Return to Work after Childbirth: does Parental Leave Matter in Europe?

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Abstract

This paper investigates the role of the extended parental leave in the return to work for mothers of newborn children. Exploiting the variability in policies offered by the European countries, the paper studies the influence of statutory leave characteristics - length of the job-protection and payments during the leave-period - on the hazard of returning to work at different ages of the child. Results suggest that longer periods of job-protection increase the hazard of returning to work; on the other hand, providing paid leaves increases the probability of remaining at home during the first year of life of the child.

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1 Introduction

Statutory parental leaves have been introduced in the last 30 years in all European countries in order to extend the period of job-protection, allowing both parents to care for their child after the maternity leave period has expired[1]. Proponents of these policies claim that statutory leave results in healthier children and a better position for women in the labor market, while opponents state that these restrictions may adversely affect women's careers. The expected impact of leave from work on maternal employment is ambiguous. On the one hand, it allows women to have a break to care for the child and its absence could persuade some women not to participate in the labor market. It also guarantees the return to the previous job so that they do not lose specific human capital. On the other hand, it may withdraw women from the labor market for long periods, with negative implications for their future employability, wages, and career. These effects are not clear a priori (Klerman and Leibowitz, 1997; Berger and Waldfogel, 2004) and needed to be tested empirically.

The object of this paper is to investigate the effect of statutory parental leave on mother's post-birth employment. Previous research on this topic in the US context shows a small influence of statutory leave duration on women's time out of labor force (Han et al., 2007; Hashimoto et al., 2004; Baum, 2003; Klerman and Leibowitz, 1997), while the Canadian experience indicates a larger effect (Baker and Milligan, 2005). One explanation put forward is that where statutory leave is shorter (e.g. 12 weeks in US) we are less likely to observe an impact than where statutory leave is longer (from 17/18 weeks to 29/70, in the Canadian case). Besides the duration, another important aspect to take into account, when analyzing statutory leave's effects, is the process of self-selection into jobs covered by leave-regulations (Hashimoto et al., 2004; Baker and Milligan, 2005): women who have access to jobs with maternity rights may have unobservable characteristics which also affect their post-birth decisions.

[1]The first country to introduce the parental leave was Sweden in the mid 60's. Only mothers were eligible. Fathers were allowed to share the leave from 1974 (Gustafsson, 1984).

In this paper, I exploit the variability in policies across EU countries, in terms of length of the leave and payments during the leave-period. I compare women with similar human capital characteristics and household conditions but in different countries, and consequently subject to different leave regulations. The EC directives require a minimum of 3 months of parental leave, but permits degrees of freedom for additional time, payments, and flexibility in the timing. And, indeed, the features of statutory parental leave differ substantially across Europe: its length ranges from a minimum of 3 months to a maximum of 3 years, and the wage replacement ratio varies from 0% to 100%. The conditions required to qualify for the leave vary across countries, but women with at least 1 year of employment are generally covered.

A comparative study on maternity leave's effects has been carried out by Ruhm (1998), who compares employment rates and wages among women and men (used as comparison group) in different European countries, and shows how maternity leave's availability is associated with an increase in women's employment but a reduction in their relative wages. Instead, my paper focuses on the effect of statutory parental leave (the optional leave which temporally follows the maternity leave) on mothers' return to work across Europe.

Understanding the economic consequences of statutory leave for women is relevant to policy for at least two reasons. First, it is important to understand whether leave policies may be used to enhance female labor market participation, especially in countries with a low participation rate relative to the 60% set by the Lisbon strategy (Council of the European Union, 2000). Second, it is important to evaluate whether they may be used as instruments to make parents spend more time with their children (Baker and Milligan, 2008). Parental care, especially during the first year elapsed from childbirth (James-Burdumy, 2005), has been shown to be important for the child's development: a reduction in infant mortality (Ruhm, 2004), more breastfeeding and child immunization (Tanaka, 2005; Berger et

al., 2005), better cognitive outcomes (Gregg et al., 2005; Ruhm, 2004), and better educational outcomes (Ermisch and Francesconi, 2002) have been observed.

In this paper, employment decisions of mothers after childbirth are analyzed, using the European Community Household Panel and treating the data in a survival perspective. The institutional background of different European countries is presented in Section 2 and the methodological framework in Section 3. The ECHP data are illustrated in Section 4, while Section 5 comprises the empirical estimations. Sections 6 and 7 compare and interpret the results across countries. Conclusions follow (Section 8).

2 The Institutional Background

Parental leaves extend the period of job-protection, allowing both parents to care for their child after the maternity leave period has expired. The EC directives require a minimum of 14 weeks of maternity leave and 3 months of parental leave (Table 1). While the length of maternity leave and its wage replacement ratio are quite homogenous among countries, parental leave differs substantially in terms of length, paid period, and incentives for fathers' take-up. With respect to mothers' take-up, maternity leave is used by almost all of them, while the extended parental leave is optional and, given the amount of benefits, its use depends on mothers' constraints and preferences. The conditions required to qualify for the leave vary across countries, but women with at least 1 year of employment are likely to be covered.[2] We observe for Belgium, Portugal, and the Netherlands the minimum period of 3 months for each parent while very long leave of 2|3 years exists in France, Spain, Austria, Germany and Finland.

[2] In almost all countries women need to be employed for at least 1 year to have the right to the parental leave, in some countries with the same employer. The most restrictive requirements are in Portugal where both the parents have to be employed, while the least restrictive are in Austria, where they only need to show they are eligible for family allowances (De Henau et al., 2008).

For some countries, parental leave includes the right to be paid during the period surrounding the childbirth, with payment related to the previous wage (e.g. Finland and Italy) or as flat rate (e.g. Austria). The right to leave can be individual or family based: in the first case, if one parent does not take the leave, it is lost for the family. In this sense, parental leave could play an important role in re-distributing the work division in the couple and promoting gender equality (see last column in Table 1): short leave, well paid and with no possibility to transfer months from the father to the mother, could lead fathers to share this task more frequently. In all countries, the parent's job position is protected during the whole leave, with the exception of Spain where the protection covers just one year. Moreover, in some countries women are allowed to take only part of the leave and to work a reduced number of hours; or allowed to postpone the leave until the child is older, rather than immediately after childbirth (De Henau et al., 2008).

For simplicity, I only study the first transition from non-employment to employment and observe whether the availability of these arrangements influences when women decide to return to work. In particular, the focus is on the effect of two characteristics of statutory leave: the duration of job-protection and whether or not women receive government transfers during the leave-period. To the author's best knowledge, in all countries analyzed, parental leave arrangements were introduced before the first wave of the utilized survey and duration and payments have not been substantially changed during the years of the survey. The only exceptions are Ireland and the UK where parental leaves were introduced, respectively, in 1998 and 1999.

Another policy which does not constitute the object of the study but can affect return to work is the availability of childcare. The possibility of working when the child is young is constrained by the availability of childcare and, later, by the pre-primary and primary school system. Better access to care services for children as well as high quality and low costs can decrease the cost of working for mothers, discouraging them from looking after the child at home. Large differences emerge in the public

availability of childcare among European countries, especially for children under 3 (Table 2). When comparing return to work for women from different countries in Section 7, availability of childcare will be taken into account.

3 The Methodological Framework

Suppose a woman makes her labor market participation decisions in order to maximize the household's lifetime utility. When out of employment household utility *u* (measured in terms of consumption goods) depends on the husband's income (when in a partnership), on her private income and on her productivity at home, which varies with the number and ages of children. When in paid employment, the wage she receives in the labor market is an additional determinant of household utility (Ermisch and Wright, 1991).

After childbirth, she decides whether or not to work according to the wage offers she receives, which are assumed to be from a distribution $F(w, X)$ where *X* represents fixed characteristics of the woman. Let $V_2(X, H)$ be the expected discounted lifetime utility when not in employment and $V_1(X, H, w)$ when employed at wage *w* in a household with characteristics represented by *H*. The expected value of the best option, over an infinite span of life, is given by

$$T(X) = \int_{-\infty}^{+\infty} \max\{V_2(X, H), V_1(X, H, w)\} dF(w, X) \qquad (1).$$

Burdett et al. (1985) show that there is a stopping rule which guarantees the existence of this maximum: she will decide to be employed if and only if $V_1(X, H, w) > V_2(X, H)$, where $V_1(X, H, w)$ is

strictly increasing in *w*. Burdett et al. (1985) derive that the corresponding maximizing strategy is characterized by a reservation wage function $z(X,H)$ so that she decides to be employed if $w > z(X,H)$. When she has a child, the reservation wage may rise as motherhood increases the demand for her time in childcare activities, or it may decrease as a consequence of the increased demand for market goods required for home production. When time out of the labor force passes, women tend to lose some labor force related human capital, with a negative impact on the mean of the wage offer distribution. At the same time, the child becomes less time intensive, with a consequent lowering of the reservation wage. Maternity and parental leave rights may guarantee the mother a return to her former job for a certain period of time (and therefore she has the probability of receiving an offer of 1), while any associated transfers will increase her reservation wage. On the whole, as time since childbirth passes, her participation behaviour will depend on the relationship between the loss in human capital which affects her potential wage, the loss in her productivity at home (due to the child's age), and the existence of maternity/parental leave rights, which affect her reservation wage.

In the first part of the analyses, I estimate a reduced form model of labor market participation for each country separately (Section 5) in order to highlight differences in the timing of return to work and in the impact of other variables. I then predict the survivor functions for women with different level of education in each country and compare them graphically (Section 6). Finally, I pool observations from all countries and include directly variables related to the length of the job-protection and payments during the leave-period in order to identify the impact of such characteristics on the hazard of returning to work (Section 7).[3]

[3] Gutierrez-Domenech (2005) and Kenjo (2005) use a two-step procedure for analyzing mothers' labor market participation after childbirth. They first analyze a number of countries separately and then explain different countries' performances by looking at the development of policies over time. Kenjo (2005) plots the predicted probability of being at work for some "typical" women, with children born in the 80's and in the 90's, and comments how different average behaviors may depend on policy changes between the two decades. Gutierrez-Domenech (2005) takes the coefficients of the year dummy variables from the country regressions (which are proxies for the socio-economic environment) and regress them on a number of explanatory variables, such as female labor market participation, percentage of female part time workers, a parental leave indicator, a taxation system indicator, etc…

In the first step, the dependent variable is the time elapsed since childbirth until re-entry in the labor market. The higher the probability of returning to work, the smaller this duration. In this study the event of interest, the transition from non-work to work, may occur at any particular instant in time, but data are provided in discrete intervals of time, which leads to the use of a discrete hazard model. The selected sample is a random sample of women from the moment of their child's birth onwards, followed until the spell ends or until the end of the survey. These latter observations are right censored.

Suppose the time is divided in equal intervals of 1 month, every interval indexed by a positive integer. Let T be called the time spent out of the labor market, h the hazard of returning to work, and S the survivor function associated with T. Every woman's spell is observed from the first month after birth through to the end of the j^{th} month, at which point her spell is either completed ($c_i=1$) or right censored ($c_i=0$).

The hazard rate for a woman i is given by

$$h_{ij} = \Pr[T_i = \mathrm{j} \mid T_i \geq j] \qquad (2),$$

which is the probability of leaving the non-employed state in the interval $(j-1, j]$, given that she has not worked until $j-1$.

The likelihood contribution for a censored spell is given by

$$L_i = \Pr(T_i > j) = S_i(j) = \prod_{k=1}^{j} (1 - h_{ik}) \qquad (3),$$

while the likelihood contribution for a completed spell is given by

$$L_i = \Pr(T_i = j) = h_{ij} S_i(j-1) = \frac{h_{ij}}{1-h_{ij}} \prod_{k=1}^{j} (1-h_{ik}) \quad (4),$$

so that the likelihood for the whole sample is equal to

$$L = \prod_{i=1}^{n} [(\frac{h_{ij}}{1-h_{ij}})^{c_i} \prod_{k=1}^{j} (1-h_{ik})] \quad (5).$$

This implies that

$$\log L = \sum_{i=1}^{n} c_i \log(\frac{h_{ij}}{1-h_{ij}}) + \sum_{i=1}^{n} \sum_{k=1}^{j} \log(1-h_{ik}) \quad (6).$$

This expression has the same form as the likelihood for a common binary regression (Jenkins, 2004), where y_{ik} is equal to *1* when $c_i=1$ and T_i is included in the interval *(j-1, j]*:

$$\log L = \sum_{i=1}^{n} \sum_{k=1}^{j} [y_{ik} \log h_{ik} + (1-y_{ik}) \log(1-h_{ik})] \quad (7).$$

The hazard rate *h* may depend on the time already spent out of employment and on some other characteristics of the woman, the household and the social and economic environment she faces. I choose a complementary log-log hazard specification, which is consistent with a continuous time model and interval censored survival time data (Jenkins, 2004). The hazard rate into work for a woman *i* at time *j* is given by

$$h_{ij} = 1 - \exp[-\exp(\alpha + \eta_i + \beta X_i + \delta H_i + \lambda E_i + \gamma J] \quad (8).$$

That is, the hazard is a function of the characteristics of the woman (*X*), and the household (*H)*, the regional economic environment (*E)*, and time spent not working (*J*), which corresponds to the age of the child. The model is estimated with a woman-specific variable η_i, which follows a normal distribution and is assumed to be independent from both time and the other explanatory variables (Lancaster, 1979; Nickell, 1979).

After having estimated the return to work separately by country (Section 5), I predict the survivor function out of the labor force for some typical women, when the child is 0-4 years old

$$\hat{S}_{qzj} = \prod_{k=1}^{j} (1 - \hat{h}_{qzk}) \tag{9}$$

where *z* indicates the country of residence, *j* the elapsed time from birth and *q* a "typical" woman comparable across countries (Section 6).

Finally, I pool observations from all countries to test whether parental leaves characteristics significantly affect the hazard to work (Section 7). To this aim, the age of the child *J* in equation (8) has been interacted with the characteristics of the statutory leave to assess whether women with the right to the job-protected and paid leave differ significantly in the timing they return to work. All other control variables *X, H, E* – see equation (8) – are allowed to have different impacts across countries through the inclusion of country dummy interactions. The characteristics of statutory parental leaves are shared by all women in the same country, given the age of the child. If there are unobservable characteristics at the country level, then the error terms result correlated within countries, causing the standard errors of the estimated coefficients to be biased downward (Moulton, 1990). Therefore, the bias has been corrected by adjusting the estimates of the standard errors of the coefficients to account for the non-independence of observations within each country (Primo et al., 2007).

The advantage of using different countries where the right is universal instead of one country where the right is given according to particular agreements is that avoids the problem of women selecting themselves in certain jobs with preferred family policies (Berger and Waldfogel, 2004; Hashimoto et al., 2004).

4 The Data

For the empirical analysis I use data from the European Community Household Panel (ECHP), a dataset provided by Eurostat which covers a wide range of topics and allows a comparison of the European member countries for the years 1994-2001.

The sample is composed of women who have a child during the time of the survey and who have worked before[4]: the dependent variable is defined as the duration, in months, between birth and return to work. There is no information, in the survey, about the take-up of the leave and the coverage of the leave. Women working before childbirth are assumed to be eligible for it.

The study includes Italy, Greece, Spain, Portugal, France, Belgium, Austria, UK, and Finland. The remaining countries cannot be studied because of missing monthly information concerning the date of birth or the employment pattern.[5]

In order to see when mothers return to work after having a child, two different and complementary sources of information are used: the job information stated at the moment of the interview, and the monthly employment calendar, reported for the previous calendar year. The aim is to understand whether they are actually working in the period surrounding the birth and not whether they "hold" a

[4] Women, either working the previous wave or having worked in the last two years, are included in the sample.

[5] German and Danish datasets do not comprise the variable month of birth, Dutch and Luxembourgian datasets do not include the employment calendar, while the Swedish dataset is not a panel.

job, since policy makers may be concerned with potential loss in human capital, and potential gain in child's health, which depend on how much time they actually spend at home (Klerman and Leibowitz, 1994). Many women are employed but not at work. Consequently, hours of work, hours of care, and earnings are cross-checked. A woman is considered "at work" when she works at least 15 hours a week, cares for her child less than 9 hours a day, and her earnings are different from zero. For women returning to work, about 90% have complete information about employment activities in the months between that interview and the previous one. For these women it is possible to determine the month they started working. For the other 10%, the medium point in the interval of time between the two interviews is imputed. For women not returning to the labor market (right-censored observations), the date of the final interview is the end of the spell.

In order to study which factors make women more likely to return to work, I estimate a hazard discrete function, specified as a complementary log-log model with random effects as described in the previous section. The regressions are estimated for each country separately. With reference to equation (8) variables related to the woman, her household and the regional economic environment are considered.

In the hazard function woman's level of education and her age at birth are first included. Then age of the child in years, its square and its cube, are included to test if the hazard of employment increases or decreases with time, and how this pattern varies across countries. Since parental leave was introduced in Ireland in 1998 and in UK in 1999, a dummy variable is defined equal to 1 to indicate that the woman is eligible for it. Household income, which is expected to have a negative effect on the reservation wage[6], is also controlled for. Although potentially endogenous, two variables regarding the fertility decisions of the woman are introduced: a dummy variable indicating whether this birth is a first birth and a dummy variable indicating the birth of another child during the out-of-work spell. By including the variable "first birth", the effect of the regressors is assumed to be the same for all births,

[6] Income is measured in PPP (purchasing parity power), provided by Eurostat, in order to be comparable across different countries.

except for a shift parameter captured in this variable. An alternative could be to include only women after their first birth but, that would reduce the sample and the possibility to observe the same woman more than once makes it easier to identify unobserved heterogeneity. Finally, the regional unemployment rate is included in order to take into account the economic environment which women face. The regional unemployment rate is drawn from REGIO, a dataset from Eurostat which provides descriptive statistics on each country's labor market, year by year, region by region. All covariates change over time, with the exception of level of education, age at birth, and the dummy "first birth", which are constant over the spell.

In Table 3 the characteristics of the samples are summarized at the beginning of the spell. The country-samples' size ranges from a minimum of 399 spells (11,496 month-observations, Austria) to a maximum of 911 spells (20,610 month-observations, Spain).

The percentage of mothers returning to work by the end of the basic maternity leave varies from a minimum of 22% in Austria to a maximum of 60% in Portugal.[7] Indeed, these two countries represent two extremes for what concerns rights related to the parental leave: the Austrian government offers up to 18 months of paid leave while the Portuguese offers only 3 months, unpaid, with the exception of the first week. The "first birth" variable reflects different levels of fertility in Europe: a high percentage (around 55%) of first-birth children is observed in countries with a low fertility rate like Italy, Greece, Spain, Portugal, and a lower percentage of first-birth children (below 45%) in countries with a higher fertility rates like Ireland, Finland and Belgium. Household income is generally higher in Northern and Central Europe than in Southern Europe. A woman's average age at birth goes from a minimum of 28 in Austria to a maximum of 31 in Finland, Ireland, and Italy. However, in Finland and Ireland, the relatively old age at birth may be explained by the large proportion of women not at the first child (57% in Finland and 65% in Ireland) while this is not the case for Italy (only 43% of women not at first

[7] All women are assumed to use the basic maternity leave so that they are at risk of working from the 4th month.

child). Level of education differs greatly across countries; with the percentage of highly educated women exceeding 40% in Belgium, Finland, Greece, UK, and France, while lower than 30% in the remaining countries. Portugal is the only country where more than half of mothers have less than secondary schooling.

5 Model Estimates

Table 4 presents a cross-country comparison of child's age when mothers re-enter the labor market. Overall, in Europe, at least 25% of new mothers are working when the basic maternity leave has expired. The few exceptions are represented by women in Austria and Finland, who return to work at a slower rate, probably influenced by the generous statutory parental leave for which they are eligible. On the other hand, in Belgium and in Portugal at least 50% of women are working by the time the child is only 4 months old. In almost all countries at least one-half of mothers are working when the child is 3 years old. In Italy, Spain, Greece and Ireland it is not possible to observe the first 75% of them back in the labor market.

The estimated parameters of participation hazard equations are reported in Table 5. Highest levels of education have positive and significant effects on the hazard of returning to work: women with a higher opportunity cost associated with maternity tend to start working very early after birth. The impact is very strong in Southern European countries and in Ireland while is small and insignificant in Finland. This is consistent with the finding that the effect of mother's education is usually found weaker where policies are more generous (Gustaffson et al., 1996; Gutierrez-Domenech, 2005; Kenjoh, 2005).

As the child grows up, the likelihood for a woman to work depends on the relationship between the decline of the potential wage and of the reservation wage, which depends on her productivity at home

and on the statutory leave schemes. The sum of these effects is estimated by looking at the impact of the time spent out of the labor market. In all analyzed countries, the hazard to work decreases when time out of paid employment passes by. The squared term is positive and significant indicating that, after some time, the negative effect is becoming less and less negative. This happens before the child turns 2 in Austria and Finland, and after age 3 in Greece, Spain and the UK. The cubed term is negative again, implying a slower return to work for mothers of children older than 5 years old who are still out of the labor force.[8]

Looking at the household characteristics we find a negative effect of household income on the hazard rate into work, as expected, but insignificant in most countries. In most countries, the first birth compared to subsequent ones raises the hazard into work, with the exception of Finland. Lengthy leaves introduce the possibility for women to have multiple children before returning to their job. Indeed, the effect of the birth of another child is negative in countries with long parental leave like France and Finland: in these countries the woman can decide to have only one career-break, giving birth to the second child before entering the labor market. In the French case, the leave is paid only for the second child. In Finland, she receives more generous benefits in the first 6 months of the leave than for the rest of the period. When significant, the regional unemployment rate has the expected negative sign. The dummy variable "EC directive" has a positive and significant effect in the UK, where parental leave has been introduced in 1999. UK mothers, with the addition of this period of leave after the basic maternity leave, seem to return sooner.

[8] Several specifications of the time dependence have been tried. One alternative way of taking into account the age of the child is including age dummy variables. However, including three dummy variables indicating the first, the second and the third year of life of the child would not fit the data as well as including the age, its square and its cube.

6 Comparing Mothers' Return to Work across Europe

In order to facilitate interpretation of the results, the predicted probabilities of being at work are plotted for comparable women across countries. The probability of being back to work is given by the complement of the survivor function at any month elapsed from birth (see equation (9)). In Figure 1, the cases of three women 30 years old, at the first child, with different levels of schooling are simulated in each country, with median household income by level of education, and with an unemployment rate equal to the one stated in EUROSTAT statistics for 2001. In this simple way, an idea may be given of the level of labor market participation among new mothers in different countries when they have the first child. An investigation of the role played by education can ascertain how the reconciliation between work and family depends on the woman's characteristics rather than on the social environment.

Figure 1 indicates that in countries with generous statutory parental leave (Finland and Austria), a large proportion of mothers is out of the labor market after childbirth. About 70% of mothers with a medium level of schooling are at home one year after childbirth in Austria and Finland. In Finland the payments mothers receive during the 6 months is related to their wage (a replacement rate of 66%), and it decreases radically in the subsequent two and one-half years to a fixed amount of money. In Austria mothers are paid for the whole leave period (18 months), and as already clear in the estimations, there is not a large difference among women with different schooling.

In France, only 10% of women with secondary education are not yet working when the child is 1 year old, even though the leave is 36 months long. This may depend on not being eligible for transfers when they have only one child. But women with at least two children (including one younger than 3 years old) who stop working or reduce their work hours can benefit from the Allocation Parentale d'Éducation which is a benefit paid until the youngest child is 3. This may explain why France has the

highest average post first-birth employment compared with other countries with long (and paid) parental leave provisions and why, in France, the difference in behavior between the first and the second birth is very large (see Table 5), suggesting that mothers of more than one child tend to stay at home after birth for a longer period.

The three countries with the fastest return to work are those in which women have the right to the shortest parental leave (3 months in Portugal and Belgium, 4 in the UK). British women do not receive any payment during this period; Portuguese women are paid only the first week, while Belgian women receive lump sum payments for the whole period, which may explain a higher percentage of women (20%) out of the labor market when the child is 6 months old compared to the British and Portuguese women.

What emerges looking at Italy, Spain, Greece and Ireland, are the differences between the three types of women: education plays a bigger role there than in most of the other countries. While highly educated women return to work after birth, others are more likely to give up. This could be due to the lack of protected leave which forces women to quit their job, to the low childcare availability or to less favorable attitude towards women's work in these societies. In contrast, in Austria and in Finland, where long and paid leave is provided, the differences among women with different levels of human capital are almost non-existent. Also highly educated women seem to take the opportunity to care for the child by themselves.

Generally, different leave arrangements seem to shape survivor functions in different countries. The next section formally tests whether different post-birth employment across countries is significantly associated with the characteristics of statutory parental leave.

7 The Effect of the Statutory Parental Leave on the Return to Work

In this section, in order to identify the effect of statutory leave characteristics on the return to work, observations from all countries are pooled and policy-variables are directly included in the model. Two institutional variables are included: a dummy variable "job-protection", which is equal to 1 when the woman has the right to a job-protected leave until the previous month; and a dummy variable "transfers" when the woman is eligible for transfers in that month. The two institutional variables are interacted with the child being 1 year old, 2 years old, and 3 years old. All other control variables are allowed to have different impacts across countries through the inclusion of country dummy interactions.

Institutional characteristics (Table 6) seem to be important determinants of the return to work for mothers in Europe, relative to the impact of human capital characteristics. While there are no differences during the first year of life of the child between women with and without the right to a job-protected leave, the hazard to work is significantly higher for women whose job is protected during the second and third year of the child. Women who have not returned to work by the first birthday of the child and have their jobs protected are more likely to start working again. The possibility of receiving transfers during the first year of life of the child makes women return to work at a slower rate.[9]

Heterogeneous effects by level of education may be also interesting from a policy point of view. By estimating the model separately by level of education (Table 7), we find that the positive effect of job-protection, when the child is 2 years old, is particularly large for medium and highly educated women while the positive effect of job-protection, when the child is 3 years old, is especially strong for low-education women. The negative effect of eligibility to transfers mainly applies to women with medium

[9] The interaction between transfers and second/third year of life of the child have been also included in previous analyses. Since their effects do not appear significant in any specification and do not allow the convergence in the model for highly educated women for the low number of cases, they have been excluded from the specifications shown here.

education. They probably face a higher opportunity cost from not working than lower-education women and, at the same time, they are not attached to the labor market as much as higher-education women.

8 Conclusions

The aim of this paper has been to investigate empirically the effect of statutory parental leave on European mothers' post-birth employment. First, return to work has been analyzed separately by country: women with more human capital return more quickly, while women with higher family incomes return to work at a slower rate. The impact of human capital characteristics seems to be relatively larger in Italy, Spain and Greece while smaller in Finland, where parental leave arrangements are more generous.

Exploiting the variability in policies offered by the EU countries, in terms of length of job-protection and transfers during the leave-period, this paper has studied the influence of statutory leaves on the mother's hazard of returning to work at different ages of the child. Institutional characteristics seem to be important determinants of the return to work for mothers in Europe, relative to the impact of human capital characteristics. If the policy goal is to increase female labor market participation, we find that longer periods of job-protection make women more likely to return to work after a child's birth. If the policy goal is to increase mothers' involvement in children's development, women in countries with paid leave are observed to spend more time at home with their children during the first year of life.

While it is admittedly difficult to define similar women in different countries, cross-country comparisons can help understand constraints that individuals face in different institutional contexts and explain part of the large behavioral differences observed across Europe.

For further developments on this topic, better data would be needed on monthly employment status, together with information on monthly take-up of parental leave, and related benefits, for mothers and fathers. This kind of information would allow precise measurements of how many hours parents work and how many hours they care for their child, at any time after birth. Two further characteristics of statutory leave could also be studied, which are important both from a “child” and “mother’s career” point of view: the possibility of taking leaves on a part time basis, and the possibility of mothers and fathers sharing leaves.

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Tables and Figures

Table 1: Statutory Maternity Leave and Parental Leave in Europe

	Maternity leave		Parental leave			
	Period (weeks)	Average replacement rate (%)	Total leave duration (months)	Paid period (% of the total leave)	Father's period (months)	Transferable months
IT	22	80	11	55	6	0
DK	18	62	11	70	0	11
IE	18	70	6.5	0	3.25	0
UK	18	43	8	0	4	0
FI	18	66	33	100	0	33
PT	17	100	6	8	3	0
EL	17	50	7	0	3.5	0
ES	16	100	36	0	0	36
FR	16	100	36	0	0	36
LU	16	100	12	100	6	0
NL	16	100	6	0	3	0
AT	16	100	24	100	6	18
BE	15	77	6	100	3	0
GE	14	100	36	67	0	36
SE	14	80	18	79	2	12

Source: De Henau, Meulders and O'Dorchai (2008).

Table 2: Public Childcare in Europe

	Infants (younger than 3 years old)			Pre school aged children (equal or older than 3 years old)		
	Coverage (%)[a]	Public funding (%)[b]	Opening hours (per day)[c]	Coverage (%)[a]	Public funding (%)[b]	Opening hours (per day)[c]
DK	55	75	10.5	90	75	10.5
SE	40	85	11	72	85	11
FR	39	78	10	87	100	8
BE	30	83	9	99	100	7
FI	23	85	10	42	85	10
GE	9	82	10	73	82	6
PT	12	80	7	72	100	5
AT	10	82	7	70	82	6
IT	6	80	10	87	91	8
LU	3	83	9	76	100	5
EL	3	80	9	48	100	4
ES	5	80	5	77	100	5
IE	2	100	9	50	100	4
NL	2	65	10	66	100	7
UK	2	94	8	60	100	5

Notes: [a] Percentage of slots per 100 children. [b] Percentage of costs covered by public funding. [c] Number of hours covered per day in European countries. Source: De Henau, Meulders and O'Dorchai (2008).

Table 3: Descriptive Statistics

	Work (%)	Age	Tertiary education (%)	Secondary Education (%)	HH Income (PPP)	First child (%)	Unemployment rate (%)	Number of spells	Number of observations
FI	24.7	31.0	51.0	39.7	15615	43.0	11.1	526	9,544
UK	43.3	29.8	42.8	14.2	20826	49.9	6.8	879	17,153
IE	34.9	31.1	19.6	53.0	20368	34.9	10.4	644	13,531
BE	57.8	30.6	60.1	28.9	24039	43.4	10.1	519	5,633
AT	22.1	28.2	11.3	68.7	27702	51.4	4.0	399	11,496
FR	43.3	29.9	38.4	40.1	21314	47.4	10.8	893	14,637
IT	48.1	31.2	12.8	53.2	18294	56.9	11.7	896	13,318
EL	39.2	29.1	43.5	33.5	16959	53.2	9.8	543	10,762
ES	27.4	30.4	28.3	23.1	17719	54.9	19.8	911	20,610
PT	60.4	28.3	11.3	19.0	13679	58.0	5.5	773	7,688

Notes: Descriptive statistics of the samples, the 4th month after childbirth.

Table 4: Survival Times

	First quartile survival time (months)	Median survival time (months)	Third quartile survival time (months)
Finland	9	22	42
UK	4	10	72
Ireland	4	35	-
Belgium	4	4	22
Austria	11	36	90
France	4	14	75
Italy	4	7	-
Greece	4	19	-
Spain	4	46	-
Portugal	4	4	22

Table 5: Model Estimates (Finland, UK, Ireland, Belgium, Austria)

	Finland	UK	Ireland	Belgium	Austria
Age of the child (months)	-0.280*** (0.040)	-0.275*** (0.028)	-0.340*** (0.042)	-0.397*** (0.052)	-0.234*** (0.036)
Squared age of the child (months)	0.012*** (0.02)	0.007*** (0.001)	0.010*** (0.001)	0.012*** (0.002)	0.008*** (0.001)
Cubed age of the child (months)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)
Age of the woman at birth (years)	0.034 (0.158)	0.642*** (0.155)	0.320 (0.215)	1.043*** (0.318)	0.024 (0.142)
Squared age of the woman at birth (years)	0.000 (0.002)	-0.008*** (0.003)	-0.004 (0.003)	-0.017*** (0.005)	-0.000 (0.002)
Tertiary education	0.465 (0.309)	1.074*** (0.255)	2.982*** (0.458)	2.493*** (0.442)	1.099** (0.502)
Secondary Education	0.389 (0.298)	0.344 (0.337)	1.905*** (0.351)	1.438*** (0.449)	0.405 (0.334)
(Lower than secondary education)					
HH income (/10,000 PPP)	-0.092 (0.058)	-0.172*** (0.062)	-0.178** (0.090)	-0.026 (0.057)	-0.049 (0.052)
First birth	-0.394** (0.164)	1.629*** (0.201)	1.395 *** (0.280)	0.450* (0.233)	0.750*** (0.258)
Another child	-0.962*** (0.270)	-0.034 (0.304)	0.030 (0.423)	0.649 (0.445)	-0.492 (0.311)
Unemployment rate	-0.068** (0.030)	0.032 (0.044)	0.065 (0.055)	-0.058* (0.034)	-0.192 (0.154)
EC directive		0.535** (0.245)	0.622 (0.412)		
Constant	-2.238 (2.475)	-13.339*** (2.377)	-9.527 *** (3.441)	-16.165*** (4.942)	-2.997 (2.257)
Observations	9,544	17,153	13,531	5,633	11,496
$Sigma_u$	1.038	2.449	2.484	2.030	1.838
Log likelihood	-1,561.033	-1,764.976	-1,024.194	-878.787	-1,078.539

Notes: Discrete hazard model; standard errors in brackets (*** significant at 1% level, **at 5%, * at 10%).

Table 5 cont.: Model Estimates (France, Italy, Greece, Spain, Portugal)

	France	Italy	Greece	Spain	Portugal
Age of the child (months)	-0.311*** (0.033)	-0.309*** (0.040)	-0.262*** (0.042)	-0.186*** (0.032)	-0.353*** (0.047)
Squared age of the child (months)	0.010*** (0.001)	0.009*** (0.001)	0.007*** (0.001)	0.005*** (0.001)	0.012*** (0.002)
Cubed age of the child (months)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)
Age of the woman at birth (years)	0.329 (0.215)	0.652** (0.258)	-0.229 (0.287)	-0.011 (0.269)	0.434*** (0.165)
Squared age of the woman at birth (years)	-0.004 (0.003)	-0.009** (0.004)	0.006 (0.005)	0.002 (0.004)	-0.006** (0.003)
Tertiary education	1.644*** (0.321)	2.120*** (0.443)	2.944*** (0.493)	3.581*** (0.367)	2.020*** (0.450)
Secondary Education	0.694** (0.302)	1.380*** (0.286)	1.830*** (0.475)	2.017*** (0.351)	0.852 *** (0.327)
(Lower than secondary education)					
HH income (/10,000 PPP)	-0.117* (0.059)	-0.190** (0.087)	-0.218** (0.104)	-0.152 (0.094)	-0.096 (0.101)
First birth	2.179*** (0.232)	0.561** (0.230)	0.326 (0.288)	0.750*** (0.271)	0.735*** (0.245)
Another child	-2.127*** (0.510)	0.633 (0.478)	0.408 (0.459)	-0.372 (0.479)	0.152 (0.470)
Unemployment rate	-0.018 (0.041)	-0.026 (0.017)	-0.004 (0.072)	-0.049** (0.021)	0.010 (0.064)
Constant	-8.093** (3.395)	-12.362*** (4.137)	-1.481 (4.327)	-5.566 (4.161)	-7.104*** (2.537)
Observations	14,637	13,318	10,762	20,610	7,688
$Sigma_u$	2.529	2.880	2.958	3.067	2.454
Log likelihood	-1,625.752	-1,468.622	-958.010	-1,489.877	-1,267.611

Notes: Discrete hazard model; standard errors in brackets (*** significant at 1% level, **at 5%, * at 10%).

Table 6: Effects of Statutory Leave Characteristics on the Hazard of Returning to Work

	Pooled countries
Parental leaves' characteristics	
Job-protection during the first year	0.591
	(0.566)
Transfers during the first year	-0.578*
	(0.322)
Job-protection during the second year	1.167***
	(0.332)
Job-protection during the third year	1.972***
	(0.328)
Control variables	
Childcare availability	-0.008
	(0.011)
Age of the child (months)	-0.551***
	(0.114)
Squared age of the child (months)	0.016***
	(0.004)
Cubed age of the child (months)	-0.000***
	(0.000)
Age of the woman at birth (years)	0.222***
	(0.040)
Squared age of the woman at birth (years)	-0.003***
	(0.001)
Tertiary education	0.793***
	(0.034)
Secondary education	0.286***
	(0.005)
(Lower than secondary education)	
HH income (/10,000 PPP)	-0.135***
	(0.014)
First birth	0.293
	(232)
Another child	-1.515***
	(0.158)
Unemployment rate	-0.027***
	(0.003)
Constant	-2.986
	(1.458)
Observations	124,372
Log likelihood	-14,025.581

Notes: Discrete hazard model; standard errors in brackets, adjusted for clustered observations (*** significant at 1% level, **at 5%, * at 10%). Interactions between country dummy variables and age of the child, of the mother, level of education, household income, unemployment rate and fertility characteristics are included but coefficients are not reported. Reference country: France.

Table 7: Effects of Statutory Leave Characteristics on the Hazard of Returning to Work, by Level of Education

	Lower than secondary education	Secondary education	Tertiary education
Parental leaves' characteristics			
Job-protection during the first year	0.593	0.402	0.850
	(0.628)	(0.568)	(0.566)
Transfers during the first year	-0.474	-0.877***	-0.517
	(0.360)	(0.330)	(0.318)
Job-protection during the second year	0.655**	1.007**	1.784***
	(0.257)	(0.476)	(0.293)
Job-protection during the third year	2.145***	1.867***	1.983***
	(0.339)	(0.376)	(0.349)
Observations	54,077	45,191	25,104
Log likelihood	-4,507.658	-5,102.779	-4,243.856

Notes: Discrete hazard model; standard errors in brackets, adjusted for clustered observations (*** significant at 1% level, **at 5%, * at 10%). All control variables and interactions (as in Table 6) are included but coefficients are not reported.

Figure 1: Survivor functions, by Age of the Child, Level of Education, and Country