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**Career Interruptions due to Parental Leave
–A Comparative Study of Denmark and
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Abstract:

Parental leave mandates are associated with high female employment rates, but with reductions in relative female wages if leave is of extended duration. We analyze the impact of family policies (parental leave and childcare prices) of Denmark and Sweden on women's career breaks due to childbirth. These countries are culturally similar and share the same type of welfare state ideology, but differ remarkably in pursued family policies. Our analysis takes advantage of the availability of comparable longitudinal data and allows us to estimate parallel models across the two countries. The impact of family policies and economic incentives on the probability of returning to the labor market is estimated using a duration model approach. Our results show that economic incentives affect the behavior of mothers in both countries. However, the parental leave mandates as such are very important determinants for the observed behavior. Based on policy simulations we find that if fathers were given more parental leave, it would promote the labor supply of women.

JEL classification: J1, J22.

Keywords: Maternal Leave, Parental Leave, Childcare, Family Policy, Mothers' Labor Supply.

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1 Introduction

Employment rates of mothers with young children have increased in almost all countries over the past thirty years. However, this trend has been accompanied by a large decrease in fertility in most countries (OECD, 2001). In contrast, the Nordic countries have not experienced such a strong trade-off between mothers' employment and fertility. Both female employment and fertility rates have been high in an international perspective. Female employment rates for young women are close to 80% and fertility rates are only slightly lower than 2. Studies on female labor supply show that, contrary to most other countries where young children have a large negative impact on mothers' labor supply, this effect is much smaller or non-existing in the Nordic countries (see Smith et al., 2003).

The family policies in the Nordic countries have a long tradition in offering facilities and subsidies to encourage mothers to combine family and work. Many international comparative studies show that women appear to increase their attachment to the labor force when given the opportunity to take paid leave (see for example, Ruhm & Teague, 1997; Joesh, 1995; and Waldfogel et al., 1999). Thus, the positive effects to the labor market tend to outweigh the costs of conducting such parental leave and benefit policies and therefore they legitimize these family friendly policies (Joesh, 1995; Gustafsson et al., 1996; Rønsen & Sundström, 1996). Ruhm's (1998) comprehensive comparative study on European countries, for example, finds that parental leave legislation raises the female employment-to-population rate by 3-4%, and even more for women of childbearing age. However, there may also be negative effects of very generous family-friendly schemes if these schemes are mainly picked up by the mothers and not the fathers (see Nielsen et al., 2002, Datta Gupta and Smith, 2002). The schemes may reduce the human capital of the woman compared to men, and they may give rise to statistical discrimination effects, reduce women's wage growth and increase the gender wage gap. However, in this paper we do not focus on these negative potential effects of family-friendly policies.

The aim of this study is to examine the duration of career interruptions contingent to childbirth of Danish and Swedish women. Which factors affect a mother's decision to return to work after childbirth? How important are the benefit compensation rate and the parental leave schemes? Do the prices and the availability of publicly provided childcare affect the retention decision? How do the availability and eligibility rules concerning fathers' leave affect the length of the career break of the mothers?

Our analysis takes advantage of the availability of comparable longitudinal data. These data allow us to estimate parallel models across the countries in order to determine to which extent the family-leave policies affect women's retention. The study examines Danish and Swedish mothers who participate in the labor market and interrupt their careers due to childbirth during 1990s. Here we also make use of fathers' characteristics and their uptake of parental leave. It is interesting to compare these two culturally similar countries which share the same pattern of employment of women overall and of women with young children in particular, but differ remarkably in their family policies. During the last decades, Sweden has implemented fairly long maternal and parental leave schemes compared to Denmark. On the other hand, the coverage of publicly provided and subsidized childcare for children aged less than 3 has been considerably higher in Denmark compared to Sweden (Ellingsäter, 1998). We test by simulations the impact of family policy regimes on the length of mothers' career breaks.

The raw data and the empirical estimations clearly show that women have a very high probability of returning to employment when the parental leave has expired (well over 90% do return). The rules of parental leave schemes as well as the other parts of the family policy regimes affect the mothers' decision on job retention. The same seems to apply to men. When given explicitly the possibility for taking parental leave, the majority of fathers (about 70% of fathers in Sweden, and almost 50% of fathers in Denmark) make use of it. However, very few of the Danish fathers take more than two weeks of parental leave just after the childbirth. Our results clearly show that there is room for policy changes, which might promote both female labor supply and equal role sharing by both parents.

The structure of the paper is the following. The next section shortly describes the family policies in Denmark and Sweden. Section 3 summarizes some of the recent international studies about the impact of family policies on mother's employment. In Section 4, the econometric model is presented. The description of data and the descriptive statistics are presented in Section 5. Section 6 analyzes the results from the estimations and policy simulations, and Section 7 concludes.

2. Earlier Studies of Labor Supply Effects of Family Policy Schemes

According to many comparative studies, the impact of family policies on mothers' (or fathers') return to work can be quite substantial. A large literature provides insights on how different policies result in different labor force attachments of women. Waldfogel et al. (1999) compare

mothers in the US, Britain and Japan and find that young children have a very strong negative effect on women's employment. However, they find strong evidence that family leave coverage increases the likelihood that a woman will return to employment after childbirth in all three countries investigated. They conclude that the recent expansions in family leave coverage in these countries are likely to lead to increased employment of women after childbirth and in some cases even boost job retention. Ruhm (1998) investigates the economic consequences of paid parental leave in nine European countries and finds that a right to paid leave raises the employment rate of women. Even short durations of guaranteed work absence have a substantial effect on female employment. These results are confirmed for Germany in a study by Ondrich et al. (1999).

A longer entitlement period, such as the Swedish one, tends to lengthen the time out of employment shortly after childbirth, but in the long run a longer leave period enables more parents (mothers) to join and stay in the labor force and therefore results in higher overall re-entry rates. Rösen & Sundström (1996) study the impact of family policies on the return to work by comparing the post birth employment activity of Norwegian and Swedish women. They analyze rates of re-entry into paid work after the first birth for mothers in 1968-1988. The most important findings are that the right to paid maternity leave with job-protection greatly speeds up the return to employment and that women who have this right are much more likely to resume employment. However, part of this effect may be due to the fact that those women, who are eligible for leave schemes, are also the women with a more permanent attachment to the labor market and the strongest preferences for market work. Extensions in leave schemes and the so-called Swedish "speed-premium" on the next birth have, though, delayed the return to work.

Gustafsson et al. (1996) analyze labor force transitions around childbirth and the extent to which lower labor force participation rates of mothers are explained by different family policies. They compare German, Swedish and British women and find that different welfare policy regimes produce different outcomes in labor force participation among mothers. These countries represent the three main types of different welfare states. The difference in total labor force participation of women is a result of fewer mothers entering the labor force and entering later after births in Germany and Great Britain than in Sweden. Although there is no such difference before the birth of the first child, the difference is more pronounced for second and third births.

In the study by Gustafsson et al. (1996), it is found that women's own human capital is important both in Germany and Great Britain, whereas in Sweden also less educated women have entered

the labor force by the time the child is two years old. The same result is found in Klerman & Leibowitz (1990) and Joesh (1994). Family income has been reported to have either a negative or no relationship with the timing of post-birth employment (Wenk & Garrett, 1992). Results are more mixed for most other factors, such as education level, age at birth, marital status, and race (Desai & Waite, 1991; Wenk & Garret, 1992). For Sweden, Rösen & Sundström (1996) found that more educated women have shorter career breaks contingent to childbirth compared to less educated women.

A good deal of the literature has found that at least part of the wage gap between the sexes is the result of women having more frequent career interruptions (some of the early references are Mincer & Polachek, 1974; Gronau & Weiss, 1981). Forgone growth of human capital and the depreciation of human capital during lengthy leave periods cause wage setbacks for women. The wage gap can be a consequence of a direct or indirect discrimination, too. Entitlements that allow substantial time off work may cause employers to limit women to jobs where absences are least costly, thereby increasing occupational segregation, which has obviously occurred in Nordic countries (see Stoiber, 1990).

Since the parental leave mandates and job-protection during the leave of absence tend to promote job retention, they may also promote a more rapid wage growth. If protected leave allowed women to return to a previous employer, as opposed to getting a new job or leaving the labor market entirely for a period, the leave policies would prevent women from losing tenure and firm-specific human capital, and consequently promote wage growth through gains from good job matches and reduced depreciation of human capital during non-employment periods. Recent studies in the US and Britain provide evidence of positive wage effects of returning to the same employer after childbirth (see, for example, Waldfogel, 1997; Joshi et al., 1996). There is also some recent evidence on the positive wage effects of maternity leave coverage in the US and Britain (Waldfogel, 1998). However, this effect may to a large extent be a consequence of that the women covered by generous leave schemes are a selected group, who are able to get a job at firms with attractive working conditions and “fringe benefits” like maternal leave schemes. For countries like Sweden and Denmark, these selection effects are expected to be very small since the leave schemes are almost universal in both countries, and to a great extent publicly financed. A government mandate eliminates this type of sorting of workers. Thus, empirical studies from Sweden and Denmark have found very small long-run effects on subsequent earnings for mothers who entered formal maternity leave (see Albrecht et al., 1999; Datta Gupta and Smith

(2002). However, Datta Gupta & Smith compare the wage growth of women to that of men, and they find that when controlling for background characteristics, the wage increases of men are considerably larger during the child-bearing period compared with women, irrespective whether they are mothers or not. The explanation could be that since almost every mother makes use of the compensated parental leave she is entitled to, employers expect every woman, by default, to experience career interruptions, and thus even those women who actually do not get children face a lower wage growth, a type of statistical discrimination. Hence, the leave schemes may have negative long-run wage effects in countries with an almost 100% coverage, but they are not observed when comparing the wage development of mothers with non-mothers. This conclusion is consistent with Ruhm (1998) who finds that, based on time series from OECD countries, the gender wage gap tends to increase significantly when new leave schemes are introduced or the leave schemes are extended.

There is less recent empirical research on the effects of child day care programs on parents' (mothers') work choices and families' decisions about how to provide care for their children. Lack of formal and affordable good quality care may constrain mothers to take paid employment, see OECD (2001). The limited empirical evidence within this area is probably due to lack of data on availability, prices and type of childcare. A recent comprehensive study based on British data is found in Paull et al. (2002) and OECD (2002).

3 Description of the Danish and Swedish Family Policies

Although the Danish and Swedish family policies are much more developed compared to most other countries, there are large differences in the rules concerning parental leave programs as well as the coverage and price structure of childcare.¹

3.1 Parental Leave Schemes

On the whole, the Swedish parental leave schemes are highly flexible and fairly generous compared to the Danish schemes. The principal idea in the Swedish system is that parenthood is considered to be a shared responsibility between the mother and the father. Fathers are therefore particularly encouraged to take leave, which has resulted in a very recent policy reform providing a minimum of two months of ring-fenced leave for either parent that is not transferable to the

¹ In this paper, we do not analyze the impact of the taxation scheme, i.e. whether joint, split or separate taxation on the labour supply of the fathers and mothers. In both countries, the tax schemes are based on the separate taxation principle, which is neutral with respect to the relative incentives to work for the spouses, see Smith et al. (2003).

other parent (the two months for the father are often denoted the “father quota”). Compared to Sweden, the leave schemes in Denmark have been rather inflexible in the sense that until recently it has not really been possible to split the leave period in several periods like in Sweden. There is much less focus on a shared responsibility of both parents. Thus the period of parental leave which can be taken by either parent is much shorter in Denmark than in Sweden, and a ring-fenced leave for the father has only existed for a short period from 1999 to 2002, except for two weeks in connection with childbirth. In both countries, the length of the leave period has been extended over the years. In Sweden, the compensation rate has been slightly reduced during the 1990s, whereas in Denmark the tendency is mixed: for some schemes the compensation has increased, for others reduced. The rules are described in more detail below.

Duration of the Leave Schemes

Sweden has a universal parental leave and benefit coverage. All parents are entitled to the leave, regardless of whether they are participating in the labor force or not. Since 1994, parents have been entitled altogether to 450 days compensated leave per child. The leave can be taken flexibly from 60 days before the expected date of birth until the child is eight years old. Benefits can be used either full-time or part-time or saved and used any time within the entitlement period. The system allows both parents to share the leave and to interrupt the leave in order to save days for later use. Parents are entitled to have 360 days (each have 180 days) parental leave with a compensation level that is related to the income prior to the leave period, and in addition to that a father is permitted to take 10 extra days of leave in connection with childbirth. A parent is allowed to transfer his or her days of leave to the other parent, but 30 days are reserved for him or her only. If the other parent does not use these days, they are lost. In addition to that, parents are allowed to take an extra period of leave of 90 days with only a guarantee level of compensation, a flat rate which is € 6.7 per day.² So, the parental leave for each child amounts to 450 days in total, which can be divided among the parents in a very flexible way. Single parents are entitled to 450 days as well. In the case of multiple births, parents are entitled to an additional 180 days leave.

Denmark has a slightly less universal system compared to Sweden (see, for instance, Rostgaard et al., 1999 for a more detailed description of the Danish leave schemes). Since 1985, mothers who have a regular income during the latest 13 weeks before the birth are entitled to a maternal leave of 4 weeks before the birth (8 weeks in some unions in the public sector) and 14 weeks after, plus

² The guarantee level of compensation is SEK 60 (since 1987). The exchange rate used here is € 1 = SEK 8.6.

a parental leave period of 10 weeks until 2002 when the parental leave was extended, see below). This parental leave can be taken either by the mother or the father, but the parents cannot be on leave at the same time. During these 10 weeks, a parent is only allowed to work a few hours weekly. If the parent chooses to work part-time, the benefit is reduced accordingly, and the “non-used” period cannot be saved and used later as in Sweden. Further, a father is entitled to 2 weeks’ leave in connection to childbirth. During 1999-2002, the father was entitled to two extra weeks after the 10-week parental leave. These weeks were reserved for the father only and were lost if he did not use them. During the period 1992-2002, an additional ‘childcare leave scheme’ was available. The childcare leave scheme allowed both parents, whether employed or unemployed, to take leave for a period of up to 52 weeks for each child aged less than 9 years.³ Most parents were entitled to the leave, irrespective of membership of unemployment insurance funds (UI-funds), employment etc. The scheme was changed several times and was abolished completely in 2002, when the parental leave period was extended from 10 to 32 weeks abolished in addition to the 14 weeks of maternal leave just after childbirth. At the same time, the 2 weeks of ‘father quota’ leave was abolished.

Compensation during the Leave Period

Sweden: The level of compensation depends on prior earnings. If parents have not been employed a period before childbirth, they are eligible only for a guarantee level of benefits which amounts to € 6.7 per day (since 1987). If the parents were employed, they are entitled to an 80% replacement of their previous income up to an income ceiling. In some sectors (specified in collective agreements between unions and employers’ confederation), the public compensation may be supplemented by the employer to full-wage compensation. Further, there is a so-called “speed-premium” for mothers who intend to have another child soon after the previous child. A mother is guaranteed to have the same level of compensation without returning to employment if there is not more than 30 months in between the childbirths. The main purpose of this rule was to stimulate fertility among Swedish mothers.

Denmark: The compensation during maternal leave depends on the sector of employment. In the public sector, there is full-wage compensation. For the privately employed, the compensation depends on collective agreements between the employers and the unions, and some of them have

³ Thus, more individuals are entitled to childcare leave than to parental leave schemes. Housewives without any regular income are the only group which is not entitled to childcare leave. However, this group constitutes less than 5% of the population in the age groups concerned. The duration of the childcare leave period depends on the age of a child. If the child is less than 1 year, the entitled period is 26 weeks, and it might be extended to 52 weeks if the employer accepted this extension. If the child is older, the duration is shorter.

specified a full pay during maternal and parental leave.⁴ For those groups, which are not covered by these agreements, the compensation is calculated according to the rules of the unemployment insurance benefit system (UI-benefits). The compensation is 90% of previous earnings up to a maximum. On average, the compensation rate is 60-70% of former earnings. Since men on average tend to have higher earnings than women, and since more than half of the mothers are entitled to a full pay during parental leave, because they are employed in the public sector, most households have a strong economic incentive to let the mother use the parental leave period, which can be shared between the parents. The compensation during childcare leave was considerably lower than for the maternal and parental leave periods. Initially, the compensation rate was 100% of the UI-benefits but it has been reduced several times since 1994, and since 1999 the compensation has been 60% of the UI-benefits. In 2002, when the childcare leave and parental leave schemes were combined into a one scheme, the compensation rate for this extended parental leave period is left to the same level as the former childcare leave, i.e. 60% of the UI-benefits.

3.2 Childcare

A major aspect of the effect of children on the earning capacity of parents is the access to as well as the quality and prices of day care facilities. If it was easy and relatively cheap to get childcare, the earnings capacity of the parents (mothers) might well be less “damaged” than in countries where childcare facilities are scarce or expensive. Furthermore, if the quality or stability of the childcare arrangements is low, it may induce higher absenteeism from work and lower the productivity of the parents (mothers), compared to countries with high coverage along with high quality and stable childcare. In Sweden and Denmark, the coverage of publicly provided childcare for children aged below 3 years has increased considerably during the last decades (see OECD, 2001). Despite the large expansion, there is a constant shortage of child day care places in both Sweden and Denmark. One major reason is that public day care is highly subsidized, i.e. the price is much lower than the actual price of producing these services. The quality is fairly high in an international setting when measured by the staffing and economic resources spent on public childcare (see Rostgaard & Fridberg, 1998; Waldfogel, 1998, for international surveys of childcare systems).

⁴ An increasing number of workers in the private sector are entitled to a full compensation of former earnings. Collective agreements between unions and employers specify that the employers are due to supplement the public benefits. In 2002, all women have a full pay during maternal leave.

Municipalities are responsible for arranging childcare. There are various forms of public day care programs: day care centers, family day care and after school homes. Beside the public services, there also exist private childcare services (some of them are publicly supported), but the amount of private services is considerably less than in other non-Nordic countries. The public childcare system is universal and is based primarily on children's needs, and therefore it is very common for children to attend publicly provided childcare even though the parents are not working.

Sweden: In autumn 2000, 76% of children aged 1-5, 67% children aged 6-9 and about 7% of children aged 10-12 attended public childcare (Socialdepartementet, 2001). According to a survey, only about 3% of 1-5 year-old children were in private childcare (Skolverket, 2002). Day care fees have increased especially during the 1990s because of the dampening economic situation in municipalities and in order to suppress the demand. The fees contributed to 18 % of the total costs in 1999. The payment scheme varies across municipalities although most often the payment is related to the number of children, time used and parents' income. While the time-based fees provide parents with greater opportunities to influence the costs of childcare, they can also cause large marginal effects when a parent increases hours of work, especially for single parents. On average, the cost for a two-earner household with two children is € 230 (ranging from € 0 to 467). A completely new payment scheme was introduced in 2002, which is called 'maxtaxa' referring to a payment ceiling (for a respective family the cost will be at maximum € 210).

Denmark: About 92% of all children aged 3-5, and more than half of the children aged 0-2 years attended publicly provided childcare in 1999. As in Sweden, the demand for public childcare is strongly stimulated by large price subsidies to childcare. According to the governmental regulations, parents are not allowed to pay more than 30% of the variable costs of the day care place for pre-school children aged less than 7, i.e. the local governments stand for at least 70% of the variable cost and additionally all fixed costs. In many municipalities, the subsidies are even larger. Further, there is an additional means-tested subsidy for low-income households. The monthly costs of a childcare place vary between municipalities. The typical monthly cost for a 0-2 year-old child ranges from € 250 to € 300, while for older children the prices are lower. As in Sweden, expenditure on publicly (or privately) provided childcare is not deductible from taxable income.

Despite the high coverage of publicly provided childcare in both countries, there is an excess demand for childcare places in many municipalities. There are more or less formal queuing

systems in many municipalities implying that parents either have to extend their leave of absence or use private childcare. There is no systematic information on queues to public childcare. Furthermore, a small market for untaxed private childcare exists, but there is fairly little information on the amount and prices of privately provided childcare. One reason that private childcare is seldomly used and there is a lack of exact information is that private childcare is almost always untaxed and part of the underground sector because of the high levels of VAT and income taxes in Denmark and Sweden. If private childcare was produced in the formal (taxed) sector and without subsidies, the prices would be extremely high compared to publicly provided care. However, parents also seem to prefer public day care for quality reasons.

3.3 Other Family Policy Regulations

The law guarantees a job security which entails the same or a comparable position upon the parent's return from leave. In both countries, it is illegal to fire a parent on parental leave. In Sweden, there is a job protection period of 18 months for parents of a newborn, and furthermore parents are legally entitled to work shorter hours until the eighth birthday of the child, with a corresponding reduction in wages, in both the public and private sectors. In Denmark, this is only the case for publicly employed parents.

In both countries, a scheme for care days exists. In Denmark, the publicly employed have a right to 10 care days annually with full pay, which can be used if the child is ill, for visits at the doctor etc. Since 1998, some groups in the private sector have also got the right to care days (14 days with full pay). In Sweden, there is a parallel care day scheme. A parent has a right to 60 days of care annually if the child is ill up to the 12th birthday of the child.

Finally, in both countries the option of part-time work has been available for most women. The part-time frequency has been high in both countries, but in the latest decades it has dropped considerably in Denmark, but not in Sweden. In 1983, 43% of all Danish employed women were part-time employed while in 2000 the frequency was only 17%. Women with young children tend to work longer hours than women without children, see Smith (1998). In Sweden, 46% of the Swedish mothers and about 6% of the Swedish fathers of young children worked part-time (SCB, 2001) in 1998.

4 Model

Our intention is to estimate parallel models of the effects of different family policies on job retention of Danish and Swedish mothers, controlling for other individual and family characteristics that are likely to affect retention. In deriving a model that describes the decision to re-enter the labor market after childbirth, we assume that the fertility decision has already been made and the decision whether to resume employment depends on the expected utility over the lifecycle at each point of time. A formal theoretical model based on this approach is found in Ondrich et al. (1998, 1999).

Based on an inter-temporal plan, the timing of job retention may be described by a model where the mother in each period evaluates her expected utility of returning to work ($V_W(t)$) with her expected utility of staying at home ($V_M(t)$) for one more period. The expected utility from returning to work includes the wage effects from human capital depreciation, forgone training and the potential wage effects of losing the current job, and thus probably losing a firm specific human capital. The expected utility from staying at home one more period depends on individual preferences, family situation (e.g. the existence of other children) and the rate of compensation while on leave. The model by Ondrich et al. does not explicitly include prices and availability of alternatives to a mother's time with respect to care for the child, i.e. public or private childcare, and the price and availability of the father's time, but these variables may be added to the model. The presence of a newborn is likely to increase V_M strongly within the first months or years, but as children grow they become less time intensive (but more goods intensive), and thus the utility of staying at home one more period is likely to fall. The mother will return to work at the first t for which $V_W(t) > V_M(t)$. Ondrich et al. show that the probability of returning to work in a given period is a negative function of the time until the leave period expires and the compensation rate.

In analyzing the return to work after the childbirth, we use a continuous time duration model. A set of parameters is used to generate probabilities of events occurring in intervals of different lengths. The intention is to consider the impact of family policies (duration of and compensation in maternal and parental leave, prices and availability of childcare) on job retention, controlling for other aspects that might affect their preferences, such as education, age, marital status and having other young children. The career break due to childbirth is measured as a period on compensated parental leave, calculated as full-day equivalents and measured in weeks on parental leave. The probability of ending a career break and resuming employment is estimated using a

Cox proportional hazard model of the duration of parental leave. The advantage of this method is that it does not require any a priori assumption about the probability distribution to represent survival times.

The model is written as

$$h_i(t;X) = \lambda_0(t) \exp [X(t) \beta] \quad (1)$$

where $h_i(t;X)$ represents the hazard for individual i at time t , $\lambda_0(t)$ is the baseline hazard function that is left unspecified, i.e. we use a semi-parametric approach, and $X(t)$ represents a vector of time invariant and time-varying covariates and β is a vector of parameters.⁵

A principal drawback when applying the basic Cox proportional hazard model is that it assumes for any two individuals that the ratio of the hazards is constant over time. However, there are various ways to test whether this proportionality assumption holds, for example, with the Schoenfeld residuals method, that is used here. Another drawback with the model is that it does not account for unobserved heterogeneity. Individuals usually differ in ways that are not fully captured by the model. As pointed out in numerous studies, estimation of hazard models that do not control for unobserved heterogeneity may result in biased estimates of the parameters (Heckman & Singer, 1985). For example, individuals with unobserved characteristics in the form of preferences for market work and career ambitions, will probably return to work before individuals who are less committed to work. Thus, the observed probability of returning to work, conditional of not having returned yet, i.e. the hazard, will tend to decline with the length of the spell simply because of a sorting effect where more and more individuals with unobserved characteristics for non-work will dominate the group of individuals still on leave. On the other hand, along the lines of the human capital theory the heterogeneity with respect to the preference for work is at least partly observable. Differences in human capital endowments are reflected in differences in the level of education and in labor market experience. Therefore, we could expect to capture the group of women with a higher preference for work by controlling for these

⁵ Since the option of part-time work may play an important role for the decision to return to the labor market, it would have been interesting to see whether mothers end up to a part-time or full-time employment after the parental leave spell by estimating a competing risks model, which allows us to estimate destination-specific hazard functions. Unfortunately, the information in our data sources on part- and full-time states after childbirth is incomplete, and therefore we are not able to apply a competing risks approach.

observable characteristics if schooling attainment is a function of ability and motivation and other unobserved characteristics, see Figure 1 below.

5 Data and Descriptive Statistics

The Swedish Data

To study career interruptions due to parental leave, we use register data containing information on parental leave periods of all parents and compensation levels, conducted by the National Insurance Board, Sweden. These data are the supplement to the large longitudinal LINDA database⁶ which has register-based information on income and taxes with a rich array of individual and family characteristics. The LINDA data are representative data on the Swedish population and contain information on about 300,000 households annually. Due to the panel property of the data, we are able to follow individuals from the year 1992 up to 2000. In total, there are 20,573 observations (childbirths) in the Swedish sample. Since some women experience more childbirths during the observation period, the same mother may have more birth records in the sample.

The parental leave data contain information on all children and their parents who have taken parental leave during the child's first eight years. The data have records on periods when taking leave, level of compensation, number of days with compensation and rate of compensation. These data cover the years 1993-2001 (June). The key variables of the study are collected from both the basic LINDA database and the supplementary data basis. Since the idea is to study the length of the career break, we focus only on the mothers who were employed, self-employed or unemployed prior to childbirth. In order to be able to follow mothers at least 15 months after childbirth, the birth cohorts considered are 1993-1998. The records for mothers' and fathers' characteristics are collected from a year before and the information about the re-entry to the labor market from a year after the parental leave spell. We only include birth observations where we have observations on both fathers and mothers.

In Sweden, mothers can take parental leave with a 25, 50, 75 or 100% compensation rate. Parental leave periods are then converted as full-day equivalents. Nevertheless, the majority (92%) of all mothers take the leave with a 100% cover. Mothers are followed until they resume work or stop their parental leave schemes. A career break, the dependent variable, is counted as

⁶ Longitudinal Individual Data (LINDA) is a joint endeavor between the Department of Economics at Uppsala University, The National Insurance Board (RFV), Statistics Sweden and the Ministries of Finance and Labor. The data have been collected systematically since 1960.

the time in weeks between the first day of the parental leave period and the last one during the first fifteen months after the childbirth. Even though the majority of the mothers take their period of leave very concentrated right after the birth, some women choose to return to employment before their maternity leave has expired.

The Danish Data

The Danish sample is selected from the Danish Longitudinal Panel Database which is a random register-based sample selected by Statistics Denmark.⁷ The sample is a representative panel sample, which covers each of the years 1976-1997 for about 300,000 individuals (5% of the Danish adult population). For this study, we have selected all women in the master sample who gave birth to at least one child during the period 1993-1996 and who were labor market participants prior to childbirth. For these women, additional register information from “The integrated Social Statistics” owned by Statistics Denmark is merged to the master sample. The register includes weekly or monthly information on all types of public income transfers and weekly information on participation in different leave schemes. The first year included in this register was 1993, and at the time of selecting the sample, the last available year was 1997. Therefore, we restrict the selected sample to children born during the period 1993-1996 in order to reduce the number of right-censored observations. We include a small number of children where we only observe the mother but not the father. However, in the estimations only observations where both parents are observed are included. In total, there are 9,378 observations (childbirths) in the Danish sample.

Based on the information from the “The integrated Social Statistics”, we construct spells of career breaks related to each childbirth. A spell is defined as an unbroken period out of the labor market, either in maternal leave, parental leave or childcare leave, or out of job without being in any scheme. The spell ends when the woman starts to work.

From the registers in Statistics Denmark, we get additional information on the fathers of the children who are born in the master sample during 1993-1996. Thus, we are able to construct household information by combining the additional information on fathers with the sample of mothers. The background information is collected during the years 1992-1996 since a number of the explanatory variables are defined by their value during the year prior to birth.

⁷ Documentation of the 5% sample is found on www.cls.dk.

The Danish and Swedish mothers are classified into three different samples according to the order of the child. The first sample consists of mothers who give birth to their first child, the second sample contains the mothers who are having their second child and the third sample contains the higher order births. The adopted children and multiple births are excluded. Further, we only choose mothers who have a partner, either married or cohabiting with her.

Due to the differences in the constructions of the data, the Danish and Swedish observations (events) are collected in different ways. In both samples, we avoid left censoring by conditioning on parents who get a baby within the observation period. In the Swedish case, mothers are followed about fifteen months after the childbirth or until they re-enter the labor market if it happens before. Right censoring occurs after the observation period if the mother has not returned to the labor market, which is the case if she has a new period of parental leave, starts studying or stays at home caring the child. In the Danish case, the sample is selected from a random sample of mothers who had a child during the period 1993-1996. These women are observed weekly during the period. A spell is right censored if the woman is still on maternal, parental or childcare leave at the end of the observation period, i.e. ultimo 1997.

Table 1 shows the sample means of parental leave durations for mothers and fathers in Denmark and Sweden, distributed by birth order. On average the leave period of Swedish mothers was about 10 weeks longer than the period of Danish mothers. The average leave period for the first child was about 40 weeks in Sweden and 30 weeks in Denmark, while the maternal leave period tends to increase slightly in both countries, the more children the mother already has. A Swedish father on average had a leave period of 4 weeks during the period 1993-1998 while Danish men spend much less time on paternal leave, only about 1.3 weeks per child. This partly reflects that a larger proportion of Danish men (about 40%) do not at all take-up any leave when they become fathers. For Sweden, this figure is only about 27%.

Table 1. The mean duration of parental leave periods of mothers and fathers in weeks and the share of fathers taking parental leave.

SWEDEN ¹⁾ Observation period 1993-98	First Child	Second Child	Higher order
Parental leave taken by a mother (duration in weeks)	40.2	42.5	43.1
Parental leave taken by a father (duration in weeks)	4.4	3.8	4.0
Percentage of fathers who takes a leave period	77 %	69 %	72 %
DENMARK Observation period 1993-96	First Child	Second Child	Higher order
Parental leave taken by a mother (duration in weeks)	30.6	31.4	32.5
Parental leave taken by a father (duration in weeks)	1.3	1.3	1.2
Percentage of fathers who takes a leave period	59%	59 %	58%

¹⁾ For Sweden, the observation period is restricted to the first 15 months after childbirth.

Table 1 only shows average figures on leave periods. There is a large variation between women with respect to the length of their maternal leave. Figures 1-2 show the sample frequencies of weeks on parental leave for all mothers and fathers in the Swedish and Danish samples. In Figure 1, we have split the samples into women with and without a higher education, since there is a tendency that those with a higher education have considerably shorter maternal leave periods, especially in Sweden according to Figure 1. Further, it is also observed from the ‘raw survival curves’ in Figure 1, that the Danish women to a much larger extent than the Swedish women tend to return to work after a leave period of 25-28 weeks (6-7 months) while the much more smoothed Swedish curve indicates a larger variation of the length of leave periods for Swedish women, with a peak at 9-10 months. This may reflect the much more flexible Swedish leave schemes which allow mothers to return to work before the leave period expires, without losing the right to use the rest of the leave period at a later point in time. The fathers’ leave periods, measured in weeks in Figure 2, also show large differences between Sweden and Denmark. Apparently, there are two types of Danish men, those who take up 2 weeks and those who do not take-up any weeks on paternal leave. Then there is a very small group of Danish men who take-up more than 2 weeks. The distribution of Swedish men is much more smoothed, and a much larger proportion than Danish men have fairly long paternal leave periods, i.e. more than 2 weeks.

Figure 1. Survival curve of the career break of mothers. Comparison between the highly educated mothers and mothers having lower education. The upper panel shows the Swedish sample, the lower the Danish.

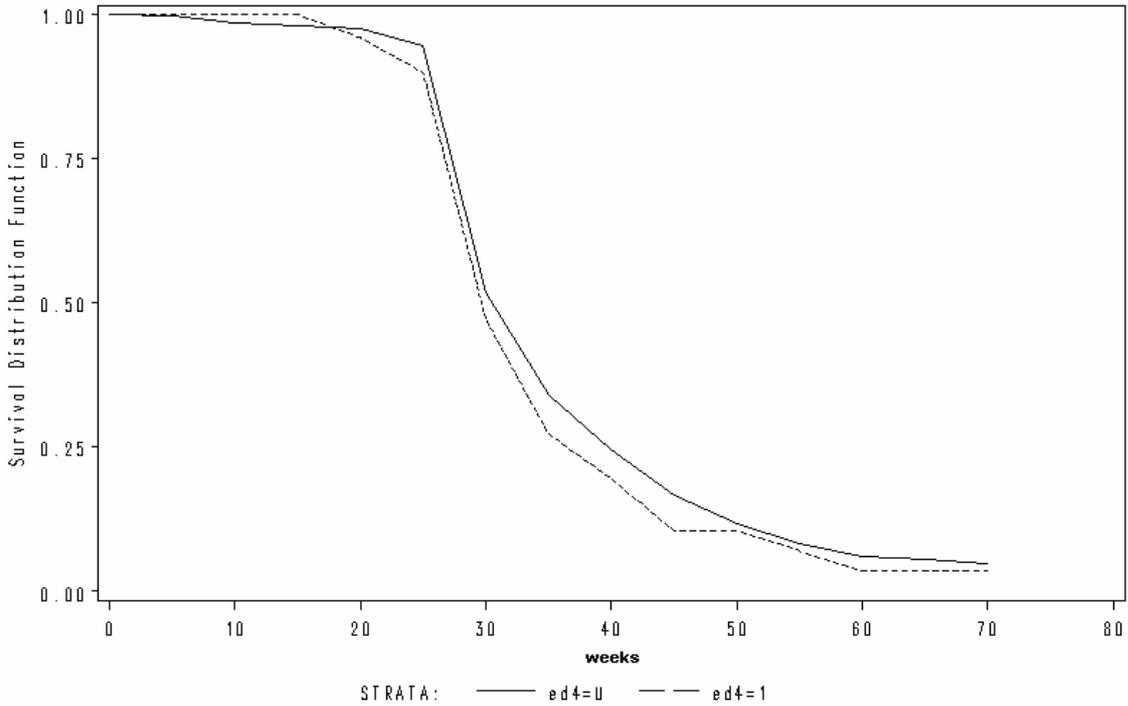
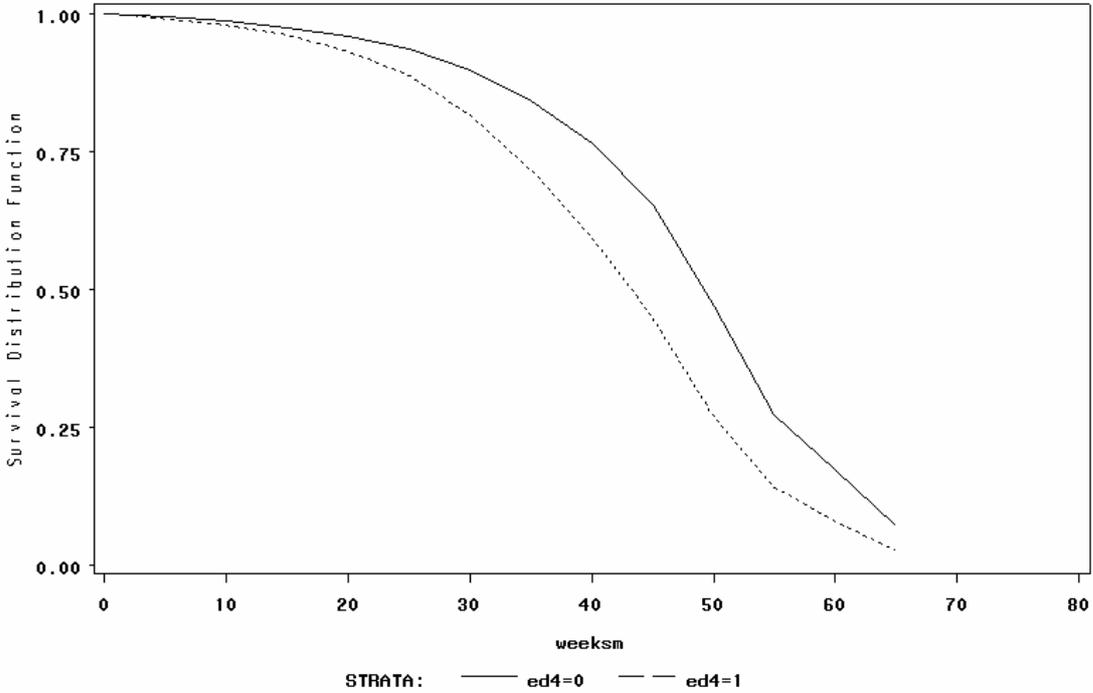
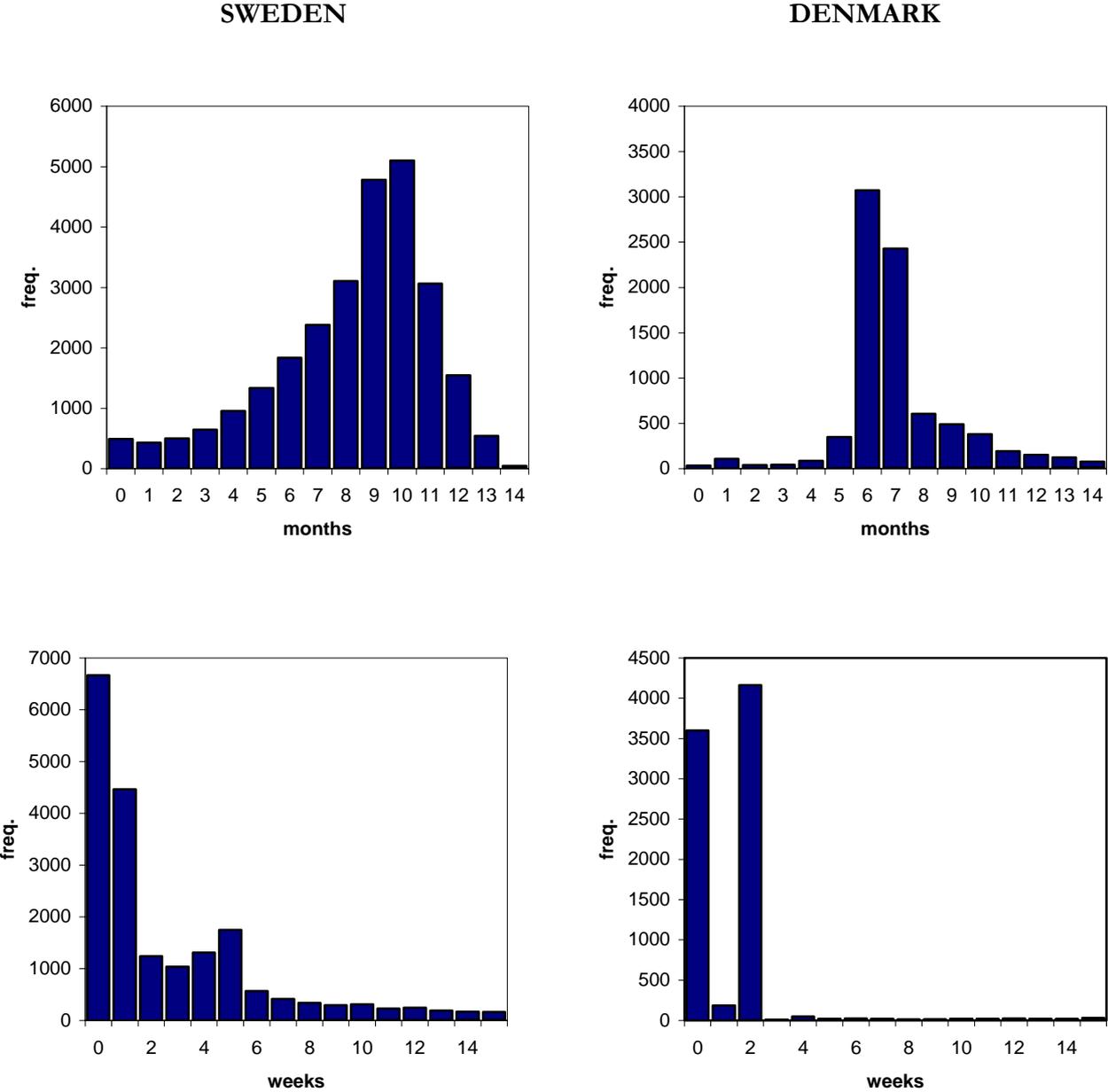


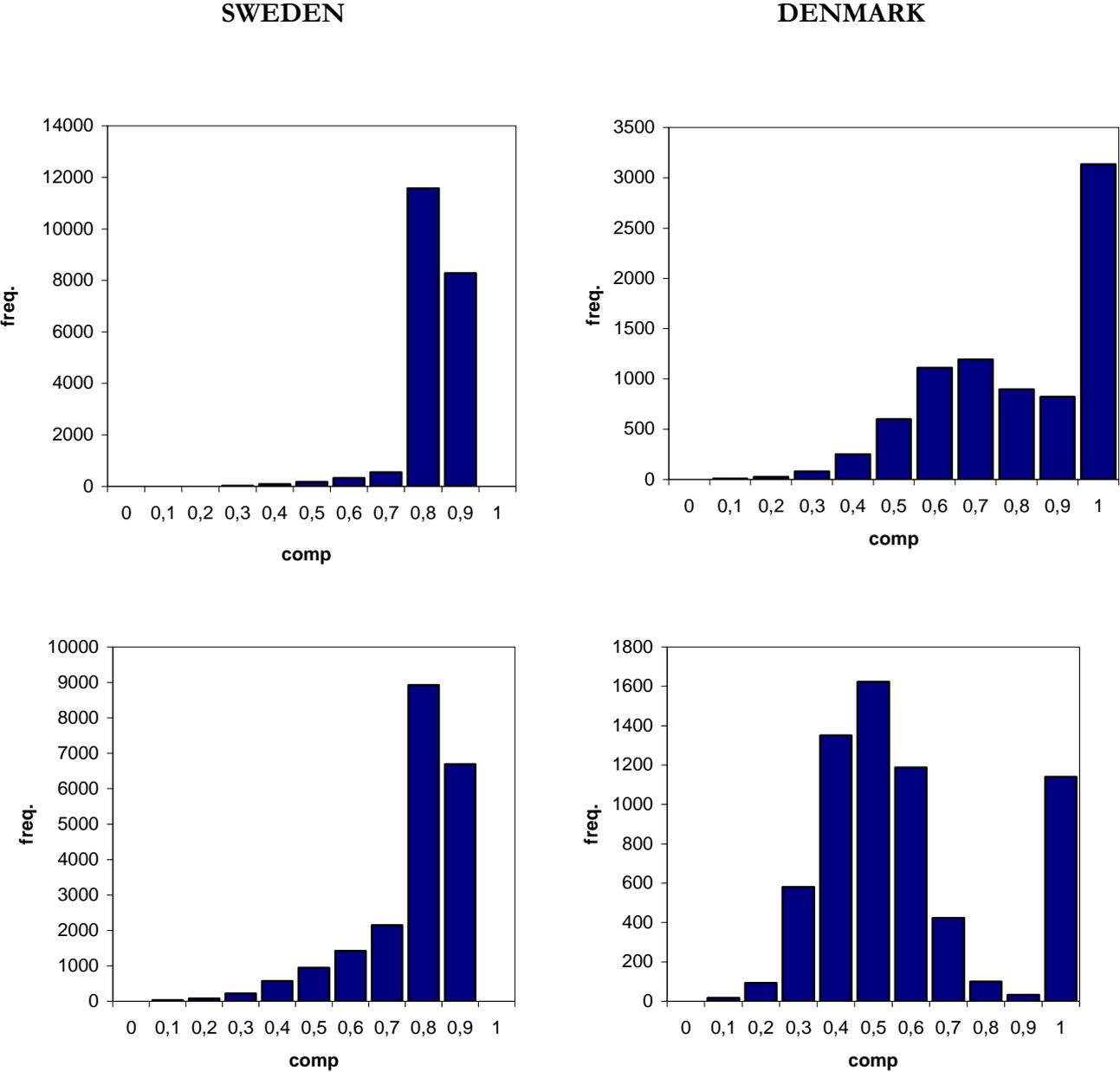
Figure 2. Duration of parental leave of mothers (the upper panels) and fathers (the lower panels).



One of the key explanatory policy variables in the estimated model in Section 6 is the compensation rate during the leave period. As described above, the rate of compensation is not constant during the mandated leave in either of the countries but decreases stepwise. Based on the register information on hourly wages, duration and timing of leave periods and supplementary information on the compensation rules, we are able to construct for each individual a time-varying variable representing the compensation rate that she receives during the leave of absence. The compensation rate is defined as the hourly compensation divided by the

hourly market wage that the woman had prior to the leave period. The compensation rate is only calculated for the fathers and mothers where we have observations on their wage income. In Figure 3, we show the average compensation rate during the leave period, i.e. a weighted average of the compensation rate for men and women in the two countries. Most Swedish women receive a compensation rate around 80-90%. For Danish women, the variation much larger, with about half the women receiving full pay (public employed) while the rest have much lower compensation rates than in Sweden. The same pattern is observed for fathers in the two countries, but in both countries the fathers tend to have lower compensation rates than mothers.

Figure 3. Compensation rates during the leave period for women (upper panels) and men (lower panels). Sweden (n=21018) and Denmark (mothers=8117, fathers=6549).



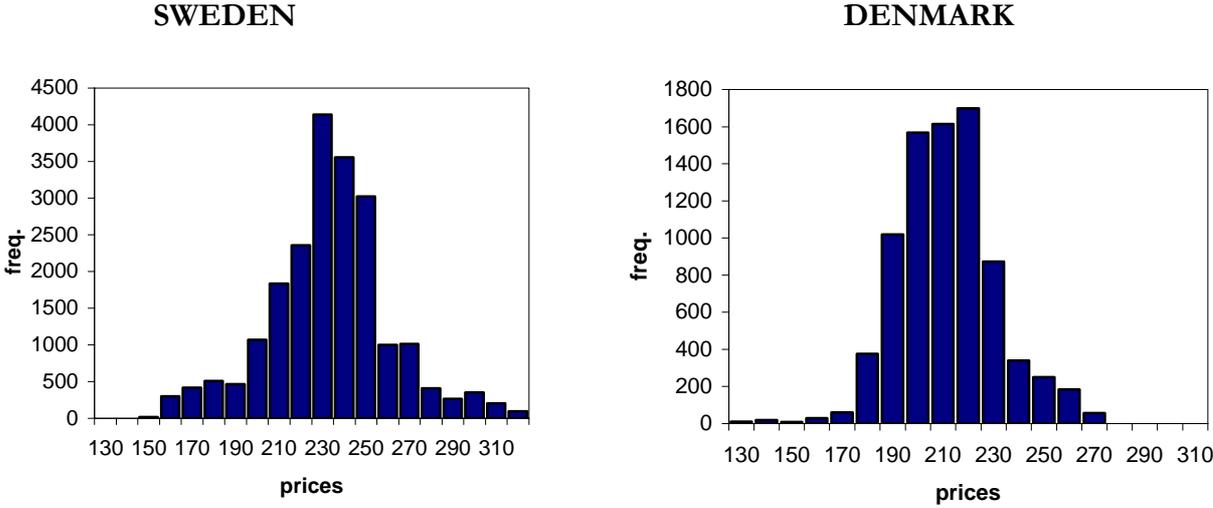
A second policy variable which may explain the length of the leave period of the mother is the length of the father's leave period. For Sweden, we use the length of the parental leave period that is targeted to fathers. During the observation period, 1993-1998, the Swedish father quota was extended, and this variation allows us to use this variable as a covariate. For the Danish sample, we use the length of a parental leave the father actually took, because there was no variation in the Danish paternal leave period during the observation period. The actual take-up of parental leave may be endogenous in the model, because the duration of both parents' spells may be determined in a simultaneous process. The actual duration of fathers' leave periods might be instrumented or the duration of both parents' spells might be modeled in a simultaneous structure, but we do not have access to valid instruments in the sample, and therefore we prefer to use observed weeks of the father. This, of course, implies that our results may overstate the substitution effects between the parents, and that the causality may run both ways.

Additional information on the local prices of publicly provided childcare is included in the sample. We include information on prices in 1993 in each of the 273 Danish municipalities and in about 150 Swedish regional areas, see Figure 4, which shows the sample distribution of monthly prices of publicly provided childcare for children aged 0-2 years.⁸ As seen from Figure 4, there is a large variation in childcare prices, with a higher average level in Sweden compared to Denmark. However, compared to many other countries outside Scandinavia, the prices are fairly low. In order to control for the rationing of the public childcare, we also add an indicator variable for those municipalities where the availability of public childcare is limited.

Other control variables (time-constant) are collected from the LINDA data (Sweden) and the 5% sample (Denmark) a year prior to childbirth. These are age, level of education, years of labor market experience, sector of employment, employment status, marital status, total income of a household and the number and ages of other children. We have the respective information about fathers, too.

⁸ There are about 238 municipalities in Sweden, but the information of prices is aggregated to regional prices. For Denmark, we use prices at municipal level. For each child in the sample, we assign the monthly price of childcare in the concerned area (municipality or for Sweden a larger area), whether or not the child is in publicly provided childcare after the leave period of the parents.

Figure 4. Monthly childcare prices. Sweden (n=21018) and Denmark (n=8117).



The labor market status before childbirth will possibly affect the timing of the labor market re-entry. For women without a permanent job, the employment status during pregnancy might be highly relevant. Thus, we include an indicator variable for whether a woman was unemployed before the childbirth. We also control for a sector of occupation prior to birth. The sector of occupation is: State, municipality, private employer or unemployed. The hypothesis is that those employed in the public sector might return to work earlier due to wider opportunities of combining work and parenthood (more flexible work schemes, e.g. part-time work).

The timing of paid work is hypothesized to depend on a woman’s opportunity cost of working for pay relative to her opportunity cost of staying home. The opportunity cost of staying home depends on a set of *human capital variables*. Those who have a higher opportunity cost will be expected to return to work sooner. In view of that, the age at childbirth has a negative effect on job-retention since younger women have longer future work horizons and therefore would lose more from a career interruption. Also, women who have invested more in human capital, having higher education and more work experience may have more to lose when staying out of the employment. On the other hand, more education may also raise the reservation wage of a mother. To capture these effects, we use age, attained level of education and years of work experience as covariates. The level of education is defined by four categories: primary school, high-school or vocational school, short university degree and long university degree. The lowest level of education is used as a reference group in the estimations.

The family situation plays an important role in women's employment decisions. The age of other children seems relevant to the timing of women's work decisions in addition to the number of children. To address these effects, we use categorical variables for other 0-2 and 3-6 year-old children. Also an indicator variable for marital status is used. Further, the economic situation of a family may play an important role in the timing of women's employment after childbirth. To capture this effect, we use family income as a covariate.

To control for *the macro economic trends* during the period of interest, the yearly national unemployment rate is used as a covariate. Higher unemployment rates are expected to lengthen the time out of work. All the monetary values are expressed in Euros in 2000 prices. In Appendix, Tables A1-A3 summarize the descriptive statistics for each of the three sub-samples, i.e. 1st birth observations, 2nd birth observations and 3rd or more births observations.

6 Results and Policy Simulations

The results from the proportional hazard model of the duration of parental leave are presented in Tables 2-3 for the Swedish and Danish samples, respectively. Based on the estimated hazard function, we simulate the effects of different policy changes. These simulation results are presented in Tables 4 and 5.

6.1 Estimation of the Hazard Function

Despite the considerable variation in the observed behavior of mothers in the two countries, the estimations in Tables 2 and 3 reveal large similarities with respect to the sign and size of estimated coefficients of the hazard functions for returning to work. A higher compensation rate significantly tends to lengthen the career break for both Danish (except 3 or more childbirths) and Swedish mothers, which is in accordance with a priori expectations. The length of the father's leave period reduces the leave period of the mother significantly. The effect is only insignificant for Danish fathers having their third child. However, it should be kept in mind, that the definition of this variable is measured differently for Sweden and Denmark, and for Denmark there may be simultaneity problems which may imply that the numerical size of the estimated effect is overstated. The estimation results indicate that for one week's increase in the fathers' quota, the hazard of job retention goes up about 4% for Sweden and 6-7% for Denmark. However, the latter figure may be overstated because of the simultaneity problems mentioned above.

Table 2. Sweden: The results from the estimations of the proportional hazard model of re-entering the labor market after childbirth according to birth order.

VARIABLE	1 ST CHILD		2 ND CHILD		3 RD CHILD	
	PARAMETER ESTIMATE (STANDARD ERROR)	HAZARD RATE	PARAMETER ESTIMATE (STANDARD ERROR)	HAZARD RATE	PARAMETER ESTIMATE (STANDARD ERROR)	HAZARD RATE
Family policy regimes:						
Compensation rate	- 0.638 *** (0.197)	0.528	- 0.235 * (0.103)	0.790	- 0.343 ** (0.113)	0.710
Father's leave	0.036 ** (0.013)	1.037	0.040 *** (0.007)	1.041	0.045 *** (0.008)	1.046
Day care price	0.024 (0.087)	1.024	- 0.113 ** (0.043)	0.893	- 0.076 (0.049)	0.927
Big city	- 0.512 (0.873)	0.599	- 2.578 *** (0.490)	0.076	- 1.650 ** (0.565)	0.192
Day care price * city	0.150 (0.367)	1.162	1.053 *** (0.206)	2.865	0.688 ** (0.237)	1.989
Labor market status						
Sector of occ.: state	0.198 ** (0.072)	1.219	0.192 *** (0.039)	1.212	0.352 *** (0.052)	1.422
Sector of occ.: municip.	0.102 * (0.050)	1.108	0.045 (0.025)	1.046	0.116 *** (0.029)	1.123
Unemp. prior to birth	- 0.371 *** (0.113)	0.690	- 0.182 *** (0.042)	0.833	- 0.208 *** (0.049)	0.813
Human capital variables:						
Age	- 0.010 (0.010)	0.990	- 0.010 (0.005)	0.990	- 0.029 *** (0.005)	0.984
Educ: High-school	0.169 (0.114)	1.184	0.133 ** (0.047)	1.143	0.168 *** (0.042)	1.112
Educ: Short university	0.410 *** (0.121)	1.507	0.334 *** (0.053)	1.397	0.442 *** (0.051)	1.411
Educ: Long university	0.701 *** (0.126)	2.016	0.570 *** (0.059)	1.768	0.651 *** (0.055)	1.752
Years of work exp.	0.072 (0.017)	1.074	0.056 *** (0.009)	1.057	0.063 *** (0.010)	1.053
Yrs. Of work exp ² /100	- 0.240 (0.095)	0.787	- 0.159 ** (0.051)	0.853	- 0.139 ** (0.057)	0.881
Family situation:						
Marital status: married	- 0.170 (0.102)	0.844	- 0.013 (0.024)	0.987	- 0.028 (0.031)	0.972
Family inc (€10 000)	0.004 (0.011)	1.004	0.001 (0.007)	1.001	- 0.005 (0.004)	0.995
Other child: 0-2 yrs. old	----	----	0.333 *** (0.043)	1.395	0.081 * (0.038)	1.085
Other child: 3-6 yrs. old	----	----	0.207 *** (0.038)	1.230	0.013 (0.029)	1.013
Macro economic variables:						
Unemployment rate	- 0.073 ** (0.027)	0.930	- 0.042 ** (0.014)	0.959	- 0.067 *** (0.017)	0.936
Number of observations	3300		9756		7517	

Significance levels: * < 0.05, ** < 0.01, *** < 0.001.

Table 3. Denmark: The results from the estimations of the proportional hazard model of re-entering the labor market after childbirth according to birth order.

VARIABLE	1 ST CHILD		2 ND CHILD		3 RD CHILD	
	PARAMETER ESTIMATE (STANDARD ERROR)	HAZARD RATE	PARAMETER ESTIMATE (STANDARD ERROR)	HAZARD RATE	PARAMETER ESTIMATE (STANDARD ERROR)	HAZARD RATE
Family policy regimes:						
Compensation rate	- 0.595 *** (0.121)	0.551	- 0.599 *** (0.139)	0.549	- 0.071 (0.213)	0.931
Father's leave	0.053 *** (0.009)	1.054	0.062 *** (0.013)	1.064	0.026 (0.017)	1.027
Day care price	0.032 (0.103)	1.033	- 0.031 (0.104)	0.969	- 0.183 (0.182)	0.833
Big city	- 0.258 (1.591)	0.773	- 1.282 (2.063)	0.278	- 0.483 (4.786)	0.617
Day care price * city	0.145 (0.734)	1.156	0.597 (0.951)	1.817	0.188 (2.227)	1.207
Labor market status						
Sector of occ.: state	0.233 ** (0.086)	1.262	0.129 (0.097)	1.138	0.260 (0.164)	1.297
Sector of occ.: municip.	0.066 (0.049)	1.068	- 0.058 (0.052)	0.943	- 0.040 (0.084)	0.960
Unemp. prior to birth	0.261 *** (0.051)	1.298	0.208 *** (0.060)	1.231	0.242 * (0.098)	1.274
Human capital variables:						
Age	- 0.007 (0.008)	0.993	0.006 (0.009)	1.006	- 0.012 (0.012)	0.988
Educ: High-school	0.266 *** (0.054)	1.305	0.105 (0.056)	1.111	0.008 (0.086)	1.008
Educ: Short university	0.369 *** (0.067)	1.446	0.199 ** (0.067)	1.221	0.262 ** (0.098)	1.300
Educ: Long university	0.634 *** (0.112)	1.886	0.390 ** (0.120)	1.477	0.231 (0.185)	1.260
Years of work exp.	0.072 *** (0.019)	1.075	0.008 (0.020)	1.008	- 0.018 (0.027)	0.982
Yrs. of work exp ² /100	- 0.331** (0.113)	0.718	- 0.017 (0.102)	0.983	0.317 * (0.130)	1.372
Family situation:						
Marital status: married	0.050 (0.040)	1.051	0.078 (0.042)	1.081	0.066 (0.073)	1.068
Family inc (€ 10 000)	- 0.004 (0.010)	0.996	0.015 (0.009)	1.015	0.004 (0.013)	1.004
Other child: 0-2 yrs. old	----	----	- 0.007 (0.076)	0.993	0.005 (0.070)	1.005
Other child: 3-6 yrs. old	----	----	0.008 (0.075)	1.008	- 0.058 (0.079)	0.944
Macro economic variables:						
Unemployment rate	0.189 *** (0.015)	1.208	0.178 *** (0.015)	1.195	0.170 *** (0.024)	1.185
Number of observations	3675		3172		1270	

Significance levels: * < 0.05, ** < 0.01, *** < 0.001.

Day care prices also show an expected sign for the second and higher order births, but the effect is only significant for the second birth sample in Sweden. The effect is not significantly different from zero for the other samples, which is not surprising since the prices of childcare are relatively low and queuing systems may dominate price effects. The effect of childcare prices is negative only if the availability is good (the interaction term shows a positive sign). This can be seen in the estimate of the availability of public childcare which is more important to the job retention decision for the third sample than the price. It may well be the case that many mothers have to postpone the job retention due to queuing. The availability of all types of childcare is meager in big cities, not only the publicly provided childcare but also the availability of informal care. Informal sources of care, such as that provided by grandparents, friends and neighbors in a non-market setting, may be more difficult to get if a family does not live near these informal networks.

The second set of the variables controls for the characteristics considering *the labor market status*. The sector of employment seems to affect the retention decision in both countries. Women employed in the public (state and municipality) sector in Sweden and the state sector in Denmark tend to return earlier to work (when controlling for the higher compensation rate in the public sector in Denmark) compared with the private sector employed (the reference group). This may reflect a more tolerant and supportive attitude from the employer's side towards parenthood, mothers return sooner but are allowed more flexibly to take time off work when needed (see Nielsen et al., 2002). In the private sector, there is not necessarily such a family-adjusted flexibility. Further, the employment status prior to childbirth affects the decision to return to the labor market. For the Swedish sample, we see that mothers who were unemployed prior to childbirth have longer periods of leave, which is quite intuitive. For Denmark we get the opposite result; mothers who were unemployed prior to childbirth tend to return earlier to their job. We have no good explanation of this result, except that it may reflect the very large changes in the Danish labor market in the period 1993-1996 which was dominated by a strong cyclical upturn and some major labor market reforms which, among others, implied much more tight rules concerning availability for the labor market for unemployed people.

The human capital variables capture the effect of education, age and years of labor market experience on the risk to return to work. The raw data shown earlier in Figure 1 and the results from the hazard models confirm that the level of education has a very strong and pronounced effect on women's decision to return to work. The higher the attained degree of schooling, the shorter the career break. The effect is significant in most of all three samples. The reference level in the

estimations is compulsory school, and compared to that, for all three higher categories the effect is positive, indicating a higher risk to return. For example, for the Swedish samples the hazard for employment is estimated to be almost 2 times higher for women having a long university degree than for women having the lowest level of education. For the Danish samples, the effect is also strong, especially for the 1st child sample, while for the third or more childbirth the educational effect seems to be lower than for the first two childbirths. The education variable is likely to pick up some of the differences in foregone earnings since wages are not included in the model.

The age mother's age on return from leave has a significant effect only for the sample of 3rd or higher order births in Sweden. For them, the effect is negative on job retention, though the effect is minimal, for each one-year increase in age at childbirth the hazard of return goes down by 1.6%. The number of years of labor market experience reflects the attachment to the labor market prior to childbirth. This variable and its square are significant for 2 childbirths or more in Sweden. The more work experience the mother has, the shorter the career break but with a decreasing rate. For Denmark, the effect is estimated to have an increasing rate for women having their 3rd child or more. However, the numerical size of the age effect is small.

The model has control variables for *the family situation* of a mother. The marital status, an indicator for being married, may reflect traditional values or a more stable family concept. However, the variables turn out to be insignificant in both countries. For the Swedish samples, the existence of other children shortens the career break, whereas the effect is reversed for the Danish samples. Apparently, the availability of childcare is part of the cause. In Sweden, it is easier to get a day care place if there are other siblings who already have a place in day care. We do not see this effect for Denmark where the sibling variables are insignificant.

In order to include the effect of the *macro economic situation*, the national unemployment rate is added as a covariate to the model. For the Swedish samples, the effect is clearly negative, indicating longer career interruptions for mothers, while the effect is the opposite for the Danish sample. One explanation of the difference between Sweden and Denmark with respect to this result may be the cyclical effects and labor market reforms mentioned above. An additional explanation might be the differences in job-protection laws in the two countries. When the unemployment rate is high, mothers with a job might want to return sooner if they fear for losing the job. However, if there is a job-protection, this may not be a problem, at least in principle.

6.2 Policy Simulations

In order to test how changes in family policy regimes would affect the length of career breaks of mothers, we pursue some policy reforms and apply the new rules to the Danish and Swedish samples. To predict the length of the career break, we replace a set of family policy covariates with the new ones and evaluate the survivor estimates for a “typical” case. In order to be able to obtain predictions, the time-dependent covariate, the rate of compensation, is changed to a time-constant replacement rate that will only depend on the previous income, the sector of employment (Denmark) and the year in question (Sweden). For the Swedish case, the mandated parental leave period for mothers is added to the equation as an explanatory variable to be able to control for that in simulations.

The survival probability, $S(t)$, at time t for an individual with covariate values \mathbf{x} can be written as

$$S(t) = [S_0(t)]^{\exp(\beta\mathbf{x})} \quad (2)$$

where $S_0(t)$ is the baseline survivor function. After estimating β , we get an estimate of $S_0(t)$ by a non-parametric maximum likelihood method. With that estimate we generate the estimated survivor function for a “typical” case by substituting her characteristics and the suggested policy reforms in the equation (2).

First, we apply the Danish system to the Swedish 2nd child mothers’ case but we keep the entitled days for mothers constant (the compensation rate is set to either 1.0 for the public sector or 0.7 for the private sector). In the second policy suggestion, we apply more equal parental leave schemes that share the responsibility more even between the parents and predict the effect on the length of the mothers’ career breaks. The parental leave quota for fathers is set to four months with everything else unchanged, i.e. maintaining the idea of flexibility. The third policy reform tests the effect of a free and perfectly available child day care. Lastly, we test the effects of different compensation rates, with a full pay and with a lower rate of compensation.

The last row of Table 4 shows the predicted lengths of the career breaks after the suggested changes in family policy schemes. According to the results, mothers having their 2nd child would react to these changes. When the Danish system is applied to the Swedish sample, the simulations indicate that women in the private sector with the low compensation rate would have a one-week

shorter career break, which is not much out of the total of 330 days of leave. If there were full wage compensation as it is the case in the public sector in Denmark, Swedish women having their second child would take 2 weeks' longer leave. The second policy reform gives fathers a 16-week long parental leave all other things unchanged (the entitlement period of mothers is left unchanged). This reform would decrease the career break for the mother of the type family by 4 weeks. The result could imply that, if we tried to promote equality between males and females in the labor market, more leave should be directed explicitly to fathers (even without decreasing the entitlement period of mothers). If the idea were to encourage women to shorten the career breaks contingent to childbirth, i.e. work more hours, this might also result in smaller losses in wages and future earnings.

Table 4. Results from policy simulations for a typical household. The predicted length of the career break under different family policy rules applied to the Swedish sample of mothers having the 2nd child.¹⁾

FAMILY POLICY RULES	2 ND CHILD (the Swedish rules)	2 ND CHILD (the Danish rules)	2 ND CHILD (16 weeks of leave for fathers)	2 ND CHILD (no day care fees, availability)	2 ND CHILD (compensation rates: 1.0 / 0.5)
Compensation rate	0.8	0.7 / 1.0	0.8	0.8	1.0 / 0.5
Father's leave (weeks)	4.0	2.0	16.0	4.0	4.0
Max entitlement period for the mother (days)	330	330	330	330	330
Day care fee	2.5	2.0	2.5	0	2.5
Childcare availability	0	1	0	1	0
Duration of leave	41	40 / 43	37	39	42 / 38

1) A typical household is defined as a household with a mother having average characteristic for continuous variables and modal values for indicator variables. Thus, the mother is 32 years old, she is married and she has another child aged 0-2 years. She has 7 years of labor market experience, a long university degree, and she is employed in the public sector (state). Her husband takes 4 weeks parental leave. The family income is € 33'.

The third reform involves changes in child day care availability and its price. As we saw earlier, we cannot test the price effect separately, because the restrictions in the supply side of the childcare may dominate the price effect. Free and perfectly available childcare would result in two weeks' shorter parental leave periods for mothers, when the quality aspects of child day care are not considered. Finally, we assessed the effects of different rates of compensation. When mothers were given a full compensation, they would increase their leave by one week, and when the compensation was decreased to 0.5, they would return three weeks sooner to the labor market.

The results from these policy reforms applied to the Danish sample are seen in Table 5. We use a compensation rate of 0.8 for the 'standard person', despite the compensation rate is typically either 1 (public sector) or lower than 0.8 (private sector). When applying the Swedish 'standard

rules', there seems to be no effect on the duration of Danish mothers' leave periods. The same is the case in Column 4, where we simulate the effect of free childcare and better availability of childcare. If the leave period for the father was extended to 16 weeks, this would reduce the mother's leave period by about 2 weeks. Finally, if the 'standard mother's' compensation rate was increased from 0.8 to full pay, this would extend the leave period by about 1 week, from 29 to 30, but if the compensation rate was reduced, the simulations indicate no effect on the leave period.

Table 5. Results from the policy simulations for a typical household. The predicted length of a career break under different family policy rules applied to the Danish sample of mothers having the 2nd child.¹⁾

FAMILY POLICY RULES	2 ND CHILD (the Danish rules)	2 ND CHILD (the Swedish rules)	2 ND CHILD (16 weeks of leave for fathers)	2 ND CHILD (no day care fees, availability)	2 ND CHILD (compensation rates: 1.0 / 0.5)
Compensation rate	0.8	0.8	0.8	0.8	1.0 / 0.5
Father's leave (weeks)	2.0	4.0	16.0	2.0	2.0
Max entitlement period for the mother (weeks)	28	47	28	28	28
Day care fee	2.0	2.5	2.0	0	2.0
Childcare availability	1	0	1	1	1
Duration of leave	29	29	27	29	30 / 29

1) A typical household for the Danish sample: the mother is 30 years old, she is married and has another child aged 0-2 years. She has 3 years of labor market experience, a high-school degree and she is employed in the public sector (municipality). Her husband takes one week of parental leave. The family income (excluded the mother's labor income) is € 42'.

Thus, the Swedish mothers seem to be more sensitive to these policy changes than Danish mothers. Especially the reactions to changes in the fathers' leave periods differ between the two countries. This may reflect that for a long period, there has been much more political focus on shared responsibility of the parents and fathers' take up of parental leave. Parents may tend to adopt the rules as norms which conduct their behavior. Further, the much more flexible structure of the Swedish schemes may explain the apparently larger substitution effects between Swedish parents, compared to Danish parents. Further, as shown in Figure 3, the compensation rate of Danish fathers tends to be much lower than that of Danish mothers (because a much larger proportion of the fathers are employed in the private sector while more than half of the mothers are publicly employed). We do not explicitly include the compensation rate of the fathers, and thus, the much lower paternal compensation rates may imply that Danish parents are to some extent 'caught' in a corner solution, where marginal changes of other policy rules have no effect on the behavior of the majority of the parents.

7 Conclusions

This study investigates the effects of different family policy regimes on the job retention of Danish and Swedish mothers, controlling for other individual and family characteristics that are likely to affect retention. Here we focus only on mothers who had a partner and participated in the labor market and interrupted their careers due to childbirth during the 1990s. Our analysis takes advantage of the availability of comparable longitudinal data, which allow us to estimate parallel models across the countries. The timing of re-entry to the labor market is hypothesized to depend on a woman's full wage relative to her reservation wage. The probability of ending a career break and resuming employment is estimated using a Cox proportional hazard model.

Compared to previous research, this study applies the latest and more representative data. So far, only a few studies have addressed the impact of family policies on the return to work, positive exceptions are the studies of Rønsen & Sundström (1996) and Gustafsson et al. (1996), where they compare the determinants of the length of a career break in connection with childbirth between Sweden and some other European countries. The novelty and the contribution of this study are to compare the two Scandinavian countries with similar welfare state ideologies with high labor force participation of mothers but with different parental leave regimes. Moreover, here we also take the family policy regimes explicitly into account including the child day care availability and prices.

The labor market activity of mothers in Nordic countries is among the highest in the world, and yet they have the most generous parental leave schemes. The parental leave regimes are based on the labor market attachment before childbirth and contain a job-protection. The Danish and Swedish family policies provide families with different kinds of incentives, which are reflected in labor market outcomes. The idea was to compare these two countries, which are much alike. They have similar cultural background, and in both countries female labor force participation rates are high, and particularly mothers with young children are very active in the labor market compared with other countries. But the rules of family policies differ. Whereas Sweden is a country with universal, flexible and generous parental leave schemes, Denmark represents a more conservative type of family policies when it comes to parental leave schemes. On the other hand, the coverage of publicly provided child day care is higher in Denmark and prices are slightly lower compared to Sweden. In Sweden, and to a smaller degree Denmark, many families have to queue for a place in a day care center, which makes things more difficult for families and perhaps cause mothers a need to decrease their hours of work.

To a great extent, the paid parental leave mandates determine the rate of return to employment. Since parental leave is longer in Sweden, the return rates are lower during the first months after childbirth than in Denmark. To be able to compare the re-entry rates of mothers between the two countries, we should keep in mind the country-specific features (e.g. other benefit systems and the labor market legislation) which counteract with the family policy rules. Economic factors have a clear effect on the decision to return from leave. A lower compensation rate prolong the duration of the leave period, and in areas with a good availability of childcare the higher prices of day care postpone it. We also find that fathers' parental leave take-up play an important role in the timing of women's employment after childbirth; the longer leaves for fathers the shorter time off work periods for mothers. Our findings underline the importance of the labor market attachment of mothers. Over 90% of mothers in both countries return to the labor market after childbirth.

A number of policy simulations based on the estimated hazard functions for the two countries are performed, in order to test how much these changes would affect the mothers' parental leave take-up. The policy changes include applying the Danish rules to the Swedish mothers and vice versa, giving fathers more ring-fenced leave, providing an access to a free childcare and varying the rate of compensation. For Sweden, each of these changes results in some reactions in mothers' parental leave take-up for the Swedish sample, but the most interesting result is that when fathers were given a parental leave of 16 weeks, all other things unchanged (the entitlement period of mothers), the leave for the mother of the type family decreased by 4 weeks. This result implies that, if the political ambition is to promote equal career prospects between men and women, more leave should be directed explicitly to fathers.

For Denmark, the substitution effects are smaller than for Sweden. We explain this empirical evidence by the fact that there – contrary to Sweden - has been only a very short “father quota” leave period (which is now abolished), on average the economic incentives are extremely negative for the fathers, and thus there is yet no tradition in Denmark for the families to consider potential substitution options between the time of the parents.

Thus, this paper provides some evidence that if the political ambition is to promote the labor supply of women and to promote a more equal role sharing between mothers and fathers, an active family policy may help to achieve these goals.

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Appendix

Table A1. Descriptive statistics of the sample of parents, the Swedish (1993-1998) and the Danish (1993-1996), where the mother gives birth to her first child. All variables related to the market work are records from a year prior to the birth. Monetary values are given in Euros in 2000 prices.

VARIABLE	SWEDEN		DENMARK	
	MOTHERS	FATHERS	MOTHERS	FATHERS
AGE	29.2	33.4	27.9	30.4
AGE WHEN HAVING THE FIRST CHILD	29.2	30.9	27.9	30.4
HAVING CHILDREN 0-2 YEARS OF AGE	0	0.00	0	0
HAVING CHILDREN 3-6 YEARS OF AGE	0	0.01	0	0
NUMBER OF CHILDREN	1.0	1.09	1.0	1.0
MARRIED	0.94		0.31	0.33
EDUCATION (the highest attained level)				
ELEMENTARY SCHOOL	0.05	0.11	0.18	0.19
HIGH-SCHOOL DEGREE	0.47	0.44	0.53	0.57
BACHELOR'S DEGREE	0.24	0.22	0.24	0.16
MASTER'S DEGREE (or higher)	0.24	0.23	0.05	0.08
HOURS OF WORK *)	1 788.4	2007.1	1 425.4	1 751.8
SHARE WITH FULL-TIME WORK *)	0.90	0.93	0.95	n.a.
HOURLY WAGE RATE (€) *)	10.9	12.9	17.0	20.0
LABOR INCOME (€ 10 000) *)	1.85	2.23	2.34	2.98
YEARS OF WORK EXPERIENCE	7.4	11.5	6.3	9.4
FAMILY INCOME (€ 10 000)	3.40		3.54	
SECTOR OF EMPLOYMENT				
STATE	0.11	0.14	0.06	0.06
MUNICIPALITY	0.38	0.13	0.34	0.06
PRIVATE	0.48	0.67	0.59	0.86
OTHER	0.03	0.06	0.01	0.02
LIVING IN A BIG CITY **)	0.48	0.48	0.20	0.19
PARENTAL LEAVE				
TAKE-UP OF LEAVE (weeks)	40.2	4.4	30.6	1.3
SHARE OF THE FATHERS HAVING LEAVE		77.3		59.0
DAY CARE FEE (€)	232.0		207.1	
COMPENSATION RATE 1 ***)	0.83	0.78	0.78	0.55
COMPENSATION RATE2	0.79	0.75	0.49	0.37
COMPENSATION RATE3	0.14	0.17		
NUMBER OF OBSERVATIONS	3 300	3 300	3675	3435

*) For Sweden, the information on hours of work and hourly wage rates are not available for every individual but for about 1/3 of our sample, therefore the mean values are calculated only for those having this information.

For Denmark, the mean values are calculated excluding the self-employed.

**) For Sweden, Stockholm, Göteborg and Malmö areas. For Denmark, Copenhagen, Frederiksberg and Aarhus.

***) For Sweden, the rate of compensation changes during the parental leave (time-varying variable) and varies across sector of occupation (with an income ceiling), and there have also been changes in the parental leave compensation rules over the years. For Denmark, the rate of compensation varies across sector of occupation, and further there is an income ceiling for compensation.

Table A2. Descriptive statistics of the sample of parents, the Swedish (1993-1998) and the Danish (1993-1996), where the mother gives birth to her second child. All variables related to the market work are records from a year prior to the birth. Monetary values are given in Euros in 2000 prices.

VARIABLE	SWEDEN		DENMARK	
	MOTHERS	FATHERS	MOTHERS	FATHERS
AGE	30.4	33.1	30.5	32.8
AGE WHEN HAVING THE FIRST CHILD	27.8	28.8	26.5	n.a.
HAVING CHILDREN 0-2 YEARS OF AGE	0.25	0.24	0.55	0.56
HAVING CHILDREN 3-6 YEARS OF AGE	0.64	0.64	0.36	0.35
NUMBER OF CHILDREN	2.00	1.89	2.00	2.00
MARRIED	0.56		0.59	
EDUCATION (the highest attained level)				
ELEMENTARY SCHOOL	0.07	0.13	0.19	0.19
HIGH-SCHOOL DEGREE	0.57	0.55	0.51	0.56
BACHELOR'S DEGREE	0.20	0.16	0.26	0.16
MASTER'S DEGREE (or higher)	0.16	0.16	0.04	0.09
HOURS OF WORK ^(*)	1 378.1	1 921.9	1 381.0	1 804.8
SHARE WITH FULL-TIME WORK ^(*)	0.81	0.92	0.96	n.a.
HOURLY WAGE RATE (€) ^(*)	10.8	13.1	17.0	21.5
LABOR INCOME (€ 10 000) ^(*)	1.35	2.16	2.29	3.27
YEARS OF WORK EXPERIENCE	8.2	13.1	8.1	11.7
FAMILY INCOME (€ 10 000)	3.46		4.06	
SECTOR OF EMPLOYMENT				
STATE	0.09	0.12	0.05	0.07
MUNICIPALITY	0.43	0.12	0.42	0.07
PRIVATE	0.42	0.68	0.51	0.84
OTHER	0.06	0.08	0.02	0.02
LIVING IN A BIG CITY ^(**)	0.39	0.39	0.12	0.12
PARENTAL LEAVE				
TAKE-UP OF LEAVE (weeks)	42.5	3.8	31.4	1.27
SHARE OF THE FATHERS HAVING LEAVE		69.0		58.8
DAY CARE FEE (€)	230.0		206.8	
COMPENSATION RATE 1 ^(***)	0.84	0.79	0.80	0.53
COMPENSATION RATE2	0.81	0.76	0.48	0.35
COMPENSATION RATE3	0.17	0.17		
NUMBER OF OBSERVATIONS	9 756	9 756	3172	3 048

Notes: See Table A1

Table A3. Descriptive statistics of the sample of parents, the Swedish (1993-1998) and the Danish (1993-1996), where the mother gives birth to her third or higher order child. All variables related to the market work are records from a year prior to the birth. Monetary values are given in Euros in 2000 prices.

VARIABLE	SWEDEN		DENMARK	
	MOTHERS	FATHERS	MOTHERS	FATHERS
AGE	33.2	35.9	33.2	35.3
AGE WHEN HAVING THE FIRST CHILD	25.4	27.6	24.3	n.a.
HAVING CHILDREN 0-2 YEARS OF AGE	0.14	0.13	0.38	0.39
HAVING CHILDREN 3-6 YEARS OF AGE	0.66	0.80	0.71	0.72
NUMBER OF CHILDREN	3.37	3.17	3.20	3.18
MARRIED	0.75		0.70	
EDUCATION (the highest attained level)				
ELEMENTARY SCHOOL	0.14	0.20	0.26	0.23
HIGH-SCHOOL DEGREE	0.55	0.52	0.39	0.51
BACHELOR'S DEGREE	0.18	0.13	0.31	0.17
MASTER'S DEGREE (or higher)	0.14	0.15	0.04	0.09
HOURS OF WORK ^(*)	1 386.2	1 958.0	1 329.4	1 741.1
SHARE WITH FULL-TIME WORK ^(*)	0.77	0.92	0.93	n.a.
HOURLY WAGE RATE (€) ^(*)	10.8	13.3	17.0	21.1
LABOR INCOME (€ 10 000) ^(*)	1.29	2.12	2.19	3.21
YEARS OF WORK EXPERIENCE	9.2	15.7	9.0	12.9
FAMILY INCOME (€ 10 000)	3.83		4.16	
SECTOR OF EMPLOYMENT				
STATE	0.07	0.12	0.05	0.06
MUNICIPALITY	0.53	0.15	0.52	0.10
PRIVATE	0.32	0.63	0.38	0.83
OTHER	0.08	0.10	0.05	0.01
LIVING IN A BIG CITY ^(**)	0.34	0.34	0.09	0.09
PARENTAL LEAVE				
TAKE-UP OF LEAVE (weeks)	43.1	4.0	32.5	1.2
SHARE OF THE FATHERS HAVING LEAVE		72.5		58.2
DAY CARE FEE (€)	229.0		205.2	
COMPENSATION RATE 1 ^(***)	0.84	0.79	0.85	0.54
COMPENSATION RATE2	0.81	0.76	0.49	0.34
COMPENSATION RATE3	0.17	0.17		
NUMBER OF OBSERVATIONS	7 517	7 517	1 270	1 197

Notes: See Table A1

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