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The Multifaceted Impact of Education on Entry into Motherhood

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Abstract. This article studies the composite effect of education on young women's entry into motherhood, using longitudinal data from Norway from 1971 to 2001. In line with previous research, we find that school enrolment delays motherhood, but having finished education there is a catching-up effect, as women who have completed at higher levels have their first child sooner than women who have completed at lower levels. Contrasting behaviour between women within various fields of education further indicate a career-adjustment effect related to differences in opportunity costs and/or preference heterogeneity. Finally, increasing educational differences in the timing of motherhood among younger cohorts suggest that long parental leaves and generous family benefits may fit better with a career track in some jobs than others.

Key words: fertility, first-birth, education, multivariate hazard model

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Résumé. Cet article étudie l'effet composite de l'instruction sur l'entrée en maternité des jeunes femmes, en s'appuyant sur des données longitudinales norvégiennes couvrant la période 1971–2001. Dans la ligne de précédentes recherches, nous trouvons que la poursuite des études retarde la maternité. En revanche, dès l'arrêt des études, il y a un effet de rattrapage et les femmes qui ont atteint des niveaux d'instruction plus élevés ont leur premier enfant plus tôt que celles qui ont fini leurs études à des niveaux plus bas. Selon les filières suivies, les femmes n'ont pas les mêmes comportements, révélant un effet d'ajustement de la carrière dépendant des coûts et/ou de préférences hétérogènes. Enfin, pour les plus jeunes générations, l'accroissement des différences dans le calendrier des naissances selon le niveau d'instruction tend à prouver que les congés parentaux et des prestations familiales conséquentes conviennent davantage à certains cursus de carrière professionnelle qu'à d'autres.

Mots clés: fécondité, première naissance, instruction, modèle de risque multivarié

1. Introduction

During the last decades Norway and other western countries have witnessed a pronounced trend in the postponement of entry into motherhood. The mean age at first birth among women in Norway was 27.9 years in 2003, which is 2.7 years higher than it was 15 years ago (Statistics Norway, 2004a). At the same time there has been a rapid educational expansion, during which the proportion of Norwegian women with a university degree has about doubled, from 11.4% in 1988 to 22.1% in 2002 (Statistics Norway, 2004b). The connection between education and timing of first birth has been widely analysed, and it is a well known descriptive finding that women with higher education are older at first birth than those with lower education (see e.g. United Nations 1996–2001, Table 17). When analysed in an event-history framework, however, there is less consistent evidence on the postponing effect of higher education on the entry into motherhood.

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 has recently been demonstrated by Kravdal (2004) for Norway. This is because the causality is also likely to run the other way, i.e. fertility may have affected the educational level obtained later in life.

In event-history models where education is as a fixed covariate measured at some point after childbirth, the results corroborate the findings of descriptive statistics: women with higher education postpone motherhood longer than women with lower education. When longitudinal information on education is available and education is treated as a time-varying variable, however, the results are less uniform. This is because education as a time-varying covariate is very highly correlated with age and other life events closely linked with age (see e.g. Liefbroer and Corijn, 1999; Santow and Bracher, 2001). The results are thus quite sensitive to the specification of the model. When school enrolment is controlled for in such models, the effect of educational level is sometimes even estimated to be positive (Blossfeld and Huinink, 1991; Kreyenfeld, 2000; Hank, 2002). 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; Hoem, 2000; Andersson, 2000; Hank, 2002).

In addition to educational level and educational activity, some studies have also shown that the field of education is important for women's fertility behaviour (Hoem, 1994; Kalmijn, 1996; Lappegård, 2002). In this study we take all three aspects of education into account when analysing entry into

motherhood. We hypothesize that timing of first birth among young women are dominated by their current educational activity and their labour 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 labour 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 labour market they are headed, which is probably closely linked with both level and type of education. Information on the 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 provide us with complete and real time-varying variables for education. This is an important improvement relative to imputing educational level and enrolment based on standard progress through the educational system, which is sometimes the only resort if the educational histories are incomplete. As shown in Kravdal (2004), the latter approach may give quite misleading results.

The rest of the study is organized as follows: in the following section we introduce the theoretical framework for the analysis and discuss 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 with a short summary and discussion.

2. Theoretical Framework

When a traditional family structure with strict gender-specific division of labour is challenged in modern societies, the reconciliation of childbearing and female employment becomes an urgent issue. The timing of first birth is clearly an important consideration in this respect, as the economic loss (the opportunity cost) of taking a break from the labour 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 is 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). Taking all other things 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 the lack of human capital accumulation and depreciation of job skills (Happel et al., 1984; Cigno and Ermisch, 1989; Walker, 1995). An important determinant of the timing of fertility is thus the woman's life-cycle earnings profile, depending among others 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 labour 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 the labour market may be less damaging to their future labour 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. Furthermore, since highly educated women are older upon leaving the educational system, they have a shorter time left of their reproductive period. They may therefore want to catch up on childbearing to fulfil their fertility plans. Blossfeld and Huinink (1991) argue e.g. that both increasing medical problems connected with late births and societal age norms may induce highly educated women to catch up on childbearing when they have finished their education.

Based on the above reasoning and empirical evidence, we shall argue that the postponing effect on first-birth rates of a higher *level* of education mainly operates through prolonged participation in the educational system. Having completed education, however, differences in opportunity costs may first and foremost be reflected through different *fields* of education that lead to different occupations and employment sectors. These jobs may be associated with working conditions that are more or less compatible with childbearing and childrearing, as well as with differences in earnings and career prospects that imply that the optimal time to have a child and take a break are assessed differently.

Field of education may, however, also convey differences in preferences and priorities, independent of economic resources and opportunity costs. Hakim (2000, 2003) argues, for example, that heterogeneous preferences and priorities lead to a polarization of work-lifestyles and family models. On the one side there are work-centred women who are committed to work or

equivalent activities, while on the other side there are home-centred women who throughout life give priority to family and children. Between these two groups there is a larger group of adaptive women who prefer to combine employment and family without giving a fixed priority to either (Hakim, 2000). Since heterogeneous work-life strategies are likely to lead to differential occupational choices, we must assume that field of education also reflects preference heterogeneity.

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 larger than in societies in which the incompatibility is small (Blossfeld, 1995). Liefbroer and Corijn (1999) emphasize that the compatibility of female productive and reproductive 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 labour market commitments 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 (Liefbroer and Corijn, 1999).

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 fulfil 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. Thus we formulate additionally the *catching-up-hypothesis:*

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

The argument for this hypothesis 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 in the labour market, which implies that the cost of a career break in connection with childbirth will differ. This motivates the *career-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 labour 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 the 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 labour market commitments has become weaker, and that the negative effect of educational attainment on family formation has thereby weakened.

3. The Norwegian Setting

At the beginning of the 1970s the total fertility rate (TFR) in Norway was well above the replacement level with 2.5 children per woman. 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 the TFR in Norway was again close to the 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% (1st and 2nd stage higher education in all), while the corresponding percentage among men increased from 13.1 to 21.9%. Thus, in Norway today, the proportion with higher education is practically the same for women and men. There are still more men than

Table 1. The 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			
Per woman	1.72	1.93	1.85
Mean age[$] at first birth – women			
Primary and lower secondary	23.3	23.9	24.0[#]
Upper secondary	24.0	25.3	26.4[#]
University, 1st stage	26.5	28.1	29.5[#]
University, 2nd stage	28.5	30.0	31.6[#]

Source: Statistics Norway.
[$] Age measured at the end of the year.
[#] Figures from 1998.

women with an upper (2nd stage) university education, however. But, since these numbers reflect 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 spectacular 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 out of three women aged 19–24 years were registered in higher education, compared to 21.6% among men.

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 childbearing over time. For example, among women with primary and lower secondary education the 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 the mean age in 1998 was 29.5 and 31.6 years, respectively. In both university groups

the mean age had increased with 3 years since 1980. The educational differences in the mean age at first birth have thus increased over time (for further details see Lappegård, 2000; Rønsen, 2004).

4. Data, Methods and Classification

4.1. DATA

Our analyses are based on longitudinal data from the Norwegian Central Population Register and the Norwegian Educational Database. The data have been linked in order to obtain 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 total. We excluded women with an immigrant background in order to get as homogeneous data as possible and also because information on education is largely missing for immigrants.[2]

4.2. 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, the 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 the 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

$$\log(P_t/1 - P_t) = \beta X_t \tag{1}$$

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. We follow the women from age 16, until entry into motherhood or to the end of 2001, if no birth occurs. The data have events dated by month, but we use quarters in the model to reduce the otherwise vast number of records obtained (person-months).

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 therefore be preferable to model the two processes simultaneously, but as this is a more complex estimation procedure, we did not attempt to do so. Our approach has been to formulate a model that primarily reflects the manifold dimensions of education as discussed above. To highlight the close connection between the educational activity and the educational level we have first

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

combined the two into a single variable (see Table 2). Then we have split both educational activity and educational level into different types or fields of education, as described in more detail below. To address the 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).

4.3. 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 school 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. In addition, we have divided those who are in education into seven different groups according to

type of study, based on the study-code in the Norwegian Educational Database:

1. *Primary and lower secondary*
2. *Upper secondary: academic*
3. *Upper secondary: vocational*
4. *University, 1st stage: female dominated fields (e.g. pre-school teaching, primary school teaching, nursing)*
5. *University, 1st stage: male dominated fields* (e.g. engineering, administration and economics)
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).

5. Results

5.1. THE EFFECTS OF BEING A STUDENT

Not surprisingly, and in full accordance with previous research, student enrolment is found to have a negative effect on 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.

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

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:	0.12
Primary and lower secondary	
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:	1
Primary and lower secondary	
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.

education the negative effect is much less pronounced within the vocational than within the 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.

At the 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 labour market and get more established in their careers before they become mothers.

5.2. THE EFFECTS OF LEVEL AND FIELD OF EDUCATION

The results in Table 3 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

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	*1.01*
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	*1.01*

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

upon finishing education. Further, in Table 4 there are some noticeable contrasts between women within different fields that support the career-adjustment-hypothesis (H3).

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 labour market situation, as musicians, dancers, actors and pictorial artists often work freelance and have loser ties to the labour 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 having a baby. 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. This corroborates Hakim's argument (2000, 2003) 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. Most of 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 can also be found in occupations that generally are related to high work-orientation and high costs of withdrawal from the labour market. These findings further suggest that there is no clear-cut relationship between high costs of labour market withdrawal and postponed motherhood, and that preference heterogeneity also plays a role in the differential timing of first birth.

5.3. COHORT TRENDS

In order to examine possible changes in educational effects across successive female cohorts we estimated the model separately for three cohorts: 1955–1959, 1960–1964 and 1965–1969.[3] 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 upon school completion 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 their studies. Thus, the findings do not support the cohort-effect-hypothesis (H4) that educational differences in the timing of first birth have

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

	Birth cohort		
	1955–1959	1960–1964	1965–1969
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	*1.00*	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.

become smaller among women in younger cohorts. However, the findings do fit the descriptive pattern of increased educational differences across cohorts in the 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 labour 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 labour market before having a baby. At the same time the competition on the labour market has become fiercer, with more job insecurity and extra demands of work efforts in many jobs (see e.g. Sørensen, 2002). 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 1955–1959 and the 1960–1964 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,

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
In education:			
Primary and lower secondary	0.32	0.15	0.10
Upper secondary: academic	0.22	0.13	0.13
Upper secondary: vocational	0.57	0.42	0.42
University, 1st stage: female dominated fields	0.48	0.44	0.45
University, 1st stage: male dominated fields	0.26	0.26	0.23
University, 1st stage: others	0.51	0.45	0.39
University, 2nd stage	0.52	0.45	0.37
Not in education:			
Primary and lower secondary	1	1	1
Upper secondary	1.14	1.03	*0.99*
University, 1st stage	1.35	1.22	1.12
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
In education	0.47	0.34	0.34
Not in education:			
Primary and lower secondary	1	1	1
Upper secondary	1.24	*1.00*	0.95
University: Hum. and Aesthetics, 1st stage	1.13	0.83	0.75
University: Hum. and Aesthetics, 2nd stage	1.72	1.27	*1.06*
University: Teaching, 1st stage	1.74	1.29	1.25
University: Teaching, 2nd stage	1.53	1.81	1.51
University: Social science, 1st stage	1.26	*0.93*	0.81
University: Social science, 2nd stage	1.82	1.40	1.34
University: Law, 2nd stage	2.06	1.33	1.29
University: Adm. and Economics, 1st stage	1.44	1.19	*1.03*
University: Adm. and Economics, 2nd stage	*2.02*	1.33	1.10
University: Engineering, 1st stage	1.38	*1.03*	0.97
University: Engineering, 2nd stage	1.95	1.37	1.13
University: Nursing, 1st and 2nd stage	1,83	1.42	1.39
University: Physicians, 2nd stage	2.34	1.43	1.62
University: Health care otherwise, 1st stage	1.72	1.29	1.11
University: Health care otherwise, 2nd stage	1.98	1.63	1.30
University: Others and missing	1.44	*1.01*	0.93

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

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 completed education within different fields, is on the other hand, quite unambiguous (Table 7), as the more mixed trend among teachers and physicians at upper university level (inverted and ordinary U-shape, respectively) is not significant.

6. Conclusion

Our analysis of the timing of first birth among women in Norway demonstrates that education influences young women's entry into motherhood in manifold ways. In full accord with previous research, our results confirm that there is a student-effect as educational activities clearly delay 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 behaviour is influenced by future educational aspirations as well as by aspirations related to the future occupational career. After finishing their studies 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 behaviour between women within different fields of education, which indicates that there is a career-adjustment-effect in women's entry into motherhood. 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 labour 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 are not necessarily 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 the labour market in connection with a childbearing 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 are making family life and female labour market commitments 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 labour market, this may have contributed to the increasing educational differences in timing of motherhood observed in younger cohorts.

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Notes

[1] In Norway, the economic situation for female students who give birth to a child 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] Women who have died or emigrated are excluded as information on their education is also often lacking. This could, in principle, bias the results as fertility is related to both migration and mortality. Fertility *differentials* should, however, only be very marginally affected.
[3] We did not run separate analyses for younger cohorts, as a high proportion have not yet entered motherhood, especially among the highly educated.

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