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Socioeconomic differentials in multi-partner fertility among men

Abstract:
This paper analyzes male fertility, focusing especially on multi-partner fertility, for cohorts born 1955 to 1984. We find that socioeconomic disadvantaged men have the lowest chance of becoming fathers, and also the lowest likelihood of having more children in stable unions. Multi-partner fertility, on the other hand, is positively associated with both disadvantage and advantage, as higher-order birth-risks with a new partner are more prevalent among men with low as well as high socio-economic status. An intervening factor among the former may be more unstable unions and higher dissolution risks, while the elevated risk among the latter may be associated with their higher prefrerences for children as well as features that make these men more attractive as partners and fathers of future children.

Keywords: Male fertility, multi-partner fertility, childlessness, socioeconomic differences

JEL classification: J11, J12, J13

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Sammendrag

Dette arbeidet analyserer fruktbarhet blant menn med spesielt fokus på flerkullsfødsler for kohortene 1955-1984. Vi finner at menn med lav sosioøkonomisk status (lav utdanning/lav inntekt) har lavere sannsynlighet for å bli fedre enn andre menn, og lavere sannsynlighet for å få flere barn i samme samliv. Flerkullsfødsler er på sin side positivt assosiert med både høy og lav sosioøkonomisk status: Menn med både høy og lav sosioøkonomisk status har høyere sannsynlighet for å bli far med en ny partner enn andre menn. For menn med lav sosioøkonomisk status kan dette ses i sammenheng med flere ustabile samliv og høyere samlivsoppløsning. For menn med høy sosioøkonomisk status kan dette være knyttet til at de har sterkere preferanser for barn og ressurser som gjør dem mer attraktive som partnere og far til fremtidige barn.

1. Introduction

Fertility research has traditionally been highly gendered with focus on women's childbearing (Goldscheider and Kaufman, 1996; Martín-García 2009), but shifting gender roles and an increased emphasis on the father as caregiver as well as provider has brought male fertility higher up on the research agenda. In a country like Norway where gender-equality has been a political goal for decades and gender practices in society have resulted in top rankings on the gender-equality indexes (e.g. UN's Gender empowerment measurement, GEM), three trends in particular highlight the importance of more in-depth analyses of men's fertility patterns. First, more men than women remain childless and there is a trend toward increasing gender gap in younger cohorts (Kravdal and Rindfuss 2008; Lappegård, Rønsen and Skrede 2011). This could reflect a stronger self-selection away from fatherhood by men, or a stronger selection of men into fatherhood by women, or both. Second, there is an increasing propensity among men to have children across partnerships, so-called multi-partner fertility (Carlson and Furstenberg 2006; Guzzo and Furstenberg 2007; Lappegård el al. 2011). Estimates from the U.S. indicate that 8 per cent of American men aged 15-44 have children with more than one partner (Guzzo and Furstenberg 2007), while estimates from Norway show an increase in the proportion of men who had children with more than one partner from less than 4 per cent in cohorts born before the Second World War II to about 11 per cent in cohorts born in the early 1960s (Lappegård et al. 2011). Third, while socio-economic differentials in fertility have diminished among Norwegian and other Nordic women, they remain large and have even increased among men (Andersson et al. 2009; Rønsen and Skrede 2010). The reduced dissimilarities for women is mainly due to lower childlessness and higher cohort total fertility among the highly educated, which suggests that generous family and labor market policies have enabled most women to pursue both a career and childbearing and thus had a positive effect on female fertility. The large and increasing socio-economic fertility differentials in men's fertility thus attract attention and calls for closer investigation of the processes behind these patterns. Our focus in this article will be on the multi-partner fertility process, which is a little researched topic, especially outside the US.

Like many other demographic events, multi-partner fertility is a complex process that is closely interlinked with other transitions over the life-course. First, it is directly dependent on the event of a first-birth, as entry into fatherhood is obviously a necessary prerequisite for experiencing other child-births, whether it is with the same or with a new partner. Next, it is closely related to union formation and dissolution (Manlove, Logan, Ikramullah and Holcombe 2008). Previous research show that unmarried parents are more likely to have had a child by a previous partner than married parents (Carlson and Furstenberg 2006; Manlove et al. 2008) and men not in a co-residential union at the

proceeding birth are more likely to have their next child with a new partner (Guzzo and Furstenberg 2007). So far, the studies of American men suggest that multi-partner fertility is associated with socioeconomic disadvantage (Carlson and Furstenberg 2006; Guzzo and Furstenberg 2007). Given socioeconomic differences in divorce (Härkönen and Dronkers 2006), different conditions upon entering parenthood may act as a mechanism that selects men from disadvantaged socioeconomic background into groups with higher divorce risks and hence higher multi-partner fertility propensities.

Most analyses of male fertility have been based on survey data, but some authors have questioned the quality of such data for studies of male fertility (Rendal, Clarke, Peters, Ranjit and Verropoulo 1999). There seems to be a tendency of underreported biological children, especially if the father no longer co-resides with the child (Juby and Le Bourdais 1999). We use a very rich data from the Norwegian population registers where almost all children are linked to a father. The article explores socioeconomic differentials in male fertility for cohorts born 1955 to 1984, based on longitudinal data on births, marital status, education and income. We study the multi-partner fertility process using a two-step procedure, analyzing first the event of becoming a father, and next the competing risk of having a higher-parity birth with a new partner (multi-partner fertility), a higher-parity birth with the same partner (same-partner fertility), or no more children.

2. Marital history and multi-partner fertility

There is an obvious link between higher union dissolution rates, increased stepfamily formation and more multi-partner fertility, and studies of stepfamily fertility have appeared from several countries. However, these studies only consider children born within a new marriage or consensual union, and the woman or the couple is still the unit of analysis. Nevertheless, the literature on stepfamily fertility may throw some light on the multi-partner fertility process. In an early study of the fertility of the remarried, Griffith et al. (1985) proposed two hypotheses linked to the value of a first child in addition to the value of a child per se: the birth confers the status of parenthood, but also demonstrates the commitment of the parents to each other. When partners bring previous children into a union, the first child born to the couple may confer parenthood status on neither partner, but the child still has commitment value. If, on the other hand, one partner has no children before the current union, and stepchildren do not provide the same parental status as biological children, the previously childless partner may still strongly value the parenthood status conferred by the first shared child (Vikat et al. 1999). The assumption is therefore that stepfamily formation will produce "extra" births, and empirical evidence from both Europe and the US suggest that this is the case (Buber and Prskawetz 2000; Henz 2002; Olah 2001; Thomson 1997; Thomson 2004; Vikat et al. 1999).

We try to disentangle some of the inter-linkages with union formation and dissolution by controlling for the partnership history in the birth process models. We are able to do so as far as marriage is concerned, as we have high-quality, longitudinal data on marital status, and we distinguish between ever-married men who have never divorced, ever-married men who have later divorced, and never-married men. An obvious assumption is that men who have been continuously married will be more likely to father a child with the same partner and less likely to father a child with a new partner than men who have once married and later divorced. A complicating factor regarding men that have never married is that we do not know whether they ever have been cohabiting, as our administrative data do not contain such information. However, cohabiting unions have been found to be less stable than formal marriages, even if there are children in the relationship (Byberg, Foss and Noack 2001; Manning, Smock and Majumdar 2004). Consequently, never-married fathers are likely to have less stable partnership histories and be more "at risk" of multi-partner fertility than continuously married fathers, which has also been found in studies of American men (Manlove et al. 2008; Guzzo and Furstenberg 2007; Carlson and Furstenberg 2006). The differences in multi-partner fertility between men with divorce experience and never-married men are more ambiguos. In our data, both groups contain present and past cohabitants, but a reasonable assumption is that never-married men have the most unstable union histories, and therefore are more likely to have a child with a new partner than ever-married men who have later divorced. Previously married men may have other unobserved characteristics that make them both more attractive and more unattractive as prospective partners and fathers of future children than never-married men. A previous marriage may e.g. signal commitment ability, and these men may also be more family- and child-oriented themselves, but a divorce may also signal less partnership commitments and less father involvement. Such circumstances suggest that men who have ever married and later divorced could be both more likely and less likely to father a child with a new partner than men with no marriage experience. All things considered, it is therefore difficult to predict which of the two groups will have the highest multi-partner fertility.

3. Socioeconomic status and multi-partner fertility

Traditionally, the argument has been that men with higher socioeconomic status will be more attractive as potential marriage partners and better equipped to support a family (Becker 1981). In a traditional male breadwinner/female caregiver family this is crucial, but in many industrialized countries there has been a move away from the traditional family type with a male breadwinner towards a more modern family type with dual breadwinning. Norway is characterized by the latter, but part-time work is still very common among mothers, and mothers continue to do most of the household work (Kitterød and Pettersen 2006). The Norwegian family model is therefore far from

gender-neutral, and the present division of labour has been characterized "gender-equality light" (Rønsen and Skrede 2006; Skrede 2004). The income prospects of the male partner remain crucial and women will regard men with higher provider ability more attractive as partners and potential fathers than men with poorer income prospects. Consequently, we assume that men with higher socioeconomic status (income and educational attainment) will be more likely to become fathers than other men. Similarly, we expect the likelihood of having another child with the same partner to increase with higher socioeconomic status.

When multi-partner fertility is concerned, the relationship with socioeconomic status is less clear-cut. A key factor here is the underlying selection process related to dissimilar union dissolution risks mentioned above. In the Nordic countries, previous research has found that men with higher educational attainment have lower dissolution risks than men with lower education (e.g. Hoem 1997; Jalovaara 2003; Lyngstad 2004). The negative selection of highly educated men into the pool of men "at risk" of multi-partner fertility thus interacts with the direct positive effect on further childbirths of higher education, and may cancel or even outweigh the assumed positive association with socioeconomic status for this group. Differences in divorce risks thus act as a mechanism that selects men with different socio-economic background into groups that are more or less likely to experience multi-partner fertility. A prior, it is therefore difficult to predict the direction of the association between socioeconomic status and multi-partner fertility. In addition, we expect to find significant interaction effects between socioeconomic status and marital status history. If marriage experience signals abilities of partnership commitment and child involvement, a higher socioeconomic status may for example be more important for ever-married men who have later divorced than for men who have never married.

Income and educational attainment are both important ingredients of men's socioeconomic status, but income may be conceived to play a larger role in some educational groups than in others. In previous research from Scandinavia, educational level has e.g. been found to be positively associated with egalitarian attitudes (Berhardt 2000) and with the division of household labour (Kitterød 2002). That is, men with higher education have more egalitarian attitudes and share households tasks more equally with their spouses than men with lower education. Also, previous studies from both the U.S. and Europe have shown that men with egalitarian attitudes towards gender roles in the family have in fact higher fertility aspirations than men with traditional attitudes (Kaufman 2000; Puur, Oláh, Tazi-Preve and Dorbritz 2008; Goldscheider, Oláh and Puur 2010). Hence, men with higher education may express more interest in childcare and domestic chores, and therefore be considered more attractive as

potential partners and fathers to future common children, independent of their income prospects. Consequently, we would expect income to play a smaller role in the fatherhood process for highly educated men than for men with lower education. For higher-order births, the interaction effects between education and income may further differ between births with the same partner and births with a new partner. The income prospects of a highly educated father may e.g. be more important for multi-partner fertility than for same-partner fertility if previous union disruption signal less partnership commitment and less involvement in practical parenting from the potential father.

4. Data and methods

Our analysis is based on individual-level data extracted from various administrative registers covering the whole population of Norway. Each resident has a unique indentifying code, which makes it possible to link information from different data sources together. The births of biological children are extracted from the Central Population Register, which contains all children of every person who has ever lived in the country since 1960. For each birth we are able to link the father and the mother of the child in order to determine whether the respective birth is with the same or with a new partner.

Our study includes the 1955 to 1984 male birth cohorts. The plentiful data permit analyses that are not feasible with ordinary sample surveys, e.g. examinations of relatively small groups like men with higher university education. Another virtue of register data is that they are recorded consecutively, and therefore their quality and completeness is unlikely to be related to the nature of the relationship a parent has with a child as the child ages (Kravdal and Rindfuss 2008). The registration of fathers is following the pater-est law where marriage of the mother declares the paretnity of the child and otherwise it is decalared at birth. Consequently, the birth histories of our selected male cohorts are almost complete; only about 1-1.5 per cent of the total number of children have no registered father in our data. In surveys this is a much greater problem, as biological children may be underreported if they no longer co-reside with the father (Juby and Le Bourdais 1999).

The birth histories have further been linked to administrativ, data on education, income and marital status recorded annually. Immigrants are excluded from the analysis, as we have no information on their life-histories prior to immigration. Our latest information for education and income is from 2005, but since we lag these variables with one year in the models, the cut-off point for the analysis is 2006. The maximum age of men in our study is thus 51 years (the 1955 cohort).

Our main indicators of socioeconomic status are level of education and income. Level of educational is divided into four groups, using the Norwegian standard classification of education[1]: (i) compulsory (10 years of schooling), (ii) secondary (11-13 years), (iii) college or university, up to and including a bachelor's degree (14-17 years), and (iv) college or university education taking 5 years or more, e.g. a master degree (18 or more years). Income is a person's gross annual pensionable earnings in Norwegian Kroner (1 US$ = about 5.39 according to present exchange rates[2]). We use log income[3] in real terms, i.e. the amount each year is adjusted according to the consumer price index with 2005 as the basis year.

In the models we further control for educational activity (in education), socio-economic background and region of upbringing. Educational activity is a time-varying dummy variable indicating whether or not a person has been engaged in any schooling lasting a month or more in a given year. It thus encompasses both shorter and longer courses at all levels of education. Social background is based on information of the educational level of the men's parents. If possible, the father's education is used, if not the mother's education serves as basis. The variable has three levels: low, medium and high. Low corresponds to education at the compulsory level (10 years), medium to educations at the secondary level (11-13 years) and high to education at college or university level (14 years or more). Region of upbringing is based on information of the person's municipality of residence at age 16, and has been grouped into wider regions based on a standard regional classification for Norway.

Since childbearing is an ongoing process, and we have access to long time-series of longitudinal data, we model these dynamics by means of hazard rate regression. The central concept, the hazard rate, is defined as the rate with which an event occurs within a certain short time interval, given that it has not occurred before. Formally it can be written

$$(1) \qquad h(t) = \lim [P(t \leq T < t + \Delta t \mid T \geq t)] / \Delta t \quad \Delta t \rightarrow 0+$$

where h(t) is the hazard rate the P(.) denotes the probability of experiencing a childbirth in the time interval Δt. There are many possible parametric specifications for the hazards function. We use a discrete hazard rate model, as most of our data are recorded on an annual basis. Using a logit transformation, the discrete hazard rate function can be expressed as

[1] We use a recent version of the standard where the levels of education have been revised to be more compatible with international standards (see http://www.ssb.no/utniv_en/).

[2] 11. April 2011.

[3] The income of persons with zero earnings is set to 1 NOK.

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

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.

A challenge when modeling multi-partner fertility is its dependence on having fathered a child in the first place, and its close association with union dissolution. Thus, we are faced with multiple processes that are partly sequential and partly more synchronized. An ambitious attempt would be to model these processes simultaneously, but we have not embarked on this procedure here. Instead our modelling strategy has been to first analyse the event of becoming a father, and next to analyse the competing risk of having a higher-parity birth with a new partner (multi-partner fertility), a higher-parity birth with the same partner (same-partner fertility), or no more children. The simultaneity with union dissolution remains, however. Because the two processes are so closely interlinked, it seems unreasonable to regard current marital status as an exogenous explanatory variable in the model. Instead we condition on the past marital status history, which is likely to ameliorate some of this endogeneity. Nevertheless, in the first birth model we regard the processes of marrying and having children as too simultaneous to warrant the inclusion of marital status history as an exogenous variable, even if we lag it with for example a year. For second and higher-order births we do include the past marital history, and as previously mentioned we distinguish between the following groups: (i) men who have ever married, but never divorced, (ii) men who have ever married, and later divorced, and (iii) men who have never married. This should capture some of the past relationship history which has proved an important determinant of multi-partner fertility in previous research (Guzzo and Furstenberg 2007; Manlove et al. 2008). Table 1 display descriptive statistics of the variables included in the models for higher-order births.

In the first-birth model, the process time is the person's own age, measured at the end of the calendar year and categorized into broader 5-year intervals (except for the last which contain ages 45-51). In the higher parity models, duration is measured by time since last birth which is equivalent to the age of the youngest child. It is measured in years and entered as a continuous variable with a square term to catch possible non-linearity. The higher-order parity model also controls for age at first birth, which has been shown to be an important determinant of continued childbearing in much previous research (e.g. Manlove et al. 2008). Furthermore, the higher-order parity model includes parity (number of previous children) as a separate covariate to control for variations in the timing of different higher-order births, from the second (parity one) and up to the fifth (parity four).

When modelling first birth, we follow the men from the year they turn 16 and until they father a first child or, if not, until the end of the observation period (2006). When modelling the competing risk of further children with the same or with another partner, we follow the men from the year of birth of their last child and until the year of a new birth, or in the case of no further children, to the end of the observation period. That is, we model the exposure to second or higher order births together, analyzing births up to the fifth child, and include parity as a covariate in the model. In all models, we censor individuals who die or emigrate during the follow-up period at the time of death or emigration. We also censor men who enter a same-sex registered partnership at the time of that event, as their risk of fathering further children with a female partner is minute.

Table 1 Descriptive statistics of fathers (measured at first year of observation).

Educational level	
Compulsory (10 years)	26.8
Secondary (11 to 13 years)	48.1
Some college (14 to 17 years)	17.6
Higher degree (18+ years)	7.1
Mean income (NOK, 2005-prices)	280,736
Marital history	
Never married	57.9
Ever married, never divorced	37.7
Ever married, ever divorced	4.4
Educational activity	
In education	16.4
Parents educational level	
Compulsory (10 years)	17.3
Secondary (11 to 13 years)	53.8
University (14+ years)	25.5
Age (years)	
16-24	15.8
25-29	33.5
30-34	32.1
35-39	14.5
40-44	3.6
45-51	0.6
Birth cohort	
1955-59	26.7
1960-64	25.3
1965-69	23.8
1970-74	16.4
1975-79	6.4
1980-84	1.5
Parity (number of previous children)	
One	48.8
Two	34.8
Three	13.4
Four	3.0
Age at first birth	27.2
Number of observations	1,071,090

5. Results

As has been shown for men's cohort fertility patterns before (Rindfuss and Kravdal 2008; Lappegård et al. 2011), there is a positive association between educational level and male fertility. In the present analyses, this turns up in higher first-birth rates for university educated men, and in particular for those with a higher university degree (Table 2). We find the same pattern for higher-parity births with the same partner (Table 3), where the positive association is even stronger. However, when multi-partner fertility is concerned, there pattern is more bifurcated. Men with compulsory education are more likely to experience this event than men with secondary and some college education, but men with a higher university degree still have the highest birth-risk with a new partner. The elevated risk for low-educated men is in line with previous research from the US which has shown that multi-partner fertility is often associated with socioeconomic disadvantage (Carlson and Furstenberg 2006; Guzzo and Furstenberg 2007), but the higher rates also for top-educated men has not been documented before, as far as we know.

This suggests that the multi-partner process is quite multifaceted, involving elements of both selection and attraction. Low education may be an impact factor because it is associated with more unstable unions and higher dissolution risks. High education, on the other hand, is usually associated with lower union dissolution rates, so we must look for other explanations here. An argument close at hand is the traditional notion that men with higher education are better equipped to support a family and therefore more attractive as partners and potential fathers. Besides, these men may have other unobserved characteristics that enhance their multi-partner birth propensity. Our results thus indicate that both disadvantage and advantage plays a role in the multi-partner fertility process, and that the association with socio-economic status may be more nuanced than previously observed.

As predicted, a man's income has a positive effect on entry into fatherhood (Table 2) and having another child with the same partner (Table 3), and interestingly also on higher-order births with a new partner. The strongest income effect is on the likelihood of having a first child, however, indicating that economic considerations are more decisive for men's chance of ever becoming a father than for their likelihood of having more children. As discussed, this may in part reflect men's own preferences and constraints, but also differential selection processes into fatherhood based on their attractiveness to women as partners and income providers.

Table 2. Relative risks (odds ratios) of first birth among Norwegian men (95% confidence limits in parentheses).

Educational level	
Compulsory (10 years)	1
Secondary (11 to 13 years)	1.01 (1.01-1.02)
Some college (14 to 17 years)	1.15 (1.14-1.16)
Higher degree (18+ years)	1.46 (1.44-1.48)
Log income (NOK, 2005-prices)	1.14 (1.14-1.14)
Educational activity	
Not in education	1
In education	0.63 (0.63-0.64)
Parents educational level	
Compulsory (10 years)	1.21 (1.20-1.22)
Secondary (11 to 13 years)	1.16 (1.15-1.17)
University (14+ years)	1
Age (years)	
16-19	1
20-24	4.65 (4.55-4.74)
25-29	9.16 (8.97-9.35)
30-34	9.79 (9.58-10.00)
35-39	5.91 (5.77-6.05)
40-44	2.40 (2.33-2.47)
45-51	0.74 (0.70-0.79)
Birth cohort	
1955-59	1
1960-64	0.92(0.91-0.93)
1965-69	0.87 (0.86-0.88)
1970-74	0.78 (0.77-0.79)
1975-79	0.62 (0.61-0.63)
1980-84	0.47 (0.46-0.47)
Number of observations (man years)	12,854,257

Note: The model also includes control for region.

In the higher-order parity model (Table 3), the past marital history is an important control variable. Not surprisingly, we find that men who have been continuously married (ever married/never divorced) are much more likely to father another child with the same partner, and much less likely to have a child with a new partner than men who have never been married. Men who have ever been married, but later divorced also have higher same-partner birth-risks compared to never-married men, but quite interestingly, we find that they have much higher multi-partner birth-risks too. As argued above, this is not obvious a priory as never-married men probably have more unstable unions and therefore are more "at risk" of having a child with a new partner. Apparently, other circumstances weigh more heavily here, for example unobserved characteristics that make previously married men more attractive to women as partners and fathers and/or differential values and preferences that make these men more child- and family oriented than never-married men. With the information available in our register data we cannot disentangle these influences, but later in the article we shall gain some more insights by

examining how marital status history interacts with education and income and thus indirectly impacts the outcome for different socio-economic groups.

Table 3. Relative risks (odds ratios) of higher-order births among Norwegian fathers (95% confidence limits in parentheses)

	Same partner	New partner
Educational level		
Compulsory (10 years)	1	1
Secondary (11 to 13 years)	1.17 (1.16-1.18)	0.87 (0.86-0.89)
Some college (14 to 17 years)	1.41 (1.40-1.43)	0.91 (0.88-0.94)
Higher degree (18+ years)	1.67 (1.65-1.70)	1.10 (1.04-1.15)
Log income (NOK, 2005-prices)	1.02 (1.02-1.03)	1.02 (1.02-1.02)
Marital history		
Never married	1	1
Ever married, never divorced	2.00 (1.98-2.01)	0.17 (0.17-0.18)
Ever married, ever divorced	1.03 (1.01-1.05)	2.15 (2.11-2.20
Educational activity		
Not in education	1	1
In education	0.86 (0.85-0.87)	0.96 (0.93-0.99)
Parents educational level		
Compulsory (10 years)	0.96 (0.95-0.97)	1.00 (0.97-1.03)
Secondary (11 to 13 years)	0.97 (0.96-0.98)	1.00 (0.97-1.03)
University (14+ years)	1	1
Age (years)		
16-24	1	1
25-29	1.52 (1.50-1.55)	0.99 (0.95-1.04)
30-34	1.78 (1.74-1.82)	0.80 (0.76-0.84)
35-39	1.45 (1.41-1.49)	0.53 (0.49-0.56)
40-44	0.91 (0.87-0.94)	0.31 (0.28-0.33)
45-51	0.55 (0.52-0.58)	0.19 (0.17-0.21)
Birth cohort		
1955-59	1	1
1960-64	1.04 (1.03-1.05)	1.07 (1.05-1.10)
1965-69	1.04 (1.02-1.05)	1.11 (1.08-1.14)
1970-74	1.06 (1.05-1.07)	1.10 (1.07-1.14)
1975-79	1.02 (1.00-1.04)	1.08 (1.03-1.13)
1980-84	0.85 (0.81-0.89)	0.86 (0.77-0.96)
Age of youngest child	2.68 (2.67-2.69)	1.74 (1.72-1.75)
Age of youngest child squared	0.89 (0.89-0.89)	0.98 (0.98-0.98)
Parity (number of previous children)		
One	1	1
Two	0.27 (0.27-0.27)	0.53 (0.52-0.54)
Three	0.14 (0.14-0.14)	0.38 (0.37-0.40)
Four	0.17 (0.16-0.17)	0.36 (0.33-0.39)
Age at first birth	0.90 (0.89-0.91)	0.95 (0.93-0.97)
Age at first birth squared	1.02 (1.02-1.02)	1.00 (0.99-1.00)
Number of observations (man year)	7.494.406	

Note: The model also includes control for region.

The other control variables will only be commented upon briefly here. We find that men who come from lower social background become fathers at younger ages than men who grew up in higher social status families (Table 2). This is in line with previous research showing that more poor men report being fathers (Guzzo and Furstenberg, 2007). When higher-party births are concerned, men from more disadvantaged families are less inclined than men with higher social status to have another child with the same partner, while there are no social background differentials in higher-parity births with a new partner (Table 3). The increasing negative gradient across birth-cohorts for first birth reflects the ongoing postponement of fatherhood by younger male generations, but similar to women, there seems to be some recuperation going as the 1960s and the 1970s birth cohorts have slightly rising higher-parity birth rates, both when same-partner fertility and multi-partner fertility is concerned.
Being in education clearly delays fatherhood and also the progression to higher parities with the same partner, while there is no effect of educational activity on multi-partner fertility. The peak age of becoming a father is estimated to be 30-34 years, which is also the peak age for fathering another child with the same partner. The peak age for multi-partner fertility is somewhat lower, however, below 30 years. For both higher-order birth events, the association with age at first birth is negative while age at first birth squared is positive, i.e. the higher the age at first birth, the less likely men are to have more children, but this effect dwindles as age at birth increases. Finally, fathers of two or more children are less likely to have another child than one-child fathers, but it is worth noticing than the negative association is stronger for same-partner than for multi-partner fertility, which suggests that previous children are somewhat less inhibiting for further childbearing in a new than in the same relationship.

Previously, we argued that the associations between socioeconomic status and multi-partner fertility may vary with marital history, as different groups of men may have different marriage dissolution risks. The results so far indicate that men with different marital histories may be dissimilar in other respects as well, for example in their own family values and preferences and in their attraction to women as partners and potential fathers to common children. Since the influence of such unobserved characteristics may vary with socioeconomic status too, we have furthermore run models with interactions between marital status, and education and income respectively for higher order births. The results are reported in Appendix Table 1 and 2, but to get a clearer picture of the patterns we have also computed the odds ratios for various marital history groups. The odds ratios have been obtained by multiplying the main effect of education and income respectively with their interaction effects with marital status. This means that compulsory educated men constitute the reference category within each marital history group.

Table 4. Computed relative risks (odds ratios) of higher-order births among Norwegian fathers by educational level and marital history

	Marital history		
	Ever married/ never divorced	Ever married/ ever divorced	Never married
Same partner			
Educational level			
Compulsory (10 years)	1	1	1
Secondary (11 to 13 years)	1.09	1.16	1.28
Some college (14 to 17 years)	1.29	1.49	1.62
Higher degree (18+ years)	1.50	2.06	2.07
New partner			
Educational level			
Compulsory (10 years)	1	1	1
Secondary (11 to 13 years)	0.64	1.05	0.82
Some college (14 to 17 years)	0.66	1.28	0.75
Higher degree (18+ years)	0.67	1.79	0.79

Note: The estimates have been computed by multiplying the main effect of educational level with the interaction effects of educational level*marital history, as reported in Appendix Table 1.

Starting with the interaction between educational level and marital history (Table 4), we find that for same-partner fertility, the educational gradient is positive for all three marital history groups. It is steeper for ever-married fathers who have later divorced and for fathers who have never been married than for continuously married fathers, however. This suggests that when further childbirths with the same-partner is concerned, higher education is more important the more unstable marital histories men have had. For multi-partner fertility there are larger and partly opposing contrasts between the marital history groups. Among both continuously married and never-married men the risk of a multi-partner birth is higher for men with compulsory education than for men with more education, but the negative educational gradient is somewhat stronger for continuously married fathers. This corroborates previous findings from the US that multi-partner fertility is associated with socioeconomic disadvantage (e.g. Guzzo and Furstenberg 2007). On the other hand, there is a clear positive educational gradient among men who have ever married and later divorced, implying that for these fathers the risk of a birth with a new partner is higher, the higher their educational level. This shows that multi-partner fertility may also be associated with socioeconomic advantage. To what extent the dissimilar socioeconomic associations are the outcome of men's own preferences and self-selection away from or into further union formation and fathering or their differing attraction to and selection by women cannot be ascertained on the basis of register data, but we can conclude that men who have children with more than one partner seem to be more heterogeneous than previously observed.

Table 5. Computed income effects (odds ratios) by marital history Higher-order births among Norwegian fathers

	Log income	
	Same partner	New partner
Marital history		
Ever married/never divorced	0.99	0.93
Ever married/ever divorced	1.04	1.05
Never married	1.06	1.01

Note: The estimates have been computed by multiplying the main effect of income with the interaction effects of income*marital history, as reported in Appendix Table 2.

Turning to the interaction between income and marital status (Table 5), we see that higher income has no positive effect on further childbirths for continuously married men. In fact, the estimate is negative and quite substantial for multi-partner fertility, indicating that the higher the income, the lower is the risk of fathering a child with a new partner. In contrast, we obtain positive income estimates for both birth-events in the two other marital history groups. However, for never-married fathers the effect is stronger if the birth is with the same than with a new partner, whereas the magnitude is about the same for both multi-partner and same-partner fertility among ever-married fathers with divorce experience. Hence, higher income is predominantly a positive determinant of further childbirths if the father has not been continuously married. If he has a history of marital disruption there is a positive impact on both same-partner and multi-partner fertility, but if he has never been married the positive impact is predominantly on further childbirths with the same partner.

Earlier we also argued that the effect of income may differ across educational groups. Income may e.g. be more important for those with a lower than for those with a higher education, as highly educated men may have other attributes that make them attractive as partners and fathers, such as more positive attitudes to the sharing of family tasks and to gender equality in general. To check these assumptions we have furthermore run models with interactions between income and educational level. The results are reported in Appendix Table 3 for first birth and 4 for higher-order births. The corresponding computed odds-ratios are displayed in Table 6 and 7 below.

Table 6. Computed income effects (odds ratios) by educational level. First birth among Norwegian men.

	Log income
Educational level	
Compulsory (10 years)	1.13
Secondary (11 to 13 years)	1.14
Some college (14 to 17 years)	1.17
Higher degree (18+ years)	1.08

Note: The estimates have been computed by multiplying the main effect of log income and the interaction effects of log income*educational level, as reported in Appendix Table 3.

Table 7. Computed income effects (odds ratios) by educational level. Higher-order births among Norwegian fathers

	Log income	
	Same partner	New partner
Educational level		
Compulsory (10 years)	1.04	1.02
Secondary (11 to 13 years)	0.94	1.02
Some college (14 to 17 years)	1.01	1.05
Higher degree (18+ years)	1.00	1.06

Note: The estimates have been computed by multiplying the main effect of log income and the interaction effects of log income*educational level, as reported in Appendix Table 5.

For first birth (Table 6), the income gradient is positive for levels up to and including some college education, but for men with a higher university degree there is a downward shift to a lower positive level. This renders some support for our assumption that higher income may be of less importance for the fatherhood chances of highly educated men. When higher-order births are concerned (Table 7), the income gradients differ depending on birth-outcome. For same-partner births the income estimate is positive for men with compulsory education and either negative or non-significant for men at higher educational levels, whereas for multi-partner fertility the estimate increases with education. This suggests that the income prospects of a highly educated father may be more important for multi-partner fertility than for same-partner fertility. As argued before, one reason for this could be that a previous union disruption signals less partnership commitment and less involvement in practical parenting from the potential father. Moreover, the group of highly educated father "at risk" of a multi-partner birth is more select than other educational groups, as men with high education are less likely to divorce or separate in the first place, and income may be more important the more select the educational groups are.

6. Discussion and conclusion

In this article we study how socio-economic status is related to men's fertility behaviour. Men's fertility behaviour is driven by preferences for partnership and fatherhood on the one side and their attractiveness to women as partners and potential fathers on the other side. Over the years shifting gender roles has led to new expectations to the fatherhood role and more emphasis on the father as caregiver as well as provider. Accordingly, men's preferences and opportunities for childcare have gained importance, but as long as men continue to be the main breadwinners, their potential as economic providers remains essential. Using administrative register data for Norway, we analyze entry into fatherhood and propensity to father further children with either the same or a new partner. Men with low education and income are found to have the smallest chances of becoming fathers, and having become fathers, they are also less likely to have more children with the same partner. Both

entry into fatherhood and further childbirths in the same union is thus positively associated with socioeconomic advantage. However, the risk of having a child with a new partner is positively related to both socioeconomic advantage and disadvantage. This suggests that the multi-partner process is more multifaceted, involving elements of both selection and attraction. Socioeconomic disadvantage may act as a selection mechanism as it is associated with more unstable unions and higher dissolution risks. Socioeconomic advantage, on the other hand, is usually associated with lower union dissolution rates, and a more reasonable interpretation in this case may be that these men are better equipped to support a family and therefore more attractive as partners and potential fathers.

Another striking result from the present study is that men with divorce experience have a higher risk of multi-partner fertility than men who have never been married. In order to get better insights into the close relationship between union stability and economic stability we further tested for interaction effects between marriage history and educational attainment. The results show that the association with educational attainment is opposite for ever-married men who later divorced and for never-married men. In the former group, the multi-partner birth risk is greatest among the high-educated, while in the latter, it is greatest among the low-educated. Hence, there seems to be a selection of socioeconomic disadvantaged men both away from ever becoming fathers and from multi-partner fertility, especially if they have never been married. It might well be that these men have never been in a stable relationship with the mothers, which has grave implications both for the children and the fathers themselves.

The finding that divorce experience and socioeconomic advantage are positively associated with multi-partner fertility might be related to bias in the marriage market, as higher education is not only linked to better provider ability, but also to more gender equal attitudes and practices in the family (Bernhardt 2000; Kitterød 2002). It has also been argued that gender role attitudes have an affect on how men (and women) view parenthood. A study from the U.S. showed that egalitarian men want children even more than traditional men and it is argued that, rather than being symbolic, children are very much an interactive part of an egalitarian man's family (Kaufman 2000). Conditional of their work- and family-life strategies, some women may have preferences for a main provider, while others may have stronger preferences for a co-child-carer. Anyhow, women are more likely to consider socioeconomic advantaged men more attractive as partners and potential fathers. In the marriage market these factors may exceed the potential downside of having divorce experience. On the contrary, a previous marriage may signal commitment ability and thus attractiveness. We suspect that both are operative and mutually in force.

Our study has two limitations in particular. First, using register data we have complete fertility histories, but we only have access to observable behaviour and no information on men's attitudes to and preferences for fatherhood, including their willingness and ability to be both a provider and co-child-carer. In order to get better insights into these circumstances we need data that illuminate more of the attitudional factors that determine men's fertility behaviour. Second, using marital histories we get important insights into the influence of different marriage experiences on especially multi-partner fertility, but in order to get a fuller picture we would need complete union histories, including cohabitations outside marriage. As cohabitation has become more prevalent, this is important in order to disentangle childbirths within established unions from childbirths in unstable unions where the father has never co-resided with the child.

The contribution of this article is to provide more insights into male fertility in general, and multi-partner fertility in particular, as much of the existing studies in this area are mainly from the US. A common finding from previous research is that multi-partner fertility is primarily associated with socioeconomic disadvantage. Our analysis broadens this perspective and shows that multi-partner fertility is a multifaceted phenomenon, related to both socioeconomic disadvantage and advantage, and involving elements of both selection and attraction. Future work needs to examine these contrasts more in depth. In addition, there is a need to focus more on the consequences of these processes, for the well-being of fathers as well as children.

References

Andersson, G., M. Rønsen, L. B. Knudsen, T. Lappegård, G. Neyer, K. Skrede, K. Teschner and A. Vikat. 2009. Cohort fertility patterns in the Nordic countries. *Demographic Research* 20: 313-352.

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

Bernhardt, E. 2000. Att skaffa barn på 2000-tallet. Vad påverkar viljan att bli föräldar? [Having children in the 2000s. What affects the wish to become parents?]. *Framtider* 4:4-7.

Buber, I.and A. Prskawetz. 2000. Fertility in second unions in Austria: Findings from the Austrian FFS. *Demographic Research* 3(2).

Byberg, I. H., A .H. Foss and T. Noack. 2001. Gjete kongens harer – rapport fra arbeidet med å få samboere mer innplassert i statistikken [report on cohabitation in the statistics]. Reports 2001/40. Oslo/Kongsvinger: Statistics Norway.

Carlson, M.J. and F.F. Furstenberg. 2006. The prevalence and correlates of multipartnered fertility among urban U.S. parents. *Journal of Marriage and the Family* 68:718-732.

Goldscheider, F. and G. Kaufman. 1996. Fertility and commitment: Bringing men back in. *Population and Development Review* 22 (supplement):87-99.

Goldscheider, F., L. S. Oláh. 2010. Reconciling studies of men's gender attitudes and fertility: response to Westoff and Higgins. *Demographic Research* 22: 189-198.

Griffith, J.D., H.P. Koo, and C.M. Suchindran. 1985. Childbearing and family in remarriage. *Demography* 22(1):73-88.

Guzzo, K.B. and F.F. Furstenberg. 2007. Multipartnered fertility among American men. *Demography* 44(3):583-601.

Härkönen, J. and J. Dronkers. 2006. Stability and change in the educational gradient of divorce. A comparison of seventeen countries. *European Sociological Review* 22(5): 501-517.

Henz, U. 2002. Childbirth in East and West German step-families. *Demographic Research* 7(6):307-342.

Hoem, J.M. 1997. Educational Gradients in Divorce Risks in Sweden in Recent Decades. *Population Studies* 51:19-27.

Jalovaara, M. 2003. The Joint Effects of Marriage Partners' Socioeconomic Positions on the Risk of Divorce. *Demography* 40:67-81.

Juby, H. and C. Le Bourdais. 1999. Where have all the children gone? - Comparing mothers' and fathers' declarations in retrospective surveys. *Canadian studies in population* 26:1-20.

Kaufman, G. 2000. Do Gender Role Attitudes Matter?: Family Formation and Dissolution Among Traditional and Egalitarian Men and Women. *Journal of Family Issues* 21: 128-144.

Kitterød, R.H. 2002. Utdanning og ulikhet? En diskusjon av utdanningsnivåets betydning for deling av husarbeid blant småbarnsforeldre [Education and inequality? A discussion of the educational effect of the division of housework among parents with young children]. *Sosiologisk tidsskrift* 3:179-208.

Kitterød, R.H. and S.V. Pettersen. 2006. Making up for mothers' employed working hours?: housework and childcare among Norwegian fathers. *Work Employment and Society* 20:473-492.

Kravdal, O. and R.R. Rindfuss. 2008. Changing relationship between education and fertility - a study of women and men born 1960-64. *American Sociological Review* 73:854-873.

Lappegård, T., M. Rønsen, and K. Skrede. 2011. Fatherhood and Fertility. *Fathering* 9(1) 103-120.

Lyngstad, T.H. 2004. The Impact of Parents' and Spouses' Education of Divorce rates in Norway. *Demographic Research* 10:122-142.

Manning, W. D., P. J. Smock and D. Majumdar. 2004. The relative stability of cohabiting and marital unions for children. *Population Research and Policy Review* 23(2) 135-159.

Manlove, J., C. Logan, E. Ikramullah, and E. Holcombe. 2008. Factors associated with multiple-partner fertility among fathers. *Journal of Marriage and the Family* 70:536-548.

Martín-García, T. 2009 'Bring men back in': A re-examination of the impact of type of education and educational enrolment on first births in Spain. *European Sociological Review* 25(2): 199-213.

Olah, L.S. 2001. Gender and family stability: Dissolution of the first parental union in Sweden and Hungary. *Demographic Research* 4:27-96.

Puur, A., L. S. Oláh. 2008. Men's childbearing desires and views of the male role in Europe at the dawn of the 21st century. *Demographic Research* 19: 1883-1912.

Rendal, M., L. Clarke, H.E. Peters, N. Ranjit, and G. Verropoulou. 1999."Incomplete reporting of men's fertility in the United States and Britain: A research note. *Demography* 36(1):135-144.

Rønsen, M. and K. Skrede. 2006. Nordic fertility patterns: compatible with gender equality?. In *Politicising parenthood: Gender relations in Scandinavian welfare state restructuring*, edited by A.-L. Ellingsæter and A. Leira. Bristol: Policy Press.

Rønsen, M. and K. Skrede. 2010. Can public policies sustain fertility in the Nordic countries? Lessons from the past and questions for the future. *Demographic Research* 22: 321-346.

Skrede, K. 2004. Færre menn blir fedre [Fewer men becomes fathers]. *Økonomiske analyser* 6:57-68.

Thomson, E. 1997. Couple childbearing desires, intentions, and births. *Demography* 34:343-354

Thomson, E. 2004. Step-families and childbearing desires in Europe. *Demographic Research* 3(5):115-134.

Vikat, A., E. Thomson, and J.M. Hoem. 1999. Stepfamily fertility in contemporary Sweden: The impact of childbearing before the current union. *Population Studies* 53:211-225.

Appendix: Tables

Table A1. Main effects and interaction effects (odds ratios) between level of education and marital history (95% confidence limits in parentheses). Higher-order births, Norwegian fathers

	Same partner	New partner
Educational level		
Compulsory (10 years)	1	1
Secondary (11 to 13 years)	1.28 (1.26-1.29)	0.82 (0.80-0.84)
Some college (14 to 17 years)	1.62 (1.59-1.65)	0.75 (0.72-0.79)
Higher degree (18+ years)	2.07 (2.02-2.12)	0.79 (0.72-0.86)
Marital history		
Never married	1	1
Ever married, never divorced	2.30 (2.27-2.33)	0.20 (0.19-0.21)
Ever married, ever divorced	1.09 (1.06-1.12)	1.78 (1.73-1.84)
Interactions		
Secondary * ever married, never divorced	0.86 (0.84-0.87)	0.78 (0.74-0.83)
Some college * ever married, never divorced	0.80 (0.78-0.81)	0.87 (0.79-0.95)
Higher degree * ever married, never divorced	0.72 (0.70-0.74)	0.85 (0.73-0.98)
Secondary * ever married, ever divorced	0.91 (0.88-0.94)	1.28 (1.23-1.33)
Some college * ever married, ever divorced	0.92 (0.88-0.97)	1.70 (1.60-1.81)
Higher degree * ever married, ever divorced	0.99 (0.93-1.06)	2.28 (2.04-2.53)

Note: The model also includes all the other covariates in Table 3.

Table A2. Main effects and interaction effects (odds ratios) between income and marital history (95% confidence limits in parentheses). Higher-order births, Norwegian fathers.

	Same partner	New partner
Log income	1.06 (1.05-1.06)	1.01 (1.01-1.02)
Marital history		
Never married	1	1
Ever married, never divorced	4.30 (4.12-4.49)	0.48 (0.43-0.54)
Ever married, ever divorced	1.29 (1.18-1.40)	1.40 (1.31-1.53)
Interaction effects		
Log income * ever married, never divorced	0.94 (0.94-0.94)	0.92 (0.91-0.93)
Log income * ever married, ever divorced	0.98 (0.98-0.99)	1.04 (1.03-1.04)

Note: The model also includes all the other covariates in Table 3.

Table A3. Main effects and interaction effects (odds ratios) between income and level of education (95% confidence limits in parentheses). First birth, Norwegian men.

Log income	1.13 (1.13-1.13)
Educational level	
Compulsory (10 years)	1
Secondary (11 to 13 years)	0.91 (0.87-0.94)
Some college (14 to 17 years)	0.77 (0.72-0.82)
Higher degree (18+ years)	2.54 (2.33-2.77)
Interaction effects	
Log income * secondary	1.01 (1.01-1.01)
Log income * some college	1.03 (1.03-1.04)
Log income * higher degree	0.96 (0.95-0.96)

Note: The model also includes all the other covariates in Table 2.

Table A4. Main effects and interaction effects (odds ratios) between income and level of education (95% confidence limits in parentheses). Higher-order births, Norwegian fathers.

	Same partner	New partner
Log income	1.04 (1.04-1.04)	1.02 (1.02-1.02)
Educational level		
Compulsory (10 years)	1	1
Secondary (11 to 13 years)	1.46 (1.39-1.53)	0.90 (0.83-0.97)
Some college (14 to 17 years)	1.96 (1.84-2.08)	0.64 (0.53-0.77)
Higher degree (18+ years)	2.91 (2.68-3.17)	0.66 (0.43-1.01)
Interaction effects		
Log income * secondary	0.98 (0.98-0.99)	1.00 (0.99-1.01)
Log income * some college	0.97 (0.97-0.98)	1.03 (1.01-1.05)
Log income * higher degree	0.96 (0.95-0.96)	1.04 (1.01-1.08)

Note: The model also includes all the other covariates in Table 3.