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Gaining weight through retirement? Results from the SHARE survey*

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Abstract

This paper estimates the causal impact of retirement among the 50-69 year-old on Body Mass Index (BMI), the probability of being either overweight or obese and the probability of being obese. Based on the 2004, 2006 and 2010-11 waves of the Survey of Health, Ageing and Retirement in Europe (SHARE), our identification strategy exploits the European variation in early retirement schemes and the stepwise increase in early retirement ages in Austria and Italy between 2004 and 2011 to produce an exogeneous shock in retirement behaviour. Our results show that retirement induced by discontinuous incentives in social security systems causes a 0.12 percentage point increase in the probability of being obese among men within a two to four-year period. Additional results show that this effect is driven by men having retired from strenuous jobs and who were already at risk of obesity. No effects are found among women.

Keywords : Body Mass Index; Obesity; Retirement; Instrumental Variables

JEL code : I10, J26, C23

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1 Introduction

In its 1998 report, the World Health Organization (WHO) ranked the obesity epidemic among the leading ten global public health issues. Obesity rates in the world have more than doubled over the last 30 years (WHO (2012)). In the 27 European Union member states, approximately 60% of the adult population -260 millions of adults- is either overweight (Body Mass Index (BMI) from 25 to 29.9 kg/m^2) or obese (BMI 30 kg/m^2 and above) (International Obesity Task Force (IASO/IOTF (2010)). Obesity has become a pan-European epidemic (IASO/IOTF (2002)) and prevalence rates in the EU-27 range from 7.9% in Romania to 24.5% in the United-Kingdom (Organisation for Economic Cooperation and Development OECD (2010)).

Obesity is a risk factor for numerous highly-prevalent and costly chronic diseases (cardiovascular diseases, type-2 diabetes, hypertension and certain types of cancer) and for disability. It reduces the quality of life, shortens life expectancy and lowers the levels of labour productivity (Must et al. (1999)). Moreover, it places a heavy financial burden on the individual and on society -particularly on public transfer programmes and private health plans (Finkelstein et al. (2003)). At the individual level, Emery et al. (2007) find that healthcare costs for French obese individuals are on average twice the costs for normal-weight individuals. At the aggregate level, obesity-related healthcare expenditures account for 1.5 to 4.6% of total health expenditures in European countries (see Schmid et al. (2005) and Emery et al. (2007) for French and Swiss evidence respectively).

In most European countries, obesity rates reach their peak around age 60.5[1] (Sanz-de Galdeano (2005)). Recent studies have highlighted the particularly strong impact of overweight, obesity and increased BMI on morbidity and disability among adults aged 50 and older (Andreyeva et al. (2007); Peytremann-Bridevaux and Santos-Eggimann (2008)), thereby attracting policymakers' attention to the substantial burden that obesity places on the general health and autonomy of adults aged over 50.

Understanding the causes of obesity among the elderly is therefore a key issue. Unlike other age groups -such as children or adolescents- it hasn't received much attention yet. As the elderly are characterised by low labour participation and high job-exit rates, one might wonder whether transitions out of employment have an impact on the weight trajectory of people aged 50 years and older. In this paper, we focus on the most common transition out of employment, i.e, retirement.

There are some reasons to believe that retirement might trigger weight changes. The Grossman model of the demand for health (Grossman (1972)) is consistent with the inter-

[1] This figure does not allow us to disentangle age and cohort effects. Using the 2004, 2006 and 2010 waves of the Survey of Health, Ageing and Retirement in Europe (SHARE), we find that obesity rates among the 50-70-year-old reach their peak between age 55 and 65 for all cohorts born between 1940 and 1954.

pretation that individuals are likely to adopt health-producing activities -such as physical exercise or healthier diets- after retirement : although retirees have a tighter budget constraint, they have more time to allocate to leisure. Empirical findings seem to corroborate this view. In a three-year follow-up of French middle-aged adults, Touvier et al. (2010) find that retirement is associated with an increase in leisure-time physical activities of moderate intensity, such as walking. On US longitudinal data, Chung et al. (2007) find that households spend less on eating out ($10 per month on average) following retirement. They show, however, that their monthly spending on food at home does not change. In a recent review of the literature, Hurst (2008) argues that due to an increase in food home production, the overall food intake does not decline following retirement. These results suggest that retirement would rather operate on weight through changes in physical activity than via food consumption.
At the same time, retirement might also increase the risk of social isolation and depression (Friedmann and Havighurst (1954); Bradford (1979)), leading individuals to potentially reduce their efforts in health-producing activities and develop addictive behaviours (alcohol or tobacco consumption). The loss of a structured use of time may also encourage snacking in-between meal times and sedentary habits (television watching). In the study mentioned before, Touvier et al. (2010) find that retirement is also associated with an increase in time spent watching TV.
Overall, the direction of the effect is not clear. More specifically, it is likely to be highly heterogeneous, in particular across job types. As retirement induces a direct reduction in job-related exercise, individuals having retired from strenuous jobs are at a higher risk to gain weight if they do not compensate by increasing their leisure-time physical activity or by decreasing their food intake. Conversely, retirees from sedentary jobs may lose weight if their leisure-time activities after retirement are more physically demanding than time at work.

The purpose of the present paper is to estimate the causal impact of retirement on BMI, the probability of being either overweight or obese and the probability of being obese. Identifying such a causal impact is problematic in the presence of confounding factors and reverse causality. Retirement is indeed often a choice, and often based on unobservable characteristics which may be correlated with weight (time preference[2], health or psychological deteriorations). Reverse causality may also be a concern. As overweight and obese individuals are on average paid less, less promoted (Cawley (2004); Morris (2006); Brunello and d'Hombres (2007); Schulte et al. (2007)) and in worse health, their incentives to retire might be higher than normal-weight individuals. Burkhauser and Cawley (2006) show that fatness and obesity are indeed strong predictors of early receipt of old-age benefits in the USA.

To tackle this endogeneity issue, we use an instrumental variable approach. Our identification strategy exploits the fact that as individuals reach the Earliest Retirement Age (ERA) at which they are entitled to either reduced pensions or full pensions -conditional on a sufficient number of years of social security contributions -the probability that they retire strongly

[2]See Smith et al. (2005), Anderson and Mellor (2008) and Ikeda et al. (2010) for empirical evidence of the positive relationship between time preference and BMI.

increases. Said differently, the discontinuous incentive in the social security system provides a strong exogeneous shock on retirement behaviour. We exploit the variation in ERAs across Europe as well as its variation over time (in countries that implemented a stepwise increase in the ERA during the period under study) to solve the major identification problems related to confounding factors and reverse causality. We implement a fixed-effect instrumental variable model in order to control for both time-invariant factors (such as genetics) and time-varying ommited variables and/or reverse causality. We finally estimate the short-term causal effect of a transition to retirement on weight. We use the 2004, 2006 and 2010 waves of the Survey of Health, Ageing and Retirement in Europe (SHARE). Our results show that retirement causes a 0.12 percentage point increase in the probability of being obese within a two to four-year period[3] among men. Additional results show that this effect is driven by men having retired from strenuous jobs and who were already at risk of obesity. No effects are found among women.

This paper relates to several strands of literature. First and foremost, it contributes to the literature on the effects of retirement on weight. Most papers in the literature on this topic estimate mere correlations, disregarding the possibility that retirement be endogenous. Results have been quite consistent so far. Nooyens et al. (2005) find that the effect of retirement on changes in weight and waist circumference depends on one's former occupation : weight gain is higher among men who retired from an active job. Forman-Hoffman et al. (2008) find no significant relation for men, but a weight gain for women retiring from blue-collar jobs. Gueorguieva et al. (2010) find a significant increase in the slopes of BMI trajectories only for individuals retiring from blue-collar occupations. To the best of our knowledge, Chung et al. (2009) and Goldman et al. (2008) are the only studies tackling the endogeneity issue. Both use longitudinal data from the Health and Retirement Study -the US equivalent of the European SHARE survey- and estimate fixed-effect models. They use social security and Medicare eligibility (ages 62 and 65 respectively) as instruments for retirement.[4] Chung et al. (2009) conclude that people already overweight and people with lower wealth retiring from physically-demanding occupations suffer from a modest weight gain. Goldman et al. (2008) find that males retiring from strenuous jobs gain weight (by 0.5 units of BMI) during the first six years of retirement, while those retiring from sedentary jobs lose some. We improve with respect to this literature in three respects : first, we identify a causal effect of retirement on weight, while most papers document a mere correlation. Second, the variation in ERAs across Europe and over time allows us to explore the effect of retirement on weight at different ages, not just ages 62 and 65, as in Chung et al. (2009) and Goldman et al. (2008). Moreover, weaker assumptions in terms of weight trajectories by cohort and age are needed

[3] There is a two-year period between the 2004 and 2006 waves of SHARE and a four-year period between waves 2006 and 2010.

[4] Chung et al. (2009) also use spouse pension eligibility as an additional instrument. However, in a recent paper studying the effect of spousal retirement on own retirement patterns in France, Stancanelli (2012) shows that there is considerable heterogeneity in cross retirement. She finds that joint retirement is not as important as shown in previous studies. Using spouse pension eligibility as an additional instrument might thus be a questionable strategy.

in our empirical setup. Finally, our paper is the first one to exploit European data. Most of the above-mentioned studies -except Nooyens et al. (2005)- use US data from the Health and Retirement Survey (HRS). Given the differences in terms of labour markets, social security schemes and social policies, it is not clear whether the results obtained for the USA should hold for Europe.

This paper also relates to a substential recent literature that explores the effects of retirement on health and related outcomes -mental health, cognitive functioning and well-being. This literature indulges its best to take into account the endogeneous nature of retirement. Recent papers have exploited discontinuous incentives in social security systems as exogeneous shocks in retirement decisions (Charles (2004); Neuman (2008); Coe and Lindeboom (2008); Coe and Zamarro (2011)[5]; Rohwedder et al. (2010); Behncke (2011); Bonsang et al. (2012); Blake and Garrouste (2012)) as we do. However, the results in this literature are still ambiguous, and whether or not retirement has a detrimental effect on health is still an open debate. As weight change is likely to be an important mechanism by which retirement affects health, this paper contributes to this recent and growing literature by exploring one of the potential mediating channels between retirement and health.

Finally, this paper contributes to a growing body of literature that investigates the impact of various dimensions of professional activity on body weight and obesity, such as papers focusing on unemployment (Marcus (2012)), working conditions (Lallukka et al. (2008b)), occupational mobility (Ribet et al. (2003)), job insecurity (Muenster et al. (2011)), physical strenuousness at work (Böckerman et al. (2008)), working overtime (Lallukka et al. (2008a)), and income (Cawley et al. (2010), Schmeiser (2009), Colchero et al. (2008)).

The paper develops as follows. Section 2 presents our empirical approach and Section 3 describes the data (the 2004, 2006 and 2010 waves of SHARE). Section 4 presents the results and Section 5 provides some conclusions.

2 Empirical approach

We investigate the impact of retirement on BMI, the probability of being either overweight or obese and the probability of being obese. As a first step, we pool the observations from the 2004, 2006 and 2010 waves of the SHARE survey and estimate the following equation by

[5] Our identification strategy is similar in spirit to Coe and Zamarro (2011), who use the 2004 wave of SHARE and use country-specific early and full retirement ages as instruments for retirement behaviour. However, we improve with respect to this paper in two respects. First, we take advantage of the panel structure of the SHARE data, which allows us to control for individual time-invariant unobservable characteristics. Then, we exploit the European variation in early retirement schemes as well as reforms in early retirement ages in Austria and Italy over the 2004-2011 period to produce an exogeneous shock in retirement. Finally, rather than investigating the effect of retirement on health, we investigate the effect of retirement on an under-investigated dimension of health and a major risk factor for numerous diseases, i.e, weight change and obesity.

a standard Pooled Ordinary Least Squares (POLS) model[6] :

$$Y_{it} = \alpha + \gamma R_{it} + X_{it}\beta + D_i + D_t + u_{it} \tag{1}$$

where Y_{it} denotes the weight outcome of individual i at time t. R_{it} is a binary variable indicating whether individual i is retired at time t, X_{it} a vector of individual characteristics either time-varying or time-invariant, D_i a country dummy, D_t a time dummy and u_{it} the error term.
However, the retirement status R_{it} can potentially be correlated with the error term u_{it}, in which case the POLS estimate of γ is inconsistent. Endogeneity may arise from several sources. Omitted variables, such as unobservable time preference or health deteriorations may have an impact both on the probability of retiring and on weight changes. Similarly, reverse causality may also be a concern : obese individuals may be more likely to seek early retirement benefits (Burkhauser and Cawley (2006)).

Faced with these endogoneity problems, we consider a Fixed-Effects (FE) model such as :

$$Y_{it} = \alpha + \gamma R_{it} + K_{it}\beta + D_t + \alpha_i + v_{it} \tag{2}$$

where Y_{it} still denotes the weight outcome, R_{it} the individual retirement status, K_{it} a vector of time-varying individual characteristics, D_t a time dummy, α_i an individual fixed-effect -including the country fixed-effect- and v_{it} the error term.
The FE model allows regressors to be endogeneous, provided that they are correlated only with α_i, the time-invariant component of the error, but not with the idiosyncratic error v_{it}. If some unobservable time-varying characteristics are correlated with R_{it}, however, $\hat{\gamma}$ continues to be biased. Moreover, reverse causality is still a concern.

In order to tackle the endogeneity problem, we estimate a Fixed-Effect Instrumental Variable (FEIV) model. This model allows us to control for both time-invariant factors (such as genetics, food preferences over the life-course or time preference) and time-varying ommited variables as well as reverse causality. Our identification strategy exploits the fact that as individuals reach the Earliest Retirement Age (ERA) in their countries, the probability that they retire strongly increases. This exogeneous shock in retirement behaviour as well as the within-individual variation across waves allows us to estimate the causal impact of a transition to retirement on weight in the short-run -within a two to four-year period.

Retirement decisions in industrialised countries depend on a number of institutional features. In particular, the earliest age at which individuals are entitled to pension benefits has been shown to exert a powerful influence on their retirement behaviours (Gruber and Wise (1999)). This ERA is defined as the earliest age at which individuals are entitled to either

[6] We estimate equation (1) by POLS whether the dependent variable is continuous (the BMI) or binary (being either overweight or obese/being neither overweight nor obese; being obese/not being obese). Estimating equation (1) by pooled probit when the dependent variable is binary yields very similar results in terms of sign and significance of the coefficients.

reduced pensions or full pensions -conditional on a sufficient number of years of social security contributions. The official retirement age is the age at which workers are entitled to either minimum-guaranteed pensions or full old-age pensions irrespective of their contributions or work histories. It appears to be typically less important in predicting retirement behaviour than the ERA (Gruber and Wise (1999)). Few individuals actually work until the official retirement age, thus generating a gap between the official retirement age and the average effective age at which older workers withdraw from the labour force.

Earliest, official and effective retirement ages in Europe are presented in Table 1. As evidenced in columns 1 and 2, the official retirement age varies very little across countries and genders. In contrast, the ERA varies quite a lot across countries and genders (columns 3 and 4). Effective retirement ages are indeed lower than official retirement ages in every country (see columns 5 and 6 for men and women respectively). A number of countries in our sample implemented substantial reforms in ERAs over the period under study. Between 2004 and 2011 -period during which the 2004, 2006 and 2010 waves of SHARE were conducted on the field-, Austria implemented a stepwise increase in women's ERA from age 57 in 2004 to age 59 in 2010-2011. Men's ERAs were also slightly increased between 2004 and 2005 in this country. Italy introduced as well a stepwise increase in the minimum age to request early retirement, from age 57 in 2004 to age 59.5 in 2010. More information about the Austrian and Italian reforms are available in Table 1.

We take advantage of the ERA variation across countries and over time to explore the causal effect of retirement on weight. We instrument the retirement status R_{it} by a dummy variable indicating whether individual i's age at time t is above or below the ERA in force at time t in his country c. Let age_{it} be individual i's age at time t and ERA_{ct} the ERA in i's country c at time t. Our instrument is defined as :

$$Z_{ict} = \mathbb{1}_{\{age_{it} > ERA_{ct}\}} \tag{3}$$

A good instrument should be strongly correlated with actual retirement behaviour but should not directly affect weight outcomes.

As shown in Table 1, Z appears to be well correlated with retirement status. Suggestive evidence is provided by columns (7) and (8) : in each country, there is a large gap in the fraction of individuals retired before and after the ERA cutoff. For example, only 17% of individuals in the pooled sample in France are retired before age 60 -when they are first entitled to social security benefits- but this proportion increases to 88% after age 60. Taking advantage of the panel structure of our data, we then compute for each country the proportion of individuals retiring when reaching their country's ERA between two subsequent waves of the survey (see column (9)). This proportion is high in most countries. For instance in Belgium, 34.3% of the individuals reaching age 60 between two waves of the survey actually retire between these two waves.

At the same time, once controlling for age, reaching the ERA cutoff is highly unlikely to be correlated with weight outcomes except through the increased probability of retiring. This exclusion restriction holds if we assume there is no discontinuity in the weight trajectories of different cohorts at ERAs (both country and time-varying) except for the effect of retirement at these given ages. In the robustness section, we show that this assumption is likely to hold in our data.

Equation (2) is then estimated by fixed-effect two-stage least squares. In the first stage, the retirement status R_{it} is regressed on Z_{it} and other covariates. In the second stage, equation (2) is estimated by a FE regression/FE linear probability model where R_{it} is replaced with its predicted value from the first stage. The covariance matrix of $\hat{\gamma}$ is corrected accordingly. In this setup, $\hat{\gamma}$ is identified on the subset of individuals who decide to retire when reaching the ERA in force in their country between two waves of the survey. It measures the causal effect among this subpopulation of the transition to retirement on weight within a two to four-year period.

Our empirical setup can be viewed as a fuzzy regression design with multiple discontinuities (both country and time-varying). It allows us to explore the effect of retirement on a wide range of ages, not just ages 62 and 65 as in the US studies. Moreover, weaker assumptions in terms of weight trajectories by cohort and age are needed in this setup.

As Coe and Zamarro (2011) underline, there do exist other ways to exit the labour force, e.g, through unemployment or disability programmes. However, to the extent that these patterns are stable within countries over the period under study, the individual fixed-effect will pick up this variation and it will not bias our results.

3 Data

3.1 Presentation of the sample

We use data from the Survey of Health, Ageing and Retirement in Europe (SHARE). SHARE is a multidisciplinary and cross-national panel database containing individual information on health, socio-economic status and social and family networks. Approximately 85,000 individuals over 50 years old and their spouses/partners (independent of their age) from 19 European countries (including Israel) have been interviewed so far. By now, four waves have been conducted and further waves are being planned to take place on a biennial basis. We use the 2004, 2006 and 2010 waves of SHARE.[7] In order to have a balanced panel, our sample includes the ten European countries that took part in the 2004 SHARE baseline survey and further participated in waves 2006 and 2010, i.e, Austria, Germany, Sweden, The Nether-

[7]The 2008-2009 wave of SHARE, SHARELIFE, is a retrospective survey that focuses on people's life histories. Although it can be linked to the existing data of SHARE, it is not of direct use here and we do not use it.

lands, Spain, Italy, France, Denmark, Switzerland and Belgium.

Our sample contains all individuals interviewed in waves 2004, 2006 and 2010[8], aged 50 to 69 years old[9], who declared in each wave being either employed or retired. In other words, we only consider the traditional and most frequent pattern of retirement, where individuals transit directly from work to retirement. Transitions from employment to unemployment, invalidity or inactivity are thus excluded. We also exclude transitions from retirement to employment, unemployment, invalidity or inactivity. In the empirical analysis we thus compare individuals whose job status remains stable across waves (either retired or employed) and individuals who retire across waves. Finally, as there is no early retirement option in Denmark and since early retirement was abolished in 2005 in the Netherlands, both countries are excluded from the analysis. Overall, our dataset contains 2703 individuals[10] from eight countries (Austria, Germany, Sweden, Spain, Italy, France, Switzerland and Belgium) across the three waves.

3.2 Variables

We use a question on self-declared current job situation to determine whether an individual is retired or not. According to this definition, anyone who declares herself as retired, whether she has been or not in a paid job during the month preceding the interview -even for a few hours- is considered as retired. Conversely, anyone who declares herself to be employed or self-employed is considered as currently working. The self-declared retirement status seems to be a reliable information in SHARE : it is strongly associated with the eligibility for either public or private pensions in the dataset[11]. We also use an alternative and more restrictive definition of retirement as a robustness check. According to this definition, an individual is considered as retired if (i) his self-declared job situation is "retired" and (ii) he did not do any paid work during the preceding month. Conversely, an individual is considered as employed if his self-declared job situation is "employed or self employed". Tables 2 and 3 provide summary statistics for the full sample -pooled over 2004-2010- for men and women respectively. Each table also presents characteristics for the individuals either continuously employed across waves (column 2), continuously retired across waves (column 3), or having retired across waves (column 4). According to Tables 2 and 3, 45% of men and 43% of women in the full sample were employed or self-employed, the rest being retired. Eight hundred and sixteen individuals (47% of the individuals working in 2004) retired between 2004 and 2010. According to our alternative definition of retirement, only 395 individuals (26% of the indi-

[8]High attrition rates are a concern if non response is systematically related to health. However, differential attrition due to health in SHARE is not clear-cut (De Luca (2009)). We conclude that our results are not likely to be systematically biased by differential attrition due to health.

[9]The 50-69 age window broadly corresponds to the ages at which individuals reach the ERA in their country and become entitled to pension benefits.

[10]Once conditioning on having a balanced panel and no missing value on weight, height and any covariate included in the model, our sample goes down to 2493 individuals across the three waves.

[11]Among the 3281 individuals retired in the pooled sample, 84% declared that they had received an income from either a public or occupational old age pension during the year preceding the interview.

viduals working in 2004) retired between 2004 and 2010.

The BMI is calculated in each wave as the self-declared weight in kilograms divided by the square of the self-declared height in meters (kg/m^2). We derive clinical weight categories from the BMI : underweight (BMI under 18.5 kg/m^2), normal (BMI from 18.5 to 24.9 kg/m^2), overweight (BMI from 25 to 29.9 kg/m^2) and obese (BMI 30 kg/m^2 and above). We also compute individual weight change (in kg) as well as a dummy variable indicating if the individual experienced a weight change of at least 10% between two subsequent waves of the survey. The BMI is a rather crude measure of body composition, as it does not distinguish fat from lean mass (Prentice and Jebb (2001); Burkhauser and Cawley (2008)). However, it has been shown to be highly correlated with more precise measures of adiposity. When reported, BMI may suffer from measurement error (Niedhammer et al. (2000); Burkhauser and Cawley (2008)). Following Brunello et al. (2013), we note that the rank correlation between country level self-reported and objective measures of weight is however very high in Europe (Sanz de Galdeano (2007)). The average BMI of the full sample was 26.95 kg/m^2 for men and 25.79 kg/m^2 for women, slightly above the overweight threshold in both cases. Eighteen percent of men in the full sample were obese, 49% overweight, 32% normal and less than 1% underweight. As for women, 17% were obese, but less than 33% were overweight and 49% had a normal weight. Interestingly, while only 15% of men employed in all waves were obese, 21% of men retired in all waves were obese. The same pattern was found for women (the corresponding figures are 14% and 24%). This large gap is probably best explained by the fact that individuals employed in all waves are on average younger than individuals retired in all waves. However, it suggests that the 50-69-year-old undergo serious weight change around retirement age.
Additional descriptive statistics seem to corroborate this view : 11% of individuals in the full sample experienced a weight change (either gain or loss) of at least 10% between two subsequent waves of the survey. In the full sample, around 17% of individuals became either overweight or obese across two subsequent waves of the survey, while 8% of individuals either overweight or obese switched back to a normal weight category during the same period. Figures 1 and 2 suggest that weight change is more important among individuals having retired between waves. Figure 1 pictures the distribution of weight change among individuals having retired across waves versus the distribution of weight change among individuals continuously employed or retired in all waves, for men and women respectively. A simple look at each graph suggests that the distribution is flatter among individuals having retired across waves (the peak around zero -meaning no weight change- is indeed less clear-cut), for both men and women. Although the distributions are not significantly different -neither for men nor for women-, it is suggestive evidence that individuals who retire experience weight change to a higher extent than individuals continuously employed or retired during the period under study. Similarly, the proportion of individuals experiencing a weight change of at least 10% between two subsequent waves of the survey (see Figure 2) is higher among men and women having retired (11% and 14% respectively) than among men and women continuously em-

ployed or retired (9% and 12% respectively).[12]

Different sets of covariates are used, depending on the specification used (POLS, FE or FEIV models). We introduce age and age squared in all specifications to control properly for the age trend and to account for a potential non-linear effect of age on weight. Each specification also includes marital status (lives with a spouse-partner/does not live with a spouse-partner) and time dummies for 2006 and 2010. The average age of men and women in the full sample was 59.8 and 59.7 years old respectively. On average, men and women having retired between 2004 and 2010 were aged 60.3 and 60.4 years old respectively. Eighty-seven percent of men in the full sample lived with a spouse or partner, while only 72% of women did so. Gender, educational level[13] (primary education/lower secondary/upper secondary/postsecondary), occupation[14] (blue collars/white collars/technicians/managers and professionals) and country dummies are only included in the POLS specification, as FE and FEIV models do not permit to identify the effects of time-invariant variables. Summary statistics for gender, educational level, occupation and country can be found in Tables 2 and 3 for men and women respectively. Seventeen percent of men in the full sample had achieved primary education, 18% lower secondary education, 33% upper secondary education and 32% post secondary education. The corresponding figures for women are 17%, 18%, 30% and 35%. Thirty-three percent of males in the full sample were in blue-collar occupations, 13% in white-collar occupations, 20% were technicians and 34% managers or professionals. Similarly, 20% of women in the full sample were in blue-collar occupations, 32% in white-collar occupations, 19% were technicians and 29% managers or professionals. Men and women having retired across waves exhibited the same patterns of education and occupation than individuals in the full sample. Belgium, Sweden, France, Italy and Germany were the most represented countries in the male and female full samples.

In some specifications, we control for health characteristics. As health status is co-determined with retirement as well as weight, controlling for it is likely to generate some endogeneity in our model. However, we show the estimates for POLS, FE and FEIV models for both the baseline and the extended specification including health variables. Whenever introduced in our regressions, health covariates are : self-assessed health status (measured on a five-point scale as excellent/very good/good/fair/poor) and the Euro-D depression index (measured on a twelve-point scale, where twelve is highly depressed). Descriptive statistics for self-rated health and the Euro-D depression index can be found in Tables 2 and 3 for men and women respectively. Men and women in the full sample exhibited a similar pattern of self-assessed health. Conversely, women were on average more depressed than men in all samples. Individuals employed in all waves -whether men or women- were in better health

[12]This is only suggestive evidence, given that the two proportions are not statistically different according to the khi-square test (neither for men nor for women).

[13]Based on the 1997 International Standard Classification of Education (ISCED 97)

[14]Based on the 1988 International Standard Classification of Occupations (ISCO 88). Occupation is not time-varying in our data, which is plausible given that we consider elderly workers.

than individuals retired in all waves or individuals having retired between waves.

Finally, we supplement our dataset by the ERA in force in each country at the time of the survey (see Table 1). We build a dummy variable for each individual indicating whether his age is above or below the ERA in his country at time t.

4 Results

4.1 Determinants of retirement

Almost 46% (816 individuals) of the individuals working at baseline retired between 2004 and 2010. Among them, 45% (369 individuals) retired across two waves of the survey while reaching the national ERA during that period. It suggests that actual retirement behaviour is well correlated with the ERA.
First stage results are reported in Table 8. As expected, they indicate that the ERA is an important predictor of retirement. Reaching the ERA increases the probability of retiring by 0.21 and 0.27 percentage points for men and women respectively (both effects are significant at the 1% level). These results, combined with F-stats on excluded instruments of 120.7 and 166.1 for men and women respectively, show that reaching the ERA provides an strong exogeneous shock on retirement behaviour. Once controlling for country-specific age breaks, the probability to retire decreases with age up to a certain point, where it increases again -probably when reaching the official retirement age. Finally, neither time dummies for 2006 and 2010 nor marital status appear to be statistically important for retirement behaviour. As the ERA is probably more binding for individuals with long careers, we expect compliers to be less educated people. However we do not re-run our IV estimates on the sub-population of less educated people. The results obtained would be difficult to interpret as they could reflect either a modified first-stage and/or a heterogeneous response to retirement by education level.

4.2 The impact of retirement on BMI, overweight and obesity

Given the differences in terms of both biological consititutions and labour market histories, we run separate models for men and women. Tables 4 and 5 report the POLS estimates for BMI (columns 1 and 2), the probability of being either overweight or obese (columns 3 and 4) and the probability of being obese (columns 5 and 6) for men and women respectively. All specifications include age, age squared, time dummies for 2006 and 2010, marital status and time-invariant variables such as education, occupation and country dummies. The first column of each pair presents the results without including health controls, while the second column presents the results once controlling for self-rated health and the EURO-D depression index.
Most of the control variables are statistically significant and of the expected sign. A steep education gradient in BMI, overweight and obesity is found for women and to a lower extent for men. Post-secondary education is indeed associated with a lower BMI and a lower probability of being either overweight or obese as well as being obese for both men and women. Once

controlling for education, occupation is not significantly associated with BMI, overweight and obesity, except for women : females in managerial or professional occupations have a lower probability of being overweight than blue-collar females. Living with a spouse or partner does not seem to be correlated with BMI or the probability of being obese but is associated with a higher risk of being either overweight or obese among men. Most country indicators are significant.[15] Surprisingly enough, once we control for retirement behaviour, age has a small and insignificant impact on BMI, overweight and obesity.
Our baseline specification reveals a positive and significant association between retirement and weight outcomes for men as well as women. Retirement is positively correlated with BMI : it increases BMI by 0.50 and 0.69 units for men and women respectively (both effects are significant at the 5% level). It also increases the probability of being either overweight or obese and the probability of being obese for men (both effects are significant at the 10% level) and the probability of being obese for women (at the 5% significance level). Results go in the same direction once controlling for health variables, although the magnitude of the effects declines and most results become only marginally significant. Once controlling for health variables, retirement among men becomes only marginally associated with the probability of being either overweight or obese. However, it leads to a modest weight gain (0.38 BMI gain on average, at the 10% significance level). As for women, retirement becomes only marginally associated with BMI and the risk of obesity.

However, these correlations are hard to interpret, because they potentially reflect the effects of unobserved characteristics that may affect both weight outcomes and retirement behaviour. The importance of confounding factors is apparent when we look at the coeffıcents on retirement once implementing fixed-effect regressions (see Table 6 and Table 7 for men and women respectively). Once taken into account the potential endogeneity arising from the correlation between retirement and time-invariant unobserved characteristics, retirement is no longer significantly associated with weight outcomes for men. The sign of the coefficient even becomes negative for BMI and the probability of being either overweight or obese (although both effects are insignificant at conventional levels). Conversely, retirement leads to weight gain (by 0.25 BMI, at the 5% significance level) and increases the probability of being obese for women (at the 10% significance level), although the magnitude of the estimates declines as compared to POLS results. Not controlling for time-invariant factors -such as time preference for instance, which has a positive effect both on the probability of retiring and on weight gain- may indeed generate an upward bias and account for the larger effect of retirement on weight in POLS models. Controlling for health variables only marginally affects the estimates, suggesting that time-invariant health characteristics affect weight outcomes to a larger extent than health changes over time.

However, the fixed-effect estimates cannot be interpreted as causal : a number of omitted time-varying factors can easily generate some bias in the model. Health or psychological

[15] Results not shown but available upon request.

deteriorations -for instance- may trigger both retirement and weight change. Hence, we need to take into account the remaining endogeneity in the model by instrumenting retirement behaviour. Results are presented in Tables 9 and 10 for men and women respectively. Under the hypothesis that reaching the ERA is a valid instrument, our preferred IV estimates show that retirement induced by social security schemes causes a 0.11 percentage point increase in the probability of being obese (at the 10% level) within a two to four-year period among men. However, it does not significantly affect men's BMI nor men's probability of being either overweight or obese, although both coefficients are positive.[16] Our results suggest a non linear impact of retirement on men's BMI : it would mostly affects the right-hand side of the BMI distribution. Finally, we find no significant effect of retirement on women's weight outcomes.

The impact of retirement on weight outcomes is likely to be highly heterogeneous across job types. In particular, individuals having retired from physically-demanding jobs are likely to gain weight if they do not compensate by increasing their leisure-time physical activity or by decreasing their food intake. In order to test for this, we re-run our FEIV models by adding an interaction term of retirement status with a measure of previous job's physical strenuousness. The physical strenuousness of work is measured using a question asking workers their opinion about the following statement : "My job is physically demanding". Four answers are available ranging from "strongly agree" to "strongly disagree". We dichotomise the responses into strenous work (strongly agree/agree) and sedentary work (disagree/strongly disagree). As this information is only available in SHARE for individuals who were working at baseline, FEIV models are estimated on a smaller sample -934 men and 808 women across three waves.[17] Table 11 shows the results when interacting retirement status with our binary indicator of job strenuousness.[18] As controlling for health variables has little to no effect on FEIV estimates, Table 11 reports the FEIV estimates for BMI (columns 1 and 2), the probability of being either overweight or obese (columns 3 and 4) and the probability of being obese (columns 5 and 6) for the baseline specification only. The first column of each pair presents the results for men, while the second column presents the results for women. As shown in column (5), the retirement effect on obesity seems to be mainly driven by men having retired from strenuous jobs. The coefficient associated with retirement is equal to 0.12 and insignificant at conventional levels, but the interaction term is equal to 0.11 and significant at the 5% level. Both coefficients are jointly significant at the 10% level. Overall, retirement causes

[16]The coefficients associated with the effect of retirement on BMI in FEIV models are very close to the ones obtained for the USA using a similar FEIV strategy. We find that retirement causes a 0.24 and 0.26 BMI increase among men and women respectively within a two to four-year period (although both coefficients are insignificant at conventional levels). This is comparable to Chung et al. (2009) findings : on US data, retirement causes a 0.24 increase in BMI within a two-year period (at the 10% significance level). Unfortunately, as Chung et al. (2009) did not study the causal impact of retirement on the probability of being either overweight or obese nor on the probability of being obese, other comparisons based on the magnitude of the coefficients cannot be made.

[17]Among individuals who were working at baseline, 56.4% had a sedentary job and 43,6% had a strenuous job.

[18]The interaction is instrumented for. First stage results are not displayed but available upon request.

a 0.23 percentage point increase in the probability of being obese among men having retired from strenuous jobs (at the 10% significance level). This result is robust to the threshold chosen for obesity : among men having retired from strenuous jobs, retirement significantly increases the probability of having a BMI above 31.[19] Conversely, retirement does not seem to have a significant impact on neither the BMI, the probability of being either overweight or obese nor the probability of being obese among men having retired from sedentary occupations. Altogether, our results suggest that retirement has a non linear impact on men's BMI : it mostly affects the right-hand side of the BMI distribution. Additional results show that the causal impact of retirement on the probability of being obese is only significant for men who already had a BMI higher than 24 at baseline.[20] This suggests that retiring from a strenuous job has a triggering effect on obesity for men already at risk of obesity. As for women, columns (2), (4) and (6) show that they do not experience weight changes following retirement, whether they have retired from strenuous or sedentary jobs. The coefficients associated with the retirement indicator and the interaction term are never significant, whatever the outcome.

In this paragraph, we further investigate the heterogeneous response to retirement according to gender. As retirement is likely to operate on weight through physical activity and food intake, we try to assess whether changes in food intake and physical activity following retirement are gender-specific. Due to data limitations[21], we focus on changes in leisure-time physical activity after retirement. Leisure-time physical activity is captured in SHARE by the following question : "How often do you engage in activities that require a moderate level of energy such as gardening, cleaning the car, or doing a walk?". Four answers are available ranging from "more than once a week" to "hardly ever, or never". We dichotomize the responses into high (more than once a week/once a week) and low moderate leisure-time physical activity (one to three times a month/hardly ever, or never). Our FEIV models show that women tend to increase their leisure-time physical activity following retirement while men do not. Retirement causes a 0.15 percentage point increase in the probability of performing a moderate physical activity at least once a week (at the 5% significance level) among women. The corresponding coefficient for men is equal to 0.07 and insignificant at conventional levels.

[19]The coefficient associated with retirement is equal to 0.03 (standard error : 0.10) and insignificant. The coefficient associated with the interaction term is equal to 0.10 (standard error : 0.05) and significant at the 5% level.

[20]When considering men who already had a BMI higher than 24 and who were working at baseline, our sample goes down to 721 individuals across the three waves. We re-run our FEIV models on this subsample to estimate the effect of retirement on the probability of being obese. The coefficient associated with retirement is equal to 0.12 (standard error : 0.15) and insignificant at conventional levels. The coefficient associated with the interaction term is equal to 0.11 (standard error : 0.06) and significant at the 5% level. Both coefficients are insignificant on the subsample of men who had a BMI lower than 24 and who were working at baseline.

[21]SHARE contains two measures of food consumption : the monthly household expenditure on food consumed away from home and the monthly household expenditure on food consumed at home. However, these two measures are hard to interpret : they are likely to reflect a household joint decision concerning food consumption. They do not necessarily reflect an individual change in food consumption -and even less an individual change in food intake.

This would be suggestive evidence that the heterogeneous impact of retirement across genders is partly explained by women's higher propensity to engage in leisure-time physical activities following retirement. However, the results do not seem robust to alternative dichotomisations of leisure-time physical activity. When using an aternative dichotomisation of leisure-time physical activity (hardly never or never versus more than once a week/once a week/one to three times a month), we find that retirement causes a 0.13 (0.12) percentage point increase in the probability of performing a moderate physical activity at least one to three times a month among men (women). Both coefficients are significant at the 5% significance level.
Overall, our data lead to inconclusive results with regard to gender-specific patterns in leisure-time physical activity following retirement. Moreover, only very precise measures of physical activity -both at work and during leisure time- would have allowed us to investigate whether individuals actually compensate the direct reduction in job-related exercise by increasing their leisure-time physical activity following retirement. Thus, data limitations make it difficult to explore the underlying mechanisms throuh which retirement affects weight as well as the gender-specific patterns in food intake and physical activity.

4.3 Robustness checks

Our estimation strategy is likely to yield unbiased results if properly controlling for the age trend. As one may worry that our results be driven by an inadequate estimation of the age effect, we have tried linear, quadratic (presented) and quartic age terms in robustness checks. Results are qualitatively similar.[22]
As underweight status is associated with a higher risk of morbidity and mortality for the elderly (Corrada et al. (2006)), one could be afraid that underweight individuals have a heterogeneous response to retirement. It might be the case that underweight individuals lose weight because of retirement, thus leading to an overall insignificant impact of retirement on BMI. We check that our results are robust to the exclusion of underweight individuals by re-running our IV estimates on normal, overweight and obese individuals at baseline. Results are virtually unchanged.[23]
Up until now, retirement was defined using a question on self-declared current job situation (see Data section). According to this definition, anyone who declares herself to be retired is

[22]When introducing age as a linear term, the point estimates associated with the effect of retirement on the probability of being obese in FEIV moldels for men are very similar to those obtained when introducing age as a quadratic term (presented). The coefficient associated with retirement is equal to 0.06 (standard error : 0.06) and insignificant at conventional levels and the coefficent associated with the interaction term is equal to 0.10 (standard error : 0.05) and significant at the 5% level. The corresponding figures when introducing age as a quartic term are 0.05 (standard error : 0.13, insignificant at conventional levels) and 0.10 (standard error : 0.05, significant at the 5% level). We find no significant results for men's BMI nor men's probability of being either overweight or obese. No significant results are found for women.

[23]When considering the probability of being obese as the outcome in the FEIV model for men, the coefficient associated with retirement is equal to 0.12 (standard error : 0.12) and insignificant at conventional levels. The coefficient associated with the interaction term is equal to 0.11 (standard error : 0.05) and significant at the 5% level. When considering either the BMI or the probability of being obese as the outcome, the coefficients associated with retirement and the interaction term in FEIV models for men are still insignificant. No significant results are found for women.

considered as retired. One concern could be that individuals declare themselves as retired even when working full -or part-time, simply because they have left their "career" job. We use an alternative definition according to which anyone who is in the paid labour force is considered as employed (see Data section). Results from the FEIV regressions using this alternative definition show that the point estimates of the retirement indicator and its interaction with job strenuousness are very similar to those presented in Table 11 but no longer significant.[24] Given that only 395 individuals retire between 2004 and 2010 according to this alternative definition, this result is likely to be due to a power problem.
An additional concern is that there might be other things than retirement at ERAs that could cause a nonlinear relationship between weight and age at these given ages. For example, one may think of country-specific cohort effects which may reflect differencial trends in food supplies, health policies or early life conditions. An imperfect way to test for this is to introduce the age*country and age^2*country terms in our FEIV models to test whether age has a differential impact on weight across countries. All coefficients associated with these additional terms are insignificant in all our FEIV models. The point estimates obtained on the retirement indicator and its interaction with job strenuousness do not significantly vary as compared to those presented in Table 11. In particular, when looking at the coefficients obtained when considering the probability of being obese as an outcome, the coefficient associated with retirement in the FEIV model for men is equal to 0.19 (standard error : 0.15) and insignificant at conventional levels and the interaction term is equal to 0.11 (standard error : 0.05) and significant at the 5%. Both coefficients are jointly significant at the 10% level.

5 Conclusion

This paper studies the effect of retirement on several weight outcomes using the 2004, 2006 and 2010 waves of SHARE. It exploits the European variation in early retirement schemes and the stepwise increase in the ERA in Austria and Italy to produce an exogeneous shock on retirement behaviour. This allows us to estimate the short-term causal impact of retirement on weight. Our results show that retirement induced by social security rules causes a 0.12 percentage point increase in the probability of being obese within a two to four-year period among 50-69 year-old men. We give evidence that this effect is driven by men having retired from strenuous jobs and who were already at risk of obesity. Our findings suggest that retirement has a non-linear impact on BMI, mostly affecting men already at the right-hand side of the distribution. No significant effects are found among women.

A possible interpretation of our findings is that the impact of retirement on weight is likely to be driven by a direct reduction in job-related exercise. The gender-heterogeneity of

[24] When considering the probability of being obese as the outcome in the FEIV model for men, the coefficient associated with retirement is equal to 0.13 (standard error : 0.28) and insignificant at conventional levels. The coefficient associated with the interaction term is equal to 0.20 (standard error : 0.18) and insignificant at conventional levels. No significant results are found for women.

our results would be explained by gender-specific patterns in food intake and physical activity following retirement. Women would adjust their food diet and their physical activity to a better extent than men, thus compensating the loss of job-related exercise following retirement. Due to data limitations, we were not able to investigate these gender-specific patterns in great detail. There is some evidence in the literature, however, that women adjust to retirement more sucessfully than men (Barnes and Parry (2004)).

A limitation to this study is that our results for retirement do not necessarily generalise to other transitions out of employment. The impact of transitions from employment to unemployment, invalidity or inactivity on weight among older workers should be further investigated.

However, our results have some important policy implications. Given the increasing number of people approaching retirement age and the upward trend in obesity rates (where each cohort is heavier than the previous one), men retiring from strenuous jobs in the near future will be likely to suffer from health disorders following retirement. Public health policies specifically targeted at this population should be considered in order to guarantee healthy ageing and healthy life years following retirement.

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Figure 1: Distribution of weight change (in kg) among individuals having retired across waves and individuals either employed or retired in all waves, for men and women respectively.

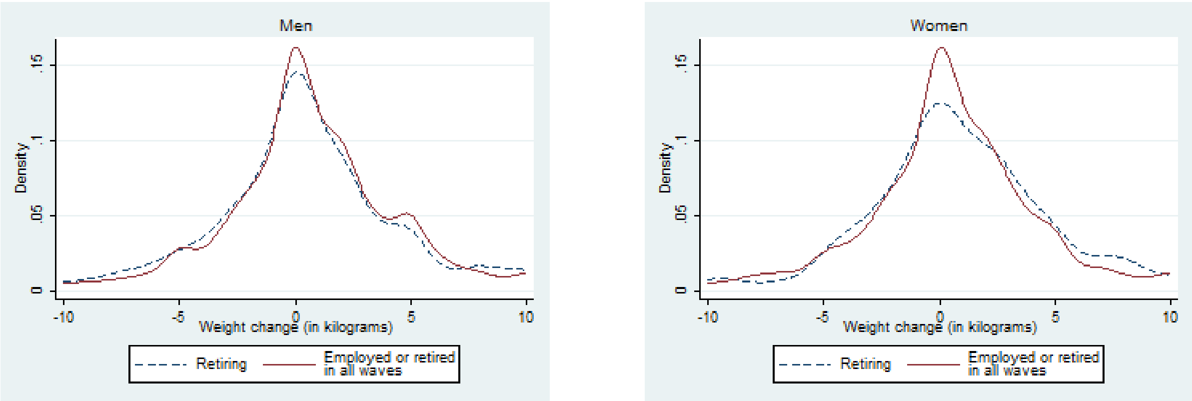

Figure 2: Proportion of individuals experiencing a weight change (in kg) of at least 10% among individuals having retired across waves and individuals either employed or retired in all waves, for men and women respectively.

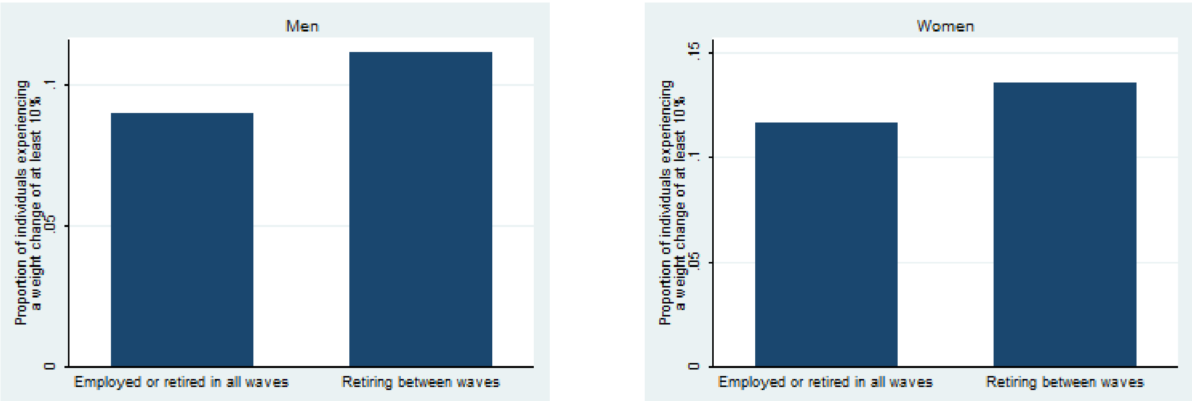

Table 1: Official (ORA), Earliest (ERA) and Effective retirement ages; proportion of individuals retired below and above the ERA and proportion of individuals retiring when reaching the ERA between two subsequent waves of the survey.

Country	Official retirement ages (ORA)[a]		Earliest retirement ages (ERA)[a]		Effective retirement ages[d,e]		% of retired below ERA[d]	% of retired above ERA[d]	% of individuals retiring when reaching ERA across waves[f]
	Men	Women	Men	Women	Men	Women			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Austria	65	60	61.9[b]	57[b]	57.6	55.9	32.7	95.3	27.5
Belgium	65	63	60	60	57.5	57.7	21.1	81.6	34.3
France	65	65	60	60	56.9	58.3	17.0	88.0	44.5
Germany	65	65	63	60	59.9	58.7	11.5	79.9	38.6
Italy	65	60	57[c]	57[c]	57.9	57.7	18.6	81.6	27.2
Spain	65	65	61	61	61.4	59.8	8.9	68.9	21.6
Sweden	65	65	61	61	61.4	61.8	6.5	50.7	19.4
Switzerland	65	64	63	62	61.4	61.0	5.4	65.4	39.0

[a] Official and earliest retirement ages are provided by Keese (2006) and OECD (2011) reports. They concern workers retiring in 2005 under the main mandatory pension schemes and exclude special arrangements for public-sector workers and other workers such as the long-term unemployed or disabled.
[b] The 2004 pension reform in Austria introduced a gradual increase in the ERAs for men and women. The ERAs were increased by two months for each quarter of birth for men born in the first two quarters of 1943 and women born in the first two quarters of 1948. Following these increases, the ERAs were increased by one month for each quarter of birth for men born in the third quarter of 1943 and later and for women born in the third quarter of 1948 and later. Furthermore, the 2004 pension reform also created special corridor pensions for men born in the last quarter of 1943 and later. The minimum entry age for these corridor pensions was 62, thereby making the ERA beyond age 62 non-binding in many cases (Manoli and Weber (2012)). We calculate the binding ERA in force in each wave of the survey for men and women respectively. The average ERA in force in Austria when the 2004-2005 wave of SHARE was conducted on the field was approximately 61,9 and 57 years old for men and women respectively. The corresponding numbers for women for the 2006-2007 and 2010-2011 waves of SHARE were 57,7 and 59 years old. As for men, we take 62 as the binding age for the 2006 and 2010 waves.
[c] Before 2008, workers in Italy could retire at age 57 if they had contributed to the system for 35 years. According to a recent reform -approved as part of the 2008 budget process, the minimum age to request early retirement in Italy will increase from 57 to 61 years old by 2013. The minimum age to request early retirement in Italy was 59 years old from July 1, 2009 to December 31, 2010 and 60 years old from January 1, 2011 to December 31, 2012 (OECD (2011)). We take 59.5 as the average ERA in force when the 2010-11 wave of SHARE was conducted on the field.
[d] Figures in columns 5-9 are computed using the pooled sample, i.e, 7479 observations.
[e] We compute the effective retirement age as the average age of individuals who retired between 2004 and 2006 or between 2006 and 2010 in our data. As we do not have reliable information on the month and year in which the individuals retire, we cannot give the actual average age at which they retire. For this reason, figures in column 5-6 can be misleading because they systematically under-estimate the effective retirement age, which is calculated in 2004 for individuals having retired between 2004 and 2006 and calculated in 2006 for individuals having retired between 2006 and 2010.
[f] The panel structure of our data allows us to compute the proportion of individuals actually retiring between two subsequent waves of the survey when reaching the ERA in force in their country during the same period.

Table 2: Summary statistics for the pooled sample of men.

Characteristics		**Whole sample**	**Employed in all waves**	**Retired in all waves**	**Retiring between waves**[a]
		Average	Average	Average	Average
		(1)	(2)	(3)	(4)
Demographics					
Age		59.82	56.84	62.87	60.32
Marital status	Lives with spouse/partner	0.87	0.85	0.88	0.90
	Doesn't live with spouse/partner	0.13	0.15	0.12	0.10
Education	Post-secondary	0.32	0.41	0.22	0.32
	Upper secondary	0.33	0.29	0.33	0.37
	Lower secondary	0.18	0.18	0.18	0.17
	Primary education	0.17	0.11	0.27	0.15
Occupation	Managers and professionals	0.34	0.43	0.24	0.32
	Technicians	0.20	0.17	0.20	0.21
	White collars	0.13	0.12	0.15	0.13
	Blue collars	0.33	0.27	0.41	0.33
Employment					
Retirement status	Retired	0.45	0.00	1.00	.
	Employed or self-employed	0.55	1.00	0.00	.
Health related measures					
Weight category	Underweight	0.01	0.00	0.01	0.01
	Normal	0.32	0.36	0.30	0.30
	Overweight	0.49	0.48	0.50	0.50
	Obese	0.18	0.15	0.21	0.19
Body Mass Index		26.95	26.49	27.38	27.08
Self-assessed health	Excellent	0.14	0.19	0.10	0.13
	Very good	0.26	0.30	0.19	0.27
	Good	0.42	0.39	0.47	0.43
	Fair	0.15	0.11	0.21	0.15
	Poor	0.03	0.01	0.03	0.02
Euro-D	Euro-D depression index (1-12)	1.45	1.50	1.48	1.38
Country	Austria	0.08	0.05	0.12	0.08
	Belgium	0.22	0.19	0.24	0.24
	France	0.15	0.13	0.19	0.15
	Germany	0.09	0.11	0.06	0.09
	Italy	0.16	0.09	0.27	0.12
	Spain	0.07	0.08	0.06	0.08
	Sweden	0.16	0.24	0.04	0.17
	Switzerland	0.07	0.11	0.02	0.07
Observations		4059	1497	1245	1317

[a] An individual retiring between waves is defined as an individual having retired either between 2004 and 2006 or between 2004 and 2006.

Table 3: Summary statistics for the pooled sample of women.

Characteristics		**Whole sample**	**Employed in all waves**	**Retired in all waves**	**Retiring between waves**[a]
		Average	Average	Average	Average
		(1)	(2)	(3)	(4)
Demographics					
Age		59.68	56.45	63.06	60.41
Marital status	Lives with spouse/partner	0.72	0.73	0.69	0.75
	Doesn't live with spouse/partner	0.28	0.27	0.31	0.25
Education	Post-secondary	0.35	0.42	0.25	0.37
	Upper secondary	0.30	0.30	0.29	0.29
	Lower secondary	0.18	0.17	0.19	0.19
	Primary education	0.17	0.11	0.27	0.15
Occupation	Managers and professionals	0.29	0.34	0.24	0.28
	Technicians	0.19	0.19	0.16	0.23
	White collars	0.32	0.32	0.34	0.30
	Blue collars	0.20	0.15	0.26	0.19
Employment					
Retirement status	Retired	0.43	0.00	1.00	.
	Employed or self-employed	0.57	1.00	0.00	.
Health related measures					
Weight category	Underweight	0.01	0.01	0.01	0.02
	Normal	0.49	0.53	0.38	0.53
	Overweight	0.33	0.30	0.37	0.31
	Obese	0.17	0.14	0.24	0.14
Body Mass Index		25.79	25.43	26.89	25.22
Self-assessed health	Excellent	0.14	0.18	0.06	0.15
	Very good	0.25	0.30	0.16	0.27
	Good	0.41	0.39	0.45	0.40
	Fair	0.17	0.11	0.28	0.16
	Poor	0.03	0.02	0.05	0.02
Euro-D	Euro-D depression index (1-12)	2.37	2.24	2.81	2.13
Country	Austria	0.07	0.02	0.15	0.06
	Belgium	0.20	0.19	0.24	0.17
	France	0.16	0.14	0.15	0.20
	Germany	0.12	0.14	0.09	0.13
	Italy	0.13	0.07	0.24	0.11
	Spain	0.04	0.06	0.01	0.03
	Sweden	0.21	0.27	0.10	0.24
	Switzerland	0.07	0.11	0.02	0.06
Observations		3420	1299	990	1131

[a] An individual retiring between waves is defined as an individual having retired either between 2004 and 2006 or between 2004 and 2006.

Table 4: Pooled OLS results for men : the impact of retirement on BMI, the probability of being either overweight or obese and the probability of being obese.

	Men					
	BMI		Overweight or Obese (BMI≥25)		Obese (BMI≥30)	
	(1)	(2)	(3)	(4)	(5)	(6)
Retirement	.499**	.381*	.048*	.040$^{\mu}$	.038*	.026
	(.223)	(.220)	(.025)	(.025)	(.022)	(.021)
Age	.152	.088	.053	.049$^{\mu}$	-.003$^{\mu}$	-.009
	(.273)	(.270)	(.034)	(.034)	(.028)	(.028)
Age squared	-.002	-.001	-.001*	-.001$^{\mu}$	.000	.000
	(.002)	(.002)	(.000)	(.000)	(.000)	(.000)
Time dummy for 2006	.159**	.100	.018$^{\mu}$	.014	.032***	.027***
	(.081)	(.082)	(.012)	(.012)	(.009)	(.009)
Time dummy for 2010	.544***	.444**	.065***	.059***	.050**	.040**
	(.193)	(.190)	(.023)	(.023)	(.019)	(.019)
Marital status						
(Ref : Does not live with a spouse/partner)						
Lives with spouse/partner	.217	.214	.072**	.072**	.009	.010
	(.323)	(.320)	(.035)	(.034)	(.028)	(.028)
Education (Ref : Below secondary)						
Post secondary education	-1.378***	-1.243***	-.133***	-.124***	-.113***	-.099***
	(.356)	(.350)	(.040)	(.040)	(.035)	(.035)
Upper secondary education	-.606*	-.600*	-.069*	-.069*	-.050$^{\mu}$	-.050$^{\mu}$
	(.347)	(.340)	(.036)	(.035)	(.033)	(.033)
Lower secondary education	-.634*	-.573*	-.028	-.025	-.043	-.036
	(.351)	(.345)	(.037)	(.037)	(.034)	(.034)
Occupation (Ref : Blue collars)						
Managers and professionals	.002	.158	.015	.025	-.021	-.005
	(.290)	(.283)	(.033)	(.033)	(.028)	(.027)
Technicians	.391	.521	.054$^{\mu}$	.062*	.013	.026
	(.332)	(.327)	(.034)	(.034)	(.031)	(.030)
White collars	.365	.43	.033	.037	.042	.048$^{\mu}$
	(.337)	(.331)	(.035)	(.035)	(.034)	(.033)
Country dummies	yes	yes	yes	yes	yes	yes
Health controls	no	yes	no	yes	no	yes
R-squared	0.04	0.07	0.04	0.04	0.03	0.05
Observations	4059	4059	4059	4059	4059	4059

Notes : (1) *** : significant at the 1% level, ** : significant at the 5% level, * : significant at the 10% level, $^{\mu}$: significant at the 15% level. (2) Standard errors in parentheses are clustered at the individual level. (3) Columns 3-6 are estimated by linear probability models.

Table 5: Pooled OLS results for women : the impact of retirement on BMI, the probability of being either overweight or obese and the probability of being obese.

	Women					
	BMI		Overweight or Obese (BMI≥25)		Obese (BMI≥30)	
	(1)	(2)	(3)	(4)	(5)	(6)
Retirement	.691**	.443$^{\mu}$	.048$^{\mu}$	.021	.052**	.037$^{\mu}$
	(.301)	(.294)	(.030)	(.029)	(.023)	(.023)
Age	-.060	-.123	-.025	-.030	.007	.003
	(.381)	(.371)	(.038)	(.037)	(.030)	(.030)
Age squared	.0004	.001	.0003	.0003	-.000	-.000
	(.003)	(.003)	(.000)	(.000)	(.000)	(.000)
Time dummy for 2006	.272***	.215**	.023*	.018	.019*	.015$^{\mu}$
	(.034)	(.104)	(.013)	(.013)	(.010)	(.010)
Time dummy for 2010	.164	.107	-.005	-.011	.012	.009
	(.067)	(.230)	(.026)	(.025)	(.019)	(.019)
Marital status						
(Ref : Does not live with a spouse/partner)						
Lives with spouse/partner	.248	.237	.008	.008	-.008	-.009
	(.276)	(.271)	(.029)	(.029)	(.022)	(.022)
Education (Ref : Below secondary)						
Post secondary education	-2.544***	-2.233***	-.179***	-.146***	-.160***	-.142***
	(.542)	(.531)	(.053)	(.052)	(.042)	(.041)
Upper secondary education	-1.653***	-1.540***	-.133***	-.120**	-.113***	-.107***
	(.513)	(.503)	(.048)	(.047)	(.040)	(.039)
Lower secondary education	-1.094**	-.958*	-.066	-.051	-.097**	-.090**
	(.513)	(.506)	(.047)	(.046)	(.041)	(.040)
Occupation (Ref : Blue collars)						
Managers and professionals	-.475	-.310	-.133***	-.114**	-.033	-.024
	(.499)	(.481)	(.051)	(.050)	(.039)	(.039)
Technicians	.181	.242	-.044	-.037	-.012	-.009
	(.501)	(.482)	(.050)	(.048)	(.041)	(.040)
White collars	-.487	-.411	-.070*	-.062$^{\mu}$	-.026	-.022
	(.433)	(.422)	(.042)	(.041)	(.035)	(.035)
Country dummies	yes	yes	yes	yes	yes	yes
Health controls	no	yes	no	yes	no	yes
R-squared	0.06	0.10	0.06	0.09	0.04	0.06
Observations	3420	3420	3420	3420	3420	3420

Notes : (1) *** : significant at the 1% level, ** : significant at the 5% level, * : significant at the 10% level, $^{\mu}$: significant at the 15% level. (2) Standard errors in parentheses are clustered at the individual level. (3) Columns 3-6 are estimated by linear probability models.

Table 6: Fixed-effects results for men : the impact of retirement on BMI, the probability of being either overweight or obese and the probability of being obese.

	Men					
	BMI		Overweight or Obese (BMI≥25)		Obese (BMI≥30)	
	(1)	(2)	(3)	(4)	(5)	(6)
Retirement	-.122	-.136	-.002	-.004	.020	.019
	(.107)	(.106)	(.019)	(.019)	(.014)	(.014)
Age	.358*	.349*	.089***	.087***	.009	.007
	(.188)	(.188)	(.032)	(.098)	(.021)	(.021)
Age squared	-.002	-.002	-.001***	-.001***	.000	.000
	(.001)	(.001)	(.0002)	(.0002)	(.000)	(.000)
Time dummy for 2006	-.201	-.220	-.010	-.013	-.011	-.013
	(.214)	(.213)	(.041)	(.041)	(.027)	(.027)
Time dummy for 2010	-.482	-.490	-.011	-.012	-.078	-.080
	(.605)	(.604)	(.119)	(.118)	(.080)	(.080)
Marital status						
(Ref : Does not live with a spouse/partner)						
Lives with spouse-partner	-.214	-.224	-.064	-.065	-.013	-.013
	(.208)	(.205)	(.043)	(.043)	(.030)	(.030)
Health controls	no	yes	no	yes	no	yes
R-squared	0.91	0.91	0.80	0.80	0.83	0.83
Observations	4059	4059	4059	4059	4059	4059

Notes : (1) *** : significant at the 1% level, ** : significant at the 5% level, * : significant at the 10% level. (2) Standard errors in parentheses are robust. (3) Columns 3-6 are estimated by fixed-effect linear probability models.

Table 7: Fixed-effects results for women : the impact of retirement on BMI, the probability of being either overweight or obese and the probability of being obese.

	Women					
	BMI		Overweight or Obese (BMI≥25)		Obese (BMI≥30)	
	(1)	(2)	(3)	(4)	(5)	(6)
Retirement	.251**	.248**	.008	.008	.024*	.024*
	(.100)	(.099)	(.017)	(.017)	(.014)	(.014)
Age	.175	.190	.014	.015	-.018	-.017
	(.188)	(.186)	(.032)	(.031)	(.022)	(.022)
Age squared	-.002	-.002	.000	.000	.000	.000
	(.001)	(.001)	(.000)	(.000)	(.000)	(.000)
Time dummy for 2006	.367	.295	.061	.057	.035	.030
	(.271)	(.268)	(.043)	(.043)	(.032)	(.032)
Time dummy for 2010	.544	.369	.125	.115	.059	.046
	(.785)	(.782)	(.127)	(.127)	(.096)	(.095)
Marital status						
(Ref : Does not live with a spouse-partner)						
Lives with spouse/partner	.439*	.319	.022	.018	-.002	-.012
	(.230)	(.232)	(.032)	(.031)	(.032)	(.032)
Health controls	no	yes	no	yes	no	yes
R-squared	0.93	0.93	0.86	0.86	0.84	0.84
Observations	3420	3420	3420	3420	3420	3420

Notes : (1) *** : significant at the 1% level, ** : significant at the 5% level, * : significant at the 10% level. (2) Standard errors in parentheses are robust. (3) Columns 3-6 are estimated by fixed-effect linear probability models.

Table 8: First-stage results : Impact of being above the Earliest Retirement Age (ERA) on retirement status.

	Retired			
	Men		Women	
	(1)	(2)	(3)	(4)
Above the ERA	.206***	.206***	.274***	.274***
	(.019)	(.019)	(.021)	(.021)
Age	-.057*	-.057*	-.141***	-.141***
	(.031)	(.031)	(.031)	(.031)
Age squared	.001**	.001**	.001***	.001***
	(.000)	(.000)	(.000)	(.000)
Time dummy for 2006	.053	.052	.040	.039
	(.044)	(.045)	(.046)	(.046)
Time dummy for 2010	.199	.199	.151	.148
	(.129)	(.129)	(.134)	(.134)
Lives with spouse/partner	.012	.011	.021	.019
	(.040)	(.040)	(.037)	(.037)
Health controls	no	yes	no	yes
R-squared	0.30	0.30	0.34	0.34
F-Stat of excluded instruments	120.71	119.91	166.14	166.54
Observations	4059	4059	3420	3420

Notes : (1) *** : significant at the 1% level, ** : significant at the 5% level, * : significant at the 10% level. (2) Standard errors in parentheses are robust. (3) Columns 1-4 are estimated by fixed-effect linear probability models.

Table 9: Second-stage results for men : the causal impact of retirement on BMI, the probability of being either overweight or obese and the probability of being obese.

	Men					
	BMI		Overweight or Obese (BMI≥25)		Obese (BMI≥30)	
	(1)	(2)	(3)	(4)	(5)	(6)
Retirement	.279	.241	.052	.047	.108*	.108*
	(.450)	(.451)	(.074)	(.074)	(.060)	(.060)
Age	.391**	.380*	.093***	.092***	.016	.014
	(.197)	(.197)	(.032)	(.032)	(.022)	(.022)
Age squared	-.002*	-.002	-.001***	-.001***	-.000	.000
	(.001)	(.001)	(.000)	(.000)	(.000)	(.000)
Time dummy for 2006	-.231	-.247	-.014	-.016	-.018	-.019
	(.236)	(.236)	(.042)	(.042)	(.029)	(.029)
Time dummy for 2010	-.578	-.580	-.024	-.024	-.100	-.102
	(.674)	(.673)	(.121)	(.120)	(.085)	(.085)
Marital status						
(Ref : Does not live with a spouse/partner)						
Lives with spouse/partner	-.221	-.231	-.065	-.066	-.014	-.015
	(.205)	(.201)	(.041)	(.041)	(.029)	(.029)
Health controls	no	yes	no	yes	no	yes
Observations	4059	4059	4059	4059	4059	4059

Notes : (1) *** : significant at the 1% level, ** : significant at the 5% level, * : significant at the 10% level. (2) Standard errors in parentheses are robust. (3) Columns 3-6 are estimated by FEIV linear probability models. (4) As the **xtivreg2** command in Stata only computes the whithin R-squared, the overall R-squared is not reported here.

Table 10: Second-stage results for women : the causal impact of retirement on BMI, the probability of being either overweight or obese and the probability of being obese.

	Women					
	BMI		Overweight or Obese (BMI≥25)		Obese (BMI≥30)	
	(1)	(2)	(3)	(4)	(5)	(6)
Retirement	.233	.283	.011	.017	.009	.012
	(.361)	(.359)	(.057)	(.057)	(.045)	(.044)
Age	.173	.193	.015	.016	-.019	-.018
	(.192)	(.191)	(.031)	(.031)	(.024)	(.024)
Age squared	-.002	-.002	-.000	.000	.000	.000
	(.001)	(.001)	(.000)	(.000)	(.000)	(.000)
Time dummy for 2006	.368	.294	.061	.057	.036	.030
	(.286)	(.283)	(.042)	(.042)	(.033)	(.033)
Time dummy for 2010	.546	.365	.125	.114	.061	.047
	(.822)	(.818)	(.125)	(.124)	(.098)	(.098)
Marital status						
(Ref : Does not live with a spouse/partner)						
Lives with spouse/partner	.439**	.318	.022	.018	-.002	-.012
	(.215)	(.218)	(.030)	(.031)	(.030)	(.030)
Health controls	no	yes	no	yes	no	yes
Observations	3420	3420	3420	3420	3420	3420

Notes : (1) *** : significant at the 1% level, ** : significant at the 5% level, * : significant at the 10% level. (2) Standard errors in parentheses are robust. (3) Columns 3-6 are estimated by FEIV linear probability models. (4) As the **xtivreg2** command in Stata only computes the whithin R-squared, the overall R-squared is not reported here.

Table 11: Second-stage results for men and women : the impact of retirement by occupation type (strenuous/sedentary).

	BMI		Overweight or Obese (BMI≥25)		Obese (BMI≥30)	
	Men	Women	Men	Women	Men	Women
	(1)	(2)	(3)	(4)	(5)	(6)
Retirement	.042	.685	.036	.054	.119	.075
	(.907)	(.756)	(.140)	(.129)	(.117)	(.094)
Retirement*strenuous occupation before retirement	.473	.006	.011	-.096	.106**	-.035
	(.371)	(.364)	(.058)	(.063)	(.053)	(.046)
Age	.473	.508	.103	.002	.098	.015
	(.750)	(.636)	(.103)	(.114)	(.098)	(.079)
Age squared	-.003	-.005	-.001	.000	-.001	.000
	(.006)	(.005)	(.001)	(.001)	(.001)	(.001)
Time dummy for 2006	-.329	.371	-.012	.075	-.058	.020
	(.443)	(.391)	(.065)	(.060)	(.050)	(.043)
Time dummy for 2010	-.666	.520	-.0167	.172	-.191	-.005
	(1.22)	(1.089)	(.181)	(.169)	(.139)	(.122)
Marital status						
(Ref : Does not live with a spouse/partner)						
Lives with spouse/partner	-.023	.525**	-.038	-.021	.009	.004
	(.260)	(.237)	(.054)	(.032)	(.039)	(.036)
Observations	2802	2424	2802	2424	2802	2424

Notes : (1) *** : significant at the 1% level, ** : significant at the 5% level, * : significant at the 10% level. (2) Standard errors in parentheses are robust. (3) Columns 3-6 are estimated by FEIV linear probability models. (4) Information on the physical strenuousness of work before retirement is only available for individuals who were working at baseline, i.e, 2802 men and 2424 women in the pooled sample. (5) As the **xtivreg2** command in Stata only computes the whithin R-squared, the overall R-squared is not reported here.