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Social Security and Divorce

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Abstract

This paper studies how the likelihood and timing of divorce is influenced by Social Security's ten-year rule, which provides spousal benefits to divorced people if their marriages lasted at least ten years. Bunching analysis indicates that approximately 2 percent of divorces occurring in the six months after ten-year anniversaries would have occurred earlier if not for Social Security's ten-year rule. For older couples, who are likely more focused on retirement and have greater earnings disparities, divorces are approximately 9 percent higher in the two years after ten-year anniversaries than would be predicted without the abrupt change in Social Security benefits. The increase in divorces after ten years of marriage appears to come from couples with disparate earning records.

Keywords: Marriage, Divorce, Social Security

JEL Codes: J12, H5, J18

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1 Introduction

When and why people divorce matters because divorce has both emotional and economic implications.[1] Divorcing couples are happier after the divorce than before it, which means that delaying divorce can have psychic costs (Gardner and Oswald 2006). An individual's potential financial well-being after divorce is likely a factor in the decision to leave a marriage, but understanding how financial well-being outside of marriage affects divorce is complicated by a couple's financial situation being related to many unobserved factors that also affect divorce probabilities. This paper examines how Social Security's ten-year rule, which entitles divorced individuals to Social Security spousal benefits if their marriages lasted at least ten years, affects divorce timing and likelihood. This arbitrary rule creates a sharp increase in the value of exiting a marriage at ten-year anniversaries for secondary earners relative to the value of exiting the marriage at nine years and provides an opportunity to understand how financial factors affect divorce.

In economic models of marriage, people choose to be married when the value of being married exceeds the value of being single. Therefore, raising the value of being single for married people should theoretically increase divorces, and people who would benefit from Social Security's ten-year rule should have an incentive to delay divorce until after ten years of marriage. Despite a theoretical basis for Social Security's ten-year rule affecting divorce, Dickert-Conlin and Meghea (2004) find its implementation in 1977 had little immediate impact on divorce timing using a difference-in-differences strategy with the length of marriage in years from Vital Statistics data. Goda et al. (2007) point out that the ten-year rule should have a larger influence on couples with

[1]Much research studies the consequences of divorce on economic outcomes. For examples, refer to Ananat and Michaels (2008), Bedard and Deschenes (2005), Couch et al. (2013), Gadalla (2008), Genadek et al. (2007), Lavelle and Smock (2012), Page and Stevens (2004), Peters et al. (2014), and Smock et al. (1999).

disparate earnings histories. Using data from the Panel Study of Income Dynamics (PSID), they find small, statistically insignificant effects of the ten-year rule on vulnerable couples.

Other research on the link between financial incentives and divorce has found mixed results. Alm and Whittington (1997) use PSID data to study how income tax penalties affect marriage and divorce decisions. They find evidence that marriage decisions respond to tax penalties while divorce decisions do not. Bitler et al. (2004), on the other hand, find divorce propensities fall after the passage of welfare reforms that increase the value of being married relative to being single. Thus, the current state of the literature is inconclusive about whether or not financial incentives influence divorce.

The current paper studies how the ten-year rule affects divorce using 1985 to 1995 Vital Statistics divorce data with the length of marriage in months. If Social Security's ten-year rule affects divorce through either a decrease in divorces before the ten-year mark or an increase after it, divorces should discontinuously increase immediately after ten-year anniversaries. Plotting divorces by the duration of marriage in months and estimating the discontinuity in the divorce rate at ten years of marriage show clear evidence of a distortion in the distribution of divorces around ten-year anniversaries. I then implement bunching analysis to quantify how many divorces are delayed and for how long. The basic approach involves using how divorces trend with marriage duration away from ten-year anniversaries to estimate how they would trend near them if not for the benefit change occurring immediately at the tenth year of marriages. With the counterfactual distribution estimated, I then calculate the divorces missing from the distribution before ten-year anniversaries as well as the extra ones after them.

The bunching analysis indicates that about 2 percent of divorces occurring in

the six months after ten-year anniversaries would have occurred before them if not for Social Security's ten-year rule. Responses to the ten-year rule vary dramatically by age. For couples with the woman under the age of 25 at the time of marriage, I find only weak evidence of a small effect of the ten-year rule on divorce rates. For couples where the woman was 45 or older at the time of marriage, I find that there are 9 percent more divorces in the two years after ten-year anniversaries than the estimated distribution predicts.

Since the Vital Statistics collection program ended in 1995 and because having individual-level economic data is necessary to examine characteristics of couples who divorce, I also draw on data from the 2008 to 2011 American Community Survey (ACS). People delaying divorce until their tenth anniversaries would cause the likelihood of being divorced to increase discontinuously after ten years of marriage. For people who married at older ages, the likelihood of being divorced gaps up at ten-year anniversaries by 19.4 percent. The marriages that end are those where one spouse worked in an occupation that earned at least 50 percent more than the other spouse's occupation and those with spouses with unequal education levels. Thus, it appears that Social Security's ten-year rule affects couples where one member has a higher earnings potential than the other.

These results provide strong evidence that Social Security and financial considerations factor into divorce decisions, especially for older Americans. The current paper extends previous work on Social Security's ten-year rule in several ways. First, the paper focuses on data several years after the implementation of the ten-year rule, meaning people would be more likely to know about the ten-year rule and how to

take advantage of it.[2] Second, the paper uses Vital Statistics data with the length of marriages in months. When examining a flow measure like divorce rates, knowing the length of marriage in months is crucial as it allows for examining divorces within a close range of ten-year anniversaries. Similarly, having the duration of marriages in months allows for examining whether or not divorces bunch around ten-year anniversaries. Finally, the large data sets used in the analysis allow for exploring heterogeneous effects of the ten-year rule based on age at the time of marriage. Understanding heterogeneity by age is important as changes in family structure in old age have become increasingly common. Stevenson and Wolfers (2007) document the recent rise in marital formation of older Americans, while Brown and Lin (2012) study the dramatic increase in divorces for older Americans, which they term the "gray divorce revolution."

2 Background

2.1 Social-Security's Ten-Year Rule

People contribute to Social Security through payroll taxes, and employers match the employee contribution. Upon retiring, workers can receive Social Security benefits if they accumulated at least forty quarters of earnings over their work lives. The size of the benefit, or the Primary Insurance Amount (PIA), is computed based on the average of the worker's highest 35 years of indexed monthly earnings.[3]

[2]Studying the implementation of the ten-year rule has added empirical challenges because the ten-year rule applied to divorces retroactively, meaning people could have delayed divorce before the law became effective if they anticipated the law. Alternatively, if people who would have delayed divorce until the ten-year mark had already divorced when the law was passed, it could take several years before the ten-year rule would display an effect.

[3]People receive their full PIA if they retire at the full retirement age. Beginning in 2000, the full retirement age began to rise incrementally from age 65 to age 67. People can retire starting at age 62 and receive a reduced benefit (Social Security Administration 2013).

If their ex-spouses are still alive, former spouses are eligible for spousal benefits of 50 percent of the primary earners' PIA if their marriages lasted at least ten years before ending in divorce. If their ex-spouses are deceased, former spouses are eligible for spousal benefits equal to the primary earners' full PIA if their marriages lasted at least ten years before ending in divorce.[4] Even former spouses who qualify for Social Security on their own earnings histories can still receive spousal benefits if the spousal benefits are greater than what they would receive based on their own earnings. Divorced people whose marriages lasted fewer than ten years are not eligible for any spousal benefits.

The Social Security Administration (SSA) defines eligibility based on formal marriage length. A separation delayed until ten years of marriage would still be considered intact. Remarrying results in the individual no longer being eligible for spousal benefits from a previous marriage; however, if a subsequent marriage ends in divorce, the person can be eligible for spousal benefits from any previous marriages that lasted at least ten years. An ex-spouse remarrying does not affect an individual's eligibility (Social Security Administration 2013).[5]

The ten-year rule was part of a 1977 Social Security law and went into effect in 1979. While the main purpose of the 1977 law was to ensure the financial stability of Social Security, it also changed the length of marriage requirement for spousal benefits from twenty years to ten years because marriages were ending more quickly than before (Dickert-Conlin and Meghea 2004).

The vast majority of spousal benefits go to women since they tend to have lower

[4]Spousal benefits are different than survivor benefits. A widow or widower is also entitled to the deceased spouse's full PIA as long as the marriage lasted at least nine months before the death of the spouse.

[5]A divorced spouse receiving a spousal benefit does not affect the other spouse's Social Security payment in any way. If a person has several marriages that last ten years, all former spouses can claim spousal benefits under his PIA without affecting his benefit. Married people can receive spousal benefits after one year of marriage.

PIAs. In 2006, approximately 8 percent of people receiving Social Security received it through the spousal benefit, and approximately 98 percent of people receiving spousal benefits were women. The ex-husband's full PIA is much more likely to be larger than the woman's PIA than half of the ex-husband's PIA is. For this reason, a majority of divorced wives will receive benefits based on their deceased ex-husbands' PIA if their ex-husbands die (Butrica and Smith 2012). As more women enter the labor force and earn higher wages, more women are receiving Social Security without the spousal benefit (Social Security Administration 2013 and Goda et al. 2007).

2.2 Conceptual Framework - Heterogeneity by Age at Time of Marriage

The impact of the ten-year rule likely varies with age. As retirement is nearer for older people, they are likely more focused on Social Security benefits. Young people, on the other hand, tend to be myopic in thinking about retirement. Young people also likely do not know the value of the spousal benefit as earnings typically peak later in life, whereas older people generally have a better idea about whether or not spousal benefits would increase their Social Security payments.[6]

Even if young people are perfectly rational and forward thinking, they still may not be influenced by Social Security's ten-year rule because they have time to marry again and to achieve spousal benefits through another spouse. Since married people are no longer eligible for spousal benefits from previous marriages, young people would have to go through most of their adult lives unmarried or have subsequent marriages end in divorce to claim spousal benefits from divorces that occurred in their twenties

[6]For both older and younger people, Social Security benefits can be difficult to calculate, and people often have a difficult time estimating their benefits. To give people a better idea of their benefits, the SSA began mailing out annual statements of benefits in 1995.

or early thirties. Approximately 69 percent of women and 78 percent of men remarry after divorce (Schoen and Standish 2001), and young divorced people are much more likely to remarry than older divorced people (Brown et al. 2006), suggesting young divorced people likely expect to remarry. Not remarrying is a smaller price to pay for older adults. Older couples are also more likely to respond to the ten-year rule because a higher percentage of couples from older cohorts have disparate earnings records. Younger generations of women have more parity with their husbands and would be less likely to benefit from the ten-year rule.

Throughout the remainder of the paper, I consider how the ten-year rule influences divorce for the full sample as well as for three broad age groups. For the couple-level Vital Statistics data, the groups are couples with women younger than 25 at marriage, couples with women 25 to 44 at marriage, and couples with women 45 or older at marriage. With the individual-level ACS data, the groups are women younger than 25 at the start of marriage, women ages 25 to 44 at the start of marriage, and women 45 or older at the start of marriage. I focus on the age of the woman since women are more likely to receive spousal benefits. To ensure that these broad age groups are appropriate, I also consider smaller age bins, which produce noisier results but provide a fuller picture of how the response to the ten-year rule varies by age.

3 Bunching in Divorces around Ten-Year Anniversaries

3.1 Data

The first set of results uses Vital Statistics data from 1985 to 1995. The Vital Statistics data were compiled by the National Center for Health Statistics and contain

information from divorce certificates collected at the state level. About half of all states participated in the program. While some states provided a random sample to the National Center for Health Statistics, other states provided data on all divorce certificates. These data are not nationally representative as the non-reporting states come disproportionately from the South and Mountain West.[7] I restrict the sample to couples who divorced within four years of their ten-year anniversaries.

The Vital Statistics data have several advantages. First, they contain information on the month and year of marriage and divorce, meaning I can calculate the duration of marriage in months. Second, the data set is large. For the years 1985 to 1995, the data contain information on 2,008,923 divorces. Of these, 1,818,591 contain the ages of the spouses and the information necessary to compute the duration of marriage in months. Finally, these data come straight from divorce certificates and are likely very accurate.

3.2 Empirical Strategy

Discontinuity at Ten Years since Marriage

If Social Security's ten-year rule leads to couples delaying divorce until their ten-year anniversaries, then the divorce rate would discontinuously increase at ten years since marriages began. Thus, as a simple test of whether or not the ten-year rule influences divorce rates, I begin by examining whether or not a discontinuity exists at ten years since marriage by estimating the following equation:

$$y_m = \alpha + f(m, \lambda) + D_m\beta + \eta_m, \tag{1}$$

[7]Refer to Shryock and Siegel (1973) for more information about Vital Statistics divorce data and to Kennedy and Ruggles (2014) for more information about the history of the collection of divorce data in the United States more generally.

where m indexes marriage duration in months, y is the number of divorces happening at a given duration, f is a smooth function representing the duration profile of divorces, D is an indicator variable equal to 1 if the divorce occurs after at least ten years of marriage, and η is an unobserved error component. I estimate Equation (1) by modeling f as a quadratic polynomial on either side of the ten-year threshold. In addition to estimating Equation (1) with the number of divorces as the dependent variable, I also include the log of the number of marriages at a given duration as the dependent variable, which will allow the β coefficients to be interpreted as estimates of the percentage discontinuities in divorce rates.

Bunching

Testing for a discontinuity at ten years of marriage allows for establishing whether or not Social-Security's ten-year rule affects divorce rates, but it does not allow for examining whether or not the increase in divorces at ten-year anniversaries are retimed or to examine the length of any retiming. Thus, I also employ bunching analysis.

To examine bunching in divorces around the ten-year marks of marriages, I exclude data from around the ten-year cutoff and estimate how divorces would trend with months since marriage in the absence of the abrupt change in incentives at ten-year anniversaries. I then use this counterfactual distribution to examine bunching behavior around ten-year anniversaries. Persson (2014) uses a similar strategy to study marriage timing in response to changing survivor's insurance in Sweden.[8]

[8]Bunching analysis has also been used to study responses to tax thresholds by Bastani and Selin (2014), Kleven and Waseem (2014), Kopczuk and Munroe (2014), and Saez (2010). Manoli and Weber (2014) use bunching analysis to study how employer-provided retirement benefits affect retirement timing.

To implement this approach, I first estimate the following equation:

$$y_m = \alpha + g(m, \lambda) + \eta_m, \tag{2}$$

where m indexes the duration of marriage in months, y is the number of divorces happening at a given duration, g is a polynomial in the marriage duration, and η is an unobserved error component. I estimate Equation (2) excluding divorces around ten-year anniversaries. I then use the parameter estimates to compute $\hat{y}_{before}$ and $\hat{y}_{after}$, estimates of the number of divorces that would have occurred in the omitted bunching region without a change in divorce incentives occurring at the ten-year marks of marriages. I next calculate the bunching estimates $\hat{B}_{before}$ and $\hat{B}_{after}$ as the difference between the number of divorces predicted from the counterfactual distribution and the actual number of divorces occurring in the bunching regions, where $\hat{B}_{before}$ estimates the missing mass of divorces for couples before ten-year anniversaries and $\hat{B}_{after}$ estimates the bunching that occurs immediately after ten-year anniversaries.

This framework requires two main assumptions. The first is that g would trend smoothly if not for Social Security's ten-year rule. A possible concern with this assumption is that there may have always existed something related to ten years of marriage that causes marriages to end that is completely unrelated to Social Security's ten-year rule, which could be the case since many factors enter into divorce decisions that cannot be observed in administrative data. For example, a gap in divorces at ten-year anniversaries would exist if couples wanted to hold out until the ten-year milestone before divorcing for psychological reasons or if there was another unobserved change happening at ten years of marriage. As a test of the assumption that g would trend smoothly if not for the ten-year rule, I replicate the Vital Statistics analysis using data from before the ten-year rule's implementation in Appendix A.

I find no evidence of any trend break at ten years of marriage before the ten-year rule was implemented, which suggests that Social Security's ten-year rule is indeed responsible for the altered divorce distribution.[9]

The second assumption is that data from outside the bunching region can be used to approximate g within the bunching region. This assumption would be violated if people delayed divorce from very early on in marriages to benefit from the ten-year rule. This assumption relates to the choice of bunching regions, which is not immediately clear. The bunching region needs to be wide enough to exclude divorces affected by the ten-year rule; however, making the bunching region too wide can result in the loss of precision and results in Equation (2) being used to estimate $\hat{y}$'s far out of sample. Therefore, I report results for a range of bunching regions. I begin by setting the bunching region to be six months before and six months after ten-year anniversaries. This bunching region allows for a focused examination within a close range of ten-year anniversaries but assumes that couples do not delay divorce for more than six months and that divorces delayed because of the ten-year rule happen quickly after ten-year anniversaries. To consider the possibility of longer delays and to allow couples more time to divorce after reaching their ten-year anniversaries, I also show results that set the bunching regions to be one, one-and-a-half, and two years before and two years after ten-year anniversaries. For the main analysis, g is fitted as a cubic polynomial. In Appendix B, I consider the sensitivity of the results to specifying g as different polynomials.

Standard errors for the bunching estimates are estimated by bootstrapping. To do this, I draw a random sample with replacement from the original sample that is equal in size to the original sample. I then replicate the procedure described above 1,000

[9]In results available upon request, I also test for discontinuities in divorce rates at five, fifteen, and twenty years of marriage and find none, which provides more evidence that people do not delay divorce to reach certain milestones.

times to produce a distribution of $\hat{B}_{before}$ and $\hat{B}_{after}$. The standard errors for the bunching estimates are then calculated as the standard deviation of the distribution of bootstrapped estimates.

3.3 Results

Figure 1 shows the number of divorces by marriage length for all ages and for different age groups. For older couples in particular, divorces gap up immediately after ten-year anniversaries. For couples in the middle age group, divorces also appear to increase slightly at ten-year anniversaries. For couples where the woman was 25 or younger at the time of marriage, divorces appear to trend more smoothly.

The β coefficients from Equation (1) are shown in Table 1 and reveal a statistically significant increase in the divorce rate for people 25 and older at the time of marriage as well as for the full sample. For couples where the woman was at least 45 or older at marriage, divorces increase by 23 percent at ten-year anniversaries. For middle-aged couples, divorces increase by over 4 percent immediately after ten-year anniversaries. For younger couples, there is only weak evidence of an increase in divorces after ten-year anniversaries. For the full sample, divorces increase by 3.3 percent.[10]

These results provide evidence that age is a major factor in how divorce decisions respond to the ten-year rule. To further explore how the response to the ten-year rule varies with age, I replicate the analysis using five-year age bins in Table 2. With one exception, the point estimates rise with each age bin, though they are generally not statistically significantly different from each other. These results reveal a nonlinear

[10]In Appendix C, I test for evidence of bunching in divorces at twenty years of marriage using data from 1966 to 1974, which is when Social Security required twenty years of marriage before ex-spouses would be eligible for spousal benefits. I do not find strong evidence that people were delaying divorces to reach twenty-year anniversaries. This null result suggests that people who have been married for longer may be less responsive to Social Security's rules regarding divorce or that the switch to the ten-year rule raised awareness of Social Security's divorce rules.

response to the ten-year rule. For women in the three older age bins, the estimated discontinuities are statistically significant and large. For women who married at 56 to 60, the estimated increase in divorces in over 60 percent.[11]

I next implement the bunching procedure described in Section 3.2 to produce estimates of the missing mass of divorces during the six months before ten-year anniversaries and the bunching that takes place during the six months after ten-year anniversaries. The results are shown in the top panel of Table 3 and suggest that approximately 2 percent of divorces occurring in the six months after ten-year anniversaries are delayed from the six months before. For couples with women who were 45 or older at marriage, approximately 11.8 percent of divorces occurring during the six months after ten-year anniversaries appear to be retimed. For couples with women who married younger, 1.8 percent of divorces occurring in the six months after divorce are retimed.

In panels B and C, I set the bunching regions to be one year and one-and-a-half years, respectively. The results from both bunching regions suggest that there are extra divorces after ten-year anniversaries for couples with women who were 45 or older at marriage. For couples with women who married younger, the results from panels B and C are contradictory. In panel B, the results imply that there is a missing mass of divorces immediately prior to ten-year anniversaries for couples with women who were younger than 45 at marriage. In panel C, the results imply that there are extra divorces after ten year-anniversaries for couples with women who were younger than 45 at marriage. The results from the bunching analysis for younger women being sensitive to the bunching window likely suggests that g does a poor job predicting what would happen within the bunching region using data far from the cutoff for younger

[11] I do not consider higher age bins because there are not couples divorcing at each marriage duration in months for older ages.

women. Thus, the results for the larger bunching windows should be interpreted with caution for younger couples.

Panel D displays results with the bunching region set to be two years before and after ten-year anniversaries. With this wide bunching region, there is only evidence of bunching for couples where the woman was 45 or older at the time of marriage. There are approximately 9.1 percent more divorces occurring during years 10 and 11 than the estimated distribution predicts. The estimate of divorces missing during years 8 and 9 is statistically indistinguishable from zero, suggesting that the extra divorces may not be merely retimed from years 8 and 9. These results for older couples are consistent with the results from the one-year and one-and-a-half-year bunching windows.

The results from the wider bunching regions suggest that older people may not have divorced if they would never have received spousal benefits or that they delay divorce from very early on in marriages for spousal benefits. These results make interpreting the results with the bunching region set to be six months before and after difficult to interpret for older individuals. It appears that the ten-year rule affects divorce rates for older couples into the eleventh year after marriage, meaning estimates of $\hat{y}_{before}$ and $\hat{y}_{after}$ might be biased downward when the bunching region is set to six months.

The results presented in this section are most comparable to Dickert-Conlin and Meghea (2004), who find no immediate impact of the ten-year rule's implementation using Vital Statistics data from 1975 to 1980.[12] These differences suggest that while people may not have changed their behavior because of Social Security's ten-year rule

[12]Dickert-Conlin and Meghea (2004) use a difference-in-differences strategy to identify the immediate effect of the law by comparing divorces in 1978-1980 to divorces in 1975-1977. When I compare the discontinuities from Equation (1) from these two time periods, I find no significant differences, which corroborates the Dickert-Conlin and Meghea result of no immediate impact of the law and suggests that differences in methods are not the reason I find the ten-year rule influences divorce.

immediately, older people in particular soon began adjusting their divorce timing so that they could receive spousal benefits after divorce.

4 Changes in the Likelihood of Being Married

4.1 Data

While the Vital Statistics data are ideal for examining how the ten-year rule influences the distribution and timing of divorces, the Vital Statistics data lack many demographic and labor force variables, meaning they do not allow for knowing characteristics of couples the ten-year rule influences. Examining characteristics of couples is important because economic theory suggests that couples with large disparities between the primary and secondary earners should be the most responsive to the ten-year rule. The Vital Statistics records are also strictly a flow measure, whereas we are also interested in if and how the stock of marriages changes at the ten-year mark. Because of these issues and to focus on more recent data, I examine Social Security's ten-year rule using Integrated Public Use Microsample Series (IPUMS) ACS data from 2008 to 2011.

Beginning in 2008, the ACS began asking people the year their most recent marriage began. I subtract people's answers to this question from the survey year to calculate the years since their marriages began. I focus on people over the age of 17 who married 5 to 14 years prior. Because I am interested in how the likelihood of being divorced changes, only non-widowed ever married people are included in the sample. With the ACS, the unit of observation is the individual because I can only identify both members of the couple when the couple is still married. Because women make up the vast majority of people receiving spousal benefits and to keep the results

concise, I focus on women with the ACS analysis.[13] Since the SSA considers couples who have separated as having intact marriages, I code separated people as still being married. As with the Vital Statistics, the ACS also has the advantage of being large. The final sample contains 809,912 observations. This large sample size contrasts with the PSID, which also has information on marriage histories. The PSID only has data on 16,361 marriages, the vast majority of which are comprised of young people.

Despite its advantages, the ACS has three issues. The first is that we only know the length of marriage in years, which means that brief delays in divorce are difficult to observe. Unless divorces are delayed for considerable lengths of time or there is a spike in divorce rates after ten years that is not from retimed marriages, we may not find any evidence the ten-year rule affects the likelihood of divorcing even if it does. For this reason, the ACS analysis focuses primarily on the divorces of older individuals. The second limitation is that the ACS only asks respondents the years of their most recent marriages. This means that if someone gets a divorce after ten years of marriage and then remarries, she will not show up in the data as having been divorced after ten years of marriage. Since divorce rates rise after ten-year anniversaries, the estimates would be biased towards zero if this happens. Asking about the year of the most recent marriage but not the year of divorce also means that I do not know the length of marriages for divorced people, which leads to me studying the years since marriages began and current marital statuses. Third, Social Security PIA is calculated based on lifetime labor earnings, while the ACS only asks about current earnings. Using current earnings is especially problematic with older individuals since many are retired. To mitigate this concern, I use people's education levels and the average earnings of

[13] I also restrict the sample to only women to avoid counting people from the same marriages twice. The results for men are similar to women except that it appears as though there is a slight gap at ten-years since marriage for men in the middle age group. This is not entirely surprising given the fact that it is likely the age of the woman and not the age of the man that matters since women are likely the ones benefit from the ten-year rule.

their prior occupations to study what kind of marriages end immediately after ten-year anniversaries.

To explore the characteristics of couples who divorce, I create a series of indicator variables that capture within-couple specialization that are equal to one if the woman is in a certain type of marriage and zero otherwise. Since people who are no longer married have a value of zero for these indicator variables, these variables will allow for understanding what types of marriages end at ten-year anniversaries. The first indicator variable equals one if both members of the couple are in the labor force at the time of the interview. I create a separate variable equal to one if an individual is married to someone with a different labor force participation status than herself. Since current labor force participation is likely a poor proxy for lifetime earnings, I also take advantage of the ACS question that asks people if they have ever worked over the last five years. I create a variable equal to one if the woman is married to someone with the same answer to this question as herself and a separate variable equal to one if the woman is married to someone with a different answer to this question.

If people report that they have worked in the last five years, the ACS asks them about their occupation. I compute the mean earnings of each occupation and then create a variable equal to one if women are in marriages where one member is in an occupation that earns at least 50 percent more on average than the other's occupation. I create another variable equal to one if the woman is in a marriage with an occupational earnings difference of less than 50 percent. When people have not worked during the last five years, they are assigned an occupational earnings of zero and are thus identified as being in marriages with wide earnings disparities if their spouses worked at all. Finally, I create an indicator variable equal to one if women are married to men with the same education levels as well as an indicator equal to one if women are married to men with different education levels. Education is an attractive

measure because it predicts lifetime earnings and has the advantage of generally being fixed from an early age.

Means of key variables are shown in Table 4. As with the estimates, the means are weighted using IPUMS weights. An important difference between older and younger women in the sample is how many times they have been married. Only 6 percent of younger women have been married more than once, while 83 percent of the older sample has had multiple marriages.

4.2 Empirical Strategy

With the ACS data, I consider what happens to the likelihood of being married at ten-year anniversaries by estimating the following equation:

$$y_i = \gamma_{st} + X_i\alpha + f(l_i, \lambda) + D_i\beta + \eta_i, \tag{3}$$

where i indexes the individual, t indexes the year, s indexes the state, y is either an indicator equal to one if the individual is married, X is a set of individual covariates that includes years of education, a vector of indicator variables for race, and a vector of indicator variables for age, γ is a full set of year and state interactions, f is a smooth function representing the profile of the dependent variable with respect to the length of marriage l in years, and D is an indicator equal to one if the marriage happened at least ten years prior. I model f as a quadratic polynomial on either side of ten-year anniversaries. Including state-by-year fixed effects means Equation (3) accounts for any state differences and any state-specific shocks over time. For example, state-wide law changes regarding the division of assets and changes to a state's economy are both captured by these fixed effects.

I omit several indicator variables from Equation (3) to avoid multicollinearity.

Specifically, I omit the indicator for Alabama in 2008, the indicator for being white, and the indicator for the earliest possible age in each regression. The β coefficients can be interpreted as the percentage-point change in the likelihood of being married at ten years since the beginning of marriages for people who have ever married.

4.3 Results

Figure 2 shows how the likelihood of remaining married trends with years since marriages began. The likelihood of remaining married trends smoothly at ten-year anniversaries for all women except for those who were 45 or older at the time of marriage. For women 45 and older at the time of marriage, the likelihood of being married gaps down at ten-year anniversaries.

The results from estimating Equation (3) with indicator variables for remaining married as the dependent variable are shown in Table 5. The estimates suggest that the likelihood of being married falls by 3.2 percentage points or 3.8 percent as marriages of older women cross the ten-year threshold. This estimate implies that the likelihood of being divorced increases by 19.4 percent as marriages of older women cross the ten-year mark. Since I classify separated women as being married, the likelihood of being married would trend smoothly at ten-year anniversaries if people were moving out before ten-year anniversaries but waiting to file the paperwork. The large coefficient indicates that older people are delaying changes in living arrangements as well.

These results are consistent both with couples retiming their divorces and with there being extra divorces after ten-year anniversaries for older women. Couples opting to forgo divorcing at nine years of marriage would mean the ten-year rule causes the likelihood of remaining married at nine years to be artificially high. When these

divorce-delaying couples divorce at ten years of marriage, the likelihood of being married would gap down even if the ten-year rule only affected marriage timing. On the other hand,if there were extra divorces at ten-year anniversaries that did not come from couples delaying divorce, the likelihood of remaining married would also gap down at ten-year anniversaries.

Table 6 shows results from using narrower age bins. As in Table 2 with the Vital Statistics data, Table 6 indicates non-linearities in response to the ten-year rule based on age. The estimated change in the likelihood of remaining married is negative and statistically significant for women who married from age 41 to age 55. For women who married at younger ages, there is no evidence of changes in the likelihood of remaining married at ten-year anniversaries.

Next I estimate variations of Equation (3) to examine the characteristics of marriages that end at ten years.[14] I focus the discussion on older people since they are the ones for whom a discontinuity was documented in Table 5. In column one of the top panel of Table 7, the dependent variable equals one if the individual is in a marriage where both members have the same labor force participation. A negative and significant β coefficient would imply that the marriages that end abruptly at ten-year anniversaries are those where members have the same labor force participation. The coefficient on crossing the ten-year mark is statistically indistinguishable from zero, suggesting that it is not couples with identical labor force participation statuses that drive the fall in marriage probabilities documented in Table 5. In column one of the bottom panel of Table 7, the dependent variable equals one if the individual is married to someone with a different labor force status than herself. The coefficient

[14]I focus on understanding what kind of marriages end at ten years of marriage because I can only observe characteristics of both members of the couple when the couple is living together. Once a woman is divorced and no longer living with her husband, I can no longer determine characteristics of her marriage.

of -0.035 suggests that the marriages that end are those where spouses had different labor force statuses.

Column 2 of Table 7 displays β estimates from Equation (3) with the indicator variables based on whether or not both members of the couple have ever worked over the last five years as the dependent variables. These results indicate that couples whose marriages end are those where both members answered the same to having ever worked in the last five years. In column 3, the dependent variables are based on average earnings of the spouses' occupations. The coefficient of -0.027 when the dependent variable is an indicator for couples having been in occupations with different average earnings suggests that it is couples with different earnings potentials who divorce at their ten-year anniversaries.

The last column of Table 7 evaluates how similar the education levels are for couples who divorce at ten-year anniversaries. In the last column of the top panel of Table 7, the dependent variable is one if women are married to husbands with the same education levels. In all cases, the coefficients are statistically insignificant. In the bottom panel, the dependent variable is an indicator equal to one if the woman is married to someone with a different education level. The estimate of -0.032 for older couples indicates that the couples who divorce are those where one member has more education than the other member.

These results are most comparable to Goda et al. (2007), who also study how marriage stocks change at ten-year anniversaries and find small, statistically insignificant differences in divorce probabilities at ten-years of marriage between couples with and without large earnings disparities between the primary and secondary earners. My estimates of the change in the likelihood of being divorced at ten-year anniversaries are small for the full sample as well. Unlike the PSID, though, the ACS allows for studying heterogeneity based on age and reveals important differences in age at

marriage.

We would not expect divorces from the ten-year rule to comprise a large share of total divorces since the vast majority of marriages are not near their ten-year anniversaries and because many factors unrelated to Social Security influence divorce. Nevertheless, the ACS allows for performing a back-of-the-envelope calculation to better understand the percent of divorces for people who married over the age of 44 that are influenced by the ten-year rule. According to the ACS, 98,611 marriages where the woman was 45 or older at marriage ended in divorce in 2011. Of these divorces, 9,049 ended at marriage durations of 10 and 11. The Vital Statistics bunching estimate implies that 9.1 percent, or 823, of those divorces in years 10 and 11 are additional divorces that would not have occurred in years 10 and 11 without the sudden change in spousal benefits after divorce at ten-year anniversaries. These numbers imply that the ten-year rule influenced about 0.84 percent of divorces in 2011 for older couples, which is a small but non-trivial share of divorces.

4.4 Heterogeneity, Robustness, and Placebo Tests

I now test for heterogeneity based on marital status, consider the robustness of these results to various estimation choices, and conduct placebo analyses. Table 8 displays results with the dependent variable being an indicator for being married, but the results are similarly robust for other outcome variables.

I first test for differences between people in their first marriages and people who have been married more than once. Heterogeneity by marital history may exist because people who have been married multiple times may be more aware of divorce rules than people who are on their first marriages. Alternatively, people who are on subsequent marriages may be eligible for spousal benefits from previous marriages

and may therefore not care about reaching the ten-year mark in their current marriages. Column 1 displays results with the sample restricted to people who have only married one time, while column 2 displays results with the sample restricted to only people who have had multiple marriages. For people married more than once, the point estimate of the fall in the likelihood of remaining married at ten years is larger in absolute value for the full sample and for people who married at 45 or older. For people married only once, the fall in the likelihood of remaining married is statistically insignificant. These results suggest that older people in subsequent marriages may be more responsive to the ten-year rule.

For the main analysis, I coded an individual as being married if she was separated because the SSA uses the official marriage length in determining eligibility for the spousal benefit. In column 3, I test the sensitivity of the results to defining being married as being zero if people are separated. The results are similar to the original estimates.

All of the ACS estimates are weighted using the IPUMS sample weights. In their review of econometric issues associated with survey weights, Solon et al. (2013) suggest considering both weighted and unweighted estimates. Column 4 tests the sensitivity of the estimates to not using weights. The point estimate for the change in the likelihood of being married at ten years of marriage for older people is statistically indistinguishable from the prior estimate and from zero.[15]

Another possible concern is that the controls in Equation (3) may be inadequate,

[15]In their analysis of marriage and divorce data, Ratcliffe et al. (2008) evaluate twenty data sets containing marital information along a variety of dimensions, including representativeness, and conclude that the ACS is one of the three best. Unfortunately, though, no other data set with marriage lengths is large enough to verify that the ACS information on years since marriages began is nationally representative. Since I use the ACS to verify that the likelihood of being married and divorced changes abruptly at ten years of marriage and to study the characteristics of marriages that end at ten years, the sample does not need to be representative for the results to be valid. Rather, the likelihood of being included in the survey cannot change at ten-years of marriage, which it presumably does not.

which would be the case if the effects of demographic variables change at the cutoff. To consider this possibility, I supplement Equation (3) with interactions of years of education, age, and the non-omitted race indicators with quadratic polynomials with respect to years since the start of marriages. The results are shown in column 5 and are almost identical to the original results, suggesting returns to demographic variables changing at the threshold do not drive the fall in the likelihood of remaining married at ten-year anniversaries. A related concern is that many factors affect divorce that I do not control for, such as health, income, and the presence of children in the household. These factors changing discontinuously at ten-year anniversaries could potentially bias the results.[16] In column 6, I supplement Equation (3) with controls for the presence of children, the individual's annual earnings, and indicator variables for having a cognitive difficulty, an ambulatory difficulty, self-care difficulty, vision difficulty, or difficulty living alone. The estimates are very similar to the original estimates.

An alternative to estimating Equation (3) using ordinary least squares (OLS) would be to estimate the model using a probit regression. Column 7 of Table 8, displays average marginal effects from probit regressions of Equation (3). The estimates of the average change in the likelihood of being married at ten-year anniversaries from the probit regressions are nearly identical to the OLS estimates.

One might also be concerned that f is not flexible enough to capture the likelihood of remaining married trending smoothly with years since marriages began for older people. In columns 8 and 9, I replicate the analysis using marriage durations of nine and eleven years as placebo cutoffs. One of the estimates of abrupt changes in the likelihood of being married at these marriage lengths is statistically significant at

[16]For these factors to be driving the changes at ten years of marriage, they would have to change at ten-year anniversaries other than through divorce. A concern with controlling for these factors is that divorce likely affects health, income, and the presence of children.

the ten-percent level. An issue with using the years immediately before and after the cutoff is that f can be influenced by the cutoff at ten years. As a further check, I replicate the analysis setting marriage durations of six through eight and twelve through fourteen as the cutoffs. The point estimates are significant at least the ten-percent level 12.5 percent of the time, which is close to the 10 percent we would expect from chance. These results provide evidence that f can sufficiently account for the marriage profile trending smoothly.

Finally, I include widows in the sample and consider how the likelihood that women are widows changes at ten-year anniversaries. The likelihood that a woman classifies herself as a widow could change at ten-year anniversaries if divorced women are more likely to consider themselves widows rather than divorced if their ex-husbands die while they are receiving spousal benefits. However, we would be concerned if the likelihood of being a widow changes dramatically at ten-year anniversaries.

Figure 3 shows how the likelihood of being a widow changes with years since marriages began. Estimates of Equation (3) with the dependent variable being an indicator equal to one if the woman is a widow are shown in Table 9. The profiles with respect to years since marriage do not provide evidence of large spikes at ten-year anniversaries. The change in the likelihood of being a widow is estimated to increase by 0.3 percentage points and is significant at the five percent level. None of the estimated discontinuities are statistically significant for any of the age groups. Although statistically significant for the full sample, the estimate is 91 percent smaller than the estimate for the decrease in the likelihood of remaining married after ten years of marriage and does not indicate that widowhood increases dramatically at ten-year anniversaries.

5 Conclusion

Social Security is a key part of retirement plans and retirement income for Americans. This paper provides evidence that Social Security's requirement that spouses be married for at least ten years before qualifying for spousal benefits influences divorce timing and propensities. Around 2 percent of divorces occurring within the six months after ten-year anniversaries would have occurred before them if not for Social Security's ten-year rule. For older couples, the effects are even more dramatic. It appears that many older couples would not have divorced if they could not receive spousal benefits after divorce or that they delay divorce for many years to benefit from the ten-year rule. Even many middle aged couples, who account for over forty percent of all divorces in the sample, delay divorcing until after their ten-year anniversaries.

The likelihood of being divorced gaps up at ten-year anniversaries for women 45 or older at the time of marriage, suggesting Social Security's ten-year rule is not only affecting the timing of divorce paperwork. Instead, people delay changing living arrangements until after ten years of marriage. The marriages that end are ones where one member of the couple likely earned significantly more than the other, which speaks to the importance of the spousal benefit for women who specialize in home production. As the ten-year rule means that many secondary earners are better off from divorcing after ten-year anniversaries relative to divorcing before ten-year anniversaries, the results from this paper provide evidence that financial well-being after divorce is a consideration for people when making the decision to leave a marriage.

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Table 1: Discontinuity in Divorces at Ten Years of Marriage

	Divorces at 9 Years	Discontinuity at 10 Years: Number of Divorces	Discontinuity at 10 Years: Log of Number of Divorces
All Couples	73,575	166***	0.033***
		(56)	(0.009)
Married Younger than 25	46,188	60	0.020*
		(44)	(0.011)
Married from 25 to 44	25,775	79***	0.043***
		(30)	(0.014)
Married Older than 44	1,612	27***	0.230***
		(8)	(0.064)

Notes: *, **, and *** indicate significance at 10%, 5%, and 1%. Robust standard errors are in parentheses below the estimates. The data are from the 1985 to 1995 Vital Statistics data on divorces and include all divorces that occurred within four years of ten-year anniversaries. All regressions control for quadratics in length of marriage in months on either side of ten-year anniversaries of marriages. The discontinuity in divorces at ten years is per month.

Table 2: Discontinuity in Divorces at Ten Years of Marriage—Narrower Age Bins

		Discontinuity at 10 Years	
	Divorces at 9 Years	Number of Divorces	Log of Number of Divorces
Married from 16 to 20	24,780	30	0.021
		(27)	(0.013)
Married from 21 to 25	24,094	41	0.022
		(32)	(0.016)
Married from 26 to 30	12,335	46**	0.047**
		(19)	(0.018)
Married from 31 to 35	5,895	17	0.048
		(13)	(0.030)
Married from 36 to 40	2,823	11	0.068
		(11)	(0.046)
Married from 41 to 45	1,334	-2	0.011
		(7)	(0.069)
Married from 46 to 50	704	12**	0.232**
		(5)	(0.096)
Married from 51 to 55	345	67**	0.263**
		(3)	(0.122)
Married from 56 to 60	157	8***	0.613***
		(2)	(0.168)

Notes: *, **, and *** indicate significance at 10%, 5%, and 1%. Robust standard errors are in parentheses below the estimates. The data are from the 1985 to 1995 Vital Statistics data on divorces and include all divorces that occurred within four years of ten-year anniversaries. All regressions control for quadratics in length of marriage in months on either side of ten-year anniversaries of marriages. The discontinuity in divorces at ten years is per month.

Table 3: Bunching of Divorces around Ten Years of Marriage

Panel A	Estimated Divorces from 9.5 to 10 Years without Ten-Year Rule	Diff between Observed Divorces	Standard Error	Percent Diff	Estimated Divorces from 10 to 10.5 Years without Ten-Year Rule	Diff between Observed Divorces	Standard Error	Percent Diff
All Couples	36,156	-763	212	-2.11***	34,029	676	198	1.99***
Married Younger than 25	22,762	-337	165	-1.48**	21,705	384	162	1.77***
Married from 25 to 44	12,587	-367	124	-2.91***	11,587	205	115	1.77*
Married Older than 44	807	-59	31	-7.28*	737	87	31	11.76***
Panel B	Estimated Divorces at Year 9 without Ten-Year Rule	Diff between Observed Divorces	Standard Error	Percent Diff	Estimated Divorces at Year 10 without Ten-Year Rule	Diff between Observed Divorces	Standard Error	Percent Diff
All Couples	75,050	-1,475	364	-1.96***	66,528	-77	326	-0.12
Married Younger than 25	46,978	-790	282	-1.68***	42,759	-254	261	-0.59
Married from 25 to 44	26,384	-609	213	-2.31***	22,367	39	181	0.17
Married Older than 44	1,688	-76	53	-4.48	1,402	138	51	9.86***
Panel C	Estimated Divorces at Years 8.5 to 9 without Ten-Year Rule	Diff between Observed Divorces	Standard Error	Percent Diff	Estimated Divorces at Years 10 and 11.5 without Ten-Year Rule	Diff between Observed Divorces	Standard Error	Percent Diff
All Couples	115,803	-782	499	-0.68	34,039	666	206	1.96***
Married Younger than 25	71,867	-168	396	-0.23	21,686	403	170	1.86***
Married from 25 to 44	41,225	-478	295	-1.16	11,605	187	120	1.61
Married Older than 44	2,711	-136	76	-5.01*	748	76	32	10.13***
Panel D	Estimated Divorces at Years 8 and 9 without Ten-Year Rule	Diff between Observed Divorces	Standard Error	Percent Diff	Estimated Divorces at Years 10 and 11 without Ten-Year Rule	Diff between Observed Divorces	Standard Error	Percent Diff
All Couples	159,457	-182	874	-0.11	125,227	851	746	0.68
Married Younger than 25	98,497	58	693	0.06	81,663	184	618	0.23
Married from 25 to 44	57,228	-161	523	-0.28	41,040	437	416	1.07
Married Older than 44	3,732	-79	139	-2.13	2,524	230	107	9.10**

Notes: *, **, and *** indicate significance at 10%, 5%, and 1%. The data are from the 1985 to 1995 Vital Statistics data on divorces and include all divorces that occurred within four years of ten-year anniversaries. The estimates of divorces that would have occurred without the ten-year rule come from fitting a polynomial excluding data from the bunching region and then using the parameter estimates to estimate the divorces that would have occurred in the bunching region. Standard errors are calculated from the bootstrapping procedure described in the paper.

Table 4: Means of Key Variables from the America Community Survey

	Within 5 to 14 Years of Marriage	9 Years since Marriage	10 Years since Marriage
		Full Sample	
Married	0.830	0.829	0.816
Divorced	0.170	0.171	0.184
Black	0.100	0.101	0.104
White	0.763	0.763	0.761
Hispanic	0.160	0.159	0.162
Age	39.675	39.377	40.275
College	0.325	0.327	0.319
High School	0.908	0.907	0.902
Married More than Once	0.312	0.316	0.315
Married to Spouse with Same LFP	0.505	0.499	0.494
Married to Spouse with Diff LFP	0.229	0.235	0.229
Married to Spouse with Same LFP over Last 5 Years	0.597	0.592	0.577
Married to Spouse with Diff LFP over Last 5 Years	0.137	0.141	0.145
Married to Spouse in Occ with Similar Wages	0.340	0.337	0.327
Married to Spouse in Occ with Different Wages	0.490	0.492	0.489
Married to Spouse with Same Education Level	0.289	0.287	0.286
Married to Spouse with Diff Education Levels	0.541	0.542	0.530
n	809,912	82,283	84,612
		Married before Age 25	
Married	0.828	0.825	0.820
Divorced	0.172	0.175	0.180
Black	0.075	0.074	0.077
White	0.769	0.769	0.768
Hispanic	0.218	0.219	0.225
Age	30.613	30.129	31.066
College	0.272	0.276	0.270
High School	0.887	0.883	0.877
Married More than Once	0.060	0.056	0.057
Married to Spouse with Same LFP	0.464	0.451	0.458
Married to Spouse with Diff LFP	0.257	0.268	0.260
Married to Spouse with Same LFP over Last 5 Years	0.577	0.572	0.563
Married to Spouse with Diff LFP over Last 5 Years	0.144	0.146	0.155
Married to Spouse in Occ with Similar Wages	0.344	0.343	0.333
Married to Spouse in Occ with Different Wages	0.484	0.482	0.487
Married to Spouse with Same Education Level	0.292	0.291	0.291
Married to Spouse with Diff Education Levels	0.535	0.534	0.529
n	258,285	26,309	26,754

Continued from previous page

	Within 5 to 14 Years of Marriage	9 Years since Marriage	10 Years since Marriage
		Married from 25 to 44	
Married	0.830	0.830	0.816
Divorced	0.170	0.170	0.184
Black	0.114	0.116	0.119
White	0.749	0.747	0.747
Hispanic	0.139	0.138	0.137
Age	41.233	40.934	41.881
College	0.374	0.376	0.363
High School	0.924	0.925	0.921
Married More than Once	0.370	0.378	0.378
Married to Spouse with Same LFP	0.529	0.526	0.516
Married to Spouse with Diff LFP	0.210	0.211	0.208
Married to Spouse with Same LFP over Last 5 Years	0.617	0.610	0.594
Married to Spouse with Diff LFP over Last 5 Years	0.122	0.127	0.130
Married to Spouse in Occ with Similar Wages	0.352	0.348	0.340
Married to Spouse in Occ with Different Wages	0.478	0.482	0.476
Married to Spouse with Same Education Level	0.290	0.288	0.286
Married to Spouse with Diff Education Levels	0.541	0.543	0.530
n	453,586	45,894	47,635
		Married Older than 44	
Married	0.835	0.836	0.805
Divorced	0.165	0.164	0.195
Black	0.106	0.107	0.111
White	0.819	0.827	0.817
Hispanic	0.085	0.077	0.089
Age	61.063	61.202	61.855
College	0.235	0.233	0.232
High School	0.890	0.889	0.879
Married More than Once	0.825	0.826	0.825
Married to Spouse with Same LFP	0.507	0.504	0.487
Married to Spouse with Diff LFP	0.242	0.251	0.240
Married to Spouse with Same LFP over Last 5 Years	0.556	0.562	0.528
Married to Spouse with Diff LFP over Last 5 Years	0.194	0.193	0.199
Married to Spouse in Occ with Similar Wages	0.258	0.255	0.237
Married to Spouse in Occ with Different Wages	0.577	0.581	0.569
Married to Spouse with Same Education Level	0.274	0.270	0.267
Married to Spouse with Diff Education Levels	0.561	0.566	0.538
n	98,041	10,080	10,223

The sample is from the 2008 to 2011 IPUMS ACS and consists of women whose most recent marriages began between 5 and 14 years prior to the survey year. All means are computed using IPUMS weights.

Table 5: Changes in the Likelihood of Remaining Married at 10 Years since Marriage

	n	Indicator Variable for Being Married
Full Sample	809,912	-0.006
		(0.004)
Married Younger than 25	258,285	-0.000
		(0.007)
Married from 25 to 44	453,586	-0.003
		(0.005)
Married Older than 44	98,041	-0.032***
		(0.011)

Notes: *, **, and *** indicate significance at 10%, 5%, and 1%. The sample is from the 2008 to 2011 IPUMS ACS and consists of women whose most recent marriages began between 5 and 14 years prior to the survey year. Robust standard errors are shown in parentheses. All regressions use IPUMS weights and control for age, education, race, sex, year and state interactions, and a quadratic with respect to years since marriages began on either side of ten-year anniversaries.

Table 6: Changes in the Likelihood of Remaining Married at 10 Years since Marriage—Narrower Age Bins

	n	Probability of Remaining Married at 9 Years of Marriage	Indicator Variable for Being Married
Married from 16 to 20	87,221	0.790	-0.009
			(0.013)
Married from 21 to 25	213,520	0.848	0.002
			(0.007)
Married from 26 to 30	174,045	0.848	-0.005
			(0.008)
Married from 31 to 35	109,894	0.819	0.008
			(0.011)
Married from 36 to 40	77,755	0.801	-0.001
			(0.013)
Married from 41 to 45	57,536	0.813	-0.025*
			(0.015)
Married from 46 to 50	40,067	0.823	-0.040**
			(0.018)
Married from 51 to 55	23,197	0.838	-0.040*
			(0.022)
Married from 56 to 60	11,809	0.852	-0.019
			(0.029)

Notes: *, **, and *** indicate significance at 10%, 5%, and 1%. The sample is from the 2008 to 2011 IPUMS ACS and consists of women whose most recent marriages began between 5 and 14 years prior to the survey year. Robust standard errors are shown in parentheses. All regressions use IPUMS weights and control for age, education, race, sex, year and state interactions, and a quadratic with respect to year since marriages began on either side of ten-year anniversaries.

Table 7: Types of Marriages that End at 10 Years since Marriage

	n	Indicator Variable for Being Married to Spouse with Same LFP	Indicator Variable for Being Married to Spouse with Same LFP over Last Five Years	Indicator Variable for Being Married to Spouse in Occ with Similar Earnings	Indicator Variable for Being Married to Spouse with Same Education Level
Full Sample	809,912	0.002	-0.001	0.003	0.003
		(0.005)	(0.005)	(0.005)	(0.004)
Married Younger than 25	258,285	0.008	-0.000	-0.002	0.008
		(0.009)	(0.009)	(0.009)	(0.008)
Married from 25 to 44	453,586	-0.002	0.004	0.009	0.002
		(0.007)	(0.006)	(0.006)	(0.006)
Married Older than 44	98,041	0.004	-0.026*	-0.005	0.000
		(0.014)	(0.014)	(0.012)	(0.012)
	n	Indicator Variable for Being Married to Spouse with Diff LFP	Indicator Variable for Being Married to Spouse with Diff LFP over Last Five Years	Indicator Variable for Being Married to Spouse in Occ with Diff Earnings	Indicator Variable for Being Married to Spouse with Diff Education Level
Full Sample	809,912	-0.007*	-0.005	-0.009*	-0.009*
		(0.004)	(0.003)	(0.005)	(0.005)
Married Younger than 25	258,285	-0.004	0.004	0.002	-0.008
		(0.008)	(0.006)	(0.009)	(0.009)
Married from 25 to 44	453,586	-0.003	-0.008*	-0.012*	-0.005
		(0.005)	(0.004)	(0.007)	(0.007)
Married Older than 44	98,041	-0.035***	-0.005	-0.027*	-0.032**
		(0.012)	(0.011)	(0.014)	(0.014)

Notes: *, **, and *** indicate significance at 10%, 5%, and 1%. The sample is from the 2008 to 2011 IPUMS ACS and consists of women whose most recent marriages began between 5 and 14 years prior to the survey year. Robust standard errors are shown in parentheses. All regressions use IPUMS weights and control for age, education, race, sex, year and state interactions, and a quadratic with respect to year since marriages began on either side of ten-year anniversaries.

Table 8: Robustness of Estimates with Dependent Variable Being an Indicator for Being Married

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Full Sample	-0.003	-0.011	-0.003	-0.007**	-0.006	-0.006	-0.007*	0.004	-0.001
	(0.005)	(0.007)	(0.004)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Married Younger than 25	-0.002	0.012	0.005	-0.007	-0.001	0.002	-0.002	0.007	-0.007
	(0.007)	(0.033)	(0.008)	(0.005)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Married from 25 to 44	-0.004	-0.001	-0.001	-0.003	-0.003	-0.005	-0.004	0.002	-0.002
	(0.006)	(0.009)	(0.006)	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Married Older than 44	-0.008	-0.037***	-0.037***	-0.026***	-0.031***	-0.030***	-0.033***	-0.001	0.021*
	(0.028)	(0.012)	(0.012)	(0.008)	(0.011)	(0.011)	(0.011)	(0.010)	(0.011)
Sample/ Estimation Alteration	Married Once	Married at Least Twice	Coding Separations as Unmarried	Unweighted Estimates	Interacting Demographics with f	Controlling for Health, Income, and Children	Average Marginal Effects from Probit	Placebo Test at 9 Years	Placebo Test at 11 Years

Notes: *, **, and *** indicate significance at 10%, 5%, and 1%. The sample is from the 2008 to 2011 IPUMS ACS and consists of women whose most recent marriages began between 5 and 14 years prior to the survey year. Robust standard errors are shown in parentheses. All regressions use IPUMS weights and control for age, education, race, sex, year and state interactions, and a quadratic with respect to years since marriages began on either side of ten-year anniversaries. The estimates consider the robustness of the estimates in column 1 of Table 5. In column 1, the sample size for each row is 537,443, 243,890, 278,413, and 15,140. In column 2, the sample size for each row is 272,469, 14,395, 175,173, and 809,912. In columns 3 through 7, the sample size for each row is 809,912, 258,285, 453,586, and 98,041. In column 8, the sample size for each row is 817,298, 257,745, 456,076, and 103,477. In column 9, the sample size for each row is 801,014, 258,821, 450,334, and 91,859.

Table 9: Changes in the Likelihood of Being Widowed at 10 Years since Marriage

	n	Probability of Being Widowed at 9 Years of Marriage	Indicator Variable for Being Widowed
Full Sample	832,586	0.026	0.003**
			(0.001)
Married Younger than 25	260,135	0.008	0.001
			(0.002)
Married from 25 to 44	461,304	0.018	0.003
			(0.002)
Married Older than 44	111,147	0.121	0.013
			(0.008)

Notes: *, **, and *** indicate significance at 10%, 5%, and 1%. The sample is from the 2008 to 2011 IPUMS ACS and consists of women whose most recent marriages began between 5 and 14 years prior to the survey year. Robust standard errors are shown in parentheses. All regressions use IPUMS weights and control for age, education, race, sex, year and state interactions, and a quadratic with respect to years since marriages began on either side of ten-year anniversaries.

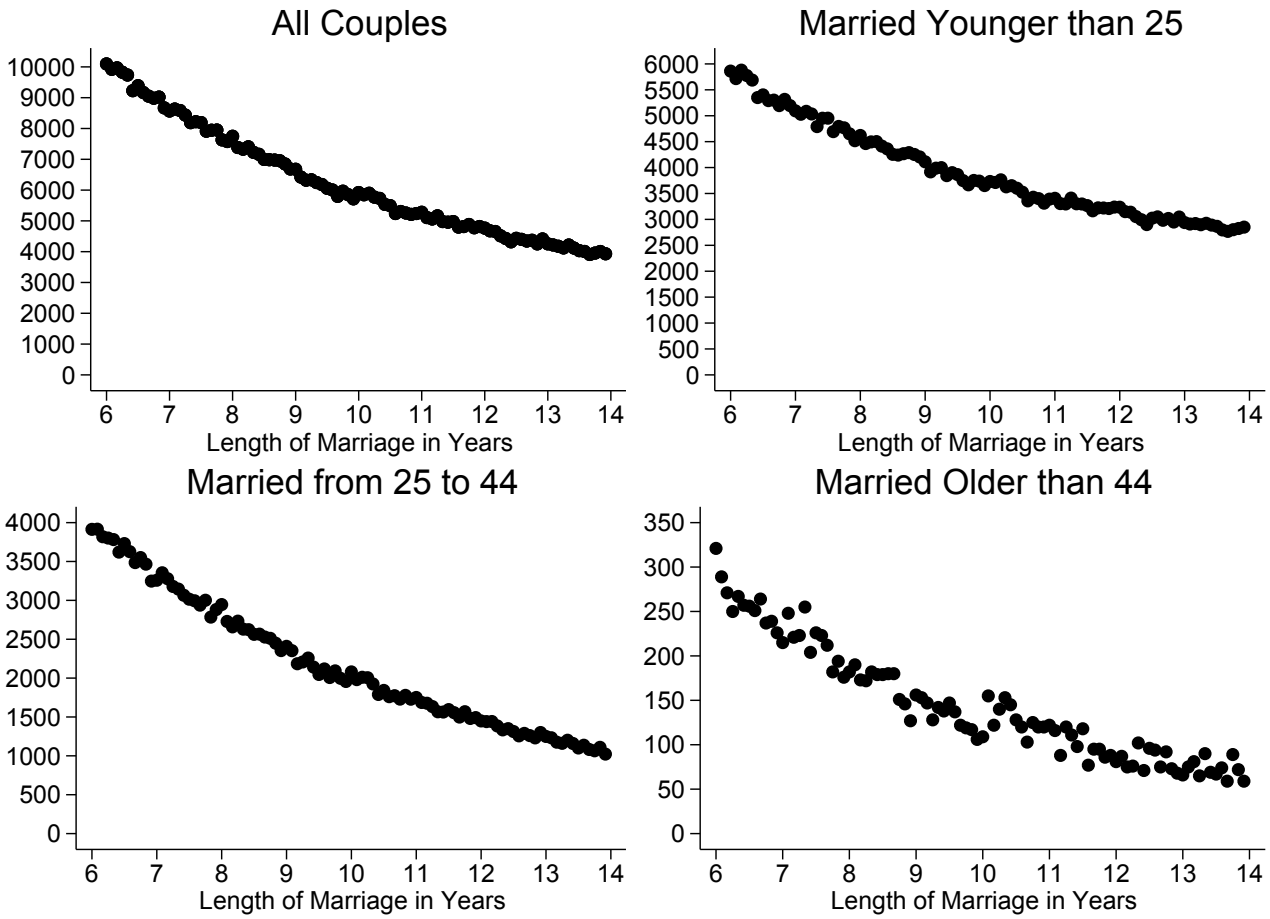

Figure 1: Divorces by Marriage Length, from the 1985 to 1995 Vital Statistics Data

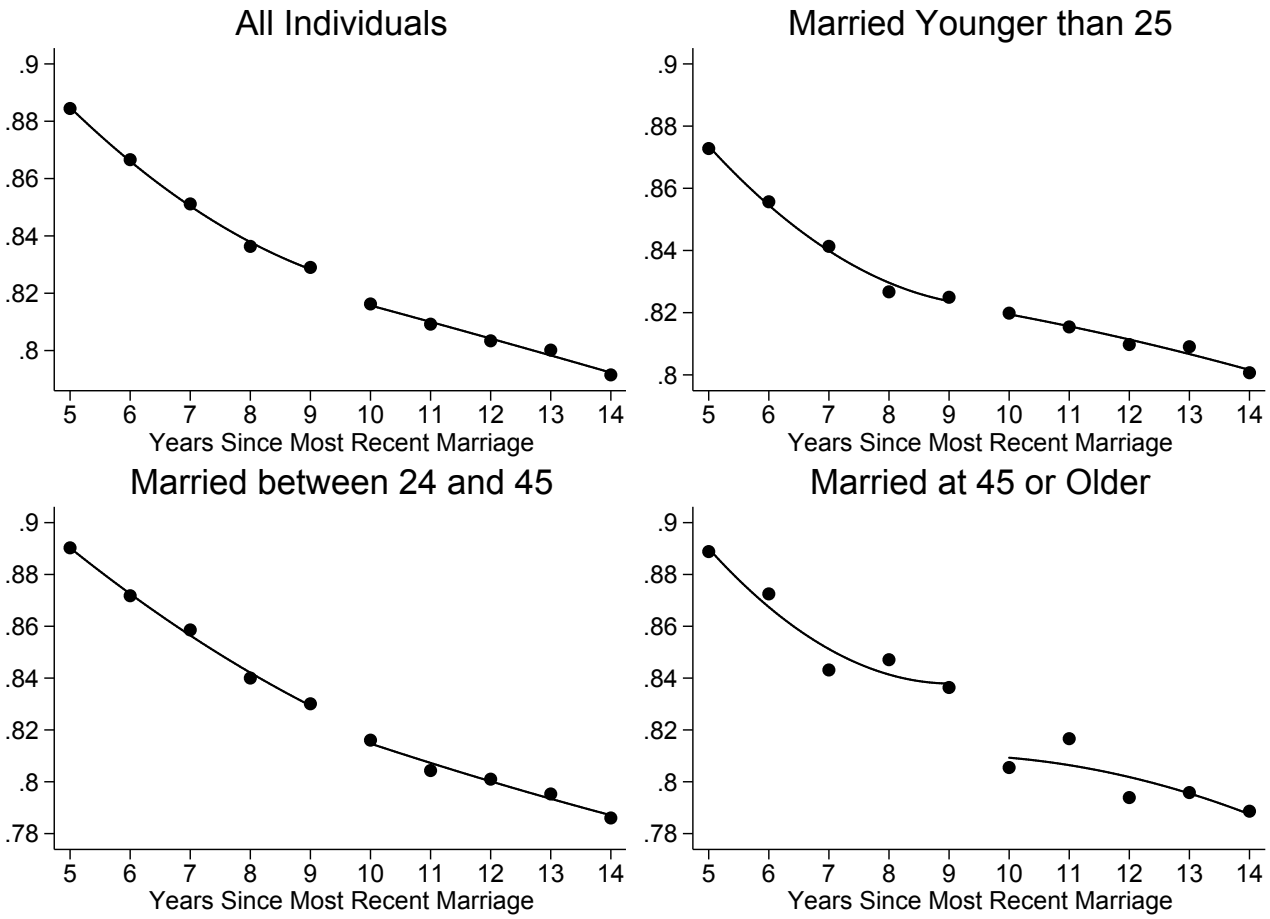

Figure 2: Probability of Remaining Married by Years since the Marriage Began, from the 2008 to 2011 ACS

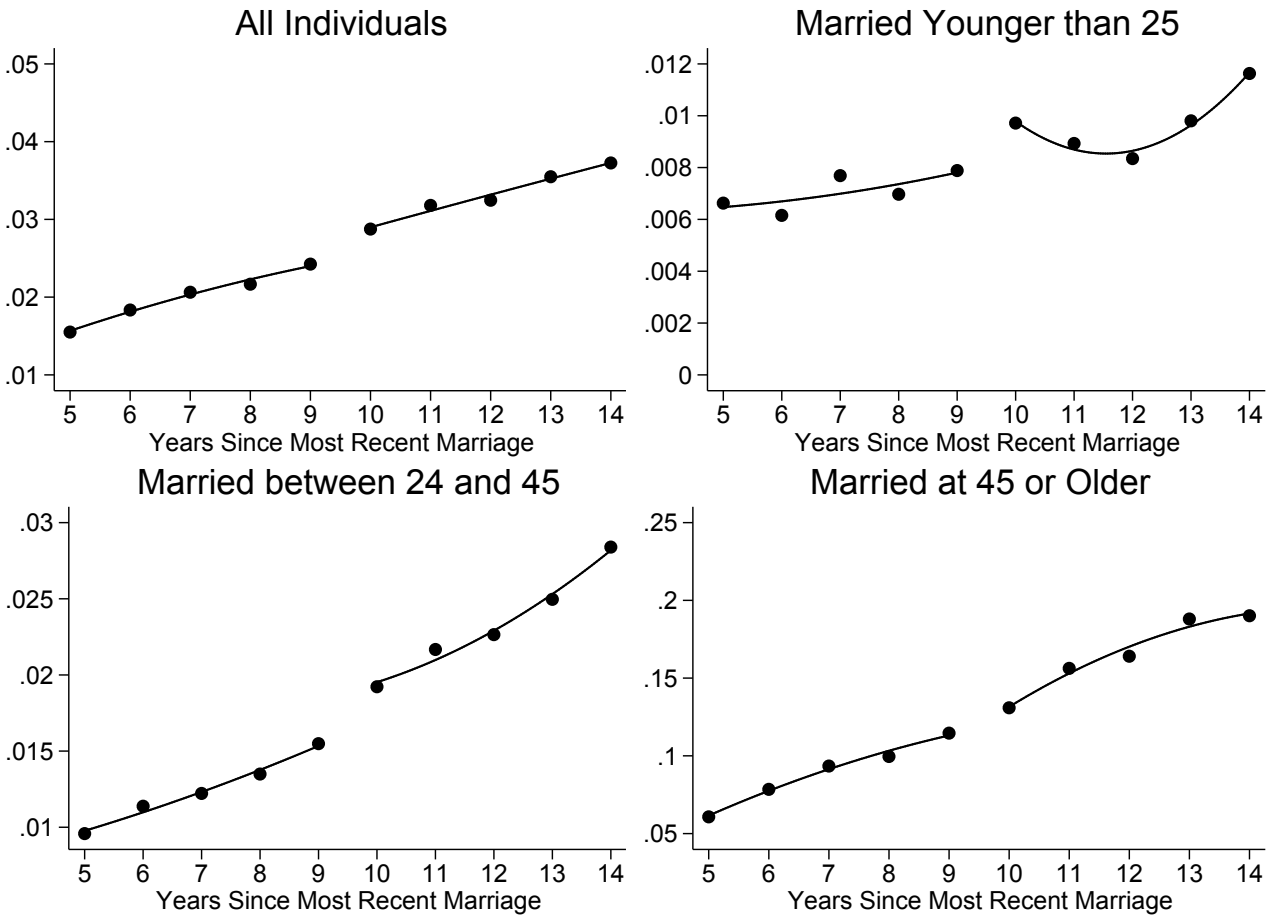

Figure 3: Probability of Being Widowed by Years since the Marriage Began, from the 2008 to 2011 ACS

Appendices

A Trend Breaks before the Ten-Year Rule

To test for similar discontinuities at ten years of marriage before the ten-year rule was implemented, I use data from 1966 to 1974. The reason for allowing several years of data before the passage of the 1977 law is that the law applied to all existing divorces, not just the ones happening after the law was passed. This means divorce rates might change before the law if people were anticipating the change from a twenty-year to a ten-year requirement.

I first conduct Kolmogorov-Smirnov tests to determine whether or not the distributions of marriage lengths are different for the two time periods. A failure to reject that they are different would cast doubt on the ten-year rule being responsible for the discontinuity observed at ten years of marriage presented in the main text. Both for the full sample and for each age group, the Kolmogorov-Smirnov tests reject the null hypotheses that the distributions are the same at the one-percent level. These tests provide suggestive evidence that the ten-year rule influences divorce timing.

As divorce norms and economic factors changed between these two time periods, it is possible that the distributions could be different even without the ten-year rule being implemented. As such, I next replicate the approach taken in the main analysis to test for discontinuities at ten years of marriage before the ten-year rule was implemented. Graphs of the divorce profiles before the ten-year rule was implemented are shown in Figure A.1. As with the main Vital Statistics results, the number of divorces falls with the duration of marriages. In none of the graphs does there appear to be any gaps or bunching associated with ten years of marriage. Table A.1 shows estimates of the discontinuities at ten-year anniversaries using data from 1966 to 1974. All of the estimates are statistically indistinguishable from zero and provide no evidence of

discontinuities before the ten-year rule was implemented.

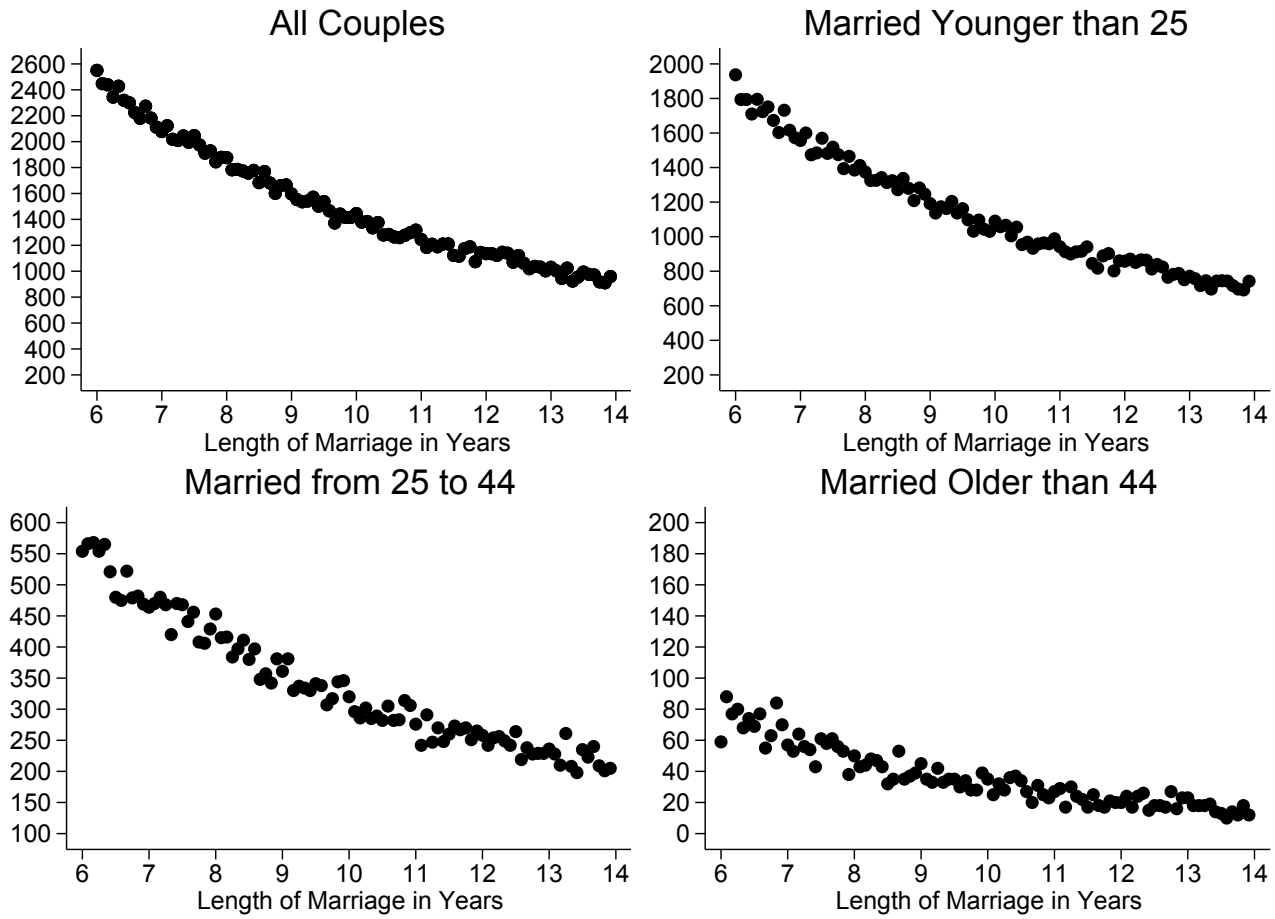

Figure A.1: Divorces by Marriage Length, from the 1966 to 1974 Vital Statistics Data

Table A.1: Discontinuity in Divorces at Ten Years of Marriage before Ten-Year Rule

	Divorces at 9 Years	Number of Divorces	Log of Number of Divorces
All Couples	17,950	-14	-0.004
		(23)	(0.016)
Married Younger than 25	10,726	3	0.011
		(19)	(0.021)
Married from 25 to 44	6,395	-15	-0.028
		(13)	(0.025)
Married Older than 44	829	-2	-0.020
		(5)	(0.080)

Notes: *, **, and *** indicate significance at 10%, 5%, and 1%. Robust standard errors are in parentheses below the estimates. The data are from the 1966 to 1974 Vital Statistics data on divorces and include all divorces that occurred within four years of ten-year anniversaries. All regressions control for quadratics in length of marriage in months on either side of ten-year anniversaries of marriages. The discontinuity in divorces at ten years is per month.

B Sensitivity of Bunching Estimates to Polynomial

The bunching results presented in Section 3 modeled g as a cubic polynomial in Equation (2). Tables B.1 through B.4 show the sensitivity of the bunching results to using polynomials of different degrees. The results using bunching regions of six months, one year, or one-and-half years are very similar regardless of the polynomial used. When the bunching region is two years wide, the estimate of extra divorces after ten-year anniversaries for older couples is not significant for higher polynomials. However, the estimates are similar in size and do not provide evidence that contradicts the results presented in the paper.

Table B.1: Bunching of Divorces around Ten-Years of Marriage—Sensitivity to Polynomial Choice

	Estimate of Divorces from 9.5 to 10 Years without Ten-Year Rule	Diff between Observed Divorces	Standard Error	Percent Diff	Estimate of Divorces from 10 to 10.5 Years without Ten-Year Rule	Diff between Observed Divorces	Standard Error	Percent Diff
Second Degree Polynomial								
All Couples	36,220	-827	211	-2.28***	33,965	740	198	2.18***
Married Younger than 25	22,790	-365	165	-1.6**	21,677	412	162	1.90***
Married from 25 to 44	12,618	-398	123	-3.15***	11,555	237	116	2.05**
Married Older than 44	812	-64	31	-7.83**	732	92	31	12.49***
Fourth Degree Polynomial								
All Couples	36,127	-734	231	-2.03***	34,001	704	214	2.07***
Married Younger than 25	22,751	-326	180	-1.43*	21,694	395	172	1.82**
Married from 25 to 44	12,561	-341	132	-2.71***	11,561	231	125	2.00*
Married Older than 44	815	-67	34	-8.26**	746	78	33	10.46***
Fifth Degree Polynomial								
All Couples	36,145	-752	233	-2.08***	33,984	721	214	2.12***
Married Younger than 25	22,775	-350	182	-1.54*	21,670	419	172	1.93***
Married from 25 to 44	12,556	-336	133	-2.68***	11,566	226	124	1.96*
Married Older than 44	813	-65	34	-8.03*	748	76	32	10.16***

Notes: *, **, and *** indicate significance at 10%, 5%, and 1%. The data are from the 1985 to 1995 Vital Statistics data on divorces and include all divorces that occurred within four years of ten-year anniversaries. The estimates of divorces that would have occurred without the ten-year rule come from fitting a polynomial excluding data from the bunching region and then using the parameter estimates to estimate the divorces that would have occurred in the bunching region. Standard errors are calculated from the bootstrapping procedure described in the paper and are shown in parentheses. The results in Table 3 modeled g as a cubic polynomial.

Table B.2: Bunching of Divorces around Ten-Years of Marriage—Sensitivity to Polynomial Choice

	Estimate of Divorces at Year 9 without Ten-Year Rule	Diff between Observed Divorces	Standard Error	Percent Diff	Estimate of Divorces at Year 10 without Ten-Year Rule	Diff between Observed Divorces	Standard Error	Percent Diff
Second Degree Polynomial								
All Couples	75,301	-1,726	353	-2.29***	66,276	175	328	0.26
Married Younger than 25	47,095	-907	276	-1.93***	42,643	-138	260	-0.32
Married from 25 to 44	26,503	-728	205	-2.75***	22,248	158	186	0.71
Married Older than 44	1,704	-92	50	-5.38*	1,386	154	52	11.13***
Fourth Degree Polynomial								
All Couples	75,478	-1,903	440	-2.52***	66,957	-506	417	-0.76
Married Younger than 25	47,323	-1,135	344	-2.4***	43,104	-599	326	-1.39*
Married from 25 to 44	26,446	-671	252	-2.54***	22,429	-23	238	-0.1
Married Older than 44	1,709	-97	64	-5.69	1,423	117	63	8.19*
Fifth Degree Polynomial								
All Couples	75,550	-1,975	455	-2.61***	66,885	-434	413	-0.65
Married Younger than 25	47,411	-1,223	355	-2.58***	43,016	-511	325	-1.19
Married from 25 to 44	26,432	-656	263	-2.48***	22,443	-37	232	-0.17
Married Older than 44	1,707	-95	68	-5.57	1,426	114	62	8.02*

Notes: *, **, and *** indicate significance at 10%, 5%, and 1%. The data are from the 1985 to 1995 Vital Statistics data on divorces and include all divorces that occurred within four years of ten-year anniversaries. The estimates of divorces that would have occurred without the ten-year rule come from fitting a polynomial excluding data from the bunching region and then using the parameter estimates to estimate the divorces that would have occurred in the bunching region. Standard errors are calculated from the bootstrapping procedure described in the paper and are shown in parentheses.

Table B.3: Bunching of Divorces around Ten-Years of Marriage—Sensitivity to Polynomial Choice

	Estimate of Divorces at Years 8.5 to 9 without Ten-Year Rule	Diff between Observed Divorces	Standard Error	Percent Diff	Estimate of Divorces at Years 10 and 11.5 without Ten-Year Rule	Diff between Observed Divorces	Standard Error	Percent Diff
Second Degree Polynomial								
All Couples	116,681	-1,660	444	-1.42***	34,089	616	205	1.81***
Married Younger than 25	72,277	-578	358	-0.8	21,709	380	169	1.75**
Married from 25 to 44	41,639	-892	256	-2.14***	11,628	164	119	1.41
Married Older than 44	2,766	-191	64	-6.9***	751	73	32	9.67**
Fourth Degree Polynomial								
All Couples	115,784	-763	558	-0.66	34,032	673	231	1.98***
Married Younger than 25	71,803	-104	451	-0.14	21,660	429	189	1.98**
Married from 25 to 44	41,201	-453	316	-1.1	11,595	197	136	1.7
Married Older than 44	2,781	-206	83	-7.4***	776	48	35	6.16
Fifth Degree Polynomial								
All Couples	116,137	-1,116	688	-0.96	34,074	631	237	1.85***
Married Younger than 25	72,224	-525	556	-0.73	21,710	379	193	1.74*
Married from 25 to 44	41,118	-371	413	-0.9	11,585	207	142	1.78
Married Older than 44	2,795	-220	113	-7.88*	778	46	37	5.93

Notes: *, **, and *** indicate significance at 10%, 5%, and 1%. The data are from the 1985 to 1995 Vital Statistics data on divorces and include all divorces that occurred within four years of ten-year anniversaries. The estimates of divorces that would have occurred without the ten-year rule come from fitting a polynomial excluding data from the bunching region and then using the parameter estimates to estimate the divorces that would have occurred in the bunching region. Standard errors are calculated from the bootstrapping procedure described in the paper and are shown in parentheses.

Table B.4: Bunching of Divorces around Ten-Years of Marriage—Sensitivity to Polynomial Choice

	Estimate of Divorces at Years 8 and 9 without Ten-Year Rule	Diff between Observed Divorces	Standard Error	Percent Diff	Estimate of Divorces at Years 10 and 11 without Ten-Year Rule	Diff between Observed Divorces	Standard Error	Percent Diff
Second Degree Polynomial								
All Couples	160,478	-1,203	790	-0.75	124,206	1,872	773	1.51***
Married Younger than 25	99,017	-462	637	-0.47	81,143	704	625	0.87
Married from 25 to 44	57,687	-620	458	-1.08	40,580	897	452	2.21**
Married Older than 44	3,773	-120	120	-3.17	2,484	270	118	10.87**
Fourth Degree Polynomial								
All Couples	160,951	-1,676	1,764	-1.04	126,721	-643	1,736	-0.51
Married Younger than 25	100,360	-1,805	1,394	-1.8	83,526	-1,679	1,367	-2.01
Married from 25 to 44	56,801	266	1,064	0.47	40,613	864	1,062	2.13
Married Older than 44	3,790	-137	268	-3.61	2,582	172	262	6.68
Fifth Degree Polynomial								
All Couples	161,266	-1,991	1,962	-1.23	126,407	-329	1,659	-0.26
Married Younger than 25	100,756	-2,201	1,529	-2.18	83,130	-1,283	1,346	-1.54
Married from 25 to 44	56,632	435	1,219	0.77	40,783	694	973	1.7
Married Older than 44	3,878	-225	311	-5.8	2,493	261	237	10.46

Notes: *, **, and *** indicate significance at 10%, 5%, and 1%. The data are from the 1985 to 1995 Vital Statistics data on divorces and include all divorces that occurred within four years of ten-year anniversaries. The estimates of divorces that would have occurred without the ten-year rule come from fitting a polynomial excluding data from the bunching region and then using the parameter estimates to estimate the divorces that would have occurred in the bunching region. Standard errors are calculated from the bootstrapping procedure described in the paper and are shown in parentheses.

C Discontinuities in Divorces at Prior Cutoff

I now test for evidence of a discontinuity at twenty-year anniversaries using data from 1966 to 1974, which is when the SSA required twenty years of marriage before divorced spouses were eligible for spousal benefits. Because few people marry older than 44 and divorce around twentieth anniversaries and because the people who marry at 25 or older are in their mid-forties or older at their twenty-year anniversaries, I divide couples into two age groups instead of three. Figure C.1 shows how divorces trend with marriage duration near twenty-year anniversaries. It appears as though divorces may increase abruptly after twenty-year anniversaries for couples who married older than 24 but not dramatically so.

I next estimate Equation (2) setting twenty years as the cutoff and using data from 1966 to 1974 on divorces that occurred within four years of twentieth anniversaries. The results are shown below in Table C.1. Although I cannot rule out a large discontinuity for older couples, neither the graphs nor the estimates provide compelling evidence of a discontinuity in divorces at twenty years of marriage. This ambiguous evidence contrasts with the strong evidence of bunching around ten-year anniversaries. These results may suggest that people who have been married twenty years are less sensitive to Social Security incentives than people who have been married for ten years. Alternatively, they may also indicate that the passage of the ten-year rule raised awareness that Social Security provided spousal benefits to marriages that lasted certain lengths before divorce.

Table C.1: Discontinuity in Divorces at Twenty Years of Marriage Prior to Ten-Year Rule

		Discontinuity at 20 Years	
	Divorces at 19 Years	Number of Divorces	Log of Number of Divorces
All Couples	7,372	-0	-0.004
		(17)	(0.030)
Married Younger than 25	4,285	-13	-0.041
		(14)	(0.040)
Married Older than 24	652	13	0.043
		(11)	(0.044)

Notes: *, **, and *** indicate significance at 10%, 5%, and 1%. Robust standard errors are in parentheses below the estimates. The data are from the 1966 to 1974 Vital Statistics data on divorces and include all divorces that occurred within four years of ten-year anniversaries. All regressions control for quadratics in length of marriage in months on either side of ten-year anniversaries of marriages. The discontinuity in divorces at ten years is per month.

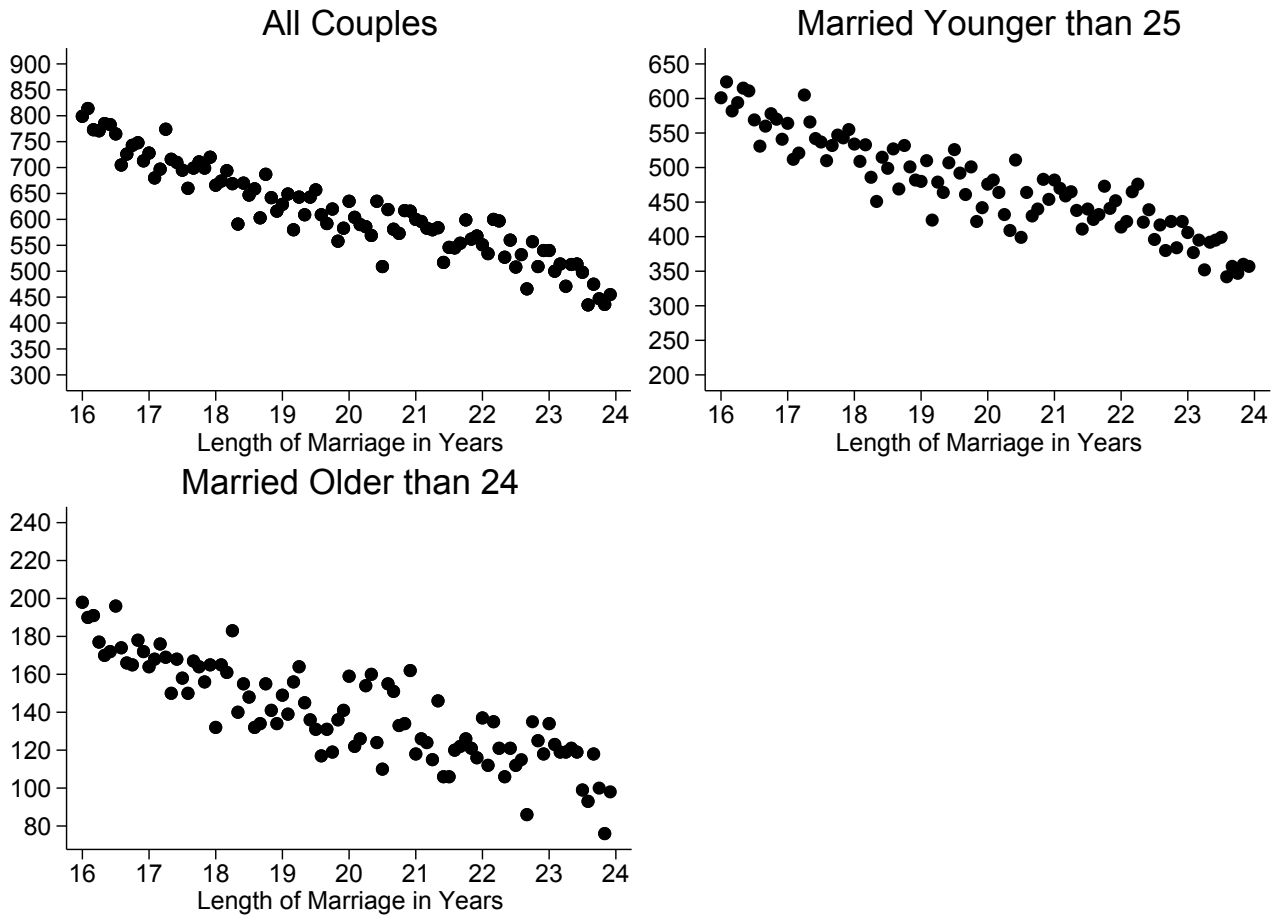

Figure C.1: Divorces by Marriage Length, from the 1966 to 1974 Vital Statistics Data