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Allocation of Time to Work, Housework, and Childcare between Couples: An Empirical Analysis Using the Spanish Time Use Survey

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Abstract

The paper analyses how Spanish people use their time differently and how this influences their lives. The data set of the 2002-2003 Spanish Time Use Survey (STUS) is used in the paper. This data set provides detailed accounts of Spanish people's daily activities. We focus on how a couple allocate their time between paid work, housework and childcare and how the time allocation between paid work, housework and childcare changes under different circumstances. We find that education levels, number of children, ages of the youngest children and characteristics of spouses all influence the time allocation of Spanish couples who work full-time. We also find that people may tend to marry spouses who share their same time allocation preferences. We also observe that Spanish full-time working wives play a very important role in both the labour force and daily family lives. They work full-time in a modern way and also carry out their family responsibilities in the traditional way.

Keywords: time allocation, paid work time, housework time, childcare time

Content

1. Introduction

Time allocation between couples is an interesting issue given that an understanding of how and why couples allocate their time between different activities can reveal much about the differences in their preferences and hence, in their decisions. And this is a crucial point in understanding social, economic and cultural differences across countries.

Furthermore, understanding time allocation between couples in Spain is particularly important if we take into account that the female labour force participation rate has increased greatly in the last few decades: in 1976 it was less than 30% and in 2010 it stands at 51%. This change has modified time allocation by women and hence within couples, which has contributed to a major change in the Spanish lifestyle. In addition, Spain's time allocation to paid work and housework is markedly different from that of other OECD countries. Table 1 below shows that the figure for time devoted to paid work by Spanish men is the highest of any OECD country. The figure for the time that they devote to housework is the second lowest in any OECD country. By contrast, the time devoted to paid work by women is the fourth lowest and the time spent on housework is the second highest in those countries.

Our aim in this paper is to analyze how husbands and wives allocate their time to paid work, housework and children, if any. We estimate the main determinants that affect their choices of time allocation between these activities. We set out to learn the differences in time allocation and its determinants between couples with and without children, and how time allocation changes as children grow up.

Many research papers have examined the issue of time allocation:

- Hamermesh (2001) suggests that American couples prefer to arrange their

work time in a way that enables leisure time to be spent together. And couples whose earnings are higher arrange it so that they can enjoy more joint leisure all else being equal.

- Jenkins and Osberg (2003) develop a time use model, analyze the synchronisation of working hours and estimate social activities using British Household Panel Survey (BHPS) data. They find that social activities depend on others such as the leisure time available to the companion.
- Gronau and Hamermesh (2006) compare U.S. and Israeli data on the relative intensity of expenditure on goods- and time-intensive activities. Their conclusion is that leisure is a time-intensive activity, while health, travel and lodging are goods-intensive activities. The authors also try to demonstrate that goods-intensive activities vary according to education and age. The accounting for this method has broad application areas in the economic world.
- Fernandez and Sevilla-Sanz (2006) find that when women's relative earnings increase their relative share of housework time in Spain does not decrease as expected. In other words, women's relative share of housework decreases when their earnings increase, but if they earn more than their husbands they still have to do more housework than their husbands. The finding implies that one of the key points in time allocation of housework within couples may be social norms.
- Cardoso et al. (2008) use the data set of France, Italy and Germany to analyze the relationship of time allocation and its influence between parents and children. They find out that parents' time allocation and their behaviour affect their children directly. Parents' preferences and net work are transmitted to their children because of the status of parents as role models.
- A very important paper related to ours is that of Bloemen et al. (2009). They analyze the time allocation by Italian couples on weekdays and at weekends. They find that more highly educated couples spend more time with their children. Women's time allocation does not have much influence in terms of

their husband's characteristics. They also check the residual correlation and find that childcare time is complementary and housework time is substitutable.

- Finally, Gimenez-Nadal and Sevilla-Sanz (2010) analyze data for many Western European countries and find that working mothers enjoy much less leisure than working fathers and singles, which leads to less satisfaction about working mothers' free time.

Our main results are the following: First, education level, number of children, the age of the youngest children and spouse characteristics have significant effects on the time allocation of Spanish couples in full-time work. Second, people tend to marry spouses who share their preference as regards time allocation. Third, Spanish wives who work full time play a very important role in both the labour force and daily family lives. They work full time in the modern way and also carry out their family responsibilities in the traditional way.

The rest of the paper is organized as follows: Section 2 summarizes the theory of time allocation. Section 3 describes the data. Section 4 presents the empirical contribution, which follows a very similar approach to that of Bloemen et al. (2009), who estimate time allocation for Italian couples under different circumstances.

2. The Theory of Time Allocation

Becker pioneered the introduction of time allocation into the household utility-maximization problem. In 1965 he published a paper titled "A Theory of the Allocation of Time", in which he introduced many important notions, such as time of work, productivity of time and substitution between time and goods.

Becker introduces the idea of time of activities through the most outstanding social cost -- foregone earnings. Becker introduces the concept of full cost of activities as

the sum of market price and time spent. Time spent is calculated as the value foregone because of the time used up. Thus, the cost of time is successfully introduced into non-work activities. Becker also introduces non-working time into the household utility maximization function and resource constraints. He assumes that households combine time and market goods to produce commodities as producers. Working activities, such as time of work, can be calculated more easily than non-working activities. Becker also gives a proper explanation of why men's time of work decreases less: because of increased income. The phenomenon can be explained by a negative relationship between income and work time. But for women, it goes in the opposite direction because of a strong substitution effect.

Becker further points out that if the productivity of consumption time increases, commodity prices may fall and hence work time would also fall. But if both productivity of working time and productivity of consumption time increase at the same rate, the marginal foregone earnings will not change, nor will the relative price.

Becker also looks at the potential substitution between time and goods. If the cost of time increases, the amount of time will decrease but the amount of goods will increase. So an increase in earnings causes a deviation from not only earnings-intensive commodities but also time-intensive commodities towards goods-intensive commodities. The substitution towards goods increases the cost of time, and the increased cost of time will result in more expensive goods.

He further finds that if earnings increase the quality of goods increase because of (i) an increase in income and (ii) a substitution of goods for time. If income increases but earnings do not – the increase comes from property income - then there would be no such effect on the quality of goods.

3. Data Description

3.1. The Spanish Time Use Survey

In this paper we use the Spanish Time Use Survey (henceforth STUS). This is part of Eurostat's Harmonized European Time Use Survey (HETUS). The STUS contains information from a sample of 20,603 households. More importantly for our purposes, it contains time allocation data on a wide variety of activities by 46,774 individuals (detailed information is provided below). The survey period is one full year, running from 7 October 2002 to 5 October 2003.

The dataset provides a variety of standard individual information, such as education level and age, along with labour market information such as labor force participation, type of work (occupation and industry, part-time or full-time work, type of contract) and net monthly salary (We have eight slots whose units in euros are 0 to 250; 251 to 750; 750 to 1125; 1125 to 1375; 1375 to 1750; 1750 to 2250; 2250 to 2750; 2750 to 3250). The most novel part of the dataset is the diary information, which records all activities in a day broken down into 10-minute slots. The diary day in STUS begins at 06:00 and ends at 05:59 on the following morning, which provides useful information on a full day. Detailed activities are recorded in each 10-minute slot. That means that there are 144 time slots in a day (10*6*24=144). The most important slots are the time from 6:00 to 00:00: from 00:00 to 6:00 almost everybody reports that they are sleeping, so these times are not included in the analysis. It is also worth mentioning that the one-day-diary survey includes both weekdays and weekends. Given that our interest is to understand time allocation between paid work and other family activities, we only consider information from weekday diaries.

The most important categories include time devoted to personal care, to study, to work, to housework, to childcare, to taking care of other dependent members of the

family, to transportation and to different types of leisure (going to the cinema, playing sports, etc).

Table 2 displays the main characteristics of men and women in the general sample. This table reveals some interesting issues: First, there are more women than men (7637 and 6576 observations respectively). The average age is 40 for men and 42 for women. 69% of the people in the sample have 2 children, 7% have 1 child and 20% have none. Men are on average more highly educated than women, primarily due to a higher proportion with secondary education.

As regards labor market characteristics, men spend more than twice as long as women on paid work, at 418 minutes and 192 minutes per day respectively. This is because the proportion of working men (66%) is much higher than the proportion of working women (34%). This is the main reason for the huge difference in paid work time between men and women in the general sample. A look at how long they spend on housework shows that women spend 307 minutes whereas men spend only 73 minutes. Women also spend around three times as long on childcare than men (37 minutes and just 13 respectively). A look at net monthly wages shows that men earn 32% more than women (1151.18 euros and 868.94 euros respectively)[1].

After labor market characteristics above, the next point of interest is potential work experience, defined as Age-Education-6. With this definition, we implicitly assume that individuals enter the job market immediately after their education period finishes and do not leave it. The years of potential work experience for men and women are similar at 26 and 27 respectively.

The aim of the paper is to look at how wives and husbands allocate their time between

[1] One detail that must be mentioned here is that there are no wage diaries for those not in paid work. We assign zero wages to these people in order to obtain proper average wages.

work, housework and childcare, and to examine the determinants of their time allocation, so our empirical exercise focuses only on couples in full-time work. More specifically, we consider two different samples: the first includes both parents and non-parents and the second includes only couples in full-time work with children.

3.2. Description of the Samples of Couples in Full-time Work

The original qualified dataset contains 21,703 observations for men and 25,071 for women. However, given that we want to focus on full-time couples, we drop all those who do not work full-time, do not live with a partner or fail to report any relevant information such as education, age, net salary, information on children or the diary. Our final sample contains information on 627 men and 627 women who work full-time and live in couples. When we further restrict the sample to those couples with at least one child, it is reduced to 497 couples in full-time work..

In the general sample of couples in full-time work the average age is 42 for husbands and 40 for wives. A check on education levels shows that wives who work full-time seem to be the most highly educated in comparison with the general sample, so there is evidence of positive sample selection in the sample of wives in full-time work. The proportion of husbands with university degrees is almost double the figure for men in the general sample, i.e. husbands who hold university degrees are more likely to work full-time than those who do not. The same goes for wives.

A comparison of time devoted to paid work and housework between this sample and the general one reveals that wives spend more than twice as long on paid work than in the general sample and husbands spend 22% longer. Time allocated to housework dramatically decreases for wives, to around two thirds of the time reported in the general sample. This is reasonable, since wives who work full-time have less time for housework than those who do not. The explanation might be that full-time working

wives may do housework more efficiently or they may hire others to help them with housework because of their time limitations. However, husbands spend only a little longer on housework in the sample of couples in full-time work.

Focusing on the sample of couples in full-time work with children, it emerges that the average age of parents does not seem to be younger or older than for couples in full-time work on average, and their education level is also rather similar. The main difference is that among parents the average number of children is two. A comparison of the time allocation of parents and that of the rest of couples in full-time work reveals that husbands who have children work 2 minutes more than those who do not, while wives who have children work around 2 minutes less than those who do not, though the difference is trivial.

Net monthly wages are higher than in the general sample for both husbands and wives, at 1335 euros for husbands and 1098 for wives. The potential working experience is 27 years for husbands and 24 years for wives,i.e. similar to the general sample.

A comparison of times spent on housework by wives and husbands, which is one of the key points in our paper, shows that in the restricted sample of couples in full-time work with children wives spend more than twice as long on housework (other than childcare) as husbands. Wives also spend 1.8 times longer on the childcare part of housework. A comparison across samples shows that in the restricted sample of couples in full-time work with children, husbands do 36% more housework and wives do 30% more housework than in the general sample of couples in full-time work, which suggests that most of the extra housework time comes from childcare.

Table 4 provides more details about the distribution of time between paid work, housework and childcare for both husbands and wives, and the husband’s share of the couple’s total time spent on these activities. The median value represents the typical

behaviour, which provides information that cannot be seen from average values, because average values are driven by those values that are closer to the maximum or minimum, thus the average value may be different from the median value, and the difference comes from those extreme values.

An examination of the sample of couples in full-time work shows that Spanish husbands spend 92 minutes on housework, but the median is only 70 minutes, which is lower than the average value, as ¼ of husbands do no housework. In the restricted sample of couples in full-time work with children there is still one quarter of husbands who do no housework. Husbands' median shares of housework in minutes are around 25% in both samples, which implies that wives take the bulk of responsibilities for housework.

The husbands' share of the total time spent by couples on paid work is 52% to 55% in each quartile, which implies that time allocation within Spanish couples in full-time work is not balanced. Wives spend as much time on paid work as husbands but they also do most of the housework in daily lives. Indeed, the data show that Spanish husbands spend the second least amount of time on housework of husbands in any OECD country.

To provide more details on the time allocated by Spanish couples to paid work, housework and childcare over a full day, we provide figures on how the proportion of time allocated by husbands and wives to different activities varies in different time slots in these two samples. These figures reveal not only how much time husbands and wives spend on to each activity but also when they spend it. The dashed blue curves show the proportion of husbands who are working/doing housework/ engaged in childcare at each time slot and the solid red ones show the same for wives.

Figure 1 depicts the proportion of time spent by the men and women in our sample of couples in full-time work on paid work in each time slot. As can be seen, the proportion is very low before 06:00 but increases significantly from then until the peak hour of 10:00 for both husbands and wives. From 10:00 to 12:00 the proportions hold steady at around 90%., and from 13:00 they start to drop. At 15:00 around 40% of husbands and 35% of wives are working. After the lunch break (usually taken from 14:00 to 16:00 in Spain) the proportions of work for couples increases again. By 17:00 they stand at 60% for husbands but only around 40% for wives. Then the proportions start to fall slowly until 21:00. Figure 3, which represents the restricted sample of couples in full-time work with children, reveals a very similar pattern, which suggests that the allocation of time to paid work among couples with and without children is rather similar.

Figure 2 provides information about the proportion of husbands and wives who do housework in each time slot. As can be seen, the red curve is well above the blue curve, which means that a higher proportion of wives than husbands do housework in all time slots within the day. There are important changes between 07:00 and 09:00 for both spouses. Around 18% of wives but only around 8% of husbands are doing housework at 08:00. There are some couples who do housework during the day, but the proportions are less than 10%. After 18:00 the proportions of housework time for both husbands and wives increase until 21:00, reaching the highest proportions of the whole day. Around 46% of wives but only around 20% of husbands are doing housework at 21:00. The proportions drop from 21:00 to 23:00. The figures show that the proportion of wives who do housework is twice the proportion of husbands, which matches with our tables very well. Similar data can be seen in Figure 4 in the restricted sample of couples in full-time work with children.

Figure 5 shows the proportion of time that men and women (couples in full-time work with children) devote to childcare. The pattern is similar to that of housework (Figure

4) although Figure 4 is flatter and the proportions are somewhat higher. The similarity means that husbands and wives devote time to childcare mostly in the morning from 07:00 to 09:00 and in the afternoon and evening from 16:00 to 23:00. In the morning, the proportions are low (around 7% for wives and 3% for husbands). In the evenings the proportions go up, peaking at around 20:30 at 14% for wives and 8% for husbands. There is a small hump between 16:00 and 00:00 for wives. The first small hump appears at 17:30, when the proportion of childcare for wives increases to 11%, then decreases and subsequently increases again until 21:00, when a second small hump appears. The proportion then decreases again.

4. Determinants of Time Allocation: Empirical Estimation

Our main aim is to find the main factors that determine how time is allocated to paid work, housework and childcare. We thus examine variables which provide basic information in our estimation, and also those that may influence a person's allocation of time in their daily life.

As mentioned above, we analyse couples in full-time work, so it is very important to consider information on spouses to see how a husband or wife's decision regarding time allocation is influenced by their spouse. We therefore include information on spouses to make our estimation more precise. Last but not least, every individual is weighted so that the sample is representative of the Spanish Population.

4.1. Empirical Method

As mentioned above, our aim is to estimate the main determinants of the time allocated to the main activities considered in the paper for our sample of couples in full-time work. Our approach is similar to that of Bloemen et al.(2009). We estimate a simultaneous system which can be summarized as follows:

$$t^{*}_{ijk} = x^{'}_{ik}\beta_{jk} + x^{'}_{is}\beta_{js} + e_{ijk} \qquad j = 1,2,3\ ,\ \ k = m, f\ ,\ \ i = 1,...,N$$

where t represents time allocation, j represents the activities of work, housework and childcare, k is the household member (male or female) in household i, s represents spouse, x_{ik} represents household characteristics, x_{is} represents the spouse's characteristics and e_{ijk} represents unobservables.

For the general sample of couples in full-time work we estimate a simultaneous two-equation system where the dependent variables *(t_{ijk})* are (i) time devoted to paid work; and (ii) time devoted to housework[2]. For the sample of parents we estimate a simultaneous three-equation system where the dependent variables *(t_{ijk})* are (i) time devoted to paid work; (ii) time devoted to housework (excluding childcare); and (iii) time devoted to childcare.

The set of independent variables *(X)*, which are common to the different equations, includes basic individual information such as education and region. We also include some job characteristics, such as occupation and industry. Family information, such as the number of children and their ages (in particular, an indicator of whether the youngest child is aged 0 to 3 and an indicator of whether the youngest child is aged 4 to 6) and an indicator of domestic service. Finally, we also include some information on spouses, such as education, potential work experience, occupation and industry.

4.2. Sample Selection

Given that our samples are of full-time workers, so it is likely to be non-representative

[2] Given that some couples in the general sample of couples in full-time work have children and others do not, housework time includes possible time devoted to children in the household. However, for the sample of parents, we distinguish between housework other than childcare and specific childcare.

of the population as a whole, in which only 66% of men and 34% of women are in full-time work. If we do not correct for this, our estimates are likely to be biased. We thus proceed in a standard two-stage process: in the first stage we estimate the probability of being a full-time worker from the general sample of men and women. The dependent variable is binary: it takes the value of one if the individual is a full-time worker and zero otherwise. Among the independent variables we include age and its square, spouse's age and its square, education, region and number of children. We do not include any independent variable regarding jobs in this first stage because many individuals do not have one. Age and its square are used as the exclusion restriction variable, as they does not seem to affect time devoted to paid work or housework once other controls are included, but it is a very significant determinant for the probability of working full-time[3]. From this first-stage estimation Mill´s ratio is constructed and included as an additional variable in the simultaneous estimation.

4.3. Results of the Estimation

As mentioned above, we focus on the determination of three time allocation variables: paid work, housework and childcare (the latter only for the sample of parents). We run estimations on a simultaneous equation system for both the sample of the couple in full-time work and the sub-sample of couples in full-time work with children. Tables 5 and 6 provide the result of the estimations for these two samples respectively.

For the general sample of couples in full-time work, education level has a significant impact on paid work time for husbands. Husbands who have university degrees spend 5.92 hours per week more on paid work than those who have only primary education. The coefficient is also positive for husbands with secondary education, though it is only marginally significant. Domestic service decreases wives' housework time by

[3] We would have liked to find a better exclusion restriction, but were unable to do so with the information at our disposal.

2.17 hours per week. Husbands' potential work experience has a positive effect on wives' housework time. Lambda, which captures the probability of full-time working, has a positive effect on paid work time for husbands, which means that the more husbands participate in the full-time labor market, the more time they will work.

The number of children has a positive effect on the father's paid work time. Having children with ages from 4 to 6 has a negative effect on the father's paid work time and a positive effect on the father's housework time. Having children aged from 0 to 3 also has a positive effect on the father's housework time. The number of children has a negative effect on the mother's paid work time and a positive effect on her housework time. This is especially so when children's ages are 3 or less: the mother's housework time increases by 6.40 hours per week, but her paid work time does not change. Having children aged from 4 to 6 does not affect the time spent by mothers on paid work or on housework.

Husbands' characteristics do not have any effect on wives' paid work time, and wives' characteristics do not have any effect on husbands' housework time. But a look at how spouses' characteristics influence each other reveals that the decrease in hours of work per week for husbands is much greater than the increase in wives' housework time. The explanation might be that marriage has more effect on men's daily lives than on women's. Once a man marries a woman he might commit somewhat to his family life as compared to when he is single. The level of commitment depends on who he marries. But women may accept the social norm that they will spend time doing housework, and who they marry may have very little effect on this. Our estimation shows that if a man marries a woman who has university degree, he spends 4.12 hours less on paid work every week. If the marginal effect of wives with secondary education on husbands' paid work time is also considered, the total decrease in hours spent on paid work every week for men will be even greater.

In the restricted sample of couples in full-time work with children, holding a university degree also plays an important role in husbands' paid work time. The number of children affects husbands' childcare time, but not the time that they spend on paid work and housework other than childcare. Having children aged under 7 has a negative effect on the father's paid work time and a positive effect on childcare time. Domestic service decreases both husbands' and wives' housework time, and increases wives' paid work time by 2.40 hours per week.

The number of children has a negative impact on wives' paid work time and a positive effect on the time that they spend on housework other than childcare, but no effect on the time devoted to childcare is found. Having children aged under 4 increases wives' childcare time by 6.38 hours per week. Having children aged from 4 to 6 has a negative effect on the time spent by wives on housework other than childcare but a positive effect on childcare time.

Husbands' characteristics have no effect on wives' paid work time in this sample. But husbands' and wives' characteristics affect each other´s time allocations on housework and childcare. For instance, the potential work experience of husbands has a positive effect on the time spent by wives on housework other than childcare but a negative effect on wives' childcare time. However, wives' potential work experience has a negative effect on the time spent by husbands on both paid work and childcare. Among more highly educated couples, if a man marries a woman who has a university degree his paid work time decreases by 4.29 hours per week and his housework time increases by 2.57 hours per week. And if a woman marries a man who has a university degree, her housework time increases by 0.25 hours per week and her childcare time decreases by 1.48 hours per week. Lambda in this case has a negative influence on wives' childcare time, though it is only marginally significant. The negative lambda means that the more wives participate in the labour market, the less time they devote to childcare.

4.4. Correlation of Unobservables Between Spouses

The residual obtained after running the second stage estimation for husbands and wives respectively captures the joint density of errors $(e_{im}' \; e_{if}')'$ in the four equations estimated in the general sample of couples in full-time work and in six equations in the restricted sample of couples in full-time work with children. Once the simultaneous equation system is estimated, the unrestricted variance-covariance 4 by 4 and 6 by 6 matrices of the errors of the simultaneous equation system are obtained in the two samples respectively.

The residual correlation, which is the correlation between unobservable parts, can capture both unobservable individual preferences and omitted variables. For instance, non-labour family income and individual preferences for work and/or leisure may be important determinants for time allocation but they are not observed, so they are in the residual component. Correlation between unobservable parts may contain interesting information, because unobservable parts contain information such as household preferences and the omitted variables. If positive residual correlation is observed it may reveal complementary relationships between unobservable parts and if negative residual correlation is observed it may reveal substitutable relationships between unobservable parts.

The results in panels A and B in Table 7 are quite similar, and indeed the results in panel A are like a reduced version of those in panel B. Once the results in panel B, which has more coefficients and provides more information, are clear then panel A will become as well. Thus, we first discuss the results in panel B and then those in panel A.

In panel B the unobservable part of the non-childcare housework time and childcare time of husbands are negatively correlated with the unobservable “own paid work time”, which implies that those who spend more time on paid time work will spend less on non-childcare housework and on childcare. The same goes for wives.

The unobservables for paid work time of husbands and wives are strongly positively correlated, which might indicate that people prefer to find spouses whose preferences concerning paid work are similar to their own or that the omitted variables in the two equations are positively correlated . The strongly positive correlation also holds for both non-childcare housework time and childcare time, so it might be said that people tend to marry spouses whose preferences concerning the allocation of time in their daily lives are similar. The positive correlation also suggests that time allocated to paid work by wives is complementary to that of husbands. So does the relationship between wives’ non-childcare housework time and husbands’ housework time and between wives’ childcare time and husbands’ childcare time. This result is similar to that found by Bloemen et al.(2009), and might be explained by the theory of assortative mating, which holds that individuals mate with similar individuals (positive assortative mating)

The unobservable part of paid work and childcare times of partners are negatively correlated, and so are paid work time and non-childcare housework, which implies that if husbands tends to pay more attention to work and spend more time on work, wives would also like to focus on work and devote more time to it, which decreases the time that wives spend on housework and childcare. That is, the negative correlation suggests that time allocated by wives to housework is substitutional with husbands’ paid work time, and the time allocated by wives to childcare is also substitutional with husbands’ paid work time. It might indicate that wives do not

commit to their husbands' time allocations. Wives might prefer to choose the same style of time allocation as their husbands, and vice versa.

This result differs from that found by Bloemen et al.(2009), who analyze time allocation by Italian couples. However, the two exercises are not strictly comparable given that their sample contains all couples, including those who do not work. They find that when husbands devote more time to work, wives would like to spend more time on housework and childcare. However, for our couples in full-time work we find that if husbands work more then wives also work more. Thus, when husbands increase their paid work time wives will also increase their paid work time but decrease the time that they allocate to housework and childcare. An explanation for this phenomenon might be that the couple may hire someone else to handle the non-childcare housework and childcare when they are both busy.

For the general sample of couples in full-time work we find the same types of correlation for all kinds of combinations, though the numbers differ somewhat. The only difference with sample 2 is that childcare time is not considered separately but together with non-childcare housework.

5. Conclusions

Our paper analyses how Spanish couples in full-time work allocate their time. We focus on three time uses: paid work, housework and childcare, because through these three uses it is possible to see how people work and live, and what kind of factors may affect their lives. This may help to provide an understanding of some important features of the economic situation and culture of Spain.

We use the Spanish Time Use Survey (henceforth STUS), which contains information from 20,603 households. The survey period is one full year, running from 7 October

2002 to 5 October 2003.More importantly for our purposes, it contains time allocation data on a variety of standard information on activities from 46,774 individuals.

We follow the idea of the paper *A Theory of the Allocation of Time* by Becker and apply the methodology of Bloemen et al (2008). We use a two-stage estimation, where the probability of working full time is estimated in the first stage and in the second stage a simultaneous system of two equations is estimated for a general sample of couples in full time work and a simultaneous system of three equations for the restricted sample of couples in full-time work with children once sample selection is corrected for. We also check the residual correlation at the end.

Our results suggest that education level, number of children, the ages of the youngest children and spouse characteristics influence time allocation in both the general and restricted samples.

From the correlation observed among the unobservable component of each estimation, we find that time allocated to paid work by wives is complementary to that of husbands. The same goes for the relationship between wives' non-childcare housework time and husbands' housework time, and between wives' childcare time and husbands' childcare time. However, the time allocated by wives to housework is substitutional with husbands' paid work time, and the time allocated by wives to childcare is also substitutional with husbands' paid work time.

In conclusion, this paper reveals that Spanish full-time working wives do most of the housework and childcare work even though they also participate in the labour market and spend a similar amount of time on paid work as their husbands. They play an important role in both the labour force and family lives: they work as much as their husbands but also take on the bulk of responsibilities in their family lives. It would be a key point for policy makers to design female-friendly labour market policies and

protect their benefits in the labour market in order to balance their work and family lives.

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Table 1 Paid work and domestic work of Europeans

(Average time allocated to different activities by men and women)

	Paid work men	Housework men	Paid work women	Housework women
Mean minutes per day - activity				
Belgium	187	148	113	250
Bulgaria	212	157	154	301
Estonia	267	153	185	293
Finland	228	136	153	236
France	228	144	137	274
Germany	207	142	116	254
Italy	255	95	112	320
Latvia	300	110	209	236
Lithuania	285	129	211	269
Norway	244	141	158	227
Poland	241	142	135	285
Slovenia	233	158	162	296
Spain	261	97	126	295
Sweden	251	149	174	222
United Kingdom	250	138	144	255

Table 2 General sample (all men and women)

	Men	Women
Age	40.46 (11.63)	41.57 (11.77)
Primary education	0.53 (0.50)	0.57 (0.50)
Secondary education	0.30 (0.46)	0.25 (0.43)
University degree	0.17 (0.38)	0.18 (0.38)
Potential work experience	25.91 (12.31)	27.13 (13.01)
Net monthly wage	1151.18 (574.33)	868.94 (527.09)
Number of kids	1.57 (0.88)	1.55 (0.90)
Proportion having of 0 children	20%	21%
Proportion of having 1 children	7%	8%
Proportion of having 2 children	69%	66%
Minutes of paid work	417.95 (235.46)	192.22 (229.88)
Minutes of housework	73.38 (105.50)	306.84 (193.96)
Minutes of childcare	12.80 (41.18)	37.16 (82.11)
% persons work full time	0.66 (0.47)	0.34 (0.47)
Number of observations	6576	7637

Standard errors are reported in brackets.

Table 3 Full time working couples

	Husbands	Wives
Panel A : General sample of full time couples		
Age	42.32 (8.11)	40.13 (7.97)
Primary education	0.37 (0.48)	0.32 (0.47)
Secondary education	0.35 (0.48)	0.34 (0.47)
University degree	0.28 (0.45)	0.34 (0.47)
Potential work experience	26.65 (8.64)	24.07 (8.66)
Net monthly wage	1334.93 (602.27)	1097.6 (520.01)
Minutes of paid work	510.35 (118.27)	446.96 (105.36)
Minutes of housework	91.59 (87.93)	203.024 (101.60)
Number of observations	627	625
Household characteristic		
Number of children	1.57 (0.83)	
Proportion having of 0 children	21%	
Proportion of having 1 children	1%	
Proportion of having 2 children	77%	
Number of youngest children aged 0-3	0.18 (0.38)	
Number of youngest children aged 4-6	0.15 (0.36)	
Numbers of couples	625	
Panel B The restricted sample of full time couples with children		
Age	43.28 (7.46)	41.13 (7.19)
Primary education	0.39 (0.49)	0.36 (0.48)
Secondary education	0.34 (0.47)	0.33 (0.47)
University degree	0.27 (0.44)	0.31 (0.46)
Potential work experience	27.76 (8.06)	25.33 (7.86)
Net monthly wage	1339.83 (604.19)	1097.672 (527.23)
Minutes of paid work	512.49 (114.39)	444.64 (105.63)
Minutes of housework	97.63 (92.36)	215.18 (100.77)
Minutes of childcare	27.17 (50.72)	49.23 (68.09)
Numbers of observations	494	494
Household characteristic		
Number of children	1.99 (0.20)	
Proportion of having 1 children	2%	
Proportion of having 2 children	97%	
Number of youngest children aged 0-3	0.23 (0.42)	
Number of youngest children aged 4-6	0.19 (0.40)	
Numbers of couples	494	

Table 4 Time distribution of full time working couples

	10%	25%	Median	75%	90%
Panel A General sample of full time couples					
Husband					
Minutes of paid work	400	450	490	560	640
Minutes of housework	0	20	70	150	210
Wives					
Minutes of paid work	360	420	460	500	550
Minutes of housework	70	125	200	265	320
Shares of husbands time on total couple's time in the activity					
Minutes of paid work	0.526	0.517	0.516	0.528	0.538
Minutes of housework	0	0.138	0.259	0.361	0.396
Panel B The restricted sample of full time couples with children					
Husband					
Minutes of paid work	400	440	500	580	660
Minutes of housework	0	20	70	160	220
Minutes of childcare	0	0	0	40	100
Wives					
Minutes of paid work	340	400	450	490	550
Minutes of housework	80	150	220	280	340
Minutes of childcare	0	0	10	90	150
Shares of husbands time on total couple's time in the activity					
Minutes of paid work	0.541	0.524	0.526	0.542	0.545
Minutes of housework	0	0.118	0.241	0.364	0.393
Minutes of childcare	0	0	0	0.308	0.4

Table 5 Results Estimation in the general sample of full time couples

	Husband		Wife	
	Coefficient	Standard Error	Coefficient	Standard Error
Paid work time (hours per week)				
Number of children	1.03**	0.53	-1.12**	0.51
Indicator of youngest children aged 0 to 3	-1.28	1.11	0.004	1.64
Indicator of youngest children aged 4 to 6	-2.91**	1.11	0.23	1.32
Secondary education	3.02*	1.65	-1.73	2.49
University degree	5.92**	2.21	-0.91	4.48
Spouse's secondary education	-2.14*	1.27	-0.72	0.95
Spouse's university degree	-4.12**	1.71	0.42	1.18
Spouse's potential work experience	-0.18**	0.08	0.02	0.09
Domestic service	0.68	1.00	1.45	0.91
lambda	20.81**	8.82	-1.16	5.61
constant	40.83**	5.95	41.87**	8.94
Housework time (hours per week)				
Number of children	0.61	0.37	2.23**	0.48
Indicator of youngest children aged 0 to 3	3.78**	0.79	6.40**	1.55
Indicator of youngest children aged 4 to 6	2.84**	0.79	1.90	1.25
Secondary Education	-0.06	1.17	-2.61	2.36
University Degree	-0.47	1.57	-6.28	4.24
Spouse's secondary Education	0.38	0.90	0.90	0.90
Spouse's university degree	0.78	1.21	-0.28	1.12
Spouse's Potential work experience	0.002	0.06	0.19**	0.09
Domestic service	-1.08	0.71	-2.17**	0.86
lambda	-12.27*	6.26	-8.39	5.31
constant	5.52	4.22	16.07*	8.47

* Significance at the 10% statistical significance level

** Significance at the 5% statistical significance level

Table 6 Results of Estimation in the restricted sample of full time couples with children

	Husband		Wife	
	Coefficient	Standard Error	Coefficient	Standard Error
Paid work time (hours per week)				
Number of children	-0.35	2.02	-6.22**	1.95
Indicator of youngest children aged 0 to 3	-2.76**	1.15	-1.38	1.45
Indicator of youngest children aged 4 to 6	-3.73**	1.09	-0.94	1.20
Secondary education	2.10	1.71	0.49	2.36
University degree	4.83**	2.18	3.26	4.40
Spouse's secondary education	-1.75	1.34	-1.40	1.06
Spouse's university degree	-4.29**	1.78	-0.90	1.34
Spouse's potential work experience	-0.27**	0.10	-0.07	0.08
Domestic service	1.31	1.02	2.40**	0.97
lambda	12.44	8.44	5.48	5.37
constant	51.52**	7.08	45.77**	9.80
Housework time (hours per week)				
Number of children	-0.39	1.40	3.46**	1.68
Indicator of youngest children aged 0 to 3	1.09	0.80	-0.41	1.25
Indicator of youngest children aged 4 to 6	1.13	0.76	-2.56**	1.03
Secondary education	0.13	1.19	-2.69	2.03
University degree	-1.38	1.52	-5.35	3.78
Spouse's secondary education	1.14	0.93	1.46	0.92
Spouse's university degree	2.57**	1.24	0.88	1.15
Spouse's potential work experience	0.12*	0.07	0.25**	0.07
Domestic service	-1.54**	0.72	-1.74**	0.83
lambda	-6.06	5.87	-6.15	4.62
constant	3.41	4.92	6.50	8.43
Childcare time (hours per week)				
Number of children	1.50*	0.81	1.11	0.97
Indicator of youngest children aged 0 to 3	3.05**	0.46	6.38**	0.72
Indicator of youngest children aged 4 to 6	1.78**	0.44	4.29**	0.59
Secondary education	0.18	0.69	-0.09	1.17
University degree	0.67	0.87	-1.20	2.18
Spouse's secondary education	-0.45	0.53	-0.44	0.53
Spouse's university degree	-1.11	0.71	-1.48**	0.66
Spouse's potential work experience	-0.10**	0.04	-0.12**	0.04
Domestic service	0.71*	0.41	-0.30	0.48
lambda	-2.29	3.38	-4.50*	2.66
constant	-1.22	2.83	10.52**	4.85

* Significance at the 10% statistical significance level

** Significance at the 5% statistical significance level

Table 7 Correlation matrix errors for the model:
standard deviations on main diagonal, correlation coefficients off-diagonal

Panel A: General sample of full time couples				
	Paid Work Husband	Housework Husband	Paid Work Wife	Housework Wife
Paid work Husband	1			
Housework Husband	-0.4454**	1		
Paid Work Wife	0.9143**	-0.4100**	1	
Housework Wife	-0.3969**	0.8943**	-0.4679**	1

Panel B: The restricted sample of full time couples with children						
	Paid Work Husband	Housework Husband	Childcare Husband	Paid Work Wife	Housework Wife	Childcare Wife
Paid work Husband	1					
Housework Husband	-0.3971**	1				
Childcare Husband	-0.2437**	0.0076	1			
Paid Work Wife	0.8969**	-0.3616**	-0.2264**	1		
Housework Wife	-0.3452**	0.8508**	0.0545	-0.4066**	1	
Childcare Wife	-0.2134**	0.0576	0.8117**	-0.2611**	-0.0089	1

* Significance at the 10% statistical significance level

** Significance at the 5% statistical significance level

Figure 1: Proportion of men/women who work

General sample of full time couples

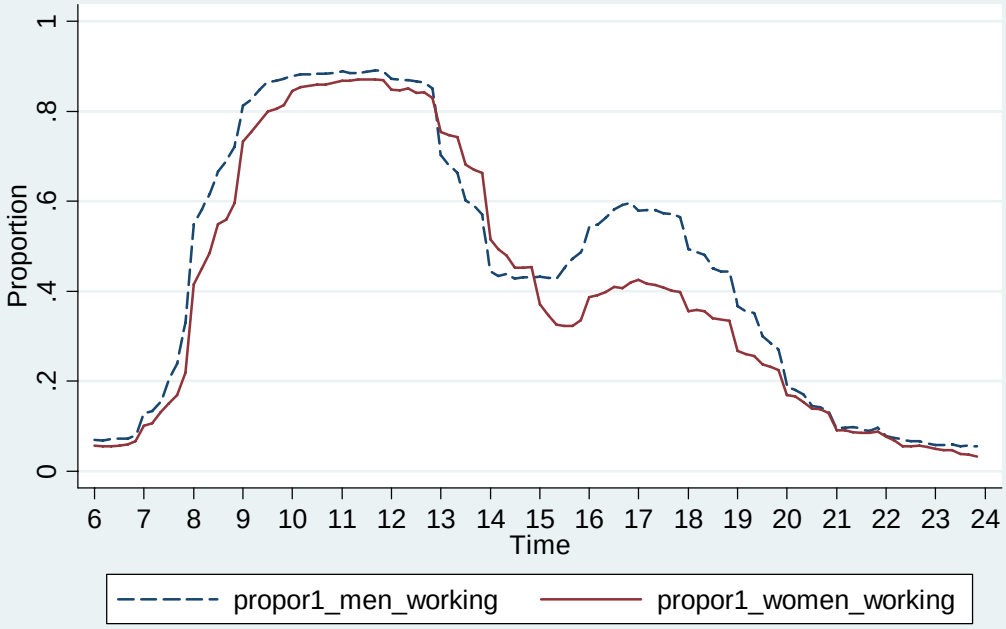
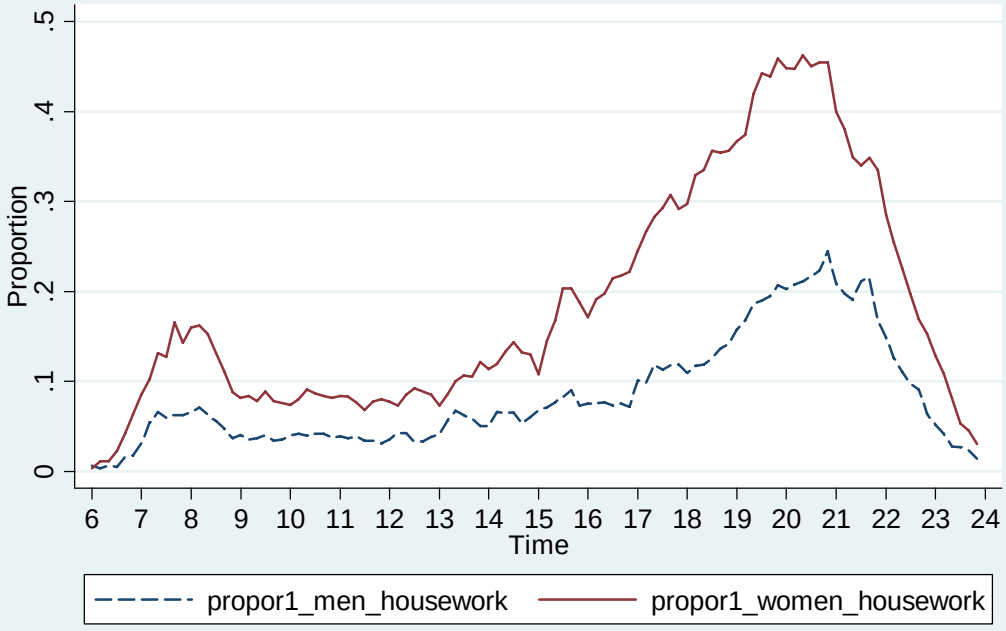


Figure 2: proportion of men/women who housework

General sample of full time couples



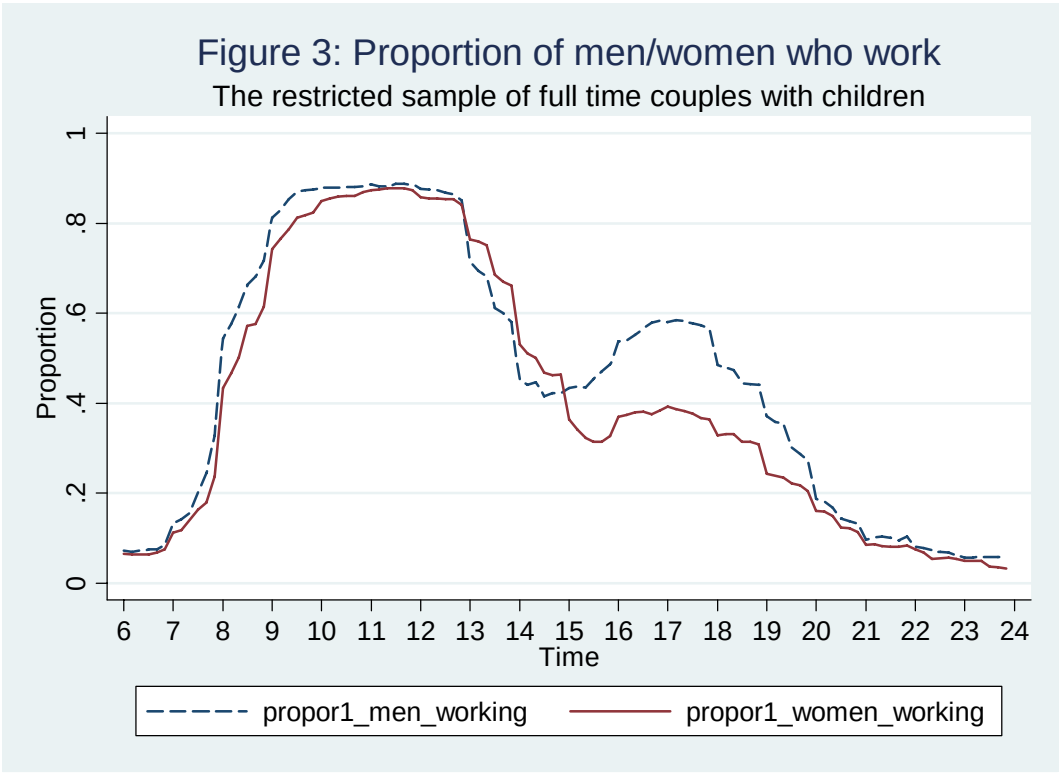


Figure 3: Proportion of men/women who work
The restricted sample of full time couples with children
Proportion
0
.2
.4
.6
.8
1
6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Time
propor1_men_working
propor1_women_working

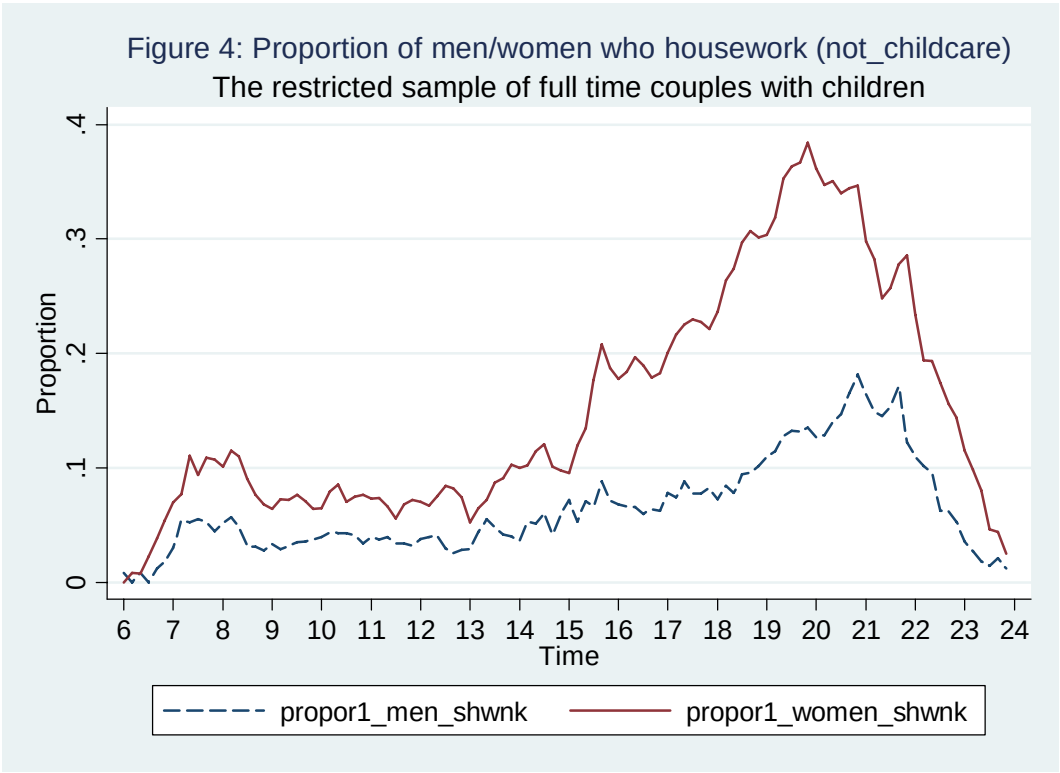


Figure 4: Proportion of men/women who housework (not_childcare)
The restricted sample of full time couples with children
Proportion
0
.1
.2
.3
.4
6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Time
propor1_men_shwnk
propor1_women_shwnk

Figure 5: Proportion of men/women who housework (childcare)

The restricted sample of full time couples with children