Parental Education and Time Allocation of Childcare

Evidence from the Spanish Time-Use Survey

Alessandro Di Nallo

Abstract

Parents invest material resources and time to raise children. Time investment is thought to be determinant to provide quality childcare and promote children's development. This paper focuses on the time allocation of spouses using the recent Spanish Time Use Survey with two complementary approaches. First it highlights the cross sectional patterns in time spent with children by working and non-working parents. Second, it presents a stylized model of time allocation to illustrate the interplay of preferences and market productivities on parenting and work choices. The empirical model simultaneously specifies three time-use allocations – childcare, paid work and housework – for each spouse, allowing for correlation across the errors of the three equations. We find that education has a positive effect on childcare, especially for women, and time spent with children does not follows patterns typical of home production. We speculate that one possible reason for this positive education gradient refers to the investment aspect of caring time.

Summary of contents

1. Introduction

The time that parents devote to caring for raising their children has an enormous and sometimes underestimated value for society's investment in human capital.

Parents devote their time and material resources to their offspring and expect these investments to foster their children's human capital and keep their children safe and healthy. This is one possible channel through which social status is transmitted from generation to generation.

Theories concerning child development contend that the time parents devote to children is crucial to children's intellectual development. According to these theories, the time parents spend with their children, along with other financial and material resources, can be seen as investments into the production of child quality (Becker, 1981). Thanks to parental stimulation, children learn to trust their caregivers, build their healthy social relations and enhance their cognitive abilities (Coleman, 1988). These experiences help create the mechanisms allowing the transmission of knowledge, skills and human capital. Theories in developmental psychology also hold that periods of separation from parents, and in particular from the mother, may undermine the child's intellectual growth and leave the parents less sensitive and proactive towards their children's needs because they have fewer opportunities to learn their infants' signals and to develop the appropriate response.

A better understanding of the determinants of parental time investments in childcare is important in light of recent economic changes, including labour market involvement of women and a growing proportion of single-parent families, which may disrupt these investments. In contrast to the expectation that the total amount of parental childcare has decreased over time, the literature (Bianchi, 2000; Gauthier, Smeeding, & Furstemberg, 2004; Aguiar & Hurst, 2007) has highlighted that time devoted by mothers, and to a smaller extent by fathers, to caregiving has slightly increased with a particular emphasis on primary and higher-quality activities.

Well-grounded evidence in the literature contends that well-educated mothers and fathers spend more time with children than less educated mothers (Gauthier *et al.* 2004; Hill & Stafford , 1974; Leibowitz, 1977). Well educated mothers and fathers also spend more of their child-related time on activities aimed at nurturing their

children' development with respect to their less educated counterparts (Bianchi, 2000; Guryan *et al.*, 2008).

Why highly educated parents spend more time and in a different way is an open question. Past research suggests that parents differentiated background influence their values and behavior (Kohn, 1963) and, hence, parenting practices.

Although the literature on this topic for Anglo-Saxon countries is rather broad, the evidence for Spain is limited. The Spanish labor market is characterized by its lower degree of flexibility compared to other countries: parental leave legislation is less generous compared to the Scandinavian Countries and job timetables often involve very long lunch breaks and late finishes. In terms of childcare availability, funding for under 3 years old is rather limited with some subsidized public nurseries. This can clearly impose certain obstacles to parents spending time with their children.

Hence, learning more about the association between parental time and socio-economic characteristics is definitely helpful to evaluate the mechanisms of transmission of parents' abilities to children. Following this line, the paper first analyzes whether there is a significant difference in the amount of childcare time and the type of childcare between across the level of education of parents, accounting for their occupational status. We find that higher-educated working parents spend more time with their children, compared to their non-working counterparts. This relationship holds across mothers and, to a lesser extent, fathers. It also holds across two out of three sub-categories of childcare: basic and educational. Second, this study analyzes simultaneously a three-fold time use choice of spouses within each household – including paid work, childcare and housework time – allowing for correlations between the errors of the three equations. We use information on individuals' market wage along with education achievements to disentangle parents' productivities from personal preferences for childcare in order to better understand why more skilled people require more caring time although their high education signals superior parenting skills. The empirical estimations confirm a positive effect of education on childcare time which seems to validate the hypothesis that preferences drive the time for caring. Further we find also evidence of a positive relationship of the educational gradient with parents' predilection for spending childcare time together.

The study is based on the Spanish time use survey carried out in the period 2009-2010, which collects information through time diaries and depicts a fully-fledged outline of the population.

The structure of the paper is as follows. The next section describes the main strands of the literature concerning parents' time allocation and childcare. Section 3 presents in detail the data and Section 4 outlines the main results from the descriptive analysis. Section 5 depicts the theoretical framework and the econometric specifications. Section 6 analyzes the empirical outcomes. The last section concludes the paper.

2. Literature review

Reasons for parental investments of financial resources and time in children span over a wide range of explanations, from an innate biological drive to ensure the survival of offspring and the perpetuation of the family line, to a rational behavior that maximizes parents and child's utility.

Economic models depict the household as a firm-like production unit that pools resources through exchanges with external units and efficiently allocates them to optimize its outputs. The primary conceptual framework that economists use to analyze people's use of time is the Becker's (1965) household production model. In this model, people derive utility or satisfaction from household-produced goods such as their children's health and development. Parents are assumed to rationally choose the optimal amount of time for different activities, such as childcare and market labour, and the resources they need to maximize their utility subject to technological, financial and time constraints. The fundamental assumption is that the production and use of these outcomes requires purchases of goods and services from the market and time specifically devoted to their transformation. As in the microeconomic models that describe firms' technological constraint, families as well face alternative production techniques regarding how inputs of good and time are combined to generate the desired outcomes. For instance, parents can deploy several strategies to promote their children's wellbeing, ranging from spending a huge amount of their time teaching and caring to benefitting from the services of full-time professional child-care providers. Parents also are constrained

as far as financial resources and time are concerned, coherently with typical consumer and labour models.

Family structure is assumed to influence caregiving through a number of mechanisms in the household production model. First, changes in family structure determine the resources requirements: marriage or cohabitation allow the pooling of time and money resources, which can be allocated to caregiving, purchase of care services, or both. Second, partners may decide to specialize. Marriages, more than cohabitation, are likely to promote higher levels of specialization. With multiple household members, one person can focus on market work while another can specialize in housework (Becker, 1985). Third, partnership may directly increase the well-being thanks to stability and peacefulness: co-residence ease coordination and mutual help in assisting children (Weiss & Willis, 1985) and provides behavioral models for children (Haveman & Wolfe, 1995).

The relative resources perspective holds that the amount of domestic work is determined according to the level of resources the partners can bring to the household (McElroy & Horney, 1981; Lundberg & Pollack, 1993). The division of housework within the household is mainly driven by power relations between women and men. In this framework, the allocation of the housework, including childcare, reflects power relations and strategic interactions between household members. In terms of the traditional labour models, the couple faces a two-stage decision approach: in the first stage the spouses choose the amount of market hours; in the second, they adjust their housework burden according to their strategic negotiation. For example, higher levels of education and wage relative to one's spouse translate into more bargaining power which permits to avoid the less attractive activities, such as the domestic tasks. As a consequence of these assumptions, women are responsible for the largest housework duties due to their weakest bargaining position.

Sociologists have raised doubts about the hypothesis that decisions on time allocations to paid work determine how much time is left for the child (Coverman, 1985; England & Farkas, 1986). This claim relies on the assumption that women and men devote time to housework to the extend they have available time, as determined by competing demands, generally proxied – in the theoretical models – by employment status and partner's employment status.

Gender may also affect caregiving in the household production model. The model implies that specialization is likely to occur in household if returns to time spent in household and market activities are increasing and the partners can pool their resources and output. However, the economic model does not fully explain the gender-driven distribution of tasks although it suggests that small, initial differences in relative abilities can lead specialization. Thus, if women are grown up with a sharper inclination for caregiving and housework or, alternatively, if labour market discourages childbearing, partners *per se* specialize in different activities.

2.1 Empirical evidence

A broad strand of literature has debated about the newly-established trends in housework in the families. Some scholars claim that husbands do not spend more housework than in the past and that women continue to be overburdened, as a consequence of the relatively recent involvement of women's in the labour market. On the other hand, competing claims contend that men are more involved in housework and that gender differentials in housework, and childcare, are narrowing and becoming less gender-driven.

The analysis of comparable repeated cross-sections of American time-diaries from 1965 to 2000 has shown that women's hours of household labour (including childcare and other forms of housework) declined substantially, while men's increased by a little (Gershuny & Robinson, 1988).

Well-established evidence is mothers' higher commitment to childcare with respect to fathers', although the gender gap has been declining over time. The ratio of married fathers' to mothers' childcare time has increased from 0.24 in 1965 to 0.55 in 1998, in the United States (Bianchi, 2000) and similarly in the U.K. (Craig, 2006). On the other hand mothers spend proportionally more time in routine care while fathers devote proportionally more time to recreational activities (Pleck, 1997).

Bianchi (2000), Bianchi *et al.* (2006), Aguiar & Hurst (2007) and Ramey & Ramey (2007) report that American couples spent more time on childcare in the United States today than in the past, regardless of their occupational status. In particular the average amount of fathers' childcare time raised from 0.4 hours/day in 1965 to

1.0 hours/day and mothers' time from 1.7 to 1.8 hours/day over the same time span (Bianchi, 2000).

Most of the literature focusing on the parental time use has highlighted that both parents' youngest child (Zick & Bryant, 1996) and family structure (Bianchi *et al.*, 2006), are determinant factors in childcare allocation. Aguiar and Hurst found consistent results showing that average time spent in child care for men and women, adjusted for changing demographic (including the aging of the population and declining fertility rates), increased by roughly 2.0 hours per week between 1965 and 2003. Such an increase is more apparent for more educated couples relative to less educated couples (Ramey and Ramey, 2007).

Gautheir *et al.* (2004) confirmed this trend also for the 16 Countries analysed by the Multinational Time Use Study. Examining parental time spent in child care for married/cohabiting parents with at least one child under age five, the authors provide evidence of a notable increase in time spent in child care for either working or non-working mothers and fathers. They also document that fathers have changed their customs, reducing time for personal activities (including sleeping) and paid work to help out their partners in housework tasks, while mothers' increased time spent in child care is offset by progressive reduction in paid work, personal activities and, in particular, housework.

2.1.2 Work and childcare time

The literature has also supported the claim that employed parents spend less time with their children than non-employed parents. However, time use studies suggest differences in the amount of working and non-working parents devote to childcare are not as great as the amount of time employed working. Analyses using the National Institute of Child Health and Development (NICHD) Study of Early Child Care examine the differences in childcare time allocation among employed and inactive mothers with 7 month-old infants and show that employed mothers spent only about 12 hours less per week with infants than their non-working counterparts despite being 30 hours per week at work (Booth *et al.*, 2002; Huston & Aronson, 2005). Since school-aged children are often not present in the home when the parent is working, the time allocated by non-working parent is not much greater than time spent by working parents – and not nearly as large as the difference in working hours (Bianchi *et al.*, 2004; Gauthier *et al.*, 2004). Moreover, employed

parents alter their work hours in order to maximize their spells with their offspring. Bianchi (2000) found that about one-third of new mothers confirm their work schedule after childbirth while two-thirds follow another one during the early stages of the child life. According to this view, parents re-define their time allocation in order to more effectively serve their children. A study conducted by Hook & Wolfe (2011) highlights that the consequences of fathers' evening shifts vary by the national context. They find that a consequence of evening work, often viewed as positive for fathers because allows them to spend more time caring with children - is sensitive to both household employment arrangements and country context.

Further, time diary studies also suggest the employment status only marginally explains parental involvement in childcare. Nock & Kingston, 1988 analyze a sample of 226 married couples with children from the 1981 *Study of Time Use* and document that most of the differences in childcare existing between working and non-working couples consist in the childcare activities. In other words, non-employed women spend significantly more time in activities that require low levels of child-parent interactions, such as doing housework while the child watch the television in another room. In addition, Booth *et al.* (2002) and Huston and Aronson (2005) provide evidence that employed mothers are more inclined to social interactions with the offspring, rather than to basic childcare.

Howie *et al.* 2006 estimate a simultaneous model that addresses the potential endogeneity of employment hours on the time mothers spend with young children and vice versa, using a set of instruments based on parental attitudes towards work and childcare. Using survey data from mothers in Missoula (Montana, USA), they find a negative but inelastic relationship hours of employment and the hours of maternal child care. This finding confirms the hypothesis that that children do not bear reduced parental time inputs as a consequence of their mothers' market work burden. Rather, mothers bear most of the burden since increased market seems to crowed out other activities such as household production and leisure.

Hallberg & Klevmarken (2003) use Swedish data and instrument parents' wage, market time and children's time spent in external care. Unlike American data, more egalitarian time allocation emerge from this study as resulted are not gender-driven: neither own nor spousal wages affect child care time, own working hours have a negative effect on own time spent in childcare, and spousal hours work have a positive effect.

Lausten & Deding (2006) present some interesting results concerning the interactions between the different time use activities (market work and non-market work, either generic or split into housework and childcare) as well between the spouses. They document the existence of substitution effects between market work and non-market work for both men and women, in a Danish Time-Use Survey. Further, they confirm the theory of division of labour, advanced by Becker (1965), according to which partners divide their tasks based on their comparative advantages. When explicitly introducing the time devoted to childcare, the analysis highlights one main point: the positive "cross spouse" substitution between man's and woman's housework meaning that she aligns to housework time allocation of her partner.

Kalenkoski, Ribar and Stratton (2006) use British and American data to jointly estimate primary and secondary childcare time. They analyse the determinants of parental time investments in primary and secondary (passive) childcare using correlated tobit models. They find no evidence that cohabiting and married parents devote different time to childcare in either Country, although significant differences are documented between couples and single parents in both Countries. The former spread their childcare activities more homogeneously over the working week while the former concentrate their care in the weekends.

2.1.3 Education and time allocation

A large strand of the literature has stressed that highly educated mothers are keener to spend time with their children than their less-educated counterparts. The first evidence dates back to Hill & Stafford (1974) who documented that high socio-economic status mothers spend at least two times as much time in preschool child care as low socio-economic status mothers do, using a nationally representative sample from the 1965 *Productive Americans Survey*. This evidence has been confirmed by Kimmel & Connelly, 2007 that highlighted that women's predicted wage is positively correlated with childcare allocation using data from the 2003-2004 *American Time Use Survey*.

The association between working time and childcare also depends on the working scheduled. Furthermore, does this association depend on how families reconcile work and family commitments as expressed by mothers' employment status?

The literature has drawn a line between two types of childcare: primary childcare, which involves direct interactions with the child and passive childcare which is more similar to the provision of custodial care. Bianchi (2000) has argued that primary childcare indicates more accurately the quality of caring and is more susceptible to mother's beliefs and educational background, while secondary childcare is more dependent on mother's working status as mothers who work outside the home spend substantially less time in the presence of their children with respect to their unemployed counterparts.

More recently Guryan *et al.* (2008) analyze the parental time allocation to children using the American data from the ATUS. They document that higher educated parents spend more time with their children. In particular college or PhD-graduated mothers spend about 4.5 hours per week more in childcare than mothers with a high school degree or less. This surprising relationship is confirmed also by robustness test involving four subgroups: both non-working and working mothers and fathers. Further, this results hold also for sub-categories of child care but is particularly apparent for educational childcare, suggesting that highly educated parents view childcare as an investment more than their less-educated counterparts. The positive education gradient in childcare is opposite to the education gradient observed for typical leisure and housework activities. As a general conclusion, the authors infer that time spent with one's children is valued more by highly educated individuals who are supposed to have a higher opportunity cost of time. This evidence reveals that the preference structure for childcare time is different from that towards other activities.

Similar evidence emerge from Esping Andersen & Bonke (2008) that address the issue whether parental investments in children are polarizing between highly and low-educated couples. Analyzing the Danish Time Use Survey, they find additional evidence that the amount that fathers and mothers devote to children is strictly related to education of both partners, with no extra-effect attributable to mothers. Moreover, part of this trend is mediated by assortative marriage since homogamy seems to amplify the intensity of childcare in the highly educated couples and depress it in the low-educated couples.

3. Data

The data used for this analysis are drawn from the “Encuesta de Empleo del Tiempo” (Time Use Survey) conducted by the Spanish National Statistics Institute between 2009 and 2010. This is the second edition of the Time Use Survey has been conducted in Spain following the guidelines set by Eurostat, under which 15 European Countries have conducted similar operations in recent years. In this edition, the sample has been reduced with respect to the period 2002-2003, with 9,541 households and 25,895 individuals interviewed.

This survey collects information through time diaries rather than through activity recall questionnaires, guaranteeing a better level of accuracy. Further, the structure of the diaries permits to distinguish between primary activities – such as playing with a child or telling him a story, which are done purposefully for him – and passive activities – which are done with a child present but do not involve him. Moreover the survey balance reports between weekdays and weekends. These design features coupled with the large sample sizes allow us to analyze time use for weekends and weekdays separately.

The diary was collected for all individuals older than 10 years. For children of this age, only demographic data are available while information about their activities is completely missing. In addition, there are 3,818 individuals who did not respond to daily activities, so that the final sample is reduced to 19,295 people.

The diary was filled in for one day, which was chosen by the interviewer and could be either a week or a weekend day. In the daily activities of individuals have to list the activity going on in each interval of 10 minutes for 24 hours (from 6 am until 5:50 the next morning). At each interval they were required to indicate their main activity and one other activity, if any, and specifying with whom they were performing those tasks.

From the dataset were selected individuals for which it was possible to detect kinship: lone parents or couples with just one spouse filling the time diary were dropped. Following the recurrent criteria in the literature we focused on heterosexual couples, whose spouses were older than 17 and under 60 and with at least one child under the age of 18. Marital status did not affect our selection and was used as a control in the regression analysis. In the final sample, 2,411 couples resulted from the selection.

For the empirical analysis, we concentrated on four categories: market work, housework, leisure and childcare .

Paid work includes the time spent at one's workplace and spent also travelling to work. Housework includes all the household tasks to produce goods and services: from home cleaning to meal preparation, from grocery shopping to home maintenance. Leisure encompasses socializing time, hobbies, sport time, watching television and similar activities. We excluded activities that do not provide direct utility to the individuals, such as sleeping, eating and personal care. Childcare is computed either at a household level (as the sum of mother's and father's joint time childcare) and at an individual level, as the total number of childcare spent by mothers and fathers.

Activities related to childcare concern children and kids younger than 18. The questionnaire allows for the construction of two distinct measures of childcare: the spell of time when the main activity is reported to be childcare (primary childcare) and the time when childcare was mentioned as a secondary use of time in response to the question "What else were you doing?" and the time generically spent with children defined performing other activities. In other terms, individuals who define preparing a meal or going shopping as their main activity may be with their child. In either case childcare turns to a more superficial form of supervision.

By distinguishing activities coded as primary from those coded as secondary, we intend to focus on activities in which parents are intentionally involved and provide good quality childcare. This restriction may be susceptible of some criticism. For this reason we performed a complementary analysis concerning also other childcare activities classified as "secondary". In this case the amount of time spent in presence of the child is larger since it may include also the time when a parent is preparing a meal while the child is watching the TV in a different room.

Within primary childcare, we identified three distinct typologies, based on the classification provided by the parents:

a. basic childcare involves face-to-face parent-child interaction that revolves around physical childcare, feeding, bathing and the other children's physical needs;
b. developmental childcare includes face-to-face active parent-child interaction: teaching, reading, telling stories, playing games, listening to children and all

the other critical activities for the development of children's linguistic, cognitive, and social capacities;

c. travel and communication encompasses transportation to school and visits.

This distinction is important since the various types of childcare probably differ according to parents' observable and unobservable characteristics.

Educational level was detected by the individuals' highest achievement declared in the questionnaire. All partners included in this analysis responded to this question and could choose among: being illiterate, not completing primary education, completing primary education – which were combined as our reference group in all econometric specification; completing secondary education; achieving "Bachillerato" (high school), or medium/high vocational qualifications; achieving first-cycle degree (undergraduate) or second/third degree (Master and PhD).

Information on monthly gross earnings was collected in seven intervals ranging from €600 or less up to more than €3000. We set earnings equal to the mid-point of each interval, and to the lower bound of the top interval. People having no income and being contemporarily unemployed were categorized as "missing wage"[1]. For consistency with the analysis of the time allocated to childcare and housework, which is only collected via the time diary, we also use information on market hours reported in the diary. In the course of our study we present jointly and separately couples who answered the diary during a week day and those that answered the diary over weekend days. Regressions involving paid work, typically the SUR models, focus on the "weekday" sample[2].

4. Descriptive statistics

Sample descriptive statistics are provided in Table 1, both including and excluding couples who answered the diary at the weekend.

The proportion of married couples amounts to 91.8% of the larger sample. The employment rate of mothers and fathers with at least one child under 18 is 60.2% and 82.8%, respectively. The average number of children under the age of 18 is

[1] People who were employed but did not declare income was not taken into consideration in our final analysis. Alternative specifications assuming non-random missing values, which won't be shown here, also featured people not declaring income, under a particular category .

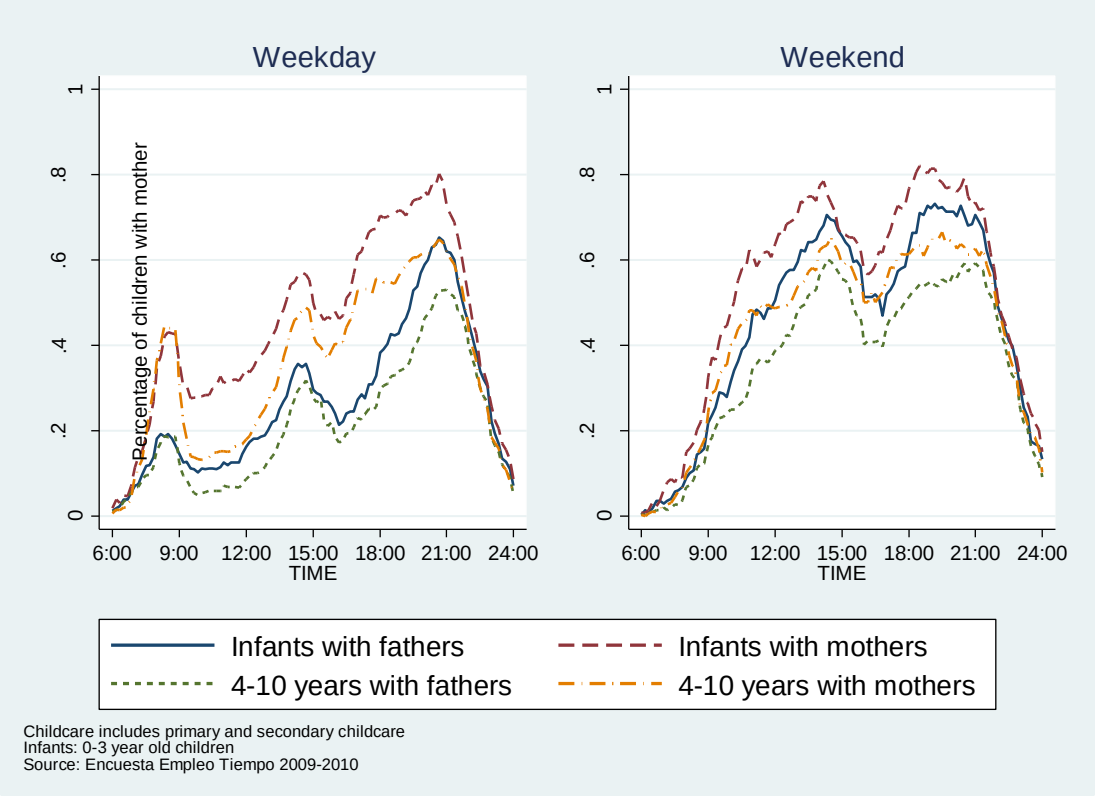
[2] Additional variables are included in the analysis. They include: delay in handing in the questionnaire; geographical fixed effect (18 dummies for the Comunidades and 3 dummies indicating the urban population of household's hometown: less than 20,000 inhabitants, between 20,000 and 100,000, over 100,000.

Table 1 Sample descriptive statistics

	Full sample (N=2441)		Working days (N=1774)	
	Mean	Sd	Mean	Sd
Mother				
Total childcare time	2.163	2.467	2.379	2.481
Total childcare time (with child aged 0-3)	3.727	2.553	3.986	2.486
Total housework time	4.107	2.453	4.222	2.533
Total leisure time	3.767	2.398	3.117	2.125
Total work time	2.321	3.396	3.285	3.603
Education (percent)				
Less than secondary	0.171	0.376	0.168	0.374
Secondary	0.236	0.424	0.237	0.425
Bachillerato & Vocational	0.329	0.470	0.325	0.469
Graduate & Postgraduate	0.264	0.441	0.269	0.444
Age	40.250	8.016	40.161	7.911
Employed (percent)	0.603	0.489	0.605	0.486
Monthly wage	1,157	647.7	1,152	643.4
Father				
Total childcare time	1.288	1.984	1.187	1.772
Total childcare time (with child aged 0-3)	2.301	2.362	2.050	2.052
Total housework time	1.882	2.034	1.656	1.989
Total leisure time	4.578	3.020	3.687	2.665
Total work time	4.491	4.163	6.339	4.164
Education (percent)				
Less than secondary	0.191	0.393	0.195	0.397
Secondary	0.248	0.432	0.243	0.429
Bachillerato & Vocational	0.349	0.476	0.353	0.478
Graduate & Postgraduate	0.212	0.407	0.209	0.407
Age	42.75	7.377	42.780	7.275
Employed (percent)	0.828	0.377	0.830	0.371
Monthly wage (log)	1,312	820.8	1,315	822.3
Household				
Married couple	0.918	0.275	0.920	0.271
Mother on leave (percent)	0.007	0.084	0.006	0.078
Paid Housework (percent)	0.109	0.312	0.107	0.309
Overlapping work schedule (hours)	1.240	2.379	1.866	2.678
Boy in the household (percent)	0.708	0.455	0.707	0.455
Mother's age at birth	30.51	5.320	30.42	5.307
Age difference (f-m, years)	2.511	4.721	2.635	4.674
Child aged 0-3 (percent)	0.253	0.435	0.267	0.479
Child aged 4-10 (percent)	0.350	0.507	0.349	0.506
Number of children (under 18)	1.619	0.700	1.631	0.692

These are unweighted sample statistics. The diary activities are in hours per day. Childcare for 0 through 3-year old children is estimated in the restricted sample of families having at least an infant. Wage rates are averaged over positive values only.

Figure 1 Proportion of children with mothers and father during day-time.



1.62. A tiny share of women benefit from a leave scheme while a larger group takes advantage of a paid housework.

Women and men. Women clearly take the lead in generic childcare, with almost twice as much time as men, irrespective of their employment status (Table 1). The average time per day women spend in primary childcare is 2.16 hours per day, most of which is accounted for by basic childcare (1.41 hours/day). This figure raises to 3.73 hours if women have at least one child under the age of 3, with almost 3 hours of basic childcare, which is overwhelming at early ages. Learning activities are confined to roughly one hour per day for mothers with an infant, far above the 22 minutes registered in the whole sample.In the full sample, women spend slightly more than two times as much time in generic childcare as do men (2.16 hours/day vs. 1.28). However this gap is mainly explained by the basic childcare as in the other two subgroups the partners are comparable (0.38 hours/day for women vs. 0.31 hours/day for men in educational childcare). Interestingly, time spent on educational activities is similar across genders in the family with infants, with women spending on average 30 minutes a day, only 3 minutes more than their partners.

Table 2 Average time devoted to childcare, by age of the child and by work status

	Fathers		Mothers	
	Employed	Not-employed	Employed	Not-employed
Child under 18 (full sample)				
Primary childcare				
Generic	0.598 (1.004)	0.917 (1.518)	1.220 (1.596)	1.721 (1.905)
Educational	0.312 (0.713)	0.315 (0.710)	0.371 (0.714)	0.411 (0.734)
Travel	0.074 (0.391)	0.068 (0.316)	0.084 (0.349)	0.113 (0.414)
Total	1.233 (1.911)	1.553 (2.288)	1.934 (2.330)	2.508 (2.623)
Secondary childcare	1.093 (1.913)	1.495 (2.315)	2.251 (2.333)	2.893 (2.913)
Observations	1994	417	1448	963
Child under 3				
Primary childcare				
Generic	1.696 (1.979)	1.306 (1.376)	2.675 (2.056)	3.365 (2.025)
Educational	0.543 (0.792)	0.555 (0.922)	0.630 (0.896)	0.599 (0.837)
Travel	0.037 (0.219)	0.064 (0.375)	0.089 (0.328)	0.113 (0.486)
Total	2.748 (2.621)	2.468 (2.469)	3.981 (2.772)	4.596 (2.630)
Secondary childcare	1.239 (1.955)	1.635 (1.974)	2.671 (2.498)	3.534 (3.079)
Observations	115	495	356	254

Standard deviations in brackets. Statistics based on the sample of individuals aged 18 and older (full sample), who have at least one child under the age of 3, who are married or cohabiting, and from whom there is complete information on all the variables used in the analysis

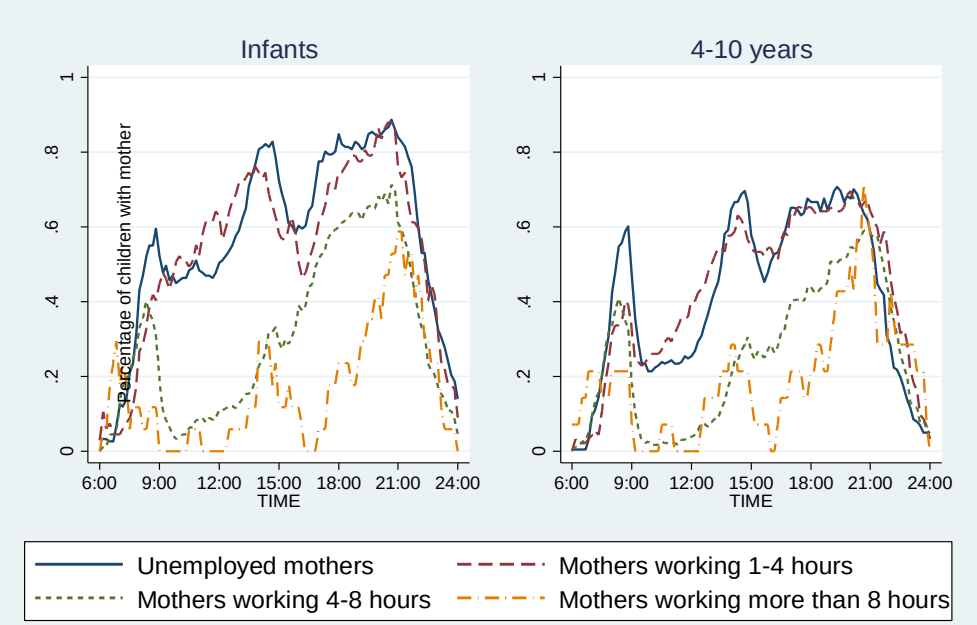
Women and, to a larger extent, men perform more housework than childcare: at the mean, women spend more than 4 hours in household tasks, men 2 hours and 20 minutes. However, while this figure is pretty flat over educational groups for males, it is steeply negative for females. Mothers seem to reduce their efforts in housework , maybe with the help of appliances and paid housework, to carve out additional time to devote to their children.

Childcare over the daytime. The mother–child and father–child time are examined by time of day, and compared across cohorts and between weekends versus weekdays, to give an initial overview of the nature of parental time with children. Each figure indicates the mother–child and father–child time when the child is awake at that time (which is the sum of primary and secondary childcare). Figure 1 shows that the distribution of childcare follows a three-mode pattern either for men or women during weekdays, with peaks corresponding to the three main daily meals. At the peak evening times, within a 10-minute period, about 80% of children are with their mother and about 65% with their father.

Mother-child time differ by age of child, with mothers more likely to be with infants during the daytime. On weekends, the mother–child and father–child time converge, although children are still more likely to be with their mother than with their father across the day. Here younger children are somewhat more likely to be with either parent during the daytime hours, although infants are more likely to spend some of their day sleeping.

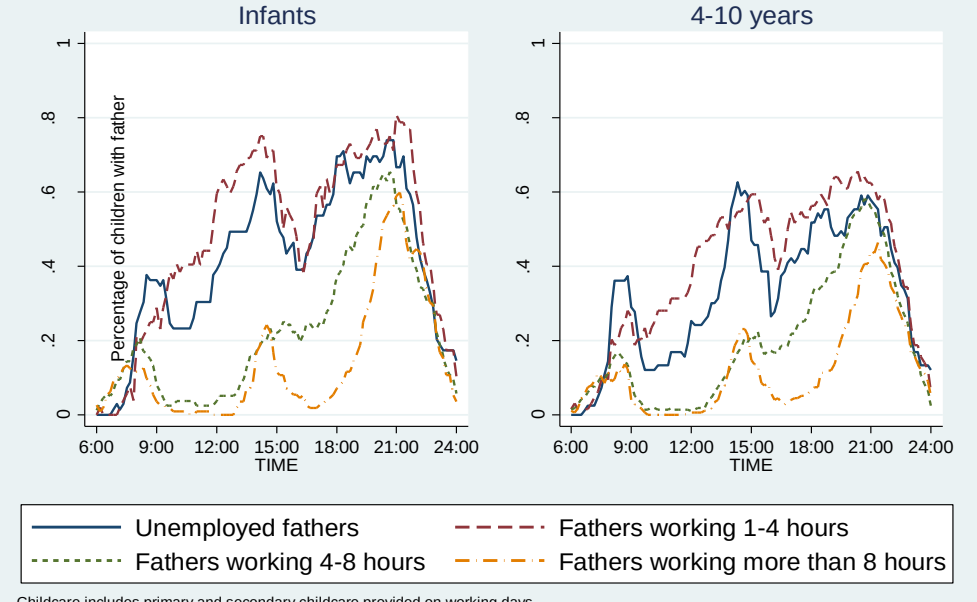
Employment status. These differences are not fully explained by the men's commitment to the labour market balanced out by women's specialization in household tasks (Table 2). Even restricting the analysis to the working individuals, women spend an average of 1.93 hours/day on primary childcare, roughly 42 minutes more than working men (1.23 hours/day). Unsurprisingly, this gender gap is apparent also between non-working mothers and fathers: 2.50 vs. 1.55 hours/day . More interestingly the gap between working and non-working mothers is barely constant when considering the primary childcare devoted to kids under 3, although the amount is definitely higher (3.98 hours/day for working mother 4.596 hours/day for their unemployed counterparts) and is even reversed as far as the educational childcare is concerned (0.63 hours/day vs. 0.60 hours/day). Working mothers seem to try to limit their spare-time disadvantage at the early stages of their children compared to their non-working counterparts. This phenomenon enlarges between working and non-working men: although the latter devote more time to children in the large sample, the former spend 30 percent more of their total childcare time with their new-born offspring. Hence, employed men contribute more in terms of childcare than their non-employed counterparts only when their children are young. However, this data do not account for potential self-selection problems since working women with children may have chosen more flexible or lighter jobs. Turning to childcare allocation over daytime, Figure 2 shows that mothers who usually spend longer hours in paid employment (in weekdays) are less likely to be with the child over the day, although being in paid employment for fewer than 3 hours/day is associated with very little difference in mother–child time compared to not being in paid employment. The 4–10 year old children are often not with their mothers between 10 am and 3 pm, even if the mother was not employed, reflecting children's participation in child care or early education programs such as preschool. There is no evidence here that employed mothers, or those working longer hours, make up time with their children by spending longer

Figure 2 Proportion of children with mothers by mother's paid work during day-time for weekdays.



Childcare includes primary and secondary childcare provided on working days
Infants: 0-3 year old children
Source: Encuesta Empleo del Tiempo 2009-2010

Figure 3 Proportion of children with fathers by father's paid work during day-time for weekdays.



Childcare includes primary and secondary childcare provided on working days
Infants: 0-3 year old children
Source: Encuesta Empleo del Tiempo 2009-2010

with them in the morning or evening. They just concentrate their childcare activities early in the morning and at dinner-time.

Figure 3 shows that fathers' presence was also associated with their paid work hours, although differences are quite small by hours worked for those employed Longer than 4 hours —the majority of fathers. For these fathers, few are with their child during the daytime. Differences by hours are a little more apparent early in the afternoon and evening, as those working short full-time hours may have come home from work sooner than those working longer hours.

The groups that stand out are the fathers who were not employed or who were in 1-4 hour work —they spend more time with their children than fathers in full-time employment. However, these fathers were the minority. Also, comparing back to the mothers' graph (Figure 2), these fathers were still not as likely to be with the children as the not-employed or part-time-employed mothers.

Education. The time allocated to childcare varies substantially by the level of education, with highly-education individuals spending significantly more time on childcare. This trend holds, albeit less steep, for men. Non-working and working women who did not accomplish the secondary school spend an average 1.36 and 0.66 hours/day in total childcare, respectively, while their counterparts who at least graduated spend 2.38 and 1.49 hours/day in average. The gains in primary child time for highly-educated mother are similar across employment status, with non-working women spending constantly 55 minutes more than their counterparts, for each educational level. In other words, the educational gradient is equal while the intercept shifts downwards by an almost constant amount of time. However, this gap nearly fades out in the educational childcare and even reverts for high-educated women, who devote more time to educational activities than their counterparts. For men, the gains in primary and educational childcare time for higher levels of qualifications are substantial and even larger for non-working fathers, which suggests that highly educated non-working men use more of their extra free time for childcare than do less educated non-working men. Further, high-educated women tend to have fewer children (1.83 vs. 2.27 for those with no high-school education), although they spend more time with them, which makes the pattern of childcare across education groups rather unexpected. Higher-educated women are also slightly more likely to be married. In this case it is worth to distinguish the case of never-married women from those who had a separation.

Table 3 Average time devoted to childcare, by education and work status

	Fathers		Mothers	
Childcare	Employed (N=1994)	Not-employed (N=417)	Employed (N=1448)	Not-employed (N=963)
Below secondary				
Primary childcare				
Generic	0.367 (0.786)	0.665 (1.254)	0.657 (1.107)	1.358 (1.808)
Educational	0.206 (0.562)	0.195 (0.494)	0.124 (0.393)	0.260 (0.600)
Travel	0.073 (0.423)	0.057 (0.340)	0.105 (0.558)	0.048 (0.267)
Total	0.830 (1.690)	1.064 (1.800)	0.982 (1.564)	1.820 (2.363)
Secondary childcare	1.281 (1.144)	1.388 (1.329)	1.247 (1.110)	1.431 (1.576)
Observations	303	117	167	245
Secondary school				
Primary childcare				
Generic	0.445 (0.878)	0.950 (1.297)	0.922 (1.381)	1.597 (1.732)
Educational	0.233 (0.663)	0.324 (0.594)	0.314 (0.785)	0.434 (0.826)
Travel	0.060 (0.370)	0.061 (0.298)	0.061 (0.282)	0.097 (0.345)
Total	0.945 (1.791)	1.603 (2.083)	1.500 (2.247)	2.409 (2.622)
Secondary childcare	1.269 (1.144)	1.826 (2.574)	1.485 (1.720)	2.055 (2.860)
Observations	483	151	270	298
Bachillerato and vocational studies				
Primary childcare				
Generic	0.647 (1.011)	1.274 (2.022)	1.283 (1.554)	1.888 (1.890)
Educational	0.353 (0.750)	0.477 (1.017)	0.359 (0.706)	0.495 (0.730)
Travel	0.069 (0.360)	0.087 (0.315)	0.076 (0.316)	0.162 (0.519)
Total	1.339 (1.862)	2.234 (2.978)	1.989 (2.306)	2.857 (2.610)
Secondary school	1.538 (2.238)	1.693 (3.184)	1.590 (1.642)	2.083 (3.031)
Observations	728	111	486	308
Graduate and Postgraduate				
Primary childcare				
Generic	0.823 (1.165)	0.791 (1.174)	1.492 (1.790)	2.382 (2.347)
Educational	0.393 (0.772)	0.302 (0.599)	0.487 (0.737)	0.444 (0.677)
Travel	0.096 (0.435)	0.072 (0.260)	0.095 (0.323)	0.165 (0.490)
Total	1.613 (2.131)	1.401 (1.827)	2.408 (2.467)	3.313 (2.840)
Secondary childcare	1.780 (2.303)	1.416 (1.320)	1.921 (2.402)	2.113 (2.257)
Observations	480	32	525	112

Standard deviations in brackets. Statistics based on the sample of individuals aged 18 and older (full sample), who have at least one child under the age of 3, who are married or cohabiting, and from whom there is complete information on all the variables used in the analysis

Table 4 Education, household-level childcare by gender burden and joint childcare

	Total primary childcare (hours/day)	Mother's share of primary childcare (share)	Joint primary childcare (hours/day)	Joint mother's and father's childcare over total primary childcare
Mother's education				
Less than secondary	2.294	0.677	0.266	0.041
Secondary	3.022	0.692	0.412	0.061
Bachillerato & Vocational	3.649	0.669	0.500	0.073
Graduate & Postgraduate	4.335	0.614	0.662	0.093
Father's education				
Less than secondary	2.600	0.701	0.309	0.047
Secondary	3.212	0.697	0.430	0.061
Bachillerato & Vocational	3.764	0.639	0.527	0.079
Graduate & Postgraduate	3.982	0.620	0.624	0.086

Statistics based on the sample of individuals aged 18 and older (full sample), who have at least one child under the age of 3, who are married or cohabiting, and from whom there is complete information on all the variables used in the analysis

The second category is particularly conspicuous in the low-educated women (Bernardi & Martinez-Pastor, 2010) who are more exposed to the risk of separation and divorce and, hence, bearing the whole amount of childcare.

Table 4 highlights that total parental care varies considerably with education, and in particular with mother's. However, the share of women's contribution shrinks at higher educational levels, both of mothers' and fathers' and the amount of joint childcare, albeit more responsive to mothers' education, is positively related to the educational achievements of both partners. This outcome confirms the claim that higher education may be associated with greater acceptance of the current social norms about parenting, which have remarkably developed for men in the latest decades.

5. Theoretical framework and empirical strategy

The primary goal of this analysis is to identify how Spanish parents consider their time spent on childcare. Theoretical models predict different allocations for home production and leisure, according to individual preferences. Childcare is often categorized as a form of home production and, as a consequence of this

assumption, models predict a specific pattern for different levels of education and income.

In contrast to the economic theoretical claim, individuals often consider time spent with their children more attractive than home production activities (Krueger *et al.*, 2009) so that the time they spent with their children is more akin to leisure rather than to home production. Although it might seem misguided to classify such a manifold activity as childcare as leisure or home production, economic models can help disentangle this problem. In the following paragraph we will illustrate some principles of economic and sociologic models of time use that exemplify how types of time allocation vary across people with different education and wages, which economist assimilate to the opportunity cost of one's time.

The Consumption theory depicts the family economics approach, systematized by (Barro & Becker; 1988, 1989) suggests that parents are altruistic towards their kids. In this perspective parents derive utility from three elements: home-produced goods, leisure and well-cared-for children. Indeed having healthy kids directly contributes to parents' utility either because parents are altruistically concerned about their offspring's future happiness, or because parents may just selfishly expect to receive back a monetary transfer from their offspring in their old age (Caldwell, 1978). Kids thus resemble a "consumption" good in the utility function of their parents, who optimally decide to share their resources between their own consumption and the consumption of their offspring.

Following Becker (1965), each consumption good is produced using a combination of market expenses and time. Two out of the three elements involved in parents' utility function, home production and leisure, are classified based on the elasticity of substitution between time and goods in their production (Aguiar and Hurst, 2007). The former is characterized by a high substitutability between time and market inputs. For example, home-made food can easily be substituted by pre-processed food. The latter features a fairly low level of substitutability between time and market goods because activities such as socializing with friends and watching a movie are more time-intensive and cannot be substituted for by ready-made market surrogates. Childcare is not easily classifiable such as the other two elements in parents' utility function.

The classification of parents' activities under the categories of home production, leisure and childcare is not purposeless. In this context, time allocation of each of

the previous activities vary with the parents' opportunity cost of time, hence with wage and educational level.

A higher wage induces people to substitute home production, leisure and childcare activities for longer working hours because the opportunity cost of work is higher. This effect is larger for home-production because home-made goods are relatively more substitutable by market surrogates. A higher wage also brings a positive income effect, which leads people to desire more of all goods. The income effect is larger for goods whose elasticity to income is high. The argument outlined above suggests that the higher wage should depress time devoted to home production rather than to leisure. If childcare is akin to home production, it decreases because of the greater opportunity cost of time. On the other hand, if time spent with children follows a pattern similar to leisure, it is possible to conclude that parents treat childcare as a form of delightful activity.

Moreover, highly skilled people are very likely to enter the job market. On the other hand, low-skilled people, and in particular mothers, may prefer to stay home and grow their offspring. In fact, because the opportunity costs of foregoing wages are higher, people who invest more in their own higher education are drawn to allocate more time to paid than to unpaid labour, according to the Beckerian framework. Therefore the theory predicts that educated parents spend less time doing household work and childcare, if it is akin to housework tasks, and are likely to have fewer children because the opportunity costs of leaving the workforce are greater for the more highly educated.

5.1 Econometric specifications

We estimate multivariate ordinary least squares models of the determinants of the time parents allocate during a day to childcare, paid work and housework.

As we pointed out in the previous section a large number of parents reported not spending any time on childcare. This is could be partly explained by the occurrence of an atypical day for some individuals. However if the observed zeros were zeros on any other possible day, OLS regression should produce robust estimation. Recent evidence (Stewart, 2009) shows that, for time use data, the ordinary squares method may be a better estimator than the Tobit model, which is generally used for censored data.

Further, market time as well as child care time are modeled in recognition of the importance and the endogeneity of labor supply decisions in all time allocation decisions: since working hours are jointly determined with parents' childcare time, standard estimation techniques may lead to biased estimates. An IV approach that explicitly assumes endogeneity with respect to parents' labour supply[3] would be preferable but is precluded because of the lack of any credible instrument in the survey.

In order to deal with this problems, we present two strategies. The first specification measures the educational gradient with an OLS regression for four distinct categories: working and non-working mothers, working and non-working fathers. Let t_{jk} denote the time spent on activity j with $j = \{Childcare, housework\ paid\ work\}$ by household member $k = \{mother, father\}$ of household $i(i = 1, \dots, N)$. The time spent on any given activity depends on educational level μ_{ik} and other observed characteristics x_{ik} and error term ε_{ijk}.

$$t_{ijk} = \psi_k \mu_{ik} + \beta_k x_{ik} + \epsilon_{ijk}$$

We introduce dummy variables representing the differing levels of educational achievements: individuals who completed secondary school, individuals who completed high-school education (the Spanish "Bachillerato" and vocational education), and individuals who reached graduate and post-graduate education. Persons who did not completed the secondary school are the residual category and, hence, the omitted group, so that the coefficient on the other levels of education can be interpreted as additional hours spent with children compared to the reference group. Controlling for additional factors permits to correct pattern of education for hidden trends and spurious association between socio-demographic characteristics and attitudes towards childcare. As controls, we include the marital status, the number of children, and whether children aged 0-3 are present in the household. Further we control for the age of the parent which is expected to negatively correlated with care time because older parents have generally older and less time-consuming children (Esping Andersen & Bonke, 2008); the last three

[3] If this prediction of the Becker holds true, parents entering the job market self-select from the population: high-educated parents are more likely to search for a job because their cost of forgone income is higher.

control are a possible proxy for mother's career commitment, since a well-established claim contends that women face steep opportunity costs postponing motherhood (Hotz *et al.*, 1997). Eventually[4] we include whether the mother is on maternity leave, which simultaneously measures the presence of an infant, and purchased help from, for instance, a child-minder.

The model presented to this point could also be expanded to allow both productivity of time and tastes for goods to vary according to a person's earning capacity. For example, high-educated and/or high-wage individuals might be more efficient in the production of home-made goods, as well as childcare activities. This inclination may lead them to spend more time in housework activities or, on the contrary, produce the same output in less time. Secondly, partners' relative productivities can translate into bargaining power that, in turn, affects specialization (Lundberg *et al.*, 1997) and housework tasks. On the one hand the marginal return to spending additional time in home production is higher for individuals with higher non-market productivity. On the other hand, the most productive parents can produce the same output in less time or, according to the bargaining theory, exploit their dominant position to reduce their housework and caring efforts. These effects are opposite and may balance out so that the inclusion of a proxy for the productivity may have an ambiguous effect on the individuals' time allocation. To identify the impact of market productivities, we include the parents' declared monthly wage. The inclusion of a proxy for parents' productivity would also imply that education would, more unambiguously, capture non-market characteristics such as preferences, cultural norms, and possibly parenting talent because highly educated parents are supposed to have stronger prioritization of children (Gauthier *et al.*, 2004, Esping Andersen & Bonke, *ibid.*).

The second model explicitly addresses the impact of market productivities and the preferences for childcare. This specification also takes into account the fact that employment, housework and childcare time are endogenously determined but does not deal with the possibility that childcare time spent by mothers and fathers is correlated.

We simultaneously model three time-allocation equations – for every activity mentioned above – using a Seemingly Unrelated Regression model (SUR). The

[4] We also control for geographical fixed effects such as the "Comunidad" the household lives in and the "number of inhabitants" of the hometown. Respectively 16 and 5 dummy variables.

econometric model is sufficiently general that we can test the predictions of the theoretical framework depicted above. The estimation of a structural model is not feasible since there aren't enough information on the market quantities and prices of housework and childcare. We include the wage w_{im} and w_{if} of the husband and wife along with the other variables listed above.

$$t_{ijk} = \alpha_{jk}^{m} \ln w_{im} + \alpha_{jk}^{f} \ln w_{if} + \psi_{ik}\mu_{ik} + \beta_{jk}x_{ik} + \epsilon_{ijk}$$

This system of equations allows the joint estimation of different activities and explicitly recognizes the direct interconnections between caring, paid work and housework, which are testable through the correlations of the residuals, ϵ_{ijh}.[5] The correlation of the residuals among the time-use equations may arise because parents' decision about job commitment are taken with childcare time or because the productivity in the labour market may also reflect high housework skills, if labour market attachment prevents individuals from accumulating housework experience. Further this model assumes that the error terms of these equations are very likely to include some unobservable variables like preferences towards certain childcare types or paid work, which are not observable. As a consequence, since at least some of these unobservables will be the same in all equations, the error terms will very likely be correlated with each other[6]. Estimating the time-allocation equations simultaneously and allowing for correlation in the error terms contributes to correct for the endogeneity determined by the relationship between employment, housework and childcare time. For each partner's equation, the unobserved components are distributed

$$\epsilon_k \sim N(0, \Sigma)$$

Where Σ is the unrestricted variance-covariance matrix of this system, whose dimension is $3x3$.

[5] To avoid over-identification, we exclude leisure and sleeping time so that we run SUR regressions of paid work, housework and childcare for male and female, separately. We have run also separate SUR regressions substituting leisure for housework and paid work. The results are comparable to those we present in the next Section.

[6] In such a situation, if these omitted unobservable variables do not generate endogeneity (i.e. if they are uncorrelated with the observable regressors) we could still estimate each equation separately. However, by doing so we would not be using the information contained in the correlation across the error terms which instead can be exploited when estimating the equations jointly. The name "seemingly unrelated models" suggests the fact that in the absence of explicit cross-correlation restrictions on the parameters, the equations of the system seem to be totally unrelated although in reality they might be related through the error terms. But, since the error terms are unobservable, such relationships do not appear explicitly.

So far, the models have neglected that the time spent on childcare by mothers and fathers is interdependent since it is jointly decided in the household. This means that estimating the two partners' equations separately implies a loss of efficiency compared to a model that estimates the choice of childcare time by mothers and fathers jointly. We address this issue analyzing how parents organize their childcare time with a SUR model specifying two equations for mothers' and fathers' individual care (when the partner is not present) and the third one for the joint childcare time (when both assist their child). Following Esping-Andersen & Bonke (*ibid.*), we add one control to the two previous specifications: a measure of the overlapping work schedule of the two partners. This variable, measured in hours, counts the number of hours the partners spend contemporarily at work and accounts for the probability that the partners share their childcare activities.

6. Results

The data on mother-child and father-child time were analyzed using OLS to determine if educational achievement are associated with more or less time spent with children, after controlling for other child or family characteristics and whether data were collected on the weekend. These results are shown for non-working and working individuals since we assume a systematic difference in the two categories. While there are some interesting relationship between parent-child time and various control factors, these are discussed in the second model, which more broadly analyzes the choice of time allocation.

According to Table 5 non-working graduated women and high-school graduated women spend 0.31 and 0.34 hours per day more than their less educated counterparts, respectively, but only the second coefficient is significant at the 90 percent level. Women who completed secondary school do not significantly differ from the reference group. These differences widen and become significant when estimates concern working mothers. In this case the educational gap amounts to 0. 35 and 0.55 hours/day (roughly 21 and 33 minutes) for high-school and university graduated women, respectively. A similar trend holds for working men. Those who completed secondary education and had a high-school qualification spend on childcare the same amount of time as their less educated counterparts. This share raises to 0.28 hours/day (about 17 minutes) for the highly educated

fathers. This progression does not hold only for non-working fathers. In this category, no significant difference between highly educated fathers and the reference group is detected. However, rather surprisingly, high-school graduated men are found very devoted to childcare with respect to any other group (39 minutes more than the reference group). This significant finding might be affected by the sample size that is limited to 415 individuals.

The regression analysis differentiating childcare by type confirms the interesting pattern in education for working mothers. For working women, the gradient is apparent for the educational childcare, so that working women with a college degree spend 0.25 hours/day (15 minutes) than their counterparts with less than a high school degree, and also secondary school and high-school graduated women spend significantly more time (nearly 8 minutes/day) than the reference group. The education gradient is less steep with respect to generic childcare but insignificant for the travels.

For non-working mothers the education gradient does not exist in any of the three childcare types the educational childcare. The education gradient is only apparent for the basic childcare but it is non-significant with respect to the educational childcare. Albeit smaller in magnitude, results for working fathers are more similar to working mothers across educational levels. Working college-educated men spend 0.09 hours/day (less than 6 minutes) more than working men with less than secondary education in learning activities and the same gradient holds even more apparent for generic childcare. For non-working men, the educational gradient is not clear but this might be due to the little number of college-educated non-working men.

Tabel 6 shows the differences for time spent in home production and leisure for bot non-working and working women across education groups. The analysis highlights a steep negative education gradient for home production activities and a positive one, although less clear, for leisure. Graduated non-working women spend 0.83 hours/day (48 minutes) less than their less-educated counterparts. The negative gradient is also apparent for working women across the three educational levels. High-education and mothers devote a little more than half an hours less (42 minutes) than the reference group.

The theory predicts that individuals with a high opportunity cost of time, all else equal, are more willing to purchase market substitutes for their home production

Table 5 OLS regressions. Effect of mother's and father's education on childcare time

	Total childcare (1)	Basic childcare (2)	Educational childcare (3)	Travel childcare (4)
		Working mothers (N=1,453)		
Education Level				
Secondary	0.249	0.075	0.143**	-0.050
	(0.178)	(0.120)	(0.068)	(0.035)
Bachillerato & Vocational	0.345**	0.175	0.137**	-0.049
	(0.163)	(0.110)	(0.062)	(0.032)
Graduate & Postgraduate	0.547***	0.219*	0.245***	-0.038
	(0.169)	(0.114)	(0.064)	(0.033)
Adjusted R^2	0.426	0.444	0.117	0.017
		Working mothers (N=953)		
Education Level				
Secondary	0.230	0.040	0.106	0.022
	(0.181)	(0.132)	(0.065)	(0.038)
Bachillerato & Vocational	0.341*	0.085	0.120*	0.096**
	(0.181)	(0.132)	(0.065)	(0.037)
Graduate &Postgraduate	0.310	0.251	-0.008	0.079
	(0.243)	(0.177)	(0.087)	(0.050)
Adjusted R^2	0.456	0.452	0.106	0.051
		Working fathers (N=1,996)		
Education Level				
Secondary	-0.067	-0.029	-0.007	-0.035
	(0.126)	(0.066)	(0.052)	(0.029)
Bachillerato & Vocational	0.148	0.071	0.076	-0.033
	(0.119)	(0.062)	(0.049)	(0.028)
Graduate & Postgraduate	0.280**	0.150**	0.093*	-0.016
	(0.132)	(0.070)	(0.054)	(0.031)
Adjusted R^2	0.253	0.255	0.102	0.029
		Non-working fathers (N=415)		
Education Level				
Secondary	0.141	-0.026	0.069	0.022
	(0.256)	(0.175)	(0.089)	(0.042)
Bachillerato & Vocational	0.653**	0.287	0.181**	0.011
	(0.255)	(0.174)	(0.088)	(0.042)
Graduate & Postgraduate	-0.241	-0.236	-0.000	0.004
	(0.394)	(0.269)	(0.137)	(0.065)
Adjusted R^2	0.302	-0.026	0.069	0.022

Notes: Standard errors in parentheses. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1. The conditional differences in time use are expressed in units of "hours per day". Conditional differences report the coefficients from regressions of time spent in each time use category on education dummies (with "not completing secondary school" being omitted), age, number of children dummies, a married dummy, age of youngest child dummies, number of work hours dummies (more than 0 and less than4, between 4 and 8, more than 8), paid housework, mother on leave, day of questionnaire (whether weekend or weekday), regional fixed effects, urban population dummies. Robust standard errors are in parentheses. Samples include all men and women between the ages of 16 and 60 (inclusive) that have at least one child under the age of 18.

Table 6 OLS regressions. Effect of mother's and father's education on housework and leisure.

	Working mothers (N=1,453)		Non-working mothers (N=953)	
	Housework (1)	Leisure (2)	Housework (3)	Leisure (4)
Education Level				
Secondary	-0.314*	0.268	0.038	0.068
	(0.189)	(0.200)	(0.201)	(0.202)
Bachillerato & Vocational	-0.444**	0.176	-0.320	0.094
	(0.173)	(0.183)	(0.201)	(0.202)
Graduate & Postgraduate	-0.700***	0.273	-0.834***	0.511*
	(0.179)	(0.190)	(0.270)	(0.271)
Adjusted R^2	0.246	0.279	0.216	0.140
	Working fathers (N=1,996)		Non-working fathers (N=415)	
	Housework (1)	Leisure (2)	Housework (3)	Leisure (4)
Education Level				
Secondary	0.217*	0.184	-0.004	-0.113
	(0.127)	(0.163)	(0.329)	(0.370)
Bachillerato & Vocational	0.295**	0.127	0.152	-0.510
	(0.120)	(0.153)	(0.329)	(0.370)
Graduate &Postgraduate	0.173	0.399**	0.191	-0.515
	(0.134)	(0.171)	(0.508)	(0.571)
Adjusted R^2	0.192	0.424	-0.004	-0.113

Notes: Standard errors in parentheses. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1. The conditional differences in time use are expressed in units of "hours per day". Conditional differences report the coefficients from regressions of time spent in each time use category on education dummies (with "not completing secondary school" being omitted), age, number of children dummies, a married dummy, age of youngest child dummies, number of work hours dummies (more than 0 and less than4, between 4 and 8, more than 8), paid housework, mother on leave, day of questionnaire (whether weekend or weekday), regional fixed effects, urban population dummies. Robust standard errors are in parentheses. Samples include all men and women between the ages of 16 and 60 (inclusive) that have at least one child under the age of 18.

.

Table 7 OLS regressions. Effect of mother's and father's education on "secondary" childcare time

	Total childcare (1)	Basic childcare (2)	Educational childcare (3)	Travel childcare (4)
		Working mothers (N=1,453)		
Education Level				
Secondary	0.056	0.033	0.010	-0.006
	(0.115)	(0.051)	(0.047)	(0.004)
Bachillerato & Vocational	0.116	0.056	0.025	-0.006
	(0.105)	(0.047)	(0.043)	(0.004)
Graduate & Postgraduate	0.339	0.096	0.105	-0.004
	(0.209)	(0.059)	(0.065)	(0.002)
Adjusted R^2	0.069	0.030	0.068	0.010
		Non-working mothers (N=953)		
Education Level				
Secondary	0.169	0.095	-0.022	0.008
	(0.135)	(0.062)	(0.076)	(0.009)
Bachillerato & Vocational	0.223	0.104*	0.015	0.012
	(0.155)	(0.062)	(0.076)	(0.009)
Graduate &Postgraduate	0.252	0.123	0.002	0.003
	(0.181)	(0.080)	(0.102)	(0.012)
Adjusted R^2	0.085	0.035	0.079	0.005
		Working fathers (N=1,996)		
Education Level				
Secondary	-0.017	-0.012	0.023	-0.013
	(0.071)	(0.035)	(0.020)	(0.009)
Bachillerato & Vocational	0.086	0.036	0.028	-0.010
	(0.067)	(0.032)	(0.019)	(0.007)
Graduate & Postgraduate	0.176*	0.083	0.043*	-0.016
	(0.095)	(0.046)	(0.025)	(0.010)
Adjusted R^2	0.059	0.020	0.047	-0.033
		Non-working fathers (N=415)		
Education Level				
Secondary	0.093	0.037	0.027	0.007
	(0.147)	(0.062)	(0.074)	(0.008)
Bachillerato & Vocational	0.122	0.047	0.019	0.005
	(0.147)	(0.062)	(0.074)	(0.008)
Graduate & Postgraduate	0.059	-0.011	0.076	0.002
	(0.227)	(0.096)	(0.114)	(0.013)
Adjusted R^2	0.054	0.036	0.031	-0.006

Notes: Standard errors in parentheses. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1. The conditional differences in time use are expressed in units of "hours per day". Conditional differences report the coefficients from regressions of time spent in each time use category on education dummies (with "not completing secondary school" being omitted). Other covariates as listed in Tables 5 and 6

time and thereby reduce their time input into home production tasks, as compared with leisure. This intuition is clearly validated for either working and non-working women by the empirical evidence. For men, this phenomenon might not hold because, for instance, the relative productivity in home production follows a different pattern by educational attainment.

Using the alternative specification of childcare performed as a secondary activity, there is no education gradient with respect to spending time in the presence of one's children for either working women, non-working women, working men and non-working men. All differences are between education groups are conditioned on demographics. The baseline of this analysis highlights that even though parents of differing education spend similar total time around their children, the nature of the interaction is very different. The main conclusion is that high educated parents, especially among those who are employed, spend much more time in activities where childcare is defined as the primary activity.

In tables 8 and 9 we present the results of the model estimating mother's and father's time allocation of childcare, housework and paid work. We find strong evidence of educational gradient for childcare. In contrast to the previous cross-section estimate, we find a comprehensive estimate for either working and non-working mothers. Indeed, this estimation takes into account the underlying preferences for childcare, employment and housework, captured by the residuals. More in detail, this model considers the "background" choices of time allocation and the correlations among them.

Unsurprisingly mothers are found to spend significantly more time on infants' and 4 through 10-year-old-children (roughly 2 hours/day and 1 hour/day respectively). In particular the presence of an infant reduces mother's effort in housework and paid work, which signals the use of part-time or flexible job schemes. This negative effect vanishes when children are older and mothers might have resumed their full-time occupation. The estimated coefficients are nearly twice as large for women as for men. Mother's wage does not affect her childcare time. However, it significantly impacts on their labour supply. High-income (and more productive) mothers choose to sacrifice housework rather than assistance to their children. This result confirms the negative correlation between maternal labour market time and housework tasks documented in the literature. In other words, mothers trade off less housework for paid work to resolve their time constraints. Mothers

benefitting from maternal leave almost entirely transfer their forgone work time to childcare with no additional effort devoted to housework. In this light, those who can afford some form of paid housework, allocate more time to childcare rather than to paid work. Mother's age is negatively related to childcare time, along with the age difference between father and mother. The number of children reduces caring time and causes the mother to spend more in housework.

Turning to fathers, Table 9 confirms the existence of an educational gradient, albeit less apparent than that for women. Coherently with Esping-Andersen & Bonke (2008) father's childcare is significantly driven by education, with high-school and university graduated being clearly more involved than their counterparts and education has no effect on labour supply. Further, coherently with Sayer et al. (2004) we find that education effect is stronger for mothers than for fathers. The model suggests that men's childcare time and housework is inelastic with respect to their market productivity while the opportunity cost of their involvement in the labour market is positively linked to their wage. Interestingly, the higher the wife's wage, the more time her husband spends on housework and childcare. It is plausible that high-wage women have more negotiating power within the household, resulting in a little more housework and childcare carried out by men. The presence of a boy does not entail any additional contribution by fathers in childcare, as previously claimed by Lundberg *et al.* (2007), but only in working hours. The negative sign associated to outside help is a reflections of individual preferences: it signals fathers' attempt to freeing up their time from unpleasant activities, when it is possible.

Although the previous model captures preference and productivities only via proxies, an overview of the estimations suggests that parents' education matter in allocation of time to childcare and is more relevant than market productivity.

The last model, which deals with the joint childcare of parents, permits to analyze the topic under another perspective. We do no longer assess how individuals' activities influence one another but we point out at the cross-influences of parents' childcare activities. Indeed, in this model we combine the preferences for childcare of both parents in each parent's childcare equation and in the joint childcare equation.

Again, mothers' and fathers' education have a significant effect on the time they spent in their own childcare but no individual's preference influences partner's

caring time: father's education does not affect mother's care of children and vice versa. Further, the coefficients associated with education, albeit depicting again some kind of gradient, nearly halve. However, highly-educated parents appear more willing to spending caring time together than their counterparts. In line with the previous literature, parental market productivities do not play any role in how Spanish couples organize their childcare. Age differential between partners drives negatively the choice of joint care. The number of children does not represent for parents an incentive to spend childcare activities together. This result is consistent with the previous outcomes and may just be the consequences that higher-education parents, who are more inclined to joint childcare, are also those with the lowest fertility across the educational groups. This model raises a partial confutation of parents' gender preferences. Fathers are indeed likelier to spend more individual time with their sons rather with their daughter. The boy-effect is therefore a manifestation of gendered preferences which vanishes in joint caring. Parenting patterns during mother's leave are particularly revealing of parents preferences. When the mother's stays home, her childcare time greatly raise but almost (and not significantly) decreases father's. However, joint time increases. It seems that parents use maternal leave as an opportunity to better specialize in childcare, but do not forgo the chance to jointly care their children, because they might consider it as an enjoyable activity.

Table 8 SUR regressions. Effect of mother's preferences and productivities on childcare, housework and paid work

	Childcare (1)	Mother Housework (2)	Paid work (3)
Educational level (preferences)			
Secondary	0.272**	-0.122	-0.195
	(0.124)	(0.146)	(0.180)
Bachillerato & Vocational	0.374***	-0.586***	0.298*
	(0.120)	(0.140)	(0.173)
Graduate & Postgraduate	0.527***	-0.875***	0.230
	(0.136)	(0.160)	(0.197)
Wage (productivities)			
Mothers' wage (log)	-0.131	-0.267**	0.722***
	(0.094)	(0.110)	(0.136)
Fathers' wage (log)	0.172*	0.021	-0.336**
	(0.095)	(0.112)	(0.138)
Missing mothers' wage	-0.200	-0.410	1.686*
	(0.636)	(0.747)	(0.921)
Missing fathers' wage	0.878	-0.287	-1.513
	(0.686)	(0.805)	(0.993)
Mother's Age	-0.046***	0.049***	-0.015
	(0.007)	(0.008)	(0.010)
Age difference in years (father-mother)	-0.023***	0.024**	-0.016
	(0.009)	(0.010)	(0.012)
Married couple	0.052	0.036	-0.429**
	(0.142)	(0.167)	(0.206)
Child aged 0-3	1.591***	-0.262***	-0.265***
	(0.086)	(0.101)	(0.125)
Number of children	0.275***	0.069	0.056
	(0.070)	(0.082)	(0.101)
Boy in the household	-0.037	0.034	0.195
	(0.087)	(0.103)	(0.126)
Mother on leave	3.004***	0.197	-2.949***
	(0.361)	(0.423)	(0.522)
Paid Housework	0.239*	-0.434***	-0.202
	(0.138)	(0.162)	(0.200)
Constant	2.520***	3.808***	2.802**
	(0.884)	(1.037)	(1.279)
Observations	1,774	1,744	1,744
Adjusted R^2	0.421	0.194	0.360

Notes: Standard errors in parentheses. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1. The conditional differences in time use are expressed in units of "hours per day". Conditional differences report the coefficients from regressions of time spent in each time use category on education dummies (with "not completing secondary school" being omitted). Additional controls: late questionnaire completion. Robust standard errors are in parentheses. Observations concern working days.

Table 9 SUR regressions. Effect of father's preferences and productivities on childcare, housework and paid work

	Childcare (1)	Mother Housework (2)	Paid work (3)
Educational level (preferences)			
Secondary	0.077	0.147	0.286
	(0.126)	(0.149)	(0.269)
Bachillerato & Vocational	0.340***	0.161	-0.092
	(0.119)	(0.141)	(0.254)
Graduate & Postgraduate	0.431***	0.048	-0.439
	(0.141)	(0.167)	(0.300)
Wage (productivities)			
Mothers' wage (log)	0.186*	0.381***	-0.940***
	(0.095)	(0.113)	(0.202)
Fathers' wage (log)	-0.085	-0.089	0.609***
	(0.094)	(0.111)	(0.199)
Missing mothers' wage	0.743	1.432*	-3.636***
	(0.646)	(0.765)	(1.374)
Missing fathers' wage	-0.151	0.377	0.567
	(0.674)	(0.798)	(1.434)
Mother's Age	-0.028***	0.015*	-0.031**
	(0.007)	(0.009)	(0.016)
Age difference in years (father-mother)	-0.019**	0.008	-0.023
	(0.009)	(0.011)	(0.020)
Married couple	-0.034	-0.088	-0.142
	(0.156)	(0.185)	(0.333)
Child aged 0-3	1.022***	-0.019	-0.170
	(0.095)	(0.113)	(0.203)
Number of children	0.056	-0.024	0.136
	(0.075)	(0.088)	(0.159)
Boy in the household	0.031	-0.080	0.441**
	(0.092)	(0.109)	(0.196)
Mother on leave	0.113	0.443	0.232
	(0.418)	(0.494)	(0.888)
Paid Housework	0.062	-0.360**	0.375
	(0.146)	(0.173)	(0.310)
Constant	1.492	-0.044	7.736***
	(0.917)	(1.085)	(1.950)
Observations	1,774	1,744	1,744
Adjusted R^2	0.421	0.194	0.360

Notes: Standard errors in parentheses. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1. The conditional differences in time use are expressed in units of "hours per day". Conditional differences report the coefficients from regressions of time spent in each time use category on education dummies (with "not completing secondary school" being omitted). Additional controls: late questionnaire completion, urban population fixed effects. Robust standard errors are in parentheses. Observations concern working days.

Table 10 SUR regressions. Effect of parents' preferences and productivities on individual and joint childcare time

	Mother's childcare (1)	Father's childcare (2)	Joint childcare (3)
Mother's educational level (preferences)			
Secondary	0.139	-0.038	0.087
	(0.121)	(0.089)	(0.112)
Bachillerato & Vocational	0.244**	-0.017	0.096
	(0.116)	(0.085)	(0.107)
Graduate & Postgraduate	0.264**	0.112	0.254**
	(0.133)	(0.098)	(0.123)
Father's educational level (preferences)			
Secondary	0.055	-0.045	0.134
	(0.115)	(0.085)	(0.106)
Bachillerato & Vocational	0.025	0.178**	0.162
	(0.109)	(0.081)	(0.101)
Graduate & Postgraduate	-0.103	0.096	0.249**
	(0.130)	(0.096)	(0.121)
Wage (productivity)			
Mothers' wage (log)	-0.073	0.040	-0.017
	(0.080)	(0.059)	(0.074)
Fathers' wage (log)	0.059	-0.063	0.086
	(0.082)	(0.061)	(0.076)
Mother's Age	-0.024***	-0.010**	-0.030***
	(0.006)	(0.004)	(0.005)
Age difference in years (father-mother)	-0.003	-0.005	-0.021***
	(0.007)	(0.005)	(0.007)
Married couple	0.112	-0.069	-0.050
	(0.121)	(0.089)	(0.112)
Child aged 0-3	1.151***	0.406***	1.074***
	(0.073)	(0.054)	(0.068)
Number of children	0.222***	-0.109**	0.221***
	(0.259)	(0.044)	(0.055)
Boy in the household	-0.013	0.134**	-0.017
	(0.074)	(0.055)	(0.069)
Mother on leave	1.628***	-0.315	0.975***
	(0.307)	(0.226)	(0.284)
Paid Housework	0.345***	0.123	-0.050
	(0.118)	(0.087)	(0.109)
Overlapping work schedule (hours)	-0.058***	-0.035***	-0.035**
	(0.016)	(0.011)	(0.014)
Constant	1.805**	1.106**	1.163*
	(0.764)	(0.564)	(0.706)
Observations	1,774	1,774	1,774
Adjusted R^2	0.302	0.106	0.246

Notes: Standard errors in parentheses. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1. Additional controls: late questionnaire completion. Robust standard errors are in parentheses. Observations concern working days.

7. Conclusions

The empirical analyses suggest coherent conclusion about how individuals spend their time in child care relative to alternative uses of their time. The education gradient is negative for home production, indefinite for leisure and generally positive for paid work and childcare time, especially for mothers. Time spent caring for one's children appears to be substantially distinct from the other uses of time. Some economists have advanced the hypothesis that higher levels of education are systematically linked to more comfortable jobs that enable parents to spend more time with their children. Alternate interpretations contends that the greater time input among educated parents suggests, in any case, that they discount the value of earnings or other utilities against the expected return to their child investments. Such decisions reflect a strong prioritization of children. Neither of the interpretation can be a-priori rejected. Nevertheless we explain below why we are inclined toward the second hypothesis, supported also by a broad scientific consensus, according to which parents' education is the key: being highly educated increases significantly parental time investments and, hence, time.

There might be forces - charmingly called "sensitiveness", "empathy", "affection", "smartness" – arousing parents' enthusiasm for either education or devotion to children. These factors, generally denoted by "unobserved heterogeneity", are difficult to measure. Furthermore, they contemporarily affect the ability of reaching higher educational accomplishments, which are positively related to childcare time, and the success in the job market, which diverts parents from childcare though. Eventually, education is considerably linked with the occupational position and, hence, with time allocation, also through this indirect channel. Therefore, on the one hand, education may be thought of beneficial with respect to the allocation of time to childrearing. On the other hand, it may turn out detrimental.

However the significant difference in time allocation between highly-educated working and non-working mothers would assign to high-education mothers more abilities to contribute to their infants human capital despite workload and fatigue.

Hence they might be more able to concentrate nurturing activities during daily childcare time and, in line with the pioneering considerations by Leibowitz (1972, 1974), they would also be more able to reconcile their efforts at the workplace and at home.

Additionally, another well-grounded objection to our claim contends that, although higher-educated parents may have a higher return to investing in their children, they can produce the same amount of human capital in their children in less time, being more productive. The empirical strategy using the SUR model aims to tackle just this point. By accounting contemporarily for parents' productivities and preferences, our goal was to net out the opposite forces driving parents' competing choices about childcare, housework and paid work time. Although more empirical work is needed, for instance, to structurally model the decision of entering the job market, as in Bloemen & Stancanelli (2008), the results of our model lead to the interpretation that the additional time investment in childcare by high-education parents overwhelms the reductions due to higher productivity.

Moreover, as an alternative explanation for the educational gradient, mothers may also consider market-purchased childcare options as poor substitute for parental time. In particular highly-educated mothers may be more likely to feel that market alternatives are not good substitutes for their own time spent with their kids. Therefore they could be also more willing to enhance the quality of mother-child relationship. This hypothesis might gain strong support from evidence that adults often state that spending time with their children in recreational activities is among their most enjoyable activities (Krueger *et al.* 2009), notably if compared to other home production activities. From another point of view, we would also suppose that high-education mothers may use better external childcare arrangements while working, thanks to their larger economic resources. This hypothesis is not tested in our study and provides an interesting question for further research.

Turning to wage, the results generally confirm the theoretical predictions claiming that market time responds positively to own wage and negatively to partner's wage. Further, the own wage elasticity of housework of mothers is significant while the cross-wage elasticity is not and, quite surprisingly, cross-wage elasticity of wage for fathers is positive and significant meaning that high-income women may have enough bargaining power to convince their partner to help the perform housework tasks. In addition, as income increases, the marginal utility from time invested into children education is not higher than the marginal utility of a non-educational activity. On the other hand, the positive and slightly significant (at ten percent level) cross-elasticity of wage with respect to childcare time might suggest

that partners may only marginally specialize in their respective fields (such as housework/childcare and work).

In the light of this, we can interpret our focus on joint childcare. If decision regarding childcare were guided by a search for efficiency, we would expect more individual specialization and less joint care, conditional on the spouses' productivities and caring activities. Instead, the evidence of our model is that the couples with higher educational level, and potentially more productive, prefer to care for their children together, which reveals strong preferences for caring.

Bibliography

Aguiar, M., & Hurst, E. (2007). Measuring Trends in Leisure: The Allocation of Time Over Five Decades. *Quarterly Jounral of Economics, 122(3)*, 969-1006.

Álvarez, Begoña and Daniel Miles, 2003. Gender effect on housework allocation: Evidence from Spanish two-earner couples. *Journal of Population Economics* 16(2), 227-242.

Barro, R., & Becker, G. (1989). Fertility choice in a model of economic growth. *Econometrica, vol. 57*, 481-501.

Becker, G. (1965). A Theory of the Allocation of Time. *The Economic Journal 75*, 493-517.

Becker, G., 1973. A Theory of Marriage: Part I. The Journal of Political Economy, 81(4), 813-846.

Becker, G., 1974. A Theory of Marriage: Part II. The Journal of Political Economy, 82(2), S11-S26.

Becker, G. (1981). *A Treatise on the Family.* National Bureau of Economic Research.

Becker, G. (1985). Human Capital, Effort, and the Sexual Division of Labour. *Journal of Labour Economics 3*, S33-S58.

Becker, G., & Barro, R. (1988). A Reformulation of the Theory of Fertility . *Quarterly Journal of Economics, vol. 103*, 1-25.

Bernardi, F., & Martinez-Pastor, J. (2010). Female Education and Marriage Dissolution: Is it a Selection Effect? . *European Sociological Review, Vol. 3, N. 0*, 1-15S.

Bianchi, S. (2000). Maternal Employment and Time With Children: Dramatic Change or Surprising Continuity? *Demography 37(3)*, 401-414.

Bianchi, S. (2000). Maternal Employment and Time With Children: Dramatic Change or Surprising Continuity? *Demography 37(3)*, 401-414.

Bianchi, S., Robinson, J. P., & Milkie, M. (2006). Maternal Employment and Time With Children: Dramatic Change or Surprising Continuity. *Demography, 37(4)*, 401-414.

Bittman, Michael, Paula England, Nancy Folbre, Liana Sayer and George Matheson, 2003. When does gender trump money: Bargaining and time in household work. American Journal of Sociology 109(1), 186-214. 20

Bloemen, H., & Stancanelli, E. (2008). How do parents allocate time : the effects of wages and income. *FCE Working paper, N. 2008-30*.

Caldwell, J. (1978). A Theory of Fertility: From High Plateau to Destabilization. *Population and Development Review, Vol. 4*, 553-577.

Coleman, J. (1988). Social Capital in the Creation of Human Capital. *The American Journal of Sociology*, S95-S120.

Coverman, S. (1985). Explaining Husbands' Participation in Domestic Labor. *Sociological Quarterly 26*, 81-97.

Craig, L. (2006). Does Father Care Mean Fathers Share? *Gender & Society, vol. 20*, 259-281.

England, P., & Farkas, G. (1986). *Households, Employment and Gender: A Social, Economicand Demographic View.* Aldine.

Ermisch, John and Marco Francesconi, 2002. *Intergenerational Social Mobility and Assortative Mating in Britain.* IZA discussion paper no. 465.

Esping Andersen , G., & Bonke, J. (2008). Productivities, Preferences and Parental Childcare. *DemoSoc Working Paper, N. 2008-29*.

Gauthier, A. H., Smeeding, T., & Furstemberg, F. (2004). Are Parents Investing Less Time in Children? Trends in Selected Industrialized Countries. *Population and Development Review, 30(4)*, 647-671.

Gershuny, J., & Robinson, J. P. (1988). Historical Shifts in the Household Division of Labour. *Demography 25*, 537-53.

Guryan, J., Hurst, E., & Schettini Kearney, M. (2008). Parental Education and parrental time with children . *NBER Working Paper 13993*.

Hallberg, D., & Klevmarken , A. (2003). Time for children: A study of parent's time allocation. *Journal of Population Economics, 16*, 205-226.

Haveman, R., & Wolfe, B. (1995). The Determinants of Children's Attainments: A Review of Methods and Findings. *Journal of Economic Literature*, 1829-1878.

Hill, C. R., & Stafford, F. P. (1974). Allocation of time to pre-school children and educational opportunity. *Journal of Human Resources, 9 (3)*, 323-341.

Hill, R. C., & Stafford , F. P. (1974). Allocation of Time to Preschool Children and Educational Opportunity. *The Jounral of Human Resources 9(3)*, 323-341.

Hook, J., & Wolfe, C. (2011). Parental Involvement and Work Schedules: Time with Children in the United States, Germany, Norway, and the UNited Kingdom". *European Sociological Review*.

Hotz, V., Klerman, J., & Willis, R. (1997). The economics of fertility in developed countries. In M. Rosenzweig, & O. Stark, *Hanbook of Population and Family Economics, Vol. 1A* (pp. 276-347). Amsterdam: Elsevier.

Howie, P., Wicks, J., Fitzgerald, J., Dalenberg, D., & Connelly , R. (2006). Mothers' time spent in care of their children and market work: a simultaneous with attitudes as instruments. *Applied Economic Letters*, 503-506.

Huston, A., & Aronson, S. R. (2005). Mothers' Time With Infant and Time in Employment as Predictors of Mother–Child Relationships and Children's Early Development. *Child Development, Vol. 76 (2)*, 467-482.

Kimmel, J., & Connelly, R. (2007). Mothers' Time Choices: Caregiving, Leisure, Home Production, and Paid Work. *Journal of Human Resources, 42(3)*, 643-61.

Krueger, A., Faniel , K., Schkade, D., Schwarz, N., & Stone, A. (2009). *Measuring the Subjective Well-Being of the Nations: National Accounts of Time Use and Well Being.* Chicago: University of Chicago Press.

Lausten, M., & Deding, M. (2006). Choosing between his time and her time: Market work and housework if Danish couple. *Electronic International Journal of Time Use Research, 3*, 28-48.

Leibowitz , A. (1974). Home Investments in Children. *Journal of Political Economy 82(2)*, 111-131.

Leibowitz, A. (1977). Parental Inputs and Children's Achievement. *Journal of Human Resources 12(2)*, 243-51.

Lundberg, S., & Pollack, R. (1993). Separate Spheres Bargaining and the Marriage Market. *Journal of Political Economy, University of Chicago Press, vol. 101*, 988-1010.

McElroy, M., & Horney, M. (1981). Nash-Bargained Decisions: Toward a Genralization of the Theory of Demand. *International Economic Review 22*, 333-349.

Nock , S., & Kingston, P. W. (1988). Time with Children: The Impact of Couples' Work-Time Commitments. *Social Forces, vol. 67*, 59-85.

Pleck, J. H. (1997). *Paternal Involvement: Levels, Sources, and Consequences. In M. E. Lamb (Ed.) "The Role of the Father in Child Development", pp. 66-103.* New York: Wiley.

Ramey, G., & Ramey, V. (2007). The Rug Rat Race. *University of San Diego, Working Paper*.

Stewart, J. (2009). Tobit or not Tobit. *IZA Discussion Paper, N. 4588*.

Vandell, D., Booth, C., Clarke-Stewart, A., McCartney, K., & Owen, M. (2002). Child-care usage and mother-infant quality time. *Journal of Marriage and the Family, 64(1)*, 16-26.

Weiss, Y., & Willis, R. (1985). Children as Collective Goods and Divorce Settlements. *Journal of Labour Economics 3*, 268-292.

Zick, C. D., & Bryant, K. W. (1996). A new look at parents' time spent in child care: Primary and secondary time use. *Social Science Research 25(3)*, 260-280.