THE IMPACT OF INSTITUTIONS ON MOTHERHOOD AND WORK

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Abstract

In this paper, we aim to explore the impact of social policies and labour market characteristics on the woman's decisions of working and having children, using data from the European Community Household Panel (ECHP). We estimate the two decisions jointly including in the analysis, beyond personal characteristics, variables related to the child care system, parental leave arrangements, and labour market flexibility. Our empirical results show that a non negligible portion of the differences in participation and fertility rates across women from different European countries can be attributed to the characteristics of these institutions. Child care availability increases the likelihood of women's employment as well as the opportunities of part-time (when its characteristics are similar to full time), while parental leave affect positively and significantly the likelihood of having a child especially for women with lower education.

1. Introduction

Over the last decades women participation rates have increased remarkably in the European Union countries, while fertility declined in most advanced countries and is now below the replacement rate. While the growth in participation carry some positive implications for the ability of countries and the European Union itself to meet a variety of social and economic targets, increasing the number of workers available to pay pension obligations to current retired. On the opposite the declining population levels make it less likely that the current form of European pension systems can be sustained.

The countries that currently have the lowest levels of fertility (Spain, Italy and Greece) are those with relatively low levels of female labour force participation, while the countries with higher fertility levels (Denmark, France) have relatively high female labour force participation rates. These important differences indicate that different countries are in different stages of development and are constrained by specific cultural, social and economic factors. In spite of similar standard of living, in fact, European countries differ for several institutional characteristics.

How to design policies in order to raise women's employment rates without diminishing fertility rates? An understanding of this relationship, in different contexts, has encouraged researchers to consider fertility and labour market participation as a joint decision, which depend not only on income and household characteristics but also on the institutional environment.

In this paper, we analyze the impact on women employment and fertility decisions of different institutions such as the child care system, the parental leaves schemes, and the labour market flexibility. We describe how these policies work across Europe in Section 2, with the most relevant literature regarding their influence on working and fertility decisions and the difficulties associated to comparative analyses. In particular we focus on Belgium Netherlands Italy Spain France Denmark and the UK representing quite different welfare states. The methodological framework is presented in Section 3, and the dataset and the variables used in Section 4. The results of the empirical analysis are in Section 5. Conclusions follow.

2. The determinants of fertility and female labour market participation

The variation in women's decisions regarding work and fertility across countries reflect several factors related to culture and social norms as well as economic incentives[1]. In the growing literature regarding culture and social norms, Fernandez and Fogli (2005) show that a significant part of the variation across time and space of fertility and participation is explained by culture. Berman et al. (2006) report evidence on the impact of catholic religiosity on fertility differences across countries. While these factors are important in our research we focus more on the economic aspect of women's decisions. For example the important differences across countries, (especially between the Northern and Southern Europe) reflect the fact that only Nordic countries (and France) have implemented institutional structures that enable women to balance work and childbearing (Kohler *et al.* 2002, Billari and Kohler 2004, Jaumotte 2004, Diprete *et al.* 2002). We consider policies which increase the flexibility of working time arrangements as well as policies which support families with young children: child care and parental leave.

2.1 Flexibility of working time arrangements

The possibility to combine work and childrearing depends strongly on the occupational structure and working arrangements. In countries where part-time is low unemployment rate is often high indicating important rigidities and labor market frictions.

Married women who choose to work tend to have full-time work commitments, which is not compatible with having large numbers of children. The positive link between part-time jobs and women's participation in the labour market has been shown in studies based on cross-country analyses. Empirical analyses of several countries show that being a mother (compared with being childless) decreases the probability of choosing full-time work and increases the probability both of not working or working part-time (Bardasi and Gornick 2000).

In countries where part-time opportunities are scarce, married women are forced to choose between not working or working full-time, neither of which is necessarily their preferred option. The low proportion of part-time opportunities, in

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[1] For excellent surveys on the determinants of participation and fertility across different institutional environments see Sleebos 2005, Neyer 2006.

fact, does not seem to be consistent with self-reported preferences: a large number of women who are unemployed or do not participate in the labour force report that they would actually prefer to work part-time. Even among the employed, more people state a preference for working fewer paid hours than for working longer hours at the given hourly wage (European Economy, 1995). Therefore, greater opportunities for part-time employment by reducing the opportunity costs of having children have a positive impact on fertility rates. In countries where part-time opportunities are higher, fertility rates are also higher (Netherlands, Denmark, U.K.).

However as we have shown in a recent work (Del Boca *et al.* 2005), different countries are not only characterized by different levels of part-time opportunities but these opportunities may have different "nature". Our findings show in fact that part-time has a positive effect on participation and fertility only in countries where it provides higher quality jobs. In these countries, in fact, part-time jobs are characterized by higher job protection and social benefits and have very similar characteristics to full-time jobs (more permanent positions with higher hourly wages) than elsewhere and consist mainly of permanent positions and middle-level jobs (Ariza *et al.* 2005).

2.2 Child care and parental leave

The impact of other policies are more related to different level of generosity[2] in their policies towards working women. For child care we may consider mainly levels of availability, in terms of hours of opening and number of slots. Studies on temporal patterns have shown that the increased availability of child care is one possible explanation for the change in fertility over time and for the observed changes in the relation between women's participation and fertility (Ahn and Mira 2002, Ermisch 1989, Englehardt and Prskawetz 2002, Kogel 2002).

Differences emerge among European countries in terms of availability and flexibility in the services offered: in Southern Europe the percentage of children under three who are in child care is quite low compared with Nordic countries such as Denmark and it is characterized by greater rigidity in the number of weekly hours available. On the contrary, the proportion of children over three in child care is

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[2] See for example the rankings of generosity of public policies in De Henau *et al.* 2006.

relatively high in Southern European countries, even compared to Northern European countries (Table 1).

Table 1

Child Care in Europe, 1999/2000

	Infants		Pre school aged children	
	Coverage(*) (%)	*Opening hours (per day)*	*Coverage (%)*	*Opening hours (per day)*
Belgium	30	9	99	7
Denmark	55	10.5	90	10.5
France	39	10	87	8
Italy	6	9	87	8
Netherlands	2	10	66	7
Spain	5	5	77	5
UK	2	8	60	5

Source: De Henau J. *et al.* (2006)
(*) Percentage of slots per 100 children

Another important social policy that has an impact on balancing work and child rearing is the parental leave. Parental leave arrangements seem to be important to help women in reconcile motherhood and work: longer maternity leave, in fact, alleviates the tension between the conflicting responsibilities women may face as mothers and as workers. Under EU law, employed women are entitled to a maternity leave of minimum 14 weeks and to a parental leave of minimum 3 months. The member states can choose to extend these minimum requirements (Table 2) and can decide whether to guarantee of pension and seniority rights during the leave, what proportion of leave can be transferred between parents and the part reserved for the father only, on what basis parents can take the leave (full/part) and the child's upper age limit at which the right to parental leave expires.

Maternity leave is likely to have a positive impact on women's employment rate since more women would enter employment if they knew they had access to leave. A relatively strong correspondence between the generosity of child-related policies of maternal employment (including maternity leave) and women's employment profiles emerges from cross-country comparison. In Northern European countries, where policies are more generous, female participation in the labour market is higher (Jaumotte 2004)

Table 2
Maternity leave and parental leave in Europe in 1999

| | Maternity leave | | Parental leave | |
	Period (weeks)	Average replacement rate (%)	Total leave duration (months)	Paid period (% of the total leave)
Belgium	15	77	6	100
Denmark	18	62	11	70
France	16	100	36	100
Italy	22	80	12	55
Netherlands	16	100	6	0
Spain	16	100	36	0
U.K.	18	43	8	0

Source: De Henau J. *et al.* (2006)

Quite different results, however, have been reported for the U.S. During the period 1980-1990 the labour supply of new mothers did not increase more in States where maternity laws were enacted. After 1993, when the FMLA Act was introduced, the effect of maternity leave appears limited probably because a 12-weeks is such a short period, the coverage is not universal and in many cases leave is unpaid (Klerman and Leibowitz 1994, Waldfogel 2002). The expected effect of the duration of leave is in fact ambiguous: in theory, the longer women stay out of the labour force, the greater the loss they incur in terms of skill deterioration and lost opportunities for promotion and training.

Ruhm and Teague (1997) examine the association between leave policies and indicators of macro economic conditions and found that paid leave is associated with increased employment and reduced unemployment

In our analysis of women's decision to both work and have children, we take into account personal characteristics, like age, education and non-labour income, and we analyze their interactions with the institutional environment. Previous empirical findings are quite consistent with the implications of microeconomic analysis and indicate that female education (as a proxy for wages) has a negative effect on fertility and a positive effect on participation while non labour income has a disincentive effect on participation. Bratti (2001) explains women's participation decisions in the period surrounding a birth event, estimating the effect of education and several economic variables on the decisions to give birth and to participate in the labour market. He found that education increases women's commitment to work. In particular, highly educated women continue to work in the period surrounding a birth

event, and therefore education induces fertility postponement. His results imply that policies aiming at increasing women's education would have a positive effect on participation, but an uncertain effect on fertility, given evidence of a U-shaped pattern of fertility with education, interpreted in terms of the prevalence of income over substitution effects due to education and by more access to private child care for highly educated women (Ahn and Mira 2002). Finally the role of the extended family is very important in South Europe where it represents an important substitute for formal child care, affecting positively both participation and fertility (Del Boca, Pasqua and Pronzato, 2005; Pronzato, 2006).

3. The Econometric Specification

In our model, the relationship between participation and fertility depends not only on household characteristics, but also on variables related to the characteristics of the environment the households face. In this empirical analysis we attempt to determine empirically the extent to which different combinations of currently existing social and labour market policies (e.g., part-time employment opportunities, subsidised child care provision, parental leave) affect the decisions to participate in the labour market and to have children.

In order to estimate the effects of individual's, household's and environmental characteristics on the joint decision to work and to have a child we use a bivariate probit model that allows to estimate the joint probability to work and to have a child in the year considered.

The econometric specification of the fertility and labour supply decision rules are assumed to be quasi-reduced form representations of the demand functions representing the solutions to the optimisation problem. A latent variable structure is assumed for both decisions. To illustrate this, we consider a two equation system. Let the net value of being employed in period t be given by:

$$P_{i,t}^* = H_{i,t}\beta_1 + Y_{i,t}\beta_2 + E_{i,t}\beta_3 + u_{i,t}$$

The latent variable representing the net returns to an additional child in period t is given by:

$$B_{i,t}^* = H_{i,t}\delta_1 + Y_{i,t}\delta_2 + E_{i,t}\delta_3 + v_{i,t}$$

where $H_{i,t}$ is the row vector containing the observed variables measuring the household i woman's human capital at time t, $Y_{i,t}$ is the vector of household's income at time t and it includes the husband's earnings and $E_{i,t}$ is the vector of variables describing the economic environment (labour market characteristics and social policies). The term $u_{i,t}$ is a disturbance term. And the disturbance term $v_{i,t}$ is not assumed to be distributed independently of $u_{i,t}$.

Define the variable $d_{i,t}^p = 1$ if the woman in the household i participates to the labour market in period t, and set $d_{i,t}^p = 0$ if not. Define the birth outcome in a similar way, that is, let $d_{i,t}^f = 1$ if there is a birth in household i during period t and set it equal to zero if this is not the case. Then we have that

$$d_{i,t}^p = 1 \Leftrightarrow P_{i,t}^* > 0 \qquad \text{and} \qquad d_{i,t}^f = 1 \Leftrightarrow B_{i,t}^* > 0$$

Assume that $d_{i,t}^{p^*}$ and $d_{i,t}^{f^*}$ are normally distributed with unit variance, therefore we have that:

$$P(d_{i,t}^p = 1) = \Phi(H_{i,t}\beta_1 + Y_{i,t}\beta_2 + E_{i,t}\beta_3) \qquad \text{and}$$

$$P(d_{i,t}^f = 1) = \Phi(H_{i,t}\delta_1 + Y_{i,t}\delta_2 + E_{i,t}\delta_3)$$

Once specified the marginal probabilities of $d_{i,t}^p$ and $d_{i,t}^f$, the multivariate model is completed when we specify the joint probability $P(d_{i,t}^p = 1, d_{i,t}^f = 1)$ which is determined if the joint distribution of $d_{i,t}^{p^*}$ and $d_{i,t}^{f^*}$ is specified. If $d_{i,t}^{p^*}$ and $d_{i,t}^{f^*}$ are jointly normal with a correlation coefficient ρ, thus

$$P(d_{i,t}^p = 1, d_{i,t}^f = 1) = F_p(H_{i,t}\beta_1 + Y_{i,t}\beta_2 + E_{i,t}\beta_3, H_{i,t}\delta_1 + Y_{i,t}\delta_2 + E_{i,t}\delta_3)$$

where F_p is the bivariate normal distribution function with zero means, unit variance and correlation ρ. Therefore in this model the marginal probabilities are first specified and then a joint probability consistent with them is found.

In this model we use both individual data and data at regional and country level to describe the environment women face. If the disturbances are correlated within regions that are used to merge aggregate with micro data, however, then even small levels of correlations can cause the standard errors to be seriously biased downward. The bias of the standard errors can result in spurious finding of statistical significance for the aggregate variable of interest (Moulton, 1990). We correct this

bias by "clustering" the observations by region (Primo et al, 2007). Then, we also introduce dummies indicating whether the woman lives in a country in the North, Central-West or South Europe, or in the U.K.

4. Data and variables

For our empirical analysis we use the European Community Household Panel (ECHP), a longitudinal survey co-ordinated and supported by the Eurostat. The survey involves a representative sample of households and individuals interviewed for eight years (1994-2001) in each of the 15 countries[3]. The standardized methodology and procedure in data collection yield comparable information across countries, making the ECHP a unique source of information for cross-countries analyses at the European level. The aim of the survey, in fact, is to provide a comparable information on EU population, representative both at the longitudinal and the crosswise level. The data collected cover a wide range of topics on living conditions (income, employment, poverty and social exclusion, housing, health, migration, and other social indicators).

Therefore the ECHP survey allows for analyses of how individuals and households experience change in their socio-economic environment and how they respond to such changes, and for analyses of how conditions, life events, behaviour, and values are linked each other dynamically over time.

The unit of analysis of the ECHP are the families and, within the households, all individuals older than 16, even if it is possible to have information (mainly demographic information) also on children under 16. In almost every country the concept of family is based on the two criteria of the condivision of the house and on the common daily matters. A *household* is therefore defined as "one person living alone or a group of persons (not necessarily related) living at the same address with common housekeeping – i.e., sharing a meal on most days or sharing a living or sitting room" (Eurostat, 1999, p. 25).

The ECHP has many advantages: it covers the whole population, including non-working persons; as a household data set, it includes a lot of useful and harmonised information (number and age of children, marital status for example). Moreover, it is possible to link household-level information to individual data so that

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[3] Austria (from 1995), Belgium, Denmark, Finland (from 1996), France, Germany, Greece, Italy, Ireland, Luxembourg, the Netherlands, Portugal, Spain, Sweden (from 1997) and U.K..

it allows to study, for example, the labour supply decisions of the female partner in a couple accounting for her own personal characteristics but also for those of the male partner.

For our empirical analysis we selected seven of the fifteen countries of the dataset, representative of the different geographical areas of Europe: Italy and Spain (Southern European countries), France, Belgium and the Netherlands (Central West-European countries), Denmark (a Northern European country) and the U.K. (a Northern European country, characterised by a more liberal welfare regime). For these countries we consider the data relative to the year 1999. The information given by the ECHP dataset has been integrated with information taken from REGIO (a Eurostat dataset providing regional data) about the characteristics of the "environment" in which the women live. Both the choice of the year and the choice of the countries have been therefore constrained by the availability of regional data on relevant aspects of the labour market (in particular the availability of part-time jobs and relative importance of the services sector) and of the child care services.

We selected all households in which women is in the age range 21-45, married or cohabitant, in order to exclude those women who might be still enrolled in school or may be already retired. For the analysis of fertility the age restriction helps to ensure that women included in the final sample will have a high probability of being fecund.

Our aim is to estimate simultaneously the probability for a woman to work and to have a child. The dependent variables used in our analysis are therefore whether the woman is working at the time of the interview and whether she has had a child in the year of the interview. In the dataset, there is no variable which tells us whether a woman is on maternity/parental leave. Since the question in the interview is about their "normal" activity status, we expect that women who are on leave state that they work.

The independent variables we use to explain women's decisions can be divided in five main groups:

Personal characteristics

- woman's age (and squared age).

- woman's education: we use three dummies variables (third level of education, second level of education and less than second level of education. The last is the excluded one).

Household's characteristics

- presence of other children (different from the childbirth considered in the analysis) in the household[4]: we use four dummies variables indicating no children (the excluded one), children aged 0-3, children aged 4-14 and children older than 14. We differentiate the presence of other children according to their age since we believe that children at different age have different effect on mothers' decision to work and to have an additional child.
- presence of grandparents: presence in the household of either the woman's or of the partner's parents.
- woman's non-labour income, that include all household sources of income but woman's labour income and social transfers (in euros and divided by 1000).

Labour market characteristics

- regional availability of part-time jobs, obtained as the ratio between part-time workers and total employed at regional level (from the dataset REGIO). The distinction between full-time and part-time work is made by Eurostat on the basis of a spontaneous answer given by the respondent[5]. The regional availability of part-time jobs has also been interacted with a dummy variable (High Quality) that take value 1 in those countries in which the hourly wage of part-timers is 10% or more higher than the hourly wage of full-timers (Italy and Belgium according to the estimates in Ariza *et al.*, 2005, that use ECHP

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[4] We do not differentiate between own children and stepchildren.

[5] According to Eurostat, in fact, it is impossible to establish a more exact distinction between part-time and full-time work, due to variations in working hours between Member States and also between branches of industry. To correct implausible answers the answer to the question cross-checks have been done with the answer to the question on hours worked per week. The Eurostat website report that the average hours worked by part-timers in 1999 in the European countries considered in the present study are respectively 21.7 in Belgium, 19.6 in Denmark, 22.9 in France, 23.4 in Italy, 18.7 in the Netherlands, 18.2 in Spain and 18.0 in the U.K.

data[6]), zero otherwise. This interaction may help to differentiate the effect of part-time when it represent a 'good' job and when it represent a 'bad' job (see also Del Boca *et al.*, 2005).

Social policies

- social transfers to the household, that represent income from public transfers (in euros and divided by 1000).

- availability of child care, obtained as the percentage of children 0-3 using child care facilities (from the dataset REGIO)[7].

- generosity of the parental leave arrangement: we use the values of the index provided by De Henau *et al.* (2007), computed after comparing different regulatory settings for maternity leave in the private sector according to four basic criteria: the level of protection with respect to work resumption, flexibility in the timing of the leave, the level of replacement income, and the incentives for the father's take-up. The index takes value 100 when the parental leave rules are is the most generous in all aspect among all European countries and value zero when the country is the least generous in all aspects considered of the parental leave policy.

Dummies variables for the geographical area of residence

- North if the household lives in Denmark.
- Central-West if the household live in France, in Belgium or in the Netherlands
- South if the household lives in Italy or in Spain.
- U.K if the household live in the U.K (dummy excluded).

The information concerning income has been made comparable using PPP (Purchasing Parity Power) specific coefficients provided by Eurostat in the ECHP

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[6] Ariza *et al.* (2005) report that the ratio between the hourly wage of part-timers and the hourly wage of full-timers is 1.11 in Belgium, 1.06 in Denmark, 0.95 in France, 1.25 in Italy, 1.04 in the Netherlands, 0.92 in Spain and 0.91 in the U.K.

[7] From previous results and from Table 1 we know in fact that child care facilities for children between 3 and school age is higher and more similar across the different European countries.

dataset. In our empirical analysis we consider the effect of all variables above mentioned on the probability for a woman to work and to have a child.

Table 3 reports the descriptive statistics for the sample for the countries considered.

Table 3

Descriptive statistics

	Denmark	*France*	*Belgium*	*Netherlands*	*Italy*	*Spain*	*U.K.*
% of working women	81.3	62.0	74.3	61.2	49.9	45.0	69.8
% of women that had a child in the year	8.9	9.6	7.5	6.1	8.2	8.1	7.1
Women's age	33.9	34.2	35.0	32.3	35.4	34.8	34.0
% of women with tertiary education	33.4	34.0	47.7	17.7	8.5	23.8	40.0
% of women with secondary education	47.0	39.9	33.4	49.5	44.7	21.7	14.8
% of women with primary education	19.6	26.1	18.9	32.8	46.8	54.5	45.2
Woman's non-labour income (euro, PPP)	17,960	18,394	20,524	21,148	15,900	14,697	19,540
Presence of grandparents in the HH (%)	0.9	1.0	1.6	0.3	6.2	8.8	2.8
Social transfers to the HH (euro, PPP)	4,888	3,450	4,478	2,233	1,245	1,542	2,260
% employed part-time (in the region of residence)	20.8	17.6	16.2	37.3	7.7	8.3	25.3
Child care availability (in the region of residence) (%)	64.0	12.1	12.1	18.0	7.3	5.7	2.8
Index of generosity of parental leave policy	61.5	40.9	71.5	40.1	77.3	17.6	47.8
N. obs.	787	1,834	964	1,830	2,295	1,909	1,668

The descriptive statistics show a picture quite coherent with the empirical evidence discussed in the previous sections. The percentage of women working is higher in Denmark, in Belgium and in the U.K., while it is much lower in Italy and Spain.

Women are more educated in North and Central-West European countries, especially in the U.K. and in Belgium, than in Southern countries. In particular in Italy only 8.5% of women has tertiary education, while in Spain more than a half of women have only primary education.

Women's non-labour income, even if corrected for parity purchasing power, is lower in Spain and Italy than in the other countries, showing the lack of policies for economic household support in Southern European countries (Pronzato, 2006). In fact, the percentage of households who receive family allowances in Denmark and Belgium is above 90% while in Italy and Spain is below 20%.

The comparison of the labour market characteristics and social policies indicates that the percentage of part-time workers is particularly low in the Southern European countries, while part-time is widespread in the Netherlands and in the U.K. However, part-time work differs in the different European countries in terms of legislation, social benefits and job protection. The ECHP data show that in Denmark and France, part-time work is higher among young women, while in the Netherlands, Belgium, the U.K. it is widespread mainly among women older that 30.

Moreover, while in most countries part-time work is used more among lower educated women, in Italy highly educated women use part-time more than lower educated ones. In France, Spain and the U.K. temporary part-time contracts prevail over permanent part-time contracts. Finally, they find that while in France and Spain part-time is mainly involuntary, while in Denmark, the Netherlands and the U.K. it is mainly women's choice.

Other differences concern the child care availability for children between 0 and 3 years which is extremely low in the Southern European countries (and in the U.K.), and very high in Denmark.

The index of the generosity of the parental leave policy shows that working mothers' are particularly protected in Italy, Belgium and Denmark, while Spain seems to have a less generous parental leave policy.

The family structure shows different features across countries: the percentage of households where we observe a co-residence between married children and their

parents is relevant only in Southern European countries where the lack of public services makes the role of the extended family important (here considered with the variable 'presence of grandparents in the household').

5. The Empirical Results

We estimate the probability of working and having a child with a bivariate probit model. We first estimate the effect of personal and household's characteristics on for the whole sample (Table 4) and then we consider also the environmental variables (labour market characteristics and social policies) separately for women with tertiary education and for women with less then tertiary education, since, as our results show, these variables have quite different effects on the two groups of women (Table 6 and 7).

Table 4

Bivariate probit estimates (std. error in brackets)

	Prob. of working	Prob. of having a child
Women's age	.156**	.368**
	(.025)	(.047)
Squared women's age	-.002**	-.006**
	(.000)	(.001)
Tertiary education	.859**	.167**
	(.080)	(.048)
Secondary education	.414**	.031
	(.081)	(.037)
Woman's non-labour income	-.001	.000
	(.001)	(.002)
Children 0-3	-.672**	-.2647*
	(.092)	(.090)
Children 4-14	-.577**	-.212**
	(.123)	(.077)
Children >14	-.336**	-.722**
	(.110)	(.189)
North	.360**	.155**
	(.045)	(.061)
Center-West	-.174**	.112
	(.059)	(.078)
South	-.468**	.181**
	(.093)	(.073)
Constant	-2.246**	-6.269**
	(.531)	(.735)
N. obs.	10,460	
Log likelihood	-8851.838	
Rho	.009 (.032)	

** = significant at 95% , * = significant at 90%

The likelihood of both participation and fertility increases with age at the decreasing rate. Women with secondary and tertiary education are more likely to work with respect to women with primary education (excluded category), while only tertiary education increases the probability of having an additional child.

The presence of children in the household decreases the probability of working and having another child, but the effect is different according with the age of the children. In fact, younger children have a stronger negative impact on the probability of being employed, while are the older children who most negatively affect the probability of having an additional child.

The variable related to non-labour income is not significant, while we could not include the variable "presence of grandparents in the household" in these estimates since it is highly correlated with education: parents or parents-in-law of the woman are present in the household mainly where women are less educated[8].

We now turn to the analysis of social policies and labour market characteristics on women employment and fertility. We estimate our model separately for women with tertiary education and for women with less than tertiary education.

As shown in Table 5, employment rates of women with tertiary education are high and similar in all countries, while more differences emerge when we look at women with a lower level of education. At the same time the percentage of women that had a child in the year considered is lower for less educated women in all countries, but Denmark. It is therefore important to asses the effects of environmental variables on the two different groups since these descriptive statistics seem to suggest the need for more policies to reconcile work and family mainly targeted to less educated women.

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[8] And in fact also in the estimates for women with tertiary education presented in Table 6 we excluded this variable due to the lack of variability.

Table 5

Employment and fertility for different educational levels

	Denmark	*France*	*Belgium*	*Netherlands*	*Italy*	*Spain*	*U.K.*
Women with tertiary education							
% of working women	91.4	71.7	89.8	75.7	80.7	72.8	79.8
% of women that had a child in the year	8.5	12.3	9.0	8.2	9.7	10.8	8.3
Women with less than tertiary education							
% of working women	76.3	57.7	60.1	58.2	47.1	36.4	63.6
% of women that had a child in the year	8.8	8.4	6.2	5.5	8.0	7.2	6.5

Tables 6 and 7 report the results of our estimates. Age has the same positive but decreasing effect on both the probability of working and having children for the two groups.

While having the same negative effect on women's employment probability for the two groups, children affect negatively the probability of having an additional child only when they are very young, while when they grow the effect on fertility is negative only for less educated women. This can be explained as an income effect: due to the high cost of children especially for women with a lower earning potential, less educated women are less likely to have an additional child if they have already one or more.No-labour income has a negative effect on both employment and fertility for both groups[9].

The effect of the presence of grandparents in the household has been estimated only for the group of less educated since very few households where the women with tertiary education had grandparent co-residents. For lower educated women the presence of grandparents in the household has a large and positive coefficient in the working equation: the probability of working goes from 54% to 73% with the presence of grandparents in the household. This can be interpreted in two ways. On one hand parents when co-residing may be able to facilitate women to work, helping

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[9] Even if it not significant on the probability of having a child for less educated women.

in the household in various chores and compensating for the rigidities of child care schedules. On the other hand it could be an additional economic burden that requires women to provide additional income, by working in the labour market.

We now turn to the discussion of working time arrangements. In contrast with results of previous literature, the availability of part-time jobs here has a negative effect on the probability of working. Given the differences in "quality" of part-time (reported in Del Boca Pasqua Pronzato. 2005), we add an additional term (Part-time*High Quality) which is an interaction between part-time and living in countries where part-time arrangements characterize better paid jobs and more permanent contracts (Italy and Belgium). The effect becomes positive and significant for highly educated women, implying that an increase of 10 percentage points in high quality part time opportunities would raise the probability of working from 78 to 85%. This seems to confirm the important differences between the characteristics of part-time across countries: part-time opportunities increase female participation only for highly educated when they provide high quality jobs in terms of payments and permanent contracts.

When we look at the effect of part-time job availability on fertility, this is not significant for highly educated women, with higher income that, even when working full-time can pay for private child care (typically baby sitters), while it is negative for less educated women since part-time jobs for lower educated are often less paid and protected. Once again we observe a negative income effect on fertility for less educated women.

Social transfers as they are designed in most of the countries (see Pronzato, 2006), do not seem to help reducing the negative income effects on fertility. They represent, in fact, mainly transfers to workers that already have children and in Sothern European countries they look more as measures to reduce poverty rather than instruments to support larger households. On the contrary, the impact of social transfers has an expected negative effect on participation, confirming most earlier studies.

Child care availability has a positive effect on the probability of working for women with all level of education, but the effect seems to be stronger for less educated women: increasing childcare availability by 10%, the probability of working would go from 55% to 70% for low educated women, while from 75% to 83% for highly educated women.

It is interesting to indirectly observe that the cost of childcare seems to influence the participation behaviour: less educated women are more affected by public childcare provisions and presence of grandparents (both cost less than private crèches and baby-sitting), while for highly educated women the influence of public childcare is smaller and the co-residence with grandparents very rare.

Parental leave has instead no effect on participation. This result can be interpreted in light of the results from other studies (Jaumotte 2004, Ruhm 1998) where a positive effect of leave was found at until a certain length (estimated of an equivalent of 20 weeks). Beyond this length a further increase appear to have a negative effect. This reversal suggests that while a short parental leave strengthen women labour market attachment through a job guarantee, extended parental leave may weaken labour market skills and damage future career paths and earnings making it difficult for mother to return to the labour market. Therefore analyzing several countries the negative effect can offset the initial positive one. The generosity the optional parental leave has instead a positive effect on the probability of having a child for lower educated women, while it is not significant when we look at highly educated women. This seems to confirm that the generosity of parental leave is less relevant in the decision of having a child for more educated women that are more attached to the labour market and have more possibilities to pay for baby-sitters.

On the contrary more generous parental leave arrangements may help women with lower education to have children. For women with less educated, however, the coefficient is not simple to interpret since it takes into account the job protection, the flexibility in the timing, the income replacement, and the gender-equality dimension. Let's consider two extremes: Spain (score: 17.6) with only one third of the leave with protected job, where the parental leave can be taken only immediately following childbirth, without any transfers and any incentives for the father's take-up; Belgium (score: 71.5) where during the whole leave the job is protected, the leave can be taken until age 8 of the child, the transfers are one third of the average female wage, and half of the leave has to be taken by the father, otherwise it is lost for the family. Because of this, the probability to have a child for a woman with similar characteristics is 6% in the first case, while 9% in the second.

Our results seems to indicate that social policies like parental leave arrangements and child care availability (and the presence of grandparents, whose importance reveals the lack of child care) affect women with less human capital,

while highly educated women are mostly affected by labour market opportunities which allow them not to interrupt their career. In fact, Aaberge *et al.* (2005) show that women with lower education are more responsive to economic incentives than women in other income groups.

Finally the correlation coefficient (ρ) is negative, but not significant. The correlation between these two decisions, however, can have different signs among the analysed countries.

Table 6

Bivariate probit estimates (std. error in brackets)
for women with tertiary education

	Prob. Of working	Prob. of having a child
Women's age	.257**	.682**
	(.069)	(.089)
Squared women's age	-.003**	-.011**
	(.001)	(.001)
Woman's non-labour income	-.007**	-.005**
	(.001)	(.002)
Children 0-3	-.620**	-.196*
	(.096)	(.107)
Children 4-14	-.442**	-.133
	(.104)	(.115)
Children >14	-.072	-.516
	(.235)	(.431)
Presence of grandparents in the HH (*)	-	-
Part-time	-.012**	-.006
	(.006)	(.005)
Part-time*High Quality	.045**	-.008
	(.010)	(.008)
Child care availability	.023**	.007
	(0.11)	(.008)
Social transfers to the HH	-.047**	-.022*
	(.008)	(.013)
Generosity of parental leave	-.001	.002
	(.003)	(.003)
North	-.767	-.309
	(.674)	(.547)
Center-West	-.444**	.064
	(.139)	(.121)
South	-.665**	-.017
	(.164)	(.169)
Constant	-3.116**	-11.185**
	(1.251)	(1.431)
N. obs.	2,689	
Log likelihood	-2,028.746	
Rho	.098 (.052)	

** = significant at 95% , * = significant at 90%
(*) Variable excluded because of the low percentage of women with tertiary education leaving with grandparents

Table 7

Bivariate probit estimates (std. error in brackets)
for women with less than tertiary education

	Prob. Of working	Prob. of having a child
Women's age	.139**	.308**
	(.030)	(.061)
Squared women's age	-.002**	-.006**
	(.000)	(.001)
Secondary education	.367**	.018
	(.074)	(.037)
Woman's non-labour income	-.005**	.002
	(.001)	(.002)
Children 0-3	-.591**	-.321**
	(.121)	(.103)
Children 4-14	-.572**	-.250**
	(.128)	(.084)
Children >14	-.351**	-.762**
	(.128)	(.211)
Presence of grandparents in the HH	.582**	-.098
	(.137)	(.124)
Part-time	-.018**	-.011**
	(.006)	(.003)
Part-time*High Quality	.012	-.018*
	(.010)	(.010)
Child care availability	.042**	-.009
	(.010)	(.006)
Social transfers to the HH	-.064**	-.003
	(.009)	(.008)
Generosity of parental leave	.001	.003*
	(.003)	(.002)
North	-2.221**	.529
	(.632)	(.395)
Center-West	-.7.0**	.232*
	(.150)	(.122)
South	-1.264**	.059
	(.144)	(.140)
Constant	-1.295**	-5.078**
	(.596)	(.925)
N. obs.	7632	
Log likelihood	-6,418.029	
Rho	-.061 (.041)	

** = significant at 95% , * = significant at 90%

6. Conclusion

In this paper we estimate jointly the decisions of working and having children using ECHP data. We focus on the impact of social policies and labor market opportunities, related to the child care system, parental leave arrangements, and part time opportunities. In order to take into account potential heterogeneity with women with different levels of education we consider the impact of social policies on women with tertiary education and women with less less tertiary education.

Labor supply of women with higher education is more responsive to initiatives which increases the flexibility of working arrangements, while labor supply of women with lower education is more responsive to child care availability, social tranfers. The fertility decisions of lower educated women are much less sensitive to changes in social policies. Part time affects negatively the decisions of having a child whie parental leave have a small positive effect. For lower education women part time income may not be enough to afford to have a child.

We also take into account the different "quality" of part time opportunities across countries. Also in this case education matters: In fact while for higher educated women a higher quality part has a positive effect on participation providing additional flexibility needed for conciliating work and the family, for less educated part time (independently on the quality level) the effect is always negative. Further analyses will deal with norms and values to explain further the differences social policies across countries and their different impact on households decisions.

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