

MEMORANDUM

No 42/2000

**The Impact of Individual and Aggregate Unemployment on Fertility
in Norway**

*By
Øystein Kravdal*

ISSN: 0801-1117

Department of Economics
University of Oslo

This series is published by the
University of Oslo
Department of Economics

P. O.Box 1095 Blindern
N-0317 OSLO Norway
Telephone: + 47 22855127
Fax: + 47 22855035
Internet: <http://www.oekonomi.uio.no/>
e-mail: econdep@econ.uio.no

In co-operation with
**The Frisch Centre for Economic
Research**

Gaustadalleén 21
N-0371 OSLO Norway
Telephone: +47 22 95 88 20
Fax: +47 22 95 88 25
Internet: <http://www.frisch.uio.no/>
e-mail: frisch@frisch.uio.no

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Øystein Kravdal
Department of Economics
P.O. Box 1095 Blindern
0317 Oslo, Norway

e-mail: okravdal@econ.uio.no

The Impact of Individual and Aggregate Unemployment on Fertility in Norway

Øystein Kravdal

Department of Economics,
University of Oslo

Running title: Fertility and unemployment in Norway

Word counts:

Abstract: 158 words

text (excluding notes, references and acknowledgement): 7152

ABSTRACT

Continuous-time hazard models are estimated from register-based birth, migration, education and unemployment histories for the complete Norwegian population, linked with aggregate data for municipalities. The data cover the period 1991-98. First-birth rates are slightly higher among women who had been unemployed twelve months before than among others, whereas higher-order birth rates are slightly lower. Although men's unemployment has a more pronounced negative effect, according to paternity rate models, the overall conclusion is that unemployment in Norway has had a negligible impact on fertility through individual-level effects. Aggregate-level effects are more important. Higher-order birth rates are lower in municipalities where men's or women's unemployment is high than elsewhere. All in all, the peak unemployment level of 6% experienced in 1993 is found to be associated with a reduction of about 0.08 in total fertility. The results accord well with economic theories for first and higher-order births that are based on the assumption that women are still the primary caretakers.

INTRODUCTION

Unemployment may lead to a substantially reduced income, depending on the country's compensation system, and may also trigger emotional reactions. Besides, it may create expectations, also among those who have not lost their job, about a relatively poor economic situation in the future. It is therefore not unlikely that the currently high unemployment rates in Europe (11 % as a E.U. 1998 average for all age groups, compared with 4% in the U.S. and Japan; see e.g. Statistics Norway 2000) may be partly responsible for their below-replacement fertility.

Looking further back, fertility reached a low in many countries during the 1930s, when unemployment was high and more detrimental to the families' well-being than it currently is. At that time, birth rates had already fallen sharply for some decades, but it may well be the economically hard times strengthened the decline.

Some time-series analyses suggest a relationship between fertility and unemployment. For example, Macunovich (1996) reported a negative effect of young American women's unemployment on their birth rate. In an earlier study, where no other variables were included, both men's and women's unemployment were found to reduce fertility, and more clearly so for higher-order birth rates than for first-birth rates (Macunovich and Easterlin 1988). In an American study of first births, Rindfuss et al. (1988) found an inhibiting effect of unemployment during recent decades as well as during the Depression, without distinguishing between men's and women's unemployment. A similar effect of men's unemployment in the post-war period was reported from Great Britain (De Cooman et al (1987) and Ermisch (1988)), where unemployment otherwise was found to leave little imprint on fertility. On the basis of

data going back to the mid-19th century, Tzannatos and Symons (1989) concluded that unemployment to a large extent was responsible for the low British fertility during the Depression.

Few researchers have been able to consider individual unemployment, and the results from these studies are diverse. Rindfuss et al (1988) showed that women's unemployment in the United States had no impact on first births, whereas men's unemployment seemed to discourage early parenthood. A Belgian exploration (Impens 1989) suggested a negative effect of women's unemployment, and a British study (Sullivan and Falkingham 1991) showed that men who had experienced some unemployment during young adult years more often than others had become fathers by age 23. On the other hand, Kreyenfeld (2000) found women's unemployment to increase first-birth rates among Germans with low education, and Hoem (2000) showed such a pattern more generally for Swedish first births.

Hoem (2000) also found that an indicator of local unemployment had an opposite and quite strong effect.

In this study, register data for the complete Norwegian population are used to assess how both individual- and aggregate-level unemployment have influenced first- and higher-order birth rates. A woman's perspective is taken, in conformity with traditions. It is estimated how a woman's birth rate is influenced by her own unemployment, that of other women in the community, and that of men. The latter will partly reflect that women in areas with many unemployed men more often than others have a partner who is unemployed. The data did not include any information on partners, but to get at least an impression of this individual-level contribution, paternity rate models for men are also estimated. It is controlled for a few factors that are likely to be strong determinants of unemployment as well as fertility. Simulation is

used to find out how changes in unemployment levels such as those experienced in Norway have influenced total fertility.

THE NORWEGIAN SETTING

Trends in fertility and unemployment

Total fertility is quite high in Norway by European standards, for reasons not discussed here. After a low of 1.66 in 1983-84, there was an increase during the late 1980s, followed by a quite stable level (Figure 1). Total fertility in 1999 was 1.85. A shallow trough can be discerned, because total fertility in 1993 was 0.07 lower than in 1990 and 0.03 lower than in 1996. The figures for the last three years of the decade were, on average, 0.05 lower than for the first seven years.

(Figure 1 about here)

Parity-specific trends are shown in Figure 2. Birth rates relative to those in 1977 are plotted by calendar year, with controls for age of the woman and duration since last previous birth. Trajectories of second- and higher-order birth rates are very similar: A decline started about 1965, was brought to an end in the mid-1970s, and was succeeded by a constant level or slight upturn. A different pattern is seen for first-birth rates below age 30, which dropped from 1972 until the mid-1980s, with a somewhat less marked decline afterwards (whereas an increase appeared at higher ages; not shown). The 1990s have witnessed very moderate changes. A weak and

smooth downward trend is seen for first-birth rates, whereas higher-order birth rates have been more stable, except for a minor dip for second and third births around 1993.

(Figure 2 about here)

There has been little unemployment in Norway compared to many other European countries (and the timing of the ups and downs has often been different, not least because of the country's oil-dependent economy; see e.g. Rødseth 1994). Norwegian unemployment rates for the last three decades are shown in Figure 1, along with total fertility. These rates are defined as the number of fully unemployed (seeking work without having any labour income) divided by the number of people in the labour force. Both numerator and denominator are based on the quarterly Labour Force Surveys, where people are asked about their employment status, and are for the age group 16-74.

A slight increase up to 3.4% and a subsequent return to the post-war normal of about 2% was experienced in the first half of the 1980s, whereas the 1990s saw a more pronounced rise and fall. The rate reached 6%, and subsequently dropped to 3%.

Visual inspection of the curves does not suggest any sharp relationship between unemployment and fertility. The highest level of unemployment coincides with a local minimum in fertility (in 1993), but unemployment was not much lower in 1990, when fertility reached the highest level since 1975, and fertility increased from 1987 to 1990, in step with an unemployment on the upturn. However, this lack of parallel development does not rule out the possibility of more pronounced effects that may be masked by other social changes taking place simultaneously.

Economic consequences of unemployment

This study is based on unemployment data from the Labour Directorate. People who register at the local Employment Offices as seeking work, and who have no labour income, are reckoned as 'registered fully unemployed' in statistics from the Labour Directorate. (See below for a brief description of the differences in unemployment levels between this statistics and that based on the Labour Force Surveys, which was referred to above.) In order to be considered as seeking employment, one must be willing to take any work that is offered or to take part in employment training courses. One must also report as unemployed every fortnight. This excludes the possibility for educational activities that are scheduled for normal working hours (but very short courses are permitted).

The unemployed are entitled to a compensation if they have had a labour income of at least about 45000 NOK the previous year (or as a three-year average), or if they have been in compulsory military service (see e.g. Kjørstad 1998).

This compensation (before tax) is about 60% of the income (including unemployment compensations) earned the previous year. During the study period, compensation could be received for at least 1.5 years, except for those who had earned their rights through military service exclusively. In 1996, the compensation period was increased to 3 years for people with previous income above about 90000 NOK.

Regulations about compensation for spells of unemployment beyond these limits have changed markedly during the 1990s. Up to May 1991, no support was provided for the next 0.5 year, after which a new compensation period could start. This blocking of transfers was gradually weakened, and after 1996, a second 3-year

compensation period could be started immediately (with a lower amount of support, of course, due to the lower income in the past). These changes are not important for many people, because few are unemployed more than one year. (Only about 1/3 of the unemployed in the 1990s had been unemployed for 6 months or more according to Table 3.)

Many unemployed meet with substantial economic problems, in spite of the relatively generous compensation. In a survey from 1991, 44% of the long-term unemployed (i.e. unemployed more than 6 months) reported that they would not be able to cover unexpected expenses of 2000 NOK. The corresponding proportion for the employed was 15% (Colbjørnsen 1994). 62% reported that they bought fewer new clothes and spent less on vacation than they had done before, 47% had taken up extra loans, and 14% had needed to sell the car or the house. Only 8% felt that their long-term unemployment had had no influence.

THEORETICAL CONSIDERATIONS

The demand for children within a union: Economic arguments

There are good reasons to expect different effects of unemployment (and other economic factors) on first and higher-order births. Let us consider a childless couple, not necessarily married, but at least in a steady relationship that is expected to last for some years. When they decide whether to (try to) have a child as soon as possible, the alternative is to postpone entry into parenthood, as few want to remain childless (see discussion in Kravdal 1994 and references therein). A purely economic argument

would therefore be that the parents choose the timing that they expect will minimize the (life-time) costs of childbearing. For example, it would be disadvantageous to have a child while attending school because it might inhibit the parents from reaching a higher level of qualification, with a long-term penalty in terms of future income.

For a couple who already have one child, there is also obviously a quantum decision to be taken. They may decide not to have a child soon, even if it would be more expensive to delay childbearing, because costs would be too high anyway compared to current and expected income.

In accordance with these arguments, the best strategy for a childless couple would be to try to synchronize the period with very intensive child care needs (i.e. the first few years after paid maternity or paternity leave, which was 32-48 weeks with full compensation during the study period) with a period when one parent would not work anyway because of unemployment.

This means that, if unemployment is expected about 1.5 years later (and for a non-negligible subsequent period), the couple would need to conceive immediately to 'make use of' it. If, on the other hand, unemployment is expected later than that, they could just as well wait, and if it is not expected at all, there would be no particular incentive to rush for parenthood.

If current unemployment is considered an indication of the chance of unemployment about 1.5 years later, conception rates for the first born should be high during periods of unemployment. Assuming that mothers are still the primary caretakers, such effects should be seen for women's unemployment in particular.

However, it is not obvious that the unemployed have such expectations. A spell of unemployment rarely lasts another year (according to statistics that may not be widely known), and although the currently unemployed may realize that they have a

higher chance of a later spell of unemployment than others, they do not necessarily have any ideas about its timing.

If the currently unemployed are more optimistic about the chances of getting a job, they may even see a reason to postpone parenthood. In the special situation where a maternity leave would delay entry into a new job, there would be an economic loss because labour income is likely to be higher than the maternity compensation based on a relatively low past income due to unemployment. Besides, a few extra months outside the labour market may reduce future earnings, depending of the speed of the human capital depreciation.

It is also possible that the unemployed expect to quite soon be offered a job, but a poorly paid one, so that opportunity costs would be relatively low compared to what they would be at a higher age. This would tend to increase first-birth rates.

Another economic argument that has been suggested as relevant for first births is that, unless costs of childbearing will be considerably higher as a result of delayed parenthood, the birth should be postponed until the income is higher (Happel et al. 1994). (In plain language, this is because a given cost will be easier to bear the higher the income, and because covering the costs through borrowing also has its price.) Under the assumption that men are the main breadwinners, such an argument implies relatively low first-birth rates when a man is currently unemployed.

Effects are likely to be different for higher-parity transitions. If the man has lost his job, and therefore has a relatively low current income and perhaps also suspects low future earnings, higher-order birth rates are likely to be low. This hinges on the assumption that child 'quality' requirements are not correspondingly reduced (but are shaped primarily by the past economic situation).

A woman who is (or, rather, expects to remain or to quite soon become)

unemployed will face lower costs of childbearing than the employed in case of immediate conception, and may exploit this opportunity. However, her unemployment also signals of poor contribution to the family income when the child gets older (and would not need intensive care anyway), so the effect on higher-order births is unpredictable.

The length of the spell of unemployment may also have an impact, but this is not easily predicted. For example, those who have already been unemployed for many months are perhaps more conscious about the possibility that they will experience unemployment in the future, and they will tend to have the poorest economy currently. On the other hand, they may consider the chance of remaining unemployed another year relatively low.

The unemployment of other people in the community is another factor of potential importance, because it may be a signal of a relatively high risk of future unemployment. As suggested above, this may possibly be of importance for the timing decision.

Another possible effect of aggregate unemployment is that it depresses wages generally. If women currently have low earnings because of this, and they assume it to be a temporary situation (although not ended within a year), they would have a good reason to conceive as soon as possible. Thus, if unemployment for women is of importance primarily for their wages, and men's unemployment is most crucial for theirs, the former would have a stimulating effect on first-birth rates and the latter a depressing effect.

Aggregate-level effects may also be seen for progressions beyond parity one. If unemployment for the same sex is considered an indication of future unemployment, and if men's earnings are most important for the family, one would expect the latter to

have the most clearly depressing effect.

There is no obvious reason to expect the unemployment effect on higher-order birth rates to depend on parity, except perhaps that second births may involve less of a quantum (and more of a spacing) decision than third and fourth births. The unemployment compensation depends on the number of children (Kjønstad 1998), but the differences are so small that they cannot possibly be of any importance.

So far, it is the employed and the unemployed who have been compared. This is not unreasonable in a Norwegian setting. For example, at age 30-39, when most have completed their education, 94% of the men and 83% of the women are in the labour force (Statistics Norway at www.ssb.no). The difference reflects that some women with at least one child are homemakers. As discussed elsewhere (Kravdal 1992a), some homemakers may simply not consider employment an alternative, and would have low childbearing costs and low family income. However, this is likely to be a small group now. Most of the homemakers have probably not got access to adequate child care, or may feel that it is inappropriate to purchase child care. If this would be the case also after subsequent births, they will face high opportunity costs. In conclusion, the effect of registered unemployment for women with at least one child may well be more positive when it is compared with all who are not unemployed rather than only the employed.

A similar problem arises at the aggregate level. If many women in a municipality are unemployed, it could be because a large proportion of those in the labour force are unemployed, or because many are in the labour force and few are homemakers. The latter would contribute to a higher fertility in the area, according to the assumptions above.

Other factors of relevance

Also other causal pathways seem plausible, although the direction of these effects is not easily predicted. For example, preferences (given income and childbearing costs) may differ between employed and unemployed. Men and women who have no job may tend to consider life as meaningless and value the emotional returns to childbearing and –rearing relatively high compared to the satisfaction derived from other activities and goods. However, the opposite is no less plausible. Unemployed people may have a state of mind that makes contact with children more of a burden.

The arguments above are conditioned on living in some sort of stable relationship where both partners can count on each other for some time ahead. This would be the case for married couples and many cohabitators. Women who are single or have a relationship not involving sex would, of course, not bear any children, and for those in a more advanced dating relationship or in a consensual union with weak mutual commitment, fertility desires would probably to a large extent reflect the woman's own unemployment and its short-term consequences. This is because such a woman would tend to face great uncertainty. The current partner may not be around a few years later, and if she has another partner at that time, she would not know which economic contribution to expect from him. In addition, there would probably be many unintended pregnancies among these women.

Differences in sexual activity among women who are not in a 'stable' relationship will not be discussed here, except pointing out that some American studies have reported unemployment to be linked with high adolescent fertility (Ku et al. 1993; Klitsch 1994).¹

Fertility among women who are not in a 'stable' relationship is probably not negligible in Norway (e.g. Kravdal 1997), and it may well be that their own unemployment stimulates birth rates. However, the overall differences in total fertility between unemployed and others must primarily be due to differences in the proportion who are in 'stable' unions and the fertility in these relationships. The latter has been discussed above. With respect to partnership, no firm conclusions should be drawn. According to the view that specialization between spouses is a major source of utility from a union, women's lack of income, which is signalled by her own unemployment and that of other women, would stimulate rather than undermine union formation and stability. The opposite would be the case for men, i.e. a woman living in a municipality with many unemployed men would relatively often not live in a marriage-like relationship. This constitutes an additional argument for the more pronounced negative effect of men's than of women's unemployment that is suggested above. However, according to a 'pooling-of-resources' model, women's earnings are just as important for union utility (Oppenheimer 1994). In that case, one would see a contribution to the effect of women's unemployment that would run opposite to the possibly positive effect stemming from a couple's cost considerations.

Unfortunately, the data do not allow the importance of partnership as a mediating factor to be checked. ²

METHODS AND DATA

Data

The data include all women and men born 1950-1982 who have lived in Norway for

some time between January 1991 and December 1998. Thus, men and women of age 16-41 can be studied throughout the observation period.

The variables are from different sources that have been linked by means of the personal identification number assigned to every Norwegian resident. Birth and migration histories have been extracted from the Central Population Register. The birth histories include date of birth for all children born alive to (or fathered by) the women and men in the 1950-1982 cohorts. The migration histories allow identification of the municipality in which a person has lived any given month of the study period. Data on unemployment levels and population sizes of these municipalities have been taken from the Municipality Data Base operated by the Norwegian Social Science Data Services.

Educational histories, which include the highest educational level as of 1 October every year and the enrollment status at that time, have been taken from the Annual Educational Statistics Files produced by Statistics Norway.

Data on spells of registered full unemployment have been taken from the register on job searchers (the so-called SOFA register) owned by the Labour Directorate. It is the lack of older data in this register that has dictated the choice of study period.

Statistical approach

As explained above, there may be substantial differences in unemployment effects between first and higher-order births. This study is therefore based on continuous-time hazard models estimated separately for first and higher-order births. In the first-birth

models, individuals are followed from age 16 or January 1991, whichever is the latest, and censored at time of death or emigration, age 41, or the end of 1998, with the exception that they are excluded from the analysis during periods when they lived in another country. (Censoring at age 30 gave almost the same results.) Similar, but multi-episode, models are estimated for higher-order births, with parity as a covariate.

All covariates are categorical, and the hazard is assumed to be constant within 2-year age intervals and 1-3-year duration intervals. Introductory checks revealed that this is a sufficient control for age and duration.

All unemployment and education variables, which are most likely to be influenced by an impending birth, are lagged. A twelve-month lag is used, to reflect that many childbearing decisions are taken well before conception, but a nine-month lag gave very similar results.

It is estimated how a woman's birth rate is influenced by her own unemployment, that of other women, and that of men. The latter captures also the effect of having an unemployed partner, if any. Given the woman's own unemployment, those who live in areas where many men are unemployed are less likely to live in a 'stable' relationship (according to the assumptions above), and those who *do* are likely to have a different (and supposedly lower) fertility because their partner more often is unemployed. To get an impression of the latter individual-level contribution, models are also estimated for men. In these models, the effects of individual unemployment reflect a combination of differences in union formation and dissolution between unemployed and employed and the importance of male partner's unemployment for fertility among 'stable' couples.

Partners' unemployment may well be correlated. This means that the individual effect of woman's unemployment according to a model such as that described above

(reflecting to a large extent, but not exclusively, the impact of the female partner's unemployment on a 'stable' couple's fertility), will capture also part of the effect of the partner's unemployment. Given the signs that appear in the tables below, the true effect of a woman's own unemployment will be less negative or more positive than the estimated effect. Similarly, the effect of a man's own unemployment, according to a similar paternity rate model, will capture part of the effect of the woman's unemployment. The direction of this bias is less clear.

Individuals who live in the same municipality may share some unobserved characteristics, which means that standard assumptions in regression analysis about independent observations are not reasonable. So-called multilevel models have been developed to handle these problems, and are now quite frequently applied in demographic research. Such modelling generally yields larger standard errors, but the differences are often small (see e.g. Kravdal 2001). In this large-scale study, all interesting effect estimates would probably be strongly significant anyway. In addition, there is no standard software that can be used for the estimation of multi-level hazard models with so large data sets. Such models have therefore not been estimated.

Regressors

The following are the main possible activities for these relatively young people:

- enrolled in school and
 - registered as unemployed at the Employment Offices (with or without right to compensation)

- applying for jobs but not registered as unemployed
- employed
- not interested in work
- not enrolled and
 - registered as unemployed at the Employment Offices (with or without right to compensation)
 - applying for jobs but not registered as unemployed
 - employed
 - homemaker
 - military service

Relatively few of the persons enrolled in school are registered as unemployed at the Employment Offices. To be registered as unemployed, they need to be active job searchers, which is usually not compatible with studies (see above). Besides, many students will not be eligible for compensation, because they have also been enrolled the last few months and therefore have had a low income, and thus have little to win by being registered. Finally, a large group will simply not be interested in work, because they are involved in demanding full-time studies.

The data do not allow a detailed categorization of activities. It is merely distinguished between unemployed and not unemployed, and between enrolled and not enrolled. The main interest lies in the response to unemployment among those who are not enrolled, who are the largest group, and who would otherwise largely have been employed, if not homemakers (at parities above one, and generally more relevant for women than men) or in military service (only relevant for the youngest men).

Human capital variables are generally thought to be strong determinants of unemployment, and this is found to be the case also in Norway (Røed and Zhang 2000). Educational level is therefore included as a control variable.

It is the highest completed education (and enrollment status) as of 1 October every year that is available. The educational level is registered in 1-3 year steps.³ The quite few individuals whose educational level is unknown are excluded from the analysis, but the results would not have been markedly different if they instead were included as a separate category.

School enrollment is not measured as accurately as unemployment. It has been assumed that people who are registered as enrolled 1 October a given year went to school all months from July that year through June the next. (Schools are, of course, usually closed mid-summer, but most people know in July whether they will go to school in September and later, and behave accordingly.). This means that some young adults who take short courses around 1 October are wrongly classified as enrolled also during the remaining parts of the school year. Conversely, educational activities finished before 1 October or started afterwards will be completely neglected. As explained below, this misclassification of enrollment cannot be critical.

Aggregate unemployment is assumed to be constant during a calendar year. It is defined as the weighted average of the unemployment levels in all municipalities the woman lived in during this calendar year, with weights reflecting duration of residence in each municipality. (The migration histories only cover the period up to 1997, and it has been assumed that no migration takes place in 1998). The unemployment level in a municipality is defined as the total number of men or women aged 16-39 who are registered (in the Employment Offices) as fully unemployed, as an average over the calendar year, divided by the total population in this age group.

According to this definition, the national unemployment has varied between 2% and 5% (6% for men and 4% for women) during the 1990s. This is slightly different from the figures shown in Figure 1 (and in most official statistics on national trends). The reasons are that different unemployment data are used (and had to be used, because data from the Labour Force Surveys are not available at the municipality level), that only people in the prime childbearing ages are considered, and that the denominator is the total population rather than the labour force (once again reflecting lack of data from the Labour Force Surveys).

The unemployment level varies considerably across the country. For example, communities where many people work in the public sector or in other industries that are not strongly challenged by international competition are likely to witness low unemployment rates. A varied labour market may also inhibit unemployment. In this study, an East / South+West / North+Middle indicator is included as a control variable in combination with occupational structure (predominantly primary, secondary or tertiary, according to a classification developed by Statistics Norway 1985). One might perhaps expect also a central/peripheral dichotomy to be important as a control variable, but that turned out not to be the case.

In principle, the estimated aggregate effect may reflect not only the impact that an elevated general level of unemployment would have on fertility, but that, for example, some people who plan to soon have a child move to an area with low unemployment. A simultaneous modelling of fertility and migration has not been attempted in this study.

Simulations

A Monte Carlo simulation is performed to see how the changes in birth rates induced by unemployment influence total fertility. Birth histories are generated for 10000 women, which was experimentally proved to be a sufficiently large simulation sample. Starting at age 16, a three-month birth probability (easily calculated from the rate) is predicted for each woman every third month on the basis of characteristics at the beginning of the three-month interval and the model estimates. A birth is ascribed to the woman within the interval if a random number with a uniform distribution over $[0,1]$ is less than the calculated probability. Birth probabilities beyond parity four are assumed to be 0. The average number of births in this sample is the simulated total fertility.

A 'reference model' for women is first estimated. It includes only age, duration since last previous birth (when relevant), and parity (when relevant). The corresponding 'reference simulation' gives a total fertility of 1.85.

The next steps, reported below, are to find out how total fertility would be for a group of women who are subject to these 'reference' rates for first- and higher-order births except for a proportional change in the rates corresponding to the estimated net effects of own or other people's unemployment.

RESULTS

Estimated effects

As shown in Table 1, women who are unemployed display higher first-birth rates

twelve months later than do other women. This accords with the idea that they expect unemployment to stick with them for some time (but not many years), or expect to be offered relatively low wages for a while, and try to exploit this opportunity to incur low childbearing costs. The difference is 6%, when comparing among those who are not enrolled in school. On the other hand, higher-order birth rates are reduced by women's unemployment, but only by 4%.

(Table 1 about here)

As explained above, enrollment status is not fully known. Fortunately, even if the models are estimated without any consideration of enrollment, the main conclusions are not changed. The same effects appear for higher-order births (and in paternity-rate models), but the impact of unemployment on first-births becomes twice as strong.

Also the effects of aggregate unemployment fit reasonably well with expectations. Women's first-birth rates are weakly reduced by men's unemployment and raised by women's unemployment, whereas higher-order birth rates are negatively influenced by both men's and women's aggregate unemployment. The latter effect is sharpest for men's unemployment.

Only four categories are used for aggregate unemployment, with the fourth covering all levels above 5%. However, other models revealed that there were no substantial differences in fertility within this category.

Men's and women's unemployment are, of course, positively correlated, but the correlation factor is only about 0.65 (not shown), and with such a large number of observations (about 400 regional units and 9 years) multicollinearity does apparently

not pose a problem. When only one of the variables was included, effect estimates were only slightly different, in the expected direction. Besides, the estimates were only marginally sensitive to alternative specifications of other regressors.

As explained above, a woman who lives in areas where men's unemployment is high has a fertility different from others partly because she has an unemployed partner, if any. The estimates from a paternity model gives an impression of this contribution. As opposed to the stimulating effect of women's unemployment on first-birth rates, the effect of men's unemployment at the individual level is negative and quite large (Table 2). Also men's higher-order birth rates are clearly reduced (by 13%) by men's individual unemployment. The effect is markedly stronger than the corresponding effect for women. This also fits well with expectations.

In these paternity rate models, the effects of aggregate unemployment (not shown) are quite similar to those estimated in birth rate models.

(Table 2 about here)

Effects of length of unemployment are not easily predicted, and it is simply shown here, without any further discussion, that the positive effect on women's first-birth rates is restricted to short-term unemployment (Table 3). Men's unemployment has a sharper negative effect on first-birth rates the longer it has lasted.

(Table 3 about here)

Effects of other variables, such as educational level (not shown) and enrollment, are roughly as found in other studies (Kravdal 1992b, 1994) and not

discussed here.

Simulations

The individual-level impact of women's unemployment is indeed negligible. Simulations show that a group of women exposed to the 'reference' birth rates, except for a proportional increase of 6% in first-birth rates and a reduction of 4% in higher-order birth rates, have a total fertility raised by 0.024 compared to the 'reference' simulation. The lowest unemployment level for the 1990s was 2% for both sexes, and the peak levels were 6% for men and 4% for women (using numbers from the Labour Directorate, as described above). If women's unemployment increases from 2% to 4%, their average total fertility will increase by $0.02 * 0.024$ through an individual-level effect.

However, there is also an aggregate effect. All women's first-birth rates will be raised by a factor of 1.04, and their higher-order birth rates by a factor of 0.97, if aggregate unemployment is increased from 2% to 4%. If there is a simultaneous increase in men's unemployment, from 2% to 6%, there will be a change in fertility rates of 0% for first births (because the 1.04 factor associated with 4% unemployment for women is combined with an estimate of 0.96 associated with 6% unemployment for men) and a change of 13% for higher-order births (the corresponding estimates being 0.97 and 0.90). This corresponds to a reduction of 0.082 in total fertility.

Part of this reduction of 0.082 is due to the larger proportion of women who experience a lower fertility because they do not have a partner, or who have a partner who is unemployed. According to the paternity rate model estimates, men who are

unemployed will have a total fertility 0.264 lower than others (of which 1.81 is due to the lower first-birth rates). If the size of this group increases by 4%, the total impact stemming from the individual-level effects will be 0.04×0.264 , which is about 0.01. This reflects both that unemployed men probably are under-represented in 'stable' unions, and that fertility in these unions is low because of the male partner's unemployment.

Obviously, the aggregate contribution is the dominant one. This conclusion hinges, of course, on the assumption that the estimate of the aggregate effect is no more biased than the individual effect by the lack of control for potential confounders that are not available in the data.

Such results also nicely illustrate the need to incorporate macro-level variables in the models. If aggregate-level variables had been left out, the estimated individual-level effects would have captured part of the aggregate effects, but only a very small one (not shown).

To summarize, slightly more women experienced the marginally increased fertility associated with own unemployment in 1993 than five years before or five years afterwards. Besides, slightly more experienced the substantially reduced fertility stemming from own partner's unemployment. This had little overall importance. What really mattered was that everyone reduced their fertility as a result of this increase in unemployment. Roughly, one may conclude that total fertility would have been 0.08 higher around 1993 if unemployment had been at the low level experienced during most of the post-war period.

More precisely, women who experience these birth rates associated with 4-6% unemployment throughout their lives will reach a fertility 0.08 lower than in the 'reference simulation'. A response of exactly this size is not necessarily seen in period

total fertility. That depends on how the distribution over duration and parity is in the different age groups of the population. However, the differences may not be large. To illustrate this, an additional simulation was done on the basis of a starting distribution by age, parity and duration calculated from 1990 national population data. When birth rates were kept at the reference level for two years, then abruptly reduced to that associated with 4-6% unemployment, and one year afterwards turned back to the reference level, period total fertility was 0.11 lower in the third year than it would have been without this 'shock'. On the other hand, it was 0.015 higher the fourth year, 0.004 higher the fifth year, and only slightly higher the next ten years.

The length of unemployment has not been considered in these models. Of course, when unemployment at a given time of the year increases from 2% to 6%, it could be the result of a higher rate of entrance into unemployment, a longer duration, or a combination. To illustrate the importance of this distinction, assume first that there is a situation where 2% of the men are unemployed 0-5 months (more precisely, that 2% of their exposure time is in the state '0-5 months of unemployment'). In a second situation, 6% of the men are in this category. That means that average total fertility becomes 0.008 lower (according to simulations based on estimates in Table 3). Going to the extreme, a third situation could be that 2% are in the 0-5 category, 2% in the 6-12 category and 2% in the 13+ category (i.e. an increase in cross-section measure of unemployment exclusively due to longer durations). That would lead to a fertility reduction of 0.016 compared to the first situation. Of course, the figure $0.04 \cdot 0.264 = 0.011$ referred above lies between these two figures. Effects of women's individual unemployment are small anyway. Thus, regardless of whether the increase in unemployment stems from higher entry rates or longer durations, it is obvious that the aggregate-level effects are dominant.

An unresolved puzzle

Ending the investigation here would be convenient, as the estimates make good sense in light of the theoretical discussion. However, one might also like to see whether the idea of parity-independent unemployment effects for people who have already become fathers or mothers is supported by the data. Unfortunately, the results of this check are somewhat puzzling, and leave the researcher with quite a punishment for curiosity and thoroughness.

An interaction between parity and unemployment in the multi-episode model for transitions beyond parity one turned out to be strongly significant (not shown), and when separate models were estimated for each parity, a very clear pattern appeared (Tables 4 and 5). Individual unemployment has a stronger positive effect the higher the parity, with the change being most pronounced for men. Above parity two, there is even a significant fertility-*stimulating* effect of men's unemployment.

Also aggregate effects change across parity. In particular, fourth births are less markedly influenced by a combination of men's and women's unemployment than are the lower-order births.

(Tables 4 and 5 about here)

Various kinds of selection may lie behind these changes in individual effects. One possibility is that there is a subgroup in the Norwegian population who have generally high fertility and also respond less strongly than others to unemployment

(e.g. because of a tighter family network to rely on), so that even the unemployed have higher birth rates than experienced by the majority. Immigrants from high-fertility countries might possibly be such a minority group. If unemployment in the majority group reduces fertility sharply, and if current unemployment is linked with past unemployment, few of the unemployed at high parity levels will be from the majority group, and relatively many will come from the minority group. Average fertility among the unemployed may therefore be higher than among the employed, who will be more strongly dominated by the majority group (although with more representation from minority groups than at lower parities).

If unemployment effects are indeed confounded by, for example, ethnicity (or citizenship or country of birth) at high parity levels, and to a lesser extent at low parity levels, it also means that the first and higher-order birth rate models in focus of this study are misspecified. In that case, the effects that are estimated, with controls for education and a few community characteristics and demographic factors, are inadequate measures of the causal impact of unemployment on fertility. If ethnicity is the most important excluded variable, the causal effects of unemployment are probably more clearly negative than suggested by the estimates.

Another explanation could be that the group it is compared with, which includes the employed, homemakers and others without work (but not registered as unemployed), could be different at higher parities. For example, more of them might be homemakers, who perhaps have a relatively low fertility, as explained above. However, the interaction with parity is sharpest for men, among whom very few are homemakers.

Simulations based on estimates from parity-specific models for higher-order births give, of course, the same results as reported above.

THE BOTTOM LINE

Women's unemployment has a less fertility-depressing effect than that of men. In fact, it even seems to raise the first-birth rates. These results are obtained from models where the lower educational level of the unemployed is taken into account, but not other possible sources of spuriousness, such as their ethnicity.

On the whole, unemployment has had a modest impact on fertility in Norway. In particular, micro-level effects have been completely unimportant. According to simulations based on the model estimates, an increase in unemployment from 2% to 6% would reduce total fertility by only 0.01 through individual-level effects.

Macro-level effects are more important. Attempts have been made to control for potentially important confounders, such as occupational structure, but one can, of course, never know whether there are additional factors that should have been included (if available). According to the estimates, an increase in unemployment from 2% to 6% is associated with a reduction of fertility by about 0.08, as a combined individual- and aggregate-level effect. Stated differently, if unemployment in 1993 had been at the low level of 2% (or less), which was experienced during much of the post-war period, total fertility would have been 0.08 higher.

The data provide no opportunity to check the impact of the very high levels experienced in some other European countries. Besides, it could well be that the response to a given unemployment level would be sharper in a country with a less generous welfare system. Therefore, even though elimination of a 6% unemployment apparently would leave relatively little imprint on Norwegian fertility, one cannot rule

out the possibility that successful attempts to fight a higher unemployment elsewhere may have a considerable impact – without claiming that the currently low fertility necessarily is a major societal problem.

ACKNOWLEDGEMENTS

A grant from the Norwegian Research Council was used to establish the individual data. Thanks are due to Statistics Norway for having linked the necessary data, and to the Labour Directorate for having permitted the use of unemployment data. The aggregate data were provided by the Norwegian Social Science Data Services (Municipality Data Base; 'Kommunedatabasen' in Norwegian). None of these institutions are, of course, responsible for the analysis of the data or the interpretations. Comments from Nico Keilman, Ron Rindfuss and participants in a seminar at Max Planck Institute in Rostock are greatly appreciated.

REFERENCES

- Colbjørnsen, T. 1994. "Fra elendighetsbeskrivelser til mestringsstudier", in A. Sandmo (ed.), *Perspektiv på Arbeidsledigheten*. SNF Årbok. Bergen: Fagbokforlaget.
- DeCooman, E., J. Ermisch, and H. Joshi. 1987. "The next birth and the labour market: A dynamic model of births in England and Wales", *Population Studies* 41: 237-268.
- Ermisch, J. 1988. "Econometric analysis of birth rate dynamics in Britain", *Journal of Human Resources* 23: 563-576.
- Happel, S.K., J.K. Hill, and S.A. Low. 1984. "An economic analysis of the timing of first birth", *Population Studies* 38: 299-311.
- Hoem, B. 2000. "Entry into motherhood in Sweden: the influence of economic factors on the rise and fall in fertility, 1986-1997", *Demographic Research* (online) www.demographic-research.org/volumes/vol2/4
- Impens, K.K. 1989. "The impact of female unemployment on fertility in Flanders", in R.L. Cliquet, G. Dooghe, J. De Jong-Gierveld and F. Van Poppel (eds.), *Population and Family in Low Countries* VI 18: 119-140.
- Kjønstad, A. (ed.) 1998. *Folketrygdloven med Kommentarer*. Oslo: Ad Notam Gyldendal.

Klitsch, M. 1994. "Racial differences in early coitus may be influenced by neighborhood context", *Family Planning Perspectives* 26: 236-238.

Kravdal, Ø. 1992a. "The weak impact of female labour force participation on Norwegian third-birth rates", *European Journal of Population* 8 : 247-263.

Kravdal, Ø. 1992b. "The emergence of a positive relation between education and third birth rates in Norway with supportive evidence from the United States", *Population Studies* 46 : 459-475.

Kravdal, Ø. 1994. "The importance of economic activity, economic potential and economic resources for the timing of first birth in Norway", *Population Studies* 48: 249-267

Kravdal, Ø. 1997. "Wanting a child without a firm commitment to the partner: Interpretations and implications of a common behaviour pattern among Norwegian cohabitants", *European Journal of Population* 13: 269-298.

Kravdal, Ø. 2001. "Main and interaction effects of women's education and status on fertility: The case of Tanzania", to appear in *European Journal of Population*.

Ku, L. F.L. Sonenstein, and J.H. Pleck. 1993. "Neighborhood, family, and work: influences on premarital behaviors of adolescent males", *Social Forces* 72: 479-503.

Kreyenfeld, M. 2000. "Changes in the timing of first birth in East Germany after

re.unification”, *Schmollers Jahrbuch* 120: 169-186. Berlin: Duncker & Humblot.

Macunovich, D.J. 1996. “Relative income and price of time: exploring their effects on US fertility and female labor force participation”, *Population and Development Review* 22 Suppl: 223-257.

Macunovich D.J. and R. Easterlin. 1988. “Application of Granger-Sims causality test to monthly fertility data”, *Journal of Population Economics* 1: 71-87.

Oppenheimer, V. K. 1994. “Women’s rising employment and the future of the family in industrial societies”, *Population and Development Review* 20: 293-342.

Rindfuss, R.R., S.P. Morgan, and C.G. Swicegood. 1988. *First Births in America*. Berkeley: University of California Press.

Røed, K. and T. Zhang 2000. “Labour market transitions and economic incentives”, Memorandum 2000/15, Department of Economics, University of Oslo, Norway.

Rødseth, A. 1994. ”Om konjunkturane i Norge etter 1980: Vegen til høg arbeidsløyse”, In A. Sandmo (ed.), *Perspektiv på Arbeidsledigheten*. SNF Årbok, Bergen: Fagbokforlaget.

Statistics Norway. 1985. “Standard for kommuneklassifisering”, Standarder for norsk statistikk 4. Oslo-Kongsvinger.

Statistics Norway. 2000. "Økonomisk utsyn over året 1999", Økonomiske analyser 1/2000. Oslo-Kongsvinger.

Sullingham, O. and J. Falkingham. 1991. "Unemployment: family circumstances and childhood correlates among young people in Britain", in M. Murphy and J. Hobcraft (eds.), *Population Research in Britain, Population Studies* 45 Suppl: 115-132

Tzannatos, Z. and J. Symons. 1989. "An economic approach to fertility in Britain since 1860", *Journal of Population Economics* 2: 121-138.

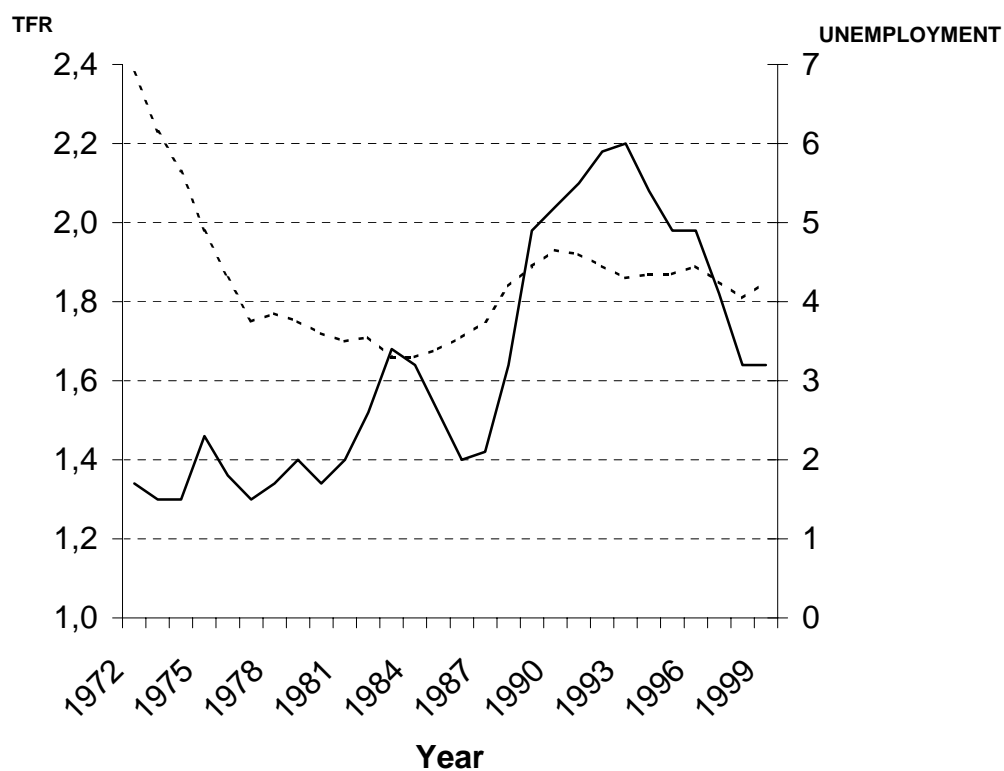
NOTES

¹ Their relevance may be questioned. Unemployment in the US is perhaps more often than in Norway associated with erosion of social control and a poverty and hopelessness that make sexuality a particularly attractive escape.

² Only formal marital status some years before is available. Besides, one would run into problems also with more detailed partnership data, because the link with actual births would partly reflect the confounding effect of childbearing decisions taken some time before, under the influence of partnership at that time.

³ For example, a 'completed high-school' is recorded as the highest level until the person has passed an examination normally requiring at least one year of college or university studies. After that, no change is recorded until a level corresponding to a bachelor degree is reached. Thus, people may be enrolled in school for many years without increasing their registered educational level (and even more than 3 years, because they may take several courses at the same level). Changes in educational level have been supposed to take place in June.

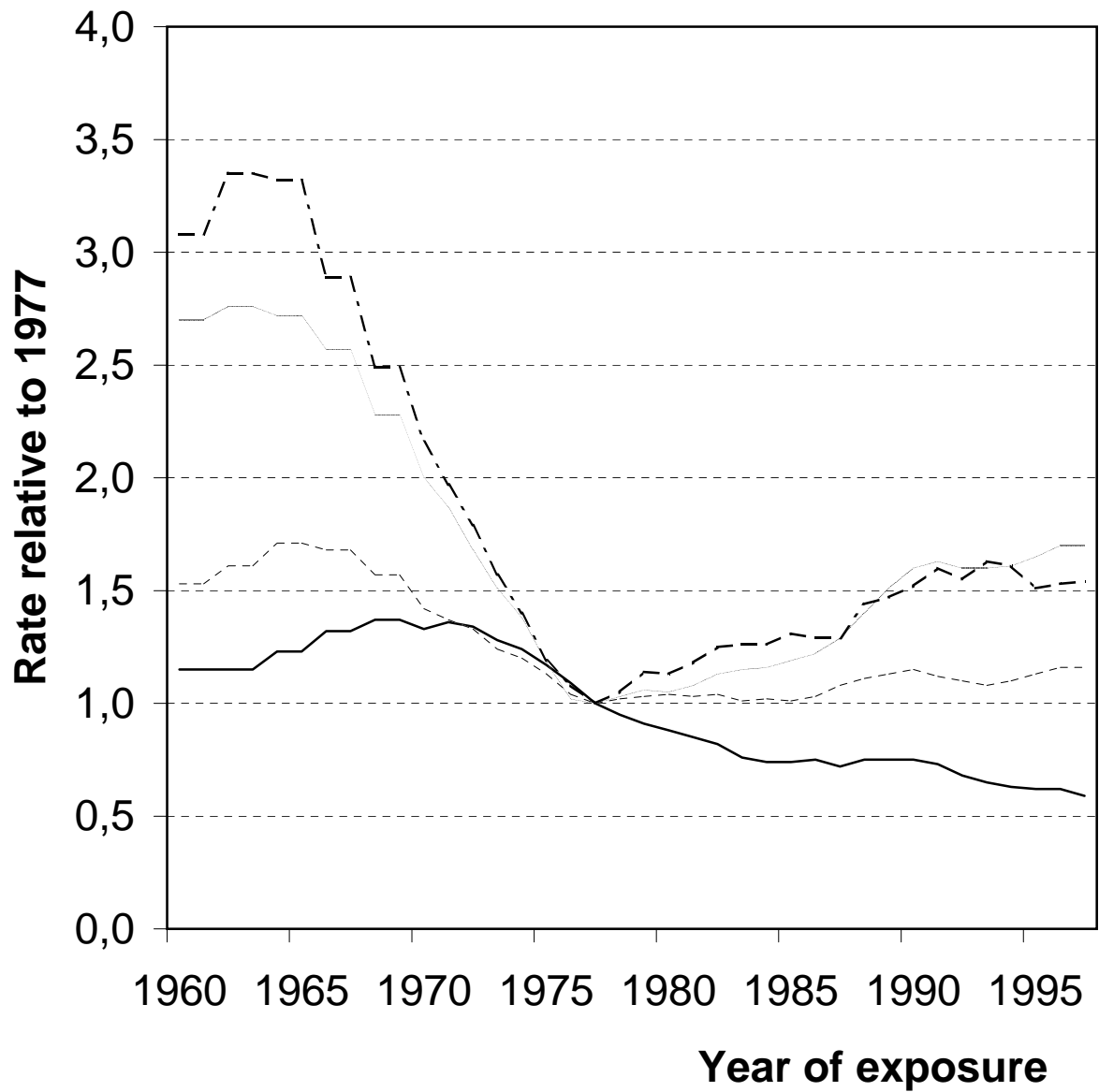
Figure 1. Total fertility rate and percent of labour force who are unemployed in Norway 1972-99



----- Unemployment (percent of labour force who are unemployed)
 ——— Total fertility rate

Source: Statistics Norway

Figure 2. Standardized period effects in Norwegian birth rates 1960-97



— first-birth rates, age 15-29
 second-birth rates
 - - - - third-birth rates
 - . - . fourth-birth rates

Model for first birth: Year+Age
 Model for higher-order births: Year+Age+Duration

Table 1. Effect estimates (with 95% confidence interval) in continuous-time hazard models for parity transitions among women, based on Norwegian register data for 1991-1998.

	First births ¹		Higher-order births ²	
	Estimate	N	Estimate	N
ACTIVITY				
Not enrolled in school				
Not unemployed ³	1	118910	1	196934
Unemployed	1.06* (1.03-1.09)	5949	0.96* (0.94-0.98)	11286
Enrolled in school				
Not unemployed	0.44* (0.43-0.45)	34666	0.59* (0.58-0.60)	14861
Unemployed	0.76* (0.71-0.80)	1153	0.65* (0.60-0.70)	678
UNEMPLOYMENT RATE FOR MEN AGED 16-39 IN THE MUNICIPALITY (%)				
-2.9 ³	1	21656	1	36443
3.0-3.9	0.98* (0.96-1.00)	26240	0.95* (0.94-0.97)	37817
4.0-4.9	0.99 (0.97-1.01)	28174	0.94* (0.92-0.95)	39348
5.0-	0.96* (0.94-0.98)	84608	0.90* (0.89-0.92)	110151
UNEMPLOYMENT RATE FOR WOMEN AGED 16-39 IN THE MUNICIPALITY (%)				
-2.9 ³	1	40255	1	58956
3.0-3.9	1.03* (1.02-1.05)	60848	0.97* (0.96-0.98)	78203
4.0-4.9	1.04* (1.02-1.06)	44547	0.97* (0.95-0.98)	63531
5.0-	1.10* (1.07-1.12)	15028	0.97* (0.96-0.99)	23069

¹ Also age (15 categories), educational level (4 categories), year (3 categories), and region of residence (East/ South+West / Central+North combined with 3 categories for occupational structure) are included

² Also age (15 categories), duration since previous birth (7 categories), parity (1,2,3), educational level (4 categories), year (3 categories) and region of residence (East/ South+West / Central+North combined with 3 categories for occupational structure) are included

³ Arbitrarily chosen baseline category

* significant at the 0.05 level.

N Number of births

Table 2. Effect estimates (with 95% confidence interval) in continuous-time hazard models for parity transitions among men, based on Norwegian register data for 1991-1998.

ACTIVITY	First births ¹		Higher-order births ²	
	Estimate	N	Estimate	N
Not enrolled in school				
Not unemployed ³	1	125715	1	192386
Unemployed	0.80* (0.78-0.72)	7436	0.87* (0.85-0.89)	7823
Enrolled in school				
Not unemployed	0.59* (0.58-0.60)	24261	0.88* (0.87-0.90)	13287
Unemployed	0.64* (0.60-0.68)	1086	0.83* (0.77-0.89)	737

¹ Also age (15 categories), educational level (4 categories), year (3 categories), local unemployment level (4+4 categories), and region of residence (East/ South+West / Central+North combined with 3 categories for occupational structure) are included.

² Also age (15 categories), duration since previous birth (7 categories), parity (1,2,3), educational level (4 categories), year (3 categories), local unemployment level (4+4 categories), and region of residence (East/ South+West / Central+North combined with 3 categories for occupational structure) are included.

³ Arbitrarily chosen baseline category

* significant at the 0.05 level.

N Number of births

Table 4. Effect estimates (with 95% confidence interval) in continuous-time hazard models for parity transitions among women, based on Norwegian register data for 1991-1998.¹

	Second births	Third births	Fourth births
ACTIVITY			
Not enrolled in school			
Not unemployed ²	1	1	1
Unemployed	0.95* (0.93-0.97)	0.96* (0.93-1.00)	1.07 (0.98-1.15)
Enrolled in school			
Not unemployed	0.55* (0.54-0.56)	0.74* (0.71-0.76)	0.87* (0.81-0.94)
Unemployed	0.61* (0.55-0.66)	0.73* (0.62-0.85)	0.96 (0.70-1.31)
UNEMPLOYMENT RATE FOR MEN AGED 16-39 IN THE MUNICIPALITY (%)			
-2.9 ²	1	1	1
3.0-3.9	0.94* (0.92-0.96)	0.95* (0.93-0.98)	1.02 (0.97-1.08)
4.0-4.9	0.92* (0.90-0.94)	0.95* (0.92-0.98)	1.02 (0.96-1.08)
5.0-	0.87* (0.85-0.89)	0.93* (0.90-0.96)	1.04 (0.98-1.11)
UNEMPLOYMENT RATE FOR WOMEN AGED 16-39 IN THE MUNICIPALITY (%)			
-2.9 ²	1	1	1
3.0-3.9	0.98* (0.97-1.00)	0.95* (0.93-0.97)	0.94* (0.90-0.98)
4.0-4.9	1.00 (0.98-1.02)	0.93* (0.90-0.95)	0.89* (0.84-0.94)
5.0-	1.00 (0.97-1.02)	0.93* (0.90-0.96)	0.93* (0.87-0.99)

¹ Also age (15 categories), duration since previous birth (7 categories), educational level (4 categories), year (3 categories) and region of residence (East/ South+West / Central+North combined with 3 categories for occupational structure) are included.

² Arbitrarily chosen baseline category

* significant at the 0.05 level.

Table 5. Effect estimates (with 95% confidence interval) in continuous-time hazard models for parity transitions among men, based on Norwegian register data for 1991-1998.¹

	Second births	Third births	Fourth births
ACTIVITY			
Not enrolled in school			
Not unemployed ²	1	1	
Unemployed	0.77* (0.75-0.79)	1.05* (1.01-1.10)	1.42* (1.31-1.53)
Enrolled in school			
Not unemployed	0.81* (0.80-0.83)	1.04* (1.00-1.08)	1.30* (1.20-1.40)
Unemployed	0.73* (0.67-0.80)	1.08 (0.93-1.27)	1.71* (1.30-2.24)

¹ Also age (15 categories), duration since previous birth (7 categories), educational level (4 categories), year (3 categories), local unemployment level (4+4 categories), and region of residence (East/ South+West / Central+North) combined with 3 categories for occupational structure) are included.

² Arbitrarily chosen baseline category

* significant at the 0.05 level.

Table 3. Effect estimates (with 95% confidence interval) in continuous-time hazard models for parity transitions, based on Norwegian register data for 1991-1998.

ACTIVITY	MEN				WOMEN			
	First births ¹		Higher-order births ²		First births ¹		Higher-order births ²	
	Estimate	N	Estimate	N	Estimate	N	Estimate	N
Not enrolled in school								
Not unemployed	1	125715	1	192386	1	118910	1	196934
Unemployed								
< 6 months	0.85* (0.82-0.87)	6130	0.87* (0.85-0.89)	6144	1.10* (1.06-1.13)	5121	0.95* (0.93-0.97)	8273
6-12 months	0.67* (0.63-0.72)	983	0.87* (0.82-0.92)	1237	0.92* (0.84-1.00)	644	0.99 (0.95-1.03)	2201
> 12 months	0.57* (0.52-0.64)	323	0.82* (0.75-0.90)	472	0.84* (0.72-0.97)	184	1.00 (0.94-1.07)	812

¹ Also local unemployment level (4+4 categories), age (15 categories), educational level (4 categories), year (3 categories), and region of residence (East/ South+West / Central+North combined with 3 categories for occupational structure) are included. Effects are not shown for those who are enrolled in school.

² Also local unemployment level (4+4 categories), age (15 categories), duration since previous birth (7 categories), parity (1,2,3), educational level (4 categories), year (3 categories) and region of residence (East/ South+West / Central+North combined with 3 categories for occupational structure) are included. Effects are not shown for those who are enrolled in school.

³ Arbitrarily chosen baseline category

* significant at the 0.05 level.

N Number of births