

The Role of Unemployment in the Commitment Dissolution Decision among Young Swedes

by
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Abstract. This paper studies the role of unemployment in the dissolution of relationships by applying a two-step estimation method to an extensive data set, which contains information about young Swedish males and females. Unemployment is recognized as endogenous in the separation decision, and the results show that the effect of unemployment on separation is biased when unemployment is assumed to be exogenous in the separation equation. The probability of separation is found to be increasing with male unemployment, whereas female unemployment decreases the probability of dissolution.

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1 Introduction

There has been an increase in the number of divorces in Sweden over the past 40 years, with a peak in the mid 1970's. Since then, the number of divorces has been stabilized at a fairly high level as compared to the level before the 1970's. At the same time, even though the unemployment rate has decreased as part of the recovery from the 1990's recession, it is still higher than its pre-recession level. Becoming unemployed is likely to be a vital event in an individual's life. Being subjected to unemployment is often associated with deterioration in both the individual's psychological and physical well-being (e.g. Winkelmann and Winkelmann, 1998). Deteriorating physical and mental health can, together with economic hardship following on unemployment, increase the probability of marital dissolution among couples. The purpose of this paper is to analyse the effects of unemployment on the probability of separation¹ among committed couples.

The economic theory of divorce stems from the influential article of Becker et al. (1977), which suggests two main explanations for divorce. First, learning about match quality is crucial for the stability of a relationship, and separation could be initiated if either partner meets someone that is considered as a better match. Second, there can be a deviation between the utility you originally expected from marriage and the utility that is actually realized. Both these explanations have been subject to empirical investigation and in several of the previous articles on the subject, unemployment has been introduced as a control variable. For instance, Bracher et al. (1993), Böheim and Ermisch (2001), Jalovaara (2001), Svarer (2004, 2005) and Norberg-Schönfeldt (2007) find positive relationships between unemployment and divorce. However, it is possible that there is a problem of introducing unemployment in a divorce equation. It may be hard to determine the timing of unemployment and divorce; is the divorce caused by unemployment, or do people end up in unemployment because their relationship is bad? Unemployment may be endogenous for the divorce decision as some underlying unobservable factors may influence both variables.

Studies that explicitly focus on the role of unemployment in the decision to divorce have, so far, been very few. Jensen and Smith (1990) use panel data from Denmark and find male unemployment to be associated with an increased probability of divorce, while no effects are found for female unemployment. Jensen and Smith base their analysis on the ac-

¹ The words separation, dissolution and divorce will be used interchangeably throughout the paper.

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tual divorce date, which brings attention to the question of causality. If there is a deviation between the date of separation and the date of actual divorce, the unemployment may begin in between. Therefore, the results may show an increased probability of divorce following unemployment, when the true effect is, instead, that the separation (i.e. the impending divorce) has increased the risk of unemployment.

Lampard (1994) addresses the issue of timing more explicitly when analysing whether unemployment affects divorce, or whether divorce affects the risk of unemployment. The results show that the causality works in both directions. One way of minimizing the potential problem with causality is to use the separation date instead of the actual divorce date when analysing the effect of unemployment, as is done in Kraft (2001). Kraft is the first to actually utilize panel methods, in terms of fixed and random effect approaches, in analysing the effect of unemployment on divorce. He claims that this is important, since it is possible that individual-specific characteristics have an influence both on the risk of becoming unemployed and the probability of separation. For the same reason as Kraft (2001), Hansen (2005) also utilizes panel data methods in his study of the effect of unemployment on marriage stability among Norwegian couples. Although the use of fixed or random effects methods accounts for individual-specific effects, which could certainly be present when studying divorce, these methods do not necessarily account for the fact that something may be omitted that influences both occurrences, in which case unemployment would be correlated with the error term of the divorce equation.

Therefore, the model used when analysing the effect of unemployment on divorce in this paper is a two-step simultaneous equation model accounting for the possible endogeneity of unemployment. The possible appearance of additional individual-specific effects will be accounted for using a random effects method. To ensure that the correct causality is observed, the date of separation instead of the divorce date will be used.

This study contributes to the existent literature in that it is the first attempt to deal with the possible simultaneity problem of introducing unemployment in the divorce equation. The data set used is extensive and the number of observations and explanatory variables exceed those of previous studies. Finally, this is the first attempt to more thoroughly analyse the role played by unemployment in the termination of relationships using Swedish data.

The paper is outlined as follows. Section 2 discusses the existing theories and empirical results on the determinants of divorce in general, and

the role of unemployment in particular. Section 3 gives a description of the data and section 4 specifies the empirical model. Section 5 presents the results and section 6 gives a concluding summary.

2 Existing Theories and Empirical Results

Over the past three decades, many researchers have addressed the question of why the divorce rates in the western world have increased. This has led to several theories and explanations of divorce and divorce patterns, some of which are economic, while others are related to other areas such as sociology². Within economics, the theory of family formation and dissolution is based on utility maximization. One of the most important contributions to the economic theory of divorce is the article by Becker et al. (1977), which explains that people get married or engage in committed relationships when their expected utility from being in the relationship exceeds their expected utility from remaining single, and that they divorce when the opposite occurs.

Like many other decisions, getting married is associated with rewards as well as a substantial risk. At the time of engagement, there is uncertainty about several factors that influence the utility from the relationship. Hence, marital instability is a natural consequence of incomplete information about partner characteristics, productivity and spousal needs. Therefore, the expected and the realized utility from the relationship can deviate, and the Becker et al. model indicates the importance of, for example, age at the start of commitment, education, income, number of children and unexpected events for the probability of divorce. The implications do, to some extent, depend on the society surrounding the couple. In a society characterized by the traditional division of labour, so-called negative assortative mating may be preferable where opposites, who are able to complement each other, are attracted to each other. In a society characterized by a more equal division of labour (market and non-market), positive assortative mating may instead apply and people are looking for an equal.

² One theory linking unemployment to marital instability is the ABC-X model (e.g. Voydanoff, 1983). It implies that the infliction of unemployment on a family depends upon the interaction of the family's coping resources and the family's perception of the crisis. Unemployment can stress a relationship in several ways. For example, unemployment will often lead to financial stress. In addition, it may lead to the perception of moral failure either for the unemployed or for the spouse, and it may cause psychological deterioration which could stress the relationship. Another theory is the social exchange theory, which recognizes the economic, social and psychological costs and gains from marriage (e.g. Levinger, 1982).

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The implication of age at the start of commitment is connected to search theory. If the search for a partner is costly, people will tend to search for a shorter time period. This increases the probability of making a relatively poor match which, in turn, would increase the probability of dissolution. Different levels of, for example, education and income or different religions or different ethnicities are also connected to the quality of the match, and if there are large deviations between spouses, the probability of divorce increases in a society where positive assortative mating is relatively beneficial. Even if there are no considerable differences at the time of engagement, i.e. the match quality is initially high, the spouses may come to deviate in terms of the level of education or income as the relationship goes on, which would then increase the divorce probability of dissolution. The number of children is, together with acquiring property and adding to the stock of information about ones' partner, examples of investments in commitment specific capital that are considered to increase the gains from remaining in the commitment. There are several studies that are concerned with both marriage formation and marital dissolution, and the results generally confirm the importance of the above mentioned factors.

Since partners are matched into commitment based on the information that is known at the time of commitment and the predictions that can be made about the unknown characteristics of the partner, new information can change the expected gains from staying in the relationship. The least explored contribution of the Becker et al. model is the role of unexpected events, which is where unemployment belongs. Factors like unexpected changes in money transfers, income or long-term earnings capacity have been explored in some studies (e.g. Weiss and Willis 1997, Böheim and Ermisch, 2001, Svarer, 2005, Walker and Zhu, 2006, and Norberg-Schönfeldt, 2007). However, as has already been mentioned, the number of studies focusing on the role of unemployment on divorce, in a more extensive fashion than just including it as a control variable, has been limited.

If a person becomes unemployed, this can be interpreted as an unexpected event since unemployment may be hard to foresee. Unemployment by one spouse may reduce the partner's expected utility of staying in the relationship because of the financial stress, and the probability of divorce would then increase with the number of days in unemployment. Besides the monetary factors associated with unemployment, unemployment is often connected to other psychological factors that can reduce the expected gains from marriage. Preferences for risk sharing can, to some extent, counteract the effect of unemployment on divorce.

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In her review on unemployment and families, Ström (2003) discusses the empirical work up to date that has paid special attention to unemployment and its role in the divorce decision. Some of the studies she mentions focus on male unemployment only; Ross and Sawhill (1975) analyse the role of male unemployment and find that unstable male employment increases the divorce probability; Conger et al. (1990) and Sander (1992) confirm these results. Jensen and Smith (1990), Lampard (1994) and Starkey (1996) analyse both male and female unemployment, and find male unemployment to be more closely linked to marital dissolution than female unemployment.

It is interesting that all the above results indicate that the effect of male unemployment is more severe than the effect of female unemployment. Ström (2003) hypothesizes that this may be due to women having more developed social networks outside the labour market, and that unemployment would reduce their double burden of paid and unpaid work. Moreover, because of the traditional division of labour, females may be less traumatized by unemployment, which may be the reason for the results found in the above studies. Sweden is, however, considered to be a country of high gender equality, at least when it comes to female education and labour force participation, which means that this may not be the case for Swedish couples. However, the same type of results as the above are found by Kraft (2001) whose study relates to modern German families where the traditional gender roles, with the male as a breadwinner, may not be as clear cut either.

The one exception to the above results is the study by Hansen (2005) on Norwegian data. He finds that the divorce probability increases with both male and female unemployment in a similar fashion. Since Sweden and Norway are quite similar with respect to female labour force participation and social security systems, the same results as found by Hansen may also apply to Swedish data.

3 Data

The empirical study is based on data from the LOUISE part of the LISA-data base along with compulsory school and secondary school graduation registers obtained from Statistics Sweden. The LISA-data base is longitudinal and contains yearly observations on family situation, education, income and labour force participation for all Swedes aged 16-64. The graduation registers contain information about grade point average (GPA) from compulsory and upper secondary school. In addition, the data contain information on an evaluation of cognitive and non-

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cognitive traits³ obtained from the National Service Administration, which is responsible for enrolling, enlisting and administering those eligible for national military service. The tests are taken by most males who are Swedish citizens in the year they turn 18.

The sample comes from a cohort of 110 000 individuals born in 1973 and registered in Sweden in December 31, 1990. The individuals were followed between 1990 and 2003. A sample of 45 120 individuals has been selected from this data set. The selected individuals are those who entered a committed relationship between the years 1993 and 2002. A relationship is defined to be committed if the individual is cohabiting with children or is married (with or without children). Only the first committed relationship of every individual in the sample is considered. The individuals are observed annually from the first year of commitment until they separate or the observation period ends.

Since the information about partner characteristics is limited, it is not possible to choose either males or females as representatives for the couple. It is, however, possible that the effects of unemployment, and the correlation between unemployment and divorce, differ between men and women. Therefore, the analysis is carried out separately for males and females. The samples contain information on 18 764 males (with female partners) and 26 356 females (with male partners). Survival frequency by commitment year for the observed males and females is given in Table 1 and Table 2, respectively.

Tables 1 and 2 show that the probability of dissolution is decreasing with the year for the start of the commitment. Males tend to enter into committed relationships later than females, as the commitment year of females is more evenly distributed over the observation period. The survival frequency for males is in general lower than the survival frequency for females for any given year.

³ The evaluation of non-cognitive traits consists of medical and physical tests and one interview with a psychologist and one with an enrolment officer. Physical fitness and strength are also evaluated. The enrolment test of cognitive traits includes measurements of linguistic comprehension, technical understanding and logistical and spatial awareness.

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Table 1. Survival Frequency by Commitment Year, Males

<i>Duration</i>	<i>Year for Start of Commitment</i>									
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1	0.87	0.91	0.92	0.93	0.94	0.96	0.96	0.97	0.97	0.98
2	0.78	0.81	0.83	0.85	0.88	0.91	0.92	0.94	0.93	
3	0.69	0.72	0.76	0.80	0.83	0.86	0.88	0.90		
4	0.63	0.67	0.70	0.75	0.79	0.82	0.85			
5	0.57	0.63	0.66	0.70	0.75	0.79				
6	0.52	0.57	0.62	0.67	0.72					
7	0.50	0.53	0.60	0.64						
8	0.48	0.51	0.56							
9	0.46	0.48								
10	0.45									
<i>N</i>	484	732	1 042	1 338	1 595	1 855	2 313	2 897	3 105	3 403

Table 2. Survival Frequency by Commitment Year, Females

<i>Duration</i>	<i>Year for Start of Commitment</i>									
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1	0.91	0.92	0.94	0.95	0.95	0.96	0.97	0.97	0.98	0.98
2	0.82	0.84	0.87	0.89	0.90	0.92	0.93	0.94	0.95	
3	0.76	0.77	0.81	0.84	0.85	0.89	0.90	0.91		
4	0.70	0.71	0.77	0.80	0.80	0.85	0.87			
5	0.64	0.67	0.73	0.76	0.77	0.82				
6	0.60	0.63	0.69	0.73	0.73					
7	0.56	0.59	0.67	0.70						
8	0.53	0.56	0.64							
9	0.50	0.53								
10	0.47									
<i>N</i>	1 611	1 837	2 165	2 281	2 557	2 660	3 017	3 482	3 313	3 442

The variables used in the empirical analysis are based on earlier literature dealing with quality of match and gains from commitment. The variables are divided into individual-specific characteristics, parental characteristics, partner characteristics and characteristics related to the relationship. Parental characteristics are included in order to control for socioeconomic circumstances during childhood. Earnings, schooling and age of the spouses and differences in schooling age and ethnicity between spouses are all variables that have previously been found to have negative effects on the probability of separation.⁴ Variables that are

⁴ See Weiss and Willis (1997) and Svarer (2004, 2005).

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likely to influence the number of days an individual spends in unemployment in a given year are also included. These variables reflect individual characteristics, parental characteristics and regional characteristics. Ethnicity, age and schooling are variables likely to affect the number of days an individual spends in unemployment in a given year, but socioeconomic background is also likely to be of importance.⁵ Definitions and explanations of variables are given in Table A1 of Appendix A.

Descriptive statistics for males and females are displayed in Table 3 below. The descriptive statistics are displayed separately for individuals whose relationships remained committed throughout the observation period (i.e. were still committed at year 2003) and individuals whose relationships ended during the observation period. Descriptive statistics for time varying variables are measured the year before the relationship ends for individuals who end up separating and the year before the observation period ends for individuals who remain committed throughout the observation period, which makes it hard to directly compare the means of the time varying variables over relationship outcome.

As can be seen from Table 3, individuals who separated were younger when their relationship started, and they have attained a lower grade point average (GPA). They are also to a larger extent born outside of Sweden. For men, it is also apparent that those who end up separating are those achieving a lower result in cognitive and non-cognitive traits on the evaluation performed by the National Service Administration. Once more, it is clear that males enter into committed relationships later than females. When comparing the columns of Table 3, it also looks as though individuals who separate have lower annual earnings, spend more days in unemployment and have a lower educational level, measured as the number of years of schooling, than those who remain committed. When making comparisons between the columns in the below table, it must, however, be remembered that the year of measurement differs over relationship outcome.

⁵ See, for example, Machin and Manning (1999) and Altonji and Blank (1999).

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Table 3. Individual Specific Characteristics, Means

<i>Variable Name</i>	<i>Males</i>		<i>Females</i>	
	Committed _t	Dissolved _t	Committed _t	Dissolved _t
Age at Start of Commitment	26.43 (2.29)	23.87 (2.42)	25.70 (2.60)	23.05 (2.38)
<i>Labour Market Variables</i>				
Earnings _{t-1}	2.47 (1.19)	1.56 (1.08)	1.54 (0.87)	0.92 (0.78)
Days in Unemployment _{t-1}	31.92 (84.62)	101.74 (138.38)	49.65 (103.10)	116.46 (132.52)
<i>Education</i>				
Compulsory School _{t-1}	0.10	0.27	0.06	0.24
Upper Secondary School _{t-1}	0.60	0.62	0.53	0.62
University _{t-1}	0.29	0.11	0.41	0.14
GPA Compulsory School	3.04 (0.70)	2.64 (0.74)	3.33 (0.67)	2.92 (0.74)
<i>Ethnicity</i>				
Sweden	0.95	0.89	0.95	0.91
Born Abroad	0.05	0.11	0.05	0.09
<i>Military Service Variables</i>				
Evaluation of Non-Cognitive Traits	5.21 (1.71)	4.43 (1.82)		
Test of Cognitive Traits	4.87 (1.88)	4.10 (1.85)		
Number of Observations	15 437	3 327	21 151	5 205

Note: Standard deviations are given within parentheses. Earnings are annual earnings, in the price level for the year 2000, expressed in hundred thousand SEK.

Apart from individual characteristics, one thing that may influence the number of days an individual spends in unemployment in a given year is the state of the labour market where he or she participates. To control for this, a variable measuring the regional employment growth rate will be included in the analysis.⁶ Since parental characteristics are often found to have an influence on children's labour market success, characteristics such as parental income, parental education and parental ethnicity are of interest. Descriptive statistics for parental characteristics are displayed in Table 4 below. Once more, they are displayed separately for males and females and for relationship outcome.

⁶ Other variables could have been chosen, for example, the unemployment rate in the labour market region or the number of labour market opportunities. All these measures are, however, likely to be highly correlated and in that case, the choice will be of minor importance. For an explanation of this variable, see Table A1 of Appendix A.

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Table 4. Parental Characteristics, Means

<i>Variable Name</i>	<i>Males</i>		<i>Females</i>	
	Committed _t	Dissolved _t	Committed _t	Dissolved _t
Mothers' Earnings	1.21 (0.62)	1.12 (0.60)	1.22 (0.61)	1.14 (0.60)
Fathers' Earnings	1.94 (1.08)	1.71 (0.90)	1.98 (1.06)	1.77 (1.04)
<i>Mothers' Education</i>				
Compulsory School	0.31	0.35	0.31	0.37
Upper Secondary School	0.47	0.50	0.47	0.47
University	0.22	0.15	0.22	0.16
<i>Fathers' Education</i>				
Compulsory School	0.38	0.42	0.37	0.40
Upper Secondary School	0.42	0.45	0.42	0.44
University	0.20	0.13	0.21	0.16
<i>Mothers' Ethnicity</i>				
Sweden	0.87	0.80	0.88	0.83
Born Abroad	0.13	0.20	0.12	0.17
<i>Fathers' Ethnicity</i>				
Sweden	0.86	0.79	0.87	0.81
Born Abroad	0.14	0.21	0.13	0.19
<i>Number of Observations</i>	15 437	3 327	21 151	5 205

Note: Standard deviations are given within parentheses. Parental characteristics are measured over the years 1990-1992. Earnings are mean annual earnings, in the price level for the year 2000, expressed in hundred thousand SEK.

The stability of a relationship is naturally not only dependent upon one person and his or her characteristics, but is also dependent upon the characteristics of the partner. For the partners of the individuals in the sample, there is information about age, earnings, ethnicity and education. The descriptive statistics for partner characteristics are given in Table 5 below.

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Table 5. Partner Characteristics, Means

<i>Variable Name</i>	<i>Males</i>		<i>Females</i>	
	Committed _t	Dissolved _t	Committed _t	Dissolved _t
Age at Start of Commitment	26.07 (3.68)	23.51 (3.91)	28.64 (4.14)	26.86 (4.62)
Partner's Earnings _{t-1}	1.39 (0.83)	0.87 (0.80)	2.53 (1.40)	1.63 (1.16)
<i>Partners' Education</i>				
Compulsory School _{t-1}	0.08	0.27	0.09	0.23
Upper Secondary School _{t-1}	0.54	0.59	0.58	0.63
University _{t-1}	0.38	0.13	0.34	0.15
<i>Partners' Ethnicity</i>				
Sweden	0.92	0.87	0.92	0.84
Born Abroad	0.08	0.13	0.08	0.16
<i>Number of Observations</i>	15 437	3 327	21 151	5 205

Note: Standard deviations are given within parentheses. Earnings are annual earnings, in the price level for the year 2000, expressed in hundred thousand SEK.

Apart from the characteristics of the partners in the relationship, there are also some characteristics specific to the couple that could influence the relationship outcome. One such characteristic is the number of children of the couple. Descriptive statistics for the couple specific characteristics are given in Table 6 below.

Table 6. Couple Characteristics, Means

<i>Variable Name</i>	<i>Males</i>		<i>Females</i>	
	Committed _t	Dissolved _t	Committed _t	Dissolved _t
Duration of Commitment _{t-1}	3.57 (2.29)	3.02 (1.92)	4.29 (2.60)	3.41 (2.15)
Number of Children _{t-1}	1.31 (0.86)	1.26 (0.80)	1.39 (0.84)	1.25 (0.77)
Living in City _{t-1}	0.40	0.38	0.40	0.39
Social Assistance Recipients _{t-1}	0.02	0.25	0.01	0.20
Different Ethnicity	0.09	0.13	0.09	0.17
Different level of education _{t-1}	0.37	0.43	0.37	0.43
<i>Number of Observations</i>	15 437	3 327	21 151	5 205

Note: Standard deviations are given within parentheses.

4 Empirical model

This section presents the empirical model. As previously discussed, one problem when evaluating the impact of unemployment on divorce is that individuals systematically act on the basis of unobservable characteristics. In this case, one possible characteristic would be the ability to live up to one's obligations or promises. Such information is likely to influence both the number of days an individual will be unemployed in a given year and, at the same time, it may influence the probability that the individual will end up separating. If an individual who, on average, has longer unemployment spells also has a less serious view on relationships, the effect of unemployment on separation will be biased upwards if estimated as a single probit.

To control for the possible bias due to the endogeneity of unemployment, the model used to analyse separations in this paper is a two-equation simultaneous panel data model of the following form:⁷

$$U_{i,t} = \alpha_1 + \beta_1 x_{i,t}^1 + \gamma_1 z_{i,t} + \mu_{i,t} \quad (1)$$

$$D_{i,t+1} = \alpha_2 + \beta_2 x_{i,t}^2 + \gamma_2 z_{i,t} + \delta U_{i,t} + \omega_{i,t} \quad (2)$$

where the dependent variables $U_{i,t}$ and $D_{i,t+1}$ measure the number of days in unemployment in year t and the occurrence of separation in year $t+1$, respectively⁸. The vectors $x_{i,t}^1$ and $x_{i,t}^2$ are explanatory variables specific to each equation, while $z_{i,t}$ contains explanatory variables included in both equations. The two disturbance terms $\mu_{i,t} = \varepsilon_{i,t}^1 + u_i^1$ and $\omega_{i,t} = \varepsilon_{i,t}^2 + u_i^2$ both consist of time-varying components, $\varepsilon_{i,t}^1$ and $\varepsilon_{i,t}^2$, and time invariant individual-specific terms, u_i^1 and u_i^2 . A random effects approach is used, which is mainly motivated by the fact that the size of the cross section exceeds the time series observations by far, and by the fact that several of the control variables are time invariant.

⁷ An alternative approach would have been to specify the model as a bivariate probit. A bivariate probit model would, however, have required a binary specification of unemployment. Different specifications of unemployment have been tried in a bivariate probit but, when trying to utilize the panel structure of the data, the estimation becomes unsuccessful.

⁸ As previously mentioned, the reason for using the number of days in unemployment the year before the separation is to avoid including observations on unemployment that have, in fact, been measured after the separation has occurred.

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Since separation is only observed annually, the explanatory variables from the previous period are used in order to avoid including values on explanatory variables that are measured after the separation has occurred. As previously mentioned, the effect of unemployment on divorce could differ between males and females. Therefore, the above model will be estimated separately for males (controlling for characteristics of their female partners) and females (together with their male partners).

The inclusion of the number of days in unemployment in equation (2) poses a potential problem. If unemployment is correlated with the disturbance term of equation (2), that is, if the stochastic components of the disturbances from the two equations are correlated, an ordinary probit estimation of equation (2) will result in biased estimates. Therefore, the model is estimated using a two-step estimation procedure, in a way similar to Bollen et al. (1995) and Norton et al. (1998). The first step involves a generalized least squares (GLS) estimation of equation (1). The estimated coefficients are used to predict the number of days in unemployment ($\hat{U}_{i,t}$) for each individual in every period of time. The predicted values are then used to replace the actual days of unemployment in equation (2). The second step is a probit estimation of equation (2), where the estimated standard errors must be adjusted because of the inclusion of the predicted value of the number of days in unemployment. The correction is carried out using the Murphy and Topel (1985) correction of the estimated covariance matrix.

In order to determine whether unemployment is, indeed, endogenous in the divorce equation, or whether the divorce equation could be estimated as a single equation probit model, an exogeneity test is carried out; see, for example, Smith and Blundell (1986) or Rivers and Voung (1988). This test examines whether the unobservables in the equation for the number of days in unemployment help explain the variation in the probability of divorce after controlling for the observable explanatory variables. In the test, the estimated error term from equation (1) is included together with the actual number of days in unemployment in the divorce equation. A t -test of the significance of the coefficient on the estimated error term is then performed. If the coefficient is not significantly different from zero, the null hypothesis that the number of days in unemployment is exogenous in the divorce equation cannot be rejected. If so, equation (2) could be estimated by simple single probit regression.

If unemployment is found to be endogenous, identifying restrictions must be imposed on the exogenous variables in order to obtain consistent parameter estimates. Since there is one supposedly endogenous vari-

able, at least one variable must be excluded from the separation equation. The model must then be tested for validity of the instruments.

5 Results

In this section, the results from the estimation of the two equation simultaneous panel data model in equations (1) and (2) are presented and discussed. The results for the male sample are presented and analysed in subsection 5.1, whereas the results for the female sample are given in subsection 5.2.

5.1 The effect of unemployment on divorce, male sample

This subsection begins with a discussion about the GLS results from the unemployment equation (1), which are presented in Table 7. This is followed by a discussion about the probit results for the separation equation (2), which are displayed in Table 8.

Table 7. GLS Results for Unemployment Equation, Males

<i>Variable Name</i>	<i>Coeff. (s. e.)</i>
<i>Individual-Specific Characteristics</i>	
Age	-12.47*** (0.18)
Born Abroad	16.93*** (2.59)
Upper Secondary School	-10.62*** (1.64)
University	-8.18*** (2.19)
Compulsory School GPA	-16.30*** (1.05)
GPA Missing	-17.85*** (4.46)
Evaluation of Non-Cognitive Traits	-4.63*** (0.40)
Evaluation Missing	-10.73*** (2.57)
Living in City	-15.57*** (1.17)
Regional Employment Growth Rate	-3.19*** (0.24)

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Table 7. Continued

<i>Parental Characteristics</i>	
Mother Earnings	-3.91*** (0.94)
Father Earnings	-3.89*** (0.52)
Constant	484.68*** (5.49)
<i>Model Information</i>	
LM test of no random effects (1 df)	29591.16
R ² -adjusted	0.16
<i>Number of Observations</i>	
	65 125

Note: * Statistically significant at the 10 percent level, ** Statistically significant at the 5 percent level, *** Statistically significant at the 1 percent level

The null hypothesis of no unobserved heterogeneity can be rejected judging by the high value of the *LM*-test statistic reported in Table 7, which is well above the critical value for any level of significance. The number of days in unemployment seems to be decreasing with age, education and compulsory school GPA. It is also decreasing with the evaluation of non-cognitive traits from the National Service Administration, as can be seen by column 2. The variable “evaluation missing”, which is reported in the table, shows a large negative impact on unemployment of not having participated in the non-cognitive evaluation. Besides being an immigrant, those with a missing result from the evaluation are those who had already started their higher education by the time of enrolment and those who studied four years of upper secondary school and were, therefore, excused. These individuals are expected to be less likely to become unemployed. Others who miss the evaluation are, for instance, those with allergies, bad eyesight or hearing problems.

The number of days in unemployment is lower for people living in an urban area and for those who live in a labour market region with a high employment growth rate. Parental earnings also have a negative impact on the number of days in unemployment.⁹

⁹ Versions of the model that include parental education have also been estimated since this is likely to be a determinant of the child’s labour market performance. Parental education is, however, highly correlated with own education and parental earnings and it is, therefore, excluded in the final model without any consequences for the main results.

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Table 8 below gives the probit results from the separation equation. Column 1 reports the result of a probit estimation, where unemployment is treated as an exogenous variable.¹⁰

Much as expected, the results in column 1 of Table 8 show that the probability of dissolution increases with the number of days in unemployment. In order to determine whether to use the observed number of days in unemployment as an explanatory variable in the separation equation or not, let us first discuss the predictive power of the estimated unemployment equation. The reported R^2 from Table 7 is 0.16. If the R^2 is less than 0.1, the simple probit estimator could be preferred over the two-step estimator, at least when sample sizes are small according to Bollen et al. (1995). The R^2 of Table 7 is higher than 0.1, the sample size is fairly large, and the parameter estimates are highly significant. Although this is interpreted as “enough” predictive power, the reader should keep the somewhat low R^2 -value in mind.

As has previously been mentioned, for the separation equation to be identified, at least one restriction must be imposed on the separation equation. The excluded variables, i.e. the instrumental variables, are the variables measuring participation and result from the evaluation of non-cognitive traits, the variable measuring employment growth rate and the variable measuring if the individual was born abroad. It is important to choose instrument variables that are unlikely to be directly correlated with relationship outcome. The use of employment growth rate as an instrument can easily be motivated as being directly connected to labour market activities. When it comes to the result from the non-cognitive test, the measured characteristics are probably observed by the potential partner at the start of the relationship. Therefore, it is highly likely to be a determinant of whether you are matched into a commitment to start with. Since these characteristics are likely to be observed at the start, they should not be of any significance for the future of the relationship. Being born abroad is also something that is known at the start of the relationship; it is unlikely that simply the fact that an individual is born abroad should have any significant influence on the relationship outcome. However, if the spouses are of different ethnicities, it is likely to influence the relationship since it is probably harder to keep a relation-

¹⁰ There is no evidence of random effects in the separation equation, which may be due to the respondents of the sample entering into relationships relatively late and that there are not enough time series observations for any random effects to be detected. However, to control for the possibility of other forms of non-independence of observations over time, than what is supported by the random effects approach, the standard errors are adjusted for clustering on individuals.

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ship stable if you have different religions or different cultural backgrounds.

To make an assessment of the validity of the instruments, four tests have been performed. First of all, the instruments need to have a significant impact on the number of days in unemployment. Individual t -tests of the instruments show that each instrument significantly affects the number of days in unemployment. To determine whether the instruments, as a group, affect the number of days in unemployment, an F -test was performed. The F -test returned a value of 222.7 with four degrees of freedom, which is well above the critical value for any level of significance. These tests conclude that the instruments are strong predictors of the number of days in unemployment. The third test involves a likelihood ratio test between the log likelihood of the model of column 3 (where the endogeneity of unemployment days is accounted for) and the likelihood of its counterpart where the instruments are used to substitute for the predicted number of unemployment days. The null hypothesis of validity means that the model of column 3 is the correct specification. If the instruments are valid, there should be no significant difference between the log likelihoods. The LR -test gives a value of 6.23 with three degrees of freedom, which is not significant at the 90 percent level. The fourth test involves t -tests on the coefficients for the instruments when all but one are included in the model of column 3. Neither of the coefficients is significant. The above discussion leads to the conclusion that the instruments are valid. Therefore, these instruments will be used.

Column 2 of Table 8 presents the probit regressions for divorce; both the observed number of days in unemployment and the estimated residual from the unemployment equation are included as regressors. A t -test for the coefficient on the estimated error term from the unemployment equation is the test of the null hypothesis that the number of days in unemployment is exogenous. The test rejects exogeneity of the number of days in unemployment. Therefore, the suggested two step procedure is more appropriate for estimating the impact of the number of days in unemployment on separation. Due to the above discussion, the following analysis will be based on the results from column 3. Marginal effects for the variables can be found in Table B1 of Appendix B.

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Table 8. Probit Results for Separation Equation, Males

<i>Variable Name</i>	<i>Column</i>		
	1	2	3
	Coeff. (s. e.)	Coeff. (s. e.)	Coeff. (s. e.)
<i>Individual-Specific Characteristics</i>			
Predicted Unemployment Days			0.002** (0.001)
Unemployment Days	0.0002** (0.001)	0.002*** (0.001)	
Estimated Error from Unemployment Equation		-0.002*** (0.001)	
Age	-0.03*** (0.005)	0.007 (0.01)	0.006 (0.01)
Upper Secondary School	-0.12*** (0.02)	-0.10*** (0.03)	-0.10*** (0.03)
University	-0.26*** (0.04)	-0.24*** (0.04)	-0.24*** (0.04)
Compulsory School GPA	-0.10*** (0.01)	-0.06** (0.02)	-0.06** (0.02)
GPA missing	-0.27*** (0.06)	-0.24*** (0.06)	-0.24*** (0.06)
Earnings	-0.05*** (0.01)	-0.05*** (0.01)	-0.06*** (0.01)
<i>Partner Characteristics</i>			
Older (in years)	0.01* (0.005)	0.01* (0.005)	0.01* (0.005)
Younger (in years)	0.05*** (0.006)	0.05*** (0.006)	0.05*** (0.006)
Born Abroad	-0.17*** (0.04)	-0.17*** (0.04)	-0.17*** (0.04)
More Educated	-0.08*** (0.02)	-0.08*** (0.02)	-0.08*** (0.02)
Less Educated	0.09*** (0.02)	0.09*** (0.02)	0.09*** (0.02)
Earnings	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)
<i>Parental Characteristics</i>			
Mother Earnings	0.03** (0.01)	0.04*** (0.01)	0.04*** (0.01)
Father Earnings	-0.05*** (0.01)	-0.04*** (0.01)	-0.04*** (0.01)

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Table 8. Continued

<i>Couple Characteristics</i>			
Different Ethnicity	0.21*** (0.03)	0.20*** (0.03)	0.20*** (0.03)
Living in City	0.09*** (0.02)	0.12*** (0.02)	0.12*** (0.02)
Social Assistance Recipients	0.42*** (0.03)	0.41*** (0.03)	0.43*** (0.03)
Children ≤ 3 Years	-0.03* (0.01)	-0.03* (0.01)	-0.03* (0.01)
Children 4-6 Years	0.10*** (0.02)	0.10*** (0.02)	0.10*** (0.02)
Children 7-10 Years	0.08*** (0.03)	0.07*** (0.03)	0.07*** (0.03)
Children 11-15 Years	-0.01 (0.05)	-0.02 (0.05)	-0.02 (0.05)
Children 16-17 Years	0.14 (0.13)	0.14 (0.13)	0.14 (0.13)
Constant	-0.50*** (0.12)	-1.37*** (0.44)	-1.36*** (0.44)
<i>Model Information</i>			
Log likelihood	-12325.78	-12323.66	-12326.45
Chi squared	1620.07 (23df)	1624.31 (24df)	1618.75 (23df)
Pseudo R-squared	0.06	0.06	0.06
<i>Number of Observations</i>			
	65 125	65 125	65 125

Note: Standard errors of columns 2 and 3 have been Murphy and Topel corrected for the inclusion of predicted values of unemployment days and the predicted error term, respectively. All standard errors are adjusted for clustering. * Statistically significant at the 10 percent level, ** Statistically significant at the 5 percent level, *** Statistically significant at the 1 percent level

From Table 8 above, it is clear that the probability of separation is increasing with the number of days in unemployment for the male sample. From Table B1 of Appendix B, it can be seen that the marginal effect of unemployment is 0.0002, which may seem small as compared to the separation probability as a whole for males, which equals 0.051. However, it must be remembered that this is the effect of one additional day in unemployment. One additional month would apparently have quite a substantial effect on the probability of separation. It is, however, likely that the effect of one additional unemployment day is nonlinear.¹¹ Compared to the marginal effect of unemployment in the simple probit esti-

¹¹ A loglinear specification has been tried as well as squared and cubed terms without adding to the information.

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mation, the effect is larger when endogeneity is controlled for. This means that the effect in the simple probit equation was underestimated, instead of overestimated as expected. There must be some unobserved characteristic that is causing a downward bias; an example could be if you are a careerist. This would have a negative effect on unemployment but could, if you work long hours, have a positive effect on separation probability.

There is no direct effect on dissolution of own age. This result somewhat contradicts the theory of match quality but, on the other hand, age here is not equivalent to age at the start of the commitment, which could be the reason for the result. It should also be remembered that a large negative effect of age was found on unemployment days in Table 7. The coefficients for the variables measuring deviations in age both show that the probability of separation increases with larger differences in age. Similar results have been found in several other studies and suggest that people at different levels of maturity have less stable relationships.

Having a partner who was born abroad has a stabilizing direct effect on the commitment. This should, however, be interpreted with caution. There was no direct effect of the individual himself being born abroad on divorce which allowed for the use of that variable as an instrument. Therefore, it is possible that no direct effect would be found from the partner being born abroad, if it were possible to control for partner unemployment, since being born abroad could be a proxy for unemployment. Being of different ethnicities is, instead, destabilizing, which is something that confirms the idea of positive assortative mating.¹² This could be related to people of different cultures or religions having different attitudes towards relationships and/or divorces which could complicate matters.

For educational level, the direct and indirect effects both work in the direction of reducing the separation probability, but the probability is somewhat higher for couples where the male is more educated than the female. Living in a city has a direct destabilizing effect on relationships, which is in line with previous findings (e.g. Svarer, 2004, 2005) and one explanation is that there are more alternative matches for people living in a city. The indirect effect through unemployment reduces the negative impact, however.

¹² The simultaneous inclusion of the two being born abroad variables together with the different ethnicities variable may seem somewhat odd. The variable measuring different ethnicities is, however, defined in such a way that even if both spouses were born abroad, they can still be of different ethnicities.

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Male earnings seem to be more important for a steady relationship, since the probability of separation is decreasing with male earnings. This shows that, at least for women, the gains from commitment are increasing with income. A couple receiving social assistance are more likely to separate than others. As stated in Norberg-Schönfeldt (2007), receiving social assistance could often be connected with other factors that may be the real cause of the instability.

In the male sample, the idea that children have a stabilizing effect does not seem to apply in general. This opposes the theory of investments in commitment specific capital to some extent. There is a stabilizing effect of having very young children but the presence of children between ages four and ten has a destabilizing, instead of a stabilizing, effect. This may be due to the relatively young mean age of spouses in the male sample. To be able to have a child over the age of four, the average female partner had to be very young when the child was born, which may, in itself, be destabilizing.

5.2 The effect of unemployment on divorce, female sample

In this subsection, the results from the model in equations (1) and (2) are given for the female sample. The GLS results from the unemployment equation are presented in Table 9, and the probit results from the separation equation are displayed in Table 10.

The results of the unemployment equation in Table 9 show that, as for the male sample, female unemployment is negatively related to age. When it comes to schooling, the number of days in unemployment increases with upper secondary school compared to compulsory school, but there is a large negative effect of university studies. A woman living in a city or in a labour market region characterized by a high employment growth rate on average experiences shorter spells of unemployment than other women. Women born abroad are unemployed for longer periods. The number of days in unemployment is decreasing with the earnings of both parents.

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Table 9. GLS Results for Unemployment Equation, Females

<i>Variable Name</i>	<i>Coeff. (s. e.)</i>
<i>Individual-Specific Characteristics</i>	
Age	-9.05*** (0.16)
Born Abroad	17.15*** (1.93)
Upper Secondary School	2.80** (1.38)
University	-25.82*** (1.72)
Compulsory School GPA	-18.60*** (0.75)
GPA Missing	-54.41*** (3.57)
Living in City	-36.13*** (0.91)
Regional Employment Growth Rate	-0.85*** (0.22)
<i>Parental Characteristics</i>	
Mother Earnings	-6.54*** (0.70)
Father Earnings	-2.53*** (0.39)
Constant	409.37*** (4.60)
<i>Model Information</i>	
LM test of no random effects	29510.92
R ² -adjusted	0.13
<i>Number of Observations</i>	108 600

Note: * Statistically significant at the 10 percent level, ** Statistically significant at the 5 percent level, *** Statistically significant at the 1 percent level

Table 10 below gives the probit results from the separation equation. Column 1 reports the result of a probit estimation for the separation equation with unemployment treated as exogenous. Once more there is no evidence of unobserved heterogeneity in the separation equation, and according to the results in column 2, unemployment is found to be endogenous and the two step procedure will be applied.

Since females are not eligible for military service in Sweden, evaluation of non-cognitive traits can not be used as an instrument for unemployment. However, since the variable measuring the regional employment

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growth rate and the born abroad variables exist for females, these will be used as instruments. Individual t -tests of the instruments show that each instrument significantly affects the number of days in unemployment. The F -test for determining the significance of the instruments in the unemployment equation gives a value of 75 with two degrees of freedom, which is again well above the critical value for any level of significance. The likelihood ratio test between the log-likelihood of the model in column 3 and the likelihood of its counterpart, where the instruments are substituted for the predicted number of unemployment days, shows that there is no significant difference between the two log likelihoods, since the value is 0.16 with one degree of freedom. The critical value for significance at the 90 percent level is 2.71. The t -tests of the coefficients for the instruments when they are included in the model of column 3 are not significant. Therefore, the following discussion will be based on the results in column 3. The marginal effects for the variables can be found in Table B2 of Appendix B.

The coefficient for the predicted number of days in unemployment in column 3 of Table 10 shows that the effect of number of days in unemployment on divorce is negative for the female sample. This is somewhat surprising, but shows that the effect of unemployment on divorce is indeed overestimated when the endogeneity of unemployment is not accounted for. From Table B1 of Appendix B, it can be seen that the marginal effect of one additional unemployment day is -0.001, to be compared with the general separation probability in the female sample of 0.048.

The negative effect of female unemployment on divorce could be a sign that when females are unemployed, the non-market work is taken care of and the relationship becomes more stable. Therefore, the division of labour in Sweden may not be as non-traditional after all. Naturally, the effect could also be the result of a deliberate choice of the couple regarding the division of labour. Another likely explanation is that women are often the initiating party in the divorce decision, which has been found by, for example, Sayer et al. (2005), and a woman who is unemployed will probably be less likely to initiate a divorce since the value of her outside alternative will be lower than when she was employed.

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Table 10. Probit Results for Separation Equation, Females

<i>Variable Name</i>	<i>Column</i>		
	1	2	3
	Coeff. (s. e.)	Coeff. (s. e.)	Coeff. (s. e.)
<i>Individual-Specific Characteristics</i>			
Predicted Unemployment Days			-0.007*** (0.002)
Unemployment Days	0.0002*** (0.0001)	-0.007*** (0.002)	
Estimated Error from Unemployment Equation		0.007*** (0.002)	
Age	-0.02*** (0.003)	-0.08*** (0.02)	-0.08*** (0.02)
Upper Secondary School	-0.14*** (0.02)	-0.12*** (0.02)	-0.12*** (0.02)
University	-0.28*** (0.03)	-0.46*** (0.05)	-0.46*** (0.05)
Compulsory School GPA	-0.10*** (0.01)	-0.23*** (0.03)	-0.23*** (0.03)
GPA missing	-0.34*** (0.05)	-0.66*** (0.10)	-0.67*** (0.10)
Earnings	-0.02** (0.01)	-0.03** (0.01)	-0.03*** (0.01)
<i>Partner Characteristics</i>			
Older (in years)	0.01*** (0.002)	0.01*** (0.002)	0.01*** (0.002)
Younger (in years)	0.08*** (0.01)	0.08*** (0.01)	0.08*** (0.01)
Born Abroad	-0.07** (0.03)	-0.07** (0.03)	-0.07** (0.03)
More Educated	-0.04** (0.02)	-0.04** (0.02)	-0.04** (0.02)
Less Educated	0.04** (0.02)	0.04** (0.02)	0.04** (0.02)
Earnings	-0.06*** (0.01)	-0.06*** (0.01)	-0.06*** (0.01)

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Table 10. Continued

<i>Parental Characteristics</i>			
Mother Earnings	0.03*** (0.01)	-0.02 (0.02)	-0.02 (0.02)
Father Earnings	-0.05*** (0.01)	-0.06*** (0.01)	-0.06*** (0.01)
<i>Couple Characteristics</i>			
Different Ethnicity	0.20*** (0.03)	0.22*** (0.03)	0.22*** (0.03)
Living in City	0.08*** (0.01)	-0.16*** (0.06)	-0.16*** (0.06)
Social Assistance Recipients	0.39*** (0.02)	0.40*** (0.02)	0.40*** (0.02)
Children \leq 3 Years	-0.08*** (0.01)	-0.08*** (0.01)	-0.09*** (0.01)
Children 4-6 Years	0.07*** (0.01)	0.07*** (0.01)	0.08*** (0.01)
Children 7-10 Years	0.03 (0.02)	0.03 (0.02)	0.03 (0.02)
Children 11-15 Years	0.14** (0.06)	0.14** (0.06)	0.14** (0.06)
Children 16-17 Years	-0.05 (0.17)	-0.05 (0.17)	-0.05 (0.17)
Constant	-0.63*** (0.09)	2.20*** (0.69)	2.24*** (0.69)
<i>Model Information</i>			
Log likelihood	-19736.73	-19727.36	-19732.29
Chi squared	2309.11 (23df)	2327.84 (24df)	2318.00 (23df)
Pseudo R-squared	0.06	0.06	0.06
<i>Number of Observations</i>			
	108 600	108 600	108 600

Note: The standard errors of columns 2 and 3 have been Murphy and Topel corrected for the inclusion of predicted values of unemployment days and the predicted error term, respectively. All standard errors are adjusted for clustering. * Statistically significant at the 10 percent level, ** Statistically significant at the 5 percent level, *** Statistically significant at the 1 percent level

For females, there is both a direct and a negative effect of age on the probability of separation, but the indirect effect through unemployment is now destabilizing and the probability of separation is once more increasing with age difference between partners. The direct effect of schooling decreases the probability of separation, but the probability is increasing if the male spouse has a lower education, the latter being the opposite of the result found for males. Being committed to a partner

born abroad is again stabilizing. As for the male sample, being of different ethnicities has a destabilizing effect on the relationship.

Living in a city has a negative direct effect on the probability of dissolution for females. This could be interpreted in terms of the marriage market. According to Edlund (2005), women, in fertile ages, outnumber men in urban areas. She suggests that the reason may be linked to higher male incomes in urban areas, and that women migrate to urban areas in order to achieve better matches. This means that, *ceteris paribus*, females in cities are less likely to divorce. Receiving social assistance is once more negative for stability, but having a high earning father is stabilizing. As was the case for the male sample, the presence of very young children is stabilizing for the relationship whereas the effect of having older children works the other way around.

6 Conclusions

This study focuses on unemployment and its effects on the probability of separation. Unemployment is often included as a control variable in the economic divorce literature, but research more explicitly focusing on the role of unemployment in the divorce decision has so far been limited. This paper takes the investigation of the role played by unemployment in the dissolution of relationships further than has previously been done. By applying a two step estimation method to an extensive data set, unemployment is recognized as endogenous in the separation decision. In the few studies that actually do focus on unemployment and divorce, little attention has been given to the role of female unemployment. Besides finding unemployment to be endogenous, this study sheds some new light on the role of female unemployment by separately studying two samples of individuals, one female sample and one male sample, while controlling for the characteristics of their respective partners.

The findings are that for males, the probability of separation is increasing with the number of unemployment days, and that the effect is underestimated when unemployment is treated as exogenous. For females, treating unemployment as exogenous in the separation equation instead overestimates the role played by unemployment. For females, the separation probability is found to be decreasing with unemployment, which differs from findings in previous studies. One explanation could be that the division of labour in Sweden may not be as non-traditional and that unemployment eases the double burden of paid and unpaid work for females. Since females have in previous studies been found to be those often initiating a separation, another possible explanation is that a woman is less likely to initiate a separation during unemployment.

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As indicated by the results of this study, there is more to unemployment and its role in the separation decision than has previously been known, especially when it comes to female unemployment. Therefore, more research is called for. For example, if data were available, it would be interesting to do the same type of analysis as is done here for both spouses in a couple.

Appendix A

Table A1. Variable Definitions and Explanations

<i>Variable Name</i>	<i>Explanation</i>
<i>Individual-Specific Characteristics</i>	
Age at Start of Commitment	The age of the individual at the start of the commitment, the individual's age in every year will be used in estimations.
Earnings	The individual's gross income expressed in hundreds of thousand. Includes both labour and non labour income.
Days in Unemployment	The number of days in unemployment in a given year.
Compulsory School	Takes the value 1 if the highest level of schooling that the individual has completed in a given year is nine years of compulsory school, used as a reference case.
Upper Secondary School	Takes the value 1 if the highest level of schooling that the individual has completed in a given year is 2-4 years of upper secondary school.
University	Takes the value 1 if the highest level of schooling that the individual has completed in a given year is more than upper secondary school education.
GPA Compulsory School	Grade point average from the final year of compulsory school, scale 1-5.
Sweden	Takes the value 1 if the individual was born in Sweden, used as a reference case.
Born Abroad	Takes the value 1 if the individual was born outside of Sweden.
Evaluation of Non-Cognitive Traits	Psychological evaluation, males only, scale 1-9.
Test of Cognitive Traits	Practical and theoretical tests, males only, scale 1-9.
<i>Parental Characteristics</i>	
Parental Earnings	The mean gross income over the years 1990-1992 expressed in hundreds of thousand. Includes both labour and non labour income.
Parent Compulsory School	Takes the value 1 if the highest level of schooling completed in 1992 is nine years of compulsory school.
Parent Upper Secondary School	Takes the value 1 if the highest level of schooling completed in 1992 is 2-4 years of upper secondary school.
Parent University	Takes the value 1 if the highest level of schooling completed in 1992 is more than upper secondary school.
Parent Sweden	Takes the value 1 if the mother or father respectively was born in Sweden, used as reference case.

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Table A1. Continued

Parent Born Abroad	Takes the value 1 if the mother or father respectively was born outside of Sweden.
<i>Partner Characteristics</i>	
Age at Start of Commitment	The age of the partner at the start of the commitment, partner age in every year will be used in the estimations. In order to account for different effects depending on who is older, partner age will be divided into two separate variables, measuring whether the male or the female is older in the estimations.
Partner's Earnings	The partner's gross income expressed in hundreds of thousand. Includes both labour and non labour income.
Compulsory School	Takes the value 1 if the highest level of schooling that the partner has completed in a given year is nine years of compulsory school, used as reference case.
Upper Secondary School	Takes the value 1 if the highest level of schooling that the partner has completed in a given year is 2-4 years of upper secondary school.
University	Takes the value 1 if the highest level of schooling that the partner has completed in a given year is more than upper secondary school education.
Sweden	Takes the value 1 if the partner was born in Sweden, used as a reference case.
Born Abroad	Takes the value 1 if the partner was born outside of Sweden.
<i>Couple Characteristics</i>	
Duration of Commitment	Describes how long the commitment has lasted, cannot be used with age in the estimations.
Number of Children	Measures how many children a couple has in a given year, will be divided into age intervals in the estimations.
Living in City	Takes the value 1 if the couple lives in one of the three larger cities of Sweden in a given year.
Social Assistance Recipients	Takes the value 1 if the couple received social assistance in a given year.
Different Ethnicity	Takes the value 1 if the spouses are of different ethnicities, this variable is on a finer scale than the "born abroad" variables.
Different level of education	Takes the value 1 if the spouses have different levels of education in a given year. In the estimations, this will be divided into two separate variables, measuring whether the male or the female has a higher degree of education, in order to account for different effects depending on who is more educated.
Regional Employment Growth Rate	Measures the change in employment growth rate in the labour market region between two years.

Appendix B

Table B1. Marginal Effects, Separation Equation, Males and Females.

<i>Variable Name</i>	<i>Males</i>	<i>Females</i>
	Marginal Effects	Marginal Effects
<i>Individual-Specific Characteristics</i>		
Predicted Unemployment Days	0.0002**	-0.001***
Age	0.01	-0.01***
Upper Secondary School	-0.01**	-0.01***
University	-0.02***	-0.03***
Compulsory School GPA	-0.01***	-0.02***
GPA missing	-0.02***	-0.03***
Earnings	-0.005***	-0.04**
<i>Partner Characteristics</i>		
Older (in years)	0.008*	0.001***
Younger (in years)	0.004***	0.01***
Born Abroad	-0.01***	-0.01**
More Educated	-0.007***	-0.004**
Less Educated	0.008***	0.003**
Earnings	-0.001	-0.01***
<i>Parental Characteristics</i>		
Mother Earnings	0.004***	-0.001
Father Earnings	-0.004***	-0.01***
<i>Couple Characteristics</i>		
Different Ethnicity	0.02***	0.02***
Living in City	0.01***	-0.01***
Social Assistance Recipients	0.05***	0.05***
Children ≤ 3 Years	-0.002*	-0.01***
Children 4-6 Years	0.01***	0.01***
Children 7-10 Years	0.01***	0.003
Children 11-15 Years	-0.001	0.01**
Children 16-17 Years	0.01	-0.004
Constant	-0.12***	0.19***
<i>Model Information</i>		
Log likelihood	-12326.45	-19732.29
Chi squared	1618.75 (23df)	2318.00 (24df)
Pseudo R-squared	0.06	0.06
<i>Number of Observations</i>	65 125	108 600

Note: Marginal effects are computed at the means of the variables, marginal effects for dummy variables are $P|1 - P|0$. * Statistically significant at the 10 percent level, ** Statistically significant at the 5 percent level, *** Statistically significant at the 1 percent level.

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