How Does Consumption Change upon Retirement?

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Abstract In this paper we investigate the way consumption changes around retirement in Italy. Using micro data covering the 1985-96 period, we document the existence of a one-off drop in consumption at retirement of the household head, as in the UK and the US, but (at 5.44%) smaller in size, and show that consumption of work-related goods falls around retirement and home production of food and other goods increases.

Keywords Consumption, Retirement, Life-Cycle Model

JEL Classification D9, E2

1. Introduction

In developed countries, consumption accounts for a large fraction of GDP (over two thirds in the US and some European countries, around 60% in Italy). Also, rising fractions of the population approach or are past retirement age. The way consumers respond to retirement and the way they spend in their old age is thus a topic of great interest in the analysis of aggregate economic fluctuations and trends, as well as in the economic policy debate.

The standard model to analyse the consumption-saving choice is Modigliani's life cycle model, that stresses the retirement motive for saving. The model has been extended to cover uncertainty and precautionary saving, leisure choice and a bequest motive (Deaton, 1992, Browning and Lusardi, 1996), but its key prediction can still be described as follows: consumers form intertemporal plans aimed at smoothing their marginal utility of wealth over the life-cycle.

The literature has emphasized that there is a one-off drop in consumption at the time of retirement, documented for the UK in Banks, Blundell and Tanner, (1998) and for the US in Bernheim, Skinner and Weinberg (2001). We show that a smaller drop also exists in Italy, by using detailed diary-based data from the Survey of Family Budgets (SFB) covering the 1985-1996 period.

The reason for this drop could be attributed to a number of causes, including changes in preferences due to increased non-market time, unexpectedly low pension or liquidity problems, adverse health shocks inducing early retirement, myopic or perhaps time-inconsistent behavior. Of particular interest in this context is that in our data we can rule out explanations related to lack of resources: Italian employees receive a large lump-sum payment upon retirement (technically, a severance pay worth up to three times their gross annual salary). Unexpected low pension income is also unlikely to have played a role, given that the prevailing system during the period was both generous and simple.

We focus our investigation on a number of preference-related reasons why expenditure on non-durable goods and services ("consumption") may fall immediately after retirement and investigate their importance in our data:

- Work-related expenditure (transport to and from work, canteen meals and business clothing) is no longer needed
- Home production of services (laundry, gardening, house-cleaning, cooking) becomes advantageous - on the assumption that the market price of leisure falls at retirement (this is consistent with seniority-related pay, e.g.). This has recently been stressed by Aguiar and Hurst, (2005) and (2007), in their careful analysis of food consumption and shopping patterns around retirement

Our estimation results support the view that the retirement consumption drop can be explained within the life-cycle model (see Hurd and Rohwedder, 2008, for recent US evidence to this effect).

The paper is organized as follows. In Section 2 we introduce the data and show age profiles for total non-durable consumption. Section 3 presents econometric evidence on the retirement consumption drop. Section 4 provides similar evidence on some broad commodities, including work-related expenses and health, that can shed light on the reasons behind the retirement consumption drop. Section 5 concludes.

2. Cohort analysis

A standard way to investigate the dynamic properties of consumption with repeated cross section data is to rely on cohort analysis. Households are grouped into cohorts on the basis of such characteristics as year of birth of the head, education of the head and region of residence. In order for this grouping to make sense we require that these characteristics be time invariant: if this condition is met, cohort data allow us to follow synthetic individuals over time.

In this paper we use data from the Italian Survey on Family Budgets (SFB), a large diary-based representative sample of the Italian population covering the 1985-1996 period on a consistent basis. This survey contains high-quality, detailed information on consumer spending, household composition, housing stock, current employment status. Unfortunately, it does not record any information on past employment, or on actual or expected retirement data (see Appendix 1 for further details).

We follow standard practice and group households in 5-year bands: the age of the head is the mid-age of the cohort. The cohorts we use are briefly described in Appendix 1. In Figure 1 we plot for every second cohort the age profiles of the average logarithm of consumption, in real terms, after adjusting for discrepancies with National Accounts (NA) statistics.[1]

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[1] We define as "consumption" real expenditure on non-durable goods and services. For a description of the National Accounts adjustments see Appendix 1.

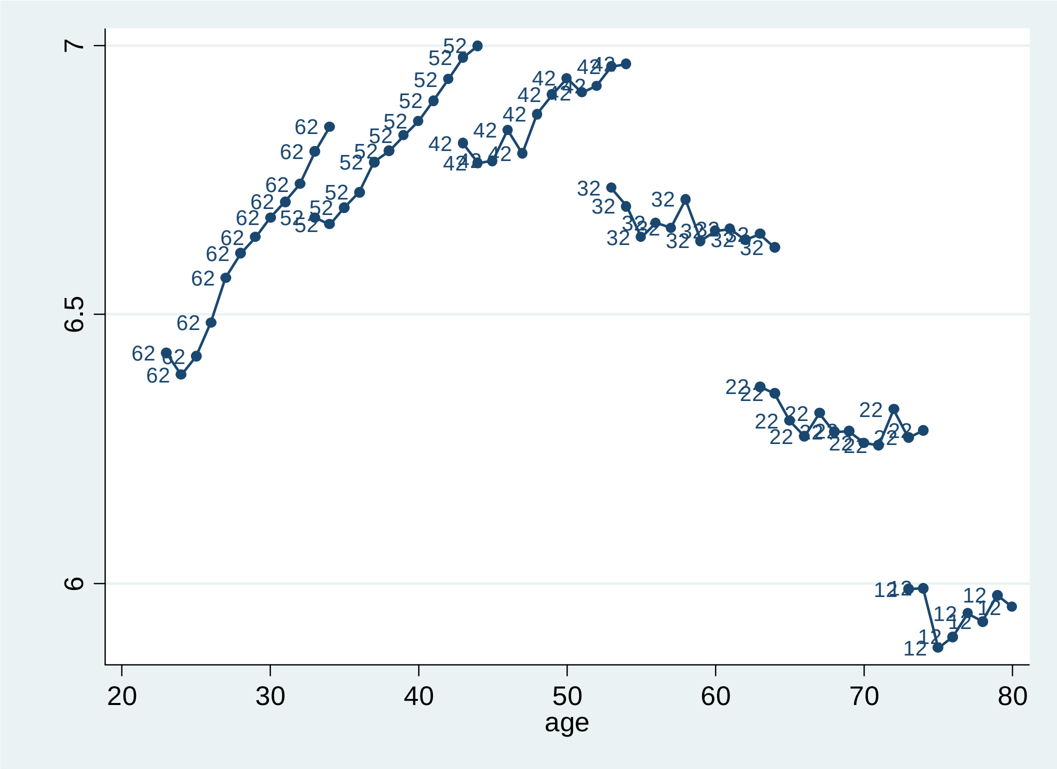

Figure 1. Logarithm of consumption, NA adjusted, cohort age profile

Average logarithm of consumption by cohort and age in 1989 Euros, after adjustment for discrepancies with National Accounts. Data points are labeled by the mid-point of the range of head's years of birth that defines the cohort.

In figure 1 we observe strong increases of expenditure as a function of age up to around age 50. Then total expenditure is either stable or gently declining in age. We also see that younger cohorts spend more than their predecessors for a given age: this result is unambiguous for the four oldest cohorts (born 1942 or earlier). Vertical distances are much smaller instead for the two youngest cohorts. One can also detect common peaks in expenditure around 1992, followed by drops, for the four youngest cohorts.

In the absence of time effects, vertical distances between the broken lines can be interpreted as pure cohort effects - the life-cycle theory of consumption would attribute such cohort effects to differences in life-time resources across generations. We notice that in our case such vertical distances are all positive, but are reduced after 1992. The presence of a strong business cycle effects in Italy in the 1990s is well established and has been related to the major reforms in social security, public health provision and the tax system that were undertaken at the end of 1992 (see Miniaci and Weber, 1999, Attanasio and Brugiavini, 2003). This was less important for cohorts close to or already past retirement age at the time (statutory retirement was 60 for men and 55 for women in 1992 - it has slowly been raised ever since).

The most striking feature is that the age profile flattens out after age 55. A further feature worth stressing is that the oldest cohort has an increasing age profile. If household dissolution/death positively relates to life-time resources, composition effects are likely to be driving these age patterns.

The rationale for plotting cohort age profiles lies in Modigliani's life cycle theory whereby consumption (or its logarithm) can be written as:

$$\ln(c_{ht}) = \sum_{c=1}^{C} \alpha_c d_{hc} + f(age_{ht}) + \varepsilon_{ht} \qquad (1)$$

where c_{ht} is consumption, h denotes the household and t the time period, households belong to C year of birth (*yob*) cohorts and d_{hc} are cohort dummies. The identity $age = yob + t$ makes interpretation hard without further assumptions: in the equation time effects are in the error term (ε_{ht}) and the assumption is implicitly made that all time trends can be attributed to the interaction of age and cohort. Consumption is a linear function of age in the stripped down version of the model (see Deaton, 1992, e.g.), but will be hump-shaped because of uncertainty and age-related changes in demographic composition (Attanasio et al., 1999). The logarithmic transformation is particularly useful in this context if we believe cohort differences are best expressed in proportional terms.

In our analysis we investigate how retirement affects consumption patterns, once age effects are taken into account. To this end it is useful to illustrate how many heads of household are retired in our data. This is shown in Figure 2 that plots the proportion of retired heads against age. The solid line refers to people who draw a pension ("pensioners"), the dashed line focuses on retirement from work ("retired"). A head is classified as "retired from work" if he/she is retired from work and draws a pension. A head is classified as "pensioner" if either he/she is retired from work or he/she is out of labour force and he/she relies on a pension as the main income source, and this explains why this proportion approaches unity for ages over 70. Examples of pensioners who are not retired from work are widows (on a survivor's pension), individuals who are eligible for means-tested old age pension and people who are unable to work (they draw invalidity pensions). This last group accounts for the presence of some very young pensioners, but is relatively small in comparison to the others.[2]

The proportion of heads who are retired from work (dashed line) is that of direct interest for our analysis. We see that this proportion is null at young ages, but becomes positive around age 46 – some early retirement schemes were in operation prior to the mid-1990s pension reforms in Italy that allowed individuals to retire from their mid-forties onwards. However, retirement begins in earnest around age 50 and is all but complete by age 68. After such age, the proportion of retired heads starts falling, presumably because of differential mortality by gender. It is worth stressing that male labor market participation is much higher among men than among women in Italy (particularly for the generation approaching retirement age in our sample), and male mortality is higher than female mortality for all ages. It is therefore likely that retired males are increasingly replaced by female survivor pensioners after age 68, and this explains the fall in the proportion of retired heads past that age, accompanied by the continued increase in the proportion of pensioners.

[2] It is worth stressing that practically no head of household is retired from work and without some type of pension in Italy (whether an early retirement, old age, or disability/invalidity pension).

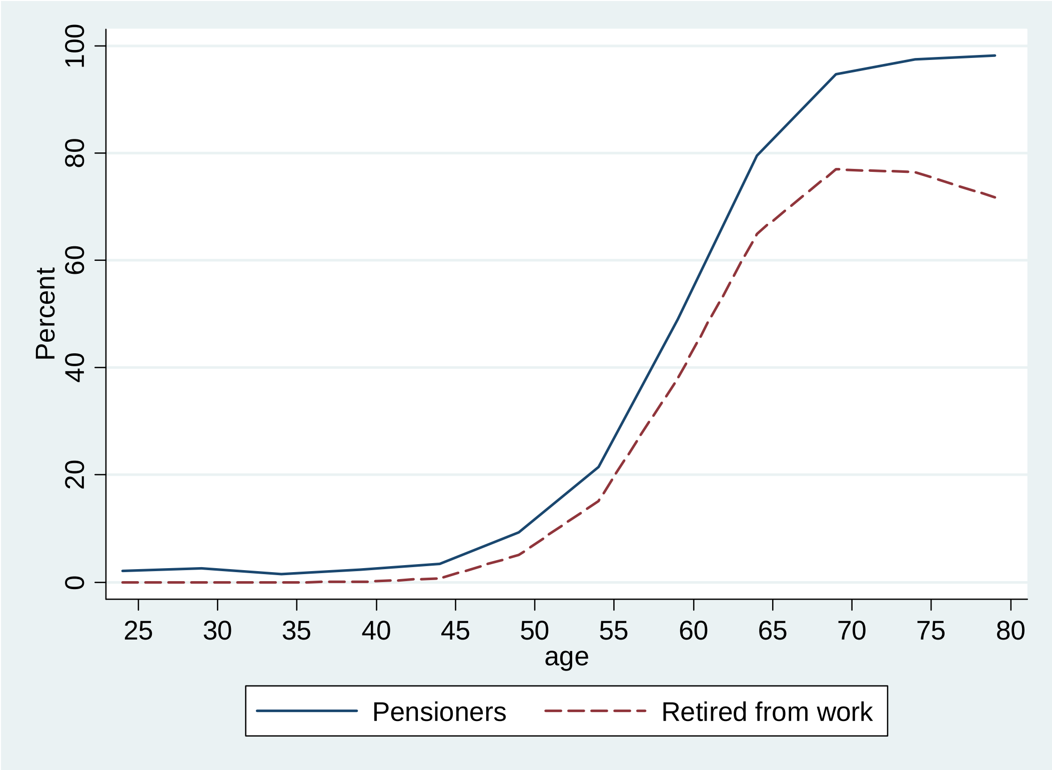

Figure 2. Proportions of retired household heads by age

Solid line: pensioners (drawing any pension, not necessarily retired from work). Dashed line: only retired (drawing a job-pension and retired from work).

The relatively wide age range over which people retire is only partly due to the existence of gender and job specific statutory retirement ages (for most employees, these were 60 for men and 55 for women, even though they had been raised to 62 and 57 by 1996). The key reason lies in the existence of early retirement schemes that were in place for both private and public sector workers over the whole sample period. It is worth stressing that the SFB does not contain information about previous employment for the retired, or years of pension contributions, and this limits the scope of our analysis.

3. Regression Analysis

In this section we pose the following question. Is there an additional effect of retirement on consumption over and above the effect of aging? In order to answer this question we estimate the age-cohort profiles described above and test for the presence of intercept shifts for households whose head is retired compared to all the other households.

As a benchmark, we take the specification corresponding to Figure 1:

$$\ln(c_{ht}) = D_t^{'}\beta + \sum_{c=1}^{C} \alpha_c d_{hc} + f(age_{ht}) + \varepsilon_{ht} \qquad (2\ )$$

As usual, we attribute all time trends to the interaction of age and cohort, but we have added to equation (1) a vector of time-variables D_t, to explicitly allow for common business cycle effects in view of the strong common time effects apparent in Figure 1, as well as systematic differences between NA and survey averages. Age effects are modeled by means of a fifth order age polynomials.

Estimation results are shown in Table A2, column 1. Two time variables are included: the difference between the survey average and the national accounts statistic, and the residual of the regression of GDP on a linear trend. Not surprisingly, both variables have positive and significant coefficients. A one-thousand euros increase in the discrepancy between average SFB consumption and NA aggregate translates in a 0.35% increase in the estimated intercept. Cohort effects are monotonically increasing from the oldest cohort (born 1910-14 - the control group) to the youngest cohort (born 1965-69), whose average consumption is 181% higher.

Age effects (shown in Figure 3) reveal a rising profile throughout, with an inflexion point around age 70. The final rise in average consumption may be a result of the often noted differential wealth mortality effect – whereby the rich live longer (Shorrocks, 1975).

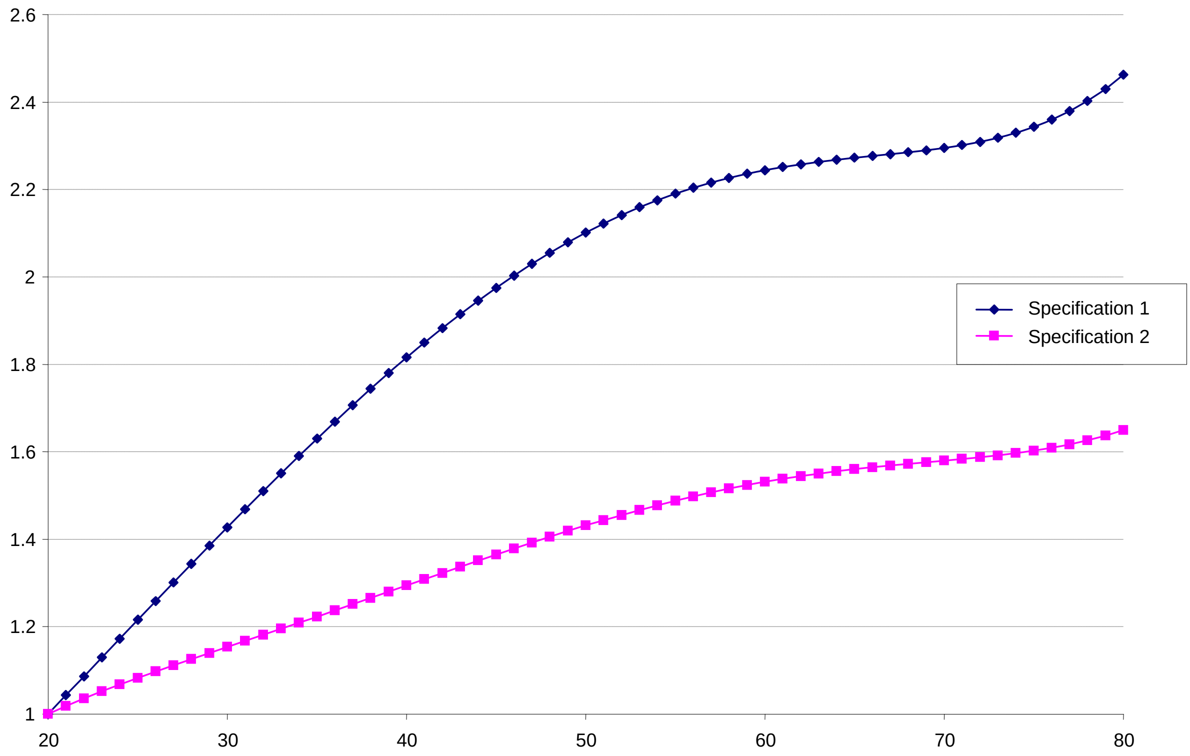

Figure 3. Estimated age effects on household consumption

Specification 1 is our baseline model for household consumption (see equation 2). Specification 2 controls for the log of the number of equivalent adults. The corresponding estimation results are shown in columns 1 and 2 of Table A2.

In column 2 in Table A2 we introduce the logarithm of the number of equivalent adults in the regression[3]: its estimated coefficient is .727, significantly different from unity. This implies that taking per-capita consumption is too strong a correction for family size effects. In this specification age effects are much less important for relatively young individuals, as shown in Figure 3. Time and cohort effects are instead similar to those reported in Column 1.

In columns (3) to (6) we report estimates from a specification that controls for further variables. To be more precise, we estimate

$$\ln(c_{ht}) = D_t^{'}\beta + \sum_{c=1}^{C}\alpha_c d_{hc} + f(age_{ht}) + Z_{ht}^{'}\gamma + \varepsilon_{ht} \qquad (3)$$

[3] We adopt the Carbonaro equivalence scale, that is widely employed in poverty studies in Italy (see Inquiry Commission on Poverty, 1997). This scale assigns a unitary weight to a 2-members household, a weight of .599 to a 1-member household, and then weights of 1.335, 1.632, 1.905, 2.150 and 2.401 to households of 3, 4, 5, 6 and 7 or more members, respectively.

where Z_{ht} is a vector of variables including socio-demographic indicators (dummies for the gender of the head, education of all family members, regions, and the fraction of household members by age classes). In some specifications Z_{ht} includes some housing-related proxies of standard of living-life cycle wealth, and/or two retirement/pension variables: a dummy for head retired from work and a dummy for the head living instead on other types of pension (e.g.: widows on a surviving spouse pension, or persons whose main source of income is a disability pension or people on a means-tested basic old-age pension).

In column (3) we report estimated parameters for a specification that includes in Z_{ht} a set of variables that relate to household composition, region of residence, and educational attainment by various household members.

Estimated cohort and year effects are similar in column 3 to those reported in columns 1 and 2. The age effects are instead quite different, because many of control variables have age patterns. The estimated parameters of the age polynomial imply a monotonic increase of log consumption with age. Estimated parameters of the control variables can be summarized as follows: household size (number of equivalent adults) has the same coefficient (.72) as in column 2, but household composition plays a role. In fact, the proportions of household members by age group have important effects (young children cost less than teenagers or older children; the proportion of adults aged 27-59 has a positive effect, aged 60 or more has a negative effect). Important effects are also played by education: the better educated household members are, the higher is consumption.

In column (4) we report estimates of a specification that includes in the Z_{ht} controls for life-time resources. In particular, we exploit the available information on the size of the main residence (expressed in squared meters) as well as on its rental value (actual rent for tenants, imputed rent for home-owners). We expect these two variables, that are defined and used irrespective of ownership, to correlate strongly with the long-term standard of living of the households in the sample, with household size and perhaps age. The estimated parameters on both housing variables are indeed positive and highly significant, despite the fact that the dependent variable (consumption) does not include rent or imputed rent, as explained in the previous section. The inclusion of these housing variables has an impact on other parameters, too, in particular it reduces the estimated effects of household size and of higher education.

In columns (5) and (6) we report estimates of specifications that control for retirement: a dummy for head retired and a dummy for the head living on other types of pension. Column (5) does not and column (6) does condition on the housing indicators discussed above. We shall take the size of the parameter coefficient on the retirement dummy as an estimate of the retirement consumption drop.

If we compare the estimated parameters in columns (3) and (5) of Table A2, we detect remarkably few changes, but for the coefficients of the age polynomial and of the female head dummy. However, both retirement and pensioner dummies are highly significant: retirement from work is associated with a consumption drop of 7.24%, drawing some other pension is associated with a cut of 15.70% in consumption.

The possibility arises that, other things being equal, the retirement and pensioner dummies capture differences in life-time resources. We can gauge the importance of this type of association by considering the estimates reported in column (6), where the Z_{ht} contains the usual demographic variables, as well as the housing indicators and the retirement dummies. We expect these main residence variables to be a good proxy for long-term differences in standards of living, at least for a majority of the sample. It is important to stress that the available evidence suggests that very few people change their main residence around retirement in Italy (as indeed in many other countries).

When we compare the estimated parameters in columns (4) and (6) of Table A2, we again only detect changes in the coefficients of the age polynomial and of the female head dummy. And again we find that both retirement and pensioner dummies are highly significant: retirement from work is associated with a consumption drop of 5.44%, drawing some other pension is associated with a cut of 13.70% in consumption. Both these parameters are smaller in absolute terms than in column (5) – as expected. But they are unambiguously different from zero.

In our discussion so far we have not tackled the issue of whether the estimated coefficients on the retirement dummy can be interpreted as estimates of the retirement consumption drop. Our method in fact exploits repeated cross section data but no exogenous source of variation in the economic environment – even though we control for demographics and (to some extent) life-time resources, there are other sources of variability that may affect estimated parameters in a predictable way.

If we believe the key explanation of the retirement consumption drop puzzle lies in work-related expenses, we should consider the case where fixed costs to work vary across the population (Kolodziejczyk, 2006). We shall see that in this particular case we can reach an unambiguous conclusion on the bias in our estimated coefficients.

Let us stress that observed consumption includes work-related expenses. Assume the relation of interest takes the form:

$$\ln(c_h) = \alpha + \beta\, ret_h + \varepsilon_h \tag{4}$$

where we expect β to be a negative number, because work-related expenses are not incurred after retirement. We assume individuals to retire early if they face higher costs to work, ν_h. Let us say that

$$ret_h = 1(\upsilon_h > \overline{\upsilon}) \tag{5}$$

where 1(.) is an indicator function that takes value 1 if the inequality holds, that is if the individual costs of working are higher than a given threshold.

Then we can write:

$$E\left[\ln(c_h) \mid ret_h = 1\right] = \alpha + \beta + E\left[\varepsilon_h \mid \upsilon_h > \overline{\upsilon}\right] \tag{6}$$

$$E\left[\ln(c_h) \mid ret_h = 0\right] = \alpha + E\left[\varepsilon_h \mid \upsilon_h \le \overline{\upsilon}\right] \tag{7}$$

and the OLS estimate of β is based on the difference between the sample analogues of (6) and (7).

Given that work-related expenses are included in consumption, we expect $Cov(\varepsilon,\upsilon) > 0$, and $E\left[\varepsilon_h \mid \upsilon_h > \overline{\upsilon}\right] > E\left[\varepsilon_h \mid \upsilon_h \le \overline{\upsilon}\right]$. Thus the OLS overestimates β, that is it underestimates the retirement consumption drop.

Therefore, we can conclude from our regression analysis that 5.44 % is a lower bound for the true retirement consumption drop, if heterogeneity in costs to work is the key reason why people choose to retire early.

It is worth stressing that, if retirement is instead induced by health shocks (as in Blau, 2008), this conclusion is no longer valid. In a related paper Battistin *et al.* (2008) provide evidence that large fractions of Italian individuals retire as soon as they become eligible for the generous government-backed early retirement schemes (failing to retire immediately after becoming eligible was not a financially sound proposition for most individuals during our sample period: Brugiavini, 1999, computes the implicit tax rate of postponing retirement in Italy at 81%). Given that most people in their late fifties/early sixties are in good health, we conclude that for a vast majority of individuals retirement was not induced by adverse health shocks.[4]

We have also estimated the same set of equations for those households without grown children (that is older than 25 years). The sample size is considerably reduced (-12%), as children leave home relatively late in Italy. Our key estimation results do not change much, in the sense that retirement effects are if anything slightly stronger.

4. Evidence on broad commodities

In order to better understand how consumption changes upon retirement we now look at cohort profiles by broad commodities, by distinguishing those commodities that are work-related from those that are instead "leisure intensive" plus health.[5] For the sake of simplicity we shall only consider unconditional averages. In the case of those goods where participation changes a lot over with age this may provide a blurred picture of the underlying patterns of behavior.

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[4] Battistin *et al.* (2008) use SHIW, a different data set that contains the answers to just a few recall consumption questions, but enough information on pension contributions to establish at what age an individual has or will become eligible for an early retirement or old age pension. They use pension eligibility as an instrument for retirement and obtain a point estimate of the causal effect of retirement on non-durable consumption of -9.83%, or - 4.11%, once changes in demographics are taken into account. In either case, our point estimate of -5.44% falls well within their estimated confidence intervals. A thorough comparison of their (SHIW) and our (SFB) consumption data is presented in Battistin *et al.* (2003).

[5] We have not attempted NA adjustments for these commodities, because we cannot be sure the SFB and NA items closely match in their definition of the non-durable component, but for some obvious cases, such as food.

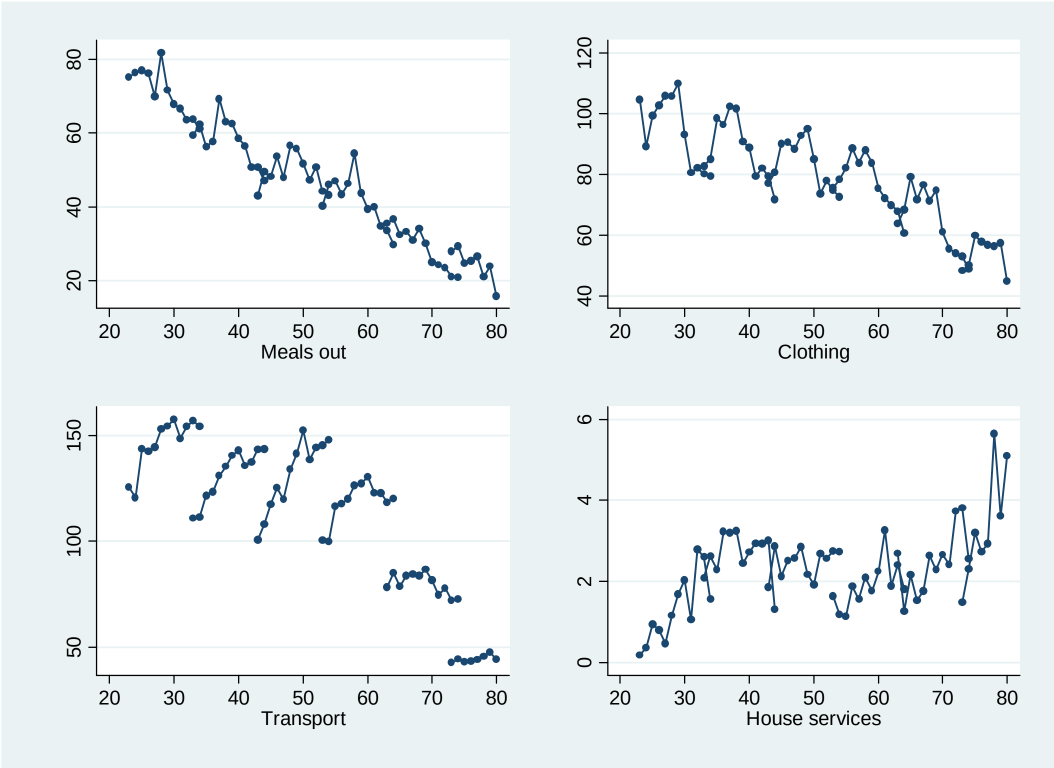

Figure 4. Work-related per-capita expenditures: cohort age profiles

Average per capita expenditure on work-related broad commodities (meals out, clothing, transport and house services) by cohort and age in 1989 Euros.

In Figure 4 we show cohort age profiles for four work-related broad commodities: meals out, clothing, transport (that includes motor fuel) and house (domestic) services. In all cases (non-durable) expenditure is divided by the number of equivalent adults. The figure shows clearly that for all but one item expenditure is falling after adjusting for family size (the exception is house services, that include all sorts of cleaning, baby sitting, house sitting and housekeeping services: here expenditure peaks around 40, then falls but rises sharply in old age). Business cycle effects are strong (of opposite sign) for transport and clothing.

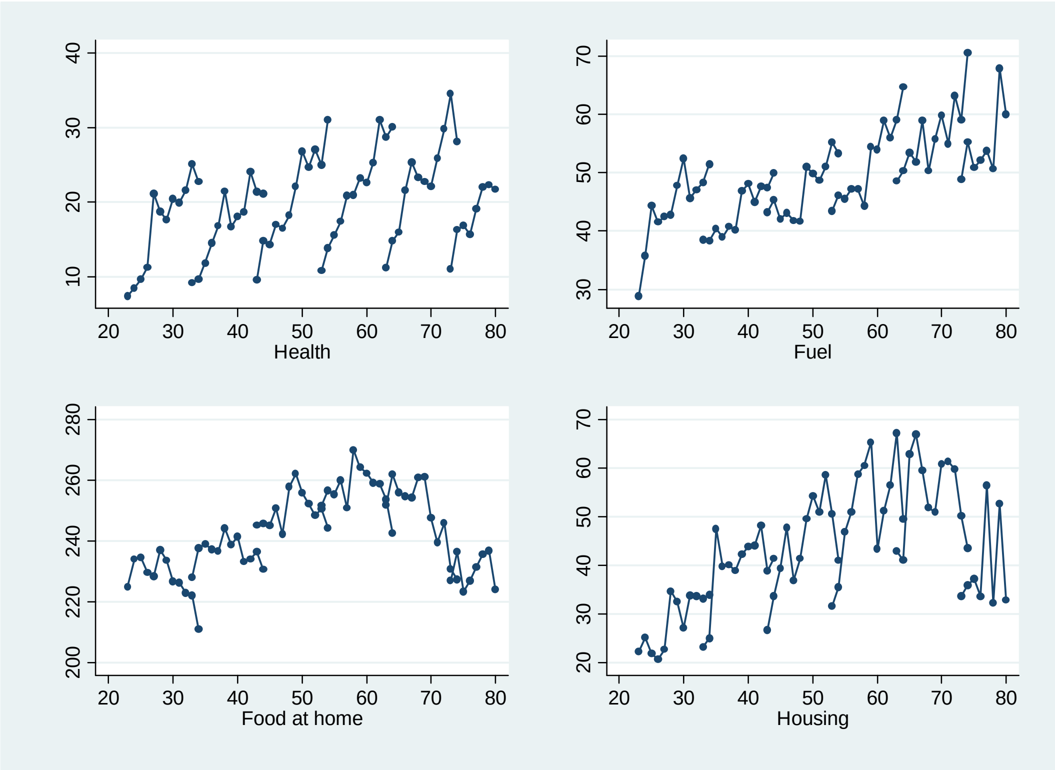

Figure 5. Old-age related per-capita expenditures: cohort age profiles

Average per capita expenditure on old-age related broad commodities (health, fuel, food at home, housing) by cohort and age in 1989 Euros.

Of interest is also the age pattern of spending on health (out-of-pocket expenditure on drugs, doctors and nurses, medical appliances, hospital treatment), fuel (heating fuel and electricity), housing (it includes water, maintenance and repairs; in our definition it does not include rent and imputed rent) and food at home. For all these items expenditure rises with age up to age 70, as shown in Figure 5. After the age of 70, for health and fuel the age profile remains upward sloping, while for food at home and housing services there is a decline. The pattern prior to age 70 for food at home (combined with the fall in restaurant meals) is in line with the view that consumers substitute into home production after retirement. Health expenditure shows a marked increase over time for all cohorts, possibly as a result of the wide-spread introduction of co-payments in the public health service after 1992.

The age pattern of health spending has attracted much attention given its relevance for precautionary saving and for economic policy: Jappelli and Pistaferri (2000) have argued it is only mildly increasing because of wide coverage of public health insurance in Italy. However, Jappelli, Pistaferri and

Weber (2007) find important effects of health risks on saving for Italian households, particularly for those households who live in areas where the public health system is perceived not to provide high quality care. Thus the possibility that the elderly fail to decumulate wealth because they perceive increased health risks is potentially important - conditional upon survival, we know that health risks are indeed an increasing function of age (Palumbo, 1999; De Nardi, French and Jones, 2006). Even without direct measures of perceived health risks, some information on their relevance can be inferred by looking at how peak health spending changes with age.

In Figure 6, we report the proportion of households spending more than 10% of their budget on health goods and services. This may be an interesting measure of the health risks. We see that non-negligible fractions (5% or more) spend this relatively high share on health past age 60, and that there are strong cohort effects, with younger cohorts apparently less well insured than older cohorts. These cohort effects may testify of an increased taste for high-quality care in younger generations, but could also be related to the increase of co-payments over time, particularly for people aged 70 or less. Overall, we can conclude that the role played by health risks on saving is likely to become increasingly important in Italy, despite the universal coverage of its public health system.

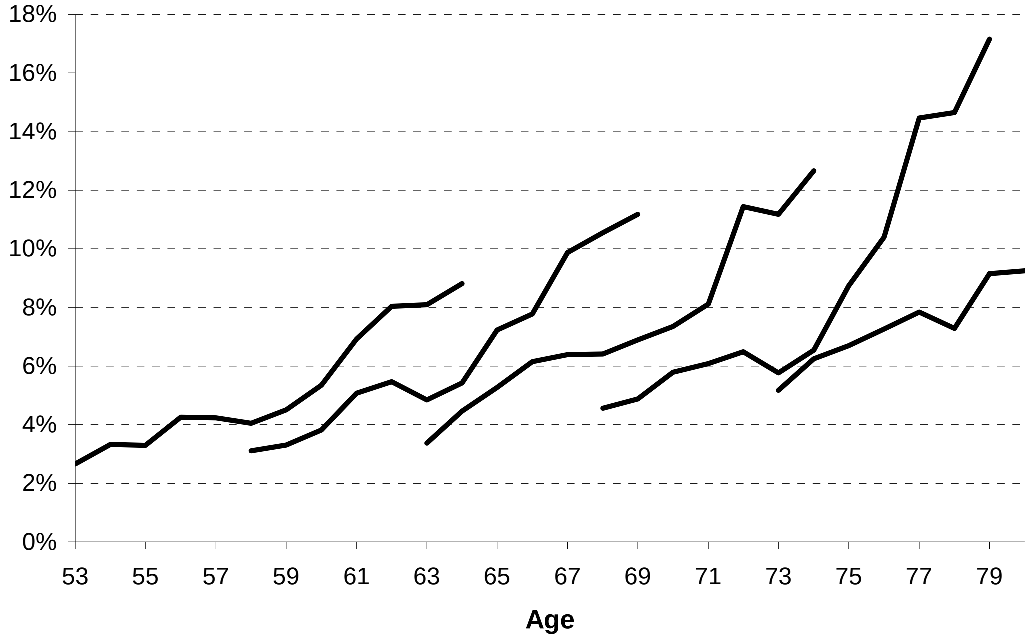

Figure 6. Proportions of households spending more than 10% of their budget on health: cohort age profile

An issue we want to investigate is whether retirement affects consumption composition, after controlling for age effects. A useful variable to define to this end is the share of each broad commodity out of the total budget. To be more precise, we can define the ratio of non-durable spending on the *i*-th broad commodity to total non-durable expenditure. The share will be an increasing function of the budget if the good is a luxury, a negative function if it is a necessity. In the standard framework where utility is separable between durables and non-durables and is time additive in its non-durable part, non-durable expenditure in each period is the relevant budget concept and is proportional to life-time wealth (permanent income). (See Blundell, 1986, Deaton, 1992, or Attanasio, 2000).

We show in Figure 7 how the food at home and meals out budget shares depend on age and retirement status for two cohorts, one born around 1927 and the other born ten years later. We see that for food at home the age profile is higher for the older cohort: given that this type of food is a necessity, this confirms that older generations are poorer. We also notice that the food at home shares are higher for the retired than for workers: this likely reflects the fall in the opportunity cost of cooking one's meals that follows retirement. For food out (that includes restaurant and canteen meals) cohort effects are not noticeable, but there is a strong retirement effect (the retired consume less food out of the home than the workers, for a given age). This agrees well with the opportunity cost argument given for food at home.

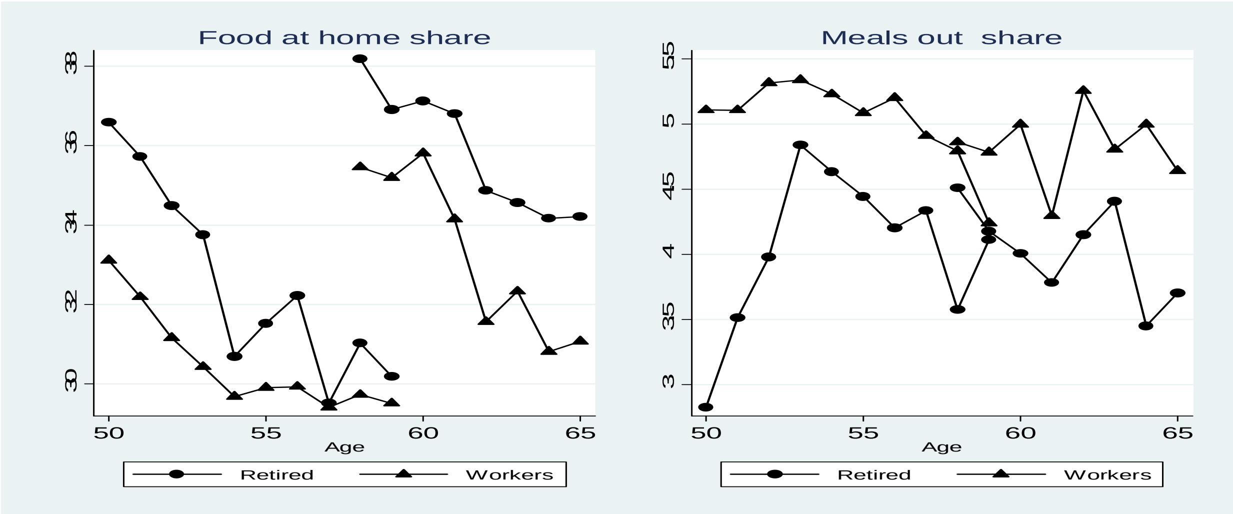

Figure 7. Food at home and food out budget shares, cohort age profile

Average shares (ratios of expenditure on specified commodity to expenditure on all non-durable goods and services times 100) are plotted by age and retirement status for two different cohorts, born around 1927 and 1937 respectively.

The next figure presents budget shares age-retirement profiles for two important, work-related commodities: transport and heating fuel. Figure 8 shows that there are important cohort effects for transport (a luxury good) but not for fuel. The retired consume relatively less transport and relatively more heating fuel than the workers, in line with the notion that much transport costs are incurred to travel to and from work, whereas retirement involves more time spent at home, and therefore higher heating costs.

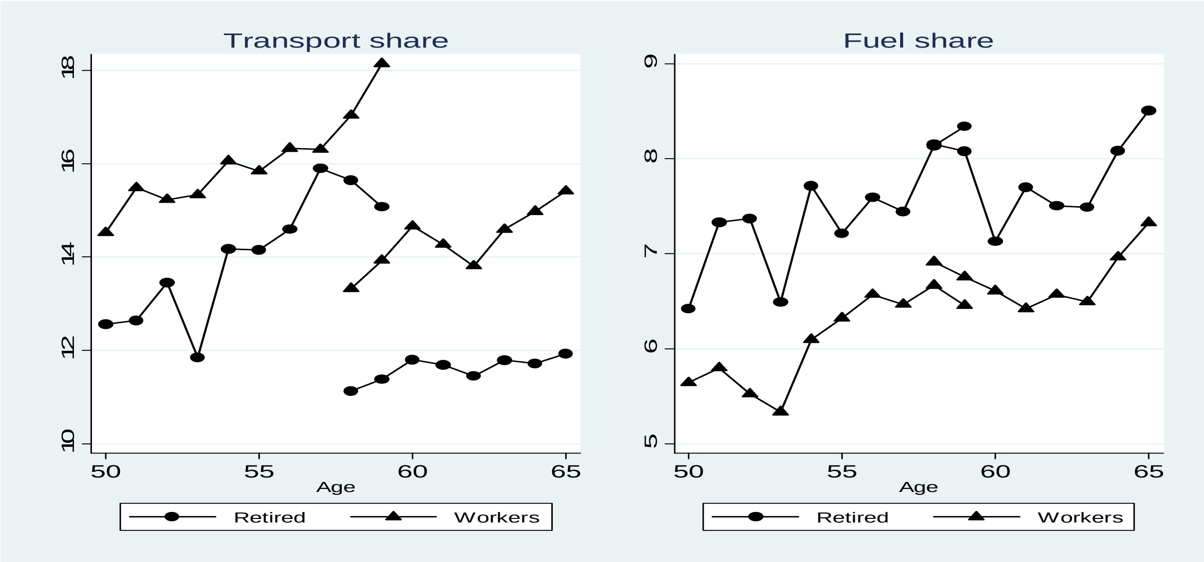

Figure 8. Transport and heating fuel budget shares, cohort age profile

Average shares (ratios of expenditure on specified commodity to expenditure on all non-durable goods and services times 100) are plotted by age and retirement status for two different cohorts, born around 1927 and 1937 respectively.

Finally, in Figure 9, we look at two relatively minor, but interesting, budget shares: health and holidays. Health appears to be a luxury good (younger, richer cohorts have higher health budget shares), and this is not surprising, given that basic health needs are met by the public health system. Health spending is also proportionally more important for the retired, either because retirement has a negative effect on health, or because poor health is the cause for retirement for at least some individuals. Notice that an opportunity cost argument would have implied a higher budget share for workers (who can hardly afford the long waiting involved in the public health system). A further point is the existence of clear upward trends in health spending, that are mostly due to the introduction of co-payment requirements for ever larger groups of individuals over the sample years. Our unconditional averages are thus also affected by composition effects: in 1985 53% of households whose head was 58 years old presented non-zero health spending; in 1995 this proportion had risen to 67%.

Holidays spending (that is highly volatile) appears to be a luxury, too, but there is no clear retirement effect. The notion that people do a lot of traveling in their early retirement years is not supported by the data.

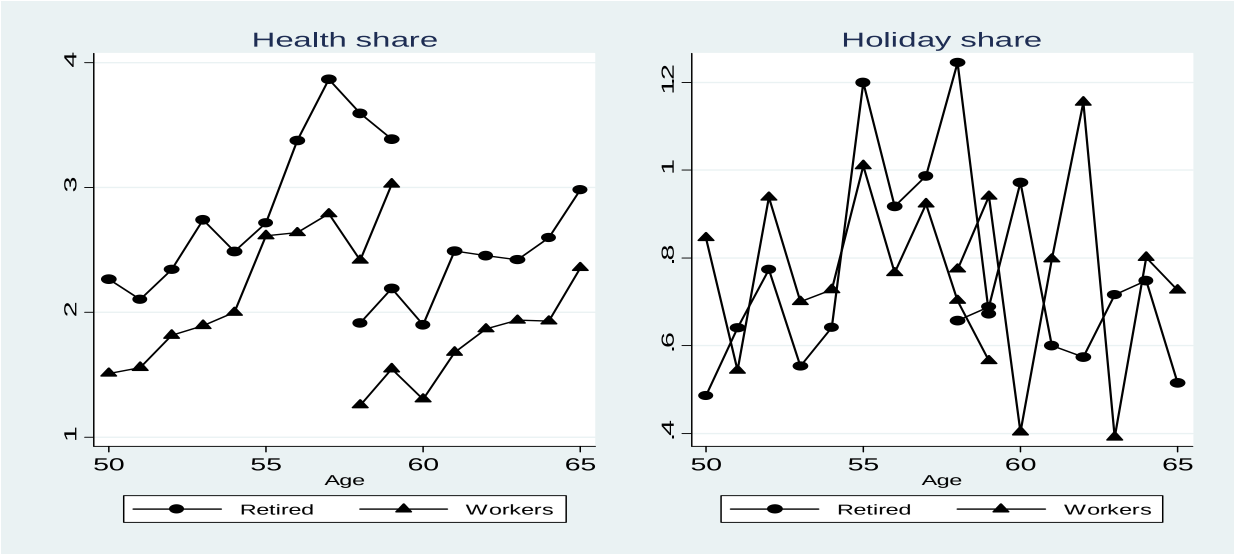

Figure 9. Health and holidays budget shares, cohort age profile

Average shares (ratios of expenditure on specified commodity to expenditure on all non-durable goods and services times 100) are plotted by age and retirement status for two different cohorts, born around 1927 and 1937 respectively.

The effects of age and retirement of consumption can also be investigated by looking at budget share equations like:

$$s_{ht}^{i} = \beta_i \ln(c_{ht}) + \sum_{c=1}^{C} \alpha_{ic} d_{hc} + f_i(age_{ht}) + D_t^{'}\phi_i + \varepsilon_{ht}^{i} \qquad (8)$$

where $s_{ht}^{i} \equiv 100 * p_t^i q_{ht}^i / \sum_j p_t^j q_{ht}^j$. A first advantage of this Working-Leser specification is that life-time wealth effects are captured by the first regressor, $\ln(c_{ht})$, so there is no need to control for income or wealth directly. A second advantage is that necessities and luxuries are easily identified: the former exhibit negative β_i's, the latter positive β_i's. The borderline case of unit budget elasticity implies a zero β_i.[6]

Given our interest in effects of retirement and demographics we can specify the equation as:

$$s_{ht}^{i} = \beta_i \ln(c_{ht}) + \sum_{c=1}^{C} \alpha_{ic} d_{hc} + f_i(age_{ht}) + Z_{ht}'\pi_i + D_t^{'}\phi_i + \varepsilon_{ht}^{i} \qquad (9)$$

---

[6] The budget elasticity for good *i* can be computed as $\eta_i = 1 + \beta_i / s^i$ where s^i is normally taken at the sample average

where we let Z_{ht} include the same variables as in the specification of column (6), with the sole exception of the rental value of the main residence. This last variable is instead used as instrument for the logarithm of consumption. Retirement is instead treated as exogenous – however, the findings we are going to discuss are qualitatively unaffected when the sample excludes those households whose heads are between 55 and 65 years of age, that is when we focus on individuals whose current retirement status is mostly due to their age, not their own preference for leisure.

Table 1. Estimation results of the share equations

	ALL FOOD	FOOD AT HOME	MEALS OUT	TOBACCO	
$\ln(c_{ht})$	-21.087	-20.701	2.819	-0.835	
	(0.465)**	(0.407)**	(0.239)**	(0.077)**	
HH Retired	-0.788	0.174	-0.805	-0.151	
(from work)	(0.110)**	(0.093)	(0.067)**	(0.017)**	
HH Pensioner	-1.629	-0.142	-0.832	-0.373	
(not from work)	(0.126)**	(0.123)	(0.067)**	(0.028)**	
Sample mean	42.377	32.489	5.189	1.788	
	HOUSE SERVICES	**HOUSING**	**FUEL**	**HEALTH**	**TRANSPORT**
$\ln(c_{ht})$	0.982	10.254	0.962	0.749	1.750
	(0.059)**	(0.327)**	(0.198)**	(0.140)**	(0.336)**
HH Retired	-0.046	0.898	0.496	0.428	-0.711
(from work)	(0.014)**	(0.068)**	(0.060)**	(0.037)**	(0.074)**
HH Pensioner	0.103	1.642	0.874	0.645	-1.254
(not from work)	(0.024)**	(0.093)**	(0.089)**	(0.048)**	(0.124)**
Sample mean	0.195	3.973	6.942	2.262	14.234
	HOME GOODS	**HOLIDAYS**	**CLOTHING**	**LEISURE**	**OTHER GOODS**
$\ln(c_{ht})$	-1.709	1.489	2.503	1.985	2.120
	(0.179)**	(0.140)**	(0.256)**	(0.211)**	(0.245)**
HH Retired	-0.004	0.115	-0.099	0.062	-0.350
(from work)	(0.038)	(0.033)**	(0.059)	(0.041)	(0.062)**
HH Pensioner	-0.051	0.116	-0.246	0.178	-0.379
(not from work)	(0.058)	(0.040)**	(0.083)**	(0.057)**	(0.093)**
Sample mean	5.542	0.754	9.250	5.870	8.600

Instrumental variable estimates of key parameters in share equations for different commodities (see equation 9). $\ln(c_{ht})$ is instrumented with the rental value of the main residence. Sample mean is the average of the dependent variable of each equation. Observations: 369912. Standard errors are adjusted for clustering at the cohort and year level. *: significant at 10%, **: significant at 5%, ***: significant at 1%.

In Table 1 we present key estimates for various share equations. The first commodity, "all food", that accounts for 42% of total non-durable expenditure, is split in its three components (food at home - that includes beverages - meals out and tobacco). Commodities whose share is larger than 5% are food at home, meals out, heating fuel, transport (14%), home goods, clothing, leisure goods and services and other goods and services.

We see that food is a necessity – of its components, meals out is instead a luxury. Overall the food share is lower for the retired, keeping consumption constant, but this in entirely due to reduced expenses on meals out and tobacco – food at home is in fact slightly (but not significantly) higher. When we consider that we estimated that retirement is accompanied by a 5.44% reduction in consumption, we can estimate the overall effect on the various shares: food at home has a negative coefficient on $\ln(c_{ht})$ of -20.7, and this implies a 1.12% increase in the food at home budget share, to be added to the direct effect of 0.17%, 1.29% increase in total. Meals out have a positive coefficient on $\ln(c_{ht})$ of 2.8, and the effect of the consumption fall is to reduce their share by 0.15%. When we add the direct effect, we get a 0.96% fall in total.

All this is entirely consistent with the argument that retirement induces increased home production of meals at the expense of meals out.

For some goods retirement is associated with higher shares (other things being equal): housing (that does not include rent), heating fuel, health, holidays and leisure goods and services. All these goods are classified as luxuries. Lower shares after retirement are found for house services, transport and other goods. Home goods (a necessity) is instead unaffected by retirement.

The largest budget share drops associated to retirement are those in meals out (-.96%) and transport (-.80%); the largest increases are in housing (.34%), fuel (.44%) and health (.39%). Expenditure on holidays increases by a small margin (.03%), even though this is a large increase relative to its sample mean (of .75% - the relative increase is 15.3%).

The evidence from share equations is therefore supportive of the importance of work-related expenses and of home-production activities.

5. Conclusions

In this paper we have used a very large, Italian repeated cross sections data set covering the 1985-96 period, to investigate the presence and importance of consumption changes around retirement. We have shown that average non-durable expenditure on goods and services is overall lower for retirees, and exploited the high-quality diary-based information on detailed expenditure items to illustrate how different consumption categories vary with both age and retirement – a topic that is of great potential interest given the growing fractions of retirees in most developed countries.

More specifically, we have contributed to the debate on the retirement consumption puzzle by showing that there is a fall of total consumption at retirement, estimated at 5.44%, similar to but smaller than implied by UK and US evidence. We have argued that this represents a lower bound to the actual consumption drop, if work-related expenditures vary across households and individuals with higher costs retire earlier on average. We have produced evidence that consumption of work-related goods falls around retirement age and home production of food and other goods increases.

Our findings corroborate the growing body of evidence (recently reviewed in Hurst, 2008) that retirement causes a small drop in expenditure, but this can be reconciled with life-cycle optimization if one takes into account the changes brought about by retirement on the need to spend on work-related goods and services and on the opportunities afforded by the increased leisure time.

This is a much-revised version of "Is There a Retirement Consumptin Puzzle in Italy?" IFS WP03/14. We are grateful for helpful discussions with Orazio Attanasio, Agar Brugiavini, Tullio Jappelli, Costas Meghir and Luigi Pistaferri, and for comments made by Rob Alessie and Sarah Smith and two anonymous referees. We also thank audiences at seminars at UCL, CAM (Copenhagen), and at the 2002 NBER Aggregate Implications of Microeconomic Consumption Behavior Summer Institute workshop, ESEM 2002, ESPE 2002, EEA 2002 meetings as well the RTN Economics of Ageing 2003 London conference. The usual disclaimer applies. Some early results along the lines of this paper are presented in Miniaci, Monfardini and Weber (2002).

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Appendix 1: data and cohort description

The Italian Survey on Family Budgets (SFB), contains high-quality, detailed information on consumer spending that is collected and used by the Italian Statistical Office (ISTAT) to compute weights for various inflation measures. Response rates for the SFB are consistently high (normally around 80%).

Table A1: Cohort description

Cohort	Year of birth	Age in 1985	Age in 1996	Minimum cell size	Maximum cell size	Mean cell size
1	1910-1914	71-75	82-86	677	2,222	1,651
2	1915-1919	66-70	77-81	606	2,059	1,608
3	1920-1924	61-65	72-76	1,674	3,320	2,900
4	1925-1929	56-60	67-71	1,959	3,432	3,105
5	1930-1934	51-55	62-66	2,211	3,552	3,255
6	1935-1939	46-50	57-61	2,238	3,592	3,301
7	1940-1944	41-45	52-56	2,170	3,569	3,279
8	1945-1949	36-40	47-51	2,405	3,787	3,416
9	1950-1954	31-35	42-46	2,260	3,506	3,226
10	1955-1959	26-30	37-41	2,140	3,369	2,857
11	1960-1964	21-25	32-36	640	3,026	1,932
12	1965-1969	16-20	27-31	443	1,670	1,058

Note: For Cohort 12 (1965-1969) the first 5 years are not used, for Cohort 1 (1910-1014) the last 4 years are not used.

Given the wide regional differences present in Italy, we use a 10-good region-specific price index to deflate all expenditures. However, we don't define cohorts on the basis of region of residence, but only of the year of birth of the head. In the SFB the head is defined as the first-listed person in the municipal register of households ("Intestatario della scheda famigliare"). It is normally the male within couples (this is not true in 1% of our sample). We follow standard practice and group households in 5-year bands: the age of the head is the mid-age of the cohort. In Table A1 we present a brief description of our cohorts: the oldest cohort we consider is made of all households whose head was born between 1910 and

1914. These individuals were 71-75 years of age in 1985 (first sample year), 82-86 in 1996 (last sample year). The average number of households included in this cohort in each survey is 1651, with a peak of 2222 in the earlier years and a trough of 677 in later years. Average cell size is even higher for later cohorts: cohort 6, born 1935-39, has a remarkable average cell size of 3301, and a minimum cell size of 2238. Smaller cell sizes are observed for cohorts born in the 1960s: for cohort 12 the minimum cell size is as low as 52 (in 1985), so we disregard the observations for the first five sample years in our application (bringing minimum cell size up to 443).

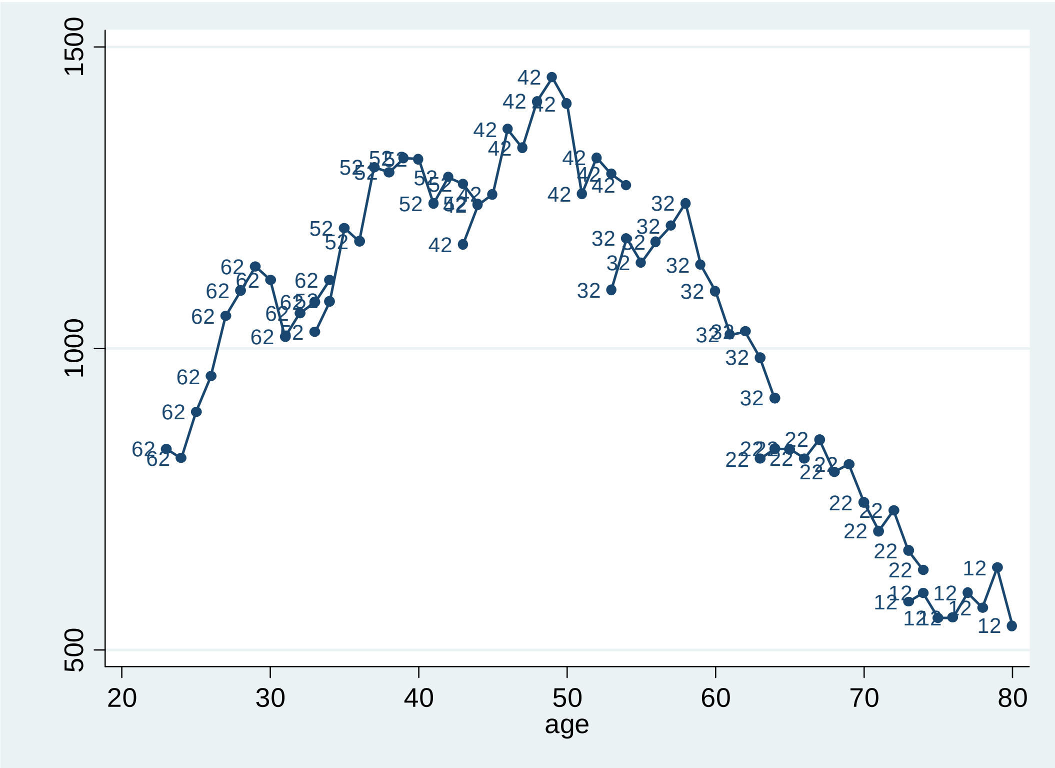

Figure A1. Total expenditure, cohort age profile

Average total expenditure by cohort and age in 1989 Euros. Data points are labeled by the mid-point of the range of head's years of birth that defines the cohort.

In Figure A1 we plot average total expenditure (including purchases of durable goods) versus age for every second cohort. Each data point is labeled by the mid-point of the range of head's years of birth (*yob*) that defines our cohorts. All figures are expressed in 1989 Euros.

As explained in Section 2, the presence of a strong business cycle effects in Italy in the 1990s is well established. However, a comparison between aggregate SFB data and National Accounts (NA) statistics reveals that business cycle effects are more pronounced in SFB: this implies higher growth in the 1980s and lower growth in the 1990s, but also an earlier start of the 1993 recession (Grant, Miniaci and Weber, 2002).

In the sequel, we shall allow for the difference between SFB averages and NA statistics by assuming this discrepancy is the same for all cohorts, and correcting our cohort averages for the difference in growth rates across the two sources of information. Figure A2 shows how the total expenditure age profiles appear after such correction is implemented. Growth in the early sample years is now reduced, and the decline in the late sample is also less marked, but the overall picture is not much affected.

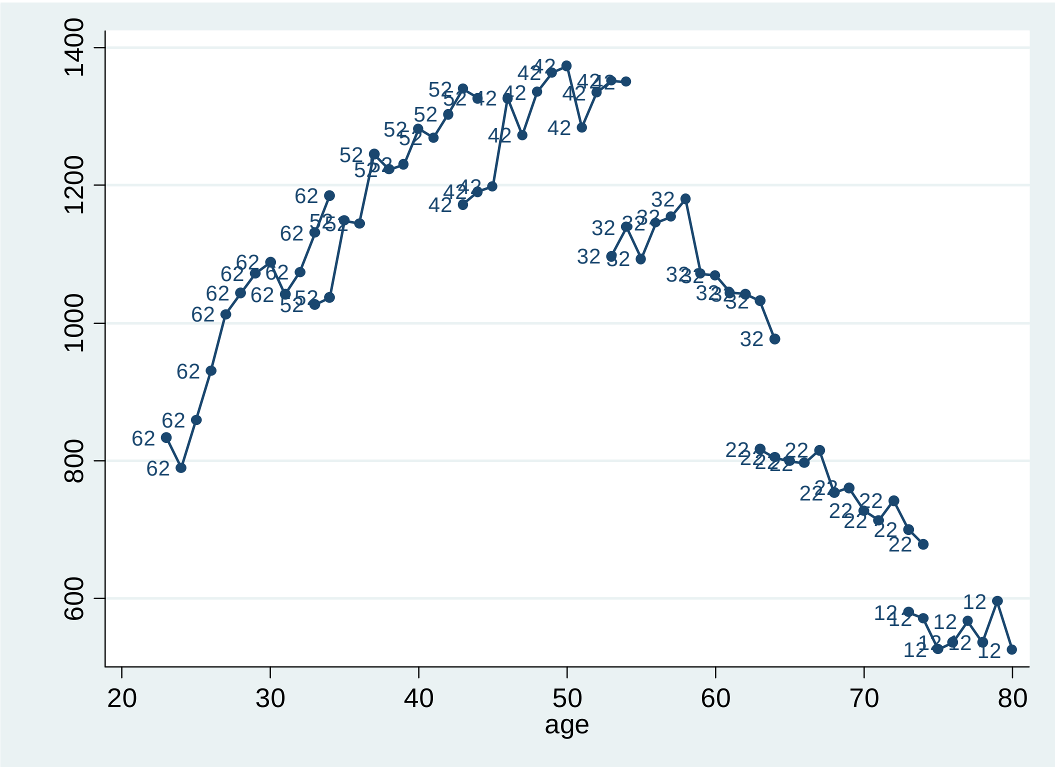

Figure A2. Total expenditure, NA adjusted, cohort age profile

Average total expenditure by cohort and age in 1989 Euros, after adjustment for discrepancies with National Accounts. Data points are labeled by the mid-point of the range of head's years of birth that defines the cohort.

The logarithmic transformation is particularly useful in this context if we believe cohort differences are best expressed in proportional terms. See Figure A3.

A potential limitation of the profiles shown so far is that they relate to total expenditure rather than consumption. Total expenditure includes purchases of durable goods and excludes consumption of their services. A measure for the latter is hard to compute in micro data (given that we don't observe the stock of durable goods). A measure of the former is however available, and non-durable expenditure can be calculated at the household level. [7] On the assumption of preference separability between durables and non-durables, expenditure on non-durable goods and services is the relevant consumption measure. The result is shown in Figure 1 in the text.

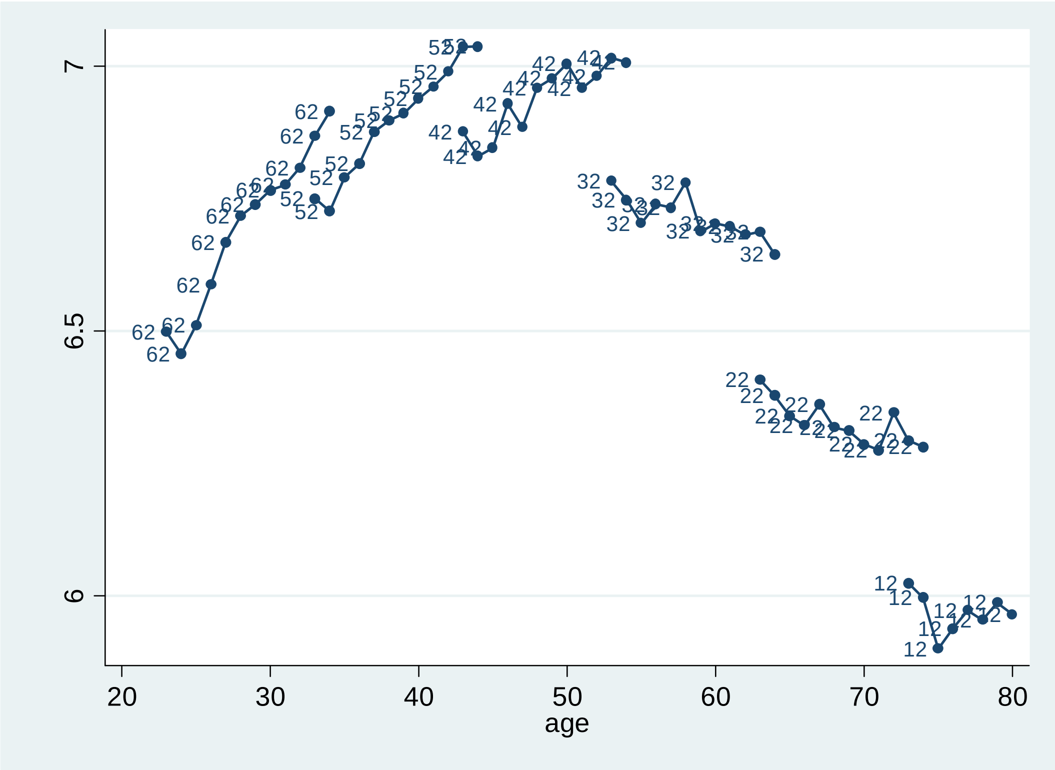

Figure A3. Log(total expenditure), NA adjusted, cohort age profiles

Average logarithm of expenditure by cohort and age in 1989 Euros, after adjustment for discrepancies with National Accounts. Data points are labeled by the mid-point of the range of head's years of birth that defines the cohort.

[7] In the public use tape of the SFB one needs to make assumptions on the durability of some residual items. We exploit information from the 1995 raw data to produce our own estimate of expenditure on non-durable goods and services for all available years. See Monfardini, Miniaci and Weber (2001) for a description.

Table A2: Estimates of regression equations for log(Consumption)

	(1)	(2): (1)+eq.scale	(3): (2)+demo	(4): (3)+house	(5): (3)+retired	(6): (4)+retired
Difference SFB - NA	0.0035***	0.0034***	0.0031***	0.0030***	0.0031***	0.0030***
	0.0003	*0.0003*	*0.0003*	*0.0003*	*0.0003*	*0.0003*
GDP trend residuals	0.0022***	0.0022***	0.0022***	0.0022***	0.0022***	0.0021***
	0.0002	*0.0002*	*0.0002*	*0.0002*	*0.0002*	*0.0002*
Coh yob=17	0.1982***	0.2019***	0.1832***	0.1520***	0.1867***	0.1558***
	0.0152	*0.0140*	*0.0137*	*0.0132*	*0.0140*	*0.0134*
Coh yob=22	0.4140***	0.4100***	0.3763***	0.3118***	0.3836***	0.3193***
	0.0230	*0.0198*	*0.0208*	*0.0199*	*0.0217*	*0.0205*
Coh yob=27	0.6090***	0.5864***	0.5327***	0.4378***	0.5418***	0.4473***
	0.0303	*0.0265*	*0.0287*	*0.0274*	*0.0298*	*0.0282*
Coh yob=32	0.8008***	0.7628***	0.6666***	0.5462***	0.6763***	0.5567***
	0.0408	*0.0347*	*0.0370*	*0.0353*	*0.0385*	*0.0364*
Coh yob=37	0.9861***	0.9448***	0.7981***	0.6505***	0.8081***	0.6617***
	0.0496	*0.0424*	*0.0442*	*0.0422*	*0.0458*	*0.0433*
Coh yob=42	1.1564***	1.1222***	0.9454***	0.7719***	0.9579***	0.7855***
	0.0572	*0.0494*	*0.0522*	*0.0500*	*0.0541*	*0.0513*
Coh yob=47	1.2970***	1.2769***	1.0780***	0.8830***	1.0928***	0.8986***
	0.0660	*0.0581*	*0.0630*	*0.0605*	*0.0653*	*0.0621*
Coh yob=52	1.4317***	1.4315***	1.1970***	0.9843***	1.2126***	1.0008***
	0.0739	*0.0655*	*0.0721*	*0.0693*	*0.0748*	*0.0712*
Coh yob=57	1.5570***	1.5776***	1.3003***	1.0682***	1.3148***	1.0843***
	0.0831	*0.0735*	*0.0807*	*0.0775*	*0.0836*	*0.0796*
Coh yob=62	1.6816***	1.7303***	1.4170***	1.1590***	1.4298***	1.1741***
	0.0922	*0.0816*	*0.0885*	*0.0852*	*0.0916*	*0.0874*
Coh yob=67	1.8116***	1.9007***	1.5459***	1.2600***	1.5576***	1.2746***
	0.1018	*0.0911*	*0.0983*	*0.0943*	*0.1018*	*0.0967*
Age	0.084	0.2728***	0.0308	0.0333	0.0717	0.0647
	0.0665	*0.0585*	*0.0812*	*0.0782*	*0.0840*	*0.0803*
Age^2	-0.0022	-0.0118***	-0.0001	-0.0005	-0.0019	-0.0019
	0.0030	*0.0026*	*0.0037*	*0.0035*	*0.0038*	*0.0036*
$Age^3/1000$	0.0769	0.2818***	-0.0034	0.0073	0.0322	0.0345
	0.0631	*0.0562*	*0.0795*	*0.0764*	*0.0828*	*0.0789*

	(1)	(2): (1)+eq.scale	(3): (2)+demo	(4): (3)+house	(5): (3)+retired	(6): (4)+retired
$Age^4/1000000$	-1.2600	-3.206***	0.0850	-0.0318	-0.2340	-0.2761
	0.6479	*0.5808*	*0.8283*	*0.7962*	*0.8642*	*0.8235*
$Age^5/1000000000$	6.909**	13.7***	-0.5522	-0.0848	0.4924	0.7173
	2.5700	*2.3200*	*3.3300*	*3.2000*	*3.4800*	*3.3200*
Ln(#eq.adults)		0.7267***	0.7236***	0.6410***	0.7201***	0.6388***
		0.0239	*0.0160*	*0.0146*	*0.0164*	*0.0149*
HH female			-0.0932***	-0.0876***	-0.0755***	-0.0716***
			0.0048	*0.0046*	*0.0051*	*0.0049*
Spouse			-0.0355***	-0.0250***	-0.0374***	-0.0273***
			0.0065	*0.0064*	*0.0065*	*0.0064*
Centre			-0.0538***	-0.0668***	-0.0539***	-0.0663***
			0.0103	*0.0102*	*0.0103*	*0.0102*
South			-0.2940***	-0.2606***	-0.2920***	-0.2587***
			0.0113	*0.0113*	*0.0112*	*0.0112*
HH primary school			0.1618***	0.1309***	0.1540***	0.1245***
			0.0083	*0.0081*	*0.0079*	*0.0078*
HH high school			0.1750***	0.1352***	0.1664***	0.1286***
			0.0056	*0.0046*	*0.0056*	*0.0046*
HH college degree			0.1450***	0.1139***	0.1399***	0.1102***
			0.0061	*0.0060*	*0.0061*	*0.0059*
HH prim sch.*Centre			-0.0068	0.0002	-0.0100	-0.0027
			0.0109	*0.0107*	*0.0109*	*0.0107*
HH high sch.*Centre			-0.0173**	-0.0106	-0.0160**	-0.0098
			0.0059	*0.0057*	*0.0059*	*0.0057*
HH college*Centre			0.0300**	0.0246*	0.0309**	0.0254**
			0.0095	*0.0094*	*0.0094*	*0.0094*
HH prim. sch.*South			0.0225*	0.0052	0.0194	0.0026
			0.0105	*0.0107*	*0.0105*	*0.0106*
HH high sch.*South			0.0133*	0.0046	0.0128*	0.0039
			0.0058	*0.0056*	*0.0058*	*0.0056*
HH college*South			0.0353***	0.0272**	0.0359***	0.0278**
			0.0087	*0.0086*	*0.0087*	*0.0086*
HH female *Centre			0.0183**	0.007	0.0231***	0.0118
			0.0067	*0.0065*	*0.0067*	*0.0064*

	(1)	(2): (1)+eq.scale	(3): (2)+demo	(4): (3)+house	(5): (3)+retired	(6): (4)+retired
HH female *South			-0.0188**	-0.0300***	-0.0059	-0.0179**
			0.0069	*0.0067*	*0.0069*	*0.0066*
PrChild[0,3]			-0.1850***	-0.1672***	-0.1872***	-0.1688***
			0.0117	*0.0111*	*0.0119*	*0.0113*
PrChild(3,5]			-0.1483***	-0.1339***	-0.1509***	-0.1358***
			0.0113	*0.0109*	*0.0115*	*0.0110*
PrChild(5,10]			-0.1225***	-0.1121***	-0.1255***	-0.1144***
			0.0109	*0.0107*	*0.0110*	*0.0108*
PrChild(10,13]			-0.0702***	-0.0644***	-0.0741***	-0.0673***
			0.0108	*0.0107*	*0.0110*	*0.0108*
PrChild(13,18]			-0.0228*	-0.0105	-0.0249*	-0.012
			0.0112	*0.0107*	*0.0113*	*0.0108*
PrChild(>18)			0.0648***	0.0812***	0.0771***	0.0912***
			0.0073	*0.0070*	*0.0074*	*0.0070*
PrAdult(18,27)			-0.0078	-0.0062	-0.0183	-0.0146
			0.0110	*0.0108*	*0.0111*	*0.0108*
PrAdult[27,60)			0.0427***	0.0350**	0.0354**	0.0293**
			0.0109	*0.0108*	*0.0109*	*0.0108*
PrAdult(>=60)			-0.0388***	-0.0422***	-0.0369***	-0.0410***
			0.0104	*0.0103*	*0.0103*	*0.0102*
Spouse primary sch			0.0365***	0.0197***	0.0358***	0.0196***
			0.0052	*0.0052*	*0.0051*	*0.0051*
Spouse high school			0.0853***	0.0619***	0.0882***	0.0650***
			0.0036	*0.0035*	*0.0036*	*0.0035*
# children with at most compulsory education			0.0060	0.0023	0.0036	0.0004
			0.0037	*0.0033*	*0.0037*	*0.0033*
# children with at most secondary education			0.0376***	0.0179***	0.0327***	0.0141***
			0.0038	*0.0035*	*0.0036*	*0.0033*
# children with tertiary education			0.0962***	0.0636***	0.0908***	0.0596***
			0.0076	*0.0072*	*0.0075*	*0.0071*
ln(sq. meters)				0.1671***		0.1659***
				0.0044		*0.0044*
ln(Rent or imputed rent)				0.1198***		0.1178***
				0.0024		*0.0024*

	(1)	(2): (1)+eq.scale	(3): (2)+demo	(4): (3)+house	(5): (3)+retired	(6): (4)+retired
HH Retired					-0.0724***	-0.0544***
					0.0064	*0.0057*
HH Pensioner not from work					-0.1570***	-0.1370***
					0.0072	*0.0068*
Constant	3.7690***	2.4075***	4.6581***	3.7648***	4.3297***	3.5214***
	0.5703	*0.5072*	*0.7056*	*0.6836*	*0.7275*	*0.6997*
Adjusted R^2	0.1478	0.2781	0.3782	0.4004	0.3807	0.4023

OLS estimates, standard errors – in italics - are adjusted for clustering at the cohort and year level. Observations: 369912. *: significant at 10%, **: significant at 5%, ***: significant at 1%.