Do Married Couples Coordinate their Retirement? Evidence from a Pension Reform

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Abstract

We examine whether husband's and wife's retirement decisions are interrelated, and whether they are positively related due to leisure complementarity or negatively related due to liquidity constraints, using SHARE survey data for Israel. To deal with the endogeneity of retirement choices, we use the retirement eligibility date of each spouse as an instrument for actual retirement. The 2004 retirement age reform, which was applied gradually by an individual's month of birth, provides substantial heterogeneity in the retirement eligibility date for individuals in our sample. For dual-earner couples, our linear IV results imply that the likelihood of both male and female individuals to retire increases with the retirement of their spouse, supporting the leisure complementarity hypothesis. However, the significance of the effect disappears in an alternative probit IV regression and in a regression discontinuity analysis. Our results are therefore inconclusive, and emphasize the need to verify empirical results with alterative estimation methods.

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1. Introduction

Population aging is widespread in developed countries, including Israel, as a result of increased longevity and decreased fertility. Concurrently, the public attention to the standard of living of the elderly population is increasing over time. Retirement is a critical point in the life cycle that is most relevant for both material and psychological well-being. This is because after retirement, individuals and families experience a change in their income portfolio as well as in their time availability.

Retirement decisions made by married couples could be simultaneous. Retirement of spouses could be negatively correlated because of the income effects incurred by retirement. For most people, retirement brings about a drop in income. Therefore, retirement of both spouses implies a larger drop in income, so couples will try to smooth income by not retiring jointly. On the other hand, retirement of spouses could be positively correlated due to leisure complementarity. In addition, retirement decisions potentially depend on the relative bargaining power of each spouse. Regardless of the sign of the correlation, this calls for a simultaneous analysis of the retirement decisions of spouses.

In this paper, we study the joint retirement decisions of married couples using SHARE panel data for Israeli citizens around the age of retirement. We separate between dual-income couples, in which both spouses worked, and single-income couples, in which only one of the spouses worked. The potentially simultaneous nature of retirement decisions requires a simultaneous analysis. Michaud et al. (2020) deal with this problem by using stated retirement preferences of the spouses, regarding their own and their spouse's retirement. We take a different approach and use the retirement eligibility age as an instrumental variable for actual retirement. This allows us to estimate the actual retirement decisions of married couples simultaneously.

The use of the retirement eligibility age as an instrument is facilitated by a legislatory change in retirement age which was passed in 2004. Specifically, retirement age was increased gradually by cohorts, and this implies a substantial heterogeneity in the legal month (and age) of retirement eligibility among individuals with different birth dates. In our structural estimation of the simultaneous retirement decisions, we use the individual's date of becoming eligible for retirement as an explanatory variable, while the actual timing of retirement of the spouse is instrumented by the spouse's retirement eligibility date.

Several previous studies assessed the effect of increasing the retirement eligibility age on labor supply of the older population in Israel. BOI (2018) found that the increase in the statutory retirement age between 2004 and 2009 had a marked effect on the effective retirement age. Kimhi

et al (2019) found that both labor force participation and hours of work have increased after the increase in the retirement age for both males and females. Sand and Lichtman-Sadot (2024) found that the retirement eligibility deferral increased labor supply for both males and females. They also found that spillover effects differed by gender. Specifically, the deferral of the wife's retirement eligibility age had no effect on the husband's retirement age, while the deferral of the husband's retirement eligibility age increased the wife's labor force participation.

We contribute to this literature by testing the effect of the retirement eligibility date on actual retirement not only by simple regressions, but also consider the dynamics around the date of retirement using an event study specification, and finally, testing the effect using a regression discontinuity design around the retirement eligibility date threshold. Another related study on the spillover effect of retirement between spouses is found in Kruse (2021), using a Norwegian pension reform affecting private sector workers only. That study found that women tend to be influenced by husband's retirement while the evidence for men is inconclusive. Similarly, García-Miralles and Leganza (2024) found evidence for joint retirement of husbands and wives, and showed that women respond more than men to changes in the spouse's retirement incentives.

Our results on the effect of own retirement eligibility on actual retirement are in line with previous results in the sense that we find a positive effect of becoming eligible for retirement on actual retirement for both males and females, although the relationship is found to be weaker for females. This result is consistent with the smaller effect of the reform on females found in BOI (2018) and Sand and Lichtman-Sadot (2024). For the cross-effect we find a marginally significant effect of the husband's retirement on the wife's retirement, but no significant effect of the wife's retirement on the husband's retirement is found. In the regression discontinuity design the cross-effect disappears entirely.

The remainder of the paper is organized as follows. Section 2 describes the retirement age reform in Israel. Section 3 presents the data used in our analysis. Section 4 describes the empirical methodology. Section 5 presents the results and section 6 concludes.

2. The 2004 retirement age reform

The pension system in Israel went through rapid changes in the past two decades, mostly moving from a defined benefit system to a defined contribution system, reflecting the notion that individuals should bear the prime responsibility for their retirement futures (Achdut and Spivak, 2010). The current pension system comprises of two main pillars: national insurance (universal old age allowances plus income supplement allowances for eligible low-income and low-asset

individuals) and occupational pensions. Occupational pensions became compulsory in 2008: all wage earners must contribute a given share of their income to a privately managed savings instrument, which will eventually pay out the pension allowance.

The legal age of retirement, at which employees become eligible to start receiving their old-age national insurance payments as well as their pension allowances, is not equal for men and women. Before the 2004 reform, the retirement age for males was 65 and the retirement age for females was 60. In the 2004 reform the retirement ages were gradually raised by two years, to 67 for males and 62 for females. In practice, the law was gradually applied to cohorts by month of birth, according to the schedules described in Table 1 and Table 2.[2]

Table 1: Retirement age for male individuals born until April 1942

Month of Birth	Age of Eligibility
until March 1939	65
Apr. - Aug. 1939	65 + 4 months
Sep. 1939 - Apr. 1940	65 + 8 months
May - Dec. 1940	66
Jan. - Aug. 1941	66 + 4 months
Sep. 1941 - Apr. 1942	66 + 8 months
from May 1942	67

Source: 2004 retirement law.

Table 2: Retirement age for female individuals

Month of Birth	Age of Eligibility
until March 1944	60
Apr. - Aug. 1944	60 + 4 months
Sep. 1944 - Apr. 1945	60 + 8 months
May - Dec. 1945	61
Jan. - Aug. 1946	61 + 4 months
Sep. 1946 - Apr. 1947	61 + 8 months
May 1947 - Feb. 1956*	62

Source: 2004 retirement law; *At this point, the law was frozen beyond the age of 62, although originally planned to gradually go up to age 64. Our data includes females who would potentially be affected by the additional expansion of the law which was not executed, but not during the time of the analysis (these are younger spouses, ages 37-59 at the time of interview).

[2] The retirement age for females was planned to be raised further to 64 by 2017, in order to allow women to increase their pension allowances by additional saving at their high earning years, but this change was halted by legislation in 2017. In November 2021 legislation was passed to gradually increase the female retirement age to 65.

3. Data

For the empirical analysis we use data from several waves of the SHARE project (Survey of Health, Aging and Retirement in Europe). We use all waves covering interviewed citizens in Israel: the first wave conducted in 2005-2006, the second wave conducted in 2009-2010, the fifth wave from 2013 and the sixth wave from 2015. The SHARE project samples the entire population of persons 50 years and older at the time of sampling, whose regular residence is in the respective country. In the first wave, all household members born in 1954 and earlier were eligible for an interview. Starting at wave two, for new countries or refreshment samples, households were eligible to be surveyed if at least one respondent per household was born in 1956 or earlier for wave two, 1962 or earlier for wave five and 1964 or earlier for wave six. In addition - in all waves - current partners living in the same household are interviewed regardless of age. All respondents previously interviewed are also interviewed in subsequent waves. New partners living in the households are also interviewed regardless of age. Age-eligible respondents who participated and moved within the country are traced and interviewed in subsequent waves, while young partners, new partners and partners who never participated, are not traced if they moved.

Table 3 enumerates the individuals covered in the four SHARE waves that are used in our analysis. We define as married individuals with a declared marital status of either ``Married and living together with spouse'' or ``Registered partnership''. Individuals who declared a marital status of ``Married, living separate from spouse'', ``Never married'', ``Divorced'' or ``Widowed'' are considered not married. We construct a household level database, documenting variables of interest for both husband and wife. Here we are constrained to households where both partners responded to the interview, which leaves us with 2,902 observations (household-wave combinations). We exclude from the analysis two same sex female households, and remain with 2,900 observations (5,800 individual-wave combinations). We separate these households into dual-income households where both husband and wife earned an income prior to retirement (2,113 observations), and single-income households where only the husband had an income prior to retirement and the wife was defined as working in the household (787 observations). Table 4 presents the number of women defined as working in the household out of all married women in the sample, by population group. The total is 2,890 observations, because for ten females the population group is not reported. 84% of Arab-Israeli women are defined as working in the household. This is consistent with a well-known stylized fact that labor force participation is traditionally low among Arab-Israeli women (Yashiv and Kasir, 2011). In contrast, only 18% of

veteran-Jewish women and 3% of former USSR immigrant women in our sample are defined as working in the household. The high employment rate of former USSR immigrants may stem from a more gender-equal employment history under the Soviet Union, but also to relatively low income jobs held by many older immigrants, making it difficult to live off of one salary.

Table 3: Individuals covered in waves, by gender and marital status

	Male		Female		All		
Wave	Not married	Married	Not married	Married	Not married	Married	Total
1	145	928	389	986	534	1,914	2,448
2	204	942	520	941	724	1,883	2,607
5	241	1,004	546	999	787	2,003	2,790
6	191	753	483	758	674	1,511	2,185
Total*	781	3,627	1,938	3,684	2,719	7,311	10,030

* Summing across wave includes subsequent interviews of the same individuals.

Table 4: Females declared as working at home, by population group

Working at home	Veteran Jewish	Arab-Israeli	FUSSR immigrant	Total
No	1,614	77	413	2,104
Yes	366	406	14	786
Total	1,980	483	427	2,890
Percent working at home	18%	84%	3%	27%

Individuals are considered eligible for retirement if their age at the time of the interview exceeds their legal retirement age according to the reform (Tables 1 and 2). Actual retirement status is defined as retired for individuals who reported ``retired'' as their current job situation. Other statuses: ``employed/self-employed'', ``unemployed'', ``permanently sick/disabled'', ``homemaker'' and ``other'', were considered not retired.

Tables 5 and 6 present summary statistics of the variables used in our analysis, for dual- and single-income married households, respectively. These tables describe the observations that are used in the final regression analysis. These are limited, in the reduced-form retirement equations, to households with non-missing values of the legal retirement status and other characteristics (age, education, housing density and population group): 1,922 for the dual-income households and 568 for the single-income households. The structural equations are further limited to the households for which the actual retirement status is observed.

Table 5: Household summary statistics, dual-income households

Variable	Obs	Mean	Std. Dev.	Min	Max
Eligible for retirement (H)	1,922	0.49	0.5	0	1
Eligible for retirement (W)	1,922	0.56	0.497	0	1
Retired (H)	1,798	0.52	0.5	0	1
Retired (W)	1,826	0.5	0.5	0	1
Age (H)*	1,922	67.65	9.253	49.17	94.08
Age (W)*	1,922	63.94	9.335	40.58	91.75
Post-secondary educ (H)	1,922	0.5	0.5	0	1
Post-secondary educ (W)	1,922	0.49	0.5	0	1
Rooms in house per head	1,922	1.78	0.688	0.17	5.75
Arab-Israeli	1,922	0.03	0.165	0	1
Former USSR immigrant	1,922	0.21	0.405	0	1

* ages are measured in months.

Table 6: Household summary statistics, single-income households

Variable	Obs	Mean	Std. Dev.	Min	Max
Eligible for retirement (H)	568	0.46	0.5	0	1
Retired (H)	473	0.55	0.5	0	1
Age (H)*	568	66.84	9.45	48.67	93
Age (W)*	568	62.71	9.56	37.33	91.92
Post-secondary educ (H)	568	0.21	0.4	0	1
Post-secondary educ (W)	568	0.08	0.27	0	1
Rooms in house per head	568	1.56	0.71	0.29	5
Arab-Israeli	568	0.43	0.5	0	1
Former USSR immigrant	568	0.02	0.16	0	1

* ages are measured in months.

More females than males are eligible for retirement, despite the fact that they are younger on average, and this is due to the gender difference in the legal retirement age. However, actual retirement rates are somewhat lower for females, indicating that females have a higher tendency to prolong their career beyond the legal retirement age. Post-secondary education is a proxy for earnings capacity. The share of individuals with post-secondary education is 52% and 51% for males and females, respectively, in dual-income households. In the single-income households, both males and females are much less educated on average: only 21% of the males and 8% of the

females have post-secondary education. This implies that women in the single-income households are not working because of their low earning capacity. The lower education of their husbands is probably due to assortative mating. The average number of rooms per capita stands for household wealth, and it is also lower in single-income households, 1.56 compared to 1.8 for dual-income households. Again, the share of Arab-Israeli households is substantially higher in single-income households (43% vs. 2% in dual-income households) and the share of former USSR immigrants is substantially higher in dual income households (21% vs. 2% in single income households).

Table 7 presents the actual retirement status of individuals in our sample by their retirement eligibility status, separated by gender. There is an obvious correlation between the retirement eligibility status and the actual retirement status. For males, 86% of retirement-eligible individuals have retired, while 83% of non-eligible individuals have not retired. Females, both eligible and non-eligible for retirement, retired less often than men. 79% of eligible females retired, and 86% of non-eligible females did not retire.

Table 7: Actual retirement and retirement eligibility, by gender

	Male				Female			
	Eligible		Non-eligible		Eligible		Non-eligible	
Retired	747	86%	146	17%	779	79%	102	14%
Not retired	117	14%	716	83%	202	21%	643	86%
Total	864	100%	862	100%	981	100%	745	100%

Table 8 presents statistics for the age difference between husband and wife in our data, and average retirement age difference (for couples who both retired). In the full sample, the average age difference between husband and wife is 3.67 years, while the average legal retirement age difference is 4.78 years, both in favor of the husband. In the both-retired sub-sample, these gender differences are not strikingly different, 3.61 and 4.97, respectively. The average difference in the actual retirement age (in the both-retired sub-sample) , 2.93 is lower than the legal retirement age difference, which implies a tendency of individuals to retire closer to the spouse's retirement. We observe this also in the retirement date difference combining information of age difference and retirement ages: the mean difference is -0.68 years, reflecting a large mass of couples who retired during the same year.

Table 8: Age and retirement age differences between spouses in dual-income households

Variable	Obs.	Mean	Std. Dev.	Min	Max
Full sample					
Age difference	1,726	3.67	3.83	-13.5	31.75
Legal retirement age difference	1,726	4.78	0.72	1.33	7
Both retired in sample					
Age difference	193	3.61	3.66	-4	22.08
Legal retirement age difference	193	4.97	0.46	3	6.33
Actual retirement age difference	193	2.93	7.29	-20.08	19.17
Retirement date difference	193	-0.68	7.14	-25	17.17

4. Methodology

As noted above, individual retirement decisions for married couples are likely synchronized. Leisure complementarity may lead couples to retire around the same time, while income considerations may cause one spouse to delay retirement as the other spouse retires. These effects may also vary by the relative bargaining power each spouse holds within the household. This poses a challenge for the identification of the cross-effects of couples' retirement decisions. We therefore use the retirement eligibility status as an instrument for actual retirement. We estimate the retirement decision equations simultaneously using instrumental variable methods, and validate the results using a regression discontinuity design.

4.1 Instrumental variable estimation of retirement decisions

For the dual-income couples in our sample, we jointly estimate two structural retirement equations, one for males and one for females, where the retirement decision of an individual depends on the retirement eligibility status of the individual, which we consider to be exogenous, and on the retirement choice of the spouse, which is considered endogenous. We use the spouse's retirement eligibility status as an instrument for the spouse's retirement status. The structural equations are specified in equations (1) and (2):

$$(1)\ Retired_{H_{it}} = \alpha_0 + \alpha_1 Eligible_{H_{it}} + \alpha_2 Retired_{W_{it}} + \alpha_3 X_{H_{it}} + \alpha_4 X_{W_{it}} + \alpha_5 X_{it} + \epsilon_{H_{it}}$$

$$(2)\ Retired_{W_{it}} = \gamma_0 + \gamma_1 Eligible_{W_{it}} + \gamma_2 Retired_{H_{it}} + \gamma_3 X_{W_{it}} + \gamma_4 X_{H_{it}} + \gamma_5 X_{it} + \epsilon_{W_{it}}$$

where $Retired_{H_{it}}$ and $Retired_{W_{it}}$ stand for the retirement status of husband and wife in household *i* at time *t*, respectively. $Eligible_{H_{it}}$ and $Eligible_{W_{it}}$ stand for the retirement eligibility of husband and wife, respectively. Both actual retirement and retirement eligibility are binary variables. $X_{H_{it}}$ and $X_{W_{it}}$ are individual characteristics which include the level of education, the age at the time of the interview, and population group affiliation. X_{it} are household characteristics - in our case: housing density. $\epsilon_{H_{it}}$ and $\epsilon_{W_{it}}$ are standard errors clustered at the level of the individual, to account for error correlation across time (survey waves). We estimate each equation twice, once using linear probability models for the retirement choices in both stages of the 2SLS, and once using probit specifications. To obtain standard errors for the probit 2SLS, we use an empirical bootstrap procedure (with 100,000 repetitions).

The reduced form equations for the retirement model are specified in equations (3) and (4). Here we let retirement choices depend only on the exogenous retirement eligibility statuses of the individual and of the spouse, and the additional individual and household characteristics:

$$(3)\ Retired_{H_{it}} = \alpha_0 + \alpha_1 Eligible_{H_{it}} + \alpha_2 Eligible_{W_{it}} + \alpha_3 X_{H_{it}} + \alpha_4 X_{W_{it}} + \alpha_5 X_{it} + \epsilon_{H_{it}}$$

$$(4)\ Retired_{W_{it}} = \gamma_0 + \gamma_1 Eligible_{W_{it}} + \gamma_2 Eligible_{H_{it}} + \gamma_3 X_{W_{it}} + \gamma_4 X_{H_{it}} + \gamma_5 X_{it} + \epsilon_{W_{it}}$$

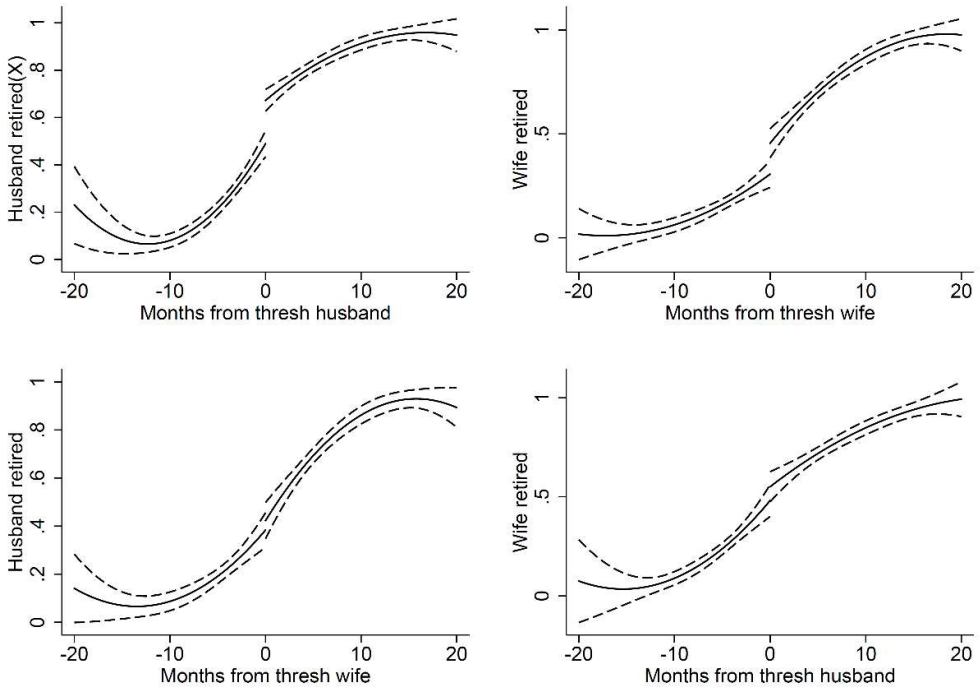
Again, we estimate both linear probability and probit models for these specifications.

4.2 Regression discontinuity design

To complement our discrete analysis, we also estimate a regression discontinuity specification which is commonly applied in the retirement literature (Battistin et al. (2009), Stancanelli and van Soest (2012), Moreau and Stancanelli (2015), Chen et al. (2017)). The legal retirement eligibility age provides an exogenous cutoff point around which the probability to retire changes dramatically. For each spouse, we define a count variable: months since legal retirement eligibility, accepting the value zero at the month of eligibility, negative values before eligibility, and positive values after eligibility. Figure 1 plots the quadratic fit of the propensity to retire for male and female spouses over own and spouse's count variable. No control variables are included, so these are merely data inspection graphs to support the regression discontinuity approach. In the top panel, the jump in propensity to retire around the date of legal retirement eligibility is visible for

both males and females, although more substantial for the males. In the bottom panel, no substantial jump is detected around the spouse's date of legal retirement eligibility. Overall, the propensity to retire increases from left to right in all graphs, capturing the effect of age.

Figure 1: Actual retirement status as a function of months to legal retirement, quadratic fit



In the retirement decision equation of individuals in dual-income couples (Equations 6 and 7), we include own legal retirement eligibility status and a function of the count variable as well as the actual retirement status of the spouses, instrumented using their own legal retirement status. Wife, husband and household characteristics are added as additional controls. [3]

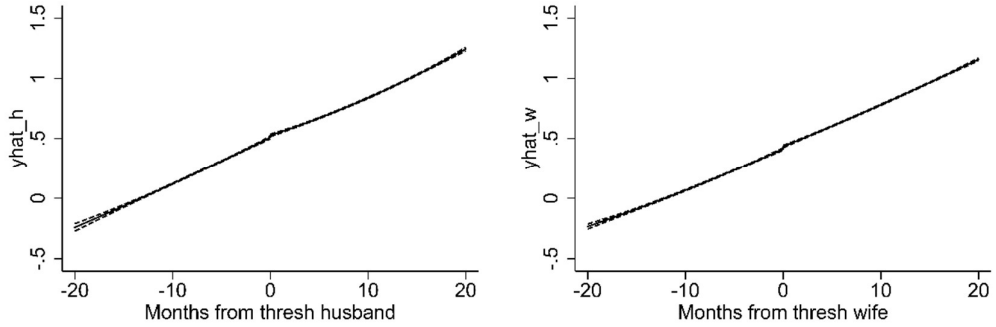
$$(5)\ Retired_{\{Ht\}} = \alpha_0 + \alpha_1 Eligible_{H_t} + f(Months\ to\ eligibility_H) + \alpha_2 \widehat{Retired}_{W_t} + \\ + \alpha_3 X_{H_t} + \alpha_4 X_{W_t} + \alpha_5 X_{it} + \varepsilon_{H_t}$$

$$(6)\ \text{Retired}_{\{\text{Wt}\}} = \gamma_0 + \gamma_1 \text{Eligible}_{\text{W}_\text{t}} + f(Months\ to\ eligibility_W) + \gamma_2 \widehat{Retired}_{H_t} + \\ + \gamma_3 X_{W_t} + \gamma_4 X_{H_t} + \gamma_5 X_{it} + \varepsilon_{W_t}$$

[3] We tried a linear and a quadratic specification, with interactions allowing for a different fit in the before and after periods.

Figure 2 presents a graphical falsification test for the regression discontinuity design.[4] Here we plotted the predicted probabilities to retire regressed on all other control variables other than age, retirement eligibility status and time to retirement eligibility, as a function of the count variables. There is no substantial jump around the time period 0, which supports the RDD requirement that other controls are not the cause of the jump around the threshold.

Figure 2: RDD falsification test



5. Results

The results section consists of several subsections. We first present event studies of the dynamics of the propensity to retire in the months leading to and following the retirement eligibility event, to support the use of retirement eligibility as an instrument for actual retirement.[5] Next, we present the results of estimating the retirement equations, in the reduced-form and IV versions. Finally, we repeat the retirement analysis using the regression discontinuity approach.

5.1 Event studies

To illustrate the appropriateness of the individual's retirement eligibility status as an instrument for actual retirement, we conduct an event study analysis, looking at the effects of time-dummies around the month of becoming eligible for retirement, on the probability of actual retirement. This is intended to shed light on the dynamics of the decision to retire around this event. We define dummy variables for the months since obtaining the retirement eligibility status. These variables are different for every individual, according to their age and their birth cohort, according to the 2004 retirement law. One month prior to the first month of retirement eligibility (t = -1) is chosen

[4] A similar test appears in Moreau and Stancanelli (2015).
[5] This is different from the RD approach later employed because the timing enters non-parametrically.

as the base-period, and the coefficients for the other time periods ($t < -1$ or $t > -1$), obtained from linear regressions, show the changes of the retirement probability relative to this period.

The full regression results for both husbands and wives are shown in appendix table A1. Figure 3 plots the coefficients for the time-since-retirement-eligibility dummies from the retirement regression for males. The probability to retire is not significantly different than in t=-1 for all pre-eligibility months. Starting from $t = 0$, the first retirement eligibility month, we observe a jump in the probability to retire of 32% compared to $t = -1$. The increased probability remains significant up to 13 months after obtaining retirement eligibility and then returns to being not significantly different than the base period. Figure 4 presents the coefficients from a similar regression for females. Again, all marginal effects prior to period t=-1 are not statistically significant. Now we find an increase in the probability to retire at $t = 1$, one month after legal eligibility, of 25.8% compared to $t = -1$. Then we find a higher probability to retire at $t = 3$, $t = 5$ and between $t = 7$ and $t = 13$, all around 25%-30% higher than at $t = -1$. These results, although not surprising, confirm the relationship between the retirement eligibility status and actual retirement decisions, and support our choice of the retirement eligibility status as an instrumental variable for actual retirement.

Figure 3: Effects of months since retirement eligibility on the probability of being retired, husband

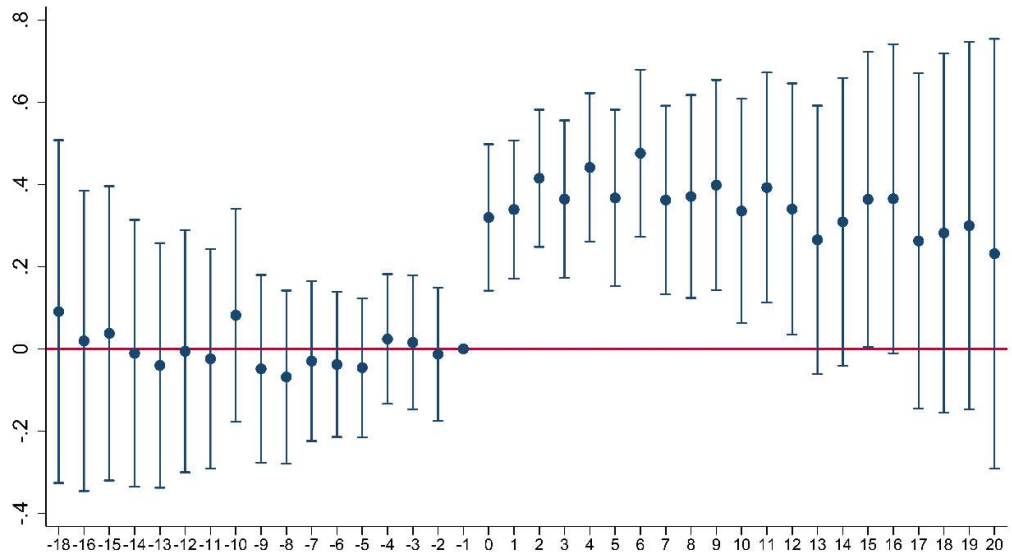
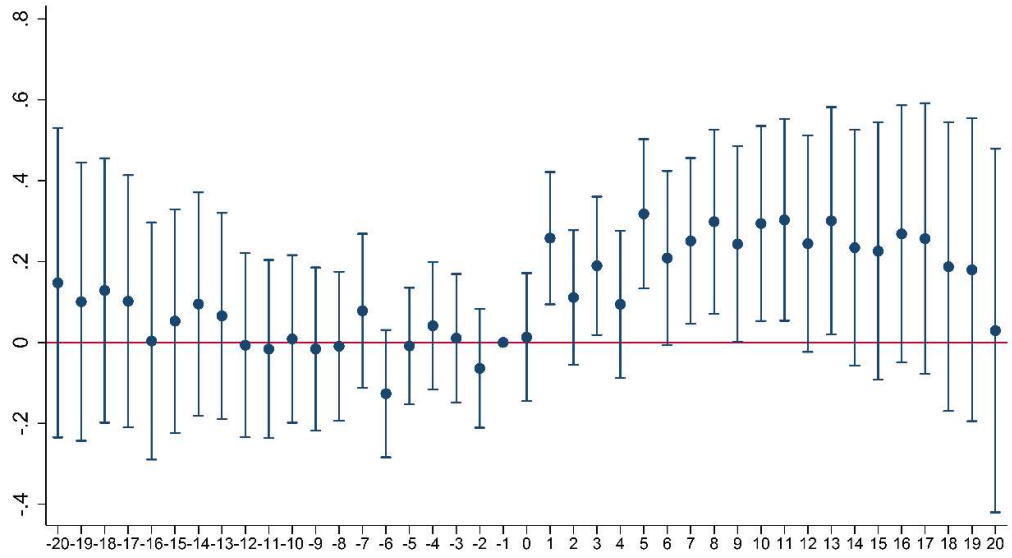


Figure 4: Effects of months since retirement eligibility on the probability of being retired, wife



5.2 IV estimation of retirement decisions of married couples

We first present the results of estimating the retirement decision as a function of own retirement eligibility status and the retirement eligibility or actual retirement status of the spouse, for dual income households (table 9). Column 1 and column 5 present OLS regressions, for males and females respectively, of retirement status, on the exogenous variables of own and spouse's retirement eligibility statuses. Own retirement eligibility increases the probability to retire by 39.6% for males, and by 29.2% for females. Spouse's eligibility increases the probability to retire by 6.8% for males and by 8.1% for females. Age increases the probability to retire by 1.76% for males and by 1.58% for females. The age of the spouse does not significantly affect retirement beyond the effect of retirement eligibility status. Own and spouse's post-secondary education has no significant effect on retirement. Belonging to the Arab-Israeli minority group increases the probability to retire for females by 17.7% compared to the veteran-Jewish group, while the former USSR immigrant group is not statistically different from the comparison group. Among males, no significant difference is found between the population groups.

Columns (2) and (6) present average marginal effects from similar specifications using probit regressions. Compared to the OLS, both own and spouse's retirement eligibility statuses have slightly smaller effects. Own retirement eligibility increases the probability of retirement by 17.3% for males and by 11.9% for females. In this specification the spouses' retirement eligibility is not significant for both genders. The effects for the control variable are very similar to those obtained in the OLS specification.

Columns (3) and (7) present 2SLS specifications where actual retirement status depends on own retirement eligibility status and the actual retirement status of the spouse, instrumented by the retirement eligibility status. The first stage regressions for these structural equations are the OLS regressions of the opposite gender. The effects of own retirement eligibility status on retirement choices is very similar to the ones obtained in the OLS specification (37.8% for males and 11.9% for females). The effect of the spouse's actual retirement status is much larger than the effect of the spouse's retirement eligibility status. This is expected, since the eligibility only represents the possibility for the retirement event, while the actual retirement is its realization. For males it is 23%, which is still smaller than the effect of own retirement eligibility status. For females, it is 20.6% which is close in magnitude to the effect of own retirement eligibility status. However, the cross retirement effects are only marginally significant. The results for the additional control variables are again similar to the previous specifications.

Columns (4) and (8) present similar IV specifications, only now both the first and the second stage are probit regressions. We obtain standard errors by an empirical bootstrap with 100,000 repetitions. Compared to the 2SLS, we again obtain slightly smaller effects for own retirement eligibility status and for the spouse's actual retirement status. Own retirement eligibility increases the probability to retire by 17.2% for males and by 11.1% for females. As in the reduced form probit equations, retirement decisions are not affected significantly by the spouse's retirement in the IV probit specifications. Results for other controls are quite similar to the 2SLS results.

5.3 Regression discontinuity design

We now present the results for the regression discontinuity analysis. Table 10 presents selected coefficients of the estimated retirement equations.[6] Columns (1) and (2) present a linear fit on both sides of the RD threshold for both spouses. Columns (3) and (4) present a quadratic fit. In addition to the cutoff, we also allow the slope to differ on the two sides of the cutoff, by including interactions with the retirement eligibility status. The retirement status of the other spouse is included in every regression instrumented using their own retirement eligibility status.

[6] The full regression results can be obtained from the authors.

Table 9: Retirement decisions estimation results for dual-income households

VARIABLES	(1) OLS-males	(2) PROBIT-males	(3) ivreg-males	(4) ivprobit-males	(5) OLS-females	(6) PROBIT-females	(7) ivreg-females	(8) ivprobit-females
Retired by law	0.396***	0.173***	0.378***	0.172***	0.292***	0.119***	0.277***	0.111***
	(0.0434)	(0.0298)	(0.0476)	(0.0318)	(0.0413)	(0.0312)	(0.0447)	(0.0313)
Retired by law (spouse)	0.0679*	0.0275			0.0810*	0.0113		
	(0.0372)	(0.0290)			(0.0437)	(0.0317)		
Retired-hat (spouse)			0.230*	0.0616			0.206*	0.0733
			(0.1260)	(0.0945)			(0.1100)	(0.0867)
Age	0.0176***	0.0197***	0.0165***	0.0194***	0.0158***	0.0199***	0.0162***	0.0203***
	(0.0032)	(0.0036)	(0.0032)	(0.0032)	(0.0029)	(0.0038)	(0.0028)	(0.0032)
Age (spouse)	-0.0016	-0.000574	-0.00524	-0.00121	0.00484	0.00527	0.0012	0.00288
	(0.0030)	(0.0034)	(0.0039)	(0.0038)	(0.0030)	(0.0035)	(0.0039)	(0.0043)
Post-secondary educ	-0.0427	-0.0384	-0.0437	-0.0394*	0.042	0.0418	0.037	0.0426**
	(0.0288)	(0.0279)	(0.0283)	(0.0207)	(0.0289)	(0.0283)	(0.0279)	(0.0206)
Post-secondary educ (spouse)	0.0242	0.0207	0.0145	0.0179	0.00429	0.00517	0.013	0.00645
	(0.0309)	(0.0290)	(0.0296)	(0.0214)	(0.0277)	(0.0279)	(0.0276)	(0.0211)
Rooms in house per head	-0.0235	-0.0238	-0.0253	-0.0241*	0.00847	0.0137	0.0133	0.0168
	(0.0171)	(0.0159)	(0.0170)	(0.0139)	(0.0195)	(0.0184)	(0.0193)	(0.0147)
Arab-Israeli	0.0877	0.0765	0.0469	0.0667	0.177***	0.184***	0.159***	0.177***
	(0.0612)	(0.0513)	(0.0607)	(0.0536)	(0.0631)	(0.0584)	(0.0598)	(0.0529)
Former USSR imm.	-0.0285	-0.0283	-0.0314	-0.0292	0.0101	0.0165	0.0154	0.019
	(0.0295)	(0.0299)	(0.0280)	(0.0243)	(0.0326)	(0.0326)	(0.0309)	(0.0254)
Constant	-0.753***		-0.504**		-1.085***		-0.930***	
	(0.1130)		(0.2040)		(0.1180)		(0.1710)	
Observations	1,726	1,726	1,726	1,726	1,729	1,729	1,729	1,729
R-squared	0.519		0.532		0.493		0.508	

*** p<0.01, ** p<0.05, * p<0.1; standard errors are clustered at the individual level. Columns (4) and (8) represent 2SLS specifications with a probit in both stages, here standard errors are bootstrapped, clustered at the individual level, number of repetitions=100,000; Average marginal effects are presented in the table for all probit specifications (columns (2) (4) (6) (8)).

Table 10: RDD estimation of retirement decisions

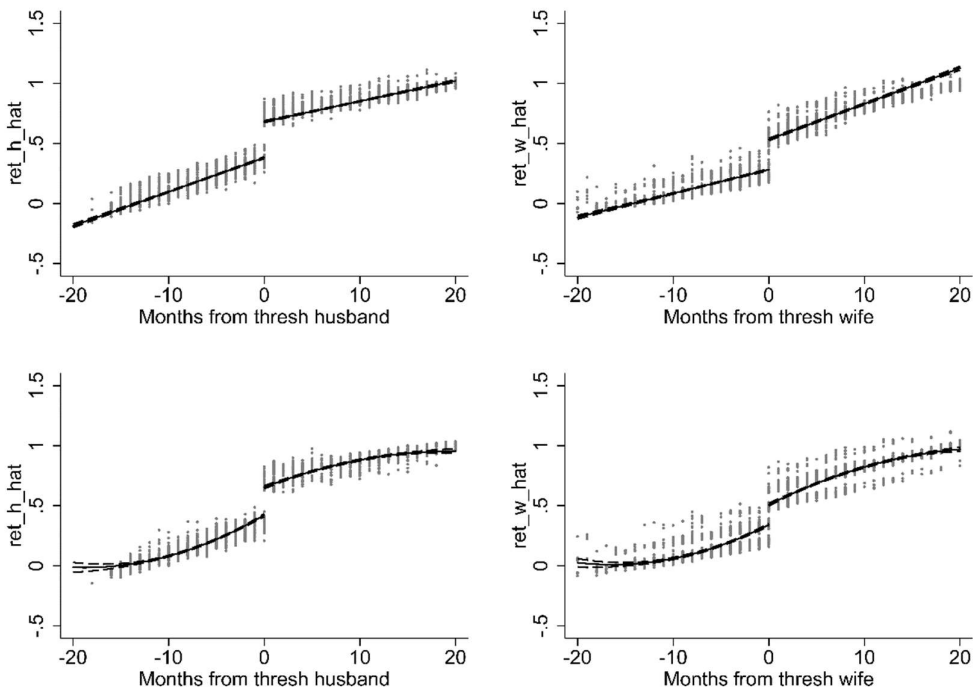
	Linear RD		Quadratic RD	
	Retired (H)	Retired (W)	Retired (H)	Retired (W)
VARIABLES	(1)	(2)	(3)	(4)
Eligible for retirement	0.375***	0.292***	0.233***	0.174***
	(0.047)	(0.043)	(0.060)	(0.049)
Spouse retired (instrumented)	0.118	0.155	-0.055	-0.00004
	(0.123)	(0.115)	(0.141)	(0.122)
Months from threshold	0.016	0.014	0.031	-0.008
	(0.019)	(0.017)	(0.024)	(0.020)
Months from threshold squared			0.003***	0.001
			(0.001)	(0.0004)
Months from threshold x Eligible	-0.011***	0.004	-0.028**	0.031***
	(0.004)	(0.004)	(0.014)	(0.011)
Months from threshold squared x Eligible			-0.004***	-0.002***
			(0.001)	(0.000)
Observations	1,726	1,726	1,726	1,726
R-squared	0.535	0.507	0.517	0.502

Spouse's retirement decisions are instrumented by the spouse's retirement eligibility status; included control variables: husband's and wife's education and age, housing density, and population group dummies; *** p<0.01, ** p<0.05, * p<0.1; standard errors are clustered at the individual level.

The jump of the probability to retire around the retirement eligibility cutoff is statistically significant for both males and females in both specifications. In the linear specification we find a 37.5% increase in the males' probability to retire when they become eligible for retirement, and the corresponding increase for females is 29.2%. In the quadratic specification, both jumps are smaller: 23.3% for males and 17.4% for females. The (instrumented) retirement status of the other spouse has no significant effect on the probability to retire for both males and females in both specifications.

Figure 5 presents a graphical illustration of the results. In general, the linear and quadratic specifications turn out with quite similar outcomes. The jump around the threshold is larger for males than it is for females; the probability to retire generally increases from left to right in all cases (probably also capturing the effect of age). It is interesting to note that for males, the slope appears to slightly flatten beyond the threshold, while for females the slope becomes steeper. This can be explained by the smaller response of females to their eligibility to retire, which seems to spread their retirement events over later time periods.

Figure 5: RDD Retirement plots



6. Conclusion

We studied the simultaneous retirement decisions of married couples using SHARE panel data for Israeli citizens around the age of retirement. Coordinated retirement decisions by married couples could be negatively correlated due to income effects, or positively correlated due to leisure complementarity. In addition, retirement decisions potentially depend on the relative bargaining power of each spouse. To deal with the endogeneity of spouse's retirement, we used the retirement eligibility status as an instrument for actual retirement. Due to a legislatorial change in the ages of retirement eligibility which was passed in 2004, and was gradually implemented by cohorts, we observe a substantial heterogeneity in the month (and age) of retirement eligibility among individuals with different birth dates. We complement the IV regression specification with a regression discontinuity design around the dates of retirement eligibility of the spouses.

In the linear IV regression specification we found that for dual income households, the likelihood of both male and female individuals to retire increases with the retirement of their spouse, supporting the leisure complementarity explanation. However, in the probit IV regressions and in the regression discontinuity analysis, the cross effects dis not come up statistically significant. Our results are therefore inconclusive, and highlight the need to validate empirical results with alternative estimation methods.

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Appendix

Table A1: Event study results of the retirement choice dynamics, months around retirement eligibility

VARIABLES	(1) Retired (H)	(2) Retired (W)	VARIABLES	(1-cont.) Retired (H)	(2-cont.) Retired (W)
Retired spouse	0.160***	0.161***	0	0.320***	0.013
	(0.034)	(0.034)		(0.091)	(0.081)
Age (W)	-0.005*	0.024**	1	0.339***	0.258***
	(0.003)	(0.010)		(0.086)	(0.083)
Age (H)	0.021*	-0.001	2	0.415***	0.111
	(0.012)	(0.003)		(0.085)	(0.085)
Educ (H)	-0.01	0.009	3	0.364***	0.190**
	(0.011)	(0.010)		(0.098)	(0.087)
Educ (W)	-0.003	0.003	4	0.441***	0.094
	(0.012)	(0.010)		(0.092)	(0.093)
Housing density	-0.027	0.021	5	0.367***	0.318***
	(0.018)	(0.021)		(0.109)	(0.094)
Arab Israeli	0.045	0.154***	6	0.476***	0.209*
	(0.059)	(0.058)		(0.104)	(0.110)
Former USSR immigrant	-0.036	0.022	7	0.362***	0.251**
	(0.030)	(0.032)		(0.117)	(0.105)
			8	0.371***	0.299**
-14	-0.011	0.095		(0.126)	(0.116)
	(0.165)	(0.141)	9	0.398***	0.243**
-13	-0.04	0.066		(0.130)	(0.123)
	(0.152)	(0.130)	10	0.335**	0.294**
-12	-0.006	-0.007		(0.139)	(0.123)
	(0.150)	(0.116)	11	0.392***	0.303**
-11	-0.024	-0.016		(0.143)	(0.127)
	(0.136)	(0.112)	12	0.340**	0.244*
-10	0.082	0.009		(0.156)	(0.136)
	(0.132)	(0.106)	13	0.265	0.301**
-9	-0.049	-0.016		(0.166)	(0.143)
	(0.116)	(0.103)	14	0.309*	0.234
-8	-0.068	-0.009		(0.178)	(0.149)
	(0.107)	(0.094)	15	0.364**	0.226
-7	-0.03	0.078		(0.183)	(0.162)
	(0.099)	(0.097)	16	0.365*	0.269*
-6	-0.038	-0.127		(0.192)	(0.162)
	(0.090)	(0.080)	17	0.263	0.257
-5	-0.046	-0.009		(0.208)	(0.171)
	(0.086)	(0.073)	18	0.282	0.187
-4	0.024	0.041		(0.222)	(0.182)
	(0.080)	(0.080)	19	0.3	0.18
-3	0.016	0.011		(0.227)	(0.191)
	(0.083)	(0.081)	20	0.232	0.029
-2	-0.013	-0.064		(0.266)	(0.229)
	(0.083)	(0.075)			
Observations	1,726	1,726	Observations	1,726	1,726
R-squared	0.569	0.54	R-squared	0.569	0.54
Month-Year FE	Yes	Yes	Month-Year FE	Yes	Yes

*** p<0.01, ** p<0.05, * p<0.1; standard errors are clustered at the individual level.