# Time to cook: Expenditure at Retirement in Spain *

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**Abstract**

Detailed panel expenditure data from Spain reveals little evidence of a retirement consumption puzzle in 1985–2004. However, there is a drop in food at home expenditure in the later years of the sample along with evidence of households paying lower prices for the food they purchase after retirement. Our findings are consistent with a model that allows for home production as long as one accounts for the greater participation in housework by men after retirement coinciding with this latter period. Our work adds to the evidence from several countries and helps in reconciling the retirement consumption puzzle with life-cycle models.

**JEL Classification:** E21

We use a rich and unique longitudinal expenditure survey from Spain to study if the substitution between market goods and home-produced goods within households can explain expenditure patterns around retirement. Households appear to reduce expenditure substantially around the age of retirement, and this behavior has been labeled puzzling because life-cycle consumption models predict that households want to smooth (the marginal utility

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of) consumption when they experience a predictable drop in income as at retirement. The expenditure decline takes the form of a discrete drop in the year of retirement or around retirement and has been documented for the US (e.g., Hamermesh 1984, Mariger 1987, Bernheim et al. 2001, Haider & Stephens 2007), for Canada (e.g., Robb & Burbidge 1989), for the UK (e.g., Banks et al. 1998), for Italy (e.g., Miniaci et al. 2010, Battistin et al. 2009), and for Germany (e.g., Schwerdt 2005) among other countries. A closer look at the literature, however, reveals that much of the documented consumption decline at retirement relates to food expenditure (see Hurst 2008). Because food can be prepared at home, the substitution of market goods for time intensive home-produced goods has been proposed as a rational explanation for the drop in Expenditure at Retirement.[1] Understanding the cause of the expenditure decline at retirement is important both to researchers who are trying to analyze how individuals make complex decisions when the future is uncertain, and to policy makers who are concerned about the adequacy of savings for retirement.

This paper contributes to the literature by using a very rich longitudinal dataset, the Spanish expenditure survey, a rotating panel that follows households for up to eight quarters. Previous literature has mostly focus on food expenditure because of the lack of suitable longitudinal datasets with more detailed information on expenditure (well-known longitudinal studies such as the Panel Study of Income Dynamics, PSID, or the British Household Panel, BHPS, record mainly food purchases) or has relied on repeated cross sections using synthetic-cohort analysis. However, food expenditure may not be the best proxy for total or nondurable expenditure, and using synthetic cohorts limits the analysis that can be done to some extent. The Spanish data are sufficiently detailed to analyze changes in expenditure for a broad selection of goods and services, not just food, and we have actual expenditure changes at retirement for many households (rather than across households), as we observe actual transitions into retirement. Moreover, the Spanish case is particularly interesting because household income does not fall at retirement for a large fraction of households, unlike in the US and the UK. Pension replacement rates are high in Spain and minimum

[1] Previously, researchers had attributed the consumption drop at retirement to various causes, from myopic or nonrational behavior as argued by Bernheim et al. (2001) and Angeletos et al. (2001), to the arrival of unexpected shocks as in Smith (2006), or to non-separabilities between leisure and consumption as in Banks et al. (1998).

pensions are such that household income actually increases at retirement for those in the bottom quartile of the pre-retirement income distribution. Given the state of the literature, this constitutes an interesting opportunity to contrast the validity of alternative theories in the literature to explain why consumption tracks income at retirement such as myopia or hyperbolic discounting.

Our data span from 1985 to 2004. Some methodological changes were introduced in the expenditure survey in 1997, and we consider two subperiods. We refer to 1985–1997 as the earlier years, and 1998–2004 as the later years. We find no evidence of a decrease in total expenditure or nondurable expenditure at retirement in Spain in either period—spending on work related categories goes down but this is far from a puzzle. This finding is not too surprising because even if households were myopic, there is little reason to expect retirement related expenditure declines when income is not falling. However, when focusing on food, we document a significant fall in expenditure (total and at home) but only in the later years of the survey. The results for the latter period, a decrease in food expenditure and no significant drop in nondurable expenditure, are consistent with findings from two recent U.S. studies using shorter or less detailed expenditure panel datasets—Aguila et al. (2011) use the panel structure of the Consumption Expenditure Survey (CEX) and Hurd & Rohwedder (2008) use the Health and Retirement Study (HRS) supplemented with the Consumption and Activities Mail Survey (CAMS).

Given that food is a time intensive good which can be produced at home, the fact that there is a decline of food expenditure not too dissimilar to the US in the latter period of our survey, coupled with no fall in broader expenditure measures or income, corroborates the home production story over other explanations. We provide further evidence for the home production hypothesis in this later period by showing that households substitute market goods for home production. First, we show that households do more and cheaper shopping at retirement. Along with expenditure, the Spanish expenditure survey records purchased quantities of food, drink and tobacco categories. We construct household-specific price indices as in Aguiar & Hurst (2007*a*) and show that up to 20% of the decrease in food spending at retirement is driven by a decrease in the cost of the food basket for retirees. Additional time diary information from the 2002 Spanish Time Use Survey (STUS) reveals that retirees

devote more time to shopping, confirming the evidence from prices, and more time to cooking activities. Increases in households' home production time come with a time reallocation between spouses, whereby the head takes upon some of the home production activities after retirement.

After ruling out that the difference in the behavior of food spending at retirement in both periods is due to changes in pension replacement rates over time or to the methodological differences in the expenditure survey in the two periods, we provide an explanation that hinges on augmenting the home production model with social norms. We argue that non-egalitarian norms about the household division of labor in the earlier period may have prevented the reallocation of home production time between the spouses that would have otherwise resulted from a change in relative wages upon retirement—i.e., food expenditure before and after retirement stays the same because home production stays the same. More egalitarian social norms in the latter period, however, may have allowed spouses to freely reallocate time resources upon retirement, resulting in the substitution of market goods for home-produced goods and the observed drop in food expenditure, albeit not necessarily food consumption, in the later years of the survey. Consistent with our hypothesis, information on attitudes from the International Social Survey Program (ISSP) reveals that, gender norms changed in Spain over the period and men and women developed more egalitarian attitudes. Additionally, although there are no time use diaries corresponding to the earlier period of the expenditure survey, responses about the division of household labor from the ISSP reveal that men take over a greater share in domestic tasks over this period. In summary, the evidence seems to point towards a substitution of market goods for home-produced goods as the main explanation for the observed decline of food expenditure in the latter years of the Spanish expenditure survey.

The rest of the paper is organized as follows. Section 1 describes the dataset and provides a brief summary of the Spanish pension system. Section 2 documents how spending changes upon retirement in Spain. Section 3 investigates the home production model. Section 4 concludes.

# 1. Data and Background on Spanish Pensions

## 1.1. *The Spanish Expenditure Survey*

We use a household-level dataset of quarterly spending called "Encuesta Continua de Presupuestos Familiares" (ECPF hereafter). The ECPF is a rotating panel conducted by the Spanish National Institute of Statistics (INE). Out of the approximately 3,100 to 4,000 households interviewed each quarter, one eighth is renewed every quarter so many households can be followed for up to eight consecutive quarters. The ECPF overcomes some shortcomings of other panel datasets such as the PSID or the BHPS because it contains very detailed information on expenditure (not just food) as well as demographic and economic variables. Since households are followed for a longer period than households in the CEX, we can take advantage of a true (although short and unbalanced) panel structure. The time over which the data is collected is also useful (we have data from 1985 to 2004) as it covers a period of rapid economic and social change in Spain. Unique to our dataset is the availability of information on quantities purchased for a broad range of food items (in addition to expenditure), along with information on meals consumed at home (for the latter period), which allows us to study the relationship between expenditure and home production.

We utilize two distinctive periods of the survey. The first period covers 1985:1 to 1997:2 (ECPF-85), while the second period goes from 1997:4 to 2004:4 (ECPF-97).[2] The aim of both surveys is the same, the construction of weights for the Spanish CPI.[3] However, important methodological changes were introduced in 1997. The most relevant change for our analysis is the introduction of two modes of collaboration in the ECPF-97. Whereas in the ECPF-85 households record expenditure for all categories all quarters, in the ECPF-97 households report on all expenditure categories in quarters under what the INE calls *strong*

[2]Researchers have used the ECPF-85 to address a variety of topics. For example, Browning & Collado (2001) find no excess sensitivity of consumption to large and predictable income changes associated to bonus pay in Spain, while Carrasco et al. (2005) study habit formation.

[3]The method for collecting information on expenditures is mixed. First, households are asked to record directly all spending during a reference week in a diary provided by the INE. An interviewer also leaves behind a form for households to record expenses outside the reference week on good and services not typically purchased on a weekly basis, and comes back to meet the household member who runs the household to complete a detail questionnaire about spending on a given month or quarter for those items using the form as well as recall information.

*collaboration* (G), but report only on selected categories of goods and services in periods of *weak collaboration* (g). In other words, a given household keeps track of expenditure on goods and services that are not typically bought weekly when in weak collaboration mode, but keeps track of all expenditures when in strong collaboration mode. With this change, the INE wanted to limit survey fatigue while still getting accurate numbers for expenditure on non-everyday items. The typical sequence of collaboration for a household is G G g g G G g g, although a few households seem to report all expenditures all quarters probably due to confusion.[4] Sample sizes are generally bigger in the most recent years (4,000 vs. 3,100 households), and although the ECPF-97 contains richer demographic information on each household member, information on household income is particularly poor as is only reported in intervals—the ECPF-85 contains detailed income information for several household members.

Pou & Alegre (2002) document that total expenditure in the ECPF-85 accounts for 79.9% of consumption in the Spanish National accounts. By categories, food, housing, and clothing are particularly well represented (the ECPF-85 accounts for 90% or above of the National Account numbers), while medicines and other goods and services are less so (roughly 40%). Income levels are systematically much lower than the corresponding figures in the National Accounts, about 65.1%, but growth rates in the ECFP-85 and the National Accounts are practically the same for both income and total expenditure, which suggests that underreporting is constant over the period–earnings are better captured than capital income, accounting for 69% and 15%, respectively, of the corresponding figures in the National Accounts. The ECPF-97 accounts for roughly 85% of consumption in the National Accounts.[5] Income information is very limited in the ECPF-97 to report meaningful comparisons with the National Accounts.

[4]Another relevant methodological change is that in the ECPF-97 expenditure is recorded upon the acquisition of goods and services, rather than at the moment of payment (which may occur in the future). This is especially relevant for items which are paid in installments, and avoids possible measurement error due to retrospective thinking by respondents. There is also a different classification of expenditure categories in both waves, PROCOME in ECPF-85 vs. COICOP/HBS in ECPF-97.

[5]We computed this number by dividing total expenditure from the ECPF-97 by household consumption from the National Accounts in the years 1998 to 2004. 85% is the average ratio over that period. Both series are available from the INE at www.ine.es.

## 1.2. *Pensions in Spain*

The public retirement pension system in Spain is pay-as-you-go, and pensions are of the defined-benefit type. The system is financed through contributions from employers and employees, 23.6 and 4.7% respectively.[6] Retirement pensions are organized around three basic plans: the general regime (the largest, covering private sector employees and some public servants), the regime for employees of the Central Government, and five special regimes (the self-employed, miners, fishermen, farm workers and small farm owners, and domestic workers). Individuals may qualify for a small non-contributive pension at old age if they are not covered by the above plans and can prove need. Private pension plans are not very important for Spanish households during our sample period. According to the OECD, total assets in private pension funds were about 2% of GDP in 2001, compared to 75% in the US.

The normal retirement age in Spain is 65 years old. Certain groups of workers can retire earlier without penalty (typically after age 60 but a few even earlier), mostly workers in dangerous professions (miners, fishermen, airline and railroad employees, policemen, etc.), professionals whose activity may be hard to maintain after a certain age (dancers, bullfighters, etc.), and some public employees. Early retirement with penalty is also possible at age 60 for workers in the general regime who contributed to the Social Security system before 1967, or at age 61 for unemployed individuals who have contributed at least 30 years to the system (and a few other special cases).

During our sample period, pension eligibility for workers in the general regime requires a minimum of 15 years of contributions and complete withdrawal from the labor force.[7] The initial amount of the pension is obtained by multiplying a base and a replacement rate. (Pensions are updated using the CPI). The base is a moving average of monthly contributions in the 8 years immediately before retirement (15 after a reform in 1997). For those retiring at a normal retirement age, the replacement rate depends on the number of years of contributions.[8]

[6] Other contributing pensions offered through the Social Security system are pensions for disability, widowhood, orphans and other relatives. Pensions for old-age account for roughly 3/4 of all pensions.

[7] An amendment in 2002 allows for part-time employment after retirement in certain cases.

[8] An individual receives 100% of the base if he has contributed 35 or more years to the system. Otherwise, the replacement rate is $.6 + .02 \times (n - 15)$, where $n$ is the number of years of contributions. After the 1997 reform, the replacement rate is $.5 + .03 \times (n - 15)$ if $15 \leq n < 25$ and $.8 + .02 \times (n - 25)$ if $25 \leq n < 35$. The

In case of early retirement, the replacement rate is reduced by 8 percentage points for each year under age 65 (i.e., the penalty is 40% for somebody retiring at age 60). After 1997, the penalty is reduced to 7 percent for those who retire early with 40 or more years of contributions. An amendment in 2002 varies the penalty for early retirement from 6 to 8% depending on age and the number of years of contributions, introduces a 100% replacement rate for those retiring after age 65 regardless of contribution years, and provides incentives to work past age 65, as the replacement rate can be higher than 100 percent if retiring after age 65 with more than 35 years of contributions.[9] There is a minimum and a maximum for pensions. The minimum pension is compatible with early retirement, varies with household size and has been increasing over time, which implies no penalty at all from early retirement for certain individuals. Jiménez-Martín & Sanchez-Martín (2007) report that almost 35% of old-age pensions were topped up to the minimum in 1999. Also, minimum pensions have been increasing over time and surpassed the minimum annual wage in 2000.

Our sample period corresponds to an era of rapid sectorial change in Spain that led to special agreements between the State and firms in specific sectors (e.g., coal, steel, ship building) to reduce the labor force. Collective wage settlements imposed mandatory retirement at age 65, facilitated retirement at 64 with full benefits, and encourage early retirement (at 60 or even earlier) through lump sum payments leaving many workers in a pre-retirement situation.[10] According to data from the Spanish Social Security Administration, early retirement is not uncommon in Spain during period covered by our survey. In 1987, 34.4% of new retirees are 60 or younger, 27.5% are aged 61–64, 33.6% are 65 years old, and 4.5% are over the age of 65—the corresponding numbers for 1999 were 39.5, 23, 33.8 and 3.7, respectively (see IMSERSO 2002).

base and replacement rates are calculated differently for employees of the Central Government. See Boldrin & Jiménez-Martín (2006) for a comprehensive description of the Spanish pension system.

[9]Self-employed workers do not have an early retirement option but can continue to work while receiving a pension. Public employees must retire at age 65, with a few exceptions, can retire early at age 60 without penalty if they have enough years of service, and their pension is compatible with earnings from employment in the private sector.

[10]For some workers, this situation is better protection than ordinary dismissal. The state provides unemployment benefits and the firm provides additional contributions to the social security system, and/or above typical severance packages. The process of pre-retirement is quite controversial in Spain as there is a sentiment that many firms which are not in a situation of crisis use pre-retirement agreements as a way to lower labor costs at the expense of public funds. See Miguelez (2000).

In Section 2.3 we document that household income does not decrease at retirement for households outside of the top quartile of the pre-retirement income distribution throughout the period covered by the ECPF.

# 2. Expenditure at Retirement in Spain

## 2.1. *Empirical Specification*

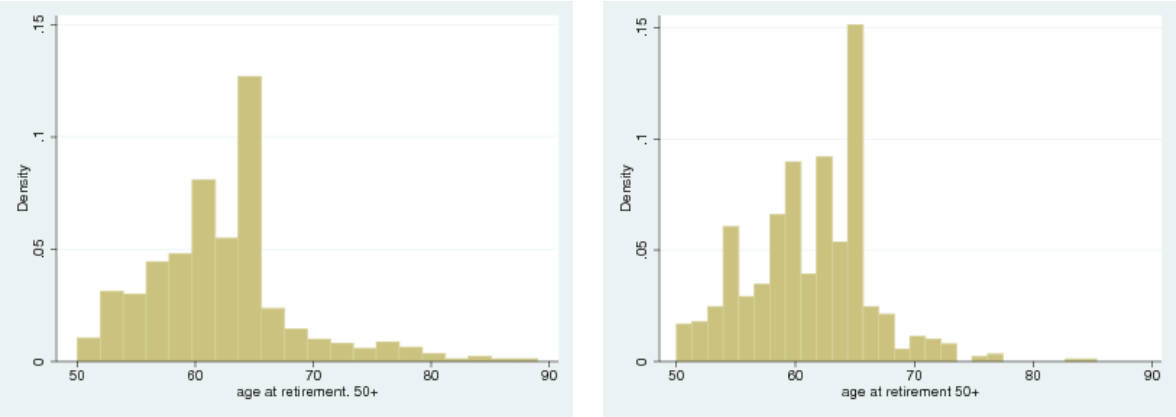
In order to document whether there is a retirement consumption puzzle in Spain, we follow standard methodology and run the following regression:

$$\log C_{it} = \alpha_i + \beta R_{it} + \gamma X_{it} + \varepsilon_{it}, \tag{1}$$

where $C_{it}$ is (deflated) consumption for household $i$ in period $t$, $\alpha_i$ is a household fixed effect, $R_{it}$ is a dummy for whether the head of household is retired or not, $X_{it}$ denotes controls (quarter-year dummies, household head age dummies and household size dummies), and $\varepsilon_{it}$ is an error term.[11] This equation can be derived from a standard Life Cycle-Permanent Income Hypothesis model (see Browning et al. 1985, Blundell & Macurdy 1999) as shown in Smith (2006).

A finding of $\widehat{\beta} < 0$ signifies an expenditure drop at retirement. Since our specification includes household fixed effects, we are capturing deviations in expenditure from average expenditure associated to retirement for a given household. When estimating equation (1), we allow for heteroskedasticity of unknown form and cluster standard errors by household. Appendix A presents results from an alternative specification that relies on expenditure growth rates calculated using the ECPF-85 (this analysis cannot be done with data from the ECPF-97). Results are very similar in the two specifications.

[11] Battistin et al. (2009) show that retirement induces a significant drop in the number of grown children living with their parents, which accounts for a large fraction of the retirement consumption drop in Italy. We control for household size in a flexible way using household size dummies.




*(a)* ECPF85 *(b)* ECPF97

Fig. 1. *Distribution of Retirement Ages in the Expenditure Survey*

## 2.2. *Sample*

Retirement is identified from a question in the ECPF regarding economic activity the week before the interview. In the survey, a household member can be classified in the following categories: (1) employed, (2) unemployed, (3) retired or receiving a pension, (4) homemaker or (5) other—a student, a person in military training, a person living of capital income only, etc. We focus on heads and classify a household as "retired" if the head is in category (3).

The survey question does not allow us to distinguish retirement pensions from other pensions. According to Spanish Social Security rules, most individuals are not eligible to receive retirement pensions until age 60. An individual in category (3) who is younger than 60, is either receiving a non-retirement pension (e.g., disability or widowhood), is perhaps in a situation of pre-retirement, or belongs to a very particular group of workers. Figure 1 presents the distribution of retiring ages for the household heads we observe retiring within the study, who are 50 or older when first interviewed. Although there is a peak in retirement at age 65, a significant proportion of household heads take advantage of early retirement, and a fraction of heads starts receiving a pension before the legal early retirement age of 60.[12] Some workers also retire past age 70.

For the main analysis, the sample is limited to households with heads 59–70 years old,

[12]The ECPF-85 does not contain information on work hours so we are not able to consider alternative definitions of retirement. The ECPF-97 contains information on work hours for those reporting being employed.

with stable marital status, and who are in the labor force the first time they are observed. The age restriction allows us to exclude certain individuals who may have retired unexpectedly as normal early retirement starts at 60. Households with permanent visitors are excluded, as are households with obvious inconsistencies in basic demographic characteristics in consecutive quarters (e.g., a change in head gender or a change in age larger than 2 years) and missing information in any of the necessary variables for our analysis. The panel is unbalanced in the sense that observations from individuals who leave the survey prior to the final year of our sample period are included. As in previous studies, we only consider the first move into retirement and ignore any subsequent movements in and out of retirement. Our baseline sample includes households who we actually observe retiring within the survey, but in some specifications we augment the sample to include those who do not retire within the survey or who are retired to begin with within the 59–70 age range.

To be able to compare our results to those of previous studies, we define the following expenditure categories: (1) total expenditure; (2) nondurable spending which includes food, clothing, utilities, household services, medical services, transportation, entertainment and communication, personal care, and restaurants and hotels; (3) nondurable spending excluding work related expenses (clothing, public transportation, and restaurant meals); (4) work-related categories excluding food away (clothing and transportation mainly); (5) total food expenditure; (6) food away; (7) food at home.[13]

Table 1 presents summary statistics of the relevant variables for both the ECPF-85 and the ECPF-97—Appendix A describes how we arrived at these samples. For the baseline sample in the ECPF-85, we have 2,442 observations for 366 households who transition into retirement while in the survey, and we observe them 7 quarters on average. The average age for household heads in our sample is 63, 90% of the heads are married, 92% have male heads, and the average household size is 3.15 members. Summary statistics are similar in the ECPF-97: 388 households transition into retirement, the average age is 63, average household size is 2.89, 83% are married and 90% are headed by males. The most important difference is that the number of periods a household is in the sample is lower (5 quarter on average)

[13]The estimation equation derived from a life-cycle model strictly applies to nondurable consumption. Results for total expenditure are reported for completeness.

Table 1
*Summary Statistics from the Spanish Expenditure Survey (ECPF)*

| | ECFP-85 | | | | | ECPF-97 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | SD | Min | Max | Obs. | Mean | SD | Min | Max | Obs. |
| Log. Total Exp. | 7.99 | 0.65 | 5.30 | 10.44 | 2442 | 8.34 | 0.63 | 6.13 | 10.41 | 1236 |
| Log. Nondurable Exp. | 7.71 | 0.66 | 4.92 | 9.59 | 2442 | 7.70 | 0.70 | 4.97 | 9.70 | 1236 |
| Log. Nondurable Exp. | 7.46 | 0.65 | 3.28 | 9.38 | 2442 | 7.58 | 0.70 | 4.83 | 9.55 | 1236 |
| Log. Work-Related Exp. | 5.72 | 1.63 | 0.00 | 9.23 | 2442 | 6.07 | 1.07 | 1.61 | 8.51 | 1122 |
| Log. Food Exp. | 6.88 | 0.66 | 0.06 | 8.78 | 2442 | 7.00 | 0.75 | 2.93 | 9.12 | 1236 |
| Log. Food Away | 4.27 | 2.27 | 0.00 | 8.40 | 2442 | 5.62 | 1.17 | 0.00 | 8.79 | 1009 |
| Log. Food Home | 6.61 | 0.75 | 0.06 | 8.51 | 2442 | 6.63 | 0.76 | 2.84 | 8.81 | 1236 |
| Log. Household Income | 7.93 | 0.79 | 0.00 | 10.59 | 2242 | — | — | — | — | — |
| Household size | 3.15 | 1.44 | 1.00 | 9.00 | 2442 | 2.89 | 1.30 | 1.00 | 10.00 | 1236 |
| Married | 0.90 | 0.30 | 0.00 | 1.00 | 2442 | 0.83 | 0.38 | 0.00 | 1.00 | 1236 |
| Head's age | 63.08 | 2.30 | 59.00 | 70.00 | 2442 | 63.43 | 3.03 | 59.00 | 70.00 | 1236 |
| Male head | 0.92 | 0.27 | 0.00 | 1.00 | 2442 | 0.90 | 0.30 | 0.00 | 1.00 | 1236 |
| Household w. homemaker | 0.71 | 0.45 | 0.00 | 1.00 | 2442 | 0.62 | 0.49 | 0.00 | 1.00 | 1236 |
| Log. Price index | –0.03 | 0.16 | –0.88 | 0.81 | 2433 | –0.03 | 0.23 | –1.87 | 0.95 | 1194 |
| Log. Quantity categories | 2.54 | 0.41 | 0.00 | 3.30 | 2433 | 4.17 | 0.18 | 3.09 | 4.25 | 1196 |
| Total meals at home/week | — | — | — | — | — | 40.04 | 23.26 | 0.00 | 266.00 | 1194 |
| Small Town dummy | 0.56 | 0.50 | 0.00 | 1.00 | 2442 | 0.51 | 0.50 | 0.00 | 1.00 | 1196 |
| Periods in survey | 7.14 | 1.40 | 2.00 | 8.00 | 2442 | 5.33 | 1.13 | 1.00 | 6.00 | 1236 |
| Periods in regressions | 7.14 | 1.40 | 2.00 | 8.00 | 2442 | 3.42 | 0.79 | 1.00 | 4.00 | 1236 |
| Retired dummy | 0.49 | 0.50 | 0.00 | 1.00 | 2442 | 0.44 | 0.50 | 0.00 | 1.00 | 1236 |
| Households retiring | 366 | | | | | 388 | | | | |

*Notes*: Our sample includes households with heads aged 59–70 who were in the labor force when first interviewed, who do not change marital status, and who are observed retiring within the survey.

reflecting the more recent nature of the survey. Moreover only about 3 quarterly observations per household can be used in the regressions because of the different collaboration modes in the ECPF-97. Since only households in strong collaboration mode report expenditure in all categories, we cannot use observations from weak collaboration periods in the expenditure regressions. However, all periods can be used to construct retirement histories, etc.

## 2.3. *Results*

Table 2 shows the results obtained when estimating equation (1) using both the ECPF-85 and the ECPF-97 together (top panel) and separately (bottom panels). First, we find no evidence of a decrease in total expenditure at retirement. When using the broader nondurable expenditure definition in the pooled data, there is a 2.1% decline of expenditure upon retirement but the estimated coefficient is not statistically different from zero. When excluding work related spending, the coefficient decreases to 1.8%, while the coefficient for work-related categories is considerably higher, 7.6%, but imprecise. Total food spending and spending on food away from home decline with retirement by 5.5 and 14%, respectively (coefficients significant at the 5 and 10% level, respectively). Food at home declines by 3.4% but the coefficient is not precisely estimated.

When using data from the ECPF-85 alone, no estimated coefficient is significantly different from zero (the largest coefficients are for work-related categories and food away from home, 10.7 and 15.5%). These results are in line with those in Christensen (2008) who uses the ECPF-85 but employs a different sample and methodology. She finds no evidence of a decline of expenditure at retirement, except for health related expenses which are heavily subsidized for retirees in Spain.

For the ECPF-97, we only find a significant decline of expenditure at retirement for food, total and at home, of roughly 13% and 9%, respectively. The coefficient for food away from home is large, 9.5%, but not precise. The results for the ECPF-97 are consistent with those reported in Aguila et al. (2011) who use the panel structure of the CEX for the first time and compare household spending before and after retirement. Unlike previous studies using U.S. cross-sectional data, these authors find no significant drop in nondurable expenditure at retirement. They also find a decline of total food spending of roughly 6% (somewhat smaller

Table 2
*Expenditure at Retirement*

| | Total Expenditure (1) | Nondurable Expenditure (2) | Nondurables (no work) (3) | Work-related categories (4) | Food Total (5) | Food Away (6) | Food Home (7) |
|---|---|---|---|---|---|---|---|
| | | | ECPF-85 and ECPF-97 | | | | |
| Retired dummy | 0.008 | –0.021 | –0.018 | –0.076 | –0.055** | –0.140* | –0.034 |
| | (0.019) | (0.019) | (0.021) | (0.063) | (0.023) | (0.077) | (0.025) |
| N | 3678 | 3678 | 3678 | 3564 | 3678 | 3451 | 3678 |
| | | | ECPF-85 | | | | |
| Retired dummy | 0.008 | –0.012 | –0.007 | –0.107 | –0.026 | –0.155 | –0.011 |
| | (0.020) | (0.022) | (0.024) | (0.077) | (0.025) | (0.094) | (0.028) |
| N | 2442 | 2442 | 2442 | 2442 | 2442 | 2442 | 2442 |
| | | | ECPF-97 | | | | |
| Retired dummy | 0.006 | –0.045 | –0.045 | 0.012 | –0.130** | –0.095 | –0.093* |
| | (0.040) | (0.037) | (0.038) | (0.092) | (0.050) | (0.095) | (0.054) |
| N | 1236 | 1236 | 1236 | 1122 | 1236 | 1009 | 1236 |
| | | | ECPF-85 mimicking the ECPF-97 structure | | | | |
| Retired dummy | –0.023 | –0.051 | –0.035 | –0.277** | –0.059 | –0.189 | –0.020 |
| | (0.035) | (0.033) | (0.038) | (0.110) | (0.039) | (0.131) | (0.042) |
| N | 1350 | 1350 | 1350 | 1350 | 1350 | 1350 | 1350 |

*Notes*: The regression is $\log C_{it} = \alpha_i + \beta R_{it} + \gamma X_{it} + \varepsilon_{it}$, where $C_{it}$ is real consumption for household $i$ in period $t$, $\alpha_i$ is a household fixed effect, $R_{it}$ is a retired dummy (equal to 1 if the household is retired and 0 otherwise), and $X_{it}$ denotes additional controls (year-quarter dummies, household size dummies, head of household age dummies). Samples in both surveys include households with heads aged 59–70 and stable marital status, who were in the labor force when first interviewed and retire within the survey. Robust standard errors (in parentheses) clustered by household. *** (**) [*] significant at the 1 (5) [10]%.

than in previous literature as they might be capturing a short-run effect), and a decrease in food at home spending of around 4.5%. Given that food is one of the consumption categories more amenable to home production, those authors argue their evidence provides further support for the home production explanation of the retirement consumption puzzle.

As previously discussed, there are important methodological differences between the ECPF-85 and the ECPF-97. Our previous regressions, even when pooling the two surveys, do not rely on comparisons of households across surveys because our specification includes household fixed effects and no household is in both surveys. However, it is important to determine if expenditure patterns upon retirement, particularly for food where the difference across surveys is most striking, have changed smoothly over time. To this end, we pool both surveys together maintaining the fixed-effects specification but allowing for the effect of retirement on spending to vary over time. We divide the sample period in four sub-periods (two for each survey) with roughly the same number of households retiring within them, and report the coefficients on the four retirement dummies separately. Thus, we run the following regression:

$$\log C_{it} = \alpha_i + \sum_{j=1}^{4} \delta_j \, R_{it}^{j} + \gamma X_{it} + \varepsilon_{it}, \tag{2}$$

where $R_{it}^{j}$ is a retired dummy equal to one if head of household $i$ is retired and retires within period $j$, and zero if $i$ is not retired or retires in a different period (all other variables were previously defined). We focus on the evolution of $\delta_j$ over time. As seen in Table 3, there is no particular pattern for the effect of retirement on total expenditure over time, but for the other expenditure categories, particularly for food expenditure, there seems to be a somewhat accelerating trend so that the drop in expenditure upon retirement increases over time. We do not seem to have enough observations to get precision in our estimates but nevertheless the pattern is suggestive.

We further explore whether the introduction of collaboration modes in the ECPF-97, which prevents us from using all quarterly observations from that survey, is causing any biases by mimicking the ECPF-97 structure when using data from the ECPF-85. That is, we exclude about half of the observations from the ECPF-85 following the pattern G G g

Table 3
*Expenditure at Retirement. Different Periods*

| | Total Expenditure (1) | Nondurable Expenditure (2) | Food Total (3) | Food at Home (4) |
|---|---|---|---|---|
| Retired, 1985–1990 | –0.006 | –0.014 | –0.023 | 0.010 |
| | (0.028) | (0.030) | (0.036) | (0.040) |
| Retired, 1991–1997 | 0.021 | –0.015 | –0.038 | –0.037 |
| | (0.029) | (0.031) | (0.032) | (0.038) |
| Retired, 1998–2000 | 0.010 | –0.024 | –0.085 | –0.076 |
| | (0.066) | (0.058) | (0.065) | (0.072) |
| Retired, 2001–2004 | 0.007 | –0.053 | –0.152** | –0.098 |
| | (0.046) | (0.046) | (0.072) | (0.074) |
| N | 3678 | 3678 | 3678 | 3678 |

*Notes*: The regression is $\log C_{it} = \alpha_i + \sum_{j=1}^{4} \delta_j R_{it}^j + \gamma X_{it} + \varepsilon_{it}$, where $C_{it}$ is real expenditure in period $t$ for household $i$, $\alpha_i$ is a household fixed effect and $R_{it}^j$ is a retired dummy equal to 1 if the household head is retired and entered retirement within period $j$ and 0 otherwise. $X_{it}$ denotes additional controls (year-quarter dummies, household size dummies, head of household age dummies). The sample includes households with heads aged 59–70 with stable marital status, who were in the labor force when first interviewed and retire while in the survey. Robust standard errors (in parentheses) clustered by household. *** (**) [*] significant at the 1 (5) [10]%.

g G G g g (and keep a few random households reporting spending all quarters as in the ECPF-97). Recall G denotes strong collaboration when households report all expenditures, while g denotes weak collaboration which means households only record expenditure on infrequently purchased items. The results in the last panel of Table 2, when compared to the second panel, indicate that having less observations in this manner leads to slightly larger coefficients (in absolute value) but importantly, none of the estimated coefficients is statistically significant, and the food coefficients are well below those estimated with data from the ECPF-97. Further robustness checks dealing with the methodological differences between the ECPF-85 and the ECPF-97 are discussed in Appendix A.

*Other robustness checks*

Our results are robust to changes in the sample definition (excluding female heads, adding households not retiring within the sample or households who are retired to begin with, and considering younger retirees) as shown in Appendix A. We also asses whether expenditure patterns depend on retirement being voluntary following Smith (2006), who proposes separating households who are more likely to have retired involuntarily from the rest. We find that the fall in food expenditure in the ECPF-97 cannot be explained by involuntary retirement alone, and the difference in the behavior of food expenditure at retirement between the two periods for those who are less likely to retire involuntary persists.

*The role income*

Bernheim et al. (2001) find that households with lower income replacement rates and those at the bottom of the wealth distribution have larger expenditure declines at retirement. These households might not have saved enough for retirement for various reasons and, for them, an income drop at retirement translates into an expenditure decline as households adjust to their new reality. Minimum pensions in Spain are close to or higher than the minimum wage during our sample period and replacement rates do not fall much with pre-retirement earnings: the replacement rate is identical for workers with earnings 0.5 to 1.5 times mean earnings, 81%, decreasing to 66.7 for those with twice mean earnings (net replacement rates, replacement rates as a percentage of net earnings, are slightly higher, 84.2%

for the median earner). In the same interval, 0.5 to 2 times mean earnings, replacement rates in the US vary from 50.3 to 28.8%, and from 72.2 to 50 for the OECD on average. It is nonetheless important to document how income changes at retirement in Spain and whether expenditure patterns vary across income/wealth groups to interpret our findings and to determine if the income poor are driving our results.

We first document how income changes at retirement. The ECPF-85 contains reliable and detailed income information but this is not the case for the ECPF-97 which only includes self-reported household income intervals (eight income brackets). The ECPF does not contain wealth information. In the ECPF-85, household income is defined as the sum of salaries and wages, income from self-employment, capital income, pensions, unemployment insurance, in-kind wages and other transfers (including lottery winnings, inheritance, etc.) for all household members. Income is reported after tax withholding and is net of social security payments. To document income changes at retirement in the later period, we use the European Community Household Panel Survey (ECHP) which runs from 1994 to 2001, lining up with the ECPF-97 period.[14] We are able to construct a sample of individuals going through retirement as in the ECPF-97 with similar sample size and characteristics (details in Appendix B). In the ECHP, household income is net and includes income from work (salary and self-employment earnings), non-work private income, capital income, rent and property income, and private and social transfers (including pension, unemployment, and housing allowances). The ECHP reports annual income and we divide annual income by four to obtain a quarterly figure comparable to the ECPF-85.

Table 4 summarizes results from running the specification in equation (1) with household income as the dependent variable. We further document how income changes at retirement for different pre-retirement income groups by running the regression:

$$\log Y_{it} = \alpha_i + \beta R_{it} + \sum_{j=1}^{2} \lambda_j \left(R_{it} \times I_i^j\right) + \gamma X_{it} + \varepsilon_{it}, \tag{3}$$

where $Y_{it}$ denotes household real income and $I_{it}^j$ is an indicator variable for being income

[14] We cannot document income changes at retirement for the period 2001–2004 using the ECHP. However, given that there were no major pension reforms between 2001 and 2004, we do not believe our conclusions would change.

poor ($j = 1$) or income rich ($j = 2$) before retirement, and all other variables are defined as before. We classify households as income poor (rich) if they were in the bottom (top) income quartile in one the two periods before retirement in the ECPF-85 (ECHP).

The coefficient for the retirement dummy shows that, on average, income does not decrease at retirement in either period, columns (1) and (3). Interestingly, household income increases upon retirement for the group in the bottom quartile, possibly because of the minimum pension, and it decreases only for the top quartile group. The pattern is the same in both surveys, columns (2) and (4). If we restrict the sample period in the ECHP to 1998–2001 to better match the ECPF-97, results are similar, no average income decline (in fact, there is a significant income increase on average). Appendix A presents further robustness analysis using the income brackets in the ECPF-97 with similar patterns. We conclude that it is unlikely that changes in replacement rates over the sample period can explain the different behavior of food expenditure upon retirement in the ECPF-85 and the ECPF-97.[15]

We further explore if there are differences in the behavior of expenditure at retirement by pre-retirement income group by running the specification in equation (3) with expenditure on the left hand side. In this case, we use the limited income information in the ECPF-97 and classify households as pre-retirement poor (rich) if they report being in one of the two (four) lowest (highest) income brackets in one of the two periods before retirement. This classification roughly corresponds with a bottom-top quartile cut-off (see Table A6 in Appendix A). We use the top and bottom quartile cut-offs when using the ECPF-85 just as in the income specification.[16]

Table 5, top panel, summarizes our findings for the ECPF-85. There are no significant differences across income groups for the estimated effect of retirement on total and nondurable expenditure. The pre-retirement income rich and income poor seem to decrease

[15] A different approach to study the effect of income changes upon retirement on consumption would be to use an instrumental variable regression approach by regressing consumption on income, instrumenting with a retirement dummy and possibly interactions for poor and rich. However, we do not have good income data for the ECPF-97 and moreover, there does not seem to be any pattern in terms of retirement on income (i.e., no first stage), which makes this approach less appealing in this case.

[16] In the ECPF-97, those in the income poor group had incomes below 811 euros a month pre-retirement in 1992 prices and those in the income rich group had incomes above 1,983 euros a month. In the ECPF-85, average income the year before retirement is 660 euros for the poor and 1,989 euros for the rich. The alternative of classifying households as poor (rich) if they have income below (above) 811 (1,983) euros when using ECPF-85 data produced very similar results.

Table 4
*Income at Retirement by Income Group*

| | ECPF-85 | | ECHP 1994–2001 | | ECHP 1998–2001 | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Retired dummy | 0.030 | 0.008 | 0.053 | 0.052 | 0.093** | 0.077 |
| | (0.043) | (0.045) | (0.042) | (0.050) | (0.047) | (0.060) |
| Retired × Bottom Income Quartile | | 0.172** | | 0.110** | | 0.078 |
| | | (0.081) | | (0.068) | | (0.117) |
| Retired × Top Income Quartile | | –0.133* | | –0.125*** | | 0.005 |
| | | (0.080) | | (0.046) | | (0.106) |
| N | 2242 | 2442 | 1908 | 1908 | 1004 | 1004 |

*Notes*: The regression is $\log Y_{it} = \alpha_i + \beta R_{it} + \sum_{j=1}^{2} \lambda_j \left(R_{it} \times I_i^j\right) + \gamma X_{it} + \varepsilon_{it}$, where $Y_{it}$ is real household income for household $i$ in period $t$, $\alpha_i$ is a household fixed effect, $R_{it}$ is a retired dummy (equal to 1 if the household is retired and 0 otherwise), $I_{it}^j$ is an indicator variable for being in the bottom or the top income quartile before retirement, and $X_{it}$ denotes additional controls (year-quarter dummies, household size dummies, head of household age dummies). Samples in both surveys include households with heads aged 59–70 and stable marital status, who were in the labor force when first interviewed and retire within the survey. Robust standard errors (in parentheses) clustered by household. *** (**) [*] significant at the 1 (5) [10]%. Income information is limited in the expenditure survey after 1997 (ECPF-97) and we use the 1994–2001 European Community Household Panel (ECHP) to document income changes in the latter period.

food at home spending more than the middle group but the estimated coefficients are not precise. The results for the ECPF-97, bottom panel, show that the large food expenditure decline at retirement in the latter period is not just driven by the poor although the effect is particularly strong for this group. In this period, individuals in the top quartile income group do not seem to decrease food spending upon retirement.

With these findings at hand, we argue that the decline of food expenditure in the ECPF-97 being the result of insufficient savings due to myopia or some other reason for consumption tracking income is not consistent with the Spanish evidence. First, we find a decline of food expenditure not too dissimilar to the US despite the fact that income changes at retirement in Spain are small compared to other countries—Haider & Stephens (2007) estimate the fall in food spending at retirement in the US to be from 7–11% for workers who retire as expected, while the drop in income is 20–30%.[17] Second, the households who decrease food

[17]Battistin et al. (2009) find a 10 (14)% drop in nondurable (food) spending at retirement in Italy. These authors do not report income changes at retirement but replacement rates in Italy are high as in Spain and many workers receive bonus payments at retirement.

Table 5
*Expenditure at Retirement by Income Group*

| | Total Expenditure (1) | Nondurable Expenditure (2) | Food Total (3) | Food at Home (4) |
|---|---|---|---|---|
| | ECPF-85 | | | |
| Retired dummy | 0.003 | –0.027 | –0.022 | 0.015 |
| | (0.025) | (0.026) | (0.027) | (0.030) |
| Retired × Bottom Income Quartile | 0.015 | 0.053 | –0.012 | –0.084 |
| | (0.038) | (0.043) | (0.042) | (0.079) |
| Retired × Top Income Quartile | 0.012 | 0.030 | –0.008 | –0.071 |
| | (0.056) | (0.061) | (0.059) | (0.060) |
| N | 2442 | 2442 | 2442 | 2442 |
| | ECPF-97 | | | |
| Retired dummy | –0.001 | –0.043 | –0.112** | –0.094 |
| | (0.043) | (0.042) | (0.055) | (0.060) |
| Retired × Bottom Income Intervals | 0.010 | –0.061 | –0.140 | –0.081 |
| | (0.057) | (0.078) | (0.108) | (0.103) |
| Retired × Top Income Intervals | 0.041 | 0.073 | 0.082 | 0.129 |
| | (0.080) | (0.094) | (0.130) | (0.117) |
| N | 1236 | 1236 | 1236 | 1236 |

*Notes*: The regression is $\log C_{it} = \alpha_i + \beta R_{it} + \sum_{j=1}^{2} \lambda_j \left(R_{it} \times I_i^j\right) + \gamma X_{it} + \varepsilon_{it}$, where $C_{it}$ is real consumption for household $i$ in period $t$, $\alpha_i$ is a household fixed effect, $R_{it}$ is a retired dummy (equal to 1 if the household is retired and 0 otherwise), $I_{it}^j$ is a pre-retirement income indicator, and $X_{it}$ denotes additional controls (year-quarter dummies, household size dummies, head of household age dummies). Samples in both surveys include households with heads aged 59–70 and stable marital status, who were in the labor force when first interviewed and retire within the survey. Robust standard errors (in parentheses) clustered by household. *** (**) [*] significant at the 1 (5) [10]%.

expenditure the most are not experiencing income declines at retirement.

In summary, we find no evidence of a retirement consumption puzzle in Spain as the largest expenditure declines occur for work-related categories and food away from home, which hardly constitutes a puzzle. However, we document a change in the behavior of food expenditure at retirement: food expenditure (total and at home) decreases significantly in the latter period of the survey but not in the earlier period. Given that food is one of the consumption categories more amenable to home production, the substitution of market goods for time-intensive home-produced goods can be a rational explanation for the drop in expenditure around retirement in general. One might wonder, though, if social norms prevented increases in home production at retirement in the earlier period in Spain. Next section investigates this further.

# 3. Consumption vs. Expenditure: Home Production and Household Specialization

Authors such as Aguiar & Hurst (2005) emphasize the distinction between consumption and expenditure to explain the drop in food expenditure upon retirement in the US. Since retirees have a decreased opportunity cost of time relative to their pre-retired counterparts they can engage in non-market production to reduce their expenditure while keeping actual consumption intake unchanged at retirement. In this section, we exploit unique information in the expenditure survey on food quantities, which allows us to compute measures of the average prices paid by households before and after retirement. Moreover, we use complementary information from the 2002 STUS to document how home production changes upon retirement in Spain (details on the STUS are provided in Appendix D). An advantage of the STUS over the American time use Survey (ATUS) is that it records time-diary information for all household members, which allows us to document not just individual home production times but total household time and the reallocation of time between spouses upon retirement. Both STUS and ATUS are cross-sectional surveys so we cannot control for household permanent heterogeneity, nor disentangle age and cohort effects. Nevertheless, we

run the same retirement specification as in equation (1) without household fixed effects. Evidence from the 2002 STUS should be considered when interpreting results for the ECPF-97. Unfortunately, there is no time use diary survey in Spain prior to 2002.[18]

### 3.1. *Shopping Time and Intensity*

Aguiar & Hurst (2007*a*) use Nielsen scanner data for groceries to document that households who shop more intensively pay lower prices for identical goods (their data consists of expenditure and quantities, as well as the number of shopping trips for a sample of Denver households from 1993–1995). They find that the tendency to shop frequently and the use of discounts can account for about three quarters of the observed difference in the prices that middle-age shoppers and older shoppers pay, and argue that the large increase in shopping (and home production) post middle age can account for the decline in expenditure observed for U.S. households despite a non-decreasing consumption-age profile.

In addition to expenditure data, the Spanish survey has information on purchased quantities for many food and drink categories (quantity categories hereafter), which allow us to back out the prices that different households pay for these goods. Compared to scanner data, our data has some advantages and disadvantages. One advantage is that expenditure on these quantity categories represents a higher proportion of food at home in our data than in the aforementioned study. In our survey, these items represent 94 (61)% of food-at-home expenditure, and 31 (18)% of total expenditure ECPF-97 (ECPF-85), while scanner data categories in Aguiar & Hurst (2007*a*) represent just 20% of total grocery expenditure. (See Appendix C for breakdowns by income, age and household composition, as well as a listing of all quantity categories.) Moreover, scanner data does not include meat, fresh foods or vegetables, which we have. An additional advantage comes from the fact that our data covers

[18]The only time use evidence available for Spain before 2002 comes from The Basque Country, a northern Spanish region, whose statistical office has been collecting time-diary data every five years since 1993. Authors' cross-tabulations using the interactive data generator feature from the Basque Institute of Statistics (http://www.eustat.es) show that housework time increases for respondents over 60 by more than half an hour per day between 1993 and 2008. This increase for older individuals is more remarkable in the face of the decrease in housework time (of 32 minutes per day) experienced by younger individuals over the same period, which suggests that decreases in women's housework time over the period are more than compensated by increases in men's housework time after age 60. Micro-level data for these surveys are not currently available, so gender comparisons are not feasible.

a longer time span and we have a rotating panel. Unlike scanner data, we cannot guarantee that the products in a given category are of identical quality. For example, beer is one of our categories. Within this category we cannot distinguish Heineken 33cL vs. Heineken 1L or even Heineken from San Miguel. Prices that decrease with retirement could result from households buying cheaper goods within a category and not necessarily from better shopping. We address this issue by studying time use data directly.[19]

Since households buy a variety of different goods, it is not very informative to compare unit prices by category. Instead, we compute an average price measure for each households as in Aguiar & Hurst (2007*a*). First, for each household $i$ and good $j$ in period $t$ (a given quarter-year), we compute unit prices, $p_{it}^j$ by dividing real expenditure in the category (deflated using the CPI) by the purchased quantity, $q_{it}^j$. Let $Q_t^j = \sum_{i \in I} q_{it}^j$ be the total purchased quantity of good $j$ in period $t$. Averaging over all households, we calculate the average price for a given good during that period $\overline{p}_t^j$ weighting household unit prices by the relative quantity purchased by that household:

$$\overline{p}_t^j = \sum_{i \in I} p_{it}^j \times \left( \frac{q_{it}^j}{Q_t^j} \right).$$

Individual prices are combined into an index which measures how much more or less than average a household is paying for the basket of goods the household purchases, and is calculated as

$$\widetilde{p}_{it} = \frac{\sum_{j \in J} p_{it}^j \times q_{it}^j}{\sum_{j \in J} \overline{p}_t^j \times q_{it}^j}.$$

To guarantee that the index has mean one in every period, it is divided by the average price index across households that period, $\widehat{p}_{it} = (\widetilde{p}_{it})/(\frac{1}{I} \sum_{i \in I} \widetilde{p}_{it})$.

We run specifications analogous to the previous expenditure regressions with the average

[19] Deaton (1987) introduces a methodology that takes advantage of household-level datasets with expenditure and quantity data to estimate a system of demand equations including estimated own- and cross-price elasticities. He warns that since quality choice is affected by prices, unit values are likely to vary less than proportionately with prices. Also, ratios of expenditures to quantities can have substantial measurement error which would be negatively correlated with quantities. These considerations are important but less so in our case as unit values, which we call prices, are on the left hand side and are not used to calculate elasticities.

Table 6
*Life-Cycle Prices at Retirement*

| | Cross-Section Estimates | | Household Fixed Effects | | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Retired dummy | –0.015** | –0.025** | –0.009* | –0.019** | –0.004 | –0.016 |
| | (0.008) | (0.012) | (0.005) | (0.010) | (0.011) | (0.010) |
| Retired × small town | | 0.015 | | 0.015 | 0.011 | 0.014 |
| | | (0.017) | | (0.013) | (0.013) | (0.013) |
| Retired × early period | | 0.017 | | 0.009 | –0.003 | 0.007 |
| | | (0.023) | | (0.014) | (0.016) | (0.014) |
| Retired × small town & early per. | | –0.002 | | –0.001 | 0.002 | –0.000 |
| | | (0.028) | | (0.019) | (0.019) | (0.019) |
| Small town | | –0.041*** | | | | |
| | | (0.015) | | | | |
| Early period | | –0.007 | | | | |
| | | (0.040) | | | | |
| Small town & early period | | –0.044* | | | | |
| | | (0.027) | | | | |
| Age dummies | Yes | Yes | No | No | Yes | Yes |
| Quarter-year dummies | Yes | Yes | No | No | Yes | Yes |
| N | 3627 | 3627 | 3627 | 3627 | 3627 | 14149 |

*Notes*: The regression specification is $\log \widehat{p}_{it} = \alpha_i + \beta R_{it} + \lambda \left(R_{it} \times I_i\right) + \gamma X_{it} + \varepsilon_{it}$, where $\widehat{p}_{it}$ is an average price index for household $i$ in period $t$, $R_{it}$ is a retired dummy, $I_i$ is an indicator variable spelled out in each row, $X_{it}$ denotes additional controls and $\alpha_i$ is a household fixed effect; $\alpha_i = \alpha$ in columns (1)–(4). Small town is defined as a town with less than 50,000 inhabitants which is not a province capital. Additional controls in all columns are household size dummies and the log of the number of purchased categories. The specification in columns (1)–(2) also includes a marital status dummy and a survey dummy. Columns (1)–(5) use our baseline sample of households with heads aged 59–70 who do not change marital status throughout the survey, were in the labor force when first interviewed, and were observed retiring. Column (6) also includes households who do not retire within the survey in the same age range, etc. Robust standard errors clustered by household in parentheses. *** (**) [*] significant at the 1 (5) [10]%.

price measure on the left-hand-side. We include specifications with and without household fixed effects for comparability with the time use regressions using the STUS.[20] Results are summarized in Table 6.

Without household fixed effects and the baseline sample, column (1) of Table 6, we find that on average retired (head) households pay 1.5% less for the basket of goods they purchase than non-retired households. In column (2), we control for town size (as savings from increased shopping intensity may not be possible in small towns with limited shopping venues), time period and the interaction of both.[21] We find that the decrease in prices associated to retirement is lower for those in small towns and in the earlier period (although the coefficients are not precisely estimated). However, households located in small towns pay on average less for their purchased food to begin with, particularly in the earlier period (perhaps those households were able to buy more produce directly from farmers). Since our panel time dimension is short and the constructed average price measure is time specific (paying more or less than average in a given quarter-year), the specification with household fixed effects does not include age or time dummies. We find that households pay on average 0.9% less upon retirement, column (3). The effect is larger, a 1.9% fall in prices upon retirement, for households not in small towns and in the latter period—column (4). When including age and time dummies in the specification, column (5), the coefficient on retirement goes down and is not precisely estimated. We believe this is because we are not able to separately identify the effects of age and retirement if we only include households observed retiring. In column (6), we augment the sample to include all heads aged 59–70, with stable marital status and in the labor force when first interviewed, observed retiring or not, and in this case we estimate a similar size coefficient, –1.6%, significant at the 12% level (the additional households seem to help us better identify age effects). Overall, these findings are analogous to those of Aguiar & Hurst (2007*a*) who find that households aged 65–75, pay roughly one% less for the basket of goods they purchase than households 55–64.

[20]Households of all ages in the survey are used to calculate the total quantities and average prices used to compute the household-specific price index. Results are very similar if we restrict the sample to 59–70 year old heads to calculate total quantities and average prices instead.

[21]Small town is defined as a town with less than 50,000 inhabitants which is not a province capital. It was not possible to create a 'very small town' dummy because of the inconsistencies in town density definitions over time.

Lower prices paid at retirement suggest that retirees spend more time shopping and looking for bargains. Table 7, panel A, documents whether the time devoted to shopping activities increases after the head retires. In particular, we run OLS regressions similar to the previous expenditure regressions using data from the 2002 STUS for a sample of households with heads aged 59–70, where the dependent variable is minutes of shopping per week. We cannot control for unobserved heterogeneity because we have a single cross-section. In column (1) the dependent variable is total shopping time (calculated as the sum of the two spouses' shopping time for couples, and the head's shopping time for singles), and in column (2) the dependent variable is the head's shopping time. Average total shopping time is 248 minutes per week for households with non-retired heads, and 305 minutes per week for households with retired heads. The head's average shopping time is 133 minutes per week if not retired, and 151 minutes per week if retired. Our regressions indicate that total shopping time increases upon retirement by 45 minutes per week, and heads' shopping time by 53 minutes per week, suggesting that the lower average prices paid by retirees in the latter period of the survey do not result just from retirees buying cheaper goods within a category, but rather are associated with genuine increases in the time retirees devote to shopping (for example, by looking for bargains).[22]

One of the advantages of the STUS over time use surveys in other countries is that it contains both spouses' time diaries which allows us to document if shopping and cooking times are reallocated within the household upon the head's retirement. Table 8 shows a similar regression to that in Table 7 for a sub-sample of married households with male heads. The increase in heads' shopping time upon retirement is accompanied by a small decline in spouses' shopping time (the decrease is not statistically significant, though). Nonetheless, total household time devoted to shopping is greater for households with a retired head than for households with a non-retired head. Note that the effect of retirement on the total time households devote to home production is ambiguous and ultimately depends on the shape

[22]See Appendix E for a detailed description of the sample and definition of variables used in the analysis. Regressions including additional controls, like seven dummies for each day of the week, as well as region dummies, did not change the conclusion. Specifications including income dummies led to similar results. Grocery shopping time is distinct from time spent ordering takeout food, or time at restaurants. The STUS does not report time spent traveling for grocery shopping separately from other shopping related travel but the alternative of including travel time associated to general shopping does not qualitatively change our conclusions.

of the home production function and the relative home-labor productivity of the spouses. In the case in which bargaining power is determined by relative income, a drop in head wages upon retirement shifts the bargaining power over to the spouse, which leads to a reallocation of home production time (and thus leisure) between spouses, but also to a new production possibilities frontier where the total home-produced good is higher as long as the spouse (in this case the homemaker) has a higher preference for the home-produced good (see Lundberg et al. 2003).

Table 7
*Shopping, Cooking and Eating (Minutes per Week). Cross-Section Estimates*

| | Total Time (1) | Head Time (2) |
|---|---|---|
| | Panel A: Shopping | |
| Retired dummy | 44.85*** | 53.29*** |
| | (14.35) | (9.71) |
| | Panel B: Cooking | |
| Retired dummy | 38.58** | 26.60** |
| | (19.39) | (13.20) |
| | Panel C: Eating at restaurants | |
| Retired dummy | –4.02 | –4.86 |
| | (9.25) | (5.63) |
| | Panel D: Eating at home | |
| Retired dummy | 38.68* | 34.77** |
| | (16.25) | (10.78) |
| N | 5177 | 5177 |

*Notes*: Data from the 2002 Spanish Time Use Survey. Total time is the sum of the two spouses' time for couples, and the head's time for singles. The regression specification is $t_i = \alpha + \beta R_i + \lambda + \gamma X_i + \varepsilon_i$, where $t_i$ is minutes per week spent shopping, cooking or eating by the two spouses or the head $i$, $R_i$ is a retired dummy, and $X_{it}$ denotes additional controls, which are household size dummies, head age dummies, quarterly dummies, and a marital status dummy. We consider a head to be retired if he/she reports to be receiving a retiring pension. Our sample includes heads aged 59–70. Robust standard errors clustered by household/individual are shown in parentheses. *** (**) [*] significant at the 1 (5) [10]%.

Table 8
*Couple's Reallocation of Shopping and Cooking Time (Minutes per Week). Cross-Section Estimates*

| | Total Time | Head Time | Spouse Time |
|---|---|---|---|
| | (1) | (2) | (3) |
| | Panel A: Shopping | | |
| Retired dummy | 53.35** | 68.25*** | –14.20 |
| | (21.88) | (12.21) | (14.42) |
| | Panel B: Cooking | | |
| Retired dummy | 48.27* | 40.45*** | 8.43 |
| | (27.11) | (13.87) | (25.08) |
| N | 3535 | 3535 | 3535 |

*Notes*: Data from the 2002 Spanish Time Use Survey for a sample of married households whose head's age is between 59 and 70 years old. Total time is the sum of the two spouses' time. The regression specification is $t_i = \alpha + \beta R_i + \lambda + \gamma X_i + \varepsilon_i$, where $t_i$ is minutes per week spent shopping and cooking by $i$, $R_i$ is a retired dummy, and $X_{it}$ denotes additional controls, which are household size dummies, head age dummies, quarterly dummies, and a dummy for whether there is a dedicated homemaker in the household. We consider a head to be retired if he reports to be receiving a retiring pension. Robust standard errors clustered by household/individual are shown in parentheses. *** (**) [*] significant at the 1 (5) [10]%.

## 3.2. *Cooking Time*

Previous evidence for the US such as Hurd & Rohwedder (2003) points to retirees spending more time on cooking activities, and Aguiar & Hurst (2005) show that a drop in food expenditure is not associated to a drop in food intake. Table 7, panel B, presents results from regressions with cooking minutes per week as the dependent variable. Cooking includes not only cooking and baking activities, but other cooking-related activities such as setting up the table, washing dishes, and putting dishes in the dishwasher. Average total cooking time is 923 minutes per week for households with non-retired heads, and 1,032 minutes per week for households with retired heads. Our regressions show that total cooking time for the household increases upon retirement by 39 minutes per week. The head's cooking time also increases but somewhat less, 27 more minutes per week after retirement. Table 8 shows that the increase in household's cooking time is driven entirely by increases in the head's cooking time since the time the spouse devotes to cooking does not change significantly upon the head's retirement. Further investigation using contextual information from the diary on who

else is present during an activity indicates that spouses' solo cooking time decreases, while cooking time with the spouse increases when the head is retired. Thus, retirement may be accompanied by a change in preferences towards more time in the company of the spouse.

The ECPF-97 contains additional information on the number of meals consumed at home, which allows us to further explore how the trade-off between food at home and food away changes with retirement. Table 9 presents results from running regressions with the total number of meals at home per week on the left hand side. We include specifications with and without household fixed effects for the baseline sample of households and for an augmented sample that includes heads initially in the labor forced but not observed retiring. The mean number of household meals at home per week is 40 with a standard deviation of 23 meals (or 2 meals per household member per day with a standard deviation of 0.68 meals).[23] Without household fixed effects and the augmented sample (which might allow us to better separate age and retirement effects), column (2) of Table 9, we find that on average retired households consume 1.6 more meals per week at home. We do not find significant effects of retirement on the number of meals for the baseline sample or with fixed effects. We believe retirement may very well have opposing effects on meals at home as it brings more time for cooking meals at home (and households do indeed spend more time cooking as previously discussed), while also leaving more time for possibly smaller meals out with friends. Furthermore, working hours in Spain for most jobs in the private sector are such that there is a two-hour break in the middle of the day, and many workers outside the large cities go home for lunch, the main meal of the day in Spain. This might explain the small effect of retirement on the number of meals consumed at home.

Panels C and D of Table 7, using the STUS, show that households with retired heads spend about 39 more minutes per week eating at home (on average individuals spend a little over an hour eating at home per day), consistent with the fact that they also spend more time cooking. The time households spend eating at restaurants does not differ much between retired and non-retired (head) households, consistent with our evidence from the ECPF-97 indicating that the number of meals consumed at home does not change much

[23]The ECPF-85 does not collect information on the number of meals household members consume at home.

with retirement.[24]

Table 9
*Meals Per Week at Home. ECPF-97*

| | Cross-Section Estimates | | Household Fixed Effects | |
|---|---|---|---|---|
| | Baseline Sample | Augmented Sample | Baseline Sample | Augmented Sample |
| | (1) | (2) | (3) | (4) |
| Retired dummy | 0.276 | 1.653* | –1.102 | 0.053 |
| | (0.701) | (0.970) | (0.963) | (0.733) |
| N | 1194 | 5015 | 1194 | 5015 |

*Notes*: The regression is $\text{meals}_{it} = \alpha_i + \beta R_i + \lambda + \gamma X_{it} + \varepsilon_{it}$, where $\text{meals}_{it}$ is the total number of meals at home for a household $i$ in a given week in period $t$, $R_{it}$ is a retired dummy, $X_{it}$ denotes additional controls and $\alpha_i$ is a household fixed effect; $\alpha_i = \alpha$ in columns (1)–(2). Additional controls in all columns are household size dummies, head age dummies, and quarter-year dummies. The specification in columns (1)–(2) also includes a marital status dummy. Sample of households with heads aged 59–70 who do not change marital status throughout the survey and who were in the labor force when first interviewed in columns (2) and (4). Columns (1) and (3) use our baseline sample that includes only households observed retiring within the survey. Robust standard errors clustered by household in parentheses. *** (**) [*] significant at the 1 (5) [10]%.

Overall our results are consistent with a home production model for this latter period. According to our estimates in Table 6, paying lower prices explains at most 20% of the drop in food at home expenditure in the ECPF-97 (a 9.3% drop in food at home expenditure compared to a 1.9% drop in prices). Substitution towards cheaper, less prepared foods that are cooked at home, as the increase in cooking time suggests, as well as possibly eating less (less calories are required when not working) could explain the rest.

## 3.3. *Explaining the Differences between the Two Periods*

As in the US and consistent with a home production model, food expenditure and average prices fall at retirement in Spain in the latter period of the survey. In the earlier period, however, food expenditure does not change significantly around retirement and average prices fall less. In this section, we argue that the evidence from the two periods is still consistent with the home production model if we properly augment it with social norms regarding the

[24]Eating at restaurants is a relatively uncommon event in Spain. On average, individuals spend about an hour per week eating out.

division of household labor. As just discussed, the time heads devote to home production increases upon retirement in the later period of our sample. We argue that more egalitarian social norms in this period probably allowed spouses to reoptimize and reallocate time resources upon retirement resulting in the substitution of market goods for home-produced goods and the observed drop in food expenditure. A similar reallocation might not have been possible in the earlier period because spouses were constrained by social norms. Thus, food expenditure did not fall with retirement because of constraining social norms.

The period of our study, 1985–2004, is characterized by rapid socio-economic change, with a massive emergence of women in public life in terms of access to education, greater involvement in politics and participation in the labor market (e.g., Arellano & Bover 1995, Dolado et al. 2001). Female labor force participation increased from 34% in the mid-eighties, to 48% in the mid-nighties, and to 59% in 2005 (e.g., de Laat & Sevilla-Sanz 2011). Similarly, in the ECPF-85 (for our baseline sample), 71% of households have a dedicated homemaker, while the number is lower, 62%, in the ECPF-97.[25] This figure in and of itself already constitutes a change in gender roles and is consistent with Franco & Winqvist (2002) who document an increase in dual-earner couples in Europe over time —in 1992 dual-earner couples represented one third of all households, in 2000 they reached 45%.

Evidence from other developed countries suggests that increases in female labor force participation are accompanied by higher male participation in home production activities. For example, using data from the Multinational Time Use Study, Fernandez et al. (2010) show that women doubled their share of paid work with respect to men from 1980 to 2000 in a group of developed countries, going from 22% to 44% of total paid work, and at the same time they decreased their share of unpaid work with respect to men from almost 75% to nearly 60%. For the US, Aguiar & Hurst (2007*b*) report an increase in non-market work by men of almost four hours per week between 1975 and 2003, which is very similar to the increase of three and a half hours per week in women's market work over the same period.

Although we do not have time-diary data for the earlier period to directly test this

[25]We say a household has a homemaker if the spouse self reports to be a homemaker when the head is first interviewed (single individuals are classified as households without a homemaker). Ideally, we would like to observe what spouses do years before the head retires, but this is not possible because of the short panel length of the survey.

hypothesis, we document changes in attitudes and practices regarding the household division of labor during this period consistent with our interpretation. We use two separate cross-sections from the 1994 and 2002 family modules of the International Social Survey Program (ISSP)—see Appendix D for a description of this survey. Only in these two years respondents were asked about their personal attitudes toward gender roles as well as housework practices. Fortunately enough, the years coincide with the latter part of the ECPF-85 and the the ECPF-97.[26] Table 10 shows that gender norms and the household division of labor have become more egalitarian in Spain during this period for a sample of men and women aged 59–70. The top panel shows the proportion of individuals who disagree with the statements: "Being a housewife is just as fulfilling as working for pay", and "a man's job is to earn money; a woman's job is to look after the home and family". The middle panel shows the proportion of individuals who agree with the statements: "Having a job is the best way for a woman to be an independent person", and "both the man and woman should contribute to household income". The bottom panel reports the proportion of individuals who respond that either both partners or the men partner did the housework activity at hand (laundry, caring for the sick, grocery shopping and cooking). In all cases, higher values are associated with more egalitarian gender attitudes and practices.

Both men and women in Spain develop more egalitarian attitudes over this period, particularly women. The division of household labor also becomes more egalitarian, with a statistically significant increasing proportion of men and women responding that home production activities were usually either shared equally among both partners, or were done by the male partner. Interestingly, for all housework activities men tend to report doing more than women. For example in 2002, 11% of men reported that doing the laundry was shared among partners or that the male partner did it, whereas only 5% of women did. This kind of bias is the norm when using stylized housework questions, which makes a diary a more reliable form of information. Nonetheless, we can still infer that practices have become more egalitarian over time. (We also constructed a principal component index confirming more

[26]Several authors have used these ISSP modules to study gender roles and the gender division of labor across countries. Spain emerges, together with Japan and other Mediterranean countries like Italy, as a country with a higher weight on the gender division of labor within the family when compared to Scandinavian and Anglo-Saxon countries (e.g., Algan & Cahuc 2007, Sevilla-Sanz 2010).

egalitarian gender roles and practices over this period.)

# 4. Conclusion

We document that there is no retirement consumption puzzle in Spain during the period 1985–2004. A small decline of nondurable expenditure at retirement can be explained by a decrease in work-related expenses such as clothing, transportation, and restaurant meals. Food at home spending substantially decreases upon retirement in the latter period of the sample but not in the earlier period.

The different behavior of food spending at retirement in the two periods is consistent with an augmented life-cycle model of consumption and home production, once social norms and the division of labor within the household are taken into account. We believe that non-egalitarian norms about the household division of labor could prevent the increase and/or reallocation of home production time between spouses that would otherwise be expected after a change in relative wages upon retirement. In less egalitarian societies, potential efficiency gains from the head retiring in terms of additional savings from better shopping and more cooking are not realized because specialized homemakers continue to do all housework after the head retires. In Spain, as in other developed countries, the sharp increase in female labor force participation over the sample period brought along changes in gender roles. We present evidence documenting changes in attitudes and practices consistent with this hypothesis. We also document that men devote more time to cooking and shopping after retirement in 2002, and we uncover a more egalitarian division of home production over this period. Lack of time diary information in the earlier period of the survey for Spain limits our ability to test this hypothesis further.

We conclude with a word of caution. Our panel is fairly short and we are capturing retirees early into their retirement cycle so we cannot be sure households' savings are adequate to carry them throughout the whole process and further work is necessary to understand the needs and means of the very old in Spain.

Table 10
*The Gender Division of Labor: Attitudes and Practices*

| | Male | | | Female | | |
|---|---|---|---|---|---|---|
| | 1994 | 2002 | p-diff | 1994 | 2002 | p-diff |
| *Proportion who disagrees* | | | | | | |
| (1) "Being a housewife is just | 0.32 | 0.31 | 0.798 | 0.30 | 0.37 | 0.072 |
| as fulfilling as working for pay" | (0.03) | (0.03) | | (0.03) | (0.03) | |
| (2) "A man's job is to earn money; a woman's | 0.20 | 0.33 | 0.002 | 0.23 | 0.39 | 0.000 |
| job is to look after the home and family" | (0.03) | (0.03) | | (0.03) | (0.03) | |
| *Proportion who agrees* | | | | | | |
| (3) "Having a job is the best way | 0.60 | 0.69 | 0.058 | 0.65 | 0.76 | 0.005 |
| for a woman to be an independent person" | (0.03) | (0.03) | | (0.03) | (0.03) | |
| (4) "Both the man and woman should | 0.71 | 0.76 | 0.266 | 0.74 | 0.82 | 0.020 |
| contribute to the household income" | (0.03) | (0.03) | | 0.03) | (0.02) | |
| *Proportion responding both partners or male partner does* | | | | | | |
| (5) Laundry | 0.04 | 0.11 | 0.003 | 0.03 | 0.05 | 0.417 |
| | (0.01) | (0.02) | | (0.01) | (0.01) | |
| (6) Cares for the sick | 0.33 | 0.42 | 0.067 | 0.15 | 0.19 | 0.213 |
| | (0.03) | (0.04) | | (0.02) | (0.02) | |
| (7) Grocery shopping | 0.27 | 0.39 | 0.007 | 0.11 | 0.19 | 0.009 |
| | (0.03) | (0.04) | | (0.02) | (0.02) | |
| (8) Prepares evening meals | 0.15 | 0.17 | 0.528 | 0.09 | 0.07 | 0.352 |
| | (0.02) | (0.03) | | (0.02) | (0.02) | |
| Observations | 225 | 195 | | 278 | 261 | |

*Notes*: Data from the Family and Changing Social Norms Modules of the 1994 and the 2002 International Social Survey Program. A detailed description of sample and variables can be found in Appendix E. Standard errors in parentheses.

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# Appendix A: Robustness Analysis

*More on methodological differences between the ECPF-85 and the ECPF-97*

In Table A1, we report results from regression with dummies for individual periods before and after retirement in the ECPF-97, and for comparison, the ECPF-85, and the ECPF-85 mimicking the ECPF-97 structure. We create dummies for the period of retirement, one year before and after retirement, and two years or more before and after retirement. The excluded category is two or more periods before retirement. The results from these regressions are consistent with our previous findings. Focusing on food, we cannot reject the null hypothesis that the coefficients for the last three dummies (all periods when the household head is retired) are the same in any of the samples, and we can only reject the null hypothesis that all coefficients are the same for total food expenditure in the ECPF-97.

Furthermore, as an alternative to the experiment described in Table 3 (we divided the sample period in four sub-periods), we pool the data from the ECPF-85 and the ECPF-97 together and interact the retired dummy with a parametric time trend that ranges from 1 (survey year 1985) to 20 (survey year 2004). There is no particular pattern for the effect of retirement on total expenditure, but the decline in food expenditure upon retirement increases over time (table A2, panel A). We further allow for the interaction of retirement and trend to differ across surveys (panel B). We document, consistent with our previous findings, that the effect of retirement on food expenditure is larger in the latter period but it does not seem to just be the result of a change in methodology as the pattern was already emergent in the earlier years. In sum, we do not believe the methodological changes in the ECPF explain the difference in the behavior food expenditure at retirement in the two surveys.

*Alternative samples*

We perform a battery of robustness analysis to determine if our finding of 'no puzzle' accompanied with a change over time in the effect of retirement on food expenditure is robust to alternative sample specifications. Results are summarized in Table A3. There are 13,549 (15,105) households, not observations, with heads 50 or older in the ECPF-85 (ECPF-97). 7,324 (7,942) households have heads aged 59–70. 1,607 (1,496) are in the labor force when first interview. 382 (392) retire within the survey. 366 (388) households do not change marital status within the survey, and these households are the ones included in our baseline regressions. If we restrict the sample to male heads, results are virtually unchanged, the only difference being that the coefficient on food expenditure at home in the ECPF-97 is less precisely estimated as we have less observations. If we include heads who do not retire within the survey but satisfy all other characteristics of the baseline sample, results are unchanged. If we further add heads who were retired to begin with but still within the age range of the baseline sample, the estimated coefficients decrease in absolute value but our conclusions are unchanged (the additional observations might help us better separate age effects from a retirement effect). Lastly, we revert to our original sample restrictions but include households with heads 50 to 70 years old. In this case, we loose significance for food expenditure at home in the ECPF-97 most likely because the young retirees have received some degree of bonus payment under pre-retirement agreements, or maybe they retire early because of health reasons and do not have the time for home production.

*The Role of unexpected shocks*

Previous studies suggest that the drop in expenditure at retirement may be associated to an unexpected event which decreases wealth (such as job loss or a negative health shock), and thus the observed drop in expenditure upon retirement is still consistent with a standard life-cycle model. Tanner (1998) and Marmot et al. (2004) find that ill health and compulsory early redundancy are reported as the main reasons for early retirement. We asses whether expenditure patterns depend on retirement being voluntary or involuntary as in Smith (2006). This methodology is an alternative to using an instrument, which we lack. Previous studies use Instrumental Variable analysis that relies on lagged retirement and age respectively as instruments (e.g., Banks et al. 1998, Bernheim et al. 2001). Haider & Stephens (2007) question the validity of these instruments and try to separate expected from unexpected retirement histories by using a set of questions about subjective expectations on the timing of retirement proven to be powerful predictors of actual retirement histories. With such instrument, they find the expenditure fall at retirement to be about 30 to 40 percent lower than in IV regressions using age as an instrument, but the drop in expenditure does not disappear. A regression discontinuity approach that uses thresholds for pension eligibility, as in Battistin et al. (2009), is an alternative approach for dealing with the endogeneity of retirement but we do not have information on years of contributions to pursue this further.

There is a degree of arbitrariness in classifying retirement as unexpected and here we focus on health shocks. As in Smith (2006), we interact our retired dummy, $R_{it}$ with an involuntary retirement dummy, $INV_i$, to get at the differential effect of retirement on expenditure for the two groups. That is, we estimate:

$$\log C_{it} = \alpha_i + \beta R_{it} + \lambda \left(R_{it} \times INV_i\right) + \gamma X_{it} + \varepsilon_{it}. \tag{A-4}$$

All regressions include year-quarter dummies, household size dummies, head age dummies, as well as a health status control (bad health or not). The ECPF collects information on household member visits to doctors but this information is not publicly available. Instead, we rely on expenditure figures on health related goods and services. For each quarter-year, we say that a household experiences a negative health shock (bad health) if spending in health is above the 80th percentile of health spending for all households in the survey. Although this is far from a perfect measure of health status, the fact that there is universal health care coverage in Spain makes comparisons in health expenditure across households more meaningful than in other countries. Although a non-trivial fraction of households holds private health insurance, for the most serious diseases most households use the National Health System. We consider that a household head retires involuntarily due to poor health, if he suffers a negative health shock in any of the two periods immediately before retirement (14% of our household heads retire due to a health shock according to this definition.)

Table A4 summarizes our findings. Interestingly, there is a significant drop in expenditure at retirement for the group who retires involuntarily across all categories. Clearly, this drop in expenditure across the board is not associated to work related expenses, and most likely is due to an unexpected negative wealth shock. However, a health shock can affect the

optimal consumption decision in multiple ways. Health shocks could cause a reallocation of the consumption bundle, all else equal, towards health expenditures away from other consumption categories. If the measure of consumption excludes health expenditures, one may observe declining expenditures at retirement, which is not our case as our measure for nondurables includes health expenditures on health related nondurables and services. Also, health shocks often affect consumption needs. For example, someone stricken with a severe illness that affects the ability to work may also have decreased appetite. Because poor health may also have a direct effect on expenditure, we include an indicator for high health expenditure (in the period) in the regressions as a proxy for health status. Results for the coefficients of interest, $\beta$ and $\lambda$, are not affected greatly when this control is not included.

Our point, however, is that controlling for involuntary retirement this way, does not alter our main conclusion of no-puzzle for nondurables and a change in the behavior of food expenditure after retirement over time.

*Income in the ECPF-97*

We further explore the income measure in the ECPF-97. However, these results should be taken with a grain of salt. Income, net 'regular' monetary income according to the documentation, is given in eight brackets. To complicate the matter, the brackets were redefined in 2002 (see Table A5). We were agnostic about this redefinition and treated the intervals as relative rankings of individuals when classifying them as poor or rich before retirement in the expenditure regressions of Table 5. Poor is defined as being in the first two brackets while rich is defined as being above bracket four, roughly corresponding to bottom and top quartiles, because the distribution of individuals in the different intervals did not change substantially when the brackets were redefined (see Table A6).

The change in the brackets becomes an issue when using the actual income values for analysis, so we run separate regressions for the two subperiods, 1998–2001 and 2002–2004. We report regressions where the dependent variable is the log of mean income in each bracket using auxiliary data from the ECHP. As robustness checks, we tried adjusting the means by inflation and/or applying growth factors to the brackets using the ECHP or national income data. Results were similar and are not reported for brevity (not too surprising because we are controlling for quarter-year dummies). We reached similar conclusions when simply using the mid-point of each interval straight from the ECPF-97. The results in Table A7 are inline with previous findings using annual income information from the ECHP, and summarized in Table 4. Income increases at retirement for the bottom quartile but declines for the top quartile. For those in the middle the coefficient is negative but not precisely estimated.

To assess the possible bias introduced by using interval income, we reproduce the previous analysis using data from the ECPF-85 for which a continuous measure of income exists. We classify individuals in income brackets according to the 1998–2001 classification and study the effect of retirement on income measure three different ways: as a continuous variable, as the midpoint of each interval (using 273 euros and 3097 euros for the first and last intervals as in the first part of the ECPF-97), and as mean income in each interval. Summary statistics for the actual and the constructed income measures are presented in Table A8. The regression results, summarized in Table A9, indicate that we overestimate the income decline for the rich and underestimate the income increase for the poor when using income brackets. The sign

for the middle income group changes from an increase to a decline, although the coefficient is insignificant. This bias could explain the change in sign for the average effect of retirement on income in the latter period, observed when comparing Table A9 and Table 4.

In summary, we believe that the hypothesis that food expenditure is declining because expenditure tracks income is not a likely explanation in the Spanish case. Income increases for those at the bottom of the income distribution, yet expenditure declines and particulary for the pre-retirement income poor group.

*Alternative empirical specification*

We also consider an alternative empirical specification that uses growth rates instead of log consumption deviations with fixed effects that can only be applied to the ECP-85 as it is not possible to compare consecutive growth rates with data from the ECPF-97. This methodology has been extensively used in the literature.

Consider the standard Life Cycle-Permanent Income Hypothesis (LCPIH): Utility is separable intertemporally and households maximize expected discounted utility over the life cycle. Let us assume a constant relative risk aversion utility function:

$$U(C_{it}) = \frac{C_{it}^{1-\sigma}}{1-\sigma} e^{\gamma\theta_{it}},$$

where $\sigma$ is the risk-aversion coefficient and $\theta$ is a taste shifter. The specification used here is based on a log-linearized Euler equation, as in much of the previous literature:

$$\Delta \log C_{it} = \frac{1}{\sigma} \log[\delta(1+r_t)] + \frac{\gamma}{\sigma} \Delta \log \theta_{it} + \epsilon_{it},$$

where $r_t$ is the interest rate between periods $t$ and $t-1$, $\delta$ is the discount factor, and $\varepsilon_t$ is a rational expectations error. We assume the taste shifter to be a function of age, family size and marital status.

As in Haider & Stephens (2007), this Euler Equation is applied to the retirement consumption puzzle by estimating:

$$\Delta \log C_{it} = \alpha + \beta \tilde{R}_{it} + \gamma X_{it} + \varepsilon_{it}, \tag{A-5}$$

where $C_{it}$ is consumption (deflated) for household $i$ in period $t$, $\tilde{R}_{it}$ is a dummy variable that takes the value of 1 in the quarter of retirement and 0 otherwise, and $X_{it}$ is a set of controls which includes quarter-year dummies, household size dummies, head age dummies and marital status. We also try specifications which include dummies for one or two periods before and after retirement but these were not significant. We find no evidence of a retirement consumption puzzle as shown by the insignificant coefficients in Table A10, and the estimated coefficients are very similar to those estimated using our baseline specification.

*OLS specification*

Since we need to rely on OLS specifications when using time use data, we also present results from running OLS regressions with expenditure data. The findings, summarized in Table A11, are to be compared with Table 2. The effect of retirement on expenditure is estimated to be consistently larger when not controlling for unobserved heterogeneity.

However, the finding that the food expenditure pattern at retirement changes over time remains: the estimated effect of retirement on food spending is about half the size in the earlier period than in the later period.

Table A1
*Expenditure at Retirement. Additional Retirement Dummies*

| Periods relative to Retirement | Total Expenditure (1) | Nondurable Expenditure (2) | Food Total (3) | Food Home (4) |
|---|---|---|---|---|
| | | Panel A: ECPF-97 | | |
| –1 | –0.027 | –0.002 | 0.102 | 0.030 |
| | (0.043) | (0.045) | (0.062) | (0.063) |
| 0 | –0.029 | –0.040 | –0.031 | –0.056 |
| | (0.057) | (0.054) | (0.074) | (0.076) |
| 1 | 0.074 | –0.060 | –0.055 | –0.089 |
| | (0.086) | (0.074) | (0.099) | (0.102) |
| 2 or more | –0.055 | –0.105 | –0.058 | –0.119 |
| | (0.097) | (0.090) | (0.119) | (0.119) |
| N | 1236 | 1236 | 1236 | 1236 |
| | | Panel B: ECPF-85 | | |
| –1 | 0.011 | –0.005 | –0.001 | 0.015 |
| | (0.028) | (0.029) | (0.030) | (0.038) |
| 0 | 0.009 | –0.021 | –0.033 | 0.005 |
| | (0.036) | (0.037) | (0.039) | (0.043) |
| 1 | 0.033 | –0.003 | –0.005 | 0.010 |
| | (0.042) | (0.045) | (0.045) | (0.056) |
| 2 or more | 0.005 | –0.034 | –0.039 | 0.014 |
| | (0.052) | (0.053) | (0.057) | (0.062) |
| N | 2442 | 2442 | 2442 | 2442 |
| | | Panel C: ECPF-85 mimicking ECPF-97 structure | | |
| –1 | –0.009 | –0.043 | 0.025 | 0.032 |
| | (0.041) | (0.040) | (0.038) | (0.048) |
| 0 | –0.035 | –0.073 | –0.036 | 0.001 |
| | (0.052) | (0.047) | (0.052) | (0.052) |
| 1 | –0.051 | –0.087 | –0.019 | 0.014 |
| | (0.069) | (0.070) | (0.064) | (0.064) |
| 2 or more | –0.088 | –0.116 | –0.015 | 0.002 |
| | (0.075) | (0.071) | (0.074) | (0.075) |
| N | 1350 | 1350 | 1350 | 1350 |

*Notes*: Fixed effects regressions of log consumption on dummies for periods relative to the retirement period. The excluded category is two or more periods before retirement. See notes to Table 2 for details on further controls. The original sample in both surveys includes households with heads aged 59–70 and stable marital status, who were in the labor force when first interviewed and were observed retiring. Robust standard errors (in parentheses) clustered by household. *** (**) [*] significant at the 1 (5) [10]%.

Table A2
*Expenditure at Retirement. Trends*

| | Total Expenditure (1) | Nondurable Expenditure (2) | Food Total (3) | Food Home (4) |
|---|---|---|---|---|
| **Panel A: Pooled data** | | | | |
| Retired × Trend | 0.001 | –0.002 | –0.006*** | –0.004* |
| | (0.002) | (0.002) | (0.002) | (0.002) |
| **Panel B: Pooled data allowing trend to differ by subperiod** | | | | |
| Retired × Trend × ECPF-85 | 0.001 | –0.002 | –0.004 | –0.003 |
| | (0.003) | (0.003) | (0.003) | (0.004) |
| Retired × Trend × ECPF-97 | 0.000 | –0.002 | –0.007** | –0.005 |
| | (0.002) | (0.002) | (0.003) | (0.003) |
| N | 3678 | 3678 | 3678 | 3678 |

*Notes*: Fixed effects regressions of consumption on a retirement dummy interacted with a parametric time trend. See notes to Table 2 for details on further controls. The original sample in both surveys includes households with heads aged 59–70 and stable marital status, who were in the labor force when first interviewed and were observed retiring. Robust standard errors (in parentheses) clustered by household. *** (**) [*] significant at the 1 (5) [10]%.

Table A3
*Expenditure at Retirement. Different Samples*

| | Total Expenditure (1) | Nondurable Expenditure (2) | Food Total (3) | Food Home (4) |
|---|---|---|---|---|
| **Male heads only** | | | | |
| | | ECPF-85 | | |
| Retired dummy | 0.005 | –0.024 | –0.025 | –0.008 |
| | (0.021) | (0.022) | (0.026) | (0.029) |
| N | 2249 | 2249 | 2249 | 2249 |
| | | ECPF-97 | | |
| Retired dummy | 0.007 | –0.043 | –0.137** | –0.086 |
| | (0.042) | (0.037) | (0.053) | (0.056) |
| N | 1111 | 1111 | 1111 | 1111 |
| **With those not retiring** | | | | |
| | | ECPF-85 | | |
| Retired dummy | –0.003 | –0.026 | –0.036* | –0.028 |
| | (0.018) | (0.020) | (0.020) | (0.023) |
| N | 8891 | 8891 | 8891 | 8891 |
| | | ECPF-97 | | |
| Retired dummy | –0.031 | –0.032 | –0.101** | –0.082* |
| | (0.024) | (0.030) | (0.041) | (0.042) |
| N | 4424 | 4424 | 4424 | 4424 |
| **With original retirees** | | | | |
| | | ECPF-85 | | |
| Retired dummy | 0.001 | –0.018 | –0.019 | –0.016 |
| | (0.014) | (0.016) | (0.016) | (0.018) |
| N | 37964 | 37964 | 37964 | 37964 |
| | | ECPF-97 | | |
| Retired dummy | –0.017 | –0.033 | –0.063** | –0.054* |
| | (0.017) | (0.021) | (0.027) | (0.028) |
| N | 23124 | 23124 | 23124 | 23124 |
| **Heads aged 50–70** | | | | |
| | | ECPF-85 | | |
| Retired dummy | 0.017 | 0.004 | –0.007 | –0.003 |
| | (0.017) | (0.018) | (0.018) | (0.020) |
| N | 3649 | 3649 | 3649 | 3649 |
| | | ECPF-97 | | |
| Retired dummy | –0.008 | –0.031 | –0.073* | –0.057 |
| | (0.031) | (0.030) | (0.039) | (0.042) |
| N | 1815 | 1815 | 1815 | 1815 |

*Notes*: Fixed effects regressions of consumption on a retirement dummy. See notes to Table 2 for details. The original sample in both surveys includes households with heads aged 59–70 and stable marital status, who were in the labor force when first interviewed and were observed retiring. The samples in these regressions are changed as described by panel headings. Robust standard errors (in parentheses) clustered by household. *** (**) [*] significant at the 1 (5) [10]%.

Table A4
*Expenditure at Retirement. Involuntary Retirement*

| | Total Expenditure (1) | Nondurable Expenditure (2) | Food Total (3) | Food Home (4) |
|---|---|---|---|---|
| | | ECPF-85 | | |
| Retired dummy | 0.018 | –0.005 | –0.019 | –0.003 |
| | (0.021) | (0.023) | (0.026) | (0.030) |
| Retired × Bad Health | –0.074 | –0.044 | –0.061 | –0.082 |
| | (0.051) | (0.057) | (0.057) | (0.064) |
| N | 2442 | 2442 | 2442 | 2442 |
| | | ECPF-97 | | |
| Retired dummy | 0.019 | –0.032 | –0.121** | –0.083 |
| | (0.040) | (0.037) | (0.053) | (0.055) |
| Retired × Bad Health | –0.092 | –0.105 | –0.071 | –0.088 |
| | (0.079) | (0.116) | (0.123) | (0.133) |
| N | 1236 | 1236 | 1236 | 1236 |

*Notes*: The regression is $\log C_{it} = \alpha_i + \beta R_{it} + \lambda\left(R_{it} \times INV_i\right) + \gamma X_{it} + \varepsilon_{it}$, where $C_{it}$ is real consumption for household $i$ in period $t$, $\alpha_i$ is a household fixed effect, $R_{it}$ is the retired dummy, $INV_i$ is an indicator for having experienced health problems just before retirement, and $X_{it}$ denotes additional controls (year-quarter dummies, household size dummies, head of household age dummies, and a bad health dummy). Samples in both surveys include households with heads aged 59–70 and stable marital status, who were in the labor force when first interviewed and were observed retiring. Robust standard errors (in parentheses) clustered by household. *** (**) [*] significant at the 1 (5) [10]%.

Table A5
*Brackets the ECPF-97 (Monthly Income in Euros)*

| Bracket | 1998–2001 | 2002–2004 |
|---|---|---|
| 1 | up to 390.65 | up to 499 |
| 2 | 390.66 to 781.31 | 500 a 999 |
| 3 | 781.32 to 1,171.97 | 1000 to 1499 |
| 4 | 1171.98 to 1562.63 | 1500 to 1999 |
| 5 | 1562.64 to 1953.29 | 2000 to 2499 |
| 6 | 1953.30 to 2343.94 | 2500 to 2999 |
| 7 | 2343.94 to 3906.57 | 3000 to 4999 |
| 8 | more than 3906.57 | more than 5000 |

*Notes*: Monthly regular monetary income.

Table A6
*Bracket Income in the ECPF-97. Distribution*

| Year | mean | p10 | p25 | p50 | p75 | p90 | p95 | Obs. |
|---|---|---|---|---|---|---|---|---|
| 1998 | 3 | 1 | 2 | 3 | 3 | 5 | 6 | 167 |
| 1999 | 3 | 2 | 2 | 3 | 4 | 5 | 6 | 213 |
| 2000 | 4 | 2 | 3 | 4 | 5 | 6 | 7 | 193 |
| 2001 | 3 | 2 | 2 | 3 | 4 | 6 | 7 | 191 |
| 2002 | 3 | 1 | 2 | 3 | 4 | 6 | 6 | 202 |
| 2003 | 4 | 2 | 2 | 3 | 5 | 6 | 7 | 184 |
| 2004 | 4 | 2 | 2 | 3 | 4 | 7 | 7 | 86 |
| Total | 3 | 2 | 2 | 3 | 4 | 6 | 7 | 1236 |

*Notes*: There are eight income brackets in the ECPF-97. See Table A5 for income ranges in each interval.

Table A7
*Income at Retirement in the ECPF-97 (Bracket Income)*

| | 1998–2001 | | 2002–2004 | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Retired dummy | –0.038 | –0.056 | –0.066 | –0.092 |
| | (0.036) | (0.038) | (0.052) | (0.058) |
| Retired × Bottom Income Quartile | | 0.498*** | | 0.268 |
| | | (0.136) | | (0.173) |
| Retired × Top Income Quartile | | –0.184* | | 0.056 |
| | | (0.100) | | (0.116) |
| N | 759 | 759 | 472 | 472 |

*Notes*: The regression is $\log Y_{it} = \alpha_i + \beta R_{it} + \sum_{j=1}^{2} \lambda_j \left(R_{it} \times I_i^j\right) + \gamma X_{it} + \varepsilon_{it}$, where $Y_{it}$ is real household income for household $i$ in period $t$, $\alpha_i$ is a household fixed effect, $R_{it}$ is a retired dummy (equal to 1 if the household is retired and 0 otherwise), $I_{it}^j$ is an indicator variable for being in the bottom or the top income quartile before retirement, and $X_{it}$ denotes additional controls (year-quarter dummies, household size dummies, head of household age dummies). Samples in both surveys include households with heads aged 59–70 and stable marital status, who were in the labor force when first interviewed and retire within the survey. Robust standard errors (in parentheses) clustered by household. *** (**) [*] significant at the 1 (5) [10]%.

Table A8
*Summary Statistics for Created Interval Income in the ECPF-85. (Monthly Income in Euros)*

| Variable | mean | p50 | sd | p10 | p90 |
|---|---|---|---|---|---|
| Continuous measure | 1168 | 985 | 862 | 419 | 2081 |
| Midpoint of the interval | 1171 | 977 | 760 | 586 | 2149 |
| Mean of income in the interval | 1169 | 971 | 798 | 578 | 2129 |

*Notes*: Brackets as in Table A5 years 1998–2001 using 273 euros for the lowest interval and 3,094 euros for the top interval.

Table A9
*Income at Retirement in the ECPF-85*

| | Continuous | | Midpoint of Interval | | Average of Interval | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Retired dummy | 0.030 | 0.008 | –0.017 | –0.025 | –0.010 | –0.018 |
| | (0.043) | (0.045) | (0.021) | (0.026) | (0.022) | (0.026) |
| Retired × Bottom Income Quartile | | 0.172** | | 0.130*** | | 0.127*** |
| | | (0.081) | | (0.043) | | (0.045) |
| Retired × Top Income Quartile | | –0.133* | | –0.172** | | –0.176** |
| | | (0.080) | | (0.071) | | (0.076) |
| N | 2442 | 2442 | 2442 | 2442 | 2442 | 2442 |

*Notes*: Income in the ECPF-85 is continuous but we construct eight intervals to mimic the ECPF-97. The regression is $\log Y_{it} = \alpha_i + \beta R_{it} + \sum_{j=1}^{2} \lambda_j \left(R_{it} \times I_i^j\right) + \gamma X_{it} + \varepsilon_{it}$, where $Y_{it}$ is real household income for household $i$ in period $t$, $\alpha_i$ is a household fixed effect, $R_{it}$ is a retired dummy (equal to 1 if the household is retired and 0 otherwise), $I_{it}^j$ is an indicator variable for being in the bottom or the top income quartile before retirement, and $X_{it}$ denotes additional controls (year-quarter dummies, household size dummies, head of household age dummies). Sample of households with heads aged 59–70 and stable marital status, who were in the labor force when first interviewed and retire within the survey. Robust standard errors (in parentheses) clustered by household. *** (**) [*] significant at the 1 (5) [10]%.

Table A10
*Expenditure at Retirement. Growth Rate Specification. ECPF-85*

| | Total Expenditure (1) | Nondurable Expenditure (2) | Food Total (3) | Food Home (4) |
|---|---|---|---|---|
| Retired dummy | –0.007 | –0.015 | –0.011 | 0.010 |
| | (0.016) | (0.017) | (0.017) | (0.020) |
| N | 2076 | 2076 | 2076 | 2076 |

*Notes*: The regression is $\Delta \log C_{it} = \alpha + \beta \tilde{R}_{it} + \gamma X_{it} + \varepsilon_{it}$, where $C_{it}$ is real consumption for household $i$ in period $t$, $\tilde{R}_{it}$ is a retired dummy which takes the value of 1 in the quarter of retirement and 0 otherwise, and $X_{it}$ denotes additional controls (year-quarter dummies, household size dummies, head of household age dummies, and marital status). This is for the ECPF-85 only and the sample includes households with heads aged 59–70 and stable marital status, who were in the labor force when first interviewed and were observed retiring. Robust standard errors (in parentheses) clustered by household. *** (**) [*] significant at the 1 (5) [10]%.

Table A11
*Expenditure at Retirement. OLS Regressions*

| | Total Expenditure (1) | Nondurable Expenditure (2) | Nondurables (no work) (3) | Work-related categories (4) | Food Total (5) | Food Away (6) | Food Home (7) |
|---|---|---|---|---|---|---|---|
| | | | ECPF-85 and ECPF-97 | | | | |
| Retired dummy | –0.043 | –0.066** | –0.064** | –0.066 | –0.071*** | –0.105 | –0.072** |
| | (0.027) | (0.026) | (0.026) | (0.060) | (0.024) | (0.090) | (0.029) |
| N | 3678 | 3678 | 3678 | 3564 | 3678 | 3451 | 3678 |
| | | | ECPF-85 | | | | |
| Retired dummy | –0.022 | –0.052 | –0.051 | –0.107 | –0.046 | –0.130 | –0.058 |
| | (0.033) | (0.032) | (0.032) | (0.080) | (0.029) | (0.122) | (0.037) |
| N | 2442 | 2442 | 2442 | 2442 | 2442 | 2442 | 2442 |
| | | | ECPF-97 | | | | |
| Retired dummy | –0.108** | –0.105** | –0.102** | 0.006 | –0.139*** | –0.151* | –0.118** |
| | (0.042) | (0.042) | (0.043) | (0.070) | (0.044) | (0.082) | (0.047) |
| N | 1236 | 1236 | 1236 | 1122 | 1236 | 1009 | 1236 |

*Notes*: The regression is $\log C_{it} = \alpha + \beta R_{it} + \gamma X_{it} + \varepsilon_{it}$, where $C_{it}$ is real consumption for household $i$ in period $t$, $R_{it}$ is a retired dummy (equal to 1 if the household is retired and 0 otherwise), and $X_{it}$ denotes additional controls (year-quarter dummies, household size dummies, head of household age dummies and marital status). Samples in both surveys include households with heads aged 59–70 and stable marital status, who were in the labor force when first interviewed and retire within in the survey. Robust standard errors (in parentheses) clustered by household. *** (**) [*] significant at the 1 (5) [10]%.

# Appendix B: The 1994–2001 European Community Household Panel Data (ECHP)

The 1994–2001 ECHP is a survey based on a standardized questionnaire that involves annual interviewing of a representative panel of households and individuals in each country, covering a wide range of topics: income, health, education, housing, demographics, and employment characteristics among others. The total duration of the ECHP was 8 years, running from 1994 to 2001. In the first wave of 1994, a sample of some 60,500 nationally representative households—approximately 130,000 adults aged 16 years and over—were interviewed in the then 12 member states. We use the information regarding Spain, the "Panel de Hogares de la Unión Europea".

For our analysis, we use a sample of households similar to the one used in expenditure regressions with the ECPF-97 data. We start from a sample of 115,779 observations for 8,597 households, and keep those households whose heads are 59–70 years old which reduces the sample size to 2,803 households. We further restrict the sample to households whose heads were in the labor force (employed or unemployed) when first interviewed, which further reduces the sample to 1,934. In our regressions, we present results for the sample of heads going through a retirement transition during the sample period, which further reduces the sample to 500 households. We keep households with a stable marital history, leaving 480 households. Limiting the sample to heads with no missing variables in the regression further reduces the sample to 309 households and 1,908 observations. Our dependent variable, household income, is defined as net total household real income, which includes wage and salary earnings, capital income, property income, and public and private transfers for all members of the household. Median quarterly household income is 4,373 euros, and mean income is 5,289 euros with a standard deviation of 4,428 (all figures measured in 1993 constant euros). Although a bit higher (probably due to differences in the definitions of income and the latter period it covers), these figures are comparable to the ECPF-85 income figures, median income of 3,420 and mean income of 4,052 with a standard deviation of 2,812. Our definition of retirement is a dummy variable that takes the value of 1 if the individual reports being a retiree at his main activity, and 0 otherwise. As with the ECPF data, we only consider first transitions into retirement.

# Appendix C: Quantity Items

Tables C1 and C2 summarize the percentage of total food at home (and of total expenditure) that the quantity items represent for different households in the ECPF-85 and the ECPF-97, respectively. We present breakdowns by income, age and household composition. In the ECPF-85, as a percentage of food at home (total expenditure), the quantity categories vary from 57 (15) for households with heads younger than 30 years old to 63% (21%) for households with heads over 65. The average is 61%. The percentage goes down monotonically with income and increases with age. In the ECPF-85, the quantity categories do not include items such as prepared meals. Amongst the excluded categories are also processed items such as cured meats, canned goods, and other categories which represent a smaller proportion of total household expenditure on food at home. We could tentatively interpret the higher

expenditure on quantity categories as a signal of more home production in poor and older households. In the ECPF-97, there are 70 quantity categories that include a wider variety of items, including some prepared meals. The patterns across age and income levels are similar to those in the ECPF-85.

*Listing of quantity categories in the ECPF-85*

1. *Wheat bread* (pan de trigo, 1032). It includes all types of wheat bread, including whole wheat.
2. *Beef* (carne de vaca, 1080). It includes all beef meat, fresh and frozen.
3. *Veal* (carne de ternera, 1092). All veal, fresh and frozen.
4. *Pork* (carne de cerdo, 1101). All pork meat including piglet and bacon, fresh and frozen.
5. *Chicken* (pollo y gallina, 1122). All chicken and hen meats, whole or parts, fresh and frozen.
6. *Fresh Hake* (merluza fresca, 1191).
7. *Fresh Whiting* (pescadilla fresca, 1200).
8. *Frozen Hake and Whiting* (merluza y pescadilla congeladas, 1212).
9. *Other Fresh or Frozen Fish* (otros pescados frescos o congelados, 1221).
10. *Cow's Milk* (leche fresca o pasteurizada de vaca, 1260). It includes all fresh and pasteurized cow's milk, whole and skimmed.
11. *U.H.T. Shelf Stable Cow's Milk* (leche esterilizada de vaca, 1272). National and imported, whole and skimmed.
12. *Fresh Eggs* (huevos frescos, 1350).
13. *Olive Oil* (aceite de oliva, 1392).
14. *Sunflower Oil* (aceite de girasol, 1401).
15. *Oranges* (naranjas, 1431).
16. *Other citrus fruits* (otros cítricos, 1440). It includes lemons, mandarin oranges, grapefruits, etc.
17. *Bananas* (plátanos, 1452).
18. *Apples* (manzanas, 1461).
19. *Pears* (peras, 1470).

20. *Other Fresh Fruits* (otras frutas frescas, 1482). It includes peaches, apricots, cherries, plums, strawberries, melon, watermelon, etc.

21. *Cauliflowers and Cabbages* (coliflores y coles, 1512). It includes cauliflower, savoy cabbage, red cabbage, Brussels' sprouts, etc.

22. *Tomatoes* (tomates, 1521).

23. *Green Beans* (judías verdes, 1530).

24. *Other Vegetables and Fresh Legumes* (otras legumbres y hortalizas frescas, 1542). It includes peppers, squash, pumpkin, fresh beans, peas, eggplant, cucumber, onions, green onions, carrots, mushrooms, truffles, beats, turnip, turnip leaf, radish, artichoke, cardon artichoke, chard, spinach, lettuce, endive, watercress, celery, fresh asparagus, leek, parsley, thyme, etc. It does not include potatoes.

25. *Potatoes* (patatas, 1611). Whole and lightly transformed (peeled and cut).

26. *Sugar* (azúcar, 1632). White and brown sugar. It excludes syrups.

27. *Soda water* (gaseosas sin sabor, 1761). Sweetened and unsweetened.

28. *Flavored Sodas* (refrescos con sabor, 1770). It includes coca-cola, fanta, tonic water, non-alcoholic beer, juice based drinks, etc.

29. *Table wine* (vino de mesa, 1791). White, red and rosé. It excludes sparkling wine.

30. *Beer* (cervezas, 1800). It includes all alcoholic beers.

31. *Dark cigarettes* (cigarrillos negros, 1830).

32. *Golden cigarettes* (cigarillos rubios, 1842).

*Listing of quantity categories in the ECPF-97*

1. *Rice* (arroz, 0111102). It includes plain rice of all types and rice prepared with meat, fish, seafood or vegetables.

2. *Regular bread* (pan no integral, 0111217). Regular bread of any cereal type. Includes bread crams.

3. *Low calory bread* (pan integral, 0111222). Low calory bread of any cereal type.

4. *Other bakery items* (otros productos de panadería, 0111238).

5. *Pasta* (pasta, 011308). Uncooked fresh or frozen pasta of any kind, including that filled with vegetables, meat or fish.

6. *Beef* (carne de bovino, 0112101). It includes all beef or veal meat, fresh and frozen.

7. *Pork* (carne de cerdo, 0112209. All pork meat including piglet and bacon, fresh and frozen.

8. *Lamb and goat* (carne de ovino and caprino, 0112307). Fresh or frozen.

9. *Chicken* (pollo y gallina, 0112412). All chicken and hen meats, whole or parts, fresh and frozen.

10. *Other poultry* (otras aves frescas, congeladas o refrigeradas, 0112427). Other poultry, fresh and frozen.

11. *Cured meats* (productos de charcutería grasos, 0112519).

12. *Deli meats* (productos de charcutería bajos en grasa, 0112524).

13. *Offal and variety meats* (despojos, menudillos y casquería, 0112524). It includes liver, kidney, heart, tripe, blood, ears, etc.

14. *Prepared meats and prepared products that contain meat* (carnes preparadas y otros productos conteniendo carne, 0112600).

15. *Game and other meats* (Otras carnes comestibles y sus depojos, 0112708). It includes venison, rabbit, horse, camel, etc. Fresh or frozen.

16. *Fresh Hake* (merluza fresca, 0113117).

17. *Fresh Whiting* (pescadilla fresca, 0113122).

18. *Frozen Hake and Whiting* (merluza y pescadilla congeladas, 0113138).

19. *Other Fresh or Frozen Fish* (otros pescados frescos o congelados, 0113143).

20. *Crustacean and mollusk* (crustáceos y moluscos, 0113208). Includes lobster, shrimp, clams, octopus, callamari, etc. Fresh or frozen.

21. *Seafood, smoked or salted* (pescados y mariscos secos, ahumados o salados, 0113306).

22. *Other fish and shellfish, canned or cooked, and seafood based prepared dishes* (otros pescados o mariscos procesados o conservados y preparaciones de pescados y mariscos 0113404).

23. *Cow's whole milk* (leche entera, 0114109). It includes all fresh and pasteurized cow's milk.

24. *Cow's low-fat and non-fat milk* (leche semidescremada y descremada, 0114107). It includes all low-fat or non-fat fresh and pasteurized cow's milk.

25. *Powder milk* (leche en polvo, 0114312). All powder milk products, including baby formula.

26. *Canned or condensed milk* (leche condensada o evaporada, 0114327).

27. *Yogurt* (yogures, 0114403).

28. *Cheese* (queso y requesón, 0114500).

29. *Eggs* (huevos, 0114706).

30. *Butter* (mantequilla, 0115108).

31. *Margarine and other vegetable spreads, 0115206* (margarina y otras grasas vegetales, 0115206).

32. *Olive Oil* (aceite de oliva, 0115304).

33. *Other vegetable oils* (otros aceites comestibles, 0115402).

34. *Other animal fats* (otras grasas animales, 0115509).

35. *Citrus fruits* (cítricos, 0116107).

36. *Bananas* (plátanos, 0116205).

37. *Apples* (manzanas, 0116303.

38. *Pears* (peras, 0116401).

39. *Other pitted fruits* (frutas con hueso, 0116508). It includes apricots, cherries, mangos, avocado, olives, etc.

40. *Berries* (bayas, 0116606). Fresh or frozen.

41. *Other fresh or frozen fruits* (otras frutas frescas o congeladas, 0116704). It includes, melon, watermelon, kiwi, pineapple, etc.

42. *Seeds and Nuts* (Frutos secos y nueces, 0116802). Seeds and nuts

43. *Lettuces, greens and herbs* (Hortalizas de hoja o tallo y hierbas culinarias, 0117106).

44. *Cauliflowers and cabbages* (coles, 0117302). It includes cauliflower, savoy cabbage, red cabbage, Brussels' sprouts, etc. Fresh or frozen.

45. *Vegetable grown because of their fruit* (hortalizas cultivadas por su fruto, 0117302). It includes eggplant, squash, corn, beans, etc.

46. *Root vegetables and mushrooms* (hortalizas con raíz o bulbo y setas, 0117400). Includes carrots, onions, asparagus, etc.

47. *Legumes* (Legumbres secas, 0117507).

48. *Frozen vegetables* (verduras congeladas, 0117605).

49. *Legumes and vegetables in canned or prepared dishes* (legumbres y hortalizas en conserva, preparadas y otros productos a base de legumbres y hortalizas, 0117703).

50. *Potatoes* (patatas, 0117801). Whole and lightly transformed (peeled and cut).

51. *Other root vegetables* (tubérculos derivados de las patatas, mandioca y otros tubérculos, 0117909).

52. *Sugar* (azúcar, 0118105). White and brown sugar. It excludes syrups.

53. *Jam, marmalade and honey* (confitura, mermelada y miel, 0118203).

54. *Chocolate* (chocolate, 0118301).

55. *Confection* (confitería, 0118409). Includes candy, candied nuts, etc.

56. *Ice-cream* (helado, 0118506).

57. *Other sugar based products* (otros productos a base de azúcar, 0118604).

58. *Sauces and condiments* (salsas y condimentos, 0119104).

59. *Salt and other spices* (sal y especias, 0119202).

60. *Prepared powder soups, dessert powder mixes and baking soda* (sopas, preparaciones para postres y levadura, 0119300).

61. *Coffee* (café, 0121107).

62. *Cacao* (cacao, 0121303).

63. *Mineral water* (agua mineral, 0122106).

64. *Sodas* (bebidas gaseosas, 0122204).

65. *Fruit juices* (zumos de frutas, 0122302).

66. *Juices from vegetables* (zumos vegetales, 0122400).

67. *Hard liquor and non-wine base sparkling drinks* (espirituosos y licores, 0211100).

68. *Wine and other fermented fruit drinks* (vinos de uva y de otras frutas fermentadas, 0212109). White, red and rosé wines, apple and pear ciders and from other fruits. Also includes non-alcoholic wines).

69. *Beer* (cervezas, 0213108). It includes all alcoholic beers.

70. *Cigarettes* (cigarrillos, 0221105).

Table C1

*Expenditure on Quantity Items. Percentage of Expenditure. ECPF-85*

| | Mean | s.d. | p10 | p50 | p90 |
|---|---|---|---|---|---|
| Percent of Food Consumption | | | | | |
| All | 60.6 | 16.4 | 40.1 | 61.3 | 80.8 |
| 1st Income quintile | 63.7 | 17.8 | 41.7 | 64.7 | 85.6 |
| 2nd Income quintile | 61.6 | 16.2 | 41.2 | 62.3 | 81.6 |
| 3rd Income quintile | 60.4 | 15.6 | 40.8 | 60.9 | 79.6 |
| 4th Income quintile | 59.5 | 15.7 | 39.7 | 60.1 | 78.6 |
| 5th Income quintile | 58.0 | 16.1 | 37.6 | 58.9 | 77.5 |
| $< 30$ | 56.6 | 17.8 | 34.2 | 57.3 | 78.2 |
| 30–34 | 57.4 | 17.1 | 35.9 | 58.2 | 78.0 |
| 35–39 | 58.0 | 16.1 | 37.9 | 58.5 | 77.4 |
| 40–44 | 59.0 | 15.3 | 40.0 | 59.5 | 77.6 |
| 45–49 | 59.9 | 15.3 | 40.6 | 60.6 | 78.7 |
| 50–54 | 60.7 | 15.3 | 41.4 | 61.3 | 79.5 |
| 55–60 | 62.1 | 15.6 | 42.1 | 62.9 | 81.2 |
| 60–64 | 62.4 | 16.0 | 42.4 | 63.0 | 81.9 |
| 65–75 | 63.1 | 16.7 | 41.8 | 63.9 | 83.9 |
| No homemaker | 60.0 | 17.5 | 38.1 | 60.7 | 81.5 |
| Housewife | 60.8 | 15.1 | 41.6 | 61.4 | 79.6 |
| Percent of Total Consumption | | | | | |
| All | 18.4 | 10.1 | 7.0 | 16.9 | 31.6 |
| 1st Income quintile | 23.4 | 11.9 | 9.4 | 22.1 | 39.4 |
| 2nd Income quintile | 20.4 | 10.0 | 8.6 | 19.3 | 33.3 |
| 3rd Income quintile | 18.4 | 9.1 | 7.8 | 17.3 | 30.2 |
| 4th Income quintile | 16.5 | 8.4 | 6.9 | 15.4 | 27.4 |
| 5th Income quintile | 13.6 | 7.6 | 4.8 | 12.4 | 23.5 |
| $< 30$ | 14.7 | 9.0 | 4.4 | 13.4 | 26.3 |
| 30–34 | 15.4 | 8.9 | 5.3 | 14.0 | 27.1 |
| 35–39 | 16.1 | 8.8 | 5.8 | 14.9 | 27.9 |
| 40–44 | 17.3 | 8.8 | 7.1 | 16.2 | 28.8 |
| 45–49 | 17.3 | 8.8 | 7.1 | 16.2 | 28.9 |
| 50–54 | 17.8 | 9.3 | 7.3 | 16.5 | 29.9 |
| 55–60 | 19.2 | 9.9 | 7.9 | 17.9 | 32.0 |
| 60–64 | 19.6 | 10.2 | 7.9 | 18.0 | 33.0 |
| 65–75 | 21.1 | 11.0 | 8.5 | 19.5 | 35.8 |
| No homemaker | 17.3 | 10.3 | 5.7 | 15.6 | 30.9 |
| Housewife | 18.8 | 9.3 | 8.1 | 17.5 | 31.0 |

*Notes*: p$X$ stands for percentile $X$.

Table C2

*Expenditure on Quantity Items. Percentage of Expenditure. ECPF-97*

| | Mean | s.d. | p10 | p50 | p90 |
|---|---|---|---|---|---|
| Percent of Food Consumption | | | | | |
| All | 94.3 | 7.7 | 86.2 | 96.3 | 100.0 |
| 1st Income group | 95.5 | 7.3 | 88.1 | 97.7 | 100.0 |
| 2nd Income group | 94.5 | 7.5 | 86.6 | 96.4 | 100.0 |
| 3rd Income group | 93.9 | 7.8 | 85.6 | 95.8 | 100.0 |
| 4th Income group | 93.4 | 8.2 | 84.6 | 95.4 | 100.0 |
| $< 30$ | 92.6 | 10.4 | 82.2 | 95.5 | 100.0 |
| 30–34 | 92.3 | 9.5 | 81.3 | 94.9 | 100.0 |
| 35–39 | 92.7 | 8.7 | 83.4 | 94.8 | 100.0 |
| 40–44 | 93.4 | 7.7 | 84.9 | 95.1 | 100.0 |
| 45–49 | 93.8 | 7.4 | 85.8 | 95.5 | 100.0 |
| 50–54 | 94.5 | 7.0 | 87.1 | 96.2 | 100.0 |
| 55–60 | 95.0 | 6.9 | 87.7 | 96.7 | 100.0 |
| 60–64 | 95.2 | 7.5 | 88.1 | 97.2 | 100.0 |
| 65–75 | 95.8 | 7.0 | 88.8 | 97.9 | 100.0 |
| No homemaker | 94.0 | 8.3 | 85.4 | 96.2 | 100.0 |
| Housewife | 94.8 | 6.9 | 87.3 | 96.5 | 100.0 |
| Percent of Total Consumption | | | | | |
| All | 30.8 | 14.4 | 12.7 | 30.0 | 49.7 |
| 1st Income group | 35.8 | 16.0 | 15.4 | 35.3 | 56.7 |
| 2nd Income group | 32.1 | 13.8 | 14.2 | 31.9 | 49.9 |
| 3rd Income group | 29.4 | 12.7 | 13.2 | 29.0 | 46.0 |
| 4th Income group | 25.5 | 12.3 | 10.0 | 24.7 | 41.6 |
| $< 30$ | 25.9 | 14.5 | 6.5 | 25.4 | 44.8 |
| 30–34 | 26.8 | 13.8 | 8.9 | 26.2 | 45.1 |
| 35–39 | 28.9 | 14.1 | 11.2 | 28.2 | 47.4 |
| 40–44 | 30.0 | 13.4 | 12.8 | 29.6 | 47.3 |
| 45–49 | 29.7 | 13.3 | 12.8 | 29.1 | 47.3 |
| 50–54 | 29.5 | 13.2 | 13.0 | 28.7 | 46.7 |
| 55–60 | 30.3 | 13.6 | 13.2 | 29.6 | 48.2 |
| 60–64 | 32.3 | 14.9 | 13.9 | 31.3 | 51.9 |
| 65–75 | 34.7 | 15.6 | 15.0 | 33.9 | 55.4 |
| No homemaker | 28.9 | 14.5 | 10.7 | 28.0 | 48.0 |
| Housewife | 33.2 | 13.9 | 15.8 | 32.5 | 51.6 |

*Notes*: p$X$ stands for percentile $X$.

# Appendix D: The Spanish Time Use Survey

The 2002 Spanish time use Survey (STUS) is part of the Harmonized European Time Use Surveys (HETUS) launched by the EU Statistics Office (EUROSTAT). It consists of a representative sample of 20,603 households and contains information on daily activities by means of the completion of a personal diary, as well as household and individual questionnaires. The sample is evenly distributed over the year and the week in order to accurately represent time use patterns during all days of the week. Unlike the ATUS, which is a recall diary constructed by a telephone interviewer (who asks what the respondent was doing yesterday at 4:00am, how long the activity lasted, who was there, and where the activity took place, continuing through the day for 24 hours), HETUS surveys are leave-behind written diaries, which are typically of higher quality but are more costly to collect. The diaries time frame is 24 consecutive hours (from 6:00am in the morning until 6:00am the following day) and is divided into 10 minute intervals. In each of the intervals, the respondent records a main activity and a secondary activity (carried out simultaneously with the primary activity), whether the activity was performed in the company of a child under 10 years old, another member of the household or another adult, and the location where the activity took place. An extensive literature confirms the reliability and validity of diary data and its superiority over other time use surveys based on stylized questions, asking respondents to estimate time in activities on a "typical day" (e.g., Robinson & Godbey 1985, Juster 1985, Juster & Stafford 1991). Fernandez et al. (2010) present a comparison between the STUS and the Spanish Labor Force Survey (EPA), a well-known representative panel dataset of the Spanish labor market, and show that the main demographic and economic variables in both datasets are similar.

For our analysis we use a sample of respondents aged 59–70 as in Section 2.3. Minutes per week on grocery shopping and cooking come from the list of activities, which are coded according to a harmonized list of activities established by EUROSTAT and are grouped into 10 major categories: personal care, work, studies, household and family, volunteer work and meetings, social life and recreation, sports and open air activities, hobbies and games, means of communication, and non-specified travel and use of time. Table D1 lists the major categories and subcategories. We consider an individual head of household to be retired if he is receiving a retiring pension. The rest of controls are defined as in equation (1).

# Appendix E: The International Social Survey Program

To measure the evolution of gender roles over the time period covered by our expenditure data in Spain, we use two separate cross-sections from the 1994 and 2002 International Social Survey Program and focus on the Family and Changing Social Norms Module [ISSP (1994, 2002)]. The ISSP is an annual program of cross-national collaboration on surveys between several social science institutes dating back to 1983. Each member state individually carries a module of a 15-minute self-completion supplement to their regular national surveys, and includes a common core of background variables. The number of member states is currently 39, although not all members have participated since 1983. In each of the participating countries, an individual of at least 16 or 18 years of age (depending on the country) from

Table D1

*2-Tier Level Classification of Activities in STUS*

| ACTIVITIES | CODES |
|---|---|
| PERSONAL CARE | >= 0 & <= 390 |
| Sleep | >=100 & <200 |
| Food and drink | >=200 & <300 |
| Other personal care | >=300 & <=390 |
| WORK | >=1000 & <=1390 |
| Main job | >=1100 & <1200 |
| Secondary job | >=1200 & <1300 |
| Activities related to work | >=1300 & <=1390 |
| STUDIES | >=2000 a& <=2210 |
| From school to college | >=2100 & <2200 |
| Studies during free time | >=2200 & <=2210 |
| HOUSEHOLD AND FAMILY | >=3000 & <=3910 |
| Cooking activities | >=3100 & <3200 |
| Household maintenance | >=3200 & <3300 |
| Clothes caring | >=3300 & <3400 |
| Gardening and pets | >=3400 & <3500 |
| Construction and repairs | >=3500 & <3600 |
| Shopping and services | >=3600 & <3700 |
| Household management | >=3700 & <3800 |
| Childcare | >=3800 & <3900 |
| Playing with children | = 3830 |
| Basic childcare | (>=3800 & <=3820) or (>=3840 & <3900) |
| Help to adult members | >=3900 & <=3910 |
| VOLUNTARY WORK AND MEETINGS | >=4000 & <=4390 |
| For an organization | >=4100 & <4200 |
| Informal help to other households | >=4200 & <4300 |
| Participative activities | >=4300 & <=4390 |
| SOCIAL LIFE AND RECREATION | >=5100 & <5200 |
| Recreation and culture | >=5200 & <5300 |
| Pasive leisure | >=5300 & <=5310 |
| SPORTS AND OUTDOOR ACTIVITIES | >=6000 & <=6310 |
| Physical Activity | >=6100 & <6200 |
| Productive Physical Activity | >=6200 & <6300 |
| Activities related to sports | >=6300 & <=6310 |
| HOBBIES AND GAMES | >=7000 & <=7390 |
| Artistic hobbies | >=7100 & <7200 |
| Hobbies | >=7200 & <7300 |
| Games | >=7300 & <=7390 |
| COMUNICATION MEDIA | >=8000 & <=8320 |
| Reading | >=8100 & <8200 |
| TV and video | >=8200 & <8300 |
| Radio and music | >=8300 & <=8320 |
| RIDES AND NO SPECIFIC TIME USE | >=9000 & <=990 |
| Rides with an objective | >=9000 & <9820 |
| Pleasure driving | =9820 |
| Auxiliary codes | >=9900 & <=9990 |

*Notes*: Source: The 2002 STUS codebook. For expositional purposes we do not include the 3rd tier-level classification of activities.

the selected households completes a virtually identical questionnaire. Each year a topical module on a specific subject is developed and put together with the standard questionnaire. In the years 1994 and 2002 the ISSP topical module was "Family and changing social norms" and in addition to the usual demographic and economic variables, the survey also collected information on attitudes and practices regarding the household division of labor.

For ease of comparison with our previous analysis, we use a similar sample of male and female respondents aged 59–70 to document the evolution of gender roles in Spain for this age group. We do not restrict the sample to married individuals, although doing so does not alter our results as the majority of individuals in this age group is married (especially men).

The variables used in our main analysis come from two different sets of questions. First, in order to document gender role attitudes, we use questions that come in the form of statements to which respondents either agree or disagree with and are coded on a 1 to 5 scale from strongly agreeing to strongly disagreeing. The statements are the following: "Being a housewife is just as fulfilling as working for pay", "A man's job is to earn money; a woman's job is to look after the home and family", "Having a job is the best way for a woman to be an independent person", "Both the man and woman should contribute to the household income". Our measure of egalitarian attitudes comes from the percentage of people that either strongly disagree or disagree with the first two statements, and that either strongly agree or agree with the last two statements. Second, in order to measure actual gender role practices, we use the questions in the ISSP about the gender division of home labor. In particular, respondents are asked whether certain housework tasks are always or usually done by the female partner, both partners, or the male partner. There are four such questions, referring to doing the laundry, caring for the sick, grocery shopping, and cooking evening meals. Our measure of egalitarian division of home labor uses the percentage of respondents who answers that either both partners undertake, or the male partner undertakes those housework activities.