Why Have Divorce Rates Fallen? The Role of Women's Age at Marriage

Dana Rotz*
Harvard University

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Abstract

American divorce rates rose from the 1950s to the 1970s, peaked around 1980, and have fallen ever since. The mean age at marriage also substantially increased after 1970. Using data from the Survey of Income and Program Participation and the 1979 National Longitudinal Survey of Youth, I explore the extent to which the rise in age at marriage can explain the rapid decrease in divorce rates for cohorts marrying from 1980 to 2004. Three different empirical approaches all demonstrate that the increase in women's age at marriage can explain at least 60 percent of the decline in the hazard of divorce since 1980. Other (plausibly exogenous) factors, such as improvements in women's labor market opportunities and increased access to birth control, largely impacted divorce rates over this period by changing age at marriage. I further develop an integrated model of the marriage market to demonstrate that monotone decreases in the gains to marriage (due to the aforementioned exogenous changes) can produce both the increase in age at marriage and the rise and fall of divorce rates observed in the U.S. since 1950. Finally, I show that the recent changes in age at marriage and divorce are associated with more egalitarian marriages and decreased marital conflict. But the new patterns of family formation also imply a polarization in the lives of children born to more and less educated women.

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1 Introduction

Between 1950 and 1979, divorce rates more than doubled in the United States. Only one-quarter of the marriages that started in the 1950s ended in divorce. But half of all unions beginning in the 1970s would eventually dissolve. Divorce rates, however, soon began to fall back to previous levels. American couples marrying in 2008 are projected to divorce about 40 percent less often than those who wed at the height of marital instability.

Many studies have tried to explain the initial rise in divorce rates.[1] Decreases in marital stability have been linked to decreases in occupational segregation by gender, the rise of the welfare state, household technological progress, and changing social attitudes toward divorce.[2] Several authors have also worked to uncover a connection between family law and divorce rates.[3] Others have focused on the relationship between divorce and female labor force participation or wages.[4]

Despite the substantial attention given to the rise in divorce, there is a dearth of information on why marriages subsequently became more stable. The leveling and decline of divorce has been documented and some authors have discussed potential reasons for the downward trend.[5] But the change remains unexplained.

In this paper, I demonstrate that increases in age at marriage must be a key part of any explanation for the decrease in divorce rates after 1980. Indeed, holding a bride's age constant, marriages beginning from 1980 to 2004 are at equal risk of divorce. Thus, age at marriage can statistically explain the fall in divorce.

For age at marriage to actually explain this change in divorce rates, increases in brides' ages must cause decreases in divorce. Many reasons could justify such a relationship. Older brides have spent more time in the marriage market and thus are better informed about their options and

[1] See Stevenson and Wolfers (2007) for a survey.

[2] See McKinnish (2007), Moffitt (1997), Greenwood and Guner (2008), and Thornton (1989) respectively.

[3] See Friedberg (1998), Parkman (1992), Peters (1986), and Wolfers (2006).

[4] See Becker (1973, 1974, 1991), Johnson and Skinner (1986), Oppenheimer (1997), Ruggles (1997), and Weiss and Willis (1997).

[5] Goldstein (1999), Kreider and Ellis (2011), and Stevenson and Wolfers (2007, 2011) all document the trend in divorce rates. Isen and Stevenson (2010), Neeman, Newman, and Olivetti (2008), Rasul (2006), and Stevenson and Wolfers (2007) provide various hypotheses for the causes of the trend, although none of these have been formally tested. Goldin and Katz (2002) and Mechoulan (2006) also propose potential explanations for the decline and demonstrate that access to birth control and divorce laws (respectively) may play a role in explaining the fall in divorce.

optimal mate. Waiting to marry may also lessen a woman's incentive to search for a new partner during marriage, as a wife's outside options could deteriorate with age.

I use three different empirical strategies to explore the potential for a causal relationship between a bride's age and her risk of divorce. All estimates suggest that age at marriage and divorce are robustly correlated and, under certain conditions, can be said to be causally linked.

The first method controls for the driving forces behind family change at the state-year level to determine the extent to which omitted variables may lead to a spurious relationship between age at marriage and divorce.[6] My results suggest that this bias is limited. Moreover, further analysis shows that if observable variables are at least one-quarter as important as unobservable variables are in predicting age at marriage, then increases in age at marriage cause decreases in the probability of divorce.

A second analysis uses the marital histories of sisters to determine if differences in family background bias estimates of age at marriage's effect on divorce. If the family accounts for a large proportion of the variation in marital stability and a small proportion of the variation in age at marriage, these results suggest a causal relationship between age at marriage and divorce.

I also use state minimum age at marriage laws as instrumental variables (IVs) to more sharply pin down the causal effect of early teenage marriage on divorce. If these laws are binding for some teens but changes in the laws do not otherwise influence divorce rates, the IV procedure will estimate a local average treatment effect (LATE) of early marriage.

All of the above analyses point to the same conclusion: uncorrected estimates do not largely overstate the relationship between age at marriage and divorce. Thus, if estimates are mainly biased because of omitted (measurable) variables that cause changes in family formation or if a bride's family accounts for a large proportion of the variation in divorce risk but a small proportion of the variation in age at marriage or if the IV estimator is valid, then my results demonstrate that increases in age at marriage caused most of the fall in divorce from 1980 to 2004. All estimates suggest that age at marriage can explain 60 percent or more of the decline. That is, although factors such as female labor force participation (see Neeman, Newman, and Olivetti 2008) and access to

[6] See Stevenson and Wolfers (2007) for a summary of these factors.

reproductive technology (as in Akerlof, Yellen, and Katz 1996 or Goldin and Katz 2002) surely caused changes in the family, these and other driving forces largely impacted divorce rates from 1980 to 2004 by changing age at marriage.

Overall, these results suggest that decreases in the gains to marriage led to increases in age at marriage, which in turn drove down the divorce rate for cohorts marrying from 1980 to 2004. But this explanation may appear inconsistent with changes during the 1960s and 1970s, when the gains to marriage likely fell (e.g., because of increases in female labor force participation) but divorce rates rose. Without a framework for the relationship between the value of marriage and marital stability, these two periods seem to produce contradictory evidence on the correlation between divorce rates and the gains to marriage.

I build a simple search model of the marriage market to show that decreases in the gains to marriage from 1960 to 2004 can be consistent with both increases in divorce prior to 1980 and decreases in divorce afterward. In the model, decreases in the relative value of marriage lead to higher contemporaneous divorce rates. But the changes also induce unmarried women to be pickier about whom they marry and to marry at later ages. Both of these effects imply that a decrease in the value of marriage causes divorce rates to eventually decline. Therefore, the framework shows that reductions in the gains to marriage can lead to the initial rise and the subsequent fall of marital instability.

I conclude by discussing some descriptive evidence on the relationship between age at marriage and many other variables of interest. Results from several datasets suggest that increases in age at marriage are associated with large changes in the lives of men, women, and children. As a woman's age at marriage increases, she tends to argue with her husband less often, disagreements are reported to be more civil, and gender roles are less pronounced. Additionally, women who marry later spend less time both married and divorced. Moreover, older brides have fewer children but bear children before marriage more often. A polarization thus emerges in child living circumstances. As the age at marriage increases, children become more likely to live in a married household if their mother was married when they were born but less likely to live in a married household if their mother was single at the time of their birth.

2 Age at Marriage and Divorce

The mean age at first marriage began to increase rapidly and saliently in America around 1970, as depicted in Figure 1. The average age of first-time brides increased by almost five years from 1970 until the early 2000s; first-time grooms also married more than four years later in 2000 than they did in 1970.[7]

The women who wed as age at marriage began to rise experienced higher divorce rates than any other marriage cohort in the past 60 years. To examine both the rise and fall of marital instability, Figure 2 depicts the trend in divorce for marriages beginning from 1950 to 2004, derived from a Cox hazard regression of the form

$$\log h_i(t) = \log h(t) + \delta_{iy} + \beta X_i + \varepsilon_{it}. \tag{1}$$

Woman i's hazard of divorce after t years of marriage is $h_i(t)$, δ_{iy} is a vector of variables indicating the year (in five-year groups) that a woman first married, and X_i is a vector of other control variables. The specification allows for a fully flexible hazard rate across the duration of a marriage but requires that covariates have the same proportional effect on the hazard of divorce for all t. I focus my analysis on divorce by year of marriage using the retrospective accounts of women's first marriages commencing from 1950 to 2004, reported in the 2001, 2004, and 2008 panels of the Survey of Income and Program Participation (SIPP).[8]

Figure 2 shows estimates of the relative hazard of divorce by marriage cohort, $h_y = \exp(\delta_y)$, from regressions controlling only for year of marriage ($h_y = 1$ for marriages beginning from 1975 to 1979). Couples marrying between 1970 and 1984 faced the highest divorce rates. Marriages

[7] The change in age may be slightly overstated in the SIPP before 1960 due to selective mortality; however, most of the change is concentrated after 1960, when selective mortality is relatively unimportant. Estimates of average age at marriage using data from the 1960-1980 Censuses demonstrate this effect (see Figure 1).

Changes in age at marriage occurred across all age quantiles, causing a shift in the variable's distribution. See Stevenson and Wolfers (2007) for a discussion of the causes of these changes.

Key papers providing explanations for trends in age at marriage using a myriad of factors include: Akerlof, Yellen, and Katz (1996), Bitler, et al. (2004), Becker (1973, 1974, 1991), Brien, Lillard, and Stern (2006), Ellwood and Bane (1985), Goldin and Katz (2002), Gould and Passerman (2003), Loughran (2002), and Mechoulan (2006).

[8] See Appendix A.1 for details. The following analyses focus on the age of *women* at marriage and the divorce rate for *first marriages*. The SIPP does not report age at marriage for both spouses unless a marriage remains intact. Using male age at first marriage yields largely similar results.

beginning both before and after this period were more stable, with unions beginning in the late 1990s and early 1960s dissolving at similar rates.

Trends in the relative hazard of divorce are very different when one holds age at marriage constant, as shown by the second line in Figure 2. Given the large increase in the age at marriage (see Figure 1) and previous findings demonstrating a negative relationship between bride's age and divorce risk (e.g., Becker, Landes, and Michael 1977, Teachman 2002, and Lehrer 2008), it is not surprising that the age-adjusted and unadjusted trends diverge. Although divorce propensities still increase for marriages beginning from 1950 to 1979, there is no longer a subsequent decrease in stability once one controls for age effects. Thus, the increase in age at marriage statistically explains the decrease in divorce for women first marrying from 1980 to 2004.[9]

Although I examine only those living in the US, Americans are not alone in experiencing increasing age at marriage and marital stability after 1980. The United Nations (2009) provides measures of the singulate mean age at marriage and divorce rate around 1980 and 2004 for 28 OECD countries.[10] In each country, age at marriage rose over the given period, by between 0.7 (Norway) and 7.4 years (Belgium). Divorce rates also decreased in many of these countries throughout this time.[11]

The rise and fall in divorce was widespread within the US and occurred across groups of women differing by race, education, and location, as shown in Figure 3.[12] In all selected subgroups, controlling for age at marriage mitigates the decline in divorce from 1980 to 2004. For whites, non-college graduates, those living in urban areas, and those from both liberal and conservative states, the hazard rate of divorce conditional on age at marriage is roughly constant or increasing from 1980 to 2004. Age at marriage has a weaker effect on both non-whites and college graduates; the age-adjusted

[9]Trends both with and without age controls are robust to different specifications of the hazard function. Figure A1 demonstrates this by looking at the results from four different regressions predicting the probability of divorce before a couple's fifth, tenth, 15th, and 20th anniversaries, with and without controls for age at marriage.

See Figures A2 and A3 for relative hazard rates by age at marriage over marriage cohorts and over birth cohorts.

[10]The singulate mean age at marriage is calculated using the marital status of a country's population by age to estimate the average number of years a member of the population was single.

[11]Specifically, divorce rates in Canada, Germany, Hungary, Iceland, the United Kingdom, and Sweden all fell from the early 1980s to the early 2000s. However, no statistically significant relationship exists between the change in age at marriage and the change in divorce rates cross-nationally.

[12]Looking within smaller subgroups yields similar results. Of non-whites, the trend in divorce for blacks is most affected by age at marriage controls. Of non-college graduates, the trend in divorce for high school dropouts is least affected by age at marriage controls.

divorce rate in these groups decreased during the 1990s.[13]

A nonparametric function relating age at marriage to divorce demonstrates how powerful a bride's age is in predicting her marriage's stability.[14] Figure 4 shows the hazard of divorce by age at marriage (relative to age 22) in the SIPP, controlling for year of marriage fixed-effects and other observable characteristics.[15] The curve is both decreasing and convex, as initially suggested by Becker, Landes, and Michael (1977). Marriages beginning when a bride is 18 are twice as likely to end in divorce than those starting when a woman is 22. Brides in their mid-30's have marriages four times as stable as teenage brides.[16]

2.1 Decomposing the Determinants of Divorce

Combining the coefficients from estimates of eq. (1) with the change in the vector of independent variables over time provides additional information on the relative contribution of various factors to the decline in divorce rates (see Table 1). I use these estimates to decompose the actual change in divorce from 1980 to 2003 into components predicted by age at marriage, predicted by other observables, and not predicted by the included variables.[17] Decompositions of the change in the divorce rate from 1980 to 1995 or 2000 yield largely similar results.

On average, first marriages starting in 1980 have a divorce hazard rate about 37 log points higher than those that began in 2003. A decline in teenage marriage explains almost half of this fall in divorce. Teens comprised only 15 percent of first-time brides in 2003 but about 40 percent of brides in 1980. Because women who marry as teens divorce far more often than those who wait

[13]Note that more educated women began the period of interest with relatively high ages at first marriage. The convexity of the age-divorce function (see Figure 4) then implies a smaller decrease in divorce for any increase in age.

[14]See Lehrer (2008) and Lehrer and Yu (2011) for more detailed discussions of the shape of the relationship between age at marriage and divorce.

[15]Controls include indicators for urban location and census division at interview, education at marriage in four groups, being black, white, Hispanic, or another race, and having children prior to marriage.

[16]The convexity of the relationship also suggests caution when interpreting a coefficient on a linear variable for age at marriage.

Further analysis of the relationship between brides' ages and divorce rates indicates that age at marriage has a roughly constant effect across marriage cohorts when one holds constant the distribution of age at marriage (as in Dinardo, Fortin, and Lemieux 1996). Moreover, one can show that marriages beginning earlier in life have higher divorce rates early in marriage. But after a couple's tenth anniversary, age at marriage becomes less predictive of divorce.

[17]Age at marriage jumps from 2003 to 2004 in my SIPP panels, although it is not clear if this change is real or due to sampling error or changes in methodology. Thus, I consider the change from 1980-2003, instead of 1980-2004.

to marry, the change accounts for a substantial portion of the fall in the average hazard of divorce. Other increases in age at marriage imply further declines in divorce, with changes in age explaining 80 percent of the total change in the hazard rate.

Brides were more educated in 2003 than in 1980, but the increase in female education does not imply a large decline in divorce by itself. The doubling of the proportion of brides with a college degree only yields a decrease in the hazard rate of 5.4 log points. The hazard rates associated with all other levels of education are approximately the same. Thus, the increased education of brides only accounts for about 15 percent of the change in divorce rates from 1980 to 2003.

The changing racial composition of married families also predicts a notable component of the change in the hazard rate. The proportion of Hispanic brides more than doubled from 1980 to 2003, implying a 6 log point decrease in overall divorce hazards. Additionally, women who enter a (first) marriage with a child have higher divorce rates than those who do not. Women with children increased from 14 to 28 percent of first-time brides and thus divorce hazard rates fell 4.5 log points less than they otherwise would have. Together, the observable variables predict a decrease in divorce from 1980 to 2003 approximately equal to the actual change.[18]

2.2 Younger Brides Differ from Older Brides

The decomposition in Table 1 may tempt one to conclude that changes in the age at marriage caused most of the decline in divorce. But the relationship between these variables cannot be taken as causal without further thought. Differences between women who wait to marry and those who do not could be driving the correlation. To see how younger and older brides differ, I estimate the relationship between age at marriage and several variables from the SIPP and National Survey of Family Growth (NSFG, see Table 2).[19]

The SIPP demonstrates that women who marry for the first time later in life are more educated; the rate of college graduation increases by 1.5 percentage points if one considers a group of brides

[18]Similar results hold if one instead considers the effect of a man's age at first marriage on the probability that his first marriage ends in divorce.

The NLSY and National Survey of Family Growth (NSFG) yield coefficients similar to those in the first column of Table 1.

[19]See Appendix A.1 (A.3) for details on the SIPP (NSFG).

who are one year older. Later weddings are also more likely to involve blacks, Catholics, and women with children.[20] As Catholics and college-graduates have lower rates of divorce than others, these differences reinforce a positive association between age at marriage and marital stability, though high rates of divorce among black women and women with children before marriage might temper this relationship.

Waiting one additional year to marry is also associated with a 1.4 percentage point increase in the probability of premarital cohabitation and a 2 percentage point decrease in the probability of a shotgun wedding.[21] Moreover, as a woman's age at marriage increases, spouses' ages move closer together but fewer husbands and wives have the same educational attainment. Shotgun marriages and marriages among those far apart in age are associated with high rates of divorce, reinforcing a positive relationship between age at marriage and marital stability. If educational homogamy or premarital cohabitation relate directly to marital stability, these factors will also bias estimates of age at marriage's effect on divorce.[22]

3 The Direct Impact of Age at Marriage on Divorce

Consider the following hypothetical experiment, which would allow one to estimate the unbiased, causal relationship between a bride's age and her marriage's stability. Suppose that a woman selects her husband from a pool of men. If she chooses a spouse when she is older, she may make a better-informed decision. Alternatively, she may behave differently within her marriage if she waits to make her choice (i.e., older brides may have more limited outside options and thus be less tempted to leave their husbands). These effects should lead to greater stability in marriages beginning later in life.

If one could manipulate when a woman selects her husband, one could then simply compare the stability of marriages randomly chosen to start at earlier or later ages. Such an experiment is, of course, infeasible. But comparing women who are very similar (and likely have the same

[20] Similar traits are associated with the men who marry older women, as suggested by assortative mating.
[21] Defined as a couple marrying zero to eight months prior to a woman's first birth.
[22] The literature on cohabitation and marital stability remains inconclusive due to selection effects.

requirements for a spouse) or those that marry at different ages for exogenous reasons will allow one to closely approximate the estimates from this ideal experiment (for some group of women).

Interpreting this experiment requires that no matter when a woman is given the chance to marry, she chooses a spouse from her set of potential mates. However, women selected to choose a husband at older ages may decide not to marry at all (and thus will never divorce). In a sense, this selection effect represents an alternative way for increases in age at marriage to imply decreases in the divorce rate.

If this channel was important in explaining the decrease in divorce, one would expect two things. First, the number of women who ever married would have rapidly declined from 1980 to 2004. Second, the change in the number of women ever marrying would explain the decrease in divorce at an aggregate level. Between 1980 and 2004, the change in the proportion of women age 40 to 49 who had ever married was small (only about 6 percent). Moreover, if I create a panel of marriage and divorce rates by state and year of birth, the change in this marriage rate predicts only a small decrease in divorce from 1980 to 2004. Therefore, the following analysis treats the direct relationship between a bride's age and marital stability as the key force behind the link between age at marriage and divorce.[23]

3.1 Controlling for Factors Influencing Family Structure

Extensive research has focused on measuring the impact of various forces on age at marriage. Increases in female labor force participation and relative wages, increases in access to reproductive technology, decreases in the costs of being or becoming single, and increases in inequality have all been proposed as major causes of the rise in brides' ages.[24]

In Section 4, I develop a search model where a host of factors influence both age at marriage and divorce. Women (both when single and when married) search for potential spouses distinguished

[23]Furthermore, using samples of women for whom this selection effect may be less important (e.g., whites) yields similar results in the following analyses. Additionally, my IV technique employs variation unrelated to eventual marriage rates and thus will not capture the selection effect.

[24]For example, see Becker (1973, 1974, 1991) and Neeman, Newman, and Olivetti (2008) on female labor force participation; Akerlof, Yellen, and Katz (1996) or Goldin and Katz (2002) on reproductive access; Gould and Passerman (2003) or Loughran (2002) on income inequality; and Bitler, et al. (2004), Ellwood and Bane (1985), Hoynes (1996), Mechoulan (2006), or Rasul (2006) on other costs of being/becoming single.

by their wage rates. Those who marry later in life are less inclined to search for a new spouse while married, even conditional on spousal quality. Thus, increases in age at marriage cause a decrease in the divorce rate.

One would like to estimate the direct effect of age at marriage on divorce. But many of the variables that influence a bride's age could also affect marital stability. My model predicts that women will marry later and be less prone to divorce if they have a stronger attachment to the labor market, greater access to family planning tools, or lower costs of looking for a mate while single. Greater variance in male wages also raises the age at first marriage but has an ambiguous effect on divorce rates.

These correlations will bias estimates of the causal effect of age at marriage on divorce. Different models of the marriage market may imply different changes in divorce in response to changes in the determinants of family formation. But in most models of family structure, at least some of these forces have the power to influence both age at marriage and divorce, suggesting the potential for omitted variable bias.[25]

To reduce bias, I estimate regressions of the form

$$\log h_i(t) = \log h(t) + \beta X_i + \delta_{iy} + \theta_{is} + \alpha Age_i + \gamma C_{isy} + \varepsilon_{ist}$$

where C_{isy} is a vector of the variables thought to influence family structure, measured at the state of birth (s) by year of marriage (y) level. The vector includes measures of access to abortion, access to oral contraceptives, rates of cohabitation, Comstock laws, female labor force participation, the gender gap in wages, occupational segregation by gender, unilateral divorce legislation, welfare generosity, and male wage inequality.[26]

I estimate the effect of age at marriage on the log hazard rate of divorce (α) separately using the entire SIPP sample and the limited number of state-year variables available from 1950 to 2004 (Table 3A) and the period in which all the C_{isy} variables can be matched to the SIPP (1968-2004,

[25] See Becker (1991) or Stevenson and Wolfers (2007) for discussions of forces influencing marriage and divorce patterns.

[26] Appendix A.4 contains details on these variables and their measurement.

Table 3B). All specifications indicate that waiting one extra year to marry is associated with a 9 to 10 percent lower hazard rate of divorce.[27] Adding individual-level controls decreases the estimate of α (in absolute value) by about 1 percentage point. But the inclusion of the C_{isy} terms does not change the coefficient on age at marriage in a meaningful way. Similar results hold when one uses several dummy variables for age at marriage instead of a single, continuous variable.

Though the inclusion of C_{isy} does not affect α, these variables do predict both age at marriage and divorce. One can reject a hypothesis of $\gamma = 0$ at the 5 percent level.[28] The full set of state-year variables also predicts almost one-third of the 4.9 year change in women's age at marriage from 1968 to 2003. The more limited set of variables can explain 10 percent of the 5.7 year change in bridal age from 1950 to 2003.[29]

Three potential factors likely led the impact of age at marriage on divorce to remain constant across the specifications. First, omitting some of the C_{isy} variables likely biased α upward, while the omission of others biased α downward. Together, the effects cancelled each other out. Even if there was a net bias, both γ and the effect of C_{isy} on age at marriage are small and easily swamped by a large unbiased value of α. Finally, variables measured at the state-year level may simply not pick up much of the important variation in the factors influencing age at marriage and divorce. Even when one looks within state-year pairs, controlling for all factors varying at this level, α does not substantially change (see Table 3, col. 4).

These estimates suggest that observable variables do not lead to much bias in estimating the effect of age at marriage on divorce. But there may be important unobservable variables. I thus also use the method proposed by Altonji, Elder, and Taber (2005) to determine how large the bias from omitting unobservables would have to be to explain the estimated coefficient on age at marriage.

I simplify the problem of omitted variable bias by focusing on individual estimates of the coefficients associated with indicators for marrying before a certain age (18, 22, or 28) in regressions predicting divorce before certain points in a couple's marriage (the fifth, tenth, 15th, or 20th an-

[27] The average yearly hazard rate of divorce is 2.0 percent at $t = 10$, 1.4 percent at $t = 20$, and 0.6 percent at $t = 30$.

[28] When individually included in the regression, most of the C_{isy} variables do not have coefficients significantly different from zero; however, all significant γ coefficients are consistent with the model presented in Section 4. Further, when individually added to the regression, none of the variables changes α.

[29] Estimates from regressions also controlling for state of birth and year of marriage effects.

niversary). I estimate these effects using the 1968-2004 SIPP sample and either no other covariates or the full vector of observable controls. The coefficients vary somewhat with the inclusion of controls, giving one a sense that selection on observables, particularly year of marriage and bride's education, may be important to some extent (see Table 4). Given these estimates, one can then assume that the true effect of age at marriage on divorce is zero ($\alpha = 0$) and back out the implied extent of selection on unobservables (relative to observables).

Unobservables would have to strongly influence age at marriage for selection to explain the entire estimated value of α (see Table 4). To conclude that age has no causal effect on ten-year divorce rates, selection on unobservable characteristics would have to be about five times as strong as selection on observable characteristics. If one allows early marriage to have an effect on divorce, but imposes that there is no difference in divorce rates between those marrying before and after age 28, selection on unobservables would have to be more than 1.7 times as important as selection on observables. Because the observed variables I use include important determinants of both age at marriage and divorce (and indicators for year of marriage and state of birth), these levels of relative selection are unlikely. Therefore, age at marriage, and not some other combination of observable or unobservable factors, is the main proximate cause of the decline in divorce from 1980 to 2004.

3.2 Controlling for Family Background

Family and personal background could also affect both age at marriage and marital stability.[30] Many religions, for example, advocate either early marriage, limited divorce, or both. Young women who grew up in intact families may view marriage and divorce differently from those who experienced their parents' separation. I therefore use the 1979 National Longitudinal Survey of Youth (NLSY) to control for factors such as religion and childhood family structure.[31] The survey tracks a single cohort of women (age 14 to 22 in 1979), who on average married in 1984 at age 23.

The most straightforward approach to using the data adds controls for family background to the

[30] See Gruber (2004) and Heaton (2002).

[31] These variables are omitted from the SIPP. See Appendix A.2 for details on the NLSY.

hazard regression, as in

$$\log h_i(t) = \log h(t) + \beta X_i + \alpha Age_i + \gamma F_i + \varepsilon_{it} \tag{2}$$

where F_i is a vector of background variables (controls for religion, religious participation, family structure, media access, and mother's and father's labor force participation, education, and occupation). The NLSY also includes a sample of almost 900 sisters that I use to estimate regressions with family fixed-effects, as in

$$\log h_{if}(t) = \log h_f(t) + \beta X_i + \alpha Age_i + \varepsilon_i. \tag{3}$$

Ideally, the inclusion of family effects or family background variables allows one to estimate the effect of age at marriage on divorce, holding some of the determinants of the gains to marriage constant. However, adding fixed-effects to eq. (3) may increase the bias in α. In particular, fixed-effects will only lessen the bias if the fraction of variability in divorce that the family explains exceeds the fraction of variability in age at marriage that the family explains.[32]

Similar to the results found when adding controls at the state-year level, including controls for factors other than education does not change the coefficient on age at marriage in a meaningful way, as demonstrated by the estimates in Table 5. In addition, including family effects does little to change the value of α (see Table 6) . Specifications that replace the linear age at marriage term in eqs. (2) and (3) with a set of dummy variables also produce qualitatively similar results. Overall, the estimates from the NLSY further suggest that increases in age at marriage, and not changes in family structure, religion, or other background variables, explain most of the drop in divorce rates from 1980 to 2004.

[32]Griliches (1979) shows that this is a necessary and sufficient condition for the addition of fixed-effects to reduce bias if there is no measurement error. Stronger assumptions may be needed if age at marriage is measured with error. One cannot test this assumption but the inherent randomness of the marriage market makes it more likely to hold.

3.3 IV Using State Age Restrictions on Marriage

These initial analyses allow one to understand potential threats to a causal interpretation of the relationship between age at marriage and divorce, but they do not provide point estimates of the causal impact of age at marriage. To do this, I use an IV procedure that exploits variation in marriage age from laws limiting the earliest age that a woman can marry, with and without parental consent.[33] Because the regressions use instruments defined at the birth cohort level, the analysis is conducted on a sample consisting of ever-married women in the SIPP born from 1920 to 1974, regardless of year of marriage.

In total, 39 (22) states changed the minimum age at marriage with (without) parental permission, on average 2.00 (1.95) times. These changes then identify systems of equations such as

$$Y_{it} = \beta_t X_i + \theta_{its} + \delta_{itc} + \alpha_t(Age_i < 18) + \varepsilon_{ist} \quad (4)$$

$$(Age_i < 18) = \widetilde{\beta} X_i + \widetilde{\theta}_{its} + \widetilde{\delta}_{itc} + \varphi A_{isc} + e_{ist} \quad (5)$$

where Y_{it} is a variable indicating if a couple divorces within t years of marriage, X and θ are defined as before, δ is a vector of birth cohort fixed-effects, $(Age_i < 18)$ is an indicator for a girl marrying prior to her 18th birthday, and A_{isc} is a vector of indicators for the legal status of marriage (with and without parental consent) for girls of different ages.

Minimum age at marriage laws force many teenagers to wait to marry even if they have found a desirable spouse. The laws, however, are not binding for all teens seeking to wed. Many young women go across state lines or misrepresent their age to obtain an illegal marriage license.[34] Moreover, an analysis of legal records indicates that an underage girl could sometimes receive judicial permission to marry if she could present good reason (e.g., her pregnancy) to the court. My IV estimates of α are therefore LATEs specific to teens who do not circumvent these laws but would otherwise choose to marry.[35] Note, however, that changes in the proportion of brides under age 18

[33] Each girl is matched to a vector of indicators for the laws prevailing in her birth state when she is age 16. Dahl (2010) previously used this instrument to determine the relationship between early marriage and welfare receipt. See Appendix A.5 for details on these laws.

[34] See Blank, Charles, and Sallee (2009).

[35] This LATE could also reflect the effect of a culture that encourages such early marriages, or a combination of such

can explain about one-fifth of the fall in divorce from 1980 to 2003 (see Table 1). Understanding the effects of marriage on young teens who can be persuaded to wait to marry is therefore important for explaining divorce trends.

By discouraging early marriage, these laws could also discourage women from ever getting married. The pool of married women, and thus divorce rates, could change. However, I find no evidence that more restrictive age at marriage laws during a woman's teenage years decreased the probability that she appears in my sample of marriages. Further, more restrictive minimum age at marriage laws are not associated with higher rates of likely cohabitation in the CPS (both overall and for women under 25), suggesting these laws do not encourage non-marital unions.[36] Changes in the laws are also not preceded by trends in teenage marriage, young divorce, or single motherhood.[37]

The legal variables are relevant instruments, as demonstrated in Table 7 by the the first-stage of the IV procedure. Logically, states with more permissive laws have higher rates of early teenage marriage. Together, the variables have a joint F-statistic near 12 and a probit specification demonstrates that the strength of the instruments does not rely on the specific functional form chosen. Thus, weakness of these instruments is likely not a problem.[38]

I calculate the marginal effect of early teenage marriage from eq. (4) using a bivariate probit model. The coefficients from the IV regressions are generally larger than the standard estimates, as depicted in Figure 5. But the two coefficient vectors are statistically indistinguishable. Non-IV probit regressions imply that marriage before age 18 is associated with a 12 percentage point or 50 percent increase in the probability of divorce before one's tenth anniversary (a 10 percentage point or 25 percent increase in the probability of divorce before the 20th anniversary). At the tenth anniversary, the IV and non-IV estimates are nearly identical; at the 20th anniversary, the IV estimates are about 50 percent larger than those produced by a standard probit model. The IV estimates significantly differ from zero at most anniversaries, despite their large standard errors.

culture and the act of marrying at a young age.

[36] See Appendix A.4 for details on the measure of likely cohabitation.

One might also worry that limits on teenage marriage decreased age at marriage for those with ages just above a cutoff, violating the monotonicity assumption of instrumental variables. However, one can reject the hypothesis that raising the minimum age at marriage leads women above the new minimum to wed earlier.

[37] See Appendix A.5 and Figure A5.

[38] Estimates using limited information maximum likelihood, which Stock and Yogo (2002) show to be more robust to weak instruments, confirm my results.

Additionally, these results are robust to analyzing only more recent cohorts of women, using only laws for age at marriage with parental permission as instruments, using minimum age at marriage laws for both men and women as instruments, or considering the effect of laws on subsets of women who marry before they are 20, 22, or 25 years old.[39]

The LATEs estimated using minimum age at marriage laws as instruments are relatively well-defined but somewhat limited due to an inability to extrapolate the results to non-compliers. The lack of generalizability makes it difficult to determine to what precise extent this analysis alone suggests that increases in age at marriage can explain the fall in divorce. It does, however, suggest that age at marriage can be a very important predictor of divorce, affects some group of women, and has the potential to explain at least a portion of the fall in the divorce rate for couples marrying between 1980 and 2004.

Moreover, similarity between the plausibly causal estimates produced using IV and the estimates calculated using state-year fixed-effects (see Table 4A) suggests that estimates using the latter method are not highly biased measures of the effect of age at marriage on divorce.[40] Together, my three analyses indicate that an increase in age at marriage is the main proximate cause for the decrease in divorce rates from 1980 to 2004. Comparing the uncorrected and corrected coefficients on age at marriage further suggests that increases in age at marriage account for at least 60 percent, and potentially more, of the decline in divorce.

4 A Model of Marriage and Divorce

Past work on the family suggests that various factors relating to decreases in the gains to marriage (e.g., increased access to birth control or a women's growing role in the labor market) led

[39] However, the estimates are somewhat sensitive to the specific form of the regressions used to calculate the effects in (5). One could instead model both stages of the regression as linear or use a linear first-stage and a hazard function for the second stage. Many combinations may be of interest. The specification shown has the most conservative point estimates of all attempted combinations, suggesting the true effect of age at marriage on divorce may be larger. All other specifications yielded less precise point estimates, though effects were often statistically different from zero.

[40] My IV estimates capture LATEs for a specific group of women. The women who are affected by minimum age at marriage laws likely marry earlier than average. Additionally, the first stage of the IV procedure is stronger when one considers less-educated women. Estimating eq. (4) using the subset of women who marry before age 22 and do not have a college degree yields coefficients on age at marriage smaller than those reported in Table 4A and closer to the IV estimates reported in Figure 5, further supporting the limited bias of the estimates produced in Section 3.1.

to increases in age at marriage.[41] The empirical evidence in Section 3 further indicates that these increases in age drove down divorce rates. Within the literature, my results therefore imply that decreases in the gains to marriage lead to lower rates of divorce, via increases in age at marriage. However, this hypothesis is potentially at odds with trends earlier in the century. Most of the variables associated with the gains to marriage evolved monotonically from 1960 to 2004. But the earlier part of this period is characterized by increasing divorce rates. Similar changes in the gains to marriage thus appear to imply very different changes in the divorce rate before and after 1980.

To better understand how decreases in the relative value of marriage could lead to an inverted U-shaped trend in divorce, I consider a simple, one-sided search model. Assume that women search for potential husbands, distinguished only by their wage rates. Search is costly, and once married, the cost of looking for a (different) husband increases. Women benefit from being married because of household income sharing and economies of scale. The workhorse search model is augmented with an initial period of endogenous educational attainment. The framework abstracts from the search behavior of men and several other complications but allows for a rich relationship between age at marriage and marital stability.[42]

In a world with gains from marriage but without any frictions, a woman will always wed the best man in the population willing to marry her. Requiring women to search for a husband adds frictions to the marriage market in a straightforward and tractable manner. These frictions then lead to marriage delay and, occasionally, divorce.[43]

The key distinguishing prediction of this particular search model is that changes in the gains to marriage asymmetrically impact current and future marital stability. A decrease in the relative

[41] For example, see Becker (1973, 1974, 1991) on female labor force participation and Goldin and Katz (2002) on the pill.

[42] For a review of modern search models, see Mortensen and Pissarides (1999). Two-sided models yield predictions similar to those of the one-sided model developed in this section under certain household sharing rules, wherein a change in women's circumstances elicits a larger reaction from women than men.

[43] Indeed, my model captures several important facts that simpler models of search cannot. In particular, models in which divorce occurs due to learning about match quality or shocks to match quality (e.g., Jovanovic 1979) cannot replicate the fact that divorce decreases in probability as age at marriage increases without implying that higher reservation values lead to higher divorce rates conditional on age. Further, more complex models of learning about one's own perfect mate can imply an untenable decrease in the importance of age at marriage over time or require a high degree of non-stationarity or implausibly large discount factors (c.f., Neeman, Newman, and Olivetti 2008). Finally, models that focus on temporal uncertainty about the common value of a partner (e.g., Bergstrom and Bagnoli 1993) speak to the relationship between quality and age at marriage but do not produce interesting dynamics in divorce unless one adds complex frictions or restrictions to the matching function.

value of marriage leads to a higher divorce rate among women married at the time of a change. But the same change induces single women to be pickier about whom they marry and to wait longer to marry. These effects imply that a decrease in the value of marriage first leads to higher divorce rates but eventually causes marriages to become more stable. The asymmetry allows this relatively simple model to predict that monotone changes in the gains to marriage can produce an inverted U-shaped trend in divorce rates over time.

Three features of my model lead to this key finding.[44] First, search for a higher-earning spouse while currently married provides the mechanism for divorce.[45] Second, the model applies a fixed sharing rule to the incomes of husband and wife, making utility nontransferable.[46] These two elements allow negative shocks to the value of marriage to imply contemporaneously higher divorce rates, while increasing the stability of future marriages. Third, I assume that women can only search for a spouse for a finite time. All three assumptions together lead marriages beginning later in life to be more stable, even conditional on the characteristics of both spouses.

4.1 Setup

Formally, the model begins as a woman exits high school with a known offer of marriage. Men are distinguished only by their (constant) wage rates drawn from the commonly known distribution $F(w)$. The first potential husband a woman meets after high school receives wage $w_h \geq 0$. A woman can accept this man's proposal, decline and enter the workforce, or decline and go to college. Each period a woman is not in school she can earn z, either in actual income or imputed from home production. Going to college increases this wage and the value of a woman's first offer of marriage after graduation.[47] After her schooling is complete, a woman chooses one of three states each

[44] See Burdett (1978) for the model on which this is based. This model is also similar to that of Neeman, Newman, and Olivetti (2008), who demonstrate that learning combined with nontransferable utility can imply that women who are more attached to the labor force will divorce less often conditional on age at marriage.

[45] Note this assumption implies that in steady state, remarriage directly follows divorce. In the SIPP, many women quickly remarry following divorce (about one-half of women who remarry do so within three years of divorce). However, one cannot distinguish divorces due to search behavior from those due to parameter shifts, making it difficult to address the precise relationship between search-based divorce and remarriage.

[46] See Legros and Newman (2007) for a discussion of the effects of nontransferable utility on union formation and matching.

[47] I assume that, with certainty, women meet a mate after college with a wage greater than w_h. One could alternatively assume that female college graduates draw potential mates from a distribution that first order stochastically dominates

period: single and searching for a spouse, married and searching for a better spouse, or married and not searching. Such decisions are relevant to all women until they reach a certain age T.[48]

Searching for a spouse costs $kc < z$ when single and c when married, where $k < 1$.[49] If search occurs, a woman receives a recallable offer of marriage with probability λ.[50] For simplicity, I assume no savings instrument and risk neutral agents. When single, a woman enjoys flow benefit z and when married to a man with wage $w > 0$, she gets flow benefit $(z + w)/2^{\phi}$, where $\phi \in (0, 1)$ represents the degree of scale economies a family can achieve.

The value of getting an offer of marriage from a man with wage w' at time t is thus $\psi_t(w') = \max\{V_{St}(w'), V_{Lt}(w'), V_{Mt}(w')\}$, where the values of being single (V_{St}), married and looking for a new spouse (V_{Lt}), and married and not searching (V_{Mt}) may be written respectively as

$$V_{St}(w') = z - kc + \beta\lambda(1 - F(w'))(E[\psi_{t+1}(w)|w > w'] - \psi_{t+1}(w')) + \beta\psi_{t+1}(w') \quad (6)$$

$$V_{Lt}(w') = \frac{z + w'}{2^{\phi}} - c + \beta\lambda(1 - F(w'))(E[\psi_{t+1}(w)|w > w'] - \psi_{t+1}(w')) + \beta\psi_{t+1}(w') \quad (7)$$

$$V_{Mt}(w') = \frac{z + w'}{2^{\phi}} + \beta\psi_{t+1}(w'). \quad (8)$$

Each value function combines current utility flows, the net expected value of any search, and the discounted (using factor β) future value of optimal decision making.[51]

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the distribution of the wages of the potential spouses of non-graduates.

See Chiappori, Iyigun, and Weiss (2009) for a discussion of the returns to education in the marriage market.

[48] One can think of T as a woman's age at death but more nuanced interpretations for T as some date of exit from the marriage market are also possible. For example, if men only propose to fertile women, the relevant time frame for marriage could be far shorter than the lifetime.

[49] Women in college also pay kc to search but receive an offer of marriage with certainty.

[50] All offers of marriage are recallable, in that once a woman has found a man with a given wage rate willing to marry her, she can do so again costlessly. This allows for easier exposition, as it makes the expected gross gains from search while single and while married the same. If offers were not recallable, the relative gains to marriage would increase, as marriage with search would essentially allow a woman to hold a given offer while still looking for a better mate. Under certain conditions about the relative importance of this motivation to marry, the model without recall will produce similar comparative statics.

[51] Many of the model's assumptions can be relaxed to some degree. For example, one can add a match-specific component to marriage, so long as the common value of a husband (his wage) remains an important determinant of divorce. With this addition, factors other than rent-seeking can lead to divorce and some divorces will be welfare-improving for both ex-spouses. Women who do not search for a mate can receive unsolicited offers from potential spouses with some (small) probability. Further, children and other factors giving women a preference for marriage or stability may be incorporated. One can also add a degree of flexibility to the household income-sharing rule. I omit these extensions for easier exposition and to focus on the ability of this simple model to replicate the trend in divorce from 1950 to 2004 using only unidirectional shocks.

Women with higher wages will prefer to remain single longer because they must give their spouse part of their earnings when they marry. The effect is tempered by higher economies of scale within marriage, as a woman will effectively lose less of her income to her spouse when this multiplier increases. A woman will choose to search for a different mate when she has higher expected net returns to doing so, because of low costs, a high arrival rate, low discount rate, or high expected benefit to finding a better spouse. Further, as a potential mate's wage increases, the value of being married and not searching increases at a faster rate than the value of bring married and continuing to search, which in turn rises quicker than the value of being single.

4.2 Marriage and Divorce in a Search Framework

Similar analysis then implies the following convenient property.

Proposition 1 *Each period, a woman's decision process exhibits the reservation wage property. That is, for any pair of options j and k (among remain single, marry but continue to look for a better mate, and marry and stop searching) at time t, there exists some unique w_{jkt} where a woman is indifferent between options j and k for $w' = w_{jkt}$, strictly prefers one option when $w' > w_{jkt}$, and strictly prefers the other alternative when $w' < w_{jkt}$.*[52]

Therefore, a woman's pairwise preferences can be determined by comparing her best offer of marriage to w_{LSt}, w_{MSt}, and w_{LMt}, the points of indifference between marriage with search and singlehood, marriage without search and singlehood, and the two different marriage options. Being married and searching is preferred to being single if and only if

$$w' \geq w_{LSt} = z(2^{\phi} - 1)/2^{\phi} + c(1 - k). \tag{9}$$

A woman is thus more likely to prefer marriage with search to singlehood if she has lower wages, if the costs of search while married and while single are similar, or if economies of scale are large.

[52]The proof for this and all other propositions can be found in the Appendix B.

Likewise, a woman will prefer marriage without search to singlehood if and only if

$$w' \geq w_{MSt} = z(2^{\phi} - 1)/2^{\phi} - kc + \beta\lambda \int_{w_{MSt}}^{\infty} (\psi_{t+1}(w) - \psi_{t+1}(w_{MSt}))f(w)dw. \qquad (10)$$

Thus, a woman will be more likely to want to marry and stop searching, rather than stay single, as her wage falls, the cost of search increases, or the expected gain from finding a man with a higher wage decreases.

Similarly, a married woman will prefer not to search for a better mate if and only if $w' \geq w_{LMt}$, implicitly defined by

$$c = \beta\lambda \int_{w_{LMt}}^{\infty} (\psi_{t+1}(w) - \psi_{t+1}(w_{LMt}))f(w)dw. \qquad (11)$$

Put simply, a married woman (whose husband earns w') will search if the costs of search (c) are low or the expected gains from search ($\beta\lambda \int_{w'}^{\infty} (\psi_{t+1}(w) - \psi_{t+1}(w'))f(w)dw$) are high.

A woman's choice of marital status then rests on the ordering of these cutoff values, restricted by the following proposition in a convenient manner.

Proposition 2 $w_{LSt} > w_{MSt}$ *if and only if* $w_{MSt} > w_{LMt}$.

The proposition allows one to rule out certain counterintuitive preferences (e.g., a woman cannot choose marriage without search for some value of w but then prefer marriage with search for a higher value of w). Proposition 2 also indicates that the only possible orderings of $\{w_{MSt}, w_{LSt}, w_{LMt}\}$ are (i) $w_{LMt} > w_{MSt} > w_{LSt}$ and (ii) $w_{LSt} > w_{MSt} > w_{LMt}$. If ordering (i) occurs, a woman will stay single if $w' < w_{LSt}$, marry but continue to search if $w_{LSt} \leq w' < w_{LMt}$, and marry and stop searching if $w' \geq w_{LMt}$. Women with ordering (i) can be called "divorce-prone," as certain values of w' will induce them to search for a new spouse while married. If ordering (ii) holds, a woman optimally stays single if $w' < w_{MSt}$ or otherwise marries and does not search. Thus, women with ordering (ii) will not divorce in steady state. Women with higher wages, lower scale economies in marriage, lower relative costs of search when single, and higher costs of search during marriage (holding kc constant) are less likely to be categorized as divorce-prone.

In a fully stationary model, a woman's reservation values would not change over time and she would either be divorce-prone or not throughout her entire life. But since this model involves a marriage market of finite length, the triplet $\{w_{MSt}, w_{LSt}, w_{LMt}\}$ varies over time and women may switch classifications. In particular,

Proposition 3 *If $w_{LMt} > w_{MSt} > w_{LSt}$, then w_{LM} decreases with age. Otherwise, w_{MS} decreases. w_{LS} is constant across all ages in both cases.*

To see the implications of this statement, first consider a woman not prone to divorce at age t. Propositions 2 and 3 then imply that she will not choose to seek divorce in any subsequent period. That is, a woman who is not divorce-prone will not become divorce-prone.

The propositions are more interesting when applied to the initially divorce-prone woman. At age t, she accepts all offers of marriage from men with wages above w_{LSt} but continues to look for a new spouse when w is relatively close to this threshold. If she is still divorce-prone at age $t+1$, she will still accept the same set of marriage proposals but will now search over a more limited range of w. In essence, there is some group of marriages that involve search when a woman is t, but not at $t+1$, years of age. The restriction in search to a smaller measure of values then implies lower divorce rates. Alternatively, the woman might switch her ordering of cutoff values so that she in no longer divorce-prone at age $t+1$, also decreasing the expected probability of divorce as her age at marriage increases.

Lemma 1 *Increases in age at marriage decrease divorce rates, conditional on a wife's education and a husband's wage rate.*

To close the model, note that more women seek education when the return in either the labor market or the marriage market increases. Additionally,

Proposition 4 *Women who go to college marry at later ages (for sufficiently large λ). Women who go to college are also less likely to divorce, both overall and holding spousal earnings and age at marriage constant.*

Increases in education cause women to marry later for two reasons. First, in my model (and in most data) women complete their education before marrying. Thus, college mechanically increases age at marriage. Second, an increase in education increases a woman's wages, making her more selective about whom she marries and leading her to search longer for a suitable husband. Furthermore, higher wages will cause college women to search less within marriage (see Proposition 5 for details). Thus, women with more education divorce less often, even conditional on a husband's wage and a wife's age at marriage.

4.3 Comparative Statics

Like the results for age at marriage and education, the key comparative statics of the model rely on three components of the framework: search during marriage, nontransferable utility, and a time limit on search. These assumptions together imply that shocks to many variables can lead to both higher current rates of divorce and lower future rates of divorce. For example, a decrease in the costs of search while single due to legalized abortion will lead to higher rates of divorce among those married when the law changes. But the women who marry after the reform will have lower divorce rates because they have higher standards for a spouse, marry later, and obtain more education. Given this, shocks to reproductive rights and other variables from the 1960s through the 1990s can imply both an increase in age at first marriage and an inverted U-shaped pattern in divorce.[53] Formally,

Proposition 5 *Consider (i) an increase in a woman's wages (z), (ii) a decrease in her cost of search while single (k), (iii) an increase in her return to education, or (iv) a decrease in economies of scale (increase in ϕ). All of these changes lead to higher contemporaneous divorce rates but lower divorce rates for future marriages (both conditional and unconditional on age at marriage and education). (i)-(iv) also lead unmarried women to obtain more education and marry later.*

[53] In essence, this result captures the fact that marriages formed under one regime will not necessarily persist under alternatives. The matches made in the 1950s, 1960s, and 1970s were optimal given the conditions then; however, as society progressed, such marriages dissolved, raising the divorce rate. In my model, the divorce rate decreases once the pace of change slows and a new steady-state is reached. Additionally, women in the new regime wait longer to marry, further increasing the stability of their future marriages. Therefore, the key intuition of this model is very similar in spirit to less formal conceptualizations (c.f., Isen and Stevenson 2010, Stevenson and Wolfers 2007) that changes in one's optimal spouse can lead to both a surge and subsequent fall in divorce.

To explore this result, consider an increase in women's wages (z) holding the distribution of male wages ($F(w)$) constant. As the gender gap in wages falls, the relative gains to being single increase, and a man must earn a higher wage for a woman to choose to marry him. This leads to higher contemporaneous divorce rates, as some women no longer find their husbands' wages adequate. Divorce-prone women who are not yet married will increase the minimum wage that they require from a potential mate but not the range of w over which they choose marriage without search. The probability that these women search given they marry, and thus their probability of eventual divorce, then declines. Furthermore, the change in cutoff values can lead a previously divorce-prone woman to become non-divorce-prone. This will also increase the eventual marital stability of those unmarried when z increased. Essentially, women married to the most marginal group of husbands will choose to become single after a decrease in the gender gap in wages, raising the divorce rate. But women who are single at the time of the change will never marry men from this marginal group, lowering their eventual rates of divorce.

Additionally, increases in a husband's minimum wage will lead women to search longer for a sufficiently high-earning spouse, increasing age at marriage. This increase then further decreases the likelihood that these women's eventual marriages will end in divorce. Finally, the increase in women's wages raises the absolute returns to attending college and increases enrollment. Proposition 4 then implies further increases in both age at marriage and marital stability. Therefore, as the gender gap in wages closes, some current marriages will end but the stability of new marriages will increase both conditional and unconditional on women's education and age at marriage.

Figure 6 shows a graphical representation of the effect of the increase in z (given $F(w)$) on divorce-prone women who remain divorce-prone after the change. Before the gender gap narrowed, married, divorce-prone women (whose choice sets are depicted in Panel A) could be married to any man with wages greater than w_{LS}. When these women's wages increase, w_{LS} increases to w'_{LS}. The women married to men with wages between w_{LS} and w'_{LS} were previously content to stay married, albeit while continuing to search for a better spouse. But after the shock to z, these women no longer find their husbands adequate and leave their marriages. Thus, a decrease in the gender gap in wages will increase divorce rates.

The changes in the reservation values associated with an increase in z are the same for single and married women; however, their interpretation is different. Before the shock, if a single, divorce-prone woman (whose choice sets are depicted in Figure 6B) met a man with wages between w_{LS} and w'_{LS}, she would have married him. Such marriages would have been likely to end in divorce, as women married to these men continue searching for new mates. After the change in the gender gap in wages, these unions never form. As the change in z does not influence the relative value of marriage with and without search (w_{LM} does not change), search decreases within these women's eventual marriages. Moreover, as the group of men a woman is willing to marry shrinks, it takes her longer to find a suitable mate, increasing her age at marriage. Thus, the divorce rate will decrease for these women both directly because of the narrowing of the gender gap and because the change in wages leads these women to marry later, which in turn strengthens their eventual marriages.

Though my empirical work focuses on the importance of this latter, indirect effect, the model allows either effect to be the dominant force behind the decline in divorce. Altogether, the model demonstrates that decreases in the gains to marriage will temporarily push the divorce rate up. Women who are single at the time of a shock will then marry later and become less likely to search during marriage, eventually bringing the divorce rate back down.

Many of the variables related to the gains to marriage (and listed in Proposition 5) changed in the 1970s and 1980s. For example, female real earning power (z) grew rapidly. Expanding access to birth control and abortion likely decreased the relative costs of marital search while single. Increases in female labor force participation and decreases in household specialization could have reduced household economies of scale (increased ϕ). Moreover, a woman's increasing role in the market implies greater returns to her education. Within the model, changes in all of these factors would imply higher rates of divorce for couples married before a change and lower rates of divorce for couples marrying afterward.

4.4 Simulation

The model's comparative statics show that after a drop in the value of marriage, divorce rates will increase for a time and then decrease. Because the precise trend in divorce rates could have many

different shapes. I calibrate and simulate the model to determine potential paths for the divorce rate in response to shocks to the gains to marriage.[54]

For the simulation, I ignore the initial period of educational attainment and assume all women are identical. Women can search for a husband for $T = 10$ periods, each of which may be thought of as two years.[55] I use a one-year discount rate of $0.90,$ reflecting the young age of women as they enter the marriage market. Potential husbands have wages drawn from a log-normal distribution with mean and variance matching the wage distribution for married men ages 18 to 35 in 1980, roughly the middle of my sample.[56] A woman's first offer of marriage (received with certainty in period 1) is drawn from a similar distribution with mean and variance corresponding to the moments of the wage distribution for married men age 18 to 20 in 1980. I set z equal to 60 percent of the mean male wage rate in the first period, reflecting the gender gap that predominated in the 1950s, 1960s, and 1970s. Estimates from Browning, Chiappori, and Lewbel (2010) imply $2^{\phi} = 1.10$ for my initial cohort.[57]

Statistics from the Marital Instability over the Life Course Panel Study (MILC) lead me to choose $\lambda = \frac{2}{3}$, implying that marriage proposals arrive on average once every three years.[58] Little guidance is available on the costs of search while married but c must combine potential psychic costs due to guilt, as well as the expected cost of divorce and the actual cost of search. I therefore set c equal to the mean male wage, suggesting that if a woman married to an average man searches for a new husband in a given period, she forfeits that period's maximum gain from marriage.[59] Finally, I select the initial relative cost of search while single (k) by finding the value of k implying that the average woman in my initial cohort marries at age 21.7 (after 1.85 periods), the mean age

[54] An analytical description for the path of divorce would depend on the model's parameters, their distributions in the population, and the entire series of innovations to the gains to marriage. Thus, the high dimensionality of the problem limits one's ability to describe the analytic path of the divorce rate in the general case.

[55] Assuming women enter the marriage market at 18, they are then age $2t + 18$ at the end of period t.

[56] See Appendix A.4 for details.

[57] Browning, Chiappori, and Lewbel (2010) suggest that $2^{\phi} = 1.31$; however, the authors use data corresponding to a period of relatively high female labor force participation (1974-1992). I calculate the full-time, full-year labor force participation of young, married women during this period and associate with it a value of $2^{\phi} = 1.31$. I then assume that $2^{\phi} = 2$ if a woman works outside the home full-time throughout the year. Further assuming that the relationship between 2^{ϕ} and female labor force participation is linear, I then calculate $2^{\phi} = 1.10$ for my initial cohort, based on participation rates in 1950 (See Appendix A.4).

[58] The MILC suggests that, on average, men and women date for two years prior to marrying. I use $\lambda < 1,$ as setting $\lambda = 1$ would suggest all men believe all women are acceptable wives.

[59] This cost must be relatively high to yield reasonable divorce rates. See the online appendix for details.

at marriage in 1950.[60] The calibration yields $k = 0.17$.

I then consider how age at marriage and divorce evolve in response to the following shocks: (i) economies of scale decreasing from $2^{\phi} = 1.10$ at $t = 15$ to $2^{\phi} = 2$ at $t = 30$, corresponding to women entering the workforce at rates similar to prime-age men, (ii) the ratio of female to male wages increasing from 60 percent in the first 25 periods to 90 percent by period 30, due to z growing while $F(w)$ does not change (in real terms), and (iii) the costs of search while single decreasing to zero between $t = 20$ and $t = 22$, representing a large and rapid shock due to changes in sexual mores and access to legal abortion and the pill.[61] The timing of these changes matches the general sequence of events over the 20th century. Women began to increase their presence in the labor market relatively early on. As this presence grew, social norms changed and women gained greater control over their fertility in the late 1960s and early 1970s. Finally, after being stable for several decades, the gender gap in wages began to narrow during the 1980s.

I simulate the model and its response to each of the above shocks using cohorts born from $t = 0$ to $t = 34$.[62] Each of the changes individually leads age at marriage to increase and divorce rates to first rise and subsequently fall, as shown in Figure 7.

Combining the shocks leads the trends and levels in age at marriage to be close to those seen in Figure 1, using $age = 2t + 18$. The simulated divorce rate increases for cohorts beginning search between $t = 9$ and $t = 14$, stays roughly constant for cohorts entering the marriage market from $t = 15$ to $t = 22$, and then falls before leveling out for the 29th and later cohorts. This matches the basic pattern observed in the data and depicted in Figure 2.[63]

[60] The 1960 IPUMS Census reports a mean age at marriage for women of 21.9, while the SIPP reports a lower age. The Census sample may be more reliable (due to fewer issues of selective mortality) but I intend to match estimates in the SIPP. I thus use an intermediate value.

[61] Note that I assume that changes in female labor force participation, the gender gap in wages, and reproductive access occurred across time and do not allow for differential changes in these variables across cohorts. Assuming that changes in the value of marriage are somewhat larger across cohorts (relative to within cohorts) will lead to a smaller initial increase in divorce rates. However, as long as some non-trivial portion of the change occurs within cohorts, the model will produce the same general path for the divorce rate. Work by O'Neill and Polachek (1993) and Weinberger and Kuhn (2010) demonstrates that changes in the gender gap in wages occurred both within and across cohorts throughout the 1980s and 1990s. Goldin (2006) discusses within and across cohort trends in female labor force participation.

[62] See Appendix C (online) for sensitivity analysis and additional simulations.

[63] The model also suggests that the divorce rate should fall below initial levels in later periods. Although current levels of divorce still exceed rates during the 1950s, the simulation does not account for decreases in the costs of divorce over time. If added, this implies a less drastic downturn.

Altogether, the hypothesis that decreases in the gains to marriage led to increases in age at marriage, which in turn decreased the divorce rate from 1980 to 2004, can be reconciled with decreases in both the gains to marriage and marital stability before 1980. My simulation demonstrates that decreases in the relative value of marriage, and the resultant increases in age at marriage, could have caused both the observed rise and fall in divorce rates.

5 The Implications of Later Marriage

The previous theoretical and empirical work suggests that increases in age at marriage caused large changes in the probability of divorce. Because the increase in brides' ages had such a powerful effect on marital stability, the change in age at marriage must have also impacted the living arrangements of adults and children and the characteristics of intact marriages.

5.1 Living Circumstances of Children and Adults

The broader effects of bride's age on marital status can be seen by considering the relationship between age at marriage and the number of years a woman spends married, shown in Table 8. Conditional on year of birth, women who marry one year later spend about 9 fewer months married and 3 fewer months previously married. One can further decompose this time into 24 fewer weeks spent in a first marriage, 16 fewer weeks spent remarried, 9 fewer weeks spent divorced, and 2 fewer weeks spent widowed.[64] Thus, although waiting to marry leads to lower divorce rates, remarriage narrows the difference in the time younger and older brides spend with any spouse after they first marry.

Increases in age at marriage are also associated with differences in fertility patterns, as shown by various indicators of total fertility in cols. (2)-(4) of Table 8. Women who marry later are less likely to bear any children and have fewer children overall. But eventual mothers who marry later wait less time to have children once married and are more likely to have had children before marriage. A one-year increase in age at marriage is associated with an increase in age at first birth (conditional

[64] Does not add to 52 due to rounding and a slight difference in mortality.

on any birth) of about six months.

The changes in age at marriage, divorce, and fertility combine to alter the living conditions of children, depicted in Figure 8.[65] The graph shows the change in the probability of a child's mother being married associated with the mother's age at marriage increasing by one year (given she ever marries). As mother's age at marriage increases, children born within married families are less likely to experience their parents' divorce. This reflects the positive relationship between age at marriage and marital stability. However, as a woman's age at marriage increases, so too does the probability that she has children before marriage. Therefore, a one-year increase in a woman's age at marriage is associated with an overall decrease in the probability that her child lives in a married family (shown by the results that do not condition on mother's marital status at birth).[66] As these results condition on a mother ever marrying and marriage rates decreased as age at marriage increased, the estimates understate the aggregate negative association between average age at marriage and the probability that a young child's mother is married.

These results suggest potentially important distributional effects of the increase in age at marriage and corresponding decrease in divorce. Together, the trends create a split in society.[67] Instead of having a large number of children living some portion of their early years in married families, children are now more likely to live in the same type of household they were born in, be it married or single. If divorce decreases child well-being, the change may be beneficial because fewer children experience the dissolution of their parents' marriage. But if a father figure (and a father's income) is important for child development, this bifurcation in living circumstances could lead to greater inequality among children and greater eventual inequality among adults.[68]

[65]The SIPP reports the dates of birth for first- and last-born children. I focus on the larger sample of first-born children.

[66]Note that the rise of cohabitation likely increases the probability that a child born outside of marriage lives with both of his or her parents, but such arrangements have been shown to be less stable than marriages (c.f., Gemici and Laufer 2011 or Kennedy and Bumpass 2008).

[67]See McLanahan (2004) or Ellwood and Jencks (2004).

[68]Kim (2011) demonstrates that both forces are likely important.

5.2 How Are Early and Late Marriages Different?

To explore how increases in age at marriage lead to differences in marital harmony, I use data from both the National Survey of Families and Households (NSFH) and Marital Instability over the Life Course Panel Study (MILC).[69] The following analysis considers only women still married to their first husbands.

The marriages of those who wed earlier and later in life differ, as shown in Tables 9 and 10.[70] Results from the NSFH indicate that although increases in a woman's age at marriage do not increase her or her husband's reported happiness with marriage, marriages occurring later in life exhibit characteristics usually attributed to better marriages. Couples who marry later are more likely to spend quality time together (though a four year increase in age at marriage is associated with a couple having sex about one time less per month). Furthermore, spouses report arguing less as a woman's age at marriage increases. Men report significantly fewer arguments about household chores, money, in-laws, and kids; women report arguing less about money, spending time together, sex, and in-laws. Men who marry older women are also significantly more likely to report dealing with disagreements by calmly discussing issues and report yelling during arguments less frequently. Moreover, women who marry at later ages report that they are less likely to throw things at or hit their husband when upset and both spouses are less likely to report getting physically injured during an argument.

Both the MILC and NSFH also indicate that marriages occurring when a woman is older are characterized by less traditional values; women work more in the market, spend less time doing housework, and both spouses are less likely to report a moral issue with divorce as a bride's age rises. Increases in a woman's age at marriage are also associated with different reasons for her working or wanting to work. In 1980 (when the MILC began), women who married later in life were

[69] See Appendix A.3 for details.

[70] Regressions control for year of marriage indicators in five-year groups and the gender of the respondent in the MILC. Questions in the NSFH are answered by the spouse they pertain to; a designated respondent answered all questions in the MILC.

In the regressions analyzing characteristics of current marriages, one could control for duration of marriage (age at interview); however, the NSFH and MILC conducted all Wave I interviews at roughly the same time. Therefore, duration of marriage (current age) and year of marriage (given age at marriage) are collinear and one cannot control for both in the same regression. Using either alternative set of variables leaves the qualitative results mostly unchanged.

more likely to want to work to be around people, have a career, or feel like they had accomplished something. Moreover, they were less likely to work for purely financial reasons, suggesting that couples were either more financially sound, less likely to view their jobs as simple means to an end, or both.[71]

Although none of these relationships is necessarily causal, these results provide a rationale for the plausibly causal relationship between age at marriage and marital stability shown in the previous sections. They also imply that waiting to marry may produce gains within marriage and not simply affect relationships on the cusp of divorce.

6 Conclusion

During the past several decades, women moved into the labor force, experienced wage gains, and gained greater control over their fertility. As these changes occurred, divorce rates first rapidly rose but then began to fall. Although much is known about the initial rise in divorce, little had been previously said about its subsequent strong and sustained decline.

This paper demonstrates that once one controls for bride's age, cohorts marrying from 1980 to 2004 have similar risks of divorce. To determine if age at marriage is the proximate cause of the decline in divorce, I use three different techniques that mitigate bias in estimates of the effect of bride's age on marital stability. Controlling for the major causes of family change (e.g., female labor force participation, access to birth control, and divorce laws), controlling for family background (including family fixed-effects), and instrumenting for early teenage marriage using state laws governing the minimum age at marriage, I provide evidence suggesting that the true, causal relationship between a woman's age at marriage and her future probability of divorce cannot be substantially weaker than suggested by uncorrected estimates. All of the estimates suggest that the hazard of divorce falls by at least 6 percent when a bride waits one additional year to marry, implying that age at marriage can explain at least 60 percent of the fall in the divorce rate for cohorts marrying from 1980 to 2004.

[71] These results are robust to controlling for the difference in spouses' ages.

Within the literature on the family, the results indicate that decreases in the relative value of marriage caused an increase in age at marriage, which in turn caused the divorce rate to decrease from 1980 to 2004. But the gains to marriage changed in a similar manner before and after 1980. Thus, I also address the consistency of my findings with respect to trends in earlier decades, when the gains to marriage decreased but divorce rates increased. Using a search model of the marriage market, I demonstrate that shocks to the gains to marriage can differentially impact the eventual divorce rates of currently married and single women. The asymmetry allows monotonic decreases in the gains to marriage (e.g., because of increases in female labor force participation and abortion access), and the resultant increases in age at marriage, to cause both the increase in divorce for cohorts marrying from 1950 to 1979 and the subsequent decline in marital instability.

Analysis of many different outcomes also suggests that the increase in age at marriage and the resulting decrease in divorce may have further implications for the lives of men, women, and children. Descriptive regressions demonstrate that increases in age at marriage may improve marital quality, even for inframarginal unions. Furthermore, increases in age at marriage may result in a polarization in the lives of the nation's children. As age at marriage increases, children born within marriage are less likely to see their parents divorce, but a higher average age at marriage in general means that more children will never live within a married family. These results point to many avenues for future research on the effect of age at marriage on child welfare and outcomes. Given past analysis of marriage and the family (e.g., Johnson and Skinner 1986, Stevenson 2007, and Willis 1999), my results also suggest the potential for future work on the effect of age at marriage on investments in children, marriage-specific capital, and human capital.

A Data Appendix

A.1 Survey of Income and Program Participation

The bulk of my analysis utilizes the Survey of Income and Program Participation (SIPP) panels beginning in 2001, 2004, and 2008. These datasets provide retrospective information about a respondent's first marriage, including the year of marriage and the date and way a marriage ended, if applicable.[72] I focus my analysis on the 74,339 women in these SIPP waves with complete marital records who began their first marriages between 1950 and 2004.[73] I can also match 62,572 of these women to their state of birth, which I use to incorporate additional data.

A.2 National Longitudinal Survey of Youth (1979)

Because of many omitted variables in the SIPP, I also utilize the 1979 National Longitudinal Survey of Youth (NLSY), which follows young men and women as they marry and divorce.[74] The NLSY is much smaller than the SIPP (containing 3,831 women with adequate data) and may not be used to study trends over time, as the dataset includes a single cohort of individuals (age 14 to 22 in 1979).[75] On average, women in the sample marry at age 23 in 1984. This is slightly younger than the average age at marriage reported by the same cohort in the SIPP. The difference is likely due to attrition from the NLSY over time.

This data includes valuable family background variables, such as religion and the presence of a father figure within the home, making it relevant to my study. 2,827 women in this sample also report detailed parental characteristics (mother's and father's LFP, standardized Duncan SEI score, and years of education).[76] Finally, the NLSY contains 894 sisters (from 422 families), whom I use to estimate within-family regressions.

A.3 Other Data on Marital History and Marital Quality

Although the NLSY and SIPP provide comprehensive information on marital histories, neither dataset was designed to track and evaluate marriages. I therefore turn to several other surveys more explicitly created for this purpose. The broadest of these datasets is the National Survey of Family Growth (NSFG), which has surveyed married women every few years since 1973. The NSFG contains a large sample of women ages 15 to 44 and rich data on fertility; some waves also contain information about a woman's first spouse. I select all women from the NSFG with complete marital histories for first marriages beginning from 1950 to 2004, producing a sample of 34,124 women surveyed in 1973, 1976, 1982, 1988, 1995, 2002, or 2006-2008. All variables in this sample are reported by these women and thus male characteristics are reported by a man's wife or ex-wife.

I also utilize data from the initial waves of the National Survey of Families and Households (NSFH) and the Marital Instability Over the Life Course Panel Study (MILC), which provide personal details about the

[72] All of my analysis treats length of marriage as a censored variable if a given marriage has not ended due to divorce.

[73] Average age of marriage jumps in 2004, although such a change may be the result of differences in coding across SIPP panels or noise. Except when looking directly at trends in age at marriage, I will include 2004 in my analysis. In addition, all results are robust to the inclusion or exclusion of this year.

[74] Marriages occurring before a young adult enters the panel are also retrospectively recorded.

[75] Other NLS cohorts exist but cannot be used due to limited variation in age at marriage (the 1968 young women's cohort) or an insufficient time horizon (the 1997 cohort).

[76] I assign a Duncan score to those who do not work, as detailed in Dworkin (1981).

marriages of younger and older brides. I select marriages beginning from 1950 to 1984 in the NSFH and those beginning from 1950 to 1979 in the MILC (the former survey was conducted in 1988 and the latter in 1980), yielding a total of 3,465 marriages in the NSFH and 1,610 marriages in the MILC. As these surveys contain information about current marriages, I use only observations for families with a woman married to her first spouse at the date of the interview. Data from the NSFH comes directly from the person that a question pertains to; data from the MILC comes from the designated respondent, regardless of gender.

A.4 State-Level Data

This section more carefully describes the state-year variables that I use in the analysis of Section 3.1.[77] All variables are measured using the average value for the five years prior to a woman's marriage and matched to individuals using state of birth and year of marriage.[78]

1. Abortion Access: the number of abortions per woman age 15-44. Numbers for 1970-1972 come from the Center for Disease Control (1971, 1972, 1974) and those for subsequent years are from the Guttmacher Institute (Jones and Kooistra 2011). I use information on abortion by state of occurrence to create the longest sample possible and assume a rate of zero prior to 1970 (when abortion was first legalized on demand in five states).

2. Cohabitation: I use the March Current Population Survey (CPS) for 1963-2004 to identify those households involving "likely cohabitation" using Manning's (1995) definition: two unmarried, unrelated, opposite-sex adults over age 15 living together with no other people above age 15. Manning shows that this definition gives aggregate estimates of cohabitation close to actual rates.

3. Comstock Laws: an indicator for a state sales ban on contraceptives, using Bailey's (2010) classification.

4. Reproductive Technology: an indicator for an unmarried 18-year-old being able to purchase the oral contraceptive pill, from Goldin and Katz (2002).

5. Unilateral Divorce Law: Wolfers's (2006) preferred classification of state unilateral divorce laws and reforms.

6. Welfare Benefits: The measures available for welfare vary over time. Benefit levels for early years are from the Statistical Abstracts of the United States (1941-1995). For 1940-1944 and 1946-1952, I use total benefits paid out/total families receiving benefits in June; the numbers for 1945 are from December. Benefits for 1951 and 1952 include reimbursement for medical services. For 1953-1965, the data sources provide average payments per family in December including medical benefits and such numbers without medical benefits during 1966-1973. For 1974-1995, average monthly benefits per family are taken over all months, excluding Medicaid payments. Starting in 1995, intermittent reports from the Administration for Children and Families (1995, 1997, 1999, 2001-2004) became

[77] Both Stevenson and Wolfers (2007) and Greenwood and Guner (2008) also discuss the possibility that household technological progress influenced trends in marriage and divorce. Although these factors are likely important, one cannot measure them at the state-year level and thus I must omit them from my analysis.

[78] Other choices for the form of C_{isy} yield similar results. Sophisticated methods of lag selection are computationally infeasible due to the large number of possible combinations of my 14 variables of interest.

available, allowing one to calculate the average monthly benefit. I log-linearly interpolate the missing years. Finally, the IPUMS Censuses provide estimates of the proportion of unmarried mothers who have one, two, three, or four or more children, at the state-by-year level. I create my final measure of log welfare benefits using the errors from a regression of the log benefit level on these proportions and year fixed-effects.

Many of the variables come from samples of workers in the 1964-2005 CPS. I drop anyone living in group quarters or with incomplete demographic information (on education, marital status, and state of residence). The sample includes only those age 18-35, as my analysis largely deals with people earlier in life.

7. Female Labor Force Participation: the proportion of married women working any hours for some number of weeks last year and the proportion of women who worked 30 or more hours in the past week and 50 or more weeks in the past year (full-time, full-year).[79]

8. Segregation by Gender at Work: I first use CPS data on those working any hours to compute the segregation index by occupation-industry cells. Both occupations and industries are classified into 16 groups (available upon request). I then calculate the segregation index for a given state at a given time as

$$Seg_i = \frac{1}{2} \sum_{i,o} \left| \frac{N_{iof}}{N_f} - \frac{N_{iom}}{N_m} \right|$$

where i indexes industry, o indexes occupation, N_f (N_m) is the total number of working females (males) in the state at a given time, and N_{iof} (N_{iom}) is the number of females (males) primarily working in industry i and occupation o. I also create variables indicating the proportion of women working in traditionally male and traditionally female jobs, where traditionally male (female) jobs are defined as containing more than 95 percent male (75 percent female) workers in the 1950 Census.

Additionally, I use wage data from the CPS to control for both male wage inequality and the gender gap in wages. Using the sample of full-time, full-year workers from the CPS, I drop any workers in the armed forces, agricultural sector, or private household sector from the sample. I also omit any observations with allocated or missing wage and salary income and multiply any top-coded income variables by 1.5. The hourly wage is calculated by taking yearly wage income and dividing it by 50 times the number of hours worked last week. Any observations with nominal hourly wages below the minimum wage or a wage rate that would be top-coded if a person worked 30 hours per week for 52 weeks of the year are also removed from the sample.

9. Gender Gap in Wages: the difference in the log median wages of men and women, calculated using the above sample.

10. Wage Inequality: the difference in the 90th and 50th, as well as 50th and 10th, percentiles of the log wage distribution in the above sample.

[79] These are the only continuously available measures of work hours and weeks in the CPS from 1963-2005.

A.5 State Age at Marriage Laws

The vast majority of data on minimum age at marriage laws comes from the 1933-2001 editions of the World Almanac and Book of Facts. The almanac stopped reporting these laws in 2001, and thus I use the database of the Cornell Legal Information Institute for the 2001-2004 laws. When the two sources for these laws do not match, information from state legislative archives resolves the conflict. If a law allows for marriage before the age of majority, but no age limit is specified, I set the age of marriage with consent to 12, the common law minimum age for girls.[80]

Many states changed their laws throughout time but some changes reported in the Almanac may be erroneous.[81] If a law changes for one or two periods only, then switches back, I remove the change. If a law changes for one period and then changes again, and the changes do not move in the same direction, the first change is set to the original value. Massachusetts and Montana are omitted from the analysis, as there are many changes in the recorded laws that may or may not coincide with actual legislation. Figure A4 shows the evolution of minimum age at marriage laws over time for women, with (Panel A) and without (Panel B) parental permission. The figures show a clear increase in the allowed age at marriage with parental consent but a decrease in the age without such consent.

To determine whether law changes were driven by rates of young marriage, childbearing, or divorce, I also looked at trends in these variables leading up to (first) changes in laws (shown in Figure A5). Although much variation in these variables exists prior to a law change, one sees no clear trend in teenage marriage; the proportion of children under 11 living with young, unmarried mothers; or divorce among those under 25 before an increase or decrease in the minimum age, making these laws plausible instruments.

B Technical Appendix

Proof. (Proposition 1) Taking the derivative of the definitions in (6)-(8) with respect to w' leads to the conclusion that

$$\frac{\partial V_{Mt}}{\partial w'} > \frac{\partial V_{Lt}}{\partial w'} > \frac{\partial V_{St}}{\partial w'}.$$

Increasing w' then increases the value of marriage faster than the value of marriage and search, which in turn increases faster than the value of being single. Thus, if marriage without search (marriage with search) is weakly preferred to either option (singlehood) at w', it will continue to be preferred for $w > w'$. Conversely, if singlehood (marriage with search) is preferred to either option (marriage without search) at w', it will continue to be preferred for $w < w'$. ■

Proof. (Proposition 2) Suppose $w_{LSt} > w_{MSt}$ and $w_{MSt} < w_{LMt}$. Then by the definitions of the cutoff points $V_{St}(w_{MSt}) > V_{Lt}(w_{MSt})$ from the first statement and $V_{Lt}(w_{MSt}) > V_{Mt}(w_{MSt})$ from the second, implying $V_{St}(w_{MSt}) > V_{Mt}(w_{MSt})$, a contradiction of (10). Therefore $w_{LSt} > w_{MSt}$ implies $w_{MSt} > w_{LMt}$. Likewise, suppose that $w_{MSt} > w_{LMt}$ and $w_{MSt} > w_{LSt}$. Then $V_{Lt}(w_{MSt}) > V_{St}(w_{MSt}) > V_{St}(w_{MSt})$ which also contradicts (10). Therefore, $w_{LSt} > w_{MSt}$ if and only if $w_{MSt} > w_{LMt}$. ■

Proof. (Proposition 3)

[80] The age at marriage without parental consent was recorded by the Almanac to be the age of majority if no law provided for early marriage.

[81] See Dahl (2010). Although Dahl's work uses laws for a somewhat different period (1935-1969 versus 1936-1990 in my main analysis), I use the same data sources and process the raw data in a similar manner.

Part 1: If $w_{LMt} > w_{MSt} > w_{LSt}$, then w_{LM} decreases over time.

Suppose $w_{LMt} > w_{LMt-1}$. Then if a woman met a man with wage w_{LMt} at $t-1$, she would strictly prefer to marry him and stop searching. Eq. (11) then implies

$$\beta\lambda \int_{w_{LMt}}^{\infty} (\psi_{t+1}(w) - \psi_{t+1}(w_{LMt}))f(w)dw > \beta\lambda \int_{w_{LMt}}^{\infty} (\psi_t(w) - \psi_t(w_{LMt}))f(w)dw.$$

Using $\psi_t(w) = V_{Mt}(w)$ for $w \geq w_{LMt}$ and rearranging the above then yields

$$\int_{w_{LMt}}^{\infty} (\psi_{t+1}(w) - \psi_{t+1}(w_{LMt}))f(w)dw > \frac{1}{1-\beta} \int_{w_{LMt}}^{\infty} \frac{w - w_{LMt}}{2^{\phi}} f(w)dw.$$

This can only hold if $T \to \infty$. Thus, in a model with a finite time horizon, $w_{LMt-1} > w_{LMt}$.

Part 2: Otherwise, w_{MS} decreases over time.

Similarly, suppose $w_{MSt} > w_{MSt-1}$. Then if a woman met a man with wage w_{MSt} at $t-1$, she would strictly prefer to marry him and stop searching. Eq. (10) then implies

$$\beta\lambda \int_{w_{MSt}}^{\infty} (\psi_{t+1}(w) - \psi_{t+1}(w_{MSt}))f(w)dw > \beta\lambda \int_{w_{MSt}}^{\infty} (\psi_t(w) - \psi_t(w_{MSt}))f(w)dw.$$

Using $\psi_t(w) = V_{Mt}(w)$ for $w \geq w_{MSt}$ and rearranging the above then yields

$$\int_{w_{MSt}}^{\infty} (\psi_{t+1}(w) - \psi_{t+1}(w_{MSt}))f(w)dw > \frac{1}{1-\beta} \int_{w_{MSt}}^{\infty} \frac{w - w_{MSt}}{2^{\phi}} f(w)dw.$$

As before, this can only hold if $T \to \infty$. Thus, in a model with a finite time horizon, $w_{MSt-1} > w_{MSt}$.

Part 3: w_{LSt} does not change over time.

This follows directly from inspection of eq. (9). ■

Proof. (Lemma 1) Proposition 3 shows that over time women are less likely to search for a new mate while married. Thus, older women will be less likely to get divorced, regardless of their current marital status and conditional on both education and (future) spouse's wage. ■

Proof. (Proposition 4) To show that age at marriage increases with education, one must consider those who would marry after high school, those who would marry after college, and those who do neither. First take those who would marry their high school sweetheart. Going to college necessarily delays marriage and thus can only increase age at marriage. Additionally, those that marry neither their college nor their high school sweethearts marry later when they go to college. To see this, one can differentiate the value functions after education to find that

$$\frac{\partial V_{St}}{\partial z} \geq \frac{\partial V_{Lt}}{\partial z} = \frac{\partial V_{Mt}}{\partial z} > 0$$

implying that an increase in z (which occurs in college) increases w_{LSt} and w_{MSt}, leaving w_{LMt} unchanged. Therefore, the effect of college on earnings implies later marriage. Further, entering the marriage market later will mechanically lead to later marriage.

Finally, suppose that if a woman goes to college she will marry directly afterwards but she would not marry directly after high school. One can show that if the probability a woman will meet a suitable spouse between high school and college is greater than one half, these women will marry later if they go to college than if they do not. So long as the arrival rate is substantially large, this condition will hold.

One can finally see that marital stability increases with education by differentiating a woman's value functions with respect to z, as above, and noting the relative changes in cutoff values. ■

Proof. (Proposition 5)

Part 1: One can differentiate the various value functions to find that

$$\frac{\partial V_{St}}{\partial z} \geq \frac{\partial V_{Lt}}{\partial z} = \frac{\partial V_{Mt}}{\partial z} > 0$$

implying that an increase in z increases w_{LSt} and w_{MSt}, leaving w_{LMt} unchanged. All women thus have higher marriage standards and it takes them longer to marry if currently single. This also causes some already married women to choose to become single. The increase in w_{MSt} over w_{LMt} further leads some previously divorce-prone women to no longer be divorce-prone; however, the previously married women who make this change will either divorce in favor of singlehood or were not previously looking for a spouse (increasing divorce rates for the set of switchers who were married before the change). To see this last conclusion, denote the cutoff values after an increase in z with a $''$ symbol. Then, initially $w_{LM} > w_{MS} > w_{LS}$. If this change occurs $w''_{LS} > w''_{MS} > w''_{LM} = w_{LM}$. If those who switch orderings previously looked for a new partner, they will divorce as $w''_{LS} > w_{LM} > w$.

Finally, to see that education increases, note that the increase in z leads to an increase in the absolute return to education. Thus, holding search behavior constant, women will seek more education. Moreover, an increase in z leads women to be single for a longer period, further increasing the returns to education and supporting the result which holds search constant. Therefore, education must increase in response to an increase in z.

Parts 2 and 3: One can again differentiate to find that

$$\begin{aligned} 0 &= \frac{\partial V_{Lt}}{\partial k} = \frac{\partial V_{Mt}}{\partial k} > \frac{\partial V_{St}}{\partial k}. \\ 0 &> \frac{\partial V_{St}}{\partial \phi} > \frac{\partial V_{Lt}}{\partial \phi} \\ 0 &> \frac{\partial V_{St}}{\partial \phi} > \frac{\partial V_{Mt}}{\partial \phi} \end{aligned}$$

Steps similar to those above then give the conclusions for divorce and age at marriage.

For education, slightly different logic is required. In these cases, the relative value of being married decreases compared to that for being single. But as my model restricts marriage to those finished with their education, this will lead to an increase in the value of schooling versus search in the marriage market, thus increasing female college attendance.

Part 4: With a higher return to education, single women will obtain more schooling (increasing age at marriage and the eventual stability of marriage, see Proposition 4) and the wage a woman can earn will increase. Part 1 then implies that an increase in women's returns to education increases age at marriage, educational attainment, and marital stability for singles and increases divorce for married women. ■

Analysis of additional comparative statics for the model (with respect to λ and c) available upon request.

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Table 1: Decomposing the Change in Divorce Hazards

	(1)	(2)	(3)	(4)	(5)	(6)
Independent Variables	Coefficient (Change in Log Hazard)	Standard Error	1980 Indep. Var. Mean	2003 Indep. Var. Mean	Change from 1980 to 2003 (4)-(3)	Effect of Change on Hazard Rate (Log Points) $100*(1)*(5)$
Age at Marriage						
Under 18	0.945***	[0.0281]	0.0990	0.0272	-0.0718	-6.78
18-19	0.559***	[0.0210]	0.3061	0.1269	-0.1792	-10.02
20-22	0.255***	[0.0229]	0.1895	0.1350	-0.0545	-1.39
27-29	-0.165***	[0.0338]	0.0787	0.1414	0.0627	-1.03
30-34	-0.420***	[0.0419]	0.0496	0.1396	0.0900	-3.78
35-39	-0.622***	[0.0694]	0.0193	0.0696	0.0502	-3.13
40+	-1.21***	[0.106]	0.0169	0.0486	0.0316	-3.83
Total Change in Log Hazard Predicted by Change in Age						-29.96
Education at Marriage						
High School	0.0321	[0.0203]	0.3491	0.2222	-0.1270	-0.41
Some College	0.00946	[0.0225]	0.2803	0.3208	0.0405	0.00
College	-0.307***	[0.0308]	0.1604	0.3357	0.1753	-5.38
Black	0.0771***	[0.0228]	0.1037	0.0955	-0.0082	-0.063
Hispanic	-0.569***	[0.0346]	0.0690	0.1760	0.1071	-6.09
Other Race	-0.295***	[0.0323]	0.0682	0.0928	0.0246	-0.726
Premarital Childbearing	0.315***	[0.0206]	0.1 446	0.2862	0.1417	4.46
Urban (at Interview)	0.0749***	[0.0162]	0.7825	0.8262	0.0437	0.328
Total Change in Log Hazard Predicted by the Above Factors						-40.70
Actual Change in Log Hazard from 1980 to 2003						-36.99
Change in Log Hazard Unexplained by Observables						-3.46

Notes and sources: Women's first marriages from the 2001, 2004, and 2008 SIPP, 1950-2004 (N=74,339). See Appendix A.1 for details. Coefficients from Cox hazard regression that also includes controls for year of marriage. Coefficients measure changes in log hazard rates. Observations censored at time of interview or time of death of spouse. Omitted categories are marriage between ages 23 and 26, white, and less than high school education. Robust standard errors in brackets. *** $p<0.01$.

Table 2: Woman's Age at Marriage and Characteristics at Marriage

Dependent Variable	Mean	Coefficient on Wife's Age at Marriage	SE	Obs.
Women in SIPP				
Less than High School	0.208	-0.0126***	[0.000356]	74339
High School	0.336	-0.00350***	[0.000337]	74339
Some College	0.283	0.00131***	[0.000303]	74339
College	0.173	0.0148***	[0.000326]	74339
Had Children Before Marriage	0.162	0.00878***	[0.000307]	74339
White	0.760	-0.00335***	[0.000329]	74339
Black	0.095	0.00334***	[0.000228]	74339
Hispanic	0.083	-0.00196***	[0.000236]	74339
Women in NSFG				
Catholic	0.292	0.0103***	[0.000958]	34124
Protestant	0.579	-0.0130***	[0.00110]	34124
(Ex-) Husbands in NSFG				
Age	24.38	0.840***	[0.0106]	34124
Less than High School	0.202	-0.00179***	[0.0001]	27292
High School	0.388	-0.00171***	[0.0001]	27292
Some College	0.197	0.000348***	[0.0001]	27292
College	0.090	0.00157***	[0.0001]	27292
Previously Married	0.123	0.0206***	[0.00109]	16066
White	0.705	0.00770***	[0.00145]	12597
Black	0.095	0.00543***	[0.000889]	12597
Hispanic	0.151	-0.0135***	[0.00116]	12597
Catholic	0.307	0.00692***	[0.00160]	9146
Protestant	0.531	-0.0101***	[0.00173]	9146
Relationships in NSFG				
Cohabited Before Marriage	0.420	0.0139***	[0.00129]	16895
Mos. Cohabited (Given Any Time)	14.18	1.27***	[0.133]	7272
Shotgun Marriage	0.163	-0.0205***	[0.000819]	31195
Age Diff. (Male-Female, Mos.)	36.31	-1.87***	[0.126]	34124
Same Education Level	0.43	-0.0179***	[0.00109]	27292
Same Race	0.894	0.000205	[0.00120]	12597

Notes and sources: Ever married women in the 2001-2008 SIPP and the 1973-2008 NSFG. Women's first marriages beginning 1950-2004. See Appendices A.1 and A.3 for details. Coefficients from regressions also including controls for year of marriage in five-year groups. Shotgun marriage is defined as when a woman has her first child between zero and eight months after marriage. Same race is defined as husband and wife both being black, white, Hispanic, or another race. Same education level is defined as husband and wife both having less than high school, high school, some college, or college (or more) education. Robust standard errors in brackets. ***p$<$0.01.

Table 3: Divorce Risk Controlling for the Determinants of Family Structure

Dependent Variable: Log Yearly Hazard of Divorce				
Panel A: Year of Marriage: 1950-2004				
	(1)	(2)	(3)	(4)
Age at Marriage	-0.0956***	-0.0845***	-0.0845***	-0.0869***
	[0.00290]	[0.00305]	[0.00306]	[0.00309]
Observations	63,035	63,035	63,035	63,035
p-value on State-Year Variables			0.0255	0.000
Panel B: Year of Marriage: 1968-2004				
	(1)	(2)	(3)	(4)
Age at Marriage	-0.0937***	-0.0826***	-0.0827***	-0.0846***
	[0.00312]	[0.00325]	[0.00326]	[0.00330]
Observations	43,971	43,971	43,971	43,971
p-value on State-Year Variables			0.0421	0.000
Controls for Both Panels				
State of Birth FE	X	X	X	
Year of Marriage FE	X	X	X	
State of Birth Quadratic Trends		X	X	
Individual-Level Variables		X	X	X
State-Year Variables			X	
State-Year FE				X

Notes and sources: Women's first marriages from the 2001, 2004, and 2008 SIPP, 1950-2004. See Appendix A.1 for details. Coefficients measure changes in log hazard rates. Individual variables are for having children prior to marriage, urban location and census division (both at interview), education at marriage (four groups), and race (black, white, Hispanic, and other). State-year variables available for 1950-2004 are the abortion rate, the log average real monthly welfare benefit adjusted for family size, and indicators for unilateral divorce availability, a sales ban on contraceptives, and 18-year-old's access to birth control pills. Additional state-year variables available for 1968-2004 are the proportion of people likely cohabiting, female labor force participation (full time, full year and any hours), the log real gender gap in wages, the log real 90-50 and 50-10 wage differentials, an occupation-industry gender segregation index, the proportion of women working in traditionally male jobs and the proportion of women working in traditionally female jobs. See Appendix A.4 for details. Only the abortion rate is significant when included with no other state-year variables in regressions using marriages starting from 1950 to 2004. The proportion of women working any hours and the proportion of women working in traditionally male jobs are significant when included individually and with no other state-year variables in regressions using marriages starting from 1968 to 2004. Robust standard errors clustered by state of birth in brackets. *** $p<0.01$.

Table 4: The Relative Importance of Selection on Observables and Unobservables

Dependent Variable=1 if Marriage Ends in Divorce by Given Anniversary				
Panel A: Age Less Than 18				
Anniversary	5th	10th	15th	20th
ME of Bride's Age<18 from	0.145***	0.275***	0.242***	0.220***
Probit Regression without Controls	[0.010]	[0.018]	[0.018]	[0.019]
ME of Bride's Age<18 from	0.100***	0.195***	0.169***	0.153***
Probit Regression with Controls	[0.008]	[0.015]	[0.015]	[0.018]
Relative Selection on Unoberservables Required to Eliminate Effect	4.97	4.94	4.60	4.27
Brides Average Age Given 18 or Over	24.14	23.64	23.08	22.53
Brides Average Age Given Under 18	16.26	16.27	16.28	16.28
Panel B: Age Less Than 22				
Anniversary	5th	10th	15th	20th
ME of Bride's Age<22 from	0.079***	0.213***	0.208***	0.194***
Probit Regression without Controls	[0.004]	[0.006]	[0.006]	[0.008]
ME of Bride's Age<22 from	0.059***	0.188***	0.178***	0.164***
Probit Regression with Controls	[0.004]	[0.005]	[0.006]	[0.008]
Relative Selection on Unoberservables Required to Eliminate Effect	3.19	3.21	2.98	2.62
Brides Average Age Given 22 or Over	27.02	26.60	26.11	25.62
Brides Average Age Given Under 22	18.99	18.97	18.96	18.95
Panel C: Age Less Than 28				
Anniversary	5th	10th	15th	20th
ME of Bride's Age<28 from	0.056***	0.163***	0.202***	0.203***
Probit Regression without Controls	[0.004]	[0.008]	[0.010]	[0.012]
ME of Bride's Age<28 from	0.041***	0.137***	0.182***	0.184***
Probit Regression with Controls	[0.004]	[0.007]	[0.009]	[0.013]
Relative Selection on Unoberservables Required to Eliminate Effect	1.57	1.71	1.47	1.20
Brides Average Age Given 28 or Over	33.08	32.75	32.49	32.20
Brides Average Age Given Under 28	21.34	21.17	20.99	20.80
Proportion of All Couples Divorced Before Ann.	0.11	0.26	0.36	0.42

Notes and sources: Women's first marriages from the 2001, 2004, and 2008 SIPP, 1968-2004. See Appendix A.1 for details. Regressions without controls include only the specified age indicator. Regressions with controls include state of birth and year of marriage fixed-effects, individual controls for having children prior to marriage, urban location and census division (both at interview), education at marriage (four groups), and race (black, white, Hispanic, and other). All of the state-year variables from Table 3 are also included. See Appendix A.4 for details. Probit regressions estimated, marginal effects reported. Observations censored at date of interview or death of spouse. Relative selection on unobservables (compared to observables) calculated using Altonji, Elder, and Taber (2005). Robust standard errors clustered by state of birth in brackets. *** p<0.01.

Table 5: Divorce Risk, Age at Marriage, and Family Background

Dependent Variable: Log Yearly Hazard of Divorce						
	(1)	(2)	(3)	(4)	(5)	(6)
Age at Marriage	-0.0766***	-0.0627***	-0.0635***	-0.0633***	-0.0575***	-0.0574***
	[0.0098]	[0.0111]	[0.0113]	[0.0112]	[0.0116]	[0.0135]
Race, Education, Location		X	X	X	X	X
Children Before Marriage			X	X		X
Religion, Religiosity			X	X		X
Family Structure				X		X
Media Access Controls				X		X
Parental Characteristics						X
Complete Parent Data					X	X
Observations	3,831	3,831	3,831	3,831	2,827	2,827

Notes and sources: First marriages of women in the NLSY. See Appendix A.2 for details. Coefficients measure changes in log hazard rates. Observations censored at time of interview or time of death of spouse. Race controls include indicators for being black, white, Hispanic, or of another race; education controls for education level at marriage in four groups; location controls are for urban status and census region at marriage. Religion includes indicators for attending services once a month or more and once a week or more, and indicators for being Catholic, Protestant, or another religion. Children before marriage is an indicator for a woman having a child prior to her first marriage. Family structure includes indicators for the presence of the biological mother, biological father, both biological parents, and any father figure, as well as the number of older and younger siblings. Media access controls include indicators for the presence of newspapers, magazines, and a library card in the home. Parental characteristics are mother's and father's LFP, Duncan SEI score (standardized), and years of education. The first two variables utilize the adult in the household acting as parent at age 14, as opposed to the actual parent. Robust standard errors clustered by family in brackets. *** $p<0.01$.

Table 6: Within-Family Estimates of the Effect of Age at Marriage on Divorce Risk

Dependent Variable: Log Yearly Hazard of Divorce				
	(1)	(2)	(3)	(4)
Age at Marriage	-0.0752***	-0.0726***	-0.0810***	-0.0906***
	[0.0197]	[0.0120]	[0.0231]	[0.0255]
Race, Education, Location	X	X	X	X
Children Before Marriage	X	X	X	X
Religion, Religiosity		X	X	X
Family Structure		X	X	
Media Access Controls		X	X	
Parental Characteristics			X	
Family Effects				X
Complete Parent Data			X	
Observations	894	894	627	894
Families	422	422	297	422

Notes and sources: First marriages of women in the NLSY. See Appendix A.2 for details. Coefficients measure changes in log hazard rates. Observations censored at time of interview or time of death of spouse. Race controls include indicators for being black, white, Hispanic, or of another race; education controls for education level at marriage in four groups; location controls are for urban status and census region at marriage. Religion includes indicators for attending services once a month or more and once a week or more, and indicators for being Catholic, Protestant, or another religion. Children before marriage is an indicator for a woman having a child prior to her first marriage. Family structure includes indicators for the presence of the biological mother, biological father, both biological parents, and any father figure, as well as the number of older and younger siblings. Media access controls include indicators for the presence of newspapers, magazines, and a library card in the home. Parental characteristics are mother's and father's LFP, Duncan SEI score (standardized), and years of education. The first two variables utilize the adult in the household acting as parent at age 14, as opposed to the actual parent. Average sibling age range is 29 months. Robust standard errors clustered by family in brackets. *** $p<0.01$.

Table 7: First-Stage Estimates Using Minimum Age at Marriage Laws as Instruments

Dependent Variable=1 if Age at Marriage<18					
Panel A: OLS					
Minimum Age of Marriage with Parent's Permission			Minimum Age of Marriage without Parent's Permission		
Age	Coefficient	SE	Age	Coefficient	SE
12-13	0.0202***	[0.00580]	15	0.0574***	[0.01033]
14	0.0103	[0.00828]	16	-0.00618	[0.0193]
15	0.0274***	[0.00943]	18	0.0116***	[0.00454]
16	0.0244***	[0.00496]	19	0.0168***	[0.00714]
17	-0.00246	[0.00820]	20	-0.0189***	[0.00482]
		Observations		60,914	
		F-Statistic		11.71	
		Dependent Variable Mean		0.094	
Panel B: Probit (Marginal Effects)					
Minimum Age of Marriage with Parent's Permission			Minimum Age of Marriage without Parent's Permission		
Age	Coefficient	SE	Age	Coefficient	SE
12-13	0.00805**	[0.00398]	15	-0.00558	[0.00436]
14	0.00584	[0.00407]	16	0.00551	[0.00874]
15	0.0118**	[0.00598]	18	0.00473***	[0.00174]
16	0.00810***	[0.00219]	19	0.0119***	[0.00317]
17	-0.00203	[0.00251]	20	-0.0168	[0.00777]
		Observations		60,914	
		χ^2-Statistic		107.39	
		Dependent Variable Mean		0.094	

Notes and sources: Ever married women in the 2001, 2004, and 2008 SIPP, born from 1920 to 1974. See Appendix A.1 for details. Regressions also include controls for year and state of birth fixed-effects, education at marriage (four groups), having children prior to marriage, race (black, Hispanic, white, and other), census division, and urban location (both at interview). Omitted categories are 18 for age with permission and 21 for the age permission (no state in this period has 17 as the minimum age of marriage without parental consent). Laws matched to year woman is 16. See Appendix A.5 for details. Robust standard errors clustered by state of birth in brackets. *** p<0.01, **p<0.05.

Table 8: Woman's Age at Marriage, Total Time Married, and Fertility

	(1)	(2)	(3)	(4)
Dependent Variable	Years Married	Any Children	Number of Children	Age at First Birth
Type of Regression	OLS	Probit (ME)	Poisson	OLS
Sample	Ever Married Women	Ever Married Women Over 40	Ever Married Women Over 40	Ever Married Mothers Over 40
Age at First Marriage	-0.771***	-0.00761***	-0.0165***	0.507***
	[0.00364]	[0.000237]	[0.000770]	[0.0100]
Survey Year Fixed Effects	X	X	X	X
Birth Cohort Fixed Effects	X			
Marriage Cohort Fixed Effects		X	X	X
Observations	73,631	53,068	53,068	37,127

Notes and sources: Ever-married women in the 2001, 2004, and 2008 SIPP, first married 1950-2004. See Appendix A.1 for details. Women excluded from col. (1) if married four or more times due to incomplete marriage record. Marginal effects reported in col. (2). Women excluded from col. (4) if first child born before 1960 due to missing data. Robust standard errors in brackets. ***p<0.01.

Table 9: Woman's Age at Marriage and Characteristics of Marriage from MILC

Dependent Variable	Mean	Coefficient on Wife's Age at Marriage	SE	Obs.
Knew Each Other at Age 12	0.056	-0.00574***	[0.00153]	1610
Months Dated Before Marriage	23.90	0.400**	[0.159]	1607
Woman Works or Wants to Work				
For Financial Reasons	0.796	-0.00870**	[0.00397]	1508
To Have Financial Independence	0.460	-0.00186	[0.00447]	1508
To Have a Career/Accomplishments	0.731	0.0174***	[0.00404]	1508
To Get Away from Home/Family	0.354	-0.00407	[0.00409]	1508
To Be Around People	0.821	0.0106***	[0.00340]	1508

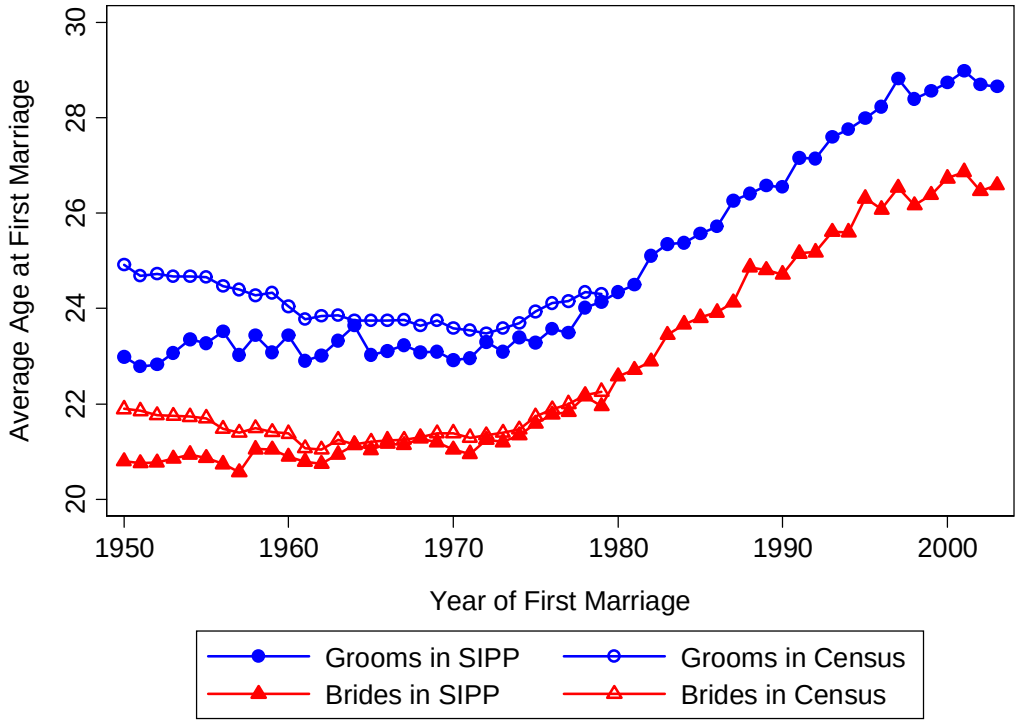
Notes and sources: Intact first marriages (of women) from MILC Wave I, beginning 1950-1979. See Appendix A.3 for details. Coefficients from regressions also controlling for year of marriage in five-year groups and if husband or wife answered questions. Work variables are only for women who worked during the marriage or would like to return to work. Robust standard errors in brackets. ***p<0.01, **p<0.05.

Table 10: Woman's Age at Marriage and Spouses' Reports of Characteristics of Marriage from the NSFH

	Wife's Responses				Husband's Responses			
Dependent Variable	Mean	Coeff. on Wife's Age at Marriage	SE	Obs.	Mean	Coeff. on Wife's Age at Marriage	SE	Obs.
Happy with Marriage	0.881	-0.0003	[0.0012]	3465	0.918	-0.0004	[0.0011]	3465
Spend Time Alone Almost Every Day	0.466	0.00627***	[0.0022]	3396	0.434	0.0118***	[0.0021]	2974
Times per Month Have Sex	6.746	-0.269***	[0.0256]	2739	6.573	-0.243***	[0.0277]	2435
Times per Month Argue About								
Household Tasks	1.269	-0.00896	[0.0113]	3256	1.243	-0.0248**	[0.0104]	2882
Money	1.508	-0.0347***	[0.0126]	3264	1.456	-0.0537***	[0.0121]	2879
Spending Time Together	1.509	-0.0415***	[0.0144]	3249	1.764	-0.0187	[0.0223]	2866
Sex	0.971	-0.0175*	[0.0101]	3188	1.187	-0.0149	[0.0121]	2805
Having (more) Kids	0.167	-0.0045	[0.0055]	3205	0.241	-0.00387	[0.0051]	2826
In-Laws	0.591	-0.0200***	[0.0072]	3224	0.585	-0.0156***	[0.0060]	2836
Kids (In General, if Applicable)	1.843	0.0124	[0.0199]	2841	1.639	-0.0332*	[0.0181]	2495
Deal with Disagreements with Spouse by								
Keeping to Self	0.516	0.00115	[0.0022]	3246	0.575	0.000218	[0.0022]	2871
Calmly Discussing	0.842	0.00211	[0.0015]	3249	0.839	0.00394***	[0.0015]	2875
Yelling	0.350	-0.00103	[0.0020]	3245	0.298	-0.00355*	[0.0020]	2869
Throwing Things at or Hitting Him/Her	0.023	-0.00150**	[0.0006]	3242	0.0178	0.0000771	[0.0009]	2858
Injured by Spouse Last Year	0.0724	-0.00269***	[0.0010]	3241	0.024	-0.000948*	[0.0005]	3064
Own Weekly Hours of Housework	36.40	-0.478***	[0.101]	3465	13.91	0.0363	[0.072]	3465
Divorce Wrong Unless Extreme Circumstances	0.757	-0.00586***	[0.0018]	3333	0.804	-0.00436**	[0.0018]	2899
Work in Market at 1st Anniversary	0.637	0.0273***	[0.0026]	1861				
Work in Market at 5th Anniversary	0.579	0.0199***	[0.0027]	1586				
Work in Market at 10th Anniversary	0.612	0.0132***	[0.0031]	1201				

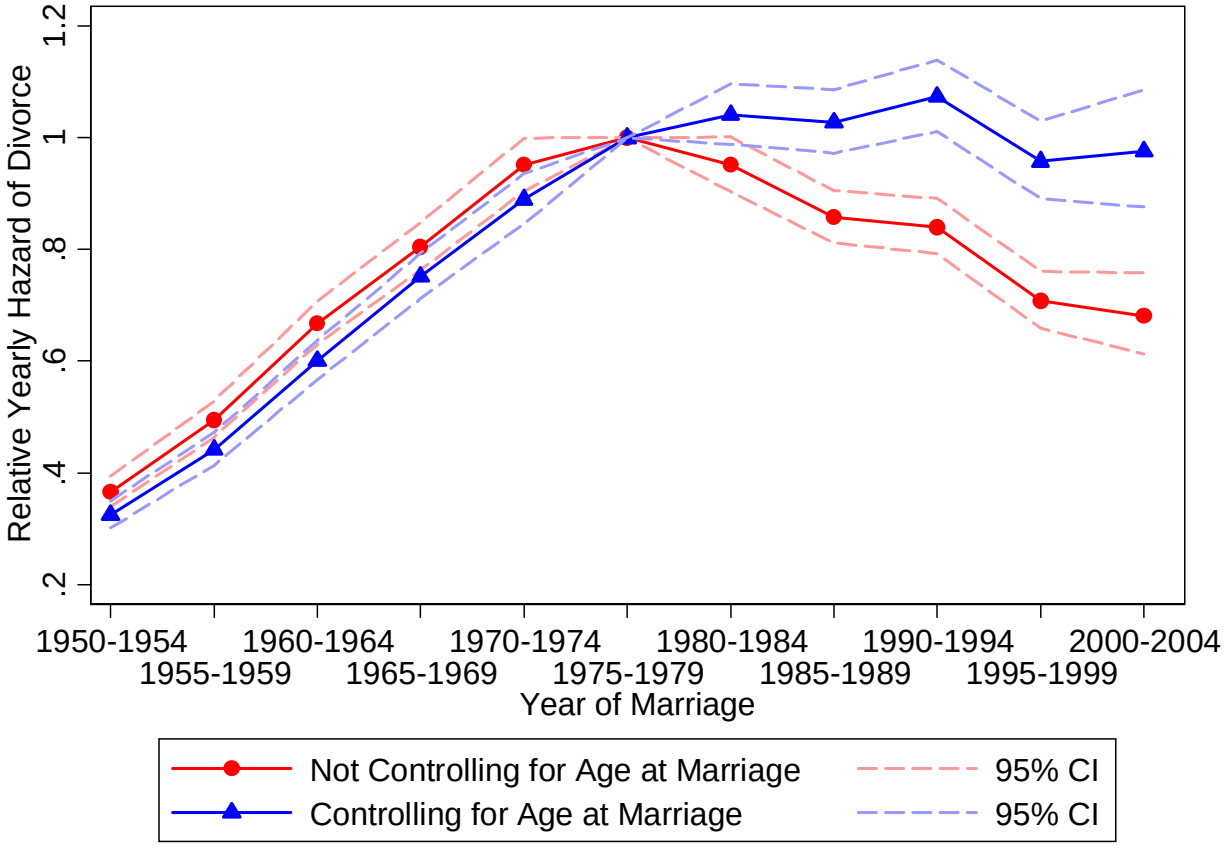
Notes and sources: Intact first marriages (of women) from NSFH Wave I, beginning 1950-1984. See Appendix A.3 for details. Coefficients from regressions also including controls for year of marriage in five-year groups. Monthly values are calculated by taking less than once per month=.5, once per month=1, several times per month=3, once per week=4, several times per week=10, and almost everyday=20. Disagreement variables are indicators for if this is a way one deals with disagreements "sometimes" or more often. Hours of housework reflect sum of usual weekly hours in nine activities. Work at given anniversary calculated using work history. Robust standard errors in brackets. ***p<0.01, **p<0.05, *p<0.1.

Figure 1: Age at First Marriage: 1950 to 2003



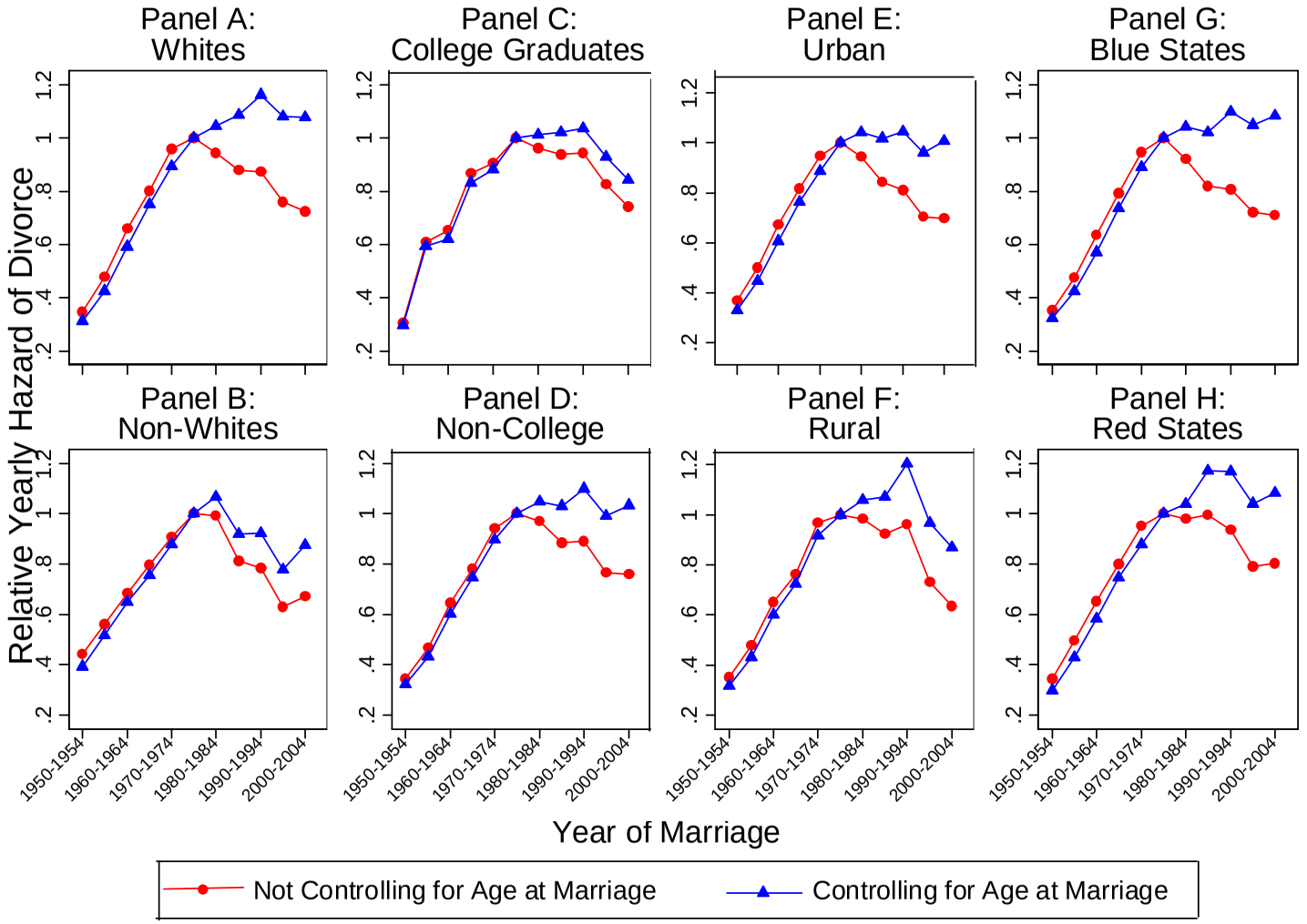
Notes and sources: Average age of first-time brides and grooms by year of marriage. SIPP sample: Women (N=74,339) and men (N=65,200) from the 2001, 2004, and 2008 SIPP panels with complete information on first marriages, 1950-2003. Census sample: Women (N=1,064,745) and men (N=1,021,497) from the largest IPUMS Census sample directly following their first marriage, 1950-1979 (i.e., age at marriage in 1975 is calculated using the reported age at first marriage for those who married in 1975 in the 1980 Census 5 Percent Sample). Difference in SIPP and Census samples likely due to selective mortality.

Figure 2: Hazard Rates of Divorce Across Marriage Cohorts



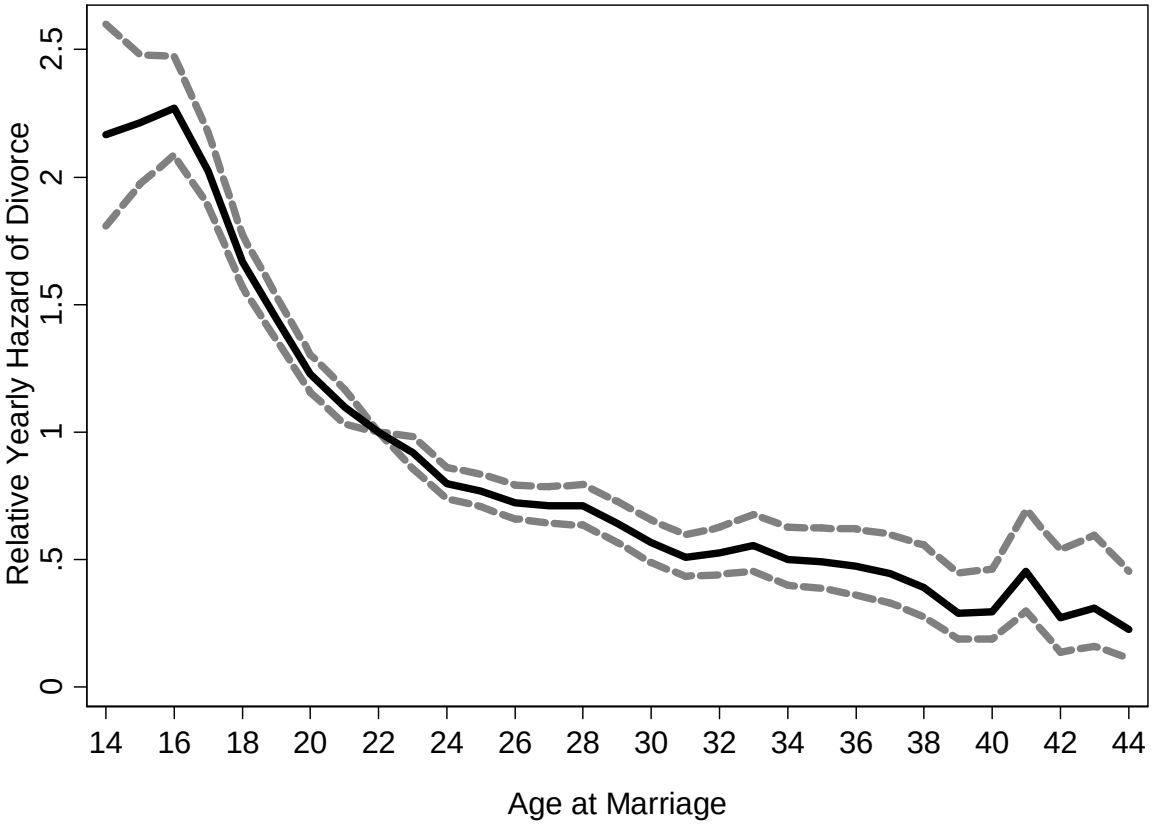
Notes and sources: Women's first marriages from the 2001, 2004, and 2008 SIPP, 1950-2004 (N=74,339). See Appendix A.1 for details. Effects are from a Cox hazard regression setting the hazard of divorce for marriages occurring from 1975 to 1979 to one. Observations censored at time of interview or time of death of spouse. Age at marriage controls include indicators for marrying under 18, 18-19, 20-22, 23-26, 27-29, 30-34, 35-39, and 40+. Robust standard errors used to calculate 95 percent confidence intervals.

Figure 3: Divorce Hazard Rates by Race, Education, and Location



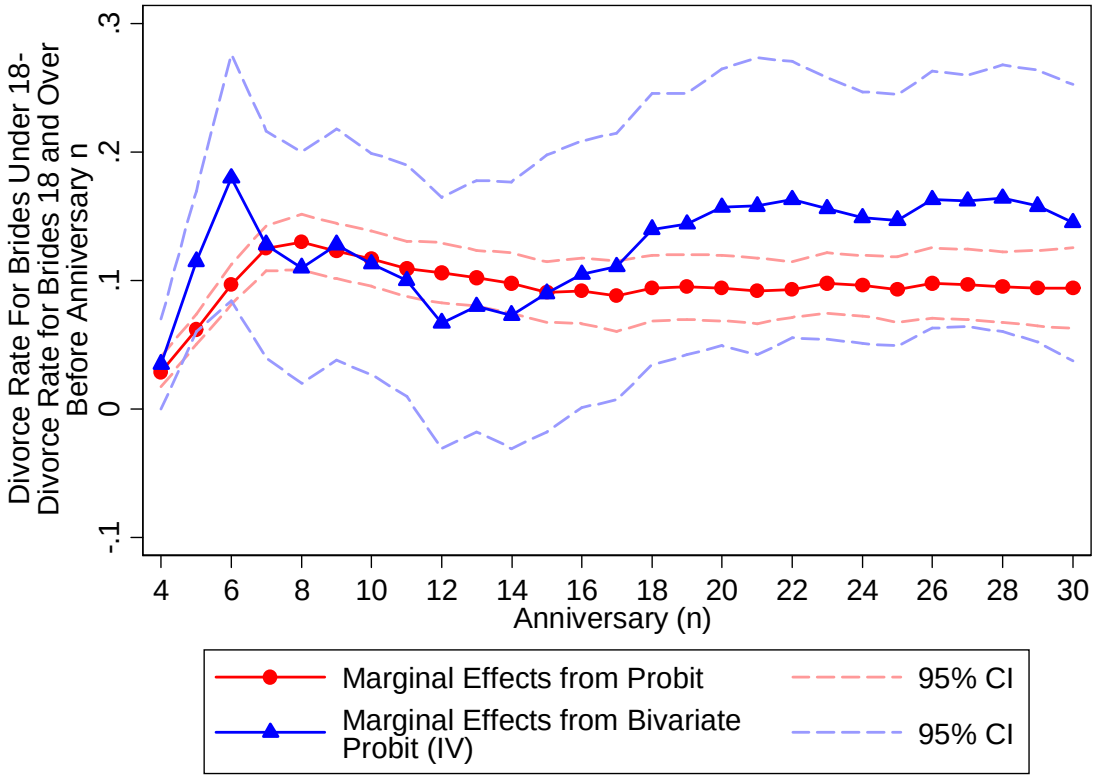
Notes and sources: Women's first marriages from the 2001, 2004, and 2008 SIPP, 1950-2004. See Appendix A.1 for details. Effects are calculated by five-year group from a Cox hazard regression setting the hazard of divorce for marriages occurring from 1975 to 1979 to one. Observations censored at time of interview or time of death of spouse. Age at marriage controls include indicators for marrying under 18, 18-19, 20-22, 23-26, 27-29, 30-34, 35-39, and 40+. College/non-college status as of time of marriage, urban/rural status at interview. Red/blue states classified using state of birth and the mean margin of victory in the 1992-2008 presidential elections (red is Republican candidates favored).

Figure 4: The Relationship Between Age at Marriage and Divorce



Notes and sources: Women's first marriages from the 2001, 2004, and 2008 SIPP, 1950-2004 (N=73,338). Marriage at age 22 is the baseline category. See Appendix A.1 for details. Observations censored at time of interview or time of death of spouse. Coefficients from Cox hazard regression also controlling for year of marriage fixed-effects, premarital childbearing, education at marriage (four groups), race (black, Hispanic, white, and other), census division and urban location (both at interview). Robust standard errors used to calculate 95 percent confidence intervals.

Figure 5: IV Estimates of the Effect of Marriage Before Age 18 on Divorce

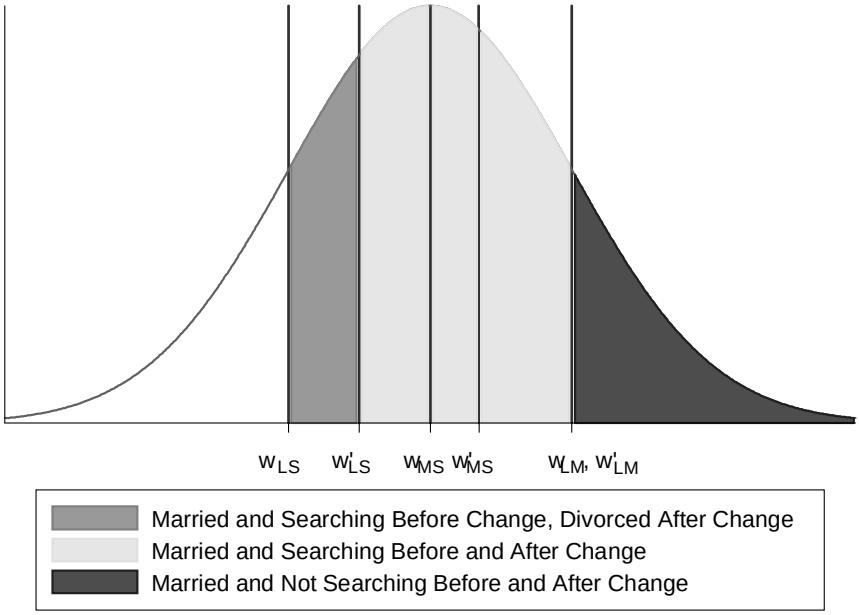


Notes and sources: Women's first marriages from the 2001, 2004, and 2008 SIPP (born 1920-1974, N=60,914). See Appendix A.1 for details. Observations included in estimating the effect of teenage marriage on the probability of divorce before the nth anniversary if the possible length of marriage (the difference between the date of spousal death or date of interview and date of marriage) is n or more years. Regressions also include year of marriage and state of birth fixed-effects and controls for having children prior to marriage, race (black, Hispanic, white, and other), census division and urban location (both at interview), and education (four categories). Robust standard errors clustered by state of birth used to create 95 percent confidence intervals. First stage using minimum age at marriage laws to predict age at marriage less than 18 in Table 7.

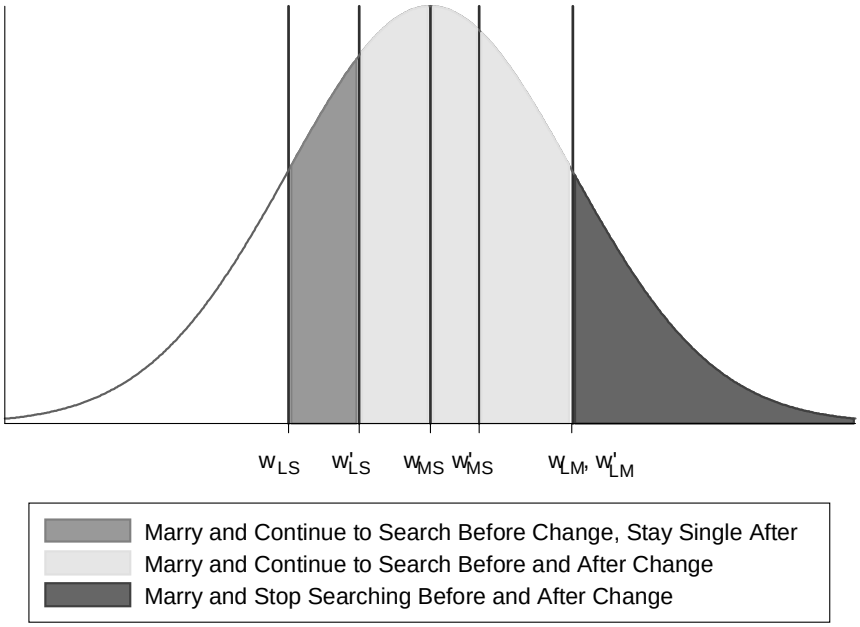
Figure 6: Change in Divorce and Search Following an Increase in Female Wages

Holding the Distribution of Male Wages Constant

Panel A: Married, Divorce-Prone Woman



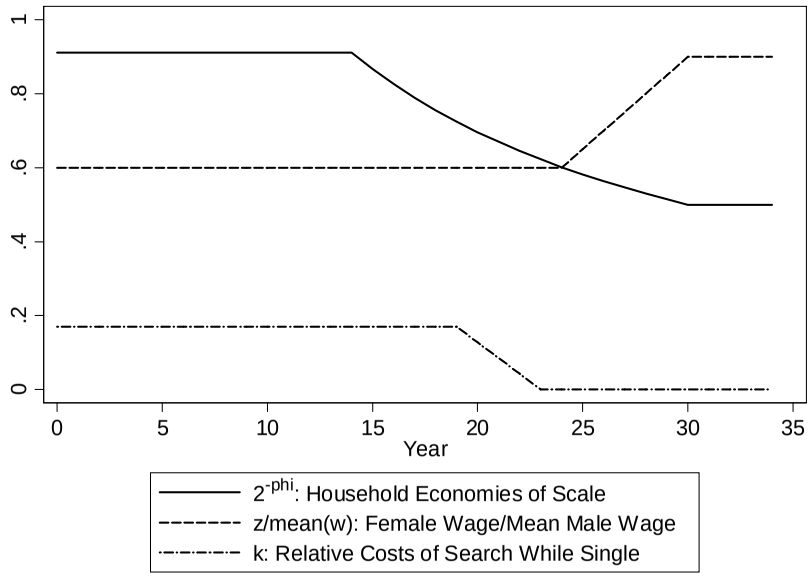
Panel B: Single, Divorce-Prone Woman



Notes: Case where divorce-prone woman does not become non-divorce-prone. Change in female wages (z) holding distribution of male wages ($F(w)$) constant.

Figure 7: Simulation of Search Model: Implications of a Decrease in the Gains to Marriage

Panel A: Changes in Parameter Values

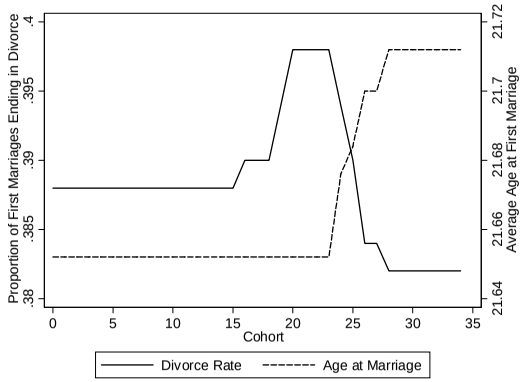


Panel B: Resulting Trends in Divorce Rate and Age at First Marriage

Panel C: Resulting Trends in Divorce Rate and Age at First Marriage, Changes in Individual Factors

Relative Costs of Search While Single

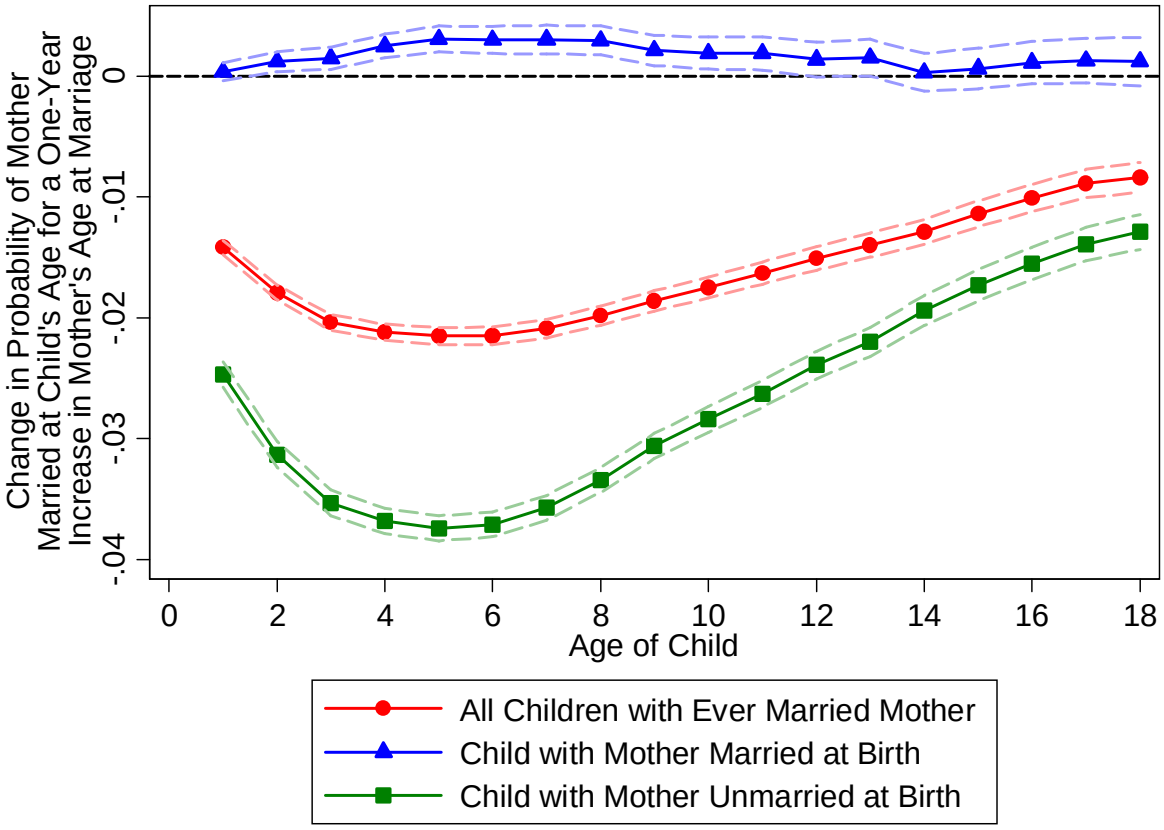
Female Wage/Mean Male Wage



Household Economies of Scale

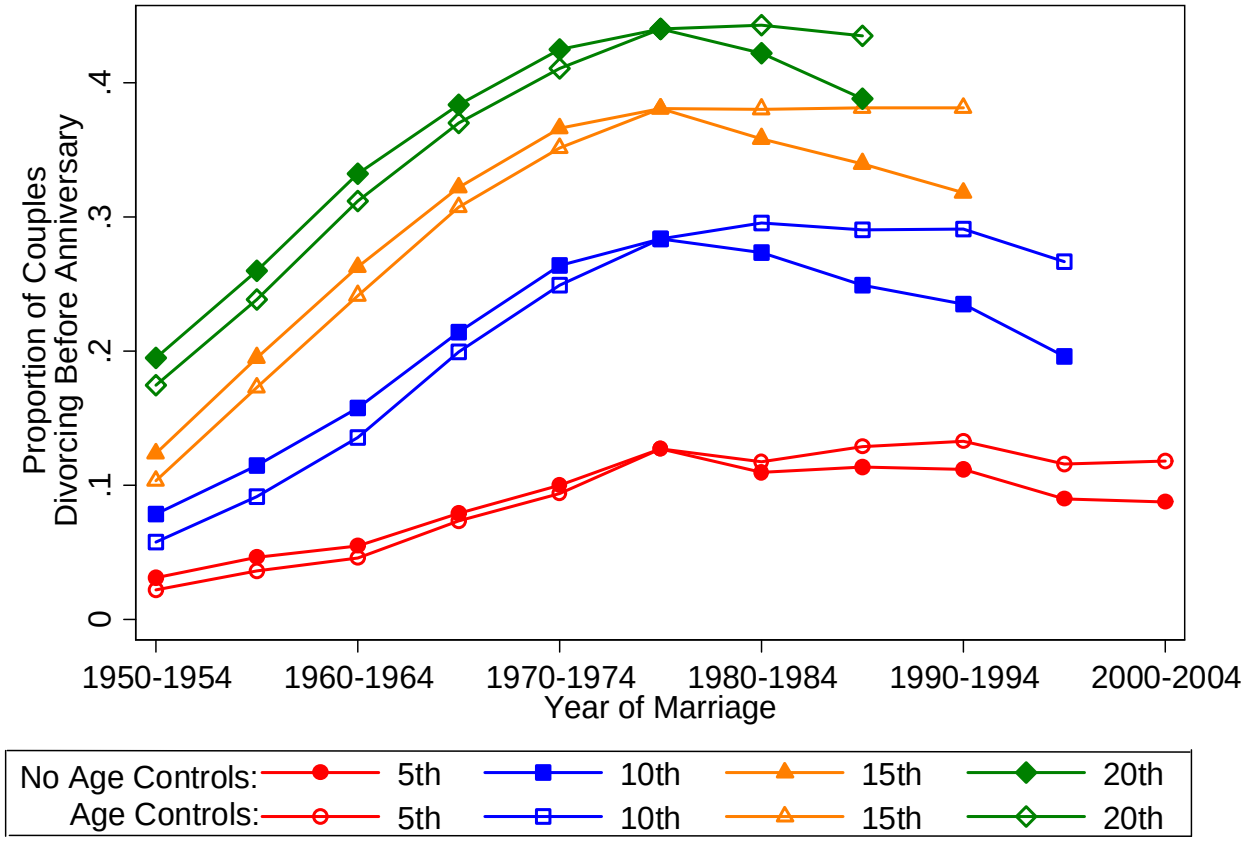
Notes: See Section 5 for details on the model and its parameterization (Section 5.4). Appendix C (online) contains a sensitivity analysis for this simulation.

Figure 8: Living Circumstances of First-Born Children



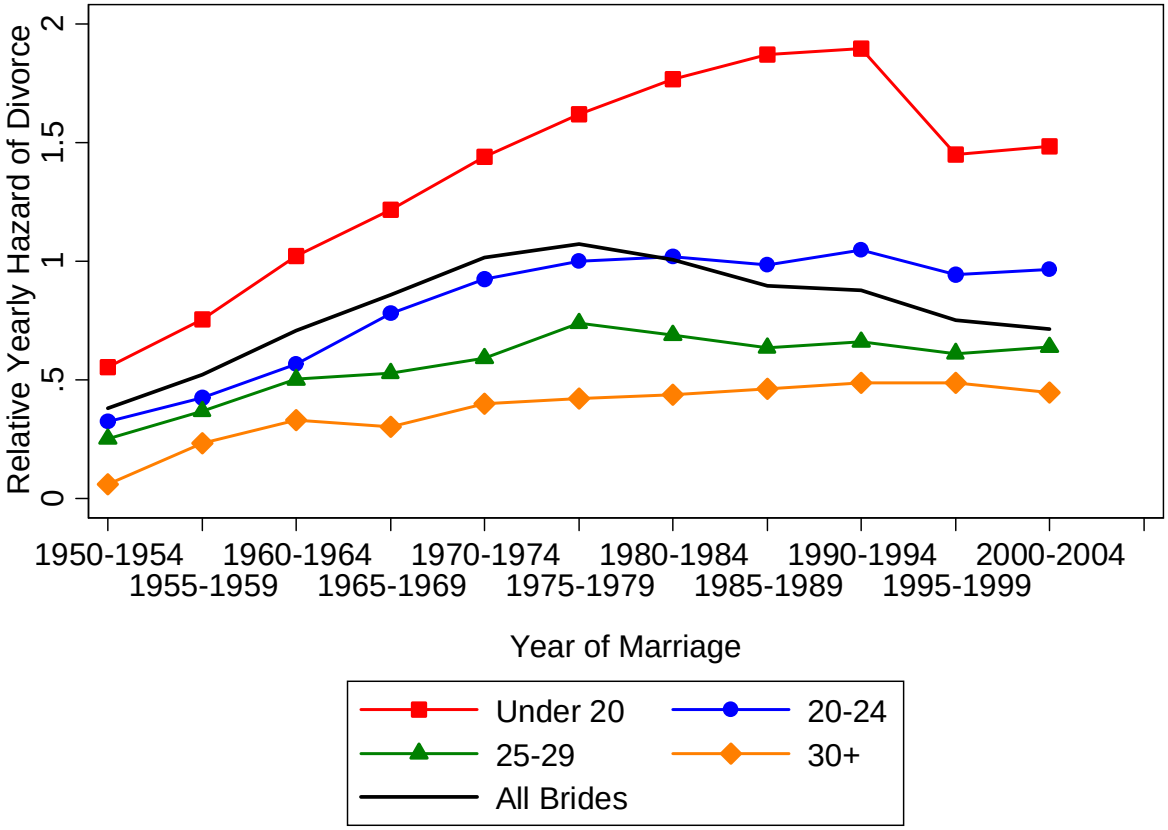
Notes and sources: First-born children of women in the 2001, 2004, and 2008 SIPP (N=46,660), born 1960-1998. Children excluded if mother marries four or more times due to incomplete maternal marriage record. Regressions also include child's year of birth fixed-effects and controls for mother's education at marriage (four groups), race (black, Hispanic, white, and other), census division and urban location (both at interview). Observations censored at time of interview or time of death of spouse. Robust standard errors used to calculate 95 percent confidence intervals.

Figure A1: Probability of Divorce by Selected Anniversaries Across Time



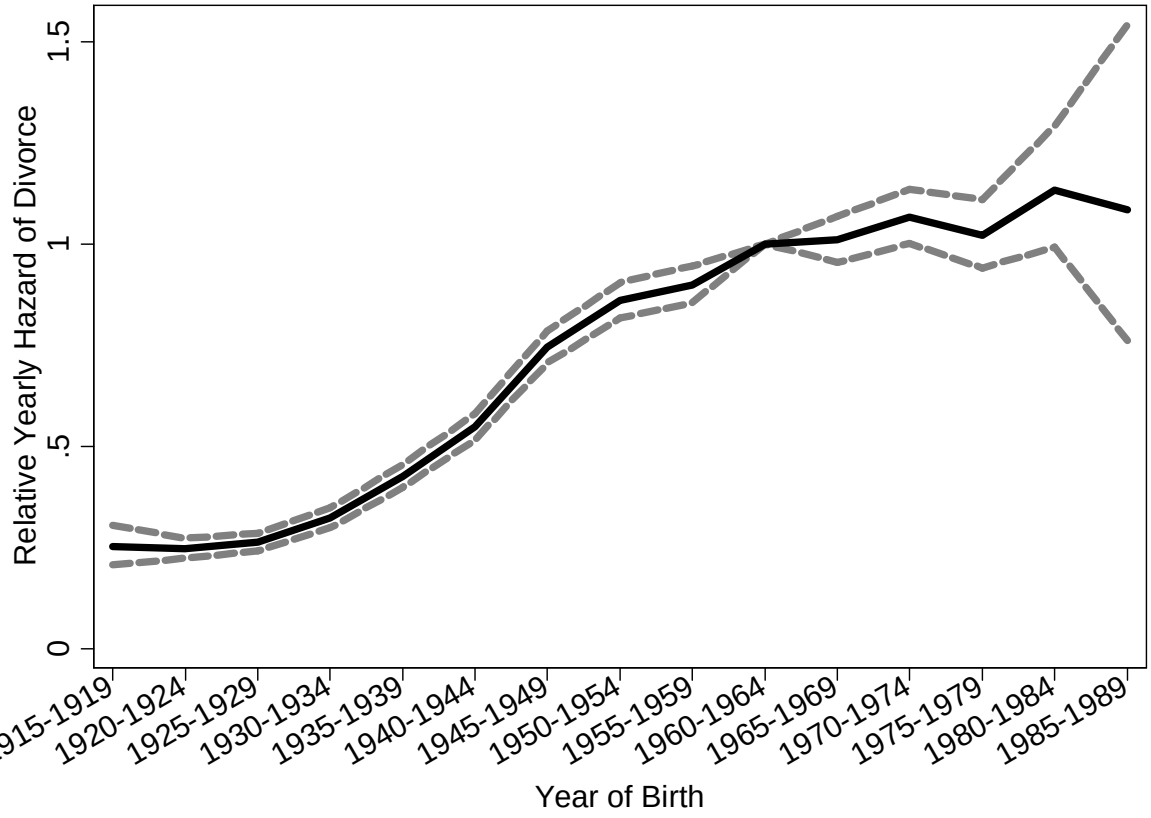
Notes and sources: Women's first marriages from the 2001, 2004, and 2008 SIPP, 1950-2004 (N=74,339). See Appendix A.1 for details. Effects are from probit regressions normalized so that conditional and unconditional regressions predict the same probability of divorce for marriages beginning from 1975 to 1979. Observations included in estimating the probability of divorce before the nth anniversary if the possible length of marriage (the difference between the date of spousal death or date of interview and date of marriage) is n or more years. Age of marriage controls include indicators for marrying under 18, 18-19, 20-22, 23-26, 27-29, 30-34, 35-39, and 40+.

Figure A2: Hazard of Divorce Across Time by Woman's Age at Marriage



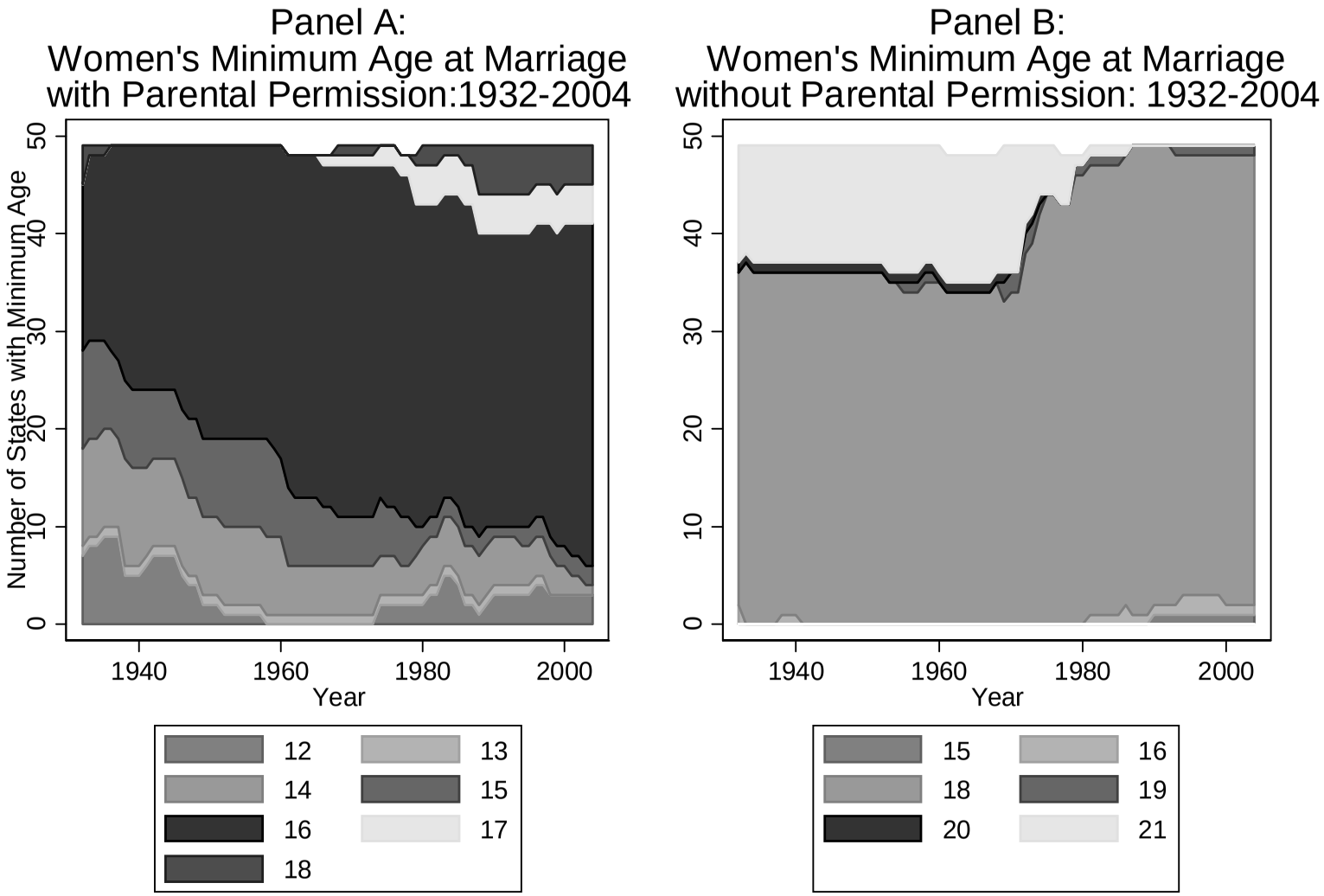
Notes and sources: Women's first marriages from the 2001, 2004, and 2008 SIPP, 1950-2004 (N=74,339). See Appendix A.1 for details. Observations censored at time of interview or time of death of spouse. Predictions from Cox hazard regression controlling for age of marriage (indicators for marrying under 20, 20-24, 25-29, and over 30) interacted with year of marriage in five-year groups, which sets the hazard rate of marriage for those beginning marriage from 1975 to 1979 at ages 20 to 24 to one.

Figure A3: Hazard of Divorce Across Birth Cohorts



Notes and sources: First marriages of women born 1915-1989 in the 2001, 2004, and 2008 SIPP. Effects are calculated by five-year group from a Cox hazard regression setting the hazard of divorce for women born 1960-1964 to one and controlling for age at marriage using indicators for marrying under 18, 18-19, 20-22, 23-26, 27-29, 30-34, 35-39, and 40+. Observations censored at time of interview or time of death of spouse. Robust standard errors used to calculate 95 percent confidence intervals.

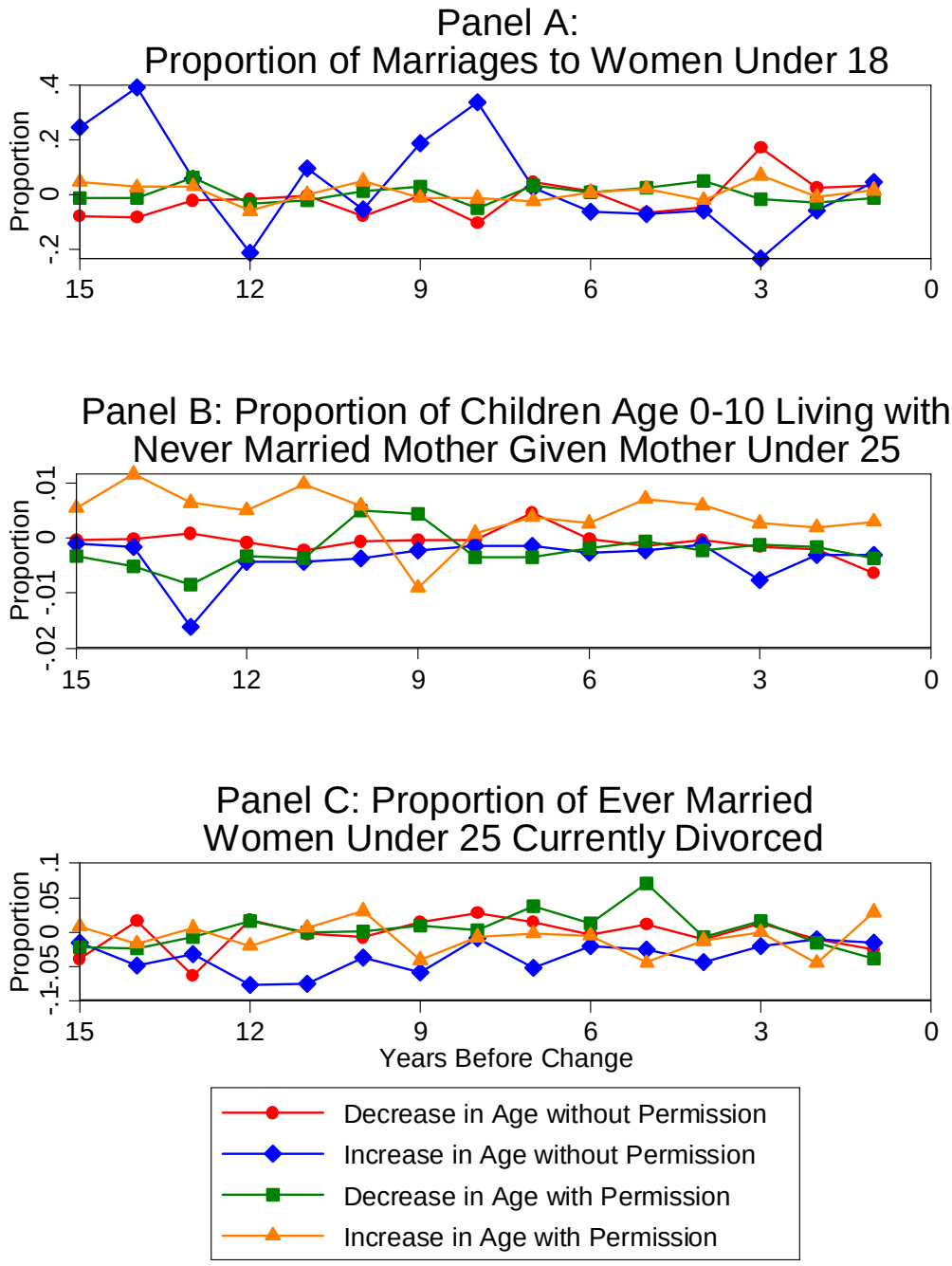
Figure A4: Minimum Age at Marriage Laws Over Time



Notes: See Appendix A.5 for details.

Figure A5: Young Marriage, Single Motherhood, and Divorce

Before Changes in Minimum Age at Marriage Laws



Notes and sources: See Appendix A.5 for details on law changes. Divorce and teenage marriage rates from CPS 1963-2004. Child living conditions from largest IPUMS Censuses (log-linearly interpolated for intercensal years). Residuals from regressions of given values on state and year fixed-effects plotted.