Employment decisions of new mothers in Italy: the role of employment protection[*]

Massimiliano Bratti[†]   Emilia Del Bono[‡]   Daniela Vuri[§]

9th January 2004

Abstract

In this paper we use newly available individual-level data from the Longitudinal Survey of Italian Households to investigate the factors affecting women's employment after the birth of the first child. We find that a higher degree of job stability and employment protection favour a stronger labour market attachment on the part of new mothers. Even after accounting for differences in average weekly hours, we find that women working in the public sector have a probability to be employed after chilbirth which is more than 20 percent higher than that of women with similar characteristics working in small private firms. Overall, the analysis conveys the picture of a 'dual' labour market where 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 market.

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

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

[†]Department of Economics, University of Warwick, CV4 7AL Coventry (UK) and Department of Economics, University of Milan (Italy) and IZA, Bonn (Germany). Email: massimiliano.bratti@warwick.ac.uk

[‡]The Queen's College, University of Oxford, Oxford OX1 4AW (UK) and IZA, Bonn (Germany). Email: emilia.delbono@economics.ox.ac.uk

[§]Corresponding author: Department of Economics, University of Florence, via delle Pandette 9, Edificio D6, Florence, Italy and IZA, Bonn (Germany). Tel: +39-055-4374567, Fax: +39-055-4374905. Email: vuri@cce.unifi.it

1 Introduction

Unlike in many other European countries, such as the UK and Sweden for instance, female participation rates in Italy are still very low, with one out of two married women aged 14-64 being out of the labour force. Although 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, we are aware of very little empirical research which investigates women's working patterns immediately after childbirth in Italy.

In this paper, we use newly available micro-data from the Longitudinal Survey of Italian Households (LSIH) to analyse the decision of married or cohabiting women to work at different points in time after becoming mothers. We are particularly interested in the effect of employment protection and job security as captured by the difference between public and private sectors and the dimension of the firm in which the woman worked before the birth of the child. We limit our analysis to the transitions following 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 in correspondence with the birth of the first child.

Public sector employees in Italy are typically granted a higher level of employment security and job stability with respect to workers in the private sector.[1] Employment in the public sector is usually seen as a life-time job, a 'secure asset' that offers certainty for the future and which is largely protected against economic downturns. The flow of expected income loss incurred by quitting such jobs is therefore very high and this should promote a higher labour market attachment.

In order to analyse new mothers' employment patterns, we estimate the probability that a woman is working 12, 24 and 36 months after the birth of her first child. Our results show that the factors affecting employment after childbearing are similar at 12, 24 and 36 months after childbirth. This confirms that, unlike the UK where the typical choice is one of interrupted employment (Joshi *et al.*, 1996), in Italy women who exit the labour market do not immediately re-enter it.

We find in our analysis that the degree of job stability and employment protection seem to play a major role. In particular, women working in the public sector or in big private companies have a much higher employment attachment than women working in small private firms and this effect is only partly accounted for by shorter working hours prevailing in the public sector. The importance of employment protection is also confirmed by the effect of the type of work contract. Women without a permanent position, i.e. without a contract or with a fixed term contract, are more likely to withdraw from the labour market.

Other important factors determining new mother's employment are the educational attainment and the amount of experience accumulated in the

---

[1] A formal definition of employment security is given in ILO (2002): "protection against arbitrary dismissal, regulation on hiring and firing, employment stability compatible with economic dynamism" (p. 3).

labour market. In particular, we find that women with a higher level of education and with a longer experience in the labour market have a higher probability of working after the birth of the first child. As for the role of part-time and child care, which are two factors frequently emphasised in the empirical literature on women's fertility and labour market participation, we find that while the former exerts a weak effect on new mother's labour market attachment, the latter is strongly significant.

The structure of the paper is as follows. In the next section we discuss the literature and present the variables which are the main focus of our analysis. In section 3, we look at the Italian legislation on employment protection in more detail. Section 4 describes the data and the procedure of sample selection, while section 5 introduces the theoretical model which provides an interpretive framework for the empirical analysis of section 6. In section 7, we present and discuss our results. Section 8 concludes, providing further considerations and discussing the policy implications of our study.

2   The determinants of employment around child-bearing

A comprehensive review of the most important determinants of women's employment around childbearing can be found in Lehrer and Nerlove (1986) and, more recently, in Dex and Joshi (1999). In these studies, women's education and wages usually appear among the most important factors associated with the labour supply behaviour of women with young children (Moffitt, 1984; Dex *et al.*, 1998). This is because childrearing is intensive in the mother's time so that its opportunity-cost increases with women's wages (Becker, 1965; Willis, 1973).

Other variables frequently considered are the husband's education and socio-economic status, which may exert important income effects (Blossfeld *et al.*, 1995), and the cost and availability of child care (Ermisch, 1989; Del Boca, 2002). More recent studies highlight the role of cohort effects (Colombino and Di Tommaso, 1996; McCulloch and Dex, 1997), the structure of the welfare system and family policy regulations (Rönsen and Sundström, 1996; Wetzels, 1999; Lauer and Weber, 2003) and family background (Del Boca *et al.*, 2000).

The main focus of the paper focuses is on the effect of employment protection on women's labour supply decisions in the period after childbearing. Our data is derived from the Longitudinal Study of Italian Households (LSIH), a newly available retrospective survey which collects information on individual employment and family histories. We are particularly interested in the effect of employment protection and job security as captured by the difference between public and private sectors and the dimension of the firm in which the woman worked before the birth of her child. This is justified by the different levels of employment protection legislation (EPL) enjoyed by private firms of different size and the public sector. We shall devote the next paragraph to the description of the EPL in Italy and public-private sectors differences while we describe here other variables included in the analysis.

Among the other factors explaining employment choices of new mothers which have been investigated in the literature, we place particular emphasis on the role of human capital variables. The amount of labour market experience, for example, is likely to positively affect the degree of labour market attachment. It contributes to the human capital stock and therefore increases both the current and the future opportunity-cost of a labour market withdrawal. This effect is usually found in studies which consider the role of potential experience on women's wages and then estimate the impact of wages onto the employment status of new mothers (Klerman and Leibowitz, 1994). Others estimate the direct effect of experience on employment following childbearing. Gutiérrez-Domenèch (2003), for instance, finds that in Belgium, West-Germany, Italy, Spain and Sweden women who have a higher working experience before motherhood are also likely to be employed afterwards.

It is often argued that the lack of part-time jobs represents a major obstacle to female labour force participation since a reduced working time is seen as a means to reconcile home and market work. According to this argument, women with part-time jobs should be more likely to be employed in the period around a birth event. By contrast, a long experience in part-time jobs may be an indicator of lower labour market attachment and we could find an effect in the opposite direction.

The latter might be the case especially in Italy. Sociological research by Stier *et al.* (2001) classifies Italy as a conservative welfare regime in which: "the state, the market, the family and the church share responsibility for citizens' welfare" (p. 1734). In this setting women are expected to give a higher priority to their parental role, and new mothers are more likely to withdraw from the labour market when their labour force attachment is already low. Moreover, part-time workers may not find convenient to stay in employment when publicly-funded child care is scarce (or child care costs are high) as their expected labour income is low as compared to full-time workers (Del Boca, 2002).

Although there are several studies which analyse women's labour force participation jointly with fertility decisions, in Italy there is a very limited amount of research that focuses on female employment around childbearing. Among recent examples, we find the studies by Del Boca (2002), who analyses the employment decision of women with children aged 0-2, and Bratti (2003), who investigates women with children aged 1-2. Among new contributions we find the analysis of transition probabilities between different labour market states around childbearing by Del Boca *et al.* (2003a), and a study of post-birth labour force status up to eight years after the first birth by Gutiérrez-Domènech (2003).

However, to the best of our knowledge, so far there has been no attempt to investigate the effect of employment protection on new mother's employment choices. This is mainly due to the lack of microdata on women's fertility and employment histories. The recent release of the LSIH allows the opportunity to fill this gap and analyse new mother's employment by

looking at the role of past jobs and work experience.[2] Before presenting the data and proceeding with the analysis, however, it is useful to look more closely at the employment protection legislation in Italy. In the next section we explain in some detail the reason why in Italy the public sector and (to a lesser extent) large private firms offer their employees a higher degree of employment protection than small and medium-size firms.

3 Employment protection legislation

As far as Italy is concerned, employers can fire workers for a 'justified objective reason' (*giustificato motivo oggettivo*), which includes reasons concerning the production activity, the organisation of work and its regular functioning. Alternatively, they can fire their employees for a 'justified subjective reason' (*giustificato motivo soggettivo*), which applies in case of a serious breach of the worker's duties. Furthermore, when an even more serious breach of conduct is observed, a worker can be dismissed without notice, i.e. for a 'just cause' (*giusta causa*).

These general rules apply to all firms, but the degree of employment protection is closely linked to the size of the firm. The most important piece of Italian legislation on this matter distinguishes between firms with 15 employees or less, and larger firms (see *Statuto dei Lavoratori, 1970, art. 18*). In general, a dismissed worker can bring legal proceedings against her employer. The court then decides about the legitimacy of the dismissal. 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. By contrast, firms with 15 employees or less are not required to rehire dismissed workers even if the court has ruled that their dismissal was illegitimate, but pay just a monetary compensation to the worker.

Another difference is that in case of dismissal for a 'justified objective reason' firms with more than 15 employees are required to prove that the redundant workers could not have been employed in other activities within the same establishment, or in other establishments within the same firm, also in other geographical locations. It is clear that larger firms find it harder to satisfy this requirement, since it is difficult for them to prove that a worker could not have been assigned to another establishment or could not have performed equivalent tasks within the same establishment. For the same reason, dismissals for a 'justified objective reason' are almost non-existent in the public sector, which is less exposed to economic downturns and where workers can be easily assigned to other tasks within the same public administration or moved to other public administrations within the national territory.

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 n. 223/1991*), which can be used only by firms with more

---

[2]To the best of our knowledge, these data have been used for similar purposes only by Solera (2003) who examines changes across cohorts in the determinants of exits and re-entries into employment. However, her work does not focus on the period around childbirth and the study mainly features a comparison between Italy and Great Britain.

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*). As large firms are more likely to use this procedure, it follows that their employees enjoy a substantially higher employment protection compared to those working in smaller firms.

These rules differentiate clearly between small and private firms and, by extension, between private and public sector jobs, since the Public Administration can be considered as a very large employer whose activity is almost totally insulated with respect to economic fluctuations.[3]

To the best of our knowledge the present is the first paper looking at the differences in new mothers' employment between the public and the private sectors and the role of employment protection. However, the previous literature, although not specifically focused on new mothers' working decisions, has shown that in Italy the public and the private sectors are different and that the role of employment protection may be important.

For instance, Pagani (2003) finds that people look more intensively for a job in the public sector the more unfavourable the labour demand conditions, the degree of job security and prospects of wage increases are in the private sector. This explains, for example, the job market strategy of people living in the South of Italy, where the average unemployment rate and the unemployment duration are higher than in the rest of the country. A similar result is found by Alesina *et al.* (1999), who show that since public jobs offer a large income premium and greater security with respect to private sector jobs, people living in the South of Italy often prefer long period of unemployment to taking a job in the private sector. They also show that individuals do not exit the public sector unless they are forced to.

Other studies focus on the wage differential between private and public sectors, controlling for endogenous selection of workers in the two sectors (Cannari *et al.* 1989; Brunello and Rizzi, 1993; Brunello and Dustmann, 1997). There is almost no evidence that in Italy endogenous selection into sector of activity occurs, while the structure of wage differentials appears to differ according to skills, education, age and gender of workers. Looking at the earnings dynamics in the two sectors, Cappellari (2002) finds that public sector workers enjoy higher starting earnings, but flatter income profiles as compared to private sector workers. He also shows that public sector employees enjoy a lower degree of earnings uncertainty. Lucifora and Meurs (2003) show that, with respect to the private sector, the public sector pays a wage premium for low skilled workers, while the opposite holds for high skilled workers, and that these effects are even more pronounced for women.

---

[3]Moreover, creation of public sector jobs has been often used as a countercyclical policy measure to raise employment. Public sector jobs are thus characterised by a much higher degree of security with respect to private sector jobs.

As we have seen in detail in the previous section, there are also marked differences between private firms of different size. Because of these differences, Garibaldi *et al.* (2003) analyse the behaviour of firms below the threshold fixed by the legislation (15 employees), which "face a trade-off between dynamic efficiency (the possibility of adjusting their size in response to future shocks) and average long-run size (the possibility of growing below the threshold)" (p.2). In both their theoretical and empirical analysis, they find that many firms prefer dynamic efficiency and choose not to cross the threshold. They also show that the 1990 employment legislation protection reform, which increased firing costs for small firms relatively to large firms, slowed down the growth of small firms significantly. Coherently with this evidence, in a recent paper Kugler and Pica (2003) find that the increase in dismissal costs in Italy after 1990 decreased accessions and separations in small relative to big firms, especially for women.

The type of contract is another factor related to employment protection and job security. Fixed-term contracts are often thought to be a stepping stone towards more stable working experiences. However, the economic literature shows that this is not necessarily the case. Using French data, Blanchard and Landier (2002) find that the spreading of fixed-term contracts leads to a high turnover in entry-level jobs without a substantial reduction in unemployment. Booth *et al.* (2002) observe that in the UK temporary workers enjoy lower levels of job satisfaction, receive less training and are less well-paid, all factors that are likely to affect their future employability and labour market attachment. As for Italy, Accornero *et al.* (2000) find evidence that atypical/fixed-term contracts are seldom an entry-port for more stable and regular jobs and that this phenomenon mainly affects women. Hence, we would expect female participation after childbirth to be even lower for mothers who previously worked with a fixed-term contract or in the informal sector.

4   The LSIH data and sample description

A largely unexplored and interesting source of data for our purposes is the Longitudinal Survey of Italian Households (LSIH). The survey is conducted by the University of Trento, 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 follow-ups took place in 1999 and 2001, respectively.

Our sample is derived from the 4,713 families interviewed in the first wave of the survey since at the time of our study this was the only sweep publicly available. The dataset includes retrospective information on the 10,423 adult members of each family. 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.[4]

---

[4]For a more detailed description of the data and the structure of the survey see Schizzerotto (2002).

With respect to past labour market histories, 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 the 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-the-labour-force states. The latter includes people who are retired, carrying out the obligatory military service, students, housewives, those who are in parental leave, and in 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 %) at 1995. However, educational attainment and occupational qualification variables are collected at a very disaggregated level and are available at various points in time, so that they are 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 24.20 years, while the mean age at the birth of the first child is about 25.51 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 marriage 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.[5] This reduces the number of observations to 3,919 married women, about 72% of the original sample.[6] We further select only women born after 1940, in order to minimise the effect of recollection errors and exclude women that we do not observe for the entire 3-year window after the birth of the first child because this period defines our dependent variable. This means that younger women do not appear in our sample. Additionally, 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. This reduces the sample to 2,011 women, 1,763 of whom

---

[5]Out-of wedlock births, which include births in cohabiting unions, were about 9% of total live births in 1997 (see *Annuario Statistico Italiano 2002*).

[6]We decide not to draw a distinction between cohabiting and married couples as cohabitation is a very recent phenomenon in Italy, and simply refer to marriage to address both types of unions.

Table 1: Patterns of employment before and after the first birth

	Employment		Full time		Part time	
	obs.	%	obs.	%	obs.	%
Neither before or after	528	29.95	582	33.01	1,603	90.92
Before only	337	19.12	348	19.74	69	3.91
After only	42	2.38	40	2.27	32	1.82
Both before and after	856	48.55	793	44.98	59	3.35
Total	1,763	100	1,763	100	1,763	100

Note: The period before is any period before the birth of the first child. The period after is three years since childbirth

had a child by 1997.

In considering the woman's employment history during the first three years after the first birth we define economic activity distinguishing between employment and non-employment and consider the period spent in maternity leave as employment as long as the total number of months of self-reported maternity leave does not exceed the compulsory period imposed by the legislation.[7] As shown in Table 1, around 70% of women in our sample have at least one employment experience either before or during the three years after the birth of the first child. In particular, 48% of women are employed sometime before and after childbearing, while almost 20% stop working with the birth of the child and do not start again in the first 36 months after. Only a negligible percentage of women have never worked before becoming mothers and start working only after the birth of their first child.

Table 1 also shows that very few women work part-time. The definition of part-time is based on a self-declaration of the respondent and is consistent with that used by ISTAT. We do not distinguish between voluntary and involuntary part-time because of small cell size. Indeed, we see that the percentage of women who had a part-time job before the birth of the first child is very small (only about 3.9%), and falls even further (to 3.3%) during the three years after the birth. As found in aggregate national statistics, our data seem to confirm that part-time employment in Italy is either not available or not chosen by new mothers. Therefore, in what follows we simply analyse women's employment status after childbearing without distinguishing between full-time and part-time jobs.

Since the fraction of new mothers who start working only after childbearing is very modest (2.38%), we focus our empirical investigation on women who showed a certain degree of attachment to the labour force. This leads us to exclude women who never worked before marriage, dropping a further

---

[7]The latter 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 30 dicembre 1971 n. 1204*). The legislation on parental leave in Italy has been recently modified (*Legge 8 marzo 2000 n. 53*), 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.

700 observations.[8] We introduce dummy variables for missing values but a few additional cases need to be excluded because for some 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 1,297 women, 1,106 of whom had the first child by 1997.

The average woman in this sample gets married at age 24.63, which is a number very close to the mean for all women in our survey (24.20 years). However, she has a child at age 26.5, almost 1 year later than the average woman in the whole dataset. This difference is entirely due to the fact that we consider only women with stronger attachment to the labour force, who tend to postpone fertility decisions. If we were to consider in our sample also those women who never had an employment spell before marriage, we would observe a mean age at the birth of the first child of about 25.62 years, which is not statistically different from the 25.50 recorded for the original dataset. This suggests that our sample selection procedures have not generated a sample with different observable characteristics with respect to the original dataset and we therefore proceed with our analysis.

5   A simple analytical framework

In this section we analyse women's labour supply decisions in the period around the birth of the first child. The theoretical model presented here is extremely stylised because our main aim is to provide only an intuitive analytical and interpretive framework for the econometric analysis. In particular, the model disregards the potential endogeneity of fertility decisions and the monetary costs of purchased child care in order to focus on the role of employment protection. As we shall see, given the very high percentage of women who give birth to at least one child, and the fact that in the empirical analysis we consider only women with a high degree of attachment to the labour force, the potential sample selection bias due to the endogeneity of fertility turns out not to be an issue. Moreover, in Italy the purchase of child care appears to be rather limited (Del Boca 2002; Del Boca *et al.*, 2003b).

Let us consider a woman who is working before having a child. At time 0, the period around childbirth, she must decide whether to interrupt her career or not. We consider two cases, which we label the *over-optimistic* expectations and the *over-pessimistic* expectations case, respectively. In the *over-optimistic* expectations case, a woman who decides to drop out of the labour market to look after her child expects to be able to find the same kind of job she had before quitting once she decides to return to employment. In the *over-pessimistic* expectations case, a woman expects to quit her job permanently if she withdraws from the labour market because of childbearing. Using these two hypothetical and rather extreme cases we intend to describe

---

[8]In an earlier version of this paper we included in our sample also 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 employed after childbirth, but all other results were not qualitatively different from those reported in the present analysis.

the way in which women form their expectations with respect to their labour market opportunities, while it is clear that a more realistic situation would lie somewhere in between.

Let us assume that a woman's utility depends on her life-time flow of earnings and on the utility derived from child rearing and that there is no discounting of utility. In the case of *over-optimistic* expectations, a woman's utility can be expressed as follows :

$$U_i = l_0 w_0 + \sum_{\tau=1}^{T} [(w_0 + \delta \sum_{t=0}^{\tau-1} l_t)(1 - P_F)^\tau] l_\tau + u_i^0(child)(1 - l_0) + u_i^1(child)(l_0) \tag{1}$$

where i is the subscript for a generic individual, w_0 is the wage at time 0, P_F is the exogenous probability of being fired, which is assumed constant over time, and T represents the end of the time horizon (with $T > 0$). We also assume that the wage is a linear function of time spent in the labour market, so that δ is the return to experience.

The model assumes that a woman receives some utility from her child, and that this utility is different depending on whether the woman is employed or not at the birth of the child. In the first case the utility derived from the child is $u_i^0(child)$, while in the second case it is $u_i^1(child)$.[9] The labour force decision of the individual at time 0 is indicated by l_0, which assumes value 1 if the woman is employed and 0 if she experiences a career interruption.[10]

If a woman holds *over-optimistic* expectations, she anticipates that $l_\tau = 1$, for all $\tau > 0$. In other words, even if she quits her current job because of childbearing, she expects to find employment afterwards with probability 1 and to receive a starting wage equal to her previous wage since her human capital is not affected by depreciation. However, in each period she faces an exogenous probability of being fired, P_F.[11]

A woman's expected utility when $l_0 = 0$ is:

$$U_i^0 = w_0(1 - P_F) + \sum_{\tau=2}^{T}(w_0 + \delta(\tau - 1))(1 - P_F)^\tau + u_i^0(child), \tag{2}$$

while her expected utility when $l_0 = 1$ is:

$$U_i^1 = w_0 + \sum_{\tau=1}^{T}(w_0 + \delta\tau)(1 - P_F)^\tau + u_i^1(child). \tag{3}$$

It is clear that a woman will decide to participate in the labour market if $U_i^1 - U_i^0 > 0$.

---

[9]In analogy with Cigno (1991), and unlike Walker (1995), we do not assume a recursive structure for the utility of fertility, i.e. that children give a flow of utility also for all periods following childbearing.

[10]Note that here we do not distinguish between participation and employment.

[11]Note that we assume that a woman is subject to the probability P_F to be fired in each period, and even if she has just been hired.

Assuming that the utilities $u_i^0(child)$ and $u_i^1(child)$ (u_i^0 and u_i^1, hereafter) of childrearing do not depend on the woman's observed characteristics, but are idiosyncratic stochastic terms unobservable by the researcher, it is easy to show that the probability that a woman decides to continue working is:

$$Pr(U_i^1 - U_i^0 > 0) = Pr(u_i^0 - u_i^1 < w_0 + \delta \frac{(1 - P_F)}{P_F}(1 - (1 - P_F)^T). \quad (4)$$

If we define $G \equiv w_0 + \delta \frac{(1-P_F)}{P_F}(1 - (1 - P_F)^T$ and $\epsilon_i \equiv u_i^0 - u_i^1$ the expression above becomes:

$$Pr(U_i^1 - U_i^0 > 0) = Pr(\epsilon_i < G), \quad (5)$$

which shows that factors which increase the expected income flow, G, reduce the probability that a woman interrupts her career.

For example, let us consider the effect on G of a change in the exogenous probability of being fired. This is given by the following expression:

$$\frac{\partial G}{\partial P_F} = \frac{\delta P_F(T+1)(1 - P_F)^T - \delta + \delta(1 - P_F)^{T+1}}{P_F^2}. \quad (6)$$

A necessary and sufficient condition for this derivative to be negative is that:

$$(1 - P_F)^T < \frac{1}{P_F T + 1} \quad (7)$$

which turns out to be always true for $P_F \in (0,1)$. Therefore, an increase in the firing probability is associated with an increase in the probability of experiencing a career interruption around childbirth.

Moreover, a greater starting wage (due for example to higher education or higher past working experience) or a steeper earnings profile are always associated with a lower probability of a career interruption at childbirth, as we can see from the following expressions:

$$\frac{\partial G}{\partial w_0} = 1 \quad (8)$$

$$\frac{\partial G}{\partial \delta} = \frac{(1 - P_F) - (1 - P_F)^{T+1}}{P_F} > 0. \quad (9)$$

In the case of *over-pessimistic* expectations, a woman's expected utility when $l_0 = 0$ is:

$$U_i^0 = u_i^0, \quad (10)$$

since $l_\tau = 0$ for all $\tau > 0$. On the other hand, when $l_0 = 1$, U_i^1 is the same as before. Therefore, it turns out that:

$$Pr(U_i^1 - U_i^0 > 0) = Pr(u_i^0 - u_i^1 < w_0 + \sum_{\tau=1}^{T}(w_0 + \delta\tau)(1 - P_F)^\tau). \quad (11)$$

In analogy with the previous case, let us define $G \equiv w_0 + \sum_{\tau=1}^{T}(w_0 + \delta\tau)(1-P_F)^{\tau}$ and $\epsilon_i \equiv u_{0i} - u_{1i}$, and analyse the effect of a change in one of the exogenous variables on the probability of experiencing a career interruption around childbearing. In this case, we find that:

$$\frac{\partial G}{\partial P_F} = -\sum_{\tau=1}^{T}(w_0 + \tau\delta)\tau(1-P_F)^{\tau-1} < 0, \tag{12}$$

$$\frac{\partial G}{\partial w_0} = 1 + \frac{(1-P_F)}{P_F}(1 - (1-P_F)^T) > 0, \tag{13}$$

$$\frac{\partial G}{\partial \delta} = \sum_{\tau=1}^{T}\tau(1-P_F)^{\tau} > 0. \tag{14}$$

Therefore, the signs of the effects of increasing the firing probability, or the starting wage, or the steepness of the earnings profile on women's labour supply decisions around childbirth are all preserved. It must follow that the signs are the same also in intermediate cases and that the implications of a change in the exogenous variables are invariant with respect to differences in expectations about future employment opportunities held by the individual.

The *over-optimistic* and the *over-pessimistic* expectations cases can be seen as metaphors of a flexible or a highly regulated labour market, in which it is, respectively, very easy or very hard to find a new job once an individual quits her previous one. Since in the *over-pessimistic* expectations case the expected income loss associated with a career interruption is higher than in the *over-optimistic* expectations case, it follows that the probability of an interruption must be lower. Therefore, a stagnant and scarcely flexible labour market is also one in which women who work exhibit a stronger attachment to the labour force and do not quit their jobs because of childbirth.

This situation could reflect, for instance, what is found for Italy by Stier et al. (2001), who analyse women's employment patterns in 12 industrialized countries and observe "[...] in Israel, Italy, and, to a lesser extent, Austria, [...] large proportions of women in continuous full-time employment and continuous non-employment".[12] Similarly, Solera (2003) finds that with respect to the UK a substantial fraction of Italian women never enter employment and that uninterrupted participation is by far the most diffused pattern among those who work.

The most important aspect of this model is, for our aim, the effect of the firing probability, P_F, on the probability of a career interruption around childbirth. If we consider the firing probability as being inversely related to employment security and protection, it follows that women in more protected jobs, such as those employed in the public sector or in big private companies, are less likely to quit around the time of childbearing. On the contrary, women in less protected jobs, such as those working in the informal sector or in small private companies, are more likely to quit at the time of the birth of their child. In our framework, this is simply due to the fact that women enjoying a lower degree of employment security have a lower

---

[12]See Stier and Lewin-Epstein (2001), p. 1748.

expected flow of future income. As we shall see below, this prediction is entirely supported by our empirical evidence.

6   The econometric model

The way in which women form their expectations about their future employment opportunities is likely to be somewhere in between the processes described by equations 4 and 11. However, in section 5 we proved that the effect of a change in one of the exogenous variables on the probability of a career interruption is the same independently of the type of expectations, so that in considering the application of this model to the data no further considerations are needed.

On the other hand, a more general framework would require us to consider factors other than those included in G. This is why in the empirical specification of the model we control for a wider set of variables which includes proxies for G, such as educational qualifications, past labour market experience, occupation and sector of activity of the woman, but also the availability of child care or variables related to the characteristics of the partner.

Taking as our reference period the 3-year interval after the birth of the first child, we can express the utility associated with a career interruption, U_i^0, and the utility associated with a continuous working experience, U_i^1, in the following way:

$$U_{i,t+j}^0 = \beta_j^0 X_{i,t-m} + u_{i,t+j}^0, \tag{15}$$

and,

$$U_{i,t+j}^1 = \beta_j^1 X_{i,t-m} + u_{i,t+j}^1, \tag{16}$$

where t is the date of birth of the first child, $j = 1, 2, ..., 36$ indicates the number of months after the birth, i is the subscript for the generic individual, $X_{i,t-m}$ is a vector of women's characteristics taken at the time of marriage, which occurs m months before the birth of the first child, and $u_{i,t+j}^1$ and $u_{i,t+j}^0$ are the random idiosyncratic components of the indirect utilities related to childbearing.[13] Subtracting equation (15) from equation (16), we obtain:

$$U_{i,t+j}^* \equiv U_{i,t+j}^1 - U_{i,t+j}^0 = \left(\beta_j^1 - \beta_j^0 \right) X_{i,t-m} + u_{i,t+j}^1 - u_{i,t+j}^0. \tag{17}$$

Defining $\epsilon_{i,t+j} \equiv u_{i,t+j}^1 - u_{i,t+j}^0$ and $\beta \equiv \beta^1 - \beta^0$, we can rewrite (17) as:

$$U_{i,t+j}^* = \beta_j X_{i,t-m} + \epsilon_{i,t+j}. \tag{18}$$

---

[13]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.

However, we do not observe the latent utility variable $U_{i,t+j}^*$, but only the decision made by a woman. Thus, the observed decision rule is:

$$U_{i,t+j} = 1 \quad if \quad U_{i,t+j}^* > 0, \tag{19}$$

which indicates that $U_{i,t+j}$ takes on value 1 if a woman works in period $t+j$, and 0 otherwise. Hence, the decision of working after childbearing can be analysed through a standard probit model where we simply assume that ϵ_i follows a standard normal distribution. Formally, we can write:

$$Prob(U_{i,t+j} = 1) = Prob(U_{i,t+j}^* > 0) = \Phi(\beta_j X_{i,t-m}), \tag{20}$$

where $\Phi(\cdot)$ is the standard normal distribution function.

This empirical framework will be explored in the following section in order to analyse the employment status of new mothers during the three years following childbirth. Although the choice of a 3-year window may seem arbitrary, this is a conventional time-frame as this period is long enough to describe the main features of employment following childbirth and is short enough to eliminate the influence of other events, such as the birth of a second child or a change in the marital status of the individual (Rönsen and Sundström, 1996). Moreover, we have a useful indicator of the availability of child care only for the 3 years after the birth of the child, but after this period no information on child care arrangements is available from the survey.[14]

As we have seen in equation (20), we use as explanatory variables the characteristics of a woman and of her husband at the date of marriage or before. This is in order to consider these variables as predetermined with respect to fertility decisions and subsequent employment choices. It is however possible that these regressors, in particular those related to past labour market experience, are not exogenous with respect to fertility and employment decisions after childbearing if some relevant characteristics of the individuals remain unobservable. This is the case even if the variables are taken at the time of marriage or are associated to the job of longest duration before marriage.[15] In order to account for this problem and given the specific focus of the paper (the employment behaviour of new mothers), we restrict our analysis to women who exhibit a high degree of labour market attachment and include in our final sample only those who experience at least one employment episode before marriage.[16] This is thought to reduce the degree of heterogeneity in our sample.

Among the variables included in $X_{i,t-m}$, we consider the woman's sector of activity in the job of longest duration before marriage, her highest level of

---

[14]We carried out 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.

[15]The last job at marriage does not coincide with the job of longest duration at marriage in 20% of cases. But the differences are small: only 9% of women change type of contract and sector of activity, 13% change size of firm, 10% occupational group, 4% working type arrangement. Thus, the results of our analysis do not change much if we consider the last job instead of the job with the longest duration at the time of marriage.

[16]We have seen in Table 1 that the percentage of women that start working only after childbearing is negligible.

education at marriage, her husband's occupation and age at marriage, cohort and geographic differences. We also take into account the occupational qualification and type of contract of the woman's job of longest duration before marriage, the percentage of working experience spent in part-time jobs, in the main pre-marital job, the cumulative number of months spent in employment, and an indicator of past unemployment duration up to the time of marriage. Additional factors included are the availability of child care and the number of hours worked in the main pre-marital job. Table A1 in the Appendix reports some summary statistics for our sample.

Before estimating equation (20) one needs to be careful because the employment decision after childbirth is observed only for mothers and the sample of mothers might not be a random sample of the whole female population. In other words, unobservable factors affecting motherhood could also influence post-birth employment decisions. If a selection process underlying the fertility decision is at work and is ignored, then the estimates of the impact of some variables of interest on the employment decision will be biased.

In order to test for selection into motherhood, we estimate a probit model with sample selection, where the selection equation is represented by the decision of having a first child and the main equation is represented by the employment equation in (20).[17] In order to identify the employment from the fertility equation, we include the number of siblings of the woman at 14 years in the fertility equation as a proxy for her 'taste for children' and exclude this variable from the employment equation. In none of the specifications of our model we find a significant correlation between the error terms of the employment and fertility equations, despite the fact that the effect of the number of siblings on fertility is highly significant. Accordingly, in the next section we simply present the results of the estimation of a probit model without selection.[18]

7 Results

7.1 Public vs. private and the role of employment protection

In this paper we are mainly concerned with the degree of employment protection on women's labour supply decisions in the period after childbearing. In order to capture employment protection we use a dummy variable which assumes value 1 if the job of longest duration held by a woman at the time of marriage was in the public sector and value 0 if this was in the private sector. As we explained in section 3, the degree of employment protection is very highly correlated with the type of sector, both because of the different impact of the economic cycle on public and private firms and because of differences in the legislation.

---

[17]See Van de Ven and Van Pragg (1981).

[18]Two factors may contribute to the absence of a significant selection bias: (i) we are excluding from the analysis women who never worked before marriage in order to have a more homogeneous sample, and (ii) there is a very high percentage of women in marital or cohabiting unions with children (more than 85%).

It is of course possible that the existence of a public/private sector difference in new mothers' employment status is due to the fact that women working in the public sector differ with respect to some unobserved characteristics from women working in the private sector and that these characteristics also affect the probability of working after the birth of the first child. In other words, we should be careful in interpreting the effect of the sector of activity, which represents our proxy for employment protection, in terms of causality as it could be endogenous with respect to women's labour market attachment.

In order to account for this problem, one could adopt an instrumental variable strategy and find a variable which affects the woman's employment status after childbearing only through the effect on the type of sector in which she works. However, it is clear that in our context it is extremely difficult to find a valid instrument to control for the endogeneity of the public/private sector dummy. For this reason, we control for factors which can be thought to be correlated with the choice of sector of activity, such as the woman's educational qualification and her region of residence (Pagani, 2003), and we use an incremental strategy in order to analyse the way in which the effect of the public sector dummy changes as more and more control variables are added to our specification. This exercise helps us to gauge to what extent our estimates may be affected by an omitted variable bias problem.

We first estimate a simple specification of the model. We look at the effect of the public sector dummy on the probability that a woman is employed 12, 24 and 36 months after the birth of the child while controlling for the level of education of the woman, her husband's age and occupation, cohort effects and geographic dummies. As we can see from the first row of Table 2, a woman working in the public sector has a probability of being employed at 12, 24 and 36 months after the birth of the first child which is, respectively, 24, 27 and 28 percentage points higher than a woman working in the private sector. This effect is also always significant at the 1% level.

Adding more control variables, such as the type of occupation and the type of contract of the job with the longest duration before marriage, reduces the effect of the public sector dummy by about 1 or 2 percentage points. By including the woman's working experience until marriage or controlling for the availability of child care we find instead that the effect of the dummy of interest remains almost totally unaltered. It is only when we consider the effect of working hours, which are likely to be very different between public and private sector jobs, that the effect of the public sector is reduced. But even in this case, the variation is small, a magnitude of 1.5 or 2.2 percentage points depending on the time period considered.

As we saw in section 3, the effect of the employment protection legislation varies according to the dimension of the firm, with smaller size private firms granting the lowest levels of protection. Thus, in the final specification we distinguish private firms on the basis of the number of employees and this leads us to compare women working in the public sector to women working in private sector firms with 15 employees or less (the reference category). In this case we find that the effect of working in the public sector on the

Table 2: Estimates of the public sector effect, 'incremental probit'

Variable	12 months			24 months			36 months		
	m.e. (%)		st. err. (%)	m.e. (%)		st. err. (%)	m.e. (%)		st. err. (%)
baseline = public sector, education, husband's characteristics, cohort, geography	24.33	***	3.74	26.54	***	3.67	28.22	***	3.71
as above + occupation and type of contract	23.23	***	3.96	24.79	***	3.94	26.50	***	3.94
as above + past labour market experience	23.39	***	3.94	24.87	***	3.89	26.77	***	3.75
as above + childcare availability	22.75	***	4.00	24.28	***	3.88	26.31	***	3.79
as above + working hours	20.53	***	4.30	22.66	***	4.20	24.64	***	4.04
as above + private sector disaggregated by number of employees	22.60	***	4.87	23.90	***	4.76	24.87	***	4.66

Note. Heteroscedasticity robust standard errors shown. Estimation is by maximum likelihood. Only the marginal effects of the public sector dummy are shown. Symbols: *** significant at 1%, ** significant at 5%, * significant at 10%.

probability of being in employment after the birth of the first child becomes larger. This is an expected result, as we are comparing jobs characterized by the highest and the lowest degree of employment protection, respectively.

Although we have controlled in our specification for some observable characteristics affecting the sector choice, it is possible that women with a strong attachment to the labour force, and therefore higher wages, choose public sector jobs which are better paid than private sector jobs at least for unskilled workers (Lucifora and Meurs, 2003). This could be a problem for our analysis because we cannot control for differences in wages. However, Brunello and Rizzi (1993) and Brunello and Dustmann (1997) analyse wage differentials between private and public sector jobs in Italy and find no evidence of endogenous selection into sector of activity. Although these studies suggest that the endogeneity of sector choice with respect to wages may not a problem, it remains the issue that differences of work attachment between public and private sectors may also stem from differences in the expected earnings flow which are not related to differences in the degree of employment protection but to differences in hourly wages.

In order to take into account this possibility, we constructed interactions between the public sector dummy and the categorical variables representing education and job qualification. The first type of interactions were never statistically significant, proving that the effect of the public sector is homogeneous across different educational levels. The interactions between sector of activity and occupational qualification were also not significant, although in this case we had to group occupational dummies in larger categories because of small cell size and multicollinearity problems (i.e. almost all employees in the public sector are white collar workers). Thus, as far as we can see, the positive effect of working in the public sector on the probability of being employed after the first birth is not likely to originate from wage differentials.[19]

These results and those presented in 2 reveal that adding different sets of control variables to our model or checking for interaction effects does not significantly reduce the public sector employment premium. In all these cases, and for all the time periods considered, the effect of working in the public sector is to increase the probability that a woman is employed after the birth of the first child by at least 20 percentage points, and this is always highly significant. Therefore, it is possible to think that, even if we may have omitted some important characteristics of the individual which could affect her choice of the sector as well as her labour supply decisions, this problem would have only a modest effect on the results of our analysis.

Table 3 presents in more detail the results of the model estimated according to the last specification of the employment equation shown in Table 2. [20] Once again we present our results at 12, 24 and 36 months since child-

---

[19]All the results not presented in the paper are available from the authors upon request.

[20]This specification was adopted after performing a series of Wald tests for variables exclusion. The other variables which were initially included in the analysis were the religion of the woman, her husband's level of education, the industry of the job of longest duration at the time of marriage and a variable indicating whether the job was seasonal or not, the woman's parents' education and occupational group. All these variables turned

bearing. The choice of these specific points in time may seem arbitrary, but it is nevertheless representative of women's employment status during the 3-year window after the birth of the first child. Indeed, estimating monthly probit models for each of the 36 months after childbearing reveals that the predicted probabilities are smooth enough, i.e. they do not have spikes at 12, 24 and 36 months, so that by showing results corresponding to these specific points in time no important aspect of the analysis is lost.

As we can see, the effect of the public sector dummy is not only significant at the 1% level, but is also one of the most important determinants of employment after childbearing. Women whose longest pre-marital job is in the public sector are 23, 24 and 25 per cent points more likely to be employed 12, 24 and 36 months after the birth of the child than women who mainly work in small firms (i.e. less than 15 employees) in the private sector. We also see that, with the exception of firms with 16-50 employees, there is a positive effect of firms' size on the probability of new mothers' employment.

This difference is also evident from the top-right graph of Figure 1, which shows the predicted monthly probabilities of employment by firm size for all the entire 3-year window. Here, it emerges clearly that women working in the public sector have an employment probability after childbearing well above the employment probability computed for women working in the private sector, independently of the size of the firm. Only women working in very large firms (with more than 200 employees) show an employment probability similar in magnitude to that of women working in the public sector, but this is true only for the first year after childbearing. Afterwards, the gap of the employment probabilities between these two groups increases again.[21]

Because of the very low turnover in the public sector, it is likely that women whose main pre-marital job was in the public sector are very likely to occupy the same position also later on. Therefore, the positive effect of the public sector dummy on employment status may reflect the possibility of combining career and motherhood that public sector jobs offer since they are characterized by a relatively short working week with respect to private sector jobs. Indeed, we saw in Table 2 that introducing working hours reduces the effect of the public sector dummy although this variation is modest. We now see from Table 3 that the effect of working hours is negative, as we would expect. The magnitude of the coefficient implies that increasing weekly hours worked by one unit reduces the probability of working by 0.5, 0.4 and 0.4 percentage points at 12, 24 and 36 months, respectively.

The importance of employment protection as captured by the sector of activity seems to be confirmed by the effect of the type of contract of the main pre-marital job. Working in the informal sector, i.e. without a contract, as opposed to working with a permanent contract, reduces the

---

out not to be significant at the 5% statistical level, either individually or jointly, and were therefore excluded from the analysis.

[21]This might be because the Italian legislation determines some differences in maternity leave rights between private and public sector employees. These differences are mainly related to the period after the first year of the child. In particular, the legislation does not allow women working in the private sector to take paid leave in case the child is sick, while in the public sector a woman is entitled to up to a month of paid leave until the child is aged 3.

Table 3: Marginal effects on the probability of employment (probit model)

Variable	12 months		24 months		36 months	
	m.e. (%)	st. err. (%)	m.e. (%)	st. err. (%)	m.e. (%)	st. err. (%)
Woman in public/private sector - longest job before marriage						
Reference: private firm with ¡ than 15 employees						
Private firm with 16-50 employees	-11.01 ***	5.48	-10.89 **	5.52	-12.39 **	5.46
Private firm with 50-200	1.93	5.85	-4.19	6.02	-4.36	6.01
Private firm with ¿200	15.25 ***	5.72	11.48 *	5.97	6.91	6.27
Private firm number of employees missing	9.27 *	5.04	11.10 **	5.02	9.51 *	5.17
Public sector	22.60 ***	4.87	23.90 ***	4.76	24.87 ***	4.66
Woman's working hours - longest job before marriage	-0.51 ***	0.18	-0.42 ***	0.18	-0.43 **	0.19
Woman's type of contract - longest job before marriage						
Reference: permanent						
Fixed term	-7.53	5.51	-7.86	5.58	-6.47	5.54
No contract	-17.77 ***	5.53	-16.76 ***	5.55	-20.35 ***	5.56
Missing	-15.17	9.71	-14.70	9.78	-14.14	9.60
Woman's education - at marriage						
Reference: primary or not formal schooling						
Lower secondary school	13.29 ***	4.43	13.76 ***	4.44	14.35 ***	4.48
Upper secondary school	18.49 ***	5.84	17.30 ***	5.93	17.24 ***	5.96
University degree	38.91 ***	7.16	37.76 ***	7.83	38.52 ***	7.59
Woman's work experience - at marriage						
% Job exp. in P-T jobs	0.17 **	0.08	0.17 *	0.09	0.13	0.08
% Job exp. longest job before marriage	0.03	0.08	0.01	0.08	-0.05	0.08
Job experience (months)	0.14 ***	0.04	0.12 ***	0.04	0.13 ***	0.04
Woman's unemployment - at marriage						
Reference: never unemployed						
Less than 1 year	-13.33 *	7.06	-10.76	7.00	-13.25 *	7.12
More than 1 year	-23.66 ***	8.12	-23.41 ***	8.02	-20.31 **	8.04
Woman's occupation group - longest job before marriage						
Reference: unskilled manual						
Entrepreneurs	7.04	16.97	7.30	16.83	0.23	17.66
Professionals (self-employed)	-8.56	7.21	-10.33	7.24	-10.16	7.30
White collar - high	6.17	5.62	8.37	5.54	7.59	5.71
White collar - low	-10.42 **	4.91	-13.53 ***	4.96	-12.13 **	5.06
Skilled manual	-3.21	5.53	-7.72	5.64	-2.01	5.54
Partner's occupation group - at marriage						
Reference: unskilled manual						
Entrepreneurs	-17.52 **	7.93	-21.27 ***	7.88	-19.48 **	7.72
Professionals (self-employed)	3.01	5.05	1.88	4.98	1.00	5.11
White collar - high	-7.26	5.45	-9.29 *	5.45	-11.27 **	5.51
White collar - low	-4.57	5.91	-4.42	5.84	-7.01	5.95
Skilled manual	-12.30 ***	4.80	-14.28 ***	4.74	-12.74 ***	4.76
Missing	-9.97	7.23	-11.48	7.43	-12.29	7.48
Partner's age - at marriage	-0.76 *	0.42	-0.66	0.43	-1.08 **	0.43
Childcare not available	-25.83 ***	7.41	-25.20 ***	7.50	-21.18 ***	7.53
Woman's birth cohort						
Reference: 1940-44						
1945-49	1.75	5.21	1.93	5.25	4.93	5.24
1950-54	12.04 **	5.36	12.91 **	5.36	16.21 ***	5.37
1955-59	8.30	5.64	8.47	5.75	6.86	5.88
1960-64	8.44	6.12	8.56	6.20	10.06	6.16
1965-69	-0.74	7.67	4.44	7.62	5.66	7.66
Geographical area - at marriage						
Reference: South						
North West	-5.15	4.35	-2.74	4.35	-2.08	4.43
North East	-15.98 ***	4.97	-13.32 ***	4.97	-12.78 **	5.00
Centre	3.71	4.74	1.64	4.89	4.43	4.92
Isles	-9.92	7.27	-11.14	7.31	-5.61	7.29
Number of observations	1106		1106		1106	
Wald (chi2)	215.35		241.60		234.16	
Prob¿chi2	0.00		0.00		0.00	
Pseudo R2	0.20		0.20		0.19	

Note. Heteroscedasticity robust standard errors shown. Estimation is by maximum likelihood. Symbols: *** significant at 1%, ** significant at 5%, * significant at 10%

Figure 1: Monthly predicted probabilities
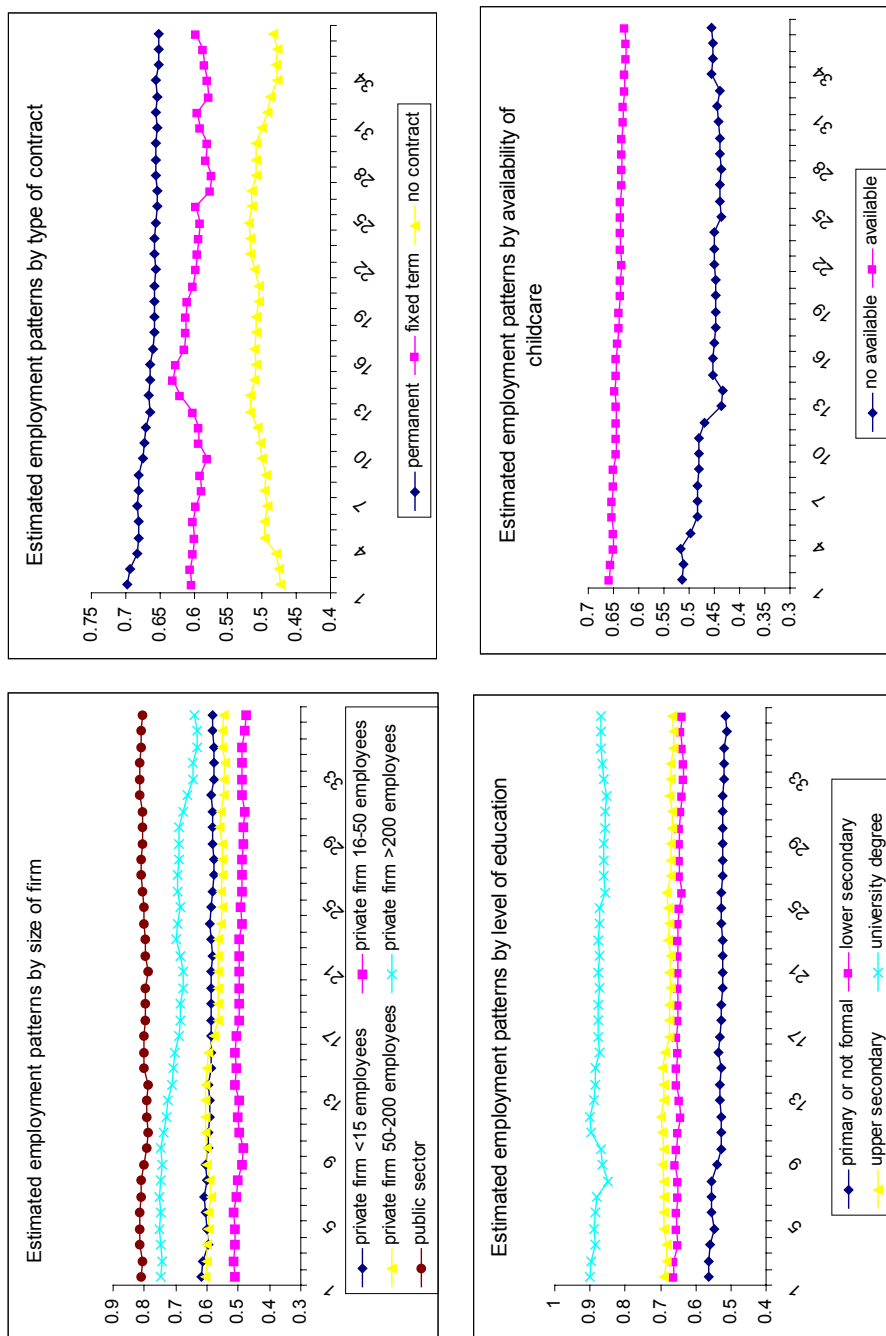
Note. This figure shows the predicted probabilities associated with some specific variables computed from monthly probit models.

probability of being employed at 12, 24 and 36 months after childbirth by 18, 17 and 20 percentage points, respectively. This is also shown in Figure 1, where we see that a woman with a permanent contract has a probability of being in employment of about 65%, almost 20 percentage points more than a woman without a contract and 10 percentage points more than a woman with a fixed term contract.

7.2 The effect of other factors

Consistently with the model outlined in section 5 and with what has been found in many other studies (Klerman and Leibowitz, 1994; Dex *et al.*, 1998; Bratti, 2003), we find that the level of education raises the probability of employment after childbirth. Having a university degree as opposed to having only primary or no educational qualifications increases the probability of working by about 39 percentage points at 12 months since birth.[22] The effect is very similar also at 24 and 36 months. The premium in the probability of employment for women with upper or lower secondary schooling is somewhat smaller, but always very significant as also shown in Figure 1.

Another aspect which was emphasized in the theoretical model was the effect of past labour market experience, here captured by variables such as the cumulative experience of employment or unemployment up to the date of marriage, the percentage of the period spent in the job with the longest duration and the percentage of the period spent in part-time jobs. As we can see in Table 3, an increase in working experience positively affects the probability of being employed after the birth of the first child. Similarly, we find that women who have experienced unemployment are less likely to be employed after becoming mothers with respect to women who have never been unemployed. The effect is particularly strong and highly significant for women affected by a longer cumulative unemployment experience.

Increasing the amount of past labour market experience accounted for by part-time work is associated with a premium in the probability of working at 12 and 24 months of about 0.2 per cent points and this effect is statistically significant at the 5% level. This result is probably associated with the fact that working part-time might be a woman's preferred mode of labour market participation also in the absence of childbearing. Therefore, those women who worked part-time in the past are probably more likely to stay in a part-time job after the first birth, which increases their opportunities of reconciling work with childrearing. It would have been interesting to explore this effect further, but this was not possible because of the very small number of women working part-time in our sample.

In analyzing the effect of occupational qualification, we compare women in unskilled manual jobs with women occupying more qualified positions, which should also receive a higher wage. As we can see from Table 3, there

---

[22]Using data from the Survey of Household Income and Wealth (Bank of Italy) and focusing on women aged 21-39 only, Bratti (2003) estimates a similar strong effect of women's education on participation. For the 1993 average differences in the probability of participation between women with university degrees and primary and lower secondary education were of 58 and 46 percentage points, respectively.

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 unexpectedly found to have a lower probability of being employed after childbirth with respect to women working as unskilled manuals.

As for the husband's characteristics, we find some evidence of an income effect. A woman whose partner is an entrepreneur or a skilled manual worker has a lower probability of being employed after childbirth with respect to a woman whose partner is an unskilled manual worker. Although some of the other marginal effects are not statistically significant, the overall signs of the partner's occupation status are generally negative. Moreover, the existence of an husband's income effect seems to be suggested also by the sign of the husband's age, which can be considered as a proxy for his labour market experience and therefore his wage. [23]

As shown in several studies (Duncan and Giles, 1996; Del Boca, 2002; Maurenzi and Pagani, 2003), child care availability is a very important factor for the reconciliation of career and family responsibilities. Therefore, we use a dummy for the absence of institutional and informal child care as an additional explanatory variable in our employment equations. The results show that the lack of child care opportunities has a negative and highly significant effect on the probability of being in employment subsequent to childbirth. The effect on the probability of employment is of -26, -25 and -21 percentage points, respectively, at 12, 24 and 36 months after childbirth.[24]

The last graph in Figure 1 shows that a woman who can rely either on formal or informal child care is almost 20 percentage points more likely to be in employment during the 3 years after childbearing than a woman with no child care availability. Very interestingly, we find a negative spike around the first child's birthday when the optional leave period expires. This seems to suggest that women who are employed before having a child may use the entire period of optional leave allowed by the legislation before quitting their jobs. Since the provision of child care services for children aged 3 or less is still very limited in Italy (Del Boca *et al.*, 2003b), the period of maternity leave is not long enough to solve the problem of reconciling career with motherhood and many women are forced to leave employment until new arrangements become available.

Overall, the empirical analysis conveys the picture of a 'dual' labour

---

[23]Other studies finding a negative husbands' income effect for Italy are for instance Colombino and Di Tommaso (1996) and Di Tommaso (1999).

[24]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 either of the three possible sources. Arguably, this variable is less affected by endogeneity problems.

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 employed after the birth of their child. These effects are captured by variables such as the sector of activity of the job with the longest duration held before marriage, but also emerge by looking at the sign and the significance of variables related to the type of contract of the main pre-marital job and the cumulative experience of employment or unemployment up to the date of marriage.

8 Conclusions

This paper investigates the factors affecting the employment decisions of married women during the 3-year period following the birth of the first child. Our results show that a higher degree of job stability and employment protection, as captured by the distinction between private and public sector jobs, different types of contract (or lack of it), and past labour market experience are strongly associated with women's probability of working after childbirth. This confirms what found by Rönsen and Sundström (1996), Ondrich *et al.* (1996) and by Gutiérrez-Domènech (2002) for other European countries.

In particular, there is a significant difference in the behaviour of women working in the public vs. private sector. Even accounting for differences in weekly hours worked, we find that women whose main pre-marital job was in the public sector find it much easier to combine career and family responsibilities and are more likely to be employed after the birth of the child. This is hardly surprising if we look at the experience of Northern European countries, such as Sweden and Denmark, where the rates of female participation went hand in hand with the expansion of the public sector (Esping-Andersen, 1997, 1999).

Furthermore, we find that the public sector premium becomes even larger when we compare the effect of working in the Public Administration to that of working in a small private firm. Since in Italy the employment protection legislation operates a clear distinction between firms with different dimensions, providing employees working in larger companies with a higher degree of protection, this leads us to think that the public sector premium can be largely attributed to a different degree of job stability and employment protection enjoyed by workers. A simple theoretical model is sufficient to show the economic incentives underlying this intuition.

Supporting evidence is also found by looking at the sign and the significance of other control variables. For example, women working in the informal sector do not benefit from any employment right and are found to have a significantly higher probability of withdrawing from the labour force after becoming mothers. Additionally, women with a longer past employment experience and who have cumulated less unemployment are much more likely to work after the birth of the child. The combination of all these effects seems to point out to the existence of a sharp distinction be-

tween women who enjoy a high degree of employment stability and those who work in less secure jobs. It follows that policies aimed at the regularization of informal workers and at the protection of employment may be very successful at increasing the probability of employment of new mothers.

As for the two most emphasized tools intended to favour the combination of career and motherhood, that is to say the provision of child care and part-time jobs, we find only mixed evidence in our data. While the lack of informal and publicly funded child care is found to significantly reduce the probability of employment after childbirth, our analysis reveals only weak evidence in support of a positive effect of part-time work. However, since our data set consists of women from many different cohorts and part-time employment is only a relatively recent phenomenon in Italy, we think that no final consideration should be reached in this respect and this aspect should be more thoroughly investigated using micro-data coming from other sources.

Bibliography

Accornero A., Anastasia B., Gambuzzo M., Gualmini E. and Rasera M. (2000), *Solo una grande giostra? La diffusione del lavoro a tempo determinato*, Milano: Franco Angeli.

Alesina A., Danninger S., and Rostagno M.V. (1999), "Redistribution through public employment: the case of Italy", *NBER Working Paper* n. 7387, Chicago.

Becker G. S. (1965), "A theory of the allocation of time", *Economic Journal*, 75: 493-517.

Blanchard O. and Landier A. (2002), "The perverse effects of partial labour market reform: fixed-term contracts in France", *Economic Journal*, 112: F214-F244.

Blossfeld H. P., Drobnic S. and Rowher G. (1995), "Employment patterns: a crossroad between class and gender", Arbeitspapier 33, Sonderforschungsbereich 186 der Universitat Bremen.

Booth A. L., Francesconi M. and Frank J. (2002), "Temporary jobs: stepping stones or dead ends?", *Economic Journal*, 112: F189-F213.

Bratti M. (2003), "Labour force participation and marital fertility of Italian women: the role of education", *Journal of Population Economics*, 16: 525-554.

Brunello G. and Rizzi D. (1993), "I differenziali retributivi nei settori pubblico e privato in Italia: un'analisi cross section", *Politica Economica*, 9: 339-366.

Brunello G. and Dustmann C. (1997), "Le retribuzioni nel settore pubblico e privato in Italia e in Germania: un paragone basato su dati microeconomici", in Dell'Aringa, C. (ed.) *Rapporto ARAN sulle retribuzioni, 1996*, Collana ARAN, Roma: Franco Angeli Editore.

Cannari L., Pellegrini G, and Sestito P. (1989), "Redditi da lavoro indipendente: un'analisi in termini di capitale umano", *Temi di discussione, Banca d'Italia* n.124, Rome.

Cappellari L. (2002), "Earnings dynamics and uncertainty in Italy: how do they differ between the private and public sectors?", *Labour Economics*, 9: 477-496.

Cigno, A. (1991), *Economics of the family*, Oxford: Clarendon Press.

Colombino U. and Di Tommaso M. L. (1996), "Is the preference for children so low or is the price of time so high? A simultaneous model of fertility and participation in Italy with cohort effects", *Labour*, 10: 475-493.

Del Boca D. (2002), "The effect of child care and part time opportunities on participation and fertility decisions in Italy", *Journal of Population Economics*, 15: 549-573.

Del Boca D., Locatelli M. and Pasqua S. (2000), "Employment decisions of married women: evidence and explanations", *Labour*, 14: 35-52.

Del Boca D., Pasqua S. and Pronzato C. (2003a), "Analysing women's employment and fertility rates in Europe: differences and similarities in Northern and Southern Europe", Centre for Household, Income, Labour and Demographic Economics Working Paper n. 29, Turin.

Del Boca D., Locatelli M. and Vuri D. (2003b), "Child Care Choices of Italian Mothers", Centre for Household, Income, Labour and Demographic Economics Working Paper n. 30, Turin.

Di Tommaso M. L. (1999), "A trivariate model of participation, fertility and wages: the Italian case", *Cambridge Journal Economics*, 23: 623-640.

Dex S., Joshi H., Macran S. and McCulloch A. (1998), "Women's employment transitions around childbearing", *Oxford Bulletin of Economics and Statistics*, 60: 79-98.

Dex S. and Joshi H. (1999), "Careers and motherhood: policies for compatibility", *Cambridge Journal of Economics*, 23: 641-659.

Duncan A. and Giles C. (1996), "Should we subsidise pre-school childcare, and if so, how?", *Fiscal Studies*, 17: 39-61.

Ermisch J. F. (1989), "Purchased child care, optimal family size and mother's employment: theory and econometric analysis", *Journal of Population Economics*, 2: 79-102.

Esping-Andersen G. (1997), "Welfare states at the end of the century: the impact of labour markets, family and demographic change", *Family, Market and Community*, OECD, Paris.

Esping-Andersen G. (1999), *Social foundations of postindustrial economies*, Oxford: Oxford University Press.

Garibaldi P., Pacelli, L. and Borgarello, A. (2003), "Employment protection legislation and the size of firms", IZA Discussion Paper n. 787, Bonn.

Gutiérrez-Domènech M. (2002), "Employment penalty after motherhood in Spain", Centre of Economic Performance Discussion Paper n. 1177, London

Gutiérrez-Domènech M. (2003), "Employment after motherhood: a European comparison", Centre for Economic Peformance Discussion Paper n. 567, London.

ILO (2002), *Decent work and the informal economy. Report VI*, ILO, Geneva.

ISTAT (2002), *Annuario Statistico Italiano 2002*, ISTAT, Rome.

Joshi H., McRae S. and Dex S. (1996), "Employment after childbearing and women's subsequent labour force participation: evidence from the 1958 British cohort", *Journal of Population Economics*, 9: 325-348.

Klerman J. A. and Leibowitz A. (1994), "The work-employment distiction among new mothers", *Journal of Human Resources*, 24: 277-303.

Kugler A. and Pica G. (2003), "Effects of employment protection and product market regulations on the Italian labor market", IZA Discussion Paper No. 948, Bonn

Lauer C. and Weber A. M. (2003), "Employment of mothers after childbearing: a French-German comparison", Centre for European Economic Research Working Paper n. 50, Mannheim.

Lehrer E. and Nerlove M. (1986), "Female labor force behavior and fertility in the United States", *Annual Review of Sociology*, 12: 181-204.

Lucifora C. and Meurs D. (2003), "Not so similar, not so different: new evidence on the public sector pay gap in FFrance and Italy" ,paper presented at the EALE 2003 Conference, Seville, Spain.

Maurenzi A. and Pagani L. (2003), "The impact of elder parents on Italian women's labour market participation", Università dell'Insubria, Facoltà di Economia Working Paper n. 2003/18.

McCulloch A. and Dex S. (1997), "Married women's employment patterns in Britain", in Blossfeld H. P. and Drobnic S. (eds.), *Careers of couples in contemporary society - From male breadwinner to dual-earner families*, Oxford: Oxford University Press.

Moffitt R. (1984), "Profiles of fertility, labour supply and wages of married women: a complete life-cycle model", *Review of Economic Studies*, 51: 263-278.

Ondrich J., Spiess C. K. and Yang Q. (1996), "Barefoot and a German kitchen: federal parental leave and benefit policy and the return to work after childbirth in Germany", *Journal of Population Economics*, 9: 247-266.

Pagani L. (2003), "Why do people from South Italy seek jobs in the public sector?", *Labour* 17(1): 63-91.

Rönsen M. and Sundström M. (1996), "Maternal employment in Scandinavia: a comparison of the after-birth employment activity of Norvegian and Swedish women", *Journal of Population Economics*, 9: 267-285.

Schizzerotto A. (2002), *Vite ineguali. Disuguaglianze e corsi di vita nell'Italia contemporanea*, Bologna: Il Mulino.

Solera C. (2003), "Changes in women's work histories across cohorts: to what extent are they due to a compositional effect? A comparison of Italy and Great Britain", *mimeo*, European University Institute, Florence.

Stier H., Lewin-Epstein N. and Braun M. (2001), "Welfare regimes, family-supportive policies, and women's employment along the life-course", *American Journal of Sociology*, 106: 1731-1760.

Van de Ven W. P. and Van Praag B. M. (1981), "The demand for deductibles in private health insurance: A probit model with sample selection", *Journal of Econometrics*, 17: 229-252.

Walker, J. R. (1995) "The effect of public policies on recent Swedish fertility behavior", *Journal of Population Economics*, 8: 223-251.

Wetzels C. (1999), *Squeezing birth into working life. Household panel data analyses comparing Germany, Great Britain, the Netherlands and Sweden*, Ph.D. thesis, Tinbergen Institute Research Series, Universiteit van Amsterdam.

Willis R. J. (1973), "A new approach to the economic theory of fertility behavior", *Journal of Political Economy* 81: 14-64.

Appendix

Table A1: sample descriptive statistics

Variable	mean	st. dev.	obs.
Employed after 12 months since the first child	0.63	0.48	1106
Employed after 24 months since the first child	0.62	0.48	1106
Employed after 36 months since the first child	0.61	0.49	1106
Woman in public/private sector - longest job before marriage			
Reference: private firm with < than 15 employees	0.32	0.47	1106
Private firm with 16-50 employees	0.12	0.33	1106
Private firm with 50-200	0.09	0.29	1106
Private firm with >200	0.07	0.26	1106
Private firm number of employees missing	0.16	0.36	1106
Public sector	0.19	0.39	1106
Woman's working hours - longest job before marriage	41.07	10.88	1058
Woman's type of contract - longest job before marriage			
Reference: permanent	0.61	0.49	1106
Fixed term	0.13	0.33	1106
No contract	0.14	0.34	1106
Missing	0.04	0.19	1106
Woman's education - at marriage			
Reference: primary or not formal schooling	0.26	0.44	1106
Lower secondary school	0.42	0.47	1106
Upper secondary school	0.32	0.47	1106
University degree	0.07	0.25	1106
Woman's work experience - at marriage			
% Job exp. in P-T jobs	6.02	22.78	1106
% Job exp. longer job	84.45	20.22	1106
Job experience (months)	73.34	45.99	1106
Woman's unemployment - at marriage			
Reference: never unemployed	0.89	0.31	1106
Less than 1 year	0.06	0.24	1106
More than 1 year	0.05	0.21	1106
Woman's occupation group - longest job before marriage			
Reference: unskilled manual	0.20	0.40	1106
Entrepreneurs	0.02	0.13	1106
Professionals (self-employed)	0.08	0.28	1106
White collar - high	0.32	0.47	1106
White collar - low	0.27	0.44	1106
Skilled manual	0.11	0.31	1106
Partner's occupation group - at marriage			
Reference: unskilled manual	0.13	0.34	1106
Entrepreneurs	0.08	0.27	1106
Professionals (self-employed)	0.14	0.35	1106
White collar - high	0.21	0.41	1106
White collar- low	0.10	0.30	1106
Skilled manual	0.26	0.44	1106
Missing	0.07	0.25	1106
Partner's age - at marriage[a]	27.84	4.19	1014
Childcare not available	0.05	0.23	1106
Woman's birth cohort			
Reference: 1940-44	0.16	0.37	1106
1945-49	0.24	0.42	1106
1950-54	0.19	0.39	1106
1955-59	0.19	0.39	1106
1960-64	0.16	0.36	1106
1965-69	0.07	0.26	1106
Geographical area - at marriage			
Reference: South	0.23	0.42	1106
North West	0.33	0.47	1106
North East	0.20	0.40	1106
Centre	0.16	0.36	1106
Isles	0.07	0.27	1106

Note. [a] Refers to non missing values only.