Separation Risk over Union Duration: An Immediate Itch?

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Abstract

This study examines the risk of separation over the duration of unions. Previous research reports a rising-falling pattern of divorce over marriage duration. Much less is known about the variation of the separation risk over cohabitation duration or over marriage duration when the length of partnership is measured from the beginning of coresidence instead of marriage. We use large-scale register data from Finland that include information about both marital and non-marital unions. We first study the risk of separation for marital and non-marital unions separately, controlling for individuals' observed and unobserved characteristics. We then examine the risk of separation over union duration considering cohabitation and marriage as parts of the same union. Our results show that in cohabitations, the separation rate is highest at early points, whereas for marriages, we find a modest rising-falling pattern. Most marriages are preceded by cohabitation, and entry into marriage is followed by a significant drop in separation levels — independent of the length of the premarital cohabitation.

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Introduction

In contemporary industrialized societies, the break-up of a coresidential partnership has become a common life event (Andersson and Philipov 2002), and it has consequences for both adults and children (Amato 2000). Over the past few decades, a myriad of studies have been published on demographic, social and economic factors that contribute to union dissolution through separation or divorce (for reviews, see Amato 2010; Lyngstad and Jalovaara 2010). The time dimensions of union dissolution – namely, the spouses' ages, the union duration, the period, and the union cohort – received much attention in the 1980s but were little studied in the following decades. However, some recent studies have returned to the classic topic of how individual time influences union stability with new methodological solutions, better data, and – above all – contemporary realities of union formation and dissolution (see Kulu 2014; Schnor 2015).

Previous research on marriage dissolution has consistently reported that the risk of divorce is low during the first years of marriage; it then increases, reaches its peak between five to seven years of marriage, and then declines (Andersson 1995; Diekmann and Engelhardt 1999; Hoem and Hoem 1992; Jalovaara 2013; Kiernan 1999; Kulu and Boyle 2010; Lyngstad 2011; Schoen 1975; Thornton and Rodgers 1987). The psychological literature considers this pattern consistent with the notion of a *seven-year itch*. Most married couples experience a gradual decline in marital quality after the first years of marriage, suggesting that there is a short 'honeymoon period' of passion followed by a longer 'post-honeymoon period' of strife, with tensions tending to culminate in or near the seventh year of marriage (Kurdek 1999). In contrast, demographers have argued that the rising-falling pattern of divorce risk may result from omitting important covariates or *unobserved heterogeneity* from the models. Divorce-prone individuals leave the risk population first, leaving mostly individuals with low separation proneness in the sample, and the risk of divorce therefore declines over the marriage duration (Vaupel and Yashin 1985). Kulu (2014) explicitly investigated the causes of the rising-falling pattern of divorce risk over the duration of marriage. The analysis supported the idea of a rising-falling pattern of divorce risk and showed that the pattern persisted when not only the measured but also the unmeasured (time-invariant)

characteristics of individuals were controlled for, thus implying that the psychological interpretation and public discourse might be correct.

Although recent research has added to our knowledge of the relationship between marriage duration and divorce, it has a clear limitation: few of the studies include information on cohabitation outside marriage. In most European countries, nonmarital cohabitation has become a common and widely accepted form of partnership. The Nordic countries are considered forerunners in this trend: moving in together is a typical way to begin a union, and although many couples marry later, a large proportion of children are born to (and raised by) unmarried cohabiting parents (Sobotka & Toulemon 2008). Focusing on first unions in Finland, Jalovaara (2013) showed that the separation pattern over union duration is very different for cohabitations and marriages. Whereas for marriages the risk of separation follows a rising-falling pattern, the separation risk in cohabitations is much higher and highest at early points, supporting the notion that cohabitations tend to be short-term partnerships. However, cohabitations also play a role as the main route to marriage: a notable proportion of cohabiters marry, and looked from the other side, more than nine of ten Finnish couples that marry cohabited first (Jalovaara 2012; Jalovaara & Fasang 2015).

This paper investigates separation risk over union duration, incorporating data on the formation and dissolution of both marriages and cohabitations. We extend previous research in the following ways. First, we examine the risk of separation over union duration, considering cohabitation and marriage as parts of the same union. We explore alternative ways of incorporating marital status into the models of union dissolution to distinguish between non-marital and marital episodes of unions. Second, we use large-scale register data from Finland with information on coresidential unions and partners regardless of marital status. The data allow a detailed analysis of how the risk of separation evolves over union duration when controlling for individuals' observed and unobserved characteristics, with symmetrical data on both partners but no sample bias arising from selective non-response. Finland is also an interesting case, with high levels of nonmarital cohabitation and union dissolution.

Previous Research

Divorce

The psychological literature suggests that a marital relationship goes through various stages as its quality changes over time (Levinger 1983). The 'honeymoon period' is followed by 'everyday routine,' during which the differences between spouses' attitudes, values and behavior come to light and are subject to discussion and arguments. During that period, spouses simultaneously encourage some of their partners' behaviors and discourage others, and attempt to adapt to those behaviors that cannot easily be changed. The partners gradually accumulate knowledge of each other's characteristics and develop a view about whether to stay together (Diekmann and Mitter 1984). If the mutual adaptation is successful, a period of stability follows in the marital relationship when the risk of separation is low. Studies on marital quality show similar changes over marriage duration. Marital quality is perceived as high at the beginning of the relationship; it declines rapidly in the early years of marriage but stabilizes thereafter (cf. Ermisch et al. 2011; Kurdek 1999; Sternberg 1986).

Although marital quality, satisfaction and perceived rewards and costs are key factors in marital stability, there are other factors that individuals assess when considering whether to end a marriage: barriers to separation and alternatives to the current union (Levinger 1976). Barriers are factors that keep partners together in addition to or even in the absence of mutual attraction. Examples include joint property, feelings of obligation toward the spouse and dependent children, and normative pressures from outside sources. Alternatives are attractions outside the ongoing relationship that do not seem compatible with the current union, the primary example being the availability of new partners (Levinger 1976). To the extent that barriers increase over marriage duration (for a decade or two at least, as is the case when the couple has dependent children), they should help explain the decline in separation risk over that duration. A decrease in alternatives with increasing marriage duration (or age) works in the same direction, although today's high separation risks may have created larger pools of potential new partners at all ages.

Empirical demographic and sociological research has focused on how divorce risk varies over marriage duration, showing a rising-falling pattern. Most studies report that the risk of divorce increases rapidly during the first years of marriage, peaks between the third and sixth years of marriage and declines thereafter (Andersson 1995; Diekmann and Engelhardt 1999; Hoem and Hoem 1992; Jalovaara 2013; Kiernan 1999; Kulu and Boyle 2010; Lyngstad 2011; Rootalu 2010; Schoen 1975). Thus, divorce levels are not the highest in the seventh year of marriage as public discourse suggests; however, a clear rising-falling pattern is observed, supporting the ideas of diminishing marital satisfaction and alternative attractions along with increasing barriers over marital duration.

Studies reporting the rising-falling pattern of divorce over marriage duration have controlled for sets of spouses' demographic and socioeconomic characteristics. However, it is likely that some important spousal characteristics have not been measured and included in the analysis. This is particularly the case with factors such as spouses' personality traits, values, and long-term goals. For example, the sample may contain individuals who are prone to divorce because of their liberal values or because they are ambitious or restless and never satisfied with their life situations. Similarly, the sample may include individuals who are less prone to divorce (than average) because of traditional value-beliefs or because they have a tendency to avoid change. If this were the case, the estimates of the risk of divorce at longer durations would be downward biased. The high-risk group leaves the risk population first, and therefore, as time passes, the share of the low-risk group increases and the hazard of divorce for the population approaches that group's (low) risk levels. With high-quality data and advanced methods, it is possible to consider the influence of both observed and (time-invariant) unobserved heterogeneity in models of union dissolution. A study by Kulu (2014) of divorce risk over marriage duration was the first to include both observed and unmeasured (time-invariant) characteristics of individuals; that study showed that the rising-falling pattern of divorce persisted once both sources of heterogeneity were considered.

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Separation in Cohabitations

Typically, cohabitation is considered a 'looser bond' (Schoen & Weinick 1992). By definition, cohabitation is characterized by weaker legal support than marriage. Cohabitations are less socially recognized, have less clear normative structures, and are less well integrated into social networks than marriages (Nock 1995). Empirical research has reported differences between the two union types. For example, cohabiting couples separate at a much higher rate than married couples, even if they have children in common (e.g., Liefbroer and Dourleijn 2006; Perelli-Harris & Lyons-Amos 2015; Wu and Musick 2008; see however Schnor 2014). In the Nordic countries, although cohabitation is a well-established form of partnership, surveys show that cohabiters have lower commitment to and satisfaction with their relationships than do married persons (Wiik et al. 2009); satisfaction and commitment are positively related to planning to marry (Wiik et al. 2010) and actually marrying (Moors and Bernhardt 2009). The differences between union types may reflect the causal effects of marrying or being married, such as more social support or pressure to stay together; however, very likely they partly reflect self-selection of more committed and satisfied partners into marriage (Kulu and Boyle 2010; Schoen & Weinick 1992). According to the diffusion theory, the selectivity of cohabitations weakens as cohabitation becomes more common, at least until cohabitation becomes nearly universal and marriages (especially those without prior cohabitation) are therefore highly selective (see Liefbroer and Dourleijn 2006). The latter may now be the case in Finland. Entry into cohabitation is common and not very selective; however, if cohabitations continue to tend to be transitory in that the great majority lead to either separation or marriage, then marriage is probably selective of partners who have strong trust in the continuity of their union.

Should we also expect to find a rising-falling pattern of separation for cohabitations? Although psychological theories on marriage duration and divorce are silent on the differences between time lived together and time married, they seem to concern life together instead of civil status and therefore would also apply to cohabitations. Briefly, when a new couple moves in together, a honeymoon-like period follows – regardless of marital status – during which mutual attraction and passion are high; incompatibilities and problems take some time to surface. However, a competing idea is that with high rates of cohabitation and separation, the threshold of forming and dissolving

cohabitations is low: selection into coresidence in terms of commitment is weak, as are the consequences of moving in (such as normative pressures to continue the union once it has begun). Research suggests that the household formation process is different for cohabitation than for marriage: many cohabiters move in with partners soon in the relationship, often 'sliding' into cohabitation for convenience or being pushed by other events, such as changes in housing or employment (for a review, see Sassler 2010). Empirical evidence is consistent with the latter idea because it seems that in cohabitation dissolution there is no initial rise but that the risk is (high and) highest at early points (Jalovaara 2013).

The present study

Although there is some knowledge of the variation in separation risk in both union types, previous research has examined the risk of separation in marital and non-marital unions separately. Given that cohabitation has become the majority route to marriage in many countries, we argue that research on union dissolution benefits from viewing cohabitation and marriage as parts of the same union.

The introductory analysis describes separation patterns for cohabitations, marriages, and all unions (i.e., cohabitations and marriages) by union duration. We continue by analyzing cohabitations and marriages separately using different models that include controls for observed and unobserved characteristics of partners to identify their influence on the patterns. We then include all unions and consider the nonmarital and marital episodes as parts of the same union. Models for all unions include two alternative measures of union type. We first distinguish between non-marital and marital episodes of the same union using a dummy variable, thus assuming the same risk patterns over union duration for marital and non-marital episodes but at different levels. We then use a measure that distinguishes between not only cohabitations and marriages but also the time in years elapsed since the entry into marriage. Although the latter is first included as a main effect only, it is ultimately included as a stratifying variable that enables us to examine whether the separation pattern of marriages is influenced by the length of premarital cohabitation.

Data and Methods

Data

We used data prepared by Statistics Finland by linking data from a longitudinal population register and registers of employment, educational qualifications, vital events, and other register sources. The extract used in this study (permission TK53-663-11) was an 11% random sample of persons born between 1940 and 1995 who were counted in Finland's population between 1970 and 2009. The data included full histories of childbearing and coresidential partnerships for the sample persons, along with educational histories and annual measurements of economic activities, incomes, and other data for the sample members and all their partners until the year 2009/2012. The sample included data on the timing of vital events, including union formation and dissolution, with the precision of one month.

From 1987 onward, cohabitations and marriages are identifiable: Finnish registers are exceptional in that they contain information on the place of residence down to the specific dwelling, enabling the linkage of individuals to coresidential couples even when they are childless and unmarried. A cohabiting couple is defined as a man and a woman registered as domiciled in the same dwelling for over 90 days, who are not close relatives (siblings or a parent and a child, for example) or married to each other, and whose age difference is no more than 20 years (this rule does not apply if the couple has shared children).

The analyses focused on cohabitations and marriages of women formed between January 1988 and September 2009. All the unions of each woman formed during that period were included. The women were born between 1940 and 1992. Data on the unions of foreign-born women were eliminated due to the lack of information on the life histories of persons born abroad covering the time preceding immigration.

Exposure time (i.e., couple-months at risk) was calculated separately for three types of unions: all unions regardless of marital status, cohabitations, and marriages. Exposure time for all unions regardless of marital status was calculated as follows: the unions were followed from the time (i.e., the month) the partners moved in together or married,

whichever came first. The unions were right censored at the death of either partner, emigration of the woman, or September 2009. The exposure for cohabitations was calculated in the same way except that entry into marriage was introduced as an additional right censor. Marriages were followed from entry into marriage and right censored just as with all unions. The outcome event in all the analyses was separation. In the case of cohabitations, separation was defined as moving apart; for marriages, it was defined as moving apart or judicial divorce, whichever came first. In cases in which the partners moved apart and then back together (without forming another union in the meantime), the union was allowed to continue without interruption because presumably, most cases were related to dates in notifications of a move.

The analyses covered approximately 140,000 unions, of which 121,000 were included in the analysis as cohabitations and 57,000 as marriages. (The majority, 66%, of the marriages were originally cohabitations that had been followed up.) The cohabitations contributed 433 thousand couple-years at risk, 51,000 of which ended in separation, whereas the marriages contributed 452,000 couple-years, 15,000 of which ended in separation. All the unions contributed 885,000 couple-years, 66,000 of which ended in separation.

Methods and Analytic Strategy

We use a continuous-time multilevel event history model to study the risk of separation over union duration (Kulu 2014). The basic model is specified as follows:

$$\ln h_{ij}(t) = \ln h_0(t) + \beta x_{ij}(t) + \sum_k \gamma_k z_{ijk}(t) + \varepsilon_i \ , \qquad (1)$$

where $h_{ij}(t)$ denotes the hazard of separation of jth union for woman i. $\ln h_0(t)$ represents the baseline log-hazard, the duration of the union, which we specify as the piecewise constant. The piecewise constant specification provides a flexible way of measuring the shape of the baseline hazard. The time (or union duration) is divided into one-year intervals. Although the hazard is assumed constant within each one-year category of duration, it could vary between them. $x_{ij}(t)$ represents the values of a variable for the union type (marital or non-marital), and β_k measures its effect on union dissolution. The model also includes time-constant and time-varying covariates denoted by $z_{ijk}(t)$, with

parameters γ_k measuring their effect. We also include a woman-level residual (or random effect) to control for the time-invariant unmeasured characteristics of a woman that influence the hazard of separation for any of her unions.

Identification of the model was attained through within-person replication. Some women had experienced more than one partnership episode. Of the women, 30% had more than one union observed in the data (70% had one, 22% had two, 6% had three, and 2% had four or more unions); therefore, it was both possible and necessary to include woman-level random effects ('shared frailty') (Aalen 1994; Gutierrez 2002; Hoem 1990; Hougaard 1995). We experimented with gamma and inverse-Gaussian distributed shared frailty. The results were similar, and we present the results for gamma-distributed shared frailty. The basic model (equation 1) described above includes a dummy variable to distinguish between episodes in which individuals are cohabiting from those in which they are married. Once an individual moves from one union status to another (i.e., marries), her separation risk can change. However, individuals are assumed to follow the same separation pattern over union duration whether or not they are married. A conventional approach to relax this assumption is to fit a model with separate baselines for cohabitations and marriages. This is also what we do as the first step of the analysis. However, this solution is not satisfactory for the current study because the conventional approach treats marital and non-marital spells of the same union as two different unions (both start with duration zero), which does not correspond to real-life experience. Alternatively, we propose to extend the basic model by including in the analysis time since marriage for marital episodes:

$$\ln h_{ij}(t) = \ln h_0(t) + \beta m_{ij}(t) + \sum_k \gamma_k z_{ijk}(t) + \varepsilon_i , \qquad (2)$$

where $m_{ij}(t)$ denotes the time since marriage formation of the jth union for woman i. In this study, we divide marriage duration into one-year intervals and use a set of dummies to measure its effect. Note that the baseline now represents the shape of hazard of separation for non-marital unions. The (log) risk of marital separation at any time point of union duration is a sum of the effects of cohabitation (or union) and marriage duration. We will later illustrate the computation of marital separation risks. The

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proposed model draws upon the notion of 'multiple clocks' proposed by Lillard (1993) more than two decades ago.

In the models, we control for basic demographic and socioeconomic characteristics of the unions and partners. Most of these control variables are time-varying covariates updated monthly (e.g., data on children and educational attainment) or yearly (e.g., income and home ownership). To control for other time dimensions, we control for *period*, *age at union formation* for the female partner (collapsed into 7 categories), and *age difference* of the partners (collapsed into 6 categories). *Union order* (1st or subsequent) is based on civil status in 1987, and from 1988 onward, on the data on all coresidential unions. ('Union order' is excluded from the multilevel models.) Variables on children include the woman's biological children. We control for the *number of children* (0-1, 2, or 3 or more), *age of the youngest child*, and a dummy indicating whether the *youngest child was a common* child of the partners. To control for socioeconomic status and resources, we include the *educational attainment* of each partner (basic, secondary, lowest tertiary, and degree-level tertiary), each partner's *income*, referring to personal income during the year that was liable to state taxation and adjusted for inflation (collapsed into 7 categories), and *home ownership* (rented home, owner-occupied flat, and owner-occupied house). Table 3 (in the Appendix) provides the distributions of total exposure and the number of separations by the control variables separately for cohabitations and marriages.

To illustrate the link between cohabitation and marriage in the study population, we present rates of separation and marriage among cohabiters from two simple hazard models. For another illustration, cumulative incidences are used to calculate the cumulative probabilities of separation and marriage among cohabiters given that they are competing events and that Kaplan-Meier estimates would overestimate the cumulative probability of each (Coviello & Boggess 2004).

Results

Introductory Models

Figure 1 shows the yearly separation risks in different types of unions from introductory models that do not include socioeconomic control variables or shared frailty. As expected, the separation pattern over union duration is very different for cohabitations and marriages. The separation rate for cohabitations is very high at early points (although unions lasting <3 months were not included), and the longer the cohabitation has lasted, the lower the separation rate is. The curve for all unions is similar because cohabitations dominate the numbers, especially at early points. The marital separation rate is much lower, and there is a rising-falling pattern: the marital separation rate first increases, remains somewhat higher for a few years and decreases thereafter. The rise occurs as rapidly as after the first year in marriage. The rise appears modest in this graph. The rate nevertheless doubles between the first and second years.
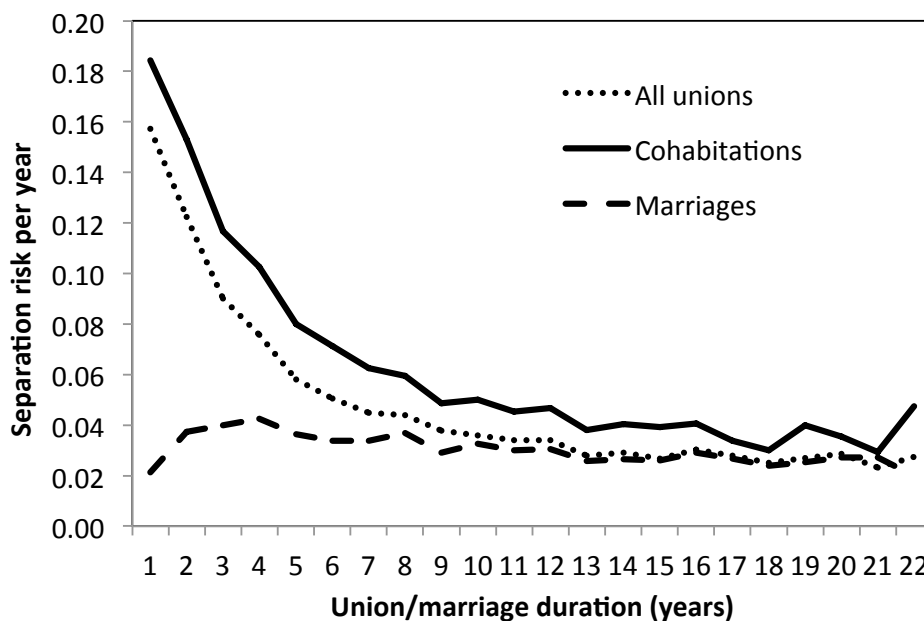

Fig 1 Separation risks per year for cohabitations, marriages, and all unions. Introductory models include the baseline but no control variables or shared frailty.

Inclusion of Observed and Unobserved Heterogeneity

The next step was to determine how controlling for observed and unobserved heterogeneity affects separation patterns over union duration for cohabitations on the one hand and marriages on the other hand. Figure 2 shows the relative separation risks by union duration for cohabitations and Figure 3 for marriages. In both figures, Model 1 includes only union/marriage duration; in Model 2, the control variables are added, and Model 3 includes the control variables along with a woman-level random effect (shared frailty). When observed and unobserved heterogeneity is included, the shape of the baseline remains essentially the same for both union types. It nevertheless seems that observed and unobserved heterogeneity explain some of the lowering of separation rates at longer durations. This is expected since individuals who are less likely to separate 'because of' their observed and unobserved characteristics are overrepresented at longer union durations.
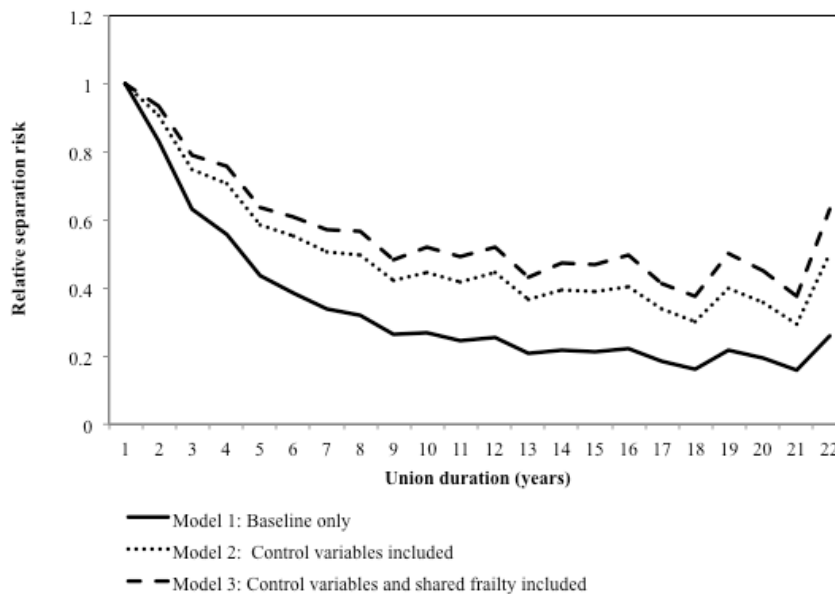

Fig 2 Relative separation risks for cohabitations from different models. Reference (RR=1) is the first year of cohabitation.
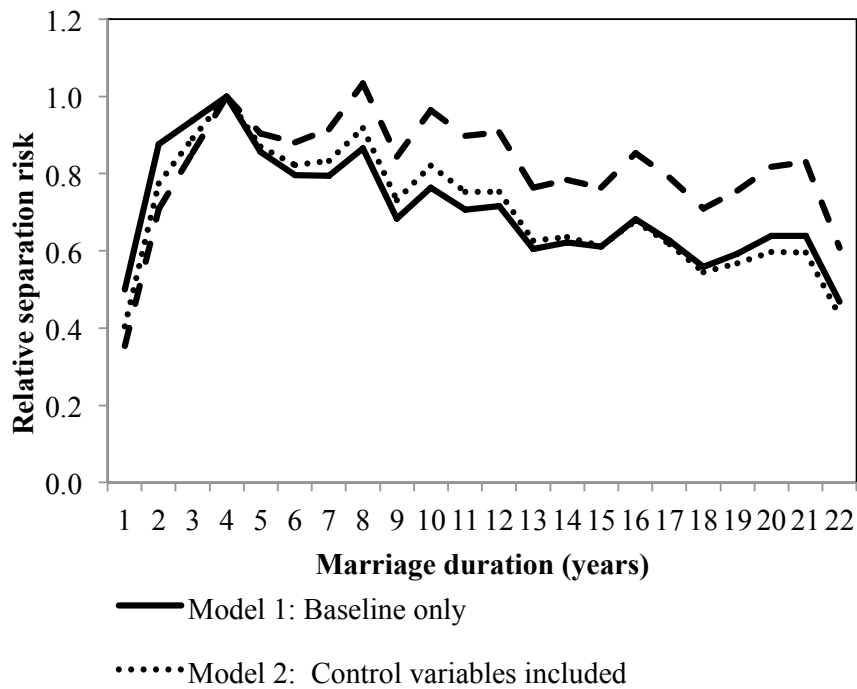
Fig 3 Relative separation risks for marriages from different models. Reference (RR=1) is the fourth year of marriage.

Marriage among Cohabiters

Before proceeding to analyses in which cohabitations and marriages are viewed as stages of the same union, we show how the two are linked in the study population with respect to cohabiting couples converting their unions into marriage. As Figure 7 (in the Appendix) shows, entry into marriage is most common during the first four years. As the cumulative incidences in Figure 8 (in the Appendix) show, 40% of cohabiting couples eventually marry. What the cumulative incidences also show is that long cohabitations are uncommon: during the first 8 and 15 years, 80% and 90% of the couples, respectively, have either separated or married, with the median being 2.7 years.

Separation in All Unions and the Effect of Marrying

We now proceed to analyses of all unions in which we view cohabitations and marriages as stages of the same union. To illustrate the situation, we first fit a model with a dummy variable indicating whether the union was a marriage or a cohabitation

(for the model specification, see equation 1). The model includes control variables and shared frailty. The hazard ratio for marriages is 0.44. If this model is used to estimate the separation baselines for marriages, the baseline hazards (representing cohabitations) are multiplied with that ratio. The results of this simple calculation, that is, separate baselines for cohabitations and marriages, are provided in Table 1. Thus, according to this model, the separation risk for marriages is, at each duration, 56% lower than for cohabitations. Figure 4 provides an illustration: let us assume that in the third year of their coresidential union, a couple marries. We also assume that the cohabitation dissolution baseline applies to couples until entry into marriage. At entry into marriage, the separation risk would drop 56% and remain at that lower level thereafter. This type of marital status dummy is what is typically used in models of union dissolution if cohabitations are included. However, we already know that the shape of the baseline hazard is different for marriages than for cohabitations, and therefore, it oversimplifies the patterns, at least for the purposes of this paper. (For the hazard ratios for other covariates, see Model 1 in Table 4 in the Appendix.)
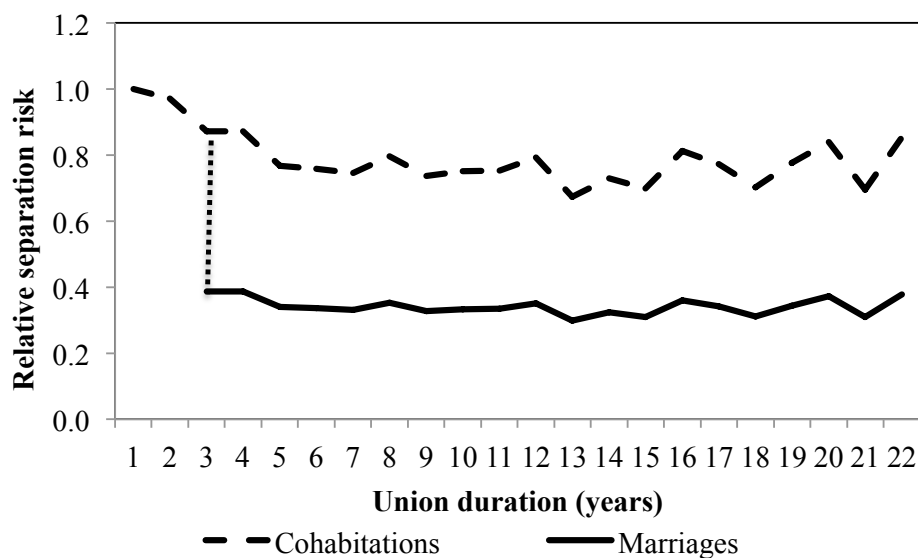

Fig 4. Relative separation risks for couples marrying during the third year of their coresidential union, according to the model with a marital-status dummy. Reference (RR=1) is the first year of cohabitation.

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As a remedy to this problem, we fit a model in which the civil-status dummy is replaced with a variable that not only distinguishes between cohabitations and marriages but also includes marriage duration in years. Again, the model includes both control variables and shared frailty (for the hazard ratios of the covariates, see Model 2 in Table 4 in the Appendix). The relative separation hazards for the civil status variable are shown in Table 2. The separation risk is higher the longer the marriage has lasted, eventually reaching the level of the reference category, that is, cohabitations. However, these values alone have little substantive meaning, and to obtain the values of separation risk over marriage duration, the separation risk over cohabitation duration and marriage duration should be analyzed together. Therefore, we now use these hazard ratios to calculate the duration-specific separation risks for marriages as follows. Again, we assume that the cohabitation baseline applies to the couple until entry into marriage. Thereafter, the couple's separation risk moves to the level of marriage, which is calculated by multiplying, from that duration year onward, the baseline risk (representing cohabitations) with the corresponding hazard ratio for marriage duration. Table 4 shows the resulting baselines. For example, the baseline for a couple who marries during the third year of their coresidential union is calculated as follows: $0.83 \times 0.197 = 0.16$ (first year of marriage), $0.80 \times 0.393 = 0.31$ (second year), and $0.67 \times 0.508 = 0.34$ (third year); these rates are relative to the separation levels for the first year of cohabitation. The result is illustrated in Figure 5, again assuming a couple marries during the third year of their union. We observe a significant drop in separation risks after the event of marriage followed by an increase and perhaps a slight decline thereafter. We thus observe a modest rising-falling pattern of marriage separations; however, the risk levels for marriages remain lower than for cohabitations, including at long durations. The baseline shape characteristic of marriages, including an initial rise in the separation risk, is now integrated into the picture.
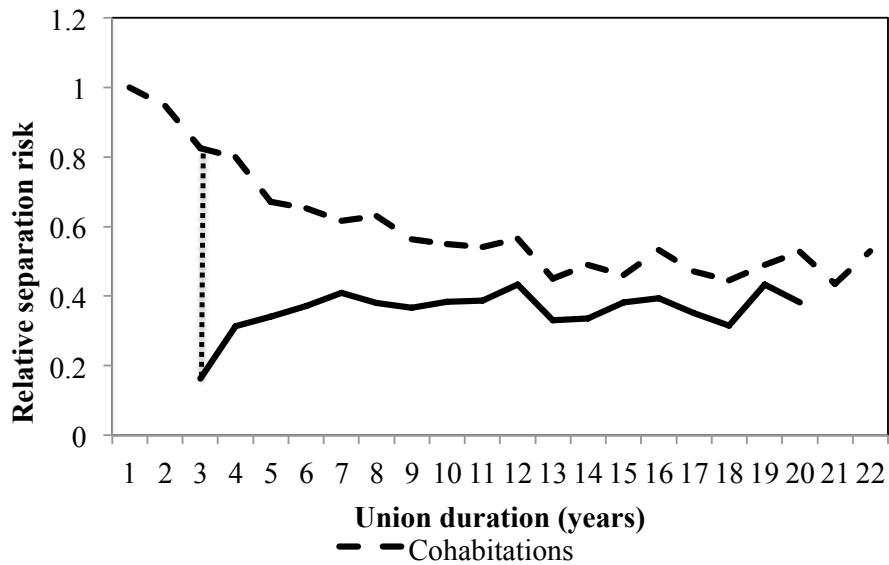
Fig 5. Relative separation risks for couples marrying during the third year of their coresidential union, according to the model that includes the marital-status variable with marriage duration. Reference (RR=1) is the first year of cohabitation.

The previous calculations are based on the assumption that the separation risk in marriages is the same regardless of whether and how long the couple has cohabited before marriage. To determine whether this is a reasonable assumption, we fitted a model with separate baselines by the length of premarital cohabitation. The model includes control variables (but not shared frailty). The relative separation risks by marriage duration from this model are shown in Figure 6. It appears that the shape of the marital separation baseline does not depend on the length of premarital cohabitation. In other words, the influence of marriage formation on the risk of separation is the same regardless of how long the couple has resided together. Thus, it seems that the model illustrated in Table 2 and Figure 5 provides an adequate representation of the data.

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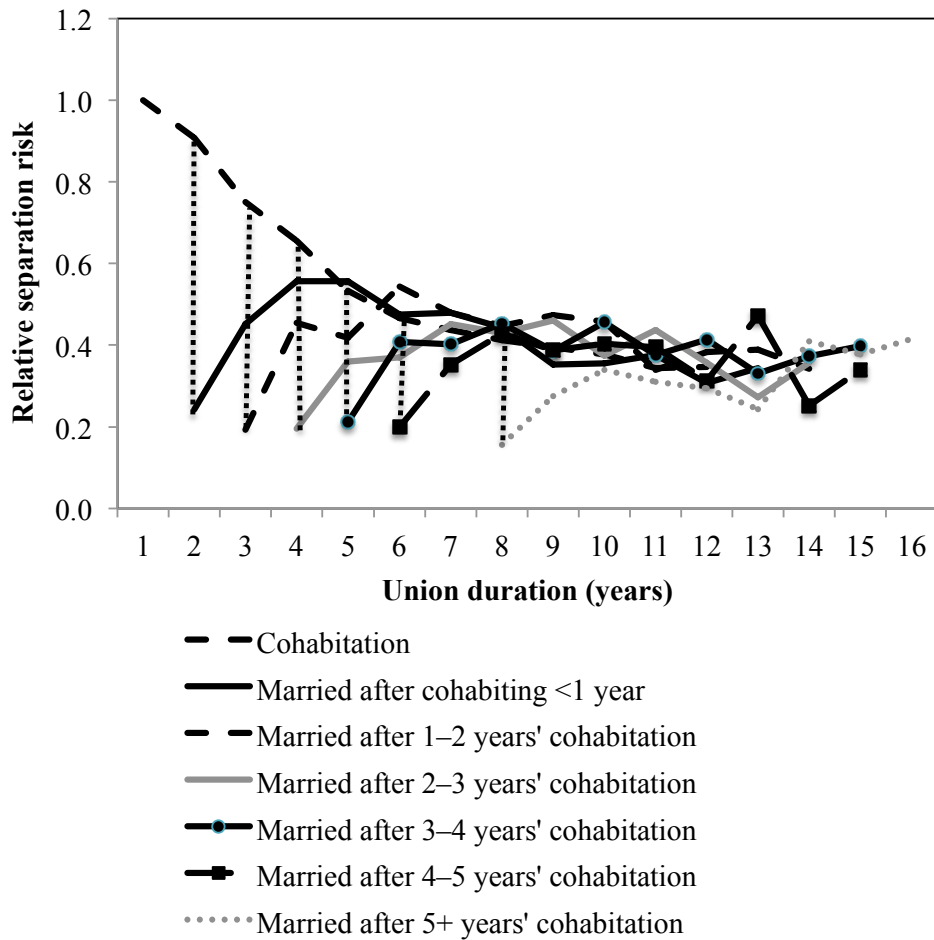
Fig 6 Relative separation risks in all unions; baseline interacted with length of premarital cohabitation. The model includes control variables but no shared frailty. Reference (RR=1) is the first year of cohabitation.

Conclusions

This study investigated separation risk over union duration, incorporating data on both cohabitations and marriages. Our results show that in cohabitations, the separation rate is very high at early points and declines over union duration. For marriages, the separation rate is much lower, and there is a modest rising-falling pattern. Because a proportion of cohabiting couples marry and the great majority of marriages are preceded by cohabitation, we explored the approach of treating cohabitation and marriages as stages of the same union. Our analyses show that entry into marriage is followed by a

significant drop in separation risk. Some of this effect is short term and is followed by a rise as soon as after the first year (creating the rising-falling shape of the marriage baseline). However, some of the effect lasts longer: levels of marital dissolution remain low, although they approach those of cohabitations, which significantly decline with union duration.

With respect to the rise in the rising-falling pattern, we now know that this is specific to marriages. If we focus on coresidence only, no initial period with lower separation risk is observed. This finding suggests that if there is a 'honeymoon effect', it is somehow related to the change in civil status. To what extent that effect is a protective effect of marriage and to what extent it is caused by the self-selection of satisfied and committed couples into marriage remains an open question. Given that 40% of the cohabiters in our sample marry and half move apart during the first 15 years, it is almost a question of take-it-or-leave-it – or, in other words, choosing between marriage or splitting up. If marriage and separation are the outcomes of opposite forces, then there must be clear self-selection into marriage.

The patterns analyzed are notably robust to the inclusion of observed and unobserved heterogeneity, although some of the decreased separation risks in longer durations are explained by the characteristics of individuals and unions. Furthermore, the union-stabilizing effect of marriage was independent of the length of premarital cohabitation. Such robustness suggests that there is something built into the duration clocks of coresidence and marriage; they do not merely reflect the influence of other factors.

The high separation rates for cohabitations suggest that there is a low threshold of forming and dissolving such unions. At least in the Nordic countries, cohabitation is in some respects increasingly a social substitute for marriage; however, to the extent that separation is a significant and consequential event, marriage and cohabitation are far from equal. Thus, this study adds to recent research suggesting that cohabitation is generally not a replacement for marriage (Perelli-Harris & Lyons-Amos 2015).

The role of childbearing should also be studied in more detail. In the Nordic context, the birth of a child (although not necessarily the first child) often coincides with the transition from a non-marital to a marital union. Childbearing could thus be seen as one factor that potentially explains the drop in separation risk at marriage formation.

Alternatively, the birth of a child can be seen as merely an indicator of other factors that influence both the relationship stability and the decision to have a child. Although our analysis controlled for both the number of children and their ages, a detailed analysis of the role of parenthood would lead to a better understanding of the factors determining the shape of separation risks for non-marital and marital unions (see Schnor 2014).

Another issue to study is the role of self-selection into marriage. One option is to jointly model the processes of marriage and separation. Doing so would help determine whether unobserved characteristics of individuals that make them less prone to (marital) separation also increase their likelihood of marrying after a period of cohabitation (e.g., values, personality traits). This analysis would thus improve our knowledge of the causes of low separation risk after entry into marriage. However, such models have limitations because they cannot detect and control for unobserved factors that are union-specific and that influence the likelihood of cohabitants to marry (e.g., a perfect match between partners, at least as perceived by the partners themselves). Research should also investigate the formation of cohabitations after courtship to determine whether a similar selection also operates in the entry into cohabitation, despite the high separation levels observed for cohabitants.

Research should also be conducted in other countries with similar partnership patterns. Because premarital cohabitation and separation have spread in many (although not all) industrialized countries, we believe that patterns in many countries are similar to those observed in this study, although there may also be significant differences caused by housing markets and policies and potentially by other institutional factors. In Nordic countries, with their flexible housing markets and welfare-state policies that support people during studies, for example, young couples have relatively easy access to rental housing; this suggests that young people can easily form and dissolve coresidential unions. In contrast, in countries in which the rental sector is less developed and young people must rely on family rather than state support, the obstacles to forming and dissolving a union may be greater and we may observe fewer short unions – and thus significantly lower levels of separation – at the beginning of cohabitations.

Using large-scale register data from Finland, this study proposed a novel way of treating cohabitations and marriages as parts of the same union in the study of union separation. It showed that separation levels are highest at the beginning of coresidential unions; the

marriage of cohabiters is followed by a significant drop in separation levels, followed by a rise and a fall, albeit at modest levels.

Acknowledgments

References

Aalen, O. O. 1994. Effects of frailty in survival analysis, *Statistical Methods in Medical Research 3*(3), 227–243.

Amato, Paul R. 2000. The consequences of divorce for adults and children. *Journal of Marriage and Family, 62* (4), 1269–1287.

Amato, Paul R. 2010. Research on divorce: Continuing trends and new developments. *Journal of Marriage and Family, 72* (3), 650–666.

Andersson, G. 1995. Divorce-risk trends in Sweden 1971–1993, *European Journal of Population* 11, (4), 293–311.

Andersson, G. and Philipov, D. (2002). Life-table representations of family dynamics in Sweden, Hungary, and other 14 FFS countries: a project of descriptions of demographic behavior. *Demographic Research, 7*(4), 67–270.

Coviello, V., & Boggess, M. (2004). Cumulative incidence estimation in the presence of competing risks. *Stata Journal, 4*(2), 103–112.

Diekmann, A. and P. Mitter. 1984. A comparison of the 'Sickle function' with alternative stochastic models of divorce rates. In A. Diekmann and P. Mitter (eds.), *Stochastic Models of Social Processes* (pp. 123–153). Orlando: Academic Press.

Diekmann, A. and H. Engelhardt. 1999. The social inheritance of divorce: effects of parent's family type in postwar Germany, *American Sociological Review, 64*, 783–793.

Ermisch, J., M. Iacovou, and A. J. Skew. 2011. Family relationships. In S. L. McFall and C. Garrington (eds.), *Early Findings from the First Wave of the UK's Household Longitudinal Study* (pp. 8–14). Colchester: Institute for Social and Economic Research, University of Essex.

Gutierrez, R. G. 2002. Parametric frailty and shared frailty models, *Stata Journal, 2,* 22–44.

Hoem, J. M. 1990. Identifiability in hazard models with unobserved heterogeneity: the compatibility of two apparently contradictory results. *Theoretical Population Review,* 37(1), 124–128.

Hoem, B., and J. M. Hoem. 1992. The disruption of marital and non-marital unions in contemporary Sweden. In J. Trussel, R. Hankinson, and J. Tilton (eds.), *Demographic Applications of Event History Analysis* (pp. 61–93). Oxford: Clarendon Press.

Hougaard, P. 1995. Frailty models for survival data. *Lifetime Data Analysis*, 1(3), 255–273.

Jalovaara M. 2012. Socio-economic resources and first-union formation in Finland, cohorts born 1969–81. *Population Studies*, 66(1), 69–85.

Jalovaara, M. 2013. Socioeconomic resources and the dissolution of cohabitations and marriages, *European Journal of Population, 29*(2), 167–193.

Jalovaara, M. & A. E. Fasang. 2015. Are there gender differences in family trajectories by education in Finland? *Demographic Research, 33*(44), 1241–1256.

Kiernan, K. 1999. Cohabitation in Western Europe, *Population Trends, 96,* 25–32.

Kulu, H. 2014. Marriage duration and divorce: the seven-year itch or a life-long itch? *Demography, 51*(3), 881–93.

Kulu, H. and P. J. Boyle. 2010. Premarital cohabitation and divorce: support for the 'trial marriage' theory?, *Demographic Research, 23*(31), 879–904.

Kurdek, L. A. 1999. The nature and predictors of the trajectory of change in marital quality for husbands and wives over the first 10 years of marriage, *Development Psychology 35*(5), 1283–1296.

Levinger, G. (1976). A social psychological perspective on marital dissolution. *Journal of Social Issues*, *32*(1), 21–47.

Levinger, G. 1983. Development and change. In H. H. Kelley, E. Berscheid, A. Christensen, J. H. Harvey, T. L. Huston, G. Levinger, E. McClintock, L. A. Peplau, and D. R. Peterson (eds.), *Close Relationships* (pp. 315–359). New York: Freeman.

Liefbroer, A C. & E Dourleijn (2006): Unmarried cohabitation and union stability: Testing the role of diffusion using data from 16 European countries. *Demography, 43*(2), 203–221.

Lillard, L. Simultaneous equations for hazards: Marriage duration and fertility timing. *Journal of Econometrics, 56*(1–2), 189–217.

Lyngstad, T. H. 2011. Does community context have an important impact on divorce risk? A fixed-effects study of twenty Norwegian first-marriage cohorts, *European Journal of Population, 27*(1), 57–77.

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Lyngstad, T. H. and M. Jalovaara. 2010. A review of the antecedents of union dissolution, *Demographic Research, 23*, 257–292.

Moors, G. & E. Bernhardt (2009): Splitting up or getting married? Competing risk analysis of transitions among cohabiting couples in Sweden. *Acta Sociologica, 52*(3), 227–247.

Nock, S. L. 1995. A comparison of marriages and cohabiting relationships. *Journal of Family Issues 16*(1), 53–76.

Perelli-Harris, B. & Lyons-Amos, M. 2015. Changes in partnership patterns across the life course: An examination of 14 countries in Europe and the United States. *Demographic Research, 33*(6), 145–178.

Rootalu, K. 2010. The effect of education on divorce risk in Estonia. *Trames: Journal of the Humanities and Social Sciences, 14*(1), 21–33.

Sassler, S. 2010. Partnering across the life course: Sex, relationships, and mate selection. *Journal of Marriage and Family, 72*(3), 557–575.

Schnor, C., 2014. The effect of union status at first childbirth on union stability: Evidence from Eastern and Western Germany. *European Journal of Population, 30*(2), 129–160.

Schnor, C. 2015. Does waiting pay off for couples? Partnership duration prior to household formation and union stability. *Demographic Research, 33*(22), 611–652.

Schoen, R. 1975. California divorce rates by age at first marriage and duration of first marriage, *Journal of Marriage and the Family, 37*(3), 548–555.

Schoen, R. & Weinick, R. M. 1993. Partner choice in marriages and cohabitations. *Journal of Marriage and the Family 55*, (2), 408–414.

Sobotka, T. & Toulemon, L. 2008. Overview Chapter 4: Changing family and partnership behaviour: Common trends and persistent diversity across Europe, *Demographic Research*, *19*(6), 85–138.

Sternberg, R. J. 1986. The triangular theory of love, *Psychological Review* 93(2): 119–135.

Thornton, A. and W. L. Rodgers. 1987. The influence of individual and historical time on marital dissolution, *Demography, 24*(1), 1–22.

Vaupel, J. W., and A. I. Yashin. 1985. Heterogeneity's ruses: some surprising effects of selection on population dynamics, *The American Statistician, 39*(3), 176–185.

Wiik, K. A., Bernhardt, E., & Noack, T. (2009). A study of commitment and relationship quality in Sweden and Norway. *Journal of Marriage and Family, 71*(3), 465–477.

Wiik, K.A., Bernhardt E, and T Noack (2010): Love or money? Marriage intentions among young cohabitors in Norway and Sweden. *Acta Sociologica, 53*(3), 269–287.

Wu, L. and Musick, K. (2008). Stability of marital and cohabiting unions following a first birth. *Population Research and Policy Review, 27*(6), 713–727

Tables in the text

Table 1. Relative separation risks by union duration for cohabitations and marriages from the model that includes the civil-status dummy. Reference (RR=1) is the first year of cohabitation.

Union duration (years)	Relative separation risk	
	Cohabitations	Marriages
1	1	0.44
2	0.97	0.43
3	0.87	0.39
4	0.87	0.39
5	0.77	0.34
6	0.76	0.34
7	0.75	0.33
8	0.80	0.35
9	0.74	0.33
10	0.75	0.33
11	0.75	0.33
12	0.79	0.35
13	0.67	0.30
14	0.73	0.32
15	0.70	0.31
16	0.81	0.36
17	0.77	0.34
18	0.70	0.31
19	0.78	0.34
20	0.84	0.37
21	0.70	0.31
22	0.85	0.38

Civil status dummy (ref: Cohabitation)
  Married   0.443

Table 2 Relative separation risks by union duration for cohabitations and marriages from the model that includes the civil-status variable with marriage duration. Reference (RR=1) is the first year of cohabitation.

Union duration (years)	Relative separation risk Cohabitations	Marriages Length of premarital cohabitation (years)					
		< 1	2	3	4	5	6
1	1						
2	0.95	0.20					
3	0.83	0.37	0.19				
4	0.80	0.42	0.32	0.16			
5	0.67	0.46	0.41	0.31	0.16		
6	0.65	0.45	0.38	0.34	0.26	0.13	
7	0.62	0.39	0.43	0.37	0.33	0.26	
8	0.63	0.40	0.37	0.41	0.35	0.31	0.12
9	0.56	0.44	0.41	0.38	0.42	0.36	0.25
10	0.55	0.40	0.39	0.37	0.34	0.37	0.29
11	0.54	0.42	0.39	0.38	0.36	0.33	0.31
12	0.56	0.40	0.41	0.39	0.38	0.35	0.36
13	0.45	0.39	0.41	0.43	0.40	0.39	0.34
14	0.49	0.37	0.31	0.33	0.35	0.32	0.29
15	0.46	0.36	0.40	0.34	0.36	0.37	0.34
16	0.53	0.34	0.34	0.38	0.32	0.34	0.33
17	0.47	0.38	0.40	0.39	0.44	0.37	0.41
18	0.44	0.42	0.33	0.35	0.35	0.39	0.35
19	0.49	0.32	0.39	0.32	0.33	0.33	0.31
20	0.53		0.36	0.43	0.35	0.36	0.41
21	0.44			0.38	0.47	0.37	0.39
22	0.53				0.32	0.39	0.32
						0.38	0.38

Civil status and marriage duration (ref: Cohabitation)

|	
Married, 1st year	0.197
Married, 2nd year	0.393
Married, 3rd year	0.508
Married, 4th year	0.572
Married, 5th year	0.664
Married, 6th year	0.604
Married, 7th year	0.649
Married, 8th year	0.699
Married, 9th year	0.716
Married, 10th year	0.766
Married, 11th year	0.734
Married, 12th year	0.686
Married, 13th year	0.828
Married, 14th year	0.740
Married, 15th year	0.744
Married, 16th year	0.709
Married, 17th year	0.885
Married, 18th year	0.725

Appendix
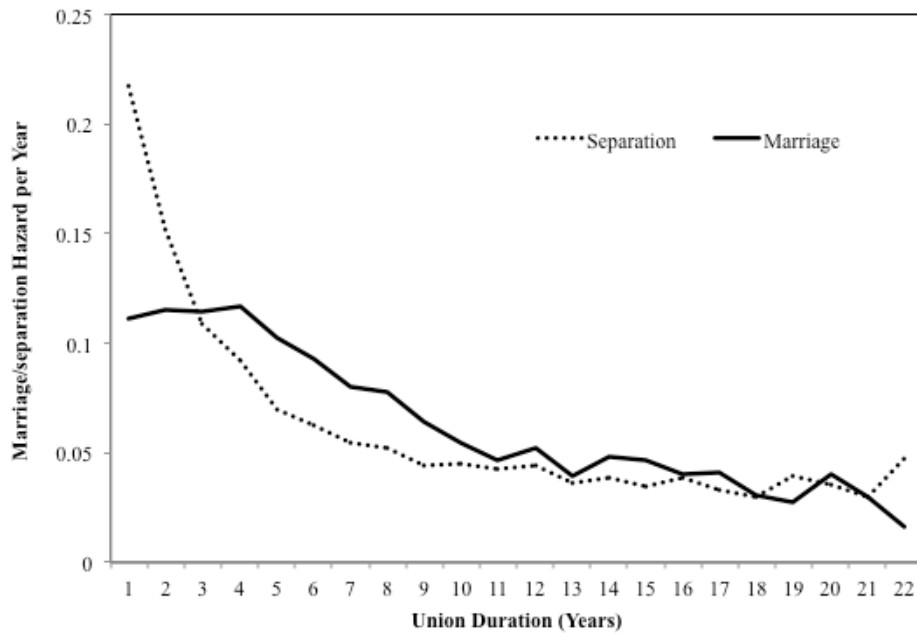
Fig 7 Marriage and separation hazards per year for cohabitations from separate models.
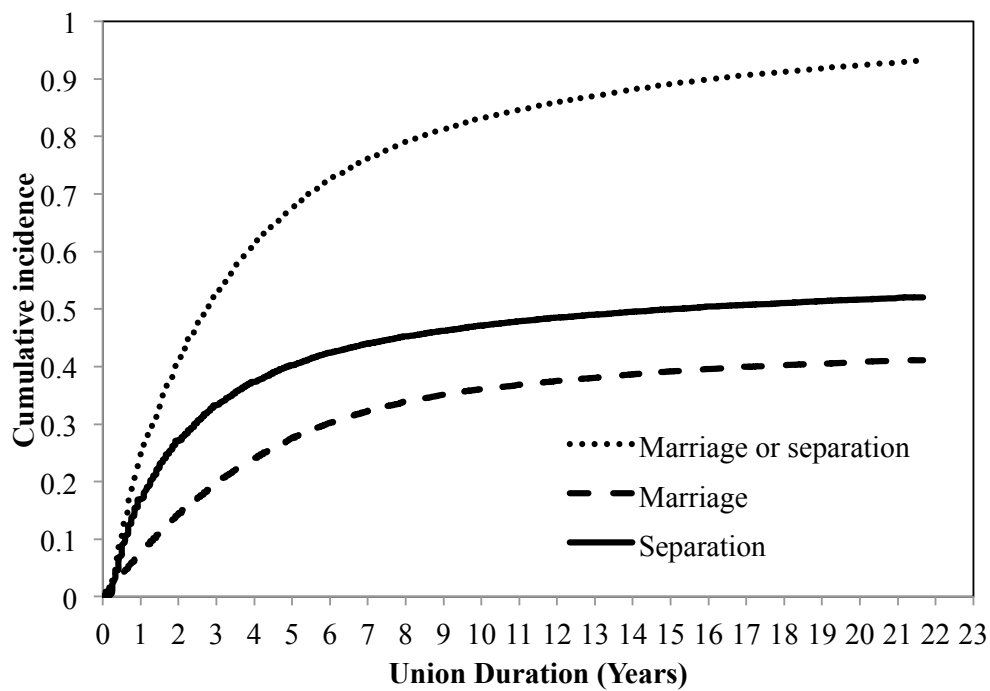
Fig 8 Cumulative incidences of separation, marriage, and either event (marriage or separation) for cohabitations.

Table 3 Couple-years at risk (N and %) and numbers of separations in the categories of the control variables; cohabitations and marriages.

	Cohabitations			Marriages		
	Couple-years		Separations	Couple-years		Separations
	N	%		N	%	
Total	432508	100	51168	452038	100	14847
Period						
1988–1992	39930	9	5664	24968	6	724
1993–1997	81614	19	12190	75900	17	2711
1998–2002	111547	26	12923	119602	26	4021
2003–2009	199417	46	20391	231568	51	7391
Age at union formation						
17–19	58887	14	9970	15317	3	853
20–24	140739	33	18042	122289	27	4490
25–29	81426	19	8687	155567	34	4568
30–34	49056	11	4742	73159	16	2233
35–39	33834	8	3450	37536	8	1208
40–44	29501	7	2922	23030	5	796
45–	39065	9	3355	25140	6	699
Union order						
First	310996	72	26597	368575	82	8667
Subsequent	121512	28	24571	83464	18	6180
Partners' age difference						
Same age or male 0–1 years older	136693	32	15246	161505	36	4758
Male 2–4 years older	105833	24	11689	119088	26	3686
Male 5–9 years older	67600	16	7866	67809	15	2447
Male 10+ years older	29962	7	4578	23586	5	989
Female 1–5 years older	64968	15	7371	65459	14	2198
Female 5+ years older	27451	6	4418	14591	3	769
Number of children						
None or 1	301531	70	40465	172108	38	6423
2	83322	19	6405	165745	37	4767
3+	47654	11	4298	114186	25	3657
Age of the youngest child						
No children	248236	57	35382	124184	27	4640
Pregnant	10821	3	617	16357	4	165
0–12 months	14717	3	908	26013	6	425
1–2 years	22550	5	1913	50198	11	1414
3–9 years	46516	11	4129	128399	28	4284
10+ years	89669	21	8219	106887	24	3919

Table 3 continues

	Cohabitations			Marriages		
	Couple-years		Separations	Couple-years		Separations
	N	%		N	%	
Youngest child						
Partners' common child	332740	77	39939	377609	84	11553
Not a common child	99768	23	11229	74429	16	3294
Female partner's education						
Basic	90410	21	12782	58091	13	3167
Secondary	211429	49	26778	170557	38	6061
Lowest tertiary	70757	16	6492	115115	25	2972
Degree level tertiary	59912	14	5116	108276	24	2647
Male partner's education	120439	28	16435	93688	21	4565
Basic	219619	51	26666	191878	42	6345
Secondary	41495	10	3769	63376	14	1472
Degree level tertiary	50954	12	4298	103096	23	2465
Female partner's income in previous year						
−5,000 EUR	41388	10	7640	23030	5	1040
5,000–9,999	78416	18	11882	65626	15	2891
10,000–19,999	141428	33	16753	134946	30	4273
20,000–29,999	114571	26	10201	134967	30	3868
30,000–39,999	34721	8	2626	52975	12	1563
40,000–49,999	10681	2	751	20017	4	569
50,000+	11304	3	1315	20477	5	643
Male partner's income in previous year						
−5,000 EUR	26481	6	5562	11983	3	750
5,000–9,999	50180	12	9236	25360	6	1687
10,000–19,999	95798	22	13215	64490	14	2661
20,000–29,999	120511	28	11883	120482	27	3553
30,000–39,999	73549	17	5890	100252	22	2752
40,000–49,999	32886	8	2321	57636	13	1442
50,000+	33103	8	3061	71835	16	2002
Home ownership						
Rent	222526	51	33937	130763	29	6726
Own apartment	110488	26	10373	128901	29	3671
Own house	99494	23	6858	192374	43	4450

Table 4 Relative separation risks by the control variables in two models for all unions: Model 1 includes the civil-status dummy, and Model 2 includes the civil-status variable with marriage duration. Both models include shared frailty. Hazard ratios and standard errors are in brackets.

	Model 1		Model 2	
	HR	SE	HR	SE
Period (Ref: 1988–1992)				
1993–1997	1.20	(0.019)	1.19	(0.019)
1998–2002	1.12	(0.018)	1.11	(0.017)
2003–2009	1.07	(0.017)	1.08	(0.017)
Age at union formation (Ref: 17–19)				
20–24	0.81	(0.011)	0.82	(0.011)
25–29	0.69	(0.012)	0.72	(0.012)
30–34	0.56	(0.012)	0.59	(0.012)
35–39	0.50	(0.012)	0.53	(0.012)
40–44	0.44	(0.012)	0.46	(0.012)
45+	0.32	(0.009)	0.34	(0.009)
Age difference (Ref: Same age or male 0–1 years older)				
Male 2–4 years older	1.03	(0.012)	1.03	(0.012)
Male 5–9 years older	1.16	(0.016)	1.16	(0.016)
Male 10+ years older	1.40	(0.025)	1.39	(0.024)
Female 1–5 years older	1.24	(0.018)	1.23	(0.017)
Female 5+ years older	1.98	(0.039)	1.94	(0.038)
Number of children (Ref: None or 1)				
2	0.75	(0.010)	0.74	(0.010)
3+	0.79	(0.012)	0.77	(0.012)
Age of youngest child (Ref: No children)				
Pregnant	0.36	(0.013)	0.37	(0.013)
0–12 months	0.43	(0.012)	0.43	(0.012)
1–2 years	0.72	(0.014)	0.69	(0.014)
3–9 years	0.96	(0.017)	0.90	(0.016)
10+ years	1.00	(0.024)	0.93	(0.022)
Youngest child (Ref: Partners' common child)				
Not a common child	1.49	(0.028)	1.57	(0.029)
Female partner's education (Ref: Basic)				
Secondary	0.87	(0.010)	0.86	(0.010)
Lowest tertiary	0.78	(0.013)	0.78	(0.012)
Degree-level tertiary	0.75	(0.014)	0.75	(0.013)
Male partner's education (Ref: Basic)				
Secondary	0.82	(0.009)	0.82	(0.008)
Lowest tertiary	0.73	(0.013)	0.73	(0.013)
Degree-level tertiary	0.73	(0.012)	0.72	(0.012)

Table 4 continues

	Model 1		Model 2	
	HR	SE	HR	SE
Female partner's income in previous year (Ref: <5,000 EUR)				
5,000–9,999	1.01	(0.015)	1.01	(0.015)
10,000–19,999	0.94	(0.014)	0.95	(0.014)
20,000–29,999	0.91	(0.015)	0.92	(0.015)
30,000–39,999	0.95	(0.021)	0.96	(0.021)
40,000–49,999	1.00	(0.033)	1.00	(0.032)
50,000+ EUR	1.05	(0.028)	1.05	(0.028)
Male partner's income in previous year (Ref: <5,000 EUR)				
5,000–9,999	1.00	(0.017)	1.00	(0.017)
10,000–19,999	0.84	(0.013)	0.85	(0.013)
20,000–29,999	0.69	(0.011)	0.70	(0.011)
30,000–39,999	0.67	(0.012)	0.68	(0.013)
40,000–49,999	0.67	(0.015)	0.67	(0.015)
50,000+ EUR	0.75	(0.016)	0.76	(0.016)
Home ownership (Ref: Rented)				
Own apartment	0.80	(0.009)	0.80	(0.009)
Own house	0.61	(0.007)	0.61	(0.007)
Civil status dummy (Ref: Cohabitation)				
Marriage	0.44	(0.005)		
Civil status and marriage duration (Ref: Cohabitation)				
Married, 1st year			0.20	(0.006)
Married, 2nd year			0.39	(0.010)
Married, 3rd year			0.51	(0.013)
Married, 4th year			0.57	(0.016)
Married, 5th year			0.66	(0.019)
Married, 6th year			0.60	(0.020)
Married, 7th year			0.65	(0.023)
Married, 8th year			0.70	(0.027)
Married, 9th year			0.72	(0.030)
Married, 10th year			0.77	(0.034)
Married, 11th year			0.73	(0.036)
Married, 12th year			0.69	(0.038)
Married, 13th year			0.83	(0.049)
Married, 14th year			0.74	(0.049)
Married, 15th year			0.74	(0.054)
Married, 16th year			0.71	(0.057)
Married, 17th year			0.89	(0.077)
Married, 18th year			0.73	(0.059)