"IT'S TIME TO CARE !" A BALANCED TIME ALLOCATION OF EARNER-CARERS? EVIDENCE FROM EUROPEAN COUNTRIES

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Abstract

This paper aims at investigating the disjunction between labour market participation and time allocation of earner-carers. The question addressed is how European countries differ from one another in terms of intra-household allocation of time, especially regarding hours worked and hours spent looking after children. Data for couples with at least one child aged less than 12 are taken from the European Community Household Panel ECHP (wave 6, 1999). The methodology consists in the simultaneous estimation of a set of equations related to working parents' time spent looking after their children, a procedure which is conform to economic theory on collective household decision-making. The econometric estimations show that spouses' child care time has a complementary rather than a substitutable character. Nevertheless, men's time at child care has an effect on women's care time that is twice as large as the impact of women's time on men's involvement in child care. The complementarity of spouses' child care time stands in the way of convergence towards equality of men and women in terms of time spent on child care. However, a positive move towards equality is observed when women increase their working hours. Even if it may not lead to full gender equality, policy-makers can still take a major step in the right direction by means of the promotion of full-time employment for women although the potential negative side-effects of this policy in terms of a decrease in parents' child care time should be followed up very closely.

Keywords: time-use, child care, family economics, simultaneous equation system, 3SLS, gender equality
JEL Classification: D1, C5, J13, J22

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1. Introduction

A direct consequence of the transition from the traditional male breadwinner model to the dual-earner model in the post war years is the (gendered) time burden (Becker, 1991; Blau and Ferber, 1992; Mutari and Figart, 2001; Oughton, Wheelock and Wiborg, 1997; Powell and Hewitt, 2002). Women remain the primary care givers and have to stand up to the task of combining their traditional care roles and their newly adopted professional responsibilities (Himmelweit, 1995, 2000; Shaver and Fine, 1995; Folbre and Weisskopf, 1998).

This paper aims at investigating the disjunction between labour market participation and time allocation of earner-carers. The question addressed is how European countries differ from each other in terms of intra-household allocation of time, especially regarding hours worked and hours spent looking after children. Data for couples with at least one child aged less than 12 are taken from the European Community Household Panel ECHP (wave 6, 1999).

The methodology consists in the simultaneous estimation of a set of equations related to working parents' time spent looking after their children.

In section 2 we present the theoretical background to household decision-making based on three different economic models. The third section serves to confront the theoretical concepts and ideas with the empirical findings set forward in the literature. The empirical background studies also help to refine our own research purposes. In a fourth section, we go deeper in to the utility framework that underlies the econometric model that we have specified and that is presented in section 5. In the fifth section we also explain the procedure we have used to estimate the econometric model. Information on the data used in our analysis is given in section 6 in which we have also presented some basic descriptive statistics based on the raw data to illustrate the stakes in our study. In section 7 we comment on the results obtained from the estimation of our econometric model and, finally, we conclude in section 8. We should note that as far as the econometric estimations are concerned, we have focused on 6 European countries: Belgium, Austria, Finland, Italy, Portugal and Denmark. However, as far as the descriptive statistics are concerned we have been as inclusive as possible given the limitations of the ECHP and have presented information on 11 European countries, excluding Germany, Luxembourg, the United-Kingdom and Sweden.

2. Theoretical background

Household decision-making underlies a great number of economic and policy debates. In this paper we focus on couples' joint decisions in terms of labour supply and time spent looking after children.

Basically, three economic models exist to study household labour supply.

Household labour supply is typically modelled using the unitary model, in which the household is considered as a unique agent, maximising its utility function subject to a household budget

constraint. Traditional human capital theory relies on wives' and husbands' comparative advantages to explain the gendered division of labour. From a theoretical angle, this model has been criticized, first because the benevolent household dictator on which the model relies does not systematically exist (Becker, 1991), and second because it raises the social choice problem through the required aggregation of preferences (Arrow, 1951; Samuelson, 1956). Empirically, evidence has been put forward that leads to reject the supposed symmetry of the Slutsky matrix as well as the assumption of income-pooling within the household (Kooreman and Kapteyn, 1987; Schultz, 1990; Lundberg et alii, 1997; Fortin and Lacroix, 1997).

A second model shifts the intra-household decision locus from the household unit to the individuals who constitute this unit. It refers to game theory to represent household decisions as bargained outcomes (Manser and Brown, 1980; Horney and McElroy, 1981; Lundberg and Pollak, 1993). As in the unitary model, comparative advantages still play an important role but their effect is mitigated because outside options available to each parent need also be considered. Furthermore, intra-household resource allocation depends on each member's income (no automatic income-pooling is assumed as is the case in the unitary model). The difficulty with this cooperative model is that an explicit determination of the threat point or the next best choice is needed for each individual agent belonging to the household.

Therefore, more recently, the collective model for household labour supply has gained importance (Chiappori, 1988, 1992, 1997; Bourguignon and Chiappori, 1992; Browning et alii, 1994; Browning and Chiappori, 1998). This model stresses the Pareto-efficiency of intra-household decisions. Such decisions arise from a negotiation process within the household that is described by a sharing rule. One of the major advantages of the collective model is that the derivatives of this sharing rule can be recovered using only observations on leisure for the household members (leisure in the broadest possible sense, that is including time spent looking after children). However, the main drawback of these collective choice models is that they do not allow for an analysis of household labour supply decisions in case just one of both spouses or none of the spouses work. The analysis of corner solutions is still *in statu nascendi*. Therefore, empirical studies are either limited to the joint estimation of men's and women's working hours thus ignoring the decision of whether to participate in the labour market or not, or they focus on married women's participation decision based on an individual choice model and considering the husband's participation to be exogenous (Dex et alii, 1995; Giannelli and Micklewright, 1995; Del Boca et alii, 2000).

Given that we are interested not only in couples' labour supply decisions but also in their choices as regards the time allocated to home production, and particularly child care, the above remarks are of utmost importance to us. The additional worker hypothesis according to which the spouse of an unemployed person is likely to work more to compensate for household earnings foregone (Lundberg, 1985) has been rejected by numerous studies that have put forward the complementary rather than substitutable character of spouses' labour supply (Barrère-Maurisson et alii, 1985; Davies et alii, 1992). However, complementarity of spouses' working hours cannot be upheld when children enter the picture (Anxo, Flood, Kocoglu, 2002). In other words,

spouses' working hours cease to be complementary in the presence of young children. In this case, wives' labour supply becomes a substitute to that of their husbands and evidence is found for the additional worker hypothesis. However, notwithstanding the important effect of children on spouses' working hours, their presence first and foremost affects spouses' decision of whether or not to participate in the labour market at all (Duquet and Simonnet, 2003).

3. Empirical background

Empirically, both the unitary and the collective model have received much attention and have often been confronted to one another whereas empirical treatment of the second model in which partners' respective bargaining power determines household decisions constitutes a somewhat separate body of literature (which this paper will not go into). As regards the unitary model, an interesting conceptual overview is given by Wallace (1999) who analyses household strategies as a concept, a method of analysis and a unit of analysis. She shows that household strategies can help to elucidate the social factors underlying economic behaviour and become particularly salient under conditions of social change (post-communism, post-Fordism, etc.).

Based on men's and women's respective comparative advantages, the unitary model of household decisions predicts that the husband will specialise in market work leaving the wife in charge of home production (whether or not she combines this with market work). Extending the model to include children may change the predicted family division of labour. Liu (1999) uses Vietnamese data to show that an increase in the wife's wage is likely to induce a substitution of children's time for mother's time in household production as the mother increases her time at work. In other words, children might contribute positively to mothers' labour supply by doing more housework. First, it would be interesting to see whether such behaviour is typical of developing countries only. Second, where does this leave men?

A more appropriate framework for the analysis of household behaviour is the 'collective' framework, in which two household members with potentially different preferences make Pareto-efficient decisions in terms of labour supply and consumption. This model does not allow two partners constituting a household to enjoy expenditure on any public goods, and particularly children are hard to account for within this framework. Chiappori et alii (2002) have adjusted the mainstream collective model to include the effects of the presence of children on both household members' utility. In policy terms, they put forward the interesting conclusion that providing funds to the person with the highest marginal willingness to pay for the public good does not necessarily increase spending on the public good since marginal willingness to pay changes with changes in resources.

A collective model of labour market participation of couples in which spouses' decisions are correlated and simultaneous is estimated for France by Duguet and Simonnet (2003). It is shown that spouse's labour participation positively and significantly affects both men's and women's participation. This finding conforms to our theoretical note about the complementarity of spouses' working hours in the absence of children but their substitutability as soon as children

enter the analysis. Family responsibilities are amongst the most important determinants of the work decision although their influence is quite different for men and women.

Focusing on the household's labour supply decision, Chiuri (1999) examines the effects of the presence of pre-school aged children creating non-separabilities in the use of time. The standard household utility model is confronted with the collective one, assuming that both include a household production function that measures the quality of time spent with children. It is shown that, at least for Italy, the collective model cannot be rejected whereas negative evidence is found for the unitary model.

A very similar study was carried out for Great Britain by Clark et alii (2001). Both a unitary and a collective model of household labour supply were estimated and negative evidence was put forward for the unitary model (rejection of the symmetry of the Slutsky matrix an of the income-pooling assumption). Finally, a novel distribution factor, the sex ratio, was used and was shown to influence the sharing rule implied in the collective model. However, domestic work was not explicitly taken into account.

Ghysels (2003) focuses on Denmark, Belgium and Spain to analyse decision-making by male and female partners with regard to the time they spend on paid work and child care. The use of a simultaneous equations framework as an empirical model of the decision-making process is proved robust. Although the empirical procedure did not allow for a selection between various theoretical household models, enough evidence was found to reject the unitary model. The main conclusion was that at least in Belgium and Denmark an increase in men's participation in child care is not likely to increase women's time for leisure.

For France and Sweden, an interesting analysis of couples' time use was carried out by Anxo et alii (2001). To simplify the estimation of the labour supply models, a sequential decision structure in the household's time allocation was assumed. In a first stage, spouses determine how much time to spend on market work and then, given this time on market work, they decide on their time on other activities. Although, time spent on market work enters as a right-hand side variable in the equations for housework and child care time, time spent on housework and child care does not affect market work. The main result is that both countries are still characterised by a traditional gender division of time although the domestic division of labour remains more unequal in France. Institutional and economic factors are shown to play an important role. The more equal gender distribution of education, the lower gender after-tax wage differential and the lower earnings loss related to childbirth explain the higher and more continuous labour participation of Swedish women. Domestic labour is more equally shared in Sweden because of the existing employment guarantee and well-compensated parental leaves. As a result, the effects of children on gender specialisation and thus on the gendered allocation of time are limited to young pre-school aged children in Sweden. Policy initiatives should thus focus mainly on fathers' involvement in child care whereas in France, attention should be given to an improved compensation of the parental leave and to adequate public provision of child care.

The empirical background studies have helped us refine our research purposes. The complex set of interrelationships between time used for market work, for child care and for leisure by both

members of a couple are rarely fully accounted for. Often, when the focus is on labour supply, children only enter the analysis through exogenous variables such as their number or age. We prefer to allow for the greatest possible number of interactions between child care time and time at market work. Similarly to Anxo et alii (2001) we first regard the simultaneous labour participation decision of spouses. Given that we do not impose any restrictions on the disturbances of this system of equations, we allow the participation decision to be correlated to the time spouses choose to spend with their children. Then we consider their simultaneous decision on how much time to spend with children given the time spent on child care by their spouse and own and spouse's labour attachment. Moreover, we correct the child care time equations for a potential selection bias by adding the inverse Mill's ratio as an additional regressor. In sum, we dispose of two sets of simultaneously estimated equations which are mutually influential. A good example of this methodology is given in the study by Hallberg and Klevmarken (2001) who concentrated on Sweden. Similarly to their analysis, we have included an often neglected variable in our equations analysing parents' time with children, that is the use of outside care facilities. Institutional child care settings might turn out to be an important factor to explain cross-country differences in the time parents' choose to spent with their children, given their labour market situation. Hallberg and Klevmarken (2001) find that a change in a mother's work hours has considerably less impact on her time spent with children than a change in a father's work hours. The conclusion is therefore that a policy working to increase the time with own children should primarily influence the father's work hours. Furthermore, outside care cannot be considered a substitute to parents' own time with the children. In this paper, we are not interested in analysing the effects exogenous variables have on either parents' time with children or their time working in the market. We will, however, profoundly discuss the interrelationships between all of our endogenous variables: working and non-working mothers' time with children, working and non-working fathers' time with children, mothers' and fathers' working hours and the use of outside child care. The next two sections are largely based on the analysis of Hallberg and Klevmarken (2001).

4. The utility framework

In line with their model, we first determine the general utility function for a one-parent household. This parent has five main sources from which to draw utility: market work (t_w), consumption of market goods (X), children (C), time spent with children (t_c) and time spent on leisure (t_l). The utility function is:

$$U=U(X,C,t_w,t_c\ t_l) \qquad (1)$$

The one-parent household will maximise this utility function subject to three constraints: a budget constraint, a time constraint and a child quality production function which relates the utility derived from having children to the time a parent gets to spend with them:

$$wt_w = X \quad (2)$$

$$T = t_w + t_c + t_l \quad (3)$$

$$C = f(t_c) \quad (4)$$

The above equations define a maximisation problem that can be solved (yielding an optimal result) through the first-order condition:

$$Ut_w + U_X w = Ut_c + U_C(dc/dt_c) = Ut_l \quad (5)$$

The first-order condition imposes equality of the marginal utilities of market work, of having children and of leisure. The first two marginal utilities are two-fold. The marginal utility of market work combines both the utility derived from working in itself (from one additional hour of work) and from the surplus in consumption of market goods allowed for by working an additional hour in the market. In our opinion the inclusion of working time in the utility function is a valuable contribution to the usual utility framework (Chiappori et alii, 2002; Chiuri, 1999; Ghysels, 2003) since it allows to take into account the value of work beyond its purely financial role.

The marginal utility of having children derives from the fact of having children in itself as well as from spending an additional hour with them. The effect of an income increase of one of the spouses on own and spouse's time spent looking after children will depend on the relative magnitude of the income and the substitution effect. If time spent with children is assumed to be preferred over market time then a higher income earned by one of the spouses will increase own time with the children in case the income effect dominates. If we also suppose there to be some level of income pooling between the spouses then we expect the second parent (the spouse of the one whose income rose) to also increase her/his time spent with the children at the expense of her/his time spent working. If the substitution effect dominates then a higher income increases the opportunity cost of spending time out of the market and thus increases time spent on market work. However, the spouse's time at work will decrease and, depending on the process benefits associated to the different activities, will increase either time spent on child care or consumption expenditure. If the spouse who works more decides to be less involved in child care and keep leisure constant then child quality will decrease and as a result the spouse's marginal utility derived from an increase in child quality will rise encouraging her (him) to spend more time on child care and less on leisure or market work. This reaction remains the same when income is kept strictly separate.

The above framework changes when instead of one parent, two spouses are considered. Their interaction will affect the resulting time spent with the children of each of them. We now need to account for different comparative advantages and bargaining power.

Furthermore, the initial framework does not take into account parents' option to resort to outside care for their children. If outside care is taken into consideration, the child quality production

function (4) will become dependent not just on the time parents spend with their children but also on the time they are cared for in outside facilities:

$$C=f(t_c,t_{cc}) \quad (6)$$

If we consider outside care to have a price, we need to adjust the household's budget constraint (2):

$$wt_w=X+p_{cc}t_{cc} \quad (7)$$

The new budget constraint modifies the marginal utilities equality. Given the additional cost of outside child care for the household, we must impose the marginal utility of an additional hour in outside care to be equal to that derived from market consumption of an equal amount.

$$U_C(dc/dt_{cc})=U_Xp_{cc} \quad (8)$$

We then obtain the following first-order condition to solve the new maximisation problem:

$$Ut_w+U_Xw=Ut_c+U_C(dc/dt_c)-U_Xp_{cc}=Ut_l \quad (9)$$

Furthermore, we assume that outside child care is necessary during the hours parents work in the market. Therefore, we impose:

$$t_w=t_{cc} \quad (10)$$

Using this constraint, we can rewrite the FOC:

$$Ut_w+U_X(w-p_{cc})+U_C(dc/dt_w)=Ut_c+U_C(dc/dt_c)=Ut_l \quad (11)$$

The marginal utility of market work now has three instead of two components: the utility derived from working an additional hour in itself, from spending the amount earned by an additional hour of market work on consumption goods after outside care has been paid for and from the additional child quality of one additional hour of outside child care. The marginal utility of market work must equal that of child quality production at home and that of leisure. In this model we now have to include the fact that the effect of an income rise is dampened because of the additional child care cost it brings about. As a result, we suspect that including outside care will increase parents' market work and decrease both their leisure and child care time (proportional to the process benefits associated to these activities respectively).

Finally, we impose a total time constraint. The time spent with the children by one spouse frees the other to engage in market work or to benefit from leisure while the time children are cared

for in outside facilities necessarily corresponds to working time of the parents. $t_{c.}$ represents the time spent with the children by both parents together.

$$T=t_{cf}+t_{cm}+t_{c.}+t_{cc} \qquad (12)$$

5. The econometric model

Our analysis relies on a set of four interdependent variables: child care time by non-working mothers and fathers and child care time by working mothers and fathers. In the previous section we have introduced the relevant utility functions in a framework of households with two interacting spouses. Although no specific functional forms are imposed and we thus refrain from estimating a full structural model, the model used does reflect the fact that the way spouses allocate their time is mutually dependent as well as the fact that time allocated to one activity necessarily depends on time allocated to other activities. Our model involves four equations that make up a switching regression system (13) to estimate child care time of both working and non-working parents:

$$\begin{aligned}
t_{cf} &= \alpha_{01} + \alpha_{11}\, t_{cm} + \alpha_{41}\, t_{cc} + \alpha_{61}\, Y + \alpha_{71}\, X_f + \alpha_{81} X + \varepsilon_{f1} \\
T_{cf} &= \alpha_{02} + \alpha_{12}\, t_{cm} + \alpha_{22}\, t_{wf} + \alpha_{32}\, t_{wm} + \alpha_{42}\, t_{cc} + \alpha_{52}\, w_f + \alpha_{62}\, Y + \alpha_{72}\, X_f + \alpha_{82} X + \varepsilon_{f2} \\
t_{cm} &= \beta_{01} + \beta_{11}\, t_{cf} + \beta_{41}\, t_{cc} + \beta_{61}\, Y + \beta_{71}\, X_m + \beta_{81} X + \varepsilon_{m1} \\
T_{cf} &= \beta_{02} + \beta_{12}\, t_{cf} + \beta_{22}\, t_{wf} + \beta_{32}\, t_{wm} + \beta_{42}\, t_{cc} + \beta_{52} w_m + \beta_{62}\, Y + \beta_{72}\, X_f + \beta_{82} X + \varepsilon_{m2}
\end{aligned}$$

With
- t_{cf} = child care time of non-working mothers
- T_{cf} = child care time of working mothers
- t_{cm} = child care time of non-working fathers
- T_{cf} = child care time of working fathers
- t_{wf} = hours of market work of mothers
- t_{wm} = hours of market work of fathers
- t_{cc} = hours of outside child care
- w_f = net wage of mothers
- w_m = net wage of fathers
- Y = household non-labour income
- X_f = vector of exogenous variables specific to mothers
- X_m = vector of exogenous variables specific to fathers
- X = vector of common exogenous variables
- α, β = regression coefficients
- ε = error terms

As already mentioned, child care time is dependent on parents' decision of whether or not to participate in the labour market. However, the choice of work hours is endogenous. Indeed, the

choice of working hours depends on the time spent with children and inversely, the time spent with children depends on the time spent on market work. Given that the choice of working hours is endogenous, the switch from equation 1 in which mothers do not work to equation 2 in which they do becomes endogenous through the inclusion of the endogenous variable representing mothers' working hours. The same holds for the switch between equations 3 and 4. We estimate a system of two participation equations of which the reduced-form is written as follows:

$$t_{ci} = t_{ci} \quad \text{if} \quad l_i \leq 0$$
$$= T_{ci} \quad \text{otherwise} \qquad (14)$$
$$l_i = \gamma'_i Z_i + \eta_i \qquad (15)$$
$$L_i = 0 \quad \text{if} \quad l_i \leq 0$$
$$= 1 \quad \text{otherwise} \qquad (16)$$

with i=m,f, L_i a dummy to indicate labour market participation and Z_i a vector of gender-specific and common exogenous variables that determine parents' decision of whether or not to take on employment. We assume that the random error terms in equations (13) and (15) are distributed according to the multivariate normal distribution. However, since we do not assume that they are uncorrelated, we allow for labour market participation to be dependent on parents' time spent with children. For example, negative correlation between η_i and ε_{f1} indicates that there is a trade-off for mothers between participating in the labour market and spending time with their children.

It is important to pay some attention to the way in which parents' child care time reacts to a change in one of the exogenous variables at the right-hand side of the equations (13). Let us consider the effect of an additional year of education on mothers' time spent with children. Additional education increases the opportunity cost of time spent with children as it increases the value of market work through a higher potential wage. An increase in education entails two different effects each leading towards a decrease in mothers' child care time. First of all, a selection process takes place given that higher education attracts some mothers to the labour market (a change in a different exogenous variable would maybe have caused some mothers to withdraw from the labour market). Such entries or exits from the labour market are called selection effects. Second, the change in education encourages mothers to re-allocate their time, devoting more of it to market work and less to their children. To guarantee the robustness of our estimates we need to correct for this potential selection bias in our sample. Usual OLS estimation would yield biased estimates given that there is no longer independence between the disturbance and the independent variables in the time equations.

The Heckman (1978) procedure allows us to solve the above problem by extracting the possible correlation between the disturbances of the time equations (13) and the independent right-hand side variables and to estimate our model in two steps.

First step

We estimate equations (14)-(16) as a bivariate probit model.

$$P_i = \text{Prob}[L_i = 1 \mid Z_i] = \Phi(\gamma'_i Z_i) \qquad (17)$$

with Φ the cumulative distribution function of the normal distribution. Note that for reasons of identification (resulting from the fact that we estimate a reduced-form model instead of a full structural model) we need to include one unique Z-variable in the bivariate probit system which influences parents' labour participation but has no explanatory power with respect to their time with children. For details on the set of variables used in the regressions we refer to Appendix 1.

We now estimate a correction term (the Inverse Mill's Ratio) both for the male participation equation and the female participation equation in our bivariate probit model. This correction term will, in our case, be identical for men and women given that their respective labour participation decisions are explained by the exact same set of independent, right-hand side variables. The term can be interpreted as an indicator of non-observed characteristics or as a measure of the error terms of the participation equations that are not directly observable. The Inverse Mill's Ratio is defined according to the following formula:

$$\lambda_i = \varphi(g'_i Z_i)/\Phi(g'_i Z_i) = \text{the hazard function} \qquad (14)$$

with $\varphi(.)$ and $\Phi(.)$ respectively the density and the distribution function of the standard normal law and *g* the vector of parameter estimates resulting from the bivariate probit model.

We use the Inverse Mill's Ratio as an additional regressor in the equations estimating the time parents' spend with their children (13) in order to clear the error terms of these equations from their possible correlation with the exogenous variables. The sign of the coefficient associated to this lambda in equations (13) indicates whether the effects in terms of time with children generated by changes in the exogenous variables are either under- or over-estimated if the selection bias is not taken into account. For example, a negative sign means that the effects of the exogenous variables on the time parents get to spend with their children will increase in size if the selection bias is corrected for and thus parents' child care time is under-estimated in the non-corrected version of the model.

Second step

We now estimate the interdependent system of time equations (13) including the Inverse Mill's Ratio as an additional regressor in each equation by 3SLS. To correct for the endogeneity

problem in this system of time equations we need at least one unique identifying instrument for each of the endogenous variables. The endogenous variables are: t_{wf}, t_{wm}, t_{cc}, w_f, w_m. A description of the set of variables as well as an overview of the instruments we used to take into account the endogeneity problem are presented in Appendix 1. We should note that although our model would allow to estimate parents' time allocation for four types of couples (both working, neither working, just one parent working), a sufficient number of observations was available only for the case where both parents participate in the labour market (see Appendix figure A.1).

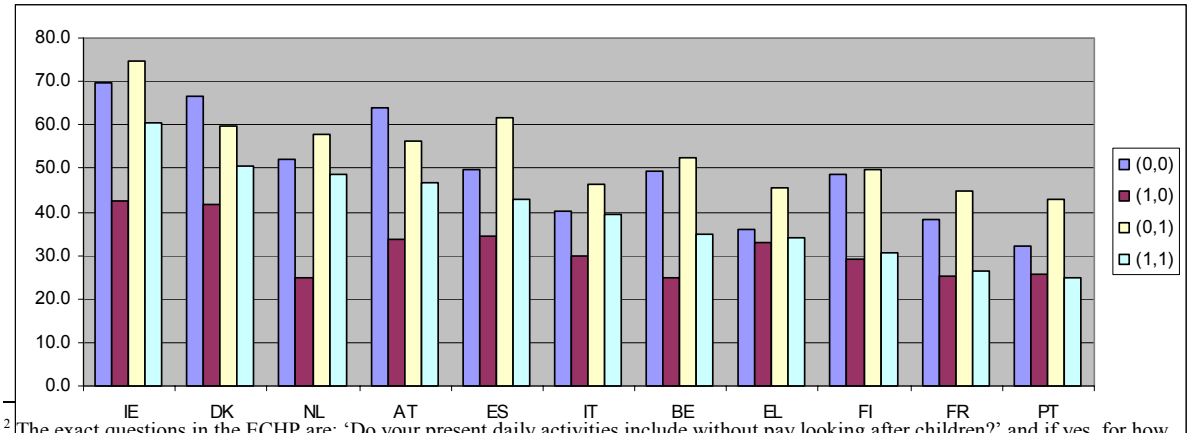
6. Data

The data used for this study are taken from the European Community Household Panel (ECHP, wave 6, 1999). Since the main variable of interest is the time spent with children, we selected only couples – married or not – with at least one child aged less than 12 years old. This leaves us with a larger sample of observations than the one we would have obtained if we had focused only on couples with young children, i.e. infants and preschool children.

When looking at the "raw data" on time allocation, some useful descriptive statistics can be derived to form a first impression of what is at stake. The aim of this section is to use the raw data to review the interactions between parents' time spent looking after children[2] and their labour market decisions according to different influential factors such as level of education, number of children, age of the youngest child, etc. We present some of the most interesting results that will support our further analysis of intra-household time allocation. We gathered information on 11 European countries, excluding Germany, Luxembourg, the United-Kingdom and Sweden for which no data are available in the ECHP on time spent looking after children.

We suspect time spent looking after children to depend on parents' labour market participation status: when both spouses work they are expected to have less time available for their children than non working mothers or households where both spouses do not work.

Figure 1 : Female average weekly hours spent looking after children according to couples' labour market participation (f,m)

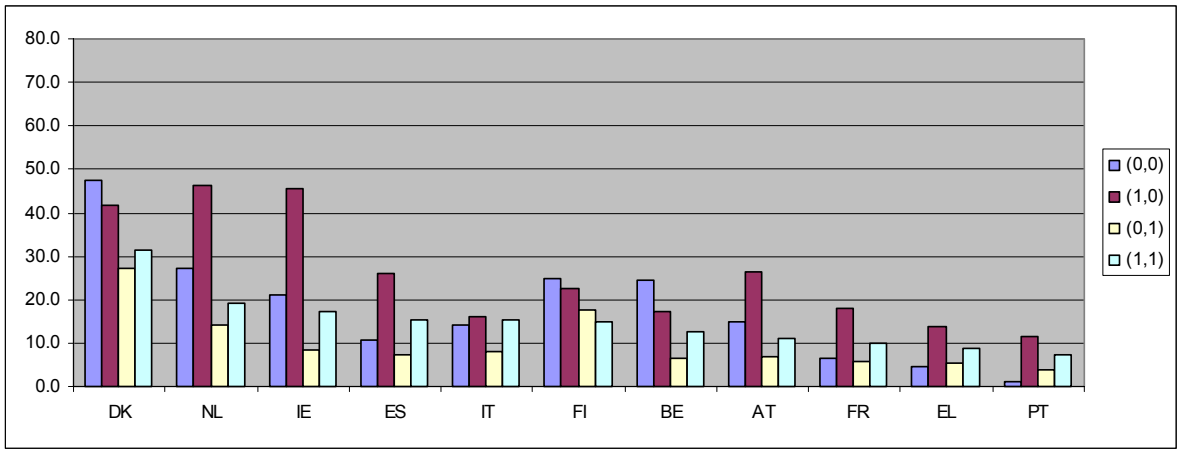


[2] The exact questions in the ECHP are: 'Do your present daily activities include without pay looking after children?' and if yes, for how many hours per week? The term 'looking after' leaves a lot of room for interpretation. For a more detailed discussion we refer to Ghysels (2003, p.119)

Note to read the legend : (0,1) means female partner does not work while male partner does.
Countries ranked by time spent when both partners work (1,1).

Source : Eurostat ECHP 1999 (wave 6) and own calculations

Figure 2 : Average male weekly hours spent looking after children according to couples' labour market participation (f,m)



Note to read the legend : (0,1) means female partner does not work while male partner does.
Countries sorted by time spent when both partners work (1,1).

Source : Eurostat ECHP 1999 (wave 6) and own calculations

A first remark considering both graphs is that neither Portuguese mothers nor fathers spend much time with their children. On the contrary, at the upper extreme Denmark figures as a country where parents spend the most time with their children, independent of sex or labour market situation.

Figure 1 puts forward some general cross-country differences in the time mothers get to spend with their children. Again Portugal but also France contrast sharply with Denmark and Ireland. In general, the figure confirms our *a priori* assumption that labour market participation causes mothers' child care time to decrease, except for Greece, Finland, France and Portugal where working mothers' time with children is not affected by their spouse's labour market situation.

Fathers' time is depicted in Figure 2. Except for Denmark, where fathers spend considerably more time with their children whether they work or not, the figure shows little cross-country difference. The exceptionally high level of time spent looking after children by workless fathers whose spouse is employed in the Netherlands and Ireland should be interpreted with great caution given the very small number of such couples in our sample.

Note that for both sexes the change in time spent with children is very small when differences in working hours are taken into account (Cfr. Appendix tables A.5 and A.6).

Although our sample contains only couples with children, note that the time couples expect to have for child care will probably affect their decision of whether or not they will have children at all. If they do decide to have children, they might choose to wait until their careers are steadily launched thus postponing the arrival of the first child.

7. Estimation results

Appendix table A.6 presents the detailed results of the simultaneous estimation of working parents' time spent with their children. Except for Denmark, partner's child care time turns out to be extremely significant. Moreover, in Denmark, the coefficients of partner's care time are relatively weak compared to the other countries, meaning that parents interact a lot less than in other countries to decide on how to allocate their time. However, both are quite equally involved in child care. Especially mothers' time spent with the children is more sensitive to the presence and number of young children than to their partner's child care time. This is in line with the results put forward by our descriptive statistics based on the raw data (see Appendix table A.4). On average women spend 60 and 68 hours per week respectively on child care when there is a child aged under 3 in the household with and without pre-school aged brothers or sisters compared to 35 hours a week when there is just one child aged between 6 and 12 in the household. Unlike for women, fathers' child care time is influenced more by the presence of pre-school aged children than by young children in the household. Again, this conforms to the descriptive statistics which show that on average men spend 39 hours a week on child care in case there is a child of pre-school age in the household.

In the remaining five countries, partner's child care time has a significant and positive effect on one's own time with the children. This means that we cannot conclude on the substitutability of parents' child care time. On the contrary, if one spouse decided to spend more time with the children, the other would feel encouraged to do the same. Similar results can be derived from the raw data (see Appendix table A.4). For example, Ireland clearly stands out from the other countries by the large amount of time women devote to their children's care independently of their number or age and, indeed, Irish men also score relatively high compared to the other countries in terms of their child care time. On the contrary, in Portugal, men spend very little time on child care and again this is by no means compensated by a greater involvement of their spouses who also spend the smallest amount of time with their children compared to the other countries. Moreover, in all countries, the effect of fathers' child care time on the time mothers spend with the children is far more important than in the opposite case (the effect of mothers' time on fathers' time). If fathers decide to spend an additional hour at child care, then this will result in more than one hour of an increase in mothers' child care time while a one hour increase in mothers' time with the kids lifts fathers' time by only between 0.66 and 0.86 of an hour.

Our econometric results also show that, except for Portugal and for Denmark, a full-time employment commitment by women has a significant and negative impact on their child care time while it positively influences men's time spent looking after the children. Appendix table A.5 confirms that when women work between 35 and 40 hours (as compared to between 25 and 34 hours), men's child care time doubles in Ireland, rises by 9 hours in the Netherlands and by 7 hours in Belgium while it decreases in Portugal (-3 hours), Spain (-2 hours) and Finland (-1 hour). For Portugal the associated coefficients are not significant while for Denmark, both men's and women's child care time is positively influenced by women's choice to work full-time (although the effect is not significant for men). Indeed, note that from Appendix table A.5 we learn that, in Denmark, women's child care time is independent from their working hours: they spend on average roughly 50 hours per week on child care whether they work full- or part-time.
In general, the negative effect of full-time employment on women's child care time is slightly greater than its positive impact on men's care time.

Finland stands out as the only country where extremely long male working hours (>40 hours weekly) significantly influence both parents' time with the children: while men spend on average 20 hours less time with the children, women increase their time by roughly 23 hours. This econometric result is once again confirmed by the descriptive statistics. A comparison of Appendix tables A.5 and A.6 for Finland shows that over all possible working hours for women, a shift in male working hours from less than 40 hours per week to more than 40 hours per week leads men to spend on average 6.4 hours less on child care while it increases women's care time by just 1.2 hours. Remarkably, men's time decreases the most when his spouse also works extremely long hours and thus a woman's child care time increases more than average in response to her husband's long working hours when she herself also works very long hours.

In our regressions the use of outside care is significant only in Portugal. However, except for Portugal, the descriptive statistics in Appendix table A.2 show that outside care cannot be regarded as a substitute for parents' time with their children. The degree to which external care is used should rather be interpreted as an indicator of parents' working hours. Appendix table A.1 puts forward the rising use of outside care as mothers move from no work to part-time employment and eventually to full-time employment.

There are quite some disparities between the countries as regards the way parents' child care time reacts to the number and age of the children in the household. Parents of just one child aged under 3 significantly modulate their child care time in response to this household situation in all countries, except for Danish men. However, note that their response varies in size across the countries, the largest effects being observed in Austria and the smallest in Italy. Indeed, Appendix table A.4 confirms this result showing that Italian women increase their child care time only by 12 hours in the presence of a single under-3 compared to an increase of 32 hours in their care time in Finland, 25 hours in Denmark and France and 21 hours in Austria. Although an equally

small increase of 12 hours is observed in Ireland, note that in general women's time spent with their children is already at an exceptionally high level in this country. The presence of a single child aged under 3 increases men's child care time by only 4 hours in Italy compared to 11 hours in Finland and 16 in Denmark.

The time effects induced by the presence of one child aged less than 3 are strengthened when there are other pre-school aged children in the household. However, the coefficients cease to be significant in Italy and Belgium as well as for Portuguese men. Appendix table A.4 confirms this result. Time spent looking after children is generally highest, both for men and for women, in case there is more than one pre-school aged child in the household of which the youngest is under 3 years of age. In this case, women's time reaches a high of 78 hours in Ireland while the longest care time of men is observed in Denmark (36 hours).

The presence of pre-school aged children has a significant impact on parents' time use in just three of the countries, Portugal, Denmark and Austria (only in case of a single child aged between 3 and 5 years of age). A major difference between Portugal and Austria on the one hand, and Denmark on the other, is that preschool children encourage men to work more (or at least to spend less time at child care) in the former countries whereas they increase men's care time in the latter. The exact same conclusion can be drawn from Appendix table A.4. While Portuguese and Austrian men do not adjust their child care time (compared to the reference case) in the presence of a pre-school aged child, Danish men spend on average 20 hours more on child care in this case. In all three countries, pre-school children increase women's child care time. Again, we can also see this from Appendix table A.4, the highest increase in mothers' time with the children being observed in Denmark (+19 hours) compared to 11 and 12 hours in Portugal and Austria respectively.

A priori we expect the presence of older children in the household to have an important effect on parents' child care time given that they can take over at least some share of the household chores to alleviate their parents' care and housework burden. Remarkably, the presence of a child over 16 years of age in the household is significant only in Finland where it decreases mothers' child care time by roughly 10 hours.

Finally, as we have explained earlier, we have used the Inverse Mill's Ratio (λ) as an additional regressor in the equations estimating the time parents spend with their children in order to clear the error terms of these equations from their possible correlation with the exogenous variables. The sign of the coefficient associated to λ indicates whether the effects in terms of time with children generated by changes in the exogenous variables are either under- or over-estimated if the selection bias is not taken into account. The results indicate that λ is significant only in Finland and Belgium for both sexes and in Denmark for men only. In other words, correcting for the selection bias was useful for these countries because if we had not introduced λ in the time

equations for these countries the coefficients would have either underestimated (for women in Finland and men in Belgium) or overestimated (for Finnish and Danish men and for Belgian women) the real effects of the exogenous variables on parents' child care time, that is they would have been smaller or bigger in absolute terms.

8. Conclusion

To conclude on our analysis, we thought it interesting to extend the male-female comparative perspective to an analysis of the gap in women's and men's child care time[3] according to different characteristics such as women's labour market situation, the decision of men to work extremely long hours and the number and age of the children belonging to the household.

The set of figures (A.4 to A.6 in the Appendix) summarises our main findings. First, we observe that men only very rarely play a more important role than their spouses in terms of child care, with the exception of the Netherlands in the case of full-time working women. This Dutch particularity should not be taken too seriously given the overwhelming popularity of part-time work in this country.

Second, it becomes clear from looking at the figures that, in all countries, women's decision to enter the labour force as well as their decision to increase their working hours lead to a substantial reduction in the proportion of households where the gap in child care time between the spouses is larger than 40 hours. However, parents' child care time is still far from reaching equality in all of the countries analysed. We should nevertheless note that an increase in women's working hours contributes to a narrowing of the child care time gap between men and women and thus to a more balanced intra-household division of child care responsibilities in Belgium, Denmark, Finland, France and Portugal.

Third, very long working hours by men are shown to widen the gap in child care time between spouses.

Fourth, a glance at the effect on the gender balance in parents' child care time of the presence of children in the household shows that in the 6 countries of our econometric analysis, men spend relatively less time than women on care for young children (infants and pre-school aged) but become more involved as children reach school age[4]. However, it is important to keep in mind that men's involvement in child care is at very different absolute levels throughout the countries in our sample. Overall, men's child care time is considerably lower in Italy and Austria compared to its level in Denmark, Portugal, Belgium and Finland.

From our econometric estimations we observed that spouses' child care time has a complementary rather than a substitutable character or, in other words, the more one spouse

[3] The gap is computed as the difference between mothers' hours and fathers' hours.

[4] This may reflect the broad possible meaning of the variable 'looking after' which may include time spent playing with children. For a more detailed discussion, see Hallberg and Klevmarken (2001).

spends time with the children, the more the other will invest in child care as well. The sign of the coefficient of the variable 'partner's care time' turned out positive for both sexes indicating to a certain extent that spouses highly value the time they get to spend together on caring. Nevertheless, men's time at child care has an effect on women's care time that is twice as large as the impact of women's time on men's involvement in child care. The complementarity of spouses' child care time stands in the way of convergence towards equality of men and women in terms of time spent on child care. However, our above analysis has highlighted the positive move towards equality that can be triggered off when women increase their working hours. Even if it may not lead to full gender equality, policy-makers can still take a major step in the right direction by means of the promotion of full-time employment for women supported by affordable and high-quality public child care (de Henau *et alii*, 2004 – forthcoming). The potential negative side-effects of this policy in terms of a decrease in parents' child care time should also be followed up very closely.

Further analysis should focus on comparing time allocation of both working partners and other types of couples (female non working, etc.) for countries for which enough data are available. At the same time more research should be carried out on how to include the labour market participation decision in a full structural model. Moreover, a dynamic approach would be of great interest and would be feasible given the panel dimension of the ECHP data. Finally, we will look at other data sets which may allow us to refine our results, especially time-use surveys for a daily approach of time allocation.

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APPENDICES

Appendix 1 : List of variables

Variables of the participation equations

Dependent variable: a dummy indicating whether or not the person works at least 15h per week.

- Own and partner's personal variables :
  - Age.
  - Age squared.
  - The level of education: two dummies measuring the highest level of education attained, one indicating a medium level (upper secondary education at the most) and one indicating a high level (higher education at the most) (reference : lower level of education).
  - Non-labour income : natural logarithm of private net annual non-labour income (previous year), i.e. capital income, property income and other social benefits independent of employment status.
  - Health indicators: a dummy indicating whether or not the person suffers from a chronic disability, a dummy for underweight (women only) and a dummy for obesity.

- Household variables :
  - Marital status: a dummy that equals 1 if partners are spouses and 0 otherwise.
  - Region from previous residence : 2 dummies indicating whether the previous residence was in the same area or was in another region or abroad (reference : no move since last 5 years).
  - Size of the residence : 1 dummy indicating whether the household lives in a small accommodation (not enough rooms for all members aged more than 6).
  - Other adult living in the household : 1 dummy indicating whether there is at least another adult aged more than 16, other than a couple's child.
  - Number of young children and age of the youngest child : 5 dummies, first indicating the presence of only 1 child under 6 and aged less than 3, second indicating that youngest is aged less than 3 but with other preschool children, third dummy for youngest child aged between 3 and 5 with no other preschool children, fourth indicating that youngest child is aged between 3 and 5 and is not the only preschool child, fifth dummy for more than one school-aged child with the youngest aged 6 or more (reference : one child family with child aged 6 or more)
  - Total number of children: 1 dummy indicating whether there are 3 or more children in the household (of any age)

- Age of the oldest child : 1 dummy indicating whether the oldest child (living in the household) is aged 16 or more.
- Region: a dummy for each region (NUTS 1 aggregates), except fot Denmark, Ireland, Finland and the Netherlands.
    - Belgium : Vlaanderen (region 1), Wallonie (region 2), Bxl-Capitale (reference)
    - France : Bassin parisien (region1), Nord-Pas-de-Calais (region 2), Est (region 3), Ouest (region 4), Sud-Ouest (region 5), Centre-Est (region 6), Mediterranée (region 7), Île de France (reference).
    - Italy : Nord Ovest (region 1), Nord Est (region2), Emilia-Romagna (region 3), Centro (region 4), Lazio (region 5), Abruzzo-Molise (region 6), Campania (region 7), Sud (region 8), Sicilia (region 9), Sardegna (region 10), Lombardia (reference).
    - Greece : Voreia Ellada (region 1), Kentriki Ellada (region 2), Nisia Aigaiou + Kriti (region 3), Attiki (reference).
    - Spain : Noroeste (region 1), Comunidad de Madrid (region 2), Centro (region 3), Este (region 4), Sur (region 4), Canarias (region 5), Noreste (reference).
    - Portugal : Madeira + Açores (region 1), Portugal contin. (reference).
    - Austria : Südösterreich (region 1), Westösterreich (region 2), Ostösterreich (reference).

Variables time use equations

Dependent variable : Weekly amount of hours spent looking after children

- Endogenous variables :
    - Male working time : 1 dummy indicating whether total job activity consumes more than 40 hours a week.
    - Female working time : 2 dummies, one indicating whether mother works between 35 and 40 hours a week, the other for more than 40 hours a week (reference: part-time job between 15 and 35 hours).
    - Own labour income : natural logarithm of the total net amount of annual income from work (previous year).
    - Use of outside care: 1 dummy indicating whether any of the children in the household are looked after on a regular basis by someone other than their parent or guardian, whether at home or outside such as at a crèche or kindergarten.

- Own personal variables :
    - Educational level : see labour market participation equation.

- Household variables :
    - Other adult in the household : see labour market participation equation.

- Number of young children and age of the youngest child : see labour market participation equation.
- Total number of children (of any age) : see labour market participation equation.
- Oldest child living in the household aged more than 16 (dummy 1 if true).

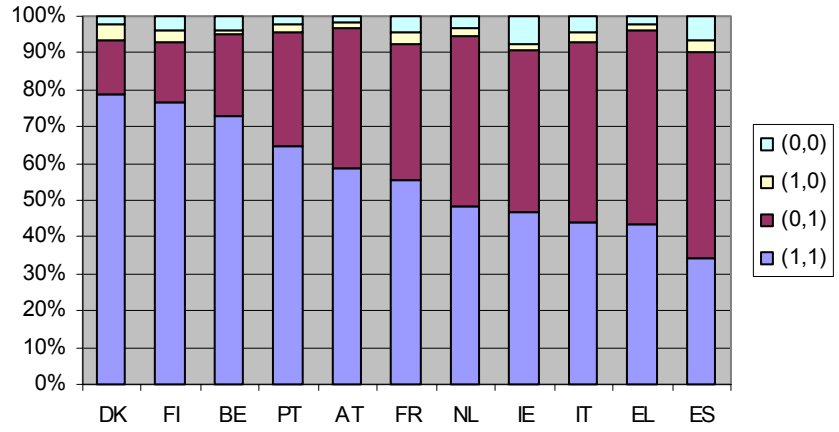
Instruments for endogenous variables

- Own and partner's personal variables :
  - Age.
  - Age squared.
  - No contact with neighbours: 1 dummy indicating whether talking to any of the neighbours occurs less than once a month.
  - Age when full-time education was stopped (not asked for France and the Netherlands).
  - Age squared when full-time education was stopped (idem).
  - Number of months worked in previous year (not asked for the Netherlands).
  - Health indicators: see labour market participation.
  - Non labour income : see labour market participation.

- Household variables :
  - Married couple : see labour market participation.
  - Small accommodation : see labour market participation.
  - Owner : 1 dummy indicating whether the household owns its accommodation.
  - Crime and vandalism : 1 dummy indicating whether there is crime or vandalism in the area

Appendix 2 : Descriptive statistics

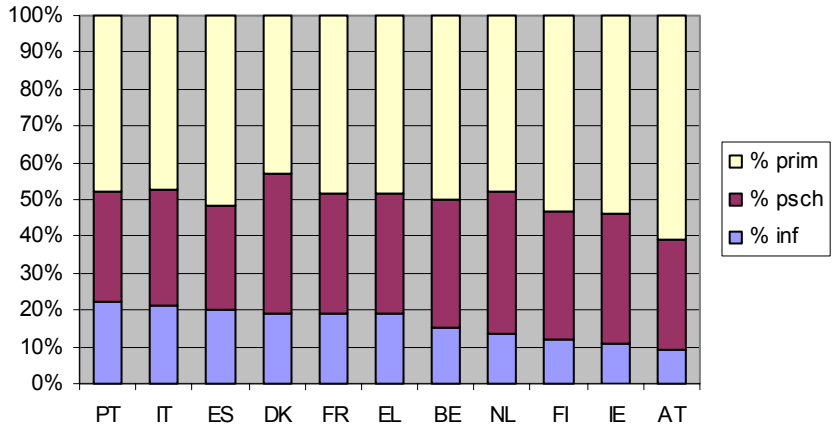
Figure A.1. : Proportion of households according to couple's work status



Note : (0,0) for both not working, (1,0) when female works and male does not, (0,1) for male working and female not, (1,1) for both working

Source : Eurostat ECHP wave 6 (1999), own calculations

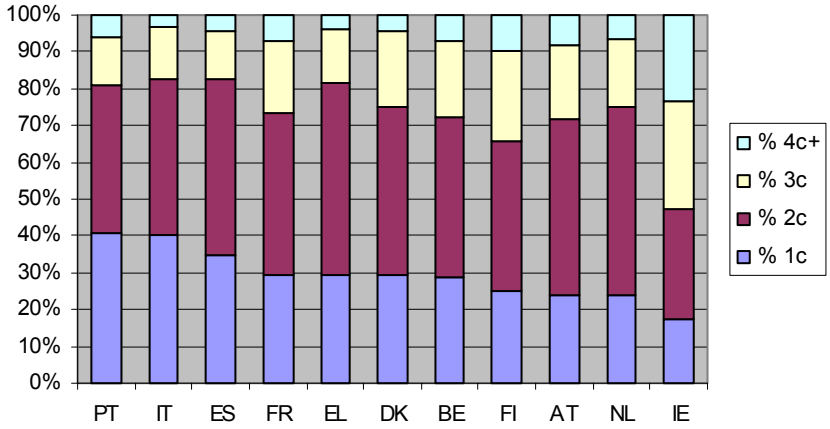
Figure A.2. Proportion of households according to the age category of youngest child



Note : "prim" for youngest child aged between 6 and 11, "psch" for preschool child (between 3 and 5), "inf" for youngest aged less than 3

Source : Eurostat ECHP wave 6 (1999), own calculations

Figure A.3. Proportion of households according to the total number of children living in the household



Source : Eurostat ECHP wave 6 (1999), own calculations

Table A.1. Proportion of use of external care according to female working time (in general and paid care)

	external care			paid external care		
	no work	part time	full time	no work	part time	full time
BE	10%	55%	70%	3%	26%	42%
DK	71%	77%	83%	66%	75%	82%
NL	12%	51%	39%	8%	39%	34%
FR	18%	53%	60%	11%	38%	43%
IE	6%	44%	64%	4%	38%	56%
IT	17%	46%	50%	12%	32%	29%
EL	9%	28%	38%	1%	6%	12%
ES	7%	33%	38%	3%	18%	19%
PT	19%	41%	52%	12%	30%	36%
AT	30%	34%	30%	24%	28%	24%
FI	23%	51%	53%	13%	42%	48%

Source : Eurostat ECHP wave 6 (1999), own calculations

Table A.2. Female and male average weekly hours spent with children according to the use of external care

	female hours			male hours		
	no outcare	non paid care	paid care	no outcare	non paid care	paid care
BE	43	38	34	10	14	14
DK	49	36	53	23	22	34
NL	51	62	54	17	19	20
FR	35	32	33	6	10	13
IE	69	66	63	12	10	20
IT	43	38	43	10	13	15
EL	40	39	41	6	9	11
ES	54	48	51	10	13	19
PT	32	30	30	4	10	10
AT	49	58	53	9	9	14
FI	32	34	39	12	19	20

Source : Eurostat ECHP wave 6 (1999), own calculations

Table A.4. Female and male average weekly hours allocated to children according to the number and age of young children (in categories)

	female hours					male hours				
	by1	bps	ps	pm1	pmp	by1	bps	ps	pm1	pmp
BE	46	45	39	34	35	15	12	11	11	11
DK	60	68	54	35	41	35	36	39	19	26
NL	58	66	57	41	48	22	22	18	15	16
FR	44	54	35	19	25	12	11	9	5	7
IE	71	78	68	59	68	19	14	13	10	17
IT	48	49	43	36	39	13	15	12	9	13
EL	49	49	43	30	35	10	7	8	5	5
ES	64	68	54	44	48	12	19	13	7	10
PT	39	39	33	22	30	8	6	6	5	6
AT	63	69	54	42	47	13	13	8	9	10
FI	50	53	42	18	28	19	23	21	8	15

Note : "by1" for only 1 preschool child, and aged <3, "bps" for 1 child <3 and other preschool children, "ps" for youngest child between 3 and 5, "pm1" for only one child aged between 6 and 11, "pmp" for more than one child aged between 6 and 11.

Source : Eurostat ECHP wave 6 (1999), own calculations

Table A.5. Female and male average weekly hours allocated to children according to female working time (and men working 40 h or less)

	female hours					male hours				
	0-14	15-24	25-34	35-40	41+	0-14	15-24	25-34	35-40	41+
BE	51	33	33	29	27	9	9	13	20	12
DK	60	59	51	52	54	35	40	34	37	41
NL	58	54	40	27	16	16	22	24	33	44
FR	43	35	21	26	27	6	7	10	15	14
IE	70	68	51	54	51	14	17	13	26	36
IT	45	37	38	39	32	9	13	15	19	14
EL	44	40	29	35	24	7	15	12	13	8
ES	60	48	43	40	30	9	12	22	20	24
PT	40	27	28	21	32	4	0	10	7	15
AT	58	51	45	50	34	8	13	13	16	12
FI	50	43	35	30	25	21	18	18	17	19

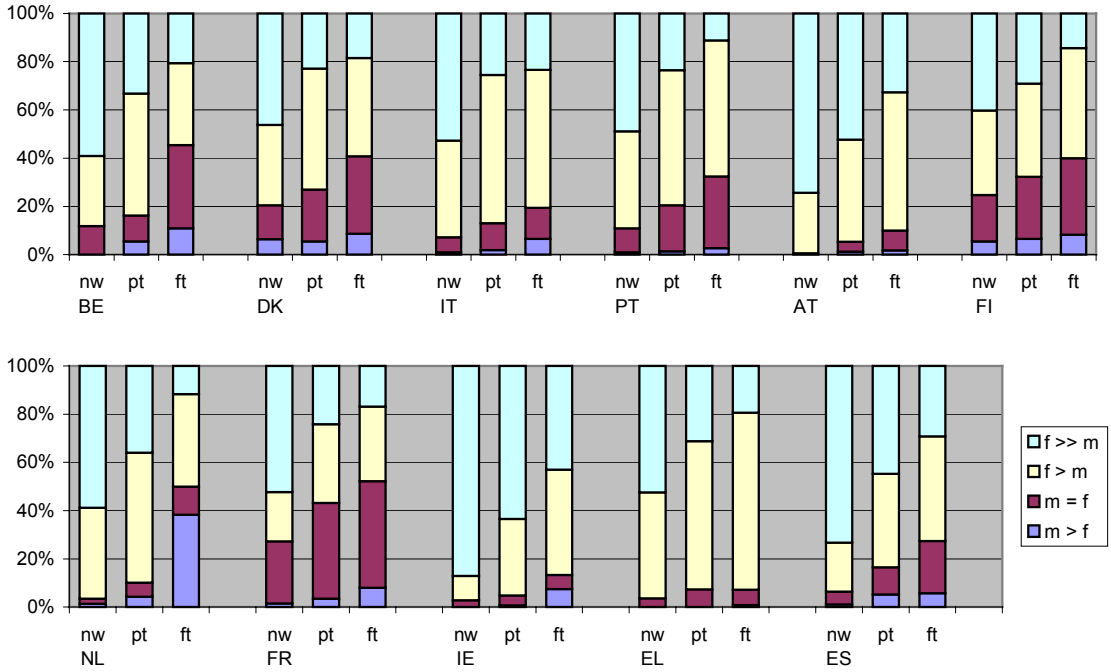
Source : Eurostat ECHP wave 6 (1999), own calculations

Table A.6. Female and male average weekly hours allocated to children according to female working time (and men working more than 40 h)

	female hours					male hours				
	0-14	15-24	25-34	35-40	41+	0-14	15-24	25-34	35-40	41+
BE	56	45	45	35	27	6	8	12	11	15
DK	64	53	44	46	44	21	17	22	24	23
NL	59	52	42	47	33	12	12	14	16	9
FR	47	32	29	22	19	5	4	9	6	8
IE	78	64	63	57	58	6	13	21	15	19
IT	47	41	41	40	42	8	11	13	14	16
EL	47	42	41	33	30	4	7	5	6	6
ES	61	52	52	43	40	5	7	12	12	10
PT	46	30	39	28	25	4	2	11	6	9
AT	55	49	59	42	29	6	10	9	10	7
FI	53	48	29	30	29	13	15	9	13	10

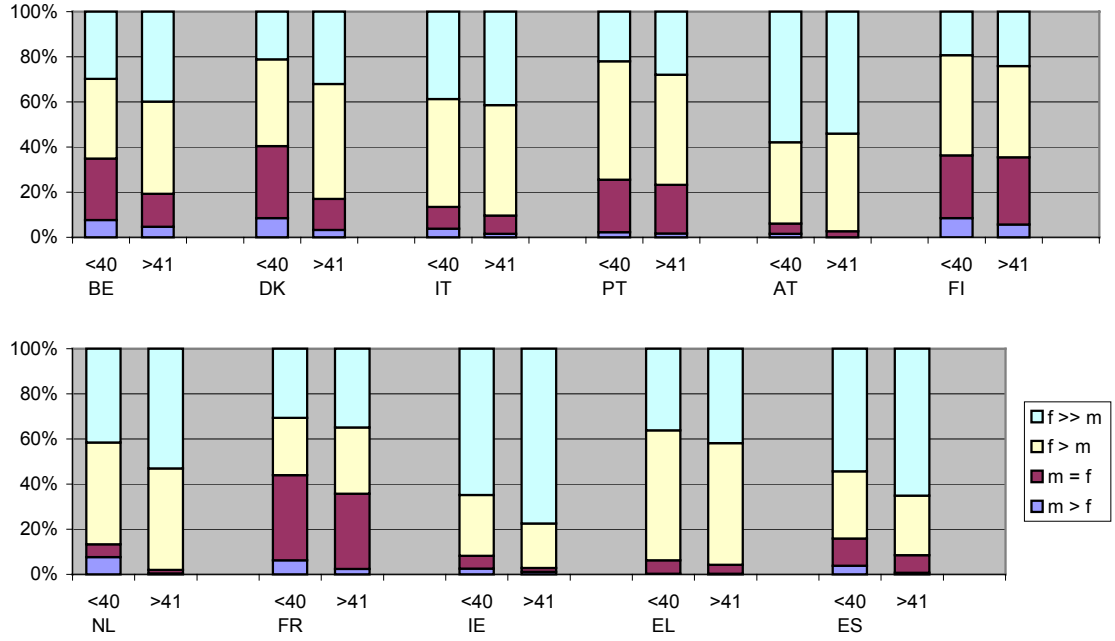
Source : Eurostat ECHP wave 6 (1999), own calculations

Figure A.4. Difference in time allocated to children (female – male) according to female working hours (in categories)



Note : "nw" for no work, "pt" fot part time work, "ft" for full time work. F >> m means that female's time is at least 40 hours higher than male's time

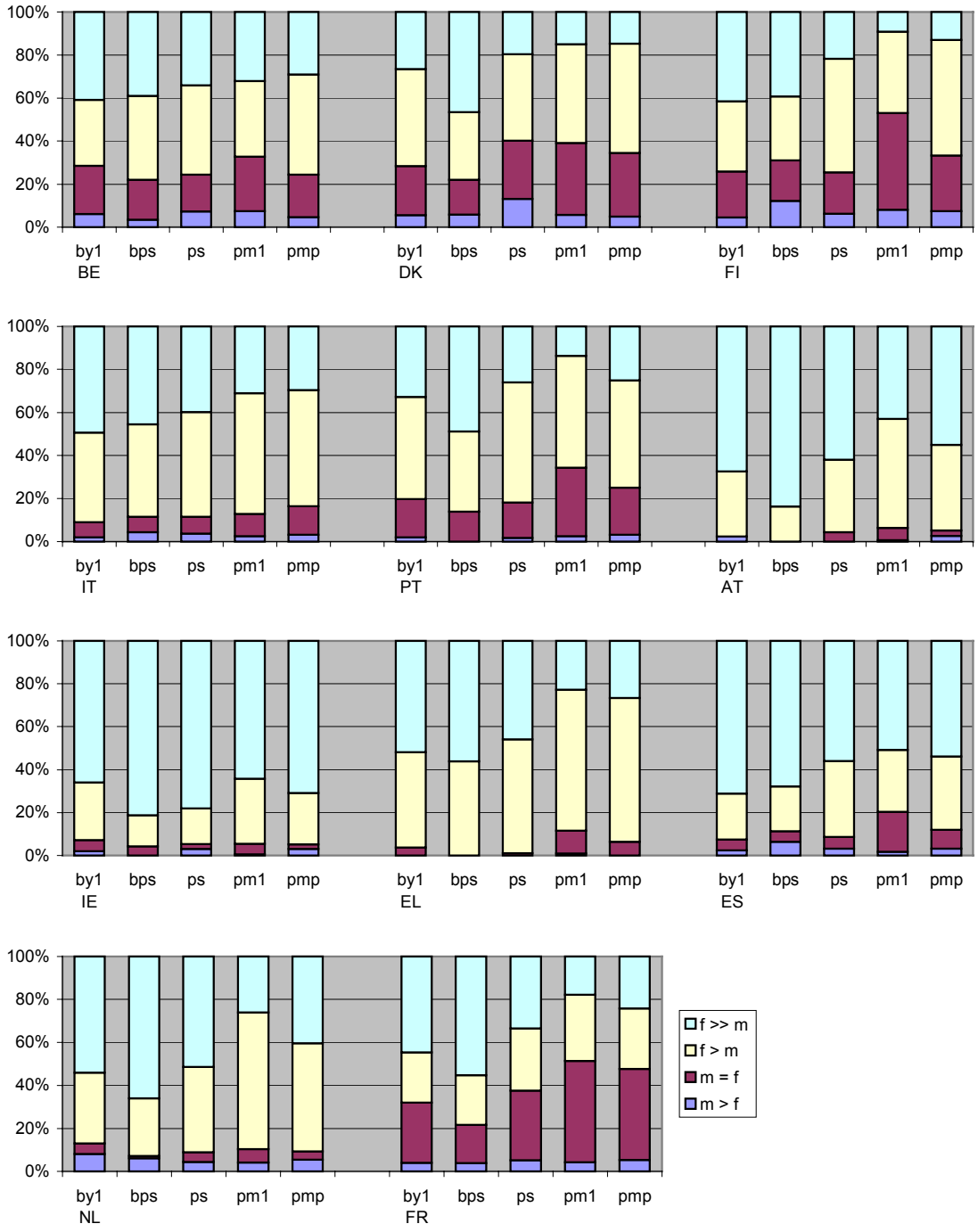
Figure A.5. Difference in time allocated to children (female – male) according to male working hours (in categories)



Note : "<40" for male working time < 40h a week, ">41" for working time 41h a week or higher.

Source : Eurostat ECHP wave 6 (1999), own calculations

Figure A.6. Difference in time allocated to children (female – male) according to age and number of young children (in categories)



Note : "by1" for only 1 preschool child, and aged <3, "bps" for 1 child <3 and other preschool children, "ps" for youngest child between 3 and 5, "pm1" for only one child aged between 6 and 11, "pmp" for more than one child aged between 6 and 11.

Source : Eurostat ECHP wave 6 (1999), own calculations

Appendix 3 : Econometric results

Table A.6. Main results from simultaneous equations of partners' time spent looking after children (six countries)

	Belgium				Denmark			
nb of obs. (both work)	323				317			
sex	female		male		female		male	
	est.	std err.	est.	std err.	est.	std err.	est.	std err.
Intercept	19.860	12.715	-12.80	14.35	11.494	15.706	16.537	31.508
Main variables								
Partner's care time	1.233	0.157 ***	0.693	0.084 ***	0.202	0.238	0.282	0.245
F working 35-40h	-20.00	7.28 ***	16.401	5.348 ***	25.068	10.245 **	7.702	10.036
F working >40h	-2.193	10.720	1.184	7.362	4.990	18.726	-7.397	13.615
M working >40h	10.428	10.214	-9.083	7.513	-4.527	12.697	-14.96	10.356
Outcare	1.321	10.426	0.159	7.258	9.561	15.405	-8.127	12.568
Personal characteristics								
Labour income (log)	-0.335	1.068	0.026	1.228	-0.186	0.852	-0.050	2.561
Medium educ	0.494	3.876	1.946	2.263	0.762	5.582	-3.272	4.242
High educ	-0.619	4.160	3.017	2.459	4.043	6.076	0.824	4.263
Household characteristics								
Other adult	28.892	20.616	-20.84	14.77	-9.509	16.748	16.785	13.360
Only 1 preschool child, and aged <3	10.102	5.729 *	-7.552	4.123 *	17.195	5.863 ***	4.977	6.148
1 child <3 and other preschool children	-2.409	7.011	1.540	4.971	27.126	7.574 ***	8.843	8.980
Only 1 child (youngest) aged between 3 & 5	1.199	4.610	-0.896	3.378	13.378	8.307	15.865	7.001 **
Yst child aged between 3 & 5, with other preschool aged children	-13.92	9.67	10.224	7.029	34.706	14.549 **	34.677	14.032 **
Yst child aged >5 with other school-aged children	-4.011	4.541	3.257	3.257	0.010	5.988	4.839	4.752
3 or more children (any age)	5.153	4.603	-2.910	3.386	2.902	4.100	1.894	3.374
Oldest child aged >16	-5.067	6.363	3.884	4.532	0.757	6.205	-1.263	5.027
Lambda	5.987	3.607 *	-4.473	2.486 *	3.522	5.056	8.166	4.028 **
Chi² (all equal to 0)	86.44		80.59		103.13		85.66	
P > Chi²	0.000		0.000		0.000		0.000	

(*** : p<0.01 ; ** : 0.01<p<0.05 ; * :0.05< p<0.10)

Note: R^2-statistics in the regressions for Belgium, Austria and Italy have negative values. This statistic measures the success of the regression in predicting the values of the dependent variable within the sample. $R^2$is a fraction of the variance of the dependent variable explained by the independent variables. A negative value for R^2 is what it is: the model predicts the dependent variable less well than would have been the case when just a constant was used. However, this is of less concern for our study given that we are interested only in the interactions between our set of endogenous variables.

Table A.6. (continued)

	Austria						Finland					
nb of obs. (both work)	238						448					
sex	female			male			female			male		
	est.	std err.		est.	std err.		est.	std err.		est.	std err.	
Intercept	33.877	5.908	***	-20.78	10.42	**	18.916	10.629	*	-15.67	10.179	
Main variables												
Partner's care time	1.390	0.218	***	0.665	0.113	***	1.156	0.105	***	0.854	0.082	***
F working 35-40h	-22.76	9.33	**	16.222	6.067	***	-19.56	11.54	*	16.887	9.718	*
F working >40h	2.471	10.918		-1.105	7.822		-15.20	14.17		13.184	11.892	
M working >40h	-2.639	8.851		0.887	6.410		23.234	7.274	***	-19.99	5.98	***
Outcare	-12.79	8.23		8.790	5.787		-3.190	7.501		2.744	6.482	
Personal characteristics												
Labour income (log)	-0.076	0.316		-0.054	0.927		-0.012	0.325		-0.042	0.561	
Medium educ	0.211	2.011		0.107	1.851		-0.017	1.528		0.015	0.957	
High educ	-1.349	3.008		0.702	2.618		-0.034	1.558		0.107	1.209	
Household characteristics												
Other adult	6.585	6.372		-5.243	4.634		-12.10	14.10		10.335	11.941	
Only 1 preschool child, and aged <3	25.872	4.854	***	-17.13	4.40	***	16.409	5.333	***	-13.94	4.77	***
1 child <3 and other preschool children	31.080	5.375	***	-20.78	4.89	***	17.322	4.746	***	-14.68	4.63	***
Only 1 child (youngest) aged between 3 & 5	20.658	6.266	***	-14.05	4.40	***	5.316	5.359		-4.382	4.706	
Yst child aged between 3 & 5, with other preschool aged children	18.658	11.916		-12.51	8.58		2.187	8.903		-1.648	7.607	
Yst child aged >5 with other school-aged children	5.701	4.060		-3.740	2.993		-0.078	3.561		0.150	3.002	
3 or more children (any age)	-0.797	4.071		0.168	2.988		1.309	2.808		-1.109	2.362	
Oldest child aged >16	-0.361	4.488		0.099	3.264		-10.16	3.409	***	8.646	3.010	***
Lambda	-3.448	2.436		2.199	1.816		-3.174	1.636	*	2.736	1.369	**
Chi² (all equal to 0)	114.70			70.83			285.75			171.68		
P > Chi²	0.000			0.000			0.000			0.000		

(*** : p<0.01 ; ** : 0.01<p<0.05 ; * :0.05< p<0.10)

Table A.6. (end)

	Italy					Portugal				
nb of obs. (both work)	519					554				
sex	female			male		female			male	
	est.	std err.		est.	std err.	est.	std err.		est.	std err.
Intercept	26.020	5.740	***	-19.26	5.39 ***	22.701	8.927	**	-14.64	7.28 **
Main variables										
Partner's care time	1.305	0.107	***	0.750	0.060 ***	1.247	0.210	***	0.704	0.086 ***
F working 35-40h	-18.42	6.21	***	14.094	4.620 ***	-6.938	10.437		6.487	7.799
F working >40h	-13.98	9.80		10.659	7.418	-2.264	13.531		1.889	9.642
M working >40h	8.451	6.240		-6.513	4.811	3.577	10.119		-0.692	7.285
Outcare	-0.922	5.877		0.892	4.509	-13.41	7.99	*	10.386	5.226 **
Personal characteristics										
Labour income (log)	-0.075	0.218		0.023	0.292	-0.120	0.308		-0.306	0.388
Medium educ	0.303	1.122		-0.022	0.678	-0.985	1.684		1.818	1.367
High educ	0.090	1.544		0.079	0.985	-0.618	2.160		2.592	2.132
Household characteristics										
Other adult	6.795	4.563		-5.165	3.489	-4.426	2.945		3.000	2.103
Only 1 preschool child, and aged <3	6.064	2.726	**	-4.527	2.170 **	9.382	2.645	***	-6.096	2.099 ***
1 child <3 and other preschool children	-0.654	4.605		0.606	3.502	9.714	5.846	*	-6.874	4.223
Only 1 child (youngest) aged between 3 & 5	3.766	3.571		-2.893	2.750	10.203	2.978	***	-7.157	2.062 ***
Yst child aged between 3 & 5, with other preschool aged children	-6.474	10.994		5.059	8.397	19.891	9.531	**	-14.16	6.62 **
Yst child aged >5 with other school-aged children	-4.229	3.451		3.220	2.623	3.000	3.962		-1.663	2.833
3 or more children (any age)	0.247	3.406		-0.165	2.623	3.676	3.478		-3.058	2.399
Oldest child aged >16	-0.368	3.724		0.217	2.865	-4.968	3.245		3.730	2.291
Lambda	-0.148	0.848		0.088	0.654	-1.410	10.201		-0.678	7.242
Chi² (all equal to 0)	235.44			214.84		116.38			150.56	
P > Chi²	0.000			0.000		0.000			0.000	

(*** : p<0.01 ; ** : 0.01<p<0.05 ; * :0.05< p<0.10)

Table A.7. Results from Bivariate probit regressions of partners' joint decision for labour market participation (11 countries)

	Belgium		Denmark		The Netherlands	
Sex	female	male	female	male	female	male
Nb of observations	550		467		885	
Intercept	-3.915	-9.605 ***	-3.517	-1.954	-5.780 ***	-1.153
Female characteristics						
Age	0.155	0.371 *	0.257 *	-0.188	0.268 **	0.390 *
Age²	-0.003	-0.005 **	-0.003	0.002	-0.003 **	-0.005 *
Medium educ	0.479 ***	0.569 *	0.549 **	-0.103	0.380 ***	0.408
High educ	1.338 ***	0.626 *	0.655 **	-0.324	0.648 ***	0.124
Non labour income (log)	0.083 ***	0.065	-0.049 *	-0.040	0.044 **	-0.079 **
Chronic health problem	-0.392	0.569	-0.316 *	-0.207	-0.389 ***	0.145
Underweight	-0.461	0.121	-0.778 **	-0.515	(n.a.)	(n.a.)
Obesity	-0.581 **	-0.536	0.103	0.590	(n.a.)	(n.a.)
Male characteristics						
Age	0.122	0.243	-0.037	0.373 **	0.023	-0.156
Age²	-0.002	-0.003 *	0.000	-0.005 **	0.000	0.001
Medium educ	0.418 **	-0.173	0.095	0.413	0.131	0.433
High educ	0.253	0.585	0.322	0.676 *	0.143	0.017
Non labour income (log)	-0.048 *	-0.062	-0.052 *	-0.040	-0.058 ***	0.050
Chronic health problem	-0.189	-1.255 ***	0.174	-0.332	0.053	-1.041 ***
Obesity	0.012	-0.458	0.005	-0.397	(n.a.)	(n.a.)
Household characteristics						
Married couple	0.078	0.186	0.331 *	0.279	0.141	0.387
Moved locally	-0.063	0.058	-0.377 *	0.208	0.294 ***	0.142
Moved from other region	0.149	-0.389	-0.274	-0.514	-0.152	5.478
Small accommodation	-0.183	-0.543	-0.170	-1.007 **	-0.046	6.090
Other adult	-0.422	-0.137	-0.653	0.128	0.457	5.149
Only preschool child, and aged <3	-0.163	0.175	-0.115	-0.396	0.557 ***	-0.960 ***
1 child <3 and other preschool children	-0.506 **	0.231	-0.035	0.044	0.016	-0.893 ***
Only 1 child (youngest) aged between 3 & 5	-0.256	0.811 **	0.297	0.230	0.210	-0.332
Yst child aged between 3 & 5, with other preschool children	0.456	0.252	0.422	6.604	-0.187	-0.608
Yst child aged >5 and other school-aged children	-0.118	0.053	0.177	0.557	-0.120	-0.483 **
3 or more children (any age)	-0.226	-0.122	-0.246	-0.310	-0.464 ***	0.148
Region 1	-0.186	0.311				
Region 2	-0.393 *	0.381				
Log likelihood	-308.0		-253.1		-678.2	
Wald Chi²	158.14		105.45		157.72	
Prob > Chi²	0.000		0.000		0.000	
rho	**0.717**		**0.090**		**-0.258**	
Likelihood ratio test (rho=0)						
Chi²	21.554		0.290		4.892	
Prob > Chi²	0.000 ***		0.590		0.027 **	

(*** : p<0.01 ; ** : 0.01<p<0.05 ; * :0.05< p<0.10)

Table A.7. (continued)

	France		Ireland		Italy	
Sex	female	male	female	male	female	male
Nb of observations	1049		557		1352	
Intercept	-3.542 **	0.684	-4.720 **	7.180 **	-3.069 *	-2.985 *
Female characteristics						
Age	0.169 **	-0.322 **	0.351 ***	-0.234	0.280 ***	-0.117
Age²	-0.002 **	0.005 **	-0.005 ***	0.003	-0.003 ***	0.002
Medium educ	0.413 ***	0.161	0.567 ***	0.427 *	0.561 ***	-0.031
High educ	0.524 ***	-0.151	1.162 ***	0.596	1.040 ***	0.000
Non labour income (log)	-0.099 ***	-0.151 ***	0.056 **	-0.147 ***	-0.012	-0.009
Chronic health problem	-0.347 **	-0.023	-0.113	0.156	0.163	-0.321
Underweight	(n.a.)	(n.a.)	-0.628	-1.046 **	-0.419 **	-0.605 **
Obesity	(n.a.)	(n.a.)	-0.139	-0.188	-0.099	-0.554 ***
Male characteristics						
Age	0.093	0.313 ***	-0.082	-0.038	-0.105	0.337 ***
Age²	-0.001	-0.004 ***	0.001	0.000	0.001	-0.004 ***
Medium educ	-0.018	-0.139	0.126	0.802 ***	0.159 *	0.376 **
High educ	-0.195	-0.060	0.355 *	1.066 ***	0.342 **	1.055 ***
Non labour income (log)	-0.013	0.112 ***	-0.084 ***	-0.061	-0.001	-0.059 **
Chronic health problem	-0.139	-0.389 **	-0.502 **	-0.964 ***	0.070	-0.675 **
Obesity	(n.a.)	(n.a.)	0.414 **	0.055	-0.176	-0.038
Household characteristics						
Married couple	-0.116	0.146	0.110	0.309	-0.104	0.372
Moved locally	0.253 **	-0.327 *	0.135	-0.441 *	-0.007	-0.089
Moved from other region	-0.152	0.025	-0.249	4.876	-0.567 ***	-0.126
Small accommodation	-0.094	-0.184	-0.330	-1.118 **	-0.085	0.101
Other adult	-0.044	6.616	-0.511	0.845	0.117	-0.454 *
Only preschool child, and aged <3	-0.559 ***	0.083	-0.104	0.008	-0.028	0.471 **
1 child <3 and other preschool children	-0.969 ***	0.086	-0.469 **	0.014	-0.110	0.426
Only 1 child (youngest) aged between 3 & 5	-0.385 ***	0.093	-0.331 **	0.126	-0.182	-0.176
Yst child aged between 3 & 5, with other preschool children	-0.143	0.408	-0.682	-0.242	-0.758 **	5.935
Yst child aged >5 and other school-aged children	-0.184	0.218	-0.247	0.213	-0.034	-0.175
3 or more children (any age)	-0.497 ***	0.024	-0.291 **	0.190	-0.239 **	-0.029
Region 1	-0.195	0.213			0.352 *	-0.359
Region 2	-0.460 **	0.448			-0.073	0.425
Region 3	-0.331 *	1.350 ***			0.423 *	0.719
Region 4	-0.079	0.234			-0.138	1.269 *
Region 5	-0.495 ***	0.281			-0.499 ***	0.011
Region 6	-0.295 *	0.386			-0.475	-0.339
Region 7	-0.419 **	0.195			-0.683 ***	-0.699 ***
Region 8					-0.701 ***	-0.373
Region 9					-0.636 ***	-0.706 ***
Region 10					-0.672 ***	-0.623 **
Log likelihood	-789.3		-424.4		-1021	
Wald Chi²	271.37		179.13		394.25	
Prob > Chi²	0.000		0.000		0.000	
rho	**0.005**		**0.280**		**-0.204**	
Likelihood ratio test (rho=0)						
Chi²	0.003		3.910		5.567	
Prob > Chi²	0.955		0.048 **		0.018 **	

(*** : p<0.01 ; ** : 0.01<p<0.05 ; * :0.05< p<0.10)

Table A.7. (continued 2)

	Greece		Spain		Portugal	
Sex	female	male	female	male	female	male
Nb of observations	754		1081		898	
Intercept	-9.578	3.387	-3.146 **	-2.219	-2.558 ***	-1.515
Female characteristics						
Age	0.214 **	-0.016	0.201 **	0.015	0.270 ***	0.060
Age²	-0.002 *	0.000	-0.003 **	0.000	-0.003 ***	-0.001
Medium educ	0.219 *	0.612 **	0.232 **	0.049	0.582 ***	5.876
High educ	1.025 ***	0.495	1.097 ***	0.156	1.304 ***	-0.121
Non labour income (log)	-0.056 **	-0.022	0.073 ***	-0.134 ***	-0.060	-0.077
Chronic health problem	-0.131	0.387	-0.219	-0.444 **	-0.328 **	-0.019
Underweight	-0.213	0.303	0.063	0.048	0.228	5.556
Obesity	0.076	-0.034	-0.149	0.010	-0.611 ***	0.455
Male characteristics						
Age	0.010	0.194	-0.057	0.176 **	-0.088 *	0.172 *
Age²	0.000	-0.003 **	0.001	-0.002 ***	0.001	-0.002 ***
Medium educ	0.035	0.097	0.049	-0.022	-0.195	5.441
High educ	0.253	0.075	0.133	0.597 ***	-0.444	0.360
Non labour income (log)	0.000	-0.014	-0.010	0.066 **	0.057	-0.007
Chronic health problem	0.144	-1.258 ***	-0.057	-0.664 ***	0.248	-0.986 ***
Obesity	-0.036	-0.024	0.306 ***	0.115	-0.005	0.126
Household characteristics						
Married couple	5.209 ***	-4.906 *	0.066	-0.117	0.282	-0.079
Moved locally	0.088	0.217	0.008	-0.074	0.123	-0.039
Moved from other region	-0.879 ***	-0.987 **	-0.401	0.421	0.159	4.941
Small accommodation	-0.005	-0.045	0.067	-0.161	-0.053	-0.295
Other adult	0.218	-0.146	0.138	-0.071	0.249 *	0.113
Only preschool child, and aged <3	-0.069	-0.005	0.031	0.189	-0.202	-0.096
1 child <3 and other preschool children	-0.424 **	6.308	-0.244	0.388	-0.718 ***	0.225
Only 1 child (youngest) aged between 3 & 5	-0.113	-0.403	0.111	-0.040	-0.099	-0.478 *
Yst child aged between 3 & 5, with other preschool children	0.299	6.569	0.164	-0.294	-0.301	4.908
Yst child aged >5 and other school-aged children	0.009	0.047	0.042	0.149	-0.328 *	0.060
3 or more children (any age)	-0.051	0.195	0.136	-0.156	-0.264 *	-0.331
Region 1	-0.215	-0.001	-0.037	-0.099	-0.525 ***	0.463 *
Region 2	-0.141	0.393	0.050	-0.387		
Region 3	0.069	0.086	-0.504 ***	-0.391		
Region 4			-0.046	-0.335		
Region 5			-0.438 ***	-0.772 ***		
Region 6			-0.037	-0.134		
Log likelihood	-541.5		-876.9		-582.4	
Wald Chi²	38282		310.64		211.48	
Prob > Chi²	0.000		0.000		0.000	
rho	**-0.101**		**-0.016**		**0.223**	
Likelihood ratio test (rho=0)						
Chi²	0.551		0.035		2.635	
Prob > Chi²	0.458		0.852		0.105	

(*** : p<0.01 ; ** : 0.01<p<0.05 ; * :0.05< p<0.10)

Table A.7. (end)

	Austria		Finland	
Sex	female	male	female	male
Nb of observations	529		785	
Intercept	0.738	-4.333	-5.332 ***	-3.758 **
Female characteristics				
Age	0.032	-0.301	0.292 ***	0.103
Age²	-0.001	0.003	-0.003 **	-0.002
Medium educ	0.407 ***	0.364	0.457 **	0.096
High educ	0.986 ***	0.295	0.630 ***	0.274
Non labour income (log)	0.031	0.079	-0.070 ***	-0.057 *
Chronic health problem	-0.263	-0.763 **	0.040	-0.270
Underweight	-0.244	-0.081	0.230	0.310
Obesity	-0.546 **	-0.086	-0.401 **	0.197
Male characteristics				
Age	0.019	0.607 ***	0.031	0.234 **
Age²	0.000	-0.008 ***	-0.001	-0.003 **
Medium educ	-0.135	0.237	-0.299 *	0.301
High educ	-0.334	1.348	-0.090	0.810 ***
Non labour income (log)	-0.037	-0.027	-0.027	0.019
Chronic health problem	0.255	-0.578	0.161	-0.050
Obesity	0.178	-0.427	0.226	-0.312
Household characteristics				
Married couple	-0.649 **	0.385	-0.001	-0.012
Moved locally	-0.091	-0.842 **	0.147	-0.321 *
Moved from other region	0.812 *	5.793	-0.303 *	-0.404
Small accommodation	0.199	-0.094	-0.263	-0.441 **
Other adult	0.085	-0.092	0.191	0.619
Only preschool child, and aged <3	-0.219	0.058	-0.685 ***	-0.549 **
1 child <3 and other preschool children	-0.434 **	-0.407	-0.810 ***	-0.739 ***
Only 1 child (youngest) aged between 3 & 5	-0.668 ***	-0.084	0.222	-0.169
Yst child aged between 3 & 5, with other preschool children	-0.584	5.274	-0.411	-0.621
Yst child aged >5 and other school-aged children	-0.216	-0.529	0.010	-0.343
3 or more children (any age)	-0.049	0.430	-0.142	0.006
Region 1	-0.108	-0.031		
Region 2	-0.204	1.131 ***		
Log likelihood	-383.1		-498.8	
Wald Chi²	94.35		219.99	
Prob > Chi²	0.001		0.000	
rho	**0.101**		**0.365**	
Likelihood ratio test (rho=0)				
Chi²	0.293		10.544	
Prob > Chi²	0.588		0.001 ***	

(*** : p<0.01 ; ** : 0.01<p<0.05 ; * :0.05< p<0.10)