Joint Retirement Decisions of Married Couples and their Effect on Food Expenditure

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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. We subsequently study the effects of those retirement decisions on food expenditures. To deal with the endogeneity of retirement choices, we use the legal retirement 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 legal retirement date for individuals in our sample. For dual income households, we found that the likelihood of both male and female individuals to retire increases with the retirement of their spouse, supporting the leisure complementarity hypothesis. In addition, husband's retirement reduced expenditure on food consumed at home, while wife's retirement had no significant effect on food expenditure. In single income households the negative effect of the husband's retirement disappears. This may be due to changing roles of husbands in home production after retirement in dual income households, but not in single income households. We found a negative effect of retirement of single males on food consumed at home but not of retirement of single females. We conclude that the effect of retirement on food expenditures is mainly due to increased home production of meals, reducing the monetary cost of meals.

1 Introduction

Population aging is widespread in developed countries, including Israel, as a result of increased longevity and decreased fertility. Concurrently, the standard of living of the elderly population receives more public attention. Retirement is a critical point in the life cycle that is most relevant for well-being, because after retirement, individuals and families experience a change in their income portfolio as well as in their time availability. According to the classical life-cycle model, consumption should not be affected by expected income changes, and post-retirement income changes are pretty much expected. Hence, if consumption declines after retirement, as has been found in many studies (the retirement consumption puzzle), it may be due to liquidity constraints that lead to sub-optimal savings, or to inadequate financial planning. However, in an augmented life-cycle model, a decline in consumption does not necessarily reduce utility, because it could be that time is substituted for purchased goods either as leisure or as an input in home production. Whatever the reason may be, post-retirement decline in consumption deserves public attention and perhaps policy response, because modern societies do not tolerate poverty among the elderly. The purpose of this research is to examine whether it is the retirement of the husband, the retirement of the wife, or both, that is most responsible for the decline in consumption in Israel.

In this paper, we study the effect of retirement on household food expenditure using SHARE panel data for Israeli citizens around the age of retirement. In dual income households, we observe the timing of retirement for both spouses, and household expenditure on food is declared in the before and after periods. In evaluating the effect of retirement by either spouse, we face a problem of endogeneity. This stems both from the simultaneous nature of retirement choices by both spouses, which could be negatively correlated due to income effects, or positively correlated due to leisure complementarity. Retirement decisions may also potentially depend on the relative bargaining power of each spouse. Moreover, the actual timing of retirement may depend on various employment and expected retirement conditions which may also relate to income and consumption. Michaud et al. (2019) deal with this problem by using stated retirement preferences of the spouses, regarding ther own and their spouse retirement. We take a different approach by using an instrumental variable for retirement, which allows us to use actual retirement choice data.

To deal with the endogeneity of timing of retirement, we use the legal timing of mandatory retirement as an instrument for actual retirement choices. Due to a legislatory change in the ages of mandatory retirement which was passed in 2004, and was gradually implemented by cohorts, we observe a substantial heterogeneity in the legal month (and age) of retirement among individuals with different birth dates. In the first stage analysis of retirement choices,

we use the individual's own legal date of retirement as an explanatory variable, and the actual timing of retirement of the spouse instrumented with the spouse's legal retirement date. In this way, we estimate the structural retirement equations.

For dual income households, we find that the likelihood of both male and female individuals to retire increases with the retirement of their spouse, supporting the leisure complementarity explanation. We find that the retirement of the husband reduces the total expenditure on food and the expenditure on food prepared at home. We do not find a statistically significant effect of the retirement of the wife on food expenditure. This can be either due to the husband's larger share in the household income, which has a greater income effect on the household at retirement. Alternatively, it might be due to the husband changing roles from providing outside of the house to in-house production, reducing the expenditure on food. However, the negative effect of husband's retirement on food expenditure is only found in dual income households, and not in households where the husband is the only provider. This could support the second explanation, if in dual earning households the wife had a dual role during the work years, the husband changes roles at retirement, while in single earning households, the husband does not take up production within the house at retirement. For single individuals, we also find a negative effect of retirement for males, and no effect for females.

The remainder of the paper is organized as follows, Section 2 surveys the relevant literature, Section 3 provides a brief policy background, Section 4 presents the data used in our analysis, Section 5 describes the empirical methodology, Section 6 presents the results and Section 7 concludes.

2 Literature review

Many empirical studies were able to identify between 4% and 20% drop in consumption after retirement in different countries. Hamermesh (1984) explained that some households simply do not save enough for retirement. Blake (1998) found that the drop in consumption is stronger as workers rely more on private rather than public pensions. Dilnot, Disney and Johnson (1994) suggested that individuals over-estimate their post-retirement income, and this leads to sub-optimal savings. Banks, Blundell and Tanner (1998) suggested that work-related expenditures such as clothing and transportation drop after retirement, but found that this cannot explain the entire drop in overall consumption. They also suggested that people are exposed to new information about medical expenditures after they retire, because their social networks change in the direction of including older people, and this leads to higher post-retirement precautionary savings. Miniaci et al. (2003) supported, using Italian

data, the suggestion that work-related expenditures drop after retirement, but rejected the explanation based on over-estimation of post-retirement income. Battistin et al. (2009) also showed that work-related expenditures drop after retirement, and also showed that most of the drop in consumption is due to the drop in the number of children living with their retired parents.

On the other hand, Ameriks, Caplin and Leahy (2007) found that households actually expect their consumption to drop after retirement and that their expectations are pretty much correct on average. Some households expect, though, that their consumption will not drop and even increase. Aguiar and Hurst (2007a) found that while work-related expenditures and food expenditures declined after retirement, leisure-related expenditures such as entertainment and charity contributions increased. Further, Aguiar and Hurst (2007b) showed that the decline in food expenditures does not mean buying less food, but rather spending more time on buying more wisely. This was also the conclusion of Chen et al. (2017), who found that food expenditures by retired males declined by about a half after retirement, but the quantity of calories consumed remained the same. Hurd and Rohwedder (2008) suggested that more time is spent on home production after retirement, replacing purchased goods. Smith (2006) found that food expenditures decline significantly after retirement only when retirement is involuntary and forced by health problems or disability, and when the retirees are less educated. Within this group, the decline in food expenditures is stronger for those who are not eligible for occupational pensions.

Borella, Moscarola and Rossi (2014) also differentiated between voluntary and involuntary retirement. They also differentiated between retirees with different levels of education and wealth. They found that consumption declined by about 4% after retirement in Italy for both voluntary and involuntary retirees, but retirees with high levels of education and wealth did not experience the decline. When wealth and education were interacted, it was found that consumption dropped by 8% for retirees with low levels of education and wealth, retirees with low education and high wealth did not experience a drop in consumption, and those with high levels of education and low wealth lost 10% of consumption after retirement, but only when retirement was involuntary. These results indicate that the drop in consumption after retirement is not homogeneous.

Bernheim, Skinner and Weinberg (2001) found that post-retirement consumption declines more for households that saved less, and in particular for households who had lower access to pension and social security payments. Hurd and Rohwedder (2008) found that post-retirement consumption remained unchanged or even increased for households in the upper half of the wealth distribution, while it declined for households in the lower half of the wealth distribution. Fisher and Marchand (2014) examined the changes in consumption

after retirement along the distribution of pre-retirement consumption, and found that the drop in consumption occurred only at the upper part of the distribution, and it increased with pre-retirement consumption. This implies that consumption, and perhaps also social welfare, becomes less unequal after retirement.

The studies mentioned above looked at retirement of the household head alone as the trigger for the change in consumption. The family context was examined by Lundberg et al. (2003), who found that the drop in consumption after retirement was significant only for married couples. They explained that women expect to live longer than their husbands and hence they have an incentive to reduce household expenditures while their husbands are alive, and they are able to do so because their husbands' bargaining power declines after they retire. Moreau and Stancaneli (2015) found quantitatively and statistically significant declines in food and clothing expenditures of couples after the husband retired, but food expenditure declined only when the wife was still working. They explained that non-working wives devoted more time to household production and hence their food expenditures were lower even before their husbands' retirement.

3 Reform background

The pension system in Israel went through rapid changes in the past two decades, reflecting the notion that individuals should bear the prime responsibility for their retirement futures (Achdut abd Spivak, 2010). The current pension system comprises of two main pillars: National insurance (old age allowances including income supplement allowance for eligible individuals) and the occupational pillar (mainly defined contribution occupational pensions). Occupational pensions are compulsory. Since 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 the employer is free to dismiss the employee who then becomes eligible to receive his pension allowance, 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 age for males was raised to 67 and the retirement age for females was raised to 62. In practice, the law was gradually applied to cohorts by month of birth, according to the schedules described in Table 1 and Table 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 high earning years, but this change was halted by legislation in 2017.

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

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).

The heterogeneity in the legal retirement age by cohort enables the identification of the effect of retirement on household consumption. Since individual retirement is highly (although not perfectly) correlated with the legal retirement date (while the latter is not related to consumption expenditure), in the sense that the likelihood to retire substantially increases at the month of legal retirement, this serves as a suitable instrumental variable for individual retirement choices.

4 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 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 ages 50 years and over 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, only one selected respondent per household must be 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 eligible in subsequent waves. New partners living in the households are also eligible 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: 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 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. Since the main analysis deals with household level consumption outcomes, 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 which do not contribute information on the gender dynamics of interest, 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, and single-income households where only the husband had an income prior to retirement and the

wife was defined as working in the household. Table 4 presents the number of women defined as working in the household out of all women in the sample, by population group. 84% of Arab-Israeli women are defined as working in the household, in this particular group the rate of participation in the work force is traditionally low among women. 18% of veteran-Jewish women in our sample are defined as working in the household, and only 3% among former USSR immigrants. The low percentage among 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 4: Females declared as working at home, by population group

Work at home / population group	Veteran Jewish	Arab-israeli	FUSSR imm.	Total
0	1,614	77	413	2,104
1	366	406	14	786
% work at home of total	*18%*	*84%*	*3%*	*27%*
Total	1,980	483	427	2,890

Tables 5 and 6 present summary statistics of the variables used in our analysis, for dual- and single-income households, respectively. The (ln) food expenditure (both within the household and in total) is slightly lower in single-income households. The share of households who ate outside of the household (the expenditure on food outside of the house was declared higher than zero) is also slightly lower in single-income households. The average number of rooms per head is also lower in single income households, 1.56 compared to 1.8 for dual income. 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 less educated on average but the males have a higher rate of post-secondary education (21%) compared to females (8%). The ages of both spouses are on average lower in the single-income household group, for an unknown reason. Again, the share of Arab-Israeli households is substantially higher in single-income households (43% vs. 2% in single income households) and the share of former USSR immigrants is substantially higher in dual income households (21% vs. 2% in single income households).

Table 5: Household summary statistics, dual-income households

Variable	Obs	Mean	Std. Dev.	Min	Max
ln food expenditure	1,404	5.52	0.653	-2.14	8.53
ln food at home expenditure	1,484	5.43	0.659	-2.14	8.52
Eat outside	1,517	0.54	0.498	0	1
Retired by law (H)	1,726	0.50	0.500	0	1
Retired by law (W)	1,726	0.57	0.495	0	1
Retired (H)	1,726	0.52	0.500	0	1
Retired (W)	1,726	0.51	0.500	0	1
Age (H)	1,726	67.71	9.231	49.17	94.08
Age (W)	1,726	64.04	9.290	40.58	91.75
Post-scondary educ (H)	1,726	0.52	0.500	0	1
Post-scondary educ (W)	1,726	0.51	0.500	0	1
Rooms in house per head	1,726	1.80	0.692	0.17	5.75
Arab-Israeli	1,726	0.02	0.156	0	1
Former USSR imm.	1,726	0.21	0.407	0	1

Table 6: Household summary statistics, single-income households

Variable	Obs	Mean	Std. Dev.	Min	Max
ln food expenditure	477	5.29	0.73	2.74	8.72
ln food at home expenditure	506	5.20	0.73	2.04	8.06
Eat outside	512	0.45	0.50	0	1
Retired by law (H)	568	0.46	0.50	0	1
Age (H)	568	66.84	9.45	48.67	93
Age (W)	568	62.71	9.56	37.33	91.92
Post-scondary educ (H)	568	0.21	0.40	0	1
Post-scondary 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	0.50	0	1
Former USSR imm.	568	0.02	0.16	0	1

Table 7: Actual retirement and legal retirement status, 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%

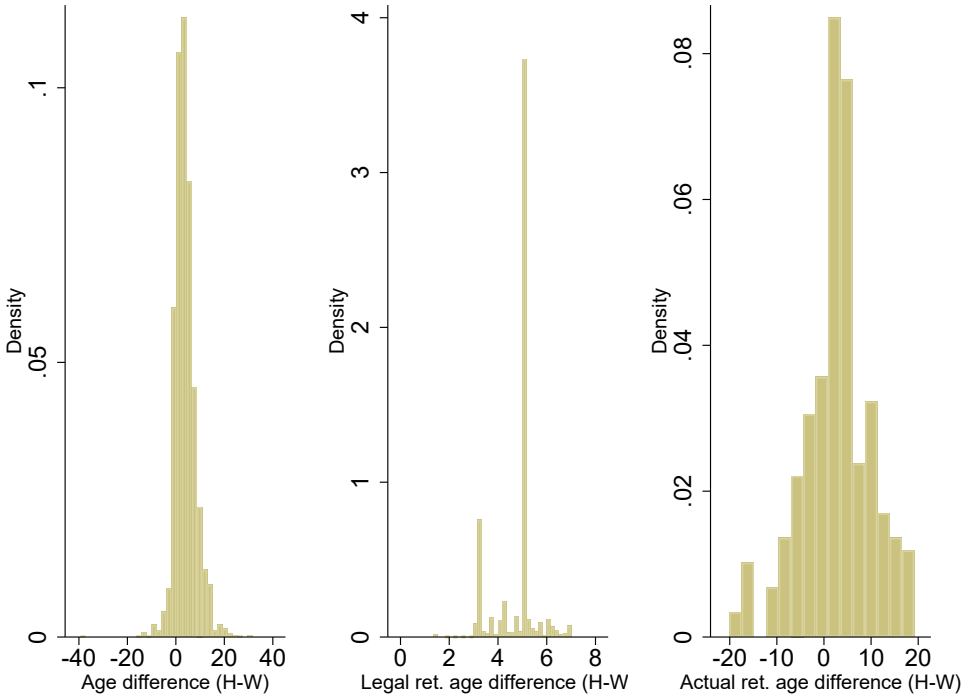
Actual retirement status is defined as retired for individuals who reported "retired" as their current job situation. Other statuses: "employed/self-employed", "unemployed", "permanently sick/disabled", "homemaker" and "other", were considered not retired. To define an individual's legal retirement eligibility we construct a new variable "Retired by law" taking the value 1 if the individual's age at the time of the interview exceeds their legal retirement age according to the reform (Tables 1 and 2), and 0 otherwise. Table 7 presents actual retirement status of the individuals in our data by their legal retirement status and by gender. There is an obvious correlation between the legal status and the actual retirement choice. For males, 86% of eligible individuals have retired, and 83% of non-eligible individuals have not retired. Females, both eligible and non-eligible, retired less often then men. 79% of eligible females retired, and 86% of non-eligible females did not retire.

Figure 1 presents histograms of the age difference among couples (husband's age minus wife's age) and the differences in the legal and the actual retirement ages (given that both spouses retired during the period of analysis), and Table 8 presents the corresponding summary statistics. The average difference in age between husband and wife in our data is 3.67 years in favor of the husband and the average legal retirement age difference is 4.78 years in favor of the husband. The average difference in the actual retirement age is lower, at 2.93, which implies a tendency to retire closer to the spouse's retirement.

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

Variable	Obs	Mean	Std. Dev.	Min	Max
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
Actual retirement age difference	193	2.93	7.29	-20.08	19.17

Figure 1: Age differences and retirement age differences between spouses



The figure on the left is a histogram of the age difference between husband and wife. A large portion of the density is in the area of several years in favor of the husband (the mean is 3.67 years, std 3.83). On the right is a histogram of actual retirement age difference. A striking mass is at around five years in favor of the husband, which corresponds with the difference in the legal eligibility status of men and women (the mean difference is 4.78 years, std 0.72), which is shown in the middle figure.

5 Methodology

Individual retirement choices may be endogenouse both with regard to the spouse's retirement choice, for married couples, and with regard to consumption expenditure. 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. To the extent that consumption expenditure relates to income, the timing of retirement may be chosen at the time most desirable considering work related conditions and the expected income after retirement.

In order to deal with these concerns regarding the identification of the effect of spouses' retirement on household consumption, we use each spouse's legal retirement age as an instrumental variable for actual retirement.

5.1 Retirement choices

In the retirement choice analysis we use two structural retirement equations, for males and females, where the retirement choice of an individual depends on the legal eligibility status of the individual for retirement at the time of the survey which we consider to be exogenous, and on the retirement choice of the spouse, which is considered endogenous. To deal with the endogeneity of the spouse's retirement status, we use the spouse's legal eligibility status for retirement as an instrument. The structural equations are specified in equations (1) and (2):

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

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

where $Retired_{Ht}$ and $Retired_{Wt}$ stand for the retirement status of husband and wife, respectively. $Eligible_{Ht}$ and $Eligible_{Wt}$ stand for the legal eligibility of husband and wife. X_{Ht} and X_{Wt} 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. ϵ_{Wt} 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 models are shown in equations (3) and (4). Here we let retirement choices depend only on the exogenous eligibility statuses of the individual and of the spouse, and the additional individual and household characteristics:

$$Retired_{Ht} = \alpha_0 + \alpha_1 Eligible_{Ht} + \alpha_2 Eligible_{Wt} + \alpha_3 X_{Ht} + \alpha_4 X_{Wt} + \alpha_5 Xit + \epsilon_{Ht} \quad (3)$$

$$Retired_{Wt} = \gamma_0 + \gamma_1 Eligible_{Wt} + \gamma_2 Eligible_{Ht} + \gamma_3 X_{Wt} + \gamma_4 X_{Ht} + \gamma_5 Xit + \epsilon_{Wt} \quad (4)$$

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

5.2 Expenditure equation

To estimate the household expenditure equation as a function of both retirement statuses, of the husband and of wife, we use the models for retirement choices as first stage equations. This way, we take advantage of the legal eligibility statuses as instruments for the otherwise endogenous retirement choices. The second stage expenditure equation is then estimated at

the household level, taking the following form:

$$lexp_{it} = \beta_0 + \beta_1 Retired_H + \beta_2 Retired_W + \beta_3 X_{Ht} + \beta_4 X_{Wt} + \beta_5 X_{it} + \epsilon_{it} \quad (5)$$

Here, $lexp_{it}$ is (log) per resident food expenditure of household i at time t. $Retired_H$ and $Retired_W$ are retirement statuses of the husband and the wife. Again, we include husband, wife and household characteristics and cluster the error terms at the husband level. For the 2SLS procedure, in specifications where the first stage is a probit equation, or is a 2SLS on its own, we obtain standard errors using empirical bootstrap.

6 Results

6.1 Event studies

To illustrate the appropriateness of the individual's legal retirement age as an instrument for actual retirement, we conduct an event studies analysis, looking at the effects of time-dummies around the month of gaining legal retirement eligibility, on the probability of actual retirement. This helps to shed light on the dynamics of the choice to retire around this event. We define dummy variables for the months since entering the legal retirement age. This timing is different for every individual, according to their age and their cohort in the 2004 retirement law. One month prior to the actual month of eligibility (t=-1) is chosen as the base-level, and the coefficients for the other time periods (t<-1 or t>-1), obtained from probit regressions, are relative to this period.The full regression results for both husbands and wives are shown in table 9.

Figure (2) plots the coefficients for these dummies from the retirement LPM 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 legal retirement 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 gaining eligibility and then returns to being not significantly different than one month prior to gaining eligibility. Figure 3 presents the coefficients from a similar specification 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 there is an increased 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 legal retirement status and actual retirement choices, and support our choice of the legal retirement date as an instrumental variable for retirement.

Table 9: Retirement choice dynamics, months around legal eligibility

VARIABLES	(1) Retired (H)	(3) 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)	-0.010	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 immig.	-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	-0.040	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	-0.030	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	0.300	0.180
-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	0.540	R-squared	0.569	0.540
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.

Figure 2: Months to legal eligibility effect on probability to have retired, husband

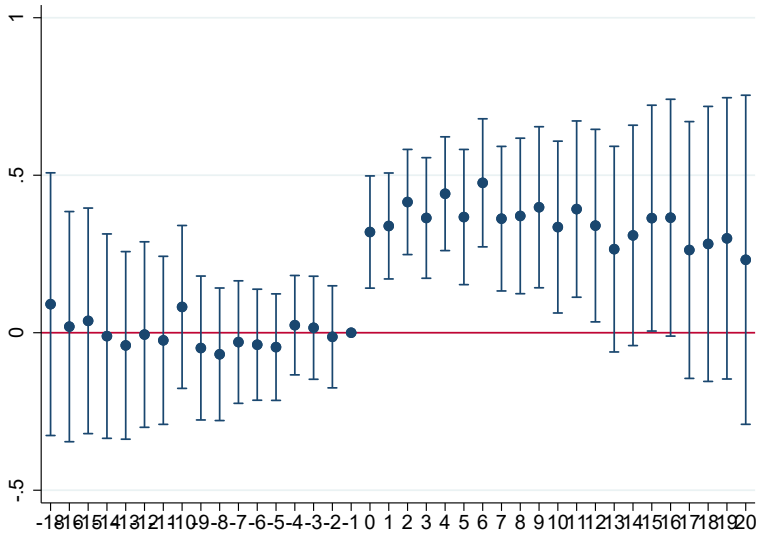
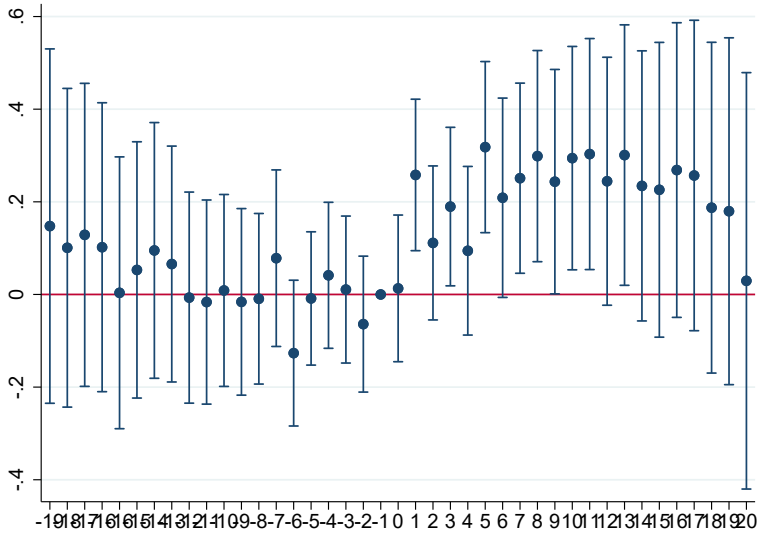


Figure 3: Months to legal eligibility effect on probability to have retired, wife



6.2 Retirement choices

First we present results on retirement choices of spouses regressions on own legal eligibility status and the eligibility or retirement status of the spouse (the reduced form equations), for dual income households (Table 10). Column 1 and column 5 present OLS (LPM) regressions, for males and females respectively, of retirement status, on the exogenous variables of own and spouse legal retirement statuses. Own eligibility increases the probability to retire by 39.6% in males, and by 29.2% in females. Spouse's eligibility increases the probability to retire by 6.8% in males and by 8.1% in females. Age increases the probability to retire by 1.76% in males and by 1.58% in females. The age of the spouse does not significantly affect retirement in both genders, beyond their legal eligibility status. Own and spouse post-secondary education has no significant effect for both genders. Belonging to the Arab-Israeli population group increases the probability to retire for females by 17.7% compared to the veteran-Jewish group, while the former USSR immigrants group is not statistically different from the comparison group. No significant difference is found between the population groups for males.

Columns (2) and (6) present average marginal effects from similar specifications using probit regressions. Compared to the LPM, both own and spouse eligibility statuses have slightly smaller effects. Own eligibility increases probability of retirement for males by 17.3% and by 11.9% for females. In this specification the spouses' eligibility is not significant for both genders. The effects for the control variable are very similar to those obtained in the LPM. Columns (3) and (7) present 2SLS specifications where retirement status depends on own eligibility status and the actual retirement status of the spouse, instrumented by their eligibility status (the structural equations). The first stages for these regressions are, in effect, represented by the LPM regression of the opposite gender. The effects of own eligibility status on retirement choices is very similar to the ones obtained in the LPM (37.8% for males and 11.9% for females). The effect of the actual spouse retirement status is, expectedly, much larger than the effect of the spouse's eligibility status. For males it is 23%, which is still smaller than the effect of own eligibility status. For females, it is 20.6% which is close in magnitude to the effect of own eligibility status. The results for the additional control variables are again similar to the previous specifications. Columns (4) and (8) present similar 2SLS 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 LPM 2SLS, we again obtain slightly smaller effects for own eligibility status and for the spouse's actual retirement status. Own eligibility increases the probability to retire by 17.2% for males and by 11.1% for females. As in the probit, spouses' retirement are again not significant in these specifications. Results for other controls are

Table 10: Retirement choices (first stage equations), double-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
			(0.126)	(0.0945)			(0.110)	(0.0867)
Age	0.0176***	0.0197***	0.0165***	0.0194***	0.0158***	0.0199***	0.0162***	0.0203***
	(0.00324)	(0.00362)	(0.00316)	(0.00318)	(0.00290)	(0.00383)	(0.00277)	(0.00321)
Age (spouse)	-0.00160	-0.000574	-0.00524	-0.00121	0.00484	0.00527	0.00120	0.00288
	(0.00302)	(0.00342)	(0.00389)	(0.00383)	(0.00304)	(0.00352)	(0.00392)	(0.00429)
Post-secondary educ	-0.0427	-0.0384	-0.0437	-0.0394*	0.0420	0.0418	0.0370	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	0.0130	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	0.0190
	(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***	
	(0.113)		(0.204)		(0.118)		(0.171)	
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)).

similar to the LPM 2SLS results.

6.3 Consumption patterns

Now we present results for the second stage equations, estimating the effect of retirement on household consumption expenditure. Table 11 present the consumption equations for the dual income households. The outcome variables are the (log) food expenditure, (log) food expenditure at home and the probability to eat outside (or declare a non-zero expenditure on food outside the house). Columns (1)-(3) present OLS regressions for the food expenditure outcomes and probit average marginal effects for the probability to eat outside, on the exogenous variables of legal retirement status. The husband's legal retirement eligibility is found to have a negative effect on food expenditure in the house and total food expenditure of 12.4%. The wife's legal retirement status is not found to have a significant effect on consumption. Both do not present a significant effect on the probability to eat outside. Education levels, rooms per head and belonging to the Arab-Israeli population group are found to increase the probability to eat outside, while belonging to the former USSR immigrants group decreases the probability to eat outside. Columns (4)-(6) present the 2SLS results for the same outcome variables, using actual retirement choices instrumented by the legal retirement statuses. Actual retirement of the husband is not found to have a larger effect on food expenditure in the house of 42.2 %, and 44.5% on total food expenditure. Again, no significant effect is found for the retirement of the wife. Rooms per head in the household, as a measure of wealth, is found to have a positive effect on expenditure of between 24-38% in all specifications.

Table 12 presents the expenditure equations results for the single-income households. Rooms per head are again found to have a positive effect on expenditure for all outcomes. However now, the legal retirement of the husband has no significant effect on food expenditure. Belonging to the Arab-Israeli population group has a negative effect on expenditure on food within the home, and a positive effect on the probability to eat outside. Belonging to the former USSR immigrants group has a negative effect on the probability to eat outside.

Table 11: Expenditure equations - 2SLS, dual-income households

VARIABLES	(1) Eat outside (Probit)	(2) lfood home (OLS)	(3) lfood (OLS)	(4) Eat outside (IV-Probit)	(5) lfood home (IV)	(6) lfood (IV)
Retired by law (H)	-0.018	-0.124**	-0.124**			
	(0.043)	(0.052)	(0.055)			
Retired by law (W)	0.012	0.017	0.027			
	(0.040)	(0.051)	(0.054)			
Retired (H)				-0.351	-0.422**	-0.445**
				(0.442)	(0.189)	(0.197)
Retired (W)				-0.013	0.131	0.175
				(0.515)	(0.220)	(0.229)
Age (H)	-0.006	0.008*	0.006	-0.008	0.016**	0.015**
	(0.004)	(0.004)	(0.005)	(0.017)	(0.007)	(0.007)
Age (W)	-0.003	-0.003	-0.001	-0.011	-0.006	-0.004
	(0.003)	(0.004)	(0.005)	(0.016)	(0.007)	(0.008)
Post-scondary educ (H)	0.095***	-0.012	0.02	0.248**	-0.043	-0.021
	(0.029)	(0.035)	(0.036)	(0.097)	(0.038)	(0.039)
Post-scondary educ (W)	0.081***	-0.025	-0.008	0.190*	-0.035	-0.015
	(0.031)	(0.036)	(0.036)	(0.101)	(0.041)	(0.040)
Rooms in house per head	0.093***	0.349***	0.384***	0.246***	0.347***	0.383***
	(0.023)	(0.028)	(0.030)	(0.077)	(0.032)	(0.034)
Arab-Israeli	0.150**	-0.092	0.098	0.714***	-0.018	0.232
	(0.068)	(0.114)	(0.151)	(0.272)	(0.128)	(0.176)
Former USSR imm.	-0.383***	0.005	-0.048	-1.209***	0.005	-0.051
	(0.037)	(0.048)	(0.047)	(0.126)	(0.051)	(0.050)
Constant		4.492***	4.520***	0	4.258***	4.299***
		(0.204)	(0.214)	(0.000)	(0.368)	(0.385)
Observations	1,735	1,684	1,594	1,517	1,484	1,404
R-squared		0.138	0.179		0.106	0.143

Standard errors in parentheses are clustered at the husband id level; $^{***}p < 0.01,^{**}p < 0.05,^{*}p < 0.1$

Table 12: Expenditure equations - 2SLS, single earning households

VARIABLES	(1) lfood	(2) lfood-home	(3) Eat out
Retired by law (H)	-0.086	-0.119	-0.016
	(0.109)	(0.102)	(0.076)
Age (H)	0.016**	0.010	-0.002
	(0.008)	(0.007)	(0.006)
Age (W)	-0.008	-0.000	-0.004
	(0.006)	(0.006)	(0.005)
Post-secondary Education (H)	-0.008	-0.058	0.089
	(0.071)	(0.066)	(0.062)
Post-secondary Education (W)	0.045	-0.008	0.167
	(0.113)	(0.110)	(0.102)
Housing density	0.564***	0.483***	0.173***
	(0.048)	(0.047)	(0.033)
Population group:			
Arab Israeli	-0.105	-0.208***	0.213***
	(0.071)	(0.067)	(0.049)
Former USSR	0.090	0.052	-0.286**
	(0.127)	(0.113)	(0.114)
Constant	3.922***	3.960***	0.473*
	(0.336)	(0.310)	(0.258)
Observations	477	506	512
R-squared	0.355	0.320	0.102

Standard errors in parentheses are clustered at the husband id level;
$^{***}p < 0.01,^{**}\, p < 0.05,^{*}\, p < 0.1$

6.4 Results for singles

Up until this point we considered married individuals only. For a matter of comparison, we now present results for individuals who are declared single at the time of the survey. Table 13 presents retirement choices as a function of own legal retirement status, age, education, housing density and population group. Retirement is strongly related to the legal retirement age for both males and females. Retirement is also positively related to age for males but not for females. Post secondary education increases females probability to retire. Belonging to the Arab-Israeli population group reduces the probability of females to retire (contrary to the situation for married females) and increases the probability for males to retire. Belonging to the former USSR immigrants group increases the probability to retire for single females but not for males, compared to the comparison group.

In the food expenditure results (Table 14), the retirement of single males has a negative effect on food expenditure for within the home and in total, and positive effect on the probability to eat outside. For women, retirement has a positive effect on food expenditure,

and no effect on the probability to eat outside.

Table 13: Retirement choices, singles

VARIABLES	(1) retired (M)	(2) retired (F)
Retired by law	0.562***	0.493***
	(0.078)	(0.047)
Age	0.007**	0.003
	(0.003)	(0.002)
Post-secondary education	0.042	0.094***
	(0.051)	(0.034)
Housing density	0.061	-0.058
	(0.048)	(0.041)
Arab-Israeli	0.172*	-0.349***
	(0.089)	(0.053)
Former USSR imm.	0.039	0.138***
	(0.061)	(0.034)
Constant	-0.550**	0.057
	(0.216)	(0.159)
Observations	478	1,346
R-squared	0.497	0.264

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

Table 14: Food Expenditure, singles (IV)

VARIABLES	(1) lfoodhome (M)	(2) lfoodhome (F)	(3) lfood (M)	(4) lfood (F)	(5) eatout (M)	(6) eatout (F)
Retired	-0.214**	0.132**	-0.183*	0.135**	1.655***	-0.657
	(0.098)	(0.056)	(0.098)	(0.055)	(0.521)	(1.077)
Unemployed	-0.015	0.099**	-0.014	0.099**	0.437	-0.762
	(0.057)	(0.042)	(0.056)	(0.042)	(0.398)	(0.775)
Age	0.008***	0.001	0.007***	0.001	-0.052***	0.008
	(0.002)	(0.001)	(0.002)	(0.001)	(0.013)	(0.018)
Post-secondary education	0.027	0.023	0.020	0.022	0.493	0.220
	(0.032)	(0.014)	(0.030)	(0.014)	(0.376)	(0.317)
Housing density	0.244***	0.188**	0.192**	0.183**	1.414***	2.101***
	(0.069)	(0.084)	(0.076)	(0.086)	(0.376)	(0.343)
Arab-Israeli	-0.144	0.070***	0.051	0.068***	-0.234	
	(0.111)	(0.024)	(0.132)	(0.024)	(0.918)	
Former USSR imm.	0.042	0.009	0.036	0.009	-0.658*	-0.145
	(0.037)	(0.017)	(0.038)	(0.018)	(0.370)	(0.427)
Constant	4.362***	4.790***	4.651***	4.907***		
	(0.222)	(0.216)	(0.235)	(0.220)		
Observations	457	1,336	454	1,334	462	1,284
R-squared	0.120	0.028	0.064	0.020		

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

7 Conclusion

We studied the effect of retirement on household food expenditure using SHARE panel data for Israeli citizens around the age of retirement. In dual income households, we observe the timing of retirement for both spouses, and household expenditure on food is declared in periods in the before and after periods. In evaluating the effect of retirement by either spouse, we face a problem of endogeneity. This stems both from the simultaneous nature of retirement choices by married couples, which could be negatively correlated due to income effects, or positively correlated due to leisure complementarity. Retirement decisions may also potentially depend on the relative bargaining power of each spouse.

To deal with the endogeneity of timing of retirement, we used an instrumental variable approach, using the legal age of mandatory retirement as an instrument for actual retirement choices. Due to a legislatorial change in the ages of mandatory retirement which was passed in 2004, and was gradually implemented by cohorts, we observe a substantial heterogeneity in the legal month (and age) of retirement among individuals with different birth dates. In the first stage analysis of retirement choices, we used the individual's own legal date of retirement as an explanatory variable, and the actual timing of retirement of the spouse instrumented

with the spouse's legal retirement date. In this way, we estimated the structural retirement equations.

For dual income households, we found that the likelihood of both male and female individuals to retire increases with the retirement of their spouse, supporting the leisure complementarity explanation. We found that the retirement of the husband reduces the total expenditure on food and the expenditure on food prepared at home. We do not find a statistically significant effect of the retirement of the wife on food expenditure. This can be either due to the husband's larger share in the household income, which has a greater income effect on the household at retirement. Alternatively, it might be due to the husband changing roles from providing outside of the house to in-house production, reducing the expenditure on food. However, the negative effect of husband's retirement on food expenditure is only found in dual income households, and not in households where the husband is the only provider. This could support the second explanation, if in dual earning households the wife had a dual role during the work years, the husband changes roles at retirement, while in single earning households, the husband does not take up production within the house at retirement. For single individuals, we also found a negative effect of retirement for males, and no effect for females.

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