The Determinants of Child Care Choice: an Analysis for the City of Seville[1]

Luis Palma Martos[2] y Cristina Borra Marcos[3]

2. PhD. in Economic and Business Sciences, University of Seville, Spain. Graduate in Economic and Business Sciences from the University of Seville, Spain. Titular professor of the Department of Economic Theory and Political Economics, University of Seville, Spain. Member of the Economic Analysis and Political Economics Research Group at the University of Seville, Spain. E-mail: lpalma@us.es
3. PhD in General Economics and Statistics, University of Huelva, Spain. Graduate in Economic and Business Sciences from the University of Seville, Spain. Member of the Economic Analysis and Political Economics Research Group at the University of Seville, Spain . E-mail: cborra@us.es

ABSTRACT

Child care choice matters constitute an important factor in parents' wellbeing. In this paper we explore child care choice from an economic perspective. Specifically, we are interested in analysing the determinants in the choice of child-care type.

To reach this goal, a theoretical model is presented which assumes that families attempt to maximize total utility. Next, an econometric conditional logit model is designed, which is then applied to a sample survey of Sevillian families.

Our findings reveal that the choice of child care type depends fundamentally on the age of the child, the amount of hours needed and the socio-economic level of the family.

Key word: Child Care, Demographic Economics, City of Seville, Spain.

RESUMEN

El asunto de la selección del cuidado de los hijos es un factor importante en el bienestar de los padres. En este artículo, exploramos la selección del cuidado de los hijos desde una perspectiva económica. Específicamente, nos interesa el análisis de los determinantes de la selección del tipo de cuidado de los hijos. Para lograr este objetivo, se presenta un modelo teórico que supone que las familias tratan de maximizar la utilidad total. Posteriormente, se diseña un modelo econométrico logit condicional que se aplica a la encuesta de una muestra de familias sevillanas. Encontramos que la selección del tipo de cuidado de los hijos depende fundamentalmente de su edad, de la cantidad de horas necesarias y el nivel socioeconómico de la familia.

Palabras clave: Cuidado de los hijos, Economía demográfica, Ciudad de Sevilla, España.

Clasificación JEL: J13.

INTRODUCTION

In this paper we examine child care choice from an economic perspective. We assume that families will attempt to maximize total utility in their use of this service. Our objective is to analyze the determinants that influence the choice of child-care type.

The maximization of utility requires knowledge of individual preferences and restrictions. We have conducted a sample survey in the city of Seville to obtain this information; nonetheless there is a common framework within which these choices are taken, which we will examine in the first two sections. The first considers how social transformations shape new individual needs and preferences. The second reflects on the institutional framework and its role in shaping restrictions. Section 4 presents the theoretical model. The data and variable construction are described in section 5. Empirical results are given in section 6. Finally, section 7 debates possible improvements and conclusions.

1. CHOICE PREFERENCES: SOCIAL TRANSFORMATIONS

Over the last decade there have been a number of important social transformations in European countries that determine the emergence of new social needs, in particular the trend towards an aging population, women's increased participation in the labour market, the expansion of new –reduced– family structures, lead to changes in the way families take care of their dependants.

Let us first take a look at the sociological framework in which care choices have to be taken.

Firstly, important **demographic changes** have taken place. The *high number of elderly people in the population* is a widespread phenomenon in western economies. The proportion of population aged 65 years and over has increased from 14.7% in 1991 to 16.7% in 2001 for European Union members. Spain shows an even more dramatic increase of three percentage points, which is remarkable for just 10 years. The sole exceptions to this trend come

from United Kingdom and Sweden. Table 1 shows rates for elderly people for selected countries in 2001.

This trend is also characterized by two circumstances: the aging of the aged, because of the increasing importance of elders aged 80 years or more, and the percentage of females in the population of elderly people. In Spain the number of women aged 80 years and over is double the number of men of that age (Cachón *et al*. 1998, 42). This increase in the relative weight attached to the population of 65 years or older is not only due to the generalized increase in life expectancy but also to the dramatic *decrease in fertility rates.*

Over the last decade fertility levels have fallen substantially in many countries of the European Union. The trend has been so dramatic that has determined the use of new terminology: 'lowest low fertility'.[4] The table 1 shows total period fertility rates for some countries. As can be seen, lowest low fertility levels are reported for most Southern European countries: Spain, Italy and Greece. All the countries however show figures below replacement levels.

Table 1. Social Transformations. Demographic Changes.

European Countries	Share of Elders (%)	Fertility Rates (%)
	2001	2000
Belgium	16.8	1.66
France	16.0	1.89
Germany	16.3	1.38
Greece	17.3	1.29
Italy	17.9	1.24
Spain	16.9	1.24
Sweden	17.3	1.54
United Kingdom	15.6	1.65
EU (15 countries)	16.7	:

Source: EUROSTAT and Billari (2004).

4. According to Billari (2004, 6), we use the expression 'low fertility levels' when fertility is below replacement, 'very low fertility' when fertility is below 1.5 children per woman, and 'lowest low fertility' when fertility is below 1.3 children per woman.

According to Billari (2004) these low levels of fertility are primarily explained by the word 'postponement'. In the new millennium, leaving the parental home, forming a new union, getting married and becoming a parent are experienced on average later than before. Spain can be seen as a clear exponent of this theory as average age for first birth was 29.1 years in 2000.

But postponement is not the only new socio-cultural trend. There is the emergence of **new family structures**, which were of marginal importance just a couple of decades ago. In the new Europe, more and more people are deciding to remain single, to cohabit with a partner or to divorce and sometimes start a new family. For example, the rates of marriage within the Spanish population as a whole have been clearly decreasing: in 1972 there were 7.63 marriages for every thousand people, but in 2001 there have only been 5.25 (INE 2003).[5]

Heuveline *et al*. (2003) have estimated the time spent on average by each child with specific types of parents. In particular, Table 2 shows the average time of the first 15 years that a child lives with a single mother in a maternal stepfamily, without the mother and with both biological parents.[6] International differences are remarkable. A child from Belgium,

Germany or Sweden will, on average, lives more than one fifth of his first 15 years without both biological parents.[7] A traditional parenthood model is still visible in Italy or Spain, with about one year average without biological parents.

The third transformation that draws a different picture for child care issues is the massive **accession of women to the labour market**. Obviously women have always participated in the economic production of European countries. Initially they were employed in rural and agrarian production, trade and crafts; women often worked from home or in structures where the boundaries between economic production and domestic reproduction were far from clear-cut. During the second half of the 20th century, the introduction of salaried employment outside the home has transformed the professional and domestic reality of women (Le Feuvre 1997).

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5. Actually, this decrease can result from a decrease in the marriages or/and increase in the elder population.
6. No data provided for U.K. or Greece.
7. Internationally United States shows the extreme, with more than one third of his 15 years spent with other family structures different from both biological parents.

Table 2. Social Transformations. Average Time of Children with Different Family Structures. Years.

European Countries	With a Single Mother	In a Maternal Stepfamily	Not with Biological Mother	With Both Biological Parents	TOTAL
Belgium	2.32	1.36	0.26	11.06	15
France	1.55	0.76	0.13	12.56	15
Germany	2.69	1.20	0.10	11.01	15
Italy	0.52	0.16	0.13	14.19	15
Spain	0.72	0.35	0.07	13.86	15
Sweden	2.08	0.75	0.33	11.84	15

Source: Heuveline *et al*. (2003).

This increase in activity levels has not taken place simultaneously across Europe. In Northern Europe, it started around the nineteen sixties; Southern Europe began its modernization approximately in the middle eighties. This different timing explains part of the distinct actual activity rates which range from Sweden's almost 60% rate to Italy's 37% (Table 3).

Table 3. Social Transformations. Women in the Labour Market.

European Countries	Female Activity Rate 2002 (%)	Unemployment Rate 2003 (%)		Part-time Employment 2002 (%)	
	Total	Women	Men	Women	Men
Belgium	42.6	8.5	7.8	37.7	5.9
France	49.1	10.6	8.3	29.7	5.0
Germany	49.4	8.9	9.6	:	:
Greece	37.7	14.1	6.1	8.1	2.3
Italy	36.8	11.7	6.8	16.7	3.7
Spain	41.1	15.9	8.2	17.0	2.6
Sweden	58.7	5.1	5.8	32.9	11.2
United Kingdom	54.8	4.4	5.5	44.0	9.4
EU (15 countries)	47.6	8.9	7.2	33.5	6.6

Source: EUROSTAT.

Total activity rates are not, however, the only important factor. The distribution of these rates by age groups also tell us what kind of influence motherhood has on labour decisions. Traditionally, it has been standard practice to distinguish three types of distribution. The discontinuous female activity model reflects that most women cease professional activity after marriage or motherhood. The double peak curve corresponds to a model of career breaks, in which women retire from labour market while their children are young. The last is the inverted U curve, characterized by continuous employment. As shown in table 4, comparable data has been found for 1990. It shows that, presently, only France may correspond to the career breaks model. Most countries show a discontinuous pattern, with higher rates for young workers. Nevertheless, activity levels are maintained relatively high after the peak, so we can conclude that abandonment of the labour market does not generally occur.

Table 4. Social Transformations. Age Group of Peak Activity Rate 1990.

European Countries	Age Group
Belgium	25-29 years
France	25-29 years/ 40-44 years
Germany	20-24 years
Greece	25-29 years
Italy	25-29 years
Spain	25-29 years
Sweden	40-44 years
United Kingdom	40-44 years
EU (15 countries)	35-39 years

Source: United Nations Statistics Division.

As Le Feuvre (1997) points out, women are more often salaried than their male counterparts. They tend to be concentrated in the tertiary sector, and mostly in the public sector, where salaried work predominates. Also, although unemployment rates vary widely from country to country (from

5.0 in United Kingdom to 11.3% in Spain), as Table 3 states, women's unemployment rate is higher than men's everywhere in the European Union, with the exception of Sweden and United Kingdom.

Additionally, in those countries in which part time work is a generalized form of employment, most of those part-time jobs are occupied by women. It is argued that this kind of employment reconciles women's careers and family responsibilities, in the absence of adequate public provision of child care facilities. Table 3 also shows part-time employment rates for men and women. They range from United Kingdom's 44% to Italy's 16%.

2. CHOICE RESTRICTIONS: INSTITUTIONAL FRAMEWORK

Every industrial country has a package of tax benefits, cash benefits, exemptions from charges, subsidies and services in kind which assist parents with the costs of raising children. Some of these instruments are aimed at encouraging a higher birth rate, others at facilitating the reconciliation of work and family life,

others at redistributing income to low-income families with children, (The Clearing House on International Developments in Child, Youth and Family Policies at Columbia University 2003). In any event, they all affect the way families handle their child care issues. What follows is a brief comparison of child benefit packages in selected European countries. The background social expenditure level is presented first.

Table 5 offers a global picture of the size of the Welfare State in some European countries. The second column presents total social expenditure as a percentage of GDP in 2001. The figures for Sweden are in first place, and are considerably ahead of other countries. Spain is in the lowest position.

As a complement to the above information, the percentage of family social expenditure is shown. We observe important differences in the weight attached to family social expenditure, from the less than 3% found for Spain to the almost 11% in Sweden (as other Nordic countries). As can be seen, there seems to be a correlation between total expenditure and family expenditure.

Table 5. Institutional Framework. Total Social Expenditure and Family Social Expenditure.

European Countries	TOTAL (% GDP)	FAMILY (% of Total Expenditure)
Belgium	27,5	10.6
France	30,0	9.6
Germany	29,8	10.6
Greece	27,2	7.4
Italy	25,6	3.8
Spain	20,1	2.7
Sweden	31,3	10.8
United Kingdom	27,2	7.1
EU (15 countries)	27,5	8.2

Source: EUROSTAT. European Social Statistics. 2001.

The child benefit package is usually composed of tax benefits, cash benefits, maternal leave and access to child care arrangements.[8] It is thus a combination of financial aid and services in kind.

Countries use different combinations of tax and cash benefits and both represent alternative ways of delivering financial help to families with children. Tax benefits can take the form of tax allowances (subtracted from the tax base) or tax credits (subtracted after gross tax has been assessed). In turn, cash benefits can be income-related or non-income-related (paid for children irrespective of parental income). Table 6 shows the different structures maintained by different countries.

Brandshaw and Finch (2002) stress that countries like Belgium, France or Germany have generous family subsidies, and use the tax system solely as an additional method of redistribution. On the contrary, in the Mediterranean countries, like Greece or Spain, the subsidies are much less important and the redistribution tends to take place through tax incentives.

The second branch of child benefit package is leave entitlement. Leave from paid work encourages a

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8. Bradshaw and Finch (2002) also consider housing and health policies and other kinds of social assistance.

balance between paid employment and unpaid care. Three possible regimes come to mind: maternity leave (for mothers taking care of newborns), paternity leave (to encourage fathers to take care of newborns) and parental leave (gender-neutral rights to take care of children, not necessarily newborns). Table 6 shows the maximum number of weeks of paid leave that mothers can take for caring for newborns. It also shows the level of compensation. As Bradshaw and Finch (2002) state, it is difficult to generalize on which country has the most generous scheme. The duration of leave, percentage of earnings replacement, maintenance of social contributions, or job guarantee are among the characteristics that matter. On this basis, France, Germany, Greece and Spain offer the most supportive arrangements.

Finally there is access to affordable childcare. Table 6 also shows the most prevalent formal arrangement for children under three. For them, the proportion in child care or education varies from three per cent in Greece to 41 per cent in Belgium. Most Southern European countries do not provide adequate formal care, and relatives or housekeepers are used where needed. France or Sweden, on the other hand, supply formal care services of some quality.

For Spain, a study developed in 1994 by the Spanish Ministry of Social Affairs (Delgado Solís 1994) shows that about 37% of those children under four attend a nursery school. Nonetheless, on average, parents take care of their children personally during most weekdays (72% of the time). Also on average, nurseries are used 15% of the time; relatives, 8%, and baby-sitters, 4%.

Table 6. Institutional Framework. Child Benefits.

European Countries	CHILD BENEFITS					
	Financial Aids		Maternity Leave		Formal Child Care Arrangement for Under Threes	
	Tax Benefits	Cash Benefits	Duration (weeks)	Compensation	Most Prevalent	Proportion
Belgium	Tax Credit	Non-income Related	15	30 days: 82% After: 75%	Day Care Family	41%
France	Tax Credit	Non-income Related	16	100%	Child Minder	17%
Germany	Tax Allowance & Tax Credit	Income Related	14	100%	Day Nursery	:
Greece	Tax Credit	Non-income Related	17	100%	Public/Private Child Care	3%
Italy	Tax Credit	Income Related	20	80%	Day Nursery	:
Spain	Tax Credit	Income Related	16	100%	Private Day Nurseries	21%
Sweden	None	Non-income Related	64	72%	Municipal Day Care Centres	:
United Kingdom	Tax Credit	Non-income Related	18	6 weeks: 90% After: 95€	Child Minder	11%

Source: Bradshaw and Finch (2002).

3. CHILD CARE CHOICE PROBLEMS: THEORETICAL MODEL

According to Blau and Hagy (1998) two main issues have occupied the attention of policy makers and scholars interested in child care. One is how the cost of child care affects the labour market decisions of mothers of young children. The other is how child care affects children, as their well-being may be influenced by the quality of those non-parental arrangements. From the Spanish point of view, two further topics must be added: first, the effect of child care policy on fertility decisions of would-be parents (in a lowest low rate framework); and second, the effect of

child care policy on the demand for labour (in a high unemployment rate framework).

These issues raise important questions about the nature of consumer demand for child care. In this paper we analyze how income, the price of child care and family characteristics influence the type of child care arrangement chosen by families. The ability of government policy to affect the type of child care chosen depends on the answers to these questions. Policies directed at increasing the market demand for child care - and thus the employment needed – may fail to achieve their goals if families are reluctant to use the market child care option regardless of its relative price.

Our theoretical model describes the choice of child care arrangements for their youngest child by Sevillian families who have children under three. Following Hofferth and Wissoker (1992) and Hofferth and Chapin (1998) labor participation decisions of parents are assumed to be independent of the child care decision. This assumption may be unrealistic for some families, in which the second earner – usually the mother – is dependent on the availability of child care options. Nevertheless, in Spain it is not

infrequent that families use some type of care even when one of the partners is not in the labour market. And in addition, given the high levels of female unemployment, working women may feel that leaving the labour force will impede their return to it after their children grow and thus for many 'losing' their job is not an option.

Each family is assumed to know which child care modes are available. We distinguish three different modes of child care: care in a day care centre or nursery school, care by a baby sitter (generally home-based) and care by a relative (either at his home or the child's). Centre and sitter care are differentiated here because prices paid may differ. Besides, even though both constitute market forms of care, sitter care is generally unregulated and frequently informal. Paid and unpaid relatives are included as a single category, although the most common form is unpaid.

It is assumed that families wish to maximize utility. Each family evaluates the utility of each available child care mode and then chooses the one with the highest utility. The utility of each mode is assumed to depend on mode attributes such as its expected price and quality, family characteristics such as income,

education level or family structure and a purely random component of utility (Hofferth and Wissoker 1992).

To obtain the statistical model, we assume an explicit relationship between the utility of a mode and the characteristics of the mode and the household. The utility of choice n for individual i, V_{in}, is assumed to be a linear function of the characteristics of the individual x_i, the attributes of the mode z_{in}, and the random component e_{in}:

$$V_{in} = z_{in}' a_n + x_i' b_n + e_{in}$$

Considering N different alternatives, the individual will choose the option with the highest utility. Option j will be chosen if

$$V_{ij} > V_{in} \quad \forall n \neq j$$

Following Hofferth and Wissoker (1992), we assume that the random components of utility are independent across individuals and modes of care and that each is drawn from the Extreme Value (I) distribution. Therefore, the multinomial logit specification for probabilities is obtained. In this case, the probability that mode j is chosen may be written:

$$P_{ij} = \operatorname{Pr}ob(V_{ij} > V_{i\dot{n}} \ \forall \dot{n} \neq j) =$$

$$= \frac{\exp(z_{ij}' a_j + x_i' b_j)}{\sum_{n=1}^{N} \exp(z_{in}' a_n + x_i' b_n)}$$

The parameters of the model can be estimated using maximum likelihood techniques.[9]

4. DATA AND VARIABLE CONSTRUCTION

The study utilizes data from a 2003 survey of family care needs and arrangements conducted at Seville in the framework of a project developed for its City Council (Seville City Council)[10]

The city census provided the sample population: households living in Seville with at least one child under three years old. According to the data of the Municipal Register, the number of families for which that circumstance is certain is 18.145.

Every respondent was requested to provide information on characteristics of their family, the type

9.   We have used LIMDEP version 7.0.
10. Palma Martos (2003).

of arrangement used for taking care of children under three on a regular basis, and the characteristics of that arrangement. Some of the families reported more than one form of aid. In those cases, they were asked for the most important one.

The survey was mostly carried out by phone, though, in certain cases, direct interviews were performed (That was the respondents' choice).

A random sample of 99 families was selected. Out of those, 37 could not be contacted or refused to be interviewed. 9 further households declared themselves not to be in need of any form of aid. In addition 7 questionnaires lacked important data. Consequently the final number of observations is 46. That implies an error of 14.43%.[11]

The dependent variable in the analysis is the mode of child care. As already stated, three modes of care are distinguished: care in a day care centre, care by a baby sitter, and care by a relative. Sample market shares for those options in Seville are 36.5%, 32.9%, and 30.6%, respectively. We thus find an even distribution of market shares.[12]

The variables characterizing the mode of care are its cost per hour contracted (PRICE) and weekly amount of time which the service is used, measured in HOURS.

We also have information on various family characteristics. Some of them are continuous variables: total number of family MEMBERS, household INCOME, AGE of the child (in months), number of children under three (NCHILDREN),... Some others are dichotomous variables: whether it is a ONE-PARENT household (0, two parents; 1, one parent), whether BOTH parents work (0, one working parent; 1 two working parents). However, the last one is a qualitative variable: EDUCATIONAL level (0, not

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11. The error e has been calculated following Levy and Lemeshow (1991), and the formulae

$$e = 1{,}96\sqrt{\frac{p(1-p)(N-n)}{n(N-1)}}$$, where N is the

population size, - 18.145 households, in this case -, n is the simple size, 46 observations, and p is the proportion of cases of the reference variable. A value of $p=0.5$ has been adopted, which implies the greater error possible. Thus the figure obtained (14.43%) represents the greater error which may be incurred.

12. This distribution of market shares appears to contradict the evidence supplied by the Spanish Ministry of Social Affairs in 1994 for which nursery schools had a much greater market share than relatives or baby-sitters (Delgado Solís 1994). Nevertheless, that study included all under fours, and as we will see the probability of choosing a nursery school increases with the age of the child.

literate/primary unfinished; 1, primary level; 2, secondary level; 3, high school; 4, university degree). Table 7 presents a description of these variables for the three options – relative care, baby sitter, and nursery school - as well as for the entire data set.

Table 7. Description of the Available Variables.

VARIABLE	UNIT	MEAN (STANDARD DEVIATION)			
		RELATIVE	BABY SITTER	NURSERY	TOTAL
PRICE	Euro/hour	0 (0.00)	3.12 (1.41)	1.19 (0.44)	1.50 (1.51)
HOURS	Weekly hours	18.25(14.29)	28.23 (16.41)	28.93(5.60)	25.41(13.36)
MEMBERS	Number	4.00(1.80)	4.00 (0.70)	3.93 (0.91)	3.97 (1.18)
NCHILDREN	Number	1.33 (0.49)	1.38 (0.51)	1.21 (0.43)	1.31 (0.47)
INCOME	Monthly 500e	2.67 (0.88)	4.08 (0.99)	1.85 (1.14)	2.84 (1.36)
AGE	Months	17.08 (6.48)	22.30 (9.54)	25.85 (5.60)	21.97 (8.05)
ONE PARENT	0/1	0 (0.00)	0.07 (0.27)	0.21 (0.42)	0.10 (0.30)
BOTH	0/1	0.66 (0.49)	0.76 (0.43)	0.42 (0.51)	0.61 (0.49)
EDUCATION	0/1/2/3/4	3.33 (0.88)	4.00 (0.00)	2.57 (1.50)	3.28 (1.16)

Source: Survey. Calculations performed using SPSS, version 11.0.

At first sight, most variables behave differently for the three options considered. The exception is the variable members, for whom the average 4 members (two parents and two children) are almost universal, and also maybe the variable number of children, with an average 1.3 children under three per family. Families that rely on a relative for the care of their under threes usually have younger children and use fewer hours; they also pay nothing. Families that rely primarily on a baby sitter (or housekeeper) have on average highest income and educational levels. Households that use primarily nursery schools have older under-threes, and, on average, lower earnings and educational levels.

The incidence of one-parent families in our sample is probably too small to draw any clear conclusion on this type of family. Also, the educational level of all the interviewees is quite high. As we know that is not the case for the entire Sevillian population, there can be an

unexpected bias in our sample, towards very educated families. (Either the less educated refused to be interviewed or the respondents lied about their educational level). Nevertheless, the variables' education and income levels present a high correlation, thus indicating that the variable education can be an indicator of socioeconomic status.

The choice of care depends upon the relative prices of various modes of care. We had actual data available on how much families paid for the type of care they chose for their child.

To estimate the model in the absence of data on the prices of each alternative faced, we must predict prices for all alternatives. We know that the price of family care is zero in every case. Observations pertaining to families choosing sitter care are used to estimating the price of this form of care by the rest of the families in the sample. Similarly, observations pertaining to families choosing care by a centre are used to estimating the price of this form of care by families not currently using this option. Table 8 shows the results.

Table 8. Estimation Results for Price Equations. Ols Method.

Equation for PRICE of the option SITTER CARE				
N. observations = 12				
R-squared = 0.684001 Adjusted R-squared = 0.61378		F [2,9] = 9.74 Prob. Value = 0.00561		
Variable	Coefficient	Standard Error	Coef./Stand. Er.	Probability
CONSTANT	3.6663127	0.782	4.686	0.0011
HOURS	0.0552380	0.014	-3.884	0.0037
NCHILDREN	0.6762721	0.405	1.668	0.1297
Equation for PRICE of the option NURSERY SCHOOL				
N. observations =14				
R-squared = 0.5206 Adjusted R-squared = 0.4344		F [2,11] = 5.97 Prob. Value = 0.01753		
Variable	Coefficient	Standard Error	Coef./Stand. Er.	Probability
CONSTANT	1.2944156	0.139	9.302	0.0000
BOTH	0.2700649	0.183	1.475	0.1682
LOWZONE*	0.57844156	0.189	-3.059	0.0109
*This is a dummy variable that selects low income families living in three city districts where subsidized nursery is available.				

Source: Mail questionnaire. Calculations performed using LIMDEP, version 7.0.

5. ESTIMATION RESULTS

The econometric model finally tested is conditional logit, where the effect of the price variable is constrained, to be equal over all modes of care.[13] That allows a welcome increase in the degrees of freedom.

The final specification was achieved by testing minor changes in the choice of explanatory variables. All of them were subject to a cause and effect relationship with the dependent variables, but some could simply not be included simultaneously, due to its mutually high correlation. This last arrangement obtained the highest value of the adjusted R-squared.[14] The results of the estimations are presented in table 9.[15]

Table 9. Estimation Results. Maximum Likelihood Method.

Dependent variable: MODE OF CARE Nobs=39				
R-squared = 0.38438			Adjusted R-squared = 0.31402	
Variable	Coefficient	Standard Error	Coef./Stand. Er.	Probability
PRICE	0.2157	0.439	0.491	0.6237
CONSTANT_RELATIV	3.1765	2.897	1.096	0.2730
CONSTANT_SITTER	-7.3530	4.6526	-1.580	0.1140
HOURS_RELATIVE	-0.081	0.041	-1.938	0.0527
AGE_RELATIVE	-0.206	0.081	-2.535	0.0112
AGE_SITTER	-0.097	0.076	-1.283	0.1994
EDUCATION_RELATI	0.592	0.303	1.950	0.0512
EDUCATION_SITTER	1.335	0.570	2.340	0.0193

Source: Survey. Calculations performed using LIMDEP, version 7.0.

13. Different specifications of a two-level nested logit model were also tested. None of them reached convergence, probably because of the lack of observations.

14. This measure is frequently known as McFadden's R-squared. It is explained, for instance, in Cabrer Borrás *et al*. (2001, 138).

15. In a logit model, just like in other discrete choice models, the coefficients obtained by the estimation are only indicative of the sing of the relationship between the variables. The magnitude of the effect of a change in a variable has to be computed by specific calculation of marginal effects.

Apparently the variables that influence the choice of child care mode are the hours contracted, the age of the child and the educational level of the head of family.

The sign of the PRICE variable is counter-intuitive as it implies that all forms of care are used more intensively with increases in their cost.[16] The fact is that the price variable is not significant and thus no conclusions can be drawn from the analysis.[17] This result of the price not being significant is actually found for Italian households in a study by Del Boca *et al*. (2003).[18]

The negative sign in the variable HOURS for the option RELATIVE reveals that with the increase in the number of HOURS, the probability of relying on relative care decreases, favouring the other two options.[19] That means families tend to use external forms of care more frequently when the hours needed increase.[20]

The AGE of the child also affects choices. The negative sign of this variable for both RELATIVE and SITTER options tell us that the older the child, the more probable the option of utilizing a nursery school becomes. Presumably, children cared for at centres are allowed to interact between each other and this fact is considered to be more important as children grow old. This result is also found in Johansen *et al*. (1996) for United States.

EDUCATION is the last determinant considered. Due to their mutually high correlation, this variable could not be included together with income level and thus it should be interpreted as a general indicator of socioeconomic status.[21] As can be derived from the negative signs of these variables for both the

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16. Other studies, like Hofferth and Wissoker (1992), for instance, report a negative and significant effect of this variable.
17. This variable could have been dropped out from the model but we thought it was worth mentioning that it did not appear to be significant.
18. Nevertheless, the model employed by Del Boca *et al*. (2003) is multinomial logit, not conditional logit.
19. The variable HOURS for the option SITTER did not appear to be significant in a previous model tested and thus have been eliminated.

20. This variable has not been included as a determinant of child care choice in other studies. Nonetheless, Blau and Hagy (1998) determine the hours of care together with the type of care.
21. We tried constructing four dummy variables to account for educational levels. That made us loose important degrees of freedom. We have maintained this variable as a qualitative one, knowing that only its sign can be interpreted. Nevertheless, in logit models specific formulae are needed to calculate marginal effects (Cabrer Borrás *et al*. 2001).

RELATIVE option and the SITTER option, more educated families tend to use relatives and, more importantly, baby sitters more frequently. Thus, as the socioeconomic level increases, families tend to rely less on the nursery option. This confirms evidence supplied by Hofferth and Wissoker (1992) but contradicts the findings in Johansen *et al*. (1996).

6. CONCLUDING OBSERVATIONS

As we have seen, important social changes have determined the upsurge of new social needs, among which we find child care services. On the other hand, countries differ very much in the institutional framework that restricts child care choices. In Spain the need for child care services has not found an adequate response from the policy arena. Private solutions are commonplace and in many cases those solutions come from outside the market – relative care – or from informal markets – housekeepers.

As for the city of Seville, our model shows that the demand for child care services is mostly determined by need and socioeconomic factors. Those families that need fewer hours of care

tend to rely on relatives. With the increase in the hours needed, families increasingly look for aid outside the family. The age of the child constitutes another view of need. With increasing age, parents tend to think that the child has to interact with other children, which explains the preference for the nursery school option. Finally, in Spain, and more importantly in Southern Spain, having a housekeeper is considered a status symbol. This fact explains why more educated parents tend to favour the baby-sitter alternative.

With respect to policy implications, apparently the price of the alternatives is not a significant determinant of child care choice. Policies which attempt to influence the market share of different care alternatives will not have much impact according to our model. Nevertheless, care is needed in the interpretation of the results. It would be desirable to conduct other studies with a greater number of observations. Also, studying the situation presented in other Southern European cities could be of great help. In the event that the results converge, we could speak of a general tendency in Latin countries towards child care issues.

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