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Does Consumption Decrease After Retirement, and for Whom?

by

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Abstract

This paper examines the decline in consumption after retirement by quantiles of the consumption distribution, by gender, by pre-retirement employment status and by age. The retirement-induced decline in consumption is larger among those who were employees than among those who were self-employed, but only for males. In contrast, those who did not work do not experience a decline in consumption when they cross the official retirement age, and in some cases their consumption actually increases. Without allowing for age-specific effects, it was found that the decline in consumption is largest in the middle of the consumption distribution, while after allowing the decline in consumption to depend on age, it was found that the decline is largest at lower levels of consumption and becomes more moderate as the person climbs along the consumption distribution. These results are consistent with the hypothesis that inadequate savings are a major reason for the decline in consumption after retirement.

Introduction

The population of developed countries, including Israel, is becoming older 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. According to the classical life-cycle model, consumption is not affected by expected income changes, and post-retirement income changes are to a large extent 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 the retirement consumption puzzle exists in Israel, and if it is, to quantify it and study its determinants. We will allow heterogeneous responses of expenditures to retirement by using quantile regression techniques. We will also allow heterogeneous responses by gender, by pre-retirement employment status, and by age. Heterogeneity is especially important for policy purposes, since policy response, if necessary, should focus on those population groups that are most vulnerable to the phenomenon.

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. 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, that 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.

Empirical methodology

This research adopts the empirical approach of Fisher and Marchand (2014). The idea is to use repeated cross-sectional data to create pseudo-cohorts of individuals born in the same year, and to follow them over time, before and after retirement. The advantage over Fisher and Marchand (2014) is that they focused on retirement of males only, while here retirement of both male and female are considered. An individual will be defined as retired if he/she is above the official retirement age (which is different for males and females and has increased over time) and has not worked in the previous three months. The basic equation that is estimated is the following:

$$(1)\quad Ln(C) = \alpha + \beta R + X\gamma + \varepsilon$$

where C is monthly consumption expenditures (or expenditures on a specific consumption category) per equivalent adult (measured in constant prices), R is a binary indicator of retirement status, and X is a matrix of explanatory variables including cohort dummies. In addition, quantile regressions are estimated in order to allow quantile-specific coefficients:

$$(2)\quad Ln(C) = \alpha_q + \beta_q R + X\gamma_q + \varepsilon$$

Equation (2) is estimated using Stata's "sqreg" command, allowing simultaneous estimation of the different quantile-specific coefficients. The simultaneous estimation is important because it enables testing equality of coefficients related to different quantiles.

Data

The data for this research were obtained from Household Expenditure Surveys in Israel for the years 1997-2012. Every two consecutive surveys were merged in order to guarantee a sufficient number of observations in each cohort. For example, the youngest cohort we define includes individuals who were 50-51 years old in 1997 or in 1998. This cohort was followed until they were 64-65 years old in 2011 or 2012, for a total of eight 2-year periods. For this cohort, only females have passed retirement age during that time span. The oldest cohort includes individuals who were 58-59 years old in 1997 or 1998 and 72-73 years old in 2011 or 2012. Including the cohorts in between, we will use a total of 5 cohorts. Younger and older cohorts were excluded from the analysis, because they are not observed both before and after the official retirement age. It should be noted that the official retirement age has increased over the sample period. The retirement age of males (females) was 65 (60) up to 2005, 66 (61) between 2005 and 2009, and 67 (62) since 2009. Table 1 summarizes the definition of the cohorts.

Table 1. List of cohorts and number of observations

Age	Cohort A	Cohort B	Cohort C	Cohort D	Cohort E	Sample size
50-51	1997-1998					906
52-53	1999-2000	1997-1998				1,586
54-55	2001-2002	1999-2000	1997-1998			1,995
56-57	2003-2004	2001-2002	1999-2000	1997-1998		2,564
58-59	2005-2006	2003-2004	2001-2002	1999-2000	1997-1998	3,002
60-61	2007-2008	2005-2006	2003-2004	2001-2002	1999-2000	2,978
62-63	2009-2010	2007-2008	2005-2006	2003-2004	2001-2002	2,901
64-65	2011-2012	2009-2010	2007-2008	2005-2006	2003-2004	2,883
66-67		2011-2012	2009-2010	2007-2008	2005-2006	2,099
68-69			2011-2012	2009-2010	2007-2008	1,504
70-71				2011-2012	2009-2010	1,013
72-73					2011-2012	544
Sample size	6,785	4,977	3,889	4,059	4,265	23,975

The fraction of retirees, according to the definition above, is 30% in the entire sample, and ranges from 26% among 60-61 year olds to 87% among 72-73 year olds. In addition to total expenditures, we analyze (separately) expenditures on major consumption categories including food, clothing, transportation and communication, education, leisure activities, health, housing, housing maintenance, and household goods. All types of expenditures are reported for the previous three months, are expressed in 2012 prices and are divided by standardized household size. Table 2 compares expenditures of retirees and non-retirees. Total expenditures of retirees are (unconditionally) 7% lower than that of non-retirees, and this is within the range of the estimates obtained in the literature. However, much of the difference is due to the lower expenditures on education, culture and entertainment as well as transportation and communication. It is likely that money expenditures on these items are substituted by time among retirees. On the other hand, housing and health expenditures are higher among retirees.

Table 2. Average expenditures among retirees and non-retirees (NIS per month)

Variable	**Retiree**	**Non-retiree**
Total expenditures*	5,657	6,074
Food*	916	892
Meals outside of home	202	207
Housing*	1,626	1,437
Home maintenance	591	596
Furniture and home equipment*	307	352
Clothing and shoes	236	240
Health*	482	409
Education, culture and entertainment*	512	692
Transportation and communication*	1,026	1,326
Other goods and services*	285	304

* Difference statistically significant at 1%.

Table 3 shows the explanatory variables used in the regression analysis as well as their means among retirees and non-retirees. All mean differences are significantly different from zero.

Table 3. Explanatory variables and their sample means

Variable	Retiree	Non-retiree
Male	0.25	0.56
Age	66.13	58.61
Married	0.69	0.82
Schooling (non-Haredi)*	10.78	12.45
Schooling (non-Haredi)*	0.11	0.26
Jewish	0.87	0.91
Center	0.44	0.46
More than one car	0.09	0.22
Rooms	3.69	4.06
Cohort A	0.09	0.36
Cohort B	0.11	0.24
Cohort C	0.17	0.15
Cohort D	0.25	0.13
Cohort E	0.35	0.10
Labor income	1,414.66	6,132.10
Non-labor income	5,163.29	3,234.04

* Haredi (ultra-orthodox) schooling is very different in terms of curriculum and labor market impact (Kimhi and Sandel, 2016), hence the variables were separated.

Results

Equation (1) was estimated by OLS for each expenditure item. Table 4 shows the coefficient of retirement status, indicating the percentage change in consumption after retirement, controlling for the other explanatory variables listed in Table 3. It can be seen that total expenditures decline by 3.5% after retirement. Housing and health expenditures decline by even higher rates after retirement, while food expenditures decline but at a lower rate than total expenditures. Expenditures on education, culture and entertainment increase after retirement, probably due to complementarity of these expenditures with free time.

Table 4. Percentage change in consumption after retirement, by expenditure item

Variable	Coefficient	Standard error
Total expenditures	-0.035**	(0.009)
Housing	-0.114**	(0.009)
Home maintenance	-0.077**	(0.012)
Health	-0.081**	(0.022)
Education, culture and entertainment	0.088**	(0.021)
Clothing and shoes	-0.012	(0.026)
Transportation and communication	0.025	(0.021)
Furniture and home equipment	-0.042	(0.035)
Meals outside of home	-0.041	(0.036)
Food	-0.029*	(0.010)
Other goods and services	-0.056*	(0.026)

Notes: Standard errors in parentheses. * statistically significant at 5%. ** statistically significant at 1%.

Up to here we have not conditioned on the pre-retirement labor market status of the people in the sample. We now want to estimate a separate retirement effect for people who are wage employees, self-employed or not employed before retirement. In order to do that we augment equation (1) as:

(3) $Ln(C) = \alpha + \beta_1 Salaried + \beta_2 Selfemployed + \beta_3 Notworking + X\gamma + \varepsilon$

Note that the β coefficients are expected to be of opposite sign to the previous results. The estimated β coefficients are shown in Table 5. These coefficients imply that the consumption of those who were not employed actually increase after retirement, while that of those who were working, decreased even more sharply than the earlier results implied. This shows the importance of controlling for pre-retirement employment status. Among the expenditure items, housing expenditures also decline the most among those who were working before retirement, while health expenditures increase after retirement, contrary to the earlier results but according to intuition, and this increase is particularly strong among those who were not employed.

Table 5. Percentage change in consumption after retirement, by expenditure item

Variable	**β_1 -** Salaried	**Standard error**	**β_2 –** Self employed	**Standard error**	**β_3 -** Not working	**Standard error**
Total expenditures	0.119**	(0.010)	0.108**	(0.014)	-0.024**	(0.010)
Housing	0.210**	(0.010)	0.236**	(0.013)	0.037**	(0.009)
Home maintenance	0.139**	(0.013)	0.274*	(0.017)	0.011	(0.012)
Health	-0.018	(0.024)	-0.045**	(0.031)	-0.136**	(0.022)
Education, culture and entertainment	0.070**	(0.030)	0.017	(0.038)	-0.022	(0.028)
Clothing and shoes	0.040	(0.024)	-0.036	(0.031)	-0.062**	(0.022)
Transportation and communication	0.149**	(0.039)	0.101*	(0.051)	-0.035	(0.037)
Furniture and home equipment	0.092**	(0.040)	0.197**	(0.050)	-0.022	(0.039)
Meals outside of home	0.060**	(0.012)	0.068**	(0.015)	0.005	(0.011)
Food	0.163**	(0.025)	0.102**	(0.032)	0.025	(0.023)
Other goods and services	0.115**	(0.029)	0.000	(0.038)	0.031	(0.027)

Notes: Standard errors in parentheses. * statistically significant at 5%. ** statistically significant at 1%.

Following Fisher and Marchand (2014), we now want to estimate the decrease in consumption after retirement along the consumption distribution. In addition, we want to allow for gender-specific retirement effects. For this purpose, we combine equations (2) and (3) and augment the model with interactions between gender and labor market status, as in equation (4), which is estimated simultaneously for all quantiles q.

(4) $\text{Ln}(C) = \alpha + \beta_{1q}\text{Male*Salaried} + \beta_{2q}\text{Male*Self-employed} + \beta_{3q}\text{Male*Notworking} + \beta_{4q}\text{Female*Salaried} + \beta_{5q}\text{Female*Self-employed} + \beta_{6q}\text{Female*Notworking} + X\gamma + \varepsilon$

The results are in Table 6. It is easy to see that the decline in consumption after retirement among those who worked is observed throughout the consumption distribution. However, it is largest in the center of the consumption distribution, at least for men. For women, the decline is largest in the center of the distribution only for women who were salaried employees before retirement. For those who were self-employed, the decline in consumption does not vary significantly along the consumption distribution (see Appendix Table A1 for significance tests).

Table 6. Percentage change in total expenditure after retirement, by gender and quantile

Quantile	**β_1 -** Salaried	**Standard error**	**β_2 –** Self employed	**Standard error**	**β_3 -** Not working	**Standard error**
Males						
P10	0.126**	(0.021)	0.066*	(0.028)	-0.108**	(0.020)
P20	0.155**	(0.021)	0.111**	(0.023)	-0.073**	(0.021)
P30	0.170**	(0.019)	0.114**	(0.021)	-0.060**	(0.019)
P40	0.160**	(0.016)	0.108**	(0.017)	-0.063**	(0.017)
P50	0.156**	(0.016)	0.119**	(0.020)	-0.058**	(0.019)
P60	0.163**	(0.018)	0.123**	(0.020)	-0.033	(0.018)
P70	0.135**	(0.020)	0.118**	(0.025)	-0.025	(0.018)
P80	0.111**	(0.024)	0.083**	(0.026)	-0.043**	(0.021)
P90	0.087**	(0.032)	0.066	(0.039)	-0.039	(0.026)
OLS	0.140**	(0.015)	0.107**	(0.018)	-0.045**	(0.015)
Females						
P10	0.052**	(0.016)	0.078**	(0.029)	-0.059**	(0.016)
P20	0.090**	(0.015)	0.101**	(0.025)	-0.035*	(0.015)
P30	0.105**	(0.013)	0.098**	(0.028)	-0.015	(0.015)
P40	0.104**	(0.013)	0.114**	(0.026)	-0.013	(0.014)
P50	0.111**	(0.014)	0.105**	(0.022)	0.009	(0.014)
P60	0.112**	(0.014)	0.113**	(0.041)	-0.000	(0.014)
P70	0.096**	(0.016)	0.137**	(0.034)	0.008	(0.018)
P80	0.074**	(0.016)	0.098**	(0.036)	0.017	(0.017)
P90	0.041	(0.022)	0.091*	(0.037)	0.039	(0.021)
OLS	0.102**	(0.012)	0.129**	(0.022)	0.004	(0.012)

Notes: Standard errors in parentheses. * statistically significant at 5%. ** statistically significant at 1%.

Comparing males and females, we can observe that among those who were salaried employees, consumption declines more sharply among men than among women throughout the consumption distribution. However, among those who were self-employed there is no difference between the decline in consumption of males and females (see Appendix Table A2 for significance tests).

Finally, we want to allow the change in consumption after retirement to depend on age. For this, we estimate a modified version of the quantile regression model, where we interact the pre-retirement employment status with age:

(5) $Ln(C) = \alpha + \beta_{1q}Salaried + \beta_{2q}Self\text{-}employed + \beta_{3q}Notworking + \beta_{4q}Age*Salaried + \beta_{5q}Age*Self\text{-}employed + \beta_{6q}Age*Notworking + X\gamma + \varepsilon$

Using the estimated coefficients, we compute the change in consumption after retirement for the mean wage in each quantile. The results are in Table 7. Similar to the previous results, it can be seen that for people who were working before retirement, either as employees or as self-employed, consumption declines after retirement for almost all quantiles of the consumption distribution, with a sharper decline for those who were employees, while the decline in consumption of females was not very different for employees and self-employed. In contrast, the consumption of those who did not work did not change dramatically, and in some cases even increased somewhat after retirement. Contrary to the previous results, we find that the decline in consumption is largest for the lowest consumption quantiles, and it becomes more moderate for higher quantiles. This raises the concern that consumption inequality increases after retirement, and indicates the need to redesign pension schemes so as to make them more progressive.

Table 7. Percentage change in total expenditure after retirement, by quantile, allowing for age-specific changes, computed for mean age

Quantile	**B_1 –** employee	**β_2 –** Self employed	**β_3 -** Not working
P10	0.153**	0.113**	-0.035
P20	0.156**	0.130**	-0.032
P30	0.167**	0.134**	-0.013
P40	0.166**	0.131**	-0.013
P50	0.156**	0.131**	-0.002
P60	0.127**	0.109**	-0.029**
P70	0.078**	0.094**	-0.043**
P80	0.045**	0.041**	-0.057**
P90	-0.017**	0.005**	-0.077**
OLS	0.106**	0.097**	-0.040**

Notes: * statistically significant at 5%. ** statistically significant at 1%.

Summary

This paper examined the decline in consumption after retirement. Previous research has shown that this decline may be different for different quantiles of the consumption distribution. We extended the analysis to differentiate the decline in consumption by gender, by pre-retirement employment status and by age, and found that each extension, in turn, makes a difference. Specifically, we found that the decline in consumption is larger among males who were employees than among males who were self-employed, while for females the decline in consumption was not very different for employees and self-employed. In contrast, those who did not work do not experience a decline in consumption, and in some cases their consumption actually increases after retirement. Without allowing for age-specific effects, it was found that the decline in consumption is largest in the middle of the consumption distribution, while after allowing the decline in consumption to depend on age, it was found that the decline is largest at lower levels of consumption and becomes more moderate as the person climbs along the consumption distribution. This result is opposite to the finding of Fisher and Marchand (2014) in the US, that the decline in consumption increases along the consumption distribution. The Israeli results are consistent with the hypothesis that inadequate savings are a major reason for the decline in consumption after retirement, and this has obvious policy implications. It is interesting to understand why the consumption patterns after retirement are so different in Israel than in the US. This is left for future research.

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Table A1. P-values for tests of different consumption declines across quintiles, by gender

Quantile	**β_1** - Salaried		**β_2** – Self employed		**β_3** - Not working	
	P10	P90	P10	P90	P10	P90
Males						
P10	.	0.288	.	0.994	.	0.033
P20	0.090	0.070	0.034	0.287	0.037	0.304
P30	0.018	0.017	0.062	0.209	0.006	0.469
P40	0.080	0.028	0.114	0.249	0.016	0.419
P50	0.185	0.026	0.076	0.151	0.034	0.521
P60	0.144	0.012	0.056	0.105	0.001	0.845
P70	0.737	0.082	0.081	0.117	0.000	0.600
P80	0.628	0.319	0.616	0.569	0.016	0.831
P90	0.288	.	0.994	.	0.033	.
Females						
P10	.	0.654	.	0.749	.	0.000
P20	0.003	0.052	0.324	0.793	0.087	0.002
P30	0.000	0.007	0.474	0.866	0.006	0.017
P40	0.001	0.006	0.251	0.562	0.005	0.015
P50	0.000	0.001	0.359	0.699	0.000	0.138
P60	0.000	0.000	0.410	0.629	0.001	0.048
P70	0.019	0.003	0.137	0.198	0.000	0.086
P80	0.284	0.036	0.643	0.833	0.000	0.127
P90	0.654	.	0.749	.	0.000	.

Notes: For each quantile, tests of equality of its β coefficient with that of the 10^{th} and 90^{th} quantiles are reported.

Table A2. P-values for tests of equal consumption declines for males and females

Quantile	**B_1 –** employee	**β_2 –** Self employed	**β_3 -** Not working
P10	0.001	0.758	0.041
P20	0.005	0.766	0.119
P30	0.001	0.636	0.041
P40	0.002	0.862	0.006
P50	0.010	0.622	0.001
P60	0.006	0.806	0.091
P70	0.056	0.635	0.132
P80	0.120	0.708	0.018
P90	0.141	0.609	0.015