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Chapter 3

Family formation and participation in higher education: crosscutting life events?

Ursula Henz

Introduction

Sweden's student population is one of the oldest in the European Union. In 1993–94, 9 per cent of all persons enrolled in education were aged 30 or above (Eurostat, 1997).[1] Among new entrants to higher education, the share of those aged 30 and above reached 20 per cent, the highest figure amongst the EU countries. The high age of students suggests that a substantial amount of educational participation must be taking place after marriage or parenthood. According to Hörnqvist (1994), 30 per cent of women born in the 1950s in Sweden lived with a partner before completing their education. As many as 15 per cent of the women in that cohort had a child before completing their education. Results from another Swedish study show that mothers who had their first child between 1980 and 1984 were more likely to take up university studies after giving birth than were those who had their first child between 1974 and 1979 (Hoem, 1995a). Evidence for high enrolment rates after marriage can also be found in other countries. In the US, Davis and Bumpass (1976) reported that at least one in five women who married after 1950 attended high school or college after marriage and, in 1970, the time of the study, the numbers were rising.

A high rate of enrolment at adult ages is intriguing because it indicates a strong deviation from the traditional sequence of life-course events. Education is typically associated with the teenage and young adult years, and is normally conceived of as preparation for adult life. High enrolment rates at adult ages, and after beginning a family, challenge this concept and suggest instead that education can be spread out over the life-course. On the one hand, this pattern may indicate substantial flexibility in integrating education into the life-course, thus opening up educational and subsequently occupational choices at later stages in life. On the other hand, it may result from pressure to update and improve one's educational credentials in order to obtain or keep a good labour-market position.

Not everyone is afforded these educational opportunities or exposed to these pressures in the same way. In this chapter I describe the variations in participation in higher education with respect to family circumstance, i.e. whether one is single, cohabiting, married, and/or a parent.[2] The data used come from the 1992 Swedish Family and Fertility Study (FFS). Multivariate models are estimated for taking up and interrupting tertiary level education.

The analyses focus on three aspects of educational participation:

1. the differences in educational participation between cohabiting and married persons, and single people;

2. the enrolment of parents compared with the enrolment of childless individuals;

3. gender differences in enrolment.

The discussion of these questions is supplemented with a consideration of the timing aspects of marriage, cohabitation and childbirth.

Family circumstances and university enrolment

Earlier studies

Being enrolled in education is often considered incompatible with family formation (Blossfeld, 1995; Brüderl and Klein, 1991; Hoem and Hoem, 1989; Kasarda et al., 1986; Marini, 1985). This is often held to follow from the observation that women who marry or have a child at an early age attain lower levels of education than women who postpone family formation (Anderson, 1993; Haggstrom et al., 1986; Hoffman, et al., 1993; Marini, 1978, 1984; Ohlsen and Farkas, 1989; Upchurch and McCarthy, 1990; Waite and Moore, 1978), though the findings are not undisputed (Rindfuss et al., 1980; Rindfuss and St John, 1983). For men at least some of the estimated negative effects of early family formation are weaker (Kerckhoff and Parrow, 1979; Marini, 1978, 1984).

Most of the studies cited above refer to the educational level achieved by a certain age. They do not take into account that the lower educational attainment of married women and mothers may be temporary, as education can be resumed after a break for marriage or childbirth. What appears as lower educational attainment is then just a delayed attainment process. Davis and Bumpass (1976) and Alexander and Reilly (1981) have studied the probability of continuing education after marriage. Their findings indicate that women who marry early acquire more postnuptial education than women who marry at higher ages, but married women acquire less education after marriage than do unmarried women of the same age.

Analysing the circumstances that influence return to school, Felmlee (1988) made use of human capital considerations. These suggest that increased levels of education should result in higher occupational attainment. The hypothesis is supported by Felmlee's findings that both women's wages and their occupational prestige were raised in the job following an episode of schooling.[3] Human capital theory also predicts that the rate of returning to school decreases with age. Therefore, transition rates to education should decrease with age, but even when enrolling at higher ages, the expected lifetime income may still be higher with the additional education than without (Björklund and Kjellström, 1994; Hogan, 1980).

Family roles and responsibilities enter the human capital equation in two ways. Women can be discouraged from returning to school by their family obligations, or family obligations can keep them from reaping the rewards of additional education. Felmlee's empirical analyses provide support for both mechanisms. Being married and having young children reduces the rate at which women leave the labour force to return to school. The presence of young children also has a negative influence on occupational attainment after education.

Bradburn et al. (1995) expand the above framework by adding a life-course perspective: earlier experiences and orientations as well as conditions in other spheres of life influence the return to education. Among earlier experiences, the educational level already attained is of special relevance. The initial educational level depends on own and parents' educational aspirations as well as on the socialising influence of peers. The higher the initial educational level, the higher the rate of returning to school.

The relation between education and occupation is quite complex. The expected costs of returning to school in terms of foregone earnings are higher for those with full-time employment than for those with part-time employment, but for the former the expected gains are higher. Full-time employment per se may indicate a stronger attachment to the labour market and thus be related to higher return rates, but part-time employment leaves more time to return to school. Another issue is financial support during study. The better the financial situation of the woman, the higher her re-entry rate; she can afford re-entry. In the case of divorced and separated women, as compared to married women, Bradburn et al. (1995) expect higher return rates due to financial necessity. They also discuss the impact of the number and age of children. When the youngest child reaches school age, the demand on the mother's attention decreases and a return to educational participation is thereby facilitated. Time and financial demands also decrease when all children have left the home, giving the mother more freedom to pursue her educational career.

Hypotheses concerning education, current economic situation, divorce and widowhood were supported by empirical analyses on a small two-wave panel study from 1956 and 1986 in upstate New York. Part-time employed women had a higher return rate than full-time employed women. Hypotheses concerning the presence of young children were only partly supported, and the onset of the empty nest was connected with a lower return rate rather than with an increase.

Another issue addressed by Bradburn et al. is the type of education pursued. For example, women had a high return rate to courses that they had begun but not completed. Different types of education are also distinguished in Teachman and Polonko's (1988) study of college enrolment for the high school class of 1972. They find that enrolment in four-year colleges is more sensitive to marriage and parenthood than enrolment in two-year colleges, and they attribute this difference to the greater geographical accessibility and more flexible scheduling of the latter type of colleges.

Teachman and Polonko include both women and men in their analysis. Their findings show that, even for men, marriage and parenthood are negatively associated with college enrolment, but that marriage is more detrimental to women. Turning to an analysis of college graduation, they find that marriage is still more detrimental to women, but parenthood is more detrimental to men. The major reason for married women's lower enrolment is said to be the greater

household demands placed on them. The stronger impact of parenthood on men's enrolment is interpreted either as a result of increasing financial demands or of spending time with the child.

Teachman and Polonko also analyse the influence of marriage and parenthood duration. It is assumed that the effects of both marriage and parenthood decline the longer individuals have been married or been parents, because older children demand less time than newborns and because the emotional and time demands of marriage are assumed to decrease with marriage duration. These hypotheses were supported when duration of marriage and parenthood were grouped into the categories: up to one year, one to two years, and longer than two years.

So far the discussion has dealt with the impact of marriage and parenthood on the decision to return to college. It is also important to note that a causal influence in the opposite direction could be present. Individuals take the schooling process into account when decisions on childbearing and marriage are made. The lower enrolment of married women and mothers may not be causally attributable to marriage and motherhood, but to a preference for forming a family over pursuing a professional career. These considerations raise the question of the degree to which low enrolment after marriage and motherhood can be attributed to self-selectivity into these states. The interrelation of schooling, parenthood, marriage formation and dissolution is the focus of a paper by Panis *et al.* (1995). They estimate a system of equations to explain schooling, non-marital and marital fertility, marriage formation and dissolution for women, taking self-selection into account. Even after controlling for self-selection, the estimations indicate that childbearing substantially increases the risk of school dropout. Marital status, on the other hand, does not have statistically significant effects on high school enrolment, but some effect on college enrolment. Concerning selectivity issues, the estimations indicate a negative correlation between the unobserved components of educational progression and non-marital fertility. Hypotheses concerning self-selection into education – self-selection related to marriage and re-marriage, marital fertility or marriage dissolution – are not, however, supported by the model.

Considering more complex family circumstances

The present analysis extends the studies discussed above by applying a more complex concept of family circumstances. The university enrolment of single persons is compared with that of cohabiting persons, married persons and separated persons, and additionally parents are compared with childless individuals. Considerations based on self-selectivity into partnership, marriage and parenthood lead to expectations of low university enrolment rates for parents, married individuals and possibly even cohabitants. It is also assumed that the younger a person is at childbirth or at marriage, the lower the educational and occupational aspirations.

To simplify the discussion, I distinguish between 'traditional' and 'modern' partnerships. Modern partnerships are characterised by a more equal relationship marked by egalitarian attitudes and dual-earner status. Traditional partnerships, on the other hand, stick more closely to the male-as-breadwinner model and

more traditional attitudes. There is some indication that marriages are more traditional and that non-marital relationships tend to be more modern (Duvander, 1998; Henz and Sundström, 2001).

Considerations based on the human capital approach can be found in more detail in Henz (1999). To sum up the most important hypotheses, we first turn to the costs of studying. People living in partnerships, as opposed to the single and separated, have someone else to support them during the course of study. The earnings loss during the course of study is on average higher for men than for women. Thus, traditional partnerships, as opposed to modern partnerships, should experience more difficulties when the male income is absent. Persons living with children may be more sensitive to income loss than others. Turning to the gains from studying, the expected future labour-force participation is generally lower for women than for men, and especially low for women in traditional partnerships. Women with children may participate less in the labour force, independent of their family circumstances.

These considerations lead to somewhat ambiguous expectations concerning enrolment. If the financial situation during the course of study is of minor importance because of the availability of study loans, women in traditional partnerships should have lower enrolment rates than others because of their lower expected labour-market participation. Study loans do not replace medium- or high-level earnings, which is why we should still expect lower enrolment rates for breadwinners. Having a child should in all circumstances lower educational participation.

Family circumstances change over a person's lifetime. Hypotheses concerning the impact of children's age and marriage duration have been presented earlier. Other hypotheses tested below address the age at which family events occur. If early marriage and parenthood indicate a strong family orientation, the effects of marriage and parenthood at young ages should be more detrimental than if these events occur at higher ages. Thus it is assumed that early marriage and parenthood are associated with permanent disadvantages. The human capital approach would lead to a somewhat different question, namely whether enrolment differences between family circumstances change with age. At higher ages the time of employment after study is shorter and thereby reduces the expected absolute gains from study for *all* family circumstances. As a consequence enrolment differences by family circumstances should become smaller at higher ages.

The choice of higher education can also be a reaction to life events within or outside the family. In particular the breakdown of earlier family plans – not finding a partner, divorce, infertility – may encourage a reorientation towards an occupational career, thereby encouraging greater interest in education. There is empirical evidence that women increase their labour supply in connection with a divorce (Diekmann, 1994; Johnson and Skinner, 1986; Tian, 1996). Additional factors that could encourage individuals to enrol in studies are discontent with the present occupational career and the desire to start a new career following a break in connection with childbirth. For example, mothers of young children should have a higher enrolment rate because education can often be the first step of a woman's re-entry into the labour market (Jonung and Thordarsson, 1980).

Modelling issues

Discussions concerning the correct way to model the impact of the family situation on education have focused on the endogeneity of marriage and parenthood. There is no straightforward solution to the problem of how to separate the causal relationships. Because we have no information on educational attitudes and plans, family circumstances themselves are interpreted both as indicators of patterns of living conditions and as preferences.

Another problem concerns the concept of educational attainment. For an increasing number of individuals, education is not completed in one go. Educational sequences are disorderly and overlap with family formation (Bumpass and Call, 1989; Davis and Bumpass, 1976; Hörnqvist, 1994; Rindfuss et al., 1987; see also Jonsson, Chapter 1 of this volume). Therefore, the observed short-term and long-term effects of family formation could differ. A discussion of selected studies with respect to the two problems of modelling can be found in Henz (1999). The latter problem is solved here by analysing educational transitions instead of attainment, and also studying changes in the effects of family circumstance over the life-course.

By taking the timing of family events into account, it is also possible to examine, albeit indirectly, the relevance of joint decisions about education and the family. At the level of behaviour we do not observe much simultaneity of changes in study enrolment and family situation. In the multivariate models estimated I use information on the time since the first of two possibly related events. If the intensity is high for short durations since the earlier of the two events, the interpretation of a joint decision gains plausibility. If the time interval between the joint events is long, that is if the intensity is low, it is doubtful that we are dealing with joint events. The longer the time interval between events, the more opportunities arise for a change of plans and for a reaction to new options. In such a situation the joint decision might be regarded as a strategy that could also be modified in accordance with changing circumstances. It is then appropriate to treat the earlier part of the decision as a condition for the later part.

Data

The 1992 FFS provides information about respondents' family circumstances and attitudes at the time of the interview, and about social background. In addition, retrospective histories of union formation and dissolution, childbearing, education and selected other activities were collected. Random samples of five age cohorts, namely ages 23, 28, 33, 38 and 43, were drawn from the Swedish population. The survey response rate was 78 per cent. In each group about 650 women were interviewed. A sample of men was drawn for the cohorts aged 28, 33, and 43. About 640 interviews were carried out in the youngest and oldest cohort, and about 380 in the middle cohort. Because of the different age composition of the male and female sample, the results of the multivariate models are not strictly comparable for the two sexes. The analyses refer to students aged 22 (women) or 23 (men) and above. We do not use information on the youngest group in the study. Ages above 33 are only covered

by the two oldest groups in the sample, and only one group reaches ages above 38. Our focus is university enrolment. Episodes in university are recorded if they lasted for at least one term of full-time studies or two terms of half-time studies. If reported, even shorter episodes are included.

Institutional background

All the studies discussed above are based on US data. The Swedish situation differs in several respects, most of which are associated with the lower costs of participation in higher education. On the other hand, rates of return from university studies are also lower in Sweden, because income is more equally distributed than in the US (Aaberge et al., 1998). Enrolment rates in higher education are lower in Sweden than in the US.

Sweden was a trailblazer in the rise of non-marital cohabitation. In the cohorts studied here, about 90 per cent of all women cohabited before they eventually married (Bracher and Santow, 1998). At age 22, about 70 per cent of the women and 45 per cent of the men in all cohorts had some cohabitation experience. The shares rose to nearly 90 per cent for women and 70–80 per cent for men at age 26. Students have a lower tendency to begin cohabitation than others, but the differences have decreased over historical time (Hoem, 1986, 1995b).[4] In the more recent birth cohorts, first birth has been postponed. The median age at first birth has risen from 23 for the generation of women born in 1945, to 26 for the women born in 1965 (SCB, 1994).

The number of entrants into higher education was stable at between 40,000 and 45,000 per year during the 1970s and 1980s. Since the end of the 1980s it has increased considerably (Swedish Ministry of Education and Science, 1992). At the same time the number of students who left school with a university entrance qualification rose. Whereas in the 1948 birth cohort 68 per cent of those with a university entrance qualification took up university studies before the age of 21, the share dropped to 39 per cent in the 1953 birth cohort and to 29 per cent in the 1963 cohort (Reuterberg and Svensson, 1992). This drop is partly due to the larger populations leaving school with a university entrance qualification, but also to the selection rules for admission to higher education, which favoured employment experience.[5] This led to an 'adultification' of higher education at the end of the 1970s, when the number of entrants above the age of 25 was greater than 20,000 (Swedish Ministry of Education and Science, 1992). This figure dropped to less than 15,000 in 1986–87, and rose again thereafter. Nowadays, the majority of students aged 30 and above are women (Brandell, 1998).

University enrolment has also been influenced by the labour-market situation. During the 1970s some branches of higher education did not lead to attractive employment opportunities. Since the end of the 1980s the demand for higher education has increased and this may have encouraged women in particular to increase their labour-market participation. Re-entry into the educational system was a common precursor to labour-market entry for women (Jonung and Thordarsson, 1980).

The loss of income during studies can be partly outweighed by the study allowance, the increased housing allowance and the study loan. For a small

group of people, even more advantageous arrangements during studies are possible (SOU, 1991). In 1975 a special adult study allowance (*särskilt vuxenstudiestöd*) was introduced to replace the income foregone during study. Since 1984 the support has been even more generous for individuals who qualify for unemployment benefit, especially those with children. The special adult study allowance was primarily directed to education at the secondary level, thus it should concern relatively few individuals in this analysis.

Of particular importance in Sweden are the family policy measures of recent decades that are intended to lower the financial and time costs associated with having children. Key factors are the expansion of public childcare facilities and the generous parental leave programme, which made it easier for parents to combine parenthood and employment (see Jonsson and Mills, Chapter 4 of this volume).

Taking up university studies

I focus on higher ages and restrict the analyses to women of at least 22 years of age and men of at least 23 years of age.[6] I analyse only individuals who have not taken up any university studies before that age.[7] Therefore, most individuals in this study have spent a certain amount of time outside the educational system before taking up university studies. By focusing on students at higher ages, a subgroup of students are considered that should differ from the total group of students in several respects. For example, most men and women who enter university studies soon after finishing secondary education may have stronger educational aspirations and better grades than those who postpone university entry. Additionally, students at younger ages are mostly single, and cohabiting or being married or a parent constitute rather unusual situations.

The upper part of Table 3.1 gives an overview of the sample selection. In addition to the age limit, two further restrictions are applied. Firstly, as it is difficult to assess who has the necessary qualifications to attend university, only individuals who have at least some kind of education at the upper-secondary level are included.[8] This criterion implies a balance between including people who lack the formal qualifications to apply for university studies, and excluding people who have these qualifications.[9] There is no uniform admission rule for university study. Different grades can be required for different courses and occupational experience can replace educational qualifications. Thereby even people with lower educational qualifications can apply for university studies, but their enrolment rate is low. Some people who fulfil the qualifications are not admitted to university because the number of places is limited.

The second restriction in these analyses is that of only including those people who take up *full-time* university studies. Part-time courses have become more common in recent decades. Their expansion aims at attracting to higher studies persons who, for various reasons, have problems committing themselves to full-time studies. In my data, part-time studies differ from full-time in that they less often lead to a degree when university studies *begin* on a part-time basis. The distributions of family circumstances indicate that married women in particular enrol in part-time studies. Because the number of part-time students in our data is too small for a separate analysis, the subsequent analyses are

Table 3.1 Overview of the sample selection, and sample description.

	Men	Women
Number of persons who have some kind of upper secondary education or higher	1,151	1,865
– and take up higher education	334	582
– and are 22 (women) or 23 (men) years of age or older when they take up studies	102	258
– and start with full-time studies	91	214
Only those who take up full-time studies at or after age 22/23 and have upper-secondary education or higher (91 men and 214 women):		
Number still enrolled after:		
– 12 months of full-time study	72	172
– 24 months of full-time study	50	109
– 36 months of full-time study	36	60
Attaining a degree before interview	28	54
Full-time enrolled at interview	27	41
Number of episodes in university:		
1	86	185
2	5	26
3	0	3
Distribution of family status at start of study (%):		
Single	22.0	29.7
Cohabiting	31.8	28.6
Married	26.6	23.1
Separated	19.6	18.7

Source: FFS 1992, age groups 28, 33, 38, 43.

restricted to the 91 men and 214 women who begin their university studies on a full-time basis.

The lower part of Table 3.1 gives information on study duration. Interruption rates are very high in the selected sample. Only about one-third of the men and one-quarter of the women who took up full-time university studies at age 23/22 or later have attained a degree at the interview date; about the same proportion in each group was still enrolled. Re-entering university after a break is more common among women: 26 of them report two stays in university, and three of them report three.

The selected student population consists of about equal shares of single, cohabiting, married and separated individuals, the last category being somewhat smaller. The distribution of family states is surprisingly stable over study durations.[10] This may indicate that, once enrolled in university studies, the interruption rates do not differ between the family constellations. An alternative explanation is that family circumstances with higher interruption rates also have a high inflow during university enrolment. From the multivariate analyses below it can be concluded that stability derives from differences in interruption rates that are outweighed by family formation processes.

The share of mothers in. the sample decreases from 42 per cent at the beginning of the first year of study to 32 per cent at the beginning of the third study year, indicating an increased interruption rate among them. In the same period, the share of fathers varies between 22 and 28 per cent of the male students without showing a clear trend.

Multivariate models

Models

Transition rate models for the beginning of full-time university studies and the interruption of full-time studies are estimated. No models for re-entry into university are presented, because the remaining sample is very small and no statistically significant differences were observed for this transition. Nor is the attainment of a degree analysed, because the data do not allow us to determine whether a long period of study is due to low commitment on the part of the student or, on the contrary, to enrolment in a long and often more prestigious line of study.

The length of time until university entrance is measured in months since age 22 for women and age 23 for men. If the individual took up part-time university studies first, the observation is censored at that date. For the second model, the duration until interruption is measured as equivalent months of full-time study since first entry to university; interruptions of part-time studies are not studied.

To analyse the transitions, piecewise constant exponential hazard models are estimated. The dependent variable is the hazard rate:

$$r\left(t \mid X(t)\right) = \lim_{\Delta t \downarrow 0} \frac{P\left(t, t + \Delta t \mid T \geq t, X(t)\right)}{\Delta t} \qquad (3.1)$$

with T the time of the event of interest, t any fixed point in time under risk, and $P(t, t + \Delta t)$ the probability that the event occurs in the interval $[t, t + \Delta t]$. $X(t)$ represents the $1 \times m$ vector of explanatory variables, which may, or may not, vary with duration t. In piecewise constant hazard models, the time axis is divided into l intervals $I_j, j = 1,...,l$, and the hazard rate is assumed to be constant in each interval:

$$r\left(t \mid X(t)\right) = \exp\left(\sum_{j=1,...,l} \alpha_j I_j\left(t\right) + \sum_{k=1,...,m} \beta_k X_k\left(t\right)\right), \quad I_j\left(t\right) = \begin{cases} 1 & \text{if } t \in I_j \\ 0 & \text{otherwise} \end{cases} \qquad (3.2)$$

In most of the models it is assumed that the covariate effects are constant over the whole observation period, but for transitions to university the covariate effects are allowed to vary by age group. The models are estimated using the program TDA (Blossfeld and Rohwer, 1995).

In the analyses of study interruption, a person may contribute more than one episode to the data set. Because it is not plausible to assume that these episodes are independent, an individual-specific random error term was allowed for in the linear predictor.[11] The modification did not result in relevant changes in the estimated parameters, and the estimated standard deviation of the error term was small in all models. Only the models without individual-specific error terms are presented.

Variables

Participation in higher education is modelled separately for men and women. Apart from family circumstances and age, we take period, social origin and previous educational attainment into account. Some of the variables are not included in a model if the estimated effects are not significant.

The main focus of the analysis is on family circumstance and being a parent. *Family circumstance* can vary over time. It is measured by the four categories: 'single', 'cohabiting', 'married' and 'separated'. A person with no previous partnership experience is classified as single. Individuals who currently cohabit are either cohabiting or married. Finally, persons who have previous cohabitation or marriage experience, but are currently not living with a partner, are classified as separated. In most analyses, the two categories 'single' and 'separated' are combined into one 'single/separated', because the number of separated persons is rather small. In many models the above categories are further divided according to whether the individual currently has *at least one child* (value 1) or not (value 0).[12]

The time-dependent variable *age* measures age in years since age 22 for men and women. It is only used in the model for interruption. *Period* is denoted by a time-dependent indicator for time before January 1987 (value 0) or during January 1987 and later (value 1).[13] Changes in the effects of family circumstances before and after 1987 were tested by including interactions between the indicators. Social origin is measured by a dummy variable that indicates whether *the father had been a manual worker* (value 1) or not (value 0).[14] *Educational attainment* is measured by one or several time-varying dummy variables. To analyse the beginning of university studies, four levels are distinguished:

1. maximum of two years in a high school vocational or academic course or equivalent (vocational);

2. adult education equivalent to a three-year upper-secondary course (adult education);

3. three- or four-year high school course completed (high school);

4. vocational training beyond the secondary level (high vocational).

For dropping out of university, a dummy variable is used with value 1 for both 'adult education' and 'high school', and value zero otherwise.

Finally, various time and age dependencies were tested for, including age at first partnership formation, age at first childbirth, the duration since partnership formation, and the duration since childbirth. The time-dependent *age of the youngest child* is the age of the child in years if the person has a child, and zero if there is no child. Thus a model with time-dependent covariates for educational attainment ($E(t)$), period ($P(t)$), family situation ($F(t)$), and age of the youngest child ($C(t)$) takes the form:

$$\log\left(r\left(t \mid X(t)\right)\right) = \left(\sum_{j=1,...,l} \alpha_j I_j\left(t\right)\right) + \hat{\beta}_E E\left(t\right) + \hat{\beta}_P P\left(t\right) + \hat{\beta}_F F\left(t\right) + \hat{\beta}_C C\left(t\right) \qquad (3.3)$$

with $\hat{\beta}_E$ the parameters for the educational levels, $\hat{\beta}_P$ the parameter for the period, and $\hat{\beta}_F$ the parameters for the different family circumstances. The difference in the log rates of a childless person compared to those of a person with a newborn child is estimated by the respective $\hat{\beta}_F$ parameter. The $\hat{\beta}_C$ parameter gives the difference in the log rate for any additional year of age of the child.

Similarly the *duration of the present partnership* is a time-dependent variable with the duration since partnership formation measured in years. It has the value zero for currently single/separated individuals. The time-dependent variable *duration since separation* measures the duration since the last separation for currently separated persons. It takes a value of zero for persons in other family states. For previously or currently married persons we also use the *age at first marriage* in years since age 17 for exposure times after the first marriage. The variable takes the value zero for never married persons or for exposure times before the first marriage. For persons who have had a child, their *age at first birth* is given in years since age 17 for times at or after the birth of the first child. The variable takes the value zero for persons without a child. To allow for non-linear relationships, the squares of the age or duration have also been used in the models. More indicators have been created for partnership formation at early ages or childbirth occurring at early ages, but no significant effects were found.

Results: transition to university

Table 3.2 shows the results for women's transition to university from models with age-specific effects.[15] We distinguish two age groups, namely from 22 to 25 years of age, and age 26 and higher. The baseline rate is considerably higher in the younger age group than in the older age group. At younger ages, eight out of 1,000 women who have not yet begun university studies take up full-time studies every month. This estimation refers to single/separated women with a high school degree and a father who is not a manual worker. In the older age group, among women with the same characteristics, only two out of 1,000 women who have not yet been enrolled in university studies take up a full-time course of study.

The model estimations show strong differences as a function of educational level. The transition rate of women with vocationally oriented education is only about one-third as high as that of women with a high school degree. Women with an upper-secondary degree from adult education have a propensity to take up university studies that is 60 per cent higher than that for those with a high school degree.[16] The high transition rate of women with a degree from adult education shows that these women take up university studies quite quickly after having attained the degree. At age 26 and older we observe the same rank order of transition intensities with regard to educational levels.

Father's class exerts a strong effect on university enrolment. The propensity of daughters of manual workers to take up university studies is only half as high as that of daughters of non-manual employees, professionals or the self-employed.

Family circumstances strongly influence the transition probabilities to university. In the younger age group, childless single/separated women have the

Table 3.2 *Women's transition rates to full-time university studies. Piecewise constant exponential hazard rate model with age-specific effects.*

a) Overview of model selection

	df	Minus log likelihood	No. of events
			206
A Baseline only	2	1,598.3	
B A + Family circumstances	12	1,568.9	
C B + Education, Social origin, Period	22	1,529.5	
D C + Period specific family effects	32	1,527.4	

b) Estimated relative risks from model C

	Age 22–25	Age 26 and older
Baseline hazard rate	0.0080	0.0021
Education:		
Vocational	0.30***	0.44***
Adult education	1.63	1.99*
High school (ref.)	1	1
High vocational	0.32***	0.66
Father manual worker	0.50***	0.67**
Period: January 1987 to 1992	1.03	0.90

Family circumstances (ref.: single/sep., no child)	No child	Child	No child	Child
Single/separated	1	0.61	1	1.45
Cohabiting	0.43***	0.10***	1.42	0.65
Married	0.33**	0.28***	0.67	0.59*

Significance levels for differences between family circumstance effects

	Age 22–25	Age 26 and older
Cohabiting: child vs. no child	***	***
Married: child vs. no child		
Child: cohabiting vs. married	*	
No child: cohabiting vs. married		**

Note: * = significant at the 10% level; ** = at 5%; *** = at 1%.

highest propensity to attend university. As expected, childless cohabiting women have lower rates, and the rate is somewhat lower still for childless married women. We also find that having a child lowers the transition rate in all family circumstances, but the effect is very small for married women. Cohabiting mothers have the lowest transition rate in the younger age group. In the older age group the differences between family statuses are somewhat smaller. We observe the highest rates among single/separated mothers and childless cohabitors. Childless single/separated women are in a middle position while the remaining three groups – childless married women and married or cohabiting mothers – have relatively low transition rates. As mentioned, for married women

having a child or not hardly makes any difference, but among cohabiting women, mothers have a much lower transition rate than childless women.

At higher ages most women with university aspirations have had time to carry out these plans. Therefore, the transition rates should be generally lower. Also, differences between the family circumstances are smaller. This is in line with the reasoning above, according to which marriage and parenthood at young ages are more self-selective and may be associated with lower educational aspiration levels.

Table 3.3 presents models that test whether the timing of family events has an influence on the transition to university. All covariate effects are now restricted to be constant over age. We see that the earlier in life a woman marries, the higher her propensity to enrol in studies after the marriage.

*Table 3.3 Women's transition rates to full-time university studies. Effects of time-related indicators.*

	Model 1	Model 2	Model 3	Model 4
Baseline age 22–25	0.0057	0.0056	0.0074	0.0069
Baseline age 26+	0.0044	0.0046	0.0052	0.0048
Education:				
Vocational	0.34***	0.34***	0.34***	0.35
Adult	1.76**	1.77**	1.76**	1.79**
High school (ref.)	1	1	1	1
High vocational	0.48***	0.49***	0.49***	0.49***
Father manual worker	0.59***	0.59***	0.59***	0.59***
January 1987 to 1992	0.94	0.96	0.95	0.96

Family circumstances (ref.: single/sep., no child)	No child	Child	No child	Child	No child	Child	No child	Child
Single/separated	1	0.84	1	0.51	1	0.34**	1	0.51
Cohabiting	0.63**	0.31***	0.63**	0.30***	0.63**	0.16***	0.82	0.07***
Married	0.39***	0.35***	0.54	0.49***	0.40***	0.17***	0.40**	0.23***
Age at marriage				0.94*				
Age of youngest child						1.25***		1.18*
Age youngest child squared						0.99**		0.99*
Cohabiting/single: Age y. child								1.29
Cohabiting/single: Age y. child sq.								1.00
Number of parameters		12		13		14		16
Minus log likelihood		1,538.3		1,536.2		1,534.0		1,529.6

Significance levels for differences between family circumstance effects in model 1

Cohabiting: child vs. no child   ***
Child: cohabiting vs. married
Married: child vs. no child
No child: cohabiting vs. married   *

Note: * = significant at the 10% level; ** = at 5%; *** = at 1%.

Figure 3.1a illustrates the estimated effects for women who married at age 20 and age 30. The effect of age at marriage is quite small and does not compensate the low enrolment rates of early married women. This corresponds to the results of Davis and Bumpass (1976) described above.

Women's transition to university also varies with age of the youngest child. The effects are depicted in Figure 3.1b. The transition rates are lowest when the child is of preschool age. For married women there is hardly any variation as a function of the child's age, but among single/separated or cohabiting women the transition rate increases strongly with the age of the child. When the youngest

Figure 3.1a Women's estimated transition rates to university by age at marriage
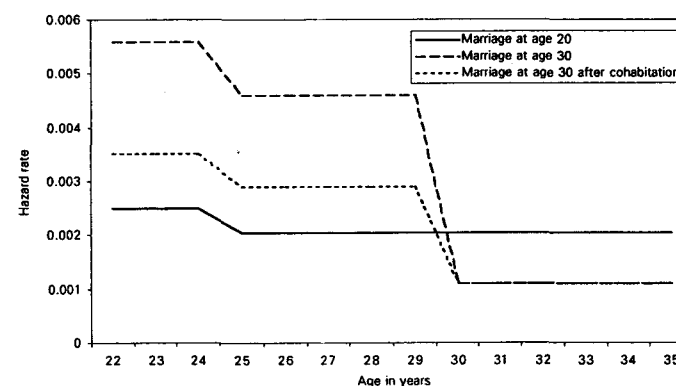
Note: Model 2 in Table 3.3 evaluated for high school education, father not manual worker, and before 1987.

Figure 3.1b Estimated effect of child's age on women's transition to university studies
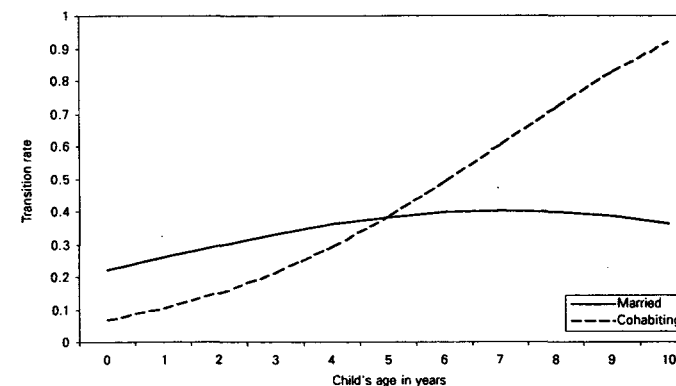
Note: Model 3 in Table 3.3; only effects of family circumstance and age of youngest child taken into account.

child is ten years old, these women have about the same transition rates as single/separated childless women.

Similar models for the transition to university are estimated for men. The results are given in Table 3.4.[17] Compared to women, men have lower transition rates to university, with the exception of those with a degree from adult education and, in the younger age group, respondents with a high vocational qualification. As for women, we observe a drop in transition rates for ages in the late twenties. The effects of education are similar to those observed for women, but some differences between the educational groups are larger. In contrast to women, the period effect is significant for men, indicating a 60 per cent higher transition rate in and after 1987 compared to the period before. This may be related to the expansion of technical studies in the late 1980s (Högskoleverket, 1998). Men's propensity to take up full-time university studies differs as a function of family circumstances in a similar manner to women's, with the exception of childless married men who take up university studies at rather high rates.

We also observe effects of the timing of life events on men's first entry into university. The effects that are significant at the 10 per cent level are reported here, but some of this evidence is rather weak because the number of cases is small. Men's tendency to attend university decreases with the duration of the current partnership.[18] We also observe an effect of the age of the youngest child.[19] The older the youngest child, the lower men's propensity to take up studies. This pattern is different from that of women. It is possible that childcare puts a greater burden on the mothers soon after childbirth and on fathers when the children grow up. Our result is not supported by the findings of Teachman and Polonko (1988), who report increasing enrolment with the age of the child, but they consider only very young ages of the child and they control for a set of covariates. Teachman and Polonko actually find very different gross enrolment patterns for different types of schools, with a decreasing rate of attending a four-year school and a constant rate of attending a two-year school. Separated men take up university studies shortly after the separation. For longer durations since the separation, the enrolment rate decreases greatly. This effect is noteworthy because the hypothesis about increased participation in education following a separation had only been formulated for women, who were assumed to be unprepared to earn an independent living. Because this should not apply to men, we interpret this effect as a reaction to separation that leads to a revision of decisions in other spheres of life. Contrary to the findings for women, men's propensity to take up university studies increases with age at marriage until age 28 and decreases for higher marriage ages.

Results: interruption of university studies

Table 3.5 gives model estimations for the interruption of higher education for women. Stays in university are longer among women with a high school degree or a degree from adult education compared to women with a vocationally oriented degree, in accordance with our expectations. Stays in university become shorter with age, as predicted by human capital theory. The duration of full-time study also varies by family circumstance. Single/separated childless women

Table 3.4 Men's transition rates to full-time university studies. Piecewise constant exponential hazard rate model.

a) Overview of model selection

	df	Minus log likelihood	No. of events
			89
A Baseline only (age specific)	2	702.0	
B A + Family circumstances (age specific)	12	691.5	
C B + Education, Social origin, Period (age specific)	22	647.2	
D No age-specific effects, variables as C	12	652.5	
E D + Period-specific family effects	17	650.5	

b) Estimated relative risks

	Model D	Model D1	Model D2	Model D3	Model D4
Baseline rate age 23–25	0.0038	0.0035	0.0033	0.0034	0.0037
Baseline rate age 26+	0.0018	0.0019	0.0016	0.0017	0.0018
Education:					
Vocational	0.28***	0.27***	0.28***	0.28***	0.28***
Adult education	4.50***	4.34***	4.52***	4.39***	4.16***
High school (ref.)	1	1	1	1	1
High vocational	0.74	0.74	0.74	0.76	0.75
Father manual worker	0.45***	0.47***	0.46***	0.47***	0.45***
Period: January 1987 to 1992	1.60**	1.72**	1.67**	1.56**	1.65**
Family circumstances:					
Single/sep., no child (ref.)	1	1	1	1	1
Cohabiting, no child	0.63*	0.79	0.63*	0.70	0.62*
Married, no child	0.76	1.16	0.75	0.83	0.41
Single/sep., child	0.75	0.69	1.46	0.64	0.52
Cohabiting, child	0.24***	0.40	0.34*	0.26**	0.22***
Married, child	0.38***	0.98	0.63	0.41***	0.21***
Partnership duration		0.89***			
Age of youngest child			0.90*		
Separated				2.38**	
Duration since separation				0.71*	
Age at marriage					1.32*
Age at marriage squared					0.98**
Number of parameters	12	13	13	14	14
Minus log likelihood	652.5	648.5	650.7	649.3	649.8

Significance levels for differences between family circumstances in model D

Cohabiting: child vs. no child	***
Child: cohabiting vs. married	
Married: child vs. no child	*
No child: cohabiting vs. married	

Note: * = significant at the 10% level; ** = at 5%; *** = at 1%.

Table 3.5 Women's interruption of university studies. Piecewise constant exponential hazard rate model.

	Model 1	Model 2	Model 3	Model 4
Baseline 0–11 months	0.020	0.033	0.019	0.021
Baseline 12–35 months	0.036	0.042	0.035	0.040
Baseline 36+ months	0.024	0.030	0.026	0.030
High school/adult education	0.73*	0.72*	0.75*	0.72*
Age	1.04**	1.03	1.04*	1.04*
Period: January 1987 to 1992	0.65**	0.66**		0.66**

Family circumstances			Before 1987	In/after 1987	
Single/sep., no child		0.61*	0.84	0.20***	0.78
Cohabiting, no child		1	1	0.98	1
Married, no child		2.29**	2.31*	2.01	2.25**
Single/sep., child		0.86	1.17	0.46	1.67
Cohabiting, child		0.85	0.81	0.93	0.80
Married, child		1.18	1.27	0.89	1.11
Separated				0.45**	
Number of events	149				
Number of parameters	6	11	16		12
Minus log likelihood	674.6	666.7	662.8		664.4

Significance levels for differences between family circumstance effects in model 2

Cohabiting: child vs. no child	
Married: child vs. no child	***
Child: cohabiting vs. married	
No child: cohabiting vs. married	***

Note: * = significant at the 10% level; ** = at 5%; *** = at 1%.

have the lowest interruption rates. As can be seen from Model 3, the interruption rate of single/separated women dropped sharply after 1987, indicating longer courses of study. This may correspond to the increasing labour-force participation of women at the end of the 1980s. Separated women stand out as having a very low interruption rate (Model 4). Married childless women have a higher interruption rate than all other women.

The estimation results for men are given in Table 3.6.[20] The few lone fathers are excluded from the analysis. The most remarkable finding is that childless single/separated men have a higher estimated interruption rate than men who live in partnerships. We also found weak evidence that men have lower interruption rates early in the family formation process than in longer lasting partnerships or when having older children (these results are not shown).

Table 3.6 Men's interruption of university studies. Piecewise constant exponential hazard rate model.

	Relative risk
Baseline	0.027
High school/adult education	0.41**
Age	1.03
Family circumstances:	
Single/sep., no child (ref.)	1
Cohab./married, no child	0.57
Cohab./married, child	0.88
Number of events	37
Number of parameters	5
Minus log likelihood	186.0
Significance level for difference between effects	
Cohabiting/married: child vs. no child	***

Notes: Single fathers are excluded from the analysis.
*** = significant at the 5% level; *** = at 1%.*

Summary and discussion

The high enrolment rates at higher ages in Sweden indicate substantial opportunities to improve educational attainment at later stages in the life-course. The main question of this study concerns enrolment differences in university as a function of family circumstance. By restricting the analysis to full-time university studies, the focus is on a type of education that should be the most difficult to combine with family responsibilities. Therefore the findings are not generalisable to all types of education.

In the empirical analyses, substantial differences emerged both in taking up university studies and in interrupting these studies. Single/separated childless men and women are among those with the highest enrolment rates, and married men and women are among those with the lowest enrolment rates. This pattern fits well with the assumption that people self-select into different family circumstances, and that a stronger involvement in family roles is usually not combined with education. Nevertheless several deviations from this general pattern indicate that self-selection does not explain all results. Having a child is associated with lower enrolment rates among male and female cohabitants as well as among married and single/separated men. There was no negative effect of having a child among married women, and having a child hardly affected single/separated women's transition rates. That having children does not matter for these women can be understood from the specific situations. Married women have low transition rates to university independently of having a child, which should be interpreted as anticipation of later family plans and as self-selection. The relatively high transition rates of lone mothers correspond with their anticipated high labour-force participation.

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Cradle to Grave

Family formation and participation in higher education: crosscutting life events?

65

The results provide interesting answers to the questions formulated in the introduction. Compared to single/separated individuals, married and cohabiting persons have lower rates of taking up full-time studies, and single/separated childless women also have a lower propensity towards interrupting their studies. Cohabiting men and women behave for the most part like their married counterparts. The only difference between cohabiting and married persons was found for childless women, with cohabiting women showing a stronger attachment to higher education than married childless women.

The detrimental effect of having a child has already been discussed. Interestingly, the enrolment of men and women varies in different ways as a function of the age of the youngest child. Mothers' propensity to study rises with the age of the youngest child, whereas fathers' propensity decreases. It can be assumed that, for both parents, the role as a provider becomes increasingly prominent, but that the women have postponed the necessary education until after childbirth.

Some of the sex differences have also been discussed earlier. Remarkably, the enrolment patterns turn out to be rather similar for men and women. High transition rates to university were found after a separation not only for women but also for men. For women this was expected because the unforeseen financial demands may lead to a need for more education. However, because men should be prepared to earn a living by themselves, their high transition rates should not be financially motivated. Instead this pattern may indicate a reorientation in life that is triggered by another life event. Differences in the behaviour of married men and women were also expected, and found. Married childless women have lower transition rates than cohabiting childless women, but married childless men have the same or even higher transition rates compared to cohabiting childless men. It seems as if, for men, marriage does not mark an entry into a more serious commitment to work and family, whereas for women it marks the end of educational participation.

Additionally, several indications of the impact of the timing of family events were found, but most of these timing effects do not offset the basic differences associated with family circumstance. They indicate instead the limited flexibility of individuals and their families to adapt to emerging needs or to opportunities to choose the 'unusual' option of full-time studies at higher ages.

To conclude, the opportunity to enrol in university studies at higher ages is mostly taken by persons with few family responsibilities. Parents rarely enrol in university studies, and even married childless women have low enrolment rates. In this respect, the measures that should encourage parents to study have not fundamentally changed enrolment patterns in tertiary education.

It cannot be discerned from the present study whether the groups with low enrolment rates do not want to study or whether their life circumstances have made studying more difficult. The data provide no information on educational aspirations, grades or on partner's education and occupation. Such information is necessary to better understand the enrolment decisions of individuals and their families.

Notes

1 This was the second highest figure for the countries in the European Union for which information was available.

2 The terms 'university studies' and 'higher education' are used interchangeably. In the empirical analyses they refer to higher education that usually requires a three-year upper-secondary educational degree.

3 The empirical analyses are based on the National Longitudinal Survey of Labor Market Experience of Young Women 1968–1973.

4 This finding refers to female students below age 27 and male students below age 28.

5 Work at home could contribute to qualifying for higher education (Jonung and Thordarsson, 1980). In the most recent years, it has also become possible to raise high school grades after leaving high school by taking extra courses and exams. Older applicants thereby improve their grades and chances of admission to university. The rising number of older students among first-year university students could be partly due to this rule.

6 With the additional year of age for men military service is taken into account.

7 For immigrants the study requires additionally that they have lived in Sweden at least one year before taking up university studies.

8 This includes two-year vocational training at the upper-secondary level, three-year adult education, an upper-secondary level diploma, vocational training beyond the secondary level or equivalent levels of education.

9 Without this restriction, there would be 222 women and 96 men who take up full-time studies after age 22/23 instead of 214 women and 91 men.

10 Figures can be found in Henz (1999).

11 These models were estimated with the SABRE package developed at the Centre for Applied Statistics at Lancaster University.

12 The variable is an indicator for parenthood and does not take into account whether the child lives in the same household as the parent.

13 This period definition is a pragmatic one that divides the transitions roughly into two equally large groups. From the general trends in the university system the period before and after 1981 is distinguished first, because the admission rules then changed in favour of younger students. Differentiating the time before and after 1981 did not prove to be important, possibly due to the small number of observations before 1981 in our sample.

14 The variable 'father manual worker' has the value 1 for three categories of father's occupational group: 'manual worker', 'manual worker with subsidiary farming', and 'farmer'. The value zero stands for 'salaried employees', 'self-employed', 'independent professionals', and 'others'.

15 For categorical variables the numbers of events and the times of exposure are given in Appendix 3.1.

16 Though the estimated effect is quite large, it is not statistically significant due to the few women who attain a secondary degree at adult education (see Appendix 3.1, Table 3.A1).

17 From the upper part of Table 3.4 it can be seen that the model with age-specific covariates is not better than the model in which the covariate effects are constant over age groups.

18 There is no significant difference depending on whether the man is currently married or cohabiting.

19 There is no significant difference depending on whether the man is currently married or cohabiting.

20 In the sample only 37 interruptions of full-time studies by men are observed. Because of this small number, the duration is not divided into intervals, i.e. a constant baseline hazard rate is assumed.

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Appendix 3.1

Table 3.A1 Transition to university. Months of exposure and number of events.

	Women		Men	
	Months of exposure	No. of events	Months of exposure	No. of events
Education:				
Vocational	84,538	61	55,384	21
Adult	5,569	21	2,606	15
High school	26,315	67	22,930	36
High vocational	57,585	57	19,101	17
Father manual worker: yes	87,679	67	52,300	27
Father manual worker: no	86,328	139	47,721	62
Before January 1987	96,833	82	49,219	56
January 1987 to 1992	77,174	124	50,892	33
Family circumstances:				
Single/sep., no child	28,903	67	23,875	41
Single/sep., child	11,163	21	4,077	4
Cohabiting, no child	29,665	44	18,219	19
Cohabiting, child	30,560	18	14,563	4
Married, no child	9,369	9	4,602	5
Married, child	64,347	47	34,685	16

Table 3.A2 Interruption of university studies. Months of exposure and number of events (interruptions).

	Women		Men	
	Months of exposure	No. of events	Months of exposure	No. of events
High school/adult education	3,465	79	1,782	19
Vocationally oriented education	2,067	70	633	18
Before January 1987	3,393	103	1,043	16
January 1987 to 1992	2,139	46	1,372	21
Family circumstances:				
Single/sep., no child	1,853	31	994	16
Single/sep., child	551	15		
Cohabiting, no child	1,454	40	623	6
Cohabiting, child	469	13	170	3
Married, no child	202	12	204	2
Married, child	1,003	38	424	10