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Massimiliano Bratti  
Emilia Del Bono  
Daniela Vuri

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**Massimiliano Bratti**

*University of Warwick, University of Milan  
and IZA Bonn*

**Emilia Del Bono**

*University of Oxford and IZA Bonn*

**Daniela Vuri**

*University of Florence and IZA Bonn*

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IZA

P.O. Box 7240  
53072 Bonn  
Germany

Phone: +49-228-3894-0  
Fax: +49-228-3894-180  
Email: [iza@iza.org](mailto:iza@iza.org)

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## ABSTRACT

### **New Mothers' Labour Force Participation in Italy: The Role of Job Characteristics\***

In this paper we use newly available individual-level data from the Longitudinal Survey of Italian Households to investigate the factors affecting female labour force participation after the birth of the first child. We focus on the effects of pre-marital job characteristics and find that working without a contract has a negative effect on new mothers' participation, while working in the public sector or in a large private firm increases the probability of participation after childbearing. We suggest that these effects could be at least partly attributed to differences in the level of job protection and employment stability enjoyed by workers. This implies that in Italy women with highly protected and stable jobs find it easier to combine career and family, while those who are less sheltered by the legislation are more likely to withdraw from the labour force after becoming mothers.

JEL Classification: J13, J21, J23, O17, C3

Keywords: childbirth, employment, informal sector, job protection, private, public

Corresponding author:

Emilia Del Bono  
The Queen's College  
University of Oxford  
Oxford OX1 4AW  
United Kingdom  
Tel.: +44 1865 289061  
Fax: +44 1865 271094  
Email: [emilia.delbono@queens.ox.ac.uk](mailto:emilia.delbono@queens.ox.ac.uk)

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# 1 Introduction

In March 2000 the European Council in Lisbon set out a 10-year strategy to make the EU the world's most dynamic and competitive economy. One of the goals of the Lisbon strategy was to increase female employment rates in the EU to at least 60% by 2010. Eight out of the present fifteen EU countries already reach this target, with France being very close to achieving it in the next couple of years. Italy, on the contrary, not only is at the very bottom of the ranking but appears to be very far behind. According to the most recent official data for 2003, in Italy only 42% women aged 14-64 are in employment, and less than one in two participates in the labour force.

The incompatibility between child rearing and work in the marketplace is often advocated as the main reason for the low labour market participation of Italian women. Quite paradoxically, however, fertility rates in Italy have been below the replacement level of 2 children per woman for over two decades, and the current rate is one of the lowest registered in Europe (1,26 children per woman in 2003). This would suggest that combining family and working responsibility is so difficult that even women with one child are unlikely to participate in the labour market. If this is indeed the case, understanding the factors which enable women to retain a strong labour force attachment around childbirth is very important, especially because if women withdraw from the labour force due to childbearing it can be quite difficult for them to return to activity.

We are aware of very little empirical research which investigates female labour force participation (LFP hereafter) patterns around childbirth in Italy. Previous research on Italian female LFP and fertility has mainly focused on individual and institutional factors and almost completely neglected the potential role played by job characteristics. Although personal characteristics, such as educational levels, and institutional features, such as the availability of child care and part-time jobs, are paramount to female LFP, we think that job characteristics, are at least as important. Indeed, different job characteristics may imply different costs of non participation. For example, high-wage jobs, jobs with greater promotion prospects and more secure jobs will entail higher costs of a withdrawal. At the same time, there are jobs which offer working arrangements which make it easier to reconcile work and family, such as jobs with a reduced or a flexible working time.

The goal of our paper is to use newly available Italian micro-data to shed light on the role of pre-marital job characteristics on new mothers' LFP. In order to do so we use new information from the *Longitudinal Survey of Italian Households*<sup>1</sup> (LSIH hereafter) to analyse the decisions of married or cohabiting women to participate in the labour market during the first three years after the birth of the first child. We focus only on the period after the birth of the first child because, as documented in Solera (2003), Italian women are unlikely to experience a career break more than once in their lives and this usually occurs at the time of the birth of the first child.

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<sup>1</sup>*Indagine Longitudinale sulle Famiglie Italiane.*

Our results show that the degree of employment protection enjoyed by certain women plays a major role in determining their labour force attachment after childbearing. This result is mainly reflected in significant differences among women according to the type of work contract, whereby women working in the informal sector have a probability of participating after the birth of their first child which is at least 11% lower than women working with a permanent contract. We also find that women working in the public sector or in big private firms have a much higher post-birth participation probability than women working in small private firms. Since public sector jobs can be considered “cycle-proof” jobs in which workers enjoy a high degree of employment protection, and since the Italian employment protection legislation favours large firms’ employees, our results seem to suggest that an important role is played by employment protection and job security in encouraging higher participation rates among new mothers.

Other factors analysed in this paper include the effect of variables related to a woman’s human capital, such as her highest educational qualification achieved and past labour market experience, and the influence of her partner’s characteristics. Because of their relevance for policy making, a particular emphasis is given to the role of part-time work and child care. We find a positive, although only marginally significant, effect of past part-time work on LFP, and very strong evidence that the unavailability of either formal or informal child care decreases new mothers’ probability of LFP in the first three years after childbirth. While we cannot say much about the first effect, due to fact that part-time work in Italy is a very recent phenomenon, the second result confirms the findings of several other studies focusing on Italy.<sup>2</sup>

The structure of the paper is as follows. In the next section we discuss the most recent literature on female LFP and employment with particular reference to the role of job characteristics. Section 3 describes the data and the procedure of sample selection, while section 4 discusses the econometric strategy and some empirical issues. In section 5, we look at the main results, focusing first on the effect of job characteristics and then on other aspects, such as the availability of child care. Section 6 summarises our main findings and conclusions.

## 2 Motivation and related literature

Neoclassical models of female labour force participation (Becker, 1981; Cigno, 1991) posit that women compare the costs and benefits of LFP when deciding whether to participate in the labour market. The costs of participation are both pecuniary and related to job search and the purchase of external child care, and non pecuniary, such as those related to the reduction in time devoted to childrearing or leisure. The benefits of participation are also both pecuniary and related to the current wage and the future expected flow of labour income, and non pecuniary due for instance to the personal

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<sup>2</sup>Such as Del Boca (2002), Marensi and Pagani (2003), Del Boca, Locatelli and Vuri (2004).

self-esteem which may derive from a satisfactory working life. It is clear that all the factors affecting these costs and benefits should be included when considering empirical models of female LFP around childbirth (see Nakamura and Nakamura, 1992).

Past empirical research related to Italy has mainly emphasized the role of individual characteristics, such as education (Bratti, 2003), or the institutional features of the Italian labour market, such as the availability of child care (Del Boca, Locatelli and Vuri, 2004) or part-time jobs (Del Boca, 2002), on women's LFP or employment. But, almost all empirical work on Italy is based on the *Survey of Household Income and Wealth* (SHIW) of the Bank of Italy, which gathers data on current LFP or employment and on the current or the most recent job characteristics (see also earlier work by Colombino and Di Tommaso, 1996, and Di Tommaso, 1999). This implies that generally no information is provided on women's past working experience and job conditions. The LSIH has clear advantages in this respect since it provides retrospective data on the whole working life of the sampled women and allows us to control for past job characteristics.

The importance of job characteristics for new mothers' LFP may stem from the fact that some types of jobs entail higher costs of non-participation (or career interruptions) or may ensure a better balance between family and work. For instance, women in jobs with a high degree of human capital depreciation, where the costs of staying out of the labour market are very high, may have a strong incentive to experience continuous participation or employment. On the other hand, women in jobs where working hours are shorter or more flexible may have advantages in reconciling work and childrearing and may show a higher labour force attachment after becoming mothers.

There is a relatively small, but nevertheless interesting, literature which looks at job and workplace aspects in order to study female labour force attachment in conjunction with fertility. Desai and Waite (1991) find that occupational characteristics which raise the cost of a labour force withdrawal, such as job-specific training, decrease the probability of leaving the labour market in the US. A similar picture emerges from the study of Nakamura and Ueda (1999), who use data from Japan to investigate the determinants of job continuity of married women after childbirth, and find an important role of the working environment. In particular, they find significant differences across industries and a very strong negative effect of being a public servant on the probability of a career interruption after the first birth.

Gutiérrez-Domènech (2002) analyses Spanish women's employment and LFP after first birth and provides additional evidence in this respect. Using data from the *Family and Fertility Survey* (FFS) and focusing on women who were working 12 months before childbirth, she finds positive effects of past working experience and high occupational status and a negative effect of the percentage of women with fixed-term contracts at the national level on the probability of employment up to 10 years after childbirth. In the same study, additional evidence from the *Encuesta de Población Activa* (EPA) reveals positive effects of working in the public sector, permanent contracts, full-time contracts and high tenure on the probability of employment be-

tween 6 and 9 months after first birth. When considering LFP rather than employment after first birth, only tenure, full-time work and high occupational status turn out to be positively related to women's participation.

More recently, Berg, Kalleberg and Appelbaum (2003) investigate the role of high-commitment environments on the worker's perception that the employer is helping in balancing work and family responsibility using US data. They find positive effects of informal training, performance related pay and promotion opportunities in the workplace, and negative effects of long working hours and involuntary overtime. Moreover, factors which are likely to be positively correlated with job satisfaction turn out to have a significant positive effect on employees' ratings of the ability to balance work and family.

In the light of these findings, we think that an analysis of the role of job characteristics on new mothers' LFP in Italy represents an interesting contribution to this literature.

### 3 The LSIH data and sample description

A largely unexplored and interesting source of data for our purposes is the LSIH. The survey is conducted by the University of Trento, the Istituto Trentino di Cultura and the Italian Office of National Statistics (ISTAT) on a representative sample of Italian families. The first wave of the survey was carried out in 1997 and a second and third waves took place in 1999 and 2001, respectively. Our sample is derived from the 4,713 families interviewed in 1997, since at the time of our study this was the only sweep which was publicly available. The dataset includes retrospective information on the 10,423 adult members of the participating families. This allows us to construct the life-history of each respondent in relation to the following aspects: timing of births, family formation and structure, education, work and occupation, social background and geographical or residential mobility.<sup>3</sup>

With respect to past labour market experience, we are able to observe whether an individual was primarily in school, working, or engaged in some other activity from the age of 18 to the date of the interview. For those who were working, we have information on the sector and occupational qualification of the job, whether an employment episode was full-time or part-time, on the type of contract, and on the hours usually worked during the week. For those who were engaged in other activities, it is possible to distinguish between unemployment and out-of-the-labour-force states. The latter includes people who are retired, carrying out obligatory military service, students, housewives, on parental leave, and on temporary or permanent sickness leave.

The main weakness of the dataset is that there are no income and earnings variables, except for total household net income and each member's contribution to it (in %) in 1995. However, educational attainment and occupational qualification variables are collected at a very disaggregated level

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<sup>3</sup>For a more detailed description of the data and the structure of the survey see Schizzerotto (2002).

and are available at various points in time, so that they can be considered good proxies of an individual's wage and family income.

The initial sample consists of 5,469 women aged 18 or above who were interviewed in 1997. Of these women, 4,143 formed at least one marriage or one cohabiting relationship and 3,732 of them have at least one child by the time of the interview. The mean age at first union for this sample is about 24.2 years, while the mean age at the birth of the first child is about 25.5 years. Official statistics for Italy reveal that in 1997 the mean age at first marriage for women was around 27.1 years and the mean age at the birth of the first child was 28.1 years (ISTAT). The difference between our data and official statistics can be explained by the fact that while the latter refer to period measures of the above indicators, the former are based on retrospective information. Given the trend towards postponement of marriage and maternity of the last decades, it is reasonable to expect that women in our sample exhibit a younger age at first union and at first birth.

In order to control for the characteristics of the partner, we consider only women who had only one marriage or one cohabiting relationship, thus excluding single mothers and women who have remarried.<sup>4</sup> This reduces the number of observations to 3,919 married women, about 72% of the original sample.<sup>5</sup> We also select only women born after 1940, in order to minimise the effect of recollection errors and exclude women with invalid data for the job histories, and those we do not observe for the entire 3-year window after the birth of the first child, as this period defines our dependent variable. This means that women more than 57 years old, or those who had a child close to 1997 do not appear in our sample. Furthermore, we do not take into account women who had a first birth within 7 months from the date of marriage to ensure that the variables collected at the time of marriage and used in the empirical analysis are predetermined with respect to the birth event (see section 4). This reduces the sample to 2,048 women, 1,751 of whom had a child by 1997.

In looking at the woman's participation history during the first three years after the first birth we consider the period spent in maternity leave as participation as long as the total number of months of self-reported maternity leave does not exceed the compulsory period imposed by legislation.<sup>6</sup>

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<sup>4</sup>Out-of wedlock births, which include births in cohabiting unions, were about 9% of total live births in 1997 (see ISTAT, 2002), but this percentage was much lower in previous decades (for instance, only slightly above 4% in 1980).

<sup>5</sup>We decide not to draw a distinction between cohabiting and married couples as cohabitation is a very recent phenomenon in Italy, and will simply refer to marriage to address both types of unions.

<sup>6</sup>This provides for a period of compulsory leave that lasts 5 months (2 months before and 3 months after the birth) and during which the woman is entitled to 80% of her salary, and an additional period of optional leave which can last up to 6 months (until the child's 1st birthday) and during which the remuneration falls to 30% of the usual take home pay (*Legge 1204/1971*). Since the average year of birth of the child in our sample is 1980, and more than three quarters of births occur after 1971, this law applied to the vast majority of mothers in our sample. The legislation on parental leave in Italy has been recently modified (*Legge 53/2000*), but the new law came into power after the end of our observation period and therefore it did not affect the behaviour of the individuals included in our analysis.



Moreover, since in our sample the percentage of new mothers who start working only after childbearing is very modest (2.46%), we focus our empirical investigation on women who had at least one employment episode before marriage, excluding a further 719 observations from our sample. This is because women who never worked before marriage are likely to have made a life-time decision of inactivity, so that the analysis of LFP after childbirth is less relevant in this case.<sup>7</sup>

When possible, we introduce dummy variables for missing values in order not to reduce further the number of observations. In a few additional cases, however, some observations need to be excluded because for certain variables the number of non-response items is too small to be treated as a separate category. As a consequence, our final sample consists of 1,322 women, 1,090 of whom had their first child by 1997.

In this sample, we see that the average woman gets married at age 24.6, which is a figure very close to the mean for all women in our survey (24.2 years), but she has a child at age 26.5, almost one year later than the average woman in the whole dataset. This difference is due to the fact that we consider only women with a certain attachment to the labour force, who tend to postpone fertility decisions. If we were to consider also those women who never had an employment spell before marriage, we would observe a mean age at first birth of about 25.6 years, which is not statistically different from the 25.5 recorded for the original dataset.

## 4 Econometric model and issues

In this work we use newly available information from the working and family histories of the LSIH in order to analyse women's LFP decisions in the period immediately following the birth of the first child. Even if the main aim of our paper is to consider the effect of past job characteristics, we also control for an individual's and her partner's attributes, her past working experience and the availability of informal or formal child care. This is in order to determine which are the factors associated with a higher degree of LFP of new mothers.

There are two main issues which we need to deal with in the empirical analysis. Firstly, it is possible that a woman's past job characteristics are endogenous with respect to labour force participation choices following the birth of a child. Secondly, since we analyse new mothers' labour market participation, there is the possibility that selection into motherhood may affect our results if there are unobserved factors which influence both women's fertility and their post-birth participation decisions. The following two subsections describe how our empirical strategy tackles these problems.

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<sup>7</sup>In an earlier version of this paper we included in our sample women who had never worked before marriage and used a dummy variable in order to identify this group. The dummy had a negative and significant effect on the probability of being in the labour force after childbirth, but all other results were not qualitatively different from those reported in the present analysis.

#### 4.1 Potential endogeneity of past job characteristics with respect to LFP after childbearing

Since our dependent variable is represented by women's labour force participation after first birth, including past job characteristics among the regressors poses a problem because these variables might be endogenous with respect to LFP around first birth. A similar issue arises with respect to previous past working experience, which is included in order to proxy for human capital accumulation and wages. This problem remains even if these variables are taken before the birth of the child, so that they are predetermined with respect to fertility decisions and subsequent participation choices. This is because there might be some unobserved characteristics of an individual which may affect her past working experience, type of job and, at the same time, her LFP status after first birth, so that the estimated effects of the regressors on the dependent variable may simply reflect women's unobserved heterogeneity.

Although we substantially reduce the degree of heterogeneity in our sample by considering only individuals who experienced at least one employment episode before marriage and control for many characteristics of a woman and her partner, this is only a partial solution to the problem. A full account of the endogeneity of past working experience and previous job characteristics would require, as usual, the adoption of an instrumental variables strategy or a joint modelling approach. However, since we consider several aspects of a woman's past employment experience and numerous features of her previous jobs, and because of the absence of valid identifying exclusion restrictions, any attempt in this direction is likely to be difficult to pursue.

On the other hand, while the endogeneity of past labour market experience is likely to remain an issue in our analysis, we argue that the endogeneity of past job characteristics constitutes less of a problem. With respect to a situation in which the variables of interest are mainly choice variables for an individual (such as educational qualifications achieved, for instance), job characteristics are the outcome of the interaction between labour supply and labour demand. Women with certain unobserved traits may focus their search efforts towards jobs with certain characteristics, but this does not imply that they will be able to get their preferred jobs. In fact, a woman's job characteristics will be also determined by general labour demand conditions and employers' decisions and this could partly attenuate the problems of endogeneity associated to the effect of these variables.

We decide against considering the characteristics of the last job before childbirth because these are more likely to be simultaneously determined with the occurrence and the timing of the first birth, and therefore also with the following labour force participation decision of the subject. Instead, we consider the characteristics of the longest job held by a woman before marriage. Alternatively, we could have chosen the characteristics of the last job held by the woman at the time of marriage, or indeed any other job episode which started before the birth of the child. Although the choice may seem arbitrary, there is a substantial degree of continuity in Italian women's working experiences and we will see that, whatever job episode preceding

the birth of the child we take, our results are not significantly altered.

The continuity of employment histories is important because it makes it more likely that women started their longest pre-marital job well before marriage and first birth, and that these job characteristics are sufficiently exogenous with respect to childbirth and subsequent participation choices to suggest a more interesting interpretation of their effects. At the same time, a high degree of permanence in the same job is key to ensure that pre-marital job characteristics are a good proxy of pre-birth job characteristics and therefore provide a good picture of the potential working conditions faced by a woman at the moment she plans her fertility and future participation.

There is substantial evidence of a high degree of continuity in women's employment histories in the LSIH dataset. In particular, we compare the longest job before marriage, the last job at marriage and the last job before childbirth. As we will see, for a substantial percentage of women these jobs are the same. Furthermore, since the survey records a different job whenever one or more of the characteristics of the current job change, and not only when there is a change of employer, we find that with respect to certain job characteristics, which turn out to be important in our analysis, the jobs held by the subjects are even more similar.

Taking only women who had a first child by 1997, Table 1 shows that the percentage for whom the longest job at marriage was also the last job at marriage is about 79%. If we cross-tabulate the type of sector (public *vs.* private), in Table 2, we notice that the probability of remaining in the same sector is quite high: 98.11% of women stay in the public sector, while 92.57% stay in the private sector. From the cross-tabulation of the characteristics of the work contract in Table 3, we see that the highest degrees of persistence are observed in the "permanent" contract category (95.69%) and the "self-employed" category (88.64%), but we also find high percentages along the main diagonal for the "no contract" (about 83%) and the "fixed term" categories (85.52%). Similar results are shown in Tables 4-6, which compare the longest job before marriage and the last job before childbirth, although in this case the degrees of persistence in the same job or in jobs with similar characteristics are lower due to the fact that the employment episodes are likely to be more distanced in time.<sup>8</sup>

So, even if in what follows we focus on the characteristics of the longest job at marriage, we show in the Appendix (Tables A5 and A6) that using the characteristics of the last job at marriage or those of the last job before childbirth does not change significantly our main results.

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<sup>8</sup>Data from the waves 1993, 1995, 1998 and 2000 of the *Survey of Households Income and Wealth* (SHIW) of the Bank of Italy show substantially similar features. If we calculate potential experience as the difference between an individual's age and age at labour market entry assuming that there were no spells of inactivity (as this information is not available in the SHIW), the ratio between the number of jobs held over the entire life and the length of the working life shows that on average both male and female workers had less than two jobs over a potential working life of 10 years.

Table 1: Last job *vs.* longest job at marriage

job	N. obs.	%
different	232	21.28
equal	858	78.72
total	1,090	100

Table 2: Last job *vs.* longest job at marriage: sector of activity

longest job at marriage	last job at marriage			Total
	public	private	missing	
public sector	208 (98.11)	2 (0.94)	2 (0.94)	212 (100)
private sector	30 (3.98)	698 (92.57)	26 (3.45)	754 (100)
missing	6 (4.84)	13 (10.48)	105 (84.68)	124 (100)
Total	244 (22.39)	713 (65.41)	133 (12.20)	1,090 (100)

*Note.* % in brackets.

Table 3: Last job *vs.* longest job at marriage: type of contract

longest job at marriage	last job at marriage					Total
	fixed term	permanent	no contract	self-employed	missing	
fixed term	124 (85.52)	20 (13.79)	0 (0.00)	1 (0.69)	0 (0.00)	145 (100)
permanent	4 (0.59)	644 (95.69)	3 (0.45)	19 (2.82)	3 (0.45)	673 (100)
no contract	4 (2.72)	15 (10.2)	122 (82.99)	5 (3.4)	1 (0.68)	147 (100)
self-employed	1 (1.14)	9 (10.23)	0 (0.00)	78 (88.64)	0 (0.00)	88 (100)
missing	2 (5.41)	8 (21.62)	0 (0.00)	1 (2.70)	26 (70.27)	37 (100)
Total	135 (12.39)	696 (63.85)	125 (11.47)	104 (9.54)	30 (2.75)	1,090 (100)

*Note.* % in brackets.

Table 4: Last job at first birth *vs.* longest job at marriage

job	N. obs.	%
different	347	31.83
equal	743	68.17
total	1,090	100

Table 5: Last job at first birth *vs.* longest job at marriage: sector of activity

longest job at marriage	last job at childbearing			Total
	public	private	missing	
public sector	203 (95.5)	4 (1.89)	5 (2.36)	212 (100)
private sector	44 (5.84)	667 (88.46)	43 (5.70)	754 (100)
missing	9 (7.29)	12 (9.68)	103 (83.06)	124 (100)
Total	256 (23.49)	683 (62.66)	151 (13.85)	1,090 (100)

*Note.* % in brackets.

Table 6: Last job at first birth *vs.* longest job at marriage: type of contract

longest job before marriage	last job before childbearing					total
	fixed term	permanent	no contract	self-employed	missing	
fixed term	112 (77.24)	29 (20.00)	0 (0.00)	4 (2.76)	0 (0.00)	145 (100)
permanent	11 (1.63)	620 (92.12)	7 (1.04)	29 (4.31)	6 (0.89)	673 (100)
no contract	7 (4.76)	19 (12.93)	112 (76.19)	8 (5.44)	1 (0.68)	147 (100)
self-employed	1 (1.14)	9 (10.23)	0 (0.00)	78 (88.64)	0 (0.00)	88 (100)
missing	0 (0)	10 (27.03)	0 (0.00)	2 (5.41)	25 (67.57)	37 (100)
total	131 (12.02)	687 (63.03)	119 (10.92)	121 (11.10)	31 (2.84)	1,090 (100)

*Note.* % in brackets.

## 4.2 Potential endogeneity of LFP with respect to childbirth

The other main issue we need to address in the empirical analysis is that of self-selection into motherhood. Labour force status of new mothers is observed only for women who had at least one child and, since the sample of mothers might not be a random sample of the whole female population with respect to some unobservable characteristics, a selection issue may arise and affect our estimates. In other words, if there are unobservable factors affecting both fertility and post-birth participation decisions, and the selection process underlying entry into motherhood is ignored, our estimates of the impact of certain variables of interest on the participation decision after the birth of the first child will be inconsistent.

In order to explore this issue, we first look at fertility decisions and analyse the factors which affect the probability that a woman has a child by 1997. Table 7 reports the results of a standard probit model where the dependent variable assumes value 1 if a woman has a child and 0 otherwise. Among the independent variables we include some characteristics of the woman and her partner measured at the time of marriage, and several characteristics of the job of longest duration before marriage held by the woman.

We see that levels of education do not exert a significant effect,<sup>9</sup> while the woman's past labour market participation, both in terms of employment and unemployment experience, is fairly important and negatively related to the probability of observing a birth. A negative sign is observed on the coefficient for the rate of unemployment in the region of residence and on that of the partner's age at marriage, which could act as a proxy of the age of the woman at marriage. A strong positive effect is exhibited by the woman's number of siblings at age 14, which may be taken as a proxy for her "taste" for children.<sup>10</sup>

The job characteristics considered include weekly hours of work, the type of contract, the occupational qualification and sector of activity of the woman in the job of longest duration before marriage. All these variables are found to be statistically insignificant at the conventional statistical level. This could be important as it shows that, everything else being equal, women who differ according to these job characteristics do not have a significantly different fertility behaviour, while these variables may have a direct impact on the participation decision after the birth of the child.

A formal way of testing for self-selection into motherhood when considering the labour force decisions of women after childbearing (i.e. of testing

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<sup>9</sup>This is not particularly surprising since we are considering only the probability of having at least one child.

<sup>10</sup>Both the number of siblings and its square are included in the probit model. Both coefficients turn out to be statistically significant. We report the marginal effect of the number of siblings computed as follows. If we indicate with  $Pr(Y = 1)$  the probability of the outcome of interest, where  $Y$  is the binary dependent variable under study, and with  $X$  the vector of regressors (with  $\gamma$  the relative vector of coefficients) excluding the number of siblings ( $sib$ ) and its square ( $sib^2$ ), we can compute the marginal effect of  $sib$  as  $\frac{\partial Pr(Y=1)}{\partial sib} = \phi(\gamma X + \beta_1 sib + \beta_2 sib^2)(\beta_1 + 2\beta_2 sib)$ , which is then evaluated at the sample mean of all covariates. Since we estimate a probit model,  $\phi(\cdot)$  is the standard normal density function, while  $\beta_1$  and  $\beta_2$  are simply the coefficients of  $sib$  and  $sib^2$ , respectively. Standard errors are computed using the delta method.

Table 7: Determinants of first birth (probit model)

Independent variables	m.e. (%)		st. err. (%)
<b>Woman's working hours - longest job before marriage</b>	<b>-0.11</b>	*	0.10
<b>Woman's type of contract - longest job before marriage</b>			
<i>Reference: permanent contract</i>	-		
Fixed term contract	<b>2.44</b>		2.44
No contract	<b>4.02</b>		2.73
Self-employed	<b>0.79</b>		4.40
Missing	<b>-1.38</b>		5.55
<b>Woman's occupation group - longest job before marriage</b>			
<i>Reference: unskilled manual</i>	-		
Entrepreneurs	<b>-13.67</b>		9.77
White collar - high	<b>-2.45</b>		3.23
White collar - low	<b>-0.34</b>		2.70
Skilled manual	<b>0.50</b>		3.60
<b>Woman's sector of activity - longest job before marriage</b>			
<i>Reference: private firm with &lt;15 employees</i>	-		
Private firm with 16-75 employees	<b>0.53</b>		2.55
Private firm with 75-150	<b>-4.92</b>		5.67
Private firm with >150	<b>-5.82</b>		5.30
Public sector	<b>-2.31</b>		3.26
Missing	<b>3.98</b>	*	2.22
<b>Woman's work experience - at marriage</b>			
% Job exp. in P-T jobs	<b>-0.02</b>		0.04
% Job exp. longest job before marriage	<b>0.00</b>		0.04
Job experience (months)	<b>-0.11</b>	***	0.02
<b>Woman's unemployment - at marriage</b>			
<i>Reference: never unemployed</i>	-		
Less than 1 year	<b>-5.32</b>		4.28
More than 1 year	<b>-13.43</b>	***	5.12
<b>Woman's education - at marriage</b>			
<i>Reference: primary or not formal schooling</i>	-		
Lower secondary school	<b>-4.24</b>	*	2.43
Upper secondary school	<b>-4.56</b>		3.03
University degree	<b>-10.95</b>	*	6.17
<b>Unemployment rate</b>	<b>-0.86</b>	**	0.41
<b>Partner's age - at marriage</b>	<b>-0.42</b>	**	0.18
<b>Partner's occupation group - at marriage</b>			
<i>Reference: unskilled manual</i>	-		
Entrepreneurs	<b>-2.24</b>		4.43
Professionals (self-employed)	<b>-2.40</b>		3.96
White collar - high	<b>-3.68</b>		3.44
White collar - low	<b>-3.70</b>		3.27
Skilled manual	<b>1.33</b>		3.47
Missing	<b>2.63</b>		2.85
<b>Woman's birth cohort</b>			
<i>Reference: 1940-44</i>	-		
1945-49	<b>1.49</b>		1.96
1950-54	<b>-0.05</b>		2.23
1955-59	<b>-3.03</b>		2.56
1960-64	<b>-8.46</b>	**	3.41
1965-69	<b>-38.19</b>	***	6.10
1970-77	<b>-75.38</b>	***	6.98
<b>Geographical area - at marriage</b>			
<i>Reference: South</i>	-		
North West	<b>-6.15</b>	*	3.47
North East	<b>-6.83</b>	*	3.67
Centre	<b>-11.94</b>	***	4.35
Isles	<b>-2.61</b>		3.26
<b>Number of siblings at age 14</b>			
Number of siblings at age 14	<b>3.91</b>	**	1.16
Number of observations			1,322
Wald (chi <sup>2</sup> )			296.24
Prob>chi <sup>2</sup>			0.0000
Pseudo R <sup>2</sup>			0.3513

*Note.* The dependent variable is a binary variable assuming value one if a woman has a first birth by 1997 and zero otherwise. We indicate with m.e. the marginal effects and with st.err. the relative heroskedasticity-robust standard errors. The Wald test is a test of the joint significance of all regressors but the intercept. \*\*\* significant at the 1% level; \*\* significant at the 5% level; \* significant at the 10% level.

for the presence of a non-zero correlation between the unobservables affecting first birth and those influencing LFP after childbirth) is to estimate a probit model with selection, where the selection equation is represented by the decision of having a first child and the main equation is represented by a participation equation.<sup>11</sup>

This can be easily modelled by indicating with  $j$  the number of months after the birth of the first child, and with  $U^W$  and  $U^{NW}$  the indirect utilities associated with activity and inactivity, respectively. We assume that these utilities depend on a vector of observable characteristics and an error term, so that:

$$U_{i,t+j}^W = \beta^W X_{i,t-m} + \epsilon_{i,t+j}^W, \quad (1)$$

and,

$$U_{i,t+j}^{NW} = \beta^{NW} X_{i,t-m} + \epsilon_{i,t+j}^{NW}, \quad (2)$$

where  $i$  indicates the woman,  $t$  is the date of birth of the child,  $X_{i,t-m}$  is a vector of women's characteristics taken at the time of marriage, which occurs  $m$  months before the birth of the first child while  $\epsilon_{i,t+j}^W$  and  $\epsilon_{i,t+j}^{NW}$  are the error terms.<sup>12</sup> By subtracting equation (2) from equation (1), we obtain:

$$U_{i,t+j}^* \equiv U_{i,t+j}^W - U_{i,t+j}^{NW} = (\beta^W - \beta^{NW}) X_{i,t-m} + \epsilon_{i,t+j}^W - \epsilon_{i,t+j}^{NW} \quad (3)$$

Indicating with  $\epsilon_{i,t+j} \equiv \epsilon_{i,t+j}^W - \epsilon_{i,t+j}^{NW}$  and with  $\beta \equiv \beta^W - \beta^{NW}$ , the previous equation can be rewritten as:

$$U_{i,t+j}^* = \beta X_{i,t-m} + \epsilon_{i,t+j}. \quad (4)$$

However, we do not observe the latent (utility) variable but only the decision made by a woman. Thus, the observational rule is:

$$U_{i,t+j} = 1 \quad \text{if} \quad U_{i,t+j}^* > 0, \quad (5)$$

where  $U_{i,t+j} = 1$  if a woman participates in the labour market in period  $t+j$  and zero otherwise.

Likewise, the utilities related to the decision of whether to have the first child or not are, respectively:

$$V_{i,t}^C = \delta^C Z_{i,t-m} + u_{i,t}^C, \quad (6)$$

and,

$$V_{i,t}^{NC} = \delta^{NC} Z_{i,t-m} + u_{i,t}^{NC}, \quad (7)$$

<sup>11</sup>See van de Ven and van Praag (1981).

<sup>12</sup>For ease of exposition we indicate with  $t$  the time of birth of the first child and with  $m$  the number of months between marriage and the birth. A more rigorous notation would require the use of  $t_i$ , because the timing of the first birth is individual specific. Similarly, we should use  $m_i$  instead of  $m$ .



with  $Z_{i,t-m}$  a vector of women's characteristics affecting fertility and  $u_{i,t}^C$  and  $u_{i,t}^{NC}$  are the error terms.

Taking the difference:

$$V_{i,t}^* \equiv V_{i,t}^C - V_{i,t}^{NC} = (\delta^C - \delta^{NC}) Z_{i,t-m} + u_{i,t}^C - u_{i,t}^{NC}, \quad (8)$$

and indicating with  $u_{i,t}$  the difference between  $u_{i,t}^C$  and  $u_{i,t}^{NC}$  and with  $\delta$  the difference between  $\delta^C - \delta^{NC}$ , equation (8) can be rewritten as:

$$V_{i,t}^* = \delta Z_{i,t-m} + u_{i,t}. \quad (9)$$

The observational rule in this case is:

$$V_{i,t} = 1 \quad \text{if} \quad V_{i,t}^* > 0, \quad (10)$$

where  $V_{i,t} = 1$  if woman  $i$  has a child and zero otherwise.

A self-selection problem may arise because  $U_{i,t+j}$  is observed only if  $V_{i,t} = 1$  and omitted characteristics may affect both the unobservable gain of participating,  $\epsilon_{i,t+j}$  and the unobservable gain of childbearing,  $u_{i,t}$ . In order to estimate the model and identify the LFP from the fertility equation, we include the number of siblings of the woman at age 14 in the fertility equation as a proxy for her "taste" for children and exclude this variable from the LFP equation. In other words, we allow  $Z_{i,t-m}$  to include at least one variable which does not appear in  $X_{i,t-m}$ .<sup>13</sup>

Assuming that  $(\epsilon, u) \sim BVN(0, 0, 1, 1, \rho)$ , i.e. is bivariate normally distributed, it is easy to show that the log-likelihood for the bivariate probit model with selection is:

$$\begin{aligned} & \sum_{U=1, V=1} \ln \Phi_2(\beta X_{i,t-m}, \delta Z_{i,t-m}, \rho) + \sum_{U=0, V=1} \ln \Phi_2(-\beta X_{i,t-m}, \delta Z_{i,t-m}, -\rho) \\ & + \sum_{V=0} \ln \Phi(-\delta Z_{i,t-m}), \end{aligned} \quad (11)$$

which can then be estimated by maximum likelihood.

We choose to analyse new mothers' labour market decisions by looking at a woman's participation status 1, 2 and 3 years after first birth (which corresponds to  $j = 12, 24$  and  $36$ , respectively, in the model). Although the choice of these three specific points in time may seem arbitrary, it is nevertheless representative of women's labour market behaviour during an important period of time after the birth of the first child. Indeed, as we will see (Figures 1 and 2), the predicted probabilities of participation after childbearing for each of the 36 months after the birth of the first child reveal a smooth pattern, i.e. there are no spikes at 12, 24 and 36 months, so that by

<sup>13</sup>Exclusion restrictions are not necessary when the model is estimated by parametric methods, but they are generally thought to be important in order not to rely only on functional form assumptions.

Table 8: Evidence on the presence of selection bias (probit with selection model)

Variables	12 months			24 months			36 months		
	coef.	***	st. err.	coef.	***	st. err.	coef.	***	st. err.
n. of siblings	0.365	***	0.047	0.364	***	0.047	0.363	***	0.047
n. of siblings <sup>2</sup>	-0.040	***	0.007	-0.040	***	0.007	-0.040	***	0.007
$\rho$	-0.162		0.332	-0.287		0.323	-0.415		0.311

*Note.* The table shows the effect of the number of siblings living with a woman when she was aged 14 and its square value on the probability of having a first birth by 1997. We indicate with  $\rho$  the correlation between the error terms of the fertility and the LFP equation.

showing results corresponding to these specific points in time no important aspect of the analysis is missed.<sup>14</sup>

It should also be said that the choice of a 3-year window is rather conventional in the literature as this period is long enough to describe the main features of participation following childbirth and is short enough to eliminate the influence of other events, such as a change in the marital status of the individual.<sup>15</sup> In any case, the choice is partly dictated by the dataset, as we have an indicator of the availability of child care only for the three years after the birth of the first child, but after this period no information on child care arrangements is available from the survey.<sup>16</sup>

As Table 8 shows, we do not find a significant correlation between the error terms of the participation and fertility equations at any point in time. This is so despite the fact that the effect of the number of siblings on the probability of having a birth is significant at the 1% statistical level.<sup>17</sup>

Two factors may contribute to the absence of a significant selection bias. Firstly, there is a very high percentage of women in marital or cohabiting

<sup>14</sup>It is possible that, by estimating the probability of participation at a particular point in time during a 3-year window instead of the probability of a transition between activity and inactivity over this period, we are discarding potentially important information. For example, we could have chosen to estimate a duration model where the dependent variable is given by the length of time in the labour force after the birth of the child. However, we think that such a model would not offer significant advantages in our case, since the window of three years is a relatively short period to consider and in Italy women who exit the labour force do not immediately re-enter it (Solera 2003).

<sup>15</sup>During the period under study a divorce decree would usually take three to five years to become absolute.

<sup>16</sup>We carried out an additional analysis on a 5-year window always excluding our indicator for child care availability and did not find major qualitative differences with respect to the results reported here.

<sup>17</sup>As a further check of the validity of our exclusion restriction, we looked at the effect of the number of siblings in a simple participation equation and found that this variable is not statistically significant in that context.

unions with children (more than 82%), and secondly it is possible that in our sample there is little individual unobserved heterogeneity left, given that we are excluding from the analysis women who never worked before marriage. In order to check whether the selection we operate is affecting these results, we estimated the same model on a sample of women which included also those who never worked before marriage. The results were similar to what shown in Table 8, and indicated that the correlation between the error terms of the participation and fertility equations was never statistically different from zero.<sup>18</sup> Accordingly, in the next section we simply present the results of the estimation of a probit model without selection.

## 5 Results

In this paper, we are concerned mainly with the effect of past job characteristics on women's labour market status in the period after childbirth. In particular, we analyse women's employment history in the period before marriage and consider how the characteristics of the job of longest duration held before marriage help to explain women's participation decisions after the birth of the first child.

For the reasons discussed in section 4 our final model is based on a standard probit specification in which the dependent variable assumes value 1 if a woman is either employed or unemployed and value 0 if she is out of the labour force after giving birth to her first child. Among the control variables we include the main characteristics of the job with the longest duration held by the subject before marriage, proxies of the woman's human capital and earnings, factors related to her partner, labour demand indicators - such as the local unemployment rate - and cohort and geographic dummies. We also take into account the availability of child care, which has been found to be an important element in explaining new mothers' working status.<sup>19</sup>

In this final specification, we do not control explicitly for subsequent fertility, but previous analysis shows that when we include a dummy variable indicating whether the woman had a second child within three years since the birth of the first child (21% of the sample) its coefficient is negative and significant at 24 and 36 months since the first birth. In particular, women who had or wanted to have a second child very soon after the first baby had about 7 percentage points lower probability of participating in the labour force than other women in our sample.<sup>20</sup> However, since this variable is potentially endogenous and its exclusion from the model does not alter the coefficients of interest, we decided not to include it in the final specification.<sup>21</sup>

For ease of exposition, our main results are divided into two tables. In

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<sup>18</sup>These results are available upon request from the authors.

<sup>19</sup>This specification was adopted after performing a set of Wald tests for variables exclusion. Other variables which were initially included in the analysis were the religion of the woman, her husband's level of education, and her parents' education levels and occupational groups. All these variables turned out not to be significant at the 5% statistical level, either individually or jointly, and were therefore excluded from the present analysis.

<sup>20</sup>A similar approach is followed by Shapiro and Mott (1994), Dex, Joshi, Macran and

Table 9: Effect of employer's and job characteristics on new mothers' LFP (probit model)

Selected independent variables	12 months		24 months		36 months	
	m.e. (%)	st. err. (%)	m.e. (%)	st. err. (%)	m.e. (%)	st. err. (%)
<b>Woman's working hours - longest job before marriage</b>	-0.69	***	-0.58	**	-0.51	***
<b>Woman's type of contract - longest job before marriage</b>	-		-		-	
<i>Reference: permanent contract</i>						
Fixed term contract	-1.52	5.02	-3.45	5.19	-0.40	5.09
No contract	-12.42	**	-11.48	**	-15.15	***
Self-employed	-4.22	6.67	-4.97	6.81	-3.96	6.80
Missing	-11.32	9.91	-10.72	9.98	-9.50	9.61
<b>Woman's occupation group - longest job before marriage</b>						
<i>Reference: unskilled manual</i>						
Entrepreneurs	11.93	13.60	11.71	13.66	7.75	14.90
White collar - high	4.89	5.29	6.38	5.28	6.83	5.45
White collar - low	-7.75	*	-11.15	**	-9.38	*
Skilled manual	0.36	5.05	-2.05	5.19	3.11	5.13
<b>Woman's sector of activity - longest job before marriage</b>						
<i>Reference: private firm with &lt; than 15 employees</i>						
Private firm with 16-75 employees	-6.63	4.91	-8.04	4.94	-9.51	*
Private firm with 75-150 employees	-5.54	6.92	-10.41	7.13	-11.50	7.22
Private firm with >150 employees	11.21	**	7.64	5.81	5.07	6.08
Public sector	22.22	***	22.50	4.20	23.89	***
Missing	5.87	4.76	6.38	4.77	4.52	4.94
Number of observations	1,090		1,090		1,090	
Wald (chi2)	192.84		204.64		199.66	
Prob>chi2	0.0000		0.0000		0.0000	
Pseudo R <sup>2</sup>	0.1793		0.1808		0.1689	

*Note.* The dependent variable is a binary indicator assuming value one if a woman participates in the labour force and zero otherwise. The specification also includes all the variables listed in Table 10. We indicate with m.e. the marginal effects and with st.err. the relative heroskedasticity-robust standard errors. The Wald test is a test of the joint significance of all independent variables but the intercept. \*\*\* significant at the 1% level; \*\* significant at the 5% level; \* significant at the 10% level.

Table 9 we present and comment on the impact of the characteristics of the job of longest duration before marriage on the probability that a woman participates in the labour market after the birth of the first child. In Table 10, we look at the effect of other variables of interest, such as experience, child care availability and the partner’s characteristics. We comment on each table in turn below.

We see from Table 9 that some of the job characteristics exert a very significant influence on the probability that a woman participates in the labour market after the birth of the first child. As we would expect, for instance, the number of hours worked per week negatively affects the probability that a new mother participates in the labour force. Since most of the women in our sample work full-time, it is clear that any additional hour of work makes it more difficult for them to reconcile career and family responsibilities.

Among the various job characteristics considered, the type of contract is found to be one of the most important factors in predicting future participation probabilities. All women who do not have a permanent employment contract in the longest job before marriage have a lower probability of working after the birth of the first child, independently of the point in time considered. Moreover, we see that this effect is statistically very significant for women who work without a regular contract (i.e. in the informal sector), who appear to be between 11 and 15 percentage points less likely to be active after childbirth with respect to women who have a permanent contract. This result is also represented in the top graph in Figure 1, which shows the predicted monthly probabilities of participation by type of contract for the entire 3-year window. Here we can clearly see a more or less constant participation “penalty” for women working in the informal sector with respect to women working in the formal sector, irrespective of their type of employment.<sup>22</sup>

When looking at the effect of occupational qualifications, we compare women in unskilled manual jobs with women in more qualified positions, which should also receive a higher wage. As we can see from Table 9, there is no clear indication that occupational categories may reflect wage differentials as the signs of the dummies are sometimes negative and sometimes positive. However, these effects are almost always statistically insignificant, with the exception of the dummy representing women working in low-skilled white-collar jobs who are found to have a lower probability of being in the labour force after childbirth with respect to women working as unskilled manuals.

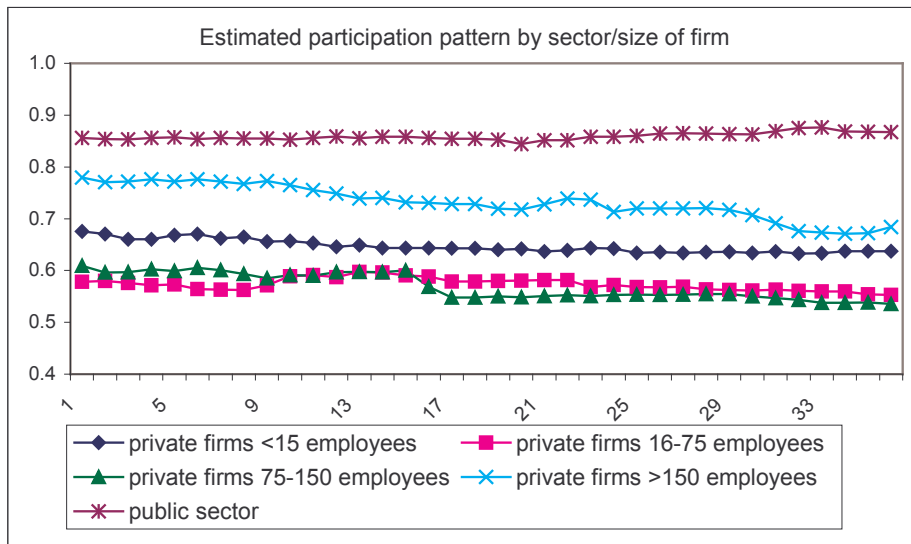
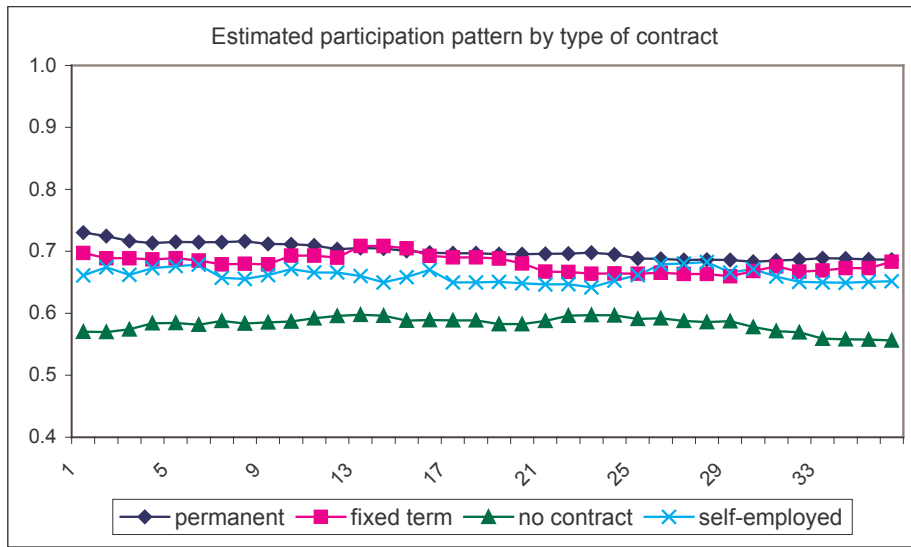
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McCulloch (1998), and Gutiérrez-Domènech (2002).

<sup>21</sup>These results are available upon request from the authors.

<sup>22</sup>We should not think of the informal sector as a way in which women can negotiate more flexible hours or working conditions which are more compatible with childrearing activities. In our sample, women working without a regular contract are mainly employed in a full-time job (85%), and work the over the entire year (92%), while only a handful of them work from home (4%). Some of these women are in very unskilled jobs, such as domestic or office cleaners (12.98%), or work as agriculture (8.16%) or manufacturing (2.72%) labourers. A sizeable proportion of them performs semi-skilled jobs, such as tailoring (9.56%), or is employed in the textile industry as machine operators (12.24%), but there is also a more skilled group which consists of secretaries (6%), child care workers (3.4%), hairdressers/beauticians (4%), and shop salespersons (11.56%).

Figure 1: Monthly predicted probabilities: type of contract and sector/size of firm



*Note.* This figure shows the predicted probabilities of participating after childbirth for different values of some selected variables. Predicted probabilities are computed from monthly probit models including all the regressors in Tables 9 and 10.

This effect may be interpreted as a higher participation of women from particularly low income families.

A very robust finding in our analysis is the importance of a woman's sector of activity. Table 9 shows that the public sector dummy is not only significant at the 1% level, but is also one of the most important determinants of participation after childbearing in terms of the magnitude of its effect. Women whose longest pre-marital job is in the public sector are 22, 23 and 24 percentage points more likely to be in the labour force 12, 24 and 36 months, respectively, after the birth of the child than women who work in small firms in the private sector.

If we look at the size of the firm, we see that although there is a certain non-monotonic effect of the number of employees on the probability of new mothers' participation, women working in establishments with more than 150 employees have a higher probability of being in the labour force after becoming mothers than employees working in small firms. This difference is also evident from the bottom graph of Figure 1, where we clearly see that women working in very large firms have a participation probability significantly higher than that of women working in small private firms especially during the first year after birth.

These differences can be attributed to the employment protection legislation, which in Italy makes a sharp distinction between small and large establishments. According to *art. 18* of the *Statuto dei Lavoratori (Legge 300/1970)*, firms with more than 15 employees are required to rehire illegitimately dismissed employees and to pay them all of the wages they lost during the litigation period, while firms with 15 employees or less must pay just a monetary compensation to the worker in case a court rules that the dismissal was illegitimate. There is also an additional major difference between small and large (or public) firms. This refers to another form of firing, known as "collective dismissals" (*Legge 223/1991*), which can be used only by firms with more than 15 employees and applies in case of an adverse economic shock which requires them to fire more than five workers at the same time. In this case, the firm can enlist the dismissed workers in a special "waiting scheme" (*lista di mobilità*). This scheme allows the workers to claim benefits (although they are not officially unemployed), offers them the opportunity to take a temporary job in the public sector, provides a social security contributions discount to the firm that subsequently hires them, and gives them priority in matching vacancies advertised by local job centres (*Uffici Regionali del Lavoro*).<sup>23</sup>

Although we control for several indicators of human capital in order to proxy wages, it is possible that differences in the probability of being in the labour force according to the type of contract or the sector of activity may also capture differences in earnings and might not be related to differences in the degree of employment protection. In order to take into account this

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<sup>23</sup>More than 80% of children in our sample were born after 1970, so that their mothers would have been covered by the rules of the *Statuto dei Lavoratori*, but only 10% of children in our sample are born after 1991, so that it is unlikely that the *Legge 223/1991* has played a major role in protecting the employment rights of the new mothers in our sample.

possibility, we constructed a set of interaction terms between the “no contract” dummy and education, and another set of interactions between the “public sector” dummy and education. The results are shown in the Appendix (Tables A2-A4), where we also report the outcome of a Wald test of the joint significance of the interaction terms.<sup>24</sup>

Tables A2-A4 in the Appendix show that the interaction terms are jointly insignificant and therefore do not capture important differences across individuals in our dataset. In particular, we see that although the effect of working in the informal sector is always negative and strongly significant at any point in time, none of the interactions with education turns out to be significantly different from zero. When we consider interactions between the public sector dummy and education, by contrast, the single interaction terms turn out to be negative and significant for higher levels of education. This suggests that the effect of working in the public sector is more pronounced for women with lower levels of education and confirms what found by Lucifora and Meurs (2004), who show that the public sector pays a wage premium for low skilled workers with respect to the private sector, while the opposite holds true for high skilled workers. However, although the public sector dummy could partly capture a wage effect, it is clear from the Wald test on the overall significance of the interaction terms that this does not represent the most important aspect of the explanation. In other words, there is clearly an effect of working in the public sector which is common across workers with different levels of education, and we think that this effect could be determined by a higher employment protection.

Overall, we can say that the sign and significance of the variables in Table 9, which describe the characteristics of a woman’s most significant pre-marital employment experience, convey the picture of a “dual labour market”. Women with jobs providing a higher degree of employment protection find it easier to combine career and family, while those who occupy less regular positions and are therefore less sheltered by the legislation are more likely not to be in the labour force after first birth.

Turning now to analyse the effect of other variables, we see in Table 10 that past labour market experience - here captured by variables such as the cumulative experience of employment or unemployment, the percentage of the period spent in the job with the longest duration and the percentage of the period spent in part-time jobs (over total labour market experience) - is very important in explaining participation choices after childbearing. In particular, increasing by one percent point the fraction of pre-marital working experience spent in part-time employment is significantly associated with a premium in the probability of working at 12 and 24 months after childbirth of respectively 0.17 and 0.19 percentage points, but does not show long-term effects on women’s activity. Similarly, we see that an increase in overall working experience is significantly and positively related to the probability of being in the labour force after the birth of the first child.

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<sup>24</sup>We also tried to construct interactions between the “no contract” dummy and the occupational qualifications and between the public sector dummy and the occupational qualifications, but because of small cell size and multicollinearity problems (i.e. almost all employees in the public sector are white collar workers) these results were not very robust.



Table 10: Effect of other factors on new mothers' LFP (probit model)

Selected independent variables	12 months		24 months		36 months	
	m.e. (%)	st. err. (%)	m.e. (%)	st. err. (%)	m.e. (%)	st. err. (%)
<b>Woman's work experience - at marriage</b>						
% Job exp. in P-T jobs	0.17	**	0.19	**	0.12	0.08
% Job exp. longest job before marriage	0.04	0.08	0.02	0.08	-0.03	0.08
Job experience (months)	0.14	***	0.11	***	0.11	***
<b>Woman's unemployment - at marriage</b>						
<i>Reference: never unemployed</i>	-		-		-	
Less than 1 year	6.22	**	5.39	*	4.77	6.35
More than 1 year	12.33	***	11.09	***	11.82	6.06
<b>Child care not available</b>	-24.77	***	-20.31	***	-15.95	7.63
<b>Woman's education - at marriage</b>						
<i>Reference: primary or not formal schooling</i>	-		-		-	
Lower secondary school	10.79	***	11.33	***	10.90	4.27
Upper secondary school	13.72	**	12.87	**	11.94	5.70
University degree	28.08	***	26.95	***	26.86	9.02
<b>Unemployment rate</b>	-0.42	0.67	-0.17	0.66	-0.03	0.65
<b>Partner's age - at marriage</b>	-0.77	*	-0.52	0.42	-0.83	0.43
<b>Partner's occupation group - at marriage</b>						
<i>Reference: unskilled manual</i>	-		-		-	
Entrepreneurs	-18.96	**	-19.52	***	-18.32	7.31
Professionals (self-employed)	-3.24	4.60	-3.64	4.60	-5.16	4.92
White collar - high	-8.57	*	-8.87	*	-10.72	5.13
White collar - low	-7.82	5.40	-6.17	5.32	-7.82	5.44
Skilled manual	-12.46	***	-15.03	***	-12.73	4.40
Missing	-12.02	*	-12.20	*	-12.74	7.14
<b>Woman's birth cohort</b>						
<i>Reference: 1940-44</i>	-		-		-	
1945-49	2.77	5.27	4.49	5.27	7.85	5.28
1950-54	16.59	***	18.52	***	21.47	5.42
1955-59	10.42	*	10.33	*	8.66	6.51
1960-64	10.18	6.78	11.54	*	12.98	6.89
1965-69	9.79	8.15	13.22	*	15.64	8.15
1970-77	3.92	16.76	-2.54	18.31	-2.19	18.23
<b>Geographical area - at marriage</b>						
<i>Reference: South</i>	-		-		-	
North West	-6.26	5.19	-2.97	5.45	-2.17	5.72
North East	-20.35	***	-15.63	**	-14.87	6.62
Centre	-0.93	5.47	-0.25	5.89	2.41	6.05
Isles	-3.12	5.99	-6.38	6.54	-1.84	6.45
Number of observations	1,090		1,090		1,090	
Wald (chi <sup>2</sup> )	192.84		204.64		199.66	
Prob > chi <sup>2</sup>	0.0000		0.0000		0.0000	
Pseudo R <sup>2</sup>	0.1793		0.1808		0.1689	

*Note.* The dependent variable is a binary indicator assuming value one if a woman participates in the labour force and zero otherwise. The specification also includes the effect of job characteristics reported in Table 9. We indicate with m.e. the marginal effects and with st.err. the relative heroskedasticity-robust standard errors. The Wald test is a test of the joint significance of all independent variables but the intercept. \*\*\* significant at the 1% level.

We also find that women who have experienced long periods of unemployment before marriage are generally more likely to participate after becoming mothers with respect to women who have never been unemployed. This effect could indicate a strong propensity to participate for this group of subjects. Further analysis of this result shows that women with longer pre-marital unemployment experience are more likely to be unemployed after the birth of the first child. Thus, it is possible that this effect is simply due to the fact that a few individual in our sample register very long unemployment spells which are not interrupted even after the birth of the first child.

As shown in several studies (Duncan and Giles, 1996; Del Boca, 2002; Marenzi and Pagani, 2003; Del Boca, Locatelli and Vuri, 2004), child care availability is a very important factor for the reconciliation of career and family responsibilities. Therefore, in all our specifications we include a dummy for the absence of institutional and informal child care as an explanatory variable. The results show that the lack of child care opportunities has a negative and highly significant effect on the probability of being active following childbirth. The effect on the probability of participating is of -25, -20 and -16 percentage points, respectively, at 12, 24 and 36 months after childbirth.<sup>25</sup>

This result is also graphically represented in top graph in Figure 2, which shows the predicted monthly probabilities of participation by availability of child care for the whole 3-year window. The figure reveals that women who do not have access to child care experience a decrease in the probability of being in the labour force after childbirth especially after 3 and 12 months since the birth of the child. Since these cutoff points determine the end of the compulsory and the optional maternity leave, respectively, this variable captures an important effect of the maternity leave legislation, which in Italy represents the main form of institutional assistance provided to mothers as child care facilities are extremely scarce for children below three years of age.

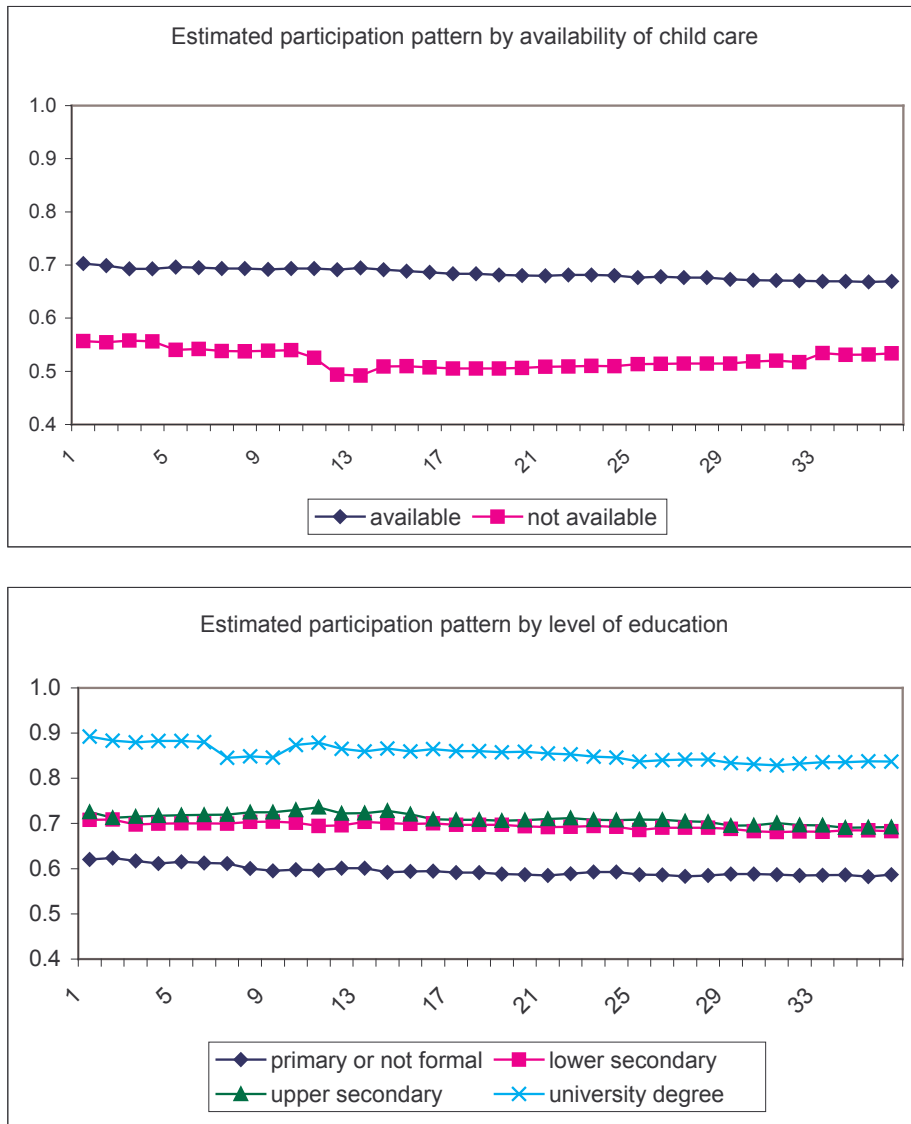
Consistently with what has been found in many other studies (see among the others Klerman and Leibowitz, 1994; Dex, Joshi, Macran and McCulloch, 1998; Bratti, 2003), we find that the level of education raises the probability of being in the labour force after childbirth. In particular, having a university degree as compared to having only primary or no educational qualifications increases the probability of participating by about 28 percentage points at 12 months since birth.<sup>26</sup> The effect is very similar also at

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<sup>25</sup>The exact formulation of the question about child care is: "In the first three years after the birth did you receive child care help from your relatives, other people or institutions (e.g. kindergarten)?" . There are four possible answers: 1 "yes, it was free", 2 "yes, it was not free", 3 "no, we had no need", 4 "no, we did not have availability of relatives/other persons/institutions". Since the first three answers could be endogenous with respect to women's employment decisions, we decided to use only the fourth answer. We constructed an indicator of child care availability using a dummy variable with value one when child care was not available from none of the three possible sources. Arguably, this variable is less affected by endogeneity problems.

<sup>26</sup>Using data from the SHIW and focusing on women aged 21-39 only but considering also women who never participated, Bratti (2003) estimates a similar strong effect of

Figure 2: Monthly predicted probabilities: child care and education



*Note.* This figure shows the predicted probabilities of participating after childbirth for different values of some selected variables. Predicted probabilities are computed from monthly probit models including all the regressors in Tables 9 and 10.

24 and 36 months, resulting in a constantly higher predicted probability of being active after childbearing over the entire 3-year period as shown in the bottom graph of Figure 2. The premium in the probability of participating for women with upper or lower secondary schooling is somewhat smaller, but always very significant with respect to women with low levels of education.

From Table 10, we also see that the husband’s characteristics are quite important in order to capture income effects. A woman whose partner is an entrepreneur, high white collar or a skilled manual worker has a significantly lower probability of being in the labour force after childbirth with respect to a woman whose partner is an unskilled manual worker.<sup>27</sup>

Overall, our main results show that the factors affecting women’s probability of participating after childbirth do not change dramatically across the 3-year window considered. This implies that there are long-term effects of various characteristics of the woman’s longest job before marriage, like the type of contract and the sector of activity on the probability of being in the labour force after childbearing. Indeed, since the factors affecting LFP after childbearing are similar throughout this period, our analysis implicitly confirms that, unlike the UK where the typical choice is one of interrupted employment (Joshi, McRae and Dex, 1996), in Italy women who exit the labour market do not immediately re-enter it.

To conclude, we compare the results above with those obtained using the characteristics of the last job at marriage and of the last job before childbearing, reported respectively in Table A5 and Table A6 in the Appendix. As we can see, the signs and the magnitudes of the effects of interest do not change very much across specifications, suggesting that the substantial lack of mobility in the Italian labour market makes it equivalent in terms of our analysis which job episode preceding the birth of the child one chooses. The main difference is found when looking at the effect of distinguishing private sector firms by number of employees. Here the difference between small and large establishments is even more important than what we saw in Table 9. In this case employees working in large firms have a significantly higher probability of participating after childbearing which lasts for the entire 3-year window considered. This could be explained by the fact that the last job at marriage or at childbearing are probably better proxies of the working conditions of our subjects at the time of childbearing and are therefore better suited to reflect the impact of the employment protection legislation.

## 6 Conclusions

In this paper we use individual-level data from the *Longitudinal Survey of Italian Households* to investigate the factors affecting female labour force participation after the birth of the first child. Since the LSIH gathers retrospective data on the entire working history of the women in the survey, we

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women’s education on LFP.

<sup>27</sup>Other studies finding a negative husbands’ income effect for Italy are for instance Colombino and Di Tommaso (1996) and Di Tommaso (1999).

use this information to assess the importance of pre-marital job characteristics in determining new mothers' labour market participation decisions in the period immediately following childbirth.

We find that several job-related factors have an important explanatory power with respect to new mothers' participation decisions. In particular, the main aspects of past experience affecting new mothers' labour force participation are the positive effect associated with working in the public sector or in large firms, and the negative effect related to working without a contract. We try to determine whether these results are simply due to earnings differences across women which cannot be captured by other control variables by including interaction terms between education and the most important job attributes. Assuming that these interaction terms are a good proxy of wage differences among jobs with the same characteristics, we find that wage effects are not what drives our results. We therefore suggest that the impact of working in the public sector or in large private firms, and that of working without a contract, on female participation after childbirth can be attributed to different levels of employment protection enjoyed by workers.

These findings convey the picture of a "dual labour market" whereby women who enjoy a substantial amount of employment protection have a higher incentive to participate in the labour force in the period immediately following childbirth, while women who find themselves in less protected and secure jobs are very likely to withdraw from the labour market. This would imply that recent reforms, such as the "Pacchetto Treu" (*Legge 196/1997*) or the "Riforma Biagi" (*Legge 30/2003*), which aim at increasing labour market flexibility in Italy, could have unintended negative consequences on female labour force participation if they are not accompanied by measures which provide a sufficient degree of employment protection for new mothers.

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# Appendix

Table A1: Sample descriptive statistics

Variables	mean	st. dev.	obs.
<b>First child</b>	0.82	0.38	1,322
<b>Number of siblings at age 14<sup>a</sup></b>			
Number of siblings at age 14	2.06	1.75	1,307
Number of siblings at age 14 <sup>2</sup>	7.30	12.40	1,307
<b>In the labor force after 12 months since the first child</b>	0.68	0.47	1,090
<b>In the labor force after 24 months since the first child</b>	0.67	0.47	1,090
<b>In the labor force after 36 months since the first child</b>	0.66	0.47	1,090
<b>Woman's working hours - longest job before marriage<sup>a</sup></b>	40.90	10.63	1,045
<b>Woman's type of contract - longest job before marriage</b>			
<i>Reference: permanent contract</i>	0.62	0.49	1,090
Fixed term contract	0.13	0.34	1,090
No contract	0.13	0.34	1,090
Self-employed	0.08	0.27	1,090
Missing	0.03	0.18	1,090
<b>Woman's occupation group - longest job before marriage</b>			
<i>Reference: unskilled manual</i>	0.20	0.40	1,090
Entrepreneurs	0.02	0.13	1,090
White collar - high	0.33	0.47	1,090
White collar - low	0.28	0.45	1,090
Skilled manual	0.10	0.30	1,090
<b>Woman's sector of activity - longest job before marriage</b>			
<i>Reference: consumer services</i>	0.28	0.45	1,090
Primary	0.04	0.20	1,090
Manufacturing	0.34	0.47	1,090
Construction	0.03	0.18	1,090
Finance and Insurance	0.03	0.17	1,090
Firms services	0.05	0.22	1,090
Public Administration	0.03	0.18	1,090
Social services	0.19	0.39	1,090
Missing	0.01	0.09	1,090
<b>Woman's sector of activity - longest job before marriage</b>			
<i>Reference: private firm with &lt; 15 employees</i>	0.32	0.47	1,090
Private firm with 16-75 employees	0.16	0.36	1,090
Private firm with 75-150 employees	0.06	0.23	1,090
Private firm with > 150 employees	0.08	0.27	1,090
Public sector	0.19	0.40	1,090
Missing	0.15	0.36	1,090
<b>Woman's work experience - at marriage</b>			
% Job exp. in P-T jobs	6.01	22.86	1,090
% Job exp. longest job before marriage	84.80	19.99	1,090
Job experience (months)	71.30	44.82	1,090
<b>Woman's unemployment - at marriage</b>			
<i>Reference: never unemployed</i>	0.89	0.31	1,090
Less than 1 year	0.06	0.24	1,090
More than 1 year	0.05	0.22	1,090
<b>Child care not available</b>	0.05	0.22	1,090
<b>Woman's education - at marriage</b>			
<i>Reference: primary or not formal schooling</i>	0.27	0.45	1,090
Lower secondary school	0.33	0.47	1,090
Upper secondary school	0.32	0.47	1,090
University degree	0.07	0.25	1,090
<b>Unemployment rate after 12 months since the first child</b>	7.01	4.15	1,090
<b>Unemployment rate after 24 months since the first child</b>	7.30	4.38	1,090
<b>Unemployment rate after 36 months since the first child</b>	7.55	4.57	1,090
<b>Partner's age - at marriage<sup>a</sup></b>	27.86	4.20	1,004
<b>Partner's occupation group - at marriage</b>			
<i>Reference: unskilled manual</i>	0.13	0.33	1,090
Entrepreneurs	0.09	0.28	1,090
Professionals (self-employed)	0.14	0.35	1,090
White collar - high	0.21	0.41	1,090
White collar - low	0.10	0.30	1,090
Skilled manual	0.26	0.44	1,090
Missing	0.07	0.26	1,090
<b>Woman's birth cohort</b>			
<i>Reference: 1940-44</i>	0.15	0.36	1,090
1945-49	0.23	0.42	1,090
1950-54	0.19	0.39	1,090
1955-59	0.19	0.39	1,090
1960-64	0.16	0.37	1,090
1965-69	0.07	0.26	1,090
1970-77	0.01	0.10	1,090
<b>Geographical area - at marriage</b>			
<i>Reference: South</i>	0.23	0.42	1,090
North West	0.33	0.47	1,090
North East	0.21	0.40	1,090
Centre	0.15	0.36	1,090
Isles	0.08	0.27	1,090

Note. <sup>a</sup> Refers to non missing values only.



Table A2: Estimates of the model including interaction terms, 12 months (probit model)

Selected independent variables	12 months					
	m.e. (%)	st. err. (%)	m.e. (%)	st. err. (%)	m.e. (%)	st. err. (%)
<b>Woman's education - st marriage</b> <i>Reference: primary or not formal schooling</i>						
Lower secondary school	11.70	4.28	8.66	4.62	9.86	4.74
Upper secondary school	14.18	5.73	11.95	5.97	12.62	6.14
University degree	27.91	11.47	30.20	7.90	32.56	9.14
<b>Woman's type of contract - longest job before marriage</b> <i>Reference: permanent contract</i>						
Fixed term contract	-		-		-	
No contract	-1.10	4.98	-1.69	4.98	-1.36	4.97
Self-employed	-12.29	5.33	-16.50	7.21	-15.85	7.23
Missing	-4.19	6.67	-4.05	6.58	-3.96	6.60
	-11.14	10.00	-11.08	9.82	-11.18	9.93
<b>Woman with no contract by level of education</b> <i>Reference: no contract and primary or not formal schooling</i>						
No contract and lower secondary school	-		-		-	
No contract and upper secondary school	-		12.51	10.69	11.41	10.77
No contract and university degree	-		6.63	11.99	6.12	12.02
	-		-39.26	28.98	-43.18	26.85
<b>Woman's sector of activity - longest job before marriage</b> <i>Reference: private firm with &lt; than 15 employees</i>						
Private firm with 16-75 employees	-7.20	5.15	-6.54	4.91	-7.18	5.16
Private firm with 75-150 employees	-6.06	7.22	-5.03	6.86	-5.55	7.20
Private firm with >150 employees	12.17	6.13	11.21	5.47	12.26	6.12
Public sector	36.27	6.77	21.81	4.20	36.13	6.79
Missing	6.22	5.16	6.43	4.68	6.67	5.12
<b>Woman in public sector by level of education</b> <i>Reference: public sector and primary or not formal schooling</i>						
Public sector and lower secondary school	-13.92	8.31	-		-13.11	8.06
Public sector and upper secondary school	-9.08	4.15	-		-8.81	4.11
Public sector and university degree	-7.89	10.70	-		-14.45	16.01
Wald (chi2)	3.45			2.76		6.38
Prob>chi2	0.3275			0.4301		0.3824

Note. The dependent variable is a binary variable assuming value one if a woman participated in the labour force and zero otherwise. The specification also includes all independent variables listed in Table 10. We indicate with m.e. the marginal effects and with st.err. the relative heroskedasticity-robust standard errors. The Wald test is a test of the joint significance of the interaction terms. \*\*\* significant at the 1% level; \*\* significant at the 5% level; \* significant at the 10% level.

Table A3: Estimates of the model including interaction terms, 24 months (probit model)

Selected independent variables	24 months					
	m.e. (%)	st. err. (%)	m.e. (%)	st. err. (%)	m.e. (%)	st. err. (%)
<b>Woman's education - st marriage</b> <i>Reference: primary or not formal schooling</i>						
Lower secondary school	12.54	4.28	9.56	4.63	9.86	4.74
Upper secondary school	12.81	5.77	10.91	6.03	12.62	6.14
University degree	26.14	12.63	29.83	8.46	32.56	9.14
<b>Woman's type of contract - longest job before marriage</b> <i>Reference: permanent contract</i>						
Fixed term contract	-2.98	5.15	-3.56	5.16	-1.36	4.97
No contract	-11.42	5.29	-15.33	7.21	-15.85	7.23
Self-employed	-4.96	6.80	-4.92	6.75	-3.96	6.60
Missing	-10.75	10.10	-10.52	9.88	-11.18	9.93
<b>Woman with no contract by level of education</b> <i>Reference: no contract and primary or not formal schooling</i>						
No contract and lower secondary school	-		9.79	10.97	11.41	10.77
No contract and upper secondary school	-		9.49	11.81	6.12	12.02
No contract and university degree	-		-40.78	27.05	-43.18	26.85
<b>Woman's sector of activity - longest job before marriage</b> <i>Reference: private firm with &lt; than 15 employees</i>						
Private firm with 16-75 employees	-8.61	5.15	-7.93	4.94	-7.18	5.16
Private firm with 75-150 employees	-10.98	7.31	-9.94	7.10	-5.55	7.20
Private firm with >150 employees	8.19	6.35	7.63	5.78	12.26	6.12
Public sector	36.59	6.70	22.17	4.20	36.13	6.79
Missing	6.87	5.16	6.96	4.68	6.67	5.12
<b>Woman in public sector by level of education</b> <i>Reference: public sector and primary or not formal schooling</i>						
Public sector and lower secondary school	-19.09	9.40	-		-13.11	8.06
Public sector and upper secondary school	-7.91	3.91	-		-8.81	4.11
Public sector and university degree	-7.03	9.89	-		-14.45	16.01
Wald (chi2)	5.02		2.69		7.83	
Prob>chi2	0.1704		0.4428		0.2511	

Note. The dependent variable is a binary variable assuming value one if a woman participated in the labour force and zero otherwise. The specification also includes all independent variables listed in Table 10. We indicate with m.e. the marginal effects and with st.err. the relative heroskedasticity-robust standard errors. m.e. are marginal effects and st.err. the relative heroskedasticity-robust standard errors. The Wald test is a test of the joint significance of the interaction terms. \*\*\* significant at the 1% level; \*\* significant at the 5% level; \* significant at the 10% level.

Table A4: Estimates of the model including interaction terms, 36 months (probit model)

Selected independent variables	36 months					
	m.e. (%)	st. err. (%)	m.e. (%)	st. err. (%)	m.e. (%)	st. err. (%)
<b>Woman's education - st marriage</b> <i>Reference: primary or not formal schooling</i>						
Lower secondary school	12.08	4.33	8.51	4.64	10.00	4.72
Upper secondary school	11.62	5.81	9.24	6.01	8.98	6.17
University degree	26.60	11.32	27.79	9.03	29.44	10.19
<b>Woman's type of contract - longest job before marriage</b> <i>Reference: permanent contract</i>						
Fixed term contract	-		-		-	
No contract	-0.05	5.06	-0.37	5.00	-0.07	4.99
Self-employed	-15.18	5.39	-21.59	7.50	-21.14	7.53
Missing	-3.98	6.78	-4.17	6.74	-4.19	6.73
	-9.70	9.74	-9.31	9.51	-9.69	9.66
<b>Woman with no contract by level of education</b> <i>Reference: no contract and primary or not formal schooling</i>						
No contract and lower secondary school	-		-		-	
No contract and upper secondary school	-		13.13	11.41	11.56	11.49
No contract and university degree	-		13.91	12.08	14.06	12.09
	-		-22.74	31.31	-25.60	30.58
<b>Woman's sector of activity - longest job before marriage</b> <i>Reference: private firm with &lt; than 15 employees</i>						
Private firm with 16-75 employees	-9.99	5.08	-9.48	4.93	-10.00	5.08
Private firm with 75-150 employees	-11.94	7.33	-11.07	7.20	-11.51	7.32
Private firm with >150 employees	5.32	6.47	4.92	6.08	5.19	6.47
Public sector	36.12	7.21	23.80	4.13	35.90	7.26
Missing	4.78	5.24	5.11	4.89	5.31	5.21
<b>Woman in public sector by level of education</b> <i>Reference: public sector and primary or not formal schooling</i>						
Public sector and lower secondary school	-18.51	9.59	-		-17.85	9.47
Public sector and upper secondary school	-6.55	4.13	-		-6.17	4.11
Public sector and university degree	-7.14	9.68	-		-10.40	12.07
Wald (chi2)	4.36		2.59		6.90	
Prob>chi2	0.2247		0.4594		0.3298	

Note. The dependent variable is a binary variable assuming value one if a woman participated in the labour force and zero otherwise. The specification also includes all independent variables listed in Table 10. We indicate with m.e. the marginal effects and with st.err. the relative heroskedasticity-robust standard errors. m.e. are marginal effects and st.err. the relative heroskedasticity-robust standard errors. The Wald test is a test of the joint significance of the interaction terms. \*\*\* significant at the 1% level; \*\* significant at the 5% level; \* significant at the 10% level.

Table A5: Probit model of new mothers' LFP with the characteristics of last job at marriage

Independent variables	12 months		24 months		36 months	
	m.e. (%)	st. err. (%)	m.e. (%)	st. err. (%)	m.e. (%)	st. err. (%)
<b>Woman's working hours - last job before marriage</b>	-0.70	0.18	-0.65	0.19	-0.65	0.19
<i>Reference: permanent contract</i>						
Fixed term contract	-5.81	5.25	-	5.38	-4.51	5.32
No contract	-15.44	5.75	-15.42	5.80	-17.02	5.76
Self-employed	1.21	5.80	0.43	5.92	0.75	6.15
Missing	-20.80	11.18	-24.15	11.43	-19.28	11.05
<b>Woman's occupation group - last job before marriage</b>						
<i>Reference: unskilled manual</i>						
Entrepreneurs	14.67	12.45	-	12.39	-	14.35
White collar - high	8.60	5.38	15.73	5.39	8.85	5.54
White collar - low	-5.19	4.93	-8.06	5.04	-7.78	5.06
Skilled manual	-1.60	5.43	-1.84	5.47	-0.02	5.46
<b>Woman's sector of activity - last job before marriage</b>						
<i>Reference: private firm with &lt; 15 employees</i>						
Private firm with 16-75 employees	-7.28	5.02	-	5.06	-10.61	5.03
Private firm with 75-150 employees	4.57	6.78	-0.43	6.99	-5.05	7.22
Private firm with > 150 employees	13.72	5.43	12.53	5.51	9.59	5.82
Public sector	22.82	4.27	22.07	4.37	22.63	4.40
Missing	5.92	4.96	5.64	4.96	5.04	5.08
<b>Woman's work experience - at marriage</b>						
<i>Reference: never unemployed</i>						
% Job exp. in P-T jobs	0.19	0.08	0.21	0.08	0.12	0.08
% Job exp. longest job before marriage	0.01	0.08	0.11	0.08	0.05	0.08
Job experience (months)	0.13	0.04	0.11	0.04	0.10	0.04
<b>Woman's unemployment - at marriage</b>						
<i>Reference: never unemployed</i>						
Less than 1 year	6.27	6.08	-	6.27	-	6.47
More than 1 year	13.61	5.30	12.95	5.60	13.26	5.81
<b>Child care not available</b>	-22.34	7.52	-19.15	7.64	-14.80	7.49
<b>Woman's education - at marriage</b>						
<i>Reference: primary or not formal schooling</i>						
Lower secondary school	-	4.21	-	4.21	-	4.28
Upper secondary school	8.43	5.71	8.94	5.75	8.47	5.82
University degree	9.79	9.84	9.09	10.53	22.48	10.03
<b>Unemployment rate</b>	22.97	0.68	21.81	0.67	22.48	0.65
<b>Partner's age - at marriage</b>	-0.58	0.41	-0.33	0.42	-0.14	0.42
<b>Partner's occupation group - at marriage</b>	-0.58	0.41	-0.33	0.42	-0.63	0.42
<i>Reference: unskilled manual</i>						
Entrepreneurs	-	7.20	-	7.26	-	7.06
Professionals (self-employed)	-18.29	4.64	-18.50	4.71	-16.72	4.95
White collar - high	-4.04	4.96	-4.37	5.06	-5.90	5.18
White collar - low	-10.21	5.44	-10.74	5.38	-12.34	5.52
Skilled manual	-9.45	4.25	-7.91	4.36	-9.34	4.39
Missing	-12.67	6.91	-15.61	7.04	-13.11	7.16
<b>Woman's birth cohort</b>	-13.46		-12.83		-13.55	
<i>Reference: 1940-44</i>						
1945-49	-	5.42	-	5.40	-	5.38
1950-54	4.53	5.48	6.13	5.58	9.27	5.59
1955-59	18.83	6.24	20.21	6.40	22.52	6.54
1960-64	13.43	6.83	13.26	6.92	11.00	6.95
1965-69	14.27	8.13	15.41	8.08	15.91	8.20
1970-77	14.43	16.90	17.59	18.62	18.56	18.48
<b>Geographical area - at marriage</b>	7.20		0.11		-0.87	
<i>Reference: South</i>						
North West	-	5.17	-	5.43	-	5.73
North East	-7.48	6.03	-4.84	6.31	-3.24	6.57
Centre	-20.65	5.46	-16.61	5.85	-14.63	6.07
Isles	-1.29	5.95	-0.92	6.53	2.32	6.77
Number of observations	-2.15		-5.23		-0.62	
Wald (chi2)	1,090		1,090		1,090	
Prob > chi2	211.95		219.34		205.84	
Pseudo R <sup>2</sup>	0.0000		0.0000		0.0000	
	0.1829		0.1865		0.1714	

Note. The dependent variable is a binary indicator assuming value one if a woman participated in the labour force and zero otherwise. We indicate with m.e. the marginal effects and with st.err. the relative heteroskedasticity-robust standard errors. This estimates refer to the specification not including interaction terms between employer's and job characteristics and education (see Table 9). The Wald test is a test of the joint significance of the interaction terms. \*\*\* significant at the 1% level; \*\* significant at the 5% level; \* significant at the 10% level.

Table A6: Probit model of new mothers' LFP with the characteristics of last job at first birth

Independent variables	12 months		24 months		36 months	
	m.e. (%)	st. err. (%)	m.e. (%)	st. err. (%)	m.e. (%)	st. err. (%)
<b>Woman's working hours - last job before childbearing</b>						
<i>Reference: permanent contract</i>						
Fixed term contract	-		-		-	
No contract	-3.79	5.07	-4.49	5.79	-3.56	5.21
Self-employed	-18.45	5.88	-19.67	5.97	-20.50	5.92
Missing	5.27	5.39	4.22	5.55	6.00	5.64
	-10.53	10.21	-14.26	10.77	-9.62	10.23
<b>Woman's occupation group - last job before childbearing</b>						
<i>Reference: unskilled manual</i>						
Entrepreneurs	15.18	11.84	17.38	11.00	10.65	13.81
White collar - high	5.33	5.54	8.16	5.44	7.92	5.65
White collar - low	8.05	5.02	-12.30	5.17	-10.72	5.26
Skilled manual	-1.53	5.15	-2.73	5.53	0.15	5.57
<b>Woman's sector of activity - last job before childbearing</b>						
<i>Reference: private firm with &lt; than 15 employees</i>						
Private firm with 16-75 employees	-4.31	5.15	-6.95	5.23	-7.43	5.22
Private firm with 75-150 employees	0.22	7.62	-3.72	7.54	-4.94	7.66
Private firm with >150 employees	15.38	5.75	13.69	5.81	12.64	6.11
Public sector	25.27	4.35	24.26	4.41	26.65	4.42
Missing	6.82	5.08	5.64	5.11	6.39	5.28
<b>Woman's work experience - at childbearing</b>						
% Job exp. in P-T jobs	0.15	0.09	0.21	0.09	0.16	0.09
% Job exp. longest job before marriage	0.11	0.08	0.01	0.01	0.06	0.08
Job experience (months)	0.23	0.04	0.21	0.04	0.21	0.04
<b>Woman's unemployment - at childbearing</b>						
<i>Reference: never unemployed</i>						
Less than 1 year	2.89	6.45	4.15	6.50	4.16	6.64
More than 1 year	23.01	3.03	23.62	3.14	23.72	3.51
	-22.08	7.55	-18.32	7.49	-13.40	7.28
<b>Child care not available</b>						
<i>Reference: primary or not formal schooling</i>						
Lower secondary school	9.93	4.32	10.32	4.31	10.18	4.40
Upper secondary school	12.89	5.78	11.44	5.84	11.30	5.92
University degree	24.07	9.80	21.91	10.72	23.52	10.07
<b>Unemployment rate</b>						
Partner's age - at marriage	-1.64	0.67	-1.39	0.66	-1.20	0.66
Partner's occupation group - at marriage	-0.66	0.40	-0.43	0.41	-0.76	0.42
<i>Reference: unskilled manual</i>						
Entrepreneurs	-16.31	7.50	-17.32	7.46	-16.02	7.22
Professionals (self-employed)	-5.06	4.85	-5.81	4.84	-7.40	5.09
White collar - high	-10.52	4.97	-11.43	4.97	-13.27	5.10
White collar - low	-8.03	5.35	-7.05	5.24	-8.63	5.34
Skilled manual	-13.57	4.36	-17.09	4.38	-14.59	4.43
Missing	-14.51	6.85	-14.24	6.92	-15.68	7.13
<b>Woman's birth cohort</b>						
<i>Reference: 1940-44</i>						
1945-49	4.76	5.77	6.93	5.73	10.62	5.68
1950-54	21.45	5.69	23.61	5.69	26.40	5.72
1955-59	15.93	6.44	16.36	6.53	14.94	6.70
1960-64	19.39	6.87	21.14	6.85	22.27	6.96
1965-69	22.49	7.59	26.40	7.41	28.32	7.59
1970-77	18.65	13.86	12.99	16.40	12.81	16.54
<b>Geographical area - at marriage</b>						
<i>Reference: South</i>						
North West	-14.88	4.95	-12.57	5.18	-11.92	5.48
North East	-29.22	5.76	-25.58	6.05	-24.49	6.35
Centre	-7.76	5.18	-7.74	5.59	-5.39	5.85
Isles	-1.94	4.95	-4.83	5.61	-0.98	5.55
Number of observations	1,090		1,090		1,090	
Wald (chi2)	250.07		262.24		245.97	
Prob > chi2	0.0000		0.0000		0.0000	
Pseudo R <sup>2</sup>	0.2257		0.2304		0.2146	

Note. The dependent variable is a binary indicator assuming value one if a woman participated in the labour force and zero otherwise. We indicate with m.e. the marginal effects and with st.err. the relative heteroskedasticity-robust standard errors. This estimates refer to the specification not including interaction terms between employer's and job characteristics and education (see Table 9). The Wald test is a test of the joint significance of the interaction terms. \*\*\* significant at the 1% level; \*\* significant at the 5% level; \* significant at the 10% level.