Jacob, Nikita

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Assortative mating, marital stability and the role of business cycles in the United States from 1968 to 2011

Nikita Jacob *

Centre for Health Economics, University of York, Heslington, UK

ABSTRACT

The strong negative correlation between divorce and a wide range of outcomes in terms of well-being, health, education and labour market performance has been well documented in the literature. Economic conditions have been found to affect marital stability. Shared gains from marriage also depend on spouses' characteristics such as age, education, ethnicity and religious beliefs. This paper examines the relationship between these spousal characteristics and the probability of dissolution while taking into account business cycle fluctuations. Using data from the Panel Study of Income Dynamics 1968–2011 for the United States and employing a duration modelling strategy, findings reveal that differences in educational attainment and ethnicity between spouses increase the hazard of marital dissolution. However similarity in religious beliefs and ethnicity reduce the risk of divorce. A period of economic growth improves marital stability. However, ethnic differences are a significant predictor of marital division, even in times of economic prosperity.

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Assortative mating; marital stability; business cycles

1. Introduction

Various literatures have identified the strong negative correlation between divorce and a wide range of outcomes (Kitson & Morgan, 1990; Amato, 2000). In particular, divorced individuals have lower economic well-being, lower psychological welfare and perform worse on health aspects.[1] Families, especially children are greatly affected by the consequences of divorce as shown by Allison and Furstenberg (1989); Gruber (2004). These studies have found that children of divorced parents tend to have lower educational attainment, lower incomes, marry earlier, separate often and have higher probability of committing suicide. The effects of marital dissolution on behavior, psychological distress and academic performance are pervasive and long lasting. These effects are larger for children who are very young at the time of dissolution as shown by Allison & Furstenberg (1989).

CONTACT Nikita Jacob nikita.jacob@york.ac.uk Centre for Health Economics, University of York, Heslington, UK

*All errors are my own. I declare no conflict of interests.

[1]Aasve et al. (2007), Blanchflower and Oswald (2004), Richards et al. (1997)

Economists such as Stevenson and Wolfers (2007) have extensively elaborated on some of the driving forces that have affected the changing landscape of family forms with regard to marriage and divorce. Among various factors, they have shown that shared gains from marriage depend on the traits of each spouse and an efficient marriage market is characterized by the match of spouses with similar characteristics such as intelligence and physical attractiveness. The interaction between these characteristics induces assortative mating. Becker et al. (1977) and Ermisch (2003) have also documented that in a marriage market, the competition for spouse leads to sorting of mates by education, wealth, attractiveness leading to positive (mating of likes) versus negative (mating of unlikes) mating. Sociologists such as Kalmijn (1998) refer to matching of homogenous spouses as *endogamy* (marriage to the same type) or *homogamy* (marriage to a similar type). Both disciplines have focused on four dimensions of spouses' characteristics, namely: age at marriage, education, ethnicity and religious denomination because evidence shows that assortative mating along these lines is important for a successful duration of marriage.[2]

Efforts have also been made to identify some of the more economic causes of marital instability. One of them is macro-level indicators such as unemployment or insufficient earnings as documented by Cherlin (1992) and others,[3] men's declining labour market opportunities (Oppenheimer, 1997; Ruggles, 1997), rising inflation (Nunley, 2010) and weakening consumer confidence (Fischer & Liefbroer, 2006). A recession can affect marital stability in two main ways. First, economic hardship caused by factors such as job loss, home foreclosures and wage declines, adds financial stress and marital unhappiness that could subsequently increase the risk of marital dissolution.[4] Second, economic barriers make divorce costly due to legal fees, rising cost of housing and childcare costs resulting from decreasing economies of scale. These associated costs of divorce may bring couples together to improve their relationship and become resilient (Amato & Beattie, 2011; Cohen, 2014; Ogburn & Thomas, 1922; Wilcox, 2009). Thus, it is theoretically ambiguous whether and how divorce rates vary with business cycles.

Motivated by the above findings, in this paper we hypothesise that the effect of spouses' characteristics on dissolution can be better understood when accounting for the role of business cycles. Positive versus negative assortative mating could determine the probability of marital dissolution given the financial phase of an economy which may influence the decisions of spouses. While there is a positive association of positively matched couples on marital stability (Louzek, 2022; Weiss & Willis, 1997), the present inquiry takes the analysis further by assessing how these effects are played out through business cycle fluctuations. The purpose of this analysis is to understand if the correlation between spousal characteristics and the probability of dissolution can vary with being in a recession or a period of economic growth.

This paper contributes to a strand of the socioeconomic literature that studies whether certain combinations of spousal characteristics can explain the likelihood of divorce. We contribute in the following ways. First, we consider the effects of spousal traits (along age, educational attainment, religion and ethnicity) on marital dissolution with respect to

[2]See Becker et al. (1977); Kalmijn (1998); Weiss and Willis (1997); Frimmel et al. (2013)
[3]R. Conger et al. (1990); Liem and Liem (1990)
[4]See R. D. Conger et al. (1994); Hardie and Lucas (2010); White and Rogers (2000); Bumpass et al. (1991); Jensen and Smith (1990) Jalovaara (2003) and Hansen (2005)

business cycle conditions. Second, we exploit longitudinal data from the Panel Study of Income Dynamics (PSID) 1968–2011 of the US, spanning over four decades and provide descriptive evidence to understand this relationship. Third, we apply a discrete time duration model, where we attempt to also account for unobserved heterogeneity that is modelled as a gamma and as a normal distribution.

We found that spousal differences in educational attainment and ethnicity increase the hazard of marital dissolution while sharing the same religious beliefs and ethnicity reduce this risk. Our findings echo that of Weiss & Willis (1997) who found that couples sort into marriage based on the characteristics that are likely to enhance the stability of the marriage, such as same ethnicity, religion and similar educational levels that reduce the probability of divorce. As an extension, we observed that a period of economic growth improves marital stability. However, ethnic differences are still a significant predictor of marital division, even in times of economic prosperity.

The paper proceeds as follows. Section 2 describes the literature and conceptual framework. Section 3 introduces the data and estimation strategy. Section 5 reports the results and sensitivity checks and Section 6 offers concluding remarks.

2. Brief literature review

In 1893 (Willcox, 1893), had noted that divorce rates were influenced by business conditions. For instance, divorce rates observed in 1873–79 and 1884–86 were periods of depression in trade for the United States. There have been speculations in the literature about the influence of economic changes on social conditions. For example Arkes & Shen (2013), used the National Longitudinal Survey of Youth (NLSY)1979 to study pro-cyclicality of divorce for this cohort, but did not find evidence of pro-cyclicality. While Hellerstein & Morrill (2010), using data from the Bureau of Labor Statistics for 1976–2009, examined the impact of macroeconomic conditions on marital stability by approximating macroeconomic conditions with the state unemployment rates. Controlling for state and year-fixed effects and state-specific time dummies, they found that divorce is pro-cyclical over the period in their study. Their results are robust to two alternative measures of macroeconomic conditions, namely log per capita income and state per capita GDP. Amato & Beattie (2011) conducted state-level analysis of divorce rates on unemployment rates using vital statistics from 1960 to 2005 at 5-year intervals, controlling for state and year-fixed effects. The authors found evidence of pro-cyclical divorce in the period starting after 1980.

Some studies have examined how economic factors affect divorce rates using macro-level economic variables to avoid endogeneity of economic outcomes. These include South & Messner (1986), who estimated a time-series model for divorce rates for the period 1948–79. They found that higher national unemployment rate and lower Gross National Product growth are associated with higher divorce rates suggesting counter-cyclical divorce rates. Fischer & Liefbroer (2006) used data from the Netherlands and also found a negative relationship between consumer confidence and marital dissolution rates, implying counter-cyclicality of dissolution rates. In contrast Ruggles (1997), using data from eleven censuses, 1880 to 1990, found that higher female labour force participation and greater growth in nonfarm employment were related to higher divorce rates indicating pro-cyclical divorce rates. Another study by Ono (1998) measured

marriage histories over the period 1950–87 using the Current Population Survey data from 1980, 1985 and 1990. This study found a positive effect of husbands' and wives' national median income on probability of separation, again suggesting pro-cyclical divorce rates. Böheim & Ermisch (2001) studied the role of economic circumstances on marital dissolution, using data from the British Household Panel Survey (1991–98). They showed that unexpected improvements in finances can substantially reduce dissolution risk. Their results strongly support the importance of new information in decisions concerning partnership dissolution.

The increase in divorces during prosperity and its decline during depression is interesting. From the relevant literature above, there appears to be no clear prediction if marital dissolution rates should be pro-cyclical or counter-cyclical or even if they should vary systematically over the business cycle as also noted by Hellerstein & Morrill (2010). Thus, it is theoretically ambiguous whether and how divorce rates vary with the business cycles. Recession, on the one hand, leads to rising stress levels and therefore increases the risk of marital dissolution. On the other hand, due to an increase in the economic costs of divorce, couples may choose to keep their differences aside and either put off their decision to divorce completely or postpone it to later time (Amato & Beattie, 2011). Ultimately, this relationship between business cycles and marital divorce becomes a question of relying on empirical evidence.

Nevertheless, factors affecting dissolution also depend on the traits of each spouse. In general, people have a tendency to choose partners with a similar social background according to sociologists such as Hendrickx et al. (1991); Kalmijn (1998) and Mare (1991) who have studied assortative mating with respect to social backgrounds such as education, class, religion, ethnicity, age, among other factors.[5] Such a matching process of likes, known as positive assortative mating, increases complementarities in household production and may boost inter-generational persistence of wealth, income, education and other economic outcomes. On the other hand, negative assortative mating, matching of unlikes is optimal for traits that are substitutes in household production, for example, wage earning power.

2.1. Conceptual framework

Economic theory, following Becker et al. (1977) and Weiss and Willis (1997), regards marriage as a voluntary partnership for the purpose of joint production and consumption including the production of children. The marriage market determines the assignment of partners and the shared gains of marriage (Becker, 1993). On the marriage market, everyone offers their assets and tries to get a partner with the best possible qualities (Del Boca & Flinn, 2014). Within this context, these qualities are both absolute (such as the amount of income or prestige) and relative (Louzek, 2022). It is natural that people who marry have similar social and psychological properties. When choosing a partner, people prefer people of the same race, social stratum and religion. Homogeneous marriages are statistically more successful. This is also indicated by the fact that mixed marriages face a higher risk of divorce (Peters, 1986; Pollak, 1985).

[5]These authors have predominantly focused on assortative mating in people's first marriages or cohabiting unions.

Theories of marriage present multiple arguments for why individuals tend to be attracted to people with similar traits and why partner dissimilarity can lead to union instability. One of them is "balance theory" as suggested by Heider (1958) and Newcomb (1953), which emphasizes psychological motivations. Partner similarity promotes mutual confirmation and validation of shared beliefs and perspectives, while dissimilarity between partners can lead to cognitive dissonance, leading to individuals feeling that either they must be wrong in their beliefs or that something is amiss with their partner (Caspi & Herbener, 1990; Kalmijn, 1998).

Another argument known as "exchange theory" (Kelley & Thibaut, 1978) focuses on the impact of dissimilarity on interactions between partners. Dissimilarity can complicate joint decision-making and may lead to behaviors on the part of each spouse, which the other may disapprove. Spouses generally have expectations of each other's behavior, and inconsistency in those expectations can produce disagreements (Pasley et al., 2001), which can, in turn, produce a negative "cascade" to defensiveness and emotional withdrawal, reduced marital quality, and eventual dissolution of the relationship (Gottman, 1993). Disagreements, especially on issues central to individual identity and goals can create conflicts in relationships (Bumpass & Sweet, 1972), while complementarity facilitates enjoyable interpersonal interaction (Burleson & Denton, 1992).

Although not all areas of dissimilarity may be problematic within a relationship, it would be reasonable to expect that divergence in areas that are relevant to the interdependence of the couple such as spousal roles in a marriage or elements that form individual identity such as ethnicity and religion would produce friction (Clarkwest, 2007). Similarly, age heterogamy, hypothesized by Bumpass and Sweet (1972) can produce diverging characteristics and interests, as well as power imbalances. Disparities in educational attainment may also create difficulties in negotiating status differentials (Pearlin, 1975) and conflicting ideals resulting from status-related variation in values and preferences (Kalmijn, 1991).

This study combines the findings from these two literatures that showed the effect of (i) business cycles and that of (ii) spousal traits, on marital dissolution. Our analysis addresses whether spouses' characteristics coupled with business cycles can affect marital discord.

3. Data and estimation strategy

3.1. Sample

The analysis in this paper uses publicly available data from the Panel Study of Income Dynamics (PSID) of the United States, which covers the period of 1968–2011.[6] The long time span of the dataset allowed for analyses of business cycles that have occurred between 1968 and 2011, which is particularly useful for the current study. The marriage history file of the PSID provides records for individuals of marriage-eligible age, which contain all known cumulative data about the timing and circumstances of his or her marriages up to and including 2011. This file contained details about marriage events of eligible people living in a PSID family at the time of the interview in any wave between

[6]PSID (2013) url: https://psidonline.isr.umich.edu/Guide/documents.aspx

1985 and 2011. It included marriages prior to 1985 as provided through restrospective reports. We obtained data on variables such as number of marriages, beginning and end dates for the first and most recent marriages and marital status of the individuals at the time of the most recent interview.[7]

This analysis is restricted only to individuals in their first marriages, thus there are 8,329 couples. Of these, 1,687 have been married before the start of the survey in 1968 and the remaining 6,537 enter their first marriage in or after 1968. There is a stock sample (those married before start of survey in 1968) with follow-up and a flow sample (those married in or after 1968). In order to take account of length-biased sampling, there is a need to condition on the fact that the couples who have survived sufficiently long in the state to be at risk of being sampled in the stock. This has to be done for both completed and censored spells (Jenkins, 2005). Marriage start and end dates are known for everyone in the sample. In the analysis, only those from the flow sample are considered, so 6,537 first marriages are followed, that have taken place between 1968 and 2011. Therefore, this comprises the risk set, which is the set of couples who are at the risk of an event occurrence at each point in time.

The hazard rate is the conditional probability that a marriage will end in a particular time, *t* for a given couple, provided that the couple is at risk at that time. Figure 1 shows the hazard function for the sample considered. In this sample, individuals are couples and time is measured in years stting from 1968, the start of the PSID up till the survey in 2011. These observations are referred to as couple-years since they are in a person-period format. Thus, couples who ended their marriage in year 1969 contribute 1 couple-year, those who ended their marriage in 1974 contribute 6 couple-years and so on.

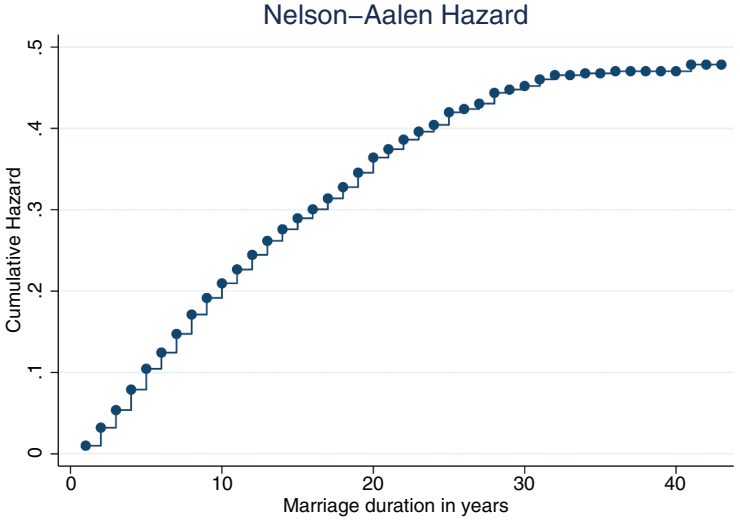

Figure 1. Cumulative hazard rate.

[7]The number of individuals reporting more than two marriages was 3,844, while 2,663 reported all their marriages and 1,181 do not report all marriages.

For the 6,537 couples there are a total of 78,303 couple-years. This total is the sum of the number at risk of ending their marriages in each of the 43 years. Those couples whose marriages did not end by 2011, or those who dropped out of the study and those where one of the spouses had become widowed are censored and they contribute what is known about them, that is, they did not end their marriages in any of the years in which they were observed. These observations are right censored since their marriages did not end till the last time that they were observed. Eighty-one marriages ended in widowhood, which implies that 2,155 of the couple-years ended in widowhood. Those couples who ended their marriages are followed until the divorce or separation after which they are not followed. Approximately 17.75% of them ended in divorce or separation and remaining approximately 80% remained intact till the 2011 survey year end.

3.1.1. Covariates

3.1.1.1. Assortative mating. Based on the aforementioned literature, spouses sort themselves into marriage based on: age at marriage, educational level attained, religious preferences and ethnicity. In this analysis, age at marriage is divided into five categories: couples where (i) husband is younger by 1 year or up to (and including) 4 years older than the wife (reference category); (ii) husband is older by 5–10 years; (iii) husband is older by 11 or more years; (iv) wife is older by 2–6 years; (v) wife is older by more than 7 years. In creating these age categories, the underlying assumption is that positively assorted couples are likely to be similar in age, while negatively matched couples tend to have higher age differences. Husbands younger than wives by 1 year is a seemingly a negligible difference and close to being equal, as compared to husband being younger than wife by 2 years or more.

Educational attainment is grouped as follows: (i) husband and wife are in the same educational category (base group); (ii) husband is in a higher educational category than the wife (H > W); (iii) husband is in a lower category than the wife (H < W).

Beginning in 1997, questions about birth location, race and ethnicity were asked and couples are grouped as (i) both are Americans, including African-Americans or Mexican Americans (base group); (ii) both are from other national origins (such as French, German, Iranian, Scottish, etc.) or both have nonspecific Hispanic identity such as Latinos, Chicanos; (iii) both have racial ethnicity such as White or Caucasian, Black, or religious ethnicityfor example, Jewish, Baptist and others that includes country people; (iv) husband and wife belong to different ethnic groups or have mixed ethnicity. In terms of religious preferences, there are five divisions: (i) both are Catholics; (ii) both are Jewish; (iii) both belong to other Christian denominations such as Protestant, Lutheran, Baptist etc; (iv) both belong to other religions such as Muslim (base group); (v) husband and wife have different religious preferences or have mixed religious preferences.[8]

3.1.1.2. Business cycles. Data on business cycles is obtained from the National Bureau of Economic Research (NBER), officially charged with declaring a recession for the United States. Whether a recession is severe or mild or whether it has ended is based

[8]Note that within the PSID, the information on ethnicity became available for both spouses in a household since survey year 1997 onwards. Please refer to the notes in the Appendix for details.

on the decision of the business cycle dating committee members and press releases made by the NBER. These decisions are based primarily on three broad categories:

- Length, duration of recession in months;
- Depth, based on indicators(%) which are Real Gross National Product, Industrial production, Non-farm employment and Unemployment rate.
- Width of the recession, that is, % of the industries that experience employment decline.

A period of recession is from Peak to Trough as shown in Table 1. The peak represents a boom in the economy, so the quarters leading to a peak are coded as 1, representing a boom. For example, just before the recession of 1973 (Q4)–1975(Q1), the US economy had a experienced a period of high growth, which is shown by the peak in the fourth quarter of 1973, so the variable boom is coded 1 for the year equal to 1973. During the period of the survey, between 1968 and 2011,[9] some recessions were severe and others were mild. For example, for the first recession in the Table 1, the variable mild is coded as 1 for year equal to 1970 since evidence[10] shows that there was a mild recession in 1970. Similarly, for the recession of 1973–75, the variable severe is equal to 1 if the year is 1974. If the period of recession that started previously goes further than the first quarter of any given year, then that year is a recession year depending on whether it was severe or mild. For instance, the recent financial recession started in the last quarter of 2007 and lasted up till the second quarter of 2009, so the variable severe is equal to 1 for the year 2009.

3.1.1.3. Other controls. Binary indicators are included for year of marriage that are divided into decades from 1968 to 1979 (base group), 1980–1989, 1990–1999 and 2000–2011 in order to control for period effects. State fixed effects are included to control for unobserved heterogeneity at the state-level. A binary variable that takes the value of 1 represents the passing of the Unilateral divorce laws across states, and 0 otherwise. The traditional "fault" model of termination of marriage lasted in the United States until the 1970s. Then a new wave of no-fault unilateral divorce laws swept across the country, mainly during the course of 1970s that allowed people to seek a divorce without the consent of their spouse, although the process of removing fault grounds for spouses to ask for divorce had already begun before the 1950s (Gruber, 2004). Figure 2 shows the adoption of unilateral divorce laws by states. According to the new law called the "no- fault" divorce law that allowed couples to divorce

Table 1. Business cycle dates.

Peak	Trough	Duration in Months	Severe	Mild	Boom
December, 1969(IV)	November, 1970 (IV)	11		1970	1969
November, 1973(IV)	March, 1975 (I)	16	1974		1973
January, 1980(I)	July, 1980 (III)	6		1980	1979
July, 1981(III)	November, 1982 (IV)	16	1981, 1982		
July, 1990(III)	March, 1991(I)	8		1990	1989
March, 2001(I)	November, 2001 (IV)	8		2001	
December, 2007 (IV)	June, 2009 (II)	18	2009		2007

Source: NBER Business cycle dates.

[9]Note that the PSID was an annual survey from 1968–1997, thereafter it became biennial.
[10]US Business Cycle Expansions and Contractions available at http://www.nber.org/cycles.html

without requiring a show of wrongdoing by either party. By 1973, two-thirds of the states had enacted no-fault divorce laws (Wardle & Nolan, 2011). Also included is a control for number of children.

Table 2 presents descriptive statistics for this sample. On average, marriages last for 21 years in this sample. The survival time of marriage, in other words, the elapsed duration since the start of the marriage spell is approximately 10 years. Over the decades, the number of people getting married has declined. For instance, in 1968 51% of marriages took place that went down to 13% in the 1990s and even further declined in the 2000s. Seventy-five percent of couples are positively matched on age, 55% of couples are matched on education. In terms of education, the number of couples where both spouses are high-school graduates (20%) and those where both are college graduates or higher (18%) is similar. The majority of the couples are composed of both spouses belonging to other national origins such as French, German, Iranian and 25% of them identify themselves as having racial ethnic background, while only 13% identify themselves to be Americans which in this sample includes Latin-Americans and African-Americans. Christianity is the major religious group in the United States, with 65% of couples belonging to different Christian denominations, while 30% are reported to be Catholic. In terms of geographical distribution, regions are quite vast and nearly 43% of respondents reside in the Southern region followed by 23% that are in the Mid-Western region of the US and 18% and 16% in the West and North-East regions, respectively.[11]

4. Methodology

Using data from the PSID covering 1968–2011, we estimate a discrete time duration model with time-varying covariates and adjust for the factors affecting the probability of marital dissolution. We employ an event history model that is a natural modelling choice where the outcome involved a rate at which any event, such as divorce, occurs (Heaton & Call, 1995). The risk of divorce varies over the course of marriage. The specification used is a proportional hazard model with a piecewise-constant baseline hazard where the baseline hazard consists of 11 parameters, λ_j^* (j = 1,2. . ., 11). Therefore, the assumption is that the hazard is constant for durations of marriage spells of every 2 years until the thirty-first year of marriage. The baseline has been divided as 0–2, 3–5 . . ., 24–26, 27–30 and 31–43. This is because the hazard is shown to be increasing in the first few years after marriage and as marriage progresses but remains constant or changes very little after the thirty-first year as shown in Figure 1.

Unobserved individual heterogeneity is accounted for, through the inclusion of a multiplicative error term in the hazard function, for which a gamma distribution with mean 1 and variance σ^2 is assumed. Accounting for unobserved individual heterogeneity is important because differences between individuals in their hazards that are unaccounted for by the explanatory variables, will tend to produce evidence for

[11]U.S regions are categorised as follows: (1)=North East: Division 1: New England- Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont; Division 2: Mid-Atlantic- New Jersey, New York, Pennsylvania (2)=MidWest: Division 3: East North Central- Illinois, Indiana, Michigan, Ohio, Wisconsin; Division 4: West North Central- Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota (3)=South: Division 5: South Atlantic- Delaware, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, Washington D.C, West Virginia; Division 6: East South Central- Alabama, Kentucky, Mississippi, Tennessee; Division 7: West South Central- Arkansas, Louisiana, Oklahoma, Texas (4)=West: Division 8: Mountain- Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming; Division 9: Pacific- Alaska, California, Hawaii, Oregon, Washington.

a declining hazard, otherwise known as negative duration dependence[12] (Allison, 1982; Heckman & Singer, 1982; Lancaster, 1990).

The hazard function for couple i in period t is specified as being proportional to $exp(f(X_i, W_t, Z_{it})$, where the following specification for $f(X_i, W_t, Z_{it})$ is adopted

$$f(X_i, W_t, Z_{it}) = \beta_x X_i + \beta_t W_t + \beta_z Z_{it} \tag{1}$$

X_i is a vector that includes binary variables related to the wife's characteristics such as age, education, ethnicity and religious preferences; binary indicators for the couple characteristics that reflect their assortative mating behaviour, whether they are positively or negatively matched in each of the four dimensions and the geographical location given by the state-fixed effects.

W_t is a vector of time dummies which indicate the year of marriage for each couple and binary variables to indicate the business cycles, whether it was a boom or a mild/severe recession. Z_{it} is a vector of interaction terms, where the variables representing business cycles are interacted with couples assortative mating variables on age at marriage, level of education, ethnicity and religious preferences.

Estimation of the parameters of interest can be performed by using standard likelihood methods. Every couple is observed for a single marriage spell. The model used here can be seen as a sequence of binary choice problems defined on the surviving population at each duration, therefore each marriage spell originates several observations. Treating each pair (i,t) as a different observation, we define τ_{it} for couple i as the elapsed duration since the start of the spell in period t and let T_i be the total duration of the spell. Under the assumption of a proportional hazard model with a piecewise-constant baseline hazard and unobserved heterogeneity, the hazard function at τ_{it} is given by (Jenkins, 2005, p. 39).

$$\lambda(\tau_{it}|X_i, W_t, Z_{it}, \nu_i) = \lambda_{\tau_{it}} exp(f(X_i, W_t, Z_{it})\nu_i$$

where ν_i is the unobserved component for couple i and $\lambda_{\tau_{it}} = \lambda_j^*$ for $\tau_{it} \leq 10$ and $\lambda_{\tau_{it}} = \lambda_{11}^*$ for $\tau_{it} \geq 11$.[13] Standard results imply that the survival function for T_i can be written as

$$S(T_i|X_i, W_t, Z_{it}, \nu_i) = exp\left(-\nu_i \sum_{t=1}^{T_i} \lambda_{\tau_{it}} exp(f(X_i, W_t, Z_{it})\right)$$

Assuming that the unobserved component has a gamma distribution with mean 1 and variance σ^2, ν_i can be integrated out of $S(T_i|X_i, W_t, Z_{it}, \nu_i)$ which results in

$$S(T_i|X_i, W_t, Z_{it}, \nu_i) = \left(1 + \sigma^2 \sum_{t=1}^{T_i} \lambda_{\tau_{it}} exp(f(X_i, W_t, Z_{it})^{-\sigma^{-2}}\right)$$

Therefore, the contribution to the log-likelihood function from couple i can be written as

$$ln(L_i) = ln[S(T_i - 1|X_i, W_t, Z_{it}) - c_i S(T_i|X_i, W_t, Z_{it})]$$

[12]Note that the probability of leaving the marriage declines over time, as seen in Figure 1.

[13]This is because the elapsed duration since the start of the marriage spell is approximately 10 years, and $\lambda_{\tau_{it}} = \lambda_{11}^*$ for $\tau_{it} \geq 11$ if the survival time is greater than 10

Table 2. Summary statistics.

Variable	Mean	Std. Dev.	Min.	Max.	N
Year of marriage	1980.947	9.691	1968	2011	78303
Year of marriage end	2002.161	9.173	1969	2011	78303
Survival time of marriage	9.810	8.497	0	43	78303
Marriage duration	21.171	11.177	1	43	78303
Age:					
H > W (−1/4)	0.747	0.435	0	1	72659
H > W (5+)	0.163	0.37	0	1	72659
W > H (2+)	0.089	0.285	0	1	72659
Education:					
HS^-	0.085	0.279	0	1	71223
HS^+	0.198	0.398	0	1	71223
SC	0.084	0.277	0	1	71223
C^+	0.180	0.384	0	1	71223
H > W	0.208	0.406	0	1	71223
W > H	0.245	0.43	0	1	71223
Ethnicity:					
Both American+	0.135	0.342	0	1	44934
Both Other national orig.+	0.562	0.496	0	1	44934
Both Racial etc.	0.250	0.433	0	1	44934
Mixed Ethnicity	0.053	0.224	0	1	44934
Religion:					
Both Catholics	0.294	0.455	0	1	72199
Both Jewish	0.023	0.151	0	1	72199
Both Other Christian denoms	0.657	0.475	0	1	72199
Both Other religions	0.010	0.099	0	1	72199
Mixed Religion	0.016	0.124	0	1	72199
Year of marriage:					
1968–79	0.512	0.5	0	1	78303
1980–89	0.297	0.457	0	1	78303
1990–99	0.133	0.339	0	1	78303
2000–11	0.058	0.234	0	1	78303
Economy:					
Severe	0.102	0.302	0	1	78303
Mild	0.1	0.3	0	1	78303
Boom	0.164	0.370	0	1	78303
Region:					
North-East	0.162	0.368	0	1	63015
Mid-West	0.234	0.423	0	1	63015
South	0.427	0.495	0	1	63015
West	0.178	0.382	0	1	63015

where c_i is a dummy variable that equals 1 for completed spells and is 0 for (right) censored ones.

Adding an unobserved heterogeneity term captures match quality, however it places a strong assumption as it is assumes v_i to be uncorrelated with the X_i, W_t and Z_{it}. So, v_i enters as a random effect into the model and there is no way to test if these random effects are correlated with the regressors. Using a frailty model explicitly formulates the nature

of dependence of related failure times, in this case, occurrences of dissolution. Frailty models condition out the individual-specific effects to make accurate inferences. Provided that the frailty distribution is correctly specified, this approach is expected to be more efficient (Lin, 1994). According to Austin (2017) there is a paucity of guidance as to how to select between different frailty families; therefore, we estimated models using Gaussian (normal) and gamma distribution for unobserved heterogeneity.

5. Results

The analysis is based on the sample period 1968–2011, wherein starting from 1985, marriage history files are available which provide retrospective information about couples marital life. The analysis consists of only first marriages that constitute 76% of the sample. First marriages are those where both spouses are reported to be in their first marriages. In all the tables presented, hazard ratios are reported instead of coefficients. These should be interpreted as the proportional effect on the hazard of dissolution by a one unit change in the regressor. A number greater than 1, indicates an increase in the hazard of divorce and a number lower than 1, indicates a decrease in the hazard. We interpret hazard ratios as $\cong (e^{\beta} - 1) \times 100$.

The first set of results, shown in Table 3, are complementary log–log specifications estimated by maximum likelihood where state-fixed effects and year of marriage-fixed effects are included in all regressions. Note that in Table 3 we have not accounted for the distribution of individual-specific effects (frailty models). Column (1) and (2) present hazard ratios, without conditioning on the state of the economy. Column (2) includes a control for the number of children. Columns (3)-(6) condition on business cycles and augment it systematically by adding interaction terms where every indicator on assortative mating (age, education, ethnicity, and religion) is systematically interacted with the state of the economy, represented by dummy variables for severe, mild recession or periods of economic growth. This gives a sense of coefficient stability over the set of controls. Then, in Table 4 estimates are obtained using a Gaussian frailty distribution, while estimates in Table 5 are obtained employing a gamma distribution for frailty. Overall, our estimates are similar across different specifications, which is reassuring.

5.1. Main effects

Results in Table 3 show that the hazard of dissolution increases, by roughly 36%, if the wife is more educated than her husband, compared to couples that have similar educational levels.[14] Perhaps, it could be that women are inclined to have greater bargaining power in the household if they are more educated than their husbands and will tend to be more independent, especially financially as they can increase their labour supply and reduce their home-production time due to advancement in household technology in the 1950's and 1960's. Moreover, with the invention of the pill, women could accumulate human capital without disrupting their education and labour market plans and prospects (Gray 1998; Stevenson & Wolfers, 2007). Consequently, educational disparities may lead to differences in ideals and result in status differentials (Kalmijn, 1991; Pearlin, 1975).

[14]From column (1) of Table 3, the hazard ratio for H>W is 1.364, so the risk of dissolution is 1.364–1) 100 = 36.4%.

Table 3. Dissolution risk: baseline results.

	Without any frailty distribution						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Variables	Marital Dissolution						
Education: H&W							
H > W	0.925	0.921	0.920	0.975	0.914	0.927	0.990
	(0.112)	(0.117)	(0.119)	(0.150)	(0.122)	(0.120)	(0.156)
H < W	1.364***	1.350**	1.364**	1.235	1.375**	1.367***	1.256
	(0.154)	(0.162)	(0.166)	(0.183)	(0.171)	(0.165)	(0.190)
Age: H&W							
H > W (5–10 yrs)	1.026	0.935	0.901	0.942	0.952	0.942	0.902
	(0.136)	(0.132)	(0.161)	(0.135)	(0.139)	(0.135)	(0.162)
H > W (11+ yrs)	1.083	1.055	1.031	1.093	1.086	1.089	1.012
	(0.373)	(0.409)	(0.553)	(0.430)	(0.441)	(0.428)	(0.555)
W > H (2–6 yrs)	0.879	0.821	0.671*	0.818	0.805	0.812	0.676*
	(0.144)	(0.144)	(0.156)	(0.146)	(0.148)	(0.145)	(0.160)
W > H (7+ yrs)	0.481	0.468	0.799	0.499	0.475	0.496	0.797
	(0.265)	(0.296)	(0.607)	(0.318)	(0.312)	(0.316)	(0.612)
Ethnicity: H&W							
Both Other National orig.	1.403	1.331	1.322	1.302	1.101	1.287	1.061
	(0.372)	(0.371)	(0.376)	(0.370)	(0.347)	(0.366)	(0.335)
Both Racial	0.460**	0.389***	0.373***	0.367***	0.325***	0.363***	0.323***
	(0.153)	(0.136)	(0.133)	(0.131)	(0.130)	(0.130)	(0.130)
Both Mixed	11.396***	11.461***	11.346***	11.150***	9.640***	11.117***	9.738***
	(2.970)	(3.161)	(3.184)	(3.110)	(2.979)	(3.095)	(3.028)
Religion: H&W							
Both Catholic	0.090***	0.076***	0.084***	0.079***	0.073***	0.063***	0.058***
	(0.059)	(0.051)	(0.059)	(0.055)	(0.053)	(0.049)	(0.047)
Both Jewish	0.167*	0.132*	0.144*	0.135*	0.125*	0.072**	0.070**
	(0.167)	(0.138)	(0.154)	(0.144)	(0.139)	(0.084)	(0.086)
Both Other Christian denoms	0.367*	0.304**	0.329*	0.319*	0.274**	0.231**	0.204**
	(0.207)	(0.177)	(0.195)	(0.189)	(0.169)	(0.156)	(0.143)
Both Mixed	1.728	1.771	1.959	1.872	1.815	1.322	1.397
	(0.856)	(0.918)	(1.033)	(0.986)	(0.985)	(0.819)	(0.898)
Economy:							
Severe			0.775	0.820	0.531	0.616	0.344
			(0.132)	(0.170)	(0.222)	(0.531)	(0.334)
Mild			1.277*	1.173	1.114	1.069	0.834
			(0.187)	(0.229)	(0.432)	(1.173)	(0.970)
Boom			0.437***	0.455***	0.216***	0.151*	0.074**
			(0.072)	(0.091)	(0.097)	(0.167)	(0.088)
Interactions							
Severe*Age: H > W (5–10 yrs)			1.192				1.283
			(0.481)				(0.525)
Severe*Age: H > W (11+ yrs)			0.873				0.873
			(0.997)				(1.004)
Severe*Age: H < W (2–6 yrs)			2.077*				2.122*
			(0.866)				(0.906)

(*Continued*)

Table 3. (Continued).

Severe*Age: H < W (7+ yrs)	0.916				0.867
	(1.139)				(1.095)
Mild*Age: H > W (5–10 yrs)	0.520				0.540
	(0.239)				(0.250)
Mild*Age: H > W (11+ yrs)	2.136				2.258
	(1.880)				(2.004)
Mild*Age: H < W (2–6 yrs)	1.154				1.225
	(0.553)				(0.596)
Mild*Age: H < W (7+ yrs)	0.000				0.000
	(0.004)				(0.003)
Boom*Age: H > W (5–10 yrs)	1.694				1.678
	(0.574)				(0.576)
Boom*Age: H > W (11+yrs)	0.742				0.717
	(0.842)				(0.817)
Boom*Age: H < W (2–6 yrs)	1.447				1.232
	(0.636)				(0.561)
Boom*Age: H < W (7+ yrs)	0.000				0.000
	(0.000)				(0.000)
Severe*Educ: H > W		0.829			0.789
		(0.301)			(0.293)
Severe*Educ: W > H		1.277			1.283
		(0.382)			(0.393)
Mild*Educ: H > W		0.736			0.746
		(0.270)			(0.276)
Mild*Educ: W > H		1.303			1.402
		(0.378)			(0.414)
Boom*Educ: H > W		0.981			0.877
		(0.324)			(0.296)
Boom*Educ: W > H		1.219			1.061
		(0.352)			(0.313)
Severe*Ethnic: Both National orig.			1.587		1.698
			(0.707)		(0.766)
Severe*Ethnic: Both Racial etc			1.282		1.188
			(0.782)		(0.733)
Severe*Ethnic: Both Mixed			2.294		2.171
			(1.263)		(1.213)
Mild*Ethnic: Both National orig.			1.320		1.397
			(0.564)		(0.608)
Mild*Ethnic: Both Racial etc			0.854		0.856
			(0.529)		(0.532)
Mild*Ethnic: Both Mixed			0.859		0.869
			(0.394)		(0.404)
Boom*Ethnic: Both National orig.			1.840		1.949
			(0.870)		(0.932)
Boom*Ethnic: Both Racial etc			2.387		2.473
			(1.391)		(1.443)
Boom*Ethnic: Both Mixed			5.582***		5.351***
			(2.893)		(2.824)
Severe*Religion: Both Catholic				1.265	1.142
				(1.187)	(1.084)

(*Continued*)

Table 3. (Continued).

Severe*Religion: Both Jewish						7.195*	7.506*
						(8.364)	(8.863)
Severe*Religion: Both Christian denoms.						1.338	1.286
						(1.168)	(1.136)
Severe*Religion: Both Mixed						1.388	0.944
						(1.593)	(1.119)
Mild*Religion: Both Catholic						1.201	1.169
						(1.399)	(1.369)
Mild*Religion: Both Jewish						1.568	1.866
						(2.462)	(2.946)
Mild*Religion: Both Christian denoms.						1.136	1.314
						(1.259)	(1.466)
Mild*Religion: Both Mixed						1.011	1.098
						(1.188)	(1.305)
Boom*Religion: Both Catholic						2.339	2.128
						(2.744)	(2.509)
Boom*Religion: Both Jewish						0.000	0.000
						(0.000)	(0.000)
Boom*Religion: Both Christian denoms.						3.294	2.771
						(3.672)	(3.106)
Boom*Religion: Both Mixed						6.742	3.816
						(8.189)	(4.720)
Wife's Characteristics							
Age: 20–29	0.683***	0.670***	0.673***	0.677***	0.665***	0.675***	0.661***
	(0.079)	(0.081)	(0.082)	(0.083)	(0.084)	(0.083)	(0.084)
Age: 30–39	0.627**	0.677*	0.684*	0.684*	0.675*	0.687*	0.668*
	(0.129)	(0.151)	(0.154)	(0.155)	(0.157)	(0.155)	(0.155)
Age: 40+	1.058	2.178	2.308	2.294	2.483*	2.289	2.460*
	(0.521)	(1.091)	(1.176)	(1.167)	(1.300)	(1.165)	(1.289)
Educ: HS+	0.789	0.786	0.777	0.778	0.789	0.784	0.790
	(0.143)	(0.149)	(0.150)	(0.149)	(0.157)	(0.151)	(0.157)
Educ: SC	0.658**	0.666**	0.657**	0.660**	0.669*	0.661**	0.671*
	(0.129)	(0.137)	(0.137)	(0.138)	(0.145)	(0.138)	(0.146)
Educ: C+	0.374***	0.369***	0.364***	0.366***	0.365***	0.369***	0.365***
	(0.081)	(0.086)	(0.086)	(0.087)	(0.091)	(0.087)	(0.091)
Ethnic: Other national orig.	1.027	1.111	1.141	1.149	1.158	1.157	1.171
	(0.229)	(0.263)	(0.277)	(0.279)	(0.295)	(0.280)	(0.298)
Ethnic: Hispanic orig	0.239**	0.279**	0.277**	0.278**	0.274*	0.280*	0.273*
	(0.152)	(0.180)	(0.181)	(0.181)	(0.181)	(0.182)	(0.181)
Ethnic: Racial	1.003	1.118	1.156	1.177	1.146	1.181	1.146
	(0.280)	(0.325)	(0.345)	(0.351)	(0.359)	(0.352)	(0.359)
Ethnic: Others	2.131**	2.084*	2.293**	2.284**	2.168*	2.279**	2.239*
	(0.786)	(0.826)	(0.927)	(0.922)	(0.912)	(0.920)	(0.942)
Religion: Catholic	0.799	0.671	0.685	0.686	0.686	0.714	0.664
	(0.711)	(0.614)	(0.646)	(0.646)	(0.681)	(0.674)	(0.661)
Religion: Jewish	0.418*	0.447	0.464	0.450	0.486	0.470	0.486
	(0.206)	(0.229)	(0.244)	(0.236)	(0.266)	(0.246)	(0.267)
Religion: Other Christian denoms.	0.197***	0.196***	0.228**	0.216***	0.207***	0.219***	0.202***

(*Continued*)

Table 3. (Continued).

	(0.105)	(0.110)	(0.132)	(0.125)	(0.126)	(0.126)	(0.124)
No. of children		0.996	0.992	0.994	0.991	0.994	0.990
		(0.044)	(0.045)	(0.045)	(0.046)	(0.045)	(0.046)
Unilateral Divorce	1.491	1.573*	1.629*	1.624*	1.687*	1.636*	1.704*
	(0.396)	(0.426)	(0.446)	(0.444)	(0.474)	(0.448)	(0.479)
Baseline hazard parameters ()	✓	✓	✓	✓	✓	✓	✓
Year of marriage fixed effects	✓	✓	✓	✓	✓	✓	✓
State fixed effects	✓	✓	✓	✓	✓	✓	✓
Couple-years: N	43,764	40,222	40,222	40,222	40,222	40,222	40,222
Number of couples	3,520	3,012	3,012	3,012	3,012	3,012	3,012
Log likelihood	−2672	−2459	−2435	−2440	−2431	−2436	−2419

These factors may have further consequences leading to marriage break-down (Marcén, 2015). We did not observe significant effects of differences in age at marriage between spouses.

Fixed variables such as ethnicity and religion strongly influence dissolution risk in all instances. A large proportion of all marriages are to individuals of the same ethnicity and religion. The hazard ratios presented in Tables 3 and 4 show that spouses belonging to the same racial groups, for instance, if both are Caucasian, Black or Jewish, face a decline in dissolution hazard by over 50% (column 1, Table 3) going up to 67.7% (column 7, Table 3). On the other hand, those couples who identify themselves as being from a mixed ethnic background are shown to face a sharp increase in the risk of marriage termination. Böheim & Ermisch (2001); Bumpass et al. (1991); Heaton (2002); Lehrer & Chiswick (1993) and Tzeng (1992) have also previously found the same. Furthermore, religion plays a very stabilizing effect, in particular, couples where both spouses are Catholic, Jewish or from other Christian denominations are likely to experience a significantly lower hazard of marital dissolution. This decrease in the hazard is much higher, over 90% for couples who are reportedly Catholic, perhaps because the Catholic church does not allow divorce. We observe this effect to be strongly significant across columns (1–7) of Table 3. This is followed by those that are Jewish, for whom the hazard rates reduces by nearly 93% (columns 6–7) and other Christian groups where the hazard declines by over 70% (columns 5–7), in comparison to couples from other religious faiths. These findings are consistent with the relevant literature such as that of Frimmel et al. (2013); Kalmijn et al. (2005); Lehrer & Chiswick (1993); Rosenfeld (2008) and Weiss & Willis (1997). These estimates are significant in the specifications, even after controlling for the number of children and state of the economy, and size of the estimates remains relatively stable.

Consistent with the theoretical explanations of Becker et al. (1977), the risk of dissolution declines with woman's age at the time of the marriage as shown in Tables 3, 4 and 5. This is in line with the findings of Böheim & Ermisch (2001). Women who are married when they are in twenties and thirties face a lower hazard of dissolution compared to those married in their teens. Also, women who are college graduates or higher face a lower risk. There are no observed effects of the number of children, but we do find that the risk of marital break-up increases with the passing of the unilateral divorce law.

5.2. Interaction effects

Since evidence shows that marital break-up often causes negative externalities, there is a strong policy interest in monitoring divorces and their consequences. It is of particular interest and perhaps, also a matter of policy concern to know if marriages, formed by spouses of specific characteristics, are negatively or positively affected by recessionary and/or expansionary episodes. Heterogeneity in the effect of business cycles is analyzed using binary indicators representing an economic boom (equals 1 for an expansionary phase and 0 otherwise). To examine whether sensitivity of marital dissolution to business cycle shocks depends on spouses characteristics, the binary indicators for assortative mating categories are interacted with the indicators for shocks (severe, mild, boom episodes). Columns (3)-(6) of Table 3 show a positive effect of periods of enhanced economic growth, which are associated with a lower risk of marriage dissolution. However, this effect also varies with couples where both spouses belong to different ethnic backgrounds, as observed in Column (4). Thus, spouses of different ethnic groups have a higher hazard of dissolution; nevertheless, they still face a higher risk even in a period of economic expansion, all else equal. Column (3) of Table 3 shows that, if the wife is older than her husband by 2–6 years, then the risk of marital break-up is greater and can also vary with the period of severe recession. If both spouses are of Jewish origin, then the dissolution hazard decreases by 90%, all else equal. However, this overall effect of Jewish couples is also, in part determined by the presence of a severe recession, where the magnitude of risk is large and so are the standard errors. In general, the magnitude and the standard errors on estimates of variables capturing differences in spouses' ethnicity and religion are large, partly due to the lower number of individual observations in these categories.

Further regressions: To account for unobserved individual effects, we present estimates using two frailty models, where the individual effects have a Gaussian and Gamma distribution.[15] Table 4 presents results for a Gaussian frailty model. These estimates are similar to the ones presented previously in Table 3, in terms of all the variables included in the regression specifications. The next set of results in Table 5 shows estimates using a Gamma frailty model. These also corroborate the earlier findings and confirm the stability of the main results obtained in Table 3. The Likelihood-Ratio test of gamma variance in Table 5 is statistically significant and so is the LR test of ρ being equal to 0, using the Gaussian distribution for individual effects from Table 4. We are able to reject the hypothesis that ρ is zero and conclude that frailty is important to be taken into account. From estimates shown in Tables 3–5, we conclude that the main effects are consistent across the different model specifications.[16] Table 5 presents results using the Gamma frailty distribution but also accounting for the wife's characteristics on age, education, ethnic and religious background.

[15] *xtcloglog* command is used if the frailty model has a Normal distribution and *pgmhaz8* command is used if a Gamma distribution is assumed for unobserved heterogeneity.

[16] We also note that in the case of estimates presented using the gamma frailty model, we do not obtain consistent estimates for the interaction terms with ethnicity and religion, therefore Table 5 does not show regressions estimates which included interaction terms on ethnicity and religion. This is due to technical difficulties in the computation of these analyses since the gamma variance is constrained to be positive, hence runs into convergence issues as it uses a slightly different computational method, compared to the gaussian. These technical problems were partly due to the reduced number of individual observations for the different categories in ethnicity and religion. Although further research is required to assess the suitability of either distribution, in our case it was simpler to assume a symmetric distribution to model the random effects.

Table 4. Dissolution risk: Gaussian frailty.

	Gaussian Frailty Distribution					
	(1)	(2)	(3)	(4)	(5)	(6)
Variables	Marital Dissolution					
Education: H&W						
H > W	0.921	0.920	0.975	0.914	0.927	0.990
	(0.117)	(0.119)	(0.150)	(0.122)	(0.120)	(0.156)
H < W	1.350**	1.364**	1.235	1.375**	1.367***	1.256
	(0.162)	(0.166)	(0.183)	(0.171)	(0.165)	(0.190)
Age: H&W						
H > W (5–10 yrs)	0.935	0.901	0.942	0.952	0.942	0.902
	(0.132)	(0.161)	(0.135)	(0.139)	(0.135)	(0.162)
H > W (11+ yrs)	1.055	1.031	1.093	1.086	1.089	1.012
	(0.409)	(0.553)	(0.430)	(0.441)	(0.428)	(0.555)
W > H (2–6 yrs)	0.821	0.671*	0.818	0.805	0.812	0.676*
	(0.144)	(0.156)	(0.146)	(0.148)	(0.145)	(0.160)
W > H (7+ yrs)	0.468	0.799	0.499	0.475	0.496	0.797
	(0.296)	(0.607)	(0.318)	(0.312)	(0.316)	(0.612)
Ethnicity: H&W						
Both Other National orig.	1.331	1.322	1.302	1.101	1.287	1.061
	(0.371)	(0.376)	(0.370)	(0.347)	(0.366)	(0.335)
Both Racial	0.389***	0.373***	0.367***	0.325***	0.363***	0.323***
	(0.136)	(0.133)	(0.131)	(0.130)	(0.130)	(0.130)
Both Mixed	11.461***	11.346***	11.150***	9.640***	11.117***	9.738***
	(3.161)	(3.184)	(3.110)	(2.979)	(3.095)	(3.028)
Religion: H&W						
Both Catholic	0.076***	0.084***	0.079***	0.073***	0.063***	0.058***
	(0.051)	(0.059)	(0.055)	(0.053)	(0.049)	(0.047)
Both Jewish	0.132*	0.144*	0.135*	0.125*	0.072**	0.070**
	(0.138)	(0.154)	(0.144)	(0.139)	(0.084)	(0.086)
Both Other Christian denoms	0.304**	0.329*	0.319*	0.274**	0.231**	0.204**
	(0.177)	(0.195)	(0.189)	(0.169)	(0.156)	(0.143)
Both Mixed	1.771	1.959	1.872	1.815	1.322	1.397
	(0.918)	(1.033)	(0.986)	(0.985)	(0.819)	(0.898)
Economy:						
Severe		0.775	0.820	0.531	0.616	0.344
		(0.132)	(0.170)	(0.222)	(0.531)	(0.334)
Mild		1.277*	1.173	1.114	1.069	0.834
		(0.187)	(0.229)	(0.432)	(1.173)	(0.970)
Boom		0.437***	0.455***	0.216***	0.151*	0.074**
		(0.072)	(0.091)	(0.097)	(0.167)	(0.088)
Interactions:						
Severe*Age: H > W (5–10 yrs)		1.192				1.283
		(0.481)				(0.525)
Severe*Age: H > W (11+ yrs)		0.873				0.873
		(0.997)				(1.004)
Severe*Age: H < W (2–6 yrs)		2.077*				2.122*
		(0.866)				(0.906)

(*Continued*)

Table 4. (Continued).

Severe*Age: H < W (7+ yrs)	0.916				0.867
	(1.139)				(1.095)
Mild*Age: H > W (5–10 yrs)	0.520				0.540
	(0.239)				(0.250)
Mild*Age: H > W (11+ yrs)	2.136				2.258
	(1.880)				(2.004)
Mild*Age: H < W (2–6 yrs)	1.154				1.225
	(0.553)				(0.596)
Mild*Age: H < W (7+ yrs)	0.000				0.000
	(0.004)				(0.003)
Boom*Age: H > W (5–10 yrs)	1.694				1.678
	(0.574)				(0.576)
Boom*Age: H > W (11+yrs)	0.742				0.717
	(0.842)				(0.817)
Boom*Age: H < W (2–6 yrs)	1.447				1.232
	(0.636)				(0.561)
Boom*Age: H < W (7+ yrs)	0.000				0.000
	(0.000)				(0.000)
Severe*Educ: H > W		0.829			0.789
		(0.301)			(0.293)
Severe*Educ: W > H		1.277			1.283
		(0.382)			(0.393)
Mild*Educ: H > W		0.736			0.746
		(0.270)			(0.276)
Mild*Educ: W > H		1.303			1.402
		(0.378)			(0.414)
Boom*Educ: H > W		0.981			0.877
		(0.324)			(0.296)
Boom*Educ: W > H		1.219			1.061
		(0.352)			(0.313)
Severe*Ethnic: Both National orig.			1.587		1.698
			(0.707)		(0.766)
Severe*Ethnic: Both Racial etc			1.282		1.188
			(0.782)		(0.733)
Severe*Ethnic: Both Mixed			2.294		2.171
			(1.263)		(1.213)
Mild*Ethnic: Both National orig.			1.320		1.397
			(0.564)		(0.608)
Mild*Ethnic: Both Racial etc			0.854		0.856
			(0.529)		(0.532)
Mild*Ethnic: Both Mixed			0.859		0.869
			(0.394)		(0.404)
Boom*Ethnic: Both National orig.			1.840		1.949
			(0.870)		(0.932)
Boom*Ethnic: Both Racial etc			2.387		2.473
			(1.391)		(1.443)
Boom*Ethnic: Both Mixed			5.582***		5.351***
			(2.893)		(2.824)
Severe*Religion: Both Catholic				1.265	1.142
				(1.187)	(1.084)

(*Continued*)

Table 4. (Continued).

Severe*Religion: Both Jewish					7.195*	7.506*
					(8.364)	(8.863)
Severe*Religion: Both Christian denoms.					1.338	1.286
					(1.168)	(1.136)
Severe*Religion: Both Mixed					1.388	0.944
					(1.593)	(1.119)
Mild*Religion: Both Catholic					1.201	1.169
					(1.399)	(1.369)
Mild*Religion: Both Jewish					1.568	1.866
					(2.462)	(2.946)
Mild*Religion: Both Christian denoms.					1.136	1.314
					(1.259)	(1.466)
Mild*Religion: Both Mixed					1.011	1.098
					(1.188)	(1.305)
Boom*Religion: Both Catholic					2.339	2.128
					(2.744)	(2.509)
Boom*Religion: Both Jewish					0.000	0.000
					(0.000)	(0.000)
Boom*Religion: Both Christian denoms.					3.294	2.771
					(3.672)	(3.106)
Boom*Religion: Both Mixed					6.742	3.816
					(8.189)	(4.720)
Wife's Characteristics						
Age: 20–29	0.670***	0.673***	0.677***	0.665***	0.675***	0.661***
	(0.081)	(0.082)	(0.083)	(0.084)	(0.083)	(0.084)
Age: 30–39	0.677*	0.684*	0.684*	0.675*	0.687*	0.668*
	(0.151)	(0.154)	(0.155)	(0.157)	(0.155)	(0.155)
Age: 40+	2.178	2.308	2.294	2.483*	2.289	2.460*
	(1.091)	(1.176)	(1.167)	(1.300)	(1.165)	(1.289)
Educ: HS+	0.786	0.777	0.778	0.789	0.784	0.790
	(0.149)	(0.150)	(0.149)	(0.157)	(0.151)	(0.157)
Educ: SC	0.666**	0.657**	0.660**	0.669*	0.661**	0.671*
	(0.137)	(0.137)	(0.138)	(0.145)	(0.138)	(0.146)
Educ: C+	0.369***	0.364***	0.366***	0.365***	0.369***	0.365***
	(0.086)	(0.086)	(0.087)	(0.091)	(0.087)	(0.091)
Ethnic: Other national orig.	1.111	1.141	1.149	1.158	1.157	1.171
	(0.263)	(0.277)	(0.279)	(0.295)	(0.280)	(0.298)
Ethnic: Hispanic orig	0.279**	0.277**	0.278**	0.274*	0.280*	0.273*
	(0.180)	(0.181)	(0.181)	(0.181)	(0.182)	(0.181)
Ethnic: Racial	1.118	1.156	1.177	1.146	1.181	1.146
	(0.325)	(0.345)	(0.351)	(0.359)	(0.352)	(0.359)
Ethnic: Others	2.084*	2.293**	2.284**	2.168*	2.279**	2.239*
	(0.826)	(0.927)	(0.922)	(0.912)	(0.920)	(0.942)
Religion: Catholic	0.671	0.685	0.686	0.686	0.714	0.664
	(0.614)	(0.646)	(0.646)	(0.681)	(0.674)	(0.661)
Religion: Jewish	0.447	0.464	0.450	0.486	0.470	0.486
	(0.229)	(0.244)	(0.236)	(0.266)	(0.246)	(0.267)
Religion: Other Christian denoms.	0.196***	0.228**	0.216***	0.207***	0.219***	0.202***
	(0.110)	(0.132)	(0.125)	(0.126)	(0.126)	(0.124)
No. of children	0.996	0.992	0.994	0.991	0.994	0.990

(*Continued*)

Table 4. (Continued).

	(0.044)	(0.045)	(0.045)	(0.046)	(0.045)	(0.046)
Unilateral Divorce	1.573*	1.629*	1.624*	1.687*	1.636*	1.704*
	(0.426)	(0.446)	(0.444)	(0.474)	(0.448)	(0.479)
Baseline hazard parameters ()	✓	✓	✓	✓	✓	✓
Year of marriage fixed effects	✓	✓	✓	✓	✓	✓
State fixed effects	✓	✓	✓	✓	✓	✓
Couple-years: N	40,222	40,222	40,222	40,222	40,222	40,222
Number of couples	3,012	3,012	3,012	3,012	3,012	3,012
Log likelihood	−2459	−2435	−2440	−2431	−2436	−2419
LR test of $\rho = 0$	1.157	1.908	1.909	2.886	1.915	2.843

We found that these estimates are comparable with those in Tables 3 and 4 and are similar across this additional set of controls.

5.3. Sensitivity checks

Table 6, presents estimates using a subset of interactions of the characteristics of the couple without accounting for the frailty distribution. This subset corresponds to the interaction terms where business cycle is now represented by a binary indicator that is equal to 1 in periods of economic expansion and 0 otherwise. These are interacted with variables such as spouses' age, educational attainment, ethnicity and religion. From earlier results in Tables 3–4 we observed that these sets of interacted variables were statistically significant, out of the full set. Furthermore, in Table 6, we expand on the spousal similarities in the level of educational attainment and categorize them as follows: both are high-school drop-outs (reference group), both are high-school graduates, both attained some college education, both are college graduates or have some postgraduate experience. In addition to these categories, other controls in the education category include: husband in a higher educational category than the wife (H > W); husband in a lower category than the wife (H < W), which capture the dissimilarities between spouses' educational levels. These results show that the hazard of dissolution decreases by almost 54% (column 7, Table 6) if the spouses are both college graduates or even higher, compared to when they are both high-school dropouts. Certainly, this would make sense since more educated couples are perhaps able to make better choices in life, particularly in terms of who to marry since they have a longer time to choose their partners and are likely to have secured stable employment. In terms of age, spouses where the wife was older than the husband by 2–6 years tend to face a lower dissolution hazard by almost 26–28% as shown in columns 2 and 7 of Table 6, respectively. This bears resemblance to the findings in Table 3 where a similar effect of a decrease in hazard was observed when wife is older than her husband by 2–6 years. However, this effect is of weak statistical significance.

Once again, we observe that race and religiousness have significant effects on the probability of dissolution (column 7, Table 6). Spouses that differ in their religious beliefs and ethnic backgrounds have a substantially higher hazard of ending their marriages, compared to those spouses with same ethnicity and religious preferences. Moreover, ethnic differences among spouses are an important factor even in times of economic prosperity.

Table 5. Dissolution risk: gamma frailty distribution.

	Gamma Frailty Distribution		
	(1)	(2)	(3)
Variables	Dissolution hazard		
Education: H&W			
H > W	0.936	0.936	0.981
	(0.117)	(0.116)	(0.146)
H < W	1.316*	1.331**	1.200
	(0.199)	(0.153)	(0.172)
Age: H&W			
H > W (5–10 yrs)	0.918	0.884	0.929
	(0.158)	(0.154)	(0.131)
H > W (11+ yrs)	1.051	1.008	1.081
	(0.394)	(0.525)	(0.407)
W > H (2–6 yrs)	0.841	0.690*	0.835
	(0.142)	(0.155)	(0.143)
W > H (7+ yrs)	0.465	0.781	0.499
	(0.308)	(0.580)	(0.310)
Ethnicity: H&W			
Both Other National orig.	1.311	1.307	1.285
	(0.346)	(0.349)	(0.344)
Both Racial	0.408***	0.395***	0.388***
	(0.135)	(0.133)	(0.131)
Both Mixed	10.412***	10.335***	10.185***
	(3.838)	(2.589)	(2.611)
Religion: H&W			
Both Catholic	0.074***	0.083***	0.079***
	(0.047)	(0.054)	(0.051)
Both Jewish	0.124**	0.135**	0.128**
	(0.123)	(0.135)	(0.127)
Both Other Christian denoms	0.323*	0.347*	0.335*
	(0.187)	(0.193)	(0.187)
Both Mixed	1.577	1.743	1.673
	(0.883)	(0.873)	(0.843)
Economy:			
Severe		0.791	0.835
		(0.134)	(0.172)
Mild		1.233	1.102
		(0.183)	(0.220)
Boom		0.448***	0.464***
		(0.074)	(0.093)
Interactions:			
Severe*Age: H > W (5–10 yrs)		1.203	
		(0.483)	
Severe*Age: H > W (11+ yrs)		0.886	
		(1.008)	
Severe*Age: H < W (2–6 yrs)		2.041*	
		(0.842)	
Severe*Age: H < W (7+yrs)		0.937	

(*Continued*)

Table 5. (Continued).

		(1.164)	
Mild*Age: H > W (5–10 yrs)		0.539	
		(0.248)	
Mild*Age: H > W (11+ yrs)		2.170	
		(1.908)	
Mild*Age: H < W (2–6 yrs)		1.186	
		(0.568)	
Mild*Age: H < W (7+yrs)		0.000	
		(0.001)	
Boom*Age: H > W (5–10 yrs)		1.716	
		(0.577)	
Boom*Age: H > W (11+yrs)		0.754	
		(0.853)	
Boom*Age: H < W (2–6 yrs)		1.420	
		(0.619)	
Boom*Age: H < W (7+yrs)		0.000	
		(0.000)	
Severe*Educ: H > W			0.837
			(0.302)
Severe*Educ: W > H			1.278
			(0.380)
Mild*Educ: H > W			0.789
			(0.291)
Mild*Educ: W > H			1.373
			(0.402)
Boom*Educ: H > W			0.988
			(0.325)
Boom*Educ: W > H			1.226
			(0.352)
Wife's Characteristics			
Age: 20–29	0.676***	0.678***	0.684***
	(0.080)	(0.078)	(0.079)
Age: 30–39	0.690	0.697*	0.697*
	(0.156)	(0.151)	(0.152)
Age: 40+	2.231*	2.365*	2.350*
	(1.087)	(1.160)	(1.151)
Educ: HS+	0.808	0.799	0.800
	(0.149)	(0.147)	(0.148)
Educ: SC	0.711	0.702*	0.703*
	(0.169)	(0.140)	(0.141)
Educ: C+	0.404***	0.399***	0.400***
	(0.111)	(0.088)	(0.089)
Ethnic: Other national orig.	1.108	1.133	1.142
	(0.243)	(0.255)	(0.257)
Ethnic: Hispanic orig	0.292*	0.291*	0.291*
	(0.185)	(0.185)	(0.185)
Ethnic: Racial	1.110	1.134	1.156
	(0.310)	(0.316)	(0.323)
Ethnic: Others	1.762	1.951*	1.945*
	(0.808)	(0.765)	(0.767)

(*Continued*)

Table 5. (Continued).

Religion: Catholic	0.713	0.729	0.730
	(0.604)	(0.627)	(0.628)
Religion: Jewish	0.406	0.430*	0.420*
	(0.235)	(0.211)	(0.207)
Religion: Other Christian denoms	0.192***	0.225***	0.214***
	(0.104)	(0.119)	(0.114)
No. of children	0.997	0.994	0.996
	(0.043)	(0.043)	(0.044)
Unilateral Divorce	1.527	1.584*	1.581*
	(0.423)	(0.416)	(0.417)
Baseline hazard parameters ()	✓	✓	✓
Year of marriage fixed effects	✓	✓	✓
State fixed effects	✓	✓	✓
Couple-years: N	40,222	40,222	40,222
Log likelihood	−2449	−2427	−2431
LR test of Gamma var = 0	20.71	18.50	18.72

5.4. Heterogeneity analysis

In Table 7, estimates are presented where the interactions are only with the binary variable indicating a period of economic expansion. In order to test the stability of our results we conducted separate sets of regressions, with and without the inclusion of the variables measuring ethnicity.[17]

We also excluded the number of children and unilateral divorce. These were dropped simply to exclude post-marital controls and restrict the analysis to using information available at the time of marriage. We included a higher number of baseline hazard parameters, but there was no significant change in the results shown previously, compared to those that are shown here. Therefore, in columns 1–2 hazard ratios are obtained from regressions excluding the variables on ethnicity and columns 3–4 include ethnicity variables. Across columns 1–4, Table 7, we found that religious preferences play a vital role. In particular, if both spouses belong to other Christian denominations (i.e various non-Catholic groups), then they are likely to experience a significantly higher risk of divorce or separation, in comparison to those couples where both spouses share Catholic beliefs. This risk is highest for couples where both spouses are from different religious faiths, followed by those belonging to other religions and lastly, for those of other Christian denominations.

With regard to ethnicity, spouses belonging to a similar racial background (for instance, if both are Caucasian, Blacks or Jewish) reduce the dissolution hazard by nearly 53% (column 4, Table 7). This seems plausible since spouses from similar ethnic backgrounds are less likely to face issues emerging from cultural frictions. Couples where both spouses are migrants and belong to other national origin such as French, Irish, Italian, etc., face a 40% higher risk of dissolution (column 4, Table 7). Similarly, couples where

[17]Note that within the PSID, the information on ethnicity became available for both spouses in a household since 1997 onwards. Differences in sample sizes are due to non-response in ethnicity variables. Since this is a constant characteristic over time, we were able to recover this information for 3,644 couples (44,934 couple-years) who had responded to the ethnicity questions. Table A1 on sample selection criteria is shown in the Appendix.

Table 6. Dissolution risk: I.

	Without any frailty distribution						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Variables	Marital Dissolution						
Education: H&W							
Both: HS+	1.209	1.198	1.191	1.153	1.200	1.199	1.151
	(0.364)	(0.369)	(0.369)	(0.379)	(0.375)	(0.371)	(0.383)
Both: SC	1.074	1.011	1.007	1.002	1.012	1.012	0.997
	(0.335)	(0.326)	(0.327)	(0.346)	(0.331)	(0.328)	(0.347)
Both: C+	0.433***	0.425***	0.428**	0.484**	0.430**	0.433**	0.467**
	(0.138)	(0.140)	(0.142)	(0.169)	(0.144)	(0.143)	(0.165)
H > W	1.043	1.027	1.026	1.040	1.026	1.035	1.037
	(0.312)	(0.315)	(0.316)	(0.340)	(0.319)	(0.318)	(0.342)
W > H	1.064	1.049	1.048	1.048	1.057	1.056	1.054
	(0.313)	(0.317)	(0.319)	(0.339)	(0.325)	(0.321)	(0.344)
Age: H&W							
H > W (5–10 yrs)	1.074	0.990	0.906	0.992	0.992	0.992	0.915
	(0.136)	(0.134)	(0.136)	(0.135)	(0.137)	(0.135)	(0.138)
H > W (11+ yrs)	1.071	1.127	1.244	1.159	1.152	1.166	1.234
	(0.361)	(0.427)	(0.507)	(0.441)	(0.444)	(0.444)	(0.507)
W > H (2–6 yrs)	0.790	0.746*	0.717*	0.748*	0.740*	0.746*	0.729*
	(0.123)	(0.125)	(0.131)	(0.126)	(0.126)	(0.125)	(0.134)
W > H (7+ yrs)	0.486	0.497	0.668	0.512	0.509	0.519	0.678
	(0.256)	(0.311)	(0.425)	(0.321)	(0.325)	(0.326)	(0.433)
Ethnicity: H&W							
Both Other National orig.	1.458***	1.489***	1.500***	1.503***	1.426**	1.491***	1.413**
	(0.213)	(0.229)	(0.232)	(0.232)	(0.233)	(0.230)	(0.231)
Both Racial	0.509***	0.466***	0.465***	0.466***	0.415***	0.465***	0.413***
	(0.095)	(0.093)	(0.093)	(0.093)	(0.090)	(0.093)	(0.089)
Mixed Ethnicity	11.451***	12.018***	11.932***	11.920***	10.592***	11.861***	10.681***
	(2.174)	(2.468)	(2.496)	(2.471)	(2.326)	(2.474)	(2.367)
Religion: H&W							
Both Jewish	2.108**	1.672	1.682	1.657	1.676	1.825	1.795
	(0.752)	(0.689)	(0.698)	(0.685)	(0.699)	(0.764)	(0.758)
Both Other Christian denoms	1.858***	1.985***	2.004***	2.000***	2.004***	1.911***	1.960***
	(0.270)	(0.309)	(0.314)	(0.313)	(0.316)	(0.316)	(0.328)
Both Other religions (Hindu, Muslims)	2.254**	2.679***	2.784***	2.773***	2.848***	3.194***	3.212***
	(0.835)	(1.016)	(1.061)	(1.056)	(1.093)	(1.287)	(1.306)
Mixed Religion	7.389***	9.319***	9.749***	9.580***	9.906***	8.670***	9.620***
	(2.058)	(2.821)	(2.971)	(2.902)	(3.063)	(2.711)	(3.096)
Boom			0.453***	0.513	0.265***	0.181	0.104
			(0.069)	(0.392)	(0.115)	(0.193)	(0.145)
Interactions:							
Boom*Age: H > W (5–10 yrs)			1.710*				1.674
			(0.557)				(0.555)
Boom*Age: H > W (11+yrs)			0.662				0.665
			(0.717)				(0.729)
Boom*Age: H < W (2–6 yrs)			1.315				1.109

(*Continued*)

Table 6. (Continued).

			(0.549)				(0.480)
Boom*Age: H < W (7+ yrs)			0.000				0.000
			(0.000)				(0.000)
Boom*Both HS+				1.313			1.309
				(1.058)			(1.095)
Boom*Both SC				1.038			1.056
				(0.871)			(0.920)
Boom*Both C+				0.407			0.466
				(0.365)			(0.431)
Boom*H> W				0.939			0.910
				(0.758)			(0.761)
Boom*W> H				1.022			0.954
				(0.809)			(0.783)
Boom*Both Other Nat. orig.					1.527		1.692
					(0.704)		(0.790)
Boom*Both racial					2.185		2.270
					(1.240)		(1.292)
Boom*Mixed Ethnicity					4.584***		4.448***
					(2.296)		(2.288)
Boom*Both Catholics						2.103	2.034
						(2.376)	(2.313)
Boom*Both Jewish						0.000	0.000
						(0.000)	(0.000)
Boom*Both other Christians						2.821	2.435
						(3.027)	(2.621)
Boom*Mixed Religion						5.929	2.988
						(6.950)	(3.582)
No. of children		1.014	1.013	1.013	1.011	1.014	1.012
		(0.044)	(0.045)	(0.045)	(0.045)	(0.045)	(0.045)
Unilateral Divorce	1.369	1.416	1.458	1.461	1.477	1.451	1.482
	(0.355)	(0.376)	(0.390)	(0.390)	(0.399)	(0.387)	(0.401)
Baseline hazard parameters ()	✓	✓	✓	✓	✓	✓	✓
Baseline parameters	✓	✓	✓	✓	✓	✓	✓
Year of Marriage FE's	✓	✓	✓	✓	✓	✓	✓
State FE's	✓	✓	✓	✓	✓	✓	✓
Couple-years: N	43,764	40,222	40,222	40,222	40,222	40,222	40,222
Number of couples	3,520	3,012	3,012	3,012	3,012	3,012	3,012
Log likelihood	−2695	−2483	−2464	−2464	−2459	−2464	−2453

spouses belong to different ethnic backgrounds face a sharp increase in the risk of marriage termination, as compared to couples where both spouses are reportedly native Americans. The magnitude of this effect is extremely high, and so are the standard errors. This effect persists even in the presence of an economic boom. The hazard of dissolution also increases with the decade of marriage, for example, couples married in the 1980s or later face a greater risk incrementally, as compared to those married in the 1970s. This may arise due to the trends in marriage and dissolution rates overtime.

Table 7. Dissolution risk II.

	Without Ethnicity		Include Ethnicity	
	(1)	(2)	(3)	(4)
Variables	Marital Dissolution			
Education: H&W				
Both: HS+	1.279	1.244	1.216	1.164
	(0.250)	(0.247)	(0.364)	(0.374)
Both: SC	1.292	1.268	1.079	1.073
	(0.275)	(0.276)	(0.335)	(0.358)
Both: C+	0.383***	0.427***	0.434***	0.468**
	(0.087)	(0.098)	(0.137)	(0.158)
H > W	1.077	1.042	1.045	1.033
	(0.210)	(0.208)	(0.310)	(0.330)
W > H	1.246	1.222	1.065	1.053
	(0.237)	(0.237)	(0.312)	(0.332)
Age: H&W				
H > W (5–10 yrs)	0.895	0.888	1.073	1.021
	(0.102)	(0.105)	(0.135)	(0.141)
H > W (11+ yrs)	1.385	1.357	1.079	0.999
	(0.396)	(0.405)	(0.361)	(0.380)
W > H (2–6 yrs)	0.974	0.998	0.790	0.769
	(0.135)	(0.142)	(0.122)	(0.130)
W > H (7+ yrs)	0.876	1.081	0.481	0.641
	(0.329)	(0.404)	(0.252)	(0.340)
Ethnicity: H&W				
Both Other National orig.			1.456***	1.409**
			(0.212)	(0.219)
Both Racial			0.512***	0.472***
			(0.095)	(0.094)
Both Mixed			11.281***	10.069***
			(2.106)	(2.024)
Religion: H&W				
Both Jewish	1.629	1.737	2.132**	2.368**
	(0.554)	(0.586)	(0.756)	(0.861)
Both Other Christian denoms	2.001***	1.963***	1.847***	1.872***
	(0.238)	(0.238)	(0.267)	(0.292)
Both Other religions (Hindu, Muslims)	1.396	1.556	2.235**	2.713**
	(0.528)	(0.609)	(0.825)	(1.072)
Both Mixed	16.389***	15.130***	7.315***	7.479***
	(4.276)	(3.900)	(2.012)	(2.171)
Boom		0.235		0.108
		(0.281)		(0.150)
Interactions:				
Boom*Age: H > W (5–10 yrs)		1.096		1.428
		(0.310)		(0.464)
Boom*Age: H > W (11+yrs)		1.239		1.555
		(0.818)		(1.283)
Boom*Age: H < W (2–6 yrs)		0.815		1.130
		(0.295)		(0.462)

(*Continued*)

Table 7. (Continued).

Boom*Age: H < W (7+ yrs)		0.000		0.000
		(0.000)		(0.000)
Boom*Both HS+		1.204		1.364
		(0.700)		(1.144)
Boom*Both SC		1.099		1.032
		(0.670)		(0.902)
Boom*Both C+		0.445		0.558
		(0.306)		(0.506)
Boom*H > W		1.278		1.054
		(0.739)		(0.880)
Boom*W > H		1.097		1.088
		(0.621)		(0.894)
Boom*Both Other Nat. orig.				1.445
				(0.630)
Boom*Both racial				1.749
				(0.947)
Boom*Both mixed				3.933***
				(1.920)
Boom*Both Catholics		1.985		2.346
		(2.186)		(2.638)
Boom*Both Jewish		0.000		0.000
		(0.000)		(0.000)
Boom*Both other Christians		2.209		2.324
		(2.363)		(2.497)
Boom*Both mixed		3.055		3.534
		(3.517)		(4.231)
Year of Marriage:				
1980–89	4.045***	4.129***	2.743***	3.032***
	(0.541)	(0.553)	(0.372)	(0.431)
1990–99	7.688***	8.251***	9.241***	11.638***
	(1.189)	(1.293)	(1.434)	(2.017)
2000–11	8.198***	10.982***	14.713***	24.158***
	(1.377)	(1.925)	(2.704)	(5.041)
Baseline parameters	✓	✓	✓	✓
State FE's	✓	✓	✓	✓
Couple-years: N	70,114	70,114	43,764	43,764
Number of couples	5,658	5,658	3,520	3,520
Log likelihood	−4963	−4935	−2696	−2663

In the next set of results shown in Table 8 we included household income as an additional control along with all the other controls as before. We also categorize ethnicity as follows: both Americans (non-migrants), both other national origins (migrants) and both from different ethnic backgrounds. In terms of ethnicity, we observed that the hazard of dissolution increases if both spouses are migrants. As noted earlier, there is a sharp increase in hazard if both spouses are from mixed ethnic backgrounds and if there are differences in religious preferences among spouses. We noted that in the presence of an economic boom, similar ethnicity (if both are natives or migrants) has a stable effect on marriage compared to being from varied ethnicities. Higher age

Table 8. Dissolution risk III.

Education: H&W	
Both HS+	1.380
	(0.838)
Both SC	1.350
	(0.867)
Both C+	0.817
	(0.560)
H> W	1.353
	(0.829)
W> H	1.345
	(0.804)
Age: H&W	
H> W (5–10 yrs)	1.220
	(0.352)
H> W (11+ yrs)	3.480**
	(2.036)
W> H (2–6 yrs)	0.759
	(0.280)
W> H (7+ yrs)	1.067
	(1.220)
Ethnicity: H&W	
Both Migrants (other national orig)	4.651***
	(1.528)
Both Mixed	23.055***
	(15.445)
Religion: H&W	
Both Jewish	6.039**
	(4.870)
Both Other Christ. Denoms	1.964*
	(0.691)
Both other religions(Hindu, Muslims)	1.380
	(1.532)
Both Mixed	16.274***
	(12.510)
Boom	1.414
	(2.681)
Interactions	
Boom*Both HS+	1.786
	(2.175)
Boom*Both SC	1.937
	(2.406)
Boom*Both C+	0.977
	(1.291)
Boom*H> W	2.202
	(2.649)
Boom*W> H	2.174
	(2.582)
Boom*H> W (5–10 yrs)	1.889
	(0.831)
Boom*W> H(2–6 yrs)	0.909

(*Continued*)

Table 8. (Continued).

Education: H&W	
	(0.531)
Boom*Both Americans	0.301**
	(0.175)
Boom*Both migrants (other nat. orig)	0.165***
	(0.082)
Boom*Religion: Catholic	0.873
	(1.352)
Boom*Religion: Other Chris. Denoms	0.774
	(1.144)
Boom*Religion: Mixed	1.178
	(1.966)
Number of children	1.018
	(0.082)
Household income	1.000***
	(0.000)
Unilateral Divorce	1.786
	(0.795)
Baseline hazard	✓
Year of marriage Fe's	✓
State Fe's	✓
Couple-years: N	23,328
Number of couples	2,657
Log-likelihood	−913.7

differences between spouses (H > W) also increase the dissolution hazard. Household income is also an important factor in marital stability.[18]

To conclude, the main effect of the business cycle only comes through the binary variable representing boom. A period of economic growth reduces the risk of divorce, but this risk is higher for couples where spouses belong to varied ethnic backgrounds. Considering the current setting, a question may arise on the role of cohabitation. However, cohabitation in the US has never really been perceived as an important issue especially in the decades of 1970–90s during which cohabitation was not a very big phenomena in the US. Stevenson & Wolfers (2007) have shown that marriage appears to be more cherished in the US with 4.7% of adult population in non-marital cohabitation. Kiernan et al. (2011) have shown that the proportion of cohabiting parents is lower in the US than in the UK, using data for 1998–2000 of the Fragile Families Study (FFS). These authors have shown that in the US, marriage seems to carry greater economic returns and that cohabiting mothers in the US do not see a sizeable benefit to their partnership unless it is through marriage.

[18]We only interact the terms with economic boom since this was the significant variable. We observed that the number of observations decreases further since just over 24,000 observations (see Table A1) are non-missing in all controls included.

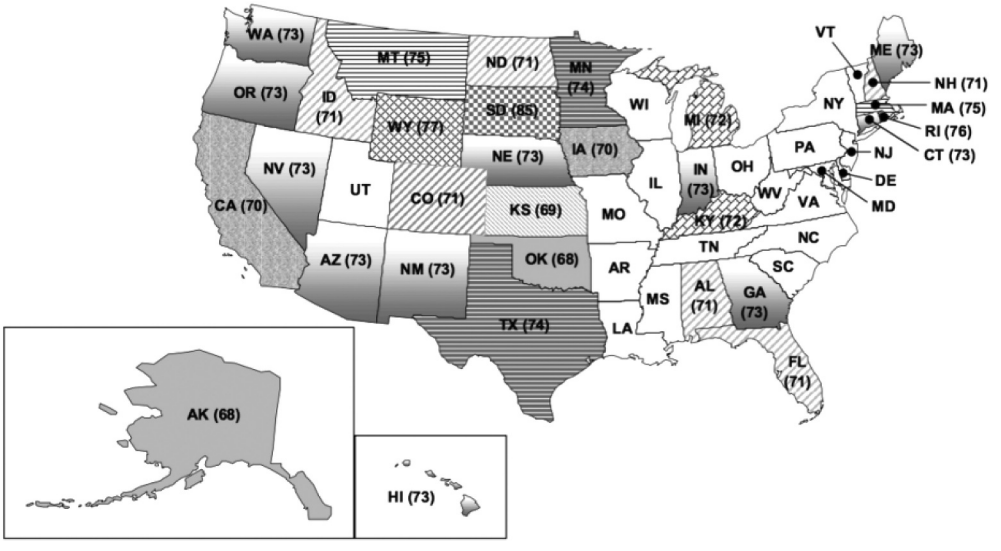

Figure 2. Unilateral divorce law adoption by state taken from Rasul (2006). Years in parentheses correspond to the year of adoption of unilateral divorce law. Coding for year of adoption taken from Friedberg (1998).

6. Conclusions

Using a rich panel data set from the United States for the period of 1968–2011, this study analyses the relation between spouses characteristics and the hazard of marital dissolution. Four dimensions of assortative mating are considered, in accordance with the previous literature which are: age at marriage, educational attainment, ethnicity and religion. This paper provides first hand descriptive evidence and tests the association between these couple-specific traits and the risk of marital dissolution, and more importantly whether this association varies if the economy is in a recession or an expansionary episode.

Results show that fixed variables such as ethnicity and religion strongly influence the risk of marital dissolution. Couples in which both spouses reportedly belong to the same racial or ethnic backgrounds, have same religious affiliations, are at a much lower risk of marriage break-down. Differences in educational attainment, in particular, higher education of the wife, relative to her spouse increases the hazard of dissolution. However, if both spouses are college graduates or both have higher educational attainment, then their risk of marital breakdown is lower compared to if both spouses were high-school dropouts. This suggests that those with higher levels of education usually marry at a later age and thus, have longer time to carefully choose their partners. Furthermore, these individuals are also likely to be in stable employment and consequently these factors promote marriage stability (Louzek, 2022). Although it does not lend much credence to the novel aspect of the paper, but the only robust effect of the business cycles is the stabilising effect of an economic boom. The risk of separation greatly increases for spouses of different ethnicity, even in the presence of an economic expansionary phase.

One potential limitation of this study is that unobserved quality of match among spouses, is likely to be correlated with their observed characteristics at the time of marriage. This selection

can promote their decision to marry in the first place and affect their chances of dissolution. Processes leading to marriage formation and why individuals decide to marry have been previously analysed, extensively by Becker et al. (1977). This paper does not set out to address this concern and only provides first hand suggestive evidence for the United States on the association between marital dissolution and assortative mating, while taking into account economic variations, thereby contributing to the broad literature on marital stability. Insofar, the interest was in using the data, from when the couple enters the survey after marriage, based on the information they have about each other, to predict their risk of marital dissolution. Future avenues of this research may look to examine the issues arising from selection effects and subsequent potential mechanisms to explain the risk of dissolution.

Disclosure statement

No potential conflict of interest was reported by the author.

Notes on contributor

Nikita Jacob is based at the Centre for Health Economics, University of York. She received a Doctorate in Economics from the University of Essex. Her research interests are primarily in applied micro-econometrics, health, family, education and development economics.

ORCID

Nikita Jacob http://orcid.org/0000-0001-5546-4521

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Appendix A.

Table A1. Sample selection.

Selection criteria	Obs (couple-years)	couples
First marriages	78,303	6,537
Non-missing ethnicity	44,934	3,644
Non-missing on controls	24,515	2,741

In the PSID survey, information on race is available from 1968 but only for heads of households, not their spouses (information for spouses start in 1985), with over 40% non-response. The variable on primary ethnic group in the PSID survey has better response rates for both head and spouses since 1997. Further questions in the survey that probe responses to ethnicity (for example first mention of ethnicity, second mention etc) drive the non-response rate very high with more than 80% as missing and 17.9% identifying as Americans. An even higher non-response for spouses is observed with over 90% non-response for spouses of heads of households. Therefore, a potential way to use information on ethnicity for both, heads of households and their spouses was to rely on information collected about ethnicity starting from 1997 onwards. These questions and their responses obtained are recorded as follows.
And what is your primary ethnic group? (for heads of households).
And what is her primary ethnic group? (for spouse).

Count	%	Value/Range	Text
342	5.07	1	American
939	13.92	2	Hyphenated American (e.g., African-American, Mexican-American)
2,736	40.55	3	National origin (e.g., French, German, Dutch, Iranian, Scots-Irish)
121	1.79	4	Nonspecific Hispanic identify (e.g., Chicano, Latino)
2,099	31.11	5	Racial (e.g., white or Caucasian, black)
116	1.72	6	Religious (e.g., Jewish, Roman, Catholic, Baptist)
41	.61	7	Other (e.g., "a mutt", "Heinz 57", "good old boy", "hillbilly")
-	-	8	DK
353	5.23	9	NA; refused

There are inconsistencies in the way this information has been collected since it confounds various factors such as race, religion and national identity. However, this variable on ethnic information has better response rates for heads of households and their spouses.