

# Asymmetries and interdependencies in time use between Italian parents

Anna Laura Mancini\*

and

Silvia Pasqua<sup>†,‡</sup>

## ABSTRACT

The importance parents give to time spent with their children for their future behavioural and cognitive development deeply affected the patterns of time allocation of both working and non-working parents in all developed countries in the last decades. We compare the two existing waves of the Italian Time Use dataset (1988 and 2002) to analyze how family time allocation changed over time in a country that experienced in that period a relevant increase in female employment rate and a continuous decline in total fertility rate. In particular, we investigate how parents' time with children depends on their employment status and on household characteristics. We use a simultaneous recursive approach to take into consideration the links among the different time uses of the individual and the correlation between spouses' decisions. We find that wife's work time strongly affects both spouses' time allocated to childcare in 2002 but not in 1988 and that fathers are much more involved in children education and care in 2002 than in 1988. More generally, as women work time increases, substitute for mothers' childcare time is found within the household (fathers or other co-resident adults). However mothers tend to delegate mainly basic care activities and only marginally "quality" time.

Keywords: time use, parents, children

JEL classification: D1, J13, J22

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\* University of Torino – Dipartimento "G.Prato" and Child-CCA, [annalaura.mancini@carloalberto.org](mailto:annalaura.mancini@carloalberto.org)

† University of Torino – Dipartimento "G.Prato" and Child-CCA, [silvia.pasqua@unito.it](mailto:silvia.pasqua@unito.it)

‡ Corresponding author: Silvia Pasqua, E-mail: [silvia.pasqua@unito.it](mailto:silvia.pasqua@unito.it); Ordinary mail: Dipartimento di Scienze Economiche e Finanziarie "G. Prato", Facoltà di economia, Corsu Unione Sovietica 218bis, 10100 Torino, ITALY

## Introduction

The increase in female labour force participation, the availability of new technologies for housework and the changed attitude towards time parents spend with their children for their future behavioural and cognitive development deeply affected the patterns of time allocation of both working and non-working parents in all developed countries (Sayer *et al.*, 2004; Bianchi, 2000; Craig, 2006).

Change in time allocation of Italian couples is particularly interesting since, as it is well known, over the last 30 years in Italy female employment rate increased noticeably but it remains one of the lowest among European countries, fertility declined remarkably and traditional family values persistently steered household decisions<sup>4</sup>.

We compare the two existing waves of the Italian Time Use dataset (1988 and 2002) to analyze how family time allocation changed over time in a period that shows an increase in female employment rate from 34.9% in 1988 to 42% in 2002<sup>5</sup> and a decline in total fertility rate from 1.36 in 1988 to 1.26 in 2002. In particular, we investigate how parents' time with children depends on their employment status and on the household structure.

Results for the U.S. showed in fact that the increased mothers' labour force participation reduced their hours of childcare but also the number of children per household. Therefore even if mothers devote less time to childcare, since there are less children per household, no negative effects emerge on children outcomes (Sandberg and Hoffert, 2001). Moreover, for better children's

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<sup>4</sup> According to a FRDB research, 35% of Italian households think that very young children are better off if they stay at home with relatives instead of staying in the crèches (Boeri, Del Boca, Pissarides, 2005)

<sup>5</sup> See OECD (2008).

academic achievements, what matters is not total time parents devote to them, but the type of activities parents and children do together (Zick *et al.*, 2001). Furthermore changes in social norms regarding parenting imply that parents place a higher value on the time they allocate to childcare and therefore the women's entry into the labour market did not produce a one-by-one decrease in the time they devote to children (Craig, 2006).

Most of the literature on time allocation of couples focuses on how spouses divide their time between work, domestic tasks and childcare without distinguish the time spent with children between basic care and quality time (Kalenkoski *et al.* 2005, 2006 and 2008; Connelly and Kimmel, 2007; Craig and Bittman, 2008; Mencarini *et al.*, 2004; Anxo *et al.*, 2007; Burda *et al.*, 2006; Bloemen and Stanca, 2008; Bloemen *et al.*, 2010). All these papers showed that working women devote less time to children than non-working mothers, but they do not investigate which activities with children (quality or basic care) receive less time. However, this distinction is relevant if we believe that the "quality" time parents spend with their children is important for the development of children's future abilities. Moreover, whether the fathers compensate or not for the reduction of maternal time devoted to childcare and which activities fathers do with their children can be relevant for the effects on children outcomes.

It is therefore interesting to investigate not only how parents' employment status affects the total time parents' spend with their children, but also which type of childcare time (basic or quality) is more reduced when both parents work. We can think, in fact, that parents are willing to find substitutes for the pure care time (help from grandparents, babysitter or childcare centres) while

they try to allocate as much time as they can to “quality” activities with their children.

While most of the empirical literature on time allocation uses separate Tobit or OLS equations for the different time uses, in this paper we use a simultaneous approach to analyse parents’ time allocation between work, domestic tasks, basic childcare and “quality” time with children. Our approach allows us to take into consideration the links among the different time uses of the individuals and the correlation between spouses’ decisions.

To the best of our knowledge only few studies analysed time allocation of Italian couples and none of them differentiate the time parents devote to their children between quality and basic care.

In our empirical investigation we find that while in 1988 the presence of children in the household did not affect fathers’ working decisions and affected only marginally their other time uses, in 2002 fathers were more involved in children caring and education. This is the response to the greater mothers’ involvement in the labour market. In 2002 mothers’ work is less responsive to family characteristics and even if, on average, they allocate more time to their children, they also rely more on other adults help (mainly on partners). However mothers tend to delegate mainly basic care activities and only marginally “quality” time. The results also indicate that spouses’ decisions are correlated and this correlation seems greater in the year 2002.

The paper is organised as follows: in Section 2 a review of the literature is presented, Section 3 illustrates the data, Section 4 shows our empirical estimation strategy, Section 5 presents the results. Conclusions follow.

## 1. Literature

Pioneering models of time allocation (Becker, 1965; Gronau, 1976) and human capital theories explained that better educated women allocate more time to work and less time to housework. These theories have been further developed, extended and tested to include fertility decisions and the effects of children on parents' time allocation and to take into account the role of each spouse bargaining power in the decision process.

Most of the empirical literature on couples' time allocation focuses on the effects of children on the time mothers and fathers devote to market work and housework. The presence of children in the household reduces the hours of market work of the mothers (Kalenkoski *et al.*, 2005), especially in association with the birth of the first child (Craig and Bittman, 2008), and increases their average hours of domestic work (Craig and Bittman, 2008). Most of the extra unpaid domestic work due to the presence of the children is therefore done by the women. Mothers, in fact, devote more time to housework and to their children than fathers. Women's education tends to increase the hours of market work, but, *ceteris paribus*, better educated women devote also more time to childcare activities (Kalenkoski *et al.*, 2006). At the same time, fathers' time with children increases with the hours of work of the spouse and with her wage (Connelly and Kimmel, 2007; Bianchi, 2000). As a consequence, women's work does not seem to have a strong negative effect on the total time parents devote to their children. However, parents' childcare time decreases with the age of the children (Drago and Lee, 2008) and in particular fathers' time with children is highest when the youngest child is below 3 years (Yeung *et al.*, 2001).

Bonke *et al.* (2007) construct an index of specialization within the couple using time use data and they find that more egalitarian division of housework emerges when men are more educated and where social values are more egalitarian. However the presence of children always increases the specialisation within the household.

There are very few studies on time allocation of Italian couples. Mencarini *et al.* (2004) using data from five Italian cities, found that in dual-earner households men did not increase much their participation in housework after childbirth, but they increase their time at work. More than 10% of fathers never help in childcare. However women's education increases the egalitarian division of housework. Tanturri and Mencarini (2009), using a different dataset, confirm how in Italy childcare is mainly a women's task.

Burda *et al.* (2006) consider time allocation in four countries including Italy. For Italy they use, as we do, the Multiscopo dataset for the years 1988 and 2002. In all countries considered but Italy total work (defined as the sum of market work and domestic work) is almost equal between men and women. In Italy, on the contrary, total work of women exceeds total work of men of 72 minutes in a representative day in 1988 and of 75 minutes in 2002. Moreover men enjoy more leisure than women in both waves. Also Bloemen *et al.* (2010) use Multiscopo dataset for the year 2002 and they impute wage data from a different survey. Their results show that husbands' housework time increases with the wage of their wife while wives' housework time decrease. As far as childcare is concerned, time of fathers increases with own wage and with the presence of small children in the household, but strong regional differences emerge.

Anxo *et al.* (2007) compare time allocation over the life-cycle in Italy, France, Sweden and the U.S. and find that in Italy and France the gender gap in worked hours increases after union formation. Moreover Italian women after childbirth increase their domestic time by 22 hours a week while the corresponding figure for men is only 6 hours a week.

The only study that looks at time allocation of Italian couples distinguishing the time parents spend with their children between quality and basic care is Ichino and Sanz de Galdeano (2004) that compares three countries: Italy, Germany and Sweden. The results show that when the mother works, basic care time is reduced by 49% in Italy (but only by 40% in Germany and 3% in Sweden), while the quality care time reduction is respectively 37% in Italy, 24% in Germany and not significant in Sweden. Interestingly, Italy is the only country where the time devoted to children by other adults increases when the mother works. Among working women, more educated ones devote more time to child care than less educated ones.

All the other studies that distinguish between basic care and quality time refer to other countries, mainly Anglo-Saxon ones. Nock and Kingston (1988) show that dual-earner households spend less time with children than single-earner households and that the differences is mainly in the shorter time working mothers devote to children. Fathers seem not to compensate for this shorter mothers' time, unless she works at night. However, they do not find a big decrease in quality time devoted to children when the mother is working. Even Zick *et al.* (2001) find that when the mother is employed, quality time that both parents devote to their children increases: employed mothers spend more time than non-working mothers in reading and helping children with homework and fathers also increase the time devoted to children.

A general trend of increasing quality time and fathers involvement with children emerges when we compare data for the U.S. in the 1960s and in the 1990s (Bianchi, 2000; Sayer *et al.* 2004). Certainly this is due to the higher average level of education of parents. Craig (2006), in fact, using Australian data for the year 1997 finds that parents' education increases time spent with children, mainly in physical care, but only university degree increases quality time. Moreover, the effect of education is stronger for mothers: women with higher education increase both time for paid work and time with their children, by decreasing both housework and time for personal care.

A paper that considers a European country similar to Italy is Gutierrez-Domenech (2008), that uses the Spanish time use survey 2002-2003 to analyse how parents spend their time with their children in basic and quality activities according to their working status. She finds that Spanish women perform almost all primary basic childcare activities while primary quality childcare is more similar across genders. Moreover, childcare time is the same between working and non-working fathers. Both father's and mother's education increases the time spent with children. Spanish data seem also to show that working mothers tend to prioritise quality childcare time over basic care time in their time allocation decision.

## **2. Strategy for empirical estimation**

We are interested in estimating the effect of different individual and family characteristics on husband and wife time allocation decisions and the possible correlations among decisions.



We imagine a typical model of household decisions in which husband and wife maximizes the household utility function that can be thought as the averaged sum of the utilities of the two spouses that depend on the consumption of market goods, on home produced goods, on leisure time and on the quality of children. Market goods and leisure are pure private goods while both home produced goods and children quality are “public goods” for the couple, that can be produced with spouses’ time and/or with goods bought on the market. The household utility is maximised subject to a household budget constraint, to each spouse’s time constraint and to a household production function (for home produced goods). The solution of the model gives the time allocation chosen by each parent, *i.e.* how each spouse divides his/her total time between work, domestic activities, basic childcare and quality care time<sup>6</sup>. The decisions are taken simultaneously and they are all affected by individual and family characteristics and by social background. Given the nature of public goods for the couple of both domestically produced goods and children quality and given the unique household’s budget constraint, spouses’ decisions are interdependent. Depending on the functional form of the utility functions, the model can produce corner solutions, meaning that each individual may allocate zero time to one or more uses.

Our empirical strategy is not to estimate a full structural model, since we want to specify neither a functional form for the utility function nor the form of spouses’ interactions. We will nevertheless use a model that takes into account that the time allocated by each spouse to different activities is jointly decided and therefore that there are interdependence in spouses’ time decisions. We will handle the existence of corner solutions by using limited dependent variable

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<sup>6</sup> Leisure is the residual time category

models. For these reasons, we estimate the following interdependent simultaneous equations:

$$\begin{cases} h_k^* = \alpha_{0k} + \alpha_{1k}X_m + \alpha_{2k}X_f + \alpha_{3k}F + \alpha_{4k}Y + \varepsilon_{hk} \\ d_k^* = \beta_{0k} + \beta_{1k}X_m + \beta_{2k}X_f + \beta_{3k}F + \varepsilon_{dk} \\ bc_k^* = \gamma_{0k} + \gamma_{1k}X_m + \gamma_{2k}X_f + \gamma_{3k}F + \varepsilon_{bck} \\ qc_k^* = \varphi_{0k} + \varphi_{1k}X_m + \varphi_{2k}X_f + \varphi_{3k}F + \varepsilon_{qck} \end{cases} \quad k = (m, f)$$

$$\begin{cases} h_k = \max(0, h_k^*) \\ d_k = \max(0, d_k^*) \\ bc_k = \max(0, bc_k^*) \\ qc_k = \max(0, qc_k^*) \end{cases}$$

where  $h_k$  is work time for individual  $k$ ,  $d_k$  is domestic time,  $bc_k$  is time for basic care and  $qc_k$  is time for quality care;  $X_m$  are husband characteristics,  $X_f$  are wife characteristics,  $F$  are family characteristics and  $Y$  are income controls that affect only labour supply.

As pointed out in Hallberg and Klevmarken (2003), our equations are not Marshallian demand functions<sup>7</sup> because they do not depend on wages. They are behavioural equations derived from the first-order conditions of the optimization problem of the household.

Given the characteristics of our sample (almost all men work, women seem to be considered as secondary earner, the presence of children mainly reduces women's work and leisure time<sup>8</sup>) a different model of household time allocation can be thought in which time uses are not all simultaneously decided.

<sup>7</sup> In the empirical analysis, we disregard the price of market substitutes for home production, since they are not known.

<sup>8</sup> See the next Section.

Work time is, in fact, the most difficult time use to be adjusted at the intensive margin: flexibility in the number of working hours depends upon the type of contract, the type of job and the employer and, therefore, the decision is mainly between working and not working. Therefore it is likely that working hours does not depend directly on the other possible time uses but only indirectly through errors correlation. Moreover, woman's labour supply is often considered more flexible and adaptable to household domestic and childcare needs (Craig and Sawrikar, 2009). It is therefore likely that spouses' times devoted to domestic and childcare activities depend directly on how much time spouses, and in particular women, commit to work. Additionally children need a minimum amount of basic care time, while "quality" time is not strictly necessary. At the same time, it is easier to find substitute providers for basic care than for quality care activities. Therefore, parents first decide how much time they want to devote to basic childcare and only after how much time they want to devote to quality care.

We, then, assume a sequence of time allocation decisions in which spouses first decide how much time they want to devote to market work and only after how to divide the residual time between domestic work, basic care, quality care and other activities (leisure). Moreover, we model each spouse's quality care time use as dependent directly on his/her own basic care time. Our empirical model is therefore one in which domestic time, basic care and quality care of both spouses depend on both spouses' work time and husband's and wife's quality time depend on each own basic care time. The simultaneous equations system becomes:

$$\begin{cases} h_k^* = \alpha_{0k} + \alpha_{1k}X_m + \alpha_{2k}X_f + \alpha_{3k}F + \alpha_{4k}Y + \varepsilon_{hk} \\ d_k^* = \beta_{0k} + \beta_{1k}X_m + \beta_{2k}X_f + \beta_{3k}F + \beta_{4k}h_f + \beta_{5k}h_m + \varepsilon_{dk} \\ bc_k^* = \gamma_{0k} + \gamma_{1k}X_m + \gamma_{2k}X_f + \gamma_{3k}F + \gamma_{4k}h_f + \gamma_{5k}h_m + \varepsilon_{bck} \\ qc_k^* = \varphi_{0k} + \varphi_{1k}X_m + \varphi_{2k}X_f + \varphi_{3k}F + \varphi_{4k}h_f + \varphi_{5k}h_m + \varphi_{6k}bc_k + \varepsilon_{qck} \end{cases} \quad k = (m, f)$$

$$\begin{cases} h_k = \max(0, h_k^*) \\ d_k = \max(0, d_k^*) \\ bc_k = \max(0, bc_k^*) \\ qc_k = \max(0, qc_k^*) \end{cases}$$

We expect the mother's work coefficients to be more significant than husband's work coefficients because men work is rather stable across families (Italian men almost always work and almost always full time) while women work is more flexible and therefore heterogeneous. A negative sign of a spouse's work coefficient on his/her own time uses ( $\beta_{4f}$ ,  $\gamma_{4f}$  and  $\varphi_{4f}$  for mothers and  $\beta_{5m}$ ,  $\gamma_{5m}$  and  $\varphi_{5m}$  for fathers) points toward a substitution effect between individual time uses. A positive sign of a spouse's work coefficient on the other spouse's time uses ( $\beta_{4m}$ ,  $\gamma_{4m}$  and  $\varphi_{4m}$  and  $\beta_{5f}$ ,  $\gamma_{5f}$  and  $\varphi_{5f}$  respectively), instead, suggests a compensation mechanism between spouses' time allocations. Finally we expect the basic care coefficient  $\varphi_{6k}$  to be negative and significant for both spouses because it should capture the joint effect of the time constraint and the minimum amount of basic care need by children.

All the errors are assumed to be identically and independently jointly normally distributed with an unrestricted covariance matrix.

$$\begin{pmatrix} \varepsilon_{hm} \\ \varepsilon_{hf} \\ \dots \\ \varepsilon_{qcm} \\ \varepsilon_{qcf} \end{pmatrix} = \begin{pmatrix} 0 \\ 0 \\ \dots \\ 0 \\ 0 \end{pmatrix}, \begin{pmatrix} \sigma_{hm}^2 & \sigma_{hm,hf} & \dots & \dots & \sigma_{hm,qcf} \\ \sigma_{hm,hf} & \sigma_{hf}^2 & \dots & \dots & \dots \\ \dots & \dots & \dots & \dots & \dots \\ \dots & \dots & \dots & \dots & \dots \\ \sigma_{hm,qcf} & \dots & \dots & \dots & \sigma_{qcf}^2 \end{pmatrix}$$

where  $\sigma_i^2$  is the variance of the  $\varepsilon_i$  and  $\sigma_{ij}$  is the covariance between  $\varepsilon_i$  and  $\varepsilon_j$ . Correlation in unobservables among the errors of the eight time-use equations may arise from unobserved household-specific correlations in preferences or productivity.

Instead of using a 3SLS as in Hallberg and Klevmarken (2003), we estimate our system as a Seemingly Unrelated Regressions system using simulated maximum likelihood. As pointed out by Greene (2003), in limited dependent variables models with simultaneous equations the endogeneity of one or more variables can be ignored in formulating the likelihood if the system is recursive (with a triangular coefficients matrix) and if the endogenous variables enter the subsequent stages as observed (h and not h\*). Observations that are censored in three or more equations involve calculation of a cumulative jointly normal distribution up to eight dimensions, depending on the number of non-negative binding constraints. To solve this problem, we use the GHK algorithm developed by Børsh-Saupan and Hajivassiliou (1993), Hajivassiliou and McFadden (1990) and Keane (1994). This algorithm evaluates the probability each individual contributes to the likelihood exploiting the fact that a multivariate normal distribution function can be expressed as the product of sequentially conditioned univariate normal distribution functions.

### **3. Data and sample selection**

We investigate the time allocation of Italian families using data from the national time use surveys 1988-89 and 2002-03, “Indagine Multiscopo sulle Famiglie – Uso del Tempo”, carried out by the Italian National Statistical Office (ISTAT). The 1998 dataset covers 13,729 households corresponding to 38,110 individuals while the 2002 wave covers 21,075 households corresponding to 55,773 individuals, including children and other adults living in the household.

An individual questionnaire containing socio-demographic information and a time diary were collected. All members older than three years<sup>9</sup> completed the time diary on a selected day. In each municipality covered by the survey, households were divided into three groups and each group was asked to fill in the daily diary at a different time: a weekday, Saturday or Sunday<sup>10</sup>. Our analysis is based on diaries completed during weekdays.

This dataset has the advantage of being representative of the Italian population and that all household members were required to fill in a time diary. On the other hand, its main disadvantage is that no information was collected on earnings or income.

The diary reports information on the time spent on a large number of tasks. Activities are coded by the respondent as main or secondary activities<sup>11</sup>. Moreover, the respondent specifies if the activity is carried out with another family member and if this member is a child younger than ten years.

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<sup>9</sup> The time diary of very young children was completed by parents.

<sup>10</sup> The oversampling of weekend diaries was a deliberate choice of the data collector (ISTAT).

<sup>11</sup> For example, someone may be cooking and watching television or cooking and looking at the children. It is the respondent that chooses which of the activities is the main one and which is the secondary one.

Therefore the data allow us to construct three different definitions of childcare: *primary childcare*, when the main activity is reported as childcare, *secondary childcare*, when childcare is defined as secondary activity and *passive childcare*, when parents report any activities with a family member younger than ten years old. Primary and secondary childcare could be divided in two subgroups, according to the type of activities parents do with their children. *Basic childcare* includes all activities related to the child essential needs (feeding, dressing, bathing, ...) while *quality childcare* refers to activities related to children educational, cultural and emotional development. Therefore quality childcare is supposed to be more effective in fostering child's development.

The distinction between primary, secondary and passive childcare and the one between basic and quality childcare are very important since we are interested in understanding if the time spent with children is reduced in families where both parents work and which kind of time is reduced. *Primary childcare* is the definition that better reflects the active parents' decision to commit time to their child, because it requires the highest degree of parental involvement among the above described definitions. Moreover, *secondary childcare* and *passive childcare* depend more heavily on the way in which parents fill in the diary<sup>12</sup>. Therefore we decide to focus our analysis only on *primary childcare* and we divide the time spent with children in between basic care and quality care.

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<sup>12</sup> For example, in the 1988 survey almost no one reported childcare as a secondary activity while in the 2002 this was often the case.

### 3.1. Sample selection and time categories

For our empirical analysis we selected a sample of married<sup>13</sup> couples with at least one child younger than 14 years old and in which both spouses are older than 18 and younger than 56 years at the time of the interview. We excluded couples in which one (or both) spouse(s) is in full-time education, retired, disable, chronically ill or doing the military service. We also excluded couples for which the weekly diary was filled in on a “special” day, like, for example, a vacation day or a sickness day<sup>14</sup>. We were forced to exclude single parents due to the very small size of the subsample, especially in 1988<sup>15</sup>. We finally exclude all households in which one or more of the variables used in the analysis were missing.

Our final samples consist of 665 households in 1988 and 1,259 households in 2002.

As already mentioned, we are interested in understanding how husbands and wives allocate their time into four different activities: market work, domestic work, basic child care and quality child care. The empirical definitions of our four time categories are here below reported.

Market work: time in paid job (main or secondary); coffee breaks and other breaks during the job; other activities related to employment, excluding job searching activities.

Domestic work: food management and preparation; housekeeping; laundry; ironing; shopping, commercial and administrative services.

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<sup>13</sup> Married stays both for married or cohabiting couples.

<sup>14</sup> In 2002 we were also able to exclude couples in which the mother is on compulsory maternity leave

<sup>15</sup> 69 observations in 1988 and 288 in 2002.



Basic care: physical care; supervision; taking to school or to other child's activities.

Quality care: doing homework with the child; playing with the child; reading to the child; reading with the child; talking to the child; watching children's movies and shows.

Tables 1 and 2 show some summary statistics on time allocation in 1988 and 2002 according to the mother's working status<sup>16</sup>. We divide couples in two main types: two earners households (44.5% in 1988 and 50% in 2002) and male breadwinner households (51.3% in 1988 and 46.6% in 2002). We also have the residual categories of female breadwinner and no breadwinner (where both spouses are unemployed). Unfortunately these categories are too small (4.2% in 1988 and 3.3%) to give reliable descriptive statistics and therefore we do not report them. Table 1 reports the unconditional mean of work time, domestic time, basic care and quality care while in Table 2 we show the ratio of individuals with non-zero values in each time category and the means conditioned on declaring a positive value<sup>17</sup>.

Work time increased significantly in 2002 with respect to 1988 for both men and women. In both periods housework is for the largest part a female task, even if wives' domestic time reduced significantly in 2002. Husbands domestic time, on the contrary, did not change much between 1988 and 2002, but fathers raised significantly the time dedicated to children. Also mothers increased considerably the time devoted to the children. When the mother does

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<sup>16</sup> An individual is classified as "working" when he/she declares to be employed.

<sup>17</sup> A well-known problem in time use studies is that the time diary reflects a one day time allocation and it could be the case that in that day individuals do not engage in some activities that they normally do. As an example, the ratio of employed individuals who declare a positive amount of working hours is less than 100% for both men and women.

not work, the father seems to be less involved in basic childcare tasks and the time he spends with the children is more oriented towards quality time. When the wives work, fathers increase more the basic childcare time than the quality care time, and the total time fathers spend with their children increases too.

Looking at Table 2, we notice that parents who allocate time to childcare activities (*i.e.* those with positive values) always spend a significant amount of time in this activity: at least half an hour in basic care and almost one hour in quality care. Moreover, not only both mothers and fathers increased the time spent with children from 1988 to 2002 (higher conditional means), but also that the number of parents who spend time with their children grows. In 1988, among dual earners couples, 24.7% of fathers and 72.3% of mothers declare a positive amount of basic care, while in 2002 the percentages raise to 47.7% and 83.2% respectively. In 1988, among male breadwinner families, 16.7% of fathers and 31.4% of mothers spend quality time with their children, while in 2002 the percentages grow to 41.4% and 61.8% respectively.

In Table 3 we report the unconditional average time spent on each activity by the two spouses as a function of each spouse's education level. The total impact of parental schooling on different time uses is *a priori* not clear. It is proven that education increases market work, but the effect on other activities is uncertain and it depends crucially on how parents value childcare time relative to other possible time uses. It seems reasonable to expect a positive correlation between education and childcare time (in particular quality care time) and a negative correlation between education and domestic work time. Domestic work time, in fact, is a low-human-capital activity easily substitutable with goods and services bought in the market, while the opposite is true for child care, especially for quality care.

In both years highly educated women (with a University degree) spend more time on paid work and less time on domestic work than poorly educated women (with compulsory education or less). In 1988 husband's education has a U-shaped effect on own time in domestic work, with the exception of middle educated husbands of middle educated wives, and the higher the wife's education the lower the husband's domestic work. Twelve years after things have changed: husband's education has a reverse U-shaped effect on husband's domestic work (secondary school husbands do more domestic work than compulsory and college husbands) and wife's education increases husband's domestic work.

In 2002 fathers with a secondary school degree allocate the highest time to childcare tasks, both care and quality care while in 1988 they increase with husband's educational level. Childcare time increases with mothers' educational level too, but highly educated women married to highly educated men decrease their childcare time supply. The higher the education level of their wife, the more time husbands allocate to childcare.

### **3.2. Variables**

Our dependent variables are the four time categories: market work, domestic work, basic care and quality care.

As independent variables we consider both individual's characteristics, household characteristics and we control for the geographical area of residence.

To capture the effect of parental education, we use compulsory education (8 years of schooling) as the reference group. The other educational levels that

can be distinguished are lower 'secondary education' (2 years of secondary school); upper secondary education (5 years of secondary school); a short university degree (2 years); and a standard university degree (4 or more years). These last two categories are aggregated together in the estimation of the model as there are few individuals in the dataset with a short university degree. For the same reason, we aggregate also lower and upper secondary schooling,

We use dummy variables for the age of the youngest child in the household. We distinguish two categories: the youngest child is (i) younger than 3 years and (ii) from 3 to 5 years old. We distinguish between these two categories because the availability of childcare facilities for children below the age of 3 is very limited in Italy, especially in the Southern regions of the country, while public childcare covers on average 95% of the population of children from 3 to 5 (Del Boca *et al.*, 2007 and 2009).

We also include the total number of children living in the household, since the higher the number of children the more the time parents have to devote to them. However, the amount of time required should increase less than proportionally with respect to the number of children, due to economies of scale.

We control for the presence of healthy adults other than the parents in the household (grandparents, adult children, other parents)<sup>18</sup>. Their role could be double fold: they can either help the family providing free childcare services and they can also be an income source.

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<sup>18</sup> We tried to control also for the presence of sick adults within the household. In general, sick adults play a competing role with children for the wife (but also for the husband) time, since they need care for themselves, and their care might also require additional expenses. However, in 1988 the sickness status is based on a question that asks if the individual is chronically ill, while in 2002 is based on a self-reported variable on the individual health status, with possible answers that varies from very good to very bad. Therefore, even if our results were robust to the inclusion of the dummy "sick adults", we were not convinced by the comparability of the two definitions and therefore we preferred not to include the variable in the estimates here presented.

We include three regional dummies to capture systematic differences across different parts of Italy. Living in the North is our reference group, compared to living in the Centre and living in the South. Households that reside in different parts of Italy face different unemployment rates and labour market conditions, different childcare availability and different living costs, all elements that could strongly affect time allocation decisions.

Unfortunately, in the dataset we have neither the wealth nor the income of the family and we hardly have variables that allow us to proxy the economic situation of the household. Richer families are more able to buy substitute for their time uses (as an example, wealthier family may afford a housekeeper), then we nevertheless try to recover some economic controls from the information included in the two waves. In both years we construct a dummy equal to 1 if the family owns the apartment or the house they live in. Home ownership is the first and main investment an Italian family made whenever possible. Families that do not own the apartment/house are often families that can not afford it. In the 1988 sample, we also construct a dummy variable equal to 1 if the family lives in public housing, as an indicator for families that are in the lowest part of the income distribution. Unfortunately in 2002 we have not the same information and, instead, we control for the family owning a holiday house as an indicator of belonging to the upper part of the income distribution. Moreover, for 2002 we define another dummy to control for those families that declare to be poor or really poor on the basis of the survey question<sup>19</sup> “How you define the economic situation of your family?”

Table 4 reports sample summary statistics for the years 1988 and 2002.

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<sup>19</sup> Since it is a self-reported variable, it depends crucially on individual beliefs and it is likely to be downward bias and centered around the mean (as it is). Nevertheless, we think that those individuals who report to be poor or really poor are likely to be families that suffer for some kind of real economic constraints.

The 2002 sample is older than the 1988 one. Education increased drastically in 2002 with respect to 1988 for both men and women. In particular the number of men and women with at least secondary school raised significantly and also the percentage of women with a university degree. More women work in 2002 than in 1988, but strong regional differences in female employment rates persists over time. In fact, in both years women are much more likely to be housewives if they live in Southern regions with respect to Northern regions. The number of children per household decreased slightly, from 1.95 to 1.84. Looking at our economic controls, the ratio of home owners rose from 65.6% to 67.7%. In 2002, 11.5% of households have a holiday house and 6.4% feel to be poor or really poor. In 1988 27.4% of households live in public housing.

#### **4. Results**

We estimate the two models described in Section 3 separately for the two years. The first model, called simultaneous model, is a SUR system of eight left-censored Tobit equations without endogenous variables. In the second model, called sequential model, we estimate a SUR system of eight left-censored Tobit equations in which we allow domestic time, basic care and quality care to depend directly from observed husband's and wife's working hours and husband's and wife's quality care time to depend directly on each own basic childcare.

Table 5 shows the estimation results of the simultaneous model for wives and Table 7 for husbands. In general, wife's time allocation is more responsive

to family and individual characteristics than husband's time allocation in both years.

Wife's education has a positive impact on wife's working hours, stronger in 2002, and a negative impact on husband's time at work, but statistically significant only in 1988 and only for wife's university degree. More educated women spend significantly less time in domestic works in both years. In 1988 wives of college educated husbands spend also less time doing domestic work while in 2002 husbands of college educated wives increase significantly their domestic time. In 1988 wife's education has a positive effect on both parents basic care, while in 2002 this positive effect holds only for wife's secondary school degree on husband basic care. Education of both parents plays no significant role in both spouses' quality time in both years.

In both years, living in a Southern region decreases significantly mother's and father's working minutes, but also mother quality time with children. On the other hand, it increases the time devoted by wives to domestic work and reduces the husbands' domestic time (less in 2002 than in 1988). Thus it is not true (at least in the South) that mothers who work less spend more quality time with their children: they spend more time in cleaning the house. Living in central regions, instead, is associated with lower husband's domestic time and lower husband's basic care time.

Having at least one child younger than 6 has no effect on both spouses' work time in both years and on father's domestic time, while it has a decreasing negative effect on mother's domestic time but only in 2002. Parents allocate more time to both basic and quality care in both years if they have children younger than 5 years old but this positive effect decreases with child's age. In particular, having a child younger than 3 increases parents' basic care in both

years and having at least one child between 3 and 5 increases both parents basic care in 2002 and mother basic care in 1988. Having at least one child younger than 6 influences positively mother's quality time too but only in 2002, while it has a positive effect on father's quality care in both years.

The number of children in the household has a significant negative effect on the mother time devoted to work, smaller in 2002 than in 1988, and a positive effect on father work time, but significant only in 2002. It also has, in 2002, a positive effect on the basic care time she dedicates to children and on the time she spends doing housework (both 1988 and 2002), while it has a negative effect on the husband's quality time in 2002.

In 2002 living with other adults decreases significantly the basic care time of both parents, as expected, but also the quality care time of both.

These results seem to support the fact that the male breadwinner family, where he provides income and she provides domestic work and care, still is a strong reference model for Italian couples.

Finally, home ownership has a positive effect on both spouses' work time but only in 2002. This effect is probably related to the need to pay back the loan associated in most of the cases to home purchases. On the contrary, perceived poverty decreases both parents work time. This variable could capture negative psychological (discouraged worker) and social effects associated with poverty.

Table 6 and Table 8 report the results of the sequential model for wives and husbands. Most of results of the simultaneous model are confirmed. This means that education and work time coefficients are actually capturing two distinct effects: the first related to personal characteristics and to the social background, the second related to the pure time constraint. Domestic time of both parents is less responsive to spouses' education. In 1988 wife's education



has a positive effect on husband's basic care but not on her own care while the reverse is true in 2002. Differently from the simultaneous model, wife's education has a positive effect on wife's and husband's quality care in 2002.

Living in the South decreases mother's basic and quality care (the coefficients of the variable "South " becomes weakly significant and negative in 2002).

Looking at work time coefficients, wife's work time decreases wife's domestic time and wife's quality time with children in 2002. The effect on wife's basic care changed over time: it was positive and significant in 1988 and it became negative and significant in 2002. It seems that in 2002 women are more time constrained than in 1988 and therefore more time at work reflects in less time dedicated to all other activities. The effect of wife's working hours on father's time allocation is null in 1988 but becomes positive in 2002. The more she works the more time he allocate to domestic work and to basic care. The effect on quality care is positive in 2002, but not statistically significant. In 2002 fathers, then, compensate for the loss in maternal time by dedicating more time to basic care of their children.

Husband's work time has a negative effect on basic care and quality care of both spouses in 2002 and no statistically significant effect in 1988. Moreover, it also has a negative effect on spouses' domestic time. An income effect seems to prevail when we look at husband's working decisions, that allows couples with an higher income to buy substitutes for their time spent in domestic activities.

Finally, as expected, basic care time has a negative effect on quality time with children. This negative effect is weaker in 2002 than in 1988 for women while the opposite is true for men.

By comparing the results for the sequential model in the two years, we get some interesting results. Fathers are more involved in children education and in child caring activities in 2002 than in 1988. Moreover, living with other adults help parents in managing both basic and quality care, in particular in 2002 where time constraints seem to be more stringent. Mothers work more in 2002 and they allocate less time to their children relying more on other adults help (father *in primis* and other family adults).

We test the specification of our sequential model of time allocation against the non-sequential more traditional simultaneous one using a Wald test on the null of work coefficients and basic care coefficients jointly equal to zero. Our test strongly rejects, on both years, the null. We then conclude that our sequential specification is better than our basic specification.

Table 10 and Table 10 report the correlation matrices for the two models in 1988 and 2002. The variances of the unobservables of the eight time use equations are always statistically significant.

In 1988 simultaneous specification we find a significant negative correlation across unobservables between wife's work and wife's basic and quality care and a positive correlation between wife's work and husband's basic and quality care. In the sequential model, where we control for the direct effect of wife's work time on other time uses, the negative correlation between wife's work and wife's children care loose its significant while the positive correlation with husband's basic care reverses its sign. In 2002, instead, the correlation in unobservables between mother's work time and mother's care is positive and significant in the simultaneous model, but it becomes negative and significant when we control for the direct effect of mother's work. The correlation between wife's work and husband's basic care becomes positive and significant in the

sequential scenario. Father time allocation, again, seems to compensate for the reduction in maternal time. In the basic model, husband's work time is negatively related to husband's both type of care in 1988 and in 2002. Once we control for the direct effect of husband's work time, this correlation becomes positive (in 2002). Also maternal care time is positively correlated with father's work. Therefore, it seems that in 2002 spouses tend to coordinate their time allocation by substituting one spouse's time with the other spouse's time.

In 2002 wife's basic care is positively correlated with husband's basic care and both parents' quality care, as well as husband's basic care is positively correlated with wife's basic care and both parents' quality care. These results imply that parents who spend more time with their children tend to divide it between basic and quality care.

## **5. Conclusions**

This paper uses the two existing waves of the Italian Time Use dataset (1988 and 2002) to analyze family time allocation decisions and their changes over time in a period that showed an increase in female employment rate and a decline in total fertility rate.

We use a simultaneous recursive approach that allows us to take into consideration the links among different time uses for the individual and the correlation between spouses' decisions.

Our results show that women's time allocation is generally more responsive to family and individual characteristics than men's time allocation and this seems to indicate that women are still considered as secondary earners in the household. Their time allocation, in fact, depends strongly on the

presence, the age and the number of children. Craig and Sawrikar (2009) found a similar result for Australia: women are more likely to adjust their hours of work as family commitments change. On the contrary, in 1988 the presence of children in the household did not affect fathers' time allocation decisions, and it becomes important for father working decisions only in 2002, when fathers were more involved in children caring and education. This is the response to the greater mothers' involvement in the labour market. This result has been found in other studies comparing time allocation in the U.S. in different years (Bianchi, 2000, and Sayer *et al.*, 2004)

In fact, in 2002 mothers' work is less responsive to family characteristics and even if, on average, they allocate more time to their children, childcare time diminishes with their work time, but they rely more on other adults help (mainly on partners) for childcare. However mothers tend to delegate mainly basic care activities and only marginally "quality" time.

Women's education increases both the time mothers spend with their children and the time fathers spend with their children (only for basic care in 1988), while men's high education has an effect on woman's quality care (only in 2002) but surprisingly men's education has no effect on fathers' care and quality time.

Despite the traditional household model of Italian couples, these results seem to be consistent with those found for other countries and confirm how parents value more and more time with children, since they increase the time devoted to "quality" activities. The implications of this for children development process and outcomes are therefore very important in terms of policy implication. The hours of work of the mothers decrease certainly both basic and quality care time with the children, but this is compensated by the increase in

the time fathers devote to their children. Unfortunately, at the moment, we have not datasets on children outcomes for Italy for analysing the consequences on children of these relevant changes.

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**Table 1**

**Time Allocation (daily minutes)  
in 1988 and 2002 (unconditional mean)**

	<b>Dual earners households</b>		<b>Male breadwinner households</b>	
	<i>Husband</i>	<i>Wife</i>	<i>Husband</i>	<i>Wife</i>
<b>1988</b>				
Work	456.34	300.39	464.58	-
Domestic work	40.63	270.75	27.61	451.56
Basic childcare	10.71	48.49	4.67	67.91
Quality childcare	17.03	16.50	8.42	22.12
<b>2002</b>				
Work	474.02	317.60	468.08	-
Domestic work	39.32	211.75	23.46	398.31
Basic childcare	24.48	72.71	13.75	110.26
Quality childcare	23.06	32.94	24.46	46.18

**Table 2**

**Time Allocation (daily minutes)  
in 1988 and 2002 (conditional mean)**

	<b>Dual earners households</b>				<b>Male breadwinner households</b>			
	<i>Husband</i>		<i>Wife</i>		<i>Husband</i>		<i>Wife</i>	
	% >0	Mean if >0	% >0	Mean if >0	% >0	Mean if >0	% >0	Mean if >0
<b>1988</b>								
Work	96.62%	472.30	78.72%	381.61	97.94%	474.31	-	-
Domestic work	56.42%	72.01	99.66%	272.66	46.33%	59.60	100.00%	451.56
Basic childcare	24.66%	43.43	72.30%	67.07	13.49%	34.59	76.83%	88.38
Quality childcare	22.63%	75.22	28.04%	58.83	16.71%	50.35	31.38%	70.49
<b>2002</b>								
Work	93.80%	505.30	84.60%	375.40	91.82%	509.76	-	-
Domestic work	58.25%	67.49	99.52%	212.76	41.90%	55.98	100.00%	398.31
Basic childcare	47.68%	51.22	83.17%	87.42	27.26%	50.44	89.26%	123.51
Quality childcare	39.20%	58.82	53.65%	61.39	41.39%	59.09	61.83%	74.68



Table 3

Time allocation (daily minutes) by educational levels in 1988 and 2002 (unconditional mean)

Wife's education	Husband's education	Husband			Wife				
		Work	Domestic work	Basic childcare	Quality childcare	Work	Domestic work	Basic childcare	Quality childcare
<b>1988</b>									
Compulsory Secondary school University	Compulsory	471.72	38.11	4.26	8.19	111.27	406.87	45.17	14.96
	Secondary school	470.88	26.49	5.13	16.88	123.25	362.28	63.33	23.71
	University	348.60	54.20	2.40	35.00	168.00	347.20	38.00	0
Secondary school	Compulsory	452.60	32.54	10.03	21.67	200.43	316.60	84.24	25.40
	Secondary school	404.48	47.64	12.02	13.71	153.82	330.51	69.81	23.04
	University	389.29	28.68	13.38	22.35	202.41	298.82	78.26	25.74
University	Compulsory	175.00	30.00	28.33	0	203.33	259.33	35.00	35.00
	Secondary school	467.71	19.29	25.71	21.79	127.86	352.50	122.86	31.07
	University	435.10	52.35	23.90	17.50	209.25	284.65	45.20	23.75
<b>2002</b>									
Compulsory Secondary school University	Compulsory	451.37	26.76	15.74	19.33	114.75	342.95	88.29	35.19
	Secondary school	448.59	42.15	20.44	23.48	125.78	338.59	84.67	39.19
	University	335.00	40.00	10.00	6.67	48.33	436.67	35.00	11.67
Secondary school	Compulsory	460.99	35.87	19.71	27.03	183.02	286.28	86.51	41.63
	Secondary school	464.99	37.35	23.30	27.67	203.19	271.77	93.81	38.41
	University	483.57	33.57	33.75	19.11	219.11	265.89	96.96	48.39
University	Compulsory	488.67	28.00	28.67	40.67	173.33	246.00	113.33	70.00
	Secondary school	424.57	43.71	20.29	27.71	211.71	230.86	119.43	50.00
	University	453.00	35.80	19.80	29.60	255.80	201.00	96.80	44.20

Table 4

## Descriptive statistics 1988 and 2002

	1988	2002
Wife's age	34.01	36.45
Husband's age	37.84	39.78
Wife's education		
<i>Compulsory and lower</i>	63.01%	47.02%
<i>Secondary school</i>	31.43%	45.04%
<i>University or higher</i>	5.56%	7.94%
Husband's education		
<i>Compulsory</i>	60.15%	50.68%
<i>Secondary school</i>	30.98%	40.43%
<i>University or higher</i>	8.87%	8.90%
Number of children	1.95	1.84
Highest number of children in the household	8	7
Working wife		
<i>Italy</i>	45.26%	51.15%
<i>Nord</i>	57.02%	61.66%
<i>Centre</i>	54.81%	59.82%
<i>South</i>	33.98%	37.64%
Other (not sick) adults within the household	14.29%	17.71%
Home owners	65.56%	67.75%
Living in a popular house	27.37%	-
Poor households	-	6.43%
Holiday house owners	-	11.52%
Observations	665	1,259

Table 5

## Estimation results for wives- Simultaneous model

		1988		2002	
		Coeff.	(St. dev.)	Coeff.	(St. dev.)
Work	Own age	0.761	(3.703)	7.634***	(2.525)
	Wife's secondary school degree	130.9***	(41.48)	120.6***	(25.75)
	Wife's university degree	157.0**	(79.83)	194.0***	(46.76)
	Husband's secondary school degree	17.53	(41.51)	26.66	(25.18)
	Husband's university degree	118.5*	(67.55)	22.99	(44.76)
	Younger kids lower than 3 years old	-108.2**	(48.62)	-44.39	(30.86)
	Younger kids between 3 and 5 years old	-39.18	(46.14)	34.22	(29.64)
	Number of children	-68.17***	(22.73)	-45.11***	(16.33)
	Other adults	72.89	(51.92)	57.04*	(30.67)
	Feeling poor			-104.3***	(38.88)
	Popular House	-42.71	(29.10)		
	Home ownership	-17.98	(25.53)	34.07**	(17.24)
	Holiday house			5.925	(23.34)
	Center	-37.61	(49.18)	13.08	(29.91)
	South	-197.2***	(38.83)	-135.1***	(24.48)
Constant	103.4	(133.0)	-250.5***	(95.16)	
Domestic	Own age	2.622**	(1.267)	0.556	(0.907)
	Wife's secondary school degree	-44.70***	(14.65)	-51.26***	(9.286)
	Wife's university degree	-54.88*	(29.30)	-102.5***	(17.44)
	Husband's secondary school degree	-22.46	(14.52)	-8.197	(9.123)
	Husband's university degree	-61.40**	(24.71)	-23.87	(16.62)
	Younger kids lower than 3 years old	8.922	(16.89)	-36.41***	(11.19)
	Younger kids between 3 and 5 years old	2.503	(16.15)	-24.63**	(10.82)
	Number of children	34.97***	(7.538)	22.42***	(5.847)
	Other adults	-27.03	(18.33)	-22.01**	(11.23)
	Center	-0.709	(17.74)	11.99	(11.17)
	South	47.25***	(13.30)	59.07***	(8.763)
Constant	218.7***	(45.23)	269.9***	(33.87)	
Basic care	Own age	-1.469**	(0.623)	-3.067***	(0.543)
	Wife's secondary school degree	21.37***	(7.007)	8.489	(5.573)
	Wife's university degree	33.39**	(13.93)	11.01	(10.40)
	Husband's secondary school degree	2.410	(6.968)	3.326	(5.472)
	Husband's university degree	-7.608	(11.98)	15.29	(9.969)
	Younger kids lower than 3 years old	98.67***	(8.089)	101.5***	(6.668)
	Younger kids between 3 and 5 years old	53.44***	(7.758)	48.55***	(6.449)
	Number of children	4.433	(3.660)	21.69***	(3.508)
	Other adults	-8.528	(9.232)	-20.93***	(6.848)
	Center	-4.791	(8.677)	-4.912	(6.714)
	South	1.043	(6.460)	-2.285	(5.251)
Constant	37.87*	(21.93)	115.2***	(20.26)	

**Table 5 (cont.)**

**Estimation results for wives- Simultaneous model**

		<b>1988</b>		<b>2002</b>	
		Coeff.	(St. dev.)	Coeff.	(St. dev.)
Quality care	Own age	-2.273**	(1.101)	-0.368	(0.542)
	Wife's secondary school degree	13.41	(12.27)	8.239	(5.571)
	Wife's university degree	37.19	(23.64)	16.37	(10.20)
	Husband's secondary school degree	15.80	(12.23)	-1.576	(5.450)
	Husband's university degree	16.06	(20.50)	3.025	(9.819)
	Younger kids lower than 3 years old	4.923	(14.11)	42.28***	(6.613)
	Younger kids between 3 and 5 years old	8.515	(13.59)	19.76***	(6.447)
	Number of children	9.811	(6.627)	0.0298	(3.530)
	Other adults	0.920	(15.94)	-15.52**	(6.890)
	Center	-8.254	(14.99)	0.756	(6.620)
	South	-25.17**	(11.45)	-11.11**	(5.267)
	Constant	-1.334	(38.14)	13.95	(20.17)

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Table 6

## Estimation results for wives - Sequential model

		1988		2002	
		Coeff.	(St. dev.)	Coeff.	(St. dev.)
Work	Own age	0.495	(3.941)	8.215***	(2.882)
	Wife's secondary school degree	103.7**	(45.52)	134.8***	(28.91)
	Wife's university degree	138.5	(87.44)	202.1***	(51.97)
	Husband's secondary school degree	9.918	(45.61)	18.65	(28.12)
	Husband's university degree	109.9	(74.27)	18.61	(49.46)
	Younger kids lower than 3 years old	-226.7***	(54.22)	-47.65	(34.58)
	Younger kids between 3 and 5 years old	-80.56	(50.45)	40.35	(32.97)
	Number of children	-87.07***	(25.78)	-51.52***	(18.49)
	Other adults	53.63	(57.16)	72.01**	(34.10)
	Feeling poor			-210.7***	(52.92)
	Popular House	-34.89	(34.02)		
	Home ownership	11.80	(30.06)	59.91**	(24.62)
	Holiday house			-0.0204	(32.55)
	Center	-29.08	(53.53)	12.49	(33.01)
	South	-204.3***	(42.62)	-135.7***	(27.43)
Constant	162.6	(142.5)	-299.7***	(108.5)	
Domestic	Own age	2.473**	(1.096)	-0.713	(0.926)
	Wife's secondary school degree	-53.71*	(29.21)	-23.59	(16.56)
	Wife's university degree	-52.29	(38.90)	-89.10***	(30.61)
	Husband's secondary school degree	-25.71	(18.72)	-8.817	(15.94)
	Husband's university degree	-58.40*	(35.21)	-14.53	(28.86)
	Younger kids lower than 3 years old	-37.52*	(20.82)	-48.50***	(17.77)
	Younger kids between 3 and 5 years old	-13.74	(19.85)	-14.31	(18.11)
	Number of children	11.53	(9.402)	31.78***	(10.15)
	Other adults	-13.20	(23.33)	-31.40	(19.50)
	Center	-20.76	(24.13)	42.07**	(20.07)
	South	-48.74*	(25.97)	7.028	(16.83)
	Husband's work time	-0.891*	(0.468)	-1.062***	(0.168)
	Wife's work time	-0.670***	(0.0603)	-0.171***	(0.0450)
Constant	831.2***	(247.6)	817.2***	(87.39)	
Basic care	Own age	-1.404*	(0.718)	-2.420***	(0.595)
	Wife's secondary school degree	1.682	(16.09)	27.40***	(7.326)
	Wife's university degree	19.68	(19.26)	33.43**	(13.08)
	Husband's secondary school degree	-0.867	(9.055)	5.491	(6.651)
	Husband's university degree	-24.13	(17.84)	19.81*	(12.04)
	Younger kids lower than 3 years old	102.6***	(10.57)	92.73***	(7.850)
	Younger kids between 3 and 5 years old	51.82***	(9.904)	52.01***	(7.794)
	Number of children	9.014*	(4.690)	18.84***	(4.562)
	Other adults	-16.00	(11.64)	-17.27**	(8.469)
	Center	-8.208	(12.09)	3.450	(8.712)
	South	5.823	(14.28)	-24.80***	(8.003)
	Husband's work time	-0.243	(0.281)	-0.235**	(0.117)
	Wife's work time	0.176***	(0.0294)	-0.240***	(0.0389)
	Constant	122.2	(145.9)	240.3***	(59.98)

**Table 6 (cont.)**

**Estimation results for wives - Sequential model**

		<b>1988</b>		<b>2002</b>	
		Coeff.	(St. dev.)	Coeff.	(St. dev.)
Quality care	Own age	-3.714**	(1.718)	-2.031**	(1.010)
	Wife's secondary school degree	-49.64	(67.21)	45.13***	(12.49)
	Wife's university degree	21.57	(70.00)	58.11***	(20.72)
	Husband's secondary school degree	4.695	(31.38)	5.729	(10.04)
	Husband's university degree	-50.71	(66.60)	26.27	(18.65)
	Younger kids lower than 3 years old	102.2	(67.04)	117.5***	(25.14)
	Younger kids between 3 and 5 years old	52.28	(42.21)	65.42***	(16.55)
	Number of children	14.07	(16.41)	15.23*	(8.157)
	Other adults	-23.38	(40.56)	-25.09*	(13.02)
	Center	-40.46	(43.19)	11.75	(12.91)
	South	-85.78	(59.29)	-50.00***	(13.16)
	Husband's work time	-1.704	(1.247)	-0.406**	(0.174)
	Wife's work time	0.0856	(0.133)	-0.387***	(0.0773)
	Own basic care time	-1.256**	(0.598)	-0.945***	(0.255)
	Constant	893.7	(628.5)	339.6***	(102.9)

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Table 7

## Estimation results for husbands - Simultaneous model

		1988		2002	
		Coeff.	(St. dev.)	Coeff.	(St. dev.)
Work	Own age	-0.578	(1.296)	-3.980***	(1.241)
	Wife's secondary school degree	-10.19	(15.58)	15.16	(13.95)
	Wife's university degree	-50.59***	(15.65)	-3.822	(26.22)
	Husband's secondary school degree	-28.52	(31.26)	-4.859	(13.83)
	Husband's university degree	-37.47	(26.46)	12.99	(25.19)
	Younger kids lower than 3 years old	-8.194	(18.06)	-16.00	(16.61)
	Younger kids between 3 and 5 years old	-7.339	(16.90)	3.664	(16.15)
	Number of children	-0.110	(8.107)	19.38**	(8.823)
	Other adults	-10.83	(19.53)	-10.10	(16.87)
	Feeling poor			-57.50***	(22.21)
	Popular House	-24.44*	(13.20)		
	Home ownership	21.73*	(12.27)	23.91**	(11.67)
	Holiday house			-12.78	(16.87)
	Center	-20.59	(18.95)	29.06*	(16.85)
	South	-40.43***	(14.13)	-41.80***	(13.20)
Constant	515.3***	(50.20)	573.0***	(51.16)	
Domestic	Own age	0.0157	(0.959)	1.916***	(0.574)
	Wife's secondary school degree	8.349	(11.50)	3.824	(6.382)
	Wife's university degree	9.426	(22.75)	11.40	(11.77)
	Husband's secondary school degree	2.900	(11.47)	17.67***	(6.294)
	Husband's university degree	11.64	(19.14)	8.078	(11.38)
	Younger kids lower than 3 years old	15.16	(13.43)	9.279	(7.656)
	Younger kids between 3 and 5 years old	-2.877	(12.53)	8.427	(7.438)
	Number of children	6.616	(5.946)	-4.470	(4.065)
	Other adults	13.32	(14.60)	-6.331	(7.833)
	Center	-21.62	(14.05)	-29.06***	(7.855)
	South	-25.90**	(10.45)	-16.66***	(6.049)
	Constant	-12.11	(37.45)	-69.94***	(23.74)
Basic care	Own age	0.0429	(0.890)	1.027*	(0.562)
	Wife's secondary school degree	34.69***	(10.23)	13.69**	(6.379)
	Wife's university degree	62.88***	(18.31)	6.922	(11.46)
	Husband's secondary school degree	2.449	(10.27)	10.16	(6.290)
	Husband's university degree	6.797	(15.97)	20.58*	(11.04)
	Younger kids lower than 3 years old	34.63***	(12.06)	48.88***	(7.518)
	Younger kids between 3 and 5 years old	16.62	(11.68)	37.23***	(7.332)
	Number of children	-0.297	(5.823)	2.169	(4.045)
	Other adults	-14.30	(15.00)	-24.12***	(8.114)
	Center	-10.78	(12.71)	-19.97**	(7.868)
	South	-17.83*	(9.754)	-8.018	(5.984)
	Constant	-90.50***	(35.04)	-97.08***	(23.28)

**Table 7 (cont.)**

**Estimation results for husbands - Simultaneous model**

		<b>1988</b>		<b>2002</b>	
		Coeff.	(St. dev.)	Coeff.	(St. dev.)
Quality care	Own age	-2.489**	(1.192)	-0.955*	(0.517)
	Wife's secondary school degree	14.60	(13.72)	10.28*	(5.861)
	Wife's university degree	20.27	(25.85)	15.47	(10.59)
	Husband's secondary school degree	5.371	(13.79)	3.419	(5.769)
	Husband's university degree	39.92*	(21.95)	1.426	(10.38)
	Younger kids lower than 3 years old	65.13***	(16.90)	55.17***	(6.856)
	Younger kids between 3 and 5 years old	57.60***	(16.16)	35.47***	(6.740)
	Number of children	-2.727	(7.993)	-8.107**	(3.738)
	Other adults	-8.758	(20.44)	-23.84***	(7.701)
	Center	6.817	(17.07)	-5.970	(7.097)
	South	-20.71	(13.08)	-7.334	(5.540)
	Constant	-30.96	(45.87)	10.71	(21.00)

significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%



Table 8

## Estimation results for husbands - Sequential model

		1988		2002	
		Coeff.	(St. dev.)	Coeff.	(St. dev.)
Work	Own age	-0.382	(0.715)	-2.446***	(0.658)
	Wife's secondary school degree	-5.660	(15.48)	-1.773	(13.78)
	Wife's university degree	-29.98	(26.23)	9.700	(24.94)
	Husband's secondary school degree	-49.94***	(15.63)	16.46	(13.93)
	Husband's university degree	-26.71	(31.22)	-6.169	(26.17)
	Younger kids lower than 3 years old	-11.24	(16.11)	-7.434	(15.07)
	Younger kids between 3 and 5 years old	-8.260	(15.93)	10.06	(15.37)
	Number of children	-0.712	(7.632)	16.20*	(8.593)
	Other adults	-9.623	(19.22)	-12.67	(16.57)
	Feeling poor			-22.11**	(9.367)
	Popular House	2.157	(3.765)		
	Home ownership	7.123*	(4.203)	3.156	(4.681)
	Holiday house			2.081	(6.431)
	Center	-18.54	(18.94)	31.25*	(16.90)
	South	-42.69***	(14.09)	-40.16***	(13.22)
Constant	510.9***	(31.45)	522.1***	(31.97)	
Domestic	Own age	0.387	(1.589)	0.0463	(0.658)
	Wife's secondary school degree	84.20**	(39.57)	6.579	(8.651)
	Wife's university degree	50.31	(63.80)	-1.799	(15.36)
	Husband's secondary school degree	14.19	(31.14)	15.05*	(7.930)
	Husband's university degree	65.01	(55.31)	11.67	(14.37)
	Younger kids lower than 3 years old	36.12	(33.29)	7.774	(9.368)
	Younger kids between 3 and 5 years old	9.330	(32.26)	12.93	(9.155)
	Number of children	11.33	(15.49)	7.526	(5.471)
	Other adults	24.74	(38.83)	-17.71*	(9.915)
	Center	10.31	(38.99)	-12.11	(10.53)
	South	48.11	(35.65)	-36.56***	(9.721)
	Husband's work time	1.677***	(0.517)	-0.659***	(0.141)
	Wife's work time	0.0530	(0.0498)	0.105***	(0.0380)
Constant	-880.5***	(269.7)	273.8***	(78.23)	
Basic care	Own age	0.0853	(0.961)	-0.206	(0.666)
	Wife's secondary school degree	42.69**	(19.40)	13.23*	(7.991)
	Wife's university degree	64.43***	(24.53)	-4.569	(13.30)
	Husband's secondary school degree	3.117	(12.73)	8.087	(6.853)
	Husband's university degree	11.49	(23.11)	22.55*	(12.16)
	Younger kids lower than 3 years old	47.08***	(14.81)	49.46***	(8.323)
	Younger kids between 3 and 5 years old	21.30	(13.98)	40.22***	(7.985)
	Number of children	5.917	(6.985)	9.880*	(5.043)
	Other adults	-14.79	(17.48)	-31.28***	(8.973)
	Center	-2.569	(16.43)	-10.79	(9.509)
	South	13.99	(17.53)	-17.84*	(9.486)
	Husband's work time	0.374	(0.314)	-0.384**	(0.159)
	Wife's work time	0.170***	(0.0542)	0.0914**	(0.0449)
Constant	-318.1*	(165.0)	103.4	(86.55)	

**Table 8 (cont.)**

**Estimation results for husbands- Sequential model**

		<b>1988</b>		<b>2002</b>	
		Coeff.	(St. dev.)	Coeff.	(St. dev.)
Quality care	Own age	-2.400**	(1.217)	-2.655***	(0.847)
	Wife's secondary school degree	15.92	(29.52)	23.82**	(11.87)
	Wife's university degree	24.99	(31.57)	8.210	(21.02)
	Husband's secondary school degree	5.649	(14.50)	2.516	(10.97)
	Husband's university degree	38.50	(28.80)	10.60	(19.90)
	Younger kids lower than 3 years old	61.15***	(20.99)	56.83***	(12.91)
	Younger kids between 3 and 5 years old	56.01***	(17.16)	47.88***	(12.78)
	Number of children	-5.885	(8.979)	4.449	(7.735)
	Other adults	-6.483	(21.21)	-37.82***	(14.05)
	Center	5.436	(19.71)	15.01	(14.84)
	South	-34.45	(27.47)	-40.26***	(13.90)
	Husband's work time	-0.135	(0.533)	-0.850***	(0.223)
	Wife's work time	-0.0750	(0.0807)	0.0157	(0.0391)
	Own basic care time	-0.281	(0.360)	-0.331**	(0.134)
	Constant	51.69	(282.8)	450.2***	(120.4)

significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

**Table 9**

**Correlation matrix – Simultaneous model**

		1988							
		Wife's work	Husband's work	Wife's domestic	Husband's domestic	Wife's basic care	Husband's basic care	Wife's quality care	Husband's quality care
Wife's work		376.37***	0.079*	-0.758***	0.070	-0.304***	0.119*	-0.117**	0.135**
Husband's work		157.67***	0.081**	0.048	-0.446***	0.048	-0.257***	0.008	-0.173***
Wife's domestic		147.91***	0.074*	0.074*	-0.113***	0.074*	-0.115**	-0.041	-0.144**
Husband's domestic		106.64***	-0.003	-0.003	106.64***	-0.003	0.274***	0.034	0.041
Wife's basic care		68.79***	68.79***	68.79***	68.79***	68.79***	0.189***	0.192***	0.101*
Husband's basic care		75.77***	75.77***	75.77***	75.77***	75.77***	0.221***	0.221***	0.231***
Wife's quality care		101.65***	101.65***	101.65***	101.65***	101.65***	101.65***	101.65***	0.422***
Husband's quality care		104.30***	104.30***	104.30***	104.30***	104.30***	104.30***	104.30***	104.30***
		2002							
		Wife's work	Husband's work	Wife's domestic	Husband's domestic	Wife's basic care	Husband's basic care	Wife's quality care	Husband's quality care
Wife's work		346.05***	0.109***	-0.734***	0.143***	-0.274***	0.226***	-0.221***	-0.033
Husband's work		206.54***	0.049*	0.100***	-0.434***	0.100***	-0.249***	0.085***	-0.222***
Wife's domestic		137.55***	0.095***	0.095***	-0.111***	0.095***	-0.224***	0.078**	-0.005
Husband's domestic		87.23***	87.23***	87.23***	87.23***	87.23***	0.265***	-0.017	0.156***
Wife's basic care		80.98***	80.98***	80.98***	80.98***	80.98***	0.116***	0.138***	0.113***
Husband's basic care		80.61***	80.61***	80.61***	80.61***	80.61***	0.116***	-0.012	0.169***
Wife's quality care		76.17***	76.17***	76.17***	76.17***	76.17***	76.17***	76.17***	0.202***
Husband's quality care		74.51***	74.51***	74.51***	74.51***	74.51***	74.51***	74.51***	74.51***

Note: Standard deviations on main diagonal. correlation coefficients off-diagonal.  
 \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

**Table 10**

**Correlation matrix – Sequential model**

		1988							
		Wife's work	Husband's work	Wife's domestic	Husband's domestic	Wife's basic care	Husband's basic care	Wife's quality care	Husband's quality care
Wife's work		400.61***	0.066	0.196**	-0.053	-0.671**	-0.300**	-0.163	0.303*
Husband's work		157.93***		0.816***	-0.959***	0.428	-0.717**	0.884**	0.019
Wife's domestic		112.85***			-0.776*	0.216	-0.604**	0.636**	-0.000
Husband's domestic		106.06***				-0.340	0.713**	-0.835**	-0.029
Wife's basic care		79.58***					-0.079	0.681	-0.037
Husband's basic care								-0.506	0.105
Wife's quality care									162.73***
Husband's quality care									
									113.53***
		2002							
		Wife's work	Husband's work	Wife's domestic	Husband's domestic	Wife's basic care	Husband's basic care	Wife's quality care	Husband's quality care
Wife's work		374.90***	0.136***	-0.189***	0.052	0.344***	0.095	0.363***	0.109*
Husband's work		207.58***		0.877***	0.743***	0.584***	0.561*	0.673***	0.888***
Wife's domestic		240.63***			0.670***	0.398**	0.463**	0.461***	0.773***
Husband's domestic		113.47***				0.447***	0.482**	0.523***	0.673***
Wife's basic care		98.73***					0.476***	0.831***	0.573***
Husband's basic care								0.498***	0.613**
Wife's quality care									145.47***
Husband's quality care									
									158.90***

Note: Standard deviations on main diagonal. correlation coefficients off-diagonal  
 \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%