The Multifaceted Impact of Education on Entry into Motherhood

by

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INTRODUCTION

During the last decades Norway and other western countries have witnessed a pronounced trend in postponement of entry into motherhood. Mean age at first birth among women in Norway was 27.7 years in 2002, which is 2.6 years higher than it was 15 years ago (Statistics Norway 2003a). At the same time there has been a rapid educational expansion, during which the proportion of Norwegian women with a university degree has more than doubled, from 9.3 per cent in 1980 to 21.8 percent in 2000 (Statistics Norway 2003b). The connection between education and timing of first birth has been widely analyzed, and a negative effect of educational level on entry into motherhood is frequently documented: Women with higher education postpone first birth longer than those with lower education (e.g. Marini 1984, Kalmijn 1996, Liefbroer and Corijn 1999, van Nimwegen et al. 2003).

In much previous research, information on education has only been available at the time of interview or data extraction, which may be from a life stage far beyond the age period preceding first birth when fertility plans are presumably made. Used in this way, education may at best be regarded as a proxy for educational goals and strategies that are formed earlier in life, and as such assumed to be exogenous to the fertility process. At worst, the results may be biased, as the causality is also likely to run the other way, i.e. fertility may have affected the educational level obtained later in life. More recently, however, analyses that use either constructed or genuine life-history information on education have also appeared. When educational level is treated as a time-varying variable and school enrolment is controlled for in the model, the effect of educational level is less uniform and is sometimes even estimated to be positive (Blossfeld and Huinink 1991, Kreyenfeld 2000, Hank 2000). Educational activity, on the other hand, is consistently found to postpone motherhood (e.g. Hoem 1986, Blossfeld and Huinink 1991, Kravdal 1994, Blossfeld 1995, Liefbroer and Corijn 1999, Andersson 2001, Hoem 2000, Hank 2002). Thus the negative effect of higher education on first- birth rates is seen to mainly operate through prolonged participation in the educational system.

In addition to educational level and educational activity, some studies have also shown that field of education is important for women's fertility behavior (Hoem 1994, Kalmijn

1996, Lappegard 2002). In this paper we take all three aspects of education into account. We hypothesize that timing of first birth among young women are dominated by their current educational activity and their labor market aspirations. Since most Norwegian women today return to work when their youngest child is quite small (Rønsen and Sundström 2002), it has become increasingly important to get a good foothold in the labor market before becoming a mother. How much time young women need in order to get established in a job and settled on a career track after completing education will again depend on where in the labor market they are headed, which is probably closely linked with both level and type of education. Information on field of study should thus give added insights into the multifaceted impact of education on entry into motherhood.

Our analysis is based on longitudinal data on fertility, educational activity, and level and field of education from administrative registers covering the whole population of Norway. The large amount of data makes it possible to construct several educational categories along all three dimensions (activity, level and field), rendering detailed information about educational differentials in the timing of first birth. The long time series of individual data further enable us to use genuine, and not constructed, time-varying variables for education.

The rest of the paper is organized as follows: In the following section we discuss the theoretical framework for the analysis and set out the main hypotheses to be tested. Next, we give a brief description of the development of fertility and education in Norway during the last couple of decades, followed by a closer presentation of the data and the empirical model. Finally, we report the main findings and conclude by a short summary and discussion.

THEORETICAL FRAMEWORK

When a traditional family structure with strict gender-specific division of labor is being challenged in more modern societies, the reconciliation of childbearing and female employment becomes an urgent issue. Timing of first birth is clearly a part of these deliberations, as the economic loss (the opportunity cost) of taking a break from the labor market constitutes a large part of the costs involved in having a child (Joshi 1990,

Kravdal 1994, Walker 1995). It is generally believed that the incompatibility of work and family are higher among highly educated than among other women, as they have more to lose in terms of foregone earnings than women with lower education. Theoretical research on fertility did not originally address the timing of fertility, however, but rather completed family size (Easterlin 1966, Becker 1981, 1991, Pollak and Watkins 1993). Later, authors have also developed models that more explicitly address the timing and spacing of fertility (for a summary: see e.g. Gustafsson 2001). All else equal, the optimal time of birth is then the one that maximizes the wife's lifetime earnings, and included in the considerations of foregone earnings are not only the current loss of wages during a career break, but also future losses due to lack of human capital accumulation and depreciation of job skills (Happel et al. 1984, Cigno and Ermisch 1989, Walker 1995). An important determinant of timing of fertility is thus the woman's life-cycle earnings profile, depending a.o. on her initial human capital accumulation and the profile of further investments, the rate of return to these investments, and the rate at which her job skills decay (Gustafsson 2001). Since the opportunity cost of leaving the labor force are particularly high for better educated women, it can be argued that they might postpone motherhood to a later stage in their employment career, when they consider themselves more established in a career-track and when taking a break from labor market may be less damaging to their future labor market career (Kreyenfeld 2000). On the other hand, if the lifetime earnings profile of highly educated women is relatively steep, it may be less costly to have the child earlier in the career rather than later (Walker 1995). The predictions of dynamic fertility models are thus not entirely unambiguous, but generally an increase in one or more of the components that constitute foregone earnings makes it more favorable to postpone birth (Gustafsson 2001).

In comparative research on family formation, the delaying influence of educational attainment has been found to vary across countries (Blossfeld 1995). This is contributed to differences between countries in so-called "family systems" which include both cultural values, family and religious traditions and family policies, and it is argued that the negative effect of educational attainment on family formation will be stronger in societies in which the incompatibility between female employment and family formation is large than in societies in which the incompatibility is small (op.cit.).

Liefbroer and Corijn (1999) emphasize that the compatibility of female reproductive and productive work has both a cultural and a structural dimension, where the cultural dimension is related to ideology, values and norms concerning the role of women on society, while the structural dimension is related to actual societal opportunities and constraints on the role of women. They further argue that family systems do not only differ between countries, but also change within countries, as the incompatibility between family life and female labor work has weakened in many countries throughout the last decades. Thus the impact of educational attainment on family formation can be expected to be weaker for younger cohorts than for older ones (op.cit.).

Based on the above discussion and previous research we outline four hypotheses to be tested in our analysis. The first hypothesis can be referred to as the *student-effect-hypothesis*:

H1: Women who are still enrolled in education will have lower first-birth rates than women who are no longer enrolled.

The argument for this hypothesis is that school enrolment and childbirth is especially incompatible, either for practical reasons[1] or as a result of normative views that students should not become parents before they have finished education. Students may also have aspirations for a future career-track that they want to fulfill before they become mothers. After finishing school, however, we assume that women with higher education will give birth sooner than other women who are no longer students. We thus formulate the *catching-up-hypothesis:*

H2: Women with higher levels of education will have higher first-birth rates upon finishing school than women wither lower education.

The argument for this is that women with higher education will have stayed longer in school and therefore have a shorter time left of their reproductive period. Further, we argue that different types of higher education will give different opportunities, status and remuneration and in the labor market, which implies that the cost of a career break

in connection with childbirth will differ. This motivates the *labor-market-adjustment-hypothesis*:

H3: Women within different fields of education will have different first-birth rates, regardless of educational level.

Women within fields where it takes longer to get established on a career track and where the costs of a withdrawal from the labor market are higher will thus postpone motherhood more than women within other fields. In addition, differences in postponement may indicate that women with certain types of education have different family and fertility preferences than other women.

Finally, we propose the *cohort-effect-hypothesis*:

H4: Educational differences in timing of first birth have become smaller among women in younger cohorts.

This hypothesis is based on the underlying assumption that the incompatibility between family life and female labor work has become weaker, and that the negative effect of educational attainment on family formation has thereby weakened.

THE NORWEGIAN SETTING

At the beginning of 1970s the total fertility rate in Norway was well above replacement level with 2.5 children per women. By 1980 it had fallen to 1.72 and by 1983 it reached an all-time low of 1.66. In contrast to most other industrialized nations, Norway and other Nordic countries experienced a rise in fertility from the mid 1980s, and at the beginning of the 1990s, TFR in Norway was again close to replacement level (1.93). Since then it has declined slightly and stabilized around a level of about 1.8.

The last couple of decades have also witnessed a vast educational expansion, with a larger increase in the proportion that has completed college or university among women than among men (Table 1). From 1980 to 2000 the percentage of women aged 16 and older with education at this level more than doubled, from 9.3 to 21.8 percent, while the

corresponding percentage among men increased from 13.1 to 21.9 per cent. Thus, in Norway today, the proportion with higher education is practically the same for women as for men. There are still more men than women with an upper (2nd stage) university education, however. But, since these numbers show the proportion among all adults, it partly conceals the educational revolution that is happening among younger birth cohorts. If we look at the percentage of 19-24 year olds registered in higher education, there has been a dramatic increase especially among women, whose enrolment rate more than tripled from 1980 to 2000. Female enrolment surpassed that among men already in 1990, and at the turn of the century almost one of three women aged 19-24 years were registered in higher education, compared to 21.6 per cent among men.

[Table 1 in around here]

In tandem with the educational expansion, there has also been a strong postponement of motherhood. The aggregate statistics in Table 1 show that women at all educational levels have delayed childbirth increasingly over time. For example, among women with primary and lower secondary education mean age at first birth was 24.0 years in 1998, an increase of 0.7 years since 1980. Among women with a lower and upper university education mean age in 1998 was 29.5 and 31.6 years, respectively. In both university groups mean age had increased with 3 years since 1980. The educational differences in mean age of first birth have thus increased over time.

DATA, METHODS AND CLASSIFICATION

Data

The analyses are based on longitudinal data from Norwegian Central Population Register and Norwegian Educational Database (NUDB). The data have been linked to form complete fertility and educational histories for all females born 1955-1984, recorded on a monthly basis from 1971-2001. The analyses are restricted to women living in Norway at the end of the year 2001, numbering 827 494 in all.

Methods

The analyses are based on a discrete hazard rate model. In discrete time, the hazard rate is the conditional probability that an event (in our case, birth of the first child) will

occur at a particular time to a particular individual given that the individual has not experienced the event before (see e.g. Allison 1984). Besides depending on current age, the hazard rate is assumed to vary with education and other personal characteristics. Using a logit transformation, the discrete hazard rate function can be expressed as

$$(1) \qquad \log (P_t/1-P_t) = \beta X_t$$

where P_t is the conditional probability that a birth occurs at time t, $1-P_t$ is the probability that no birth occurs at time t, β is a vector of coefficients, and X_t is a vector of covariates that may or may not vary with time.

The problem with education as a determinant of first birth is that the educational process is linked so closely to the birth process. It may be preferable, then, to model the two processes simultaneously, but as this is a more complex estimation procedure, we have not attempted that yet. However, we have formulated a model that reflects the close interaction of educational activity and educational level, using a combination of the two variables. We thus first divide women according to educational activity (in education/not in education) and then split the two groups further according to educational level and field. To highlight various aspects of education, we present three versions of the model in which activity, level and field have been aggregated in different ways (Models A-C).

Classification

The large amount of data enables us to divide education along many dimensions according to educational activity and type, and completed educational level and field. Educational level and field are classified using the Norwegian standard classification of education (Statistics Norway 2001). The level is divided into four main groups:

1. *Primary and lower secondary (-9 years)*
2. *Upper secondary (10-12 years)*
3. *University, 1st stage (13-16 years)*
4. *University, 2nd stage (17 years and more)*

Combining level with different fields of education, we get 18 groups:

1. *Primary and lower secondary*
2. *Upper secondary*

3. *University: humanities and aesthetics 1st stage*
4. *University: humanities and aesthetics 2nd stage* (e.g. languages, history, musicians, pictorial artists)
5. *University: teaching*, *1st stage* (e.g. pre-school teaching, primary school teaching)
6. *University: teaching, 2nd stage* (e.g. secondary educational teaching)
7. *University: social science*, *1st stage* (e.g. journalism)
8. *University: social science, 2nd stage* (e.g. psychology, sociology)
9. *University: law*, *2nd stage*
10. *University: administration and economics*, *1st stage*
11. *University: administration and economics*, *2nd stage*
12. *University: engineering, 1st stage*
13. *University: engineering, 2nd stage* (e.g. civil engineering)
14. *University: nursing*, *1st and 2nd stage*
15. *University: physicians*, *2nd stage*
16. *University: health care otherwise*, *1st stage* (e.g. welfare nursing, physiotherapists)
17. *University: health care otherwise*, *2nd stage* (e.g. dentists, pharmacists)
18. *University: Others/missing*

Educational activity in its simplest form is just a dummy variable that equals one if the woman is registered as a student that month. In addition, we have divided those who are in education into 7 different groups according to type of study, based on the study-code in NUDB:

1. *Primary and lower secondary*
2. *Upper secondary: academic*
3. *Upper secondary: vocational*
4. *University, 1st stage: female dominated fields*
5. *University, 1st stage: male dominated fields*
6. *University, 1st stage: others*
7. *University, 2nd stage*

Using register data, the availability of other fertility determinants is limited. However, in addition to age, education and birth cohort, we also control for social and regional background. **Age** is a time-varying covariate (and baseline hazard), categorized into intervals as follows: *16-20*, *21-25*, *26-30*, *31-35*, *36-40*, and *41-46*. **Birth cohorts** are collapsed into 5-year groups, consisting of women born *1955-1959*, *1960-1964*, *1965-1969*, *1970-1974*, *1975-1979*, and *1980-1984*. **Social background** is based on information on the parents' level of education, divided into *low* (primary and lower secondary), *medium* (upper secondary) and *high* (university). **Regional background** is the women's residential region at age 16 defined as *Oslo and surrounding country* (Oslo

and Akershus), *Eastern* (Hedmark and Oppland), *South Eastern* (Østfold, Vestfold, Buskerud and Telemark), *South* (Agder and Rogaland), *Western* (Hordaland, Sogn og Fjordane and Møre og Romsdal), *Middle* (Trøndelag), and *Northern* (Nordland, Troms and Finmark).

RESULTS

The effects of being a student

Not surprisingly, and in full accord with previous research, student enrolment is found to have a negative effect of first-birth rates (Table 2). Thus our analysis further corroborates the student-effect-hypothesis (H1) that childless women who are still in school will have lower first-birth rates than other women.

[Table 2 in about here]

There are, however, some noteworthy differences between various *types* of educational activity (Table 3). The effect of being enrolled is still negative for all groups, but there are significant differences in how inhibiting the student role seems to be for childbearing. Among women in upper secondary education the negative effect is less pronounced within vocational fields than within academic fields. This is probably due to higher aspirations for future education in the latter group, as women in academic fields are more likely to continue with university studies than women within vocational fields. Thus they will have more to lose by having a baby while still enrolled in upper secondary education.

[Table 3 in about here]

At university level the most pronounced differences are between those in male versus those in female dominated fields, where the former group is found to have the lowest first-birth rates. This may be related to greater difficulties in combining studies and motherhood in male dominated fields, but it may also be related to their future career aspirations. Women in male dominated fields may, for example, feel a greater need to get a good foothold on the labor market and get more established in their career before they become mothers.

The effects of level and field of education

Generally, the results in Table 4 show that university educated women who are no longer enrolled and who have completed at the upper level (2nd stage) have higher first-birth rates than non-enrolled women who completed at the lower level (1st stage). Those who have postponed motherhood longer thus give birth sooner, which support the catching-up-effect-hypothesis (H2) that childless women who stay longer in school recuperate childbearing faster upon finishing education. Further, there are some noticeable contrasts between women within different fields that support the labor-market-adjustment-effect-hypothesis (H3).

[Table 4 in about here]

Women with a lower university degree in humanities/aesthetics (e.g. musicians, artists, actors) and social sciences (e.g. journalists), in particular, are found to have relatively low first-birth rates. Other university groups with relatively low first-birth rates are engineering 1st stage, and administration and economics. The relatively low first-birth rates of women within humanities and aesthetics can probably be related to their labor market situation, as musicians, dancers, actors and pictorial artists often work freelance and have loser ties to the labor market than women in other occupations. Lower first-birth rates may then indicate that the greater uncertainty connected with a possible job break is an obstacle for childbirth. However, low first-birth rates in these and other groups (e.g. engineering, administration and economics) may also indicate that women within these fields constitute a select group who are less family oriented and more work oriented at the outset, and that these preferences guide both educational and family and fertility choices. Hakim (2000 and 2003) argues e.g. strongly that women's preferences towards work and family are very heterogeneous, independent of economic resources, and that differences in preferences deserve a more prominent place in causal explanations of female fertility and employment patterns.

The highest first-birth rates are found among women educated as physicians, followed by nurses, other healthcare workers, teachers and women with an upper social science degree. All these fields of education qualify for occupations that are involved with care for other people, but there are differences in work prestige related to the occupations.

The fact that physicians have the highest first-birth rates show that a high family-orientation also can be found in occupations that generally are related to high work-orientation and high costs of withdrawal from the labor market. These findings suggest that there is no clear-cut relationship between high costs of labor market withdrawal and postponed motherhood, and that preference heterogeneity also plays a role in the differential timing of first birth.

Cohort trends

In order to examine possible changes in educational effects across successive female cohorts we estimated the model separately for three cohorts: 1955-59, 1960-65 and 1965-69[2]. The results are reported in Table 5. The general impression is that the negative effects of educational activity have become more negative and the positive effects of higher education have become less positive over time. This implies that younger cohorts postpone fertility more when they are in education and recuperate slower when they have finished studying. Thus, the findings do not support the cohort-effect-hypothesis (H4) that educational differences in timing of first birth have become smaller among women in younger cohorts. However, the findings do fit the descriptive pattern of increased educational differences across cohorts in mean age at first birth.

The argument behind the assumption of a weaker impact of education in younger cohorts was that the incompatibility between family life and female labor force participation had become weaker across time. A possible explanation for the opposite finding is that because young women are more educated, they have higher career aspirations and want to get a firm foothold on the labor market before having a baby. At the same time the competition on the labor market has become fiercer, with more job insecurity and extra demands of work effort in many jobs. Also longer parental leaves, especially since the early 1990s, have made it more profitable to work some time before taking leave, first and foremost to establish eligibility, but also to secure higher earnings, as the parental benefit is proportional to earned income.

Table 5 further shows that the main change in the effect of education occurred between the 1955-59 and the 1960-64 cohorts. This implies that increased postponement of well-educated women is losing momentum in the youngest generations. In Table 6 the

increased negative effect of educational activity across cohorts is further seen not to apply to all types of study, as the estimated effects for female and male dominated fields at lower university level are more or less constant. The general picture of decreasing recuperation across cohorts among those who have finished their education, is on the other hand, quite unambiguous for the various fields of study, as the more mixed trend in Table 7 among teachers and physicals at upper university level (inverted and ordinary U-shape, respectively) is not significant.

CONCLUSION

Our analysis of timing of first birth among women in Norway shows that education influences young women's entry into motherhood in manifold ways. In full agreement with previous research, our results confirm that educational activity delays motherhood. The differences in first-birth rates between young women enrolled at different levels and within different fields of education further suggest that women's fertility behavior is influenced by future educational aspirations as well as by aspirations related to the future occupational career. Having finished studying, women with a higher-level education proceed to motherhood faster than women at a lower level. This confirms that there is a catching-up-effect among women who have delayed childbearing longer. But at a given educational level, we also find contrasting behavior between women within different fields of education. These contrasts may be related to at least two factors. First, there may be differences in the economic opportunity costs of a career break in different sectors that are independent of educational level. Besides, women with education directed at different sectors may need different amounts of time after school to get a good foothold in the labor market and therefore proceed to motherhood in different speed. Secondly, there may be differences in women's preferences towards family and work that might be reflected in their educational choices. Family-orientation and work-orientation does not necessarily means opposites: Some women might have high aspirations for both a family and a work career. In order to achieve both, the opportunity costs of withdrawal from labor market work in connection with a childbirth need to be compensated for to some extent. In modern welfare states, social policies directed at working mothers are helping to alleviate this need and have made family life and female labor market work more compatible. However, social policies may generate different responses from women with different educational backgrounds. Long parental leaves

and generous family benefits may fit better with a career track in certain jobs, and may thus be perceived to reduce the opportunity costs of childbearing more for some women than for others. Together with a more competitive labor market, this may have contributed to the increasing educational differences in timing of motherhood observed in younger cohorts.

REFERENCES

Allison, Paul D. 1984. *Event History Analysis. Regression for Longitudinal Event Data*. Sage University Paper series on Quantitative Applications in the Social Sciences, 07-046. Beverly Hills and London: Sage Publications.

Andersson, G. 2001. "The Impact of Labor-Force Participation on Childbearing Behaviour: Pro-Cyclical Fertility in Sweden during the 1980s and the 1990s", *European Journal of Population* 16: 293-333.

Becker, G. S. 1981, 1991. *A treatise on the family*, London/Cambridge, Harvard University Press.

Blossfeld, H-P. and J. Huinink. 1991. "Human capital investments or norms of role transition? How women's schooling and career affect the process of family formation", *American Journal of Sociology* 97: 143-68.

Blossfeld, H-P. 1995. "Changes in the Process of Family Formation and Women's Growing Economic Independence: A Comparison of Nine Countries", in Blossfeld, H-P. (Ed.) *The New Role of Women-Family Formation in Modern Societies*, Westview Press, Oxford.

Cigno, A. and J. Ermisch. 1989. "A Micro-Economic Analysis of the Timing of Births", *European Economic Review* 33:737-760.

Easterlin, R. A. 1966. "On the relation of economic factors to recent and projected fertility changes", *Demography* **3**:131-153.

Gustafsson, S. 2001. "Optimal Age at Motherhood. Theoretical and Empirical Considerations on Postponement of Maternity in Europe", *Journal of Population Economics* 14:225-247.

Hakim, C. 2000. *Work-Lifestyles Choices in the 21st Century: Preference Theory*, Oxford University Press.

Hakim, C. 2003. "A New Approach to Explaining Fertility Patterns: Preference Theory", *Population and Development Review* 29(3):349-374.

Hank, K. 2002. "Regional Social Contexts and Individual Fertility Decisions: A Multilevel Analysis of First and Second Births in Western Germany", *European Journal of Population* 18:281-299.

Happel, S.K., Hill, J.K. and S.A. Low. 1984. "An Economic Analysis of the Timing of Childbirth", *Population Studies* 38:299-311.

Hoem, B. 1994. "Lärare föder flere barn" (Teachers give birth to more children), Välfärdsbulletinen 3:17-19.

Hoem, B. 2000. "Entry into motherhood in Sweden: the influence of economic factors on the rise and fall in fertility, 1986-1997", *Demographic Research*, Vol. 2/4, [www.demographic-research.org/Volumes/Vol2/4].

Hoem, J. M. 1986. "The impact of education on modern family-union initiation", *European Journal of Population* 2:113-133.

Joshi, H. 1990. "The Cash Opportunity Costs of Childbearing", *Population Studies* 44:41-60.

Kalmijn, M. 1996. "Effecten van opleidingsniveau, duur en richting op het tijdstip waarop paren hun eerste kind krijgen", (Effects of educational level, school enrollment and type of schooling on the timing on the first birth), *Bevolking en Gezin* 1:41-71.

Kravdal, Ø. 1992. "Forgone Labor Participation and Earning Due to Childbearing Among Norwegian Women", *Demography* 29:545-563.

Kravdal, Ø. 1994. "The Importance of Economic Activity, Economic Potential and Economic Resources for the Timing of First Births in Norway", *Population Studies* 48:249-267.

Kreyenfeld, M. 2000. "Educational Attainment and First Births: East Germany before and after Unification", *MPIDR Working Paper*, WP 2000-011.

Lappegård, T. 2002. "Education attainment and fertility pattern among Norwegian mothers", *Documents* 2002/18, Statistics Norway

Liefbroer, A. C. and M. Corijn. 1999. "Who, What, Where and When? Specifying the Impact of Educational Attainment and Labour Force Participation on Family Formation", *European Journal of Population* 15:45-75.

Marini M. M. 1984. "Women's educational attainment and the timing of entry into parenthood", *American Sociological review*, Vol. 49:491-511

van Nimwegen, N., M. Blommesteijn, H. Moors and G. Beets. 2003. "Late motherhood in the Netherlands: current trends, attitudes and policies", *GENUS* 2:9-34.

Pollak, R. A. and S. C. Watkins. 1993. "Cultural and economic approaches to fertility, Proper marriage or *mesalliance*? ", *Population and Development Review* 19: 467-495.

Rønsen, M. and M. Sundström, 2002. "Family Policy and After-Birth Employment Among New Mothers – A Comparison of Finland, Norway and Sweden", *European Journal of Population* 18:121-152.

Statistics Norway, 2001. *Norwegian Standard Classification of Education*, Official Statistics of Norway, C676.

Statistics Norway, 2003a. Population statistics. Births 2002, www.ssb.no/english/subjects/02/02/10/fodte_en/

Statistics Norway, 2003b. "Sosiale indikatorer" ("Social indicators"), *Samfunnsspeilet* 4:70-71.

Walker, J.R. 1995. "The Effect of Public Policies on Recent Swedish Fertility Behavior", *Journal of Population Economics* 8:223-251.

Table 1. Percentage 16 years and older that completed higher education and percentage 19-24 years registered in higher education. Men and women. Total fertility rate and mean age at first birth. Women. 1980, 1990, 2000.

		1980	1990	2000
Percentage 16 years and older that completed higher education, 1st stage	Men	8.9	11.6	15.3
	Women	8.6	12.6	19.0
Percentage 16 years and older that completed higher education, 2nd stage	Men	4.2	5.0	6.6
	Women	0.7	1.3	2.8
Percentage 19-24 years registered in higher education	Men	11.8	16.2	21.6
	Women	9.5	20.0	31.4
Total fertility rate	Women	1.72	1.93	1.85
Mean age[a] at first birth – women	Primary and lower secondary	23.3	23.9	24.0[b]
	Upper secondary	24.0	25.3	26.4[b]
	University, 1st stage	26.5	28.1	29.5[b]
	University, 2nd stage	28.5	30.0	31.6[b]

Source: Statistics Norway

[a] Age measured at the end of the year.

[b] Figures from 1998.

Table 2. Educational effects on first-birth rates of Norwegian women born 1955-1984. Discrete hazard model (odds ratio estimates). Model A

Age	
16-20	1
21-25	1.83
26-30	2.17
31-35	1.37
36-40	0.53
41-45	0.09
Birth cohorts	
1955- 1959	1
1960-1964	0.90
1965-1969	0.89
1970-1974	0.81
1975-1979	0.64
1980-1984	0.48
Education	
In education	0.36
Not in education: Primary and lower secondary	1
Not in education: Upper secondary	1.05
Not in education: University, 1st stage	1.20
Not in education: University, 2nd stage	1.42
Social background (father's and/or mother's education)	
Low	1
Medium	0.88
High	0.67
Unknown	0.77
Regional background	
Oslo and surrounding country	1
Eastern	1.17
South Eastern	1.23
South	1.45
Western	1.38
Middle	1.50
Northern	1.47
Unknown	1.15

Table 3. Educational effects on first-birth rates of Norwegian women born 1955-1984. Discrete hazard model (odds ratio estimates). Model B

Education	
In education: Primary and lower secondary	0.12
In education: Upper secondary: academic	0.16
In education: Upper secondary: vocational	0.47
In education: University, 1st stage: female dominated fields	0.48
In education: University, 1st stage: male dominated fields	0.24
In education: University, 1st stage: others	0.39
In education: University, 2nd stage	0.40
Not in education: Primary and lower secondary	1
Not in education: Upper secondary	1.08
Not in education: University, 1st stage	1.24
Not in education: University, 2nd stage	1.46

Controlled for birth cohort, age and social and regional background.

Table 4. Educational effects on first-birth rates of Norwegian women born 1955-1984. Discrete hazard model (odds ratio estimates). Model C

Education	
In education	0.36
Not in education (NIE): Primary and lower secondary	1
NIE: Upper secondary	1.05
NIE: University: Humanities and Aesthetics, 1st stage	0.79
NIE: University: Humanities and Aesthetics, 2nd stage	1.25
NIE: University: Teaching, 1st stage	1.45
NIE: University: Teaching, 2nd stage	1.57
NIE: University: Social science, 1st stage	0.82
NIE: University: Social science, 2nd stage	1.51
NIE: University: Law, 2nd stage	1.23
NIE: University: Administration and Economics, 1st stage	1.13
NIE: University: Administration and Economics, 2nd stage	*1.01ns*
NIE: University: Engineering, 1st stage	1.05
NIE: University: Engineering, 2nd stage	1.33
NIE: University: Nursing, 1st and 2nd stage	1.54
NIE: University: Social work, 1st and 2nd stage	1.24
NIE: University: Physicians, 2nd stage	1.71
NIE: University: Health care otherwise, 1st stage	1.29
NIE: University: Health care otherwise, 2nd stage	1.54
NIE: University: Others and missing	*1.01ns*

Controlled for birth cohort, age and social and regional background. Numbers in italics = not significant.

Table 5. Educational effects on first-birth rates of Norwegian women born 1955-1969. Discrete hazard model (odds ratio estimates). Model A

	Birth cohort		
	1955-59	**1960-64**	**1965-69**
Education			
In education	0.47	0.34	0.34
Not in education: Primary and lower secondary	1	1	1
Not in education: Upper secondary	1.24	*1.00ns*	0.95
Not in education: University, 1st stage	1.59	1.17	1.07
Not in education: University, 2nd stage	1.99	1.40	1.23

Controlled for age and social and regional background. Numbers in italics = not significant.

Table 6. Educational effects on first-birth rates of Norwegian women born 1955-1969. Discrete hazard model (odds ratio estimates). Model B

	Birth cohorts		
	1955-1959	**1960-1964**	**1965-1969**
Education			
In education: Primary and lower secondary	0.32	0.15	0.10
In education: Upper secondary: academic	0.22	0.13	0.13
In education: Upper secondary: vocational	0.57	0.42	0.42
In education: University, 1st stage: female dominated fields	0.48	0.44	0.45
In education: University, 1st stage: male dominated fields	0.26	0.26	0.23
In education: University, 1st stage: others	0.51	0.45	0.39
In education: University, 2nd stage	0.52	0.45	0.37
Not in education: Primary and lower secondary	1	1	1
Not in education: Upper secondary	1.14	1.03	*0.99ns*
Not in education: University, 1st stage	1.35	1.22	1.12
Not in education: University, 2nd stage	1.58	1.46	1.28

Controlled for age and social and regional background. Numbers in italics = not significant.

Table 7. Educational effects on first-birth rates of Norwegian women born 1955-1969. Discrete hazard model (odds ratio estimates). Model C

	Birth cohorts		
	1955-1959	**1960-1964**	**1965-1969**
Education			
In education	0.47	0.34	0.34
Not in education (NIE): Primary and lower secondary	1	1	1
NIE: Upper secondary	1.24	*1.00ns*	0.95
NIE: University: Hum. and Aesthetics, 1st stage	1.13	0.83	0.75
NIE: University: Hum. and Aesthetics, 2nd stage	1.72	1.27	*1.06ns*
NIE: University: Teaching, 1st stage	1.74	1.29	1.25
NIE: University: Teaching, 2nd stage	1.53	1.81	1.51
NIE: University: Social science, 1st stage	1.26	*0.93ns*	0.81
NIE: University: Social science, 2nd stage	1.82	1.40	1.34
NIE: University: Law, 2nd stage	2.06	1.33	1.29
NIE: University: Adm. and Economics, 1st stage	1.44	1.19	*1.03ns*
NIE: University: Adm. and Economics, 2nd stage	*2.02ns*	*1.33ns*	*1.10ns*
NIE: University: Engineering, 1st stage	1.38	*1.03ns*	*0.97ns*
NIE: University: Engineering, 2nd stage	1.95	1.37	1.13
NIE: University: Nursing, 1st and 2nd stage	1,83	1.42	1.39
NIE: University: Social work, 1st and 2nd stage	1.55	1.15	*1.03ns*
NIE: University: Physicians, 2nd stage	2.34	1.43	1.62
NIE: University: Health care otherwise, 1st stage	1.72	1.29	1.11
NIE: University: Health care otherwise, 2nd stage	1.98	1.63	1.30
NIE: University: Others and missing	1.44	*1.01ns*	0.93

Controlled for age and social and region background. Numbers in italics = not significant.

ENDNOTES

[1] In Norway, the economic situation for female students who give birth is relatively good, as they receive a grant for 42 weeks equal to the maximum annual amount they would receive as a loan otherwise. However, this is still far less than what they can expect to earn after completing education.

[2] We did not run separate analyses for younger cohorts, as a high proportion have not yet entered motherhood, especially among the highly educated.