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Research Article

Delayed entry into first marriage and marital stability: Further evidence on the Becker-Landes-Michael hypothesis

Evelyn L. Lehrer

Yu Chen

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Evelyn L. Lehrer[1]
Yu Chen[2]

Abstract

BACKGROUND

In their pioneering research, Becker, Landes, and Michael (1977) found that beyond age 30 there is a positive relationship between women's age at first marriage and marital instability. They interpreted this finding as a "poor-match effect" emerging when the biological clock begins to tick.

OBJECTIVE

Our objective was to ascertain with more recent data whether or not there is evidence of a poor match effect and if so, whether it is associated with higher marital instability.

METHODS

We used data on non-Hispanic white women from the 2006–2010 National Surveys of Family Growth (NSFG) (N = 3,184).

RESULTS

We found evidence of the existence of a poor-match effect: women who delay marriage disproportionately make unconventional matches, which are generally associated with high marital instability. We also found, however, that their unions are very solid. Both of these results were consistent with earlier findings for the 1995 and 2002–2003 NSFG cycles. In attempting to explain this puzzle, we proposed and tested competing hypotheses. We found that the destabilizing effects associated with indicators of unconventional matches are also present in marriages contracted late, but are dwarfed by the stabilizing influences associated with higher levels of education and older ages.

CONCLUSIONS

This paper contributes to our understanding of the determinants of marital instability and the poor match effect by providing a new interpretation for the puzzle described above.

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[1] University of Illinois, U.S.A. E-mail: elehrer@uic.edu.
[2] University of Illinois, U.S.A.

COMMENTS
Our findings have implications for analyses of changes over time in the extent of positive assortative mating in the marriage market, and for the extensive literature showing that heterogamy in traits that are complementary in the context of marriage is destabilizing – heterogamous marriages contracted at a late age are likely to be stable.

1. Introduction

The steady increase in age at first marriage has been one of the most salient demographic trends in the U.S. landscape in recent decades. The median age rose from 20 and 23 for women and men, respectively, in 1950-1960, to 26 and 28 in 2010 (U.S. Census Bureau 2010). Several factors contributed to this trend, including the development of oral contraception and the legalization of abortion, the growth in cohabitation, changes in household technology, and the decline in the male-female wage gap (Cherlin 2004; Goldin and Katz 2002; Greenwood and Guner 2008; Isen and Stevenson 2012). The focus of this paper is on the growing number of women in the U.S. who are entering marriage in their late twenties or thereafter: What are the characteristics of the unions that they form? Are such unions stable?

Two main theoretical concepts are relevant to these questions. First, Becker (1974) developed the idea that in the optimal sorting, there is positive assortative mating (mating of likes) for traits that are complementary within the context of marriage (e.g., education, age, religion, race/ ethnicity) and negative assortative mating (mating of people who are dissimilar) for those that are substitutes (e.g., productivity characteristics). When such sorting does not occur along important dimensions, so that there is a mismatch and the resulting gains from marriage are low, the outcome is a high probability of divorce (Becker, Landes, and Michael 1977; Becker 1990). Expanding on these insights, Oppenheimer (1988) advanced the notion of a "maturity effect:" marriages contracted at an early age are at a higher risk of disruption because they are more likely to be based on mistaken expectations. At young ages individuals have inadequate self-knowledge and are uncertain about their own and their partners' potential trajectories. Moreover, some of their adult attributes have not yet emerged, making assortative mating by such traits impossible. The maturity effect postulates that postponement of entry into first marriage has a stabilizing influence for all these reasons. While emotional maturity (e. g., more realistic expectations about love and life, a better understanding of the art of compromise) is an important component, the maturity effect encompasses a far broader range of factors. The maturity effect may be reinforced by the positive association between age at first marriage and length of marital search, at the extensive margin (additional information about various potential partners) and at the intensive margin (further information about serious prospects)

(Becker 1990; Weiss and Willis 1997). Longer search at both margins facilitates a good match, although diminishing returns to search may be expected to set in at some point.

Second, Becker, Landes and Michael (1977) suggested the possibility of non-linearities, with a poor match effect emerging at older ages. The authors hypothesized that the ticking of the biological clock would likely lead women who reach their late twenties/thirties in the single state to revise their expectations downward and settle for a partner who is far from the optimal match, with adverse consequences for marital stability. The thinning over time of the potential partner pool poses an additional challenge (Hernes 1972). Postponing entry into first marriage this much could thus have a destabilizing influence, and imply that the relationship between age at first marriage and marital instability (without controlling for the spouses' characteristics at the time of marriage) is U-shaped: after a certain point, age at marriage and the probability of dissolution would be positively related.

The concepts discussed above suggest direct, causal effects of opposing directions of an older age at first marriage on marital instability. Postponement of entry into marriage may also influence marital instability indirectly by increasing exposure to the risk of other events, with varying implications for marital instability. For example, women who marry late are more likely to enter marriage with a child from a previous informal union and having cohabited with other partners – potentially destabilizing influences (Liu 2002; Waite and Lillard 1991); they are also more likely to have had the opportunity to complete a college education, a stabilizing influence (Lyngstad and Jalovaara 2010; McLanahan 2004). We use the term "total effect" to refer to the sum of the direct and indirect effects. Beyond these influences, part of the observed association between the wife's age at marriage and marital instability is spurious, reflecting the impact on each of these variables of the wife's personal and family background characteristics.

Using data from the 1960s, Becker, Landes, and Michael (1977) found evidence of a U-shaped relationship between age at first marriage and the probability of divorce, and interpreted the positive relationship emerging after age 30 as evidence of a dominant poor match effect at these later ages. Numerous subsequent studies found a strong negative relationship – often based on models with a linear age variable (e.g., Boheim and Ermisch 2001; Heaton 2002). Analyses of cycles 5 (1995) and 6 (2002–2003) of the National Survey of Family Growth (NSFG), using a specification of the age variable that allows for non-linearities, revisited the possibility of a poor match effect (Lehrer 2008) – and uncovered a puzzle. Women who delay marriage beyond the late twenties were found to disproportionately make unconventional matches, with characteristics that are typically associated with high marital instability (e.g., heterogamy in age, religion and education), suggesting that Becker, Landes, and Michael's (1977) poor match effect is indeed present; however, the findings also showed that the association between age at first marriage and marital instability (without controlling for the characteristics of the spouses at marriage) is strongly

negative until the late twenties, with the curve leveling off thereafter, i.e., there is no U-shape.

The present study makes four main contributions to this literature. First, we show that both of the findings described above for the NSFG cycles 5 and 6 also hold in the most recent NSFG cycle (2006–2010). Second, we go beyond replication of these findings by proposing and testing two competing hypotheses for explaining the puzzle. We find that although the destabilizing influences associated with unconventional matches are also present in marriages contracted late, the stabilizing effects associated with a higher level of education and an older age are far stronger and dominate. Third, our results shed new light on the determinants of marital stability by showing that couples with traits normally associated with high risk of divorce actually tend to have very stable marriages if their unions are contracted at relatively late ages. And fourth, we develop the implications of our analysis for changes over time in patterns of assortative mating and for the consequences of heterogamy in religion, education, and other traits that are complementary within the context of marriage.

2. Methods

Conducted by the National Center for Health Statistics, the most recent NSFG questionnaires were addressed to nationally representative samples of men and women ages 15–44 years, of all marital statuses, living in the United States. The data were collected over an extended period: 2006–2010 (henceforth referred to as cycle 7, for brevity). The present study uses the female sample (N = 12,279), focusing on non-Hispanic white women (N=6,301) to permit comparisons with the earlier study for cycles 5 and 6. Elimination of respondents who had never been married brought the sample to N = 3,209. After excluding observations with invalid data for the key variables, the final sample size was N = 3,184. The analysis considers women's first marriages only, as the Becker, Landes, and Michael (1977) hypothesis at the heart of this analysis is specific to such marriages. The hypothesis is about never-married women making a decision to enter first marriage, and the compromises regarding partner characteristics they may have to make. The ticking of the biological clock is not nearly as pressing an issue for men as it is for women.

The associations of the wife's age at first marriage and other variables with marital instability were assessed using Cox proportional hazards models. Survival time was defined as the interval between the respondent's first marriage and the date of marriage dissolution, measured at the time of separation (or divorce, for cases with missing data on date of separation). First marriages that had not been dissolved were treated as censored as of the interview date; cases of widowhood were treated as censored at date of husband's death. In addition to the coefficients, standard errors and hazard ratios, we

report estimated fifth-year dissolution probabilities – the complement of the survival function evaluated at 5 years and at selected values of the explanatory variables.

Table 1 provides descriptive statistics for the variables used in the statistical analyses. The main explanatory variable – the wife's age at first marriage – was specified as a series of dummy variables. Consistent with the pattern of rising age at first marriage in recent decades, 26% of the marriages took place at age 27 or later – compared with 15% in cycle 5 and 23% in cycle 6.

Table 1:   Descriptive statistics

Variable	Definition	Mean
Wife's Age at Marriage	=1 if respondent's (R) age at marriage was in category indicated	
20 or younger		0.25
(21-23)		(0.27)
24-26		0.23
27-29		0.14
30-32		0.07
33 or older		0.05
Wife's Background Characteristics		
Family of origin not intact	=1 if R's family of origin was not intact	0.33
Unaffiliated	=1 if R was raised with no religious affiliation	0.10
Wife's Characteristics at Marriage		
Education	=1 if at date of first marriage, R's education was in category indicated	
Less than 12 years		0.15
(12 – 15 years)		(0.54)
16 years or more		0.31
Child from previous union	=1 if R had had a live birth prior to the date of first marriage	0.19
Cohabitation before marriage		
With spouse only	=1 if R only cohabited with husband prior to marriage	0.45
With spouse and others	=1 if R cohabited with husband and others prior to marriage	0.13
With others only	=1 if R only cohabited with others prior to marriage	0.03
(no cohabitation)		(0.39)

Table 1:   **(Continued)**

Variable	Definition	Mean
Characteristics of husband and couple at marriage		
Husband married before	=1 if R's husband had been married before	0.15
Different race/ ethnicity	=1 if husband is non-white and/or Hispanic	0.09
Age composition	=1 if difference between husband's and wife's age is as indicated	
6 years or more		0.19
-3 years or less		0.04
(more than -3; less than 6)		(0.77)

Note: N=3,184.

We also included other variables that have been found to be risk or protective factors for divorce in previous studies (see literature reviews by Lehrer 2003; Lyngstad and Jalovaara 2010; Weiss 1997) – among them, two characteristics of the wife's background. The first is whether she lived in a non-intact family at age 14; numerous studies have documented an intergenerational transmission of divorce (Amato 1996). The second is being raised with no religion, which has been found to be associated with increased likelihood of marriage dissolution (Lehrer and Chiswick 1993; Lehrer 2008). The proportion of women raised with no religion rose steadily across the three cycles, from .06 to .08 and .10, consistent with other evidence of a growing representation of the unaffiliated in the population (Kosmin and Keysar 2006). At the same time, the "no religion" category increasingly includes people for whom religion is, in fact, part of life (Hout and Fischer 2002; Lehrer and Chen 2013), suggesting that the association between no religion and marital instability is likely to have weakened over time.

Other variables indicate wife's characteristics at the time of first marriage: her education, whether she had had a child in a previous union, and cohabitation history. Earlier studies have found a substantially lower risk of divorce for women who enter first marriage having completed 16 years of schooling or more (McLanahan 2004). The fraction of women in this category has risen markedly over time – from .16 in the NSFG cycle 5, to .28 in cycle 6, and to .31 in cycle 7.

Previous research has shown that the likelihood of marital dissolution is higher for those who enter marriage having already had a child (Waite and Lillard 1991). Regarding the generally positive association between premarital cohabitation and likelihood of divorce found in the literature, most studies have attributed it to the lower commitment to marriage among those who cohabit (Lillard, Brien, and White 1995; Svarer 2004); sharing living arrangements without the legal document of marriage may

also lead to behavioral changes conducive to higher marital instability (Thornton, Axinn, and Hill 1992). Approximately 36% of respondents in cycle 5 had lived with their spouse prior to marriage, and by cycle 6 the figure had risen to 50%; the cycle 7 estimate presented in this paper is 58%, consistent with the notion that premarital cohabitation is now the normative path towards formal marriage. In comparisons covering marriages contracted over the period 1950–1984, Teachman (2002) found no evidence of change in the association between premarital cohabitation and the risk of divorce; however, more recent research found an insignificant association between premarital cohabitation and marital stability for marriage cohorts since the mid-1990s (Manning and Cohen 2012). Cohabitation with other partners has received less attention in the literature, and studies differ on how this variable is specified, and also on other factors held constant in the analysis. Lichter and Qian (2008), among others, found that it is positively associated with risk of divorce; this also held in analyses of cycle 5 of the NSFG, but not for cycle 6 (Lehrer 2008). Cycles 6 and 7 lack data on husband's education, a serious limitation in this regard given the association between low socioeconomic status and serial cohabitation (Lichter and Qian 2008).

Another important variable that is not included in cycles 6 and 7 is the husband's religion. Our analysis includes the three traits of the husband or couple that are available in cycle 7: whether he had been married before, and dummy variables for race/ethnicity and age heterogamy. Unions involving a husband who had been previously married have been found to be less stable (Castro-Martin and Bumpass 1989; Lyngstad and Jalovaara 2010). Earlier research has found that race/ethnicity heterogamy has increased in recent decades, reflecting in part a more tolerant social environment (Amato, Johnson, and Rogers 2003). Consistent with these findings, 7% of marriages were heterogamous in race/ethnicity in cycle 5, with an increase to 8% and 9% in cycles 6 and 7, respectively. Yet race/ethnicity heterogamy was associated with a significantly higher risk of divorce in both cycles 5 and 6 (Lehrer 2008).

Theory predicts a positive sign for the effect of age heterogamy on marital instability (Becker 1990), and empirical studies have found an increased risk of divorce when the wife is older than the husband by even a small margin (Teachman 2002; 2003). The percentage of couples in which the wife was older than the husband by 3 years or more increased from 2% in cycle 5 to 4% in cycles 6 and 7 – lending support to other research showing an increased prevalence of this particular form of age heterogamy as women have come to enjoy more equal opportunities in the labor market (Coles and Francesconi 2011). Analyses of cycle 5 showed that this form of age heterogamy was associated with greater marital instability (Lehrer 2008; Teachman 2003), but the association was insignificant in analyses of cycle 6 (Lehrer 2008).

There was also an increase over the cycles in the proportion of couples in which the husband was older than the wife by 6 years or more, from 14% in cycle 5 to 16% in cycle 6 and 19% in cycle 7. Study findings show that the sign for this form of age heterogamy actually ranges in earlier research from significantly negative to

significantly positive (Heaton 2002; Lehrer 1996; Teachman 2002), possibly reflecting differences across studies in model specifications and related omitted variable biases (Lehrer 2008). The cycle 6 estimates suggest that marital instability for these couples was lower than for their age-homogamous counterparts; no significant associations could be discerned in the cycle 5 data (Lehrer 2008).

3. Results

3.1 Cox regressions

Table 2 reports the Cox proportional hazard regressions. Panel I, which controls only for the wife's background characteristics, provides an estimate of the influence of central interest: the total effect associated with the wife's age at first marriage. Panel II adds the other explanatory factors. In this and the following sections, all comparisons to results for the NSFG cycles 5 and 6 are based on findings reported in Lehrer (2008).

Table 2: Cox proportional hazards models of marital dissolution (standard errors in parentheses)

	Panel I: Controlling only for wife's background characteristics			Panel II: Adding characteristics of spouses at marriage			Panel III: Subsample Wife's age at marriage ≥27		
	Coefficient	Hazard Ratio	5th year dissolution probability[a]	Coefficient	Hazard Ratio	5th year dissolution probability	Coefficient	Hazard Ratio	5th year dissolution probability
Wife's Age at Marriage									
20 or younger	0.38(0.07)**	1.47	0.31	0.37(0.08)**	1.44	0.27			
21-23			**0.22**			**0.20**			
24-26	-0.47(0.09)**	0.62	0.15	-0.39(0.09)**	0.68	0.19			
27-29	-0.57(0.12)**	0.57	0.13	-0.55(0.12)**	0.58	0.12			**0.06**
30-32	-0.97(0.20)**	0.38	0.09	-0.96(0.20)**	0.38	0.08	-0.43(0.22)**	0.65	0.04
33 or older	-0.73(0.24)**	0.48	0.11	-0.64(0.24)**	0.53	0.11	-0.09(0.26)	(0.91)	(0.05)
Wife's Background Characteristics									
Family of origin not intact	0.44(0.06)**	1.55	0.32	0.29(0.06)**	1.34	0.25	0.12(0.19)	(1.13)	(0.07)
Unaffiliated	0.14(0.09)	(1.15)[b]	(0.25)	0.09(0.09)	(1.09)	(0.21)	0.14(0.27)	(1.14)	(0.07)

Table 2:   (Continued)

	Panel I			Panel II			Panel III		
	Coefficient	Hazard Ratio	5th year dissolution probability	Coefficient	Hazard Ratio	5th year dissolution probability	Coefficient	Hazard Ratio	5th year dissolution probability
Wife's Characteristics at Marriage Education									
Less than 12 years				-0.02(0.08)	(0.98)	(0.19)	-0.33(0.28)	(0.72)	(0.08)
12–15 years									0.10
16 years or more				-0.53(0.09)**	0.59	0.12	-0.59(0.21)**	0.56	
Child from previous union				0.27(0.08)**	1.31	0.25	0.75(0.21)**	2.11	0.12
Cohabitation before marriage With spouse only				0.28(0.07)**	1.33	0.25	0.41(0.25)*	1.51	0.09
With spouse and others				0.12(0.12)	(1.12)	(0.22)	-0.10(0.31)	(0.90)	(0.05)
With others only				0.35(0.20)*	1.43	0.27	0.79(0.45)*	2.21	0.12
Characteristics of Husband and Couple at Marriage Husband married before				0.22(0.09)**	1.25	0.24	0.45(0.21)**	1.57	0.09
Different race/ethnicity				0.41(0.09)**	1.51	0.28	0.31(0.28)	(1.36)	(0.08)
Age difference									
6 years or more				-0.01(0.08)	(0.99)	(0.19)	-0.08(0.23)	(0.92)	(0.05)
- 3 years or less				0.38(0.19)**	1.46	0.27	0.49(0.25)**	1.63	0.09

Note: N = 3,184 for Panels I and II; N= 799 for Panel III.

** *p*< .05; * *p*<.10

[a] The "reference person"(fifth-year dissolution probability shown in bold) is someone with typical characteristics. In Panel I, she is a respondent who entered first marriage at age 21–23 and whose family background characteristics are set at the modal category. The other estimated fifth-year dissolution probabilities correspond to respondents who differ from the reference person in only one trait, as noted in the stub.

The reference person in Panel II entered marriage at age 21–23 with 12–15 years of schooling; all other characteristics of the wife, husband and couple are set at the mode. The only exception is that, to facilitate comparisons with estimates reported in Lehrer (2008), the reference person is assumed to have had no previous cohabiting unions.

The reference person in Panel III is defined in the same way, except that her age at first marriage and education are set at 27–29 and 16 years or more, respectively – the modal categories for the subsample.

[b] Hazard ratios and probabilities are shown in parentheses when the corresponding coefficient is not significant at the 0.10 level.

The estimates in Panel I show that the fifth-year dissolution probability is .31 for women who entered first marriage before age 20, and declines steadily to .09 for those who did so at age 30–32. The coefficient on the 30–32 year age dummy is significantly different from that for the 27–29 year age dummy (p = .06). The probability rises slightly to .11 for ages 33 and older, but the coefficient on the dummy variable for the 33 years and older category is not significantly different from that for the 30–32 year category. The findings for cycles 5 and 6 of the NSFG showed that the curve indicating the total effect of age at marriage on marital instability is steeply downward-sloping until the late twenties, leveling off thereafter. The present results mirror those findings, with one difference: the downward slope is now seen to extend farther, to the early thirties. The Cox models assume proportional hazards. As a robustness check, we therefore estimated logit models for union dissolution at 2, 5, and 7 years after marriage. The findings we obtained were qualitatively the same (albeit with lower significance, as expected given that the logit models use less information).

With regard to the estimated coefficients on the control variables in Panel II, the results reveal few surprises in light of our discussion of the literature in the previous section. Factors found in earlier studies to be risk or protective factors for divorce generally have the expected signs.

3.2 Age at marriage and characteristics of the match

Table 3 displays selected characteristics of the respondents and their partners by the wife's age at first marriage. Women who enter marriage in their late twenties or after are more likely than their counterparts who do so earlier to have completed 16 years of schooling or more, by a wide margin. Although cycle 7 of the NSFG does not contain information on the husband's education, patterns of assortative mating in the marriage market suggest that college-educated respondents likely had partners who had attained similarly high levels of schooling (Fernandez and Rogerson 2001; Kalmijn 1991). In other observed dimensions of the match, however, women who married in their late twenties or later tended to form unions with characteristics found in earlier research to be associated with higher marital instability: they were more likely to wed men who had been previously married and who were younger than them by three years or more. These patterns closely mirror those uncovered earlier, for cycles 5 and 6, and are suggestive of a poor-match effect emerging as the biological clock begins to tick. Cycle 5, which contained richer data on husbands' characteristics, showed that women who postpone marriage are also more likely to enter unions that are heterogamous in two other important dimensions: education and religion. In addition, in all cycles, women who delay marriage themselves have characteristics generally associated with marital instability: they are more likely to have a child from a previous union and to have previously cohabited. Overall, these patterns suggest that women who marry in their

late twenties or after disproportionately enter unconventional matches. At the same time, the absence of a U-shape in all cycles indicates that the unions they form tend to be solid.

Table 3:   Selected characteristics by respondent's age at marriage[a]

	Age at marriage					
	20 or younger	21-23	24–26	27-29	30 or older	χ^2 test (p-value)
Wife's Characteristics at Marriage						
Education						
Less than 12 years	31.35	10.84	6.42	11.14	8.15	< .01
16 years or more	4.70	24.97	43.98	51.74	52.45	
Child from previous union	15.10	21.08	18.72	18.56	22.83	< .01
Characteristics of Husband and Couple at Marriage						
Husband married before	10.03	11.31	14.04	21.35	31.52	< .01
Cohabitation before marriage						
With spouse only	40.99	46.05	46.12	53.60	42.93	< 0.01
With spouse and others	3.17	9.19	15.51	21.58	31.79	
With others only	1.27	2.47	2.94	2.78	4.08	
Age difference:						
-3 years or less	0.25	0.71	2.27	7.66	16.30	< .01
Race/ethnicity difference	10.66	8.83	6.82	9.74	7.61	.08

Note: N = 3,184. [a]Figures reported are percentage of cases with dummy variable equal to 1.

Two different explanations may be behind this puzzle. (a) One hypothesis is that whatever challenges these unconventional matches may pose, they can be addressed with the greater resources and higher maturity that come with more education and older ages. That is, the destabilizing effects typically associated with such factors as a child from a previous union, a husband who was previously married, and the wife being older than the husband, are simply not present in couples that have delayed entry into marriage. (b) An alternative hypothesis is that these indicators of unconventional matches are always associated with higher marital instability – even in couples that have delayed entry into marriage – but the stabilizing effects associated with older ages and higher levels of educational attainment are larger, and dominate. These hypotheses

can be tested by re-estimating the Cox model in Table 2, Panel II using a subsample of respondents who delayed entry into first marriage. While hypothesis (a) predicts that the coefficients on the variables indicating unconventional matches should now be insignificant, hypothesis (b) implies that they should continue to be significantly different from zero and not trivial in magnitude.

3.3 Subsample of women who delayed first marriage

Panel III in Table 2 presents results for regressions estimated with the subsample of respondents who entered first marriage at age 27 years or later. The sample size is n = 799 and the coefficients are now estimated with less precision. The direction of the effects, however, is clear. The coefficient on race/ethnicity heterogamy is smaller and loses significance in the subsample. But the coefficients associated with all other traits that are generally destabilizing continue to be statistically significant, with magnitudes that are at least as large as those we found for the full sample. This is true of a child from an earlier union, a previous marriage of the husband, the wife being older than the husband by three years or more, and cohabitation prior to the marriage with the spouse only and with others only. Overall, these results are consistent with hypothesis (b). This hypothesis was also supported by a formal test. Based on the full sample, we estimated a regression including a dummy variable for age at first marriage at 27 years of age or later, and interactions between this dummy and each of the variables listed in Table 2 beginning with "child from previous union." A log-likelihood test for the joint significance of these interactions yielded χ^2, 8 df = 9.63; p = .29.

Examination of the predicted probabilities is instructive. Panel II shows that for a couple with typical characteristics in the full sample (the wife entered first marriage at age 21–23 years, with 12–15 years of schooling) the fifth-year dissolution probability is .24 if the husband had been married before, compared to .20 if he had not. In contrast, Panel III indicates that for a couple with typical characteristics in the sub-sample (the wife entered marriage at 27-29 years of age, having completed 16 years or more of schooling) the fifth-year dissolution probability is .09 if the husband had been married before, compared to .06 if he had not. These results show that for a couple in the subsample with its typical characteristics, the fifth-year dissolution probability is so low (compared to that for a woman in the full sample with its typical characteristics) that even if the husband had been married before, the fifth-year dissolution probability (though higher by 3 percentage points than if he had not) is still very low. More generally, these results illustrate the stability of unions that begin later in life, with high levels of maturity and education - even in the case of unconventional matches.

4. Discussion

4.1 Summary and implications

Analyses of data from the 2006–2010 NSFG cycle show that women who delay first marriage disproportionately enter unions having completed 16 years of schooling or more (and their husbands likely have similarly high levels of education); however, in other respects, their marriages tend to have characteristics that traditionally have been associated with high marital instability, including age heterogamy and a previous marriage of the husband. At the same time, the unions they form tend to be very solid. Both of these results are consistent with earlier findings based on cycles 5 and 6 of the NSFG. The analyses in this paper shed light on these patterns and provide an interpretation. We re-estimated the model with the subsample of respondents who delayed entry to first marriage to age 27 or beyond, and found that those traits that are associated with unconventional matches are generally risk factors for divorce for these women also. But the stabilizing effects associated with the higher level of economic resources that come with more schooling and the greater maturity that comes with older ages are far larger in magnitude.

Having emphasized the flattening-out of the curve at late ages at marriage – the U-shape postulated by Becker, Landes, and Michael (1977) is not there – the most salient aspect of the age at marriage–marital instability relationship is the steep downward sloping curve from the teens to the late twenties in cycles 5 and 6, and to the early thirties in cycle 7. It is important to note that while marriages that take place before age 20 are by far the most unstable, the difference in the estimated fifth-year dissolution probabilities for marriages contracted at ages 24–26 versus 30–32 is also sizeable: 6 percentage points. That is, the pronounced negative relationship between age at first marriage and marital instability is not driven just by unstable marriages contracted at very young ages, as suggested in earlier research (Glenn, Uecker, and Love 2010; Heaton 2002).

The divorce rate has been declining in the U.S. since the early 1980s (Cherlin 2010; Isen and Stevenson 2012; Stevenson and Wolfers 2007). An important item in the agenda for future research is to quantify the extent to which this decline over time can be accounted for by the two major trends emphasized in this paper – women's tendency to enter first marriage at later ages and their increased levels of education at first marriage. A study that focused on the first of these trends found that it could explain at least 60% of the decline in divorce for cohorts entering marriage in the period 1980–2004 (Rotz 2012). In addition, a third related trend – the widening gap in marital instability between women who have a college education and their less educated counterparts – deserves more attention (Wilcox and Marquardt 2010).

A recent study cautions that although marriages contracted at late ages may be stable, they disproportionately include marital unions of low quality – as measured by responses to questions about happiness and satisfaction with the marriage (Glenn, Uecker, and Love 2010). In another study, however, an older age at marriage was associated with a lower proneness to divorce, and the associations between age at marriage and two other subjective measures of marital quality were insignificant (Amato et al. 2003). More recent research has found that marriages contracted later in life tend to display objective characteristics associated with better unions, such as fewer arguments, healthier ways of dealing with disagreements, a lower likelihood of physical injury during an argument, and a more egalitarian intra-household division of labor (Rotz 2012). Further research along these lines would be desirable. In the meantime, the real concern should be for the non-college-educated, who tend to marry at young ages, and for whom the divorce rate has stayed the same (high school degree or some college) or even increased (high-school dropouts); this is also a group with a high rate of childbearing within the context of fragile cohabiting unions (Cherlin 2009, 2010; Martin 2006).

4.2 Limitations

Three caveats should be noted. First, the proportional hazards models in Table 2 control for factors found in earlier studies to be predictive of divorce: wife's family background variables (Panel I) and characteristics of the spouses at marriage (Panel II). But of course there is a host of unobserved relevant factors in each of these categories. In particular, our estimate of the "total effect" in Panel I must be qualified as subject to omitted variables biases. A recent study focusing on the adverse effect of marriage at very young ages on subsequent economic status was able to obtain a consistent estimate by using variations across states in minimum-age-at-marriage laws as an instrument (Dahl 2010). A similar approach could be used to obtain a consistent estimate of the adverse influence on marital stability, using data sets that include information on state of residence at the time of marriage; however, the non-linearities uncovered in the present study indicate that simple extrapolation to the older ages – beyond the early thirties – would be inappropriate.

Second, both the earlier study (Lehrer 2008) and the present paper are based on data for non-Hispanic white women only. It would be important to examine these relationships with samples of other racial/ethnic groups, including African-American and Hispanic women. And third, our data set has a relatively small number of cases in the 33 years and older age at marriage category (n=159). In addition, it only covers women up to age 44 years, which means that marriages contracted at, say, age 40, are

observed for only four years, and marriages that take place at age 45 or later are not observed at all. Whether the findings reported in the present study and the earlier piece (Lehrer 2008) hold up with richer data not affected by these limitations is an important question for future investigations.

4.3 Next steps

The findings of this study raise two new questions for research on marriage and the family. The first pertains to changes over time in the extent of positive assortative mating in the marriage market. Isen and Stevenson (2012) suggest that the U.S. has witnessed a shift in gains from marriage from production efficiencies (based on intra-household division of labor and specialization) to consumption complementarities - likely contributing to a decrease in heterogamy over time. As the authors note (p. 4), "in a consumption-based model of marriage people will be more likely to marry someone with similar preferences, which will likely manifest itself as an increase in positive assortative mating along dimensions such as age, educational background, occupation, as well as consumption, and leisure preferences." The poor match effect, first suggested by Becker, Landes and Michael (1977), revisited here, suggests that the pattern of delayed entry into first marriage has exerted an influence in the opposite direction – leading to an increase over time in heterogamy. Further analyses of these countervailing forces may shed light on the complex patterns that have emerged in studies to date, which show that heterogamy has increased in some dimensions and decreased in others (Amato et al. 2003; Cherlin 2010, Kalmijn 1991; Schwartz and Mare 2005; Qian 1998). In particular, our findings underscore the importance of taking into account age at marriage in future analyses of trends in assortative mating.

The second question pertains to the extensive literature showing that differences between the partners in religious affiliation are associated with a higher probability of divorce (Kalmijn, Graaf, and Janssen 2005; Lehrer and Chiswick 1993; Lehrer 2008; Vaaler, Ellison, and Powers 2009). The present results suggest that although inter-faith marriages contracted at a late age may be significantly less solid than intra-faith marriages also contracted at a late age, overall the former are likely to be very stable. The same remarks apply to the destabilizing effects associated with education heterogamy. A fruitful avenue for further research is to formally test these hypotheses with richer data sets containing information for both spouses on religion, education, and other traits that are complementary in the context of marriage.

5. Acknowledgements

References

Amato, P.R. (1996). Explaining the intergenerational transmission of divorce. *Journal of Marriage and the Family* 58(3): 628–640. doi:10.2307/353723.

Amato, P.R., Johnson, D.R., Booth, A., and Rogers, S.J. (2003). Continuity and change in marital quality between 1980 and 2000. *Journal of Marriage and the Family* 65(1): 1–22. doi:10.1111/j.1741-3737.2003.00001.x.

Becker, G.S. (1974). A theory of marriage. In: Schultz, T. W. (ed.). *Economics of the Family: Marriage, Children, and Human Capital*. Chicago: The University of Chicago Press: 299–344.

Becker, G.S. (1990). *A Treatise on the Family*. Cambridge: Harvard University Press.

Becker, G.S., Landes, E.M., and Michael, R.T. (1977). An economic analysis of marital instability. *Journal of Political Economy* 85(6): 1141–1187. doi:10.1086/260631.

Boheim, R. and Ermisch, J. (2001). Partnership dissolution in the UK: The role of economic circumstances. *Oxford Bulletin of Economics and Statistics* 63(2): 197–208. doi:10.1111/1468-0084.00216.

Castro-Martin, T. and Bumpass, L.L. (1989). Recent trends in marital disruption. *Demography* 26(1): 37–51. doi:10.2307/2061492.

Cherlin, A.J. (2004). The deinstitutionalization of American marriage. *Journal of Marriage and the Family* 66(4): 848–861. doi:10.1111/j.0022-2445.2004.00058.x.

Cherlin, A.J. (2009). Rebuttal: Real wedding bell woes. *The Washington Post*, April 27.

Cherlin, A.J. (2010). Demographic trends in the United States: A review of research in the 2000s. *Journal of Marriage and the Family* 72(3): 403–419. doi:10.1111/j.1741-3737.2010.00710.x.

Coles, M.G. and Francesconi, M. (2011). On the emergence of toyboys: The timing of marriage with aging and uncertain careers. *International Economic Review* 52(3): 825–853. doi:10.1111/j.1468-2354.2011.00651.x.

Dahl, G.B. (2010). Early teen marriage and future poverty. *Demography* 47(3): 689–718 doi:10.1353/dem.0.0120.

Fernandez, R. and Rogerson, R. (2001). Sorting and long-run inequality. *Quarterly Journal of Economics* 116 (4): 1305–1341. doi:10.1162/003355301753265589.

Glenn, N.D., Uecker, J.E., and Love, R.W.B. (2010). Later first marriage and marital success. *Social Science Research* 39(5): 787–800. doi:10.1016/j.ssresearch.2010.06.002.

Goldin, C. and Katz, L.F. (2002). The power of the pill: Oral contraceptives and women's career and marriage decisions. *Journal of Political Economy* 110(4): 730–770. doi:10.1086/340778.

Greenwood, J. and Guner, N. (2008). Marriage and divorce since World War II: Analyzing the role of technological progress on the formation of households. Bonn, Germany: The Institute for the Study of Labor. (IZA Discussion Paper No. 3313).

Heaton, T.B. (2002). Factors contributing to increasing marital instability in the United States. *Journal of Family Issues* 23(3): 392–409. doi:10.1177/0192513X02023003004.

Hernes, G. (1972). The process of entry into first marriage. *American Sociological Review* 37(2): 173–182. doi:10.2307/2094025.

Hout, M. and Fischer, C.S. (2002) Why More Americans Have No Religious Preference: Politics and Generations. *American Sociological Review* 67(2): 165–190. doi:10.2307/3088891.

Isen, A. and Stevenson, B. (2012, forthcoming). Women's education and family behavior: Trends in marriage, divorce and fertility. *Demography*.

Kalmijn, M. (1991). Shifting boundaries: Trends in religious and educational homogamy. *American Sociological Review* 56(6): 768–780. doi:10.2307/2096256.

Kalmijn, M., de Graaf, P.M., and Janssen, J.P.G. (2005). Intermarriage and the risk of divorce in the Netherlands: The effects of differences in religion and nationality. *Population Studies: A Journal of Demography* 59(1): 71–85. doi:10.1080/0032472052000332719.

Kosmin, B.A. and Keysar, A. (2006). *Religion in a Free Market*. Ithaca, New York: Paramount Market Publishing, Inc.

Lehrer, E.L. (1996). The determinants of marital stability: A comparative analysis of first and higher-order marriages. *Research in Population Economics* 8: 91–121.

Lehrer, E.L. (2003). The economics of divorce. In: Grossbard-Shechtman, S. (ed.) *Marriage and the Economy: Theory and Evidence from Industrialized Societies*. Cambridge: Cambridge University Press: 55–74. doi:10.1017/CBO97805 11615863.005.

Lehrer, E.L. (2008). Age at marriage and marital instability: Revisiting the Becker-Landes-Michael hypothesis. *Journal of Population Economics* 21(2): 463-484. doi:10.1007/s00148-006-0092-9.

Lehrer, E.L. and Chen, Y. (2013). The labor market behavior of married women with young children in the U.S.: Have differences by religion disappeared? Bonn, Germany: The Institute for the Study of Labor. (IZA Discussion Paper No. 7254).

Lehrer, E.L. and Chiswick, C.U. (1993). Religion as a determinant of marital instability. *Demography* 30(3): 385–404. doi:10.2307/2061647.

Lichter, D.T. and Qian, Z. (2008) Serial cohabitation and the life course. J*ournal of Marriage and the Family* 70(4): 861–878. doi:10.1111/j.1741-3737.2008.00532.x.

Lillard, L., Brien, M.J., and Waite, L.J. (1995). Premarital cohabitation and subsequent marital dissolution: A matter of self-selection? *Demography* 32(3): 437–457. doi:10.2307/2061690.

Liu, G. (2002). How premarital children and childbearing in current marriage influence divorce of Swedish women in their first marriages. *Demographic Research* 7(10):389–406. doi.org/10.4054/DemRes.2002.7.10.

Lyngstad, T.H. and Jalovaara, M. (2010). A review of the antecedents of union dissolution. *Demographic Research* 23(10): 257–292. doi:10.1111/j.1741-3737. 2012.00960.x.

Manning, W.D. and Cohen, J.A. (2012). Premarital cohabitation and marital dissolution: An examination of recent marriages. *Journal of Marriage and the Family* 74(2): 377–387. doi.org/10.1111/j.1741-3737.2012.00960.x.

Martin, S.P. (2006). Trends in marital dissolution by women's education in the United States. *Demographic Research* 15(20): 537–560. doi:10.4054/DemRes.2006. 15.20.

McLanahan, S. (2004). Diverging destinies: How children fare under the second demographic transition. *Demography* 41(4): 607–628. doi:10.1353/dem.2004. 0033.

Oppenheimer, V.K. (1988). A theory of marriage timing. *American Journal of Sociology* 94(3): 563–591. doi:10.1086/229030.

Qian, Z. (1998). Changes in assortative mating: The impact of age and education, 1970-1990. *Demography* 35(3): 279–292. doi.org/10.2307/3004036.

Rotz, D. (2012). Why have divorce rates fallen? The role of women's age at marriage. Unpublished paper, Harvard University.

Schwartz, C.R., and Mare, R.D. (2005). Trends in educational assortative marriage from 1940 to 2003. *Demography* 42(4): 621–646. doi:10.1353/dem.2005.0036.

Stevenson, B. and Wolfers, J. (2007). Marriage and divorce: Changes and their driving forces. *Journal of Economic Perspectives* 21(2): 27–52. doi:10.3386/w12944.

Svarer, M. (2004). Is your love in vain? Another look at premarital cohabitation and divorce. *Journal of Human Resources* 39(2): 523–535. doi:10.2307/3559025.

Teachman, J.D. (2002). Stability across cohorts in divorce risk factors. *Demography* 39(2): 331–351. doi:10.1353/dem.2002.0019.

Teachman, J.D. (2003). Premarital sex, premarital cohabitation, and the risk of subsequent marital dissolution among women. *Journal of Marriage and the Family* 65(2): 444–455. doi:10.1111/j.1741-3737.2003.00444.x.

Thornton, A., Axinn, W.G., and Hill, D.H. (1992) Reciprocal effects of religiosity, cohabitation, and marriage. *American Journal of Sociology* 98(3): 628–651. doi:10.1086/230051.

U.S. Census Bureau (2010). Current Population Survey, March and Annual Social and Economic Supplements, 2011 and earlier [electronic resource]. Washington, DC: US Census Bureau. [www.census.gov/population/socdemo/hh-fam/ms2.xls].

Vaaler, M.L., Ellison, C.G., and Powers, D.A. (2009). Religious influences on the risk of marital dissolution. *Journal of Marriage and the Family* 71(4): 917–934. doi:10.1111/j.1741-3737.2009.00644.x.

Waite, L. and Lillard, L. (1991). Children and marital disruption. *American Journal of Sociology* 96(4): 930–953. doi:10.1086/229613.

Weiss, Y. (1997) The formation and dissolution of families: Why marry? Who marries whom? And what happens after divorce? In: Rosenzweig, M.R. and Stark, O. (eds.) *Handbook of Population and Family Economics*. Amsterdam: Elsevier: 81–123. doi:10.1016/S1574-003X(97)80020-7.

Weiss, Y. and Willis, R.J. (1997). Match quality, new information, and marital dissolution. *Journal of Labor Economics* 15(1): 293–329. doi:10.1086/209864.

Wilcox, W.B. and Marquardt, E. (eds.) (2010). *The State of Our Unions, 2010*. Charlottesville, Virginia and New York: The National Marriage Project and the Institute for American Values.