

**INCOME DYNAMICS OF COUPLES AND THE DISSOLUTION OF MARRIAGE AND  
COHABITATION**

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# INCOME DYNAMICS IN COUPLES AND THE DISSOLUTION OF MARRIAGE AND COHABITATION

## Abstract

Several studies have shown that a relatively strong socioeconomic position of the wife is associated with an increase in the risk of divorce. Little is known about the effects of husband's and wife's income on the dissolution of cohabiting relationships. In this paper, we present theoretical arguments suggesting that the effect of the wife's relative income will be weaker for cohabiting than for married unions. Using a unique and large-scale sample of administrative records (tax records) from the Netherlands, we analyze the link between couples' income dynamics and union dissolution for married and cohabiting unions over a ten-year period. We find negative effects of household income on separation and positive effects of wife's relative income, in line with earlier studies. More importantly, we find that the shape of the effect of the wife's relative income is different for married and cohabiting unions. For married couples, the effect is more or less linear, although it is especially steep when the wife begins to have more income than the husband. Cohabiting and married couples differ when looking at the income range where wives contribute 50 percent or less. In this range, we find that the relative income effects in cohabitation are the opposite of these effects in marriage. Movements away from equality toward a husband-dominant pattern tend to increase the dissolution risk for cohabiting couples, whereas such movements reduce the dissolution risk for married couples. In general, the findings support the notion that equality is more protective for cohabitation, whereas specialization is more protective for marriage.

## **INCOME DYNAMICS IN COUPLES AND THE DISSOLUTION OF MARRIAGE AND COHABITATION**

There is growing evidence on the importance of wife's economic independence for the dissolution of marriage. Studies generally find that the risk of divorce is increased when the wife is working for pay and when the wife works more hours (Becker, Landes and Michael 1977; Bracher et al. 1993; Cherlin 1979; De Rose 1992; Heckert, Nowak and Snyder 1998; Jalovaara 2003; Manting and Loeve 2004; Poortman and Kalmijn 2002; South 2001; Von Gostomski, Hartmann and Kopp 1998; Wagner 1993). The evidence is found both in the United States and in Europe, although it appears to be more clear and consistent in the United States. Theoretically, these economic effects are most often interpreted in two ways (Becker 1981; Cherlin 1979; Cherlin 1992; Oppenheimer 1997). First, wife's employment is an expression of reduced specialization in marriage. This decreases the efficiency of marriage which in turn lowers the gains from marriage. Second, employment gives a woman a better exit option from marriage. This makes it more likely that a marriage will end when it is otherwise in trouble. The first argument is about the benefits of marriage, whereas the second argument focuses on the costs of divorce.

Although the number of studies examining the link between women's socioeconomic position and divorce has increased greatly over the recent years, important gaps in our knowledge remain. First, most of the evidence applies to the effect of the wife's labor force participation and—largely because of longitudinal data limitations—fewer studies have directly examined effects of both partners' dynamic income levels. Hence, the evidence for relative income effects on separation is so far much less consistent than the effect of wife's employment (Rogers 2004). Some studies find a clear positive effect of the wife's income share on divorce (Heckert, Nowak and Snyder 1998; Jalovaara 2003), some authors find an inverted U-shaped effect, with high levels of divorce occurring when husbands and wife have equal incomes (Rogers 2004), yet other authors find a U-shaped effect of wife's income on separation, with high levels of divorce occurring when the wife has a low or a very high income (Ono 1998).

Second, we know little about the role of economic influences for the dissolution of cohabiting relationships. An increasing number of couples live together unmarried and these unions are known to be very unstable (Brines and Joyner 1999;

Manting 1994b). Knowledge about the causes of this instability is limited and theories about economic specialization and independence have rarely been tested for these relationships. A related gap, is that we know little about whether economic theories of divorce apply to all couples or whether they are true only under certain conditions. This is especially important in light of recent and older criticisms of the economic theory. Several authors, for example, have emphasized the benefits of similarity and role sharing as opposed to the benefits of specialization and differentiation (Brines and Joyner 1999; Oppenheimer 1997; Rogers 2004). Following the criticisms of the standard micro-economic argument, one could argue that economic specialization in marriage is positive for some relationships, but actually detrimental to other relationships. Hence, the question is not so much whether the micro-economic argument is true or false, but under what conditions it is true and under what conditions it is false.

A few recent studies have begun to fill these gaps in our knowledge and have suggested that the validity of economic theories is indeed conditional on other things. First, Brines and Joyner have examined cohabiting and married unions and have shown that the number of hours the woman works had a positive effect on marital dissolution—in line with economic theory—but a negative effect on the dissolution of cohabiting unions (Brines and Joyner 1999). Second, several studies have shown that the effects of economic specialization depend on the national or historical context. In more modern (i.e., recent) periods and in more modern countries, it is found that the effects of wife's employment, income and education are more modest than in traditional settings (Blossfeld et al. 1995; Bracher et al. 1993; Hoem 1997; Poortman and Kalmijn 2002). Third, studies have interacted wife's economic characteristics with couple's value orientations, and in particular with women's gender norms, the idea being that in more egalitarian couples, the effects of wife's labor force participation on separation would not be detrimental to marriage. This idea is corroborated in some studies but not in others (Kalmijn, De Graaf and Poortman 2004; Sayer and Bianchi 2000). In general, these findings suggest that the micro-economic arguments about specialization and marriage are perhaps less valid under less traditional circumstances.

This paper has two goals. First, we reexamine the effect of wife's relative income on separation using new data, i.e., data from annual tax records in the Netherlands over a period of ten years. Second, we look at both marriage dissolution

and the dissolution of cohabiting relationships and we examine whether the effects of woman's relative income—measured in several alternative ways—on dissolution is different, depending on the type of union. In doing this, we also pay attention to the distinction between people who marry directly and people who marry after cohabitation.

The data we use have several important advantages in comparison to earlier studies: (a) because the data are from tax records, they contain highly reliable dynamic (i.e., annual) data on the income levels of both spouses, (b) because the data are based on households, they include both married and cohabiting couples, (c) the data set is quite large, especially in comparison to other important European and American studies. In our view, this results in a more powerful analysis of the effect of wife's relative income on separation than has been done before. Another advantage of the large data-set is that it is possible to look at rare types of income contributions in households, such as couples in which the wife earns all or most of the income. This is especially important in light of economic notions of reverse specialization.

## **HYPOTHESES**

In our view, there are two ways of looking at the effect of wife's relative income on marriage and separation. One approach is economic. This approach argues that different income arrangements in marriage change the financial costs and benefits of marriage and divorce. This is also the approach taken in micro-economic work on the family (Becker 1981) as well as in many empirical tests of the approach in demographic research. Another approach is cultural. This approach argues that different income arrangements in marriage have different meanings to couples depending on their value orientations and their normative expectations (Kalmijn, De Graaf and Poortman 2004). The two types of arguments are not necessarily conflicting. A given income arrangement in marriage can have a certain financial benefit but this advantage can be counteracted by the normative disapproval that husbands and wives have of such an arrangement. In other words, we need to consider economic and cultural arguments simultaneously.

There are two micro-economic arguments about the effect of wife's relative income on separation (Becker 1981; Brines and Joyner 1999; Oppenheimer 1997; Rogers 2004). First, when women have an independent income, they are better able to

leave a poor marriage. In other words, the financial exit costs are lower when women have a higher income. This argument has often been made for the wife's absolute level of income, but in our view, it applies more to the wife's income vis-à-vis the husband, i.e., the wife's *relative* income. In The Netherlands, every person has the right to a minimum level of income through welfare. Financial independence is thereby guaranteed, whether or not the wife works for pay or not. What is more relevant, in our view, is the standard of living that the wife has become accustomed to. For the wife of a rich husband, receiving only welfare benefits after divorce will be experienced as downward mobility. For the wife of a low-earning husband, being on welfare will not be such a negative experience. The perceived exit costs will thus depend on how the wife's income level after divorce compares to the level of affluence that she experienced in marriage. For that reason, it is her income relative to that of the husband which matters for her perceived exit costs.

Important to emphasize is that the argument of exit costs applies to the husband as well. Recent studies have shown that men may also experience a financial deterioration after divorce, especially in cases where the wife brought in a large part of the household income (McManus and DiPrete 2001). If the husband is to a large extent dependent on the wife for his economic well-being, we therefore expect that his exit costs will be high and that this implies a low risk of separation as well. As a result, we would expect that the effect is symmetric and that the probability of separation is lower when the income shares of husband and wife are unequal.

A second economic argument focuses on specialization (Becker 1981; Oppenheimer 1997). When both partners work for pay, there is less specialization in marriage and this reduces the gains to marriage. That specialization is beneficial is often illustrated by the finding that men can invest more in their career when the wife is not working for pay. Such investments lead to an increase in income which in turn increases the household utility. Another benefit of specialization (or cost of non-specialization) can be seen in the time pressure that dual-earner couples experience in their day-to-day lives. Especially when both partners work and when there are young children in the household, life may be experienced as more stressful and less comfortable. In principle, the argument about specialization is gender-neutral. Hence, specialization not only occurs when men are the sole earners, it also occurs when women are the sole earners. In other words, the degree of specialization is lowest when both partners have the same income, and specialization gains increase when

either one of the two spouses earns more than the other. This leads to the hypothesis that the more unequal the income shares of the two spouses in marriage, the higher the benefits of marriage, and the lower the risk of separation or divorce.

The micro-economic arguments outlined above are based on costs and benefits and ignore the preferences that couples have. In reality, different couples have different preferences and these preferences are to a large extent based on their norms and their value orientations. Cultural arguments about the effect of wife's relative income on separation focus on these value orientations. The income arrangement that is chosen in marriage is directly related to the gender roles of men and women in marriage and these roles are based on norms and values. It can therefore be argued that the evaluations of a certain income arrangement in marriage are different for couples with a traditional value orientation to gender than for couples with an egalitarian value orientation to gender.

Couples who have a traditional orientation to gender tend to prefer a situation where the husband earns more and they tend to disapprove of a situation where the wife earns more. Husbands may consider a situation where the wife earns more a threat to their male breadwinner identity and they may therefore disapprove of such an arrangement (Komarovsky 1962). This leads to the hypothesis that the more income the wife contributes, especially when wives contribute more than husbands, the more unstable the marriage will be. For couples who have an egalitarian orientation to gender roles, we would expect to find quite different effects. Because such couples value equality between men and women, they will prefer to have (near) equal income contributions in marriage and they will disapprove of situations where either the husband or the wife earns more. In other words, in egalitarian couples, it is role collaboration and role sharing that is preferred in relationships, rather than a division of labor along lines of gender (Brines and Joyner 1999; Ono 1998; Rogers 2004). This translates into a hypothesis which argues that the more unequal the income shares of husband and wife, the higher the risk of separation.

To evaluate the implications of our arguments, we present the expected effects in Figure 1. The left part of the figure applies to traditional couples, the right part applies to egalitarian couples. In each figure, we first present the implications of the micro-economic hypothesis. According to the micro-economic hypothesis, there is an inverted U-shaped effect of wife's relative income share on separation: Separation probabilities are highest when partners have similar income levels and they are lowest

when partners have unequal income shares. Important to emphasize is that the economic logic is the same for traditional and egalitarian couples.

It is only when we consider cultural arguments that we can expect differences between the two types of couples, at least in part. When husbands earn more than wives, we expect a low risk of separation for traditional couples, but a high risk of separation for egalitarian couples. For traditional couples, the risk is low because the income arrangement matches the male breadwinner model. For egalitarian couples, the risk is high because this is a situation that deviates from the ideal of equality. When husbands earn less than wives, the implications are the same, although for different reasons. For traditional couples, this situation is destabilizing because it threatens the expected dominant position of the husband. For egalitarian couples, the situation is destabilizing because it is a deviation from equality.

We can also combine the cultural and micro-economic hypotheses. In Figure 1, the dotted lines indicate what pattern we would obtain when both hypotheses are valid at the same time. The exact pattern cannot be specified because this will depend on the strength of the different arguments. Nonetheless, it is still useful to see what would happen if we simply combine the two effects. The lines show that there is a slightly positive effect of wife's relative income on separation for traditional couples. For egalitarian couples, we would expect no effect because the economic benefits of specialization are directly counteracted by the normative disapproval of inequality.

In this paper, we use the predictions in Figure 1 to examine whether the income effects as specified above are conditional on the legal status of the relationship. There are many differences between cohabiting couples and married couples, but one of the more important differences lies in their orientations to values. Several studies have shown that people who cohabit and people who cohabit before marriage have a less traditional outlook on life. Cohabiters are less religious, more individualistic, and less dedicated to traditional family values (Lesthaeghe and Surkuyn 1988; Liefbroer 1991b; Rindfuss and Van den Heuvel 1990; Thomson and Colella 1992; Thornton, Axinn and Hill 1992; Waite 1995). Attitudes toward gender roles also differ between cohabiters and married persons. In a recent longitudinal study, Clarkberg, Stolzenberg, and Waite show that men and women who hold liberal views about gender roles are somewhat less likely to enter a first union, but given that they enter a union, people with liberal gender attitudes are much less likely to be married and more likely to be cohabiting (Clarkberg, Stolzenberg and Waite 1995).



This holds for both men and women. Similar results were found for the influence of gender attitudes on the plans that young men and women have about the choice between marriage and cohabitation (Liefbroer 1991a).

Following these results, we can develop hypotheses about the moderator effect of cohabitation on separation. More specifically, the cultural approach suggests that for married respondents, there is a more or less linear positive effect of the wife's income share on separation, whereas for cohabiting couples, we would expect a U-shaped effect. The micro-economic approach implies that there is no difference between married and cohabiting couples in the effect of wife's relative income on separation. If we take the cultural and micro-economic arguments in combination, we expect an upwardly moving effect for married couples in the most relevant range of the income distribution, and a more or less flat line for cohabiting couples, again, assuming that the strengths of the effects are more or less comparable. Note that we can also make a distinction between couples who married directly and couples who married after cohabitation. The latter have more egalitarian values than the former (DeMaris and McDonald 1993).

## **DATA, METHOD AND VARIABLES**

In Europe, and to a lesser extent in the United States, there are few good social and demographic surveys that contain reliable longitudinal income data. Most European social and demographic surveys are retrospective and necessarily have to rely on employment and occupational data which are more easily recorded retrospectively. There are economic panel surveys in Europe, such as the European Community Household Panel, but these generally contain few divorcees and also have weak social and demographic data. In this paper, we use a special and rather unique source of data, i.e., tax record data from the Netherlands. More specifically, analyses were done using the Income Panel Study (IPO). The IPO is a 0.6 percent sample of the population. Currently, information is available for about 115 thousand persons who were in the sample between 1989 and 2000. Information is added for household members of the individuals in that sample.

The IPO is an excellent source for studying the relationship between income and union dissolution from a longitudinal perspective. First, the data contain longitudinal income information for each year and because these income data are

obtained from tax records, they are highly reliable. Second, in comparison to earlier studies, our sample is much larger and especially includes more cohabiting relationships. Our study includes 3,417 marriages and 9,725 cohabiting relationships, whereas the important study by Brines and Joyner included 1,855 marriages and 337 cohabiting relationships. This means that we have more statistical power than earlier studies in estimating interaction effects of marriage and cohabitation on the one hand, and income variables on the other hand. Third, an advantage of a register panel is that there is almost no panel attrition. Of the respondents that we consider, we lose about 2 percent and most of this is due to mortality. Fourth, the data contain information on respondents to which partner data were matched. Hence, we have data at the level of the couple, which is obviously attractive for analyzing divorce and separation.

There are also disadvantages of our data. First, because the data were not collected with any theoretical purpose, they contain few possible divorce determinants. Second, the duration of observation is rather short. In any panel analysis, one needs to look at relationships that were formed during the panel window, and this means that we can only look at the first 1-10 years of the union. A third disadvantage is that whereas all income variables are annually based, demographic variables—such as household type or age at entry of a union—refer to the end of a given year. This also means that the exact timing of union formation and dissolution is unknown. Events can only be roughly estimated by comparing the situation at the end of a year to the situation at the end of the following year. This implies that the formation and dissolution of short unions will be underestimated as unions that began and ended in the same calendar year are simply not recorded. It also results in an overestimation of people moving directly into marriage: A number of them might have cohabited in the same calendar year in which they married, but if they were not yet cohabiting at the end of the previous year, this period will not be measured. This means that persons with a relatively short period of cohabitation are sometimes defined as having married directly.

The following selections were made from the data. First, we selected unions formed between 1989 and 1999 because we wanted to study newly formed unions in the nineties. This also avoids left-censoring. The number of relationships formed in the panel period is 24,197. Second, we excluded persons who were divorced or widowed before the start of the union they formed during the panel period (8,156

unions). This ensures that we look at first marriages only.<sup>1</sup> Note that we are unable to exclude persons who ended a cohabiting relationship before the time we observe them during the panel. Third, we excluded cases with missing data on central variables and cases with negative income variables (1,481). Fourth, we excluded same sex couples. The remaining number of unions that we can look at is 14,560.

Dissolution in a given year occurs when a person was part of a couple at the end of the previous year, but is not part of a couple at the end of the current year. The end of living together is counted, regardless of whether there was an official divorce. The number of breakups of marriage in our data is 739; the number of dissolutions of cohabiting relationships is 2,931. Right censoring occurs in the case of death or emigration of the respondent, or at the end of the observation period.<sup>2</sup> The duration of the unions is relatively short. The average number of years we observe a union in our data is four years (varying from 0 to 10 years). Given the fact that union instability is studied during the first years of the union with a maximum of ten years, this study need not bother with the fact that the impact of determinants may change over the course of the union.

## **Method and variables**

Discrete-time event history analysis was used to analyze the data (Yamaguchi 1991). This means that the data were reorganized into a person-year file and a series of logistic regression models was estimated on the person-year data. The dependent variable is the conditional log odds of the dissolution of a union at the end of a calendar year. Duration dependency is taken into account by a set of dummy-variables for each duration of the union. The duration of the union starts counting at the beginning of cohabitation or marriage, whichever came first. The clock is not reset when a cohabiting union changes into a marriage. We note that the duration effect is assumed to be equal for cohabiting and married respondents. This assumption may not hold, as Figure 1 suggests, but we only include an interaction effect of duration and marital status in the models where we also interact the income variables with marital

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<sup>1</sup> We do not have marital status information for the spouse so that some of the relationships may be second marriages for the spouse.

<sup>2</sup> To assess the possible death of a spouse, we look at the change in marital status to 'widowed.' We cannot assess the possible death of a cohabiting partner and that this is erroneously included in the separation category. Detailed crosschecking on a subsample with vital statistics suggested that this occurred in 0.4 percent of the cohabitation separations.

status. Additional analyses suggest that including an interaction of duration and marital status does not change the coefficients in the baseline model (Table 2).

The central independent variable is the legal status of the union measured at the end of the previous year. We include two dummy-variables: cohabiting (cohabiting = 1, directly married = 0, married after cohabitation = 0), and married after cohabitation (cohabiting = 0, directly married = 0, married after cohabitation = 1). The respondents who married directly are the reference category. Note that this is a time-varying variable. In other words, we measure the effect of the legal status at the beginning of a year on the odds of dissolution in the coming year.

The income variables were obtained at the end of the year preceding the risk year. The information was obtained from both partners because the IPO database is a household sample. We considered all income, including income from labor, social security, pensions, and other legal sources. Income reported on the individual tax record is considered individual income. If there were income sources that can be shared (e.g., welfare), we relied on the way it was reported by the respondent.

From this information, various income variables were constructed. The first variable is *total household income* (after taxes and corrected for inflation, using 2000 as the reference point). This variable is included in all models. To estimate the effects of the wife's income, we calculated the *share of the wife's income* in the total income, expressed as a proportion. To estimate the effect of this proportion, called  $wp_i$ , alternative specifications were used:

(a) linear:  $wp_i$

(b) curvilinear:  $wp_i$  and  $wp_i^2$

(c) splines:  $[wp_i - 0.5]$  if  $wp_i = 0.5$  (0 otherwise) and  $[0.5 - wp_i]$  if  $wp_i = 0.5$  (0 otherwise)

(d) categorical:  $wp_i = 0$ ,  $0 < wp_i = 0.2$ ,  $0.2 < wp_i = 0.4$ ,  $0.4 < wp_i = 0.6$ ,  $0.6 < wp_i = 0.8$ , and  $0.8 < wp_i = 1.0$ .

The curvilinear specification and spline specifications allow us to assess the degree of symmetry in the effect of relative income. The curvilinear specification allows for a U-shaped effect on separation but it does not force the minimum or maximum level to be at a point of equal sharing of income. The spline function forces the midpoint to be at equal sharing but allows for asymmetry since the effect of relative income for wives who earn less than 50 percent may be weaker than the effect of relative income for wives who earn more than 50 percent. Earlier applications of spline functions to

divorce were used by Poortman and Kalmijn (2002). The last specification allows each category to have its own divorce risk and is the least restrictive. An important additional advantage of this model is that it treats the zero category (wives earn nothing) as a separate group. We compare the alternative specifications using the BIC measure (Raftery 1996).<sup>3</sup>

The selected demographic control covariates are: sex of the respondent, the presence of children in the household, foreign background (whether or not one or both parents of the person are born abroad), and age at the start of the union. For the construction of the children variable, we made some special arrangements. The tax record data do not allow us to assess whether these are children of the respondent *and* the partner. This is potentially problematic because children from previous relations may have a different impact on the stability of a union than children of the couple. To solve this problem, we compared the ages of the children to the length of the union. We only considered children whose ages were lower or equal to the duration of the union. Means and standard deviations of the independent variables are in Table 1.

## ANALYSES

### Descriptive analyses

We first look at the separation risk of marriages and cohabiting relationships. The risks are presented in Figure 2 by the duration of the union. For marriages, the duration is the duration of the union, including the possible prior cohabiting years. For cohabiting relationships, we present both the risk of separation and the risk of marriage. The figure shows that the risk of separation is much higher for cohabiting relationships than for marriages. We also see that the risk declines with the length of the union. This may be attributed to the increasingly selective nature of the survivors (an increasingly stable group is left). Interesting to observe, however, is that the decline in the risk is especially sharp for the first five years of cohabiting relationships. After that, the risk continues to decline, but the line is much flatter. This shows that the first five years of cohabitation are the real ‘weeding’ years. An

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<sup>3</sup> Defined as  $BIC = -2 \ln(L) + df$ , where  $L$  is the likelihood ratio test for comparing the model to the null-model.

interesting additional finding is that after five years, the separation risk for cohabiting relations is still twice as high as it is for marriages.

We also present survival curves in Figure 2. For cohabiting relationships, the surviving relationships are further distinguished into relations that survive as cohabiting relations and relations that survive as marriages. Overall, the survival chances for marriage and cohabitation are quite different. After ten years, 20 percent of marriages are dissolved, whereas 40 percent of the cohabiting relationships are dissolved, which is twice as high. More interesting perhaps, is that after ten years, only 17 percent of the relationships that started out as cohabiting, are still cohabiting at that time. In other words, the vast majority of cohabiting unions either marries or separates in the end.

Figure 3 presents information on our central independent variable. In these graphs, we show four categories of the income share of the wife (no income, 0-40 percent, 40-60 percent, and 60-100 percent). The graphs show how these types of contributions change during the union and how this depends on the status of the relationship. Let us first focus on what happens in marriage. At the start of marriage, we see that the situation of equality is common: In about 40 percent of the marriages, the wife contributes 40-60 percent. In another 40 percent of the marriages, we see that the wife makes a small contribution. Marriages in which the wife does not contribute constitute 10 percent and marriages in which the wife contributes more than the husband also constitute 10 percent. These are small numbers, but certainly not negligible.

The changes we see during marriage are quite dramatic. The condition of equality drops from 40 to 20 percent in ten years time, whereas the situation in which the wife makes a small contribution increases from 20 to 60 percent. In addition, we see that the share of marriages in which the wife contributes no income at all more than doubles, from 10 to 25 percent. Although it is well-known that gender inequality in income increases during marriage, our data provide powerful evidence of these household income dynamics.

Next, we look at cohabiting relationships. We first compare these relationships to marriage, thereby focusing on the first years of the union. Overall, we see that gender income inequality is smaller in cohabitation than in marriage. The share of equal income households is 15 percentage points higher in cohabiting relationships and the share of couples in which women contribute no income or little income is

lower. When we look at the change in income over time, however, we see that the pattern is the same: Gender inequality increases sharply with the duration of the union. The situation of equal income contributions drops from nearly 60 to below 40 percent and the share of couples in which the wife makes a small contribution increases from about 35 to 45 percent. Interesting is that the share of cohabiting relations in which the wife contributes the most income remains more or less stable at 10 percent.

### **Event history models of divorce and separation**

In Tables 2 and 3, we present the results for the event history analyses. We start by discussing the effects of the control variables in the baseline model (presented in Table 2).

#### *Baseline model*

The most important result from the baseline model is the contrast between marriage and cohabitation. We see that cohabiting relationships have almost a four times higher risk of separation on average, compared to marital relationships (Table 2). This is in line with the few earlier studies in the Netherlands that included cohabiting couples (Manting 1994b). Interesting is that there is no significant effect of prior cohabitation. Most earlier studies found a negative effect of prior cohabiting experience, an effect that is often attributed to the cultural differences between respondents who enter marriage directly and those who enter via cohabitation (Hall and Zhao 1995; Manting 1994a). More recently, however, it has been shown that the effect of premarital cohabitation disappears when the duration of the union is modeled correctly (Brüderl, Diekmann and Engelhardt 1997; Brüderl and Kalter 2001). More specifically, Brüderl and his colleagues found that when you include the pre-marriage years in the model, couples who cohabited before marriage were no more likely to divorce than couples who married directly, without cohabiting first. To see if this is also true in our data, we estimated the model again with a new duration variable: The duration is the duration of the marriage rather than the duration of the marriage and the prior cohabiting period. When we do this, we find the negative effect ( $b = -.24, p < .00$ ).

This confirms Brüderl's analysis and shows that the first estimate—the non-significant effect of premarital cohabitation—is the correct one.

In the baseline model, we see that there is a negative effect of union duration, which confirms the graphical results in Figure 2. We further see a negative effect of having young children at home, consistent with the literature. Having a young child decreases the odds of divorce by 16 percent (i.e.,  $1 - e^{-.172}$ ). This corresponds with earlier Dutch results (Kalmijn et al., 2004), although the magnitude of the effect is somewhat smaller in the present data. Having a somewhat older child at home has no significant effect and the sign is positive, which is unexpected. We note, however, that there are very few cases in which the youngest child is six years or older since the average observed relationship duration is about four years.

In addition, we see an effect of the age at the start of the union. The effect we see is not linear, however. In line with the literature, we see that respondents who began their union in their early twenties or teens (the reference group) have a higher risk of separation than respondents who began their union in their late twenties. This is often attributed to the poorer search process that occurs at a young marriage age. If we look at ages 25 and over, however, we see a more complex pattern. Respondents who entered a union in their thirties have a higher risk of separation than respondents who entered in their late twenties. In addition, we see that people who began very late (in their forties) have the highest separation risk. These latter results may be attributed to the role of prior separations. As was explained before, we excluded second marriages from our data, but we were unable to exclude people with prior cohabiting relationships. The effects of later union ages may therefore be related to the effect of prior union dissolutions. As has been shown in other studies, people with prior separations have a higher risk of separation than others (Booth and Edwards 1992).

We further see that first- or second-generation immigrants have a higher separation risk. Further elaborations into different ethnic groups are not possible with the data at hand.

### *Models for income variables*

In Table 3, we present the results of the different models in which we look at the role of the couple's income composition. We first notice that in all models, there is a negative effect of household income. The effect is  $-.041$ , which means that for every



1000 Euro increase in disposable annual household income, the risk of separation declines by 4 percent. When moving from a median level of income (for couples), to the welfare level, this implies a doubling of the odds of separation, which is a strong effect.<sup>4</sup> The direction of the effect is in line with the literature and has been attributed to the financial problems and resulting stress that may arise in lower income families (Ross and Sawhill 1975; Voydanoff 1990).

Model A includes a linear variable for the wife's income share and shows a positive and significant effect. The higher the income share of the wife, the higher the risk of separation. Model B includes a quadratic effect and is a significant improvement over Model A. The BIC decreases and the quadratic term is statistically significant. The coefficients imply a U-shaped effect. To evaluate the effect in more detail, we present the implications of the model in Figure 4. This figure contains the predicted conditional log odds of separation for each income share of the wife. The control variables are set at the value of the reference group. For continuous variables, we set the value at the mean. The figure shows that for increases in wives' income shares below 30-40 percent, there is hardly an effect on separation risks. After that point, the effect becomes positive. In other words, increases in women's income shares at low values do not increase the risk of separation, but increases in women's income shares at higher values do increase the risk of separation. It should be noted, however, that the general tendency of the effect is still positive, as Model A also shows.<sup>5</sup>

A stricter test of this pattern can be obtained from Model C, in which we include spline functions. The first coefficient is the effect of the wife's income share for shares over 50 percent, the second coefficient is the effect of the wife's income share for shares lower than 50 percent. The former effect reflects what happens when moving away from equality in the direction where the wife makes more, the latter effect reflects what happens when moving away from equality in the other direction. Hence, two positive effects imply a V-shaped effect. This model is an improvement over the quadratic model when we look at the BIC. The results confirm the asymmetry of the effect: The effect of the wife's income share below equality is only marginally significant, whereas the effect of the wife's income share above equality is

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<sup>4</sup> The median annual disposable household income for couple households in 2000 is 29,500. The level of welfare for couples is 12,000 per year. Hence, the implied change in the odds is  $e^{-0.041 \times (12.5 - 29.5)}$ .

<sup>5</sup> If the effect had been a symmetric U-shaped or inverted U-shaped effect, a linear term would not have been significant. The linear term is significant, however, and positive.

stronger and statistically significant. A graphic illustration of this model is also included in Figure 4. The figure reveals a more or less flat line below the value of 50 percent, and a sharp increase for values above 50 percent. Interesting to see is that the quadratic function approximates the spline function rather well. The conclusion therefore remains the same, whatever model we use: Gender inequality in income increases the risk of separation, although only when the wife makes more money than the husband.

The final model (Model D) is a more exploratory model and includes dummy-variables for separate categories of income shares. This model is a slight improvement in fit over the spline function model when we look at the BIC. The effects are also presented graphically in Figure 3. The pattern broadly confirms the effects that we observed in Model B and C. One exception is the contrast between women who have no income at all versus women who have some income. The effects suggest that women with a small income have a higher separation risk than women who have no income, whereas there is no difference between women with no income and women with intermediate income.

#### *Interactions with relationship type*

To test whether the income share effects are different for married and cohabiting couples, we added interaction effects of relationship type to each of the four income models. Two versions of relationship type were considered: a time-varying variable as presented in Table 3 and a simpler two-category version of this variable which ignores past cohabitation for married couples. The models also contain an interaction of relationship type and duration, since duration dependency appears to be different for marriage and cohabitation (see also Figure 2). In Table 4, we show whether the interaction effects were statistically significant. The results for the three-category version were somewhat weaker because the contrast between married directly and married with prior cohabitation was never important. The BIC values also show that whatever income effect we include, the model with the two-category version of relationship status always fits better than the three-category version. We therefore focus instead on the simpler two-category version.

Table 4 shows that Model B and Model C both contain statistically significant interactions of wife's income variables with relationship type. In Model B, the main

effect of wife's income share has a significant interaction with relationship type and the quadratic effect is significant as well. In Model C, the effect of wife's share for income levels above 50 percent does not interact with relationship type, whereas the effect for income levels below 50 percent does interact significantly. The model including income share categories also reveals a significant interaction with relationship type. In sum, all the models show that the income effects on separation are different for marriage and cohabitation.

When looking at the BIC, we see that the model using splines (Model C) has the best fit. We present parameter estimates of this model in Table 5. The main point to observe from this model is that the effect of the wife's income share below equality is significantly different for marriage and cohabitation. More specifically, for marriage the effect is negative whereas for cohabitation, the effect is positive. This means that moving away from equality toward a pattern of husband dominance, *decreases* the dissolution risk for marriage whereas it *increases* the dissolution risk for cohabitation.

In Figure 5, we present the implications of the interaction effects. The figure shows how the conditional log odds of separation depend on the wife's income share for each of the two types of relationships. The control variables are set at the reference group for both categories or at the mean for continuous control variables. The figure reveals an interesting difference. For married couples, the line is more or less continuous, without a clear break at 50 percent income sharing. The higher the share of the wife's income, the higher the risk of separation. The effect is stronger when wives contribute more than husbands, but the effect is always in the same direction. For cohabiting couples, we see a different pattern. For unions where wives have more income than husbands, there is also an increase in separation risk. The difference occurs when we compare couples where the wife contributes less than the husband—the most common type of couple. Here we see that increases in women's income contributions *reduce* the risk of separation. The effect is not fully symmetric, but it comes closer to a U-shaped pattern than the linear effect observed for married couples.

## DISCUSSION AND CONCLUSION

In this paper, we have examined the effect of women's relative income on the risk of separation in detail, using a large and reliable longitudinal dataset from the Netherlands. Our first finding is that there is a moderately positive effect of the wife's relative income on separation: The higher the share of the wife in the household income, the higher the risk of separation. Although the general tendency of the effect is positive, the shape of the effect depends on the legal status of the relationship. Specifically, we find that movements away from equality toward a pattern where the husband has more income, decrease the dissolution risk for married couples whereas such movements increase the dissolution risk for cohabiting couples. The difference between these two effects is substantial in magnitude and statistically significant. When looking at the full pattern, we see a more or less linear positive effect of wife's relative income on separation for married couples, with the effect becoming stronger when the wife earns more than the husband. For cohabiting couples, in contrast, we find a tendency toward a U-shaped pattern. The risk of separation is lowest when cohabiting partners have equal contributions to the household income, and the risk tends to increase when the contributions become more unequal. This increase is stronger on the right side of the continuum, where wives earn more, but it is also present on the left side of the continuum, where husbands earn more.

How can we account for these patterns and what do they tell us about our theoretical approach? Looking back at Figure 1, where we present our theoretical argument graphically, we have different scenarios. If economic and cultural considerations work simultaneously, we would expect no effect of wife's relative income for cohabiting couples. For married couples, we would expect a positive effect in the lowest part of the range and a more or less flat pattern in the higher part of the range. The effects that we find are not consistent with these expectations. When we only focus on the cultural arguments, and ignore the micro-economic arguments, we would expect a U-shaped pattern for cohabiting couples, and a positive effect for married couples, with the effect being strongest in the higher part of the range. The pattern of effects we find comes closer to this scenario than to the scenario where we combine the economic and cultural arguments. Although a direct test of the two approaches is still needed, we conclude that our findings are supportive of the cultural approach to the role of income in divorce. For cohabiting couples, deviations from

equality are destabilizing, whereas for married couples, deviations from male dominance are destabilizing.

How do our results compare to earlier findings? The number of studies analyzing dynamic income effects is not so large and most studies have focused on the effects of women's labor force participation. Our evidence is consistent with the European study by Jalovaara (2003) who finds that higher income levels of wives are associated with higher divorce risks, controlling for the husband's income. Our evidence is also consistent with the analysis of the American PSID by Hecker, Nowak, and Snyder (1998) who find a general positive effect of the wife's income share on the probability of divorce. Hecker et al. also found a different pattern for couples where wives earn most of the income, but this deviation was not significant due to the low number of cases with such an unusual pattern. Our dataset is much larger and does not show that these cases of reverse specialization are significantly different. Our findings are less consistent with a more recent American analysis by Rogers (2004) who found an inverted U-shaped effect. We should note however, that even in Rogers' analysis, the positive effect of wife's income share dominated, which is consistent with our results.

Comparisons of the interaction effects we find to earlier work are more difficult because very few authors have investigated such interactions in a convincing way. The most important exception can be found in the American analysis of Brines and Joyner (1991). Although Brines and Joyner used a smaller sample of cohabiting relationships than we do, the general pattern of effects that they find is the same as in our work. We therefore conclude, with Brines and Joyner, that the principles of stability in personal relationships are conditional rather than universal. Different relationships have different ideals and expectations, and this results in differential effects of income arrangements on their stability. Specialization is beneficial to marriage, but equality is beneficial to cohabiting relationships.

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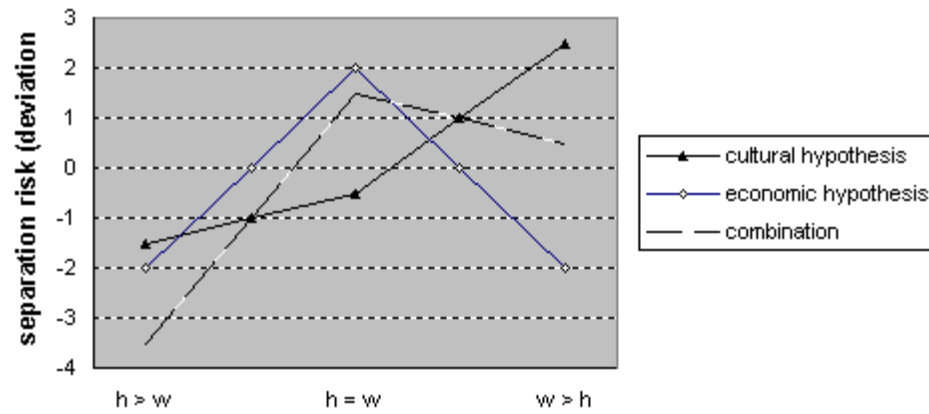
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Figure 1.- Expected effects of wife's relative income on separation

Expected effects for traditional couples



Expected effects for egalitarian couples

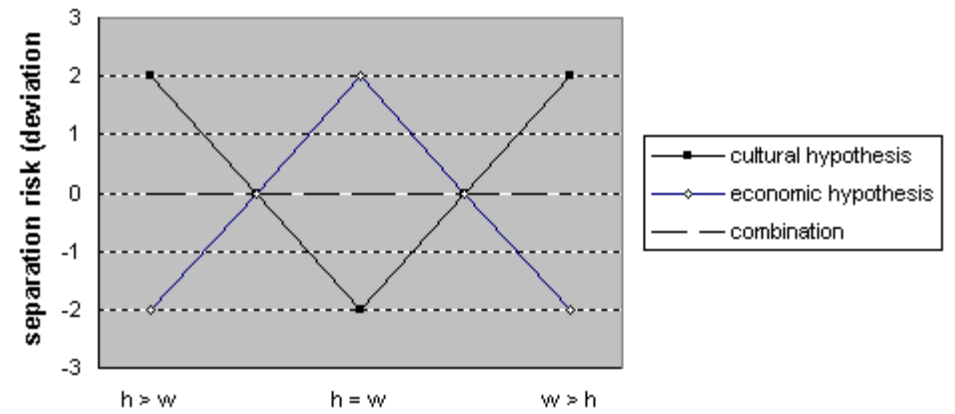


Figure 2.- Separation risk and survival of unions by type of union

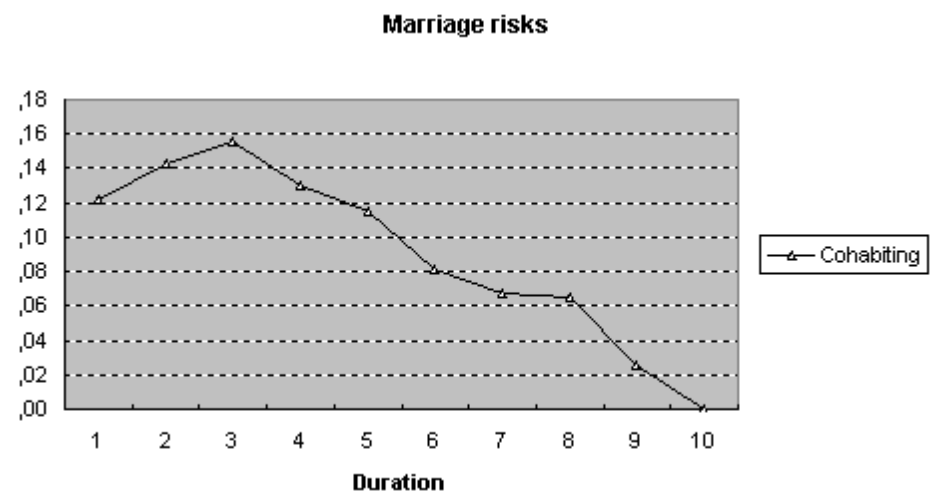
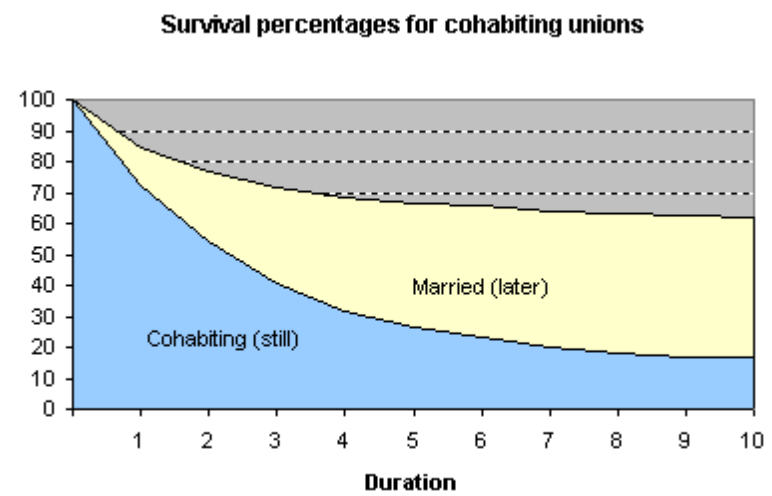
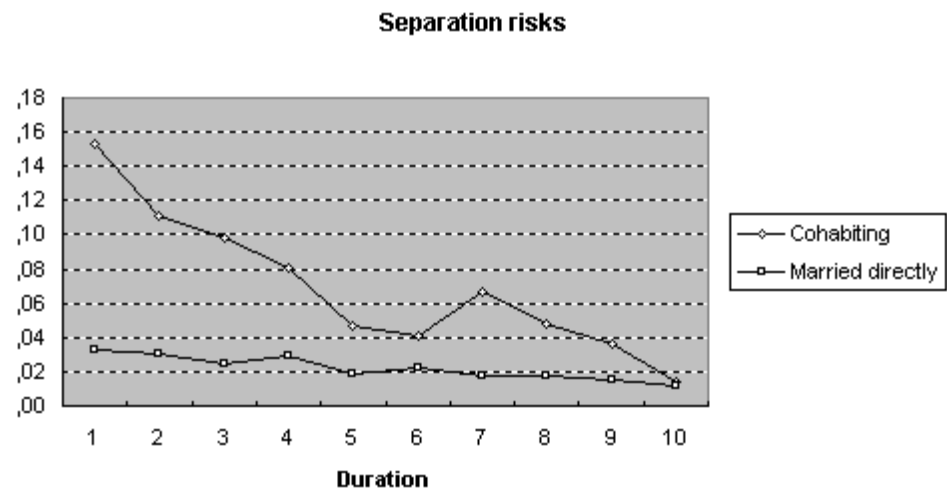
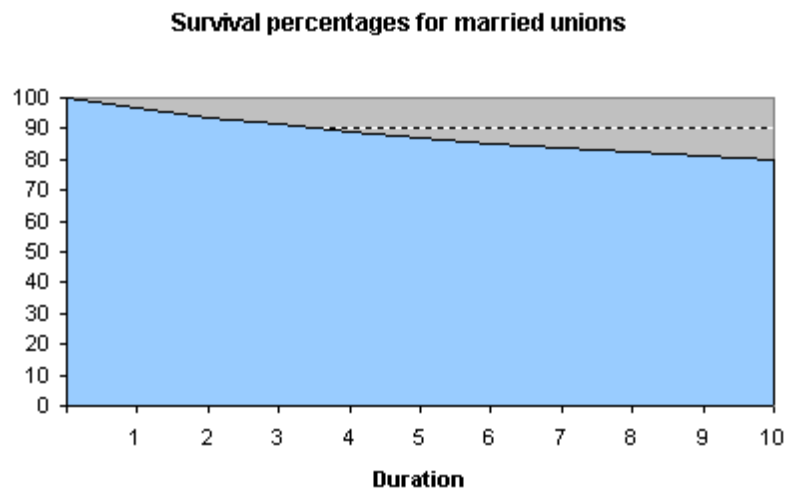


Figure 3.- Wife's income share over the course of the relationship

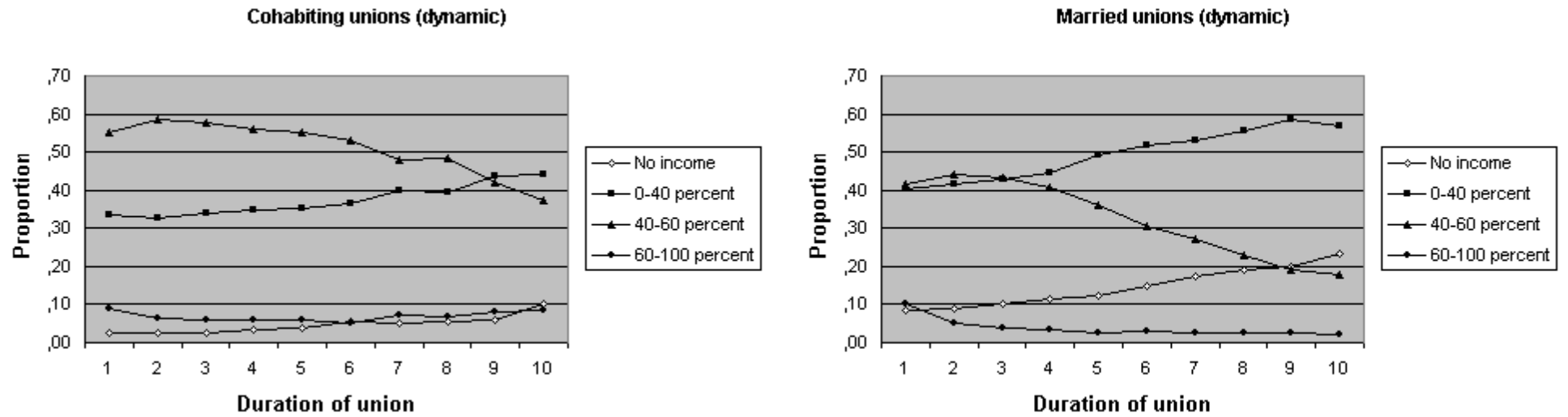


Figure 4.- Expected log odds of separation by wife's income share

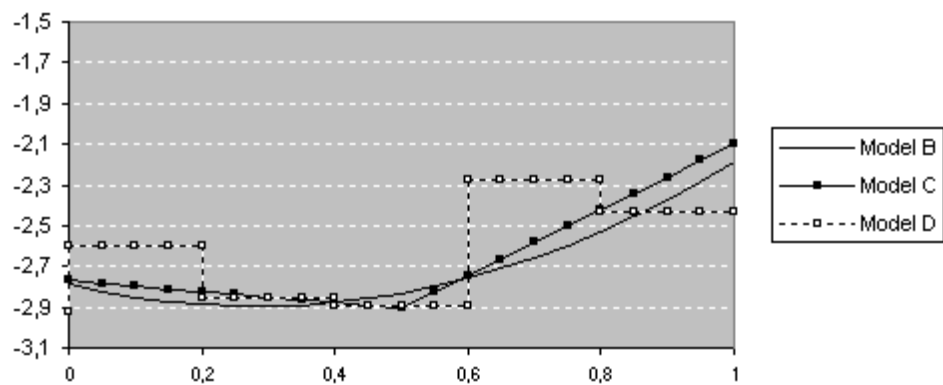


Figure 5.- Effects of wife's income share by type of relationship (Model C)

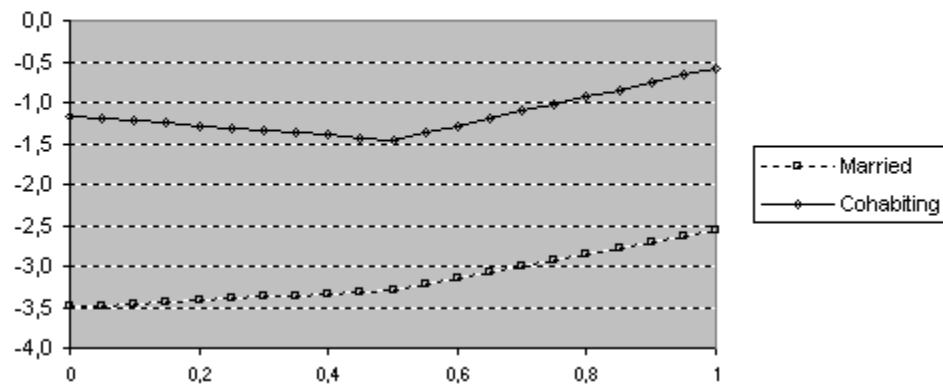


Table 1.- Proportions, means, and standard deviations of independent variables

	First year of relationship	Person-year file
Relationship (proportion)		
Married directly	.26	.32
Cohabiting	.74	.46
Married (with prior cohabitation)	-	.23
Woman (proportion)	.48	.49
Born of native-born parents (proportion)	.84	.86
Children in union (proportion)		
Youngest 0-5 (vs. no/older)	.05	.29
Youngest 6-17 (vs. no/older)	-	.04
Categorical		
Proportion 0	.04	.08
Proportion 0 - .2	.05	.08
Proportion .2 - .4	.30	.33
Proportion .4 - .6	.52	.45
Proportion .6 - .8	.06	.04
Proportion .8 - 1.0	.03	.02
Age at start living together (mean / s.d.)	27.7 / 6.2	27.2 / 5.8
Income variables		
Total household income (x 1000) (mean / s.d.)	24.9 / 9.1	27.5 / 10.1
Wife's proportion in income (mean / s.d.)	42.3 / 17.8	37.3 / 18.5
N (relationships / person-years)	13,142	56,707

Notes: The number of divorces is 739 and the number of breakups of cohabiting relationships is 2,931. The maximum duration observed, averaged over all relationships, is 4.3 (standard deviation is 2.9).

Table 2.- Baseline event-history analysis of divorce and separation: Coefficients of logistic regression model on the person-year file

	Baseline model		
	B	p	exp (B)
Duration of relationship			
1 year (vs. 10 years)	-.316	.000	.729
2 years (vs. 10 years)	-.444	.000	.642
3 years (vs. 10 years)	-.520	.000	.594
4 years (vs. 10 years)	-.993	.000	.370
5 years (vs. 10 years)	-.888	.000	.412
6 years (vs. 10 years)	-.793	.000	.453
7 years (vs. 10 years)	-.924	.000	.397
8 years (vs. 10 years)	-1.053	.000	.349
9 years (vs. 10 years)	-1.450	.002	.234
Relationship (vs. married directly)			
Cohabiting	1.340	.000	3.820
Married (with prior cohabitation)	-.093	.261	.911
Age at start living together			
25-29 (vs. < 25)	-.144	.001	.866
30-34 (vs. < 25)	.050	.358	1.052
35-39 (vs. < 25)	.033	.679	1.033
40+ (vs. < 25)	.413	.000	1.511
Born of native-born parents	-.759	.000	.468
Children in union			
Youngest 0-5 (vs. no/older)	-.172	.003	.842
Youngest 6-17 (vs. no/older)	.236	.584	1.266
Constant	-2.401	.000	
-2 log likelihood	24,498		
# person-years	56,707		
df	19		
BIC	-2,486		

Notes: The model controls for whether the man or the woman is the main respondent.

Table 3.- Income effects in event-history analyses of divorce and separation: Coefficients of logistic regression model on the person-year file

	Model A		Model B		Model C		Model D	
	B	p	B	p	B	p	B	p
Relationship (vs. married directly)								
Cohabiting	1.381	.000	1.406	.000	1.415	.000	1.408	.000
Married (with prior cohabitation)	-.006	.946	.010	.901	.014	.868	.010	.904
Income variables								
Total household income	-.041	.000	-.036	.000	-.034	.000	-.035	.000
Wife's proportion in income	.442	.000	-.777	.004				
Wife's proportion squared			1.375	.000				
Splines								
Proportion - .5 (proportion > .5)					1.609	.000		
.5 - Proportion (proportion < .5)					.272	.062		
Categorical								
Proportion 0 - .2 (vs. 0)							.326	.001
Proportion .2 - .4							.063	.464
Proportion .4 - .6							.024	.783
Proportion .6 - .8							.650	.000
Proportion .8 - 1.0							.494	.000
Constant	-1.894	.000	-1.801	.000	-1.961	.000	-1.947	.000
-2 log likelihood	24,122		24,099		24,081		24,043	
df	21		22		22		25	
BIC	-2,840		-2,852		-2,870		-2,876	

Notes: Models include control variables listed in Table 2.



Table 4.- Event-history analyses of divorce and separation: Significance tests of interaction coefficients of income and duration with cohabitation in logistic regression model on the person-year file

Interaction of relationship type and:	Relationship type in two categories (currently married and currently cohabiting)		Relationship type in three categories (currently married without prior cohabitation, currently married with prior cohabitation, and currently cohabiting)	
	Wald	p	Wald	p
<b>Model A</b>				
Household income	3.13	.08	2.56	.28
Wife's proportion in income	4.27	.04	4.96	.08
Duration	64.78	.00	82.53	.00
BIC	2802		2701	
<b>Model B</b>				
Household income	5.53	.02	5.40	.07
Wife's proportion in income	9.07	.00	10.95	.00
Wife's proportion squared	4.49	.03	6.06	.05
Duration	68.38	.00	85.96	.00
BIC	2813		2701	
<b>Model C (splines)</b>				
Household income	5.48	.02	5.04	.08
Proportion - .5 (proportion > .5)	.40	.53	.91	.64
.5 - Proportion (proportion < .5)	11.19	.00	12.86	.00
Duration	68.97	.00	86.41	.00
BIC	2830		2718	
<b>Model D</b>				
Household income	5.09	.02	5.00	.08
Income proportion categories	14.59	.01	22.01	.02
Duration	69.40	.00	86.67	.00
BIC	2806		2668	

Notes: Effects are controlled for duration, sex, age at cohabitation, native born, children, and the interaction of duration and cohabitation.

Table 5.- Interaction effects of duration and income variables on divorce and separation:  
Coefficients of logistic regression model on the person-year file

	b for marriage	b for cohabitation	p-value of difference
Duration of relationship			
1 year (vs. 10 years)	.180	-.278	.00
2 years (vs. 10 years)	.111	-.355	.00
3 years (vs. 10 years)	.347	-.537	.00
4 years (vs. 10 years)	-.005	-1.105	.00
5 years (vs. 10 years)	.214	-1.183	.00
6 years (vs. 10 years)	.027	-.640	.01
7 years (vs. 10 years)	.038	-1.004	.00
8 years (vs. 10 years)	-.019	-1.270	.01
9 years (vs. 10 years)	-.299	-2.286	.07
Relationship (vs. married directly)			
Cohabiting		1.478	.00
Income effects			
Household income	-.045	-.032	.02
Proportion - .5 (proportion > .5)	1.467	1.768	.53
.5 - Proportion (proportion < .5)	-.402	.602	.00
-2 log likelihood	24,001		
# person-years	56,707		
df	33		
BIC	-2,830		

Notes: The model controls for whether the man or the woman is the main respondent.