

# Saving regrets at retirement

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## SAVING REGRETS AT RETIREMENT

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### Abstract

In this paper, we study self-reported saving and spending regrets, a piece of information directly elicited in the Survey of Health, Aging and Retirement in Europe (henceforth SHARE). Using data from the eighth regular wave and the second Corona survey, we find a general scarcity of regret, indeed people tend to declare that - even if they could change - they would repeat the same choices made in the past. However, observing how regrets change around retirement, we find evidence of a heterogeneous effect depending on the retirement scheme: compared to workers, people who take the option for early retirement tend to report fewer no regrets and more saving regrets while those who choose the old-age pension do not exhibit any change in regrets <sup>1</sup>.

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<sup>1</sup>A preliminary version of this paper was presented at a SHARE COVID-19 meeting in November 2023 in Munich and at the Netspar International Pension Workshop in June 2024 in Leiden. Our thanks go to the participants of these events for their valuable comments.

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# 1 Introduction

Have consumers adequate resources for old age? Is the combination of governmental support (public pension) and private savings enough to keep up their living standards once they retire from work?

A possible way to answer this question is to check if consumption drops at retirement. If and when it does, this may signal that consumers realize at this important moment of their lives that their financial resources are inadequate. But other explanations are also possible: for instance, they enjoy more leisure, and may need to spend less on goods and services to reach the same level of utility. Or they can use the extra leisure to shop more effectively or to switch to home production of some goods (eating at home rather than eating out). Attanasio and Weber (2010) review these and other explanations in the context of the Life-Cycle model.

An alternative way to address this issue is to ask consumers whether they wished they had saved more. This is what is now done in some large-scale, multi-purpose surveys such as SHARE.

Our paper contributes to a small but growing stream of research about saving regrets. Börsch-Supan, Bucher-Koenen, M. D. Hurd, and Rohwedder (2023) explore the link between saving regrets and their possible determinants, with particular attention to psychological characteristics. Data from the RAND American Life panel, collected on individuals aged between 60 and 79, reveal a higher tendency to report saving regrets at an older age: 58.5 percent of the sample would have liked to save more. Using regression analyses, they show that saving regrets are correlated with the socio-economic status of the individual, while the correlation with psychological factors such as the tendency to procrastinate is weak. Hurwitz and Mitchell (2022) evaluate whether and to what extent saving regrets are linked to the possible lack of awareness regarding one's life expectancy. Using a specific HRS module, they carry out an experiment in which the group of those who only provide the answer on saving regrets is compared with those who receive information regarding life expectancy: thinking/revealing their subjective survival probabilities or learning their objective survival probabilities. People exposed to this treatment report saving regrets more frequently.

In this work, we study the adequacy/inadequacy of pensioners' finances by means of self-reported assessment of spending and saving regrets collected in the second SHARE Corona survey. Contrary to what was highlighted in previous literature, we find that only a few people (14.3 percent) report saving regrets while the majority (79 percent) would repeat the same consumption and saving choices made. Furthermore, with regression analyses we are able to measure the impact of retirement on the propensity to express regrets, whether none, savings or spending. Using an IV method we purge out the endogenous nature of retirement by means of eligibility ages for early and old-age pensions in different European countries. Constructing distinct indicators for early or statutory retirement allows us to test whether retirement has different effects between those who retire as early as possible and as late as possible. The results obtained are consistent with the phenomenon of the 'early retirement trap': retirement has no effect on regrets among those who have used the old-age pension exit but induces an increase in saving regrets among those who have resorted to early retirement.

The following section contains details about the data used. We describe our sample selection and we define the variables of interest providing some descriptive statistics. The third section contains the empirical analyses. Conclusions follow.

## 2 Data and Measurement

We use data from the Survey of Health, Ageing and Retirement in Europe (henceforth SHARE). This survey is carried out in 28 European countries and Israel and it collects information about health, demographic and economic features of people aged 50 and older.

The analysis of interest is performed on 15 countries, and considering the data collected in the eighth wave of SHARE and in the second wave of the SHARE corona survey <sup>2</sup>. Wave 8 data collection began in 2019 but stopped in March 2020 due to the outbreak of the COVID-19 pandemic. At the time of the suspension, only 70 percent of the panel sample had been interviewed. However, within a short time a new data collection called SHARE Corona survey was launched which proposes a short form questionnaire on the same topics as the regular waves and a series of questions aimed at capturing details connected to the COVID-19 phenomenon. The exceptional circumstances led to a change in data collection: instead of the usual personal administered interviews (CAPI) we opted for the new telephone administered interviews (CATI).

The original sample - obtained by combining the two waves - collects 95,986 observations: 46,733 observations from wave 8 (CAPI 8, hereafter) and 49,253 observations from the second wave of SHARE corona (CATI 2, hereafter). The study is not carried out on the entire sample but only on a subgroup of individuals: those who are in the age group between 59 and 79 years of age, who are either workers or pensioners, and who reside in countries identified through a procedure explained in detail in the appendix A. The final sample amounts to 12,233 observations - respectively equal to 5,253 for CAPI 8 and 6,980 observations for CATI 2 respectively.

*Saving and spending regrets.* The presence of regrets in past saving and spending choices is defined by means of the following question:

*Please think back to when you were around 45 years old. Suppose you could re-do your spending and saving from then to now, would you: 1. spend less and save more over the years? 2. spend and save the same over the years? 3. spend more and save less over the years?* <sup>3</sup>

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<sup>2</sup>The SHARE Corona Survey 1 and 2 were two special waves of SHARE held in June - July 2020 and 2021, respectively, during the Corona outbreak.

<sup>3</sup>It should be noted that in wave 8 two alternative versions of the same question were adopted. Half of the sample was asked the above question, subsequently included in the second corona share questionnaire, while the other half was asked the following question:

*Please think back to when you were around 45 years old. Suppose you could re-do your spending and saving from then to now, would you: 1. save more over the years? 2. save about the same over the years? 3. save less over the years?*

It should be noted that the question of interest was not addressed to all the participants but only to those responsible for household finances aged between 59 and 79 years. The individuals were divided into three groups - using binary variables - based on the type of regret they experienced (i.e. saving, none, and spending regrets).

*Retirement status.* Retirement is the treatment of interest. A person is Retired if he/she declares himself/herself as pensioner.

*Eligibility.* To address correctly the endogenous nature of retirement and therefore to be able to compare correctly workers and retirees, we use age specific retirement incentives prevailing in the different social security systems as the instrument for retirement. Based on the regulatory criteria of each country we calculate a score called time to/since eligibility which measures the number of years that separate an individual from the moment of eligibility for retirement <sup>4</sup>. In particular, two types of retirement are considered: *i*) the old-age pension scheme (hereinafter cited as OP), the normal exit from the labour force once the age is reached, and *ii*) early retirement pension scheme (hereinafter cited as EP), an early exit guaranteed upon fulfilling certain conditions. A score is then calculated for each retirement scheme (i.e. (*Sop*, *Sep*)) which is equal to zero at the time of entitlement, it is negative before and positive after. Consequently, on the basis of these scores it is possible to define the eligibility status - for each retirement scheme - by means of simple binary variables that signal eligibility by assuming a unit value for those who have a score greater than or equal to zero and a null value for those who have a negative score. Eligibility age for an early pension always precedes eligibility age for the old age pension in all those countries that set the access criteria in terms of age and almost always also in the countries that use age and years of contributions criteria.

Table 1: Eligibility statuses

|                    | Eligible for Old-age |       |        |
|--------------------|----------------------|-------|--------|
| Eligible for Early | No                   | Yes   | Total  |
| No                 | 1,449                | 70    | 1,519  |
| Yes                | 1,420                | 9,303 | 10,723 |
| Total              | 2,869                | 9,373 | 12,242 |

*Notes:* The table shows the number of ineligible and eligible people for the early pension and for the old-age pension.

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Although the question is conceptually the same, the answers provided refer only to saving decisions and do not underline the trade-off between consumption and saving. On the basis of a criterion of homogeneity, the answers to this question are not considered and we focus only on those to the question reported in the main text.

<sup>4</sup>To compute the eligibility to early and old-age pensions we used the eligibility criteria reported in Gruber, Wise, et al. (1999), Gruber and Wise (2001), Wise (2012), and by the Mutual Information System on Social Protection (MISSOC) database and Social Security Administration (SSA) data on ‘Social Security Programs throughout the World’. Further details are reported in appendix A.

Indeed, Table 1 shows a remarkable overlap between the two statuses, with 76.5 percent of people eligible for the old-age pension (i.e. 9,373 people) and 87.6 percent eligible for the early pension (i.e. 10,723 people).

### 3 Empirical Analysis

In this section, descriptive analyses and regression analyses are presented.

#### 3.1 Descriptive analysis

Table 2 shows some descriptive statistics on reported no regret, saving, and spending regrets. The presence of regrets is quite rare: 79 percent of people report no type of regret, 14.3 percent of respondents report saving regrets, and 6.8 percent of people report spending regrets.

Table 2: no regret, saving and spending regrets

| Final sample     | Count | Mean  | SD    |
|------------------|-------|-------|-------|
| No Regret        | 12242 | 0.790 | 0.408 |
| Saving Regrets   | 12242 | 0.143 | 0.350 |
| Spending Regrets | 12242 | 0.067 | 0.251 |

*Notes:* The table shows the propensity of reporting no regret, saving, and spending regrets.

These descriptive statistics are interesting as they contrast with what emerged in other analyses which report a large presence of saving regrets. Indeed, Hurwitz and Mitchell (2022) using US data (from HRS) finds that 57 percent of individuals experience saving regrets, similar results are presented in Börsch-Supan, Bucher-Koenen, M. D. Hurd, and Rohwedder (2023) and Börsch-Supan, M. Hurd, and Rohwedder (2020) that consider data from the RAND American Life Panel (ALP) and the Singapore Life Panel (SLP) respectively. Europeans therefore seem to show much less regret, a result that can be explained by the different structure of pension systems.

Figures 6-10 in the appendix report additional descriptive statistics. Analyses by country reveal substantial homogeneity, i.e. a clear dominance of no regret. However, some countries show quite significant shares of people with saving regrets. This is the case in Bulgaria, Greece, Latvia, Malta, and Sweden, where the share exceeds 20 percent and where saving regrets are more common among workers than among pensioners. Spending regrets are quite limited. The only exceptions are Bulgaria, Malta and Romania, where the share of people who express such regret is higher than 10 percent. In particular, in the first country the incidence of spending regret exceeds 20 percentage points and is higher among workers than among retirees. The differences between men and women are not evident, both groups report similar values for all types of regrets. In terms of age, there is an increasing trend of no regrets and a decreasing trend of saving regrets, while spending regrets does not show a clear evolution. Differences with

respect to the educational attainment are such that the higher the qualification, the lower the tendency to report saving regrets and the greater the tendency not to express no regret. Couples exhibit both less saving regrets and less spending regrets compared to singles, widowers and divorced people.

### 3.2 Estimation

To evaluate the causal effect of retirement on the likelihood of reporting no regret, saving, or spending regrets we implement an Instrumental Variable approach.

The model considered has the following structure:

$$Y_{i,t} = \beta_0 + \beta_1 R_{i,t} + X'_{i,t} \beta_3 + \varepsilon_{i,t}$$

where the dependent variable  $Y_{i,t}$  is a binary indicator for reporting no regret, saving, or spending regrets by individual  $i$  at time  $t$ ,  $R_{i,t}$  is his/her retirement status,  $X_{i,t}$  is a vector that collects additional variables (i.e. gender of the respondent, dummies on educational attainments, dummies on marital status, dummies on the math skills at 10 years of age, an optimism indicator, and year of birth, country, survey year and survey month dummies), and  $\beta_0$  is the constant term. The endogenous nature of the retirement decision is tackled using different eligibility statuses as instruments (i.e.  $Z_{i,t}$ ). Consequently, the first stage of the estimation is the following:

$$R_{i,t} = \gamma_0 + \gamma_1 Z_{i,t} + X'_{i,t} \gamma_3 + \epsilon_{i,t}$$

### 3.3 Results

Table 3 shows briefly the effect of retirement on the outcomes of interest. The upper part of the table refers to no regret, the central part refers to saving regrets, and the bottom part refers to spending regrets. Columns 1 to 3 differ in the use of different sets of instruments.

The first column reports the results obtained using two instruments: the eligibility status for the early pension and the eligibility status for the old-age pension. Retirement has a negative effect on the probability of showing no regret and a positive effect on the probability of reporting spending regrets, but the limited size of the coefficients and the low precision of the estimates do not allow us to detect any statistically significant effect. However, the rejection of the Sargan-Hansen over-identifying restrictions test (at the 1% level) points to potential heterogeneous effect of retirement between people who chose an early exit from the labour market vs the statutory eligibility age (see Celidoni, Dal Bianco, and Weber (2017)). The second column shows the results for those who retire as early as possible. With early retirement there is a greater propensity of pensioners to report saving regrets and a lower inclination to report no regrets compared to workers. This difference equals 23.2 percent and -23.6 percent, respectively. The third column refers to those who retire as late as possible, namely with the old age pension. In this case there are no significant retirement effects.

These results are in line with the ‘early retirement trap’ literature. Indeed, as shown in Angelini, Brugiavini, and Weber (2009), early retirement is often associated

with conditions of economic difficulty, especially among those people who have little diversified wealth, essentially composed of housing and human capital.

Table 3: IV Estimates.

|                         | 1      | 2         | 3      |
|-------------------------|--------|-----------|--------|
| <i>No regret</i>        |        |           |        |
| Retired                 | -0.019 | -0.242*** | 0.015  |
|                         | 0.048  | 0.079     | 0.052  |
| Sargan Hansen p-value   | 0.003  |           |        |
| <i>Saving regrets</i>   |        |           |        |
| Retired                 | 0.021  | 0.224***  | -0.009 |
|                         | 0.038  | 0.074     | 0.039  |
| Sargan Hansen p-value   | 0.000  |           |        |
| <i>Spending regrets</i> |        |           |        |
| Retired                 | -0.003 | 0.018     | -0.006 |
|                         | 0.037  | 0.068     | 0.037  |
| Sargan Hansen p-value   | 0.690  |           |        |
| Covariates              | Yes    | Yes       | Yes    |
| Year Birth Dummies      | Yes    | Yes       | Yes    |
| Year Dummies            | Yes    | Yes       | Yes    |
| Month Dummies           | Yes    | Yes       | Yes    |
| Country Dummies         | Yes    | Yes       | Yes    |
| N.Observations          | 12242  | 12242     | 12242  |
| N.Clusters              | 183    | 183       | 183    |
| First Stage F Stat      | 95     | 42        | 147    |

*Columns:* Columns 1-3 report the IV estimates obtained using different instruments: 1.  $Z_{i,t}$  is composed by the eligibility to early pension and the eligibility to old-age pension; 2.  $Z_{i,t}$  is the eligibility to early pension; 3.  $Z_{i,t}$  is the eligibility to old-age pension.

*Notes:* The table reports the estimated causal effect of retirement using different eligibility conditions. Additional covariates are: gender of the respondent, dummies on educational attainments, dummies on marital status, dummies on the math skills at 10 years of age, indicator of optimism, and year of birth, country, year, and month dummies. Standard errors are clustered at country level, cohort and gender of respondent. \*\*\*, \*\*, and \* respectively denote statistical significance at the 1%, 5% and 10% levels.

Having discussed the main IV estimation results of our regression models, it is worth focusing on the significance of the other controls. Tables 5, 6, and 7 in the appendix report in detail the estimates summarized in table 3. A first interesting aspect is that the propensity to report regret does not depend on gender, in fact this variable is not significant in any of the specifications of the three tables. A second result to note

concerns family composition. Couples have a greater probability of reporting no regret and a lower propensity to report saving regret than singles, divorced or widowed people. A third aspect concerns the intellectual abilities of individuals. Among the controls there are three dummies which indicate those who evaluate their mathematical skills as ‘much better’, ‘better’ or analogous with those of their primary school classmates (e.g. omitting the groups of those who did worse than their classmates or who did not attend primary school). A clear gradient emerges: the higher the mathematical skills, the greater the propensity not to report regrets and the lower the probability of showing saving regrets. Finally, regrets are also associated with people’s perception, in particular their optimism. This characteristic is measured by combining the answers to two questions regarding the tendency to see the future as good and full of opportunities (i.e. optimists are those who declare ‘often’ to both questions). Optimists tend to report no regret more often and both saving regrets and spending regrets less often.

*Robustness: years in retirement.* As a robustness test we propose a model in which the effect of years in retirement is also studied. The endogeneity of this new variable is addressed using as instruments the number of years since the eligibility status for early retirement pension or old age pension was achieved. The results are similar to those presented previously and are reported in table 8 in the appendix. The effect of the years in retirement is generally insignificant but has the opposite sign compared to that of the pensioner’s status: in the case of saving regrets, retirement increases the probability of experiencing them (by 21.3%), but the years in retirement tend to reduce the propensity to manifest this problem (albeit at a very slow rate: -0.005%), a result that could be attributed to potentially different regulatory frameworks that were more generous in the past than now, or to psychological mechanisms that prevail with age (such as justification bias).

*Robustness: different age specifications.* As addressed in Celidoni, Dal Bianco, and Weber (2017), the specification of age - especially in a context in which the effect of years in retirement is also studied - is a serious challenge. The main results table uses the most conservative approach as it includes birth year dummies. However, the results are overall stable even when including cohort dummies or different polynomials in the age of the respondent. Estimation results are represented in tables 9 to 11 in the appendix.

### 3.4 Early retirement trap

Regression analyses showed that people who tend to retire as early as possible are more likely to exhibit saving regrets once they enter retirement. As highlighted in Angelini, Brugiavini, and Weber (2009), generous social security systems can make early retirement particularly attractive. We measure the generosity of pension systems along two dimensions: the generosity of the replacement rate, and the temporal distance between early and old age pensions.

*Replacement rates.* SHARE data are complemented with the information on the net pension replacement rates provided by the OECD on the period 2014-2021. Figure 11 reports the average replacement rates - separately for men and women - for the countries of interest. There is considerable variability among countries: from 39 percent

in Bulgaria to 83 percent in Luxembourg. These differences in the generosity of pension systems tend to persist over time, in fact figure 12 in the appendix shows rather stable patterns. In order to verify whether regrets are linked to the level of the replacement rate, the sample is divided into two subgroups: that of countries with replacement rates below the median and that of countries above. Tables 12 and 13 in the appendix show very similar point estimates with respect to saving regrets, and a significant effect exclusively for the less generous countries.

*Differences in eligibility ages.* It is reasonable to believe that the economic effects to choose early retirement rather than old age pension are relatively minor if the retirement windows are close. The wider the windows are (i.e. the earlier the early pension age is compared to the old age pension age), the greater the effects. In fact, a very early exit from the labor market entails a cost that can be expressed in terms of both a lower public pension and foregone private savings for retirement. Therefore, one might expect that pension systems that guarantee a very early retirement age will also show greater cases of saving regrets.

Figures 4 and 5 in the appendix show the distributions of the different legal criteria in the various countries. Figure 13 in the appendix, shows - for each possible year of retirement - the difference between the age of eligibility for the old-age pension and that of the early retirement pension. There is not only variability between countries but also within each country. Indeed, there are countries - such as Italy - where the difference between retirement ages is considerable and others - such as Switzerland - where the distance is negligible. Furthermore, the numerous regulatory interventions that followed over time have led to a gradual convergence of the criteria for early retirement pension to those for old age pension - consider for example the cases of Austria and Germany - and a consequent overlap of the two retirement ages.

Therefore, to verify whether a greater distance between eligibility ages corresponds to greater saving regrets, the sample is divided into two subgroups: that of individuals who faced/face retirement windows less than three years apart and those who instead faced/face windows of retirement at least three years apart. Tables 14 and 15 in the appendix show results aligned according to this criteria. We find that in countries with very homogeneous access criteria the effect of retirement on the propensity to express regret is similar (i.e. not statistically different) between early retirement pension and old age pension. On the contrary, in countries that have an age for accessing early retirement at least three years lower than that for old age, the effects are significant and of opposite sign: those who choose early retirement show an increase of 25.2 percent in the propensity to report saving regrets among the retirees while those who choose old age have a 19.3 percent reduction in the probability of reporting saving regrets.

## 4 Conclusions

In the present work we have studied self-reported information on having no regret, saving and spending regrets in European countries. If 50+ Europeans could revise their consumption and saving choices, they would change little or nothing. Indeed, in the majority of cases (i.e. 79 percent of cases) people say they are happy with past choices;

in 14.3 percent of cases they wish they had saved more and in 6.8 percent of cases they wish they had consumed more. It is worth highlighting that this result is in contrast to what has been found in the United States.

However, we also find that those who retired as soon as they became eligible for an early retirement pension report higher saving regrets while those who retired at a later age (corresponding to the old age pension eligibility age) do not report saving regrets. This result is in line with the early retirement trap reported in the literature.

## Acknowledgements

This paper uses data from SHARE waves 8 and 8 ca release 9.0.0 and also uses data from the generated Job Episodes Panel (DOI:10.6103/SHARE.jep.200), see Brugiavini, Cavapozzi, Pasini, Trevisan, et al. (2013), Antonova, Aranda, Pasini, Trevisan, et al. (2014), and Brugiavini, Orso, Genie, Naci, Pasini, et al. (2019) for methodological details. The SHARE Job Episodes Panel (JEP) - release 9.0.0 - is a generated dataset based on information of Wave 3 (SHARELIFE) and Wave 7 of SHARE.

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# Appendix

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# A Data and Measurement

## A.1 Data

Table 4 shows the filtering criteria we apply to highlight the sub-sample of interest. The selection procedure - identical for both waves - is the following:

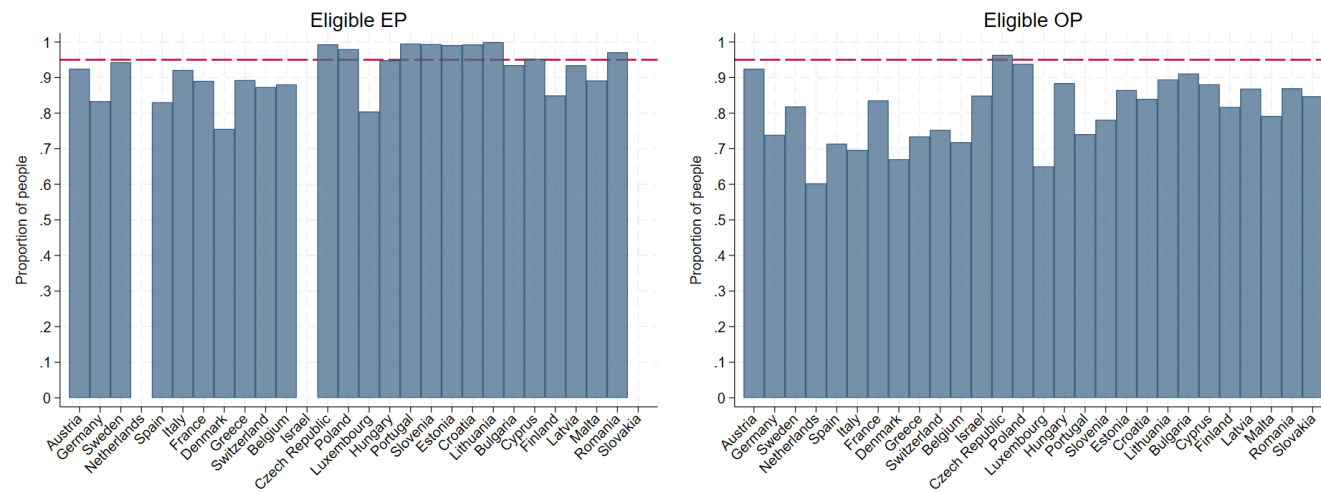
1. *Step 1*: The raw sample;
2. *Step 2*: Only the reference person is kept from each family. The reference person is the one who answers the question on saving/spending regrets. In the rare case that several people from the same family answer the question, we keep the youngest one and - in case the two respondents are of the same age - we keep the man;
3. *Step 3*: Then, people who do not report basic information - such as: age, educational qualification, marital status, family composition characteristics, information on current or past employment and information on childhood - are removed from the sample. The individuals of interest are those who are between 59 and 79 years of age and who report information on their employment history;
4. *Step 4*: Lastly, only those countries that have both retirement schemes and who have a reasonable share of people eligible for the pension. Figure 1 allows you to better appreciate the imposed filtering. Countries such as Israel, the Netherlands and Slovakia do not have legislation relating to early retirement and are therefore excluded from the sample. Countries such as Cyprus, Croatia, Estonia, Lithuania; Czech Republic, Romania, Poland, Portugal, and Slovenia are discarded as they have an incidence of eligible people in their population greater than 95 percent.

Table 4: Filtering criteria.

| Sample | Step1  | Step 2 | Step 3 | Step4 |
|--------|--------|--------|--------|-------|
| Wave   | Count  | Count  | Count  | Count |
| CAPI 8 | 53695  | 12852  | 8375   | 5258  |
| CATI 2 | 49263  | 20029  | 12375  | 6984  |
| Total  | 102958 | 32881  | 20750  | 12242 |

*Notes*: The table reports the step-wise sample selection procedure.

Figure 1: Proportion of eligible people.



*Notes:* The figure reports the proportion of eligible people for the early pension and the old-age pension.

## A.2 Eligibility

To compute the eligibility to early and old-age pensions we used the eligibility criteria reported in Gruber, Wise, et al. (1999), Gruber and Wise (2001), Wise (2012), and the Mutual Information System on Social Protection (MISSOC) database and Social Security Administration (SSA) data on ‘Social Security Programs throughout the World’. The criteria for access to early (ER) and old-age (OA) pensions in the countries considered are shown below <sup>5</sup>.

- *Austria*: EP: 60 for men and 55 for women until 2001. From 2001, early retirement depends on year of birth but men with at least 45 contribution years and women with at least 40 contribution years were unaffected by the increase in the early retirement age (ERA). From 2001 to 2005, for men born up to and including 1942, ERA is 61, then it is 62 from 1943 onwards. As of 2005 for men born in 1943-1944 ERA is 62, for those born between 1945 and 1947 it is 63, for those born between 1948 and 1950 it is 64 and 65 for men born after 1950. From 2001 to 2005 for women it is 56 for those born in 1947, 57 for those born from 1948 to 1951, 58 for those born from 1952. As of 2005 for women born between 1948 and 1949 ERA is 57, for those born between 1950 and 1952 it is 58, for those born between 1953 and 1955 it is 59 and 60 for women born after 1955. OP: 65 for men and 60 for women.
- *Belgium*: EP: No early retirement until 1966. For men, 60 afterwards; for women, 55 until 1987 and 60 since 1987. For both men and women, 61 in 2014, 62 in 2016. OP: 65 for men; for women, 60 until 1997, 61 from 1997 to 1999, 62 from 2000 to 2002, 63 from 2003 to 2005, 64 from 2006 to 2008, and 65 since 2009.
- *Bulgaria*: EP: 1 year before OP for both men and women. OP: For men 60 years of age until 2002, 61 years of age from 2003 to 2006, 63 years of age from 2007 to 2008, 63 years from 2009 to 2017, and 64 onwards. For women 56 years of age until 2002, 57 years of age from 2003 to 2004, 58 years of age from 2005 to 2006, 59 years from 2007 to 2008, 60 years from 2009 to 2017, and 61 onwards.
- *Croatia*: EP: No early pension before 2002. From 2002, 57 for men and 52 for women. From 2004, 58 for men and 53 for women. From 2006, 59 for men and 54 for women. From 2008, 60 for men and 55 for women. From 2014 56 for women. OP: 60 for men and 55 for women until 2001. From 2002, 62 for men and 57 for women. From 2004, 63 for men and 58 for women. From 2006, 64 for men and 59 for women. From 2008, 65 for men and 60 for women. From 2014, 61 for women. From 2018, 62 for women.
- *Czech Republic*: EP: Early retirement is possible up to two years before normal

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<sup>5</sup>Further references: Albuquerque, Arcanjo, and Escária (2009), Ahčan and Polanec (2008), Angelini, Brugiavini, and Weber (2009), Berkel, Börsch-Supan, Ludwig, and Winter (2004), Bingley, Gupta, and Pedersen (2010), Blanco (2000), Dorn and Sousa-Poza (2003), Euwals, Van Vuuren, and Wolthoff (2010), Gruber, Wise, et al. (1999), Gruber and Wise (2010), Guardiancich (2010), Hamblin (2013), Jousten, Lefèbvre, Perelman, and Pestieau (2010), Majcen and Verbič (2009), Mazzonna and Peracchi (2017), Mrak (2004), Bongaarts (2016), Polanec, Ahčan, and Verbič (2013), Schm, Horstmann, et al. (2002), Wise (2012)

retirement age. OP: For men 60 from 1961 to 2002, 61 from 2003 to 2008, 62 from 2009 to 2015, 63 since 2016. For women, old-age retirement depends on the number of children.

- Cyprus: EP: 63 years of age for both men and women. OP: 65 years of age for both men and women.
- Denmark: EP: 60 for both men and women. OP: 67 until 2004, 65 from 2004, 66 since 2020 – for both men and women.
- Estonia: EP: 60 for men and 55 for women until 2003. From 2004, early retirement age increased gradually for women: 56 from 2004, 57 from 2007, 58 from 2010, 59 from 2013, and 60 since 2016. OP: 63 for men; for women, 58 before 2004, 59 from 2004 to 2007, 60 in 2008 and 2009, 61 from 2010, 62 from 2013, and 63 since 2016.
- Finland: EP: No early retirement until 1963. 60 from 1963 to 1980; 55 since 1981. OP: 65 until 1983 and 60 from 1983 to 2010; since 2011, 60 for those born up to 1952, 61 for those born between 1953 and 1954, and 62 for those born since 1955.
- France: EP: 60 for men and women until 2005, 62 from 2006 and 2013, and 63 after. OP: 65 for men and women until 2005, 63 from 2006 to 2017, 63 from 2018 onward for people born before 1953, 64 for people born between 1954 and 1961, and 65 for other cohorts.
- Germany: EP: For men, no early retirement until 1973, 60 from 1973 until 2005, and 63 from 2006. For women, no early retirement until 1962, 60 from 1962. OP: 65 for all until 2012; 67 from 2012.
- Greece: EP: 60 for both men and women until 2012, 62 since 2013. OP: For women, 60 until 2012, 65 in 2013, and 67 since 2014. For men, 65 until 2012 and 67 from 2013 onward.
- Hungary: EP: For men, 60 for those born before 1938 and 61 for those born in 1938 or later; 62 from 2015. For women, 55 until 2003, 57 from 2004, 59 from 2010 and 62 from 2012. OP: 60 for men and 55 for women until 1990. 62 for men and women from 1991, and 65 from 2016 with a gradual increase for specific cohorts (63 for those born in 1953 and 1954, 64 for those born in 1955 and 1956).
- Israel: EP: No early retirement. OP: 65 for men and 60 for woman up to 2004. From 2005 to 2009, 66 for men and 61 for women. 67 for men and 62 for women from 2009 onward.
- Italy: EP: From 1965 to 1995, early retirement was possible at any age with 35 years of contributions (25 years in the public sector) for both men and women; as of 1996, it was step-wise increased up to age 60 for both the private and public sectors (61 for the self-employed). Since 2012, it is 62 for both men and women. OP: The old-age retirement was 60 (65 in the public sector) for men and 55 (60 in the public sector) for women from 1965 to 1993. Several consecutive reforms (1992, 1995 and 1998) increased the old-age retirement to 65 for men and 60 for women, with step-wise increments from 1994. The old-age retirement was 66 from 2012 and 67 from 2019 for men; for women, it was 65 in 2012, 66 from 2013 (it has been possible to retire at 62 since 2012, 63 since 2013, 65 since 2016 and 66 since 2018 in the private sector, and at 63 since 2012, 64 since 2013 and 66 since 2018 for the self-employed). The old-age retirement is 67 for both men and women

from 2019.

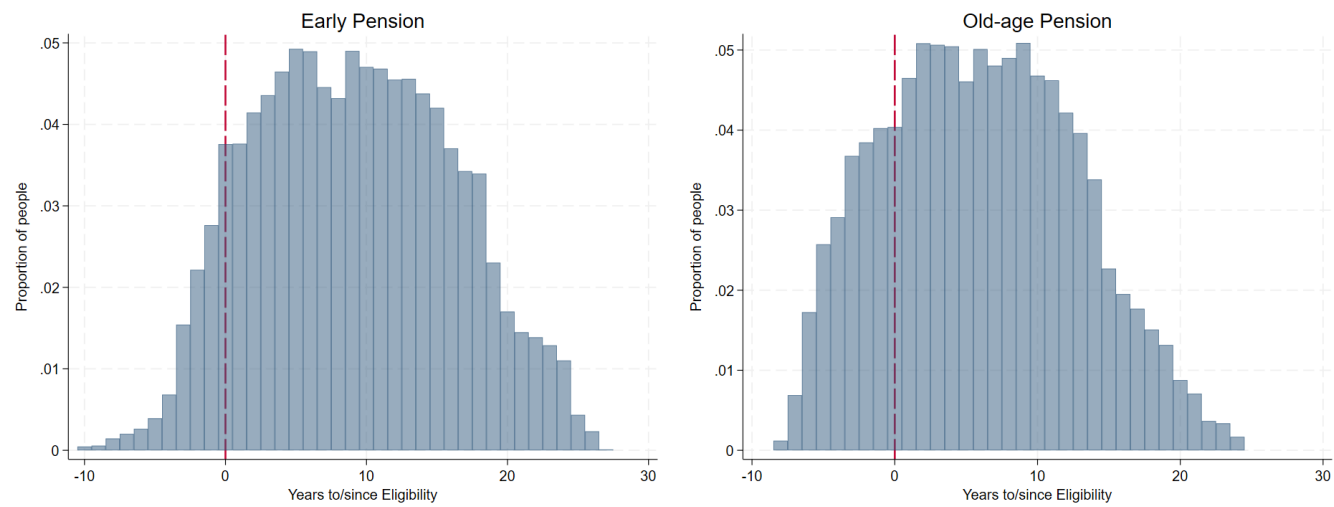
- Latvia: EP: for men 60 years of age until 2016, 61 from 2017 to 2020, 62 after. For women age 56 through 2001, 57 from 2002 to 2004, 58 from 2005 to 2006, 59 from 2007 to 2008, 60 from 2009 to 2016, 61 from 2017 to 2020, and 61 after. OP: for men 61 years of age until 2002, 62 from 2003 to 2016, 63 from 2017 to 2020, and 64 after. For women, 58 years of age until 2002, 59 years of age from 2003 to 2004, 60 from 2005 to 2006, 61 from 2007 to 2008, 62 from 2009 to 2016, 63 from 2017 to 2020, and 64 after.
- Lithuania: EP: 5 years before OP for both men and women. OP: For men 62 years of age until 2013, 63 years of age from 2014 to 2019, 64 years of age from 2020 onwards. For women 58 years until 2003, 59 years from 2004 to 2005, 60 years from 2006 to 2013, 61 years from 2014 to 2016, 62 years from 2017 to 2019, 63 years from 2020.
- Luxembourg: EP: For both men and women, 65 the same as OP up to 1992. 57 for men from 1993 onward. 60 for women from 1993 onward. OP: 65 for both men and women.
- Malta: EP: 61 years of age from 2007 onwards for both men and women. OP: 61 (60) years for men (women) until 2006, 61 (60) for men (women) born before 1953, 62 (61) for men (women) born between 1953 and 1955, 63 (62) for men (women) born between 1956 and 1958, 64 (63) for men (women) born between 1959 and 1962, 65 (64) for men (women) born after 1962.
- Netherlands: EP: No early retirement until 1975. 60 from 1975, for both men and women. OP: 65 for both men and women until 2017 and 66 from 2018.
- Poland: EP: 60 for women and 65 for men. OP: 55 for women and 60 for men.
- Portugal: EP: No early pension before 1999. For both men and women, 55 since 2011, 57 from 2012, 55 from 2015, and 60 since 2017. OP: 65 for men. For women, 62 until 1993, 63 from 1993 to 1995, 64 from 1996, 65 from 1999. For both men and women, 66 since 2012.
- Romania: EP: for both men and women it occurs 5 years earlier than OP. OP: for men (women) 65 (60) years up to 2005, 63 (58) from 2006 to 2011, 64 (59) from 2011 to 2014, 65 (60) from 2015 onwards.
- Slovakia: EP: no early retirement. OP: for men 60 years until 2002, 62 years from 2033 onwards. For women 57 years until 2001, an age between 52 and 57 years depending on the number of children from 2002 to 2003, 54 years from 2004 to 2005, 55 years from 2006 to 2007, 56 years from 2008 to 2009, 57 years from 2010 to 2011, 58 years from 2012 to 2013, 59 years in 2014 and 60 years from 2015 onwards.
- Slovenia: EP: Before 1993, no early retirement. For men: 58 from 1993 to 2014, 59 from 2015, and 60 from 2018. For women: 53 from 1993 to 2001, 54 from 2002 to 2004, 55 from 2005 to 2007, 56 from 2008 to 2010, 57 in 2011 and 2013, 58 in 2014 and 2015, 59 from 2016, 60 from 2019. OP: Before 1993, 55 for men 53 for women (40/38 years of contribution and no age requirements, we assume they start working at age 15). From 1993, 65 for men. For women, 61 from 1993 to 2004; 62 from 2005 to 2007; 63 from 2008 to 2013; 65 from 2014 onwards.

- *Spain*: EP: 64 until 1982, 60 from 1983 to 1993, and 61 from 1994 – for both men and women. OP: 65 for both men and women.
- *Sweden*: EP: No early retirement until 1963. 60 from 1963 to 1997; 61 from 1998. OP: 67 for both men and women until 1995; 65 from 1995.
- *Switzerland*: EP: No early retirement until 1997 for men and until 2001 for women. Then, 64 for men from 1997 to 2000 and 63 since 2001; 62 for women from 2001. OP: 65 for men; for women, 63 until 1964, 62 since 1964 to 2000, 63 from 2001 to 2004, and 64 from 2005.

Figure 2 shows the distributions of the scores computed considering the eligibility rules listed above. It is noted that the distributions are not symmetrical, a feature due to the survey design. Indeed, the question on regrets was addressed only to those who were at least 59 years old at the time of the survey and this clearly reverberates on the number of eligible people.

It is then useful to say a few words on figures 1 and 3 which concern the eligibility thresholds for early and old age pensions. Figure 1 shows the distribution of eligibility ages for men and women in the overall sample. The right panel refers to the old-age pension. It is possible to note that the age that is most often taken as a reference for men is 65 years of age while for women it is either 60 years of age or 65 years of age. The left panel refers to early retirement. The distribution is more homogeneous and essentially concentrated between 60 and 63 years of age. In rare cases, eligibility is achieved around 70 years of age. These cases can be traced back to those regulatory contexts in which early retirement is granted in the presence of a high number of contributions, which is why some - perhaps those who have had discontinuous careers - they are quicker to satisfy the criteria for an old-age pension than an early one. Figure 3 summarizes the distribution of entry requirements in the various countries. The requirements for men are depicted with a blue dot while those for women are represented with a red circle. There are some countries that have access criteria under 60 years of age, however these cases are essentially attributable to people who have been retired for some time thanks to outdated regulations.

Figure 2: Years to/since eligibility.



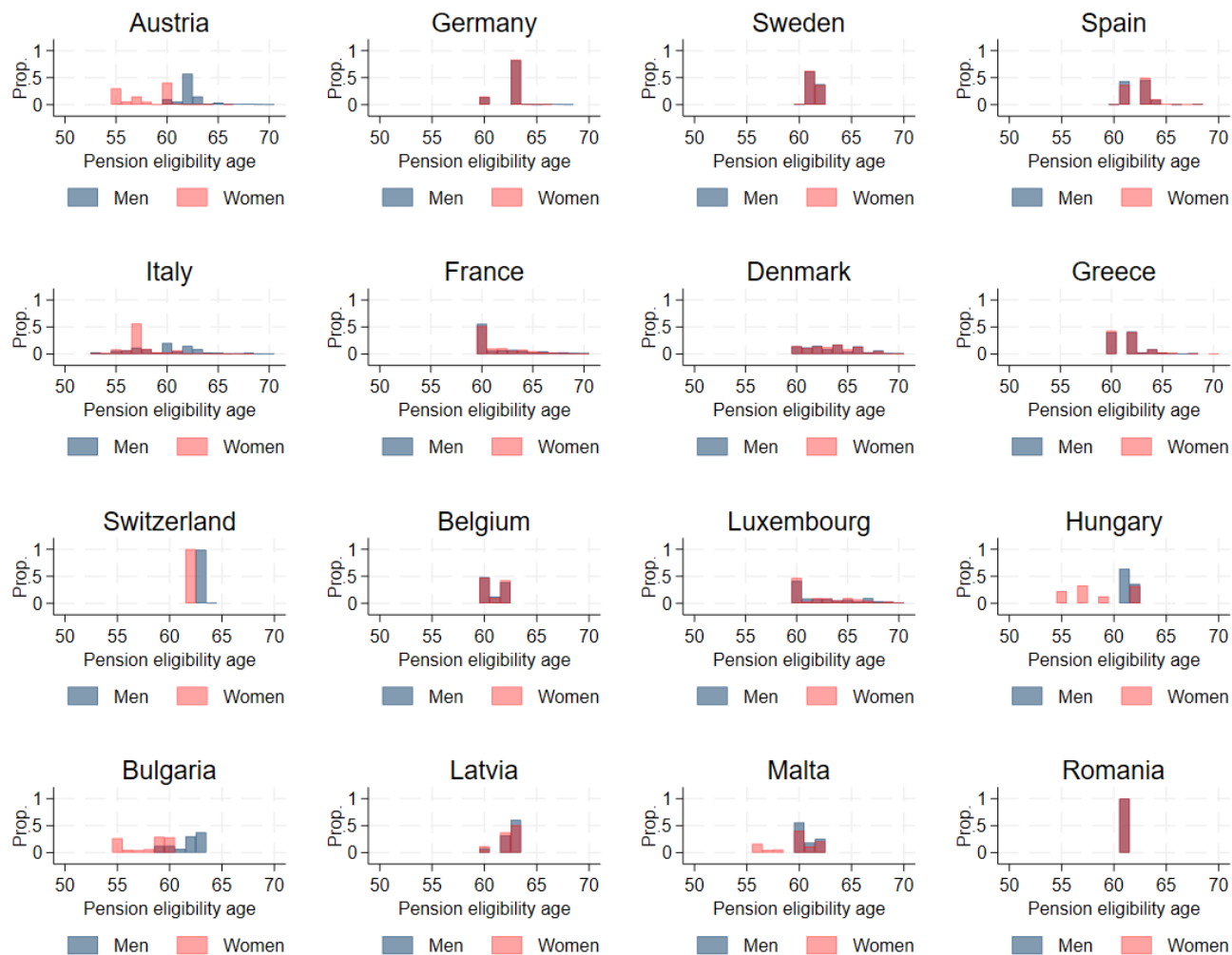
*Notes:* The figure reports the densities of the time to/since eligibility for the full sample of individuals, distinguishing by early and old-age pension.

Figure 3: Eligibility ages.



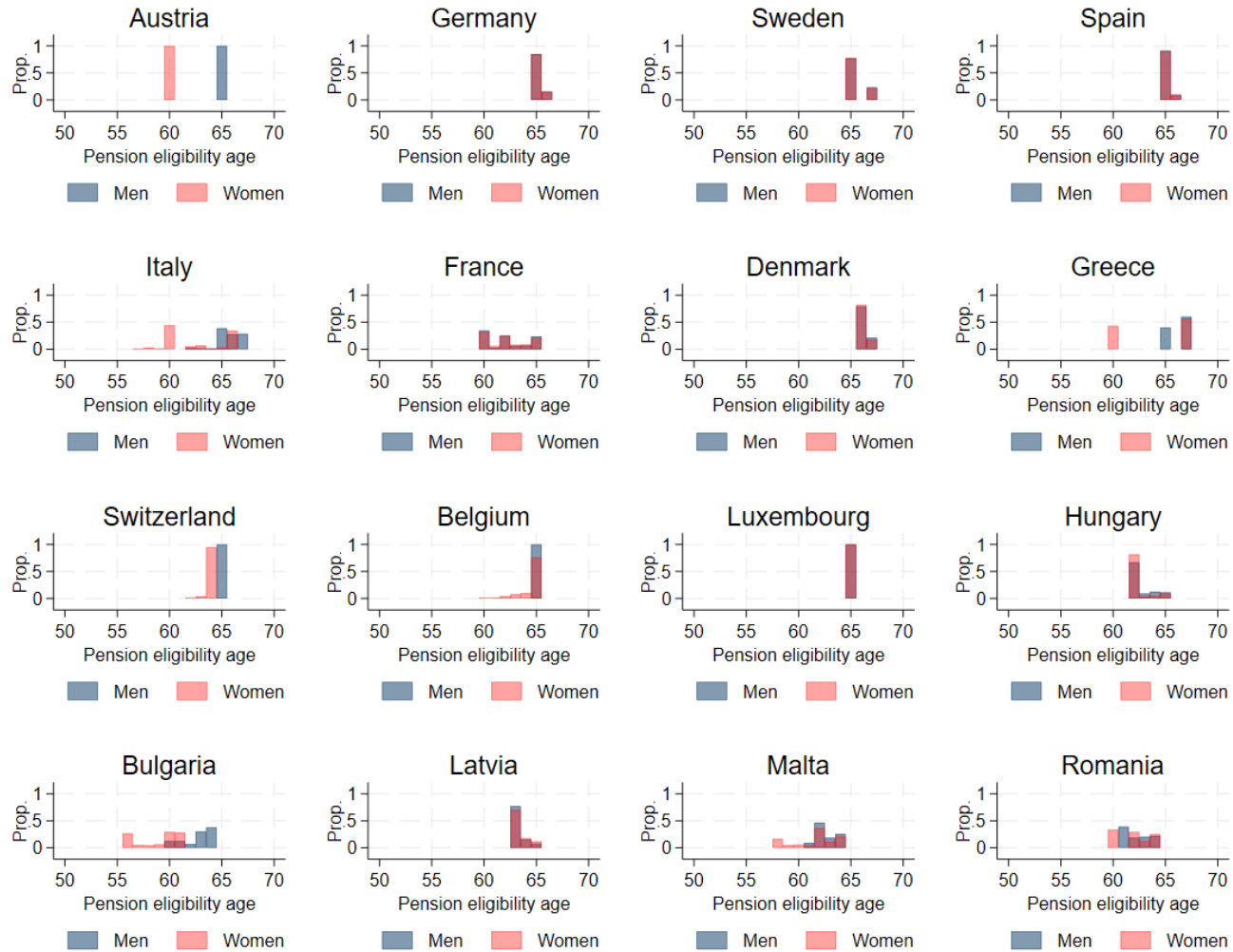
*Notes:* The figure shows the distributions of the early and the old-age pension eligibility ages in the sample of interest, for men and women.

Figure 4: Early pension eligibility ages by country.



Notes: The figure shows the early and the old-age pension eligibility ages in the countries of interest, for men and women.

Figure 5: Old-age pension eligibility ages by country.



*Notes:* The figure shows the early and the old-age pension eligibility ages in the countries of interest, for men and women.

## B Empirical analysis

### B.1 Descriptive statistics

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Figure 6: Regrets by country.



Notes: The figure shows the patterns of no/saving/spending regrets by country. The crosses represent the average value of the phenomenon, the blue bars represent the phenomenon for workers and the red ones for pensioners.

Figure 7: Regrets by gender.



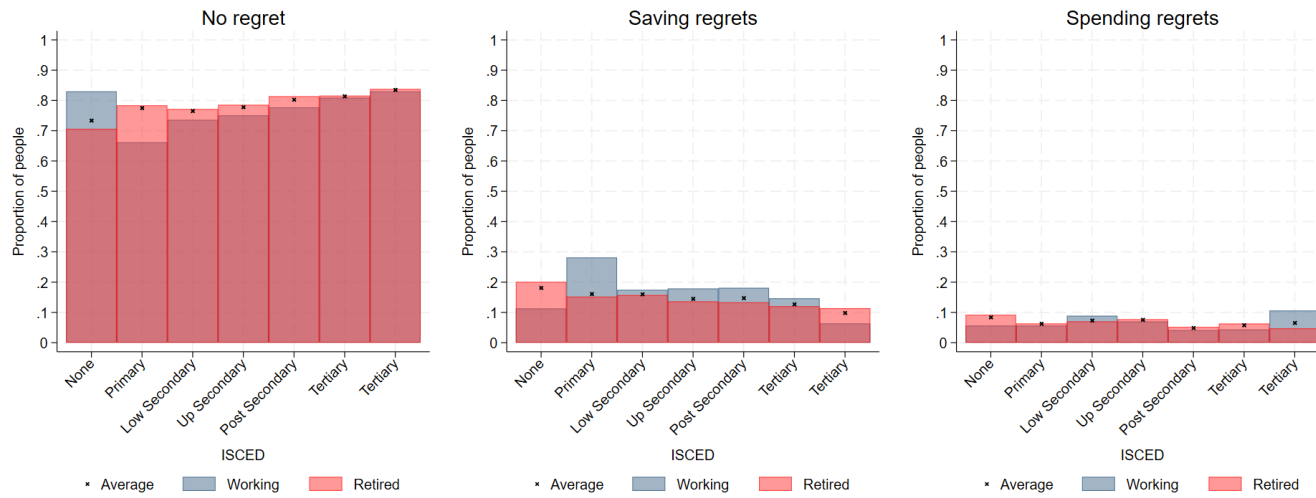
Notes: The figure shows the patterns of no/saving/spending regrets by gender. The crosses represent the average value of the phenomenon, the blue bars represent the phenomenon for workers and the red ones for pensioners.

Figure 8: Regrets by age.



*Notes:* The figure shows the patterns of no/saving/spending regrets by year of age. The crosses represent the average value of the phenomenon, the blue bars represent the phenomenon for workers and the red ones for pensioners.

Figure 9: Regrets by level of education.



Notes: The figure shows the patterns of no/saving/spending regrets by level of education. The crosses represent the average value of the phenomenon, the gray blue represent the phenomenon for workers and the red ones for pensioners.

Figure 10: Regrets by marital status.



Notes: The figure shows the patterns of no/saving/spending regrets by marital status. The crosses represent the average value of the phenomenon, the blue bars represent the phenomenon for workers and the red ones for pensioners.

## B.2 Results

Table 5: IV Estimates - main results - No regret.

|                       | 1        | 2         | 3        |
|-----------------------|----------|-----------|----------|
| Retired               | -0.019   | -0.242*** | 0.015    |
|                       | 0.048    | 0.079     | 0.052    |
| Male                  | -0.008   | -0.013    | -0.007   |
|                       | 0.007    | 0.008     | 0.007    |
| Married               | 0.039*** | 0.043***  | 0.038*** |
|                       | 0.007    | 0.008     | 0.007    |
| Diploma               | 0.025*** | 0.015     | 0.026*** |
|                       | 0.009    | 0.009     | 0.009    |
| Math: Much better     | 0.056*** | 0.051***  | 0.057*** |
|                       | 0.016    | 0.016     | 0.016    |
| Math: Better          | 0.054*** | 0.050***  | 0.055*** |
|                       | 0.013    | 0.014     | 0.013    |
| Math: About the same  | 0.050*** | 0.048***  | 0.050*** |
|                       | 0.011    | 0.011     | 0.011    |
| Optimism              | 0.048*** | 0.045***  | 0.048*** |
|                       | 0.008    | 0.009     | 0.008    |
| Year Birth Dummies    | Yes      | Yes       | Yes      |
| Year Dummies          | Yes      | Yes       | Yes      |
| Month Dummies         | Yes      | Yes       | Yes      |
| Country Dummies       | Yes      | Yes       | Yes      |
| N.Observations        | 12242    | 12242     | 12242    |
| N.Clusters            | 183      | 183       | 183      |
| First Stage F Stat    | 95       | 42        | 147      |
| Sargan Hansen p-value | 0.003    |           |          |

*Outcome:* No Regret.

*Columns:* Columns 1-3 report the IV estimates obtained using different instruments: 1.  $Z_{i,t}$  is composed by the eligibility to early pension and the eligibility to old-age pension; 2.  $Z_{i,t}$  is the eligibility to early pension; 3.  $Z_{i,t}$  is the eligibility to old-age pension.

*Notes:* The table reports the estimated causal effect of retirement using different eligibility conditions. Additional covariates are: gender of the respondent, dummies on educational attainments, dummies on marital status, dummies on the math skills at 10 years of age, indicator of optimism, and year of birth, country, year, and month dummies. Standard errors are clustered at country level, cohort and gender of respondent. \*\*\*, \*\*, and \* respectively denote statistical significance at the 1%, 5% and 10% levels.

Table 6: IV Estimates - main results - Saving regrets.

|                       | 1         | 2         | 3         |
|-----------------------|-----------|-----------|-----------|
| Retired               | 0.021     | 0.224***  | -0.009    |
|                       | 0.038     | 0.074     | 0.039     |
| Male                  | 0.004     | 0.008     | 0.003     |
|                       | 0.006     | 0.007     | 0.006     |
| Married               | -0.043*** | -0.047*** | -0.043*** |
|                       | 0.007     | 0.007     | 0.007     |
| Diploma               | -0.015**  | -0.006    | -0.016**  |
|                       | 0.007     | 0.008     | 0.007     |
| Math: Much better     | -0.060*** | -0.056*** | -0.061*** |
|                       | 0.012     | 0.012     | 0.012     |
| Math: Better          | -0.049*** | -0.046*** | -0.050*** |
|                       | 0.010     | 0.011     | 0.010     |
| Math: About the same  | -0.038*** | -0.037*** | -0.038*** |
|                       | 0.010     | 0.010     | 0.010     |
| Optimism              | -0.027*** | -0.024*** | -0.027*** |
|                       | 0.007     | 0.007     | 0.007     |
| Year Birth Dummies    | Yes       | Yes       | Yes       |
| Year Dummies          | Yes       | Yes       | Yes       |
| Month Dummies         | Yes       | Yes       | Yes       |
| Country Dummies       | Yes       | Yes       | Yes       |
| N.Observations        | 12242     | 12242     | 12242     |
| N.Clusters            | 183       | 183       | 183       |
| First Stage F Stat    | 95        | 42        | 147       |
| Sargan Hansen p-value | 0.000     |           |           |

*Outcome:* Saving regrets.

*Columns:* Columns 1-3 report the IV estimates obtained using different instruments: 1.  $Z_{i,t}$  is composed by the eligibility to early pension and the eligibility to old-age pension; 2.  $Z_{i,t}$  is the eligibility to early pension; 3.  $Z_{i,t}$  is the eligibility to old-age pension.

*Notes:* The table reports the estimated causal effect of retirement using different eligibility conditions. Additional covariates are: gender of the respondent, dummies on educational attainments, dummies on marital status, dummies on the math skills at 10 years of age, indicator of optimism, and year of birth, country, year, and month dummies. Standard errors are clustered at country level, cohort and gender of respondent. \*\*\*, \*\*, and \* respectively denote statistical significance at the 1%, 5% and 10% levels.

Table 7: IV Estimates - main results - Spending regrets.

|                       | 1         | 2         | 3         |
|-----------------------|-----------|-----------|-----------|
| Retired               | -0.003    | 0.018     | -0.006    |
|                       | 0.037     | 0.068     | 0.037     |
| Male                  | 0.004     | 0.005     | 0.004     |
|                       | 0.005     | 0.005     | 0.005     |
| Married               | 0.004     | 0.004     | 0.005     |
|                       | 0.004     | 0.004     | 0.004     |
| Diploma               | -0.010**  | -0.009*   | -0.010**  |
|                       | 0.005     | 0.005     | 0.005     |
| Math: Much better     | 0.004     | 0.005     | 0.004     |
|                       | 0.010     | 0.010     | 0.010     |
| Math: Better          | -0.005    | -0.005    | -0.005    |
|                       | 0.007     | 0.008     | 0.007     |
| Math: About the same  | -0.012*   | -0.012*   | -0.012*   |
|                       | 0.007     | 0.007     | 0.007     |
| Optimism              | -0.021*** | -0.021*** | -0.021*** |
|                       | 0.006     | 0.006     | 0.006     |
| Year Birth Dummies    | Yes       | Yes       | Yes       |
| Year Dummies          | Yes       | Yes       | Yes       |
| Month Dummies         | Yes       | Yes       | Yes       |
| Country Dummies       | Yes       | Yes       | Yes       |
| N.Observations        | 12242     | 12242     | 12242     |
| N.Clusters            | 183       | 183       | 183       |
| First Stage F Stat    | 95        | 42        | 147       |
| Sargan Hansen p-value | 0.690     |           |           |

*Outcome:* Spending regrets.

*Columns:* Columns 1-3 report the IV estimates obtained using different instruments: 1.  $Z_{i,t}$  is composed by the eligibility to early pension and the eligibility to old-age pension; 2.  $Z_{i,t}$  is the eligibility to early pension; 3.  $Z_{i,t}$  is the eligibility to old-age pension.

*Notes:* The table reports the estimated causal effect of retirement using different eligibility conditions. Additional covariates are: gender of the respondent, dummies on educational attainments, dummies on marital status, dummies on the math skills at 10 years of age, indicator of optimism, and year of birth, country, year, and month dummies. Standard errors are clustered at country level, cohort and gender of respondent. \*\*\*, \*\*, and \* respectively denote statistical significance at the 1%, 5% and 10% levels.

Table 8: IV Estimates - robustness - years in retirement.

|                                      | 1      | 2         | 3      |
|--------------------------------------|--------|-----------|--------|
| <i>No regret</i>                     |        |           |        |
| Retired                              | -0.022 | -0.225*** | 0.017  |
|                                      | 0.048  | 0.073     | 0.054  |
| log(1+Years since Retirement)        | -0.001 | 0.008     | -0.002 |
|                                      | 0.004  | 0.005     | 0.005  |
| Sargan Hansen p-value                | 0.016  |           |        |
| <i>Saving regrets</i>                |        |           |        |
| Retired                              | 0.024  | 0.213***  | -0.013 |
|                                      | 0.039  | 0.067     | 0.040  |
| log(1+Years since Retirement)        | 0.003  | -0.005    | 0.004  |
|                                      | 0.004  | 0.004     | 0.004  |
| Sargan Hansen p-value                | 0.002  |           |        |
| <i>Spending regrets</i>              |        |           |        |
| Retired                              | -0.002 | 0.013     | -0.004 |
|                                      | 0.037  | 0.063     | 0.037  |
| log(1+Years since Retirement)        | -0.002 | -0.002    | -0.002 |
|                                      | 0.003  | 0.004     | 0.003  |
| Sargan Hansen p-value                | 0.950  |           |        |
| Covariates                           | Yes    | Yes       | Yes    |
| Year Birth Dummies                   | Yes    | Yes       | Yes    |
| Year Dummies                         | Yes    | Yes       | Yes    |
| Month Dummies                        | Yes    | Yes       | Yes    |
| Country Dummies                      | Yes    | Yes       | Yes    |
| N.Observations                       | 12242  | 12242     | 12242  |
| N.Clusters                           | 183    | 183       | 183    |
| First Stage F Stat:                  |        |           |        |
| <i>Retired</i>                       | 62     | 56        | 127    |
| <i>log(1 + YearssinceRetirement)</i> | 46     | 61        | 117    |

*Columns:* Columns 1-3 report the IV estimates obtained using different instruments: 1.  $Z_{i,t}$  is composed by the eligibility to early pension, the eligibility to old-age pension and the logarithm of the number of years since eligibility for early and old-age pension; 2.  $Z_{i,t}$  is the eligibility to early pension and the logarithm of the number of years since eligibility to early pension; 3.  $Z_{i,t}$  is the eligibility to old-age pension and the logarithm of the number of years since eligibility to old-age pension.

*Notes:* The table reports the estimated causal effect of retirement using different eligibility conditions. Additional covariates are: gender of the respondent, dummies on educational attainments, dummies on marital status, dummies on the math skills at 10 years of age, indicator of optimism, and year of birth, country, year, and month dummies. Standard errors are clustered at country level, cohort and gender of respondent. \*\*\*, \*\*, and \* respectively denote statistical significance at the 1%, 5% and 10% levels.

Table 9: IV Estimates - robustness no regret - age specification.

|                                       | 1      | 2         | 3      |
|---------------------------------------|--------|-----------|--------|
| <i>Year of birth dummies</i>          |        |           |        |
| Retired                               | -0.019 | -0.242*** | 0.015  |
|                                       | 0.048  | 0.079     | 0.052  |
| First Stage F Stat                    | 95     | 42        | 147    |
| Sargan Hansen p-value                 | 0.003  |           |        |
| <i>Cohort dummies</i>                 |        |           |        |
| Retired                               | -0.004 | -0.083**  | 0.018  |
|                                       | 0.032  | 0.042     | 0.035  |
| First Stage F Stat                    | 270    | 169       | 454    |
| Sargan Hansen p-value                 | 0.023  |           |        |
| <i>Logarithm of age</i>               |        |           |        |
| Retired                               | -0.023 | -0.082*** | -0.006 |
|                                       | 0.022  | 0.028     | 0.024  |
| First Stage F Stat                    | 287    | 146       | 363    |
| Sargan Hansen p-value                 | 0.008  |           |        |
| <i>Linear polynomial of age</i>       |        |           |        |
| Retired                               | -0.019 | -0.072*** | -0.003 |
|                                       | 0.021  | 0.026     | 0.023  |
| First Stage F Stat                    | 308    | 159       | 386    |
| Sargan Hansen p-value                 | 0.009  |           |        |
| <i>Second order polynomial of age</i> |        |           |        |
| Retired                               | -0.024 | -0.228*** | 0.011  |
|                                       | 0.042  | 0.074     | 0.045  |
| First Stage F Stat                    | 119    | 38        | 147    |
| Sargan Hansen p-value                 | 0.005  |           |        |
| <i>Third order polynomial of age</i>  |        |           |        |
| Retired                               | -0.018 | -0.345*** | 0.011  |
|                                       | 0.045  | 0.112     | 0.047  |
| First Stage F Stat                    | 102    | 23        | 149    |
| Sargan Hansen p-value                 | 0.003  |           |        |

*Columns:* Columns 1-3 report the IV estimates obtained using different instruments: 1.  $Z_{i,t}$  is composed by the eligibility to early pension and the eligibility to old-age pension; 2.  $Z_{i,t}$  is the eligibility to early pension; 3.  $Z_{i,t}$  is the eligibility to old-age pension.

*Notes:* The table reports the estimated causal effect of retirement using different eligibility conditions. Additional covariates are: gender of the respondent, dummies on educational attainments, dummies on marital status, dummies on the math skills at 10 years of age, indicator of optimism, and cohort, country, year, and month dummies. Standard errors are clustered at country level, cohort and gender of respondent. \*\*\*, \*\*, and \* respectively denote statistical significance at the 1%, 5% and 10% levels.

Table 10: IV Estimates - robustness saving regrets - age specification.

|                                       | 1     | 2        | 3      |
|---------------------------------------|-------|----------|--------|
| <i>Year of birth dummies</i>          |       |          |        |
| Retired                               | 0.021 | 0.224*** | -0.009 |
|                                       | 0.038 | 0.074    | 0.039  |
| First Stage F Stat                    | 95    | 42       | 147    |
| Sargan Hansen p-value                 | 0.000 |          |        |
| <i>Cohort dummies</i>                 |       |          |        |
| Retired                               | 0.012 | 0.088**  | -0.009 |
|                                       | 0.026 | 0.035    | 0.028  |
| First Stage F Stat                    | 270   | 169      | 454    |
| Sargan Hansen p-value                 | 0.003 |          |        |
| <i>Logarithm of age</i>               |       |          |        |
| Retired                               | 0.026 | 0.077*** | 0.011  |
|                                       | 0.019 | 0.026    | 0.020  |
| First Stage F Stat                    | 287   | 146      | 363    |
| Sargan Hansen p-value                 | 0.003 |          |        |
| <i>Linear polynomial of age</i>       |       |          |        |
| Retired                               | 0.021 | 0.067*** | 0.007  |
|                                       | 0.018 | 0.024    | 0.019  |
| First Stage F Stat                    | 308   | 159      | 386    |
| Sargan Hansen p-value                 | 0.003 |          |        |
| <i>Second order polynomial of age</i> |       |          |        |
| Retired                               | 0.030 | 0.208*** | -0.001 |
|                                       | 0.033 | 0.073    | 0.034  |
| First Stage F Stat                    | 119   | 38       | 147    |
| Sargan Hansen p-value                 | 0.002 |          |        |
| <i>Third order polynomial of age</i>  |       |          |        |
| Retired                               | 0.023 | 0.293*** | -0.002 |
|                                       | 0.034 | 0.104    | 0.035  |
| First Stage F Stat                    | 102   | 23       | 149    |
| Sargan Hansen p-value                 | 0.002 |          |        |

*Columns:* Columns 1-3 report the IV estimates obtained using different instruments: 1.  $Z_{i,t}$  is composed by the eligibility to early pension and the eligibility to old-age pension; 2.  $Z_{i,t}$  is the eligibility to early pension; 3.  $Z_{i,t}$  is the eligibility to old-age pension.

*Notes:* The table reports the estimated causal effect of retirement using different eligibility conditions. Additional covariates are: gender of the respondent, dummies on educational attainments, dummies on marital status, dummies on the math skills at 10 years of age, indicator of optimism, and cohort, country, year, and month dummies. Standard errors are clustered at country level, cohort and gender of respondent. \*\*\*, \*\*, and \* respectively denote statistical significance at the 1%, 5% and 10% levels.

Table 11: IV Estimates - robustness spending regrets - age specification.

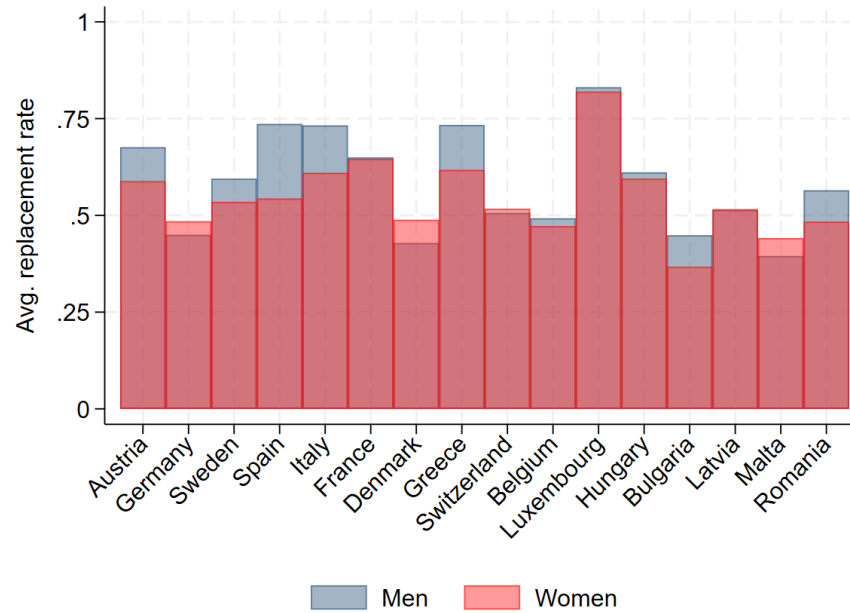
|                                       | 1      | 2      | 3      |
|---------------------------------------|--------|--------|--------|
| <i>Year of birth dummies</i>          |        |        |        |
| Retired                               | -0.003 | 0.018  | -0.006 |
|                                       | 0.037  | 0.068  | 0.037  |
| First Stage F Stat                    | 95     | 42     | 147    |
| Sargan Hansen p-value                 | 0.690  |        |        |
| <i>Cohort dummies</i>                 |        |        |        |
| Retired                               | -0.008 | -0.005 | -0.009 |
|                                       | 0.022  | 0.032  | 0.023  |
| First Stage F Stat                    | 270    | 169    | 454    |
| Sargan Hansen p-value                 | 0.885  |        |        |
| <i>Logarithm of age</i>               |        |        |        |
| Retired                               | -0.003 | 0.005  | -0.005 |
|                                       | 0.015  | 0.023  | 0.015  |
| First Stage F Stat                    | 287    | 146    | 363    |
| Sargan Hansen p-value                 | 0.618  |        |        |
| <i>Linear polynomial of age</i>       |        |        |        |
| Retired                               | -0.002 | 0.005  | -0.004 |
|                                       | 0.014  | 0.021  | 0.014  |
| First Stage F Stat                    | 308    | 159    | 386    |
| Sargan Hansen p-value                 | 0.616  |        |        |
| <i>Second order polynomial of age</i> |        |        |        |
| Retired                               | -0.006 | 0.019  | -0.010 |
|                                       | 0.031  | 0.068  | 0.030  |
| First Stage F Stat                    | 119    | 38     | 147    |
| Sargan Hansen p-value                 | 0.651  |        |        |
| <i>Third order polynomial of age</i>  |        |        |        |
| Retired                               | -0.004 | 0.052  | -0.009 |
|                                       | 0.032  | 0.092  | 0.031  |
| First Stage F Stat                    | 102    | 23     | 149    |
| Sargan Hansen p-value                 | 0.492  |        |        |

*Columns:* Columns 1-3 report the IV estimates obtained using different instruments: 1.  $Z_{i,t}$  is composed by the eligibility to early pension and the eligibility to old-age pension; 2.  $Z_{i,t}$  is the eligibility to early pension; 3.  $Z_{i,t}$  is the eligibility to old-age pension.

*Notes:* The table reports the estimated causal effect of retirement using different eligibility conditions. Additional covariates are: gender of the respondent, dummies on educational attainments, dummies on marital status, dummies on the math skills at 10 years of age, indicator of optimism, and cohort, country, year, and month dummies. Standard errors are clustered at country level, cohort and gender of respondent. \*\*\*, \*\*, and \* respectively denote statistical significance at the 1%, 5% and 10% levels.

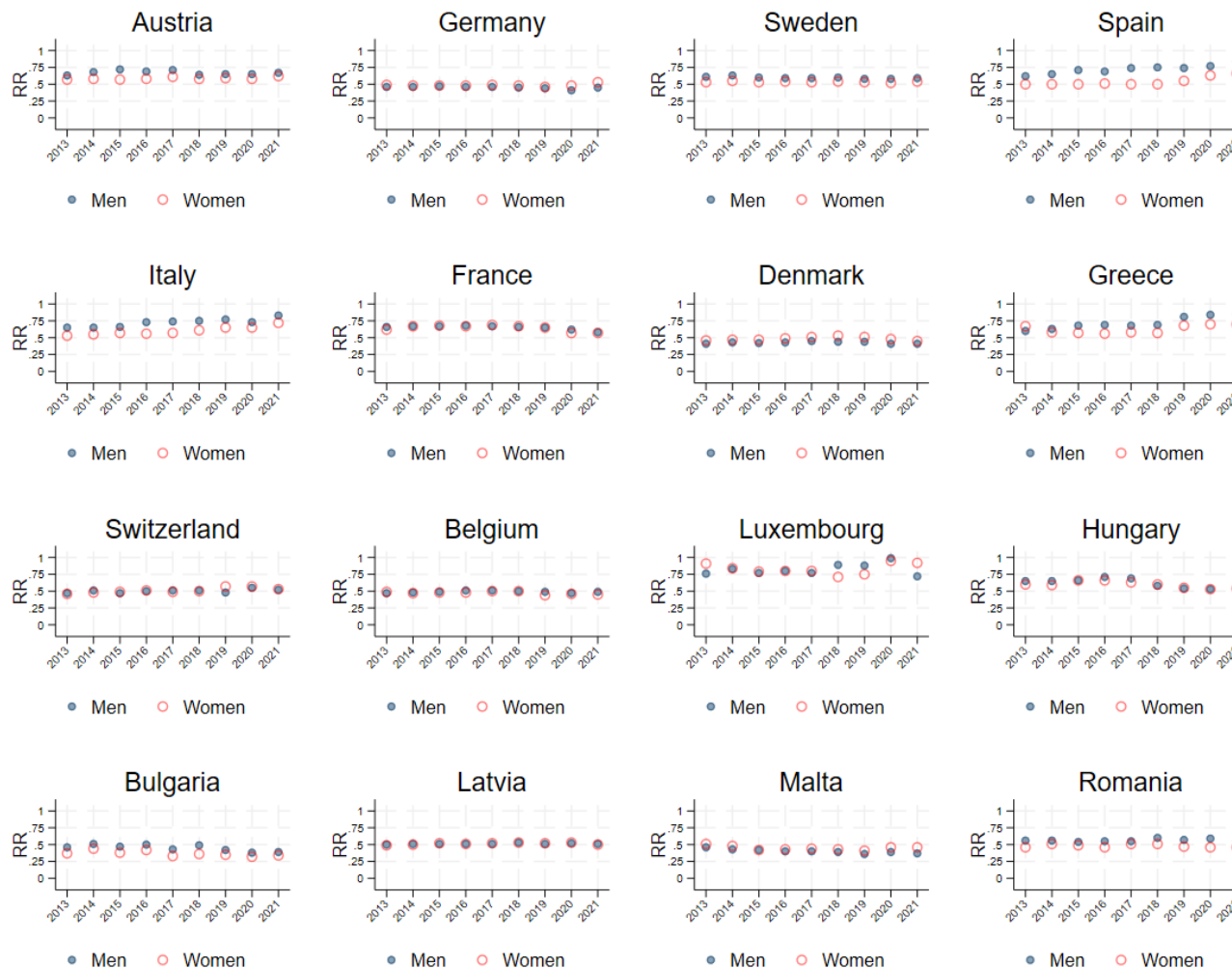
### B.3 Early retirement trap

Figure 11: Average replacement rates by country.



*Notes:* The figure shows the average replacement rates in the countries of interest, for men and women over the period 2014/2021.

Figure 12: Average replacement rates by country.



Notes: The figure shows the average yearly replacement rates in the countries of interest, for men and women over the period 2014/2021.

Table 12: IV Estimates - countries with low replacement rates.

|                         | 1      | 2        | 3      |
|-------------------------|--------|----------|--------|
| <i>No regret</i>        |        |          |        |
| Retired                 | 0.024  | -0.164   | 0.056  |
|                         | 0.073  | 0.112    | 0.079  |
| Sargan Hansen p-value   | 0.063  |          |        |
| <i>Saving regrets</i>   |        |          |        |
| Retired                 | 0.031  | 0.280*** | -0.011 |
|                         | 0.065  | 0.101    | 0.069  |
| Sargan Hansen p-value   | 0.002  |          |        |
| <i>Spending regrets</i> |        |          |        |
| Retired                 | -0.055 | -0.116   | -0.045 |
|                         | 0.050  | 0.108    | 0.047  |
| Sargan Hansen p-value   | 0.443  |          |        |
| Covariates              | Yes    | Yes      | Yes    |
| Year Birth Dummies      | Yes    | Yes      | Yes    |
| Year Dummies            | Yes    | Yes      | Yes    |
| Month Dummies           | Yes    | Yes      | Yes    |
| Country Dummies         | Yes    | Yes      | Yes    |
| N.Observations          | 6910   | 6910     | 6910   |
| N.Clusters              | 103    | 103      | 103    |
| First Stage F Stat      | 42     | 19       | 63     |

*Columns:* Columns 1-3 report the IV estimates obtained using different instruments: 1.  $Z_{i,t}$  is composed by the eligibility to early pension and the eligibility to old-age pension; 2.  $Z_{i,t}$  is the eligibility to early pension; 3.  $Z_{i,t}$  is the eligibility to old-age pension.

*Notes:* The table reports the estimated causal effect of retirement using different eligibility conditions. Additional covariates are: gender of the respondent, dummies on educational attainments, dummies on marital status, dummies on the math skills at 10 years of age, indicator of optimism, and year of birth, country, year, and month dummies. Standard errors are clustered at country level, cohort and gender of respondent. \*\*\*, \*\*, and \* respectively denote statistical significance at the 1%, 5% and 10% levels.

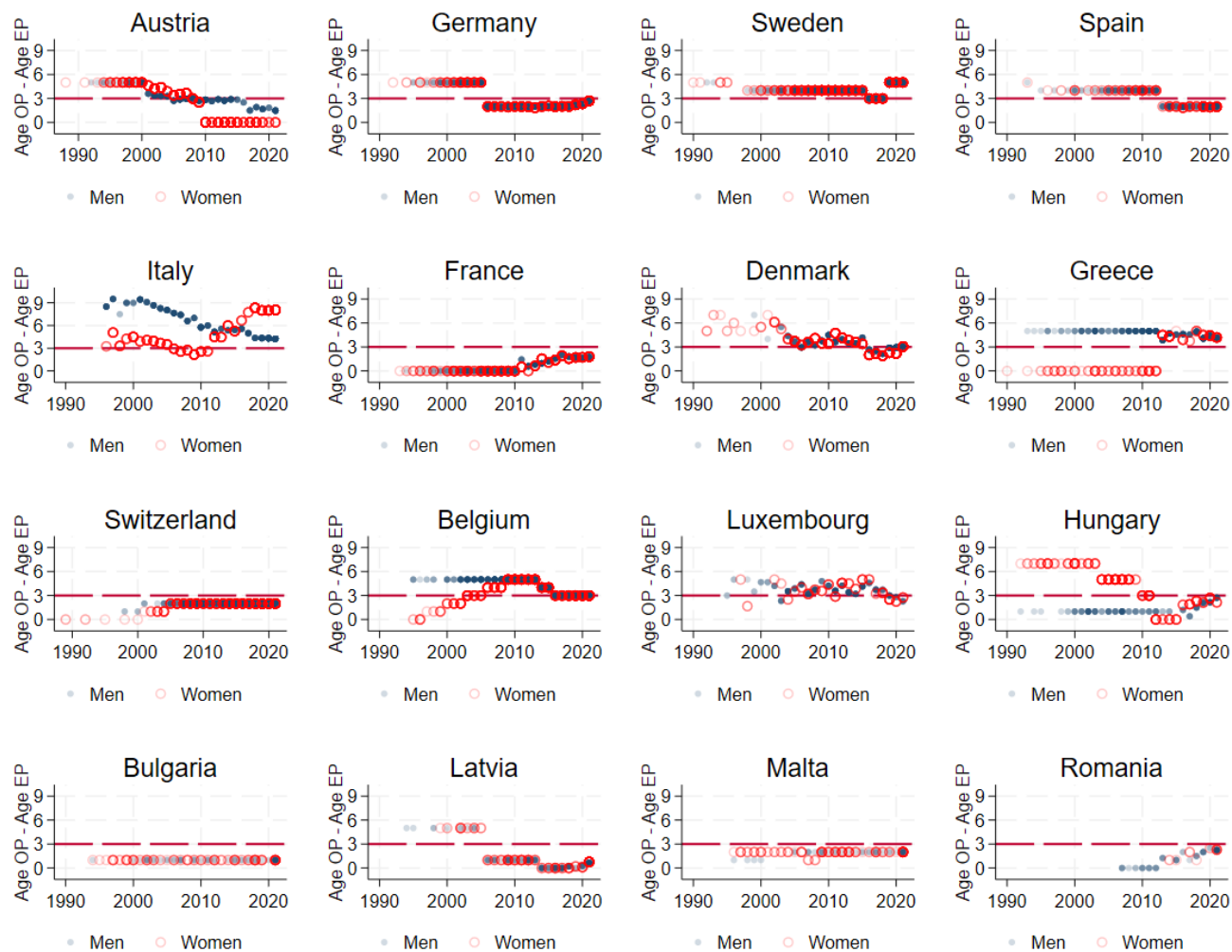
Table 13: IV Estimates - countries with high replacement rates.

|                         | 1      | 2       | 3      |
|-------------------------|--------|---------|--------|
| <i>No regret</i>        |        |         |        |
| Retired                 | -0.025 | -0.432* | -0.003 |
|                         | 0.079  | 0.223   | 0.081  |
| Sargan Hansen p-value   | 0.039  |         |        |
| <i>Saving regrets</i>   |        |         |        |
| Retired                 | -0.002 | 0.276   | -0.017 |
|                         | 0.054  | 0.199   | 0.054  |
| Sargan Hansen p-value   | 0.073  |         |        |
| <i>Spending regrets</i> |        |         |        |
| Retired                 | 0.027  | 0.156   | 0.020  |
|                         | 0.062  | 0.134   | 0.062  |
| Sargan Hansen p-value   | 0.295  |         |        |
| Covariates              | Yes    | Yes     | Yes    |
| Year Birth Dummies      | Yes    | Yes     | Yes    |
| Year Dummies            | Yes    | Yes     | Yes    |
| Month Dummies           | Yes    | Yes     | Yes    |
| Country Dummies         | Yes    | Yes     | Yes    |
| N.Observations          | 5332   | 5332    | 5332   |
| N.Clusters              | 112    | 112     | 112    |
| First Stage F Stat      | 43     | 10      | 83     |

*Columns:* Columns 1-3 report the IV estimates obtained using different instruments: 1.  $Z_{i,t}$  is composed by the eligibility to early pension and the eligibility to old-age pension; 2.  $Z_{i,t}$  is the eligibility to early pension; 3.  $Z_{i,t}$  is the eligibility to old-age pension.

*Notes:* The table reports the estimated causal effect of retirement using different eligibility conditions. Additional covariates are: gender of the respondent, dummies on educational attainments, dummies on marital status, dummies on the math skills at 10 years of age, indicator of optimism, and year of birth, country, year, and month dummies. Standard errors are clustered at country level, cohort and gender of respondent. \*\*\*, \*\*, and \* respectively denote statistical significance at the 1%, 5% and 10% levels.

Figure 13: Differences in eligibility ages by country.



*Notes:* The figure shows the differences between early and the old-age pension eligibility ages in the countries of interest, for men and women.

Table 14: IV Estimates - small differences in eligibility ages between early and old-age pension.

|                         | 1       | 2       | 3      |
|-------------------------|---------|---------|--------|
| <i>No regret</i>        |         |         |        |
| Retired                 | -0.095* | -0.187* | -0.084 |
|                         | 0.056   | 0.103   | 0.057  |
| Sargan Hansen p-value   | 0.320   |         |        |
| <i>Saving regrets</i>   |         |         |        |
| Retired                 | 0.099** | 0.180*  | 0.089* |
|                         | 0.049   | 0.094   | 0.049  |
| Sargan Hansen p-value   | 0.236   |         |        |
| <i>Spending regrets</i> |         |         |        |
| Retired                 | -0.004  | 0.006   | -0.005 |
|                         | 0.047   | 0.100   | 0.045  |
| Sargan Hansen p-value   | 0.895   |         |        |
| Covariates              | Yes     | Yes     | Yes    |
| Year Birth Dummies      | Yes     | Yes     | Yes    |
| Year Dummies            | Yes     | Yes     | Yes    |
| Month Dummies           | Yes     | Yes     | Yes    |
| Country Dummies         | Yes     | Yes     | Yes    |
| N.Observations          | 5861    | 5861    | 5861   |
| N.Clusters              | 153     | 153     | 153    |
| First Stage F Stat      | 64      | 28      | 116    |

*Columns:* Columns 1-3 report the IV estimates obtained using different instruments: 1.  $Z_{i,t}$  is composed by the eligibility to early pension and the eligibility to old-age pension; 2.  $Z_{i,t}$  is the eligibility to early pension; 3.  $Z_{i,t}$  is the eligibility to old-age pension.

*Notes:* The table reports the estimated causal effect of retirement using different eligibility conditions. Additional covariates are: gender of the respondent, dummies on educational attainments, dummies on marital status, dummies on the math skills at 10 years of age, indicator of optimism, and year of birth, country, year, and month dummies. Standard errors are clustered at country level, cohort and gender of respondent. \*\*\*, \*\*, and \* respectively denote statistical significance at the 1%, 5% and 10% levels.

Table 15: IV Estimates - large differences in eligibility ages between early and old-age pension.

|                         | 1        | 2        | 3         |
|-------------------------|----------|----------|-----------|
| <i>No regret</i>        |          |          |           |
| Retired                 | 0.098    | -0.373** | 0.204**   |
|                         | 0.081    | 0.160    | 0.084     |
| Sargan Hansen p-value   | 0.002    |          |           |
| <i>Saving regrets</i>   |          |          |           |
| Retired                 | -0.111** | 0.252*   | -0.193*** |
|                         | 0.055    | 0.139    | 0.055     |
| Sargan Hansen p-value   | 0.005    |          |           |
| <i>Spending regrets</i> |          |          |           |
| Retired                 | 0.013    | 0.121    | -0.011    |
|                         | 0.057    | 0.094    | 0.062     |
| Sargan Hansen p-value   | 0.193    |          |           |
| Covariates              | Yes      | Yes      | Yes       |
| Year Birth Dummies      | Yes      | Yes      | Yes       |
| Year Dummies            | Yes      | Yes      | Yes       |
| Month Dummies           | Yes      | Yes      | Yes       |
| Country Dummies         | Yes      | Yes      | Yes       |
| N.Observations          | 6381     | 6381     | 6381      |
| N.Clusters              | 136      | 136      | 136       |
| First Stage F Stat      | 28       | 19       | 40        |

*Columns:* Columns 1-3 report the IV estimates obtained using different instruments: 1.  $Z_{i,t}$  is composed by the eligibility to early pension and the eligibility to old-age pension; 2.  $Z_{i,t}$  is the eligibility to early pension; 3.  $Z_{i,t}$  is the eligibility to old-age pension.

*Notes:* The table reports the estimated causal effect of retirement using different eligibility conditions. Additional covariates are: gender of the respondent, dummies on educational attainments, dummies on marital status, dummies on the math skills at 10 years of age, indicator of optimism, and year of birth, country, year, and month dummies. Standard errors are clustered at country level, cohort and gender of respondent. \*\*\*, \*\*, and \* respectively denote statistical significance at the 1%, 5% and 10% levels.