Do Child Care Costs affect Labor Market decisions? Evidence from Italy*

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Abstract

In Italy the participation of women has not increased very much in the last few decades relatively to other countries and it is still among the lowest in Europe. The female employment rate stands almost 13 percentage points below the EU average and 22 below the Lisbon target. One of the most important reason is related to the characteristics of child care system.

In this paper we analyze the characteristics of child care system in Italy and its relationship with women participation to the labor market. In the first part we propose a simulation exercise which shows the impact of possible changes in the availability, cost, and hours of service of the child care system on the labor supply of mothers.In the second part we present the results of an explorative econometric analysis of labor supply and child care use, using Bank of Italy (SHIW) data.

J.E.L Subject Codes: J2, C3, D1.

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1 Introduction

One of the important long time trends in the labour market in most OECD countries has been the increase in the proportion of parents at work. A growing proportion of married families became dual earner families as well as a growing proportion of lone parents are working.

As a consequence of the composition in the labor force child care and child rearing task have been partially reallocated. Since a larger portion of mothers of young children are now in the labor force the issue of child care has been receiving increasing attention.

The increase in the incidence of non- parental child care has been object of study since the mid 1970 in the US, UK and Northern Europe, much less in Italy where it received only recently some attention.

One reasons is related to the Italian employment trend: only a relatively low proportion of women are working relatively to most European countries. As Fig 1 shows the growth of women participation has been lower than in other advanced countries (see for analyses of this trend Del Boca and Tanda 2000, Del Boca Locatelli Pasqua 2001).

The second reason is due to serious data limitations. The ISTAT Multiscopo survey contains several information relative to child care but does not provide information on family income, wages etc. The ECHP (European Community Household Panel) which has the advantage to be comparable with several European countries, contains only a very limited number of information on child care. The Bank of Italy Survey (SHIW) which is the most complete micro-survey on income and wealth of Italian households do not provide information on child care. Only in 1993 it contains a special sections with information on child care use, cost, and quality, but the sample is quite small and concerns only that particular year.

In this paper we first want to analyze some important problems in studying the effect of child care costs on participation. What is complicated about this relationship in general? Child care is a good with several characteristics (quality, hours, etc): the difficulty in the analysis of the effect of price on labor supply is that households face a menu of prices which depend on several characteristics that are related to the households demand, for example how much they want to work (demand for heterogeneous product). There are several reasons why it is even more complicated in Italy. First of all the child care system is rationed in terms of places available especially in the

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Southern areas of the country, second it also rationed in the terms of hours of child care service, creating many difficulties for women who have a full time activity.

2   Previous Research

A number of researchers have attempted to estimate the behavioral effects on various family decisions of changes in income wage rates and the price of child care. Research on the effect of child care on participation in the US, and the UK focused on the effect of costs (Heckman 1974, Blau Robins 1988, Connelly 1992, Ribar 1992 among others). These studies used different metodologies to estimate child care costs taking into account for endogeneity problems.

Heckman (1974) did not have information on child care costs and he explicitly estimates a child care price function which incorporates measures of the availability of child care and its costs. Blau and Robins (1988) included a regional average of day care expenditure, but did not control for household specific information such as the age of the youngest child. Connelly (1992) used predicted expenditures as an instrument for child care costs in a subsequent labor force participation equation. The cost instrument controlled for regional variation and family characteristics. Ribar (1992) using a more structural approach, considers expenditures per hour of care per child as its measure of child care costs.

Generally these studies have found that family behavior is significantly influenced by child care policies. Blau and Robins 1988 estimate child care price elasticities for married women of -.38 with respect to labor supply and -.34 with respect to the demand of formal child care. They found that if the child care price were zero 87 percent of the mothers would work. While Blau and Robins use the characteristics of the average women in the sample, Connelly uses the effects of change on each woman in the sample. She found also substantial labor supply effect: if universal no cost child care were available, the model predicts that 68.7 per cent of women would be employed. Ribar (1992) found much larger elasticities for both labor supply and the demand for child care. The results of all these studies show that child care costs are a very important variable. Jenkins and Symons (1995) analyzing UK data for single mothers, found similar results.

A quite different situation is the one emerging from Northern European countries. Gustaffson (1994, 1995) have consider explicitly the implication of the child care supply constraints on women labor supply decisions, in comparison with other countries. Gustaffson and Stafford (1992) investigate the responsiveness of the decision of women to work and use public child care use in response to variation in these fees, availability of places and spouse income in Sweden[1]. They found that in areas in which child care places do not appear to be rationed higher fees significantly lower the probability of mothers' market work and public child care choice, while in areas where rationing is more severe there is little evidence of such price effects.

Studies analyzing data regarding Italian child care report quite different results. Del Boca (1993) have analyzed a model similar to Blau and Robins and estimate the effect of child care costs on participation of married women considering both part time and full time and the choice of public and private child care systems [2]. The estimation of the relationship between child care costs and labor supply shows that a reduction in child care costs increases the probability of mothers' part-time employment, but has a less significant effect on the probability of working full time. These results raise some concerns, given that part-time employment opportunities are in such a short supply in the Italian labor market[3]. Chiuri (1999) using Bank of Italy 1993 analyze the demand for child care exploiting also the information concerning child care quality. Her estimates show a strong interdependence between the time use of households members as substitutes for the lack of flexibility and the scarcity of public-provided child care services. Using a different data set, this study arrives to similar conclusions as Del Boca (1993) that is household labour supply depend on child care availability rather than its costs.

Table 1 reports and summarizes the signs and the significance of the coefficients of child care on labor market participation. The different results

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[1] Sweden is by far the country among the Northern European countries where the quality of child care is higher and the availability is greater. The participation rate of mothers is also higher (fig 6).

[2] Given the lack of national sample containing information on child care use and costs it has been used a local data set on the Milan area.

[3] Empirical studies employing cross-country data have found a high correlation between the proportion of part time jobs and the participation rates of women, in particular married women with children (Meulders and Plasman 1994). The low proportion of part-time does not seem to be coherent with self-reported preferences.

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reflect certainly important institutional characteristics of the countries.

In the last few years there has been an increasing interest in the effect of institutions (social policies and labor market regulations) on labor market decisions. It has been noted that Italy shares with some other European countries the characteristics of the so-called "Southern model": the lowest level of social protection (especially social expenditures for families and children) and the strictest employment regulations, which together require the family to provide essential "social" services (Ferrera 1996, Saraceno 2000, Bertola et al 1999). Gornick, Meyers and Ross (1997) have used the Luxembourg Income Study to analyze the effect of various policies that support employment for mothers of young children. While Italy is ranked quite high for policies for mothers with children between 3-6 is ranked quite low for policies for mothers with children under three. Bradshaw et al (1997) ranked several countries (using a index (between 1 to 17) for the income support provided to families with children and Italy is ranked 10.3, Spain 12.8 and Greece 14.3, while Denmark is ranked 7.0, France is ranked 3.7, Sweden 5.3.

Cross-country data show that where public support for children is the lowest, women's participation rates are also the lowest. Figure 2 show the public expenditure on family benefits per cent of GDP (in services and cash), that shows that in Italy the cash and service transfers are among the lowest of Europe. Confronting 1980 and 1997 we see that the cash transfers decline between 1980 and 1997, while the service increased of small proportion. This pattern is very different from countries such as France, Sweden, Denmark where it increased or stay constant[4]. Some studies have defined the Southern model as a family care model in which the family acts as the explicit partner of social policies, which largely operates as a mediator of the difficult relationships between rigid labour markets and limited income maintenance systems (Antonnen Sipilla 1996).

Recent analyses have tried to discuss the implications of the Southern model (relative to others welfare models) for women's and children's welfare. They show how the relationship between the family and social policies in Mediterranean countries have contributed to the worsening position of women and children. Women work less than in the rest of Europe, have less children

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[4]Recent research has stressed the particular characteristics of the Italian welfare system (based on private transfers to older people rather than the availability of unemployment benefits) affect negatively fertility increasing the children's age of departure from the parental home.

than they want and their children well-being is lower than in the rest of Europe. According to Micklewright and Stewart (1999), children's welfare is lower in Italy (Spain and Greece) than in the rest of the European Union and did not seem to have converged to the EU better performing countries in the last few years.

The efforts of Italian families to compensate for the lack of public support and inefficiencies of the labor market and service sector do not seem to be enough. Interventions in reductions of the costs of children should be a basis for reducing the burden on the family (Ferrera (1996) and Addabbo (2001) analyze the positive experience in family welfare mix of Emilia Romagna where expanded child care with longer hours and more flexibile schedules have contributed to encourage women work. In the next section we describe in greater details the characteristics of the Italian child care system.

3   The Child care system in Italy

While in Anglo-Saxon countries where a private provision and financing of child care prevails, the costs of child care are an important variable affecting women participation, in Italy where there is a mixture of private and public, the costs do not seem to be a significant variable.

In the US and UK there is very diverse set of the child care arrangements in terms of type and costs. This diversity which can offer more choice to parents creates difficulties for the study of price responsiveness because of the product heterogeneity and unmeasured quality differences in this market. In Italy as in other European countries (such as Sweden) a high quality child care is available and quality levels are set nationally so that the common problems of unmeasured quality differences in the child care market is of less concern.

In Italy, however the public child care price is very heterogenous across areas. Costs differ from one municipality to another, because the structure of the subsidy and the number of spaces is set by the local government. Differently than private child care, the costs of public child care depend on family size (as well as on family income and family composition). Figure 3 shows that the cost of public child care is lower for larger families in all areas. Important differences characterize also public child care for children > 3 and greater than 3. First of all, the costs of child care for children less

than 3 years of age are much higher on average than the costs of child care for children > 3, for both public and private (Bank of Italy 1993, both in cases of part-time or full-time services) (Fig 4).

Other differences concern the availability of public care. While the public child care for > 3 is used by 95 per cent of children, the child care for younger than 3 is used only by 6 per cent of the population of children <3 (Figure 5). Because of this we focus mainly child care for less 3 crucial for labor market decisions.

The child care system for younger children is rationed in two ways. On one hand, the number of places available in the public sector are rationed. On the other hand also the hours of public child care are rigidly set and have a limit of 7-7.5 hours a day (Saraceno 2000). The child care for children 3-5 is rationed only on the number of hours available.

Given this characteristics public child care is not designed to accommodate full time market work of both parents. This has affected negatively the growth in the participation of mothers with younger children which has been much more limited than in other advanced countries (Figure 6).

While the availability of child care for children older than three is very uniform across regions, this is not the case for children under three. There are marked differences across regions. The proportion of children less than three years of age in public child care is over 20% in some areas of the North and only 1-2 percent in most Southern areas (this ratio is the number of places available divided by the population 0-3 years of age).

Different accessibility rates have created a situation of more significant rationing of child care in some areas of the countries especially in the South of Italy. In those areas women find difficult to find a job and are unemployed or work in the underground economy.The public child care < 3 is therefore rationed in two ways:

- in the number of places available (fifty per cent of children on average are not accepted)

- in the hours of care offered (max 7 on average relatively to 12 in private care).

Given the existence of these two types of rationing many methodological problems arise: the price of public care (and the probability of obtaining the

place) depends on several family characteristics (income, marital status), but also on the characteristics of the other households applying for a place in child care in the same area. Hours of work and child care type have to be chosen simultaneously. In the next section we discuss the potential effects of child care characteristics on mothers' labor supply.

4 Labor supply and child care characteristics

The analysis on the child care policy on labor supply is related to the availability and costs. In this section we will discuss some issues of measurement as well as the relationship among them. The issue of child care cost centers on family's ability to pay.

The analysis of availability focuses on the family's ability to find appropriate child care: shortage of child care options in terms of types schedules, location limits the use. Availability is related to the child care costs: the constraints that parents face in finding a child care is often a problem of finding care at a price that the family can afford to pay. Another important connection with child care cost is related with the fact that the distance from a child care places (especially in areas where the number of services is limited relatively to demand) increases the total costs of child care. The considerations on the child care supply availability imply that the child care price effects should be observed only in areas in which the supply constraints is not binding (Gustaffson and Stafford 1992). The issue of child care availability is particularky relevant especially in countries with low birth rates. In fact for example in a country like Italy where the average number of children is on average only one and a high proportion of children grow up without siblings, the purpose of child care is not only supervision and care but also essential socialization opportunity (Saraceno 2000)

Child care costs become part of the family decision making in two ways. First child care costs can be thought of as a part of the cost of rearing a child and so affect decisions in which the cost of children is a relevant factor. In addition child care costs lower the mother effective wage in the labor market and thus affecting decisions for which the mother wage is a relevant factor. The higher the cost of child care, the higher the cost of an additional child. This leads to the prediction that higher child care costs will tend to lower fertility(Cigno 1991, Ermisch 1989). Given the relationship between child care costs and availability on one hand the difficulties of accessibility given by lack of availability would increase the potential costs of using child care and would have a negative effect on fertility (Del Boca 2002).

Once the fertility decision has been made the major impact of child care costs is on the wage of the working mother. The reasons are that in most families mothers are the members of the families with the lowest earning. Assuming that women are the principal caregiver in the household, the mother

bases her decisions on the costs and benefits of working in the labor market and these will depend on her wage minus the cost per hour worked of child care. Increasing the cost of extra-family child care decreases her effective wage.

A decrease in her effective wage decreases the probability of participation in the labor market. If she is still participating a decline in her effective wage has two offsetting effects on the number of hours she will work. A decrease in the wage lowers the amount of family income, which has the effect of increasing the number of hours she will work in the market. But the decrease in the wage lowers the value of an extra hour spent in the labor market relative to the value of an extra hour spent at home. So the number of hours of work should decrease as the cost of child care increases. In order to illustrate the impact of child care characteristics on women labor market participation, we propose a simple model of mothers' decision to work and use child care.

5   Behavioral Model

Assuming that women are the principal caregivers in the household, the mother bases her decisions on the costs and benefits of working in the labor market and these will depend on her wage minus the cost per hour worked of child care.

Assume that only women who work use child care and that hours of work coincide with child care time. Assuming the wife's utility function is of the Cobb-Douglas type,

$$U = \alpha \ln L + (1 - \alpha) \ln C,$$

where leisure is denoted by L and consumption is given by

$$C = Y + (w - \pi)(T - L).$$

The price of child care is denoted by π and the gross wage rate is w. Throughout we assume that the husband's labor supply is predetermined and that his earnings are included in the wife's nonlabor income Y.

The two regimes of child care public and private are characterized as follows.

1. There is an income limit for public child care. We assume that eligibility is based on other family income Y (instead of a limited number of slots available). To be eligible requires that $Y \leq \overline{Y}$.

2. If a woman uses public child care she can use it for no more than $\overline{h}$ hours per time period.

3. The direct cost of public child care is less than private child care, with the hourly prices given by $\pi_p < \pi_m$.

The wife's optimization problem can be analyzed as follows. First compute the maximum utility she would realize under either regime.

The value of choosing public child care is

$$V_p(Y, w, \alpha) = \max_{T - \overline{h} \leq L \leq T} \alpha \ln(L) + (1 - \alpha) ln(Y + (w - \pi_p)(T - L))$$

The value of choosing private child care

$$V_m(Y, w, \alpha) = \max_{L \leq T} \alpha \ln(L) + (1 - \alpha) ln(Y + (w - \pi_m)(T - L))$$

Consider first the choice problem under public child care. Leisure demand is determined as follows. Let the "latent demand" for leisure under this regime be denoted

$$L_p^* = \alpha(Y + (w - \pi_p)T)/(w - \pi_p)$$

without imposing the hours constraint. Then the actual leisure choice $\hat{L}_p$ in the presence of the constraints is equal to:

$$\hat{L}_p = \begin{cases} T & \text{if} \quad L_p^* > T \\ T - \overline{h} & \text{if} \quad L_p^* < T - h \\ L_p^* & \text{if} \quad T - \overline{h} \leq L_p^* \leq T \end{cases}.$$

"Latent" leisure demand given private child care choice is given by:

$$L_m^* = (Y + (w - \pi_m)T)/(w - \pi_m),$$

and the observed leisure choice will be

$$\hat{L}_m = \begin{cases} T & \text{if} \quad L_m^* > T \\ L_p^* & \text{if} \quad L_m^* \leq T \end{cases}.$$

Then the maximum value associated with each child care type is simply

$$V_p = \alpha \ln(\hat{L}_p) + (1 - \alpha) \ln(Y + (w - \pi_p)(T - \hat{L}_p)$$

for public child care and

$$V_m = \alpha \ln(\hat{L}_m) + (1 - \alpha) \ln(Y + (w - \pi_m)(T - \hat{L}_m).$$

We cannot say that a woman will choose public child care if $V_p > V_m$ because a public child care choice is only possible if $Y \leq \overline{Y}$. If $Y \leq \overline{Y}$ then the household chooses the public child care option if $V_p \geq V_m$. Thus, assuming that the woman works, the choice between public and private child care is given by

$$d = \begin{cases} 1 & \text{if} \quad \chi[V_p > V_m]\chi[Y \leq \overline{Y}] \\ 0 & \text{else} \end{cases},$$

where d equal to 1 denotes public child care and 0 denotes private child care. Since V_p and V_m both depend on all of the parameters of the problem, it is clearly the case that the observed price of child care that a household pays is endogenous. Because there also exists hours restrictions, households even if eligibile, may not use public child care because they want to work more hours than the ones allowed by the public system. As a consequence, the price of child care is not exogenous with respect to household characteristics. Eligible households face a *menu of* prices, as in the nonlinear taxation case (e.g., Colombino and Del Boca 1990). This implies that the price and hours chosen are jointly determined both depend on some common factors : Y, w, and the α preference parameter. Therefore we need to use a model which takes into account the endogeneity of child care costs.

6 Simulation Results

In order to simulate the effects of several characteristics of the child care system, eligibility, hours of service and child care costs we use information from the Bank of Italy data to set the values of Economy 0, our baseline in terms of values per day.We set the value of upper income $\overline{Y} = 80$ as an indicator of eligibility/availability. The hourly price of public care $\pi_p = 4.5$ (thousands of liras). The hourly price of private care is set at $\pi_m = 6$. The maximum hours of public child care is set at $\overline{h} = 7$ hours a day.The preference parameter α is drawn from a power function distribution with a cumulative distribution function give by $F(\alpha) = \alpha^\beta$, $\alpha \in (0,1)$, $\beta > 0$.

We create a "data set" of 10000 simulated cases. For each case, we first use a pseudo-random number generator to choose a value of α for that case. We then generate two lognormally distributed (pseudo) random numbers (that are not independently distributed) to to represent family income and the wife's wage rate. The values of bivariate lognormal parameters used in the simulations we chosen to roughly reproduce the empirical distributions observed for working women in the Bank of Italy sample. We then run three simple experiments:

- Economy 1 increase in the upper income for child care eligibility.

- Economy 2 increase in the hours limit.

- Economy 3 increase in public child care price.

Table 2 shows the elasticities of hours of work and (child care) for families who use public child care, private child care, and for the total. The elasticity of hours of work to changes in the eligibility criterion, changing the upper income from 80 to 100, is positive for households who use public child care, while it is negative for households who use private child care. The total effect is positive but quite small. Increasing the eligibility criterion increases the number of hours supplied by mothers.

The hours elasticity to the change in the hours of public child care service is again positive for public child care users $\varepsilon(\mathrm{h}_p)$ and negative for private $\varepsilon(\mathrm{h}_m)$ with a positive total effect. Increasing the hours of service induces women using public child care work to work more hours and increases the number of women using public child care.

Finally, an increase in public child care prices reduces the hours of work (and child care) for women using public child care, while it increases the hours of work and service in the private sector. In terms of total hours, public child care prices have a disincentive effect, while the increase in the eligibility criterion and the hours restriction has a positive one.

Table 3 shows the effect of the changes on characteristics of the populations choosing the various types of child care. As a result of experiment 1, the average income of households who use public child care, Y_p, increases since households with higher earnings now can use public services. The preference parameter distributions do not change markedly. As a result of the second experiment (increase in hours of public child care service) we notice no large effects on average household income while there is some important change in the preference parameter distribution. The reduction of the preference parameter of households using public care α_p arises from the fact that more women with low α (high preference for work) now choose public child care given that it is still cheaper and the hours of services are more compatible with full time work.

As a result of the third experiment (the increase in public child care price) we observe instead an increase in the average preference parameter of mothers who use public child care. This is the result of two effects: some women with low α may leave the market since it has become more expensive than the use of subsidized child care. Some women with low α now choose private child care given that the price of private and public are about the same and the first does not have hours restrictions.

In the next section we propose an explorative analysis on the effect of child care availability and costs, as well as of informal child care possibilities, on the labor supply of women in the Bank of Italy data.

7 Methods and data.

Unfortunately none of the data sets available on Italian households (Bank of Italy, Multiscopo, ECHP) allow us to produce an analysis that is totally coherent with the model and the simulations described above. Most importantly, we have access to information on child care hours of service in only one of these data sets. However, in this data set (Multiscopo) there is no information on household earnings and income.

The Bank of Italy's Survey of Household Income and Wealth contains detailed information on the incomes and wealth of family members, several characteristics of the workplace (such as wages and hours of work), and socio-demographic characteristics of the household (ages of the family member and the number of children). However, only in 1993 does the Bank of Italy survey collect information on child care use, child care costs, and quality of public and private services (but no information is available on child care hours). We merge the 1993 dataset with regional information about availability of child care places and part-time opportunities to partially compensate for this lack of information (as well as for use as instrumental variables).

To be in the sample used for analysis, households had to consist of married adults with at least one child of pre-school age. Only 12 per cent of married couples in the Bank of Italy survey in 1993 have children of pre-school age. This small percentage is a result of the low fertility rate in Italy (see Del Boca 2001 for an econometric analysis of the fertility decision in the Italian context). The geographic distribution of our final sample has 44 percent of households from the South, 20.4 percent from the Center, 19.7 percent from the Northwest, and 16.6 percent from the Northeast. In terms of labor market participation rates of the wives and mothers, 46 percent of the sample works (almost twice than the national figure). Women with pre-school children have a higher variance in working hours than men (given a positive number of hours), indicating that jobs with more flexible hours are occupied by women with pre-school age children.

Regarding child care utilization, the low proportion of private child care availability did not allow us to consider them separately (93% of total child care is public). We note that only formal child care is reported (which does not include child care provided by relatives or friends, for example). Fifty percent of the selected sample use formal child care. Among families with children less than three years of age, 34 percent of households use child

care. Of the working mothers (46 percent of the sample) around 43 percent use child. The fact that this percentage is relatively low (in comparison to U.S. figures, for example) indicates the potential impact of the constraints presented by the high degree of rationing in access to public child care and the limited hours available to those mothers who acquire access. Table 4 reports descriptive statistics for the variables used in the empirical analysis.

We use a bivariate probit model to estimate jointly the probability of working and using child care. Given previous results (Colombino and Del Boca, 1990) that have shown a very low responsiveness of hours of work to all measured variables (given the prevalence of full time jobs in the labor market), we use participation instead of hours of work (see Del Boca (1993) for an analysis of the choice between part-time and full-time employment). The dependent variables are whether the wife is working at the time of the interview and whether or not the household uses child care.

One important problem that we face in the estimation is the issue of the endogeneity of child care costs. Since we would like to consider the two equations as constituting a (partial) demand system for the household, naturally we would like to include the parameters that define the households choice set. These include the prices of child care, both public and private, as well as any limitations on the uses of these services by a specific household. Since we only have child care costs paid by the household, this is not primarily a measure of the price but instead measures utilization. To get around this endogeneity problem, we use regional child care costs as an instrument (although certainly a very imperfect one).

The variables utilized in the analysis include:

Personal Characteristics: Wife's age, family income (total income minus wife's labor earnings), and the number of children living with the family.

Family Support: Unfortunately no information is available on informal child care use. We use a variable indicating whether one of the parents of the wife is still alive (as a proxy for potential informal child care). We also use a variable related to the transfer the family has received from relatives during the year of the interview as a proxy for family financial support.

Child Care System: As an indicator of the characteristics of the child care system,we use the ratio of the number of child care places available (for children under 3 years of age) to the number of children 3 years of age or less by area of residence in 1993. To test for the relevance of the rationing

in child care we use as a proxy a dummy variable (NW) indicating that the household is situated in one of the three regions in which the availability of child care is greatest (Piedmont, Lombardia, Emilia Romagna) in which the availability of child care is greater (see Table 5).

Labor Market: As an indicator of the probability of locating a part-time job, we use the ratio of the number of part-time jobs to total employment in the region.

8 Empirical Results

As discussed in the description of the child care system in Italy and given the model we have constructed, we can expect that the price of public child care may not "significantly" influence its use since for many regions there is a rationing of spaces. Only for less rationed areas would a clear impact be expected. Conditional on other household characteristics, such as family income, we will assess whether the costs of child care have a larger (negative) effect on its utilizations in regions where rationing of spaces is less severe.

In Table 6 we present the estimates from a specification in which regional child care costs (as a proxy for price) are not interacted with our availability indicator in either the participation or child care utilization function. The price of public child care in the region does not have a significant impact on either choice. Instead, the other regional variable that indicates the availability of part-time jobs, has a very significant impact on both the participation decision and the child care utilization decision. Households living in one of the three selected regions (i.e., $NW = 1$) have a significantly higher probability of working and using child care, though as it stands there is no rationale for why this is the case (aside from different preferences, perhaps).

In terms of personal characteristics, we see that more highly educated women are more likely to work and to use child care. Higher household income is associated with lower participation rates (the standard income effect), though higher household income is also associated with increased utilization of child care, possibly arising from a higher level of demand for leisure free of child care burdens by mothers from wealthier households. Older mothers of young children are less likely to work or to use formal child care.

Households in which the wife has at least one living parent have a higher probability of work and a lower probability of using formal child care, indicating that these households may be using parents as substitutes for formal child care. Those receiving family transfers tend to work more, which may indicate that such transfers are provided to help subsidize child care usage or may simply indicate that individuals with substantial financial commitments, like mortgages, may be more likely to work and receive transfers to help in meeting those commitments.

In Table 7 we reestimate the model after including an interaction term between regional child care cost and residence in the "high child care provision" areas. A likelihood ratio test indicates that this model is preferred

with respect to the one without this interaction term. Most of the coefficient estimates are relatively similar across the two specifications with a few notable exceptions. The child care cost variable interacted with residence in the three region area ($NW = 1$) has an associated coefficient that is negative and significant, whereas the "main effect" of child care costs continues to be insignificantly different from zero. This is consistent with our argument that the price matters only when rationing is not severe. Moreover, the "main effect" of living in one of the three high availability regions is drastically reduced in size, though the coefficient estimate remains signficantly different from zero. This could indicate that the main reason that people living in these three regions have higher participation rates and utilization rates of child care is because supply is greater, a conclusion quite consistent with competitive market models.

9 Conclusion

In this paper we analyse the effect of child care system characteristics on women's labour supply decisions. The availability of affordable child care has been identified by policy makers and social scientists in most countries as one of the most important preconditions for high levels of married female participation in the labour market.

The characteristics of the Italian child care system are peculiar. While the quality of public child care is quite high in general, and fairly homogeneous across regions, availability is both limited and heterogenous (with respect to household characteristics such as income and area of residence). Public child care, although partially subsidized, lacks both local availability and flexibility in the hours of service. Therefore it is hardly compatible with the full time employment opportunities supplied in the Italian labor market. Child care costs are subsidized to a different extent depending on the municipality. To analyze the effect of child care on mothers' labor market participation decisions in the Italian context we need to take into account the effect of rationing of services.

Our results indicate that labor force participation of women with children are affected by child care availability as well as the availability of informal child care. The availability of family support, both in the form of transfers and in the form of presence of parents of the wife both increase the probability

of market work of mothers. Child care costs are significant only in areas where child care is not severely rationed.

The empirical results seem to indicate that policies which would reduce the financial burden on the Italian family by providing an expansion of the child care system as well as more flexible working hours choices could have a large positive impact on the labour market parcipation rate of mothers with young children.

Table 4
Descriptive Statistics
(Means and Standard Deviations)

Variables	1993
Participation	48.0
	(.367)
Family Income	45.490
	(27.603)
Age of the Wife	36
	(12.5)
Family Transfers	3.149
positive values	(1067)
Number of Children	1.93
	(1.11)
Wife Schooling	11.44
	(4.5)
Public Child Care availability	8.43
	(7.7)
Parents Alive	88.7
	(37.7)
Public Child care costs	346
	(.370)
N. 0-2	0.66
Part time	6.88
	(4.77)

Table 5
Child care and Part time by Region

Regions	Child Care	Part Time
Piemonte	18.1	7.8
V. Aosta	14.0	7.8
Lombardia	17.9	8.9
Trentino	13.7	8.0
Friuli-Veneto	9.9	7.0
Liguria	10.1	6.5
Emilia	28.0	7.3
Toscana	12.2	7.5
Umbria	11.9	7.1
Marche	13.5	5.6
Lazio	10.2	5.9
Abruzzo	7.0	5.4
Molise	2.4	3.9
Campania	1.0	4.7
Puglia	4.0	6.5
Basilicata	5.8	6.0
Calabria	1.3	6.91
Sicilia	3.4	6.7
Sardegna	5.8	6.3

Table 6
Participation and Child Care Decision
(Asymptotic Standard Errors in Parentheses)

Variables	Participation	Child care
Family Income	-.198	.256
	(.032)	(.111)
Family Transfers	.117	.113
	(.045)	(.017)
Age	-.038	-.030
	(.013)	(.014)
Child care costs	-.232	-0.496
	(.267)	(0.336)
NW	.346	.358
	(.110)	(.102)
Part-Time	.316	.224
	(.120)	(.088)
Schooling	.167	.230
	(.049)	(.038)
Parents alive	.268	-.216
	(.056)	(.044)
Constant	4.506	4.906
	(3.216)	(3.236)
Correlation coefficient (ρ)	0.399	(0.287)

Table 7
Participation and Child care decision
(Asymptotic Standard Errors in Parentheses)

Variables	Part Time	Child care
Family Income	-.182	.225
	(.032)	(.221)
Family Transfers	.111	.113
	(.040)	(.097)
Age	-.032	-.025
	(.006)	(.006)
Child care costs	-.150	0.356
	(.135)	(0.546)
Child care costs*NW	-.213	-.219
	(.099)	(.070)
NW	.046	.050
	(.010)	(.022)
Part-Time	.356	.323
	(.060)	(.062)
Schooling	.165	.233
	(.016)	(.017)
Parents alive	.234	-.245
	(.121)	(.123)
Constant	2.906	3.906
	(1.416)	(2.144)

Correlation Coefficient (ρ)   0.302 (.177)

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Table 1

Effects of Child care costs on labor supply

|	
Blau Robins 1989	Positive and Significant
Connelly 1992	Positive and Significant
Ribar 1992	Positive and Significant
Jenkins and Symons 1995	Positive and Significant
Gustaffson Stafford 1992	Significant only in areas not rationed
Chiuri 1999	Non significant
Del Boca 1993, 2001	Significant only on part time

Figure1

Female participation rate in European countries
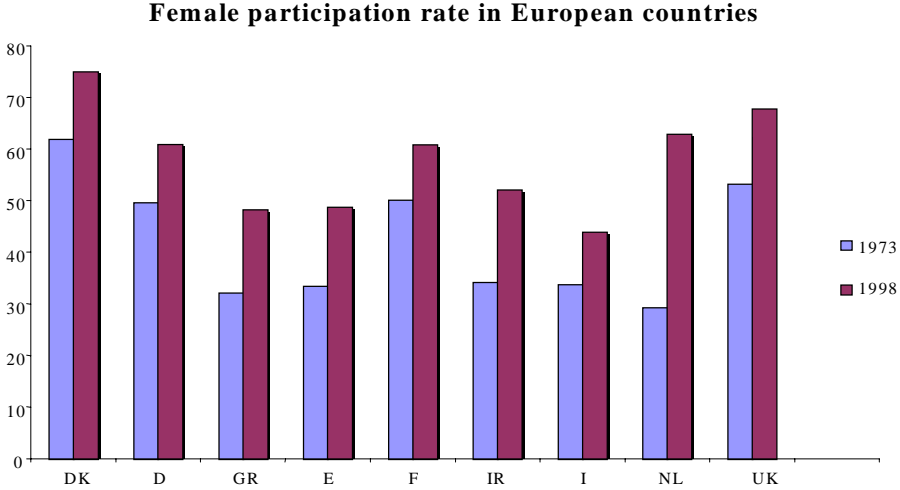
Figure 2
Gross (before tax) public expenditure on family benefits, per cent of GDP [1,2]

	1980	1997
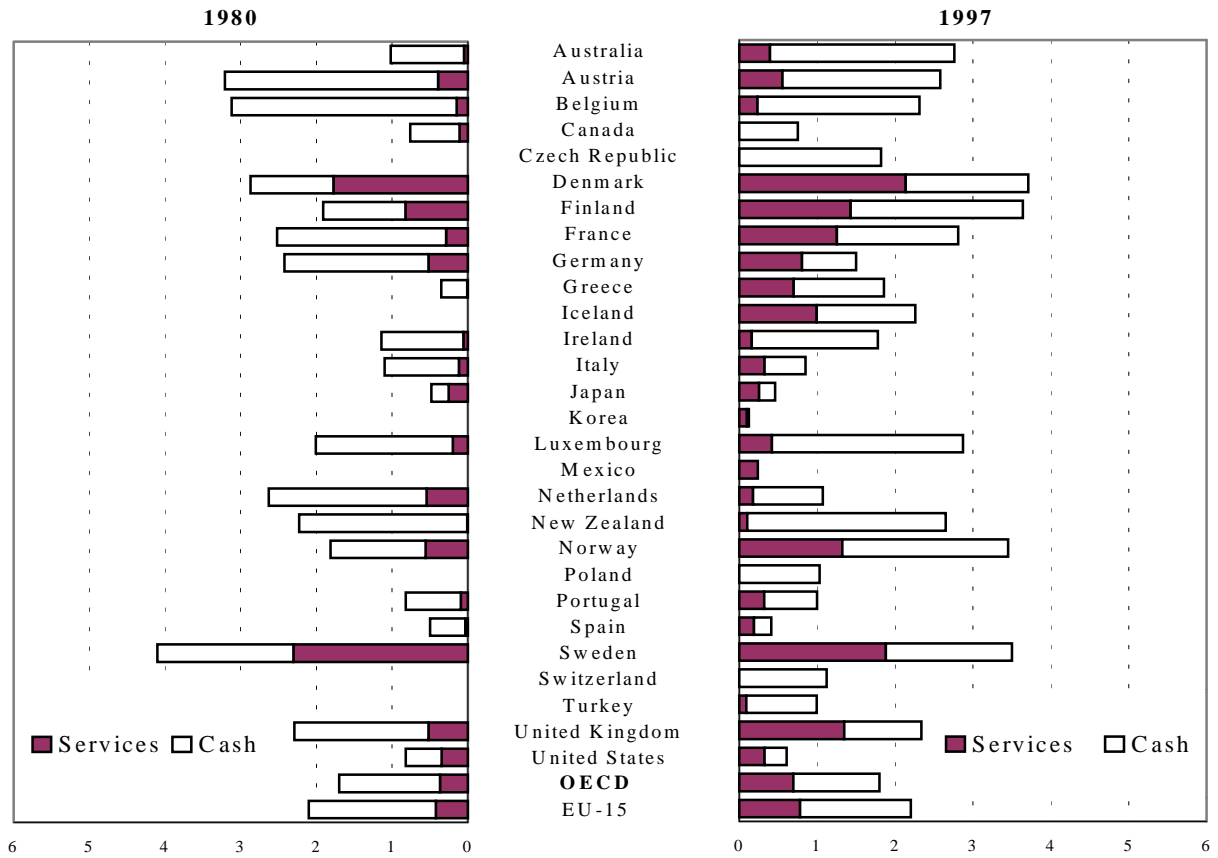
Figure 3   AVERAGE CHILD CARE COSTS FOR CHILDREN BY NUMBERS OF FAMILY MEMBERS
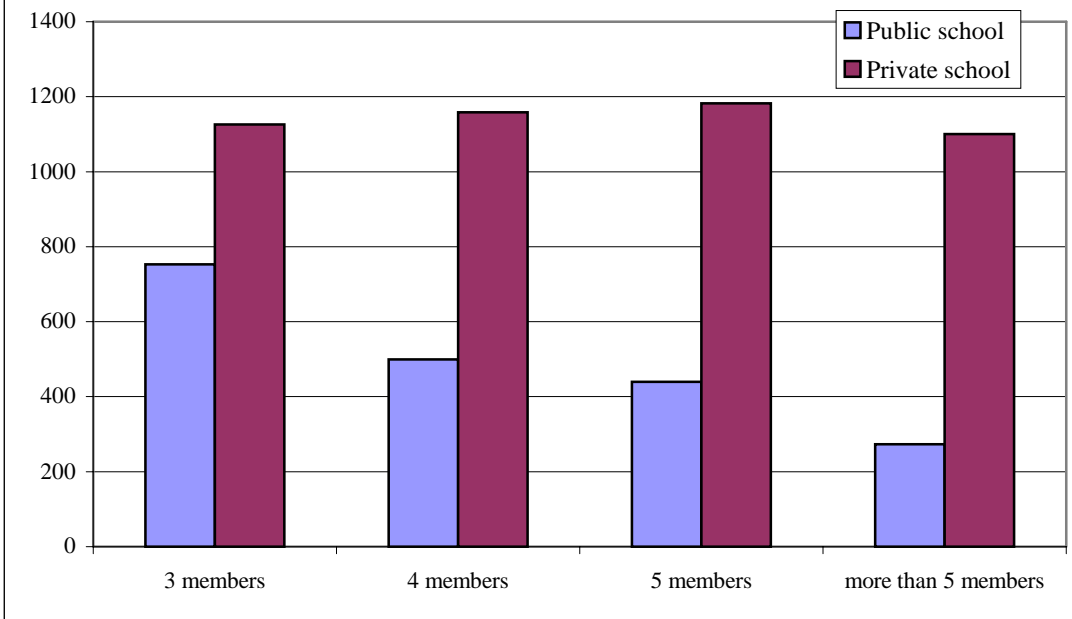
Figure 4 AVERAGE CHILD CARE COST PER YEAR FOR CHILDREN < 3 YEARS (in thousand ITL)
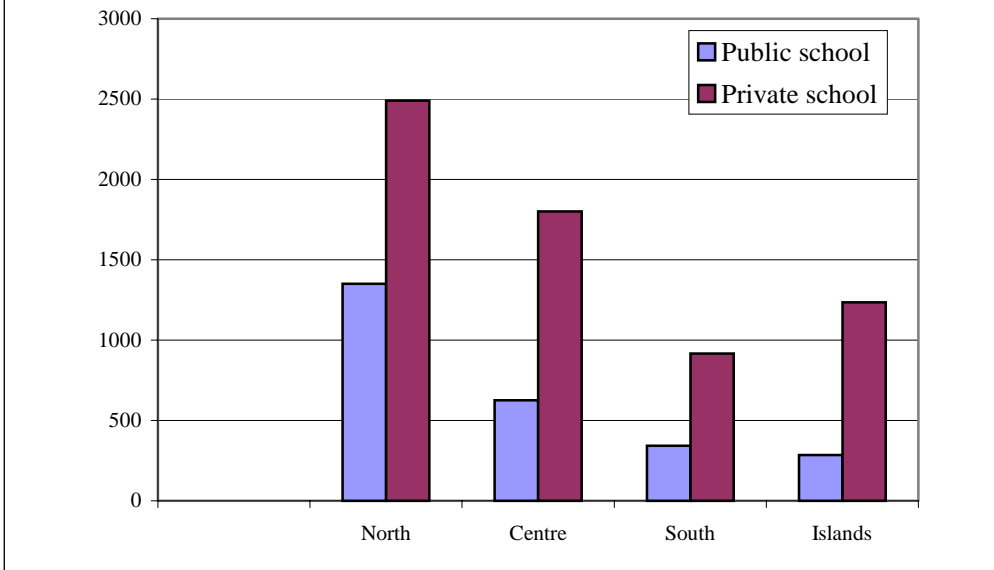
Figure 5 Proportion of children using public child care
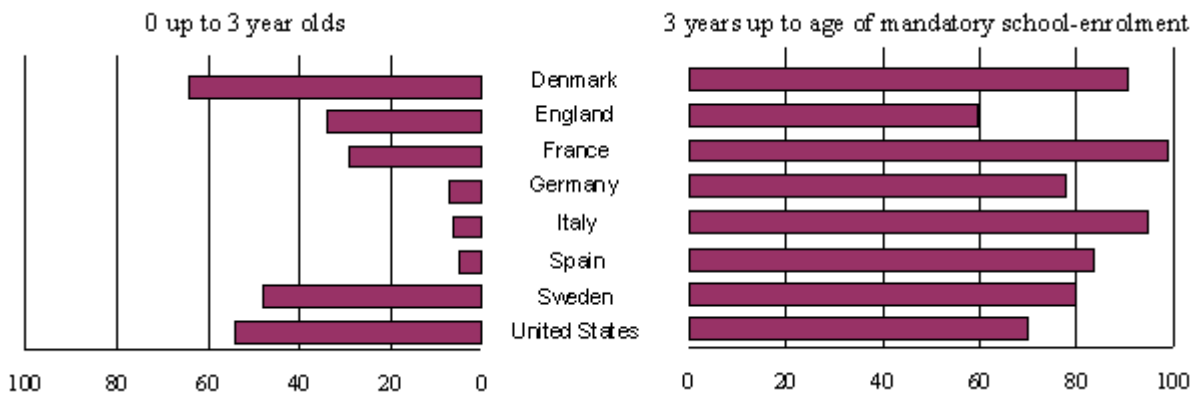
Figure 6 Proportion of Employed Mothers with young children 1989-1999.

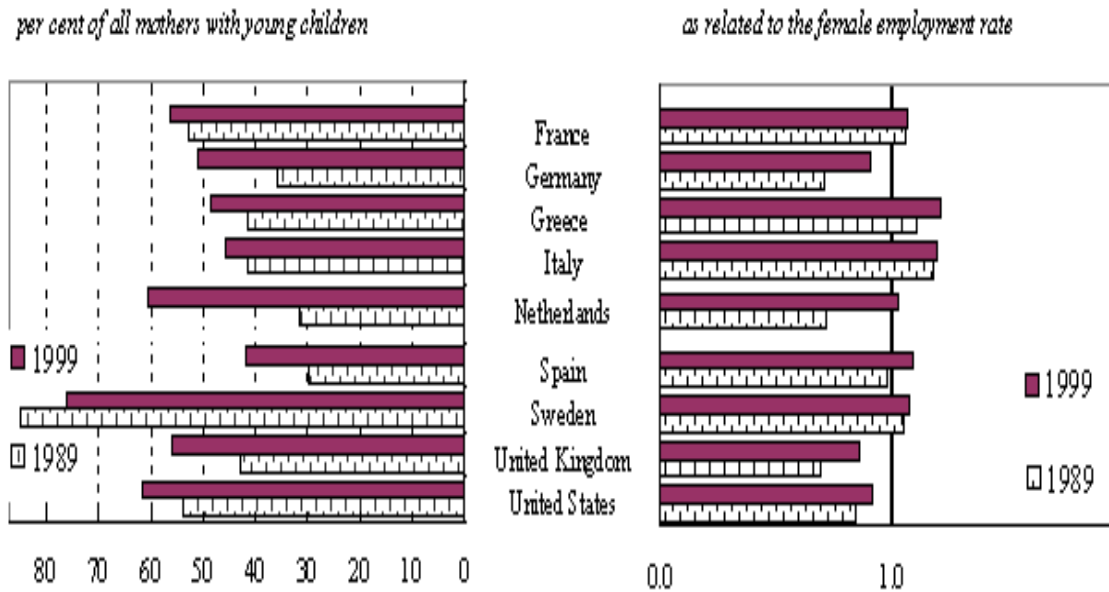*per cent of all mothers with young children*

as related to the female employment rate

France
Germany
Greece
Italy
Netherlands
Spain
Sweden
United Kingdom
United States

1989

80 70 60 50 40 30 20 10 0

0.0 1.0

1999
1989

Table 2

Elasticity of hours in public and private child care

	Parameters				Outcomes		
	Y	h	πp	π̄m	ε(Hp)	ε(Hm)	ε(H)
Economy 0	80	7	4.5	6			
Economy 1	100	7	4.5	6	.538	-.331	.018
Economy 2	80	8	4.5	6	1.609	-2.508	.199
Economy 3	80	7	5.5	6	-1.190	.785	-.194

Table 3

Effects on Sub-population Characteristics

Parameters					Subpopulation means			
	Y	h	πp	π̄m	Yp	Ym	αp	αm
Economy 0	80	7	4.5	6	40.041	202.021	.145	.076
Economy 1	100	7	4.5	6	46.408	213.915	.143	.071
Economy 2	80	8	4.5	6	40.55	217.255	.134	.082
Economy 3	80	7	5.5	6	41.310	181.959	.180	.082