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Spousal Retirement and Hours Outcomes

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Abstract

Increasing individual working lives to counter population ageing and public pension deficits is of utmost interest to policy makers today. Because over 70 per cent of older individuals live in a couple, it is relevant to investigate spouses' retirement strategies. Earlier literature in this area focused on spousal participation decision. Here we exploit the law on retirement age in France to identify the effect of a spouse's retirement on the other spouse's labor supply, accounting for both participation and hours responses. The sample for the analysis includes over 85 000 French couples with both spouses aged 50 to 70 years. We find that the husband's retirement probability increase significantly, though slightly, by about 0.02, upon retirement of the wife but the wife's retirement does not respond to the husband's retirement. Own hours of market work drop significantly and roughly by less than two hours per week upon spousal retirement.

Keywords: Ageing, Retirement, Regression Discontinuity, Policy Evaluation

JEL classification: J14, C1, C36, D04

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1. Introduction

Population ageing and public pension deficits are of utmost concern nowadays for OECD governments and this has led to the introduction of several policy reforms to increase participation rates of older workers. Because over 70 per cent of individuals live in a couple in OECD countries and most of them are dual-earners nowadays (see Figure 1), it is of great relevance to investigate the interactions between spouses' retirement strategies. The employment rates of older men declined in the eighties and early nineties to trend up again in the late nineties while the employment rates of women have followed an upward trend in the past decades in France (see Figure 2). Here we exploit the retirement law in France to investigate the causal effect of a spouse's retirement on the other spouse's participation and hours taking a regression discontinuity approach. This is the first study to date that looks not only at the participation decision but also at the response of own market hours to spousal retirement.

Although earlier retirement studies conclude that partners tend to retire together (see, for example, Giovanni Gallipoli and Laura Turner (2012), Maria Casanova, 2010; Mark An, Bent Jesper Christensen and Nabanita Datta Gupta, 2004; Gustman and Thomas Steinmeier , 2000; [1] Michael Hurd , 1990),[2] recent work highlights asymmetries in spouses' retirement strategies. In particular, Robert A Pollak (2013) argues that spouses may have conflicting interests over the timing of retirement because of age differences and gender differences in life expectancy as well as the social security design. Other studies focused on time allocation behaviour upon retirement also finding somewhat asymmetric responses of spousal household work to retirement (Elena Stancanelli and Arthur Van Soest, 2012). None of these studies considered the possibility that the wife reduce working hours rather than fully retiring when the husband retires, and vice-versa.

To date there is also controversial evidence on the effect of social security design on spouses' retirement decisions. For example, James Banks, Richard Blundell, and Maria Casanova

[1] Gustman and Steinmeier (2009) incorporate partial retirement strategies in a discrete choice model of spouses' retirement to conclude that in numerous situations individuals in a couple may decide to retire only if their spouse does not retire. Using data drawn from the Health and Retirement Study (HRS), they find that the increased labour force participation of American women has actually contributed to lower husbands' hours of market work.

[2] See Gruber, Jonathan and David Wise (2005) for a complete overview of retirement patterns all over the world.

Rivas (2010) compare retirement behaviour of American and British dual-earners (using American husbands as a control group for British husbands) to conclude that British husbands are significantly more likely to retire when their wife reaches state pension age than their American counterparts. Courtney Coile (2004) finds that both American spouses have similar participation responses to own financial and social security incentives but while the husband also reacts to the wife's (cross) incentives the opposite is not true. Kanika Kapur and Jeannette Rogowski (2007) investigating the effect of employer-provided retiree health insurance on the retirement behaviour of dual-earners in the USA, find evidence of asymmetric effects for partners: the wife's health insurance increases joint retirement while the husband's does not. David Blau (1998) concludes that eliminating dual entitlement to social security benefits would have a significantly positive effect on the labour supply of married women and a negative one on husbands' labour supply, though both effects would be small. Michael Baker (2002) found somewhat more symmetric responses of partners, concluding for a negative effect of a new allowance for dependent spouses on the participation rates of eligible Canadian women and their husbands. All these empirical studies investigated changes in the participation decision of older spouses, ignoring the possibility that the wife may reduce hours when the husband retires and vice-versa.

Our analysis is novel in three respects. First of all, earlier studies focus on the (joint) participation decision (extensive margin) rather than the hours (intensive margin) of work of older spouses. Spouses may opt for retiring together or alternatively, one spouse may reduce working hours if the other spouse retires. Therefore, we account for both participation and hours decisions in our empirical model. Second, the previous literature relates to North-American, Anglo-Saxon or Northern European countries in which private pension schemes are more widespread than in continental and Southern Europe, like France, where the main source of retirement income are first pillar individual designed (public) and strictly regulated pensions –and this may diminish incentives for joint retirement. Indeed 79 per cent of retirees claim only a public (first pillar) pension in France, 6 per cent also receive an occupational (employer-provided) pension and 18 per cent have also subscribed a private pension while the corresponding figures in the USA are, respectively, 45, 13 and 42 per cent (Bovenberg, 2011). Third, using a regression discontinuity approach as we do in this study has the advantage of being very close to a natural random experiment design (see, for example, David Lee and Thomas Lemieux, 2010, for a discussion).

Here we exploit the discontinuity in each spouse's retirement probability at the legal retirement age in France to identify the effect of spousal retirement on the own labor supply, considering, alternatively, *usual* contractual hours and reported actual hours of work *in the past week*. Because spouses are on average two years apart in age (i.e. 24 months or 730 days apart in age, as we measure age in months and fraction of months, i.e. days), we can identify the effect of spousal retirement on the own labor supply.

Using data on a sample over 85 000 French couples with both spouses aged 50 to 70, we find that the own retirement probability increases significantly and largely upon reaching legal retirement age, thus supporting our identification approach. In contrast, we find little immediate changes in the own labor supply in response to spousal retirement. In particular, the husband's probability to retire increases by 0.02 upon wife's retirement but the wife does not apparently react to the husband's retirement. Own hours of market work drop significantly, though also slightly, upon spousal retirement: by about 7% for the husband and by 10% for the wife. Therefore, we conclude that spouses do not generally "retire together". This is in line with subjective answers to a recent survey for France on reasons to retire, according to which only 18% of the respondents reported to retire because their partner was also retired while 78% reported that their partner's retirement status had no influence whatsoever on their retirement decision (see Table 1).[3] This may be explained by the individual design of public pensions: retiring together might be very costly in terms of pension entitlement.

The structure of this paper is as follows. The next section presents the empirical approach. The data and sample selection steps are then described and descriptive evidence presented. A discussion of the results of estimation follows while the last section draws conclusions.

2. The empirical model

Our objective is to study the causal effect of the husband's retirement on the wife's labor supply, and vice-versa. We exploit exogenous variation in husband's retirement due to the

[3] Table 1 is drawn from Aubert, Patrick, Nadine Barthelemy and Samia Benallah (2012).

legal retirement age which is 60 for most workers in France[4] to identify the effect of husband's retirement on the wife's labor supply, and vice-versa.

However, since some workers may retire earlier than 60, due to special sector-of-employment (or early) retirement plans, and others may retire later than 60 –for example, because they may not have accumulated enough pension contributions by the time they reach age 60 to be able to obtain maximum (full) pension benefits, we use a Fuzzy Regression Discontinuity (FRD) design (see Jinyong Hahn, Petra Todd and Wilbert van der Klaauw, 2001, for more details of this approach), which allows for a jump greater than zero but less than one in the probability of retirement at the age cut-off of 60 years.[5] In particular, the pension benefits payable reach a maximum when individuals have cumulated a given contribution record (for example, 40 years of contributions in 1994 for people born in 1944 and working in the private sector), so that once individuals have contributed enough to retire with maximum (full) pension benefits, their pension benefits will not increase further if they retire later. Furthermore, periods of unemployment or sick leave, including maternity and parental leave, all lead to full (100 per cent coverage of) pension contribution records. Thus changes in contribution period of workers of similar ages are likely to be driven by individual choice (for example, to stop working temporarily to take care of grown up children or other sick adults) and thus we do not try to model the contribution period. The jump in the own retirement probability at the own age 60 is enough to identify (each partner's) retirement in the model. We control for education, as individual that studied fewer years than average enter the labor market earlier and typically have longer contribution periods for given age, everything else equal. However, let us anticipate that our estimates are terribly robust to including and excluding any covariates from the model (see Results section).

The average age difference between the husband and the wife is two years (i.e. 24 months or say 728 days, as we measure age in months and fraction of months, i.e. days) and therefore,

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[4] Private sector workers can retire as soon as they turn sixty (in the public sector they can retire a few years earlier). The pension benefit entitlement is a function of the contribution period (which we do not observe), and thus, workers have a stronger incentive to retire at sixty if they have contributed enough years into the pension plan to retire with full benefits then. By using a fuzzy RD design we allow workers to retire also a little earlier or later than 60. Legal retirement age starts at age 60 and retirement often becomes compulsory when individuals turn 65. See, for example, Blanchet, Didier and Louis-Paul Pele (1997) for details of the French pension system. Incidentally, in 2010, legal early retirement age was set at 62 years, with effect, however, only as from 2018. Jean-Olivier Hairault, Francois Langot and Thepthida Sopraseuth (2010) model the employment effect of the distance to legal retirement age in France, within a theoretical job search framework, to conclude that increasing legal retirement age is likely to increase employment rates of older workers.

[5] Stancanelli and van Soest (2012) follow a similar approach to study the effect of spouses' retirement on spouses' housework in France, using time use data and ignoring the labor supply responses of spouses.

we can identify both discontinuities in retirement behaviour when either the husband or the wife turns 60 (see Table 5). Earlier studies of joint retirement (see Section 1 for a discussion) predict that spouses retire at a close time. Therefore, we would expect a large jump in the own retirement probability not only when the individual reaches 60 but also when the spouse turns 60. Similarly, we would expect to find a large drop in own working hours upon spousal retirement (instrumented with spousal age 60 and above). However, if spouses have contrasting interests over the timing of retirement, possibly due to the individual design of public pension benefits and the fact that the wife is on average younger than the husband (see, for example, Pollak, 2013, for a theoretical discussion of this situation), we would not expect to find large responses of the own labor supply to spousal retirement.

Using a Regression Discontinuity (RD) approach has several advantages that have been carefully discussed by, for example, David Lee and Thomas Lemieux (2010) and Guido Imbens and Thomas Lemieux (2007). Essentially, because individuals close to the discontinuity cut-off (age 60 in our case) and situated on the two sides of the age cut-off are likely to be very similar, a regression discontinuity design is very close to an experimental design. In particular, we can here apply a regression discontinuity design because there are no other policies that affect individuals of age 60 in France; and age cannot be manipulated by the respondents. Moreover, we know the individual month and year of birth as well as the day, month and year of the interview, and retirement status is also measured on the day of the interview. We thus can assume that age is measured continuously.

Under a RD design, to estimate the effect of individual retirement, R (the binary treatment) on hours of work, H (the outcome variable), we specify retirement as a function of age, $R_i = f(age_i)$, assuming that $f(age_i)$ is continuous on the two sides of the discontinuity at the legal retirement age (60 years for most workers) and that individuals cannot manipulate their age. Under a so-called "sharp" RD design, everyone would retire when they reach age 60 -the jump in the retirement probability at age 60 would be equal to one. However, in practice some individuals may retire even earlier and others may retire later (see above), and thus, we use a Fuzzy Regression Discontinuity (FRD) design. In sharp RD designs, the jump in the outcome (own labor supply) at the cutoff (age 60 here) is the estimate of the causal impact of the treatment (spousal retirement here) while in a FRD design, the jump in the outcome is divided by the jump in the probability of treatment at the cutoff to produce the local estimate (which is equivalent to an instrumental variable (IV) estimate) of the causal impact. The fuzzy RD is numerically equivalent (and conceptually similar) to IV (see see Jinyong Hahn, Petra Todd and Wilbert van der Klaauw, 2001)). Under a FRD set up, the causal effect of spousal retirement on own hours can be estimated using an instrumental variable approach, by exploiting the discontinuity in spousal retirement at legal retirement age to instrument spousal retirement (which is here the treatment).

Allowing both spouses' retirement to affect each spouse's hours of work, we specify two first stage regressions, one for the retirement of the husband (instrumented with a dummy for whether the husband has reached legal retirement age) and the other for the retirement of the wife (instrumented with a dummy for whether the wife has reached legal retirement age), as follows:

1) $H_{f,m} = a^{f} + R_m \iota_m + R_f \iota_f + Z_m \beta^{m} + Age_m \mu^{f} + D_m * Age_m \check{n}^{m} + Z_f \beta^{f} + Age_f \mu^{f} + D_f * Age_f \check{n}^{f} + \upsilon_f$

2) $R_m = a^{rm} + D_m \gamma^{rm} + Age_m \mu^{rm} + D_m * Age_m \check{n}^{rm} + Z_m \beta^{rm} + D_f \gamma^{rfm} + Age_f \mu^{rfm} + D_f * Age_f \check{n}^{rm'} + Z_f \beta^{rfm} + \nu^{rm}$

3) $R_f = a^{rf} + D_m \gamma^{rfm} + Age_m \eta^{rfm} + D_m * Age_m \check{n}^{rmf} + Z_m \beta^{rfm} + D_f \gamma^{rf} + Age_f \eta^{rf} + D_f * Age_f \check{n}^{rf'} + Z_f \beta^{rf} + \nu^{rf}$

where m stands for husband and f for wife and we estimate the instrumental variable model separately for hours of the husband and hours of the wife, respectively. The dummy D_m takes value one when the husband has reached age 60 -720 months (or 21 840 days) of age- and zero otherwise, $Age_{m,f}$ is a flexible polynomial in age minus the age cutoff , ie (age-720) and we also allow for interactions of the age cut-off dummies and the age polynomial. In the empirical specification, we use quartic polynomials in age, thus n equals 4, and the vector $Z_{f,m}$ contains other individual characteristics such as education, number of children still living at home, local unemployment rate a year before, and district and year fixed effects, as well as an indicator for the day of the month the survey was collected. We shall present the results of estimation both including and excluding the explanatory variables other than functions of age (tge Z), as well as restricting the boundaries on the two sides of the legal retirement age (as customary when applying a Regression Discontinuity Approach). It should be mentioned that our results are robust to only modelling one first stage equation, ie only controlling for retirement of the spouse (results available from the author). Although one could conceive this quasi-natural experiment as belonging to the realm of a double discontinuity framework, each spouse is treated in practice only once as individuals cannot obviously retire twice. Which treatment applies is a function of partners' age and unobserved heterogeneity (which we control for here). Because spouses are on average two years (twenty-four months) of age apart, we can identify spousal retirement in the hours regression (see later, results of estimation). Moreover, we can also identify the effect of the own retirement on the own hours of market work for each spouse thanks to the fact that some individuals continue to work past retirement -though partial retirement is not as common in France as in the United States there are still enough individuals in this situation in our sample.[6]

Alternatively, to allow explicitly for the interactions of the spouses' labor supply decisions (see, for instance, Robert Pollak, 2003, for a review of household economics; and Oliver Donni and Nicolas Moreau (2007) for a specification of collective labor supply in France; models of joint retirement draw on a variety of theoretical approaches including collective models, bivariate duration models and discrete choice models) we specify and estimate a recursive four simultaneous equation model of both spouses' market hours and retirement decisions, allowing for unrestricted correlations across the errors of the four equations:

8) $H_m = a^{hm} + R_m \iota_m + R_f \iota_f + Z_m \beta^m + Age_m \mu^m + D_m{*}Age_m \check{n}^m + Z_f \beta^f + Age_f \mu^f + D_f{*}Age_f \check{n}^{rf'} + \upsilon_m$

9) $H_f = a^{hf} + R_m \iota_{m'} + R_f \iota_{f'} + Z_m \beta^{m'} + Age_m \mu^{m'} + D_m{*}Age_m \check{n}^m + Z_f \beta^{f'} + Age_f \mu^{f'} + D_f{*}Age_f \check{n}^{rf'} + \upsilon_f$

10) $R_m = a^{rm} + D_m \gamma^{rm} + Age_m \mu^{rm} + D_m{*}Age_m \check{n}^{rm} + Z_m \beta^{rm} + D_f \gamma^{rf} + Age_f \mu^{rf} + D_f{*}Age_f \check{n}^{rf'} + Z_f \beta^r + \nu^{rm}$

11) $R_f = a^{rf} + D_m \gamma^{rm'} + Age_m \mu^{rm'} + D_m{*}Age_m \check{n}^{rmf} + Z_m \beta^{rm'} + D_f \gamma^{rf'} + D_f{*}Age_f \check{n}^{rf'} + Age_f \mu^{rf} + Z_f \beta^{rf'} + \nu^{rf}$

The four equations above are estimated by simulated maximum likelihood (see David Roodman 2007 and 2009 for an application in STATA). The effects of the spousal retirement on spousal hours (R_m, R_f in equations 8 and 9) are identified by the dummies for being aged 60 and above (D_m, D_f) in equations 10 and 11.

The 2SLS and simultaneous equation models described above are estimated on pooled cross-sectional data drawn from the French Labor Force Surveys (see Section 3 for a description of

[6] Precisely, there are 1172 husbands (1.4% of the men in our couple sample) and 284 wives (0.3% of the women in our couple sample) that report positive hours in the past week and also report to have retired from work. For the sample of individuals, 1174 men (0.9% of the men sample) and 508 women (0.3% of the women sample) that report positive hours in the past week and also report to have retired from work.

such data). Moreover, we exploit the rotating feature of the French Labor Force Surveys and also control explicitly for individual unobserved heterogeneity by specifying a composite error term, so that the errors (v's) in the equations above include a individual specific error term (a_i) and an idiosyncratic error term (u). The individual unobserved heterogeneity terms may also capture couple's specific unobserved heterogeneity, since our sample includes only individuals in a couple. We estimate respectively, the IV models of partners' hours and retirement controlling for individual unobserved heterogeneity by means of individual fixed effects; and the four simultaneous equation models of partners' hours and retirement allowing for individual random effects. The size of the estimates is comparable under the two approaches (see Table 4 and Results section), which suggests that which form of unobserved heterogeneity is assumed does not affect the results. However, not controlling for unobserved heterogeneity makes the cross-hours effect statistically insignificant (see Results section).

3. The data

The data for the analysis are drawn from the French Labour Force Surveys (LFS) 1990-2002. We use this sample cut for a number of reasons. First of all, these yearly surveys are highly comparable over time as they use the same questionnaire, the same data collection method (personal interviews at the respondent's home) and the same sample design approach. The LFS series was broken in 2003 to comply with Eurostat requirements. The recent LFS series (as from 2003) are carried out quarterly and most of them are done by telephone; and the questionnaire and the sample design have changed dramatically relative to the earlier 1990-2002 surveys. In addition, a reform of the length of the pension contribution period took place in 2003, exactly at the time of the break in the LFS series. Therefore, we select a sample of couples from the 1990-2002 yearly LFS as follows:

- Individuals were matched to their partner if any.
- Single people were dropped from the sample.[7]
- Multi-couple households were also dropped.
- Records from different survey years were pooled together.

This produced a sample of 588 654 couples. We selected couples for the analysis as follows:

[7] In this survey, it is not possible to distinguish same-sex couples from singles sharing the housing as same sex individuals are automatically coded as singles.

1. Both partners were aged between 50 and 70 (see below for our measure of age), which gave a sample of 148 395 couples.
2. Individuals that reported as the main economic situation either employment or retirement (dropping couples in which one of spouses reported to be inactive i.e. dropping 60127 couples).
3. Couples were married (we dropped 2795 cohabitant couples)[8].

This gave a final sample of 85 473 couples. To apply a regression discontinuity approach we use ten year bounds on the two sides of the discontinuity, at age 60 (i.e.720 months, as we measure age in months and fraction of months), which is the legal retirement age for most workers in France (see detailed discussion in Section 2). We also test for the robustness of the results to selecting narrower bandwidths on the two sides of the age discontinuity.

The LFS surveys has a rotating sample structure –a third of the sample is kept in for three years- which enables us to set them up a longitudinal dataset, producing a sample of 26 969 married couples that are observed at least twice and at most three times over the sample period (on average these 26 969 households were observed 2.6 times). Attrition seems a minor issue as only 5% of the sample is not re-interviewed at least a second time – though some of the non-responses could possibly be associated with the couple changing address upon (joint) retirement (as the survey does not follow households that move). Therefore, we estimate the model both for the pooled cross-section sample and for the longitudinal sample (see also Sections 2 and 4).

The LFS collects month and year of birth together with records of the day, month and year of the interview. Therefore, we construct a continuous measure of age on the day of the interview.[9] The retirement status is subjectively assessed by the individual and measured on the interview date. In particular, the individual could choose among reporting that his/her main economic status was employment, or unemployment, in full-time education, a military, retirement or early retirement, being a housewife or other inactive. Notice that our sample only includes retirees or employed persons (see sample selection steps above). Thus, we also

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[8] Joint retirement incentives are likely to differ among the two types of household. Given the small size of the sample of cohabiting couples (think that we are pooling thirteen years of data and that for a regression discontinuity approach to produce reasonable estimates, the sample size should be as large as possible) they are not studied in this paper.

[9] In our sample of 85473 couples, 376 married men and 398 married women were aged 720 months (60 years).

allow for partial retirement as we define as "retired from work" individuals that report retirement as their main economic status while also possibly reporting positive market hours.

We exploit two different measures of hours based on the following two questions:

- ✓ Usual weekly hours of work,
- ✓ Actual hours of work in the past week.

Education refers to completed years of education. The reference category includes individuals with only less than lower intermediary (or middle) education.[10] As mentioned before, individuals with higher levels of education are likely to enter the labour market later and thus to postpone retirement. The number of children comprises children younger than 18 years at the time of the survey. This variable may affect retirement as individuals with younger children are probably less likely to retire since retirement induces a drop in income (pension benefits are smaller than earnings). Besides, the presence of relatively young children may also affect work hours.

The most disaggregated area of residence available in the survey is the department. France is divided into 22 regions that are further subdivided into 95 departments - without considering the overseas territories (French Guyana, Guadeloupe, Martinique, Mayotte, Reunion Island) that were not covered by these surveys. The level of the unemployment rate may affect the individual retirement probability as, for example, employers may encourage older workers to retire in recessionary times. Therefore, we construct a measure of the local unemployment rate, using the level of the departmental unemployment rate in the year before each survey was carried out –which gives 95 department *13 survey values for the local unemployment rate.

We also include year dummies among the explanatory variables to capture macroeconomic changes and notably the secular increase in female labour supply. Finally, the survey provides information on the day of the month the survey was carried out. Since the day of the month may affect hours we also include it among the regressors. Because over 95 per cent (and over 99 per cent in some of the years studied here) of the LFS interviews were carried out in March, we do not control for the month of the survey.

[10] Until the late fifties, education in France was compulsory only until age 14, which resulted in most children obtaining only a 'primary' or 'elementary' education diploma. In 1959 a reform extended compulsory schooling to age 16, allowing then children from all backgrounds to obtain an intermediary education diploma. This explains why so many people in our sample only completed primary education.

4. Descriptive statistics and exploratory analysis

First of all, descriptive statistics are provided in Table 2.[11] The wife is on average 2 years younger than the husband. About 60 per cent of married men and 48 per cent of married women in our sample are aged 60 or above. Half of our sample has less than an intermediary (middle) school diploma, which is the reference category for the education dummies in the econometric model. About 30 per cent of the men and 27 per cent of the women have only completed middle school; while about 6 per cent of the men and 8.5 per cent of the women have only a high school diploma. The proportion of college graduates is slightly larger for men, (10 per cent) than for women (8 per cent). We know that the proportion of college graduates increases over time and does so faster for women than for men, so that in recent years this pattern is reversed (we control for year dummies in the regressions). About 97 per cent of the spouses were French nationals. The average number of children younger than 18 years is 0.30. The local unemployment rate was equal to 9 per cent on average. As mentioned before (see Section 3), there is a lot of variation in the unemployment rate, which is allowed to vary over the 95 French departments and over the thirteen years covered by the sample. Finally, about 63 per cent of men and 50 per cent of women had retired from work. According to the definition of hours used (usual weekly hours or hours of work in the past week, see Section 3) the average of usual (past-week) hours, for those still working was 42 (40) for men and 34 (31) for women. The corresponding figures when also averaging in instances of zero hours were, respectively, 12 (15) hours for men and 14 (15) hours for women.

Next, we run a Mc Crary test of the smoothness of the age distribution (see Figure A in the Appendix) to conclude that the age distribution is continuous around the cut-off point, as required to apply a regression discontinuity approach (Justin McCrary,). Table 3 provides descriptive statistics of the Z variables in our model (see Section 2) for compliers (retirees) and non-compliers (employed persons) on the two sides of the discontinuity (below and above age 60).[12] As anticipated (see Section 2), college educated spouses are less likely to retire at the legal retirement age. The number of dependent children also correlates negatively with retiring at 60. As a test that the covariates included in the instrumental

[11] Descriptive statistics for the sample including all inactive partners aged 50 to 70 years are provided in Table A of the Appendix to the paper.

[12] Table C in the Appendix to the paper provides similar statistics for the sample including also inactive spouses (see also Section 3).

variable model (the Z) are not discontinuous at age 60 we also plots the predicted retirement probability including only the Z among the regressors (see Figure B bottom panels in the Appendix).

Next, to graphically explore the discontinuity in spouses' retirement at the legal retirement age, we plot the retirement probability against age on the two sides of the age cut-off, using bins of ten month size and plotting the means of retirement in each bin against age, as is usually done in the RD literature (see Figure 2). We find large jumps in spouses' retirement as a function of own age.[13] There is no eye-detectable increase in the own retirement probability when the spouse turns sixty for either the husband or the wife. Similar patterns are provided by plots of raw data (see top pane of Figure B in the Appendix). Figures 3 and 4 provide similar information for the outcome variables, i.e. usual week hours and past-week hours of work, respectively. Own hours drop dramatically for both spouses at the legal retirement age cut-off. However, there is no detectable drop in the hours of the husband when the wife reaches retirement age and vice-versa.

Estimation Results

If partners retire at a close time, we would expect to find a large jump in the own retirement probability upon spousal retirement (instrumented with the dummy for the spouse turning 60 of age). Similarly, we would expect to find a large drop in own working hours upon spousal retirement (instrumented with the dummy for the spouse turning 60 of age). However, if spouses have conflicting interests over the timing of their retirement –for example due to the individual design of pensions- spousal retirement may have little or opposite effect on the own labor supply. Our regression discontinuity equations are given in Section 2. We allow individual hours of work to vary as a function of both own retirement (instrumented with a dummy for being aged at least 60) and the spouse's retirement (instrumented with a dummy for the spouse being aged at least 60). The age polynomials are specified as quartic polynomials in own and partner's age (minus 720 months, i.e. 60 years) and we include interactions of these polynomials with the dummies for own and partner's age 60 and above in both the outcome equation and the first stage equations as customary (see Section 2). We run a number of additional specification checks: including and excluding other explanatory variables (the "Zs" of Section 2); narrowing the sample bounds on the two sides of the

[13] The raw age distribution of married men and married women in our sample, excluding or including inactive spouses, is plotted in Charts 1 in the Appendix.

discontinuity to couples in which both spouses are aged between 52 and 68 years (or between 54 and 66 years); and using usual contractual hours as opposed to reported hours of work in the past week.

Because the first stage estimates are the same in the model in which usual weekly hours are the outcome variable or in the model in which past week hours of work are the outcome variable, we show in the first block of the tables that follow the first outcome and in the second block the latter. The bottom blocks show results of estimation of the first stage equations.

First of all, we provide selected results of estimation of various models (OLS, 2SLS, and four simultaneous equations estimated by simulated maximum likelihood) controlling for individual unobserved heterogeneity. The first set of results shown in Table 4 relates to the models only excluding other Z's covariates. According to the OLS estimates (shown in column 2 of Table 4 for the husband and in column 3, for the wife) the cross-hours effects are negative and statistically significant at 1% level of significance, though very small in size. The wife's retirement reduces the husband hours of work by over an hour per week, which corresponds to a drop of 5.5% in hours of work relative to couples close to the age discontinuity (aged 59 to less than 60 years) while the hours of the wife drop by 4.5% upon husband's retirement.

Using a fuzzy regression discontinuity approach is equivalent to estimating a two stages least squares model (see Section 2) and instrumenting the effect of wife's retirement on the husband's hours with a dummy equal to one if the wife was aged 60 (720 months) and above, and to zero if she was younger, results of estimation of which are given in column four of Table 4 for the outcome of husband's hours. Column 5 of Table 4 shows results of estimation for the outcome variable of wife's hours in which the husband's retirement is instrumented with a dummy for whether the husband was aged 60 (720 months). The first stage regression for the husband's retirement is identified by the dummy for the husband being aged 60 and above, which is strongly significant and equal to 0.24, suggesting a 50% increase in the chances to retire for married men close to the age discontinuity. Similarly, the wife's retirement is identified by the dummy for the wife's age 60 and above, which is also strongly significant and equal to 0.23, representing an increase of 56% in the wife's chances to retire. As far as the cross-retirement effects go, these are positive but small and imprecisely estimated. The husband's retirement probability increases by about 0.01 if the wife is aged 60 and above and this effect is only weakly significant (at the 10% statistical significance level). In contrast, the husband's being aged 60 and above does not significantly affect the wife's retirement probability. The effect of the wife's retirement on the husband's hours is negative, statistically significant at the 5% significance level and three times as large in absolute value relative to the estimate obtained assuming exogenous retirement and estimating a linear probability model (column 2 of Table 4). The wife's retirement reduces the husband's hours of work by almost four hours per week, which represents a drop of about 16 per cent in the husband's hours. In contrast, the effect of the husband's retirement on the wife's hours is now not statistically significant.

However, if retirement is endogenized adopting a simultaneous equation approach (see Section 2; and selected results of estimation in the last two columns of Table 4), we find that the husband's weekly hours drop by 1.6 hours (i.e. 7%) upon the wife's retirement while the wife reduces hours by 1.9 hours (i.e. 10%) when the husband retires and both effects are strongly significant. Under this four simultaneous equations set up, the first stage estimates are very similar to those using a two-stages-least-squares approach: the husband's retirement probability increases by 0.25 when he reaches s age 60 while the wife's retirement probability increases by 0.29 when she turns 60 and both effects are strongly significant at the one per cent statistical significance level. As far as the cross-retirement effects go, his retirement increases significantly and by 0.02 if she is aged 60 and above, while her retirement is not affected if he is 60 and above. Full results of estimation of the simultaneous equation model are given in Table B in the Appendix.

As far as the outcome of last-week hours goes, we do not find much evidence of any effect of spousal retirement on own last-week hours, except for the wife's last week hours that are found to drop by almost an hour upon retirement of the husband, under a simultaneous equation approach (last column of Table 4). However, if retirement were assumed to be exogenous, we would find a significant drop in own last-week hours upon spousal retirement (second horizontal block of columns 2 and 3 of Table 4, respectively, for the husband's last-week hours and the wife's last-week hours) and such drop would be much larger than for usual contractual weekly hours of work (first horizontal block of columns 2 and 3 of Table 4).

Including also other explanatory variables (the "Z"s of Section 2) in the various models (see Table 5); the estimates of the effect of spousal retirement on own hours of work are very similar to those of Table 4, as expected. The estimates are also robust to narrowing the sample size on the two sides of the discontinuity, by selecting couples in which both partners were aged 52 to 68 (Table 6) or 54 to 66 (Table 7).

Finally, not controlling for individual unobserved heterogeneity (Table 8), we would not find any significant effect of spousal retirement on own hours, while the first stage estimates are very similar to those of Table 4.

Therefore, the results of estimation suggest that there is little joint retirement of spouses in France and that each spouse reduces slightly working hours upon retirement of the other spouse. This may be explained by the individual design of pension benefits. Moreover, there is no spousal allowance in the French pension system. Under this pension system, retiring together might be very costly.

Conclusions

Because of population ageing and increasing budgetary pressure most OECD countries have introduced policies to extend individual working lives. Over two-third of older individuals live in a couple and therefore, it is of utmost importance for policy purposes to understand the retirement strategies of married workers. Earlier literature concluded that partnered individuals retire together. Recent studies argue that spouses may have conflicting interests over the timing of their retirement, because of the design of social security and the fact that the wife is typically younger than the husband and expects to live longer than him.

Our study is novel in three respects. First, in contrast with previous studies that focused on the (joint) participation decision we also look at changes in hours of work upon spousal retirement. Second, earlier literature relates to North-American, Anglo-Saxon or Northern European countries in which private pension schemes are much more widespread than in continental and southern Europe. Most French retirees rely on first pillar (public) pensions which are individually designed and thus create a disincentive for spouses to “retire together”. Third, in this study we exploit legal retirement age legislation to identify the effect of spousal retirement on own labor supply using a (fuzzy) regression discontinuity approach, which has the advantage of being very closer to a natural experiment.

The model is estimated with data on over 85 000 dual-earner couples with spouses aged 50 to 70, drawn from pooled years of the French labor force survey. In particular, we also exploit the rotating structure of the labor force survey, to control for individual unobserved heterogeneity. We measure not only usual (contractual) hours of work but also actual hours of work in the past week. Exploratory graphical analysis indicates very large jumps in the own retirement probability at the legal retirement age for both spouses, which support our identification strategy. Parametric estimation also confirms large and significant increases in the own retirement probability at the legal retirement age for both the husband and the wife, equal to 0.25 for the husband and 0.29 for the wife. When spousal retirement is instrumented with legal retirement age, we find that the husband's retirement probability increase significantly, though slightly, by about 0.02, upon retirement of the wife but the wife's retirement does not respond to the husband's retirement. Own hours of market work drop significantly, though also slightly, upon spousal retirement: by about one-hour-and-a-half to three hours per week for the husband and by almost two hours per week for the wife. Our conclusions are generally robust to specification checks. In particular, estimating a four simultaneous equation model of spouses hours and retirement by simulated maximum likelihood, we obtain similar estimates of the effect of spousal retirement on own labor supply than estimating the outcome equations one by one, by two-stages-least-squares. Assuming that retirement is exogenous we would also find a significantly negative and small effect of spousal retirement on own market hours.

We also run many other specification, including specifications in which we only allow for spousal retirement and do not control for own retirement (available from the author). Our conclusions are unaffected.

To sum up, we conclude that joint retirement strategies of spouses are of limited importance in France, possibly because of the individual design of public pension benefits but spouses reduce hours slightly upon spousal retirement. If pensions were to be designed jointly, this might allow spouses to retire together if they wished to do so, but at the cost of reduced working lives, which would add to the pension burden. Therefore, such a policy does not seem really viable now.

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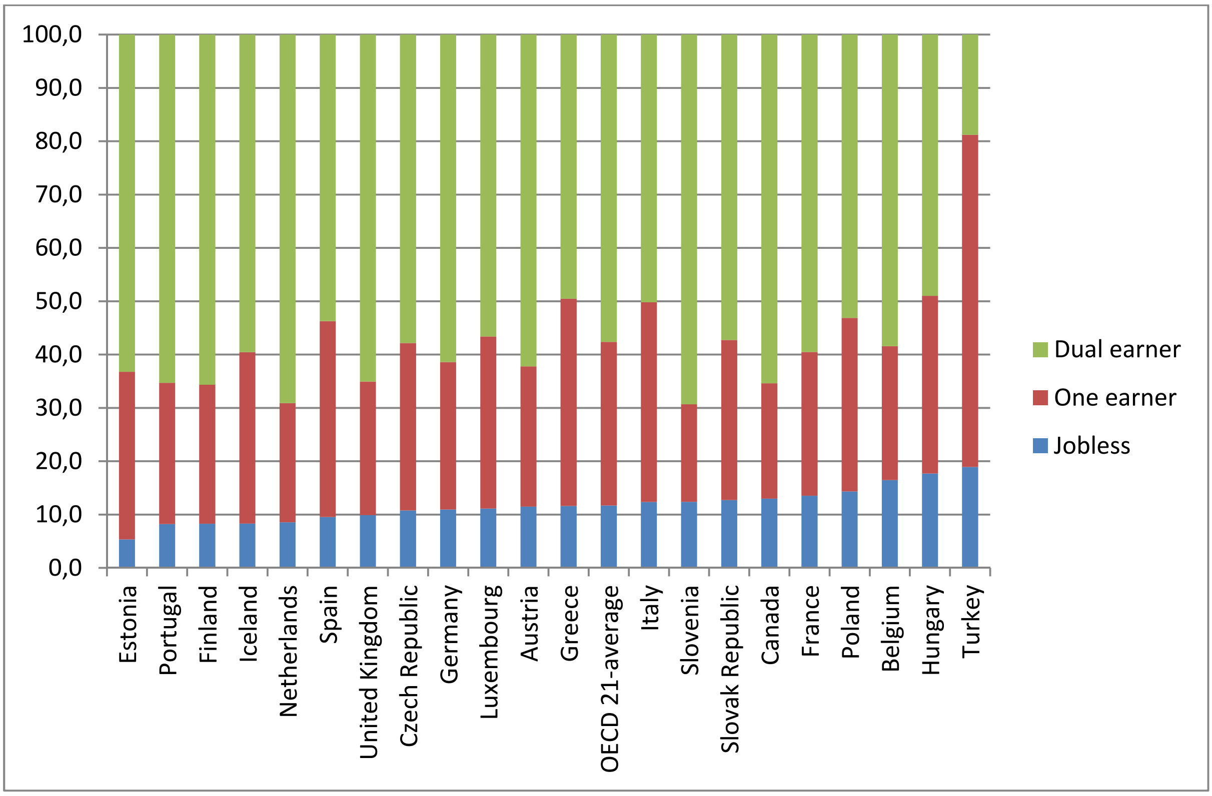
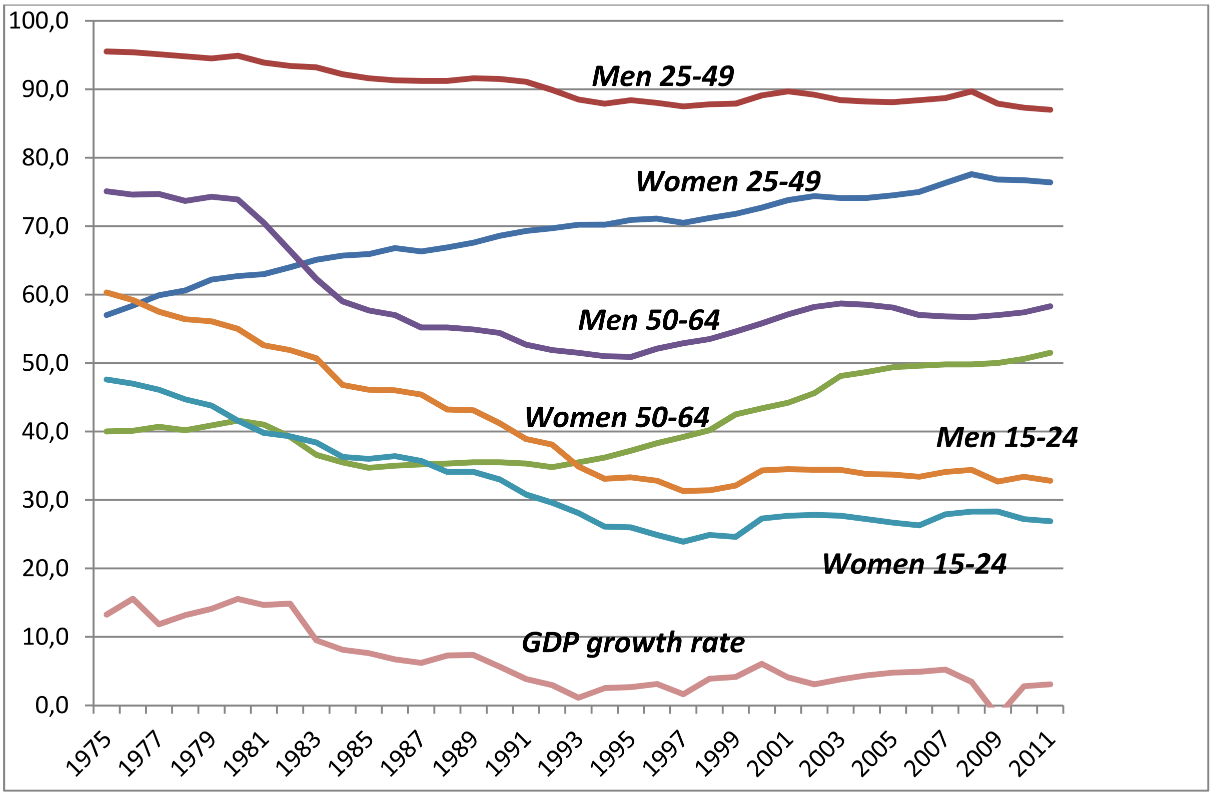
Figure 1: Most couples are dual-earner families, selected OECD countries, 2008



Source: OECD (2011), page 38.

Figure 2. Employment rates of men and women by age in France.



Sources : Author calculations; INSEE statistics.

Table1. Reasons to retire (multiple answers possible): %

	Very Important	Important	Minor reason	Not at all relevant
Retirement Rights reasons				
You can still continue to work or take up a new job	11	11	9	69
You turned 60 years of age	37	14	5	44
You turned into the age at which you could retire with the highest possible retirement pension.	49	22	5	24
Job related reasons				
You were dismissed or forced to retire	9	3	2	86
Your employer or colleagues were pushing you to retire one way or other	12	8	6	73
You were unhappy with the job conditions	12	9	7	72
You had health problems that hindered you work capacities	15	8	6	71
You had had enough of your job	23	17	10	50
Personal and Family reasons				
You had family obligations	7	7	4	81
Your spouse was also retiring or had already retired	12	6	3	78
You had other personnal projects	7	12	8	72
You wanted to take advantage of being retired as long as possible	47	21	7	26

Note: Each row sums up to 100%. The sample is a representative sample of French retirees that entered retirement from employment. The respondent could answer multiple questions.
Source: Enquête Motivations de départ à la retraite 2010, CNAV-COR-DARES-DGT-DREES-DSS.

Table 2. Sample descriptives

	Husband		Wife	
	Mean	Standard dev.	Mean	Standard dev.
Age	61.233	5.467	59.279	5.526
Age 60 and above	0.597	0.490	0.476	0.499
Primary School	0.523	0.499	0.564	0.495
Middle School	0.298	0.457	0.266	0.442
High School	0.066	0.249	0.085	0.279
College	0.109	0.312	0.081	0.274
French	0.971	0.166	0.978	0.146
Retired	0.635	0.481	0.508	0.499
Usual week Hours >0	42.18	12.861	33.90	13.72
Past week Hours (if usual week hours >0)	40.08	18.39	30.87	17.74
Usual week Hours	12.34	20.42	14.36	18.98
Past week hours	14.95	22.40	15.08	19.80
		Couple's characteristics		
		Mean	Standard dev.	
Children number		0.325	0.652	
Local U rate		9.222	2.36	
Observations no.	*85473*			

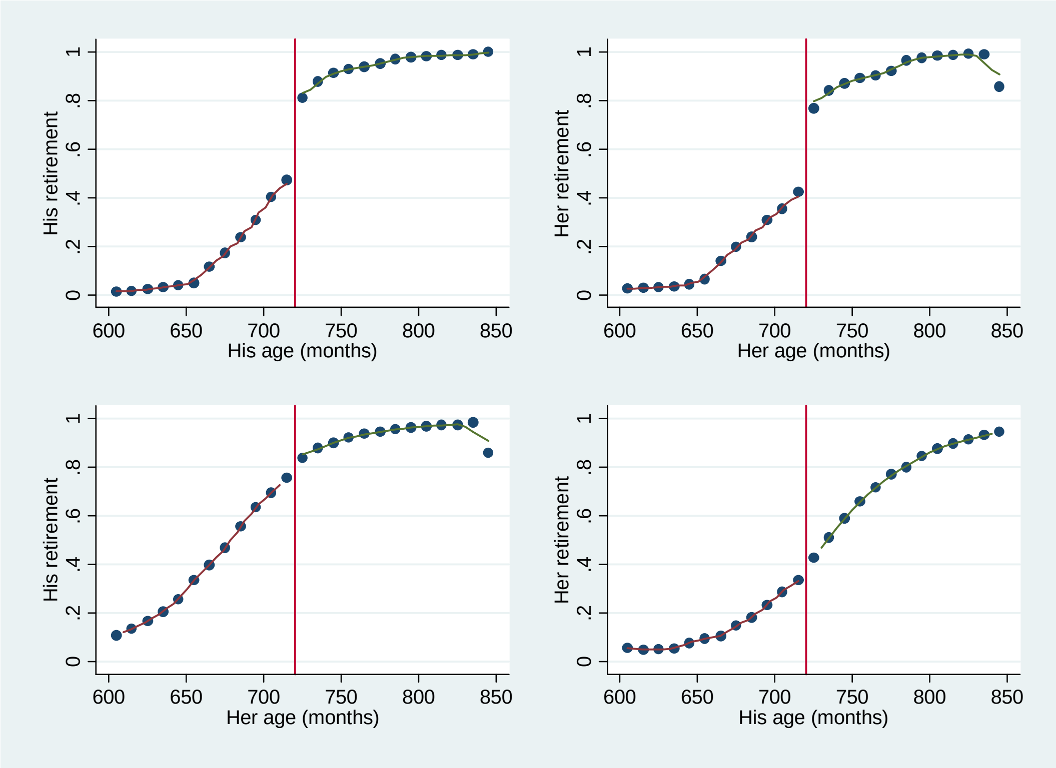
Note: The sample includes dual-earner or retiree married couples with both spouses aged 50 to 70.
The local U rate is the year (t-1) unemployment rate at the department level (there are 95 departments). U rate varies across departments and over the 13 LFS years.

Table 3. Sample descriptives by retirement status on the two sides of the age cut-off

	Not Retired Age 50-59	Retired Age 50-59	Not Retired Age 60-70	Retired Age 60-70
	Married Men			
Elementary School	0.366	0.463	0.445	0.628
	(0.481)	(0.498)	(0.497)	(0.483)
Middle School	0.382	.0376	0.193	0.245
	(0.485)	(0.484)	(0.395)	(0.430)
High School	0.083	0.077	0.082	0.054
	(0.277)	(0.267)	(0.275)	(0.226)
College	0165	0.082	0.276	0.070
	(0.371)	(0.274)	(0.276)	(0.255)
French	0.963	0.979	0.947	0.976
	(0.187)	(0.143)	(0.222)	(0.151)
Children number	0.588	0.323	0.353	0.170
	(0.813)	(0.624)	(0.669)	(0.474)
Local U rate	9.107	9.263	9.128	9.290
	(2.350)	(2.367)	(2.336)	(2.365)
Observations no.	28334	*6053*	*2829*	*48257*
	Married Women			
	Not Retired Age 50-59	Retired Age 50-59	Not Retired Age 60-70	Retired Age 60-70
Elementary School	0.479	0.421	0.654	0.667
	(0.499)	(0.493)	(0.475)	(0.470)
Middle School	0.309	0.302	0.188	0.224
	(0.462)	(0.459)	(0.391)	(0.417)
High School	0.101	0.135	0.072	0.062
	(0.301)	(0.342)	(0.259)	(0.241)
College	0.108	0.140	0.081	0.044
	(0.311)	(.347)	(0.273)	(0.205)
French	0.969	0.983	0.961	0.987
	(0.171)	(0.127)	(0.193)	0.111)
Children number	0.537	0.272	0.238	0.124
	(0.788)	(0.601)	(0.548)	(0.397)
Local U rate	9.114	9.223	9.296	9.326
	(2.338)	(2.391)	(2.359)	(2.373)
Observations no.	*38319*	*6392*	*3653*	*37109*

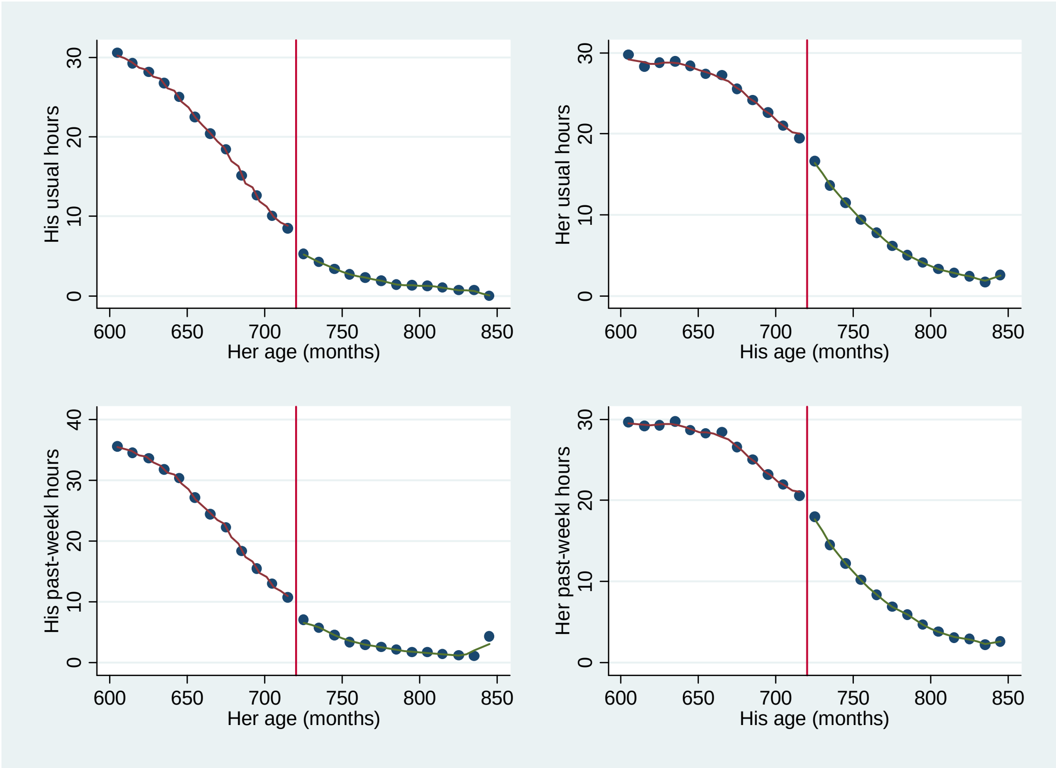
Note: The sample includes dual-earner and retiree spouses aged 50 to 70.
The total sample size is 85473 observations.

Figure 3. Retirement discontinuities at the own and the spouse's age cutoff



Note: Age is measured in months; 720 months (60 year) is the cut-off point.
The dots in the chart depict the mean of retirement by bins of size ten months.

Figure 4. (Own) Hours outcomes as a function of the spouse's (cross) age cutoff.



Note: Age is measured in months; 720 months (60 year) is the cut-off point.
The dots in the chart depict the mean of usual (contractual) or past-week hours by bins of size ten months.

Table 4. Employment and hours effects of spousal retirement (Excluding Zs); controlling for individual unobserved heterogeneity.
Couples in which both spouses were aged 50-70: unbalanced sample of 85305 couples, of which 26 969 were observed at least twice.

	OLS	OLS	2SLS	2SLS	Simultaneous Equations	
Outcome Usual Hours	**His Hours (1)**	**Her Hours (2)**	**His Hours (3)**	**Her Hours (4)**	**His Hours (5)**	**Her Hours (5)**
He Retires	**-31.17*** **	**-0.83*** **	**-35.50*** **	**-1.47**	**-36.03*** **	**-1.88*** **
	(0.16)	(0.15)	(2.18)	**(1.88)**	(0.42)	**(0.36)**
She Retires	**-1.20*** **	**-26.62** **	**-3.69** **	**-26.04*** **	**-1.59*** **	**-26.04*** **
	(0.15)	(0.14)	(1.83)	(1.88)	(0.41)	(0.36)
Sample Mean hours , spouses aged 59 to <60						
Outcome Hours Past Week						
He Retires	**-39.19*** **	**-3.39*** **	**-36.08*** **	**-0.49**	**-35.47*** **	**-0.97** **
	(0.15)	(0.16)	(1. 96)	(1.92)	(0.39)	(0.38)
She Retires	**-2.86*** **	**-28.87*** **	**0.08**	**-26.67*** **	**-0.48**	**-27.29*** **
	(0.14)	(0.15)	(1.71)	(1.83)	(0.37)	(0.37)
Sample Mean hours , spouses aged 59 to <60	*22.07*	*18.23*				
First stage his retirement			He Retires	He Retires	He Retires	He Retires
He Age 60 and above, Dm			**0.239*** **	**0.239*** **	**0.250*** **	**0.250*** **
			(0.012)	(0.015)	(0.009)	(0.009)
She Age 60 and above, Df			**0.013***	**0.013***	**0.022** **	**0.022** **
			(0.008)	(0.010)	(0.009)	(0.009)
Sample Mean retired, spouses aged 59 to < 60						
first stage her retirement			She Retires	She Retires	She Retires	She Retires
He Age 60 and above, Dm			**0.012**	**0.012**	**-0.0003**	**-0.0003**
			(0.008)	(0.008)	(0.010)	(0.010)
She Age 60 and above, Df			**0.235*** **	**0.235*** **	**0.289*** **	**0.289*** **
			(0.012)	(0.012)	(0.010)	(0.010)
Sample Mean retired, spouses aged 59 to < 60	*0.45*	*0.42*				
His Covariates (Zm)	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Her Covariates (Zf)	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Individual Fixed Effects	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**

*** stands for statistical significance at the 1 per cent level; ** at the 5 per cent and * at the 10 per cent. There are two first stage regressions as both his retirement (first stage a) and her retirement (first stage b) are instrumented in the own labor supply equation.

Table 5. Employment and hours effects of spousal retirement (Including Zs); controlling for individual unobserved heterogeneity. Couples in which both spouses were aged 50-70: unbalanced sample of 85305 couples, of which 26 969 were observed at least twice.

	OLS	**OLS**	**2SLS**	**2SLS**	**Simultaneous Equations**	
Outcome Usual Hours	**His Hours (1)**	**Her Hours (2)**	**His Hours (3)**	**Her Hours (4)**	**His Hours (5)**	**Her Hours (5)**
He Retires	**-31.13*** **	**-0.81*** **	**-35.49*** **	**-1.46**	**-36.00*** **	**-1.88*** **
	(0.16)	(0.15)	(2.18)	**(1.89)**	(0.42)	**(0.37)**
She Retires	**-1.17*** **	**-26.59** **	**-3.69** **	**-26.05*** **	**-1.56*** **	**-26.04*** **
	(0.15)	(0.14)	(1.83)	(1.88)	(0.41)	(0.36)
Sample Mean hours , spouses aged 59 to <60	*19.31*	*16.38*	*19.31*	*16.38*	*19.31*	*16.38*
Outcome Hours Past Week						
He Retires	**-39.19*** **	**-3.39*** **	**-36.08*** **	**-0.51**	**-35.43*** **	**-0.92** **
	(0.15)	(0.16)	(1. 96)	(1.93)	(0.39)	(0.38)
She Retires	**-2.86*** **	**-28.87*** **	**0.07**	**-26.66*** **	**-0.47**	**-27.37*** **
	(0.14)	(0.15)	(1.71)	(1.83)	(0.38)	(0.37)
Sample Mean hours , spouses aged 59 to <60	*22.07*	*18.23*	*22.07*	*18.23*	*22.07*	*18.23*
First stage his retirement			He Retires	He Retires	He Retires	He Retires
He Age 60 and above, Dm			**0.239*** **	**0.239*** **	**0.252*** **	**0.252*** **
			(0.012)	(0.015)	(0.009)	(0.009)
She Age 60 and above, Df			**0.013***	**0.013***	**0.022** **	**0.022** **
			(0.008)	(0.010)	(0.009)	(0.009)
Sample Mean he retired, spouses aged 59 to < 60	*0.45*	*0.45*	*0.45*	*0.45*	*0.45*	*0.45*
first stage her retirement			She Retires	She Retires	She Retires	She Retires
He Age 60 and above, Dm			**0.012**	**0.012**	**0.0002**	**0.0002**
			(0.008)	(0.008)	(0.010)	(0.010)
She Age 60 and above, Df			**0.235*** **	**0.235*** **	**0.289*** **	**0.289*** **
			(0.012)	(0.012)	(0.010)	(0.010)
sample mean she retired spouses aged 59 to<60	*0.42*	*0.42*	*0.42*	*0.42*	*0.42*	*0.42*
His Covariates (Zm)	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**
Her Covariates (Zf)	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**
Individual Fixed Effects	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**

*** stands for statistical significance at the 1 per cent level; ** at the 5 per cent and * at the 10 per cent. There are two first stage regressions as both his retirement (first stage a) and her retirement (first stage b) are instrumented in the own labor supply equation.

Table 6. Employment and hours effects of spousal retirement (Including Zs); controlling for individual unobserved heterogeneity.
Sample of couples in which both spouses are aged 52-68: 61 593 couples, of which 19165 couples were observed at least twice.

	OLS	**OLS**	**2SLS**	**2SLS**	**Simultaneous Equations**	
Outcome Usual Hours	**His Hours (1)**	**Her Hours (2)**	**His Hours (3)**	**Her Hours (4)**	**His Hours (5)**	**Her Hours (5)**
He Retires	**-31.47*** **	**-1.004*** **	**-37.45*** **	**-1.12**	**-36.00*** **	**-1.88*** **
	(0.17)	(0.17)	(2.67)	**(2.27)**	(0.42)	**(0.37)**
She Retires	**-1.004*** **	**-26.80** **	**-4.01* **	**-26.44*** **	**-1.56*** **	**-26.04*** **
	(0.16)	(0.16)	(2.44)	(2.50)	(0.41)	(0.36)
Sample Mean hours , spouses aged 59 to <60	*19.31*	*16.38*	*19.31*	*16.38*	*19.31*	*16.38*
Outcome Hours Past Week						
He Retires	**-39.19*** **	**-3.39*** **	**-35.05*** **	**0.70**	**-35.43*** **	**-0.92** **
	(0.15)	(0.16)	(2. 39)	(2.33)	(0.39)	(0.38)
She Retires	**-2.86*** **	**-28.87*** **	**-1.18**	**-26.18*** **	**-0.47**	**-27.37*** **
	(0.14)	(0.15)	(2.28)	(2.40)	(0.38)	(0.37)
Sample Mean hours , spouses aged 59 to <60	*22.07*	*18.23*	*22.07*	*18.23*	*22.07*	*18.23*
First stage his retirement			He Retires	He Retires	He Retires	He Retires
He Age 60 and above, Dm			**0.22*** **	**0.22*** **	**0.252*** **	**0.252*** **
			(0.014)	(0.014)	(0.009)	(0.009)
She Age 60 and above, Df			**0.018** **	**0.018** **	**0.022** **	**0.022** **
			(0.009)	(0.009)	(0.009)	(0.009)
Sample Mean he retired, spouses aged 59 to < 60	*0.45*	*0.45*	*0.45*	*0.45*	*0.45*	*0.45*
first stage her retirement			She Retires	She Retires	She Retires	She Retires
He Age 60 and above, Dm			**0.011**	**0.011**	**0.0002**	**0.0002**
			(0.010)	(0.010)	(0.010)	(0.010)
She Age 60 and above, Df			**0.20*** **	**0.20*** **	**0.289*** **	**0.289*** **
			(0.013)	(0.013)	(0.010)	(0.010)
sample mean she retired spouses aged 59 to<60	*0.42*	*0.42*	*0.42*	*0.42*	*0.42*	*0.42*
His Covariates (Zm)	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**
Her Covariates (Zf)	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**
Individual Fixed Effects	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**

*** stands for statistical significance at the 1 per cent level; ** at the 5 per cent and * at the 10 per cent. There are two first stage regressions as both his retirement (first stage a) and her retirement (first stage b) are instrumented in the own labor supply equation.

Table 7. Employment and hours effects of spousal retirement (Including Zs); controlling for individual unobserved heterogeneity.
Sample of couples in which both spouses are aged 54-66: 39 739 couples, of which 12081 couples were observed at least twice.

	OLS	**OLS**	**2SLS**	**2SLS**	**Simultaneous Equations**	
Outcome Usual Hours	**His Hours (1)**	**Her Hours (2)**	**His Hours (3)**	**Her Hours (4)**	**His Hours (5)**	**Her Hours (5)**
He Retires	**-31.30*** **	**-1.24*** **	**-35.72*** **	**-1.37**	**-36.00*** **	**-1.88*** **
	(0.20)	(0.19)	(3.84)	**(3.25)**	(0.42)	**(0.37)**
She Retires	**-1.07*** **	**-26.75** **	**-5.54***	**-27.83*** **	**-1.56*** **	**-26.04*** **
	(0.17)	(0.17)	(3.37)	(3.40)	(0.41)	(0.36)
Sample Mean hours , spouses aged 59 to <60	*19.31*	*16.38*	*19.31*	*16.38*	*19.31*	*16.38*
Outcome Hours Past Week						
He Retires	**-39.19*** **	**-3.39*** **	**-32.21*** **	**3.02**	**-35.43*** **	**-0.92** **
	(0.15)	(0.16)	(3. 40)	(3.34)	(0.39)	(0.38)
She Retires	**-2.86*** **	**-28.87*** **	**-0.84**	**-23.44*** **	**-0.47**	**-27.37*** **
	(0.14)	(0.15)	(3.15)	(3.23)	(0.38)	(0.37)
Sample Mean hours , spouses aged 59 to <60	*22.07*	*18.23*	*22.07*	*18.23*	*22.07*	*18.23*
First stage his retirement			He Retires	He Retires	He Retires	He Retires
He Age 60 and above, Dm			**0.20*** **	**0.20*** **	**0.252*** **	**0.252*** **
			(0.017)	(0.017)	(0.009)	(0.009)
She Age 60 and above, Df			**0.009**	**0.009**	**0.022** **	**0.022** **
			(0.012)	(0.012)	(0.009)	(0.009)
Sample Mean he retired, spouses aged 59 to < 60	*0.45*	*0.45*	*0.45*	*0.45*	*0.45*	*0.45*
first stage her retirement			She Retires	She Retires	She Retires	She Retires
He Age 60 and above, Dm			**0.011**	**0.011**	**0.0002**	**0.0002**
			(0.014)	(0.014)	(0.010)	(0.010)
She Age 60 and above, Df			**0.19*** **	**0.19*** **	**0.289*** **	**0.289*** **
			(0.016)	(0.016)	(0.010)	(0.010)
sample mean she retired spouses aged 59 to<60	*0.42*	*0.42*	*0.42*	*0.42*	*0.42*	*0.42*
His Covariates (Zm)	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**
Her Covariates (Zf)	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**
Individual Fixed Effects	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**

*** stands for statistical significance at the 1 per cent level; ** at the 5 per cent and * at the 10 per cent. There are two first stage regressions as both his retirement (first stage a) and her retirement (first stage b) are instrumented in the own labor supply equation.

Table 8. Employment and hours effects of spousal retirement (Including Zs).
Not controlling for individual unobserved heterogeneity.
Sample of couples in which both spouses are aged 50-70: 85305 couples.

	OLS	**OLS**	**2SLS**	**2SLS**	**Simultaneous Equations**	
Outcome Usual Hours	**His Hours (1)**	**Her Hours (2)**	**His Hours (3)**	**Her Hours (4)**	**His Hours (5)**	**Her Hours (5)**
He Retires	**-31.47*** **	**-1.027*** **	**-36.228*** **	-2.514	**-36.25*** **	-2.508
	(0.163)	(0.154)	(1.940)	(1.880)	(1.761)	(1.651)
She Retires	**-1.06*** **	**-26.763** **	**-0.919**	**-26.022*** **	**-0.916**	**-26.035*** **
	(0.149)	(0.141)	(1.348)	(1.482)	(1.538)	(1.443)
Sample Mean hours , spouses aged 59 to <60						
Outcome Hours Past Week						
He Retires	**-39.206*** **	**-3.386*** **	**-35.322*** **	**-1.760**	**-35.287*** **	**-1.735**
	(0.151)	(0.159)	(1.819)	(1.915)	(1.636)	(1.713)
She Retires	**-2.873*** **	**-28.883*** **	**-0.376**	**-27.969*** **	**-0.380**	**-27.959*** **
	(0.138)	(0.146)	(1.309)	(1.523)	(1.430)	(1.497)
Sample Mean hours , spouses aged 59 to <60	*22.07*	*18.23*				
First stage his retirement			He Retires	He Retires	He Retires	He Retires
He Age 60 and above, Dm			**0.289*** **	**0. 289*** **	**0.252*** **	**0.252*** **
			(0.015)	(0.015)	(0.009)	(0.009)
She Age 60 and above, Df			**0.022** **	**0.022** **	**0.022** **	**0.022** **
			(0.010)	(0.010)	(0.009)	(0.009)
Sample Mean retired, spouses aged 59 to < 60						
first stage her retirement			She Retires	She Retires	She Retires	She Retires
He Age 60 and above, Dm			**0.0012**	**0.0012**	**0.0004**	**0.0004**
			(0.012)	(0.012)	(0.010)	(0.010)
She Age 60 and above, Df			**0.289*** **	**0.289*** **	**0.289*** **	**0.289*** **
			(0.015)	(0.015)	(0.010)	(0.010)
Sample Mean retired, spouses aged 59 to < 60	*0.45*	*0.42*				
His Covariates (Zm)	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**
Her Covariates (Zf)	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**

*** stands for statistical significance at the 1 per cent level; ** at the 5 per cent and * at the 10 per cent. There are two first stage regressions as both his retirement (first stage a) and her retirement (first stage b) are instrumented in the own labor supply equation.

Appendix

Table A. Descriptives: sample of dual-earner, retiree, other inactive, married couples with both spouses aged 50 to 70 included.

	Husband		Wife	
	Mean	Standard dev.	Mean	Standard dev.
Age	60.776	5.293	58.617	5.239
Age 60 and above	.553	.497	.403	.490
Elementary School	0.531	0.499	0.605	0.488
Middle School	0.292	0.454	0.252	0.434
High School	0.065	0.247	0.075	0.264
College	0.109	0.312	0.063	0.244
French	0.949	0.217	0.957	0.201
Retired	.598	.490	.308	.461
Employed	0.337	0.472	0.317	0.465
Other Inactive	0.063	0.244	0.373	0.483
Usual Hours	41.707	11.950	33.837	13.692
		Couple's characteristics		
		Mean	Standard dev.	
Married		0.970	0.169	
Children number		0.393	0.773	
Local U rate		9.368	2.429	
Observations no.	*148395*			

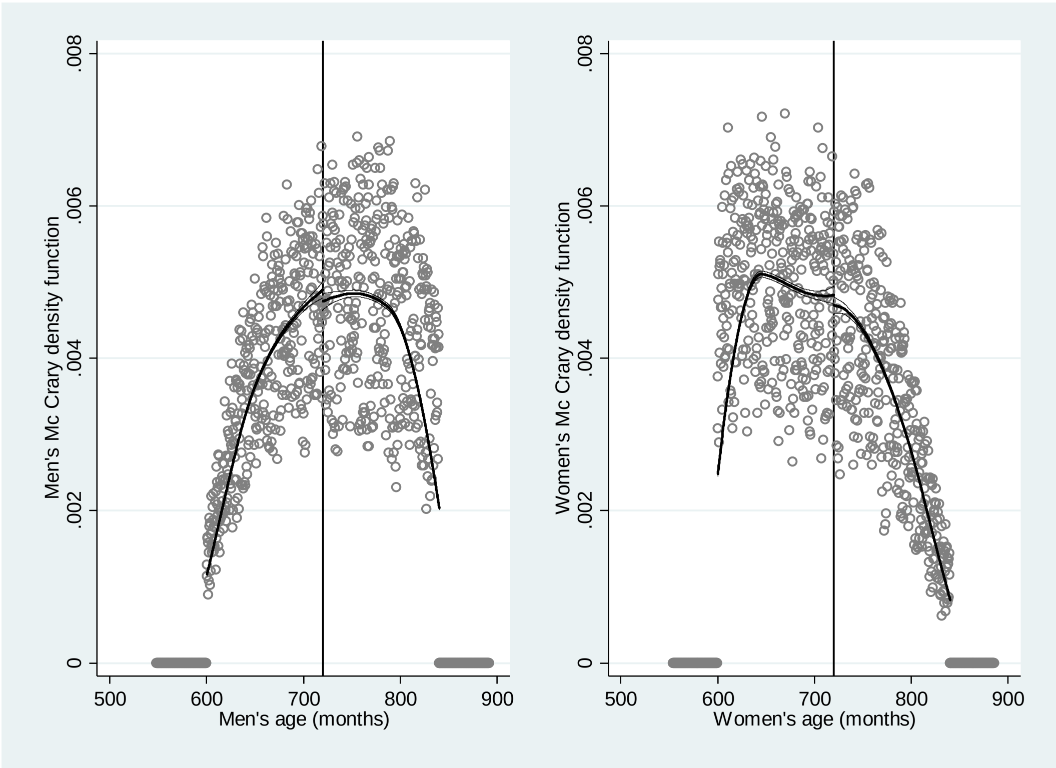
Note: The sample includes all active and inactive partners aged 50 to 70. It includes also cohabitant couples.
Hours are averaged over positive values of hours.

Table B. Appendix. Full results of estimation of the simultaneous equation model (Table 4 last two columns, specification 5 of Table 4)

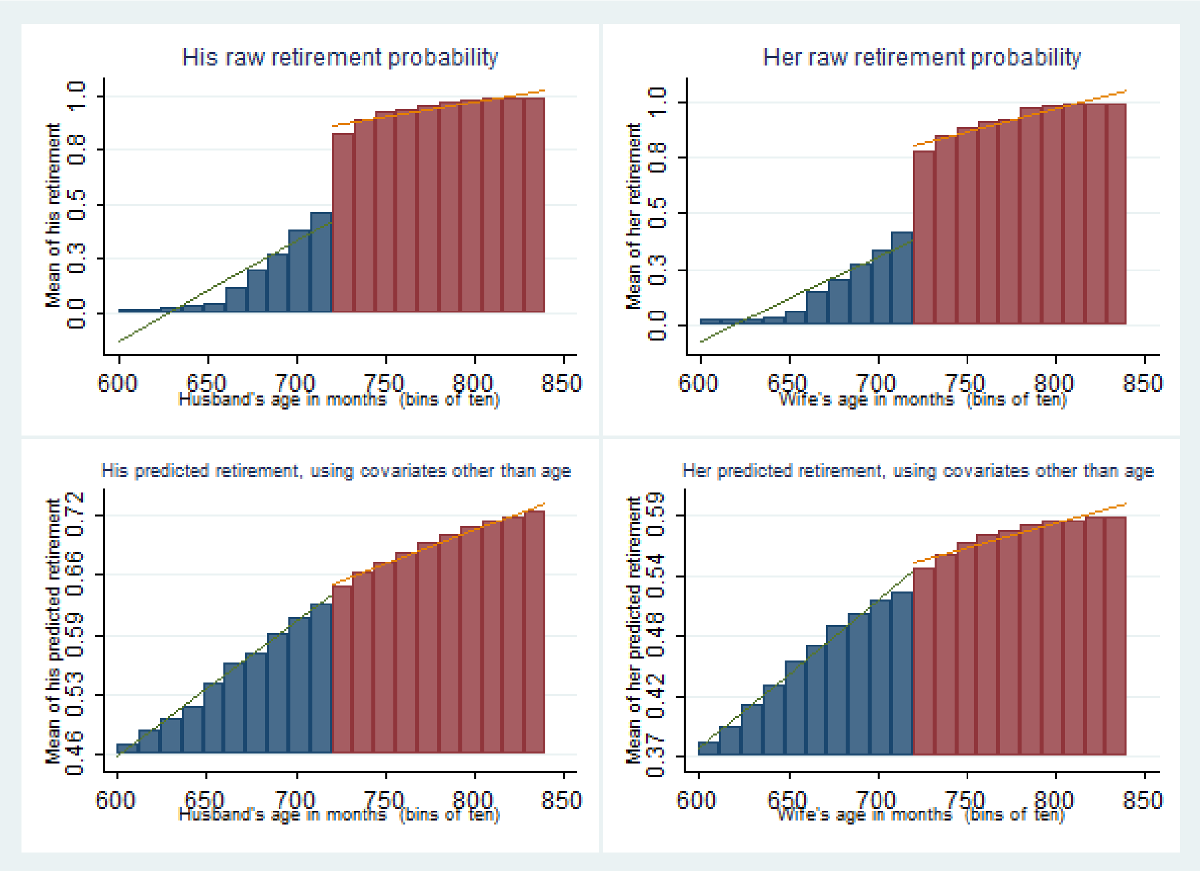
	hours1	hours2	retired_m	retired_f
Age m	1.530***	0.608	0.0683***	-0.00549
	(0.450)	(0.430)	(0.00998)	(0.0108)
Age m squared	0.531***	0.226	-0.0155***	-0.00356
	(0.199)	(0.191)	(0.00419)	(0.00455)
Age m cube	0.0757**	0.0359	-0.00350***	-0.000489
	(0.0319)	(0.0306)	(0.000649)	(0.000705)
Age m quartic	0.00378**	0.00195	-0.00017***	-2.14e-05
	(0.00166)	(0.00159)	(3.31e-05)	(3.59e-05)
Age f	0.0487	0.472	-0.00710	0.0306***
	(0.425)	(0.407)	(0.00950)	(0.0103)
Age f squared	0.0265	0.358**	-0.00526	-0.0183***
	(0.181)	(0.173)	(0.00380)	(0.00413)
Age f cube	0.00840	0.0434	-0.000710	-0.00307***
	(0.0279)	(0.0267)	(0.000565)	(0.000613)
Age f quartic	0.000611	0.00149	-2.95e-05	- 0.000131***
	(0.00140)	(0.00134)	(2.78e-05)	(3.02e-05)
Age m * Dm	-0.646	-0.476	0.0478***	0.0320**
	(0.751)	(0.721)	(0.0133)	(0.0144)
Age m squared *Dm	-0.761***	-0.347*	-0.0162***	-0.00305
	(0.214)	(0.204)	(0.00548)	(0.00595)
Age m cube *Dm	-0.0496	-0.0134	0.00738***	0.00124
	(0.0468)	(0.0449)	(0.000837)	(0.000908)
Age m quartic *Dm	-0.00485**	-0.00316*	4.58e-06	-9.61e-06
	(0.00191)	(0.00183)	(4.21e-05)	(4.57e-05)
Age f *Df	0.275	-1.096	0.0230*	0.0867***
	(0.749)	(0.719)	(0.0132)	(0.0144)
Age f squared *Df	-0.113	-0.112	4.94e-05	-0.0138**
	(0.212)	(0.202)	(0.00543)	(0.00590)
Age f cube *Df	0.00154	-0.0767*	0.00139*	0.00748***
	(0.0465)	(0.0446)	(0.000828)	(0.000898)
Age f quartic*Df	-0.00101	-1.99e-05	1.86e-08	-8.48e-05*
	(0.00189)	(0.00181)	(4.16e-05)	(4.51e-05)
retired_m	-36.03***	-1.883***		
	(0.424)	(0.368)		
retired_f	-1.59***	-26.04***		
	(0.413)	(0.358)		
Dm (age>=60) m			0.250***	-0.0003
			(0.00949)	(0.0103)
Df (age>=60) f			0.022**	0.289***
			(0.00949)	(0.0103)
Observations	85,473	85,473	85,473	85,473

*** stands for statistical significance at the 1 per cent level; ** at the 5 per cent and * at the 10 per cent.
Estimated coefficients on constants and year dummies not shown.

Appendix. Figure A. McCrary Age density of the husband and the wife.



Appendix. Figure B. Spouses' Retirement by age and other covariates.



Note: Age is measured in months; 720 months (60 year) is the cut-off point.
The top charts plot the mean of retirement by bins of size ten months. The bottom charts plot predicted retirement (regressed against all the Z covariates but age in the model) by bins of size ten months. The charts show that while retirement drops dramatically at age 60 (720 months of age), the covariates are smooth at age 60 (720 months of age).