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# Regional unemployment, gender, and time allocation of the unemployed

**J. Ignacio Gimenez-Nadal · Jose Alberto Molina**

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**Abstract** This paper analyzes the relationship between time allocation decisions of the unemployed, gender, and regional unemployment rates. Using two cross-sections from the 2002–2003 and 2009–2010 Spanish Time Use Surveys, we find that higher regional unemployment rates are associated with increases in the time devoted to study by men. Regional unemployment rates are also associated with more time devoted to household production, particularly for unemployed men and women living in a couple, and to less time devoted to leisure, particularly for unemployed men with a working partner and unemployed women not living in a couple. We interpret our findings as evidence favoring consumption smoothing. Higher regional unemployment rates imply a lower availability of jobs for the unemployed, it reduces individual expectations of finding a job, and thus households may try to increase their time spent on household production to reduce market expenditures and thus maintain their consumption constant. Increases in the time devoted to household production during business cycles need to be considered in the analysis of the wellbeing of the unemployed. Consumption smoothing may imply increased wellbeing, but more time devoted to household production is associated with lower experienced utility of individuals throughout the day.

**Keywords** Unemployment · Time use · Regional unemployment rates · Gender

**JEL Codes** D13 · J16 · J22

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J. I. Gimenez-Nadal (✉) · J. A. Molina
Department of Economic Analysis, Faculty of Economics, University of Zaragoza, C/Gran Via 2, 3rd floor, 50005 Zaragoza, Spain
e-mail: ngimenez@unizar.es

## 1 Introduction

This paper examines whether others' unemployment has any effect on the time allocation decisions of the unemployed, and analyses the gender differences associated with these effects. Aguiar et al. (2012) argue that the home production sector is a viable margin of substitution during business cycles, allowing some degree of substitutability between market consumption and leisure. They find that roughly 30 % of the market work hours foregone due to the business cycle are reallocated to non-market production, suggesting small falls in consumption (and, implicitly, wellbeing) despite the decrease in expenditure. This reallocation of work to home production may have negative implications for wellbeing, as home production activities are associated with lower enjoyment levels than leisure or civic/voluntary activities (Kahneman et al. 2004; Kahneman and Krueger 2006; Krueger 2007). By showing the effects of aggregate unemployment rates on the time use of the unemployed, our paper sheds light on the welfare implications of the business cycle for unemployed individuals.

Prior research on the macroeconomics of happiness has shown that individual well-being is related to aggregate macroeconomic variables, such as the unemployment rate, inflation, and interest rates. In particular, aggregate unemployment affects utility levels, as other studies have shown that higher levels of unemployment generally lead to lower levels of happiness in a population (Frey and Stutzer 2000; Di Tella et al. 2001; Graham and Pettinato 2001; Di Tella et al. 2003; Shields and Wheatley Price 2005). For instance, Di Tella et al. (2001) show that unemployment rates affect well-being negatively, arguing that these negative effects arise from an individual's own perception of job insecurity: greater unemployment reduces the chances of finding work. In the case of employed individuals, Clark (2003), Luechinger et al. (2010), and Clark et al. (2010) find that regional unemployment reduces the well-being of the employed because they suffer from reduced job security (Luechinger et al. 2010). In contrast, Clark (2003) also finds that the unemployed report higher levels of well-being in regions with higher unemployment, showing that the unemployed may benefit from a "social-norm effect": as more people become unemployed, one's own unemployment represents a smaller deviation from the social norm, and thus the effect of unemployment on individual well-being is lower.

We contribute to the literature by testing two theories to ascertain the channels through which others' unemployment affects the time allocation decisions of the unemployed. If, according to Di Tella et al. (2001), higher unemployment rates imply that unemployed individuals may be more discouraged, we would then expect unemployed individuals to devote more time to home production activities to compensate for the loss in expenditure power (and thus smooth consumption), and more time to study as a way of increasing their chances of finding a job. If regional unemployment rates affect the time allocation decisions of the unemployed through a "social-norm effect", we would expect to find a positive relationship between regional unemployment rates and leisure of the unemployed, as there are more individuals available to spend time in leisure activities (Jenkins and Osberg 2005).

We use a sample of unemployed individuals from two cross-sections of the 2002–2003 and 2009–2010 Spanish Time Use Survey (STUS) to analyze the

relationship between regional unemployment rates and time allocation decisions of the unemployed.[1] Our identification strategy for the effect of other's unemployment on the uses of time of the unemployed comes from the time and cross-region variations of the data. We have two cross-sections and we exploit the quarterly regional unemployment rates that provide 8 observations for each of the 17 regions of Spain. The STUS provides information on individual time use, based on diary questionnaires in which individuals report their activities throughout the 24 h of the day. The advantage of time-use surveys over stylized-questions, such as those included in the European Community Household Panel, the British Household Panel Survey, and the German Socioeconomic Panel (where respondents are asked how much time they have spent, for example, in the previous week, or normally spend each week, on market work or housework), is that diary-based estimates of time use are more reliable and accurate than estimates derived from direct questions (Juster and Stafford 1985; Robinson and Godbey 1997; Bianchi et al. 2000; Bonke 2005; Yee-Kan 2008).

We regress the time devoted to study, job search, household production, personal care, and leisure, on unemployment rates of the different Spanish regions (Comunidades Autonomas). We carry out the analysis separately by gender, since it is well- established in the literature that time use patterns of men and women are different. Women spend more time in household production and childcare, men devote more time to market work and leisure (Kalenkoski et al. 2005, 2009; Aguiar and Hurst 2007; Guryan et al. 2008; Connelly and Kimmel 2009; Gimenez-Nadal and Sevilla 2012). This pattern is especially the case in Mediterranean countries, such as Spain, with entrenched traditional gender norms regarding the household distribution of household labor (Sevilla-Sanz 2010; Gimenez-Nadal et al. 2012) and with an inflexible labor market where part-time employment is very rare (Fernández-Kranz and Rodríguez-Planas 2011).

We find that higher unemployment rates in a region are associated with increases in the time devoted to study by men, and to household production by women, with associated decreases in the time devoted to personal care by men and leisure by women. We find no effects on the time devoted to job search. Specifically, a one-percentage-point increase in the regional unemployment rate is associated with increases of 0.05 h per day of study for men and of household production for women, while the same increase is associated with decreases of 0.07 and 0.10 h per day of personal care for men and of leisure for women. The magnitude of the above effects is economically significant. For example, comparing men living in La Rioja and Canarias, the two Spanish regions with the respective lowest and highest male unemployment rates during the analyzed years, unemployed men in Canarias (30.02 % male unemployment) devote 1.52 more hours per day to study and 1.88 fewer hours per day to personal care, compared to unemployed men in La Rioja (2.81 % male unemployment).

We also find differential effects of regional unemployment rates depending on whether individuals live in couple or not, and whether the partner is employed or not. We find that the association between the time devoted to household production

[1] In the same way that Luechinger et al. (2010) select working individuals to analyze the sensitivity of subjective well-being to fluctuations in unemployment rates, we focus on unemployed individuals to study the relationship between time allocation decisions and regional unemployment rates of the unemployed.

and regional unemployment rates is greater for unemployed men and women living in a couple, compared to their single counterparts. We interpret this result as evidence that higher regional unemployment rates decrease individual expectations of finding a job. In this situation, households try to increase their time spent on household production, allowing them to reduce the market expenditures needed to maintain their consumption. We also fail to see any association between regional unemployment rates on leisure for unemployed men, and the association for women's leisure time is negative. These findings indicates that synchronization of activities is not the main channel through which regional unemployment rates affect the time allocation decisions of individuals and that the "social-norm effect" is not at the root of the observed effect of regional unemployment rates and time allocation decisions of the unemployed. Our results possibly indicate that other's unemployment also has a negative effect on the well-being of the unemployed, since prior studies have found that personal care and leisure rank among the most enjoyable activities, while household production and study rank among the least enjoyable activities (Kahneman et al. 2004; Kahneman and Krueger 2006; Krueger 2007, Knabe et al. 2010).

The rest of the paper is organized as follows. Section 2 presents the data and variables. Section 3 describes the empirical strategy. Section 4 presents our main results, and Sect. 5 sets out our main conclusions.

## 2 Data: the spanish time use survey 2002–2003 and 2009–2010

The data used for the empirical analysis come from the Multinational Time Use Study (MTUS) version of the 2002–03 and the 2009–2010 STUS.[2] The MTUS is an ex-post harmonized cross-time, cross-national, comparative time use database, coordinated by the Centre for Time Use Research at the University of Oxford. It is constructed from national randomly-sampled time-diary studies, with a common series of background variables, and total time spent in 69 activities (Gershuny 2009). The STUS consists of representative samples of Spanish households, and contains information on daily activities, gathered by means of the completion of a personal diary and household and individual questionnaires. The sample is evenly distributed over the year and the week, in order to accurately represent time-use patterns for all days of the year. The survey includes an activities diary, which all members of the household aged 10 and older complete on a selected day. The diary time frame is twenty-four consecutive hours (from 6:00 a.m. until 6:00 a.m. the following day) and is divided into ten-minute intervals. In each of the intervals, the respondent records a main activity.[3]

The use of the STUS places certain limitations on our analysis, compared to other time use studies, such as those used by Burda and Hamermesh (2010) and Aguiar et al. (2012). For instance, Burda and Hamermesh (2010) use data from the

[2] See Online Appendix A for a description of the sample used in the analysis.

[3] A full description of activities can be found in the Spanish Statistical Office, http://www.ine.es/prodyser/micro_emptiem.htm.

American Time Use Survey (ATUS), for the period 2003–2006, to analyze how long-term and cyclical unemployment rates affect the categories by individuals. Aguiar et al. (2012) use the ATUS, for the period 2003–2010, for a comprehensive analysis of time use prior to and during the recent U.S. recession, allowing the authors to document how the allocation of time evolves over the business cycle. The fact that the two STUS surveys are cross-section datasets composed of time use diaries of individuals, covering one year, means that we do not have sufficient time variation to identify how the allocation of time evolves over the business cycle, or to differentiate between the types of unemployment rate. Thus, we have regional and time (quarters) variations that only allow us to identify how differences in unemployment rates between Spanish regions affect the time allocation decisions of unemployed individuals, but not to identify the effects of the business cycle on such allocation decisions. Additionally, there may be other factors at the regional level that could drive the results, and we would be able to avoid such effects if we had sufficient time variation in the data. Rather, we use other regional variables to net out the effect of regional unemployment rates from the effects of other regional factors.

We define the following time use activities, measured in hours per day: *Study*, *Job search*, *Household production*, *Personal care* and *Leisure*.[4] *Study* refers to time spent in education, and *Job Search* refers to the time spent in job seeking. *Household production* refers to activities at home, using individual own time and some purchased goods, and have the common characteristic that another individual could be paid to perform them, while not themselves being paid (Burda et al. 2008). *Personal Care* refers to things that individuals cannot pay others to do, but must do for themselves, at least to some extent. Examples of these activities include sleeping and eating—activities that are necessary for survival. *Leisure* includes all activities that individuals cannot pay others to do, and that do not really have to be done at all.

We use unemployment rates for each Spanish region (Autonomous Community) provided by the Spanish Statistical Office (Instituto Nacional de Estadística 2011) and, given that unemployment rates are so different by gender during the relevant period, we consider unemployment rates for men and women separately. Thus, for each individual (male or female), we link the corresponding regional unemployment rate by gender, using the year of the survey (2002, 2003, 2009 or 2010), the region of residence (Aragon, Madrid, Catalonia…), and the quarter of the survey. Thus, for a woman respondent living in Catalonia and answering the survey in May of 2003, we use the regional unemployment of Catalonia in the second quarter of the year 2003 for women. Table B2 in Online Appendix B shows unemployment rates for the different regions and quarters. There are significant differences in unemployment rates between men and women, and across regions. While unemployment rates are around 25 % for women in Extremadura, unemployment rates for men are

[4] All these activities are measured as primary activities. Väisänen (2006) shows that the amount of time reported as secondary activity in the STUS 2002–03 is 82 min (out of 1,440 min per day), the lowest among the UK, Finland, France, Germany, Italy, Norway and Sweden, which makes the inclusion of secondary activities in the analysis not relevant. Some of the definitions for our time use categories are taken from Burda et al. (2008). Definitions of the different time use activities can be found in Table A1 of Online Appendix A.

around 12 % in the same region. While unemployment rates for men are around 5 % in Madrid, in Andalucia they are around 14 %.

### 2.1 Summary statistics

Column (1) in Table 1 shows the time devoted to the different time use categories measured in hours per day, by gender. We observe that both unemployed men and women devote most of their time to personal care (11.89 and 11.43 h per day for men and women, respectively) and leisure (8.36 and 5.77 h per day for men and women, respectively). We find gender differences in the other uses of time, and while unemployed men devote more time to leisure (8.36 and 5.77 h per day for men and women, respectively) and job search (0.45 and 0.10 h per day for men and women, respectively), unemployed women devote more time to household production than do men (2.63 and 5.98 h per day, respectively). Such differences may indicate that the alternative uses of time, when individuals are unemployed, vary by gender, which motivates our analysis by gender in the following Sections. Column (2) shows the percentage of individuals participating in the reference time use category during the day of the interview. We observe that, while some time use categories have a low individual participation rate (e.g., study and job search), household production and leisure have a higher proportion, with all individuals devoting at least some time to personal care. Consistent with the previously reported gender differences in the time devoted to different activities, we find differences in the percentage of individuals participating in these activities, and while unemployed men have a higher participation in job search, unemployed women have a higher participation in household production.

We analyze the raw relationship between unemployment rates and the time devoted to the various activities by plotting the time devoted to the reference activity at the region level, and overall regional unemployment rate, by gender. For instance, for the time devoted to study by men, we compute the overall time (hours per day) devoted by unemployed men in each region and each quarter to this activity, and we plot this overall time with the regional unemployment rate. Figures 1 and 2 show the plots for men and women, where we have added a regression line. For men, we observe a negative relationship between regional unemployment rates and the time devoted to study, while we find positive relationships between regional unemployment rates and the time devoted to both household production and personal care. In particular, we find that the correlation between regional unemployment rates and the time devoted to study, household production, and personal care, by men, is $-0.20$, 0.10 and 0.12, respectively. In the case of women, we observe a negative relationship between regional unemployment rates and the time devoted to leisure, while we find positive relationships between regional unemployment rates and the time devoted to both household production and personal care. In particular, we find that the correlation between regional unemployment rates and the time devoted to leisure, household production, and personal care by women is $-0.15$, 0.12 and 0.07, respectively. For the other activities, we consider that the correlation is far from significant.

**Table 1** Hours per day devoted to activities, by gender

| | (1) | | (2) |
|---|---|---|---|
| | Hours per day | | Participation in the day of the survey |
| | Mean | SD | |
| *Panel A: Men* | | | |
| Study | 0.431 | (1.651) | 8.65 % |
| Job search | 0.453 | (1.403) | 12.58 % |
| Household production | 2.630 | (2.772) | 80.20 % |
| Personal care | 11.889 | (2.371) | 100.00 % |
| Leisure | 8.355 | (3.332) | 99.15 % |
| Overall regional unemployment rate | 16.868 | (0.214) | |
| N observations | 1,884 | | |
| *Panel B: Women* | | | |
| Study | 0.586 | (1.832) | 11.93 % |
| Job search | 0.095 | (0.599) | 5.18 % |
| Household production | 5.983 | (3.464) | 96.47 % |
| Personal care | 11.434 | (2.113) | 100.00 % |
| Leisure | 5.770 | (3.033) | 99.68 % |
| Overall regional unemployment rate | 24.181 | (0.137) | |
| N observations | 2,238 | | |

Standard deviations in parentheses. Sample consists of respondents aged 21–65 who are unemployed, from the STUS 2002–2003 and 2009–2010. *Regional Unemployment Rates* comes from the Spanish Statistical Office (Instituto Nacional de Estadística), defined at the level of the 17 autonomous regions in Spain (Ceuta and Melilla are excluded from the analysis). Definitions of time use variables can be found in Online Appendix Table A1. Time use variables are measured in hours per day

Thus, the raw analysis of the time devoted to the different uses of time and regional unemployment rates shows gender differences, and while we find a negative correlation between regional unemployment rates and the time devoted to study for men, we find a negative correlation between regional unemployment rates and the time devoted to leisure for women. Thus, there may be gender differences in the effect of regional unemployment rates on the time allocation decisions of individuals, but in this analysis we do not control for other factors that may affect these decisions, such as the presence of children and the education level of individuals. Thus, in the following Section we analyze such relationships, controlling for other factors.

## 3 Empirical strategy

We estimate OLS regressions on the time devoted to the different time use categories, by gender. Since we observe a high proportion of "zeros" in certain time use categories, such as study and job search (see Column 2 in Table 1), there can be some controversy regarding the selection of alternative models, such as that of Tobin (1958). According to Frazis and Stewart (2012), OLS models are preferred in the analysis of time allocation decisions, and Gershuny (2012) argues that

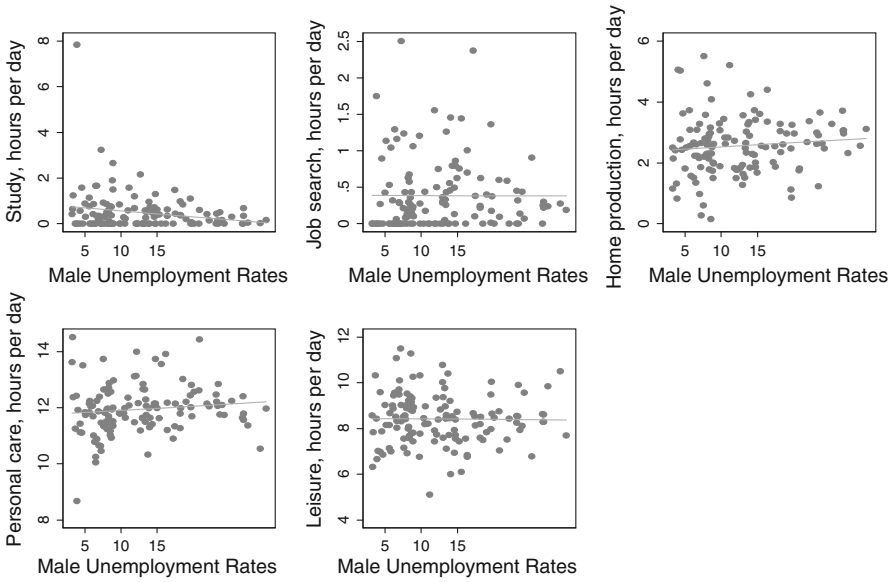


**Fig. 1** Time use of Spanish unemployed men and Regional unemployment rates. Notes: Sample consists of men aged 21–65 who are unemployed, from the STUS 2002–2003 and 2009–2010. *Regional Unemployment Rates* comes from the Spanish Statistical Office (Instituto Nacional de Estadística), defined at the level of the 17 autonomous regions in Spain (Ceuta and Melilla are excluded from the analysis). Definitions of time use variables can be found in Online Appendix Table A1. Time use variables are measured in hours per day. We compute mean values of each variable for each Spanish region

traditional diary studies can still produce accurate estimates of mean times in activities for samples and subgroups. Foster and Kalenkoski (2013) compare the use of tobit and OLS models in the analysis of the time devoted to childcare activities, finding that the qualitative conclusions are similar for the two estimation methods. Thus, we rely on OLS models, although we have alternatively estimated tobit models, and our qualitative conclusions are the same (results available upon request).

We estimate the following equation:

$$\mathrm{T_{ijt}} = \alpha + \beta_1 \mathrm{Reg\_Unemp_{jt}} + \gamma \mathrm{X_{ijt}} + \eta \mathrm{Day}_{ijt} + \delta \mathrm{Z_{jt}} + \varepsilon_{\mathrm{ijt}} \quad (1)$$

where $T_{ijt}$ represents the time devoted to the reference activity by individual "i" in region "j" at time "t", and $Reg\_Unemp_{jt}$ is the variable indicating the regional unemployment rate in region "j" at time "t". The vector $X_i$ includes standard individual and household characteristics (see, Bianchi et al. 2000; Kalenkoski et al. 2005; Krueger 2007; Connelly and Kimmel 2009, Sevilla-Sanz et al. 2010; Gimenez-Nadal et al. 2010, Gimenez-Nadal and Ortega-Lapiedra 2010; Gimenez-Nadal and Sevilla-Sanz 2010), such as age and its square, university education, secondary education, health status, number of children <18, paid housekeeper, and household net monthly income.[5] We also include a vector of dummy variables to

[5] The information for net household income in the STUS 2009–10 is very limited, since many households do not report such information. Thus, we have computed the household income for those households not providing information on income. In doing so, we have estimated household income based

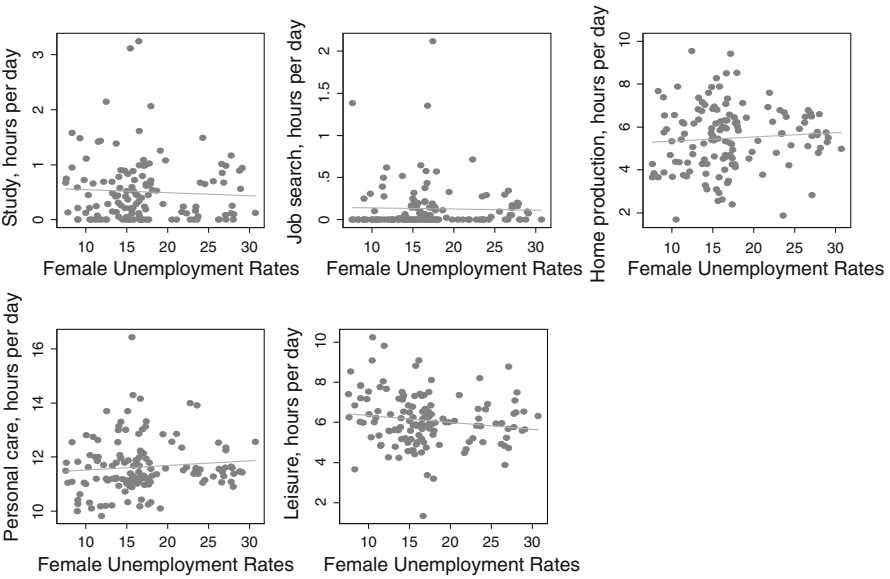


**Fig. 2** Time use of Spanish unemployed women and Regional unemployment rates. Notes: Sample consists of women aged 21–65 who are unemployed from the STUS 2002–2003 and 2009–2010. *Regional Unemployment Rates* comes from the Spanish Statistical Office (Instituto Nacional de Estadística), defined at the level of the 17 autonomous regions in Spain (Ceuta and Melilla are excluded from the analysis). Definitions of time use variables can be found in Online Appendix Table A1. Time use variables are measured in hours per day. We compute mean values of each variable for each Spanish region

scale the day of the week (Ref.: Friday), and we cluster observations by region of residence to allow for differences in the variance/standard errors due to arbitrary intra-group correlation, as in Burda and Hamermesh (2010).[6]

One of the potential identification problems of the association between unemployment rates and the time allocation decisions of the unemployed is that any permanent difference across regions may lead to a biased coefficient on

Footnote 5 continued
on age of respondent and its square, respondent's education, the number of children under 18, the presence of a paid housekeeper, whether the household lives, or not, in an urban area, and whether the respondent is part of a couple, or not. We have then estimated the value of household income. In this process, we have bootstrapped standard errors to obtain consistent results. See Table B3 in Online Appendix B for results of regressions on household income.

[6] Living in urban areas may have different effects for the unemployed, compared to those living in rural areas. Since economic activity is normally concentrated in urban areas (Black and Henderson 1999; Desmet and Fafchamps 2005; Ottaviano and Pinelli 2006; Partridge et al. 2008a, b, 2010), it may be that, despite high regional unemployment rates, the unemployed living in urban areas have more opportunities to find a job than those in rural areas, which may lead the unemployed in urban areas to devote more time to seeking employment and less time to household production and leisure. Moreover, urban areas may offer a much greater range of things to do in leisure time, compared to rural areas, which may also lead to differences in the uses of time of the unemployed. Furthermore, unemployment rates may be higher in the more agricultural regions of Spain, where more traditional ways of life increase household production. We have estimated our models controlling for whether the unemployed live, or not, in urban areas, and we find no differential size of the effect of regional unemployment rates. Results are available upon request.

unemployment rates, if these differences are correlated with the time allocation decisions of the unemployed, as well as with unemployment rates (see Sevilla-Sanz (2010) for a discussion of the identification problems that emerge when studying the effects of regional variables (e.g., social norms) on economic outcomes). For instance, social norms about preferences for work and leisure may differ geographically (Burda and Hamermesh 2010) and, in regions with high unemployment rates, it may be that individuals have a greater preference for leisure time compared to market work hours, which would explain why unemployment rates are higher in that region, given the lower preference of individuals for work. Thus, the regional unemployment coefficient $\beta_1$ would partly capture the positive effect of social norms on leisure, rather than the effect of regional unemployment rates, and thus this coefficient would be biased upward.

We provide an identification strategy that comes from the time and cross-region variations of the data, given that we use quarterly regional unemployment rates that provide 8 observations for each region. The time variation of the data allows us to account for permanent differences across regions between surveys. For example, a shift in public policy in all regions that increased the duration of unemployment benefits, and that was positively correlated with higher unemployment rates, would lead to a bias in the unemployment rates coefficient. Thus, the unemployment rates coefficient $\beta_1$ would partially capture the effect of changes in unemployment policies on leisure rather than the effect of unemployment rates, and thus this coefficient would be upward biased. The regional variation of the data allows us to correct for potential biases that could arise if there exist region-level factors that are correlated with unemployment rates. For instance, if regions with higher unemployment rates also have more generous unemployment benefits, or the duration of unemployment benefits is longer, this would lead to a bias in the unemployment rates coefficient. Hence, the unemployment rates coefficient $\beta_1$ would partially capture the effect of differences in unemployment policies on leisure, rather than the effect of unemployment rates, and thus this coefficient would be upwardly biased.

We also control for other regional variables ($Z_{jt}$) because there may be changing factors at the regional level that are correlated with both unemployment rates and the time use of the unemployed, and thus not controlling for such factors would lead to biased coefficients. We include a first set of variables: *Consumer Price Index, Activity Rates* (by gender), *Industrial Production Index*, and the *Industrial Price Index*, to control for differences in business cycles between regions. Unemployed individuals may be more discouraged in regions where these indicators perform poorly compared to other regions, leading to the unemployed in the former regions devoting less time to job search, and more time to leisure, for example. Additionally, unemployment rates will probably be higher in regions where these indicators perform poorly compared to other regions, since these indicators can be considered as predictors of the economic activity of the region. Thus, not controlling for such regional differences would lead to a downward bias of the unemployment rates coefficient $\beta_1$ for leisure, for instance.

We also include regional variables to control for differences in the wealth of the Spanish regions: *Gross Domestic Product* and *Income per capita*. In wealthier regions, the unemployed may have better economic support from their families and the regional government (e.g., more generous unemployment benefits), compared to

poorer regions, which may influence time allocation decisions of individuals, such as job search or leisure (better support may be translated into less time devoted to job search and more time in leisure, for instance). Additionally, wealthier regions may have more resources available to combat unemployment, and thus wealthier regions will probably have lower unemployment rates compared to poorer regions. Not controlling for regional differences in the wealth of regions would lead to a downward bias of the unemployment rates coefficient $\beta_1$ for leisure, for instance.

We also include variables to control for differences across regions in the health status of individuals. We include the percentage of people in each region who report having very poor health *(% people in region with very poor health*), poor health *(% people in region with poor health*), and good health *(% people in region with good health*).[7] In regions where individuals have poorer health, unemployment rates may be higher as firms may find it better to locate in regions where the general level of health is higher, given that they otherwise may have losses derived from worker illnesses. Additionally, poorer health of individuals in general may influence the time allocation decisions of unemployed individuals, as it reduces the number of individuals available to synchronize leisure. Not controlling for regional differences in the health status of individuals would lead to an upward bias of the unemployment rates coefficient $\beta_1$ for leisure, for instance.

We also include divorce rates at the region level (*Divorce Rates*). In regions with higher rates of divorce, the probability that unemployed individuals are not in couples could be higher, which would indicate that the unemployed do not have the economic support of their partners, nor do they have a partner to synchronize leisure, influencing their time allocation decisions. Furthermore, in regions where divorce rates are higher, unemployment rates will probably be lower as divorced individuals could be more likely to accept lower paid jobs, given that they are more in need of a job because they do not have the economic support of their partner. Not controlling for regional differences in divorce rates would lead to an upward bias of the unemployment rates coefficient $\beta_1$ for leisure, for instance.

We finally include a variable to measure the share of public jobs relative to the number of private jobs in the region (*Share of public jobs relative to private*). Differences in such shares may be important in the behaviour of the unemployed, given that in those regions with high proportions of public-sector jobs, it could be that the unemployed have the expectation that there will be new job offers in that sector, and thus they will try to increase their chances of getting such a job by devoting more time to study, and less time to job search. On the other hand, in those regions with low proportions of public-sector jobs, it could be that the unemployed have no expectations of working in that sector, and thus they would devote less time to study and more to job search. Additionally, regions with higher shares of public-sector jobs, relative to the private sector, may have lower unemployment rates, as public-sector jobs are considered to be more stable. Not controlling for regional

[7] Information on health status comes from the *Survey on Health and Sexual Habits*. Despite that this survey was developed in the year 2003, the last year it was carried out was 2006, and thus we have no precise information on the health status of individuals in the regions for the year 2009–2010. We have used the information for the survey carried out in 2006, as if it was the actual information for the year 2009–2010.

differences in the share of public jobs relative to public would lead to an upward bias of the unemployment rates coefficient $\beta_1$ for leisure, for instance.

## 4 Results

Tables 2 and 3 shows the results of estimating Eq. (1) on the time devoted to study, job search, household production, personal care, and leisure, for both men and women. Considering the coefficients of regional unemployment rates on the time devoted to the different activities, we observe positive associations for the time devoted to study by men and household production by women, and negative associations for the time devoted to personal care by men and leisure by women, with these associations being statistically significant at standard levels. A one-percentage-point increase in the regional unemployment rate is associated with increases of 0.05 h per day of study and household production for men and women, respectively, translating into a 3 and 1.5 % increase of a standard deviation in the time devoted to study and household production, respectively. We also observe that a one-percentage-point increase in the regional unemployment rate is associated with decreases of 0.07 and 0.10 h per day of personal care and leisure for men and women, respectively, translating into a 3 and 3.5 % decrease of a standard deviation in the time devoted to study and household production, respectively.

We obtain significant correlations between others' unemployment and the time allocation decisions of the unemployed, although there are gender differences associated with these correlations. While there appears to be a substitution between the time devoted to study and personal care by men with higher unemployment rates of the region of residence, these higher unemployment rates appear to be associated with a substitution between the time devoted to household production and leisure by women.

Other factors associated with changes in the time allocation decisions of unemployed men are the level of education, age, and the presence of children, while for unemployed women the level of education, age, the presence of children, and health status are factors that may affect their decisions. For men, we observe an inverse u-shaped effect of age on the time devoted to household production, university education is positively related to study and household production, and negatively related to personal care and leisure, and each additional child in the household is associated with increases in the time devoted to household production, and decreases in the time devoted to study, personal care, and leisure. For women, we observe an inverse u-shaped relationship for age on the time devoted to household production, and u-shaped relationships with the time devoted to study, personal care, and leisure, and university education is positively related to study and negatively related to household production. Also, each additional child in the household is associated (for women) with increases in the time devoted to household production and decreases in the time devoted to study, job search, personal care, and leisure, while poor health is associated with increases in the time devoted to study and decreases in the time devoted to job search and personal care.

The existing literature has shown that time allocation decisions may differ, depending on the civic status of individuals. For instance, Kalenkoski et al. (2005)

**Table 2** Time devoted to activities and regional unemployment rates, men

| Men | (1) Study | (2) Job search | (3) Household production | (4) Personal care | (5) Leisure |
|---|---|---|---|---|---|
| Regional unemployment rates | 0.056** | 0.025 | 0.009 | −0.069** | −0.029 |
| | (0.023) | (0.022) | (0.039) | (0.028) | (0.032) |
| Age | −0.032 | −0.016 | 0.177*** | −0.028 | −0.114 |
| | (0.024) | (0.015) | (0.035) | (0.021) | (0.078) |
| Age squared | 0.023 | 0.001 | −0.166*** | 0.028 | 0.130 |
| | (0.027) | (0.012) | (0.049) | (0.024) | (0.089) |
| Secondary education | 0.229*** | −0.060 | 0.512*** | −0.472*** | −0.246 |
| | (0.057) | (0.039) | (0.147) | (0.064) | (0.227) |
| University education | 1.127*** | −0.097 | 0.625*** | −0.708*** | −0.765*** |
| | (0.167) | (0.068) | (0.157) | (0.185) | (0.115) |
| Number of children | −0.072*** | 0.038 | 0.655*** | −0.119*** | −0.522*** |
| | (0.012) | (0.027) | (0.051) | (0.032) | (0.046) |
| Paid housekeeping | 0.015 | −0.075 | 0.650 | −0.398 | −0.107 |
| | (0.141) | (0.154) | (0.388) | (0.489) | (0.464) |
| Bad health | 0.111 | −0.078 | 0.219* | −0.040 | −0.013 |
| | (0.117) | (0.104) | (0.118) | (0.274) | (0.270) |
| Poor health | −0.030 | −0.010 | 0.194 | 0.081 | 0.033 |
| | (0.120) | (0.100) | (0.177) | (0.262) | (0.199) |
| Good health | −0.217*** | −0.021 | 0.216 | 0.785*** | −0.447 |
| | (0.062) | (0.041) | (0.275) | (0.191) | (0.277) |
| Very good health | 0.267 | −0.480*** | −1.288 | 1.003 | 0.912 |
| | (0.423) | (0.078) | (0.777) | (0.846) | (1.071) |
| Hhld income 1,201–2,000 € | 0.422*** | −0.381*** | 0.007 | −0.055 | 0.025 |
| | (0.105) | (0.060) | (0.181) | (0.143) | (0.280) |
| Hhld income 2,001–3,000 € | 0.010 | −0.061 | −0.359 | 0.024 | 0.381 |
| | (0.153) | (0.080) | (0.403) | (0.367) | (0.451) |
| Hhld income >3,000 € | 0.114 | −0.131 | −1.580*** | 1.239*** | 0.379 |
| | (0.504) | (0.098) | (0.431) | (0.256) | (0.234) |
| Consumer price index | −0.016 | 0.027** | 0.032 | 0.004 | −0.073* |
| | (0.019) | (0.010) | (0.032) | (0.024) | (0.042) |
| Gross domestic product | −0.025* | −0.010 | −0.010 | 0.023* | 0.027 |
| | (0.012) | (0.010) | (0.021) | (0.011) | (0.020) |
| Activity rate of the region | −0.012 | 0.010 | −0.041* | 0.048* | 0.011 |
| | (0.014) | (0.018) | (0.023) | (0.026) | (0.038) |
| Income per capita | 0.014** | 0.016** | 0.008 | −0.016** | −0.027*** |
| | (0.005) | (0.007) | (0.008) | (0.006) | (0.008) |
| Divorce rates | −0.050 | −0.253** | 0.161 | −0.102 | 0.334 |
| | (0.097) | (0.108) | (0.115) | (0.107) | (0.222) |
| % People in region with very poor health | 0.063 | 0.033 | 0.037 | −0.098** | −0.084 |
| | (0.055) | (0.027) | (0.068) | (0.043) | (0.095) |

**Table 2** continued

| Men | (1) Study | (2) Job search | (3) Household production | (4) Personal care | (5) Leisure |
|---|---|---|---|---|---|
| % People in region with poor health | 0.045 | 0.034 | −0.012 | −0.097** | −0.027 |
| | (0.048) | (0.023) | (0.058) | (0.038) | (0.079) |
| % People in region with good health | 0.073 | 0.041* | −0.034 | −0.113*** | −0.031 |
| | (0.044) | (0.022) | (0.062) | (0.037) | (0.077) |
| Share of public jobs relative to private | 0.021*** | 0.010 | 0.008 | −0.031** | 0.001 |
| | (0.006) | (0.009) | (0.009) | (0.011) | (0.021) |
| Industrial production index | −0.004 | −0.011* | 0.032*** | −0.011 | 0.007 |
| | (0.008) | (0.006) | (0.010) | (0.013) | (0.018) |
| Industrial price index | −0.022*** | −0.040** | 0.000 | 0.017 | 0.070** |
| | (0.006) | (0.015) | (0.016) | (0.011) | (0.027) |
| Constant | −1.283 | −1.384 | −5.526 | 20.730*** | 14.188* |
| | (5.313) | (2.808) | (6.448) | (4.635) | (7.710) |
| N observations | 1,884 | 1,884 | 1,884 | 1,884 | 1,884 |
| R-squared | 0.11 | 0.073 | 0.13 | 0.07 | 0.092 |

Robust standard errors in parentheses. Sample consists of respondents aged 21–65 who are unemployed, from the STUS 2002–2003 and 2009–2010. *Regional Unemployment Rates* comes from the Spanish Statistical Office (Instituto Nacional de Estadística), defined at the level of the 17 autonomous regions in Spain (Ceuta and Melilla are excluded from the analysis). Definitions of time use variables can be found in Online Appendix Table A1. Time use variables are measured in hours per day. * Significant at the 90 % level ** Significant at the 95 % level *** Significant at the 99 % level

find that single parents in the UK devote more time to childcare activities compared to their married counterparts. Connelly and Kimmel (2009) find that, if there is a married spouse present, mothers in the US devote more time to home production (and employment) and less time to leisure. Gimenez-Nadal and Sevilla-Sanz (2010) show that, at the European level, married women with children are those with lower levels of leisure time. One of the reasons why the time allocation decisions of individuals in couple are different from those of individuals not in couple may be synchronization of activities, since prior research has shown that individual time use choices may be contingent on the time use choices of others (Hamermesh 2002; Halberg 2003; Jenkins and Osberg 2005).[8]

Thus, the civic status of the unemployed may influence how others' unemployment affects the time allocation decisions of the unemployed, given that it affects the availability of other individuals to synchronize activities. We estimate Eq. (1) including a dummy variable to control for whether or not the respondent is part of a couple, interacting this dummy variable with the variable measuring regional unemployment rates, to analyze whether the effects of regional unemployment rates differ with the civic status of the respondent. We create a dummy variable to

[8] Hamermesh (2002) finds evidence for the US that couples arrange their work schedules to allow time for leisure that they consume jointly, and Halberg (2003) finds a positive effect of coordination on synchronous leisure, with market work and leisure timing being intra-household dependent.

**Table 3** Time devoted to activities and regional unemployment rates, women

| Women | (1) Study | (2) Job search | (3) Household production | (4) Personal care | (5) Leisure |
|---|---|---|---|---|---|
| Regional unemployment rates | −0.009 | −0.003 | 0.053*** | 0.048 | −0.104*** |
| | (0.019) | (0.007) | (0.014) | (0.027) | (0.024) |
| Age | −0.067*** | 0.004 | 0.411*** | −0.115*** | −0.229*** |
| | (0.020) | (0.011) | (0.017) | (0.019) | (0.023) |
| Age squared | 0.064** | −0.012 | −0.432*** | 0.100*** | 0.272*** |
| | (0.025) | (0.014) | (0.023) | (0.031) | (0.032) |
| Secondary education | 0.112* | 0.014 | −0.038 | 0.071 | −0.030 |
| | (0.064) | (0.019) | (0.077) | (0.059) | (0.072) |
| University education | 0.856*** | −0.026 | −0.758*** | −0.145 | 0.217 |
| | (0.059) | (0.026) | (0.105) | (0.109) | (0.174) |
| Number of children | −0.185*** | −0.069*** | 1.225*** | −0.164*** | −0.739*** |
| | (0.007) | (0.015) | (0.103) | (0.025) | (0.085) |
| Paid housekeeping | −0.375** | −0.110** | −0.598 | −0.565*** | 1.497** |
| | (0.148) | (0.047) | (0.524) | (0.177) | (0.531) |
| Bad health | 0.372** | −0.113** | −0.181 | −0.403*** | 0.211 |
| | (0.138) | (0.044) | (0.160) | (0.129) | (0.130) |
| Poor health | 0.114 | −0.063 | 0.169 | −0.417*** | 0.083 |
| | (0.077) | (0.051) | (0.158) | (0.118) | (0.104) |
| Good health | −0.076 | −0.006 | −0.887*** | 0.087 | 0.740*** |
| | (0.044) | (0.039) | (0.253) | (0.091) | (0.193) |
| Very good health | 0.345 | −0.185*** | −1.060 | 3.033*** | −2.035*** |
| | (0.701) | (0.043) | (0.663) | (0.330) | (0.529) |
| Hhld income 1,201–2,000 € | −0.030 | 0.033** | 0.046 | −0.069 | −0.014 |
| | (0.076) | (0.014) | (0.039) | (0.101) | (0.064) |
| Hhld income 2,001–3,000 € | −0.243 | −0.103** | 0.087 | 0.285 | −0.023 |
| | (0.185) | (0.042) | (0.293) | (0.220) | (0.270) |
| Hhld income >3,000 € | −0.579* | −0.022 | 0.047 | 1.614** | −1.031 |
| | (0.321) | (0.052) | (0.955) | (0.731) | (0.688) |
| Consumer price index | −0.040 | 0.007 | 0.051 | 0.059* | −0.054** |
| | (0.033) | (0.007) | (0.040) | (0.030) | (0.020) |
| Gross domestic product | 0.015* | 0.001 | −0.022 | −0.033*** | 0.044** |
| | (0.007) | (0.005) | (0.016) | (0.008) | (0.018) |
| Activity rate of the region | 0.018 | 0.033* | 0.002 | −0.057 | −0.035 |
| | (0.048) | (0.017) | (0.054) | (0.048) | (0.029) |
| Income per capita | −0.003 | 0.000 | 0.018 | 0.012 | −0.035** |
| | (0.007) | (0.003) | (0.011) | (0.012) | (0.012) |
| Divorce rates | −0.073 | −0.126* | −0.110 | −0.072 | 0.401* |
| | (0.099) | (0.064) | (0.163) | (0.155) | (0.210) |
| % People in region with very poor health | −0.022 | 0.006 | −0.048 | 0.014 | 0.093 |
| | (0.025) | (0.013) | (0.055) | (0.055) | (0.066) |

**Table 3** continued

| Women | (1) Study | (2) Job search | (3) Household production | (4) Personal care | (5) Leisure |
|---|---|---|---|---|---|
| % People in region with poor health | −0.030 | 0.012 | −0.027 | −0.009 | 0.084 |
| | (0.024) | (0.014) | (0.059) | (0.061) | (0.065) |
| % People in region with good health | −0.051 | 0.022 | 0.043 | −0.009 | 0.027 |
| | (0.040) | (0.019) | (0.101) | (0.094) | (0.102) |
| Share of public jobs relative to private | 0.028 | 0.007 | −0.029 | −0.062*** | 0.025 |
| | (0.023) | (0.007) | (0.021) | (0.017) | (0.023) |
| Industrial production index | −0.016 | −0.003 | 0.022 | 0.017 | −0.013 |
| | (0.021) | (0.003) | (0.017) | (0.018) | (0.019) |
| Industrial price index | 0.024*** | −0.015*** | −0.063*** | −0.008 | 0.067*** |
| | (0.005) | (0.004) | (0.014) | (0.012) | (0.014) |
| Constant | 6.587 | −1.158 | −3.848 | 11.229* | 8.200 |
| | (4.374) | (1.342) | (5.493) | (5.335) | (6.905) |
| N observations | 2,238 | 2,238 | 2,238 | 2,238 | 2,238 |
| R-squared | 0.099 | 0.039 | 0.325 | 0.134 | 0.16 |

Robust standard errors in parentheses. Sample consists of respondents aged 21–65 who are unemployed, from the STUS 2002–2003 and 2009–2010. *Regional Unemployment Rates* comes from the Spanish Statistical Office (Instituto Nacional de Estadística), defined at the level of the 17 autonomous regions in Spain (Ceuta and Melilla are excluded from the analysis). Definitions of time use variables can be found in Online Appendix Table A1. Time use variables are measured in hours per day. * Significant at the 90 % level ** Significant at the 95 % level *** Significant at the 99 % level

indicate whether the respondent is part of a couple (1) or not (0). Panels A and B in Table 4 show the results of estimating Eq. (1) including the civic status and its interaction with the regional unemployment rate for men and women (see Tables C1 and C2 in Online Appendix C for results for the remaining variables).

For unemployed men, we observe that the relationship between regional unemployment rates and the time devoted to study is positive, independently of whether they are part of a couple or not, but the negative relationship for the time devoted to personal care is more significant for individuals living in couple, as shown by the negative and statistically significant coefficient on the interaction term. Additionally, we find specific effects for unemployed men living in couple on the time devoted to household production and leisure, as shown by the positive and negative statistically significant coefficients of the interaction term on the time devoted to household production and leisure, respectively. Thus, while the positive relationship between regional unemployment rates and the time devoted to study is applicable to men living, and not living, in couple, the decrease in leisure and the increase of household production only applies to men living in couple.

For unemployed women, we find different effects of regional unemployment rates, depending on whether the individuals live as part of a couple, or not. We find positive relationships between regional unemployment rates and household production, on the one hand, and negative relationships between regional

unemployment rates and leisure, on the other. We find that these relationships differ by civic status, and while we find a larger positive association between regional unemployment rates and the time devoted to household production for unemployed women living in couple, compared to unemployed women not living in couple, we find a smaller negative association between regional unemployment rates and the time devoted to leisure. Additionally, we find a specific relationship for unemployed women living in couple, as shown by the negative and statistically significant coefficient for regional unemployment rates and time devoted to study by women living in couple. We also find a positive relationship between regional unemployment rates and time spent on personal care, although this relationship is less significant for unemployed women living in couple. Thus, we find differential effects of regional unemployment rates on time allocation decisions of unemployed women, depending on whether they live, or not, in couple.

Unemployment for individuals implies an income shock as labour market earnings decrease or disappear. In Spain, in order to receive a contributory benefit, an employee must have contributed at least 360 days in the last 6 years, and be

**Table 4** Time devoted to activities and regional unemployment rates, living in couple

| | (1) Study | (2) Job search | (3) Household production | (4) Personal care | (5) Leisure |
|---|---|---|---|---|---|
| *Panel A: Men* | | | | | |
| Regional unemployment rates | 0.051** | 0.019 | −0.036 | −0.058** | 0.018 |
| | (0.020) | (0.022) | (0.041) | (0.025) | (0.031) |
| In couple | −0.355* | 0.101 | 0.363 | 0.599*** | −0.629** |
| | (0.190) | (0.110) | (0.224) | (0.199) | (0.222) |
| In couple*Reg. Unemp. Rate | 0.011 | 0.006 | 0.051*** | −0.022** | −0.052*** |
| | (0.008) | (0.007) | (0.012) | (0.010) | (0.015) |
| N observations | 1,884 | 1,884 | 1,884 | 1,884 | 1,884 |
| R-squared | 0.112 | 0.076 | 0.16 | 0.072 | 0.122 |
| *Panel B: Women* | | | | | |
| Regional unemployment rates | 0.006 | −0.007 | 0.033** | 0.071** | −0.113*** |
| | (0.017) | (0.008) | (0.013) | (0.029) | (0.024) |
| In couple | 0.215 | −0.385* | 1.433*** | 0.878*** | −1.641*** |
| | (0.211) | (0.205) | (0.368) | (0.227) | (0.462) |
| In couple*Reg. Unemp. Rate | −0.035*** | 0.010 | 0.037*** | −0.056*** | 0.028* |
| | (0.007) | (0.007) | (0.009) | (0.008) | (0.015) |
| N observations | 2,238 | 2,238 | 2,238 | 2,238 | 2,238 |
| R-squared | 0.102 | 0.043 | 0.326 | 0.134 | 0.161 |

Robust standard errors in parentheses. Sample consists of respondents aged 21–65 who are unemployed, from the STUS 2002–2003 and 2009–2010. *Regional Unemployment Rates* comes from the Spanish Statistical Office (Instituto Nacional de Estadística), defined at the level of the 17 autonomous regions in Spain (Ceuta and Melilla are excluded from the analysis). Definitions of time use variables can be found in Online Appendix Table A1. Time use variables are measured in hours per day. *In couple* is a dummy variable that takes value "1" if the respondent is married or cohabiting, and "0" otherwise. * Significant at the 90 % level ** Significant at the 95 % level *** Significant at the 99 % level

registered with the employment authorities as available for work. The benefit is paid for 1/3 of the period that the unemployed person has contributed. The benefit is paid for a minimum of 4 months and a maximum of 24 months. The benefit amount is calculated on the basis of the last 180 days salary, with both a minimum and a maximum amount applicable. The unemployed receive 70 % of their reference salary (subject to the ceiling) during the initial 6 months, falling to 60 % thereafter. Those with no children have a maximum of 175 % of the IPREM, those with 1 child a maximum of 200 % of the IPREM, and those with 2 or more children a maximum of 225 % of the IPREM. The IPREM (Indicador Público de Renta de Efectos Múltiples) is a reference index for the calculation of unemployment benefits. The non-contributory allowance is available to those who are no longer entitled to the contributory pension and who do not have income above 75 % of the national minimum wage.[9] Compared to the US, where unemployment benefits can be paid for a maximum of 26 weeks in most States, the Spanish unemployment insurance system is quite generous. However, it still supposes a large reduction in earnings, as individuals receive a maximum of 70 % of their prior earnings, falling to 60 % when they have been unemployed for more than 6 months.

In this situation, where household income decreases as a consequence of unemployment, consumption patterns change and, in households where there are unemployed individuals, time-intensive commodities are produced more (Ahn et al. 2004). Thus, income shocks influence the time allocation decisions of individuals, consistent with Becker's household production theory (Becker 1965). Under this framework, the extent to which unemployed individuals have a partner to support them economically may influence how they allocate their time, and it may also influence, to some extent, how sensitive they are to others' unemployment, given the previously-reported relationship between the time allocation decisions of the unemployed and others' unemployment.

Unfortunately, we do not have information on whether the unemployed are receiving unemployment benefits, or not. Hence, we have estimated Eq. (1) including a dummy variable to control for whether or not the partner's respondent is working, interacting this dummy variable with the variable measuring regional unemployment rates, to analyze whether the effects of regional unemployment rates differ according to the employment status of the respondent's partner. Households where one of the partners is employed will almost certainly experience a lower decrease in income (smaller income shock) compared to households where both partners are unemployed, or where there is a single unemployed individual. To analyze this, we create a dummy variable to indicate whether the respondent's partner is working (1), or not (0).

Panels A and B in Table 5 show the results of estimating Eq. (1) including the partner's employment status and its interaction with the regional unemployment rate for men and women (see Tables C3 and C4 in Online Appendix C for results for the remaining variables). For unemployed men, we observe that the relationship between regional unemployment rates and the time devoted to study and personal

[9] See the Spanish Ministry of Employment and Social Security (http://www.empleo.gob.es/index.htm) for more information.

care are positive and negative, respectively, independently of whether there is a working partner, or not. The only difference we find considering the working status of the partner is for leisure, where we find a negative effect of regional unemployment rates only for those individuals who have a working partner. Hence, a 1 % increase in the regional unemployment rate is associated with an increase and a decrease of 0.06 h per day to study and personal care, respectively, by unemployed men, with no difference in the effect between men with, and without, working partners. Furthermore, we find a specific effect for unemployed men having a working partner, as a 1 % increase in the regional unemployment rate is associated with a decrease of 0.02 h per day devoted to leisure.

For unemployed women, we find different effects of regional unemployment rates, depending on whether they have a working partner, or not. We find positive relationships between regional unemployment rates and household production, on the one hand, and negative relationships between regional unemployment rates and leisure, on the other, although the negative relationship for leisure is smaller for unemployed women having a working partner. Additionally, we find a specific relationship for unemployed women having a working partner, as shown by the negative and statistically significant coefficient for regional unemployment rates and time devoted to study by women having a working partner. While we find a positive relationship between regional unemployment rates and time in personal care, that relationship is less significant for unemployed women having a working partner.

Our results based on differences in civic status and the working status of the partner can be used to test whether synchronization with others (greater availability of mates for time activities, Jenkins and Osberg 2005) is at the root of the observed relationship for both men and women. If this is the case, we would expect to find that the time devoted to leisure is greater in regions with higher unemployment rates, given that there are more available mates for time activities. Additionally, the effects should be stronger for individuals living in couple, given that they would try to time activities in concert with their partners. The fact that we find no effect of regional unemployment rates on leisure for unemployed men, and that the effect for women's leisure time is negative, indicates that synchronization of activities is not the main channel through which regional unemployment rates affect the time-allocation decisions of individuals. This hypothesis is reinforced by the fact that, after controlling for whether individuals live in couple, the effect of regional unemployment rates on the time devoted to leisure by women is still negative for those living in couple, indicating that the overall effect is negative in all cases of women.

Another channel through which regional unemployment rates may affect the time allocation decisions of the unemployed would be consumption smoothing, in which households attempt to increase their time spent on household production, allowing them to reduce the market expenditures needed to maintain their consumption. We find that unemployed men living in couple devote more time to household production, while unemployed women in the same situation devote more time to household production, compared to their counterparts not living in couple. We interpret this result as indicating that, with higher regional unemployment rates, there is a lower availability of jobs for the unemployed, decreasing individual

**Table 5** Time devoted to activities and regional unemployment rates, working partner

| | (1) Study | (2) Job search | (3) Household production | (4) Personal care | (5) Leisure |
|---|---|---|---|---|---|
| *Panel A: Men* | | | | | |
| Regional unemployment rates | 0.056** | 0.023 | −0.006 | −0.058** | −0.017 |
| | (0.021) | (0.022) | (0.042) | (0.021) | (0.028) |
| Partner working | 0.138 | −0.098 | 0.936*** | 0.168 | −0.881*** |
| | (0.112) | (0.190) | (0.232) | (0.454) | (0.256) |
| Partner working*Reg. Unemp. Rate | −0.005 | 0.005 | 0.011 | −0.013 | −0.021** |
| | (0.007) | (0.011) | (0.015) | (0.021) | (0.008) |
| N observations | 1,884 | 1,884 | 1,884 | 1,884 | 1,884 |
| R-squared | 0.11 | 0.074 | 0.154 | 0.07 | 0.113 |
| *Panel B: Women* | | | | | |
| Regional unemployment rates | 0.000 | −0.004 | 0.047*** | 0.060** | −0.113*** |
| | (0.019) | (0.007) | (0.011) | (0.028) | (0.025) |
| Partner working | 0.230 | −0.216 | 1.213*** | 0.564* | −1.376*** |
| | (0.156) | (0.152) | (0.378) | (0.273) | (0.406) |
| Partner working*Reg. Unemp. Rate | −0.024*** | 0.005 | 0.008 | −0.035*** | 0.031** |
| | (0.006) | (0.006) | (0.011) | (0.010) | (0.013) |
| N observations | 2,238 | 2,238 | 2,238 | 2,238 | 2,238 |
| R-squared | 0.107 | 0.044 | 0.354 | 0.139 | 0.168 |

Robust standard errors in parentheses. Sample consists of respondents aged 21–65 who are unemployed, from the STUS 2002–2003 and 2009–2010. *Regional Unemployment Rates* comes from the Spanish Statistical Office (Instituto Nacional de Estadística), defined at the level of the 17 autonomous regions in Spain (Ceuta and Melilla are excluded from the analysis). Definitions of time use variables can be found in Online Appendix Table A1. Time use variables are measured in hours per day. *Partner working* is a dummy variable that takes value "1" if respondent's partner works (part- or full-time), and value "0" otherwise. * Significant at the 90 % level ** Significant at the 95 % level *** Significant at the 99 % level

expectations of finding a job. Thus, we consider that one of the channels through which regional unemployment rates affect the time allocation decisions of the unemployed is consumption smoothing. This would also explain why unemployed women living in couple, and with working partners, devote less time to study, given the expenditures associated with study.

## 5 Conclusions

Unemployment is considered one of the strongest correlates of individual well-being, and economists have long debated its causes and consequences. Prior research has studied the relationship between regional unemployment rates and individual well-being, but the focus has been on individual well-being, without considering other dimensions of individual behavior, such as time-allocation decisions. We analyze how other's unemployment, as measured by regional

unemployment rates, is related to the time allocation decisions of the unemployed in Spain.

Using the Spanish Time Use Survey (STUS) 2002–2003 and 2009–2010, we find that higher regional unemployment rates are associated with increases in the time devoted to study by men, and to household production by women. Men in regions with higher unemployment rates devote less time to personal care. Women in regions with higher unemployment rates have less leisure. Our results are consistent with alternative specifications, where we include heterogeneous effects based on urban residence, marital status, and the working status of the partner. We interpret our results as evidence that these effects are due to discouragement of the unemployed living in regions with high unemployment rates, while we find no evidence of a "social-norm effect".

We also find gender differences in the relationship between regional unemployment rates and time allocation decisions of the unemployed. Given that Spain has been classified as "traditional" in terms of the gender distribution of household labor (Sevilla-Sanz 2010; Gimenez-Nadal et al. 2012), further analysis is needed to determine whether household production is affected by regional unemployment rates in a different way for men and women in more egalitarian countries.

One limitation of our analysis is that our data is a cross-section of individuals, and it does not allow us to identify the effect of unemployment rates net of (permanent) individual heterogeneity in preferences. This is particularly important in our context, since it could be that unemployment rates and individual preferences regarding market work and leisure time are correlated. As shown by Burda and Hamermesh (2010), it could be that social norms about preferences for work and leisure differ geographically and, in regions with high unemployment rates, individuals have a higher preference for leisure time and a lower preference for working in the labor market, which would explain the fact that individuals may be less productive, and thus have a higher probability of being unemployed. We cannot speak definitively about a causal relationship between unemployment rates and the time allocation decisions of the unemployed, and more research on this topic is needed. At present there are no panels of time-use surveys currently available. Alternative datasets with a panel data structure, such as the British Household Panel Survey or the Panel Study of Income Dynamics, which also have information on housework time could be used to investigate this topic. Stylized questions on housework time as the ones in these surveys have been confirmed to be less reliable than the diary information used here (Juster and Stafford 1985; Robinson and Godbey 1997). Moreover, these surveys do not have information about other uses of time such as leisure.

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