
Working Paper Series

45/15

DO MEN CARE? MEN'S SUPPLY OF UNPAID LABOUR

LEIF ANDREASSEN, MARIA LAURA DI TOMMASO
and ANNA MACCAGNAN

Do Men Care?

Men's supply of unpaid labour.

Andreassen Leif¹, Di Tommaso Maria Laura², Maccagnan Anna³

Abstract:

This paper aims to measure men's capability to provide unpaid work, considering both childcare and housework. The definition of capability is based on Sen's Capability Approach which points out the importance of studying what people are free to do and to be (the capability sets), rather than what they do and who they are (the achieved functionings). In order to operationalizing the Capability Approach, we use random scale modelling. The use of random scale modelling within the Capability Approach framework represents an advancement in the literature related to work and family and has two main implications. First, it allows us to study whether and to what extent men are restricted in their freedom of providing unpaid and paid work and we describe their restrictions; second, we analyze men's preferences in combining different levels of paid and unpaid work, given their capability sets.

The dataset used is the Spanish sample of the Multinational Time Use Survey (MTUS), a cross-country harmonised set of time use surveys composed of comparably recoded variables. Our findings suggest that even though men do relatively little childcare, it is important to them. So men do care to care. Our estimates show that only about 15% of men are totally unrestricted in their capability sets. 35% of men are restricted to provide little time to unpaid work. Our estimates suggest that both individual, household and institutional variables are important drivers in shaping restrictions and preferences.

Keywords: household production, random utility models, time use, capabilities.

JEL: D13, J16, C25

¹ Research Department, Statistics Norway, Oslo.

² Dept of Economics and Statistics Cognetti de Martiis, University of Torino, Collegio Carlo Alberto, and CHILD (Center for Household, Income, Labour and Demographic research).

³ Dept of Economics and Statistics Cognetti de Martiis, University of Torino.

Acknowledgements: The project has been carried out thanks to the "Progetto di Ateneo 2012" grant scheme funded by Compagnia di San Paolo. We are very grateful for the valuable work done by Marco Fuscaldo on the data and for his help in the initial modelling stages of the project. We also thank for valuable suggestions and comments participants to the seminar at the Frisch Center for Economic research at the University of Oslo, to the ESPE 2015 conference, to the 2015 HDCA conference, and to the 2015 conference of the International Association for Feminist Economics.

1. Introduction

Men's supply of unpaid labour is very low in Southern European countries and is central to understanding both the labour supply of men and women and gender relations. This paper aims to measure men's capability to provide unpaid work, considering both childcare and housework. The capability approach, as introduced by Sen (1985, 1992, 1999, 2009), points out the importance of studying what people are free to do and be (their capability sets), rather than what they do and who they are (their achieved functionings). Accordingly, the goal of this paper is to measure not only the observed functionings (how much unpaid work men do) but also their capability to provide unpaid labour i.e. whether they have restrictions in their freedom of being engaged in unpaid work. The capability set is not directly observable, but in our approach is measured indirectly from behaviour.

The restrictions faced by men in doing unpaid work are not necessarily hard restrictions implying that such work is physically or legally impossible. The restrictions are often of a softer type, reflecting cultural and social norms. For example, there might be cultural and gender norms against men looking after their children during the day, making it difficult, but not impossible for men to choose to do so. The labour market might also have restrictions on the taking of paternity leave or other types of leave connected with children. One can argue that it is therefore preferable to think of these restrictions in probabilistic terms, as we do in this paper.

We propose to use a random scale (utility) model to measure men's capability of being engaged in unpaid work. This approach was pioneered by Luce (1959) and McFadden (1973, 1984), and has been extended to a setting with latent capability sets by Dagsvik (2013) and Andreassen, Dagsvik and Di Tommaso (2013). The use of random scale modelling within the Capability Approach framework is a novelty in the literature about work and family and has two main implications. We believe it is an important, though imperfect, tool to study whether and to what extent men are restricted in their freedom of being engaged in unpaid and paid work. The structural nature of the model makes it possible to make counterfactual such as how many men would choose to use more time on caring for their children if there were no restrictions.

We analyse Spanish time-use data for 2002, taken from the Multinational Time Use Survey (MTUS), a cross-country harmonised set of time use surveys composed of comparably recoded

variables. The Spanish 2002 sample is notable for being relatively large and having information about both men and women in the household, including individual incomes. Spain has a Mediterranean welfare regime, characterized by a male breadwinner model, low female employment and a very high share of domestic and care work provided by women (Sevilla-Sanz A, Gimenez-Nadal JI, Fernandez C (2010), European Commission 2014). Such a regime is generally seen to limit women's freedom of choice, but, as our study points out, may also be limiting men's freedom of choice.

We find that even though men do relatively little childcare, it is important to them. On average, Spanish men perform 17 per cent of the total housework in the couple and 22 per cent of the total time devoted to care for children in the couple. However, what we can observe is the result of both preferences and restrictions. Our estimates show that few men are totally unrestricted in their capability sets (15%). Most are restricted and cannot provide more care for children (35%). Our measurements are necessarily imprecise, reflecting the difficulty in inferring the unobserved possibilities men have from the observed choices they make. Our estimates suggest that individual, household, and institutional variables are important drivers in shaping restrictions and preferences. In particular, we find that higher regional male unemployment rates increase men's restriction in paid work and that men married to low educated women are more likely to be restricted to a low level of unpaid work. Highly educated men prefer to spend more time in childcare and domestic work.

Our paper represents an important contribution to the knowledge about work-family relations. First, it utilises the Capability Approach for measuring well-being, which is not based on achievements, but on the capability to achieve what is important to the individuals. Second, the proposed methodology for measuring capabilities, random scale modelling, enables one to measure simultaneously the constraints people face in the development of their capability and their preferences. The model can help to assess the effect of institutional variables on the development of men's capability to provide care and domestic work.

The paper is organised as follows: Section 2 reviews the relevant economic literature. Section 3 presents the econometric model and in particular, it defines the state space, sets a model for the interaction within the couple, defines the utility function and the random utility model, and

finally discusses identification issues. Section 4 describes the data, Section 5, 6, and 7 present the result of the empirical analysis, Section 8 predicts the capability set and Section 9 concludes.

2. Literature review

Economic literature on household time allocation is relevant for our paper. Economic research dealing with household time allocation started in the 1960s with the New Home Economics (Mincer 1962, Becker 1965), which extended the labour supply theory to the household, stressing that spouses' production and consumption decisions are interdependent and simultaneous. Within this framework, the household allocates time into labour and leisure acting as a single unit, maximizing a joint utility function subject to a family budget constraint (Becker 1965). Gronau (1977) further developed this literature including home production as a separate activity which reacts differently to changes in socioeconomic variables. Gronau defines home production "*as a time use that generates services which have a close substitute in the market, while leisure has only poor market substitutes*" (p. 1104). Following the same reasoning, more recent literature has treated childcare as a further category different from leisure and home production (Kimmel and Connelly 2007, Folbre and Nelson 2000, Aguir et al. 2012).

Kooreman and Kapteyn (1987) pioneered the body of economic literature analysing simultaneously different types of time use within the household. Using time use data for US couples, they study husbands' and wives' time allocation considering market work and seven types of unpaid activities.

Many studies analyse female time allocation only (see amongst others Kimmel and Connelly 2007 and Maasen Van Den Brick and Groot 1997). However, thanks to the increasing availability of time use data, the empirical literature has been increasingly focusing on men also. An important work analysing only women's time allocation is the one by Kimmel and Connelly (2007) that use US time use data and study leisure, childcare, home production and market work of mothers. They find that higher husband's wages reduce mothers' paid work. Moreover, their findings suggest that higher wages decrease leisure and home production, while increasing childcare and time on the market. Higher child care costs affect child care activities, but not market time. This is in contrast with the literature suggesting a significant effect of childcare

costs and childcare availability on female employment (see amongst others Connely 1992; Connely and Kimmel 2003a and 2003b, Ribar 1995, Del Boca et al. 2009).

Using Swiss data, Sousa-Poza et al. (2001) analyse time spent by men and women in housework and child care. Their findings suggest that men respond less than women to changes in socio-economic variables. However, both better educated men and women spend more time in child care activities. Furthermore, higher women's wages increase time spent by women in child care and reduce time spent in housework. Hallberg and Klevmarken (2003) use Swedish data to study childcare time in double earner couples. They find that changes in the mother working hours does not significantly affect either parent's caregiving time. On the contrary, changes in the husband working hours are compensated by a higher caregiving time of the mother. Also, they find that the presence of young children more heavily affect the mother's market work and childcare, than the father's. Kalenkonski et al. (2005, 2009) analyse how parents allocate their time into market work, primary childcare and secondary childcare in UK. Again, both studies suggest that the presence of children affects males' and females' childcare activity, but at a very different magnitude, and only female's paid work is affected by the presence of (very young) children. Kalenkonski et al. (2009) take into consideration also the effect of wages and find that women paid work increases with own wage and decreases with the partner wage. Some evidence is also found that men's caregiving time increases with females wages.

Guryan et al. (2008) analyse several countries and find that better educated parents generally spend more time with their children than less educated parents. A similar results is found for US by Connely and Kimmel (2009a) who report that an increase in own wages is positively related with time spent in childcare for both parents. They also find that a wife's increase of paid work leads to an increase in father's caregiving time. Likewise, Connely and Kimmel (2009b) find evidence that when wife's wages are higher, fathers increase their caregiving time during weekends. Also for Spain, Gutierrez-Domenich (2010) finds that fathers' caregiving time increases when the wife is employed and, again, that better educated parents spend more time in childcare. Gimenez Nadal and Molina (2013) use time use data for UK and Spain and find that a higher educational level of the mother positively affects also the father's caregiving time.

Using Italian data, Bloemen et al. (2010) and Mancini and Pasqua (2012) analyse simultaneously men's and women's time devoted to paid work, home production, and childcare. Both studies find that the presence of children mainly affects female allocation of time. This is a result

commonly found in the literature, proving the “second-earner” nature of female employment. Also, the two works suggest that well educated women spend more time in childcare and paid work, increasing to some extent also their husbands’ childcare. Differently, for France Bloemen and Stancanelli (2014) find that an increase in own wages decrease domestic work and child care for both parents. However, higher women’s wages are associated with higher husbands’ unpaid work. This result, in line with previously cited literature, suggests that women who are better off in terms of actual or potential earnings, tend to have a higher bargaining power within the household. This result proves that spouses’ time allocation is not determined within a unitary model of household behaviour, but by a bargaining process between family members (Chiappori 1988 and 1997).

The model presented here involves two steps. First, we transform the time use data into a data set describing the possibilities face by men. This transformation involves constructing a state space estimating both wages and sharing rules within the couples in different situations. The second step is the estimation of the men’s utility function both under the assumption that he faces no restrictions on his choices (standard multinomial logit) and under the assumption that he faces restrictions in what he can choose (the capability approach).

Another advantage of our approach is that we manage to separate the direct utility of having children from the work involved in caring for them. We find that men utility increase with time spent with children but also that men have to supply labour to care for them. The supply of care work decreases with age of the child.

3. The econometric model

The random scale model we use requires that the maximum choice set is given as a set of discrete elements. This implies transforming the time use data into a data set describing the possibilities faced by men. This transformation involves constructing a state space using wage equations and equations for sharing activities within the couple. This transformation is interesting on its own because it structures the time-use data so that the relationship between signal and noise is improved. A utility (scale) function and restriction functions are then defined and estimated over the possible choices described by the state space.

3.1 The state space

Assume that all the possible choices of the male and the female in a couple are grouped into K discrete states. Let S be the universal set of all possible states, so there are K elements in S . It is the absolute maximal set of alternatives that are relevant, regardless of whether or not they are available to everybody. Note that while the states are defined in the same manner for all individuals, the characteristics of the states can differ between individuals. For example, in the state “full time work” different individuals can work different hours, as long as the number of hours worked falls within the definition of “full time”. The agents are assumed to have preferences over the alternatives in S . Let C denote the choice set of a particular agent. It consists of all the opportunities (functionings) available to the agent. For some agents C may be equal to S , but in many situations the choice set will be a proper subset of S . It could be that cultural norms reduce the employment opportunities of some woman or the care opportunities for some men. In the context of Sen’s capability approach, C represents the agent’s capability set, and the elements of C (which we call states) are the functionings that are available to the agent. The universal set S contains all the functionings that are generally possible.

The states are defined in the same manner for men and women, but each state affects them differently. For example, a woman working full time will generally expect to have a partner doing less housework than a comparable man working full time. We view such gender differences as being the result of the strategic interaction within the couple. In our thinking gender differences can thereby be due to differences in opportunities (men and women have different opportunity sets due to norms or discrimination) and to differences arising from the strategic interaction of the couple (which is also influenced by norms).

3.2 The strategic interaction within the couple

We assume that the amount of time used by a couple on paid employment, household production and child care can be seen as the result of strategic interaction. Each individual is assumed to face a choice set (a set of strategies for each individual) that incorporates the response of the partner. For example, if a husband decides to do less paid work and contribute more at home, he might expect his wife to increase her paid employment while contributing less at home.

We do not attempt to explicitly model the game theoretic structure of these negotiations, but quantify empirically how couples share paid employment, house work and child care. Let e_{jm} ,

e_{jf} , and $e_{jT} = e_{jm} + e_{jf}$ be the time used on paid employment in state j by respectively the male, the female and in total, where we, until further notice, drop subscripts indicating household. In the same manner, let h_{jm} , h_{jf} , and $h_{jT} = h_{jm} + h_{jf}$ be the time used on household production excluding child care in state j and let c_{jm} , c_{jf} , and $c_{jT} = c_{jm} + c_{jf}$ be the time used on child care in state j . We reformulate these time variables so that each is the product of total time spent by the couple on an activity and a share variable indicating how this total is shared between the husband and wife:

$$\begin{aligned} e_{jm} &= e_{jT} \cdot \alpha_{ej}, & e_{jf} &= e_{jT} \cdot (1 - \alpha_{ej}) & j \in S \\ h_{jm} &= h_{jT} \cdot \alpha_{hj}, & h_{jf} &= h_{jT} \cdot (1 - \alpha_{hj}) & j \in S \\ c_{jm} &= c_{jT} \cdot \alpha_{cj}, & c_{jf} &= c_{jT} \cdot (1 - \alpha_{cj}) & j \in S, \end{aligned}$$

where α_{ej} , α_{hj} , and α_{cj} are respectively the share of employment, housework and child care contributed by the male in state j . The shares of the female will thereby be $(1 - \alpha_{ej})$, $(1 - \alpha_{hj})$, and $(1 - \alpha_{cj})$. These share variables will in the following be estimated; depending on the average age and average wage of the couple, the ratio of the man's age to the female's and the ratio of the man's wage to female's. The implicit assumption is that the couples' total time in paid work, housework, and childcare is given in each state. This assumption is based on the idea that couples have different preferences on the total time devoted to the above activities and we take those preferences for granted. In this paper we are only concerned about how this total time is shared within the couple.

In addition to the above time use variables, each individual also uses time on travel to work, t_{jm} and t_{jf} , sleep, s_{jm} and s_{jf} , and leisure (encompassing all other activities), l_{jm} and l_{jf} , where the subscripts denote state and gender. It is assumed that travel time is the same for all states so $t_{jm} = t_m \forall j$ and $t_{jf} = t_f \forall j$. This could be because travel time is mainly determined by where the couple live. The time constraint for the man in the household is thereby given as:

$$e_{jm} + t_m + h_{jm} + c_{jm} + l_{jm} + s_{jm} = T,$$

where T is the total time constraint ($T=24$ hours = 1440 minutes), and a similar constraint applies for the woman. Letting sleep be residually determined, we have that each state j is characterized

by the time variable set $\{e_{jm}, h_{jm}, c_{jm}, e_{jf}, h_{jf}, c_{jf}, l_{jm}, l_{jf}, t_m, t_f\}$, or equivalently by the set $\{e_{jT}, h_{jT}, c_{jT}, \alpha_{ej}, \alpha_{hj}, \alpha_{cj}, l_{jm}, l_{jf}, t_m, t_f\}$.

Appendix A contains an interpretation of the share variable with an hypothetical example.

3.3 Consumption and the utility function

Let R_j be the household's consumption in state j (which we equate to the household's wage income since we do not have information on taxes or other income),

$$R_j = w_m e_{jm} + w_f e_{jf},$$

Note that we assume that wages are the same across states. Changing hours worked will therefore not influence hourly wages.

Let H_{jm} be the male's valuation of total household production,

$$H_{jm} = h_{jm} + c_{jm} + \beta_m (h_{jf} + c_{jf}),$$

and let H_{jf} be the female's valuation of total household production,

$$H_{jf} = \beta_f (h_{jm} + c_{jm}) + h_{jf} + c_{jf},$$

where β_m indicates how the man evaluates the household production of his wife in comparison to his own and β_f the same type of evaluation for the female. These β 's can be interpreted as the "perceived contribution" (see Sen 1990) of the other household member. The male may for example think that he is more efficient cleaning house than his wife, while the wife may think this efficiency is actually a result of the male not cleaning very well (deriving for example from different standards of cleanliness). The β_m and β_f parameters can be interpreted as implicit pricing of the household work of the persons in the couple. Sen (1990) underlines that the "perceived contribution" of household members can influence the outcomes of the bargaining process within the couple.

As household size, N , increases there is often considered to be economies of scale. This can be taken into account by assuming that size equivalent consumption, R_j^* , and size equivalent total household production (including child care), H_{jm}^* , can be written as:

$$R_j^* = R_j/N^{\gamma_R}$$

$$H_{jm}^* = H_{jm}/N^{\gamma_H},$$

where the equivalence scale parameters γ_R and γ_H are equal to one if there are no economies of scale⁴.

We assume that each male derives utility from size equivalent consumption, R_j^* , his evaluation of total household production, H_{jm} , leisure, l_{jm} , and sleep (which is residually determined by the time constraint). In addition, he derives extra utility from own time spent with his children, c_{jm} . We consider R_j and H_{jm} (which includes child care) to be important inputs determining child quality (an investment aspect), while own time with children, c_{jm} , reflects the consumption aspect of having a child. Time traveling to work, t_m , brings disutility. Introducing the subscript i for household, we can now write the utility function of the male in household i as:

$$U_{ijm} = g_{jm}(R_{ij}/N_i^{\gamma_R}, c_{ijm}, H_{ijm}/N_i^{\gamma_H}, l_{ijm}, t_{im}; X_{im}),$$

where X_{im} is a vector of demographic characteristics of the male in household i . The utility function of the female can be written in the same way.

3.4 A random utility approach to measuring capabilities

Let v_{ij} denote a scale function that represents the welfare of male m in household i in state j (assuming state j is available to the agent). Following McFadden (1973, 1984), we assume that

$$v_{ijm} = U_{ijm} + \varepsilon_{ijm},$$

where U_{ijm} is the deterministic term and ε_j is a random error term that is supposed to capture unobserved characteristics that affect the agent's welfare. The random error terms, ε_{jk} , are assumed to be independent with c.d.f. $\exp(-\exp(x))$.

⁴ We shall later see that in our chosen econometric specification (a random utility model with a log linear utility function) these economy of scale parameters are not identified, but we include them here for completeness.

Let $J(C)$ denote the choice of the agent when the choice set is equal to C . It is assumed that the agent chooses the alternative in C that maximizes the scale v_{ij} that is, $J(C) = j$ if $v_{ijm} = \max_{k \in C} v_{ik}$. Furthermore, let $P_j(C)$ be the probability that the man shall choose j , given the choice set C . Following (McFadden, 1984) the choice probabilities are:

$$P(J(C) = j) = P_j(C) = \frac{\exp(U_{ijm})}{\sum_{k \in C} \exp(U_{mik})}$$

which is the well-known Multinomial Logit Model. When there are state-dependent variables (as in our model), it is often referred to as the conditional logit model. The utility function is assumed to have a log-linear form,

$$U_{ijm} = \beta_1 \log(R_{ij}/N_i^{YR}) + \beta_2 \log(c_{ijm}) + \beta_3 \log(H_{ijm}/N_i^{YH}) + \beta_4 \log(l_{ijm}) + \beta_5 \log(t_{im}) + X_{im} \delta_j,$$

where $\beta_1 - \beta_5$ are alternative specific parameters (they do not vary between states) and δ_j is a vector of individual specific parameters. Combinations of alternative specific parameters and variables that do not vary between states (in this case N_i and t_{im}) are not identifiable under our assumptions and can be subsumed into the constant term, leading us to reformulate the utility function as

$$U_{ijm} = \beta_1 \log(R_{ij}) + \beta_2 \log(c_{ijm}) + \beta_3 \log(H_{ijm}) + \beta_4 \log(l_{ijm}) + X_{im} \delta_j,$$

where the parameter vector δ_j has a transformed constant term.

The motivation of psychologists such as Thurstone (1927) for proposing a random scale framework was to deal with the observational fact that individuals often violate transitivity when faced with replications of (seemingly) identical choice experiments. His explanation was that decision makers may be ambiguous about the precise value of the respective alternatives, in the sense that if the same choice setting is repeated they may choose a different alternative. This unpredictable temporal variation in tastes is represented by the stochastic error terms in the scale representation.

In our context, the assumption that the agents' preferences are uncertain is of crucial importance. A currently chosen alternative is considered only a momentary choice. Other, different, choices may be made in the future (even under the same circumstances) due to the influence of whims in perception and problems with assessing the precise value of the alternatives once and for all.

This implies that reducing the opportunities available to an agent while leaving her with the possibility of making her current choice, will nevertheless reduce her well-being because it reduces the range of possibilities in the future. Our stochastic structure thereby makes an agents' well-being depend, not only on his choices (functionings), but also on his opportunities (capability sets).

Our approach involves fairly stringent a priori assumption. The specification of each individual's choice set (the state space with its characteristics), the determination of wages (through wage equations based on imprecise income measurements) and the simple utility function impose fairly strong regularity conditions on our empirical modelling. This can be necessary when the data or the problem being analysed has a weak signal to noise ratio. We think this is the case, both with regard to our data (one random day in life of our couples) and our problem (identifying the capability sets of individuals).

3.5 The possibility of having a restricted capability set

Above, we have outlined a multinomial model for time use, based on the random utility model. It can be the basis for estimating the choice of time use when males face no restrictions in their capabilities (have a full choice set). As a base line, we report below the estimates from such a model (see Section 6).

Our main concern is, however, to estimate the degree to which men's capability for caring for their children might be constrained by norms or conditions in the labour market. We now let $r(C_s)$ denote the conditional probability that the capability set is equal to C_s ,

$$r(C_s) = P(C = C_s).$$

We shall call these probabilities, restriction probabilities, which must satisfy the restriction $\sum_s r(C_s) = 1$. The joint probability of having choice set C_s and choosing alternative j as can then be written as

$$P(J(C) = j, C = C_s) = P(J(C) = j | C = C_s) \cdot P(C = C_s) = P_j(C_s) \cdot r(C_s)$$

Note that the capability sets need not be strictly ranked (as was assumed in Andreassen et. al. (2013)). The choice probability $P_j(C_s)$ was derived above, and we assumed that the restriction probabilities also have a multinomial structure,

$$r(C_s) = \frac{\exp(Z_i \gamma_s)}{\sum_{k \in C} \exp(Z_i \gamma_k)}$$

where Z_i is a vector of individual characteristics and γ_s is a vector of state specific parameters.

3.6 Identification

We identify the model through exclusion restrictions analogous to the exclusion restrictions used to identify supply and demand in the econometric analysis of markets. An example of how this works is given in an appendix in Andreassen, Dagsvik and Di Tommaso (2014). This implies that some variables must be unique to the choice probabilities, while some other variables must be unique to the restriction probabilities. This does not exclude the possibility of using some variables in both probabilities.

Identification is complicated by the fact that it is not feasible to use all combinations of variables. Our data contain a large number of dichotomous variables, which can lead to estimation problems if there are empty cells for a combination of these in one of the states. In practice, empty cells lead to large insignificant estimates with extremely large standard errors.

Which variables to include in the two types of probabilities is mainly a modelling issue. Some variables will naturally be thought of as influencing choice while others affect the probability of being restricted. If there is doubt one can compare different specifications, such as one with the age of the youngest child in the choice probability and another specification where it is in the restriction probability. The stability of the estimates (how stable the coefficient of one variable is to inclusion or exclusion of others) depends on the covariances between these variables, and is thereby analogous to standard multicollinearity problems.

4. Data

4.1 Description of the data set

The dataset used is the Multinational Time Use Survey (MTUS), a cross-country harmonised set of time use surveys composed of comparably recoded variables. MTUS contains individual and household information on several socioeconomic and demographic variables. Each individual fills a 24 hours diary for the same day as his/her partner, either on a weekday or on a weekend. Diary respondents report their main activities for every 10 minutes along the day. MTUS does not provide information about secondary activities (simultaneous activities).

We use the Spanish dataset because it is a large sample, with information about labour income, household composition, and data for both partners in a couple. The original Spanish dataset is composed of 42,675 individuals in 19,422 households. The sample contains 12,195 heterosexual married or cohabitating couples living with their children and with no missing values on time activity. In this paper, we drop couples with children living together with other household members, such as grandmothers, grandfathers etc. We select couples where both partners are not retired, not disabled and do not take care of adult people. We also drop households where the sum of the paid work of the couple is less than 5 hours per day because we are interested in analysing how couples balance paid and unpaid work. The rationale for this sample selection is to have a homogenous group of working couples who balance paid and unpaid work. We also aim at dropping couples who filled the questionnaire during a not working day. The final sample consists of 4,625 heterosexual married or cohabitating couples.

Figure 1 shows the distribution of time spent by the men and women in our sample on paid and unpaid work activities both during the weekdays and during the weekend: about 50% of women do not work for pay, independently from the day they are observed in, while almost 50% of men never engage in housework activities

FIGURE 1 approximately here

Table 1 approximately here

Men`s time in unpaid work is very low compared to women. This is also suggested by table 1 that reports the average minutes spent by men and women in paid and unpaid activities, according to the presence of children and day of the week. Childless men on average perform 44

minutes per day of unpaid work compared to 270 minutes per day of female unpaid work. Men with children perform 81 minutes per day of unpaid work compared to 372 minutes of female unpaid work. Men, both with and without children, spend relatively more time in housework activities on Saturday while the opposite is true for women.

In our analysis we look at choices among four states categorized by two different levels of paid employment, e_{jm} , and two different levels of total unpaid house work, $h_{jm} + c_{jm}$. High and low levels of each activity are defined as being respectively above and below the median hours worked in the activities. The states are then defined as

- *State 1*: A high level of paid employment and a high of unpaid house work
- *State 2*: A high level of paid employment and a low level of unpaid house work
- *State 3*: A low level of paid employment and a high level of unpaid house work
- *State 4*: A low level of paid employment and a low level of unpaid house work

In this sample, the median of paid work for all individuals (men and women) is 8 hours per day. Men whose paid work is higher than 8 hours belong to the full time work group, while those who work less than 8 hours per day belong to the part time work group.

The median of unpaid work for both men and women (household work and childcare) is 2 hours and 20 minutes per day. Men who do more than 140 minutes of unpaid work belong to the high unpaid work group, while the low unpaid work group those who work less. We utilise the same median for men and women so to have the same states for men and women (even if at the moment we are studying only men's choices).

Table 2 shows the distribution of men and women across the four states defined above. The majority of men (68 percent) are in state 2, characterized by a high level of paid employment and a low level of unpaid work, followed by men in state 4 (low paid and low unpaid hours), in state 3 (low paid and high unpaid hours) and state 1 (high paid and low unpaid hours). When the men have no children aged less than 18, they are even more likely to be in a state of low level of unpaid work. As for women, the picture is completely reversed, with most women being in a state of high level of unpaid work, especially combined with a low level of paid work (71 percent

of women are in state 3 and 14 percent in state 1). This is against 10 percent in state 2 and 5 percent in state 4. It is interesting to note that childless women are more likely to “act” as men, and to be more in state 2 (7 percent of women with children against 17 percent of women without children are in state 2).

TABLE 2 APPROXIMATELY HERE

4.2 The possible restrictions on the capability set

There are 9 different possible capability sets, C_1 to C_9 . They range from the full capability set, consisting of all of the above states, $\{1,2,3,4\}$, to the sets where one is restricted to only one state, such as $\{1\}$, $\{2\}$, $\{3\}$ or $\{4\}$. Let r_e^H be the probability of being restricted to a high level of paid employment and r_e^L the probability of being restricted to a low level. Denote r_h^H as the probability of being restricted to a high level of house work (including child care) and r_h^L as the probability of being restricted to a low level of house work. The probability of being unrestricted in employment is denoted r_e^{NR} , while the probability of being unrestricted in house work is denoted r_h^{NR} . The restriction probabilities sum to one:

$$r_e^H + r_e^L + r_e^{NR} = 1$$

$$r_h^H + r_h^L + r_h^{NR} = 1.$$

Assuming that the probabilities of being restricted in employment (r_e^H , r_e^L , and r_e^{NR}) are stochastically independent of the probabilities of being restricted in home care level (r_h^H , r_h^L , and r_h^{NR}), we have the following 9 possible capability sets with corresponding probabilities, $r(C_j)$:

$$C_1 = \{1\} \text{ with probability } r(C_1) = r_e^H \cdot r_h^H$$

$$C_2 = \{2\} \text{ with probability } r(C_2) = r_e^H \cdot r_h^L$$

$$C_3 = \{3\} \text{ with probability } r(C_3) = r_e^L \cdot r_h^H$$

$$C_4 = \{4\} \text{ with probability } r(C_4) = r_e^L \cdot r_h^L$$

$$C_5 = \{1,2\} \text{ with probability } r(C_5) = r_e^H \cdot r_h^{NR}$$

$$C_6 = \{1,3\} \text{ with probability } r(C_6) = r_e^{NR} \cdot r_h^H$$

$$C_7 = \{2,4\} \text{ with probability } r(C_7) = r_e^{NR} \cdot r_h^L$$

$$C_8 = \{3,4\} \text{ with probability } r(C_8) = r_e^L \cdot r_h^{NR}$$

$$C_9 = \{1,2,3,4\} = S \text{ with probability } r(C_9) = r_e^{NR} \cdot r_h^{NR}$$

The assumption of independency between the probabilities of being restricted in employment and the probabilities to be restricted in housework is rather strong but it reduces the number of capability sets.

The probability of observing a person in state j is denoted Q_j . The probability of being in the different states can be written as:

$$Q_1 = r(C_1) + P_1(C_5) \cdot r(C_5) + P_1(C_6) \cdot r(C_6) + P_1(C_9) \cdot r(C_9)$$

$$Q_2 = r(C_2) + P_2(C_5) \cdot r(C_5) + P_2(C_7) \cdot r(C_7) + P_2(C_9) \cdot r(C_9)$$

$$Q_3 = r(C_3) + P_3(C_6) \cdot r(C_6) + P_3(C_8) \cdot r(C_8) + P_3(C_9) \cdot r(C_9)$$

$$Q_4 = r(C_4) + P_4(C_7) \cdot r(C_7) + P_4(C_8) \cdot r(C_8) + P_4(C_9) \cdot r(C_9)$$

The choice probabilities and the restriction probabilities are jointly estimated by maximum likelihood.

Table 3 lists the definitions of the variables used to estimate the model. In order to calculate the level of household consumption we multiply the predicted hourly wages of the two partners by their respective working hours. The hourly wages for men and women are predicted applying the usual Heckman procedure; Appendix B describe the procedure and reports the estimated equations.

TABLE 3 APPROXIMATELY HERE

Table 4 shows means and standard deviations of the variables used for the estimation of the model, including the alternative specific variables.

TABLE 4 APPROXIMATELY HERE

5. Estimation of the share variables

Each individual (man) chooses among the four states, considering how each state affects consumption in the household, his time with his children, the household production, his leisure time and his time used on sleep. As discussed in Section 2.2, the individual takes into account how his partner will react to his choice in her use of time on paid work and household production (including child care). For example, if a man chooses a low household production state (either state 2 or 4), he can expect his partner to (partly) compensate by doing more hours of household production. Or, if he chooses a high paid work state (either state 1 or 2), he expects his partner to do less paid work. In other words, the man anticipates his partner's reactions to his choices. We have not specified a theoretical household model, but our empirical specification of consumption, household production and child care in each state implicitly takes the partners reactions into account.

We predict the minutes each man uses on the different activities in the different states, also in states where the individuals are not observed in. To predict the values of the couples' minutes of paid work, domestic work and care (e_{jT} , h_{jT} , and c_{jT})⁵, we use the observed average for each combination of state and number of children. Table C1 in Appendix C shows these observed values. Therefore the minutes each couple uses in the different states are the same for couples with the same number of children. The fraction of work done by men for each activity within the couple (α_{ej} , α_{hj} , and α_{cj}) is predicted based on the parameters found from estimations using a Logit Model. The independent variables used are the same for domestic work and paid work:

- The average wage of the couple (the wealth of the couple)
- The ratio of the man's wage to his partner's wage (signalling his negotiating strength)
- The average age of the couple
- The ratio of the man's age to that of his partner (also signalling negotiating strength)
- The number of children in the household (0, 1, 2 and 3+)

The estimates are reported in table 5.

TABLE 5 HERE

⁵ See Section 2.2

The share of men time in paid work, α_{ej} , is negatively related to the average wage in the couple in all states but state 3 (low paid hours and high unpaid hours), but positively related to wage ratio. So the higher the wage of the man respect to the woman the more he works for pay. The more the children, the more the men work for pay.

The higher the average wage in the couple, the higher the share of unpaid work done by men, α_{hj} , in all the states, but the wage ratio (m/f) has a negative effect on α_{hj} , so the higher the wage of the man compared to that of the woman the less he works in the house. The more the children the less housework the man does.

For predicting the percentages of care work in each state, we utilise the same variables but we do not split the sample according to the different states because we have excluded men without children and therefore we have a reduced number of observations. The estimates are reported in Appendix C table C2.

The share of man time in childcare, α_{cj} , is positively correlated with average wage in the couple, wage ratio has a negative effect like in men's housework, the more the children the less he provides care. Compared to state 1, the man share in childcare decreases in state 2 (High paid, low unpaid) and 4 (Low paid, low unpaid) and increase in state 3 (Low paid, high unpaid).

Table C4 in Appendix C reports the actual and predicted share of men time in paid work, in unpaid work and in childcare by states.

The procedure for predicting leisure is simpler: we just imputed the average by state and number of children (0, 1, 2, 3+).

Finally, we take the predicted hours of paid work for the man and his partner and calculate consumption as equal to their total income.

6. Results

6.1 Estimation of the standard multinomial logit model

Column 1 of table 6 presents the results of the standard multinomial logit estimates, i.e. a baseline model in which there are no restrictions and only preferences are relevant for being in a

certain state. As one can see, focusing first on the alternative specific variables, men derive utility from consumption, childcare and leisure. The parameters for household production and for the household beta should be interpreted together: given our definition of household production, men prefer a state in which they selves provide less domestic activities, but where their female partner do more.

As for male education, the individual preference variables, the reference state is State 1, (characterized by high paid and high unpaid work). All parameters should be interpreted comparatively. One can observe that an increase in male education significantly reduces the probability of being in State 2 compared to the probability of being in State 1. This suggests that well educated men prefer to provide more unpaid work than low educated. No significant results are found as for the probability of being in State 3 or 4.

TABLE 6 APPROXIMATELY HERE

6.2. Estimation of the model with restricted capability sets

Column 2 of table 6 presents the results of the model with restricted capability sets, i.e. where some institutional, personal and family characteristics affect the actual capability of the man of being in a certain state. Some variables determine restrictions in paid work and other variables determine restrictions in unpaid work. However, in our model we assume that men without children are not restricted in housework (i.e. the probabilities to be restricted in unpaid work for men without children are all equal zero).

In discussing the results, we first focus on the alternative specific variables. The estimated parameters are all positive implying that consumption, child care, household production, and leisure have a positive effect on men's utility function.

Personal time with the children is significant and positive. That is men prefer a state with higher time with their children. We find that, even though men do relatively little childcare, it is important to them. This result implies that men do care to care for their children.

Consumption is also positive and statistically significant at the 1 percent level, implying that men prefer a state with high consumption.

Household production is positive and significant. This is different from what we found in the standard multinomial logit: men derive utility also from their own household production, confirming that when distinguishing between preferences and restrictions a rather different picture of the reality is obtained. It is also interesting to note that the household parameter is positive and significant but lower than 1, suggesting that men value their wife's household production less than their own.

Also leisure, as expected, has a statistically significant effect on men's utility.

As far as the preference variables are concerned, the reference state is State 1 i.e. high paid and high unpaid work. We find that men's years of schooling decreases the probability of choosing state 2 respect to state 1, i.e., in line with the literature, more educated men prefer to provide more unpaid work. On the other hand, educated men have a higher utility in states of low employment than less educated men (though, they both generally prefer full employment to low employment). This can be because men with higher education are better able to utilize a low employment situation.

In the estimates of the restriction probabilities the base category is to be unrestricted. We utilised different variables to estimate the probabilities of being restricted in paid work and in unpaid work.

As explanatory variables in the restrictions in paid work we consider regional employment rates, a dummy on whether the man is unemployed and the education ratio between the man and his female partner.

High levels of regional unemployment decrease the probability of being restricted to provide high levels of paid work while they are not statistically significant for low levels of paid work. In this last case, it is the dummy for unemployment that is statistically significant and positive. It takes all the variability due to unemployment. We included the dummy for unemployment only in the estimate of the probability of being restricted in low levels of paid work because it would not make sense to include it in the probability of being restricted to high levels of paid work. The rationale for including a dummy variable on whether the man is unemployed derives from the fact that not all men that declare themselves as unemployed are observed to work 0 hours, and

that some unemployed men are actually observed in a high level of paid work (i.e. 6 out of the 90 unemployed men observed in our sample).

The estimated parameters for the ratio between women's and men's years of education show that the highest this difference, the less restricted are men in paid work.

We assume that the probability of being restricted in care work depends on institutional and family characteristics. In particular, we include a regional dummy for living in the South of Spain, a quadratic term in child age, a dummy on whether the couple has a computer at home and a variable on female education. We find that living in the South increases the probability for men of being restricted to a low level of unpaid work. This can be connected to cultural aspects that restrict men to more traditional gender roles.

Turning to household variables, we find that the age of the youngest child has a positive, though not significant, effect on the probability to be restricted to high levels of unpaid work but this effect decreases with age (the coefficient of age square is negative). Instead, the age of the youngest child has a negative effect on the probability of being restricted to low levels of unpaid work but this effect increases with age of the child.

Having a computer at home, a proxy for cultural factors, decreases the probability of being restricted to low levels of unpaid work while it is not statistically significant for being restricted to high levels of unpaid work.

Finally, years of schooling of the partner increases the restriction probability to high levels of unpaid work and decreases the restriction probability to low levels of unpaid work. Education seems to increase women's bargaining power within the couple. This confirms a result that is commonly found in the literature.

Columns 3 and 4 of table 6 present the estimation results of two alternative specifications: the former has the variables child age, child age squared, computer and education ratio among the preferences rather than among the restrictions, the latter has South acting as a preference variable. In these alternative specifications, the original variables maintain their size and significance. In model (3) we observe that the new preference variables have hardly any effect, but having a computer that makes it more likely to provide a low level of paid work. As for

model (4), we observe that living in the South increases the probability of preferring state 2 vs. state 1, while it decreases the probability of preferring state 3 vs. state 1.

6.3 Predicted probabilities and marginal effects

We calculate the predicted probabilities for being in each state for men (with and without children), given that all dummy variables are equal to 0 and continuous variables are at their mean. This information is important to really understand the magnitude of the marginal effects because for each marginal effect we can compute how the predicted probability changes adding or subtracting the chosen marginal effect.

Table 7 shows that, as expected, men with children are more likely to be in a state of high level of unpaid work, compared to men without children. However, the vast majority of men, both with and without children are predicted to be in states characterized by a low level of unpaid work, especially in state 2 (this is 77% for men without children and 71% for men with children).

TABLE 7 APPROXIMATELY HERE

We compute marginal effects for a better understanding of t

he effect of the preference and restriction variables on the actual probability of men ending up in a particular state. They are computed as the change in the predicted probabilities of being in a certain state, given that dummy variables change from 0 to 1, and that continuous variables increase by 1%. They are computed separately for men with and without children, given that several variables have no effect on childless men (see Table 7).

The marginal effects of alternative specific variables describe how an increase in consumption/housework/childcare/leisure in state j changes the likelihood of being in each state, via the increase in men's utility. Therefore marginal effects for state dependent variables are repeated four times. We compute separate marginal effects for all variables in the household production function, i.e. men's childcare and housework and women's childcare and housework (see eqn. 6).

We observe that a change in an alternative specific variable in state j always increases the probability of being in that particular state, while decreasing the probability of being in any other state. This implies that all our alternative specific variables have always a positive effect on utility and men are more likely to choose a state with higher consumption/housework/childcare/leisure.

As for consumption, we observe that for men with children, an increase in consumption in state 1 increases by 0.24 percentage points the probability of being in state 1, while decreasing the probability of being in any other state, particularly state 2 (-0.23 percentage points). Similarly, an increase in consumption in state 2 increases by 0.29 percentage points the probability of being in state 2. As for state 3 and 4 it is lower, equal to 0.09 and 0.06 percentage points respectively. Looking at men without children, our results suggest that an increase in consumption in a certain state increases the probability of being in that particular state, by 0.14 percentage points in state 1, by 0.20 in state 2, by 0.16 in state 3 and by 0.20 in state 4.

An increase in man's childcare and housework in the four different states increases significantly the probability of being in that state while decreasing the probability of being in the others states for men with children. As for childcare, the highest effect is for a change in childcare in state 1, leading to a 0.23 percentage points increase in the probability of being in state 1. As for housework, again, the highest effect is for a change in men's housework in state 1, leading to a 0.14 percentage points increase in the probability of being in state 1.

Regarding men without children, a change in housework has not generally statistically significant marginal effects (except for state 4).

Increasing the wife's housework or childcare in a certain state significantly increases man's probability of being in that state mainly for men with children.

In particular, a change in wife's housework in state 1 increases by 0.12 percentage points the men's probability of being in that state, while a change in state 2 wife's housework increases by 0.28 percentage points the men's probability of being in state 2. It is 0.03 for state 3 and 0.05 for state 4. As for men without children, the only significant change is on the probability of being in state 4: an increase in wife's housework in state 4 increases by 0.20 percentage points the men's probability of being in that state.

As for wife's childcare, an increase in a certain state significantly increases the probability of the husband of being in that particular state, while decreasing the probability of being in any other state. The marginal effects are equal to 0.06 for a change in state 1, by 0.08 for a change in state 2, and equal to 0.01 for state 3 and 4.

The marginal effect of an increase in men's leisure in the four different states is always positive and significant. For men with children it is the highest as for state 2 (approximately 0.4 percentage points) and for men without children it is the highest for state 4 and +0.35 percentage points.

For the individual specific variables marginal effects are calculated as the change in the predicted probabilities of being in a certain state, given that dummy variables change from 0 to 1, and that continuous variables increase by 1%.

The marginal effect for the education ratio is not reported, since this variable depends exclusively from man's and woman's years of schooling. Hence, in computing the marginal effect of these latter variables, we account also for the change in the education ratio. Similarly, the marginal effect of child age includes both the effect of child age and child age squared.

The marginal effect of man's years of schooling suggests that an increase in man education significantly reduces his probability of being in state 2 (high paid and low unpaid), both if he has children or not (respectively by 0.11 and 0.09 percentage points), while increasing the probability of being in any other state, and particularly in state 3 (low paid and high unpaid, significantly only if he has children), confirming that better educated men are more keen to provide care and house work.

The marginal effects of male regional unemployment rate and of the dummy variable being unemployed have the expected sign and magnitude. The former mildly reduces the probability of being in a state of high paid work for both men with and without children – especially state 2, by about 0.07 percentage points in both cases - while increasing the probability of being in a state of low paid work, particularly in state 4 (+0.05 percentage points for both men with and without children). The latter, being a dummy on unemployment, almost annuls the probability of being in state 1 or 2 while increasing the probability of being in a state of low paid work, especially of being in state 4 (+49 and +57 percentage points respectively for men with and without children).

Men in the South of Spain are less likely to be in states of high unpaid work and more likely to be in states of low unpaid work. Focusing just on significant figures, we observe that living in the South of Spain significantly reduces by about 2 percentage points the probability of being in state 3, characterized by high level of unpaid work and a low level of paid work, while increasing by 1.6 percentage points the probability of being in state 4, characterized by low level of unpaid work and a low level of paid work.

Also child increasing age significantly reduces the probability of being in state 3 (by about 0.02 percentage points) and increases the probability of being in state 4 (by 0.02 percentage points).

Having a computer at home, instead, has a positive effect on men's care: the marginal effect are positive on state 1 and 3 (only the latter is significant and equal to about 3 percentage points) and negative on state 2 and 4 (again only the latter significant and has a magnitude of 2.4 percentage points). This result confirms our intuition, that having a computer is not necessarily related to paid work, but it is rather a signal of cultural aspects.

As for men with children, the marginal effects of the educational level of the female partner show that it has a positive effect on men's care, too. In particular, an increase in female education decreases by about 0.05 percentage points man's probability of being in state 2, while increasing by about 0.04 percentage points his probability of being in state 3 (i.e. less paid work and more unpaid work).

8. Predicting capability sets and counterfactual predictions

The estimated model can be used to predict how many are restricted in their possibility to choose among the 9 possible capability sets found in equation 21. In table 8 we present the results of such predictions. These results are particularly interesting because they show that only 15% of men are completely unrestricted.

TABLE 8 APPROXIMATELY HERE

56 percent of men restricted to high levels of paid work i.e. their capability sets are either C1 or C2 or C5. 35 percent of men are restricted to low levels of unpaid work (their capability sets are either C2 or C4 or C7). The measurement of the capability sets demonstrates that the use of random utility models (or random scale models) allows to measure not only the preferences but also the constraints that men face.

One can see that the capability sets predicted following the two alternative specifications are very similar, with the exception that more men are restricted to high levels of paid work (capability set C5) and consequently less are completely unrestricted.

If all men were completely free to choose how much to work in the labour market and at home, we would observe men changing state according to their preferences. Table 9 reports the net changes in the number of men observed in each state, if there were no more constraints. In this case we would observe more men in state 1 and 3, i.e. providing high levels of unpaid work, and less men in state 2 and 4, i.e. providing low levels of unpaid work. This phenomenon is completely driven by the preferences of men with children (6.12% of them would move to state 1 and 14.03% to state 3), while men without children would do more paid work (+0.22% in state 1 and +7.31% in state 2). It must be noticed that this is what we expect, given our assumption that men without children are unconstrained in domestic activities.

TABLE 9 APPROXIMATELY HERE

Conclusion

This paper estimates the capability of men to provide care work utilising a random utility model. The idea is that, despite men spend very little time in caring for their children, it matters to them. Nevertheless, they face many constraints both at individual, household and regional level and therefore they are constrained in the amount of time they can provide in caring for their children. The use of a random utility model allows the estimation of the probabilities of being restricted to different capability sets (or choice sets). Our main conclusion is that men do care about caring for their children but they face many constraints. In particular, we find that about 35 percent of men are restricted to capability sets which exclude the choice of high level of unpaid work. Men married to low educated women are more likely to be restricted to low levels of unpaid work. On the contrary, highly educated men prefer to spend more time in childcare and domestic work. Living in the South of Spain increases the probability of being restricted to low level of unpaid work.

A possible extension of the paper would be the estimation of the same model on some other European countries included in the MTUS database. In particular this last point would be

important to compare different cultural and social constraints that men face. A problem connected with this is that few countries have as large and detailed a data set as Spain does,

Bibliography

Aguiar, M., Hurst, E. and Karabarbounis, L. (2012). Recent Developments in the Economics of Time Use *Annual Review of Economics*, 4: 373–97.

Andreassen L., Dagsvik, J. K. and Di Tommaso M.L. (2013) Measuring capabilities with random scale models. Women's freedom of movement. Working Papers del Dipartimento di Economia e Statistica "Cognetti de Martiis", 34

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

Bloemen, H., Pasqua, S. and Stancanelli, E.G.F. (2010). An empirical analysis of the time allocation of Italian couples: are they responsive? *Review of Economics of the Household Economics*, 8: 345–369.

Bloemen, H. and Stancanelli, E.G.F. (2014) Market hours, household work, child care, and wage rates of partners: an empirical analysis. *Review of Economics of the Household*, 12(1): 51-81

Chiappori P. A. (1988) .Rational Household Labor Supply. *Econometrica*, 56 (1): 63-89.

Chiappori P. A. (1997). Introducing Household Production in Collective Models of Labor Supply *Journal of Political Economy*, 105(1):191-209.

Connelly, R. (1992). The effect of child care costs on married women's labor force participation. *The Review of Economics and Statistics*, 74: 83–90.

Connelly, R. and Kimmel J. (2009a). Spousal influences on parents' non-market time choices. *Review of Economics of the Household*, 7(4): 361-394.

Connelly, R. and Kimmel J. (2009b). Spousal Economic Factors in ATUS Parents' Time Choices, *Social Indicators Research*, 93(1): 147-152.

Connelly, R. and Kimmel J. (2003a). The Effect of Childcare Costs on Employment and Welfare Reciprocity of Single Mothers. *Southern Economic Journal*, 69(3): 498-519.

Connelly, R. and Kimmel J. (2003b). Marital Status and Full-time/Part-time Work Status in Childcare Choices. *Applied Economics*, 35(7): 761-767.

Del Boca, D., Pasqua, S. and Pronzato, C. (2009). Motherhood and market work decisions in institutional context: a European perspective. *Oxford Economic Papers*, 61: 147-171.

Dagsvik, J. K. (2013) Making Sen's Capability Approach Operational: A Random Scale Framework. *Theory and Decision*, 74: 75-105.

European Commission (2014) Report on Progress on equality between women and men in 2013

http://ec.europa.eu/justice/gender-equality/files/swd_2014_142_en.pdf

Folbre, N. and Nelson, J.A. (2000) For Love or Money - Or Both? *The Journal of Economic Perspectives*, 14(4): 123-140.

Gimenez-Nadal, J.I. and Molina, J.A. (2013). Parents' education as a determinant of educational childcare time. *Journal of Population Economics*, 26: 719-749.

Gronau, R. (1977). Leisure, Home production and Work. The theory of the allocation of time revisited. *Journal of Political Economy*, 85: 1099-1123.

Guryan, J., Hurst, E. and Kearney, M. (2008). Parental education and parental time with children. *Journal of Economics Perspectives*, 22(3): 23-46.

Gutierrez-Domenech, M. (2010). Parental Employment and Time with Children in Spain. *Review of Economics of the Household*, 8(3): 371-391.

Hallberg, D. and Klevmarck, A. (2003). Time for Children: A Study of Parent's Time Allocation. *Journal of Population Economics*, 16(2): 205-226.

Kalenkoski, C.M., Ribar, D. C., and Stratton, L.S. (2009). The influence of wages on parents' allocation of time to child care and market work in the United Kingdom. *Journal of Population Economics*, 22(2): 399-419.

Kalenkoski, C.M., Ribar, D.C. and Stratton, L.S. (2005), Parental Child Care in Single Parent, Cohabiting, and Married Couple Families: Time Diary Evidence from the United Kingdom. *American Economic Review*, 95: 194-98

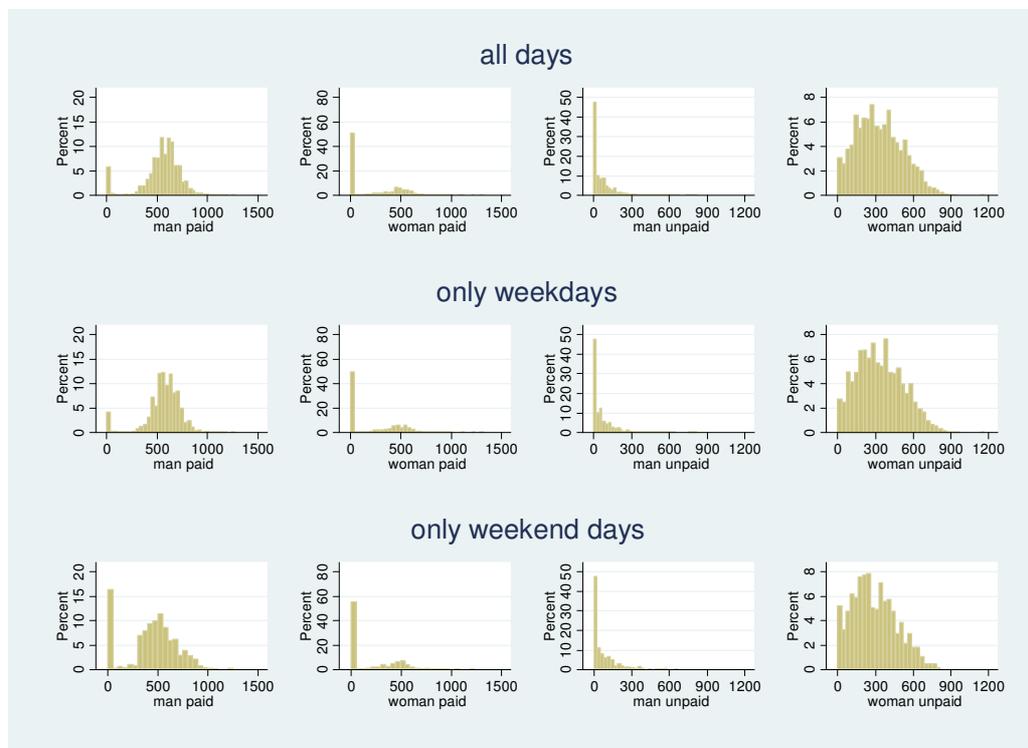
Kimmel, J. and Connelly, R. (2007). Mothers' Time Choices. Caregiving, Leisure, Home Production, and Paid Work. *The Journal of Human Resources*, 42(3): 643-681.

Kooreman, P. and Kapteyn, A. (1987). A disaggregated analysis of the Allocation of Time within the Household. *The Journal of Political Economy*, 95(2): 223-249.

Jenkins, S. P. and O'Leary, N. C. (1995), "Modelling domestic work time", *Journal of Population Economics*, 8, 265-7

- Luce, D. (1959) *Individual Choice Behaviour*. New York: John Wiley and Sons Inc.
- Maassen van den Brink, H. and Groot, W. (1997). A household production model of paid labor, household work and child care. *De Economist*, 145(3): 325–343.
- Mancini, A.L. and Pasqua, S. (2012). Asymmetries and interdependencies in time use between Italian parents. *Applied Economics*, 44: 4153-4171.
- McFadden, D. (1973) *Conditional Logit Analysis on Qualitative Choice Behaviour*. in Zarembka (eds) *Frontier in Econometrics*, New York: John Wiley and Sons Inc.
- McFadden, D. (1984) *Econometric Analysis of Qualitative Response Models*. in Griliches, Z. and M. D. Intrilligator, M.D., *Handbook of econometrics Vol III*. Oxford: Elsevier Science Publisher
- Mincer, J. (1962). “Labour Force Participation of Married Women: A Study of Labour Supply”, in H. G. Lewis (ed.), *Aspects of Labour Economics*. Princeton, NJ: Princeton University Press, 63–105.
- Ribar, D. (1995). A Structural Model of Childcare and the Labor Supply of Married Women. *Journal of Labor Economics*, 13(3): 558–597.
- Sen, A.K. (1985) *Commodities and Capabilities*. Oxford: Elsevier Science Publisher
- Sen A. (1990) *Gender and Cooperative Conflicts*. Chapter 19 in: *Tinker I Persistent Inequalities*. Chapter 19 New York: Oxford University Press.
- Sen, A.K. (1992) *Inequality Re-examined*. Oxford: Clarendon Press
- Sen A.K. (1999) *Development as a Freedom*. Oxford: Oxford University Press
- Sen A.K. (2009) *The Idea of Justice*. Harvard: Harvard University Press
- Sevilla-Sanz A, Gimenez-Nadal JI, Fernandez C (2010) Gender roles and the division of unpaidwork in Spanish households. *Fem Econ* 16:137–184
- Sousa-Poza, A., Schmid, H. and Widmer, R. (2001). The allocation and value of time assigned to housework and child-care: An analysis for Switzerland. *Journal of Population Economics*, 14: 599–618.

Figure 1 - Histograms on men and women minutes of paid and unpaid work by day of the (4,625 obs)



Source: MTUS Spain 2002-2003

Table 1 - Men and women average minutes of paid and unpaid work by day of the week and presence of children

Couples without children (1,786 obs)				
	Man paid	Woman paid	Man unpaid	Woman unpaid
Monday	565	260	46	264
Tuesday	574	236	39	282
Wednesday	566	265	46	275
Thursday	554	260	42	274
Friday	552	246	41	268
Saturday	440	258	58	242
Sunday	457	170	46	268
Average	546	249	44	270
Couples with children (2,839 obs)				
	Man paid	Woman paid	Man unpaid	Woman unpaid
Monday	571	222	81	373
Tuesday	578	199	73	387
Wednesday	570	206	85	387
Thursday	576	219	82	385
Friday	572	226	76	374
Saturday	447	194	96	327
Sunday	441	205	79	308
Average	555	212	81	372

Source: MTUS Spain 2002-2003

Table 2 Men and women divided into four states

Men						
	Full sample		Couple with no children less than 18 years old		Couple with at least one child less than 18 years old	
	Freq.	%	Freq.	%	Freq.	%
State 1: High paid employment, high unpaid work	376	8.13%	62	3.47%	314	11.06%
State 2: High paid employment, low unpaid work	3,153	68.17%	1,298	72.68%	1,855	65.34%
State 3: Low paid employment, high unpaid work	399	8.63%	107	5.99%	292	10.29%
State 4: Low paid employment, low unpaid work	697	15.07%	319	17.86%	378	13.31%
Total	4,625	100,00%	1,786	100,00%	2,839	100,00%

Women						
	Full sample		Couple with no children less than 18 years old		Couple with at least one child less than 18 years old	
	Freq.	%	Freq.	%	Freq.	%
State 1: High paid employment, high unpaid work	629	13.60%	216	12.09%	413	14.55%
State 2: High paid employment, low unpaid work	486	10.51%	298	16.69%	188	6.62%
State 3: Low paid employment, high unpaid work	3,298	71.31%	1,148	64.28%	2,150	75.73%
State 4: Low paid employment, low unpaid work	212	4.58%	124	6.94%	88	3.10%
Total	4,625	100,00%	1,786	100,00%	2,839	100,00%

Source: MTUS Spain 2002-2003

Table 3 - Definition of the variables used in the estimates

Variable	Description
State dependent variables Y	
Consumption	(Man predicted paid employment * w_M) + (woman predicted paid employment * w_F)
Man's childcare	Man's predicted hours of childcare; 0 if no children
Couple household production	(Man's predicted hours of housework + predicted hours of childcare) + $\beta_{\text{household}}$ *(woman's predicted hours of housework + woman's predicted hours of childcare)
Man's leisure * age	Man's predicted leisure* man age
Preference variables X	
Man's years of schooling	Man's education measured as years of schooling
Paid work restriction variables ZW	
Male regional unemployment rate	Male unemployment rate at the regional level (Source: Eurostat)
Education ratio (W/M)	Woman's years of schooling / man's years of schooling
Man unemployed	Binary variable = 1 if the man is unemployed
Unpaid work restriction variables ZC	
South	Binary variable = 1 if living in Andalusia or Murcia ; 0 otherwise
Child age	Age of the youngest child + 1; 0 if no children or children older than 18
Child age squared	Squared age of the youngest child
Computer at home	Binary variable = 1 if there is a computer in the household
Woman's years of schooling	Woman's education measured as years of schooling

Table 4 - Descriptive statistics by state of the man

Variable	Obs.	Mean	SD	Min	Max
State 1: Predicted Household Consumption (euros)	4625	95.55	28.52	43.36	248.39
State 2: Predicted Household Consumption (euros)	4625	96.15	27.25	44.87	225.03
State 3: Predicted Household Consumption (euros)	4625	57.74	20.65	25.05	186.00
State 4: Predicted Household Consumption (euros)	4625	59.97	17.67	28.17	143.02
State 1: Predicted Childcare Man with children (hours)	2839	1.33	0.17	0.97	2.19
State 2: Predicted Childcare Man with children (hours)	2839	0.22	0.04	0.14	0.40
State 3: Predicted Childcare Man with children (hours)	2839	1.68	0.24	1.35	2.96
State 4: Predicted Childcare Man with children (hours)	2839	0.21	0.05	0.13	0.39
State 1: Predicted Housework Man (hours)	4625	2.33	0.59	1.04	4.11
State 2: Predicted Housework Man (hours)	4625	0.38	0.26	0.05	1.89
State 3: Predicted Housework Man (hours)	4625	3.30	0.61	1.13	5.08
State 4: Predicted Housework Man (hours)	4625	0.62	0.28	0.14	1.81
State 1: Predicted Housework Woman (hours)	4625	4.30	0.39	2.99	5.74
State 2: Predicted Housework Woman (hours)	4625	4.93	0.41	3.03	5.82
State 3: Predicted Housework Woman (hours)	4625	3.19	0.55	1.85	5.46
State 4: Predicted Housework Woman (hours)	4625	4.20	0.38	2.67	5.16
State 1: Predicted Childcare Woman with children (hours)	2839	2.17	0.29	1.52	3.14
State 2: Predicted Childcare Woman with children (hours)	2839	1.52	0.37	1.01	2.26
State 3: Predicted Childcare Woman with children (hours)	2839	1.43	0.34	0.76	2.45
State 4: Predicted Childcare Woman with children (hours)	2839	1.02	0.21	0.70	1.31
State 1: Predicted Leisure Man (hours)	4625	4.41	0.22	3.65	4.80
State 2: Predicted Leisure Man (hours)	4625	5.32	0.24	4.42	5.76
State 3: Predicted Leisure Man (hours)	4625	7.81	0.88	5.89	9.19
State 4: Predicted Leisure Man (hours)	4625	8.89	0.38	7.39	9.54
Man's age	4625	44.22	9.55	19.00	73.00
Man's years of schooling	4625	10.23	3.56	0.00	21.00
Male regional unemployment rate	4625	8.13	3.30	2.40	17.00
Education ratio (W/M)	4625	1.04	0.60	0	13.00
Man unemployed	4625	0.02	0.14	0.00	1.00
South	4625	0.22	0.41	0.00	1.00
Child age	4625	5.28	5.91	0.00	18.00
Child age squared	4625	62.78	93.41	0.00	324.00
Computer at home	4625	0.61	0.49	0.00	1.00
Woman's years of schooling	4625	10.00	3.51	0.00	21.00

Source: MTUS Spain 2002-2003

State 1 is a state of high paid work and high unpaid work; State 2 is a state of high paid work and low unpaid work;

State 3 is a state of low paid work and high unpaid work; State 4 is a state of low paid work and low unpaid work.

Table 5: LOGIT Model for percentage of men' time in paid work and housework.

Dependent variable:	Share of men time in paid work				Share of men time in housework			
	State 1: High paid High unpaid	State 2: High paid Low unpaid	State 3: Low paid High unpaid	State 4: Low paid Low unpaid	State 1: High paid High unpaid	State 2: High paid Low unpaid	State 3: Low paid High unpaid	State 4: Low paid Low unpaid
Average wage in the couple	-0.0448** (0.0213)	-0.1429*** (0.0086)	0.1379*** (0.0311)	-0.0755*** (0.0190)	0.0343* (0.0187)	0.2003*** (0.0125)	-0.0524** (0.0241)	0.1252*** (0.0198)
Wage ratio (m/w)	0.7053*** (0.1324)	0.7547*** (0.0613)	0.7777*** (0.2119)	0.9288*** (0.1325)	-0.3356*** (0.0960)	-0.6981*** (0.0681)	-0.5158*** (0.1234)	-0.7835*** (0.1090)
Average age	0.0154** (0.0075)	0.0222*** (0.0026)	0.0025 (0.0100)	-0.0009 (0.0060)	-0.0071 (0.0047)	-0.0503*** (0.0033)	-0.0147** (0.0060)	-0.0250*** (0.0059)
Age ratio (m/w)	-0.4658 (0.5756)	-0.7969*** (0.2082)	-2.2205*** (0.7071)	-0.1026 (0.4525)	-0.2160 (0.4488)	0.7451*** (0.2427)	0.3057 (0.4227)	0.1789 (0.3890)
Nr of children: 1	0.2643* (0.1353)	0.2828*** (0.0537)	0.3646* (0.2036)	0.2132* (0.1248)	-0.3455*** (0.0994)	-0.4008*** (0.0685)	-0.3482*** (0.1236)	-0.1926* (0.1078)
Nr of children: 2	0.3795*** (0.1333)	0.4883*** (0.0602)	0.7651*** (0.1961)	0.5309*** (0.1564)	-0.5046*** (0.1026)	-0.5550*** (0.0707)	-0.5702*** (0.1247)	-0.6198*** (0.1421)
Nr of children: 3+	0.3869* (0.2298)	0.7382*** (0.1230)	0.6479 (0.4060)	0.5437** (0.2223)	-0.7936*** (0.1864)	-1.0381*** (0.1559)	-0.9298*** (0.2441)	-0.8619*** (0.2529)
Constant	-0.4275 (0.7253)	0.5962** (0.2537)	-1.0123 (0.8970)	-0.5432 (0.5862)	0.5156 (0.5439)	-1.0973*** (0.3021)	1.8722*** (0.5724)	-0.3035 (0.5103)
N	376	3,153	399	697	376	3,120	399	691

Source: MTUS Spain 2002-2003

Ref category for Nr of children: 0 children

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 6 - Estimation results

	(1) Model with no restriction	(2) Model with restricted capabilities	(3) Sensitivity analysis 1	(4) Sensitivity analysis 2
Alternative specific variables (Y)				
Consumption	1.4633** (0.5814)	4.1233*** (1.3126)	4.5543*** (1.4871)	3.4590*** (1.2630)
Man's childcare	1.5254*** (0.1480)	3.9559*** (0.5842)	5.0918*** (0.9462)	3.6178*** (0.5556)
Household production	-0.6896*** (0.1738)	8.4448*** (2.6080)	8.0695*** (3.0690)	7.5888*** (2.7227)
Leisure	0.0468*** (0.0083)	0.1658*** (0.0386)	0.1644*** (0.0543)	0.1384*** (0.0427)
Household beta	-0.1528*** (0.0096)	0.3803*** (0.1167)	0.4188*** (0.1278)	0.4155*** (0.1326)
Individual specific variables (X)				
State 2: High paid work, low unpaid work (ref. State 1)				
Man's years of schooling	-0.0346** (0.0165)	-0.0807*** (0.0288)	-0.0724** (0.0345)	-0.0677*** (0.0255)
South				0.3536* (0.2119)
Child age			0.0393 (0.1250)	
Child age squared			0.0116 (0.0107)	
Computer at home			-0.0713 (0.1892)	
Education ratio W/M			-0.1025 (0.1340)	
Constant	1.6485*** (0.3473)	7.5369*** (1.2940)	7.1474*** (1.6055)	6.8712*** (1.2896)
State 3: Low paid work, high unpaid work (ref. State 1)				
Man's years of schooling	0.0040 (0.0200)	0.4543*** (0.1713)	0.4795** (0.1956)	0.9290*** (0.3468)
South				-2.2390** (1.0410)
Child age			-0.1462 (0.2324)	
Child age squared			0.0155 (0.0162)	
Computer at home			2.4435** (1.1902)	
Education ratio W/M			0.5211 (1.2319)	
Constant	-0.1236 (0.3875)	-7.5192*** (1.9624)	-9.7470** (4.7123)	-10.9538*** (3.9809)
State 4: Low paid work, low unpaid work (ref. State 1)				
Man's years of schooling	-0.0080 (0.0181)	0.3777** (0.1684)	0.4237** (0.1927)	0.8673** (0.3444)
South				-1.5813 (1.0442)
Child age			-0.2864 (0.2199)	
Child age squared			0.0360** (0.0160)	
Computer at home			2.4406** (1.1941)	
Education ratio W/M			1.8313* (1.1058)	
Constant	0.0066	-1.2177	-5.2611	-5.5111

	(0.4486)	(1.9756)	(4.7265)	(3.8175)
Restriction variables (Z)				
Restriction to paid work (ZW)				
- to high paid work (ref. not being restricted in paid work)				
Male regional unemployment rate	-0.0902**	-0.0936**		-0.1381***
	(0.0428)	(0.0400)		(0.0425)
Education ratio W/M	-0.5309**			-0.4939**
	(0.2576)			(0.2075)
Constant	2.1239***	1.8580***		3.0869***
	(0.6533)	(0.4626)		(0.4966)
- to low paid work (ref. not being restricted in paid work)				
Male regional unemployment rate	-0.0053	-0.0123		-0.0518
	(0.0388)	(0.0372)		(0.0427)
Education ratio W/M	-0.2866**			-0.3041**
	(0.1384)			(0.1298)
Man unemployed	4.8064***	4.6590***		4.8579***
	(0.4801)	(0.4428)		(0.4758)
Constant	0.0477	-0.0356		0.8978*
	(0.6250)	(0.4589)		(0.5289)
Restriction to unpaid work (ZC)				
- to high unpaid work (ref. not being restricted in unpaid work)				
South	0.0150	0.6147		
	(0.4268)	(0.6210)		
Child age	0.7173			0.7847
	(0.4809)			(0.4921)
Child age squared	-0.1474**			-0.1520**
	(0.0748)			(0.0773)
Computer at home	-0.4769			-0.4843
	(0.3899)			(0.3894)
Woman's years of schooling	0.0869*	0.0584		0.0883*
	(0.0526)	(0.0561)		(0.0504)
Constant	-2.1538*	-2.7902***		-2.5423**
	(1.2580)	(0.8126)		(1.2021)
- to low unpaid work (ref. not being restricted in unpaid work)				
South	0.4247**	0.7402***		
	(0.2058)	(0.2873)		
Child age	-0.1634*			-0.1460
	(0.0969)			(0.0909)
Child age squared	0.0123***			0.0119***
	(0.0044)			(0.0043)
Computer at home	-0.5785***			-0.6115***
	(0.2127)			(0.2173)
Woman's years of schooling	-0.0550*	-0.0832**		-0.0683**
	(0.0316)	(0.0354)		(0.0298)
Constant	1.4651**	0.8897**		1.4014***
	(0.5714)	(0.3753)		(0.5395)
Statistics				
LI	-4318.7246	-4115.9987	-4103.8927	-4112.1784
Aic	8659.4492	8291.9974	8275.7854	8286.3569
N	4625	4625	4625	4625

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: MTUS Spain 2002-2003

Table 7 – Marginal Effects (model with restricted capabilities)

	Men with children				Men without children			
	State 1: High paid High unpaid	State 2: High paid Low unpaid	State 3: Low paid High unpaid	State 4: Low paid Low unpaid	State 1: High paid High unpaid	State 2: High paid Low unpaid	State 3: Low paid High unpaid	State 4: Low paid Low unpaid
<i>Predicted probabilities</i>	<i>0.0782</i>	<i>0.7140</i>	<i>0.0828</i>	<i>0.1250</i>	<i>0.0340</i>	<i>0.7676</i>	<i>0.0517</i>	<i>0.1467</i>
Consumption 1	0.0024*** (0.0008)	-0.0023*** (0.0008)	-0.0001 (0.0001)	-0.0000** (0.0000)	0.0014* (0.0008)	-0.0013* (0.0008)	-0.0000 (0.0000)	-0.0000 (0.0000)
Consumption 2	-0.0022*** (0.0007)	0.0029*** (0.0009)	-0.0004** (0.0002)	-0.0002** (0.0001)	-0.0013* (0.0008)	0.0020** (0.0010)	-0.0002 (0.0002)	-0.0005** (0.0003)
Consumption 3	-0.0001 (0.0001)	-0.0004** (0.0002)	0.0009*** (0.0003)	-0.0003 (0.0003)	-0.0000 (0.0000)	-0.0002 (0.0002)	0.0016** (0.0007)	-0.0014*** (0.0005)
Consumption 4	-0.0000** (0.0000)	-0.0002** (0.0001)	-0.0003 (0.0003)	0.0006 (0.0004)	-0.0000 (0.0000)	-0.0006** (0.0003)	-0.0014*** (0.0005)	0.0020*** (0.0007)
Man's childcare 1	0.0023** (0.0010)	-0.0022** (0.0009)	-0.0001 (0.0002)	-0.0000** (0.0000)				
Man's childcare 2	-0.0006*** (0.0002)	0.0008*** (0.0003)	-0.0001* (0.0001)	-0.0001** (0.0000)				
Man's childcare 3	-0.0002 (0.0002)	-0.0004* (0.0003)	0.0009*** (0.0003)	-0.0003 (0.0002)				
Man's childcare 4	-0.0000** (0.0000)	-0.0001** (0.0000)	-0.0001 (0.0001)	0.0002*** (0.0001)				
Man's housework 1	0.0014* (0.0008)	-0.0013** (0.0007)	-0.0001 (0.0001)	-0.0000** (0.0000)	0.0015 (0.0013)	-0.0014 (0.0012)	-0.0000 (0.0000)	-0.0000 (0.0000)
Man's housework 2	-0.0004** (0.0002)	0.0006** (0.0003)	-0.0001 (0.0001)	-0.0000** (0.0000)	-0.0003 (0.0003)	0.0005 (0.0004)	-0.0000 (0.0001)	-0.0001* (0.0001)
Man's housework 3	-0.0001 (0.0001)	-0.0003 (0.0002)	0.0007*** (0.0003)	-0.0003 (0.0002)	-0.0000 (0.0000)	-0.0003 (0.0003)	0.0021 (0.0014)	-0.0019* (0.0011)
Man's housework 4	-0.0000** (0.0000)	-0.0001** (0.0000)	-0.0001 (0.0001)	0.0002*** (0.0001)	-0.0000 (0.0000)	-0.0002* (0.0001)	-0.0006* (0.0004)	0.0008* (0.0004)
Wife's childcare 1	0.0006* (0.0003)	-0.0006** (0.0003)	-0.0000 (0.0000)	-0.0000** (0.0000)				
Wife's childcare 2	-0.0007** (0.0003)	0.0008** (0.0004)	-0.0001 (0.0001)	-0.0001** (0.0000)				
Wife's childcare 3	-0.0000 (0.0000)	-0.0001 (0.0000)	0.0001*** (0.0000)	-0.0000 (0.0000)				
Wife's childcare 4	-0.0000** (0.0000)	-0.0001** (0.0000)	-0.0001 (0.0000)	0.0001*** (0.0000)				
Wife's housework 1	0.0012* (0.0006)	-0.0011** (0.0006)	-0.0001 (0.0001)	-0.0000** (0.0000)	0.0008 (0.0007)	-0.0008 (0.0007)	-0.0000 (0.0000)	-0.0000 (0.0000)
Wife's housework 2	-0.0022** (0.0011)	0.0028** (0.0013)	-0.0004 (0.0003)	-0.0002** (0.0001)	-0.0015 (0.0012)	0.0023 (0.0017)	-0.0002 (0.0002)	-0.0006* (0.0003)
Wife's housework 3	-0.0000 (0.0001)	-0.0001 (0.0001)	0.0003*** (0.0001)	-0.0001 (0.0001)	-0.0000 (0.0000)	-0.0001 (0.0001)	0.0007 (0.0004)	-0.0006* (0.0003)
Wife's housework 4	-0.0000** (0.0000)	-0.0002** (0.0001)	-0.0003* (0.0002)	0.0005*** (0.0002)	-0.0000 (0.0000)	-0.0005* (0.0003)	-0.0014* (0.0008)	0.0020* (0.0010)
Man's leisure 1	0.0033*** (0.0012)	-0.0031*** (0.0011)	-0.0002 (0.0002)	-0.0000** (0.0000)	0.0022 (0.0014)	-0.0022 (0.0014)	-0.0000 (0.0000)	-0.0000 (0.0000)
Man's leisure 2	-0.0031*** (0.0011)	0.0040*** (0.0013)	-0.0006** (0.0003)	-0.0003** (0.0002)	-0.0021 (0.0013)	0.0033* (0.0018)	-0.0003 (0.0003)	-0.0009** (0.0004)
Man's leisure 3	-0.0002 (0.0002)	-0.0006** (0.0003)	0.0013*** (0.0004)	-0.0004 (0.0004)	-0.0000 (0.0000)	-0.0003 (0.0003)	0.0029** (0.0013)	-0.0025** (0.0010)
Man's leisure 4	-0.0000** (0.0000)	-0.0004** (0.0002)	-0.0005 (0.0004)	0.0009* (0.0005)	-0.0000 (0.0000)	-0.0010* (0.0005)	-0.0025** (0.0010)	0.0035*** (0.0013)
Man's years of schooling	0.0003 (0.0002)	-0.0011** (0.0004)	0.0007* (0.0004)	0.0001 (0.0002)	0.0002 (0.0001)	-0.0009* (0.0005)	0.0005 (0.0003)	0.0002 (0.0003)
Male regional unemployment rate	-0.0001 (0.0001)	-0.0007*** (0.0001)	0.0003*** (0.0001)	0.0005*** (0.0001)	-0.0000 (0.0000)	-0.0007*** (0.0001)	0.0002 (0.0001)	0.0005*** (0.0001)
Man unemployed	-0.0749** (0.0337)	-0.6833*** (0.0479)	0.2637*** (0.0380)	0.4945*** (0.0447)	-0.0325 (0.0218)	-0.7336*** (0.0337)	0.1996* (0.1082)	0.5665*** (0.1158)
South	-0.0188 (0.0119)	0.0226 (0.0149)	-0.0199** (0.0100)	0.0161** (0.0077)				
Child age	-0.0003 (0.0002)	0.0003 (0.0002)	-0.0002* (0.0001)	0.0002* (0.0001)				
Computer at home	0.0276 (0.0168)	-0.0331 (0.0214)	0.0294** (0.0129)	-0.0239*** (0.0092)				
Woman's years of schooling	0.0002 (0.0002)	-0.0005* (0.0003)	0.0004* (0.0002)	-0.0001 (0.0002)	-0.0000 (0.0000)	-0.0002 (0.0002)	0.0001 (0.0001)	0.0002 (0.0001)

Source: MTUS Spain 2002-2003

Note: Marginal effects are computed setting dummy variables at 0 and continuous variables are their average. The marginal effect of dummy variables is computed changing the variable value from 0 to 1 and increasing continuous variables by 1%. For the variable education ratio we do not estimate its marginal effect as difference in schooling = woman's years of schooling / man's years of schooling. The effect of the latter variables takes into account also the effect on the education ratio. A similar reasoning applies to child age also.

Table 8 - Predicted probability sets

	<i>Model with restricted capabilities</i>		<i>Sensitivity analysis 1</i>		<i>Sensitivity analysis 1</i>	
<i>C1: High paid & high unpaid</i>	95	2%	97	2%	103	2%
<i>C2: High paid & low unpaid</i>	901	19%	874	19%	968	21%
<i>C3: low paid & high unpaid</i>	34	1%	31	1%	31	1%
<i>C4: low paid & low unpaid</i>	323	7%	290	6%	294	6%
<i>C5: high paid</i>	1588	34%	1814	39%	1912	41%
<i>C6: high unpaid</i>	44	1%	33	1%	27	1%
<i>C7: low unpaid</i>	410	9%	313	7%	252	5%
<i>C8: low paid</i>	557	12%	578	12%	578	13%
<i>C9: not restricted</i>	673	15%	595	13%	460	10%
<i>Total</i>	4625	100%	4625	100%	4625	100%

Source: MTUS Spain 2002-2003

Table 9 – Change in the number of men in each state if completely unconstrained

	State 1: High paid High unpaid	State 2: High paid Low unpaid	State 3: Low paid High unpaid	State 4: Low paid Low unpaid
<i>Total sample (4625 obs.)</i>				
Absolute Change	+178	-130	+366	-414
Percent change	+3.84	-2.82	+7.92	-8.94
<i>Men with children (2839 obs.)</i>				
Absolute change	+174	-261	+398	-311
Percent change	+6.12	-9.19	+14.03	-10.96
<i>Men without children (1786 obs.)</i>				
Absolute change	+4	+131	-32	-102
Percent change	+0.22	+7.31	-1.79	-5.74

Source: MTUS Spain 2002-2003

Appendix A. Interpretation of the share variable: an example

We interpret the variables α_{ej} , α_{hj} , α_{cj} , e_{jT} , h_{jT} , and c_{jT} as describing the strategic interaction within the couple. To see why, consider a state space where each individual either works full-time or part-time defined as working more or less than 7 hours a day (at this point the numbers are only illustrative). This definition applies equally to men and women, but the characteristics of the states will be different between the genders. Assume that discussions within the couple, norms and labour market characteristics narrow the realistic options available to a couple to the following four states:

		Female	
		Full-time	Part-time
Male	1. Full-time	$e_m=9, e_f=7$	$e_m=10, e_f=2$
	2. Part-time	$e_m=4, e_f=8$	$e_m=5, e_f=3$

where each quadrant says how many hours the male and the female work in paid employment for different choice combinations. For the sake of simplicity, in this example we ignore all other activities. The above is an example of a standard game matrix, with the complication that also the contents of the payoff quadrants is affected by negotiation. The larger the state space, the more of the negotiation process can be captured in the game matrix, while the smaller the state space, more of the process is embedded in the payoffs. In the following we only consider the male's choice between the two states of full-time and part-time employment, while the response of the female is unobserved. We only observe average responses, so the above matrix collapses to:

		Consequence of an average response by the female
Male	1. Full-time	$e_{1m}=9.5, e_{1f}=4.5$
	2. Part-time	$e_{2m}=4.5, e_{2f}=5.5$

where, to keep things simple, we assume that half the women choose part-time and half full-time irrespective of the male's choice. This matrix can be reformulated using the share variables introduced earlier:

		Consequence of an average response by the female
Male	1. Full-time	$e_{1T}=14, \alpha_{e1}=0.68$
	2. Part-time	$e_{2T}=10, \alpha_{e2}=0.48$

where empirical counterparts to e_{1T} and e_{2T} are the averages observed among those working full-time and part-time respectively, while, as mentioned, α_{e1} and α_{e2} are estimated (in the table above we have for illustrative purposes inserted the averages) and we thus interpret the estimates of α_{e1} and α_{e2} as partly describing the strategic interaction within the couple. These estimated relationships are also used to input hours employed in all the different states (this is necessary, since we only observe each individual in one state).

Appendix B: Predicting hourly wages.

In order to predict hourly wage we use the Heckman Selection Procedure. In doing so, we exclude couples with missing information on income, weekly hours, educational level and people aged more than 64 years old. The final sample is composed of 8691 men and 8953 women as shown in Table B1. Table B2 presents the percentage of the sample divided by those who are working and those who are not working.

To compute the own hourly wage we use information about monthly labour income after taxes and the number of hours of paid work done in the last week. Since monthly labour income after taxes is defined in intervals (Table B3), we decide to assign to each individual in the interval, the median wage of each interval (as shown in Table B4). In order to compute the monthly hours of paid work, we take the number of working weeks in the month of the interview and we multiply it by the number of hours of paid work done in the last week. The observed hourly wage is monthly labour income after tax divided by the monthly number of paid work. Table B5 shows

some results about monthly hours of paid work and the observed hourly wage for those who are working.

The descriptive statistics of the explanatory variables used in the Heckman selection procedure are presented in Table B6, while Table B7 presents the results of the model estimation, separately for men and women. The dependent variable of the models is the logarithm of the observed hourly wage. Table B8 presents some descriptive statistics of the predicted hourly wage using the coefficients of the Heckman selection procedure, both for men and women.

Table B1: Sample selection for the Heckman Selection Procedure

	Men	Women
All couples	12,243	12,243
Excluding individuals with missing information on income, weekly hours and educational level	11,632	11,223
Excluding individuals older than 64	8,691	8,953

Table B2: Final Sample divided by working and not working individuals

	Men		Women	
	Freq.	%	Freq.	%
Working	7,193	82.76%	3,446	38.49%
Not working	1,498	17.24%	5,507	61.51%
Total	8,691	100%	8,953	100%

Table B3: Monthly labour income after tax divided by intervals

Monthly income interval	Men		Women	
	Freq.	%	Freq.	%
Not working	1,498	17.24%	5,507	61.51%
0 – 499 €	173	1.99%	508	5.67%
500 – 999 €	2,103	24.20%	1,501	16.77%
1000 – 1249 €	2,111	24.29%	615	6.87%
1250 – 1499 €	1,109	12.76%	329	3.67%
1500 – 1999 €	934	10.75%	345	3.85%
2000 – 2499 €	413	4.75%	89	0.99%
2500 – 2999 €	153	1.76%	26	0.29%
More than 3000 €	197	2.27%	33	0.37%
Total	8,691	100%	8,953	100%

Table B4: Intervals of monthly labour income after tax and their relative reference point in the estimation of the hourly wage

Monthly income interval	Median Wage of the interval
0 – 499 €	250 €
500 – 999 €	750 €
1000 – 1249 €	1125 €
1250 – 1499 €	1375 €
1500 – 1999 €	1750 €
2000 – 2499 €	2250 €
2500 – 2999 €	2750 €
More than 3000 €	3500 €

Table B5: Monthly hours of paid work: men and women

	Men		Women	
	Mean	SD	Mean	SD
Monthly hours of paid work	149.6	42.3	139.6	45.2
Hourly Wage (€)	9.6	6.7	7.7	5.8

Table B6: Explanatory Variables used in the Heckman Selection Procedure

	Men		Women	
	Mean	Std. Dev.	Mean	Std. Dev.
Continuous variables				
Age	46.04	9.91	44.93	10.44
Age of the partner	43.55	9.92	47.92	11.19
Number of children	0.89	0.96	0.83	0.95
Binary variables	%		%	
<i>Educational level:</i>				
Illiterate or less than 5 years of school	6.2%		8.9%	
Primary education	16.3%		18.9%	
Secondary education	35.9%		36.8%	
High school, low professional degree	18.1%		16.2%	
High professional degree, general degree	15.4%		13.3%	
Bachelor, doctorate	8.1%		5.9%	
<i>Partner educational level:</i>				
Partner: less than secondary education	24.5%		25.5%	
Partner: secondary education	54.5%		51.8%	
Partner: above secondary education	20.7%		22.5%	
Partner: missing educational level	0.2%		0.2%	
<i>Occupation:</i>				
Sales/Services/art support/cleaning	8.4%		12.0%	
Management	12.0%		6.4%	
Finance/legal profsnl	5.2%		1.5%	

Scienc/engin/med prof	6.2%	2.8%
Education professional	2.7%	3.1%
Other professional	3.1%	1.4%
Health/educ/soc care support	1.0%	2.9%
Clerical/office support	2.8%	3.9%
Security/armed forces	3.3%	0.2%
Farm, forestry, fishing	3.6%	1.3%
Construct, /repair, transpt	32.8%	2.6%
Self-employed non-professional	1.0%	0.2%
Missing or not applicable	17.8%	61.8%
<i>Age of the youngest child</i>		
0	4.1%	3.4%
1-2	8.3%	7.5%
3-5	10.3%	9.5%
6-7	5.6%	5.3%
8-9	8.4%	7.7%
10-12	7.8%	7.3%
13-17	13.8%	13.2%
Not having a child less than 17	41.7%	46.2%
Having a partner aged more than 64 (vs. not)	0.9%	8.3%
Public sector (vs. private sector)	15.3%	11.2%
Spanish citizen (vs. not Spanish citizen)	97.3%	97.1%
Rural area (vs. urban)	40.8%	41.5%
Observations	8,691	8,953

Table B7: Heckman selection procedure: dependent variable logarithm of wage, selection variable working/not working

	Men	Women
Wage equation		
Age	0.0318*** (0.0072)	0.0410*** (0.0086)
Age square	-0.0003*** (0.0001)	-0.0004*** (0.0001)
<i>Educational level</i>		
Illiterate or less than 5 years of school	-0.4380*** (0.0435)	-0.6030*** (0.0764)
Primary education	-0.3556*** (0.0335)	-0.4445*** (0.0605)
Secondary education	-0.3418*** (0.0281)	-0.4182*** (0.0459)
High school, low professional degree	-0.2785*** (0.0277)	-0.3488*** (0.0437)
High professional degree, general degree	-0.2055*** (0.0256)	-0.2373*** (0.0326)
<i>Partner educational level</i>		
Partner: secondary education	0.0793*** (0.0175)	0.0466 (0.0309)
Partner: above secondary education	0.1410*** (0.0224)	0.1377*** (0.0353)
Partner: missing educational level	0.3826*** (0.1216)	0.2400 (0.1865)
<i>Occupation</i>		
Management	0.4486*** (0.0244)	0.3696*** (0.0289)
Finance/legal profsnl	0.6706*** (0.0320)	0.5559*** (0.0525)
Scienc/engin/med prof	0.4126*** (0.0314)	0.5043*** (0.0442)
Education professional	0.4155*** (0.0427)	0.5825*** (0.0446)
Other professional	0.3298*** (0.0369)	0.2705*** (0.0533)
Health/educ/soc care support	0.1770*** (0.0568)	0.1302*** (0.0395)
Clerical/office support	0.1223*** (0.0375)	0.1451*** (0.0349)
Security/armed forces	0.2099*** (0.0369)	0.2557* (0.1319)
Farm, forestry, fishing	0.1552*** (0.0343)	0.0282 (0.0514)
Construct, /repair, transpt	0.1633*** (0.0207)	0.0640* (0.0376)
Self-employed non-professional	0.0445 (0.0556)	0.0664 (0.1355)
Missing or not applicable	0.1837**	0.0086

	(0.0765)	(0.1099)
Public sector	-0.0389** (0.0181)	0.0154 (0.0237)
Rural area	-0.0369*** (0.0124)	-0.0282 (0.0191)
Constant	1.1894*** (0.1559)	0.7871*** (0.1867)
Selection equation		
Age	0.1999*** (0.0179)	0.1337*** (0.0151)
Age square	-0.0027*** (0.0002)	-0.0017*** (0.0002)
<i>Educational level</i>		
Secondary education	0.3900*** (0.0410)	0.3678*** (0.0371)
Above secondary education	0.6869*** (0.0557)	1.2500*** (0.0472)
<i>Partner</i>		
Age of the partner	-0.0017 (0.0048)	-0.0183*** (0.0037)
Having an old partner	-0.3906** (0.1642)	0.0727 (0.0808)
Spanish citizenship	0.4218*** (0.1048)	0.1104 (0.0868)
<i>Rural/urban area</i>		
Rural	0.0362 (0.0367)	0.0471 (0.0295)
<i>Age of the youngest child</i>		
0	0.0964 (0.1299)	-0.7007*** (0.0994)
1-2	0.1599 (0.1100)	-0.2595*** (0.0781)
3-5	0.1074 (0.1018)	-0.2136*** (0.0733)
6-7	0.0372 (0.1065)	-0.0086 (0.0753)
8-9	0.1375 (0.0976)	-0.0820 (0.0696)
10-12	0.1421 (0.0981)	-0.0446 (0.0726)
13-17	0.0917 (0.0697)	-0.0374 (0.0553)
Number of children	-0.0407 (0.0380)	-0.1147*** (0.0285)
Constant	-2.9218*** (0.3923)	-2.2807*** (0.2985)
Rho	-0.1097 (0.0938)	0.2082*** (0.0872)

Lambda	-0.0546 (0.938)	0.1098*** (0.0473)
Observations	8,691	8,953

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table B8: Predicted hourly wages divided by monthly labour income interval

Monthly income interval	Men			Women		
	Freq.	Mean	SD	Freq.	Mean	SD
Not working	4,841	7.39	1.25	8,607	4.25	1.01
0 – 499 €	190	7.4	1.78	576	4.62	1.24
500 – 999 €	2,141	7.19	1.57	1,534	5.13	1.54
1000 – 1249 €	2,153	7.87	1.86	625	6.55	2.04
1250 – 1499 €	1,125	8.86	2.45	342	8.1	2.25
1500 – 1999 €	956	10.15	2.7	354	9	2.34
2000 – 2499 €	426	10.91	2.99	93	9.84	2.7
2500 – 2999 €	156	12.15	2.86	28	9.6	2.39
More than 3000 €	207	13.46	3.25	36	10.2	2.43
Total	12,195	8.08	2.27	12,195	4.81	1.8

APPENDIX C

Table C1: Observed minutes spent by men (M), women (W) and couples (CP) in paid work, housework and child care according to the number of children and the state in which the man is observed

Paid work												
Nr children	State 1: High paid High unpaid			State 2: High paid Low unpaid			State 3: Low Paid High Unpaid			State 4: Low paid Low unpaid		
	M	W	CP	M	W	CP	M	W	CP	M	W	CP
0	496.94	283.55	780.48	563.97	202.92	766.89	138.32	388.79	527.10	294.51	224.58	519.09
1	499.79	266.86	766.64	576.02	174.45	750.48	180.24	368.32	548.56	304.60	183.65	488.25
2	503.18	232.45	735.63	580.03	148.61	728.64	232.40	322.81	555.21	331.45	146.74	478.19
3+	518.70	239.57	758.26	588.48	121.32	709.80	194.76	305.71	500.48	326.21	150.69	476.90
Housework												
Nr children	State 1: High paid High unpaid			State 2: High paid Low unpaid			State 3: Low Paid High Unpaid			State 4: Low paid Low unpaid		
	M	W	CP	M	W	CP	M	W	CP	M	W	CP
0	183.71	261.45	445.16	22.38	284.49	306.87	236.64	176.26	412.90	40.38	242.88	283.26
1	124.43	229.21	353.64	21.24	287.52	308.77	193.84	173.68	367.52	39.95	251.80	291.75
2	120.13	264.70	384.83	22.03	320.60	342.63	186.64	206.16	392.81	31.81	270.72	302.54
3+	95.65	266.96	362.61	14.30	332.65	346.95	149.52	233.81	383.33	26.55	292.07	318.62
Child care												
Nr children	State 1: High paid High unpaid			State 2: High paid Low unpaid			State 3: Low Paid High Unpaid			State 4: Low paid Low unpaid		
	M	W	CP	M	W	CP	M	W	CP	M	W	CP
1	75.50	114.21	189.71	10.86	69.33	80.19	102.88	64.80	167.68	10.28	49.10	59.38
2	85.83	135.36	221.19	14.27	109.08	123.35	98.01	95.48	193.49	15.94	73.77	89.71
3+	103.04	170.87	273.91	15.96	130.40	146.36	148.57	129.05	277.62	12.76	75.86	88.62

Source: MTUS Spain 2002-2003

Table C2: Generalised Linear Model for fraction of time of the man in childcare

Dependent variable	Fraction of men' time in childcare
Average wage	0.0580*** (0.0143)
Wage ratio (m/w)	-0.1521** (0.0765)
Average age	-0.0071 (0.0061)
Age ratio (m/w)	0.0483 (0.2981)
Nr of children: 2	-0.1668*** (0.0636)
Nr of children: 3+	-0.1914* (0.0993)
State 2 (High paid Low unpaid)	-1.4800*** (0.0692)
State 3 (Low paid High unpaid)	0.6254*** (0.0870)
State 4 (Low paid Low unpaid)	-1.0912*** (0.1159)
Constant	-0.3098 (0.3730)
N	2,062

Source: MTUS Spain 2002-2003

Ref category for Nr of children: 1 child; Ref. category for State: State 1

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table C3: Actual and predicted fraction of men time in the three activities

	State 1: High paid High unpaid	State 2: High paid Low unpaid	State 3: Low Paid High Unpaid	State 4: Low paid Low unpaid
Fraction of men time in paid work				
Actual	72.91%	82.54%	35.08%	67.49%
Predicted	67.00%	77.32%	34.71%	62.77%
N	376	3,153	399	697
Fraction of men time in housework				
Actual	37.08%	9.05%	52.59%	15.89%
Predicted	34.59%	7.82%	51.71%	14.25%
N	376	3,120	399	691
Fraction of men time in childcare				
Actual	40.83%	12.68%	56.29%	18.64%
Predicted	39.23%	12.23%	54.80%	17.20%
N	288	1,310	244	220

Source: MTUS Spain 2002-2003

Footnote: the number of observation in each state can be different for the different time uses. For childcare it is straightforward why. The difference between housework and paid work (state 2 and state 4) depends on the fact that 33 households in state 2 and 6 in state 4 do not make any housework at all. Therefore for these men the fraction is not computed.