Mothers' Employment and Wages in Europe: Does Parental Leave Matter?

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Abstract

In the last two decades, a wage penalty associated with motherhood has been observed in many countries. Topical cross-country evidence suggests that institutions that promote the reconciliation of work and family life, e.g. parental leave, can contribute to the employment of mothers and hence to the diminution of this penalty. As parental leave systems vary considerably across European countries in terms of duration, benefits, job protection and "daddy months", a comparison of the effects of these characteristics on the mothers' wages may provide useful insights into whether and how they alleviate negative employment and income effects. This paper aims at providing useful results for future enhancements of the parental leave systems in European countries. I use the European Statistics on Income and Living Conditions (EU SILC) as the data basis for the assessment of the impact of parental leave characteristics on mothers' wages across Europe. After estimating the selection into employment with a selection model, the impact on hourly wages of mothers is estimated. Besides personal characteristics, features of the countries' parental leave systems, collected from different sources, are inserted. The following features are accounted for: duration of parental leave, job protection, amount of benefits, and incentives for the father to use parental leave. It is expected that a short duration, job protection as well as incentives for the fathers to use some leave have positive effects on the employment and wages of mothers. However, a long duration and generous benefits are expected to affect them negatively.

JEL Classification: D31, E24, J31, J38
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1 Introduction

In the last two decades, a wage penalty associated with motherhood has been observed in many countries. Topical research suggests that policies promoting the reconsiliation of work and family life, e.g. parental leave, can contribute to the diminution of this penalty. Almost all European countries have established some kind of parental leave. The consensual aim of these policies is to diminish sharp drops of income after the birth of a child through a stronger attachment of the women to the labour market. As parental leave systems vary considerably across European countries in terms of duration, benefits, job protection and "daddy months", a comparison of the effects of these characteristics on the mothers' employment and wages may provide useful insights into whether and how they alleviate negative income effects. However, to the best of my knowledge, there is no comprehensive study for European countries that analyzes these potential effects. This paper aims at closing this gap and providing useful results for future enhancements of the parental leave systems in European countries.

In this study, the European Statistics on Income and Living Conditions (EU SILC) is used as the data basis for the assessment of the impact of parental leave characteristics on mothers' employment and wages across Europe. It has been conducted annually since 2004 in almost all European countries. I use the EU SILC longitudinal data from 2004 to 2008 which includes 23 European countries[1]. After estimating the selection into employment with a selection model, the impact on hourly wages of mothers is estimated. Besides personal characteristics, features of the countries' parental leave systems are inserted. The following features are accounted for: duration of parental leave, job protection, amount of benefits, and incentives for the fathers to use parental leave. These data stem from the OECD data base on family policies and other sources. It is expected that a short duration of leave, a short job-protected period as well as the father's exclusive entitlement for parental leave weeks at a high wage replacement rate have positive effects on the wages of mothers. However, a long duration and generous benefits are expected to affect their wages negatively.

This article is structured as follows. First, I will elaborate on the theoretical and empirical background on the impact of parental leave on the employment and wages of mothers. In the next chapter, parental leave schemes across Europe are briefly summarized. After describing the data, methodology and variables, the results of the empirical models are presented. In the end, a conclusion is drawn linking the findings to the hypotheses.

[1] Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Estonia, Finland, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, the Netherlands, Norway, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, United Kingdom.

2 Theoretical and Empirical Background

2.1 Theoretical Background

Before taking a look at the potential influence of parental leave characteristics on the employment and wages of mothers, it is necessary to understand the mechanisms that can theoretically account for the drop of employment and wages that is widely observed for women after the birth of their first child. In current microeconomic theory, a large body of literature can be found on possible reasons for the wage differential between mothers and childless women (family gap, motherhood or child penalty) as well as the difference between women and men (gender gap). Generally, there are several reasons why mothers can have lower wages than men and childless women.

First, since all EU countries have established maternity and parental leave schemes, the birth of a child implies the absence of the mother from the labour market for at least several weeks. According to human capital theory, this leads to losses of job experience and tenure which will in turn have negative effects on wages (Becker 1985). The longer the absence from the labour market the larger these effects.

Second, if mothers return to paid labour at all, they might subordinate their careers to their husband's and to their children, e.g. as to location decisions and work hours, and, as a result, work less hours and / or in positions for which they are overqualified (Frank 1978, Harkness and Waldfogel 1999). In economic terms, they substitute nonpecuniary for monetary returns to work (Gangl and Ziefle 2009). In this regard, it is important to notice that the wage difference between full-time and part-time employees with similar assets does not only reflect the difference in hours, but that part-time employees earn lower *hourly* wages. As Bardasi and Gornick (2008) argue, part-time workers are systematically excluded from wage premiums and benefits, employers may take advantage of their lower bargaining position, and the comparatively high fixed costs for part-time contracts can lead to lower effective wages. In addition, in many countries part-time positions are concentrated in occupations and on levels that are not well paid. Gangl and Ziefle (2009) point out that unless mothers do not reverse their "substitution"-choices, the wage losses after childbirth are likely to be permanent.

Third, the work effort theory stipulates that mothers might reduce their effort (their "energy") at work, implying lower productivity and, therefore, wage (Anderson et al. 2003, Becker 1985). Bielby and Bielby (1988) found that mothers of pre-school children report less work effort compared with other women, but they did not test the effect on wages. Moreover, a price effect arises if employers believe that mothers are less productive, i.e. statistical discrimination is at play (Becker 1985). Precisely, employers use observable characteristics (indices) to deduce unobservable productivity when making decisions on, for example, recruitment, remuneration and promotion (Spence 1973). As a result, even if the productivity effects caused by motherhood are negligible, the employer's belief that a mother is less productive may nonetheless generate significant wage

effects (Gangl and Ziefle 2009).

A further explanation refers to heterogeneity. If being a mother is correlated with other unobserved traits that affect the earnings capacity of women, "the estimated family gap would simply reflect the effect of these unobservable variables on the earnings potential of mothers but not necessarily the fact that having children depresses wages in itself." (Dupuy and Fernández-Kranz 2007, p. 3). Similarly, women who are less successful in the labour market may decide more often to have children, to have a larger number of children, and to do less paid work (Pronzato 2009). All in all, these arguments demonstrate that wage differentials between mothers and childless women or men come at no surprise.

Yet when comparing mothers from different countries, the effect of parental leave on the wages of mothers is not straightforward. Before elaborating on particular parental leave characteristics, a look at the interrelation between women's preferences and choices and a country's legislation, as analyzed both by sociologists and economists, is valuable. Hakim (2000), a sociologist, proposes that women have genuine choices about how they want to live, including the reconciliation between work and family life. However, McRae (2003) rejects this hypothesis. She argues that all women face constraints in making decisions about their lives, that all non-trivial decisions imply opportunity and direct costs, and that the ability to overcome certain constraints varies between individuals. She shows that women with similar preferences can have very different employment careers due to different constraints and different capacities for overcoming them. For example, if many mothers would like to work full-time, but there are only a few full-time day-care slots, some of the mothers that do not get a slot might have parents who can look after their children, while others do not have this opportunity. Accordingly, an international comparison of the employment and wages of mothers can shed light into the magnitude to which parental leave characteristics can diminish the constraints for the reconciliation of work and family life.

As to economists, Heckman (1978) doubts that parental leave policies have any effects on the employment and wages of mothers. He points out that institutional choices reflect a society's preferences. In other words, in a country with a short duration of parental leave, most mothers wish to return to the labour market soon after childbirth. If this legislation would be adopted in a country in which mothers prefer to be absent from the labour market for a longer period, it would not have any effect on the behaviour of mothers. As a result, ignoring this endogeneity may lead to strongly biased estimates of the "causal" effect of institutions on the outcomes. But I question whether governments always act in line with most women's will, especially if the majority of representatives are men who decide on a bill that primarily affects women. I follow the reasoning of McRae (2003) and Del Boca and Locatelli (2006), arguing that women in Europe might have similar preferences, but face different alternatives determined by public policies.

Indeed, parental leave schemes vary greatly across European countries. They may be introduced to have positive effects for all mothers, but with respect to different priorities (Moller et al. 2006). In Sweden, for example, the parental

leave system has been developed to integrate more mothers into the labour market, while in Austria the focus has been the support of care-taking within the family. In particular, single features of parental leave schemes theoretically increase the mothers' attachment to the labour market or even the same employer, hence diminishing the motherhood penalty, while others might have negative effects on mothers' employment and wages. On the one hand, a relatively short duration of job-protected leave and incentives for the father to use parental leave are expected to lower the wage penalty of motherhood. Job protection guarantees mothers to return to the same or a similar work position in the same company. Therefore, it reduces the frequency of job transitions and complete withdrawals from the labour market, but protects them from losing job tenure and tenure-related benefits instead (Waldfogel 1998). Encouraging fathers to take a share in parental leave weeks, e.g. by granting individual rights to the father or introducing some type of bonus if the parents share the leave, are also expected to have positive effects on the reconciliation of work and family life of mothers (Gornick and Meyers 2003, Gornick 2004).

On the other hand, long leave durations and high benefit levels may prevent mothers from returning to work early (or at all), resulting in considerable losses of market resources and in stronger specialization in unpaid work. This, in turn, leads to a larger wage loss or the complete withdrawal from the labour market. In addition, employers might pass the nonwage costs of parental leave directly to the mothers by lowering their wages, or they avoid these costs by not hiring potential mothers (Gangl and Ziefle 2009, Ruhm 1998, Blau and Kahn 1996). To sum up, the effects of the qualities of a parental leave system on mothers' wages is an empirical question.

2.2 Empirical Background

As stated above, empirical analyses on the impact of parental leave policies, on the mothers' employment and wages are scarce. As to employment, studies with U.S. data show little effects of the twelve week statutory leave on women's time out of the labour force, while the effect was greater in Canada, where the leave duration is longer (Han et al. 2007, Hashimoto et al. 2004, Baum 2003, Klerman and Leibowitz 1997, Baker and Milligan 2005). Pronzato (2009) analyzed the return to work of mothers in ten European countries. She found that the three countries with the fastest return to work are those with the shortest parental leave durations, namely Belgium, Portugal and United Kingdom. Her multivariate hazard model shows further that transfers during the first year affect the hazard of returning to work negatively while job-protection during the second and the third year have positive effects. Job-protection obviously is important for the mother's wages, too. Waldfogel 1998 and Phipps et al. (2001) showed that maintaining the same job position after maternity leave decreases the motherhood penalty for women in the United Kingdom and the U.S., and Canada, respectively. This mechanism could also hold true for parental leave. However, the duration of leave leads to different results. Ruhm (1998) found negative wage effects of the introduction of parental leave policies in Europe,

especially for more extensive mandates. Ondrich et al. (2003) concluded that one month of parental leave reduces the post-break wage growth by 1.5% in Germany. Ziefle (2004) showed similar results for the same country. Stier et al. (2001) as well as Moller et al. (2006) took into account different welfare state regimes, but not particular reconciliation policies. They conclude that mothers in countries or welfare state regimes whose legislation reflects support for the employment of mothers have the smallest negative employment and wage effects. Finally, Dupuy and Fernández-Kranz (2007) investigated on the role of labour market institutions, among them parental leave. According to their results, parental leave and job protection regulations are associated with a lower motherhood penalty because they protect mothers against contract termination. The authors propose that these policies are the most effective for the reduction of the earnings gap between mothers and non-mothers but also between men and women. But, again, they did not take a closer look at different parental leave characteristics.

3 Parental Leave Schemes across European Countries

As depicted in Table 1, maternity and parental leave characteristics vary greatly across European countries. As the maximum statutory leave for mothers equals the sum of maternity and parantal leave weeks, both are included in the table. The European Union specifies a minimum of 14 weeks of maternity leave and three months of parental leave. The duration of materinty leave varies between 14 weeks in Sweden and 28 weeks in the Czech Republic. The benefit range is quite high in all countries, ranging from 55% in Slovakia to 100% in a number of countries. However, in the United Kingdom, only the first six weeks of maternity leave are reimbursed at 90% of earnings, but the other weeks are paid at a flat rate.

The shortest parental leave can be found in Belgium and Portugal. The parental leave duration in these countries does not exceed the minimum of 12 weeks that are required in the EU. In contrast, in the Czech Republic, Estonia, Spain, Poland and Slovakia, parental leave can last up to three years. As to the benefit levels, three major groups can be identified. Six countries (Cyprus, Spain, Ireland, the Netherlands, Portugal, UK) do not offer any remuneration during parental leave. In six other countries (Austria, Belgium, Czech Republic, Luxembourg, Poland, Slovakia), parents receive a flat rate monthly payment. Except for Luxembourg, where parents receive about 1700 Euros, the amount is rather low and ranges between 95 and 670 Euros per month. In the other countries, the amount of the benefit equals a percentage share of the monthly income which ranges from 30 % to 100 %.

In most countries, parents on parental leave enjoy job-protection while being on leave. In some countries, the duration of job-protection even exceeds the parental leave duration. However, in the Netherlands, parents using parental

Table 1: Maternity and Parental Leave in European Countries, 2004-2008

	maternity leave		**parental leave**						**both**
	duration (weeks)	wage replacement rate (%)	duration (weeks, longest possibel duration for the mother)	wage replacement rate / monthly flat rate	job-protection in year 1	job-protection more than 1 year	job-protection more than 2 years	fathers' exclusive weeks	longest possible maternity + parental leave for mothers
AT	16	75	104	flat rate	yes	yes	no		120
BE	15	90	12	flat rate	yes	no	no	13	27
BG	19	75	85	100%	yes	yes	yes		104
CY	16	69	13	0%	yes	no	no		29
CZ	28	100	156	flat rate	yes	yes	yes		184
EE	28	100	156	100%	yes	yes	yes		184
ES	16	100	156	0%	yes	no	no		172
FI	18	70	26	66%	yes	yes	yes	2	44
HU	24	100	104	70%	yes	yes	no		128
IE	48	70	14	0%	yes	no	no	14	62
IT	21	80	26	30%	yes	no	no	26	47
LV	19	100	52	70%	yes	no	no		71
LT	21	100	104	60%	yes	yes	yes		125
LU	16	100	24	flat rate	yes	no	no	26	40
NL	16	100	13	0%	no	no	no	13	29
NO	15	80	39	80%	yes	no	no	6	54
PL	18	100	156	flat rate	yes	yes	yes		174
PT	17	100	12	0%	yes	no	no		29
RO	21	100	83	85%	yes	yes	no		103
SE	14	80	72	80%	yes	yes	no	8	86
SK	28	55	156	flat rate	yes	yes	yes		184
SI	15	100	37	100%	yes	no	no		152
UK	26	90	13	0%	yes	no	no		39

Sources: ILO Maternity Protection Database 2011, Moss and Wall 2007, OECD Family Database 2011, Plantenga and Siegel 2004.

leave are not protected from dismissal. While parental leave is a family right in most countries, seven countries have reserved some leave weeks for the fathers, and in Finland, fathers are entitled to two "bonus weeks" if they use some parental leave. As empirical research suggests that besides the individual entitlement, the amount of payments plays a large role in the decision whether to use this leave, a variable accounting for the fathers' entitlement *and* the benefit is used in the empirical models of this study.[2] The part of the parental leave that is reserved for the father should not be mixed up with the so-called paternity leave which allows the father to be home with his family for some days or weeks directly following the birth of the child. Paternity leave is not considered here, because it is not designed to encourage fathers to take over childcare so that the mother can return to work earlier.

4 Data and Methodology

4.1 Data

The European Statistics on Income and Living Conditions (EU SILC) longitudinal data from 2004 to 2008 serves as the data basis for the assessment of the impact of parental leave characteristics on mothers' emplyoment and wages across Europe. The EU SILC has been conducted annually since 2004 in almost all European countries plus Norway and Iceland. However, not all countries are included in the longitudinal data set, so that the analysis includes 23 European countries[3].

The advantage of this survey is that it provides enough cases for a multivariate analysis due to the large sample size. But unfortunately, this survey misses several variables that are generally expected to affect employment and / or wages, like the citizenship, the sector (public or private), the firmsize and the job position, for instance.

The sample is restricted to women aged between 25 and 55 who have at least one child below the age of seven. The latter constrain is made because the aim of this study is the analysis of employment and wage effects of women who have just returned to work after having been subject to the latest parental leave legislations. Furthermore, mothers who report to be students, self-employed, unemployed, retired or out of the labour force due to health reasons or work less than 15 hours are excluded prior to the analyses, because I would like to capture the selection into employment of mothers who work suffient hours for being able to pay most of her expenses without additional contributions from a partner or the government in relation to mothers who seem to have volutarily decided to give priority to domestic and childcare tasks. In terms of the ILO employment definition, I focus on mothers who are employed part-time (15 to

[2] See Reich (2010) for an overview on studies about the fathers' parental leave participation.

[3] Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Estonia, Finland, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, the Netherlands, Norway, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, United Kingdom.

under 30 hours per week) or full-time (at least 30 hours a week) and whose income is different from zero. They are coded as "working" in the selection equation and thus enter the wage equation in the second step of the analyses. Mothers who are not actively participating in the labour market (but are neither studying, retired, sick or unemployed) are coded "not working" in this equation.

4.2 Models

As the standard Heckman (1979) selection model cannot be applied for panel data, I use the procedure proposed by Helpman et al. (2008). This model departs from the Heckman model by the incorporation of a latent variable as a control for unobserved characteristics that influence the decision to work. The latent variable for an indiviual i in the year t can be expressed as

$$z_{it} = \gamma_0 + \gamma_j \zeta_{ij} + \gamma_j \xi_{itj} + \eta_{it} \tag{1}$$

where $\xi_{itj}$is the set of time-variant variables, ζ_{ij}a set of time-invariant variables and $\eta_{it} \sim N(0, \sigma_u^2 + \sigma_v^2)$ is i.i.d. but correlated with an error term u_{it}which is smaller within a cluster, i.e. the records for one individual.[4] Dividing (1) by the standard deviation σ_η yields the probit model for the selection into employment:

$$\rho_{it} = Pr(Y_{it} = 1 | observed\, variables) = \Phi(\gamma_0^* + \gamma^* \zeta_i + \gamma^* \xi_{it}) \tag{2}$$

The indicator variable Y_{it} is defined to equal 1 when an individual i works and 0 when it does not. $\rho_{it}$is the probability that i works in year t, conditional on the observed variables, and $\Phi(\centerdot)$ the cdf of the unit-normal distribution. The equation also contains an Let $\hat{\rho}_{it}$ be the predicted probability of being employed and let$\hat{z}_{it}^* = \Phi^{-1}(\hat{\rho}_{it})$ be the predicted value of the latent variable $z_{it}^* \equiv z_{it}/\sigma_\eta$. Consistent estimation of the wage equation requires controls for the selection into employment, which generates a correlation between the unobserved $u_{it}$and the independent variables. Thus, estimates for $E[u_{it}|., Y = 1]$is needed. This term equals $corr(u_{it}, \eta_{it})(\sigma_u/\sigma_\eta)\overline{\eta}_{it}^*$ and depends on $\overline{\eta}_{it}^* \equiv E[\eta_{it} * |., Y_i = 1]$. As η_{it}^*has a unit normal distribution, a constistent estimate $\tilde{\eta}_{it}^*$ is obtained from the inverse Mills ratio, that is, $\tilde{\eta}_{it}^* = \phi(\hat{z}_{it}^*)/\Phi(\hat{z}_{it}^*)$. Therefore $\tilde{z}_{it}^* \equiv \hat{z}_{it}^* + \tilde{\eta}_{it}^*$is a consistent estimate for $E[z_{it}^*|., Y_{it} = 1]$. Hence we can estimate the wage using the formula

$$ln(wage)_{ij} = \beta_0 + \beta_k \lambda_{ik} + \beta_k \chi_{itk} + \beta_{u\eta} \tilde{\eta}_{it}^* + \tilde{z}_{it}^* + \tilde{z}_{it}^{*2} + \tilde{z}_{it}^{*3} + e_{it} \tag{3}$$

where $\lambda_i$denotes time-invariant variables , χ_{ij}time-variant variables, e_{ij} an error term and $\tilde{\eta}_{it}^*$ the Heckman (1979) correction for sample selection. In addition, as this factor does not correct for the biases generated by the unterlying unobserved firm-level heterogeneity, an additional control $\tilde{z}_{it}^*$ and its square and cube are inserted in the formula.

[4] v_{it} controls for the fraction of persons that are employed.

4.3 Variables

Both for the employment and the wage equation, *two different models* regarding parental leave variables are estimated. Model 1 contains the following parental leave characteristics:

1. duration in weeks
2. job-protection
   (a) in the first year
   (b) in the second year
   (c) in the third year
3. benefit level
   (a) no benefit (reference group)
   (b) flat rate benefit
   (c) benefit between 1 and 60% of the wage
   (d) benefit of at least 60% of the wage
4. exclusive "father weeks" with at least 60% of the wage

In contrast, model 2 accounts for different leave schemes according to the duration and benefit:

1. duration: less than or equal to one year, benefit: none (reference group)
2. duration: less than or equal to one year, benefit: flat rate or less than 60% of the wage
3. duration: less than or equal to one year, benefit at least 60% of the wage
4. duration: more than one year, benefit: none
5. duration: more than one year, benefit: flat rate or less than 60% of the wage
6. duration: more than one year, benefit: at least 60% of the wage

In addition, the dummy for exclusive weeks for the father at a high benefit rate is kept in model 2. All models also control for the duration and benefit of maternity leave.

For the estimation of the employment, the dependent variable denotes wether a mother is working or not, as defined in section 4.1. These models control for the educational level[5], the age and its square, the age of the youngest child, the number of children, the age at first birth and whether the person lives in

[5]Less than secondary education (reference), secondary education, post-secondary or tertiary education.

an Eastern country[6]. Besides, the selection procedure requires that the probit model whose dependent variable is the dichotomous variable that indicates whether a person is working or not, contains at least one explanatory variable that is omitted in the wage equation.Thus, these selection variables have to have an influence on a mother's decision to work, but must not affect her wages. The health status (as a dummy variable for bad health), marital status, the age of the youngest child and the public childcare coverage for children between zero and three years as well as the full-time coverage (30+ hours/week) for children aged three to compulsory schoolage are inserted into the employment model, but not into the wage equation.

In the wage equations, the log hourly wage in purchasing parity powers is the dependent variable. Human capital is accounted for through variables for the education, the number of years spent in paid work and its square, the number of months worked in the current year and a change of the employer in the last year. Furthermore, the model controls for the following personal and work-related characteristics: number of children, age at first birth, weekly working hours and its square, occupation, the share of females in the profession (ISCO-88, country level), the female unemployment rate and a dummy indicating an Eastern country.

5 Regression Results

5.1 Mothers' Employment

Both for the employment and the wages of mothers I present two different models. In the first model, several characteristics of parental leave systems are inserted. The second model contains variables for different leave schemes as to the duration and the benefit rate. The results for both probit models with regard to employment are presented in table 2 in the form of marginal effects. The dependent variable distinguishes between women who do not work but are not registered as unemployed, student or pensioner either and women who do at least 15 hours of paid work per week. The duration of parental leave has a negative effect on the probability that the mother is employed; in absolute terms, however, the effect is very small. As to the benefit rate, compared to the reference group (no benefit), the model reveals that all three types of benefits - flat rate benefit, less than 60% of the wage, at least 60% of the wage - diminish the probability that a mother works. This effect is smallest for the last mentioned benefit. There are mixed results regarding job protection. Job protection during the first and the third year of parental leave increase the probability that the mother works by 12% and 17%, repectively. In contrast, job protection in the second year reduces this probability by over four percent. A positive effect has the individual right for the father to take parental leave when the benefit amounts to at least 60% of the wage. This feature raises the

[6]Eastern country: Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic.

probability of employment by 5%.

In the second model, the positive impact of this variable persists, even to a larger marginal effect (12%). Regarding parental leave schemes, five different schemes are compared to the reference scheme which is characterized by a duration of one year or less without any benefit. Compared to this scheme, a short duration with a benefit that equals at least 60 % of the wage as well as a long duration without any benefit are not significantly different. But leave schemes with a low benefit (flat rate or less than 60 % of the wage) and long parental leave with high benefits (at least 60% of the wage) clearly reduce the probability of working.

The models also controls for the duration and the benefit of maternity leave. Both variables have a negative impact on the probability of being employed in both models. Furthermore, several control variables have been included which also show mostly the same effects in both models. Negative effects on the probability of working are caused by bad health, the number of children, the age at first birth and the unemployment rate. Furthermore, the squared age has a negative algebraic sign indicating that the rate of increase diminishes as the number of years rises. Surprisingly, in model 2, also the fulltime childcare coverage for children aged three to compulsory schoolage is negatively associated with the probability of employment across the sample from European countries. Moreover, the partner's income affects the mother's employment negatively in model 2, but positively in model 1. However, in both models, the effects are very small.

Positive effects on the employment result from the age, medium and high educational levels (compared to a low level), the age of the youngest child, cohabiting as well as from the public childcare coverage of children aged zero to three. In addition, in model 2, living in an Eastern country is positively associated with employment.

Summarizing the important results concerning the impact of parental leave on the employment of mothers, model 1 suggests that the probability of working decreases as the country specific leave duration rises, while the impact of job-protection provides mixed results. Although model 1 shows that any benefit has significant negative effects on the dependent variable, model 2 qualifies this result as it reveals that benefit rates can have different impacts, depending on the leave duration. In addition, parental leave weeks exclusively for the father at a wage replacement rate of at least 60% also have a positive impact on the probability of the mother being employed.

5.2 Mothers' Wages

The results for the two models on the impact of parental leave on mothers' log hourly wages are displayed in table 3. According to model 1, a high benefit of at least 60 % of the wage affects the post-leave log hourly wage negatively, while a flat rate benefit and a benefit of less than 60 % of the wage have a positive impact. Job-protection in the first and third year have a negative impact. The strongest positive impact has the exclusive right of the father to

Table 2: Impact of parental leave characteristics on mothers' employment dependent variable: employed at least 15 hours/week vs. housewifes

	Model 1 marginal effect		std. err.	Model 2 marginal effect		std. error
parental leave characteristics						
duration	-0.001	***	(0.000)			
benefit: flat rate	-0.066	***	(0.015)			
benefit: less than 60% of wage	-0.331	***	(0.017)			
benefit: at least 60% of wage	-0.042	**	(0.020)			
job protection in year 1	0.120	***	(0.029)			
job protection more than 1 year	-0.043	**	(0.019)			
job protection more than 2 years	0.167	***	(0.015)			
exclusive weeks for the father with at least 60% of wage	0.054	*	(0.030)	0.121	***	(0.025)
parental leave schemes						
<= 1 year, flat rate or less than 60% of wage				-0.094	***	(0.017)
<= 1 year, at least 60% of wage				0.013		(0.025)
> 1 year, no benefit				-0.013		(0.021)
> 1 year, flat rate or less than 60% of wage				-0.144	***	(0.020)
> 1 year, at least 60% of wage				-0.065	***	(0.024)
maternity leave characteristics						
duration	-0.010	***	(0.001)	-0.009	***	(0.001)
benefit (as % of wage)	-0.002	***	(0.001)	-0.003	***	(0.001)
control variables						
age	0.087	***	(0.009)	0.079	***	(0.009)
age squared	-0.001	***	(0.000)	-0.001	***	(0.000)
bad health	-0.329	***	(0.030)	-0.320	***	(0.031)
medium educational level	0.201	***	(0.011)	0.201	***	(0.012)
high educational level	0.332	***	(0.012)	0.346	***	(0.010)
number of children	-0.126	***	(0.007)	-0.126	***	(0.007)
age at first birth	-0.010	***	(0.001)	-0.012	***	(0.001)
age of youngest child	0.039	***	(0.002)	0.038	***	(0.002)
cohabiting	0.058	***	(0.011)	0.068	***	(0.010)
partner's income	0.000	***	(0.000)	-0.000	***	(0.000)
Eastern European country	0.019		(0.024)	0.112	***	(0.020)
unemployment rate	-0.011	***	(0.001)	-0.013	***	(0.000)
childcare coverage, ages 0 - <3	0.007	***	(0.001)	0.007	***	(0.000)
childcare coverage, ages 3 to comp. school age, >= 30 hours/week	0.000		(0.000)	-0.002	***	(0.000)

***p<0.01; **p<0.5; +p<0.1.

Sample: mothers with children below the age of seven, living with a partner in the household. Number of observations: 35103. Pseudo R2: 0.15 (model 1), 0.16 (model 2).

Sources: EU SILC (2004-2008), OECD Family Database, GGP Contextual Data; own calculations and illustration.

use leave with a wage replacement rate of at least 60%. Again, the second model confirms the positive impact of this variable. Furthermore, model 2 reveals that leave schemes with a low benefit affect the wage positively compared to the reference scheme (short leave without a benefit), whereas high benefit levels have a negative impact. There is no significant difference between short and long parental leave without benefits.

Maternity benefit has a positive effect on the mothers' log hourly wages, but the duration of maternity leave has a positive effect in model 1 and a negative effect in model 2. Looking at the classical independent variables for wage equations that are proxies for human capital and experience, model 1 exhibits a positive effect of a high educational level, and in both models the number of months spent at work in the current year has a strong positive impact. The square of the weekly working hours have a negative impact, revealing that the growth rate decreases with higher values. Unsurprisingly, the log hourly wages in all occupations are significantly different from those in elementary professions (reference group). In contrast, a higher share of females as well as a job change within the last year affects the wage negatively. As to traits related to childbirth, the age at first birth as well as the number of children impact the log hourly wage positively. Besides, it seems to rise with the increase of the partner's income. Finally, the dummy for Eastern countries and a higher female unemployment rate affect the log hourly wage negatively. As the selection variables that control for the selection incot emplyoment are not significant, it can be concluded that working mothers do not differ from non-working mothers in terms of unobserved characteristics.

Recalling the results on the impact of parental leave on the mothers' wages and combining the findings of both models, it seems that the benefit rather than the duration is the crucial factor. Low benefit rates score best in these models. However, parental leave provisions for the father at a high wage replacement rate are also important.

6 Summary and Discussion

Combining data from the EU SILC 2004 to 2008 panel with parental leave data from different sources, this paper provides insights into the impact of parental leave schemes and single characteristics on the mothers' emplyoment and wages in 23 European countries. In line with the hypotheses, a long duration of parental leave, job protection in the second year and benefit rates decrease the probabaility for being employed, while job protection in the first year and the father's individual entitlement for leave weeks at a high wage replacement rate increases this probability. The result that job protection in the second year has a negative impact might be caused by the low labour market participation of women in countries that offer two years of protection, e.g. Austria. The model that tests for different parental leave schemes show that, all in all, parental leave without benefits or short parental leave with a wage replacement rate of at least 60 % increase the likelyhood of working for mothers with small children.

Table 3: Impact of parental leave characteristics on mothers' wages
dependent variable: log hourly wages in purchasing power parities

	Model 1			Model 2		
	β coefficient		robust std. err.	β coefficient		robust std. error
parental leave characteristics						
duration	0.000		(0.000)			
benefit: flat rate	0.205	***	(0.016)			
benefit: less than 60% of wage	0.385	***	(0.024)			
benefit: at least 60% of wage	-0.386	***	(0.021)			
job protection in year 1	-0.169	***	(0.023)			
job protection more than 1 year	-0.011		(0.026)			
job protection more than 2 years	-0.123	***	(0.023)			
exclusive weeks for the father with at least 60% of wage	0.438	***	(0.038)	0.317	***	(0.036)
parental leave schemes						
<= 1 year, flat rate or less than 60% of wage				0.283	***	(0.016)
<= 1 year, at least 60% of wage				-0.329	***	(0.025)
> 1 year, no benefit				-0.007		(0.023)
> 1 year, flat rate or less than 60% of wage				0.100	***	(0.024)
> 1 year, at least 60% of wage				-0.381	***	(0.026)
maternity leave characteristics						
duration	0.016	***	(0.001)	0.017	***	(0.001)
benefit (as % of wage)	0.011	***	(0.001)	0.010	***	(0.001)

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Table 3 continued

dependent variable: log hourly wages in purchasing power parities

	Model 1			Model 2		
	β coefficient		robust std. err.	β coefficient		robust std. error
control variables						
medium educational leavel	0.006		(0.019)	-0.009		(0.019)
high educational level	0.068	***	(0.024)	0.032		(0.024)
years spent in paid work	0.003		(0.003)	0.003		(0.003)
years spent in paid work squared	-0.000		(0.000)	-0.000		(0.000)
number of months spent at work in current year	0.127	***	(0.003)	0.127	***	(0.003)
weekly working hours	0.001		(0.003)	-0.001		(0.003)
weekly working hours squared	-0.000	***	(0.000)	-0.000	***	(0.000)
occupation 1: legislators, senior officials, managers, professionals†	0.537	***	(0.022)	0.548	***	(0.023)
occupation 2: technicians and associated professionals	0.355	***	(0.021)	0.371	***	(0.021)
occupation 3: clerks	0.273	***	(0.021)	0.286	***	(0.021)
occupation 4: service workers, shop and market sales workers	0.080	***	(0.021)	0.091	***	(0.021)
occupation 5: workers in agriculture, craft, trade, machine operation	0.0660	**	(0.024)	0.074	***	(0.024)
share of females in the profession (ISCO-88, per country)	-0.001	***	(0.000)	-0.001	***	(0.000)
change of job since last year	-0.050	***	(0.016)	-0.048	***	(0.016)
number of children	0.068	***	(0.009)	0.074	***	(0.009)
age at first birth	0.010	***	(0.001)	0.012	***	(0.0021)
partner's income	0.000	***	(0.000)	0.000	***	(0.000)
Eastern European country	-0.604	***	(0.030)	-0.705	***	(0.021)
female unemployment rate	-0.006	***	(0.002)	-0.007	***	(0.002)
$\tilde{\eta}^*_{it}$	-0.106		(0.239)	0.048		(0.280)
$\tilde{z}^*_{it}$	-0.178		(1.531)	2.326		(1.765)
$\tilde{z}^{*2}_{it}$	0.437		(0.918)	-1.358		(1.051)
$\tilde{z}^{*3}_{it}$	-0.096		(0.192)	0.324		(0.218)

***p<0.01; **p<0.5; *p<0.1.

†Occupations: reference category is elementary occupations.

Sample: mothers with children under the age of seven, living with a partner, working at least 15 hours a week. Number of observations: 16687, number of groups: 9215.

Sources: EU SILC (2004-2008); own calculations and illustration.

Regarding the wages, the results are rather heterogenous. Looking at isolated leave characteristics, the negative impact of high benefits as well as job-protection in the third year confirm the hypotheses. A high benefit rate may incite mothers to return to work later, which results in a negative wage effect according to human capital theory. However, the positive effect of low benefits in comparison to no payments needs further explanations. Possibly, using parental leave might be more common in countries in which it is paid at a flat rate or a low replacement rate than in countries without a benefit. If this is the case, mothers who use it in countries without a benefit might experience higher wage penalties than mothers in countries with a flat rate or low replacement rate.

The father's exclusive entitlement to use parental leave at a high replacement rate is positive and significant in all models for employment and wages. This result is an important contribution to the existing literature, because, according to my knowledge, this is the first article that links mothers' emplyoment and wages to legislative incentives for the father to use parental leave.

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