Market work and Motherhood Decisions in Contexts

Daniela Del Boca

(University of Turin and CHILD Collegio Carlo Alberto)

Silvia Pasqua[1]

(University of Turin and CHILD Collegio Carlo Alberto)

Chiara Pronzato

(University of Essex and CHILD Collegio Carlo Alberto)

Abstract

In this paper, we explore the impact of social policies and labour market characteristics on women's decisions regarding work and childbearing, using data from the European Community Household Panel (ECHP). We estimate the two decisions jointly and, in addition to personal characteristics, include variables related to the childcare system, parental leave arrangements, family allowances, and labour market flexibility. Our empirical results show that a non-negligible portion of the differences in participation and fertility rates for women from different European countries can be attributed to the characteristics of these institutions, and that the environmental effects vary by educational level. While labour market arrangements, such as part-time opportunities (when well-paid and protected), have a larger impact on the outcomes of women with higher educational levels, childcare and optional parental leaves have a larger impact on the fertility and participation decisions of women at lower educational levels.

---

[1] Address for Correspondence: Silvia Pasqua, Child Collegio Carlo Alberto - Via Real Collegio 30, Moncalieri (Torino) – ITALY; silvia.pasqua@unito.it

1. Introduction

Over the last decades, women's participation rates have increased remarkably in European Union countries, while fertility has declined in most advanced countries and is now below the replacement rate. Growth in participation carries some positive implications for the ability of individual 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 currently retired workers. Nonetheless, 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 participation rates. These significant 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 standards of living, in fact, European countries differ in several institutional characteristics.

How should policies be designed to boost women's employment rates without diminishing fertility rates? This important question has encouraged researchers to consider fertility and labour market participation as a joint decision which depends not only on income and household characteristics but also on the institutional environment.

In this paper, we analyze the relationship between women's employment and fertility decisions in contexts characterized by different institutions (childcare systems, parental leave schemes, family allowances, and part-time arrangements). While the present analysis does not take into account the potential endogeneity of social and labour marker institutions, our results can be used for policy discussion in an explorative framework.

We first describe the different institutions in several European countries (Belgium, the Netherlands, Italy, Spain, France, Denmark and the U.K) and discuss their contribution to female labour market participation and fertility (Section 2). In Section 3 we present the methodological framework used for our empirical analysis, while the data and the variables used are described in Section 4. The results of the empirical analysis are contained in Section 5. Conclusions follow.

2. The determinants of fertility and female labour market participation

Variations in women's decisions regarding work and fertility across countries reflect several factors related to social norms as well as economic incentives[2]. In the growing literature regarding 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 religiosity on fertility differences across countries.

While these factors are important, we focus more closely on the economic aspects of women's decisions. It has been recognized that the important differences in participation and fertility across countries reflect the fact that Northern European countries have implemented earlier and stronger institutional structures enabling women to balance work and childbearing (Kohler *et al.* 2002, Billari and Kohler 2004, Jaumotte 2003, DiPrete *et al.* 2003), while Southern European countries still lack adequate policies to help working women. Among these institutional structures, we consider labour market characteristics such as part-time arrangements as well as institutions which offer direct and indirect support for families with young children: childcare, family allowances and parental leave.

2.1 Part-time arrangements

The possibility of combining work and childrearing depends strongly on the occupational structure and working arrangements. In countries where part-time work is rare, the unemployment rate is often high, indicating important rigidities and labour market frictions. In these countries, women who choose to work tend to have full-time work commitments, which is hardly compatible with having several children. Cross country comparisons show that being a mother (as opposed to 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).

The low proportion of part-time opportunities, in 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 women state a preference

---

[2] Surveys on the determinants of participation and fertility across different institutional environments are in Sleebos (2005), Neyer (2006), Del Boca and Locatelli (2007).

for working fewer hours than for working longer hours at the given hourly wage (European Economy, 1995).

However, as shown in Table 1, the characteristics of part-time jobs differ across countries. In most countries holding a part-time job is more common for lower educated women (Italy is the exception), and the incidence of temporary contracts is relatively high (France, Netherlands and the U.K.). As a consequence the hourly wage of part-timers is significantly higher than the hourly wage of full-timers only in Italy and Belgium. Ariza *et al.* (2005) also find that in Denmark and France part-time work is higher among young women, while in the Netherlands, Belgium and the U.K. it is widespread mainly among women over 30 and that while in France and Spain part-time is mainly involuntary, in Denmark, the Netherlands and the U.K. it is mainly the women's choice.

Table 1

Distribution of part-time (% over total employment), ECHP 1994-1998,

	By education			By type of contract		Hourly wage part-timers/hourly wage full-timers
	Primary	*Secondary*	*Tertiary*	*Permanent*	*Temporal*	
Belgium	31.9	25.6	20.4	23.4	27.9	1.11
Denmark	22.8	17.8	14.2	15.6	14.5	1.06
France	26.0	17.3	13.4	15.6	36.9	0.95
Italy	13.9	13.2	21.6	11.0	16.3	1.25
Netherlands	44.3	45.0	39.8	43.0	49.7	1.04
Spain	17.2	12.9	10.2	7.9	17.6	0.92
U.K.	39.4	32.2	22.3	28.7	39.9	0.91

Source: Ariza *et al.* (2005)

In a recent comparative study (Del Boca, Pasqua and Pronzato 2005), we have shown that since part-time work is not only characterized by different availability, but also by different job protection and earnings, its influence on participation and fertility is positive only in countries where part-time jobs are "high quality" jobs. In these countries, in fact, part-time jobs are characterized by job protection, social benefits and wages very similar to full-time jobs and mainly consist of permanent positions and middle-level jobs. In other countries, where part-time often corresponds to "poor quality" jobs the link is not significant.

2.2 Childcare

Studies on temporal patterns have shown that the increased availability of childcare is an important determinant of the changes in the relation between women's participation and fertility from negative to positive (Ahn and Mira 2002, Ermisch 1989, Englehardt and Prskawetz 2002, Kögel 2002).

Empirical analysis of in-kind transfers shows that the availability of childcare services significantly affects women's preferences for non-market time versus time spent in paid work. However, differences emerge among European countries in the childcare system: in Southern Europe the childcare services are typically inadequate and characterized by extreme rigidity in the number of weekly hours available. Table 2 shows that in Southern European countries the percentage of children under 3 who are in childcare is quite low compared to Northern countries, while the proportion of children over 3 in childcare is quite high everywhere.

A mismatch between the characteristics of the childcare system and labour supply appears to emerge in countries such as Spain and Italy: where the childcare systems offer very limited hours of operation, only nonworking mothers or those employed in part-time jobs find it useful (Del Boca, Locatelli and Vuri 2005, Del Boca and Vuri 2007). Moreover, in other countries where childcare availability is also low and its opening hours limited, but part-time is more widespread (Netherlands and the U.K.), it is easier for mothers to reconcile work and motherhood and therefore women's labour market participation is higher.

Table 2

Childcare in Europe, 1999/2000

	Infants (0-2)		*Pre school aged children (3-5)*	
	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
U.K.	2	8	60	5

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

In the following analysis we choose to focus on childcare for children aged 0-3 since it is the most crucial time after childbirth, when it is more difficult for women to remain attached to the labour market; we consider only availability since it also shows more variability relatively to opening hours.

2.3 Parental leave

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

Table 3
Maternity leave and parental leave in Europe

	Maternity leave		Parental leave			Job protection		Possibility of sharing with fathers	
	Period (weeks)	*Average replacement rate (%)*	*Total leave duration (months)*	*Paid period (% of the total leave)*	*Child age limit (years)*	*Job-protected period (% of total leave)*	*Seniority-protected period (% of total leave)*	*Fathers period (months)*	*Transferable months*
Belgium	15	77	6	100	4	100	100	3	0
Denmark	18	62	11	70	9	100	100	0	10.6
France	16	100	36	100	3	100	50	0	36
Italy	22	80	12	55	8	100	100	7	0
Netherlands	16	100	6	0	8	0	0	3	0
Spain	16	100	36	0	3	33	33	0	36
U.K.	18	43	8	0	5	100	0	4.15	0

Source: De Henau J. *et al.* (2007)

Maternity leave and parental leave are likely to have a positive impact on women's employment rates since more women would enter employment if they knew

they had access to leave. A relatively strong correspondence between the generosity of maternity and parental leave and women's employment profiles emerges from cross-country comparison (Pronzato 2007, Jaumotte 2003).

However, in countries where parental leave policies are more generous, employers may find costly hiring women rather than men more, making the equilibrium outcome ambiguous. Moreover, 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. Therefore, it is difficult to predict what the sign of the relationship will be.

2.4 Family allowances

Economic support provided to households with children also varies considerably across European countries. In Table 4 we observe that Southern European countries have the least generous family allowance policies, especially in terms of the percentage of households eligible for this cash benefit.

Table 4

Family allowances in Europe

	Maximum age of the child	Average amount of the family allowance			% of households with children below 12 years receiving family allowances
Belgium	18	66 (first child)	123 (second child)	183 (third child)	92,7
Denmark	18	122 (children aged 0-3)	111 (children aged 3-7)	86 (children aged 7-18)	99,1
France	19	0 (first child)	103 (second child)	235 (third child)	78,2
Italy	18	130* (two children)	77* (two children)		18,9
Netherlands	17	47 (children aged 0-5)	57 (children aged 6-11)	67 (children aged 12-17)	96,1
Spain	18	18 (first child)	21 (second child)	21 (third child)	5,8
U.K.	16	72 (couple)	111 (single parent)	58 (other children)	93,5

* For Italy the Table reports two example of households with two children and with an income below two different values

Source: Pronzato (2006)

Several studies have contrasted the effect between in kind and cash transfers on fertility and labour market participation. Although in most cases the coefficient of cash benefits has the expected negative sign on women's labour market participation, the impact on fertility depends on a number of factors. Studies based on time series found a positive relation between fertility and cash policies. Family benefits were found to result in increased fertility of 0.2-0.3 children per woman (Blanchet and Eckert Jaffé 1994, using French data). Other studies suggest the existence of a timing effect: higher family benefits would encourage early entry into motherhood but not necessarily a large family size (Barmby and Cigno 1990, and Ermisch 1989). A cross-country comparison indicated a positive but overall limited effect of child benefits on fertility (Gauthier and Hatzius 1997). If we look at different countries, whereas cash benefits do not affect fertility in Anglo-Saxon countries, they have a positive effect instead in Scandinavian countries, since they are likely to be correlated with other family support policies. These differences reflect important variations in family support policies across countries.

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 economic environment. In this empirical analysis we attempt to determine to what extent the various social and labour market policies (e.g., part-time employment opportunities, childcare provision, parental leave and family allowances) affect women's decisions to participate in the labour market and to have children.

In order to estimate the effects of individual, household and environmental characteristics on the joint decision to work and to have a child, we use a bivariate probit model that allows us to estimate the joint probability for working and having a child.

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 human capital of household i's woman at time t, $Y_{i,t}$ is the vector of the household's income at time t and 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 terms $u_{i,t}$ and $v_{i,t}$ are the disturbance terms, and $v_{i,t}$ is not assumed to be distributed independently of $u_{i,t}$.

Define the variable $d_{i,t}^p = 1$ if the woman in household i participates in 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. Thus, we have:

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

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

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

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

Once the marginal probabilities of $d_{i,t}^p$ and $d_{i,t}^f$ are specified, the multivariate model is complete 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, then:

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

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 the regional and country level to describe the environment in which women live. If the disturbances are correlated within regions however, even small correlations can cause the standard

9

errors to be biased downward. The bias of the standard errors can result in spurious findings 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 Northern, Central-West or Southern 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 Eurostat. The survey involves a representative sample of households and individuals interviewed over 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 analysis at the European level. The aim of the survey, in fact, is to provide comparable information on the 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 us to analyze how individuals and households experience change in their socio-economic environment and how they respond to such changes, as well as to analyse how conditions, life events, behaviour, and values are linked to each other dynamically over time.

The units of analysis of the ECHP are the families and all individuals older than 16 within the households; in any case it is possible to access information (mainly demographic information) on children under 16 as well. In almost every country, the concept of family is based on the two criteria of a shared house and shared 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).

---

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

The ECHP has several advantages. It covers the whole population, including non-working persons, and, 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. In this way, it allows the study, for example, of the labour supply decisions of a woman accounting for both her own personal characteristics and those of the 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 relatively 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) on the characteristics of the "environment" in which the women live. Both the choice of the year and the countries have therefore been constrained by the availability of regional data on part-time jobs and of childcare services.

We selected households with women ranging in age from 21-45, married or living with a partner, in order to exclude those women who might still be enrolled in school or already retired. For the analysis of fertility, the age restriction ensures 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 into five main groups:

Women's personal characteristics

- age (and squared age)
- education: we use three dummy variables (tertiary education, secondary education and less than secondary education. The last is the dummy excluded)

Household characteristics

- presence of other children in the household (different from the childbirth considered in the analysis)[4]: we use four dummy variables indicating no children (the excluded one), youngest child aged 0-3, youngest child aged 4-14 and youngest child older than 14. We differentiate the presence of other children according to the age of the youngest child since we believe that children at different ages have different effects on a mother's decision to work (see also Table 4 below) and to have an additional child

- woman's non-labour income, including all household sources of income except the woman's labour income and social transfers (in euros and divided by 1000). The information concerning income has been made comparable using PPP (Purchasing Parity Power) specific coefficients provided by Eurostat in the ECHP dataset

Labour market characteristics

- regional availability of part-time jobs, obtained as the ratio between part-time workers and the total employed at the 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 takes value 1 in those countries in which the hourly wage of part-timers is at least 10% higher than the hourly wage of full-timers (Table 1). This interaction provides an indicator of part-time work when it represents a "high quality" job and when it represents a "poor quality" job (see also Del Boca, Pasqua and Pronzato, 2005)

---

[4] We do not differentiate between one's 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 for implausible answers cross-checks have been performed against the answer to the question on hours worked per week. The Eurostat website reports 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..

Social policies

- the variable "family allowance" represents the ratio between the average family allowance in a certain country and the potential wage of the woman[6]. In this way, the variable, which expresses the financial help they can receive when they have a child, is exogenous and is standardized relatively to what the woman can earn in the labour market[7]. The average family allowance is calculated including the zeros, so that it depends not only on the amount received but also on the number of recipients. As shown in Table 4, the percentage of families receiving this benefit is particularly low in Italy and Spain. Indeed, these two countries (along with Greece, not included in our sample) are the only ones in Europe without the universal right to family allowances

- availability of childcare, obtained as the percentage of children aged 0-3 using childcare facilities (from the dataset REGIO)[8]

- length of parental leave: we use the length of the optional leave for which the mother is eligible [9] (De Henau *et al.* 2007)

Dummy variables for the geographical area of residence

- North if the household lives in Denmark
- Central-West if the household lives 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)

---

[6] The potential wage is obtained by using a Heckman regression, and then imputed for every woman, separately country by country. In the outcome equation, we consider her human capital characteristics (age and level of education); in the selection equation, we also take into account her family characteristics (marital status, presence of children, household income, and region of residence).

[7] If we consider the potential wage to be a good proxy of the cost of caring for a child, the variable expresses what part of childcare expenses could be covered by the benefit.

[8] From previous results and from Table 2, in fact, we know that child care facilities for children between 3 and school age is higher and more similar across the different European countries.

[9] The values included are thus different from Table 3, which includes mothers and fathers.

In our empirical analysis, we consider the effect of all the variables mentioned above on the probability for a woman to work and to have a child. Table 5 reports the descriptive statistics for the sample for the countries considered. The descriptive statistics show a picture that is quite consistent with the empirical evidence discussed in the previous sections. The percentage of women working is higher in Denmark, Belgium and the U.K., while it is much lower in Italy and Spain.

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

A comparison of the labour market characteristics and social policies indicates that the percentage of part-time workers is particularly low in Southern European countries, while part-time work is widespread in the Netherlands and in the U.K..

Other differences concern childcare availability for children aged 0-3, which is extremely low in the Southern European countries (and in the U.K.), and very high in Denmark.

Parental leave is longer in France (about 3 years) and shorter in Belgium, Netherlands and the UK..

Finally, family allowances represent only a negligible amount of money for Spanish mothers, while Belgian mothers receive an amount equivalent to one fourth of their wage.

Table 5

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
Family allowances	18	14	26	11	2	1	12
% employed part-time (in the region of residence)	20.8	17.6	16.2	37.3	7.7	8.3	25.3
Childcare availability (in the region of residence) (%)	64.0	12.1	12.1	18.0	7.3	5.7	2.8
Length of the optional leave (months)	11	36	3	3	6	12	4
N. obs.	787	1,834	964	1,830	2,295	1,909	1,668

In Table 6 we show the employment rates of mothers and non-mothers in the countries considered. As we can see, employment rates of mothers is lower than employment rates of non-mothers in all countries. Italy and Spain, in particular, are the countries where mothers seem to work less and employment rates of women with very young children is particularly low.

Table 6

Employment rates of mothers and non-mothers
(average values for the period 1994-2001)

	No children	Youngest child 0 - 3 years	Youngest child 4 – 13 years	Youngest child 14+ years	Total
Belgium	80.6	75.8	71.4	70.5	74.3
Denmark	75.9	74.4	89.6	89.7	81.3
France	62.0	51.6	66.0	69.3	62.0
Italy	63.4	45.6	47.2	47.1	49.9
Netherlands	86.6	54.9	47.1	57.8	61.2
Spain	65.5	37.9	38.1	43.1	45.0
U.K.	86.3	49.5	60.7	80.2	69.8

Source: our elaboration from ECHP data

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 characteristics on the whole sample (Table 7) and then we add the environmental variables (labour market characteristics and social policies) separately for women with tertiary education and for women with less then tertiary education. This is because we expect these variables to have quite different effects on the two groups of women (Table A.1 and A.2 in the Appendix). The empirical results obtained show that the econometric analysis of labour market participation appears to be more meaningful than the analysis of fertility, indicating a more important role of unobservables on fertility choices. One of the limitations of the economic analysis of fertility, in fact, is the omission of factors such as fecundity, tastes, and other individual and marriage-specific traits which are important factors in explaining the decision to have children.

The likelihood of both participation and fertility increases with age at a decreasing rate. Women with secondary and tertiary education are more likely to work than 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, although the effect the age of the youngest child. In fact, younger children have a stronger negative impact on the probability of being employed, while older children have the most negative effect on the probability of having an additional child.

Table 7

Bivariate probit estimates (std. error in brackets)

	Prob. of working	Prob. of having a child
Woman's age	.156**	.368**
	(.025)	(.047)
Squared woman'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)
Youngest child aged 0-3	-.672**	-.265*
	(.092)	(.090)
Youngest child aged 4-14	-.577**	-.212**
	(.123)	(.077)
Youngest child aged >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%

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

As shown in Table 8, employment rates of women with tertiary education are high and similar in all countries, while a greater deal of variation emerges when we look at women with a lower level of education. At the same time, the percentage of women who had a child in the year considered is lower for less educated women in all countries except Denmark. It is therefore important to assess the effects of environmental variables on the two different groups.

Table 8

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 who had a child in that 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 who had a child in that year	8.8	8.4	6.2	5.5	8.0	7.2	6.5

The full results of our estimates are reported in Appendix (Tables A.1 for better educated women and Table A.2 for less educated ones). 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 negatively affect the probability of having an additional child only when they are very young, whereas as 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. Non-labour income has a negative effect on both employment and fertility for both groups, but the coefficient is significant only for educated women.

In Table 9 we report the coefficients associated to the social policies under concern.

Table 9

**Estimated coefficients of selected variables by level of education
(std. error in brackets)**

	Women with less than tertiary education	*Women with tertiary education*
Probability of working		
Part-time	-.029	-.041**
	(.021)	(.014)
Part-time*High Quality	.058*	.067**
	(.030)	(.019)
Childcare availability	.041**	.028**
	(.009)	(.010)
Family Allowances	-.066**	-.090**
	(.020)	(.023)
Length of the optional leave (months)	.071^	.043
	(.059)	(.053)
Length of the optional leave (months) squared	-.002^	-.002^
	(.001)	(.001)
Probability of having a child		
Part-time	-.005	.023^
	(.016)	(.019)
Part-time*High Quality	-.016	.041^
	(.022)	(.032)
Childcare availability	.010^	.002
	(.006)	(.008)
Family Allowances	.010	.012
	(.023)	(.032)
Length of the optional leave (months)	.061^	.055
	(.051)	(.072)
Length of the optional leave (months) squared	-.002^	-.001
	(.001)	(.002)

** = significant at 95% , * = significant at 90% , ^ = coefficient greater than the st. err.

The coefficients associated with the availability of part-time jobs has a negative effect on the probability of working, but is significant only on better educated women. The interaction term (Part-time*High Quality), instead, is positive both for highly educated and less educated women, but is more significant for highly educated women. An increase of 10% in high quality part-time opportunities would increase the probability of working for better educated women from 79 to 84% and from 53 to 63% for low educated women.

On the contrary, the effect on women with lower levels of education is only marginally significant. This seems to confirm the important differences between the characteristics of part-time work across countries: part-time opportunities increase

female participation only for the highly educated when they provide high quality jobs in terms of payments and permanent contracts.

Examining the effect of part-time job availability on fertility, we only find a marginally significant coefficient of part-time work and the interaction term on more educated women.

Childcare availability has a positive effect on the probability of working for women at all levels of education, but the effect seems to be stronger for less educated women: increasing childcare availability by 10% the probability of working would rise from 53% to 67% for less educated women and from 79% to 86% for more educated ones.

The coefficient of childcare on fertility is only marginally significant for lower educated women. Interestingly, we can infer that the cost of childcare seems to influence participation behaviour: less educated women are more affected by public childcare provisions (which both cost less than private crèches and baby-sitting), while the influence of public childcare is non significant for highly educated women.

The impact of the length of parental leave is not significant in any of the specifications. It is true that there is weak evidence of a positive but decreasing effect of its duration on the probability of working for low educated women. This confirms results from previous research: when looking specifically at employed women just after childbirth, especially if poorly educated, those with short parental leave tend to exit the labour market, ultimately resulting in later re-entry than those with access to longer leaves (Pronzato, 2007). However this effect is counterbalanced by results from other studies (Jaumotte 2003), showing that the effect of leave was positive only up to a certain threshold (estimated about 20 weeks) beyond which any further increase has a negative effect. This change suggests that while shorter parental leave may strengthen women's labour market attachment through job guarantees, extended parental leave may instead weaken labour market skills and damage future career paths, making it difficult for mothers to return to the labour market. The two different tendencies may explain why the length of parental leave is not significant in our estimates.

6. Interpretations and conclusions

In this paper we have jointly estimated the decisions regarding working and having children using ECHP data. We focus on the impact of social policies and labour market opportunities for women with different levels of education. Two principal findings emerge. First, we find that the characteristics OF the labour market and social environment matter. The availability of part-time work has a positive effect on labour market participation, but only when those jobs have similar pay and protection as full-time jobs. We also observed a small positive effect of the availability of these types of jobs on fertility.

Second, we find that education also matters. Childcare availability and optional parental leave affect labour supply more significantly for less educated women, while the labour supply of women with higher education is more responsive to the supply of jobs offering flexible working arrangements. Only for women with higher levels of education do we find a positive and significant correlation between participation and fertility.

Our results indicate that even after controlling for a variety of personal, family and environmental characteristics, women in Southern Europe still prove to work significantly less than those in other European countries. In these countries, where part-time work and childcare (for children under 3) are rare, and optional parental leave is shorter, social policies encouraging employment without discouraging fertility are strongly called for if the low participation-low fertility rate equilibrium in these countries is to change.

Although this analysis does not presently take into account the potential endogeneity of institutions, the exploratory results presented here could help inform social policy debate within the European Union that began with the definition of the Lisbon Agenda for women's employment targets.

One important directive of the European Union envisions the creation of more part-time jobs (as part of the overall Employment Strategy) as an important factor for women in the South of Europe to reach the employment targets established in Lisbon. If Southern European women had access to a greater number of part-time positions, their participation would increase, but only where those jobs have similar pay and protection as full-time jobs.

The other important EU recommendation concerns childcare availability. The directive states that by 2010 member states should provide childcare to at least 33% of children under three. Our analysis indicates that this policy could be especially affective in increasing the participation rates of less educated women in Southern Europe, and should thus be given high priority.

References

Aaberge, R., Colombino U. and Strom S., (2005) 'Taxes, Transfers, Labor Supply and Household Welfare', in T. Boeri, D. Del Boca e C. Pissarides (eds.), *Women at Work. An Economic Perspective*, Oxford University Press

Ahn, N., and Mira P., (2002), 'A note of the relationship between fertility and female employment rates in developed countries', *Journal of the Population Economics*, vol. 15

Ariza A., de la Rica S. and Ugidos A., (2005), 'The Effect of Flexibility in Working Hours on Fertility: A Comparative Analysis of Selected European Countries', *Public Finance and Management*, vol. 5

Barmby T. and Cigno A. (1990), 'A sequential probability model of fertility patterns', *Journal of Population Economics*, vol. 3

Bardasi, E., and Gornick J. C., (2000), 'Women and Part-Time Employment: Worker 'Choices' and Wage Penalties in Five Industrialised Countries', ISER Working Paper 2000-1

Berman, E., Iannaccone R. and Ragusa G., (2006). 'From Empty Pews to Empty Cradles: Fertility Decline Among European Catholics', University of San Diego, mimeo

Billari F., and Kohler H.P., (2004), 'Patterns of low and lowest-low fertility in Europe', *Population Studies*, vol. 58

Blanchet D. and Ekert-Jaffe O. (1994), 'The Demographic Impact of Family Benefits: Evidence from a Micro-Model and from Macro-Data', in Ermisch J. and Ogawa N. (eds.), *The Family, the Market and the State in Ageing Societies: International Studies in Demography*, Oxford University Press, Clarendon Press

De Henau J., Meulders D. and O'Dorchai S. (2006), 'The Childcare Triad? Indicators Assessing Three Fields of Child Policies Towards Working Mothers in the EU-15', *Journal of Comparative Policy Analysis*, Special Issue

De Henau J., Meulders D. and O'Dorchai S. (2007), 'Parents' Care and Career. Comparing Parental Leave Policies', in *Social Policies, Labour Markets and Motherhood: a Comparative Analysis of European Countries* (D. Del Boca and C. Wetzels eds.), Cambridge University Press.

Del Boca, D., and Sauer R., (2006), 'Life Cycle Participation and Fertility', WP IZA 2285

Del Boca, D., Pasqua S., and Pronzato C., (2005), 'Employment and Fertility in Italy, France and the U.K.', *Labour*, vol. 4

Del Boca D. , Locatelli M. and Vuri D. (2005), 'Child-Care Choices by Working Mothers: The Case of Italy', *Review of Economics of the Household*, vol.3

Del Boca D., and Vuri D., (2007), 'The mismatch between participation and childcare' *Journal of Population Economics*, vol. 4

Del Boca D., and Locatelli M. (2007), 'Motherhood and Participation' in *Social Policies, Labour Markets and Motherhood: a Comparative Analysis of European Countries* (D. Del Boca and C. Wetzels eds.), Cambridge University Press.

DiPrete, T.A, Philip. S.M., Engelhardt H. and Paclova H., (2003)., 'Do Cross-National Differences in the Costs of Children Generate Cross-National Differences in Fertility Rates?', *Population Research and Policy Review*, vol. 22

Engelhardt H., Kögel T. and Prskawetz A., (2001), 'Fertility and Female Employment Reconsidered', MPIDR Working Paper 2001-021, Max Planck Institute for Demographic Research

Engelhardt, H. and Prskawetz A., (2002), 'On the Changing Correlation Between Fertility and Female Unemployment Over Space and Time', MPIDR Working Paper WP 2002-052, Max Planck Institute for Demographic Research

Ermisch, J., (1989), 'Purchased Childcare, Optimal Family Size and Mother's Employment: Theory and Econometric Analysis', *Journal of Population Economics*, vol. 2

Esping Andersen G., (1999), *Social Foundation of Post Industrial Economies*, Oxford University Press

European Economy (1995), 'Performance of the EU Labour Market: Results of an ad hoc Labour Market Survey', European Commission B-1049 Brussels

Eurostat (1999), *Demographic Statistics*

Fernandez, R. and Fogli A., (2005), 'Culture: An Empirical Investigation of Beliefs, Work, and Fertility', *NBER Working Papers* 11268, National Bureau of Economic Research, Inc.

Gauthier A.H. and Hatzius, J., (1997), 'Family policy and fertility: An econometric analysis', *Population Studies*, vol. 51

Jaumotte F., (2003), 'Female Labour Force Participation: Past Trends and Main Determinants in OECD Countries', OECD Economics Department WP 376

Kögel, T., (2002), 'Did the Association Between Fertility and Female Employment Within OECD Countries Really Change Its Sign?', MPIDR Working Paper WP-2001-34, Max Planck Institute for Demographic Research

Kohler, H.P., Billari F. and Ortega J.A, (2002), 'The Emergence of Lowest-Low Fertility in Europe During the 1990s', *Population and Development Review*, vol. 28

Kohler, H.P., Billari F. and Ortega J.A., (2006), 'Low Fertility in Europe: Causes, Implications and Policy Options', in F. R. Harris (Ed.), *The Baby Bust: Who Will Do the Work? Who Will Pay the Taxes?*, Lanham, MD: Rowman & Littlefield Publishers

Neyer G., (2003), 'Family Policies and Low Fertility in Western Europe', MPIDR WP 2003-021, Max Planck Institute for Demographic Research

Moulton R. B., (1990), 'An Illustration of a Pitfall in Estimating the Effects of Aggregate Variables on Micro Units', *The Review of Economics and Statistics*, Vol. 72(2)

Primo D.M, Jacobsmeier M. L., and Milyo J., (2007), 'Estimating the Impact of State Policies and Institutions with Mixed-Level Data', forthcoming in *State Politics & Policy Quarterly*

Pronzato C., (2006), 'Le scelte lavorative delle donne in Europa, tra famiglia, mercato del lavoro e politiche di conciliazione', *Economia e Lavoro*

Pronzato C., (2007), 'Return to Work after Childbirth: Does Parental Leave Matter in Europe?', ISER Working Paper 2007-30

Sleebos J., (2003), 'Low Fertility Rates in OECD Countries: Facts and Policy Responses', OECD Labour Market and Social Policy Occasional Papers No. 15, 07/10/2003

Appendix

Table A.1.

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

	Prob. of working	Prob. of having a child
Woman's age	.210**	.680**
	(.067)	(.087)
Squared woman's age	-.003**	-.011**
	(.001)	(.001)
Woman's non-labour income	-.005**	-.004**
	(.002)	(.002)
Youngest child aged 0-3	-.685**	-.235**
	(.092)	(.109)
Youngest child aged 4-14	-.458**	-.155
	(.108)	(.112)
Youngest child aged >14	-.105	-.542
	(.220)	(.430)
Part-time	-.041**	.023
	(.014)	(.019)
Part-time*High Quality	.067**	.041
	(.019)	(.032)
Child care availability	.028**	.002
	(.010)	(.008)
Family allowances	-.090**	-.012
	(.023)	(.032)
Length of the optional leave (months)	.043	.055
	(.053)	(.072)
Length of the optional leave (months) squared	-.002	-.001
	(.001)	(.002)
North	-1.087*	-.146
	(.658)	(.495)
Center-West	-.137	-.236
	(.172)	(.210)
South	-2.222**	.004
	(.462)	(.595)
Constant	-.565	-11.851**
	(1.173)	(1.550)
N. obs.	2,686	
Log likelihood	-2041.2006	
Rho	.132** (.053)	

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

Table A.2.

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

	Prob. of working	Prob. of having a child
Woman's age	.077**	.316**
	(.030)	(.061)
Squared woman's age	-.001**	-.006**
	(.000)	(.001)
Secondary education	.350**	.030
	(.074)	(.078)
Woman's non-labour income	-.002	.003
	(.001)	(.002)
Youngest child aged 0-3	-.663**	-.331**
	(.112)	(.103)
Youngest child aged 4-14	-.591**	-.256**
	(.143)	(.087)
Youngest child aged >14	-.356**	-.771**
	(.129)	(.212)
Part-time	-.029	-.005
	(.021)	(.016)
Part-time*High Quality	.058*	-.016
	(.030)	(.022)
Child care availability	.041**	-.010
	(.009)	(.007)
Family allowances	-.066**	.010
	(.020)	(.023)
Length of the optional leave (months)	.071	-.061
	(.059)	(.051)
Length of the optional leave (months) squared	-.002	.002
	(.001)	(.001)
North	-2.282**	.842*
	(.592)	(.458)
Center-West	-.592**	.100
	(.232)	(.147)
South	-2.427**	.462
	(.479)	(.600)
Constant	.627	-5.141**
	(1.041)	(1.167)
N. obs.	7,629	
Log likelihood	-6524.7118	
Rho	-.033 (.041)	

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