MARRIAGE DELAYED OR MARRIAGE FORGONE? NEW COHORT FORECASTS OF FIRST MARRIAGE FOR U.S. WOMEN

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Do recent declines in first marriage rates signal that an increasing proportion of women will remain single their entire lives, or merely that they are postponing marriage to older ages? Our forecasts for cohorts born in the 1950s and 1960s suggest that marriage will remain nearly universal for American women—close to 90 percent of women are predicted to marry. However, separate forecasts by educational attainment reveal a new socioeconomic pattern of first marriage: Whereas in the past, women with more education were less likely to marry, recent college graduates are now forecast to marry at higher levels despite their later entry into first marriage. This educational crossover, which occurs for both black women and white women in recent cohorts, suggests that marriage is increasingly becoming a province of the most educated, a trend that may become a new source of inequality for future generations. Forecasts presented here use data from the 1995 Current Population Survey and compare estimates from the Hernes model with those from the Coale-McNeil model.

The steady decline in marriage rates in the United States over the last several decades has sparked vigorous debate among social scientists over whether Americans are retreating from marriage altogether or simply postponing their marriages to older ages. The deciding facts in this debate will not become available for several decades, when cohorts born in the 1960s and early 1970s complete their entry into first marriage. Still, much can be learned from looking at the experience of cohorts that have not yet completed their entry into first marriage. With the help of statistical and behavioral models of a cohort's entry into first marriage, it is possible to predict the future experience of women who are still young today. We produce new forecasts of first marriage for cohorts born through 1965, including separate forecasts by race and by educational attainment.

Our interest in forecasts of first marriage has several motivations. First, marriage levels have implications for the welfare of adults and children (McLanahan and Sandefur 1994; Waite 1995). Here the overall level of marriage is of interest, as are differentials in marriage rates that can affect the transmission of inequality between generations. The disparity in marriage rates between whites and blacks has been noted for many years. We find evidence that a new pattern is emerging in which marriage will be more common for women with college degrees than for those without. This pattern

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may become a new source of increasing socioeconomic inequality.

Second, updated forecasts of first marriage provide new evidence in the debate over the consequences for family formation of women's increasing economic independence (Becker 1981; Bloom and Bennett 1990; Oppenheimer and Lew 1995). Has greater economic independence made women more likely to remain single, or has the effect primarily translated into a later age at first marriage? New evidence for answering this question can be obtained both from observing trends over time and from assessing differential levels of marriage between those with higher and lower earning potentials. Our findings suggest that women's economic independence is becoming associated with higher, not lower, rates of marriage.

Finally, we are interested in seeing if the rise in cohabitation that has occurred in recent decades (Bumpass and Lu 2000; Bumpass and Sweet 1989) signals that cohabitation has begun to replace marriage as a fundamental social institution. In some Western European countries, particularly in Scandinavia, cohabitation has emerged as a long-term substitute for marriage (Hoem and Rennermalm 1985). Recently, France has created new laws governing informal unions, the so-called *Pacte de Solidarité*. Do marriage patterns suggest a similar trajectory for American society? Our short answer is, no. Our forecasts of the continued near-universality of marriage suggest that marriage remains a strong social institution in the United States, although separate analyses by race point to much lower levels of first marriage among black women.

In addition to these substantive concerns, we also try to advance the methodology of forecasting cohort marriage levels. We develop maximum-likelihood methods that allow us to use Hernes's (1972) "inhomogeneous diffusion model," previously fitted to completed cohort experience, for forecasting the future behavior of cohorts that are still young. The Hernes model offers the advantage of having a behavioral interpretation in which marriage rates at a given age are a function of the social pressure exerted by those who are already married (Burch 1993; Diekmann 1989). We compare the predictions from the Hernes model with those from the Coale-McNeil model previously used in the literature (Bloom and Bennett 1990; Coale 1971, 1977; Coale and McNeil 1972; Rodriguez and Trussell 1980). We find that the two approaches produce consistent forecasts in the U.S. case.[1]

BACKGROUND

Recent Trends

Some form of marriage is found in almost every culture, and in nearly all societies most adults are expected to marry. In the United States, more than 90 percent of every female birth cohort on record since the mid-1800s has eventually married (Cherlin 1992; Hastings and Robinson 1973). Over this century, the prevalence of marriage has remained high despite social and economic changes, wars, and changes in gender roles. The baby-boom years were characterized by younger and more universal marriage than occurred during the rest of the century. Indeed, cohorts born in the 1930s married at one of the highest levels seen in any Western society, with more than 95 percent of women marrying.

The recent decline in period marriage rates in industrial societies has been depicted as one of the great social changes of our time, with some calling it a feature of the "second demographic transition" (Lesthaeghe 1995). Beginning in about 1970, aggregate measures of marriage, such as the annual rate of marriage among unmarried women 15 to 44 years of age, began to fall dramatically in the United States. This annual rate remained at levels of about 150 per thousand through the 1960s, fell to 110 per thousand by the mid-1970s, and fell further to about 100 per thousand by 1980 (National Center for Health Statistics 1996). Since 1980, the trend in aggregate rates has continued to decline (Clarke 1995).

[1] Model marriage schedules allow estimation of the timing of an event over the life course. Both the Hernes and the Coale-McNeil models describe the distribution of age at first marriage using several parameters, one of which gives the proportion of the cohort that ever marries. The parameters are chosen so as to produce the schedule that best fits the data.

Marriage rates across broad age groups (e.g., 15 to 44) can be influenced by the changing age structure of the population. For example, part of the decline in aggregate rates during the 1970s is attributable to the movement out of prime marrying ages of the exceptionally large cohorts born in the baby-boom years. However, age-standardized and age-specific measures of marriage also declined.[2] For example, age-specific rates of marriage have fallen for both young and old age groups since 1970. These declines were much faster at younger ages: The rate of marriage among single women aged 20 to 24 fell 55 percent from 1970 to 1988, while the rate for women aged 30 to 34 fell 16 percent over the same period (National Center for Health Statistics 1996:8). This shift in age at marriage can be seen perhaps most clearly in the increase in the period median age of marriage—that is, the median age of brides in a calendar year—from 20.8 years in 1970 to 25.0 years in 1998 (U.S. Bureau of the Census 1999). It is clear that cohorts coming of age since 1970 are marrying later than the cohorts that preceded them. The question that remains is whether U.S. women will compensate for their delayed entry into marriage by marrying at higher rates at older ages.[3]

THEORIES OF MARRIAGE

Several theories have been advanced to explain why individuals marry and what factors influence the timing of marriage. At one extreme, marriage is viewed as a social institution, and entry into marriage is seen as a response to social norms; at the other extreme, marriage is seen as a rational choice made by individuals for whom the benefits of married life outweigh the benefits of staying single.

Institutional theories emphasize that marriage, like the family as a whole, is supported by "a structure of norms, values, laws, and a wide range of social pressures" (Goode 1982:11). This explains why, despite dramatic changes in the economic role of marriage and the family, the historical record of marriage in the United States is said to be one of "resilience and persistence" (Modell 1986). This institutional perspective is supported by the continued popularity of marriage as an ideal for young Americans (National Marriage Project 2000; Thornton 1989).

In contrast, the economic theory of marriage, pioneered by Becker (1973, 1974, 1981), begins with the basic question of why individuals would choose to marry at all.[4] His answer is that marriage is a rational arrangement between individuals who would be more productive (in a general sense) as a joint economic unit than they would be if they remained single. The sexual division of labor within households creates "gains to trade" within marriage analogous to the gains from international trade implied by theories of comparative advantage. The theory thus contains a potential explanation of recent declines in marriage and increases in divorce.[5] As Becker (1981) concludes, "The gain from marriage is reduced by a rise in the earnings and labor force participation of women and by a fall in fertility because a sexual division of labor becomes less advantageous" (p. 353).

An important difference between these two theories of marriage is in their implications for the extent to which changes in marriage timing are accompanied by changes in proportions ever marrying. Bloom and Bennett

[2] Age-specific first marriage rates for women are estimated by dividing the number of first marriages in a given age group by the number of single women in that age group. Age-standardized rates estimate the aggregate first marriage rate implied by applying a set of observed age-specific rates, which might vary over time, to a fixed standard population age structure.

[3] Postponement of marriage to older ages will drive down period measures of the proportion ever marrying. Cohort analysis is not subject to this so-called "tempo" effect. An alternative to the cohort analysis presented here is to estimate tempo-adjusted period rates (Bongaarts and Feeney 1998; Ryder 1964).

[4] The division between "sociological" and "economic" theories of marriage is not particularly rigid. In fact, as Blossfeld (1995) notes, the first social theorists to emphasize the complementarity of male and female labor were sociologists, such as Durkheim and Parsons.

[5] This explanation for divorce applies best to the 1960s and 1970s. Since 1980, the leveling of divorce rates would appear to be at odds with continued increases in female labor force participation (Goldstein 1999).

(1990) argue that the increasing economic independence of women will lead not only to delayed marriage but also to "a decline in the proportion of individuals who ever marry" (p. 1009). On the other hand, Oppenheimer, Blossfeld, and Wackerow (1995) argue that increased education of women may result in later marriage, but will not reduce substantially the proportion of women who ever marry. Our empirical analysis of whether marriage is being forgone or merely delayed bears on this theoretical debate.[6]

THE PATTERN OF EDUCATION DIFFERENTIALS

Educational attainment is a useful proxy measure of women's economic independence because it does not involve the difficulties of estimating the potential earnings of those who do not work. The overall trend in recent decades has been for educational attainment to increase while marriage rates have fallen. However, female educational attainment also rose from the 1930s to the 1950s, a time of rising marriage rates. Other factors besides the education of women—economic booms and busts, changing social attitudes, and changing labor markets—make it difficult to analyze the temporal association between women's education and marriage. A way around this is to look at cross-sectional variation in marriage patterns by varying levels of women's educational attainment. Here the literature is mixed. Goldscheider and Waite (1986) and Thornton, Axinn, and Teachman (1995) both report a positive relationship between education and marriage. Blossfeld and Huinink (1991) find no effects in their analysis of German marriage patterns. Bloom and Bennett (1990) and Bennett, Bloom, and Craig (1989) find a negative association between the educational attainment of white women and marriage levels, but a positive effect of education on the predicted proportion ever marrying for black women.

Although Bloom and Bennett's results remain influential, there are recent signs that a new pattern of *positive* association between women's educational attainment and marriage is emerging. Okun (2001) finds a positive association between education and marriage for women marrying in the 1990s in Israel, a reversal of the earlier pattern there. Bracher and Santow (1998) find similar results for women in Sweden. Our forecasts predict this reversal in the United States as well.

Historically, in the United States, lifelong singlehood was more common for highly educated women (Cookingham 1984). We also find this pattern in more recent census data. Table 1 shows the percentage of women aged 45 to 54 who had ever married, by level of educational attainment, in the censuses from 1960, 1970, and 1980. Marriage is least common among women with the highest levels of education, a tendency that holds for blacks and whites and across time periods. However, over time, the difference in marriage patterns by education has narrowed. For example, the gap between the percentage of college-educated women who ever married and the percentage of high school–educated women who ever married shrank from 5.9 percentage points in 1960 to 2.4 percentage points in 1980. Our forecasts of the most recent data available suggest that this gap will disappear, and the previous pattern will be reversed: Marriage will become more common for women with a college education.[7]

DATA AND METHODS

DATA

The marriage histories of recent cohorts are available in sample survey data, the largest and most recent of which is the June 1995 Current Population Survey (CPS).[8] The CPS gathered marital histories of women aged 15 to 65 in some 50,000 households.

[6] Our use of the Hernes model of social diffusion seems at first glance to be more allied to institutional theories of marriage. On the other hand, it can also be seen to cover the rational choice perspective if other people's actions are seen as bringing information about the state of the marriage market.

[7] Our forecasts bear out the trend noted by Qian and Preston (1993) that between 1972 and 1987 marriage rates fell faster among those with less than a high school education than among those who had completed college.

[8] The decennial census contained a question on the date of first marriage for both men and

Table 1. Percentage of Women Aged 45 to 54 Ever Marrying, by Educational Attainment: United States, 1960, 1970, and 1980

Highest Grade Completed	All Women			White Women			Black Women		
	1960	1970	1980	1960	1970	1980	1960[a]	1970	1980
Eighth grade	94.9	95.5	95.5	94.8	95.6	96.2	95.2	94.3	91.8
1 to 3 years of high school	94.9	96.2	96.8	94.9	96.5	97.6	94.9	94.5	92.9
4 years high school	92.7	95.2	96.4	92.7	95.3	96.7	92.6	93.5	92.9
1 to 3 years college	92.0	94.6	95.9	91.9	94.7	96.2	93.4	93.2	93.5
4 years college	86.8	92.0	94.0	86.6	92.0	94.3	89.3	92.6	91.8
5+ years college	71.0	81.2	86.8	69.9	80.5	86.4	89.7	90.5	91.0
Total percentage	93.0	94.5	95.3	92.9	94.6	95.8	94.2	93.3	92.1

Sources: For 1960, U.S. Bureau of the Census (1966, table 4).

For 1970, U.S. Bureau of the Census (1972, table 4).

For 1980, U.S. Bureau of the Census (1985, table 3).

[a] For the 1960 data, the category is "nonwhite."

Our goal is to forecast the eventual marriage behavior of cohorts whose members came of age well after 1970, when marriage rates began their sudden drop. The 1995 data allow us to observe the marriages of those born from 1960 to 1964 up to age 30, those born from 1955 to 1959 up to age 35, those born from 1950 to 1954 up to age 40, and so forth. Samples are large enough to perform separate forecasts by broad measures of educational attainment and separate forecasts for whites and blacks.[9] Forecasts for other racial and ethnic groups are not presented here.

Models for Forecasting Levels of First Marriage

Our strategy is to use two different forecasting models: one, developed by Coale and McNeil (1972) is already in wide use, the other, developed by Hernes (1972) has until now not been used for forecasting. Our use of both approaches addresses the criticism that previous applications of the Coale-McNeil model have faced for being overly dependent on one particular set of assumptions (Cherlin 1990).

The Coale-McNeil model, used by Bloom and Bennett (1990), is based on an underlying Swedish age distribution of marriage from the nineteenth century, which is then transformed by shape, location, and level parameters.[10]

Hernes (1972) views the entry of a cohort into first marriage as a diffusion process analogous to the spread of an innovation across firms or the spread of a disease in a

women through 1980. Hernes used data from the 1960 census in his original paper. This question was cut from the census form in 1990 and 2000.

[9] The sample sizes per five-year birth cohort in the June 1995 Current Population Survey are as follows: N ≈ 5,000 for all women; N ≈ 1,000 for all college graduates; and N ≈ 4,000 for all women with less than a college education. The sample sizes for White women are of the same order of magnitude. For Black women, samples are smaller: N ≈ 600 for all educational levels; N ≈ 100 for college graduates; and N ≈ 500 for those with less than a college education.

[10] In the Coale-McNeil model, the density of age at first marriage is given by

$$g(a)=\frac{(.1946)\Theta}{\gamma}\exp\left\{\frac{-.174}{\gamma}(a-a_0-6.06\gamma)-\exp\left[\frac{-.288}{\gamma}(a-a_0-6.06\gamma)\right]\right\},$$

where a is the age at marriage, a_0 is the age at which first marriages begin, γ scales the speed of entry into first marriage, and Θ is the proportion of the cohort that eventually marries. The numerical constants were chosen such that when $\gamma = 1$, the model reproduces a standard marriage schedule, based on Swedish period data from 1865 to 1869 (United Nations 1983).

population. Two countervailing forces drive the cohort's rate of entry into first marriage over time. On the one hand, social pressures to marry increase, pushing marriage rates higher with age. On the other hand, the passage of time produces a counteracting force, a reduction in "marriagability." This decline can be seen either as the effect of selection by which the most marriageable are winnowed from the population or as an individual process in which the tendency to marry falls over time as the unmarried grow accustomed to single life.

The standard logistic diffusion model specifies that the rate at time t of transition from one state to another (P'_t) is proportional to the product of the proportion of the population P_t that has undergone the transition and the proportion of the population that remains in the original state, $1 - P_t$. (In the transmission of a disease, these two groups would be the "infected" and the "uninfected." Here they are the "ever married" and the "never married.") Hernes extended this model to include an additional time-varying element reflecting the decline in susceptibility over time of the unmarried. He hypothesizes that this decline is geometric of the form Ab^t, where $b < 1$. Hernes's "inhomogeneous diffusion model" thus takes the form:

$$P'_t = Ab^t[P_t(1-P_t)]. \quad (1)$$

We are the first to use the Hernes model to forecast the future experience of incomplete cohorts, although Hastings and Robinson (1973) suggested this application in the early 1970s. One obstacle in forecasting with the model was the lack of good statistical methods for fitting the Hernes model. Our method takes advantage of modern maximum-likelihood procedures and allows us to quantify confidence intervals for our estimates based on sample survey data (see Appendix A for details).

We carried out validation experiments on historical U.S. data and found that forecasts given observed marital experience to age 30 are accurate to within 2 percentage points of the observed percentage ever marrying, and forecasts based on observed marital experience to age 25 were accurate to within about 3.5 percentage points. We found that the Hernes model performed at least as well as, and in some cases better than, the Coale-McNeil model, which has been used in previous attempts to forecast marriage patterns (Bennett et al. 1989; Bloom and Bennett 1990). Both models tend to err in the direction of slightly underestimating the proportion ever marrying. The results of these validation experiments lead us to limit our forecasting applications to cohorts that have already reached age 30 and to consider our forecasts as more likely to be underestimates than overestimates of the actual proportion who will eventually marry.

RESULTS

We first present our estimates of the proportions of all women ever marrying for cohorts born in the 1940s, 1950s, and early 1960s. We then break these forecasts down by educational attainment and race.

PERCENTAGE EVER MARRYING

Forecasts of percentages of women ever marrying by birth cohort along with estimates made by earlier researchers are shown in Table 2 and Figure 1. In general, we predict that almost 9 in 10 women born in the 1950s and early 1960s will eventually marry. The levels of eventual marriage for the most recent cohorts represent a small decline from the high-marrying cohorts who came of age during the baby-boom years. However, they are comparable—to within a percentage point or two—to the levels of marriage observed for cohorts growing up early in the twentieth century. Given the perspective of the whole century, the high marriage levels of the baby-boom years appear more anomalous than do the slightly lower levels of eventual marriage we predict for the cohorts born in the early 1960s.

Our forecasts of eventual marriage for the women born in the 1940s and 1950s are similar to the earlier forecasts made by Bloom and Bennett (1990) and Bennett et al. (1989).[11] Why do we interpret marriage

[11] Results from these earlier studies were widely reported (and misreported) in the media. See Cherlin (1990) for a review of the controversy.

Table 2. Percentage of Women Ever Marrying, by Birth Cohort: United States, 1891 to 1965

Birth Cohort[a]	Prior Forecasts: Hernes Model (1)	Prior Forecasts: Coale-McNeil Model (2)	Prior Forecasts: NSFH (3)	Our Forecasts: Hernes Model (4)	Our Forecasts: Coale-McNeill Model (5)
1891–1995	90.5[b]	—	—	—	—
1896–1900	91.1[b]	—	—	—	—
1901–1905	90.8[b]	—	—	—	—
1906–1910	91.9[b]	—	—	—	—
1911–1915	93.7[b]	—	—	—	—
1916–1920	94.5[b]	—	—	—	—
1921–1925	95.9[b]	—	—	—	—
1926–1930	96.4[b]	—	—	—	—
1931–1935	97.0	—	—	—	—
1936–1940	97.6	94.4	96.8	—	—
1941–1945	95.6	94.7	95.3	—	—
1946–1950	—	92.2	95.3	93.6 (93.0, 94.2)	93.5 (92.7, 94.0)
1951–1955	—	88.6	91.3	91.1 (90.3, 91.8)	91.0 (90.4, 91.8)
1956–1960	—	87.7	88.9	88.9 (88.0, 89.9)	88.4 (87.4, 89.2)
1961–1965	—	—	—	88.6 (87.2, 90.1)	88.7 (87.1, 89.8)

Note: Numbers in parentheses are 95-percent confidence intervals. The estimates for the Hernes Model in column 1 use U.S. census data (Hastings and Robinson 1973); the forecasts for the Coale-McNeil Model in column 2 use data from the June 1985 CPS (Bloom and Bennett 1990); the forecasts in column 3 use the Coale-McNeil model with data from the 1987–1988 National Survey of Families and Households (Bennett, Bloom, and Craig 1989); our forecasts are based on fits of June 1995 CPS data. For sample size information, see note 9.

[a] The definition of five-year birth cohort varies slightly by source.

[b] Estimates based on observations for completed cohorts. All other estimates use models to forecast incomplete cohorts.

trends as stable while these earlier studies saw a pattern of decline? The first reason is that we have added an observation, that of cohorts born from 1961 to 1965, and for this latest cohort there was little or no decline in the percentage ever marrying. The second reason is that we present our estimates together with estimates for the entire century, rather than focusing only on the decline that occurred from the exceptionally high levels of marriage for cohorts who came of age during the baby-boom years. In this light, the percentage ever marrying among those born from 1961 to 1965 is only a percentage point or two lower than the percentage ever marrying among those born at the beginning of the century. Finally, the theoretical framework of the "independence hypothesis" used in earlier studies may have contributed to the interpretation that their estimates were in line with continued declines in the proportion ever marrying.[12]

Proportions of Women Ever Marrying by Education and Race

To study the effect of education on the timing and eventual level of first marriage, we divide our sample into two educational attainment groups: college graduates and those

[12] Table 2 also shows the effect of both model choice and data set selection on the predictions of the percentage ever marrying. In general, we see only small differences between these sets of estimates. However, it is notable that the differences between data sets are greater than the differences between models. In particular, our results in columns 4 and 5 show that the Coale-McNeil and Hernes models give essentially identical estimates when based on the same data.

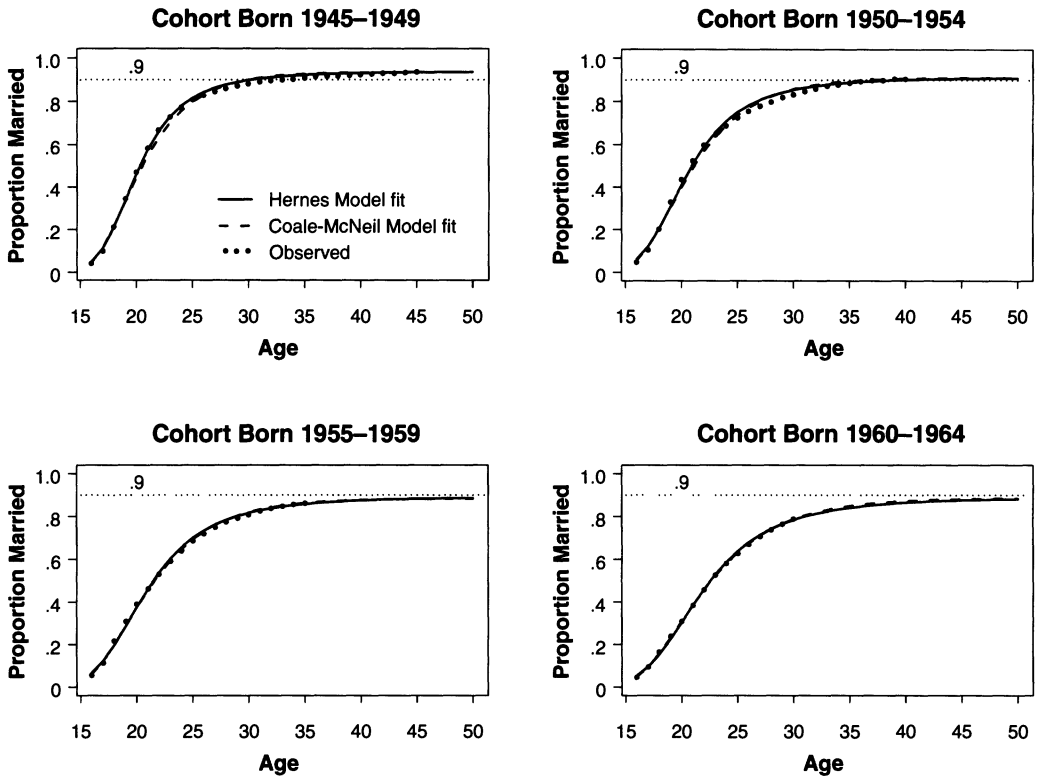

Figure 1. Cumulative Proportion of Women Ever Marrying, by Age, for Selected Birth Cohorts

Source: Estimates based on data from the June 1995 CPS.

who have not graduated from college. Past researchers have distinguished between high school graduates and those who did not graduate from high school. For more recent cohorts, however, college graduation is a clearer dividing line in both labor and marriage markets. For example, in his study of educational homogamy, Mare (1991) finds that the most difficult divide to cross is that between college graduates and noncollege graduates. The diffusion process underlying the Hernes model suggests that it makes sense to reestimate the model for subpopulations that are in some way isolated from one another rather than to attempt to estimate multivariate effects for the pooled sample.

The results of our forecasts by education are given in Figure 2, which shows the observed and predicted marriage schedules for the cohorts of women born in 1950–1954, 1955–1959, and 1960–1964 by level of educational attainment. (Note that educational attainment is measured as of 1995, not at the time of marriage.) The slope of these curves gives the rate of entry into first marriage. Looking first at the 1950–1954 cohort, we see that college graduates are less likely to marry at young ages, and that while they are more likely to marry at older ages, they never marry as much as those with less education. At age 21, some 60 percent of noncollege graduates are already married, compared with only about 30 percent of college graduates. By age 30, however, the gap narrows substantially, and by the oldest ages, college graduates are only slightly less likely ever to have married.

For the 1955–1959 cohort, we see an even larger differential in the pattern of marriage at young ages. By the last observable data point at age 35, however, the gap in first marriage by educational attainment has almost disappeared. And by age 40, we forecast a reversal, with late marriages by college graduates more than making up for their lower levels of marriage at younger ages.

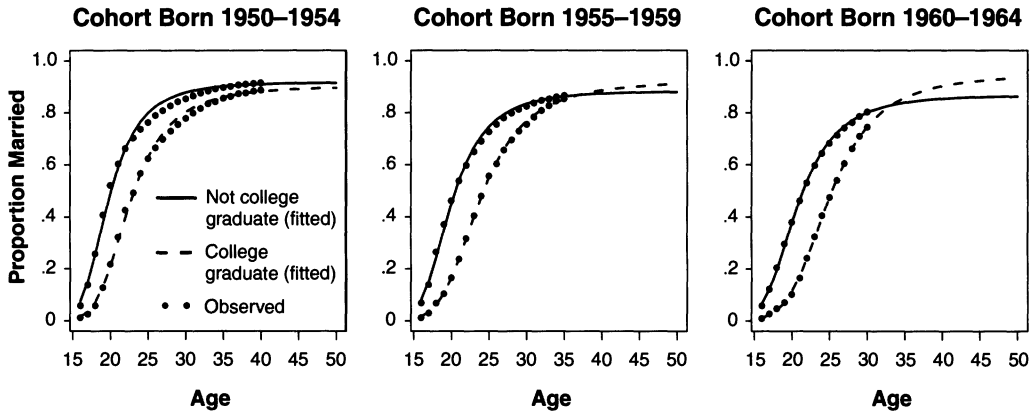

Figure 2. Cumulative Proportion of Women Ever Marrying, by Educational Attainment and Birth Cohort

Source: Estimates based on data from the June 1995 CPS.

Note: Fitted values are based on the Hernes Model.

The crossover for the 1960–1964 cohort is even more dramatic. Although we observe this cohort only up to age 30, we forecast that the gap in the proportion ever married, initially wider than for earlier cohorts, will disappear by age 33. Some 94 percent of college graduates from this cohort are forecast to marry, compared with about 89 percent of those without a college diploma.

A possible compositional explanation for this educational crossover could be the divergence of black and white marriage patterns (Bennett et al. 1989). If black women are less likely to go to college and to marry, then the crossover might be because of differences in the racial composition of the two educational groups. To explore this compositional explanation, we divided the sample by both race and education and calculated separate forecasts for each group. Figure 3 presents our results. For white women, sample sizes allow us to break down our forecasts by educational attainment. For black women, small sample sizes permit us to present only the observed data, without detailed projections. (See note 9.) Figure 3 shows that the crossover occurs for both white women and black women, and thus that the educational crossover for all women is not driven by the racial composition of educational groups. The crossover for white women is of a slightly smaller magnitude compared with the crossover for all women. The crossover for black women appears to be even stronger and to have been in place longer, starting at least as early as the 1950–1954 cohort.

Table 3 presents our estimates of the percentage of women ever marrying for each combination of race and educational attainment. The most important feature of this table is that the stability of the percentage ever marrying for all women is in fact the product of opposite trends for those with more and those with less education. This is seen most clearly for white women. Without distinguishing by education, the trend over time is quite flat. However, the chance that white women who are college graduates will marry rose from 91.4 percent (C.I. 89.5, 92.8) for the 1945–1949 cohort to 97.3 percent (C.I. 95.4, 98.9) for the 1960–1964 cohort. Meanwhile, the chance of marrying for those without a college degree fell from 96.0 percent (C.I. 95.3, 96.6) to 92.1 percent (C.I. 91.0, 93.3)over the same cohorts. For blacks, there has been a large decline in the percentage ever marrying for the entire population. This decline has been particularly substantial among women who are not college graduates. Although we are not able to produce reliable forecasts for black women who are college graduates, we see that, compared with the results for black women who are not college graduates, the results for all black women are moderated by the inclusion of college graduates, indicating that black college graduates are indeed marrying at higher levels.

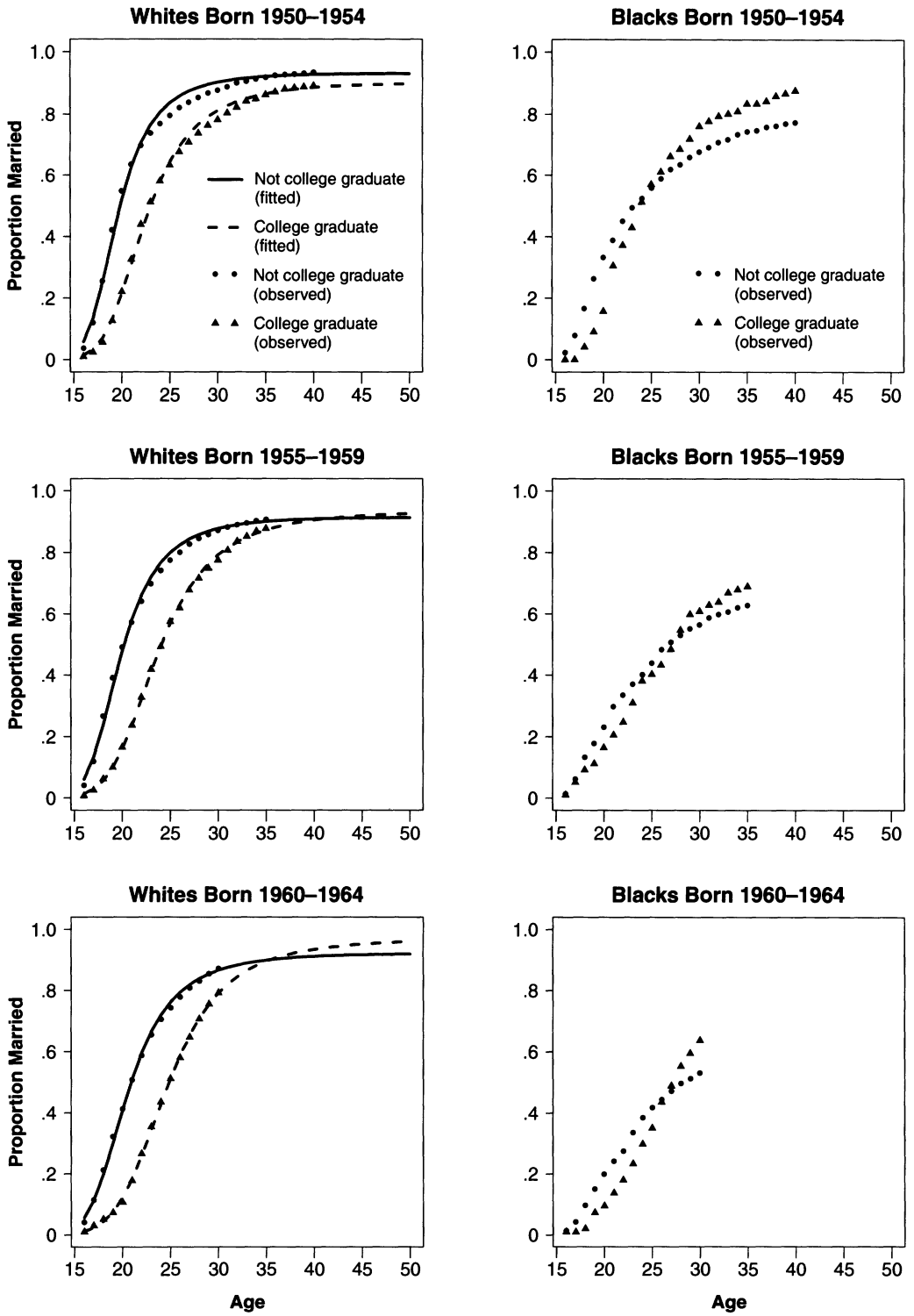

Figure 3. Cumulative Proportion of Women Ever Marrying, by Race, Educational Attainment, and Birth Cohort

Source: Estimates based on data from the June 1995 CPS.

Note: Fitted values are based on the Hernes Model. No predictions are made for black women because of small sample sizes (see note 9).

Table 3. Hernes Model Predictions of the Percentage of Women Ever Marrying, by Race, Educational Attainment, and Birth Cohort

Race and Educational Attainment	Birth Cohort			
	1945–1949	1950–1954	1955–1959	1960–1964
All Races				
College graduate	91.1 (89.6, 92.2)	89.8 (88.7, 91.1)	91.8 (89.7, 93.5)	94.6 (91.6, 97.1)
Not college graduate	94.5 (93.8, 95.3)	91.5 (90.6, 92.2)	88.0 (86.9, 88.9)	86.4 (84.9, 88.2)
Total	93.6 (93.0, 94.2)	91.1 (90.3, 91.8)	88.9 (88.0, 89.9)	88.6 (87.2, 90.1)
Whites				
College graduate	91.4 (89.5, 92.8)	90.1 (88.5, 91.4)	93.5 (91.5, 95.4)	97.3 (95.4, 98.9)
Not college graduate	96.0 (95.3, 96.6)	93.2 (92.3, 93.9)	91.4 (90.5, 92.3)	92.1 (91.0, 93.3)
Total	94.7 (94.1, 95.2)	92.2 (91.5, 92.8)	91.7 (90.7, 92.4)	93.3 (92.2, 94.2)
Blacks				
College graduate	—	—	—	—
Not college graduate	84.6 (80.9, 88.1)	78.4 (75.2, 82.6)	65.6 (62.4, 70.0)	59.5 (54.9, 64.9)
Total	84.8 (81.7, 87.5)	80.8 (78.2, 83.6)	67.0 (63.3, 71.1)	63.8 (58.0, 68.2)

Note: Numbers in parentheses are 95-percent confidence intervals. Estimates for black college graduate women are not available because of the small sample size. All estimates are based on data from the June 1995 CPS.

Our results suggest an answer to the conundrum that has puzzled other researchers about the inconsistent relationship between marriage and education for whites and blacks. Bennett et al. (1989) found that marriage was positively associated with educational attainment among blacks, but negatively associated among whites. They explained the pattern among whites as consistent with the independence hypothesis but considered the pattern among black women—higher marriage rates for those with more than a high school education than for those without—to be an aberration. Our results show that the same pattern of "educational crossover" holds for both blacks and whites, with higher educational attainment being associated with a higher likelihood of ever marrying. The difference between blacks and whites is not the direction of the effect, but rather the magnitude, with a college diploma making even more difference for blacks than it does for whites.

CONCLUSION

The context of marriage as a social institution has changed greatly in recent decades. Women's median age at first marriage has risen by some 4 years in the last 30 years; the probability of divorce for a first marriage has risen to as high as one-half; an estimated one-half of first marriages in the 1980s were preceded by cohabitation (Bumpass, Sweet, and Cherlin 1991); nearly two-thirds of married women were employed in 1995, compared with only about one-third in 1965 (U.S. Bureau of the Census 1995). Given the extent of change in the circumstances surrounding marriage, one might have expected that more women would choose to remain single. Despite warnings of impending decline, we have found few signs of change in the eventual frequencies of marriage for cohorts of women born as late as 1965: Some 9 in 10 women from these cohorts are expected to marry. Although this proportion is slightly lower than the 19 out of 20 who married among cohorts that came of age during the baby-boom years, it is in line with historical levels from earlier in the century.

While women's labor force participation has increased greatly in recent decades, the consequences of this change for marriage patterns appear to be far from simple. The fact that the major change in marriage patterns has been a shift to older ages of mar-

riage with only small declines in eventual levels of marriage suggests that increases in female economic independence are not leading women to "buy out" of marriage. In fact, we predict marriage levels will be highest for those women who are, in theory, most able to live well alone—the most highly educated.

As far as the institution of marriage is concerned, both men and women are marrying later than they did in the past. Their marriages may not last as long as they once did, but almost everyone will still, it appears, give marriage a try. Unlike in Sweden, where cohabitation appears to have become a substitute for marriage among a substantial portion of the population, the continuation of high levels of first marriage in the United States suggests that marriage remains a normative part of adult life. Our results support the idea that the general U.S. pattern is for cohabitation to be a precursor to marriage rather than a permanent substitute, but this pattern hides substantial variation by race and by educational attainment.

Our finding that women with higher educational attainment are expected to marry more than those with less education is contrary to the earlier results of Bennett et al. (1989) and to their interpretation of the effects of increased female independence. Our finding is not, however, inconsistent with a suggestion by Becker (1973:833–34) that, in combination with assortative pairing, higher productivity of women can increase the gains from marriage. That is, men find that they, too, benefit if their wives are more highly educated. In fact, the increasing labor market returns to higher education in recent decades suggest that the gains among the highly educated of marrying each other may be greater than ever. Among those who are not college graduates, our findings provide support for Oppenheimer's (1994) argument that the declines in marriage that have occurred may be a result of greater obstacles to marriage among those who cannot afford it rather than a decline in the desirability of marriage itself.

Finally, the reversal of the relationship between education and marriage has potentially important implications for inequality, particularly as it is transmitted across generations. Women with more education not only benefit directly from their own human capital, they also are likely to benefit indirectly from their husbands' human capital because of assortative pairing. Mare (1991) finds that educational homogamy increased over the second half of the twentieth century. He concludes that this increase in the strength of the association between husbands' and wives' schooling has significant implications both for social inequality within the parents' generation and for the association between parents' and children's educational attainment. Our finding in the most recent cohorts—that women who are college graduates are more likely to ever marry than less educated women—may add to the transmission of inequality that is already generated by assortative mating. Higher rates of eventual marriage by college graduates endow the children of such women with a threefold advantage: a highly educated mother, a higher likelihood of being born within a marriage, and a father who is likely to be highly educated.

Although we expect the proportion of women ever marrying to remain high, there are suggestions that marriage rate differentials are emerging not just between blacks and whites but also by socioeconomic status. Women with a college education are marrying more than ever, but those with less education are increasingly remaining single.

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APPENDIX A: MAXIMUM-LIKELIHOOD ESTIMATION OF THE HERNES MODEL

It is possible to estimate the Hernes model directly from equation 1 giving the derivative P_t', but it is easier and more exact to work directly with the observed cumulative distribution of those ever married by a given age. Hernes derived an expression for estimating the model based only on the observed cumulative proportions. Integrating equation 1 and letting $a = \exp(A/\log b)$, and $k = P_0/[a(1 - P_0)]$, he found

$$P_t = \frac{1}{1+\frac{1}{ka^{b^t}}}. \qquad \text{(A-1)}$$

Because b is generally less than 1, the predicted proportion ever marrying reaches a limit V as t gets large, where $V = 1/(1 + 1/k)$.

We implemented a maximum-likelihood procedure that assumes first marriages are multinomially distributed by single years of age according to the distribution given by the Hernes model and that the observed proportions marrying at each age constitute the best estimates of the true probabilities.

We denote the probability of marrying in the ith age group p_i, with the probability of having married by the last observed age group equal to $P_n = \sum_{i=1}^{i=n-1} p_i$. The procedure then maximizes the likelihood function by minimizing the log-likelihood $2\sum p_i \log\left(\frac{n_i}{\hat{n}_i}\right)$, where n_i is the number of individuals in the sample whose first marriage occurs at age i, and $\hat{n}_i$ is the estimate produced by the model given in equation A-1 using estimates of parameter $\hat{k}$, $\hat{a}$, and $\hat{b}$.

We obtain confidence intervals for our estimates using bootstrap resampling. (An alternative approach is to use methods based on the curvature of the likelihood function.) First, we generate a random multinomial sample equal in size to our observed sample, with the expected counts at each age equal to the observed counts. Sampling variability is introduced using a random number generator to implement the multinomial assumption. Then, we reestimate the parameters of the Hernes model based on the resampled data. This procedure is repeated 1,000 times. A 95-percent confidence interval is estimated by calculating the 2.5 and 97.5 percentiles of the 1,000 estimated parameter values.

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