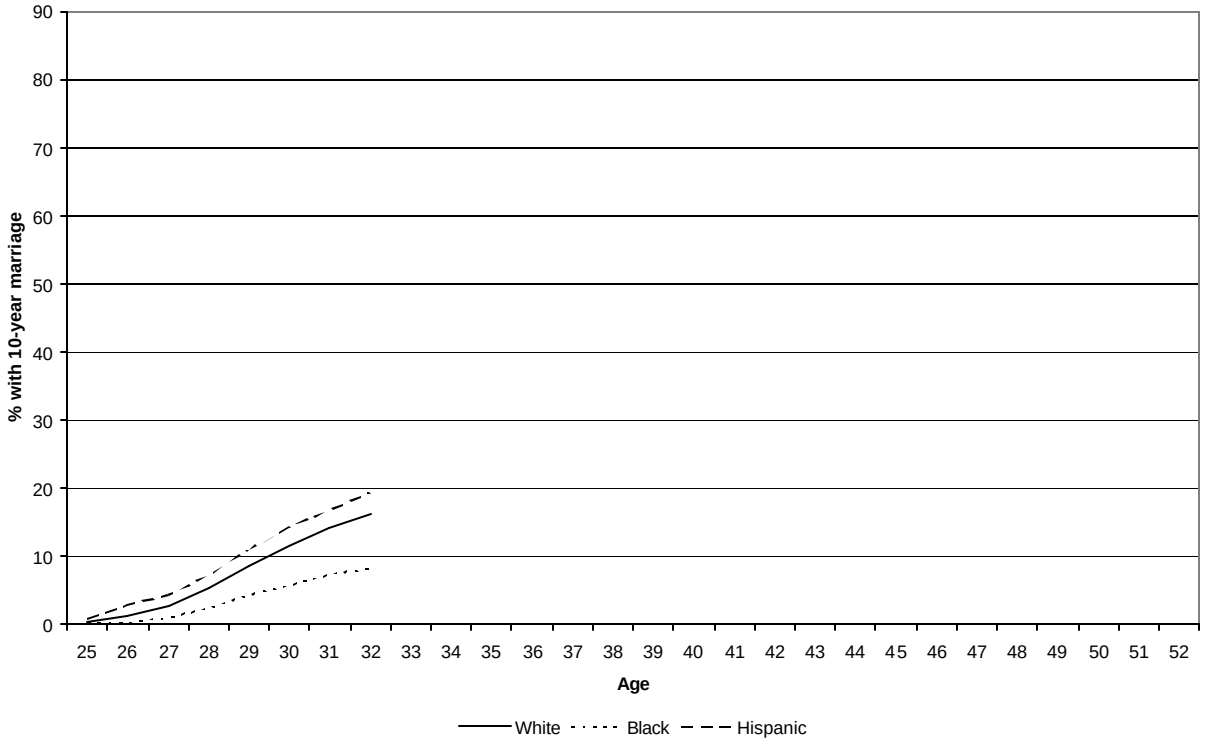


Figure 7:Percentage of White Women Attaining 10th Anniversary by Given Age, by Birth Cohort

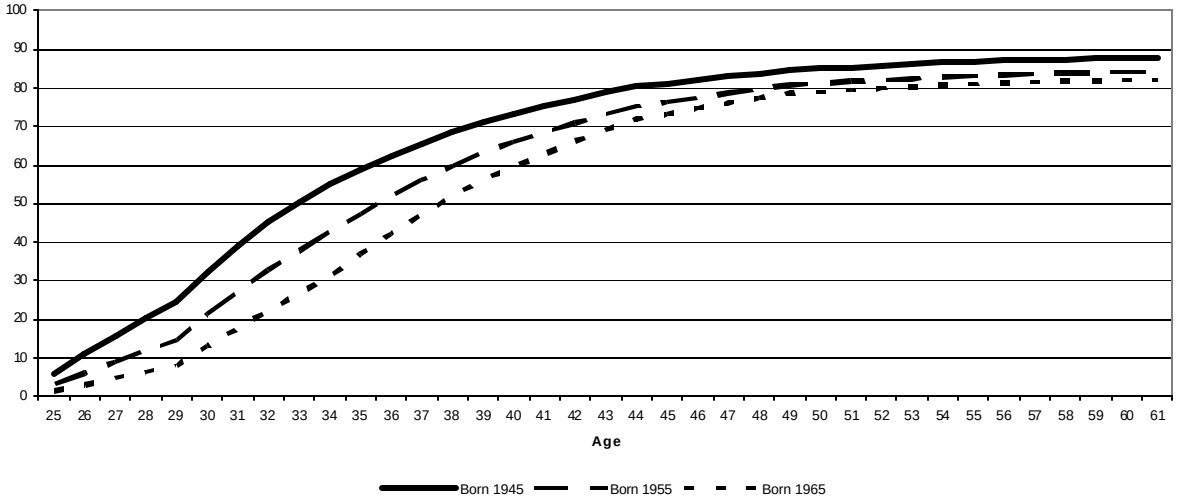


Figure 8:Percentage of Hispanic Women Attaining 10th Anniversary by Given Age, by Birth Cohort

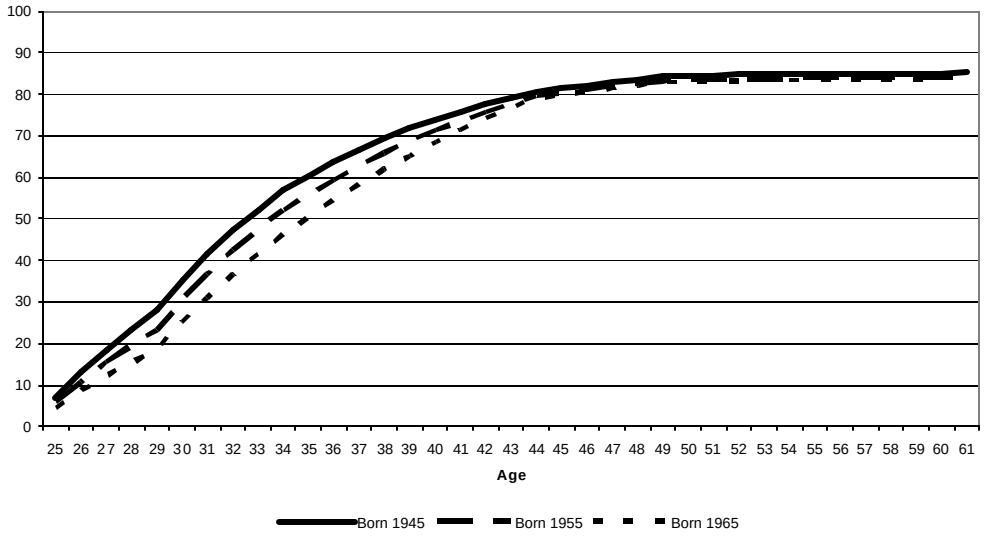
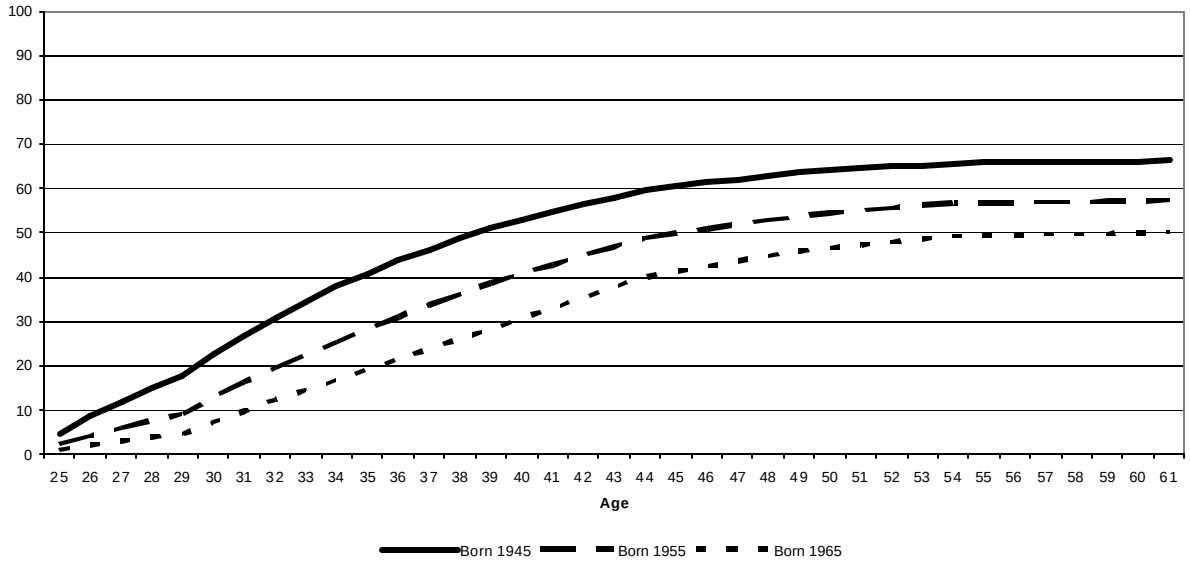


Figure 9: Percentage of Black Women Attaining 10th Anniversary by Given Age, by Birth Cohort



Appendix A
Methodological Appendix

Our analytic goal was to project the proportion of women experiencing a tenth marital anniversary by their sixty-second birthday, among birth cohorts that have not yet reached age 62. This, in turn, requires a method for modeling and projecting trends in marriage-transition rates. Moreover, because the anniversary in question may occur in a first marriage, a second marriage, or any higher-order marriage, it was necessary to develop a model of all relevant marital transitions, including the events of divorce, widowhood, and remarriage. Our approach consisted of three steps: first, we used retrospective marital-history data to compute the necessary time series of age-specific and race-specific marital-transition rates. Second, we used simple regression models to investigate the presence of time trends in each transition-rate series. When statistically significant trends were found, we extrapolated the fitted trend equations in order to produce predicted values of selected marital transition rates for future years. Finally, we used microsimulation techniques to produce samples of marital histories specific to birth cohorts and racial groups. The simulated marital histories include information on the age (if any) at which a woman reaches the ten-year point in a marriage. In the following paragraphs we discuss each of these steps in more detail.

We base our analysis on a discrete-state event history model of transitions between marital states. This is the approach commonly adopted in, for example, multistate life table analyses of the marital life cycle (see, for example, Martin and Bumpass 1989; Bramlett and Mosher 2001; or Schoen and Weinick 1993). The marital states used in our model are depicted in Figure A-1. Two features of this model merit comment. First, although often overlooked in demographic analyses of marriage dynamics, the duration of marriage has been found to be associated with differences in the risk of divorce, independent of age (Goldstein, 1999). Moreover, for our purposes it is particularly important to represent the attainment of the tenth

anniversary. Accordingly, we account for marital duration in our definition of our state space, recognizing the marital-duration categories of 0-4 years, 5-9 years, and 10 or more years. Second, although we distinguish between first marriages and higher-order marriages, we do not include separate remarriage rates for women who have had one, versus more than one, prior marriage.

Derivation of Marriage Transition Rates

We computed marital transition rates using data pooled from the marriage-history questions included in the June 1985, 1990, and 1995 Current Population Surveys. These data elements permit reconstruction of women's marital histories, with the date, and therefore the age, of the beginning and end of up to four marriages, as well as the reason each marriage ended. Each month of a woman's life up to the month of interview can be characterized according to the woman's age at the time, the calendar year, marital status, marital duration (if status is "married"), and the occurrence or nonoccurrence of a relevant marital event (e.g., becoming married, becoming divorced, becoming a widow). We counted the total number of months of "exposure" to marital events, classified by age, calendar year, marital status, marital duration, and race (white, black, and Hispanic), and we also counted the total number of "occurrences" of marital events, classified in the same way. These counts of occurrences and of exposures were all weighted using the CPS sampling weights. We grouped ages into 5-year categories 15-19, 20-24, … , 45-49, and a 12-year category for ages 50-61. Marital duration was grouped into three categories, 0-4 years, 5-9 years, and 10 or more years. Calendar year was left ungrouped. Finally, a set of age, race, time, and duration-specific marital status transition rates was computed as the ratio of occurrences of marital events to exposure, in person-years. Because the exposure is tallied in person-months, and later converted to person-years, the exposure can be considered "exact." In contrast, the procedure generally followed in the computation of

demographic rates entails using the mid-year population size (in the given exposure category) as an approximation to the exposure to the event in question.

Analysis of Trends in Marriage Transition Rates

The procedures described in the preceding section produced a large set of marital transition rates. In order to investigate the presence of time trends in specific rates, and to have a basis for extrapolating any such trends into future years, we conducted regression analyses using a standard demographic approach (e.g., Lee and Carter 1992). In particular, for each series the natural logarithm of the transition rate was regressed on time, as follows:

$$\ln(r_{m,a,t,g}) = a_{m,a,t,g} + b_{m,a,t,g}\,t + e_{m,a,t,g},$$

where *m* indicates the transition-rate series (e.g., from unmarried to first-married), *a* represents an age group, *t* denotes calendar time, and *g* indicates racial groups (a further subscript denoting marital duration is suppressed). For this analysis we limited our attention to the years 1970-1995, and coded time as *year*-1970. However, for the 50-61 age group our series extends back only to 1975. Each observation in the regressions is weighted by the total (weighted) exposure used in computing it (i.e., the denominator of the dependent variable). We use robust ("Huber-White") standard errors with which to assess the statistical significance of estimated trend effects.

Despite the large samples found in the CPS, several of the age- and time-specific marital-transition cells contain few, or no, sample observations, or event-counts equal to zero. In cases of positive exposure but zero occurrences, and therefore a calculated transition rate of zero, we substituted the value 0.00001 in order to permit use of the observation and to allow application of the logarithmic transformation. Our rationale for this substitution is that in the population from which the CPS sample is drawn, the true marital-transition rate is always at least somewhat positive. Generally the cases with computed rates of zero also received relatively little weight in the regressions.

Another problem associated with the use of sample data is the presence of age- and time-specific cases in which no exposure is recorded. This problem arose almost exclusively within the two minority groups we studied. To deal with this problem, we simply disregarded the race distinction, producing a single regression equation for all racial groups combined.

Table A-1 summarizes our regression analysis of trend effects. There are nine distinct marital transitions recognized in the model, and eight age groups, although some of the transitions are impossible for some age groups (e.g., marital durations of 10 or more years among women in the 15-19 age group). The shaded cells indicate combinations of age group and marital transition in which empty cells led us to combine the three racial groups. Otherwise, cell entries in this table indicate instances of significantly positive, or significantly negative, estimated trend parameters; the absence of such statistical significance is indicated by a zero.

The statistically significant trends are generally consistent with the often-remarked "retreat from marriage," with just a few exceptions. For example, all three groups exhibit downward trends in first-marriage rates at young ages, but these are partly offset among whites and Hispanics by rising first-marriage rates at older ages. Together these trends are consistent with a delay of first marriage, but not necessarily a reduction in the proportion ultimately marrying. In almost all instances we find significant increases over time in age-specific and duration-specific divorce rates, especially among white women. We also find a trend towards increasing reluctance among both widows and divorcees to remarry, although there are only four such negative trend effects (out of a possible 20) among widows.

We did not use the CPS survey data to derive widowhood rates; widowhood at the ages we studied is sufficiently rare to rule out the use of survey data to derive the requisite transition rates. Instead, we used published age- and year-specific male death rates for whites and blacks, obtained from National Center for Health Statistics publications. We used the same log-linear regression approach described above to fit trend lines to the age- and race-specific mortality-rate

data. Available vital statistics data do not provide data specifically for Hispanics. Based on findings reported in Liao et al. (1998), we multiplied the rates for whites ages 15-44 by 1.33, and the rates for whites ages 45 and above by 0.92, to obtain estimated death rates for Hispanic males. Because women typically marry men slightly older than themselves, the widowhood rate for women in any given age-race group is assumed in our analysis to be the simple average of the mortality rates of same-race men in that age group plus the next-oldest age group.

Microsimulation of Marital Histories

Although analytic methods for duration-dependent life tables exist (Wolf 1988), we chose to adopt microsimulation techniques in this analysis (Wolf 1986). We produced a special-purpose SAS® program to produce the simulated marital histories used in this study. We generated a large (n=1,000,000) sample of simulated marital histories for each combination of racial group and birth cohort (1945, 1955, and 1965) studied. The simulated histories begin at age 15, and end when the woman either (a) reaches the tenth anniversary of a marriage, (b) passes her 52nd birthday while unmarried (which rules out having a tenth anniversary prior to age 62) or (c) reaches her 62nd birthday. In the simulation, widowhood rates are equivalent to observed male mortality rates where observed, or to extrapolated mortality rates, based on the regression analysis, otherwise. All marital-transition rates represent predicted values from regressions. If significant trend effects were found (as noted in table A-1) the predicted rates lie on the fitted regression line; if no significant trends were found, the predicted rates come from an intercept-only regression (they are, in other words, the average rate over the 1970-1995 period). Thus, our analysis adopts a conservative approach, postulating continuance of trends in only the relatively few instances for which we found significant trend effects.

The basic microsimulation algorithm is quite simple, and exploits the fact that in our marriage model all transitions are governed by piecewise-constant exponential survival (or

hazard) functions. In such a model, the probability that the next marital event occurs at time T (since the last event) is

$$\Pr(t=T) = \exp[-R_T],$$

where t is the random variable "time to next event", and R_T is the integrated hazard. In our model, the integrated hazard is simply the sum of age-group specific and time-specific transition rates starting from the moment of the last marital event. Thus, we draw a random number, z, from the uniform 0, 1 distribution, and then proceed to find T such that $\Pr(t = T) = z$. This is equivalent to finding T such that $R_T = - \ln(z)$. By simulating "event to event" rather than "year to year," as many microsimulation programs do, we are able to generate very large samples very quickly.

Figure A-1: Marital Statuses and Possible Transitions Among Them

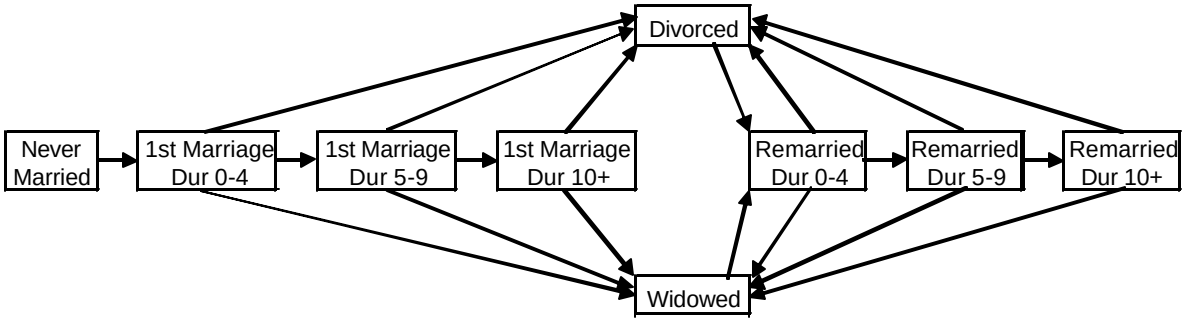


Table A-1: Presence of Trend Effects in Marital-Transition Rates, By Age Group and Race/Ethnicity, 1970-1995

				Divorce From First Marriage									Remarriage From …						Divorce From Second or Later Marriage								
	First Marriage			Married 0-4 Yrs			Married 5-9 Yrs			Married 10+ Yrs			… Widowhood			… Divorce			Married 0-4 Yrs			Married 5-9 Yrs			Married 10+ Yrs		
Age	W	B	H	W	B	H	W	B	H	W	B	H	W	B	H	W	B	H	W	B	H	W	B	H	W	B	H
15-19	-	-	-	+	0	0		0			na			0		0	0	0		na			na			na	
20-24	-	-	-	+	0	0	+	0	0		0		-	0	0	0	0	0	0	0	0		0			na	
25-29	0	-	0	0	0	0	+	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0		0	
30-34	+	0	+	0	0	0	+	0	0	+	0	+	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0
35-39	+	0	0	0	0	0	0	0	0	+	0	0	0	0	0	-	-	0	0	0	0	0	0	0	0	0	0
40-44	0	0	0	0	0	-	0	0	0	+	+	0	0	0	0	-	-	0	0	0	0	0	0	0	0	0	0
45-49	0	0	0	0	0	0	0	0	0	+	0	0	0	0	0	-	0	0	-	0	0	0	0	0	0	0	0
50-61		0			na			na			0			-			0			0			0			0	

Note: - (+) indicates significant negative (positive) time trend; 0 indicates absence of significant time trend; W = white, B = Black, H = Hispanic

Appendix B

Data for "Cumulative Percentage of Women Attaining Ten-year Marriage, by Age, Race, and Birth Cohort"

	birth cohort 1920-1929				birth cohort 1930-1939				birth cohort 1940-1949				birth cohort 1950-1959				birth cohort 1960-1969		
age	white	black	hispanic	age	white	black	hispanic	age	white	black	hispanic	age	white	black	hispanic	age	white	black	hispanic
22				22	0.01			22	0.04	0.24	0.51	22	0.00			22	0.03		
23	0.74			23	0.13	0.89	0.32	23	0.19	0.46	1.15	23	0.03			23	0.06		0.18
24	1.31	0.26	1.07	24	0.72	1.21	2.09	24	0.46	1.27	2.42	24	0.21	0.19	1.38	24	0.16	0.05	0.31
25	1.54	0.76	1.31	25	1.79	3.80	3.44	25	1.31	3.17	4.31	25	0.65	0.86	2.91	25	0.45	0.20	0.86
26	4.05	2.02	1.82	26	4.53	7.81	8.29	26	3.52	6.43	8.50	26	1.85	1.74	4.89	26	1.18	0.34	2.96
27	7.08	11.42	6.46	27	9.50	13.27	12.09	27	7.44	11.04	13.64	27	4.08	4.00	8.51	27	2.80	1.06	4.37
28	15.91	15.69	14.15	28	20.15	21.43	16.54	28	14.57	16.70	19.13	28	9.54	7.19	14.49	28	5.38	2.44	7.25
29	26.36	24.54	25.62	29	31.65	29.49	20.96	29	24.56	24.10	26.08	29	16.22	11.24	22.45	29	8.61	4.38	11.02
30	33.86	31.30	35.79	30	42.65	36.38	28.23	30	34.75	30.28	34.68	30	23.72	16.21	31.81	30	11.69	5.87	14.40
31	45.82	40.18	36.86	31	52.75	43.66	35.30	31	44.42	37.52	42.75	31	30.59	19.77	38.46	31	14.27	7.40	16.80
32	55.76	46.53	47.11	32	61.27	50.40	44.55	32	53.08	43.29	47.79	32	37.07	24.38	44.34	32	16.35	8.34	19.45
33	61.23	53.08	48.18	33	67.55	54.55	51.09	33	59.97	46.96	53.48	33	42.49	27.98	47.31				
34	68.64	55.83	56.49	34	73.31	61.00	57.77	34	64.83	49.60	57.79	34	47.00	31.33	50.79				
35	71.73	66.41	61.29	35	77.53	64.96	63.94	35	68.45	52.68	62.53	35	50.94	33.61	54.21				
36	75.95	71.12	61.94	36	80.44	68.45	68.27	36	71.30	56.87	65.49	36	54.13	36.48	56.98				
37	79.08	71.96	62.26	37	82.53	70.36	70.88	37	73.51	58.20	66.66	37	56.58	38.81	58.24				
38	81.42	72.50	62.62	38	84.24	71.42	73.42	38	75.12	59.92	69.36	38	58.68	40.47	59.28				
39	84.71	74.72	66.86	39	85.35	72.83	74.60	39	76.70	61.03	71.89	39	60.00	41.88	61.09				
40	86.49	75.15	67.04	40	86.18	73.91	76.43	40	78.13	63.11	73.15	40	60.92	42.74	61.75				
41	87.22	77.34	67.33	41	87.12	74.79	77.63	41	79.23	64.70	74.16	41	62.05	43.33	62.32				
42	87.83	77.62	67.61	42	88.21	75.77	78.12	42	80.31	66.38	75.35	42	62.82	44.00	63.44				
43	88.98	77.82	67.76	43	88.94	77.00	78.67	43	81.12	67.68	76.10								
44	89.88	78.02	67.98	44	89.39	78.10	79.21	44	82.05	68.64	76.90								
45	90.40	78.13	72.17	45	89.81	79.50	80.25	45	83.09	69.24	77.95								
46	91.22	83.81	72.21	46	90.14	80.59	82.44	46	83.74	70.18	79.36								
47	91.28	84.02	79.00	47	90.52	80.94	82.45	47	84.27	70.69	80.48								
48	91.65	84.13	79.02	48	90.69	81.40	82.99	48	84.48	71.12	80.69								
49	91.72	84.21	79.16	49	90.97	81.55	83.81	49	84.57	71.62	80.69								
50	92.09	84.26	79.25	50	91.33	82.00	83.82	50	84.71	71.77	80.69								
51	92.12	84.32	79.33	51	91.60	82.19	84.48	51	84.75	72.07	80.69								
52	92.16	84.38	79.38	52	91.88	82.76	84.58	52	84.82	72.15	80.69								
53	92.79	89.98	79.46	53	92.11	83.21	85.75	53	84.84	72.15	80.81								
54	92.83	90.04	79.49	54	92.26	83.71	85.95	54	84.88	72.34	80.81								
55	92.98	90.07	79.54	55	92.30	83.72	86.16												
56	93.02	90.15	79.59	56	92.39	83.83	86.41												
57	93.22	90.15	79.59	57	92.45	83.99	86.41												
58	93.25	90.23	79.59	58	92.54	83.99	86.41												
59	93.26	90.26	79.59	59	92.69	83.99	86.41												
60	93.26	90.27	79.59	60	92.72	83.99	87.14												
61	93.27	90.27	79.59	61	92.79	84.12	87.14												
62	93.61	90.27	79.59	62	92.79	84.12	87.48												
63	93.61	90.27	79.59	63	92.79	84.12	87.48												
64	93.61	90.27	79.59	64	92.82	84.12	87.48												

Appendix C

Table x: Percentage of Women Attaining Tenth Anniversary by Given Age, by Race/Ethnicity and Birth Cohort

Race/Ethnicity:		White			Black			Hispanic		
Year of Birth:		1945	1955	1965	1945	1955	1965	1945	1955	1965
Age:	30	24.1	14.4	8.1	17.6	9.1	4.5	27.9	23.1	19.1
	35	55.1	42.5	31.4	37.9	25.7	16.8	57.2	51.8	46.6
	40	71.4	63.3	56.3	51.6	38.9	28.4	72.1	68.8	65.6
	45	80.1	75.3	72.0	59.7	49.0	40.2	80.6	79.6	79.3
	50	84.4	80.8	78.5	63.7	53.9	45.9	84.3	83.5	83.3
	55	86.4	83.0	80.7	65.8	56.7	49.4	84.8	84.0	83.8
	62	87.6	84.3	82.1	66.6	57.4	50.1	85.2	84.4	84.2

[1] . In 1950 Congress made the rules gender neutral, extending spouse and widow benefits to men as well as women. Men rarely take these benefits because the benefits they receive as retired workers are nearly always bigger. In 2000, 97 percent of spouse and widow beneficiaries were women.

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