

DEPARTMENT OF ECONOMICS

Working Paper

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Working Paper No. 2002-19



ISSN 1396-2426

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Determinants of Divorce in Denmark*

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Abstract

In this paper we provide an empirical investigation of the determinants of divorce in the Danish marriage market. The paper complements Svarer (2002) in two ways. First, it considers more carefully the potential endogeneity of premarital cohabitation in the divorce equation. Second, it discusses more thoroughly the effects of other covariates on the divorce hazard.

JEL classification: J12

Keywords: Marriage, divorce

*Financial support from the Danish Social Science Research Council, Centre for Labour Market and Social Research, Centre for Research in Social Integration and Marginalization, and National Centre for Register-based Research is gratefully acknowledged. This paper has benefited from the comments of Gerard van den Berg, Per-Anders Edin, Niels Haldrup, Peter Jensen, Michael Rosholm, Lars Skipper, Mette Verner, Daniela Vuri, and seminar participants at the University of Aarhus, Aarhus School of Business, Centre for Applied Microeconometrics, and Copenhagen Business School, and participants at the Spring Meeting for Young Economists 2001, Nordic Econometric Meeting 2001, and Econometric Society Winter Meeting 2002. I also thank Søren Leth-Sørensen for providing the data, Jens Chr. Thellesen for excellent research assistance, and Gerda Christophersen for carefully reading the manuscript. The usual disclaimer applies.

1. Introduction

There are a number of reasons why individuals should be better off in unions than alone. A (presumably non exhaustive) subset of these reasons are economic by nature. A union allows for, among other things, division of labour, coordination of investments, sharing of collective goods, and risk pooling (Weiss (1997)). Given that individuals acknowledge these advantages and coordinate actions accordingly it is relevant to investigate why individuals leave unions (henceforth denoted divorce).

In the economics literature two main ideas have been followed to explain why couples divorce. The first, initially formulated by Becker et al. (1977), argues that it is deviations between expected and realized output from marriage that trigger divorce. Following this line of argument unexpected events are crucial determinants of divorce. Several authors have tested and to a large degree found support for this hypothesis. E.g. in terms of earnings Weiss & Willis (1997) find that large deviations between expected and realized earnings are correlated with divorce risk, whereas Ermisch & Böheim (2001) find that financial surprises to some extent are associated with divorce risk. The second argues that a reason for divorce is attributed to uncertainty about the quality of the current match and other union related characteristics of the partner. At the time of union formation the two spouses have only limited information on the determinants of the gains from the union. As time passes, new information on the quality of the match and on the outside options of each partner is accumulated and the couple decides whether to dissolve the partnership or to continue the marriage (see e.g. Weiss (1997), Burdett & Coles (1997), and Brien et al. (2001)). This idea about learning about match-specific quality is closely related to Jovanovic's (1979) model of job turnover. Likewise, the implications overlap in the sense that the divorce risk - like the exit-rate out of employment - (eventually) exhibits negative duration dependence. The longer a relationship has existed the lower the risk that a break-up will occur. In addition, couples who started out as cohabitators have the advantage of gathering information about their partner before marrying. Hence, only good matches should evolve

into marriage and marriages preceded by cohabitation would have a lower divorce risk.

As opposed to the affirmative empirical support for the first explanation for divorce, the latter has received close to no empirical support. In fact a substantial number of investigations find support for the reverse result, namely that premarital cohabitation implies higher subsequent divorce risk (see e.g. Blanc (1985), Balakrishnan et al. (1987), Bennett et al. (1988), Trussell et al. (1992), Hoem & Hoem (1992), Bracher et al. (1993), Lillard et al. (1995), Weiss & Willis (1997), and Brien et al. (2001)). A number of possible explanations for this theoretically counterintuitive result has emerged. The most prevailing being the presence of a self-selection effect. That is, couples who cohabit have a higher latent probability of divorce than couples who marry directly. This proneness to divorce is driven by differences in socio-economic circumstances and/or differences in attitudes towards marriage as an institution. Only Lillard et al. (1995) correct for the self-selection effect and do find support for the existence of such an effect. However, even after purging their model for self-selection they are not able to find support for a learning effect.

In the present paper we investigate the determinants of divorce in the Danish marriage market. In the process we take a closer look at the association between premarital cohabitation and subsequent divorce risk. We do this in the context of the Danish marriage market. As shown in Svarer (2002) the Danish marriage market is interesting in this respect since premarital cohabitation - as a marriage market phenomenon - had its beginning on a larger scale in Denmark and Sweden in the 1960s. Since then premarital cohabitation has spread throughout the western world and is now the norm in a number of countries like e.g. the US, UK, New Zealand, Norway, France, Sweden, and Denmark.

The investigation is based on a register based data set collected by Statistics Denmark covering a subset of all individuals born between January 1, 1955 and January 1, 1965. The individuals are followed from 1980 to 1995 on an annual basis. We find that premarital cohabitation decreases the subsequent divorce hazard, even after correcting for possible self-selection effects. Our result is in accordance with the learning hypothe-

sis, but not with the self-selection argument. We argue - based on newly released survey data - that similar results are likely to emerge in other countries as well.

The paper is organized as follows. In Section 2 we briefly discuss some theoretical issues concerning divorce. The data are presented in Section 3. Section 4 contains the econometric model. In Section 5 we present the results, and in Section 6 we conclude.

2. Theoretical considerations

The theoretical question facing researchers who want to analyse separations is how it can be optimal to enter a partnership at one time and then again optimal to leave this partnership at some later date. In this article we are specifically interested in investigating this question in the context of the marriage market. Following Burdett & Coles (1998) the causes of divorce are discussed under three headlines: learning effects, variations in match productivity, and variations in outside options values.

Learning effects relate to the situation where the individuals in the marriage at the start of the relationship are incompletely informed about the quality of their partner. As the marriage evolves more and more information about the partner is revealed, and sufficient unfavorable information will lead to divorce. The quality of the match is in the terminology of Jovanovic (1979) a *pure experience good*. Both partners receive, as the marriage evolves, noisy signals about their partner and when new information arrives the partner chooses to resolve the marriage or not. Initially, the stock of information is low, and bad shocks will have a larger effect than later in the marriage when more experience has been collected – on the other hand the variance on the match quality is higher in the beginning giving more scope for a big positive realization. This implies that the – theoretically derived – divorce hazard is increasing initially, whereafter it declines with marriage duration. Brien et al. (2001) extend Jovanovic’s model to the marriage market. Both models assume from the outset that the characteristics of the two spouses are known and constant over time, and that information of the initially unobserved match-specific quality component evolves over time. In this set-up

it is clear that low realizations of the match-specific component will lead to divorce as only the inside option value decreases. An interesting prediction from these models is that premarital cohabitation increases the survival probability of marriage, since the cohabitation period enables information gathering, and only good realized matches will evolve into marriage.

Although individuals are fully informed about the quality of the match¹, the flow payoff to the match may change over time. This mechanism has been the building block of divorce models by Becker et al. (1977), Weiss & Willis (1997), and Ermisch & Böheim (2001). Here it is argued that it is the deviation between expected and realized utilities/payoffs that trigger divorce. Since partners were matched based on predicted characteristics both positive and negative surprises could lead to divorce. If the gains to marriage are substantial, small shocks will not lead to divorce. Individuals, of course, acknowledge that the probability of divorce is higher the lower the expected gain from marriage, and sort on characteristics that enhance the expected gain from marriage. Becker (1973, 1974) provides an extensive analysis of optimal marital sorting that explains the predominance of positive assortative mating with respect to personal characteristics such as education, intelligence, age etc. Positive assortative mating is optimal when the traits are complements in the production function. When the traits are substitutes, production is increased through negative assortative mating (see also Burdett & Coles (1997) and Smith & Shimer (2000)).

Even though individuals are fully informed about the match quality and the flow payoff to the match is constant over time, the payoff to separating may be time varying. The accumulation of marriage-specific capital, like children, property and information about the spouse during the marriage, clearly decrease the payoff to separating. The accumulation of marriage-specific capital increases the inside option value to marriage and decreases the outside options.

In sum, the theoretical models provide several testable implications. Our main inter-

¹This amounts to assuming that the couple at the time of partnership formation immediately obtains all information about the unobserved match component.

est in this paper is to test the prediction that couples who cohabited prior to marriage have a lower probability of divorce. In addition, the discussion above also suggests that marriage-specific capital stabilizes marriage, that positive (negative) assortative mating based on traits that are complements (substitutes) in the production function enhance marriage stability, that unexpected events increase the risk of divorce, and that the divorce hazard displays negative duration dependence. In the following sections we test empirically the theoretical implications on the Danish marriage market.

3. Data

The data used in this study come from IDA (Integrated Database for Labour Market Research) created by Statistics Denmark. The information comes from various administrative registers that are merged in Statistics Denmark. The IDA sample used here contains (among other things) information on marriage market conditions for a randomly drawn sub-sample of all individuals born between January 1, 1955 and January 1, 1965. The individuals are followed from 1980 to 1995. The data set enables us to identify individual transitions between different states on the marriage market on a yearly basis. The information about civil status is based on the individual's situation on December 31 each year and is derived from household information. This means that only individuals sharing the same address are identified as cohabiting or married. If two individuals are sharing a flat, say, without being a couple it will still count as cohabitation in the data. The only way we can ascertain that individuals living together actually are partners is to consider married couples only. In this study we therefore restrict focus to marriages. Of course, married couples who are not living together will be registered as single, but this type of relationships is likely to be low in number. If there is a break in a marriage, e.g. we observe a couple to be married in 1987, to live as single individuals in 1988, and then as married couples again in 1989, we disregard

the break, and contribute the intervening spell to measurement error².

The information used in the analysis is gathered in the following way: we observe the individuals in 1980, where we have information about various personal characteristics and marriage market status. For each subsequent year we observe a new stream of data for the individuals. If the individual enters a relationship we also observe the personal characteristics of the partner. Since we are interested in marriages, and especially the personal characteristics during the marriage, we disregard left censored marriages. The individuals were between 15 and 25 years of age in 1980, and since we disregard individuals already married, the first marriage of the unit of observation is observed for the majority of the individuals (some may, of course, already be divorced). The partners are not restricted by age, and it is therefore more likely that they have experienced more marriages at the time we observe them.

In the sample there is 7327 marriages during the period. The number of marriages per person is distributed as presented in Table 3.1.

Table 3.1 around here

Only around 4 percent experience more than one marriage during the sample period. The entry and exit states out of marriage and the duration of marriages, conditional on relationships types, are presented in Table 3.2.

Table 3.2 around here

Table 3.2 reveals that the majority of marriages (approximately 79 percent) are formed by persons who lived together as a cohabiting couple before marriage. Compared to international studies covering more or less the same period the Danish population has more marriages that are preceded by cohabitation. The percentage of marriages

²For these couples the intervening spell could imply that they actually divorce and then remarry (what Bracher et al. (1993) label "The Elisabeth Taylor syndrome"). The data, however, do not allow for correct identification of this type of behavior.

preceded by cohabitation is 15 percent in Australia (Bracher et al. (1993)), 46 percent in the UK (Ermisch & Francesconi (2000)), 22 percent in the US (Lillard, Brien & Waite (1995)), and 65 percent in Sweden (Bennett, Blanc & Bloom (1988)).

Table 3.2 shows a high fraction of right censored marriages. Approximately 82 percent of the marriages are right censored. Of the marriages that do end, some of the disruptions may be caused by death of the partner. We are not able to correct for this feature, but due to the relatively young sample of individuals we believe the fraction of disruptions, due to death, to be negligible.

3.1. Explanatory variables

Table 3.3 contains descriptive statistics of the variables used in the analysis. We distinguish between marriages that were preceded by cohabitation and those that were not. We report the mean and standard deviation of the explanatory variables at the start of the marriage and by type of marriage. All variables are, however, allowed to vary during the marriage spell.

Table 3.3 around here

First, we have dummies for educational attainment. The reference category is no education beyond primary school. Since some individuals may still be in school, we observe the current education at the time of observation. The educational variables are therefore also allowed to be time varying. Next, we have information about gross income. Gross income is measured in 1980 prices and includes both labour and non labour income as well as received unemployment insurance benefits. We have three variables on children; an indicator variable for the presence of a child born to the couple younger than 3 years old, an indicator variable for the presence of stepchildren, and finally an indicator variable that takes the value 1 if the couple had a child together before marriage. If the couple has a spell of cohabitation before marriage we measure the duration of the cohabitation spell. We also include variables measuring the age of

the couple and the age difference. The variable, *sickness*, is an indicator variable taking the value 1 if the individual receives sickness benefits during the year. As a general rule sickness benefits are received if a person has a spell of illness for more than 13 weeks. If the couple has the same employer, this is captured by an indicator variable. We distinguish between individuals living in the Copenhagen metropolitan area or not by the indicator variable *province*. The individual degree of unemployment during the year, is defined as the number of hours being unemployed divided by the number of potential supplied working hours³.

Compared to those couples who marry directly (22 percent) the premarital cohabitators (78 percent) are slightly less educated, earn more, are a bit older when they marry, are a more homogeneously match with respect to age, less likely to work for the same employer, more likely to live in the province, and much more likely to have a child that is born before the current marriage either to the couple or to another partnership. Some of these features correspond to the description of cohabitators in other studies and some do not. We return to this issue in Section 5.1.

4. Econometric specification

Our empirical model follows closely Lillard et al. (1995). That is, we specify a model of the risk of divorce which explicitly incorporates both the direct effect of premarital cohabitation and a potential self-selection of more divorce-prone individuals into premarital cohabitation. Our model differs slightly since our data are observed on a yearly basis. Hence, we model the transition out of marriage as a grouped duration model. In addition, we impose a different distributional assumption on the unobserved heterogeneity components. The correlation structure between the two processes; the transition out of marriage and the decision to premarital cohabit, is determining the

³We have also tried to include information on occupational groups of the spouses. However, since there were no significant effects on the divorce probability from these variables they are excluded. Due to the same argument, we have excluded information on father's education and occupation.

endogeneity of cohabitation, i.e. the self-selection effect. Therefore, if unobserved factors both influence the individual risk of divorce and the decision to cohabit, then they are correlated and cohabitation is endogenous. Below we briefly sketch the empirical model we employ.

4.1. Empirical model

The hazard function is specified as a mixed proportional hazard. That is, it is a product of a function of time spent being married (the baseline hazard), a function of observed time-varying characteristics, x^d , and a function of unobserved characteristics, v^d ;

$$h(t|x_t^d, v^d) = \lambda(t) \cdot \varphi(x_t^d, v^d), \quad (4.1)$$

where $\lambda(t)$ is the baseline hazard and $\varphi(x_t^d, v^d)$ is the scaling function specified as $\exp(x_t^d \beta^d + v^d)$. We follow Lillard et al. (1995) and assume that the unobserved component, v^d , is individual-specific to the unit of observation. The unit of observation is the person in our sample that is followed throughout the period from 1980 to 1995.

Since we only observe the transitions on the marriage market on a yearly basis, we specify a model for grouped duration data (see e.g. Kiefer (1990)). The marriage duration T is observed to lie in one of K intervals, with the k 'th interval being $(t_{k-1}; t_k]$ and the convention $t_0 = 0$ for $k = 1, \dots, 15$. The probability that the duration T for an individual with explanatory variables x_t is greater than t_k given that the duration is greater than t_{k-1} is given by:

$$\begin{aligned} P(T > t_k | T > t_{k-1}, x_k^d, v^d) &= \exp \left[- \int_{t_{k-1}}^{t_k} h(t|x_t^d, v^d) dt \right] \\ &= \exp \left[- \exp [x_k^d \beta^d + v^d] \cdot \Lambda_k \right] \end{aligned} \quad (4.2)$$

where $\Lambda_{i,k} = \int_{t_{k-1}}^{t_k} \lambda_i(t) dt$. The interval-specific survivor expression (4.2) is henceforth denoted α_k . The probability of observing an exit out of marriage in interval k , conditional on survival until $T > t_{k-1}$, is consequently $1 - \alpha_k$. If we do not specify a functional form for the baseline hazard, the $\Lambda_{i,k}$ s are just parameters to be estimated.

As argued by Bennett et al. (1988) the decision to cohabit might be correlated with the divorce risk. The notion of self-selection is modelled by specifying a simultaneous model of the selection process into cohabitation and the transition rate out of marriage. We define an indicator for the selection, C , taking the value 1 when an individual has cohabitated prior to marriage and 0 otherwise. The selection may depend on explanatory variables, x^c , and an unobserved component, v^c . The selection process is specified as a logit model, i.e.

$$P = \Pr(C = 1|x^c, v^c) = \frac{\exp[x^c\beta^c + v^c]}{1 + \exp[x^c\beta^c + v^c]}.$$

The individual contribution to the likelihood function is then

$$\mathcal{L} = \int \int P^c (1 - P)^{1-c} (1 - \alpha_k)^j \alpha_k^{1-j} \prod_{l=1}^{k-1} \alpha_l g(v^d, v^c) dv^d dv^c, \quad (4.3)$$

where $g(v^d, v^c)$ is the joint probability density function of the unobservables and where $j = 1$ if the marriage is not right censored and 0 otherwise. Uncompleted durations therefore only contribute with the survivor probabilities.

To specify the distribution of the unobservables, we impose two restrictions:

A1: Each of the v_i , $i = d, c$ follows a discrete distribution with two points of support, v_i^1 and v_i^2 .

A2: v^d and v^c are perfectly correlated.

We normalize one of the support points in each of the cause-specific hazard functions to zero, since the baseline hazard acts as a constant term. The second assumption restricts the correlation between the unobservables in the two competing risks to be either -1 or 1. Actually, as shown by Carling & Jacobson (1995), the more general model with unrestricted correlation is theoretically identified. However, in the empirical application the estimation results implied perfect correlation. Hence, perfect correlation was imposed in the final estimations. Note, that the observation of multiple marriages for some individuals identifies the distribution of unobservables and facilitates the test for exogeneity.

5. Results

In Table 5.1 we report the maximum likelihood estimates for the parameters of the estimated model. Since we only observe that a divorce has occurred sometime within a given year, we use explanatory variables for time $t - 1$ to explain the divorce hazard at time t in order to avoid that the value of a given characteristic is influenced by the divorce event.

Compared to Svarer (2002) we pay more attention to the possible endogeneity of premarital cohabitation in the divorce hazard. This is, however, not the only potential endogenous variable. Several of the included explanatory variables face the same issue of endogeneity. Weiss & Willis (1997) provide evidence of this with respect to earnings, Johnson & Skinner (1986) with respect to female labour supply, Lillard & Waite (1993) with respect to children, and Lillard & Panis (1996) with respect to health. The endogeneity problem of other variables than cohabitation will not be explicitly addressed in the empirical model. However, we keep the endogeneity issues in mind when drawing inference.

Table 5.1 around here

5.1. Premarital cohabitation

We find that premarital cohabitation is negatively correlated with divorce risk⁴. This effect is revealed through different channels. First, we find a *perfect* negative correlation between the unobserved proneness to cohabit and the unobserved factors that determine divorce. That is, opposed to Lillard et al. (1995) we do not find a self-selection effect. They find a positive correlation between the two processes. However, we do confirm that premarital cohabitation is endogenous to the divorce risk. Second, we find that longer

⁴Note that the average duration of marriages that were preceded by cohabitation is the same as of marriages that were not. Hence, the result is not generated by comparing marriages that are consistently shorter due to an initial period of cohabitation.

duration of premarital cohabitation is associated with a lower dissolution risk. The incidence of cohabitation is - when correcting for endogeneity - insignificantly related to the divorce risk. In the model without this correction we find a significant negative effect of cohabitation (see Svarer (2002) for details). In sum, our results differ from practically all other studies in this field (see e.g. Blanc (1985) on Norwegian data, Balakrishnan et al. (1987) on Canadian data, Bennett et al. (1988), Trussell et al. (1992), and Hoem & Hoem (1992) all on Swedish data, Bracher et al. (1993) on Australian data, Lillard et al. (1995), Weiss & Willis (1997), and Brien et al. (2001) all on US data)⁵. In Svarer (2002) we discuss what potentially causes the difference in results and argue that the result should interest researchers outside Denmark since premarital cohabitation is now the norm in a number of countries like the US, the UK, Norway, Sweden, Finland, France, Austria, Switzerland, West Germany, the Netherlands, New Zealand, and Estonia.

5.2. Other results

In this section the association between the other explanatory variables and the divorce risk is briefly discussed.

The educational level of the husband is negatively correlated with the divorce risk. That is, a higher degree of education monotonically decreases the instantaneous probability of divorce. This is in accordance with a number of other studies (e.g. Weiss & Willis (1997) and Georgellis (1996)) and confirms the simple correlation between divorce rates and education that is found to be negative (Becker et al. (1977)). We have also included indicator variables for the educational pattern of marriage partners. The results reveal that a couples where both spouses have the same level of education have a higher risk of divorce, which indicates that specialization does play a role in marriage.

Weiss (1997) argues that spouses' earnings and children are potentially endogenous to the divorce decision from a dynamic model of *defensive investments*. In the model,

⁵One exception is Georgellis (1996). He finds, based on British data from the General Household Survey collected in 1990-91, that the duration of premarital cohabitation and subsequent divorce risk is negatively correlated. He does not take the possible endogeneity of cohabitation into account.

fertility and child quality requires inputs of time and money by parents in the first period, and child quality requires inputs of time and money by parents in the second period. Also, parents' wages in the second period depend on how much they worked in the first period due to learning-by-doing in the labour market. In the second period, new information is available, which could induce the dissolution of the marriage. Hence, fertility in the first period, wages in the second period and the probability of divorce are jointly determined.

Weiss & Willis (1997) address the endogeneity of earnings explicitly. In addition, they test whether differences between expected and realized earnings trigger divorce, as suggested by Becker et al. (1977). They find that if the husband experiences a positive surprise then the divorce probability decreases, whereas the divorce probability increases if the wife experiences a positive surprise in earnings. We do not endogenize earnings⁶, but find that marriages are more stable the higher the income of the husband, whereas the income level of the wife has no significant impact on the divorce risk. The negative association between husbands' earnings and divorce risk is consistently found in the literature (see e.g. Weiss & Willis (1997) and Burgess et al. (1997)). Typically, the reverse association is established with respect to wives earnings. Higher earnings of the wife are consistently found to increase divorce risk. This result lent it self nicely to the defensive investment idea, where the wife increases her labour supply in period 1 if she expects to divorce in period 2, say. We do, however, not observe this feature in the present analysis.

As Weiss (1997) argues the decision to invest in children is presumably not independent of the probability of divorce. Lillard (1993) and Lillard & Waite (1993) specify and estimate a simultaneous equation system of the two processes. They confirm that the two decisions are negatively correlated. However, they still find that the first child born to the couple stabilizes the marriage, which corroborates Becker et al.'s (1977)

⁶We tried to use the income at the beginning of the marriage as instruments for income potential. The results from that exercise, which are available upon request, revealed an insignificant effect of husband's income, and a significant, positive effect of wives' income.

notion of children constituting positive capital in the household. We find that own children born to the marriage stabilize when they are younger than 3 years old⁷ (for related results see Waite & Lillard (1991) and Weiss & Willis (1997)). This result could be driven by the lacking endogenization of fertility since couples that decide to have children might be those couples who experience higher match quality and therefore are less likely to split up anyway (cf. Lillard (1993)). In Svarer & Verner (2002) fertility is treated as endogenous in the divorce equation. That turns out to be crucial for the results. Svarer & Verner (2002) find the couples who are more prone to divorce are less likely to have children. Once they correct for this in the model, the stabilizing effect of children disappears.

Whereas own children are considered to be positive capital in the household, stepchildren, however, represent negative capital in the household according to Becker et al. (1977). Our results support this since we find that stepchildren destabilize marriages. Similar results are found by White & Booth (1985).

Children born to the couple but out-of-wedlock increase the divorce risk. This correlation could be driven by the observation that premarital cohabitation increases the risk of unwanted pregnancy, which again could lead to an otherwise unwanted - and therefore more fragile - marriage.

The marriage market is characterized by search frictions. It takes time to locate the *most* suitable match. Empirically, this is supported by the result that *age at marriage* is found to be negatively correlated with divorce risk in many studies (e.g. Becker et al. (1977) and Weiss & Willis (1997)). The inclusion of age at marriage did not give any significant results. Instead, we followed the suggestion by Lillard (1993) and included a time varying age variables. Of course, the duration of marriage and the age of the individual each change perfectly collinear with time. However, their separate effects can be distinguished because they begin at different initial values at the beginning of the current marriage. We find that the younger the husband is the more unstable the

⁷We also included indicator variables for children older than two years. None, of these came out significant, and are therefore not included in the final model.

marriage. Hence, we confirm the idea that it takes time to locate a good partner.

We find that sickness and unemployment (insignificantly at the 5% level for wives) increase the divorce hazard. The results are not surprising if the Becker et al. (1977) theory prevails. As noted in Section 2, they argue that it is unexpected events (which sickness and unemployment could be considered to be) that lead to divorce. From the viewpoint of marriage as an institution this is rather unfortunate, since Weiss (1997) argues that one of the advantages of marriage is risk pooling, i.e. the partner provides insurance in case of bad shocks. The evidence in this paper (and in related papers e.g. Jensen & Smith (1990), Bracher et al. (1993), Kiernan & Mueller (1998), and Böheim (2000)) seems to suggest that the former effect is operating.

Lillard & Panis (1996) also notice that marriage and health are positively correlated in the sense that married persons (especially men) have substantially lower mortality rates. As possible explanations for this correlation they suggest that marriage protects its incumbents or that healthier men select themselves into marriage. The former idea should encourage men in poor health to marry sooner and stay married longer. They specify and estimate a simultaneous equations model for health and marital dissolution for men. They find that healthier men have a reduced hazard of divorce, and that men who for unmeasured reasons tend to be in good health also tend to have longer marriages.

There is, at the 5 percent level, no significant effect of being in 2nd or higher order marriage. A destabilizing effect were to be expected if divorce was stigmatizing. Becker (1998) argues that individuals have a higher probability of divorce in second or higher order marriages, simply because "...the average divorced person can be presumed to be more quarrelsome and in other ways less pleasant than the average person remaining married, because an unpleasant temperament is one cause of divorce...". Actually, in a model without unobserved heterogeneity the prior marriage indicator came out significantly positive. That is, however, an inconsistent estimate of the prior occurrence effect. Including heterogeneity gives a consistent estimate, and in this case, an insignificant effect on the divorce risk.

We have included a variable that captures whether the couple works for the same employer. Working for the same firm could be an indicator of work-related traits being closely connected. We find that the divorce hazard is increased if this is the case. Whether the result reflects the fact that the couple needs some time apart is left for the reader to consider.

We have also included a rough measure on regional belonging. In most international studies it is found that individuals living in heavily populated areas are more likely to experience divorce than individuals living in less populated areas. The same pattern is confirmed in the Danish data. There is for both men and women a significant negative effect on the divorce hazard of living outside the Copenhagen area.

In Figure 5.1 the baseline hazard function is depicted. The figure reveals that the divorce hazard increases sharply in the first couple of years after marriage. Hereafter, the hazard flattens with an insignificantly decreasing tendency.

Figure 5.1 around here

Based on the discussion in Section 2 we would have expected the decreasing part of the hazard to be significant, since time spent in marriage increases the accumulation of marriage-specific capital, like children, property⁸, and information about the spouse, and consequently reduces the incentives to divorce. Likewise, we would expect that the presence of unobserved heterogeneity would lead to significant negative duration dependence, since divorce-prone couples exit earlier.

The same pattern as in Figures 5.1 is found by Lillard (1993) and Weiss & Willis (1997). The results suggest that something works counter the theoretical prediction. A likely explanation is that the correction for some of the marriage-specific capital accumulation by the inclusion of children tends to remove some of the expected duration dependence.

⁸We were not able to control for property.

6. Conclusion

In this paper we have estimated the determinants of divorce on the Danish marriage market. Based on various theories of divorce we have examined whether the decision to end a marriage can, at least to some extent, be explained by economic considerations. We find evidence that suggests that economic models do provide some guidance in determining which factors affect the stability of marriages. We have investigated the association between premarital cohabitation and the subsequent risk of divorce in the Danish marriage market more carefully. Premarital cohabitation enables the couple to gather information about the quality of the current match before actually entering into marriage. Hereby, the couple can reduce the problem of incomplete information. We find that couples who have cohabited prior to marriage have a lower risk of divorce. The fact that this pattern is (almost) uniquely found on the Danish marriage market could be attributed to the relatively broad moral bonds that characterize the Danish marriage market. In Denmark, in general, it is not associated with social stigmatization to live together without being married. The tentative conclusion from this paper suggests that this feature enables Danes to do the, in an economic sense, most sensible thing, namely, to engage in “trial marriages” before actual marriages.

Recently released data from the UN Economic Commission for Europe’s Fertility and Family Surveys indicated close similarities between Denmark and many other countries with respect to the magnitude of premarital cohabitation and the association between premarital cohabitation and divorce. This suggests that the results from this paper could be found in other countries as well, if similar studies were conducted on up-to-date micro data sets.

The present analysis treat all other explanatory variables than premarital cohabitation as exogenous. As discussed in the text this assumption is presumably not valid for the majority of the explanatory variables. In future research it would be interesting to address the endogeneity of other crucial variables more carefully.

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Appendix: Tables and Figures

TABLE 3.1: NUMBER OF MARRIAGES

Number of marriages	Number of persons	Percentage
1	6771	95.5
2	315	4.4
3	6	0.1
4	2	0.0

TABLE 3.2: NUMBER AND DURATION (IN ITALICS) OF RELATIONSHIP TYPES

Entry	Exit					Total
	MCn	MM	MS	MCs	RC	
SM	51 <i>3.6</i>	3 <i>3.3</i>	345 <i>4.0</i>	3 <i>4.1</i>	1086 <i>7.7</i>	1488
CM	118 <i>4.3</i>	4 <i>5.3</i>	720 <i>4.6</i>	7 <i>2.3</i>	4921 <i>7.2</i>	5770
CMn	2 <i>3.0</i>		25 <i>3.9</i>	0 <i>5.0</i>	36 <i>7.2</i>	63
MMn	1 <i>4.0</i>		1 <i>3.0</i>	1 <i>5.0</i>	3 <i>5.0</i>	6
Total	172	7	1091	11	6046	7327

Note: The transitions are as follows: SM is single to marriage, CM is cohabiting to marriage with same partner, CMn is cohabiting to marriage with new partner, MMn and MM are marriage to marriage with new partner, MCn is marriage to cohabitation with new partner, MS is marriage to single, MCs is marriage to cohabitation with same partner, and RC is right censored marriages.

TABLE 3.3: DESCRIPTIVE STATISTICS OF VARIABLES IN SAMPLE BY TYPE OF MARRIAGE

	Cohabited then married		Married directly	
	Mean	Std. dev.	Mean	Std. dev.
Education of Husband				
Vocational	0.53		0.44	
Short	0.06		0.06	
Medium	0.08		0.08	
Long	0.08		0.11	
Husband more educated	0.28		0.31	
Couples have same degree of education	0.47		0.43	
Income (in DKK 1980)				
Gross income, wife	80,001	30,001	69,796	38,064
Gross income, husband	113,510	56,454	102,615	65,443
Age at marriage				
Wife <21	0.37		0.46	
Wife between 21-25	0.45		0.34	
Wife between 26-30	0.14		0.14	
Husband <21	0.19		0.27	
Husband between 21-25	0.48		0.38	
Husband between 26-30	0.24		0.20	
Husband more than 4 years older	0.14		0.28	
Wife more than 4 years older	0.02		0.06	
Unemployment and sickness				
Wife's yearly degree of unemployment	0.12	0.23	0.13	0.23
Husband's yearly degree of unemployment	0.06	0.16	0.09	0.21
Sickness, wife	0.19		0.11	
Sickness, husband	0.13		0.11	
Children				
Own child younger than 2	0.31		0.06	
Presence of step children	0.16		0.28	
Premarital birth	0.38		0.08	
Other characteristics				
Working for same employer	0.08		0.16	
Province	0.53		0.44	
Duration of pre-marital cohabitation	3.57	2.65		
Mean duration of marriage (in years)	6.95	3.88	6.96	3.97
Number of observations		5770		1557

TABLE 5.1: RESULTS FROM ECONOMETRIC MODEL⁹

	Cohabitation decision		Hazard of divorce	
	Coeff.	Std dev.	Coeff.	Std dev.
Cohabitation				
Couple has cohabited			-0.0787	0.1314
Duration of cohabitation			-0.0989 ^a	0.0219
Husband's education				
Vocational	0.1969 ^a	0.0860	-0.3306 ^a	0.0771
Short	0.0550	0.1462	-0.1998	0.1358
Medium	-0.0422	0.1366	-0.3919 ^a	0.1503
Long	-0.2484 ^b	0.1346	-0.5796 ^a	0.1542
Husband more educated	-0.0648	0.0989	0.1489	0.0999
Couple has same degree of education	0.1349 ^b	0.0814	0.1994 ^a	0.0763
Income (in 1980 DKK)				
Wife's income	0.9157 ^a	0.1025	-0.0925	0.0929
Husband's income	0.3006 ^a	0.0544	-0.2557 ^a	0.0551
Children				
Own child younger than 2			-0.4963 ^a	0.0654
Step children	-0.5896 ^a	0.0829	0.4874 ^a	0.0748
Premarital birth to the couple			0.1660 ^a	0.0715
Age				
Wife between 15-20	-0.2980	0.2080	0.2770	0.1732
Wife between 21-25	0.0680	0.1868	0.2407 ^b	0.1362
Wife between 26-30	0.0528	0.1790	0.0248	0.1198
Husband between 15-20	0.1633	0.1780	0.5504 ^a	0.1779
Husband between 21-25	0.5779 ^a	0.1472	0.3076 ^a	0.1240
Husband between 26-30	0.4825 ^a	0.1271	0.2189 ^a	0.0941
Wife more than 4 years older	-0.8747 ^a	0.1778	0.2428	0.1775
Husband more than 4 years older	-0.1967 ^a	0.0980	0.2701 ^a	0.0907
Sickness and unemployment				
Sickness, wife	0.6647 ^a	0.1010	0.1446 ^b	0.0745
Sickness, husband	0.1245	0.1010	0.1978 ^a	0.0794
Unemployment degree, wife	0.1901	0.1395	0.2010 ^b	0.1131
Unemployment degree, husband	-0.3785 ^a	0.1653	0.7067 ^a	0.1457
Other characteristics				
2 nd or higher order marriage	-0.3180 ^a	0.1618	0.3555 ^b	0.1869
Work for same employer	-0.5000 ^a	0.0961	0.1628 ^b	0.0848
Province	0.5144 ^a	0.0691	-0.3628 ^a	0.0623
v_2^d	0.7478	0.4744		
v_2^c	-0.9099	0.7086		
$P1(v^d = v_2^d, v^c = v_2^c)$	0.7759 ^a	0.2882		
Number of observations	7327			

Note: ^a significant at .05, ^b significant at .1.

⁹The reference categories are: no education above mandatory education and over 30 years old.

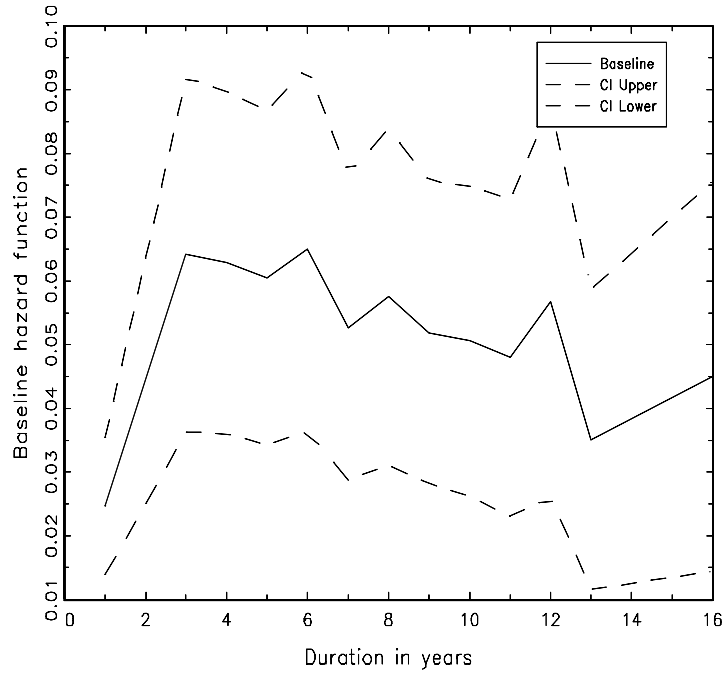


Figure 5.1: Baseline hazard

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