

**Fertility Intentions of Employed Mothers in Italy:
Does the Choice of Public *versus* Private Sector Matter?**

**Intentions de fécondité des mères occupées en Italie:
le choix entre se le secteur public ou dans le secteur privé est-elle considérable?**

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(Please do not quote without author's permission)

Abstract: This work aims at understanding whether, and the extent to which, the intention of having other children is influenced by aspects related to the employment sector chosen by “new” mothers (those who already have one child less than 2 years old).

Using Italian data from the Birth Sample Survey conducted by the Italian National Statistical Institute (ISTAT) in 2005, this work models new mothers' preferences for family formation and for “working conditions”, namely the sector of employment, taking into account the potential endogeneity of the latter.

Working in the public sector, which benefits from stronger employment protection, tends to influence the desired and the realized fertility of working mothers. This could be due to the existence of a lower level of wage discrimination compared to the private sector, to the higher level of job security and to the existence of family friendly policies. However, the choice of the working sector could be endogenous. In fact, once the selection effect is taken into account and the choice of working sector and the desired fertility are modelled together, the correlation among unobservable women's characteristics affecting the two choices is found to be negative: women who desire more children seem to be less likely to self-select into the public sector. This last finding could be the result of more productive women's working strategies: given that they are those more work oriented (and less family-oriented), they tend to enter into the public sector, a less gender discriminated sector.

Keywords: Desired Fertility, Total Demand for Children, Working Mothers, Public-Private Sector, Seemingly Unrelated Regression models.

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1. Introduction and Motivation

The present paper aims at understanding whether, and the extent to which, the *intention* for “another” child is influenced by aspects related to the employment sector chosen by new mothers (those who already have one child less than 3 years old) in Italy. Starting from the results of Bratti, Del Bono and Vuri (2005), who showed that a higher degree of job stability and employment protection favours a stronger labour market attachment for new mothers, this analysis aims at understanding whether women that are employed in the public sector do have a higher *total demand for children* than those employed in the private sector.

However, given the importance of the employment protection in reconciling family and work (Conti and Sette 2008), it might be the case that individuals self-select into the private or the public sector of employment primary according to their preferences for family formation and for working conditions, which could then be related to their fertility intentions. To put it in other words, sector choice may be endogenous and should be jointly modelled with fertility intentions.

The specific focus on Italy is motivated by the fact that it was in the early 1990s one of the first countries to attain and sustain lowest-low fertility levels¹. However, in spite of the increase in women’s education and employment rates, Italy is still one of the countries in Europe with the lowest female participation to the labour market; indeed, as reported by OECD (OECD Social Family Database), in 2009 employment rates among women remain 14.5 percentage points below the EU average and 22 percentage points below the Lisbon target of 60% (in 1999 it was 38.1%).

Considering firstly a theoretical model and -in particular- the *male breadwinner one*, one may expect that a woman who does not participate to the labour market should face a lower opportunity cost of childbearing and this should translate into a higher demand for children. For that reason, given that the Italian society is still far from the *dual earner family model* -largely widespread in the Northern European countries- in Italy we should observe higher fertility levels but -net of the biological constraint- the demographic statistics continue to report low levels of total fertility rates, distant from the replacement level of 2.1 children for woman (in particular, a total fertility rate equal to 1.35 for the 2006 even if with a slight increase with respect to the previous years²).

Although the evidence for Italy is not in line with the theoretical male breadwinner model, they are in line with results coming from the empirical literature especially the ones related to European Countries that shows that countries that record a high (low) level of female labour force participation, also record a high (low) level of fertility. This last evidence that documents the reversal of the correlation between fertility and labour force participation rates in the late 1980s (a correlation that was negative during the 1970s and up to the early 1980s) may be the result of the prevalence of income effects over substitution effects: if we think of childrearing as a time-intensive task, at high levels of the female wage, a further wage increase could actually result in an increased demand for children (Ahn and Mira 2002). Moreover, and in particular for Mediterranean countries, the combination of low fertility and low participation has been explained with the existence of a family-centered

¹ The fertility level is *low* when fertility is below replacement, which is below 2.1 children per woman; it is *very low* when the fertility rate is below 1.5 children per woman; it is *lowest-low* when fertility is below 1.3 children per woman (Kohler et al. 2002).

² In particular the Total Fertility Rate was 1.24 in 2000, 1.27 in 2001 and 2002, 1.29 in 2003, 1.33 in 2004, 1.4 in 2005 and more recently 1.38 in 2007 and the estimates for 2008 indicates a TFR of 1.41.

Source: Council of Europe (2004), OECD and ISTAT (2009).

welfare system, a family-biased production system and a family-oriented value system (Bettio and Villa 1998, Myrskylä et al. 2009).

In addition, features of the labour market that characterize the Italian situation are the lack of adequate policy measures to facilitate the work–family balance, such as childcare provision and more flexible working time, -in particular the scarce diffusion of part-time jobs- as recently described in Del Boca and Rosina (2009).

Besides those elements, other two aspects have been essential in the choice of the Italian case: firstly, the large differences between workers in the public sector as opposed to employees in the private one, as the former have almost a zero probability of being fired or of being moved to another location and enjoy a very large degree of job security. Secondly, the fact that we are recently assisting in Italy to an attempt to reduce public expenditures and to contract the public sector, especially in terms of employment. The latter is implemented through the so called “*divieto di nuove assunzioni*” decree, a temporary freezing of hiring in the public sector that appeared in the decree number 78 article 17, comma 7 published the first of July 2009 on the Italian Official Journal (*Gazzetta Ufficiale*) and became law number 102 the third of August 2009. This law aims at reducing public expenditures and it is considered one of the measures aimed at promoting the stability of the public finance. In particular, the law rules that «from the 1st July 2009 and up to the achievement of the expenditure’s objectives allocated to each administration, administrations and the institutions cannot proceed to new recruitment of temporary staff and open-ended contracts, including those already licensed and those provided for by special provisions».

If the public sector represents for women the family-friendly employment choice, then the reduction of employment opportunities may produce a further reduction in Italian women's fertility.

The study is organized as follows: after an excursus on the potential role of employment protection legislation, job security and family friendly policies presented in Section 2, Section 3 describes the data of the Italian Birth Sample Survey and the way in which they have been selected to reach the final sample of mothers. Section 4 presents the empirical strategy employed and the main results, considering the sector choice both as an exogenous choice and as an endogenous one. Finally, Section 5 reports some concluding remarks highlighting proposals for further research.

2. The Potential Role of Employment Protection Legislation, Job Security and Family Friendly Policies

In his work, Becker (1981) shows that social welfare programs have significant effects on the allocation of resources within families. For example, social security taxes tend to reduce the amount of resources children give to their aged parents. Becker maintains that programs providing aid to mothers with dependent children have reduced the cost of children as aid generally increases with the number of children..

In line with this argument, past empirical research related to Italy has mainly emphasized the role of institutional features of the Italian labour market, such as the availability of childcare (Del Boca and Vuri 2007) or part-time jobs (Del Boca 2003) on women’s labour force participation or employment. Noteworthy is also the point raised by Alesina et al. (2007): female participation is influenced by fiscal policies and childcare subsidies. Gender based taxation could be theoretically efficient; taxing less the more elastic labour supply of married women should lead to a more balanced allocation of duties within the family, helping to improve its welfare.

Considering employment protection legislation, job security and family friendly policies, typical of the public sector, we may expect that a higher level of employment protection and job security raise expected income and therefore they imply a higher total demand for children through an income effect. This is not necessarily the case, if substitution effects (of higher wages in the public sector) prevail over income effects. The type of contract is another factor related to employment protection, job security and fertility decisions: in particular, focusing on the working time, working hours flexibility typical of the public sector may cause a reduction of the cost of withdrawing from the labour market, and we might note accordingly an increase both in fertility and in labour force participation. Indeed, 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.

Empirically, in “northern and continental” countries, female part-time employment is appreciated as a way to reconcile work and family life, and not as expression of job segregation and wage discrimination. Contrariwise, the spread of fixed term contracts could increase female segregation in low-paid positions. In Mediterranean countries part-time contracts are not fully attractive for mothers, because of large wage and career disparities (Jaumotte 2006). In those countries the positive effect of part-time arrangements on mothers’ participation is lessened by the attitudes of private employers and the difficulties of returning to full-time jobs. Long or repeated spells of non-employment or under-employment in the private sector are likely to cause a major loss in mothers’ human capital and future wages. In Italy the situation is not different and part-time and flexible-hours jobs are scarce (about 10% of working women worked part-time in 1999³). The situation did not change in the last decade even if in 2000 has been adopted the decree 61/2000 in which are eliminated some constraints existing in the previous law (863/84), has been added the *elastic clause* as objective of using working schedules in a more flexible way and has been introduced some protection for part-timers (about 11.8% in 2002 and 13% of working women worked part-time in 2004⁴). To summarize, it is possible to say that Italy is now a country with strong regulations that protect part-time workers (as of the middle 1990s), but at the same time it has quite rigid labour markets with relatively higher labour costs. At the same time Italy has a smaller part-time labour market so we expect part-time work to be more concentrated in marginal segments of the labour market and, for this reason, to see larger full-time/ part-time wage gaps⁵.

For what concerns job security, the Italian labour market is highly segmented and the large number of fixed-term contracts tends to increase female segregation in low-paid positions, provides fewer career opportunities and a higher level of job insecurity (Pacelli et al. 2007). For young workers it is more and more difficult to enter the stable and protected labour market segment. Referring exactly to fixed-term contracts, they are often thought to be a method of reaching more stable working experiences. However, the economic literature shows that this is not necessarily the case. Using data for the United Kingdom, Booth et al. (2002) observe that temporary workers 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.

³ Source: EUROSTAT (1999).

⁴ Source: ISTAT (2006a).

⁵ Bardasi and Gornick in 2008 found for Italy a 22% wage gap, meaning that part-time workers earn that much less than full-time workers.

Hence, we would expect female participation after childbirth to be even lower for mothers who previously worked with a fixed-term contract.

Among the other potential roles that associate motherhood with lower hourly pay, we can take into consideration the so called “wage penalty”. As already mentioned, mothers may earn less than other women because having children causes them to lose job experience, to be less productive at work, to trade-off higher wages for mother-friendly jobs, or to be discriminated against by employers. Referring empirically to the wage penalty, as proved by Budig and England (2001) using American data from the 1982-1993 National Longitudinal Survey of Youth, there exists a wage penalty of 7 percent per child. Precisely, penalties are larger for married women than for unmarried women and even after controlling for experience a penalty of five percent per child remains. The portion of the motherhood penalty unexplained probably results from the effect of motherhood on productivity and/or from discrimination by employers against mothers.

Therefore, labour market flexibility and regulation matter.

We cannot conclude this paragraph without mentioning the provision of public childcare, another important element that is linked with the job security and that has an impact on women’s fertility decisions; referring to the Italian case, the first three years after childbirth are crucial, because new mothers not re-entering the labour market in that period are at risk of definitive exclusion. In this setting, a major role is played by the number of places in public childcare, which is extremely limited for babies below three years, especially in Southern regions (Del Boca 2003; Del Boca and Vuri 2007). Moreover, private childcare is quite expensive, while public structures provide opening hours attractive mostly to non-working, or part-time working mothers. Connecting time-flexibility and the availability of public childcare, 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 2003).

2.1. The Public Sector in Italy

In Italy workers employed in the public sector are still generally recruited through open, competitive examinations - for which a given level of education is required – and, more important for our goal and in this setting, once hired enjoy life-time contracts in which seniority plays a major role.

So, in general terms public workers cannot be discharged, except for misconduct, and the statutory terms apply regardless of whether the individual is employed at the national, regional or local authority level. This feature allows us to refer to the particular job protection that characterized the public sector. It is true that employers can fire workers for a justified objective reason or for a justified subjective reason or for right cause⁶. These rules apply to all firms, but the degree of employment protection is closely linked to the size of the firm. As it is possible to recognize from the Italian legislation and precisely from Article 18 of labour code -*Statuto dei lavoratori*- the differences between small and large firms are determined by the number of employed workers. Precisely, 15 employees is the threshold considered to define a small firm. To be exhaustive in terms of dismissal procedures, firms employing less than 15 employees must compensate the unlawfully dismissed workers and pay a severance payment that varies between a minimum of 2.5 and a maximum of 6 months («tutela obbligatoria», Article 18). Conversely, firms employing 15 or more workers must compensate the

⁶ Justified objective reason includes reasons concerning the production activity, the organisation of work and its regular functioning; justified subjective reasons applies in case of a serious breach of the worker’s duties, while when an even more serious breach of conduct is observed, a worker can be dismissed without notice, so for a just cause (Bratti et al., 2005).

worker for the foregone wages from the date of the dismissal, and are also obliged to rehire the worker («tutela reale», Article 18).

Differences are also presented in case of an adverse economic shock which requires the firms to fire more than five workers at the same time (collective dismissals). In this case, the firm can enlist the dismissed workers in a special scheme that 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. As public firms are more likely to use this procedure, their employees enjoy a higher employment protection compared to those working in small private firms.

Further, there is also a job protection coming from the Union: actually, rules of the labour code linked to union related activity apply only to firms employing more than 15 employees. Such norms entitle workers to establish a firm level institution (called *Rappresentanze Sindacali Aziendali*) that has the right to arrange general meetings, set up referendums, or post union related posters within the establishments. Also, firms with more than 15 employees have the right to vote for a worker representative for safety related issues.

In the Italian context, the threshold of 15 employees is certainly relevant, since it leaves below about 30% of the employees and more than 80% of private firms (Bartelsman et al. 2003). Actually the average number of employees in Italy for the total economy was in the late Nineties 9.4 as recorded by ISTAT (2009) and if we restrict the attention to manufacturing (that represents the most important segment in the Italian industry), we find that Italy is characterised by a average size of 14 employees, really small if compared with 78 for the US, 50 for the UK or 24 for France). Indeed, small firms are quantitatively more important in Italy relatively to other OECD economies, as was shown by Bartelsman et al. (2001) in a study conducted for the OECD and the Italian institutional settings could play a really important role.

The differences previously mentioned between the private and public sectors in terms of protection legislations may be important also for new mothers' working and fertility decisions as stated by Pagani (2003) who found that people look more intensively for a job in the public sector the more unfavourable the local labour demand conditions, the degree of job security and prospects of wage increases in the private sector are.

Another relevant aspect of the public sector is the higher diffusion of part-time compared to the private sector, a difference that could again affect mothers' working and fertility decisions. Notably, almost 21% of the workers employed in the public sector work part-time and the percentage reaches peaks of 26.7% when considering female employment; this are important evidences especially considering that i) in Italy part-time or flexible-hour jobs are not as diffused as in the rest of Europe, and ii) the private service sector -where part-time work is traditionally more widespread- has not developed in Italy as quickly as in other countries.

Relating mothers' preferences for working time to fertility intentions, we could expect that women with large families mostly prefer the part-time option, so local labour markets in which part-time work is relatively plentiful. Thus, the decisions to work and have a child may be positively influenced by the availability of part time jobs which in turns means availability of flexible work, like in the public sector.

For what concerns the wage aspect, in the public sector wage levels and wage adjustments are all decided at the central level (Barabaschi 2006); differently in the private sector collective bargaining takes place at the industry level. Another relevant point is related to the wage gap between private and public sector workers: evidence for Italy suggests a relatively large positive differential between the public and the private sector (Brunello and

Dustmann 1997; Ghinetti et al. 2002) and looking at the earning dynamics in the two sectors has been found that those employed in the public sector enjoy higher starting income, but flatter earnings profile as compared to private workers (Cappellari 2002). Again related to the wage gap between the two sectors, after conditioning on a set of variables, the differential resulted moderate for men (10 percent) and higher for females (18-20 percent) (Cappellari 2002). Moreover, a more recent study by Lucifora and Meurs (2004) finds that in Italy differences in the wage gap across genders increase along the distribution and they are higher at the top deciles. In other words, in terms of male to female wage differences, the evidence seems to suggest that females are relatively better off at the highest deciles in the public sector with respect to men. Furthermore, even the pattern of premia varies with both gender and skill: in Italy low skilled public sector workers are paid higher wages with respect to their private sector counterparts.

These elements together with the higher employment protection could translate into a higher life-time income that can have important effects on the family formation and fertility intentions. In other words, we may say that women could form expectations about their future labour market condition and project these expectations into their fertility decisions.

3. Source of Data and Data Selection

The data employed to conduct the analysis are from the Italian "Birth Sample Survey", gathered from the Ministry of the Interior and diffused by ISTAT (National Statistical Institute) at the end of 2005⁷.

The focus of the survey is on women with at least one child less than three years old; the dataset is extracted from Population Registers of the births of 2003 (January-December 2003) and represents about 10 per cent of the total resident births registered in that period.

The choice of this specific survey has been dictated by its peculiarities and the presence of complete data related to the topic of interest, especially related to future fertility intentions and the number of intended children.

Among the other available sources of data for Italy, the ISTAT Multipurpose survey provides a lot of information about the use of childcare services, but not on family income and wages or on fertility intentions. The ISTAT Labour Force Survey is accurate with respect to women's working status, but provides no information on household income or wealth. The Bank of Italy Survey of Household Income and Wealth (SHIW) is the most complete micro-survey on the income and wealth of Italian households, but it does not collect any information about childcare on a regular basis or on fertility intentions. Moreover, differently from another important dataset, the one based on the Gender Generation Survey (GGS) extensively used in the literature when dealing with mothers' or women's fertility behaviour and similar socio-economic and demographic events, the data here employed are more suitable to my purpose because they are less subject to temporal confounders; the 2005 Birth Sample Survey is actually focused on the births occurred between the period January-December 2003, so all the interviewed women have experienced the same institutional and economic environment and this element is crucial when dealing with the dynamic of fertility intentions. On the contrary, as suggested by Lo Conte et al. (2008), there exist differences in results about some life-course events

⁷ The number of births and the information about the mothers are found in the Population Registers, through the P4 Model introduced from ISTAT that releases these data. Both are available at: www.demo-istat.it. Moreover, the Survey structure and main results are described in CNEL (2003) and ISTAT (2006b).

(like employment before childbirth or the drop-out percentage for new mothers) found using other Italian surveys as the Labour Force Surveys and this is probably due to the correlation between the current job status of women and their fertility decisions.

The total sample includes 15,870 women with at least one child less than 3 years old. Before starting the investigation the data have been organized and arranged in order to obtain time-to-event variables necessary to conduct all the desired analyses. The final size of the sample of “employed mothers” is 6,055; it appears quite reduced as compared to the original one, since -given the interest in working mothers’ fertility desires and intentions- women with some specific characteristics have been selected. Notably, after having excluded 1,550 respondents who did not report essential demographic characteristics such as their age, the region of residence or the size of the family of origin, from the original sample 5,898 non-employed women, 871 pregnant women, 702 women with twins⁸ and finally 794 mothers who omitted essential information during the survey like their future fertility intentions, the number of intended children if they recorded a positive intention or the employment sector where they were employed at the time of the interview have been excluded⁹.

Descriptive statistics are reported in Table 1, where the distribution of the respondents is reported by the independent variable, that is by a positive or a negative fertility intention for another child. Focusing in particular on women’s educational attainment and on the employment sector, for what concerns the educational attainment, among our 6,055 working mothers with a high level of education, 44.82% declared to intend to have other children in future: similar percentages are recorded for medium educated women while a lower percentage (38.46%) for lower educated ones. Considering the employment sector, on a total of 6,055 employed mothers, among those who are employed in the public sector 59.22% recorded to have reached their target fertility reporting a fertility intention for another child equal to zero, while among those who were employed in the private one the percentage dropped at 53.58%. This difference in percentages, may by itself suggest that the public sector due to its characteristics makes it easier for women to realize their fertility target.

Note that the decision of including in the sample only employed women was far from non-problematic. Precisely, two different issues emerged: firstly, it could be that family-oriented women may have decided not to enter into the labour market. Secondly and more relevant, if we consider women that decided to search an employment in the public sector there is a probability that in the short run they ended without finding any job, given the high qualifications required for winning the public competition needed to enter in the sector. For this reason, it could be the case that women currently employed in the public sector -in particular the ones younger than 30-35 years old- suffer from self-selection problems. Despite the fact that our sample includes women that are already mothers of at least one child, so the average age of the respondents is higher than the one recorded on average in Italy at first birth¹⁰, in order to check the robustness of the results the whole analysis has also been performed on women older than 30 years only and results were equivalent¹¹.

⁸ The decision stands in the fact that pregnant mothers might express their intention for another child in a biased way, while for women who have twins the intention for another childbearing might be biased given that they are already mother of at least two children.

⁹ For an interesting empirical analysis about how to treat the decision not to fill completely the questionnaires see Van de Ven, Van Praag (1981).

¹⁰ In Italy the mean age at first birth in 2005 is 28.7 years old (OECD and Eurostat New Cronos, 2009); in my sample more than 67% is older than 29.

¹¹ Results are available upon request.

Table 1 Descriptive Statistics

Respondent's distribution by independent variables (value in percentage)			
	Positive intention	Negative intention	N
Age (her)			
<24	79.70	20.30	197
25-29	70.04	29.96	1008
30 – 34	56.34	43.66	2057
35 – 39	29.08	70.92	1864
40 +	10.12	89.88	939
Age (him)			
<24	76.00	24.00	50
25-29	76.90	23.10	420
30 – 34	64.08	35.92	1562
35 – 39	41.89	58.11	2194
40 +	20.61	79.39	1829
Area of residence			
North East	46.11	53.89	1592
North West	45.42	54.58	1310
Centre	43.92	56.08	1184
South	40.89	59.11	1548
Islands	41.81	58.19	421
Education (her)			
Low (Isced 0 - 2)	38.46	61.54	1079
Medium (Isced 3 - 4)	45.20	54.80	3354
High (Isced 5 - 6)	44.82	55.18	1622
Education (him)			
Low (Isced 0 - 2)	42.39	57.61	1899
Medium (Isced 3 - 4)	44.76	55.24	2998
High (Isced 5 - 6)	44.17	55.83	1150
Number of Siblings (her)			
0	41.89	58.11	604
1	47.61	52.39	2720
2	44.21	55.79	1676
3	37.86	62.14	560
4	34.66	65.34	277
5	32.63	67.37	95
6	23.63	76.37	55

Table 1 Continued.

	Positive intention	Negative intention	N
Female's Health Status			
Healthy	45.06	54.94	5899
Unhealthy	0.00	100.00	156
Female's employment characteristics			
Sector			
Public	40.78	59.22	2705
Private	46.42	53.58	3350
Female's Partnership Status			
Married	43.32	56.68	5584
Unmarried (cohabiting)	50.74	49.26	471
Female's Satisfaction with Couple's Life			
Satisfied	48.32	51.68	2746
Not Satisfied	40.22	59.78	3309
Partner's Sector of employment			
Sector			
Public	38.38	61.62	1287
Private	45.39	54.61	4768
Employees			
White collar	42.28	57.72	2344
Blue collar	45.31	54.69	1611
Autonomous worker	45.10	54.90	1949
Kind of Last Delivery			
Natural	46.03	53.97	3967
Caesarean	39.85	60.15	2088
Total Number of Children already born			
1	76.15	23.85	2839
2	17.95	82.05	2562
3	5.41	94.59	555
4	6.02	93.98	83
5	7.69	92.31	13
6	0.00	100.00	3

4. Empirical Strategy

The main aim of the present investigation is to understand what the determinants of new mothers' intention of having another child are, and which is the effect of being employed into the public sector on such intention.

In this Section, firstly it is reviewed the method applied to estimate the fertility desire and intentions of new mothers when we consider the sector choice as exogenous, then the main results of such investigation are reported. Symmetrically, the same structure has been followed when the choice of working in the public (private) sector is considered an endogenous one. It is important to highlight here that in line with Becker's static theoretical model of fertility, and given the cross-sectional nature of our data, we will model the total demand for children, rather than the intention of having other children conditional on current fertility. Given that all women in our sample are mothers, we are implicitly modelling the intention for "another child", which in this paper must be interpreted as the intention of having more than one child. The total demand for children, our dependent variable, is made by the sum of the intention to have other children and the actual children the woman had, and when we record no intention for another childbearing we can conclude that the total demand for children coincides with the realized fertility: that is the target fertility of the respondent has been reached.¹²

4.1. Exogenous Sector Choice: The Ordered Probit Regression Model

4.1.1. Model Description

The number of children is an ordered discrete variable, and we need a model that takes into account this ordering. When multiple classes of the dependent variable can be ranked, as in our case, then *ordinal regression* is preferred to multinomial logistic regression that handles the case of dependents with more classes than two which are not ordered.

In our case, the dependent variable of interest is an ordered variable, *the total demand for children*, given by the sum of the number of actual children (those already born) and the number of intended declared children for those who recorded a positive fertility intention (moreover, the "starting point of the interval" is a number of children $j=1$ given that in our sample all the respondents are mothers of at least one child).

The dependent variable under investigation is therefore a count variable and on the corresponding data generating process can be modeled either as a count model or as a discrete choice model: given the interest in considering the latent demand for children and not the completed fertility or the number of children (Olfa and El Lahag 2001), in this paper the data have been modeled by discrete choice model methods using a model that recognizes the ordering of the data, as previously described.¹³

To provide a clearer picture of our dependent variable, in our setting a demand for children equal to 3 could result from: i) a woman who has one child (the one registered in the Population Registers of the births of 2003) and that intends to have two children in future; ii) a woman who has two children (one lower than 21 months so

¹² Using the total demand for children as dependent variable rather the intention of having another child allowed us to avoid the endogeneity problem affecting the number of children already born, given that we don't need to use realized fertility as a control variable. On the contrary, if the dependent variable of interest would have been only the fertility intention, we should control for realized fertility, modelling the endogeneity both of the sector choice (as we will see in the second empirical strategy) and of the number of children already born.

¹³ The author acknowledges also that there are differences among the two models regarding the distribution of the error term: as already seen, in the ordered probit model the error is assumed to follow a normal distribution, while the count model could assume an equi-dispersion or -for more flexible models as stated in Cameron and Johansson (1997) - an under dispersion of the variable.

registered in the Population Registers of the births of 2003) and who intends to have another childbirth in future and iii) a woman who has three children (with one registered in the Population Registers of the births of 2003 and the other older than 21 months) and who has reached her target fertility with three children (no further intentions).

For what concerns the independent variables, covariates related to our female respondents and variables related to their partners in order to control for different effects are employed, such as the partner's income effect; note that these last information is provided by the female respondents and not directly by males, as the questionnaire was directed only to mothers of at least one child less than three years old¹⁴.

Among the covariates, the sector of employment is the one of major interest given the aim of our analysis. In particular our ex-ante expectation is that, given the peculiar characteristics of the public sector, women employed into the public sector have a higher (total) demand for children.¹⁵

Regarding the other demographic characteristics of the respondents, the age, the area of residence and the highest level of educational attainment have been included (see Appendix 1 for details about the International Standard Classification of Education used). In order to understand which the determinants of female's fertility choices are, other important individual aspects have been added. Particularly, are included i) the partnership status – that is a dummy for being married or cohabiting with a partner, still considered an important distinction in the Italian context; ii) the number of siblings, because it is supposed to be positively related to the propensity of having children; iii) the nature of the last delivery (that coincides with the one of the child less than three years old for the respondents with only one child), that is if it was a caesarean or a natural delivery, given that it could directly influence the (future) fertility decisions; iv) the health status, that could have a direct impact on the fertility intentions; v) if the respondent is satisfied or not with the help provided by her partner-husband in taking care of previous child(ren) and in performing the domestic duties. Given that our respondents are all employed, this last inclusion was made in order to understand if the arrival of another child is facilitated by a more equal division of household tasks as showed by Miller and Short (2004) for the United States, or if the probability of having another child is higher when the partner showed a higher interest in taking care of the previous child(ren) and in performing the domestic duties after the birth of the previous child(ren) as demonstrated by Mencarini and Tanturri (2006) for five Italian municipalities in their study on the probability of having a second child in a dual earner family model.

Note that, even if the survey reports other information related to the job characteristics of the new mothers, such as the nature of the contracts (temporary or permanent), the working time (if the job is a part-time or a full-time one) or if the respondent is a blue or a white collar worker, any of them among the covariates have been included because they might be jointly determined with the employment sector, so they might suffer from endogeneity problems.

¹⁴ The fact that women reported their partners' information and the problems that could arise from such cases are discussed extensively in literature. Anyway, note that the reported information considered here is related only to demographic characteristics; it is not referred to fertility intentions or other socio-psychological aspects that could reflect the respondents' point of view.

¹⁵ Since we use cross-section dataset, we only have current information about job characteristics (e.g. on the sector of employment). For this reason we have to assume that the current sector (and the other covariates) is a good proxy also of past sector of employment (and of past values of the other covariates), when the (once and for all) decision about total demand for children was made. This assumption may appear too strong, but Bratti et al. (2005), using longitudinal data, show a high persistence of job characteristics of new mothers overtime.

For what concerns the demographic characteristics of the respondents' partners-husbands not directly deducible from the information included in our new mothers' characteristics (such as the partnership status), the age and the highest level of educational attainment have been included. Moreover, in order to control for household's income (an information not included in the survey), some characteristics related to the job position and occupation of the man have also been added, such as the nature of his employment -in particular if he is a white or a blue collar worker, if he works in the public or in the private sector, and if he works as self employed or not. Of course, in order to include such variables in the model, it was supposed that they are exogenous to the female partner's fertility desires¹⁶.

4.1.2 *The Ordered Probit Results*

The result of our ordered probit regression model, in particular the coefficients, their standard errors and the marginal effects for parity one and two are reported in Table 2.

Given the nature of the original dataset, the reported marginal effect for parity one is used to highlight an intention equal to zero for those who are mother of only one child, precisely for those who reached at parity one their target fertility. The marginal effects for higher birth parities (from 3 to 6) are reported in Appendix 2.

First, we focus the attention on our variable of interest, precisely woman's employment sector: from the results we can argue that the probability of desiring a higher number of children increases when the respondent works in the public sector. As expected, given the implicit features of the public sector, the effect of working in that specific sector seems to increase the probability of desiring more children.

Precisely, the marginal effect for parity one results to be negative, meaning that the probability of desiring only one child is 2.2% lower when the employment sector is the public one compared to cases when the employment sector is the private one, while for parity two it changes sign and magnitude: the probability of desiring two children is 1.6% higher for the mothers working in the public sector. Moreover, we note that when the desired parity increases, as reported in Appendix 2, we firstly record a sharp increase in the probability of desiring the third and the fourth child, while starting from the 5th desired child the impact of the public sector becomes less pronounced. This is intuitive, as women choosing such high levels of fertility are likely to be very peculiar, and public/private sector are unlikely to make the difference.

Remaining in the sphere of labour market and its features, we see that not only women's but also partners' employment characteristics are important for fertility desires: precisely, when the partner is a white collar or an independent worker we record a positive effect on the desired number of children, with increasing marginal effects; precisely a strong and positive marginal effect of 1.4% and 4.5% for parity three are recorded in case of a white collar partner and of an independent worker respectively. These results are probably due to an income effect: actually, the kind of job performed by the man, together with the working status of the woman might exert important effects on higher birth parity as showed by previous empirical studies (Baizan 2004, referring to Italy and to the United Kingdom and Corijin et al. 1996 focusing on Netherlands).

¹⁶ The male's employment sector has been introduced in the model at advanced stages of the analysis. Comments about the rationale behind such decision will be presented in Section 4.2.

Table 2 Ordered Probit Model. Regression Results (Total Demand for Children).

Ordered Probit Model -Regression Results-				
	Coefficient	Standard Error	Marginal Effect Parity 1	Marginal Effect Parity 2
Variable				
Age (her)				
<24	0.22**	0.10	-0.035	-0.038
25-29	0.04	0.05	-0.007	-0.006
30 – 34	ref. Cat	–	–	–
35 – 39	-0.10**	0.04	0.018	0.012
40 +	0.05	0.05	-0.009	-0.007
Age (him)				
<24	-0.03	0.17	0.005	0.004
25-29	0.09	0.07	-0.015	-0.015
30 – 34	ref. Cat	–		
35 – 39	-0.04	0.04	0.007	0.005
40 +	0.07*	0.05	-0.019	-0.009
Area of residence				
North East	0.12***	0.04	-0.021	-0.017
North West	-0.02	0.05	0.003	0.002
Centre	ref. Cat	–	–	–
South	0.22***	0.05	-0.036	-0.033
Islands	0.05	0.06	-0.008	-0.006
Education (her)				
Low (Isced 0 - 2)	0.04	0.04	-0.007	-0.005
Medium (Isced 3 - 4)	ref. Cat	–		–
High (Isced 5 - 6)	-0.00	0.04	0.000	0.000
Education (him)				
Low (Isced 0 - 2)	-0.01	0.04	0.001	0.000
Medium (Isced 3 - 4)	ref. Cat	–	–	–
High (Isced 5 - 6)	0.16***	0.04	-0.025	0.022
Number of Siblings (her)				
Family Size (continuous variable)	0.09***	0.01	-0.016	0.012
Female's Health Status				
Healthy	ref. Cat	–	–	–
Unhealthy	-0.44***	0.09	0.100	-0.014

Table 2 Continued.

	Coefficient	Standard Error	Marginal Effect Parity 1	Marginal Effect Parity 2
Variable				
Female's Employment Characteristics				
Sector				
Public	0.13***	0.03	-0.022	0.016
Private	ref. Cat	–	–	–
Female's Partnership Status				
Married	0.33***	0.06	-0.070	0.021
Unmarried (cohabiting)	ref. Cat	–	–	–
Female's Satisfaction with Partner's Help				
Satisfied	0.07**	0.03	-0.012	0.009
Not Satisfied	ref. Cat	–	–	–
Partner's employment characteristics				
Employees				
White collar	0.06*	0.04	-0.010	0.007
Blue collar	ref. Cat	–	–	–
Sector				
Public	0.07	0.04	-0.012	0.009
Private	ref. Cat	–	–	–
Dependent employee	ref. Cat	–	–	–
Autonomous worker	0.19***	0.04	-0.033	0.028
Kind of Last Delivery				
Natural	0.19***	0.03	-0.036	-0.022
Caesarean	ref. Cat	–	–	–

Moreover, the partner's sector of employment has been also taken into consideration in order to check if it plays any significant role in shaping women's probability of desiring a higher number of children. What we found is that the partner's sector of employment is insignificant, so no effect on the total demand for children is exerted. This point appears to have a valuable meaning in our setting: actually, this result suggests that the effect exerted by working in the public sector on fertility desires is gender-specific, so it is not the result of something related to public sector irrespective of gender (e.g., higher partner's wages that might increase the woman's demand for children).

At the individual level, as previously highlighted, the model includes covariates accounting for the main socio-demographic characteristics of the mothers in the sample. Women's age at the interview, educational level and marital status enter in the model for all women together with the number of components of their family of origin. Again at individual level but referred to the partner, the age at the interview and the highest level of educational attainment have been added in the model.

From this set of individual variables, the analysis starts from the level of education, another central variable that contributes to a better understanding of the determinants of fertility choices. Note that this variable does not show the same effect both for males and for females: precisely, in a context of scarce presence of policy aimed at reconciling paid and unpaid job for working women, if a higher level of educational attainment (considered a *proxy* for income) for women is sometimes seen as negatively correlated with fertility decisions because it increases their opportunity costs, for men it is always seen as something that produces a pure income effect, increasing fertility. From our results we have evidence of this last point: actually, the coefficient for men's higher level of educational attainment is positive and significant on the desired number of children. Having a look at the marginal effects we conclude that the probability of having reached at one child the target fertility is lower for couples where the man is highly educated, while for the same couples the probability of desiring two children is 2.2% higher and the marginal effect related to a three-children desire as reported in Appendix 2 is 3.7% higher than the one recorded for couples where the man has a medium level of education (Isced 3-4).

Referring to our respondents, we do not see any significant effect of the variable related to the educational attainment: a possible interpretation is that the income and substitution effects produced by women's education cancel out, or that most effects are mediated by labour market variables (as the employment sector). Concentrating on other personal characteristics, we see that respondents' age plays an important role in the analysis of the total number of desired children. In particular, as expected, aging discourages the probability of desiring more children, while being young exerts a positive influence on the number of desired children.

This finding is reasonable especially if we consider the biological constraint that women face, which leads them to declare that their total demand for children is equal to the number of actual children (so the fertility intention for other children is equal to zero) when they are approaching the end of the fecundity period.

As it is evident from Table 2, the dummy for the partnership status has also been included among the regressors, even if the percentage of married women in the sample is nearly 92%. After having performed the analysis we note that the probability of desiring a higher number of children is significantly higher for married women (especially the marginal effect for parity three is +7.6%). Actually, even if there has been a strong increase in non-marital cohabitation among younger Italian generations and even if in the third millennium marriage is no longer central in the family formation process (Rosina and Fraboni 2004, Di Giulio and Rosina 2007), the emergence of cohabiting unions is still limited in Italy, a country traditionally based on marriage and

characterised by a traditional view of the family (Bernhardt 2004, Cavalli 2008, Gabrielli and Hoem 2010). Moreover, the existence of a rigid sequencing of events both because of social norms and because the society does not consider a viable choice becoming parents without being married (or even i.e., while studying) contributes in keeping central the event “marriage”. Such a traditional sequence, in other words, the *transition to adulthood*- is summarized as follows (Billari 2005a, 2005b): a) completion of education, b) start of first job, c) exit from the family of origin at the time of marriage, d) birth of first child and of higher order children; again, cohabitation is not mentioned.

For what concerns the number of members belonging to the respondents’ family of origin, we note that it exerts an influence on the fertility desire: the presence of siblings, considered a predictor for the preferred size of the new family, is actually found to have a positive and significant effect on the probability that the respondents desire a higher number of children (for three children the recorded marginal effect is 2.3%, while for higher fertility desires the effect of the number of siblings is reduced: in transition to higher birth parities this covariate matters less).

Finally, the husband’s role within the household in terms of unpaid job has been analyzed, precisely considering if the respondent is satisfied or not with the contribution provided by her partner/husband in taking care of the child(ren) whom the survey refers to (and of the previous ones) and in performing the domestic duties: the analysis provides empirical support to the hypothesis that receiving some form of help is positively associated with fertility intentions, in line with previous findings on Italy (Mencarini 2006, Fiori 2009). Actually, a higher husband commitment to childcare and household chores is positively associated, although weakly, with the fertility desire (in particular those higher than 2).

A control was added for problems at childbirth, specifically if the respondent experienced as last birth a caesarean delivery, supposing that a problematic experience may discourage the future fertility intention (Pinnelli and Fiori 2008), as it is supported by the actual findings.

As declared, fertility intentions are a subjective variable and may not reflect women’s true intention; in order to check the validity of the findings, a parallel analysis only on the actual number of children (or -in other terms- as if the intended number of child were zero) has been performed and results are reported in Appendix 3. When we deal with the actual number of children and focus on the control covariates accounting for the demographic characteristics, we do not record any significant difference with respect to our prior investigation, but it is worthwhile noticing two interesting results. The first one is related to women’s satisfaction about their partners’ help: essentially, when the dependent variable is no more inclusive of the intentions for other child(ren), partner’s help does not exert any effects anymore¹⁷. Finally, focusing again on our main variable of interest, we can conclude that working in the public sector appears to be important also on the number of children already born and its marginal effect has a higher magnitude with respect the case of desired children previously analysed (-5.3% for parity one and 3.6% for parity two versus -2.2% for parity one and 1.6% for parity two previously recorded).

The second result is connected to our new mother’s educational attainment, found to become significant when the dependent variable under investigation is the number of child(ren) already born. To be exhaustive, when the

¹⁷ Nevertheless, we cannot completely rely on the fact that the variable considered here is totally exogenous. Actually, especially for past fertility choices, it could be endogenously determined given that the question referred to past help or to the one performed at the time of the survey.

respondents are highly educated, the probability of having a high number of children is lower if compared to the medium educated counterpart. The opposite is recorded in case of lower educated women.

For the other covariates, both the coefficients and the marginal effects appear to be fairly similar (with some differences in magnitude), so this specification, contributes to confirm the robustness of the main model.

4.2. *Endogenous Sector Choice: The Conditional Multi-Equation Mixed Model*

4.2.1. *Model Description*

The conditional multi-equation mixed-process (*cmp*, hereafter) has been recently introduced by Roodman (2009) in order to facilitate a generalization of multidimensional models that can be combined into multi-equation systems in which the error share a multivariate normal distribution. Using maximum likelihood estimation, the conditional multi-equation model generalizes selection and switching models in which the number and type of equations vary by observation. Precisely, the model allows the simultaneous estimation of the equations taking into account the full covariance structure; moreover this estimator is also consistent for recursive systems in which all endogenous variables appear on the right hand side as observed (Roodman 2009). To be precise "mixed process" means that different equations can have different kinds of dependent variables, while "conditional" means that the model can vary by observation or that the *type* of dependent variable can vary by observation.

In this particular case, the use of conditional multi-equation's modelling framework allows the regression of limited dependent variables on two endogenous variables, one binary and the other sometimes left-censored, instrumenting with an additional variable and obtaining consistent estimates.

Precisely, the system of two equations has been modelled in the following way:

$$(3) \quad Y^* = \alpha_0 + \alpha_1 X + \alpha_2 E + \varepsilon_i$$

$$(4) \quad E^* = \beta_0 + \beta_1 W + \beta_2 Z + u_i.$$

For what concerns the correlation among the equations, we have one correlation term:

$$(5) \quad \text{Corr}[\varepsilon_i, u_i] = \rho.$$

Given that the sample of mothers who are working after childbearing is selected, as only for those mothers we have the information on sector of employment, in this model the probability of working in the public or the private sector conditional on the fact of having decided to continue working after childbearing is modeled.

To link precisely the theoretical framework with the empirical part, note that Y^* is the total demand for children for a woman in the sample, as previously defined, X is the vector of covariates related to both the respondent and her partner and E is the nature of the sector (public-private sector). E^* is the (latent) decision of working in the public (or in the private) sector, W is the vector of independent variables explaining E^* , while Z is the excluded variable correlated with the endogenous explanatory variables E and uncorrelated with the error term ε_i : an appropriate instrument/exclusion restriction is crucial to obtain reliable estimates on fertility intentions differentials as discussed by Dustmann and van Soest (1997).

Note that the inclusion of the equation E^* enables us to take into account the simultaneity of mothers' decisions. The reason for employing a conditional multi-equation mixed-model is the following: it may be that unobserved characteristics affecting the choice of the employment sector also have an effect on wages, working conditions or fertility intentions, which could bias the estimated effects of sectors; for that reason, the estimation procedure has

to take into account that potential endogeneity of the sector choice and this is possible thanks to the use of a *cmp* model.

Linking the *cmp* model description to our data, the vector of independent variables X includes the same covariates described in the section devoted to the ordered probit model; for what concerns the vector W, it contains the demographic characteristics we included in the vector X, with the exception of some characteristics related only to the fertility sphere, such as the nature of the last delivery, the respondents' health status¹⁸ and number of siblings, the partnership status and satisfaction about the male partner's help within the household.

For what concerns the variables related to the male partners, the vector W contains the same covariates included in the vector X in order to control for the income effect and as exclusion restriction has been used a "cross"-interaction term between one of the variable connected to the partner's employment characteristics, precisely the sector of employment at the time of the survey, and woman's level of education, namely if she completed at least the high school. The choice of the exclusion restriction was surely constrained by the data, but it is claimed below that this interaction is likely to be correlated with sector of employment, uncorrelated with the error term in the demand for children equation and it does not predict any outcome related to the fertility sphere, conditional on the other regressors we included in the fertility equation. In particular, after controlling for men's age, education and occupation, which are likely to be the main determinants of their incomes, and after having included the man's employment sector in the fertility equation, we maintained that due to the high centralization of wages in the public sector, potential wage effects of men's public sector interacted with the level of education of the female partner are negligible, and unlikely to affect women's fertility decisions.

The reasons that induced us through the choice of this interaction term as the exclusion restriction instead of the simpler male partner's sector of employment non interacted was twofold: from one side, given the nature of the public employment that ensures a higher level of job security, men's work in the public sector could be considered a *proxy* for a higher level of future income in the household, income that could produce income effects on women's fertility decisions. From the other side, as for non-pecuniary aspects, given the flexible nature of the public employment, it could be claimed that men employed in the public sector have more time to devote to their children and this could affect women's fertility intention increasing the conciliation between family and working life for employed mothers. In principle, this is a possible objection to using the non-interacted instrument although in the literature no strong evidence of such last argument has been found: precisely, in the literature devoted to time allocation Ichino and Galdeano (2005) found that Italian men devote a real low percentage of their time to basic childcare¹⁹, so the opportunities that a public-flexible job could supply do not exert any effect on the fertility choice when the employee is the male partner. Moreover, the evidence showed in their study suggests that in Italy fathers do not come close to compensating for the loss of child care implied by the working decision of the mother and this contributes to increase the problem of what parents can do to ensure that children are taken care of when they work. Again and in line with this last finding is the one of Smith (2004) that making a comparison about the time that fathers devote to their children's care found out that

¹⁸ Although we know from Article 18 of the Labour code that firms employing more than 10 workers are obliged to hire disadvantaged workers, in our Survey the question connected to the health status referred to respondents' perceptions (see Ajzen 1991) about being (un)healthy and the attitudes for family formation and not to physical constraints or disabilities. For that reason it has not been included among the covariates in the sector equation.

¹⁹ Two different kinds of care have been highlighted in the study, the basic and the quality care: «quality child care encompasses activities linked to children's educational and cultural development, while basic care encompasses activities related to children's more essential needs», Ichino and Galdeano 2005).

in Italy only 11% of the fathers takes care of their children in pre-schooling age in a substantial way²⁰, with respect to the 57%, 31%, 24% and 20% recorded respectively by Danish, Finnish, English and German fathers. Given that we could not completely exclude that the effect of being employed in the public sector exerts on females' decisions for men translates in a higher stability of future income flows, (that could again be connected with women's decision through an income effect), we decided to use the interaction term between women's educational attainment and partner's sector of employment. The rationale behind this choice is the following: a male partner employed in the public sector, thanks to the existence of sharp networks, of informal referrals, or of informative advantage on how to get a public job, could also introduce his wife in the public sector; furthermore, given the nature of the majority of public jobs (the majority of public workers is white collars) the whole procedure is facilitated when she records high levels of educational attainment²¹. Moreover, this interaction allows us to control the partner's sector of employment in the fertility equation: precisely, the exclusion restriction could influence the employment sector of our respondents, without exerting any effect on male's or female's wage, typically regulated at central level.

4.2.2. *The Cmp Results*

Results for the Conditional Multi-Equation Mixed model are shown in Table 3 that reports the coefficients, the robust standard errors and the marginal effects for the equations of interest. The marginal effects for higher birth parities (from 3 to 6) are reported in Appendix 4.

In this paper, we are mainly concerned with investigating the association between the sector choice and the fertility desire for working mothers. For that reason, in reporting the results for the cmp model, we comment in particular on the structural equation and its coefficients and on the correlation between the two equations, correlations that reveals the level and the "direction" of the selection into the working sector.

²⁰ With the expression "substantial way" it is meant a care of more than 28 hours per week.

²¹ In order to detect the positive influence that a partner employed in the public sector exerts on his wife/partner's decision about the employment sector, a better instrument could have been an interaction between man's employment sector and woman's year of first employment in case she started working after her partner, but as already mentioned we were constrained by the nature of the dataset and the provided information did not allow us to understand the temporal sequence of first employments for females and males. However, given the lower age of the female partner in the sample, we find credible that women started to work later than their partners (in our sample, the 97.24% of the males are older than their female partners).

Table 3. Conditional multi-equation mixed-model, Regression Results (Total Demand for Children).

Conditional multi-equation mixed-model -Regression Results-							
	Selection Equation			Structural Equation			
	Probability of working in the Public Sector (probit equation)	Robust Standard error	Number of desired children in the family (ordered probit equation)	Robust Standard error	Marginal Effect Parity 1	Marginal Effect Parity 2	
Variable							
Age (her)							
<24	-0.41***	0.12	0.17	0.12	-0.028	-0.027	
25-29	-0.14***	0.06	0.023	0.05	-0.004	-0.003	
30 – 34	ref. Cat	–	ref. Cat	–	–	–	
35 – 39	0.12***	0.05	-0.08*	0.05	0.015	0.010	
40 +	0.26***	0.06	0.09	0.07	-0.016	-0.012	
Age (him)							
<24	0.13	0.21	-0.02	0.18	0.002	0.002	
25-29	0.15*	0.08	0.10	0.07	-0.018	-0.015	
30 – 34	ref. Cat	–	ref. Cat	–	–	–	
35 – 39	0.01	0.05	-0.04	0.04	0.007	0.005	
40 +	0.15***	0.06	0.09	0.06	-0.016	-0.012	
Area of residence							
North East	0.20	0.05	0.15***	0.05	-0.026	-0.021	
North West	0.06	0.05	-0.01	0.05	0.002	0.001	
Centre	ref. Cat	–	ref. Cat	–	–	–	
South	0.12**	0.05	0.23***	0.05	-0.040	-0.035	
Islands	0.41***	0.07	0.10	0.09	-0.017	-0.014	
Education (her)							
Low (Isced 0-2)	-0.31***	0.05	0.01*	0.08	-0.003	0.002	
Medium (Isced 3-4)	ref. Cat	–	ref. Cat	–	–	–	
High (Isced 5-6)	0.66***	0.04	0.09	0.12	-0.017	-0.013	
Education (him)							
Low (Isced 0 - 2)	-0.08*	0.04	-0.02	0.04	0.003	0.002	
Medium (Isced 3-4)	ref. Cat	–	ref. Cat	–	–	–	
High (Isced 5 - 6)	-0.12***	0.05	0.13***	0.05	-0.023	0.019	

	Probability of working in the Public Sector (probit equation)	Robust Std. error	Number of desired children in the family (ordered probit equation)	Robust Std. error	Marginal Effect Parity 1	Marginal Effect Parity 2
Variable						
Number of Siblings (her)						
Family Size (continuous variable)			0.09***	0.01	-0.017	0.011
Female's Health Status						
Healthy	ref. Cat	–	ref. Cat	–	–	–
Unhealthy			-0.43***	0.09	0.100	-0.013
Female's employment characteristics						
Sector						
Public	–	–	0.27**	0.49	-0.050	0.032
Private			ref. Cat	–	–	–
Female's Partnership Status						
Married			0.32***	0.06	-0.071	0.020
Unmarried (cohabiting)	ref. Cat	–	ref. Cat	–	–	–
Female's Satisfaction with Partner's Help						
Satisfied			0.07**	0.03	-0.012	0.009
Not Satisfied	ref. Cat	–	ref. Cat	–	–	–
Partner's Sector of employment						
Sector						
Public			0.13	0.09	-0.024	-0.019
Private			ref. Cat	–	–	–
Employees						
White collar	-0.11**	0.05	0.04	0.05	-0.008	-0.005
Blue collar	ref. Cat	–	ref. Cat	–	–	–
Dependent employee	ref. Cat	–	ref. Cat	–	–	–
Autonomous worker	-0.22***	0.05	0.16***	0.06	-0.029	0.022
Kind of Last Delivery						
Natural			0.19***	0.03	-0.036	-0.021
Caesarean	ref. Cat	–	ref. Cat	–	–	–
Exclusion Restriction	0.56***	0.05				
Intercept	-0.43***	0.06				
<i>rho</i>	-0.18*					

Looking first at the coefficient for the dummy “public”, we see that it exerts a positive effect on the probability of desiring more children, similar to the simple ordered probit model previously implemented: it means that on average, working in the public sector has a positive influence on the total number of desired children.

Considering the size of the effects and comparing them with the results previously obtained we notice that: i) in this model the exerted effects are stronger for parities one and two; ii) the effects are minor for higher parities. Precisely, in the model under analysis the probability of desiring only one child is 5% lower when the employment sector of the mother is the public one (compared to cases when the employment sector is the private one), while in the previous case it was 2.2% lower. Similarly, the probability of desiring two children is 3.2% higher for public employed mothers in the endogenous model, while when the employment sector choice was modelled exogenously to the fertility choice it recorded an increase of 1.6%. On the contrary, the marginal effects of the public sector on higher desired parities are lower in the endogenous model when the considered parity is parity three, and they turn to be negative when we deal with parities four and five.

Focusing on the level of educational attainment, from Table 3 emerges that the level of education plays a role when introduced in a model that considers the endogeneity issue. Precisely, we record a (slight) positive and significant (at 10% level) effect of lower educated women on the probability of desiring more children. A not rising number of desired children with an increasing level of education may be explained i) by the prevalence of substitution effects over the income ones at higher levels of education or ii) by the prevalence of the income effect that, however, does not result in a higher number of desired children because of the lack of childcare (in terms of structure and services) that could be purchased in the market, but that is not enough to cover all the demand. In this last case, it is true that the opportunity cost of intending to have other children is the lowest between the cost of external provision of childcare and the income or experience losses derived by exiting from the labour market. Highly educated women would like to work and purchase external childcare, but the lack of such provision might limit the realization of this preference and their -eventual- higher fertility desire.

This is what happens in our sample of working mothers, since women with a low level of education are more likely to desire more children and less likely to work in the public sector, a sector that seems to attract highly educated women. In order to find evidence of this last statement, looking again at Table 3 and analysing the selection equation, it is evident that more educated women are more likely to work in the public sector, while less educated women have a lower probability of being employed into the public sector (if compared to the ones with an intermediate level of education), as it is possible to check looking at the coefficients and their signs.

Given that some problems with the job stability could emerge, in particular we could suppose that working in the public sector increases the probability of having a permanent job and this could produce also an indirect effect on fertility levels even for males, controls for partners’ employment characteristics have been added in the equation for the fertility desire. Precisely and in line with the previous ordered probit model results, women with a partner employed as an independent worker are more likely to desire more children (income effect), while when the partner is a white collar no significant effect on the total demand for children is recorded.

Focusing our attention to the negative correlation between the probability of working in the public sector and the number of desired children (embedded in the ρ coefficient) we note that at a first sight, its sign could be in contrast with the positive coefficient for the dummy “public” previously commented on when dealing with the structural equation (so with the probability of desiring more children): if it is true that the probability of desiring more children is higher when the sector of employment is the public one, why once the selection effect is taken

into account and the preferences for the working sector and the total demand for children are modelled together, the correlation among the two choices is found to be negative?

It could be the case that women that are more oriented to work in the public sector desire²² less children because of some latent characteristics that overtake the family formation attitude. These latent characteristics that overtake the family formation attitude may refer to woman's "career orientation". Actually, as stated in Pagani (2003), more educated women or women who prefer working full-time have a higher probability of searching for a job in the public sector, a sector that has been assumed to be safer with respect to the private one for its characteristics. Essentially, in the public sector the worker cannot be fired and the reservation wage associated with the public sector is higher than the one associated with the private sector: since the worker knows that the wage in the public sector will not rise with tenure²³, they require a higher wage to accept a job in this sector. In this case, the negative correlation between the unobservables would mainly be a proxy for higher reservation wages, associated with the public sector and which have a substitution effect on fertility.

Another interpretation that someone could suggest is that the latent characteristic could be the respondent's age: one can state that women that prefer working into the public sector study more in order to perform in a brilliant way in the public selection necessary to enter the public sector: this time invested could translate into a postponement of the first birth event (due to the sequencing of the events that does not consider choices as becoming parents while studying as appropriate) and consequently the total number of children results to be lower given the biological constraints. Even if it is true that to study more means to start working later, exit later from the family of origin by getting married at older age and having later the first child, in this setting it cannot be considered the latent characteristic because the model controls for the respondents' age²⁴. Moreover, in order to check the existence of such fertility delay for women employed into the public sector, a model that considers among the covariates interaction terms between the different age groups and the dummy for the employment sector has been estimated, but no differences among the effects of our variable of interest have been detected²⁵.

To summarize such last argument, the results lead us to conclude that women who desire more children are less likely to self-select into the public sector and this could be the result of more productive women's strategies: given that they are those more work oriented (and less family-oriented), they tend to enter into the public sector, a less gender discriminated sector with a lower gender wage gap if compared to the private one. But once controlling for self-selection, the public sector ensures a family-friendly environment which makes the same women to desire more children whatever and this causal effect is confirmed by the sign of the coefficient for the dummy variable "public" in the equation for the number of desired children already commented on.

²² Note that in this paper the word *desire* refers to both realized and intended fertility, it is not considered like in other works a synonym of intention.

²³ A further analysis controlling also for *tenure* has been employed in order to better check the robustness of the model. On a sample of 5,998 female respondents the model gives for the covariate related to the sector of employment (dummy for the respondent working in the public sector) the following results on the fertility equation: coefficient positive and significant at a 5% level and equal to 0.26 (with a standard error of 0.49) correlation coefficient $\rho = -0.23$ with a p-value of 0.095.

²⁴ Additionally, in order to correctly check that statement the analysis should be performed on a sample of women who completed the fertility period: actually some recuperation effects in terms of births at later ages might emerge (Rondinelli et al. 2006, Lesthaeghe 2001).

²⁵ The model gives for the covariate related to the sector of employment (dummy for the respondent working in the public sector) the following results on the structural equation: coefficient positive and significant at a 5% level and equal to 0.31 (with a standard error of 0.43 and marginal effects equal to 0.081 for parity one, 0.034 for parity 2 and 0.011 for parity 3), correlation coefficient $\rho = -0.21$ with a p-value of 0.093. For the interaction terms, no level of significance has been recorded.

Furthermore, this evidence might be also the result of a dynamic effect: women may realize after working in the public sector that they can "update" -precisely increase- their total demand for children. However, in order to empirically check this hypothesis, an even history analysis should be performed using panel data, which are not available at the time of the present analysis and is left for future work²⁶.

5. Concluding Remarks and Further Research

The present paper tried to understand how the employment sector affects the fertility desires for Italian working mothers, considering the sector of employment as an exogenous and then as an endogenous choice to the fertility decisions and contributing to both the specific literature on female labour force participation and the general literature on structural modelling of mother's intentions for another child.

When the choice of the employment sector is considered exogenous to the fertility decision we found that, the sector itself, partner's variables related to the educational attainment and the kind of performed job (considered a *proxi* for income), new mothers' satisfaction related to their partner's help with domestic or child-related duties are all important in explaining the propensity of desiring a higher number of children.

To be more precise, the education of the partner affects desires for higher birth parities and plays an important role, since it is both statistically significant and positive and it presents non negligible marginal effects on fertility desires of order two, three and four. On the contrary, new mothers' educational levels are not found to be significant in explaining their fertility desires. Furthermore, women whose partner is employed as a white collar or as independent worker show a higher probability of desiring a larger family, while his employment sector does not exert any effect on the variable of interest; on the contrary, respondents' employed in the public sector show higher probability of having more than one child and the significant and positive effect of public sector is important both in explaining the desired and realized fertility. Remaining on the sphere of job characteristics, we found that higher satisfaction recorded by our respondent in terms of (past) help provided by their partners with the last child and with the domestic duties after his/her birth (so the past experience lived by our sample of women that already sought to conciliate the working and the family life), is associated with higher probability of desiring a more numerous family. As for other demographic variables, the number of woman's siblings is significant and has a relevant effect in the model considered, meaning that women who come from larger families also tend to have a higher propensity of entering childbearing more than once (see Bratti et al. 2005).

Concerning respondents' age we see that higher fertility desires are associated to younger age, while it is decreasing as long as the women approach the age of 40. Moreover, the partnership status exerts a strong and positive effect: married women, compared to their cohabiting counterparts, have a higher probability of desiring and reaching a higher number of children.

For what concerns the probability of desiring children when the employment sector and fertility preferences are modelled together, the variables of interest, their magnitude and levels significance are generally found to be in line with the one found in the previous model. Actually, partner's job characteristics that strengthen the income

²⁶ An approach that goes in this direction has recently been used by Michaud and Tatsiramos (2008) to study the dynamic effect of birth on employment across countries in Europe.

effect, his provided help and other individual backgrounds contribute to explain both the probabilities of working into the public sector and the one of desiring a much more numerous family.

Interestingly and differently from the *ordered probit model regression* results, in the *cmp* model, mothers' educational levels are found to be significant in explaining their fertility desires. Precisely, women with a low level of educational attainment are found to be more likely to reach higher level of desired parities (until parity four), while no significant effect on the total demand for children is recorded for highly educated women.

However, this last covariate is important in shaping the preference for the employment sector of the women in the sample: basically, a high level of educational attainment is strongly associated with the probability of being employed in the public sector.

In this setting, an element of specific interest is the level of significance of the actual findings. Precisely, the fact that recent data gathered with the "Birth Sample Survey" have been used, if on one side it has offered me a unique possibility to analyze the fertility choices along with the choice of the employment sector for Italian women considering the existence of simultaneous effects (the endogeneity of phenomena related to employment and fertility), on the other hand does not permit to find universal evidence for the women included in the analysis. In order to find evidence especially for the youngest cohort and for those who excluded the intention for another childbearing, we should wait until the end of the period in which they run the risk of experiencing another birth. For those reasons, further research on this topic has to be carried out. In particular as soon as the data from a second wave of the Birth Sample Survey is available and it allows the investigation of longitudinal data the interest will be the study of the impact of changing childbearing desires on the employment sector and their dynamics in order to broaden the knowledge on women's preferences for working and family life.

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Appendices

Appendix 1.

Different school levels, International Standard Classification of Education, 1997.

<p><u>Pre-primary Education.</u> ISCED Level 0. Institution-based and designed for children who are at least 3 years old.</p>
<p><u>Primary Education.</u> ISCED Level 1. Have systematic introductory studies in core subjects, such as mathematics, reading, and writing. School participation at this level is mandatory in all Countries and generally lasts 5-6 years. Entry age varies between 4 years and 8 years.</p>
<p><u>Lower-Secondary Education.</u> ISCED Level 2. Tends to have somewhat more subject-oriented education, the teachers are more specialized, and the numbers of instruction hours is higher than in primary education. Lower-secondary education is typically the last part of compulsory education.</p>
<p><u>Upper-Secondary Education.</u> ISCED Level 3. Generally begins at the end of compulsory schooling. In the upper-secondary school, subject teaching is generally more advanced than at earlier stages. Students have considerable freedom to choose specialized subjects. The stage lasts from 1-5 years, depending on country and school system.</p>
<p><u>Postsecondary nontertiary education.</u> ISCED Level 4. Programs sometimes require a secondary school qualification. They typically have more subject depth, are more specialized than secondary education, and are more often of too short a duration to fit into the ISCED 5 category.</p>
<p><u>Tertiary education.</u> ISCED Level 5. Programs are more advanced than education offered at ISCED levels 3 or 4 and have a minimum duration of 2 years. They may require completion of a research project or a thesis and are meant to direct the participants to professions with high skill requirements or to research programs.</p>
<p><u>Advanced tertiary education.</u> ISCED Level 6. Requires the submission of a thesis or dissertation. Students who complete this stage of education should have proved their ability to carry out and advanced research work.</p>

Appendix 2.

Table 4 Ordered Probit Results- Marginal Effects for parities higher than 2 (Desired Fertility).

Ordered Probit Model - Marginal Effects for Higher Parities				
	Marginal Effect Parity 3	Marginal Effect Parity 4	Marginal Effect Parity 5	Marginal Effect Parity 6
Variable				
Age (her)				
<24	0.057	0.013	0.002	0.001
25-29	0.011	0.002	0.000	0.000
30 – 34	–	–	–	–
35 – 39	-0.024	-0.005	-0.001	-0.000
40 +	0.013	0.003	0.000	0.000
Age (him)				
<24	-0.007	-0.001	-0.000	-0.000
25-29	0.022	0.005	0.001	0.000
30 – 34	–	–	–	–
35 – 39	-0.010	-0.001	-0.000	-0.000
40 +	0.017	0.003	0.000	0.000
Area of residence				
North East	0.030	0.006	0.000	0.000
North West	-0.004	-0.001	-0.000	-0.000
Centre	–	–	–	–
South	0.054	0.012	0.002	0.001
Islands	0.011	0.002	0.000	0.000
Education (her)				
Low (Isced 0 - 2)	0.010	0.002	0.000	0.000
Medium (Isced 3 - 4)	–	–	–	–
High (Isced 5 - 6)	-0.000	-0.000	-0.000	-0.000
Education (him)				
Low (Isced 0 - 2)	-0.002	-0.000	-0.000	-0.000
Medium (Isced 3 - 4)	–	–	–	–
High (Isced 5 - 6)	0.037	0.008	0.001	0.000
Number of Siblings (her)				
Family Size (continuous variable)	0.023	0.005	0.001	0.000
Female's Health Status				
Healthy	–	–	–	–
Unhealthy	-0.096	-0.015	-0.002	-0.001

Table 4 Continued.

	Marginal Effect Parity 3	Marginal Effect Parity 4	Marginal Effect Parity 5	Marginal Effect Parity 6
Variable				
Female's Employment Characteristics				
Sector				
Public	0.037	0.036	0.019	0.001
Private	–	–	–	–
Female's Partnership Status				
Married	0.076	0.013	0.002	0.001
Unmarried (cohabiting)	–	–	–	–
Female's Satisfaction with Partner's Help				
Satisfied	0.017	0.003	0.000	0.000
Not Satisfied	–	–	–	–
Partner's employment characteristics				
Employees				
White collar	0.014	0.003	0.000	0.000
Blue collar	–	–	–	–
Sector				
Public	0.017	0.004	0.001	0.000
Private	–	–	–	–
Dependent employee	–	–	–	–
Autonomous worker	0.045	0.010	0.002	0.001
Kind of Last Delivery				
Natural	0.047	0.009	0.001	0.000
Caesarean	–	–	–	–

Appendix 3.

Table 5. Ordered Probit Results (Realized fertility).

Ordered Probit Model -Regression Results- Actual Children					
	Coefficient	Standard Error	Marginal Effect Parity 1	Marginal Effect Parity 2	Marginal Effect Parity 3
Variable					
Age (her)					
<24	-0.59***	0.12	0.229	-0.175	-0.049
25-29	-0.33***	0.05	0.132	-0.092	-0.035
30 – 34	ref. Cat	–	–	–	–
35 – 39	0.39***	0.04	-0.152	0.092	0.052
40 +	0.76***	0.05	-0.278	0.128	0.124
Age (him)					
<24	-0.23	0.02	0.095	-0.067	-0.025
25-29	-0.10	0.08	0.037	-0.025	-0.011
30 – 34	ref. Cat	–	–	–	–
35 – 39	0.26***	0.04	-0.101	0.064	0.033
40 +	0.51	0.05	-0.194	0.114	0.069
Area of residence					
North East	0.08*	0.05	-0.034	0.022	0.011
North West	-0.06	0.05	0.021	-0.014	-0.006
Centre	ref. Cat	–	–	–	–
South	0.23***	0.05	-0.088	0.054	0.029
Islands	0.02	0.07	-0.006	0.004	0.000
Education (her)					
Low (Isced 0-2)	0.16***	0.04	-0.061	0.038	0.020
Medium (Isced 3-4)	ref. Cat	–	–	–	–
High (Isced 5-6)	-0.19***	0.04	0.074	-0.050	-0.021
Education (him)					
Low (Isced 0-2)	0.08**	0.04	-0.033	0.021	0.010
Medium (Isced 3-4)	ref. Cat	–	–	–	–
High (Isced 5-6)	0.01	0.04	0.004	-0.002	-0.001

Table 5 Continued.

	Coefficient	Standard Error	Marginal Effect Parity 1	Marginal Effect Parity 2	Marginal Effect Parity 3
Number of Siblings (her)					
Family Size (continuous variable)	0.07***	0.01	-0.029	0.019	0.009
Female's Health Status					
Healthy	ref. Cat	–	–	–	–
Unhealthy	-0.33***	0.09	0.127	-0.070	-0.048
Female's Employment Characteristics					
Sector					
Public	0.14***	0.03	-0.053	0.034	0.016
Private	ref. Cat	–	–	–	–
Female's Partnership Status					
Married	0.47***	0.06	-0.186	0.137	0.044
Unmarried (cohabiting)	ref. Cat	–	–	–	–
Female's Satisfaction with Partner's Help					
Satisfied	-0.03	0.03	0.013	-0.009	-0.004
Not Satisfied	ref. Cat	–	–	–	–
Partner's Employment Characteristics					
Employees					
White collar	0.01	0.04	0.005	-0.003	-0.002
Blue collar	ref. Cat	–	–	–	–
Sector					
Public	0.09	0.04	-0.036	0.023	0.011
Private	ref. Cat	–	–	–	–
Dependent employee	ref. Cat	–	–	–	–
Autonomous worker	0.10**	0.04	-0.040	0.026	0.012
Kind of Last Delivery					
Natural	0.20***	0.03	-0.081	-0.054	0.024
Caesarean	ref. Cat	–	–	–	–

Appendix 4.

Table 6. Conditional multi-equation mixed-model Results, Marginal Effects for parities higher than 2 (Desired Fertility).

Conditional multi-equation mixed-model -Marginal Effects for Higher Parities				
Structural Equation				
	Marginal Effect Parity 3	Marginal Effect Parity 4	Marginal Effect Parity 5	Marginal Effect Parity 6
Variable				
Age (her)				
<24	0.042	0.010	0.002	0.000
25-29	0.006	0.001	0.000	0.000
30 – 34	–	–	–	–
35 – 39	-0.020	-0.004	-0.001	-0.000
40 +	0.022	0.005	0.001	0.000
Age (him)				
<24	-0.004	-0.000	-0.000	-0.000
25-29	0.026	0.006	0.001	0.000
30 – 34	–	–	–	–
35 – 39	-0.009	-0.002	-0.000	-0.000
40 +	0.022	0.004	0.001	0.000
Area of residence				
North East	0.036	0.008	0.001	0.000
North West	-0.002	-0.000	-0.000	-0.000
Centre	–	–	–	–
South	0.058	0.013	0.002	0.000
Islands	0.025	0.006	0.001	0.000
Education (her)				
Low (Isced 0 - 2)	-0.004	-0.000	-0.000	-0.000
Medium (Isced 3 - 4)		–	–	–
High (Isced 5 - 6)	0.024	0.005	0.001	0.000
Education (him)				
Low (Isced 0 - 2)	-0.004	-0.001	-0.000	-0.000
Medium (Isced 3 - 4)	–	–	–	–
High (Isced 5 - 6)	0.032	0.007	0.001	0.000
Number of Siblings (her)				
Family Size (continuous variable)	0.022	0.005	0.001	0.000

Table 6 Continued.

Structural Equation				
	Marginal Effect Parity 3	Marginal Effect Parity 4	Marginal Effect Parity 5	Marginal Effect Parity 6
Variable				
Female's Health Status				
Healthy	–	–	–	–
Unhealthy	-0.095	-0.016	-0.002	-0.000
Female's employment characteristics				
Sector				
Public	0.016	-0.014	-0.002	0.000
Private	–	–	–	–
Female's Partnership Status				
Married	0.075	0.014	0.002	0.001
Unmarried (cohabiting)	–	–	–	–
Female's Satisfaction with Partner's Help				
Satisfied	0.016	0.004	0.000	0.000
Not Satisfied	–	–	–	–
Partner's Sector of employment				
Sector				
Public	0.034	0.008	0.001	0.000
Private	–	–	–	–
Employees				
White collar	0.010	0.002	0.000	0.000
Blue collar	–	–	–	–
Dependent employee	–	–	–	–
Autonomous worker	0.040	0.009	0.001	0.000
Kind of Last Delivery				
Natural	0.046	0.010	0.001	0.000
Caesarean	–	–	–	–

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