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Discussion Papers

Maternal Employment in Norway

A parity-specific analysis of the return to full-time and part-time work after birth

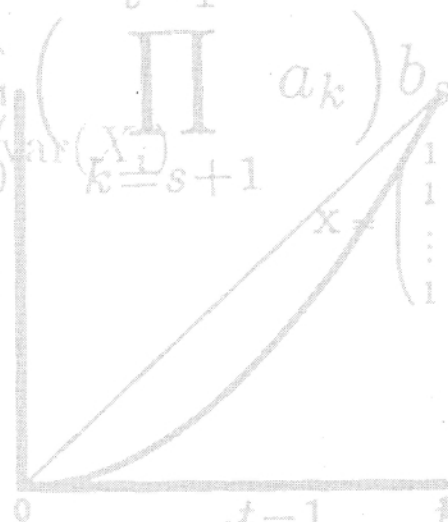
STATISTISKE NORSKE

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$$+ \frac{2}{dt} \sum_{i>j} \sum_{j=1} \text{Cov}(X_i, X_j)$$

$$\text{var}\left(\sum_{i=1}^n a_i X_i\right) = \sum_{i=1}^n a_i^2 \text{var}(X_i) + 2 \sum_{i=1}^{n-1} \sum_{j=i+1}^n a_i a_j \text{Cov}(X_i, X_j)$$



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Abstract:

This paper analyzes the (re)entry of Norwegian mothers into full-time and part-time employment following the first and second birth. Based on theories of job search and human capital depreciation and appreciation a semi-parametric hazard model is estimated, expressing the entry rate as a function of a woman's full wage (the market wage plus the present value of reductions in future earnings due to a career break) and her reservation wage. As predicted, a higher market wage and higher accumulated employment experience before birth are found to speed up the return to work, but the positive effect of employment experience declines with time since birth. The most powerful predictor of after-birth employment is the length of prior home-time periods. Having stayed at home a long time before birth strongly inhibits the return to both full-time and part-time work, and the effect becomes stronger the longer the time since birth. This is in line with the notion that women tend to be either persistent workers or persistent non-workers, as is found in several U.S. studies. New to this study is the evidence of persistency also in full-time and part-time work, as previous full-timers are much more likely to return to full-time and previous part-timers are much more likely to return to part-time work. All in all, there is no evidence that part-time workers have a looser attachment to the labour market than full-time workers.

Keywords: Maternal employment, full-time, part-time, human capital, child-birth, career interruptions model

JEL-classification: C41, J13, J22, J24 og J31

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1. Introduction

Like in most other western industrialized countries, Norwegian women have entered the labour market in ever increasing numbers during the last couple of decades. One characteristic of this development has been the remarkable increase in employment activity among mothers with young children. In Norway, the participation rate of mothers of 0-2 year olds has more than doubled from 1972 to 1991 (from 29 to 70 per cent according to the Norwegian LFSS). In a previous study I found a similar development also among one-child mothers as soon as one year after birth (Rønsen 1992).

Women's closer contact with the labour market after childbirth may have important consequences for their return from human capital investments. Several U.S. studies have found that part of the 'wage gap' between the sexes is the result of women having more frequent career interruptions (Mincer and Polachek 1974, Corcoran and Duncan 1979, Ferber and Spaeth 1984). Given these results, it is important to understand what determines the length of a career interruption associated with childbearing. Previous research on this subject has mainly focused on the length of non-employment after *first* birth (McLaughlin 1982, Mott and Shapiro 1983, Bernhardt 1988, Korpi 1989, Greenstein 1989, Desai and Waite 1991), as this is considered a time of great conflict between employment and childrearing. Little attention has yet been given to women's career interruptions after the *second* or later births. As many women still have two or more children, the conflict between employment and child-rearing may be even greater at this time.

Another little researched area has been the distinction between full-time and part-time work. The existing evidence suggests that there may be differences between these employment states beyond the obvious difference in hours worked (Korpi 1989, Wright and Hinde 1991, Rønsen 1992). There is e.g. evidence of differential returns to human-capital in full-time and part-time employment (Ermish and Wright 1993), which may be of great consequences to women.

The present paper addresses these questions further. Based on theories of job search and human capital depreciation and appreciation I analyze the (re)entry into full-time and part-time employment after the first as well as the second birth. As previous research has suggested that some occupations may pay lower penalties for labour force withdrawal (Polachek 1987, Desai & Waite 1991) I also look into possible differences in the return behavior across occupations and employment sector (public/private). Furthermore, I seek to capture some of the heterogeneity among women by controlling for variables which are likely to reflect differential preferences and values.

2. Theoretical framework

Following the work of Mincer and Polachek (1974) a woman's 'full wage' consists of three

components: (1) the market wage, (2) the present value of the reduction in future earnings caused by the increased depreciation of human capital during a career interruption, and (3) the present value of the loss in future earnings associated with the forgone on-the-job accumulation of human capital. A woman is assumed to resume employment after childbirth when her full wage exceeds her reservation wage, i.e. she starts working if and only if

$$W(t) > R(t) \quad (1)$$

where $W(t)$ is the full wage and $R(t)$ is the reservation wage at time t . According to the dynamic household production model developed by Hotz and Miller (1985), the birth of child can affect the mother's reservation wage in two ways: (i) by increasing the demand for the mother's time in child care and (ii) by increasing the demand for market inputs in home production. The former effect increases while the latter decreases the reservation wage. Hence newborns will increase the reservation wage only when they are relatively 'time intensive'. Furthermore, if children become less time intensive and more goods intensive as they grow older, the reservation wage will fall as the time since childbirth increases.

To study the time dependence of the full wage more closely, I follow the exposition in Even (1987). Decomposing the full wage into its separate parts at the beginning of the τ th period after child birth, we have that

$$W_\tau = w_0 - \sum_{t=1}^{\tau-1} \delta_t + (\delta_\tau + \alpha_\tau) \sum_{t=1}^{T-\tau} \lambda_t \quad (2)$$

where w_0 is the market wage received during the last period of employment prior to birth, δ_t is the decrease in the market wage that occurs if not employed during period t , α_t is the forgone increase in the market wage that would occur if employed during period t , $\lambda_t = 1/(1+r)^t$, where r is the discount rate, and T is the total planning period. The first two terms on the right hand side of (2) represent the market wage at the beginning of period τ . The third term represents the present value of the combined effect of human capital deterioration and forgone accumulation on future earnings under the assumption that, once the career interruption is ended, the woman will remain employed for the remaining $(T-\tau)$ time periods.

Given the above decomposition, the change in the full wage between period τ and $\tau+1$ is

$$\begin{aligned} \Delta W_\tau &= W_{\tau+1} - W_\tau \\ &= -\delta_\tau - (\delta_\tau + \alpha_\tau) \lambda_{T-\tau} + (\Delta\delta_\tau + \Delta\alpha_\tau) \sum_{t=1}^{T-\tau-1} \lambda_t \end{aligned} \quad (3)$$

where $\Delta\delta_\tau = \delta_{\tau+1} - \delta_\tau$ and $\Delta\alpha_\tau = \alpha_{\tau+1} - \alpha_\tau$. From (3) we see that if $(\Delta\delta_\tau + \Delta\alpha_\tau)$ is not 'big enough', i.e. if the combined effect of human capital deterioration and forgone accumulation does not increase sufficiently fast, the full wage will diminish with the duration of the career interruption. Second, if the depreciation/appreciation rates are time invariant the full wage will fall more rapidly the higher the rates are. Last, other things being equal, women with longer future work horizons will have

greater full wages.

The chance of ending a career interruption and resume employment will depend on time changes in a woman's reservation wage as well as in her full wage. When modelling these dynamics, the hazard rate is a popular and useful term. It can be defined as the (unobserved) rate with which an event occurs within a certain short time interval, given that it has not occurred previously. The formal expression is

$$h(t) = \frac{P(t \leq T < t + \Delta t | T \geq t)}{\Delta t} \quad (4)$$

where $P(\cdot)$ is the probability of experiencing the event in the time interval Δt . There is little a priori knowledge of the functional form of the hazard rate of employment after birth. A rising full wage and a falling reservation wage will imply a rising hazard rate, while a falling full wage and a rising reservation wage will imply a falling hazard rate. If the full wage and the reservation wage both develop in the same direction, the direction of the resulting hazard rate is uncertain. It seems reasonable, therefore, to make as few assumptions as possible about the functional form of the hazard rate. The estimates reported in this paper are based on the flexible Cox proportional hazard model, which makes no assumptions about the functional form of the baseline hazard. Besides depending on time, the hazard rate may be assumed to depend on characteristics of the individual. The hazard can thus be written

$$h(t|X) = h_0(t) \exp(X(t)\beta) \quad (5)$$

where $h_0(t)$ is the unknown baseline hazard rate, X is a vector of covariates which may or may not depend on time, and β is a vector of parameters. The transitions to be estimated are the competing risk of entering into full-time or part-time work after birth. As previous analyses have indicated that some covariates affect the two employment states differently, the estimates are performed separately for each state, censoring entries into part-time when analyzing full-time and vice versa. Women who have another birth during the observation period are censored at the time of the next birth. The model has been estimated using the procedure PHREG in the SAS/STAT software (SAS Institute Inc. 1992).

As the standard hazard rate models have no random term to account for unobserved characteristics, various techniques have been suggested to account for remaining heterogeneity after controlling for all observable characteristics (see e.g. Heckman and Singer 1984). However, there still seem to be many unsolved problems with the theory behind and the application of these methods (see e.g. Hoem 1989), and so far these techniques have not been pursued in this analysis. As long as our primary interest is in the effects of covariates and not in the duration dependence of the hazard rate, the present approach may be adequate.

3. Data and variables

The data are from the Norwegian Family and Occupation Survey of 1988, a national probability sample survey of 4019 women born in 1945, 1950, 1955, 1960, 1965 and 1968. The survey contains complete retrospective life histories on childbearing, cohabitation and marriage, educational activity and employment. In addition information on registered annual income during 1967-1988 for the respondents and their husbands (per 31.12.1987) were obtained from the Directorate for Taxation and linked to the survey data.

During the collection of the employment histories, employment spells of less than three months and weekly work activity of less than ten hours were not recorded. Weekly working hours above this limit were recorded in four intervals: 10-24, 25-34, 35-45 and more than 45 hours per week. Very few women worked more than 45 hours per week after birth, and in the analysis this interval has been collapsed with the 35-45 hours interval and defined as full-time work. The two part-time intervals have also been collapsed as there were relatively few (re)entries into long part-time work¹. Part time in the analysis is thus defined as working 10-34 hours per week.

The interviewers were instructed to consider women on maternity leave as employed, which is consistent with international convention. In addition, they were to register a special code for maternity leave. We suspect, however, that the reporting practices have differed to some extent (see Kravdal 1992a for further documentation). To avoid possible confounding effects I have therefore chosen to start the observation period after the expiry of the statutory maternity leave. Before approximately mid-year 1977 this meant 3 months after childbirth and later 4 months after childbirth. In the survey there were 2407 women who gave birth to a first child and 1652 who gave birth to a second child more than 4 months prior to the time of the interview (October-December 1988). As there is no income information before 1967, and as I did not want to extrapolate the time series, births occurring before this time have been excluded from the analysis. The restricted sample contains 2242 observations of first births and 1606 observations of second births.

The two central components in the hazard rate as discussed in section two are the woman's full wage and her reservation wage. Any variable that affects these components will also affect the hazard rate. We now turn to a brief description of the various explanatory variables that are available in our data material and discuss their expected influence on the hazard rate.

3.1. The market wage and human capital variables

The potential *market wage* is a central component of the full wage. The higher the market wage is, the higher is the full wage, and the sooner will a woman resume employment after birth. Due to the broad intervals of working hours, individual hourly wage could not be calculated directly. In addition, we do not know the potential wages of women who do not work. The wage rate used in

¹ Among those who resumed part-time employment, less than one third worked more than 24 hours per week.

the model is therefore an estimated rate. It is based on annual observations of income earned by women working a full woman-year, and is adjusted for possible selection bias introduced by using data from a restricted group of women (see Rønsen 1992 for further details about the estimation procedure). The estimated market wage is included as a time-dependent covariate in the model and is expressed in 1990 Norwegian Kroner (NOK).

The wage function used to estimate individual wage profiles include standard human capital variables such as age, education and employment experience, but do not control for possible depreciation effects due to periods of non-employment. From equation (2) we see that depreciation is a component both of the actual market wage as well as of the present value of foregone future gain if not employed. In the literature there has been some controversy as to whether depreciation (or "atrophy") is a significant phenomena in the human capital earnings function of women. Corcoran and Duncan, e.g., in their study of earnings differences between races and sexes concluded that 'labour force withdrawals do reduce wages because work experience is not being accumulated, but there is no *additional* penalty due to the depreciation of skills' (Corcoran and Duncan 1979). This is in apparent contradiction to the results of Mincer and Polachek (1974 and 1978) and Mincer and Ofek (1982). Unfortunately, there are no comparable studies of women's wages in Norway, but recent results from Sweden confirm the finding of a negative effect on wages of employment interruptions (Stafford and Sundstöm 1994). To control for possible depreciation effects, I have included a measure of non-activity before birth in the model. It is labelled *prior home-time*, and refers to the length of time since last quitting work or study (whichever is latest) and up to childbirth.

Existing evidence suggests that there is a positive relationship between the level of human capital and depreciation rates. Mincer and Polachek (1974 and 1978) found e.g. that women with more schooling and longer employment experience had larger depreciation rates than other women. In their 1982 study, Mincer and Ofek found a relatively rapid growth in wages upon the return to work after a career interruption. They interpreted this phenomenon to be the restoration of previously eroded human capital, and suggested that the reconstruction of occupational skills is more efficient, or less costly, than new construction of human capital. If so, the reconstruction process may be faster the more human capital there is to restore. Thus it seems plausible to expect educational level and previous employment experience to be important indicators of both depreciation and foregone appreciation in the earnings function of women.

Employment experience is constructed from the recorded employment histories, and is the total number of woman-years worked by the time of birth. It combines information of the length of time a woman has been in touch with the labour market and her working hours during that time. *Educational level* is the highest level attained at the time of birth, and is measured by the required number of years needed to reach this level. The years have been grouped into three levels: primary school (< 10 years), secondary school (10-12 years) and post-secondary school (> 12 years). In some studies educational level has been found to exert a positive effect on the reservation wage of mothers by enhancing the family's demand for (or ability to produce) 'child quality' (Gronau

1973). The net effect of education on the hazard rate thus depends on whether education has a stronger positive effect on the full wage than on the reservation wage.

From equation (2) we see that a longer future work horizon implies a higher full wage. As younger mothers have longer future work horizons, they are assumed to have higher return rates than older mothers, all other things being equal. Thus, the mother's age is expected to have a negative effect on the (re)entry rate, and is entered as a time-dependent covariate in the model.

In a proportional hazard model the effect of the covariates are assumed to be independent of duration. This implies a.o. that depreciation and appreciation rates are constant, which may not be a reasonable assumption. To allow for duration dependence, various interaction terms between different human capital variables and duration have been tested. In the estimates reported below only significant interaction terms are included.

3.2. Previous occupation and employment sector

Previous research on sex segregation in labour markets has suggested that women who do not expect to work continuously following childbearing may select occupations that are relatively easy to leave and re-enter. These occupations may assess lower penalties for labour force withdrawal through lower depreciation and less forgone accumulation of human capital (Polachek 1987). Women who expect to work continuously following childbearing may, on the other hand, select occupations that offer nonmonetary benefits, like flexible hours or safe and physically undemanding work. These theories are still much debated. England (1982) has tested the predictions from Polachek's theory on U.S. data, and concludes tentatively that human capital theory fails to explain occupational sex segregation. She categorizes the occupations according to their sex composition, and finds no evidence that women are penalized less for time spent out of the labour force if they choose female occupations. In addition, women with more continuous employment histories are no less apt than other women to be in predominantly female occupations.

Desai and Waite (1991) have analyzed the effect of occupational characteristics on women's employment during pregnancy and after the first birth. In agreement with England they do not find that an occupation's sex composition helps to retain workers prior to and following birth. However, other measures of an occupation's convenience of working (e.g. the proportion of part-time and part-year work) and cost of not working (amount of specific vocational preparation required for the job) seem to be better predictors of how fast mothers resumed work after birth.

In Norway, the *public sector* is the largest "consumer" of part-time workers. This sector has also traditionally had the best maternity leave arrangements². Previous employment in the public sector

² Extended maternity leave was first introduced in the government sector. Since 1973 government employees have been entitled to one year unpaid leave after birth. These rights were granted to all employees in 1977. Since 1981 government employees can take up to 3 years leave without losing their job. In addition they are entitled to 2 hours paid leave per day if they feed their baby.

has therefore been chosen as an indicator of the convenience of combining work and motherhood, and is expected to increase the return rates after birth, all other things being equal.

To control for *occupational differences* in the cost of not working I have collapsed 3-digit occupations into three broad groups according to the occupation's perceived earnings potential. The division is mainly based on preliminary estimates of the wage potential of women in the survey data (Kravdal 1994). Assuming that mothers in occupations with a faster growing earnings potential will consider it more costly to stay away from the job, they are expected to have higher reentry rates after birth.

3.3. The reservation wage. Values and preferences.

The presence of children is assumed to increase the mother's reservation wage, but as the children grow older and become less time intensive and more goods intensive, the reservation wage may fall. The *age of the first child* is therefore expected to have a positive effect on the hazard rate of returning to work after the second birth. Age of first child is included in the model as a fixed covariate measured at the time of the second birth, as making it time-dependent did not seem to make any difference to the model estimates.

Higher non-labour income (husband's/partner's income, social security benefits) is assumed to increase the demand for the mother's time spent on home production and child care, thus increasing her reservation wage. Unfortunately, we have no information on social security benefits, and the register information on husbands' income is only valid for women who were married and in lasting unions at 31.12.1987. By restricting the analysis to this subgroup, the results may be selection biased. Therefore, non-labour income has been left out of the analysis, and *marital status* serves as a proxy. The main difference is between single mothers, whose main source of non-labour income is social security benefits, and the remaining mothers, whose main source is the disposable income of their partner. As married couples are subject to joint taxation while partners in a consensual union always are taxed separately, mothers are also divided according to whether they are married or cohabitants³.

Married women have further been sub-divided according to whether they married directly without an initial period of cohabitation or not, as earlier investigations (Rønsen 1992) revealed differences between these groups which were difficult to ascribe to anything but differential preferences. Thus the marital status variable reflects more than just differences in non-labour income. As marital status may change during the observation period, it is entered as a time-dependent covariate in the model.

³ Married women in low income categories are normally taxed jointly with their husbands as this makes the couple better off than with separate taxation. The effective marginal tax rate is thus the husbands' marginal tax rate. When income exceeds a certain level, the couple will be better off with separate taxation, and the wife's marginal tax rate will be lower.

Several studies of demographic events documents the usefulness of religious activity as an indicator of individual differences in values and attitudes. In recent studies from Nordic countries religiously active women are found to be more likely to marry and less likely to enter into unmarried cohabitation (Blom 1994), less likely to experience a divorce (Hoem and Hoem 1988) and more likely to have a third child (Kravdal 1992b). In a previous analysis I found that religiously active women also were less likely to take up full-time work one year after birth (Rønsen 1992). To see if the same effects also show up after the second birth and in a dynamic setting, religious activity has been kept in the model. It is measured by *church attendance* one year prior to interview. As religious attitudes are probably fairly stable over the life-course, this should not invalidate its usefulness as a proxy for values and attitudes. Yearly church attendance has been collapsed into two groups, high (≥ 3 visits) and low (< 3 visits).

Several U.S. studies have found a great deal of stability in female labour supply behavior (Heckman and Willis 1977, Heckman 1981, Shapiro and Mott 1994, Nakamura and Nakamura 1985, 1994). Most women seem to be either persistent workers or persistent non-workers, and the degree of persistence has remained largely unchanged over the last twenty years. The number of women who are persistent non-workers has, however, decreased, while the number of persistent workers has increased (Shaw 1994). Evidence of such persistency will, no doubt, be reflected in the women's pre-birth employment histories. Thus, *employment experience* and *prior home-time* may also be indicators of differences in the reservation wage. Other things being equal, women with longer pre-birth employment experience may be assumed to have a lower reservation wage, while women with longer prior home-time may be assumed to have a higher reservation wage than other women. Together with its positive effect on the full wage, longer employment experience will have an unambiguous positive effect on the return rate to employment after birth. The effect of longer home-time periods is also unambiguous, but in the opposite direction: by raising the reservation wage and lowering the full wage it will reduce the reentry rate after birth.

Despite the growing interest in women's work careers, the study of part-time work is largely neglected. Implicitly, it is assumed that women's full-time and part-time work is of the same kind. Recent research has, however, indicated that this is not so (Korpi 1989, Wright and Hinde 1991, Rønsen 1992). Many of the new mothers with persistent work careers may be able to stick to this pattern due to the growing availability of part-time jobs. An interesting question is whether the observed persistence in employment behavior also extends to a woman's working hours. Is it possible to predict not only employment or non-employment after birth but also part-time or full-time work from a woman's pre-birth employment history? To answer this question I have included a variable which indicates a woman's type of previous employment experience. As very few women work part-time before they become mothers, this is limited to employment entries after the second birth. The variable is labelled *between birth activity* and is divided into 1) none, 2) part-time only or mixed part-time and full-time work and 3) full-time work only.

3.4. Calendar period.

The post-birth employment histories in our data cover a period of about 20 years (1967-1988). To see if there are separate period effects, calendar time is introduced in the model in fairly broad intervals. The aim has been to single out periods that differ in economic activity to capture the possible influences of macro-economic factors. A brief review of the main characteristics are as follows:

- 1967-1973: Stable period of steady economic growth.
- 1974-1977: First oil price shock followed by governmental counter-cyclical policies to offset the adverse effects in international markets of the rise in oil prices. Continued economic growth.
- 1978-1980: Contractionary policies to remedy an overheated economy and a rapidly growing deficit in the balance of payments. Price and income stop. Second oil price shock⁴.
- 1981-1984: Rising unemployment, peaking in January 1984 with nearly 80 000 unemployed persons, or more than a doubling in the period.
- 1985-1987: Liberalization of the credit markets. Huge rise in private consumption spending. Fast economic growth and fall in unemployment.

The 1981-1984 period stands out as a period of relatively low economic activity. During this time Norway experienced its first wave of relatively high unemployment. Previously, I found that mothers were less inclined to work full-time one year after first birth in this period compared to the other periods. This suggests that adverse macro-economic conditions may inhibit employment activity after birth⁵. Calendar period is entered as a time-dependent covariate in the model.

4. Descriptive statistics

Figure 1 and 2 contain plots of the *observed* monthly (re)entry rates into full-time and part-time after first and second birth, starting at the expiry of the paid maternity leave (3 or 4 months after birth). The rates fall sharply the first few months until about the 9th month when another peak is observed. This is a reflection of the Norwegian statutory maternity leave regulations, which have offered an extended period of unpaid leave until the child is one year old since 1977 (1973 in government service). Thereafter, the rates continue to fall only slightly more until they stabilize,

⁴ As the estimates for this period appears to be very similar to the 1974-1977 estimates, these two periods have been collapsed in the analysis.

⁵ In the previous analysis I also included a dummy variable for individual unemployment experience, which proved significant in the full-time alternative. In the hazard rate framework, the variable was no longer significant, and had little effect on the remaining model estimates. It was therefore dropped from the analysis.

fluctuating around a more or less constant low level for the remaining observation period⁶. The entry rates after first birth are characterized by a very high flow into full-time work during the first month (i.e. upon the expiry of the paid maternity leave). The rate is 123 per 1000 women, which is more than double the part-time rate during the first month. Looking at the return behavior after second birth, the entry rate into full-time tend to be lower than the part-time rate, except for the very first month where the two rates are quite similar (75.1 and 69.6 respectively). When calculating the proportion of women who had returned to work by the expiry of the *unpaid* maternity leave, I find that 25 per cent had taken up full-time work while 17 per cent had taken up part-time work after first birth. After the second birth, the equivalent full-time proportion was only 14 per cent, while the part-time proportion was 20 per cent.

Summary statistics of the independent variable and the model covariates are given in table 1 below.

5. Estimation results

The parameter estimates of entries into full-time and part-time employment are given in table 2 (first birth) and table 3 (second birth). To get an impression of the total effect of the covariates on all after-birth employment activity, I have also estimated models of the overall (re)entry employment rates, regardless of working hours (including events with missing information on working hours). All estimates are reported as relative risks, i.e. the coefficients have been exponentiated. For continuous variables the interpretation is then as follows: For each unit increase in the explanatory variable, the hazard is multiplied by the coefficient. For dummy variables, the coefficient gives the hazard of a specific group relative to the hazard of a chosen reference group.

5.1. Employment entries after first birth.

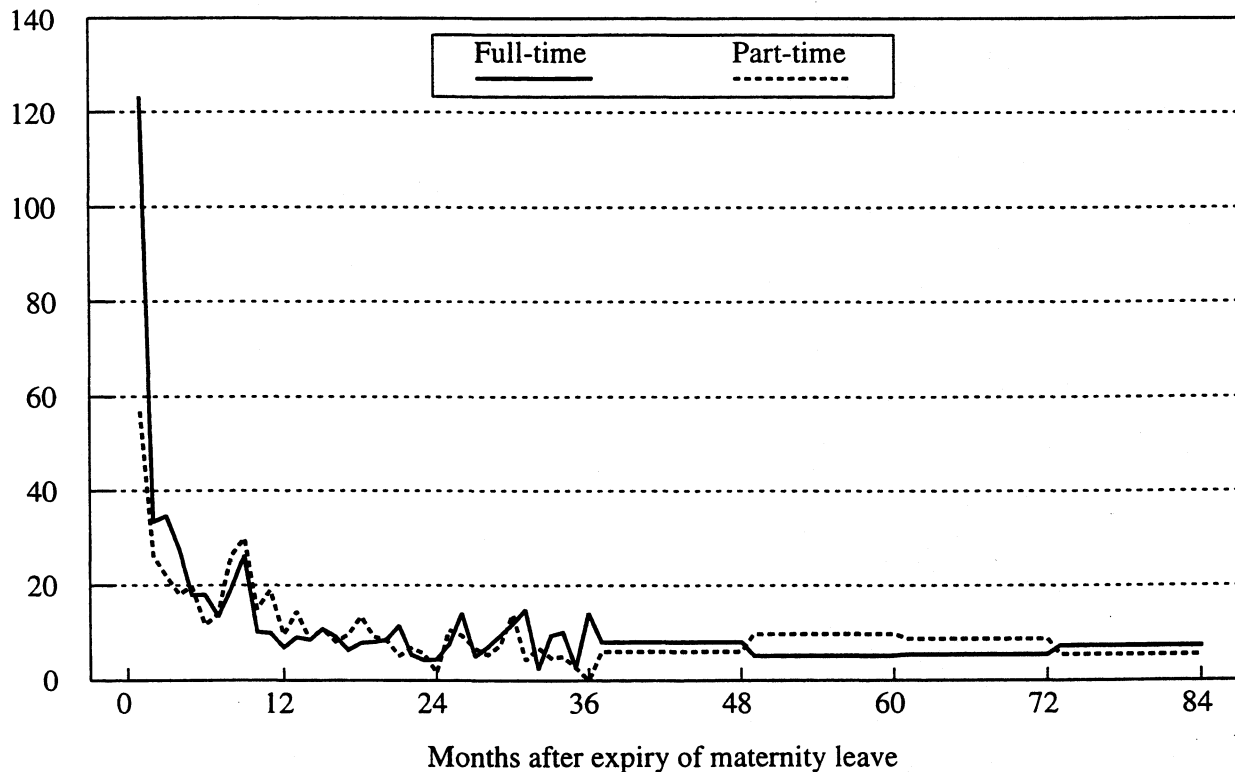
Turning to table 2, we see that the effects of the different components of the full wage are mainly as predicted. The coefficient of predicted hourly wage is estimated to be positive in both the full-time and the part-time alternative, but is significant only for part-time. The coefficient of the mother's age has the expected negative sign in both alternatives, but is not significant.

Having controlled for the market wage, the remaining positive effect of education and employment experience presumably reflect differences in work commitment and human capital depreciation and appreciation. Similar to the results of Even (1987) the effect of employment experience is found to interact with time since birth (or in our case: time since maternity leave expiry).

⁶ From month 36 onwards the rates are drawn as yearly averages due to fewer monthly events and greater random fluctuations.

Observed Full-time and Part-time Entry Rates after First Birth

Rate per 1000 women per month



Observed Full-time and Part-time Entry Rates after Second Birth

Rate per 1000 women per month

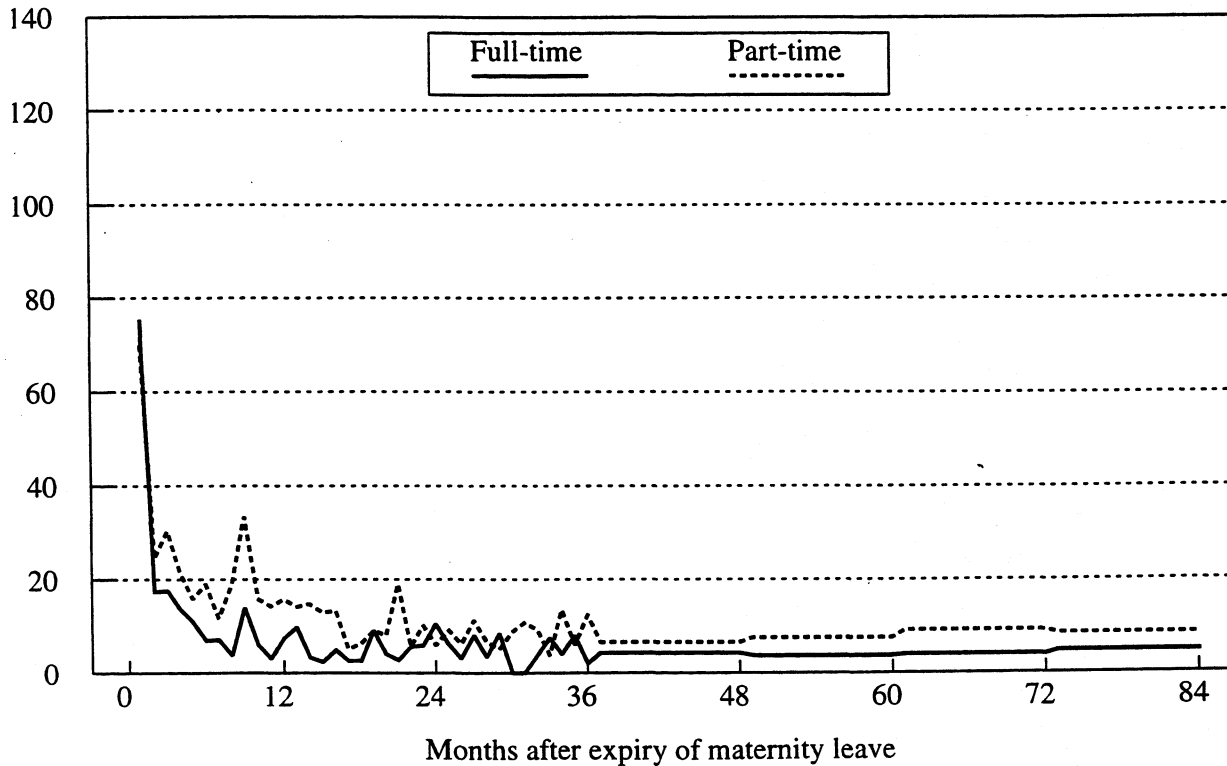


Table 1. Mean value of variables included in the model¹.

Variable	First birth N=2242	Second birth N=1606
Dependent variable:		
Duration	17.0 months	26.6 months
Independent variables:		
Mother's age	23.7 years	26.6 years
<u>Education:</u>		
<10 years	21.2%	22.7%
10-12 "	60.8%	58.6%
>12 "	18.0%	18.7%
Employment experience	4.2 woman-years	5.0 woman-years
<u>Between birth activity:</u>		
none		42.5%
part-time only		20.5%
part-time and full-time		8.3%
full-time only		28.6%
Prior home-time	0.3 years	1.4 years
Predicted market wage (1990 prices)	75.14 NOK/hour	79.61 NOK/hour
Public sector	37.2%	39.2%
<u>Previous occupation:</u>		
Teaching/nursing	20.5%	22.2%
Sales/manufacturing/service	38.3%	41.3%
Professional/technical/ administrat./clerical a.o.	41.2%	36.5%
<u>Marital status:</u>		
Cohabiting	15.0%	4.8%
Directly-married	44.9%	61.1%
Married after cohab.	28.6%	32.4%
Single	11.5%	1.7%
Age of 1st child		3.5 years
<u>Church attendance:</u>		
<3 times/year	79.7%	74.5%
≥3 "	20.3%	25.5%
<u>Calendar period:</u>		
1967-1973	27.4%	21.8%
1974-1980	32.3%	35.9%
1981-1984	18.6%	21.5%
1985-1988	21.6%	20.9%

¹ Means of time-varying covariates are reported as of the beginning of the observation period.

Table 2. Parameter estimates of employment entry after **first birth**.
Relative risks. (Absolute value of asymptotic t-statistics in parenthesis).

Variable	Full-time	Part-time	All hours (incl. unspecified)
Mother's age	0.968 (1.31)	0.956 (1.88)	0.966 (2.08)
Education:			
<10 years	1	1	1
10-12 "	1.087 (0.79)	1.051 (0.49)	1.066 (0.89)
>12 "	1.858 (3.22)	1.460 (1.94)	1.693 (3.96)
Employment experience	0.983 (0.57)	1.068 (2.53)	1.035 (1.85)
Empl.exp * duration	0.975 (3.15)	1.022 (2.66)	0.999 (0.20)
Prior home-time	0.638 (5.49)	0.736 (4.09)	0.715 (6.63)
Home-time * duration	1.773 (7.61)	1.289 (3.66)	1.498 (8.57)
Predicted market wage	1.007 (1.30)	1.014 (2.55)	1.008 (2.32)
Previous sector:			
Public	1.293 (2.86)	1.132 (1.29)	1.212 (3.01)
Other	1	1	1
Previous occupation:			
Teaching/nursing	0.995 (0.04)	1.249 (1.83)	1.103 (1.17)
Sales/Manuf./service	1	1	1
Prof./tech./adm. a.o	1.249 (2.62)	0.931 (0.85)	1.089 (1.48)
Marital status			
Cohabiting	1.411 (2.94)	0.656 (3.19)	1.002 (0.03)
Directly-married	1	1	1
Married after cohab.	1.228 (2.39)	0.937 (0.79)	1.060 (1.00)
Single	1.123 (0.96)	0.520 (4.76)	0.808 (2.46)
Church attendance:			
<3 times/year	1	1	1
≥3 "	0.761 (2.99)	1.007 (0.09)	0.879 (2.17)
Period:			
1967-1973	1.716 (3.22)	1.233 (1.28)	1.345 (2.61)
1974-1980	1.401 (3.28)	1.181 (1.66)	1.254 (3.29)
1981-1984	1	1	1
1985-1988	1.118 (0.96)	1.350 (2.58)	1.209 (2.32)
Likelihood ratio	335.4	250.8	499.21
DF	18	18	18
Events	902	923	1929
N	2242	2242	2242

Table 3. Parameter estimates of employment entry after **second birth**.
Relative risks. (Absolute value of asymptotic t-statistics in parenthesis).

Variable	Full-time	Part-time	All hours (incl. unspecified)
Mother's age	0.912 (2.83)	0.944 (2.39)	0.933 (3.74)
Education:			
<10 years	1	1	1
10-12 "	0.953 (0.32)	0.923 (0.74)	0.927 (0.90)
>12 "	1.242 (0.75)	1.099 (0.43)	1.155 (0.84)
Employment experience	0.951 (1.36)	1.025 (1.00)	1.010 (0.52)
Empl.exp * duration	0.959 (4.05)	0.997 (0.31)	0.984 (2.74)
Between birth employment:			
None	1	1	1
Part-time only or part-time/full-time	0.552 (2.80)	1.912 (5.14)	1.401 (3.28)
Full-time only	2.300 (5.04)	0.731 (2.31)	1.330 (2.93)
Prior home-time	0.847 (3.10)	0.839 (4.72)	0.843 (5.81)
Home-time * duration	1.191 (5.24)	1.194 (6.95)	1.201 (9.29)
Predicted market wage	1.025 (3.24)	1.010 (1.70)	1.015 (3.25)
Previous sector:			
Public	1.075 (0.55)	1.032 (0.31)	1.008 (0.13)
Other	1	1	1
Previous occupation:			
Teaching/nursing	0.912 (0.53)	1.245 (1.70)	1.154 (1.43)
Sales/Manuf./service	1	1	1
Other	1.006 (0.05)	0.961 (0.43)	0.967 (0.47)
Marital status			
Cohabiting	1.252 (0.93)	0.746 (1.33)	0.944 (0.38)
Directly-married	1	1	1
Married after cohab.	1.371 (2.71)	1.018 (0.21)	1.122 (1.73)
Single	1.724 (2.37)	0.600 (2.05)	0.945 (0.35)
Age of 1st child	1.089 (3.18)	1.047 (1.95)	1.061 (3.48)
Church attendance:			
<3 times/year	1	1	1
≥3 "	1.014 (0.12)	1.026 (0.32)	1.032 (0.49)
Period:			
1967-1973	2.165 (3.36)	1.143 (0.76)	1.375 (2.35)
1974-1980	1.263 (1.73)	1.163 (1.57)	1.144 (1.77)
1981-1984	1	1	1
1985-1988	0.775 (1.50)	1.208 (1.51)	1.017 (0.17)
Likelihood ratio	422.2	480.3	674.4
DF	21	21	21
Events	439	820	1341
N	1606	1606	1606

To interpret the interaction effect a comment on the time covariate is necessary. It is defined as

$$\log(t) - \frac{1}{T} \sum_{t=1}^T \log(t) \quad (6)$$

where t is time since maternity leave expiry and T is the maximum observation time. As the last term in equation (6) is the log of the geometric average of t , the interaction term is zero when t is at its geometric average, negative before that time, and positive for later values of t . The estimated coefficient of the main effect of employment experience can thus be interpreted as the effect at the geometric mean of the observation period, which in our case is about 32 months after the expiry of the maternity leave. In the full-time alternative there is no significant main effect of employment experience. However, the significant negative interaction implies that there is a positive effect of employment experience at short durations, but that the effect declines with time. These results support the notion that longer employment experience implies higher, but also faster declining human capital depreciation- and appreciation rates, contributing to a higher but faster declining full wage.

In the part-time alternative there is a significant positive main effect of employment experience as well as a significant positive interaction effect. Thus longer employment experience also implies higher depreciation and appreciation rates in part-time work, but instead of diminishing with time as in the full-time alternative, the rates now seem to increase with time. One possible interpretation may be that the accumulation process of human capital is different in a part-time job. However, more research that make a distinction between full-time and part-time work is needed before we can draw any further conclusions in this area.

There is also a positive effect of education on the (re)entry rates, but it is only significant for education at high-school and university level and mainly in the full-time alternative. However, education may also affect the mother's reservation wage positively by raising the demand for child quality, and thus offset the positive effects on the full wage.

Prior home-time has a strong negative effect on the return to work after birth. As can be seen from the reported t-statistics, no other covariate contributes more to explain the variation in the hazard rate. This is in agreement with Even (1987), who concluded that working late into pregnancy is a very strong indicator of future employment behavior.

Prior home time was included in the model for two reasons: (i) because the earnings function used to predict a woman's market wage did not control for the possible negative effect of interrupted work careers, and (ii) because past employment history is likely to reveal something of the present work commitment. Based on U.S. longitudinal data Mincer and Ofek (1982) found that women's real wages at reentry were lower than at the point of labour force withdrawal, and that the decline in wages was greater, the longer the interruption. Unfortunately, there are no similar studies of women's wages in Norway, but results from Sweden, a country with similar wage structure as Norway, suggest that there are negative effects on women's wages of time out of the labour market

which should not be overlooked (Stafford and Sundstöm 1994).

However, the magnitude of the negative effect of longer prior home-time points to some additional interpretations. For instance, the longer the prior home-time period, the lesser is the chance that a woman will be entitled to maternity leave⁷. Obviously, women on temporary leaves do not have to spend time searching for a suitable job as long as they are still pleased with their old contract (i.e. if the full wage in their old job still exceeds their reservation wage, which presumably increases after birth). Hence, they "save" search time and return faster to work. On the other hand, mothers on maternity leave also receive monetary benefits. Usually, these benefits constitute 100 per cent of the woman's monthly salary prior to birth⁸. With normal income effect assumptions, this additional non-labour income may induce mothers on maternity leave to take longer career breaks in connection with a child birth than women without such benefits. A priori, therefore, the expected effect of maternity leave on the after-birth entry rates is ambiguous, and will be examined more closely in the future.

Last, but not least, prior home-time is likely to be a good indicator of a woman's long term employment preferences. If women tend to be either persistent workers or persistent non-workers, as is indicated by several US studies, prior home-time will, no doubt, reflect such differences. Other things being equal, women with longer periods at home before birth value their time in the home higher and have a higher reservation wage than less home-committed women, and will be less likely to resume employment after birth. Prior home-time is also found to interact with duration, and the interaction effect is strongly positive, implying that the negative effect of prior home-time increases with time since birth. This points to a growing reservation wage during a career break, and the growth rate increases with the length of the break.

The net effect of working in the public sector prior to birth is also as expected. By offering better maternity leave arrangements and non-monetary benefits such as time off for breast-feeding, the public sector is able to retain workers to a greater extent than the private sector⁹. The extra conveniences offered by the public sector seem to be especially appreciated when resuming full-time work, where the positive effect is clearly significant.

Previous occupation was included in the model to capture possible occupational differences in earnings potential. The reference group of sales-, manufacturing- and service occupations are characterized by relatively low wages, and exploratory analysis with controls for education and experience indicated that these occupations also had poorer wage prospects (Kravdal 1994). The

⁷ Before mid-year 1977 a woman had to work 8 out of 10 months prior to birth to be entitled to maternity leave. Afterwards the requirements were reduced to 6 out of 10 months.

⁸ There is an upper limit, but few women have pre-birth incomes above that level.

⁹ This sector also includes women with no previous employment experience, as early investigations showed that there were no differences between this group and the private sector.

remaining occupations are divided in two, with teachers and nurses constituting a group with medium wages and wage prospects, and the rest, including a.o. technical-, professional-, administrative- and clerical workers as the category with the highest present and prospective wages. Compared to women in sales-, manufacturing- and service occupations, the mothers in the latter group have a significantly higher reentry rate into full-time employment, while teachers and nurses seem to be more inclined to take up part-time work after birth. This may be due to wage differences as hypothesized, but may of course also just reflect the greater extent of part-time contracts in teaching and nursing.

As non-labour income is not included in the model, marital status may reflect differences in income, as well as differences in preferences and values. Having presumably lower non-labour income, single mothers are expected to resume employment faster after birth. From table 2 we see that single mothers do not have a significantly higher full-time risk than directly-married mothers. In the part-time alternative there is a significant difference, but not in the expected direction. Single mothers seem to be less inclined than married mothers to take up part-time work after birth. This may be a result of the very high effective marginal tax rates that single mothers encounter in modest income categories because of income dependent deductions in social security benefits. When working full-time, single mothers "avoid" the high marginal deductions as a full-time income is normally above the upper limit for benefit entitlement. Working part time is therefore not a popular alternative among single mothers (Rønsen and Strøm 1992).

The joint taxation of married couples may refrain more married than cohabiting women from resuming employment after birth. However, as the joint taxation is mainly used when the wife's earnings are fairly low, one should not expect this to affect full-time employment. From table 2 we see that directly-married mothers have a lower risk of full-time employment and a higher risk of part-time employment than cohabiting mothers. It seems more reasonable to ascribe these results to general differences in preferences and work attachment, and this interpretation is further strengthened by the difference in full-time risk between the two groups of married women. Having lived in a consensual union before marriage is seen to raise the risk of entering into full-time work by approximately 20 per cent compared to women who married directly.

Church activity turns out to be a valuable proxy for values and attitudes also when modelling the return to employment after birth in a hazard rate framework. As was found in analyses of maternal employment one year after first birth (Rønsen 1992), religiously active women are less likely to resume full-time employment after birth, but there is no difference in the part-time risk. Sticking to more traditionalistic family values, religiously active women seem to prefer working arrangements that can more easily be combined with a stronger family orientation.

The estimated entry rates of the 1981-84 period are lower than in all other calendar time periods, although the difference is not significant in the part-time transitions. It seems that periods with economic slack may depress the reentry rates of mothers after birth, either by depressing the full wage or by raising the reservation wage or both. When the economy is at an ebb, real wages are

known to grow slower or even fall and the future may look bleaker, thus depressing the full wage. If greater difficulties in finding a suitable job make mothers more discouraged and more reluctant to resume employment, the reservation wage may also rise. As both factors affect the reentry rates negatively, the combined effect is unambiguous.

The third column in table 2 shows the estimates of the total re-entry risk after first birth. If full-time and part-time work had been regarded as one single employment state, as is commonly done, some effects which work in opposite directions in the two states would have been concealed. For instance, we would have found no differences in the reentry rates between directly-married mothers and other married and cohabiting mothers and little evidence of occupational differences. Single mothers would have appeared less inclined to take up employment after birth, while the separate analysis shows that this conclusion is only valid for part-time work. Similarly, we would have concluded that religiously active women have lower reentry rates into employment in general, but this seems to be true only for full-time work. Besides, there seems to be no duration dependence in the effect of previous employment experience, while the separate analysis indicates that the effect decreases with time in full-time work and increases with time in part-time work. These findings confirm that it is important to regard full-time and part-time employment as separate states when analyzing the (re)entry into employment after birth.

5.2. Employment entries after second birth

Table 3 shows the parameter estimates of the entry rates after *second* birth. There are many similarities with the first birth estimates, but there are also some differences. In the following I shall mainly comment on estimates that seem to differ.

Compared to the first-birth estimates there is a stronger and significant positive effect of the woman's market wage on the full-time transitions, while the estimated part-time coefficient is slightly lower. There is also a higher initial, but faster declining positive effect of employment experience on full-time entries, while there is no significant effect on the part-time entries. The over-all weaker educational effects may imply that there are greater educational differences in the demand for child quality after second birth, which increase the reservation wage sufficiently to offset the positive effects of education the full wage.

Generally, the components of the full wage seem to be less important in explaining the entries into part-time and more important in explaining the entries into full-time work after the second birth. There is no obvious a priori reason for this. Based on previous empirical evidence of larger human capital depreciation rates among women with longer employment experience (e.g. Mincer & Polachek 1974 and 1978), one may perhaps expect employment experience to be of greater importance after second birth, since mothers will have accumulated more human capital by this time. But there is a definite need for more research in this area, as studies of women's employment behavior after second or later births are practically non-existent, and as other studies rarely distinguish between full-time and part-time work.

After first birth the effect of the mother's age was estimated to be negative, as predicted by theory, but the effect was only significant when collapsing all employment entries into one single state. After second birth the negative effect of mother's age is highly significant in the full-time alternative. The effect of the age of first child is also as predicted. The older the first child, the higher is the risk of both full-time and part-time entries after the birth of the second child.

There is little evidence that the greater flexibility and non-monetary benefits of the public sector enhance the return to work after second birth. In accordance with the first birth results there are some indications that nurses and teachers are more inclined to resume part-time employment than mothers who previously worked in sales, industry or service occupations. Again, this may be due to different earnings potential in the two groups, but may just as well be a reflection of the greater extent of part-time contracts in nursing and teaching.

Marital status is an important predictor of employment behavior also after the second birth. As few mothers are cohabiting at this point, the slightly smaller positive effect on full-time work and negative effect on part-time work of belonging to this group are no longer significant. The risk of full-time work among married ex-cohabitants is, however, larger than after first birth (nearly 1.4 of the risk of directly-married mothers). The relative risk of the very few single mothers at second birth is estimated to be even higher (about 1.7 of the risk of directly-married mothers). On the other hand, single mothers are about 40 per cent less likely to take up part-time work, which confirms that they do not favor working hours which imply deductions in social security benefits.

Including a variable which indicates whether a woman worked full-time or part-time (part-time only or both part-time and full-time) between first and second birth greatly improved the explanatory power of the model, as can be seen from the high absolute value of the T-statistics of the estimated coefficients. Compared to women who did not work at all between births, women who worked only full-time is more than twice as likely to resume full-time employment after second birth, whereas women who had some part-time experience are only half as likely. Compared to previous part-time workers, previous full-time workers are more than four times ($2.3/0.552$) as likely to resume a full-time job. Looking at the part-time entries, the picture is quite opposite. Previous full-timers have an almost 30 per cent lower part-time risk than previous non-workers, while previous part-timers have almost double the risk. Compared to previous full-timers, previous part-timers are more than 2.5 times ($1.912/0.731$) as likely to resume a part-time job after second birth. Thus, women seem not only to be persistent workers or non-workers, but to a large extent they also tend to be either persistent full-time workers or persistent part-time workers.

After first birth, religious activity appeared to be a useful proxy for personal preferences of full-time work. After second birth, this effect is no longer significant. It is unclear why this is so, but one possible suggestion may be that women who go on to have a second child are a less heterogeneous group than mothers with at least one child, implying that there is less variation in preferences after the second child.

In line with the first birth results, most of the period coefficients have a positive sign, but they are on the whole less significant. Thus, there is less evidence of an adverse effect of the macroeconomic slack of the reference period, 1981-1984. The full-time risk seems to fall gradually over the periods, but there is some indication of a slightly reduced part-time risk during 1981-84 compared to the periods immediately before and after.

Looking at the third column in table 3, we again see that treating full-time and part-time as one single employment state would have concealed the effects of some covariates. For instance, working part-time or full-time previously would appear to have a similar effect on the after-birth employment risk, in both cases raising the risk by 30-40 per cent compared to non-workers. This conceals the fact that previous full-timers are much more likely to work full-time and less likely to work part-time, while previous part-timers have a lower full-time risk and a higher part-time risk.

6. Summary and conclusion

This paper has analyzed the (re)entry of Norwegian mothers into full-time and part-time employment following the first and second birth. Based on theories of job search and human capital depreciation and appreciation I employ a model which expresses the entry rate as a function of the women's full wage and her reservation wage. In addition to the market wage, the full wage consists of the present value of reductions in future earnings caused by (i) increased depreciation of human capital during a career interruption and (ii) foregone on-the-job accumulation of human capital. As previous research suggests that employment experience and educational level is positively associated with the depreciation and appreciation of human capital, these covariates are included along with predicted market wage to represent the full wage in the model. The full wage may also vary among different occupational groups and sectors, and to control for such effects broad occupational groups and a dummy variable for the public sector are included in the model.

The reservation wage is mainly a function of individual preferences, and cannot be observed directly. The arrival of a new baby is assumed to increase the mother's reservation wage due to increased demand for the mother's time in the home. As children grow older, they get less time-intensive and more goods-intensive, and hence the reservation wage may fall with time. The reservation wage is represented in the model by variables which are believed to influence or to reflect individual values and preferences such as religious activity, marital status and past work history (prior home-time, employment experience and previous full-time and part-time work).

The estimation results show that employment experience has a direct positive effect on the return rates beyond the indirect positive effect exerted through the market wage. This confirms previous empirical findings that women with higher human capital investments also have more to lose from a career interruption, but the loss seems to diminish with the length of the interruption. The market wage has a stronger positive effect on full-time entries after the second than after the first birth,

while the opposite is true for part-time entries. Traces of the same pattern can also be observed for the effect of employment experience. As there is little research which distinguish between full-time and part-time employment, and seemingly none which draws a distinction between the after-birth employment of first and later births, these differences should be explored more closely in the future.

Women who previously worked in the public sector are found to respond to the greater flexibility this sector offers to mothers of small children by returning faster to full-time work after first birth. After second birth, the effect is no longer significant. There is also some evidence of occupational differences in the return rates. After first birth these differences show up in higher full-time rates among mothers who previously worked in technical-, administrative- and clerical occupations than among the reference group of employees in sales-, industry- and service occupations. After second birth the only differences seem to be in part-time work, where there are some weak indications of higher reentry rates among teachers and nurses.

Marital status is an important predictor of the return to work after birth. No doubt, part of the effect of marital status may be due to differences in income, since non-labour income is not controlled for in the model due to lack of data for non-married women and married women in broken unions. The main division in non-labour income is between single mothers, who receive social security benefits, and the remaining mothers who may be supported by their husband or partner. Single mothers are found to be less inclined to take up part-time work than married mothers regardless of parity. After second birth they are also significantly more inclined to resume full-time work. This is probably due to the very high marginal tax rates (ordinary income tax + deductions) that single mothers encounter in lower income categories. When collapsing full-time and part-time work, single mothers have a lower total risk of employment after first birth. After second birth there is also a negative, but non-significant effect on total employment.

In a previous analysis (Rønsen 1992) marital status was also found to be a valuable proxy for values and attitudes. The present study confirms these findings. There are significant differences between married mothers when divided into those who married directly and those who lived with their partner in a consensual union before marriage. The differences show mainly up in full-time work where directly-married mothers have a lower entry risk after the first as well as after the second birth, but the effect is more pronounced after the second birth. Cohabiting mothers have a higher risk of full-time work than the directly-married mothers and a lower risk of part-time work than both groups of married women after first birth. After the second birth there are too few cohabiting mothers to establish similar differences.

In accordance with Even (1987), the most powerful predictor of a woman's labour market behavior after birth is the length of prior home-time periods. The effect is highly negative for both full-time and part-time employment entries and after the first as well as after the second birth. The positive interaction effect with duration indicates that the negative effect become stronger the longer the career interruption.

If human capital deterioration during a career break lowers a woman's market wage, as is found in several empirical studies (e.g. Mincer and Polachek 1974 and 1978, Stafford and Sundström 1994) part of the negative effect of longer home-time periods may be ascribed to its negative effect on the full wage. However, the magnitude of the effect suggests some additional explanations. For instance, women with longer home-time periods prior to birth are less likely to be entitled to maternity leave. Having a job to return to eliminates search time as long as the job still satisfies the entry criteria (i.e. if the full wage still exceeds the reservation wage). On the other hand, maternity benefits are additional non-labour income, which under normal income assumptions may be expected to prolong the employment break. The net effect of maternity leave is therefore ambiguous, and will be examined more closely in the future.

Possibly, prior home-time is first of all a good indicator of a woman's long-term employment preferences. According to several U.S. studies there is a large degree of stability in female labour supply, i.e. women tend to be either persistent workers or persistent non-workers. No doubt, prior home-time reflects such differences. If initially valuing their time at home higher than less home-committed women, mothers with longer prior home-time periods will be even less likely to resume employment after birth when presumably their reservation wage has risen even more.

This study provides new evidence of persistency also in female full-time and part-time work. Women who work only full-time after first birth are about four times as likely as previous part-timers to resume full-time work after second birth, while women who have some part-time experience between births are about two and a half times as likely as previous full-timers to resume part-time work. In fact, previous non-workers are more likely than previous full-timers to take up part-time work, and more likely than previous part-timers to take up full-time work. However, both previous part-timers and previous full-timers have significantly higher overall employment entry rates than previous non-workers. Being a former part-timer increases the risk by 40 per cent, while former full-timers have about 30 per cent higher overall employment risk. Thus, there is no evidence that women who work part-time after they become mothers have a looser connection with the labour market than mothers who stick to full-time work. In fact, the possibility of a part-time job after birth may be one reason for the increasing number of persistent workers among women.

The results of this analysis confirm the importance of regarding full-time and part-time as separate states when modelling female employment dynamics, as previously suggested by e.g. Korpi (1989) and Wright & Hinde (1991). Otherwise, we would have missed the element of persistency in full-time and part-time work as just discussed. Besides, some covariates only affect one transition, and lose importance when the two states are collapsed, while others have opposite effects in the two transitions and are neutralized when analyzed together. Several effects that appear significant when analyzing transitions to full-time and part-time separately, would therefore have been concealed if employment were treated as one single state.

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