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(Un)expected retirement and the consumption puzzle*

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Abstract

In this work we revisit the retirement consumption puzzle using Italian panel data. As emphasized in the literature, the observed consumption drop might be due to unexpected wealth shocks at retirement, which modify optimal consumption plans. Using an Euler equation approach, we test the impact of unexpected retirement on the consumption patterns of individuals around the age of retirement by using the panel component of the Survey of Household Income and Wealth (SHIW). This data set contains information on expected age of retirement, which can be used to distinguish between expected and unexpected retirement. We furthermore investigate the heterogeneous behavior of individuals with different educational levels, pension coverage and wealth. We do find evidence of a consumption drop at retirement especially for low educated people, individuals without a second pillar coverage and individuals with low wealth. Consumption drop at retirement seems rationally planned by individuals, rather than being a response to unexpected retirement.

Keywords: consumption, life-cycle, retirement puzzle, unexpected retirement

JEL classification: D91, J26

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1. Introduction

One of the main predictions of the simple version of the Life Cycle Model (LCM) is that the consumption should be kept stable over the life span, irrespective of income fluctuations[1]. Borrowing and dis/saving would act as channels through which consumption smoothing is accomplished. One of the biggest fluctuations in income takes place at retirement, when consumption is also observed to exhibit a sizeable drop, which cannot be fully explained in a standard intertemporal utility optimization framework (the "retirement consumption puzzle", after the work by Banks, Blundell and Tanner, 1998). Understanding whether and why consumption drops at retirement is important not only as a test of the LCM, but also as it may signal a situation of vulnerability of the family at retirement, a matter on which policy-makers should perhaps intervene.

As first emphasized by Banks, Blundell and Tanner (1998), the consumption drop at retirement could be reconciled within the LCM to the extent that retirement and the related income drop - the pension income is commonly lower than the last wage - is unexpected, households should react to unforeseen events by modifying their consumption rules. In this line, Smith (2006) for the UK finds that food consumption drops at retirement only for those households whose head had involuntarily retired, while there is no drop at retirement for those who decided to retire. Using subjective retirement expectations, Haider and Stephens (2007) find for the US a less pronounced decline in consumption, when retirement is expected by individuals.

Other potential explanations for the consumption drop at retirement are the decrease in the work-related expenditures, the non-separability of preferences about leisure and consumption, and home production. Work-related expenditures (Banks, Blundell and Tanner, 1998; Miniaci, Monfardini and Weber, 2010) are expenses for goods and services that do not create utility per se to the individual. They are necessary while the individual works (travel, clothing and food out expenses), but become superfluous during retirement. In the same vein, if workers compensate with consumption the disutility of work (i.e. leisure is non separable from consumption), at retirement they can reduce consumption accordingly to the increase in leisure (French, 2005; Blau 2008). Finally, as shown by Hurd and Rohwedder (2003), Aguiar and Hurst (2005 and 2008) concerning the US, while having more spare time, individuals at retirement can home produce some goods (as food) or better looking for the best price for quality goods. In this way they spend less, but they attain the same level of utility they had before retirement.

A residual explanation of the retirement-consumption puzzle could be the unpreparedness of households to the reduction in income that normally follows retirement: households might have not adequately saved during their working life and, therefore, have to decline their expenditures. Gustman and Stenmeier (2001) find that misinformation or lack of information about retirement benefits is the norm among US workers. Lusardi (1999, 2000) finds that, ceteris paribus, households who have given little thought to retirement have far lower wealth than those who have given the subject more thought. Bernheim, Skinner and Weinberg (2001) find for the US that wealth accumulation behaviour of individuals responds more to a "rule of thumb" than to the LCM. Angeletos *et al.* (2001) demonstrate through simulation methods that hyperbolic (rather than geometric) discounting households have self-control problems that lead to dynamic-inconsistent behaviours and induce planned fall in consumption at retirement.

[1] In general, utility maximization implies that the marginal utility of consumption is constant over time. If utility depends upon consumption only and under the equality between interest rate and subjective discount rate, the result converts into constant consumption.

As potentially due to a number of different causes, the consumption drop at retirement is likely to present a huge heterogeneity across households. Work-related expenditures, the elasticity of substitution between market and home-produced goods and the return to home production can widely differ among households, depending on their characteristics. In addition, differences in planning effort and in the propensity to plan are likely to be strongly associated with differences in wealth accumulation (Ameriks, Caplin and Leahy, 2003) and with different variations in consumption after retirement (Aguiar and Hurst, 2005; Bernheim, Skinner and Weinberg, 2001). To the extent that retirement income decline is partly unanticipated, we expect those households with a more consistent level of net worth to be more protected against negative income shocks.

Concerning the Italian case, previous studies using Italian data do find evidence of a small consumption drop at retirement. Miniaci, Monfardini and Weber (2010) and Battistin, Brugiavini, Rettore and Weber (2009) argue that it is due to a fall in the consumption of work-related goods and to an increase of home produced food and goods. Their analyses however do not explicitly account for unexpected retirement and are based on pseudo–panel data, so they are not able to fully account for individual heterogeneity.

In our work we study the consumption dynamics of Italian households by exploiting the panel dimension of the Survey of Household Income and Wealth (SHIW) data base. We make use of a unique feature of SHIW that is the fact that it reports, for each worker at each wave, the expected age of retirement. In addition, we characterize the behavior of each household conditional on some observed features that can reveal interesting differences among individuals. Primarily, the individual's educational and cultural background as they are likely to influence both their wealth – and hence the capability of self-insure against risks – and their preferences for home production (and the return to it) – expected to be higher, on average, for the low educated which should be more prone to substitute their time with non-durable expenditures. Finally, we also look at the subscription to a second pillar pension plan as it proxies the effort for reaching an adequate income for retirement, and the accumulated wealth level to explicitly account for the role of wealth buffer in preventing consumption drop at retirement.

In the analysis we do find evidence of a significant drop at retirement for what concerns the expenditures in non durables for low educated, individuals without a second pillar coverage and less wealthy individuals. Only for low wealth individuals, part of this drop seems to be motivated by unexpected retirement and the related drop in the permanent income.

The paper is structured as follows. Section 2 shows the empirical strategy we apply to test the presence and the determinants of the consumption drop. Section 3 illustrates the data. Section 4 discuss the results and section 5 reports the conclusions.

2. Empirical strategy

In order to analyse the consumption patterns of individuals around retirement, we estimate an Euler equation derived on the assumption of intertemporal separable lifetime preferences and constant relative risk aversion (CRRA) within-period utility. To take into account the role of demographic variables, we specify the within period utility function as:

$$u(C_{i,t}) = \frac{\exp(\beta_1 Z_{i,t})}{1-\rho} C_{i,t}^{1-\rho} \qquad (1)$$

Where (ρ) is the inverse of the elasticity of intertemporal substitution – assumed constant across individuals – and Z is a set of demographic characteristics acting as taste shifters.

The resulting Euler equation shows the consumption evolution over time as a function of the parameters of the utility function, of the intertemporal rate of time preference – that following Banks, Blundell and Tanner (1998) is allowed to depend on age – and of the market interest rate:

$$\ln C_{i,t} - \ln C_{i,t-1} = k + \frac{1}{\rho} r_t + \beta_1 \Delta Z_{i,t} + \beta_2 age_{it} + e_{i,t} \qquad (2)$$

The constant *k* captures both the (constant across households part of the) discount factor and conditional higher moments of consumption growth and of the interest rate, and $e_{i,t}$ represents all the unexpected news received in year *t*. Shocks may be related to individual or aggregate factors, as an unforcasted unemployment spell or an unexpected recession, that cause a revision to the lifetime resources and hence to consumption.

As far as retirement and the consequent change in income are expected - and therefore households do not get caught unprepared -, permanent income does not change and consumption growth should not be at all affected: to test this implication we add to equation (2) an indicator variable equal to one at the time of retirement:

$$\Delta \ln C_{it} = k + \frac{1}{\rho} r_t + \beta_1 \Delta Z_{it} + \beta_2 age_{it} + \gamma * retired_{it} + e_{it} \qquad (3)$$

According to this specification of the model, if retirement is expected, the coefficient γ should be equal to zero[2].

If, however, retirement is unexpected – that is if retirement occurs earlier than expected as a consequence of early dismissal from work or redundancy, for example – then it is accompanied by an unexpected wealth shock, which causes, in turn, a negative revision in consumption (Banks, Blundell and Tanner, 1998). In order to distinguish between expected and unexpected decisions to retire we use a unique source of information given for each (working) respondent: the expected age of retirement. In each wave, we compare the actual with the expected age of retirement. Combining these pieces of information we can distinguish among four cases: individuals retiring when expected, individuals retiring unexpectedly, individuals that expected to retire but did not, individuals that do not retire and did not expect to do so.

3. Data

We use nine waves of the Italian Survey of Household Income and Wealth (SHIW) for the period 1991-2008. The survey began in the 1960s with the aim of gathering data on incomes and savings of Italian households. Over the years, the scope of the survey has grown and now contains detailed information on Italian households' consumption and household members' demographics, labour supply including the accumulated work seniority, income and real and financial wealth.

[2] The assumptions underlying the model we use rely on the separability of consumption and leisure and do not account for home production as well as for the effect of precautionary saving arising from uncertainty

Data are representative of the Italian resident population and are collected (currently) every 2 years. Each wave covers approximately 8,000 households and 50 percent of the sample is re-interviewed the next year in order to build up a rotating panel component. The unit of observation is the family, which is defined to include all persons residing in the same dwelling who are related by blood, marriage, common-law marriage or adoption. Brandolini and Cannari (1994) and Brandolini (1999) describe the set up of this data set and quality.

The availability of data on households' expenditure and on individuals' characteristics allows us to estimate the Euler equation (equation 3) for non-durable consumption. The utility changes associated with consumption of durables are indeed difficult to measure, as current households' utility can depend on service flows from past purchases of these goods.

The data on individuals' expectations about retirement age constitute a special asset for our analysis, by knowing with certainty whether retirement was truly expected by individuals. In addition, knowing the educational attainment for each household component allows us to detect whether individuals with low educational level behave differently from individual with a higher education attainment. Finally, the survey contains information on subscription, at individual level, to second pillar pension plans and on the financial and real wealth accumulated at retirement. This is valuable information for explaining the heterogeneity of individual behaviour.

To carry out the empirical analysis we select a sample of households whose head is around the age of retirement (in the age range 50-75). In particular, as we are interested in time variations, we focus on the group of the households that are observed at least for two consecutive waves. We also exclude those individuals returning back to work after retirement. In order to avoid exceptional and little representative situations, we restrict our sample to male headed households (the vast majority in Italy, about 73 per cent in sample age range). Moreover we select households whose head is observed to be either an employee or a self-employed, by excluding those who exhibited time spells out-of the labour market other than retirement. We also exclude those individuals who were not working during the first wave of interview and 5 households with extreme changes in consumption.

The final selected sample counts 5,667 observations for 2,378 heads of households. We provide basic statistics for the selected sample in Table 1. The average family spends in food about 8 thousands euro per year, about one third of the total average expenditure for non durable goods, which is on average equal to 27 thousands euro per year. The average family in our sample is made up of about 3 components, of which 2 being income earners. The average age of the heads of households is around 57.3 and is about 2.5 years lower than the average age at retirement for new pensioners. Indeed, at the first wave the selected individuals are all working. The first pension at retirement is around 73.7 per cent of the last wage.

About 60.9 per cent of the individuals attended only the compulsory school and 11.1 per cent has a second pillar pension coverage. Employees are about 73.6 per cent of the sample and 24.2 per cent are self-employed, while the residual 2.2 per cent of individuals have mixed careers.

Table 1 – Descriptive statistics

	Mean	Std. Dev.
consumption of non durables	27383.96	14936.79
consumption of food	8379.00	4032.96
Age	57.34	5.66
employees (%)	73.58	41.10
self-employed (%)	24.17	41.23
low educated (%)	60.90	48.80
with II pillar pension (%)	11.12	31.44
household components	3.28	1.20
age at retirement	59.97	4.71
replacement rate at retirement (%)*	73.68	21.05

Note: Source: SHIW 1991-2008, pooled sample of 5,667 observations related to 2,378 male household-heads observed retiring in the period 1992-2008.
*known for 599 out of 722 individuals retiring.
Consumption and all the other monetary values are reported in euro at prices of the year 2009[3].

Table 2 reports the distribution of retiring people by educational level, participation in the II pillar and wealth. We observe that 229 out of 722 retirement episodes (about 32 per cent) are unexpected. The incidence of unexpected retirement is slightly lower for high educated than for low educated people (26 per cent *versus* 34 per cent) and for people with a second pillar coverage with respect to people without it (30 per cent *versus* 32 per cent), but does not vary according to the wealth level of individuals.

Table 2 - Distribution of retiring people by educational level, participation in the II pillar and wealth

		retired when expected	unexpected retirement	Total
By education:				
	high educated	160	56	216
	low educated	333	173	506
By II pension pilllar coverage:				
	without a second pillar pension	455	213	668
	with a second pillar pension	38	16	54
By wealth levels:				
	below the median	251	116	367
	above the median	242	113	355
Total		493	229	722

[3] We use the ISTAT consumer price index for blue and white-collar worker households (FOI).

4. Results

As discussed in section 2, we write our basic specification for consumption growth as[4]:

$$\Delta \ln C_{it} = \ln C_{it} - \ln C_{it-2} = \alpha + \gamma * retired_{it} + X_{it}\beta + T_t\theta + e_{it} \quad (4)$$

where our dependent variable is the variation in the logarithm of non-durable household expenditures occurred between two consecutive waves of the survey.

In our baseline specification, the set of regressors includes the dummy variable for retiring in the current wave[5], whose coefficient γ measures the so-called consumption drop at retirement, and the time dummies T_t, to capture the effect of time-varying interest rates. In addition we control for a set of individual specific characteristics (X) as:

- the age of the household head that captures the changes in the intertemporal rate of time preferences,
- the educational level of the household head, as cultural background normally shapes individual behaviour,
- the change in the number of household components, as consumption growth is expected to be greatly affected by changes in household composition[6],
- the change in the number of income earners as a proxy of the change in the income of household,
- the area of residence (north, centre and south), to allow for macro-regional differences in discount rates.

Results of our baseline models are reported in table 3 where we only illustrate the value of γ. Given that in our estimations we exploit the panel dimension of the data, we compute clustered robust standard errors in order to account for heteroscedasticity and serial correlation of individuals' errors across time.

In the first and simplest specification considered (see column 1 of table 3), the OLS coefficient on the retirement dummy implies an average consumption drop of about 4 per cent at retirement.

However, as shown in column 2, such a reduction in consumption at retirement does not characterize all the household heads of the sample in the same way. High educated individuals - here defined as individuals with more than compulsory education - actually show up at retirement a drop in consumption of about 2.6 percentage points, not statistically different from zero. At the opposite, for low educated individuals we detect a significant contraction of consumption at

[4] See Banks, Blundell and Tanner (1998) for a similar specification.

[5] As there is a two years lag between each wave, an individual observed retiring in wave t could actually have retired one year before.

[6] See Attanasio and Weber (1995). Alternatively, as in Miniaci et al. (2010), we could have attribute shares of the household consumption to the household members according to an equivalence scale and we could have regressed the individual consumption on each household member's characteristics. However, this would have come at the cost of introducing a substantial measurement error.

retirement of about 4.5 percentage points. We interpret these results as evidence of home production among less educated people. Different educational level are likely to be associated to different preferences for leisure and consumption. In particular, low educated are likely to know better how to home produce a variety of goods and, while retired, they finally have the time to do that, consequently being able to reduce their consumption of market goods (Hurd and Rohwedder 2003).

Table 3 - OLS by alternative specifications

	(1) b/se	(2) b/se	(3) b/se	(4) b/se
Retired	-0.0390**			
	(0.0156)			
retired*high educated		-0.0264		
		(0.0258)		
retired*low educated		-0.0446**		
		(0.0191)		
retired*with II pillar coverage			0.0847*	
			(0.0481)	
retired*without II° pillar coverage			-0.0481***	
			(0.0162)	
retired * wealth at retirement below the median				-0.0675***
				(0.0218)
retired * wealth at retirement above the median				-0.0095
				(0.0193)
R-squared	0.041	0.041	0.044	0.042
N	5667	5667	5667	5667

Note: ***1% significance level; **5% significance level; *10% significance level.
Clustered standard errors. Standard errors in parentheses.

Education, however, can also be a proxy for financial literacy. Better planners are more prepared to cope with income drop following retirement. Such an awareness can lead individuals to subscribe a second pillar pension in order to preserve the adequacy of income flows during retirement. As shown in column 3 of table 3, individuals with a second pillar coverage do not experience on average a consumption drop at retirement. Actually, if anything, they do experience an increase in consumption, with a magnitude of 8.5 per cent, albeit significant at 10 per cent level only. The estimated coefficient for non-subscribers is instead equal to -4.8 per cent and significant at a 1 per cent statistical level. However, the subscription of a second pillar pension is still not a common practice, even among high educated. In our sample, only the 9 per cent of the low educated and the 15 per cent of the high educated are enrolled into a second pillar pension. Having subscribed to a second pillar usually depends on the working scheme, with ”good” employers offering health insurance and additional pension schemes.

A key actor shaping consumption smoothing is wealth, for which education can act as a good proxy. Transitions from working statuses are likely to be smoother the higher the available (and liquid) assets. In our sample the majority of households accumulate wealth, with 70 per cent of the high educated individuals accumulating wealth above the median, opposite to 40 per cent of low

educated individuals. To test whether wealthier individuals more easily manage to smooth consumption, we run a regression disentangling the retiring population in two groups, those with wealth above or below the median of the distribution (see column 4). Wealth is defined as the sum of financial and real wealth accumulated at the time of retirement.

We find that consumption drop only characterizes the group of individuals with wealth below the median, while those families with above-the median wealth exhibit consumption smoothing between working and retirement. For the former group, the coefficient of the dummy retired in the estimated equation is about -6.8 per cent, significant at 5 percentage level. For the second, it is almost -0.01 and not statistically different from zero.

Nonetheless, retirement can be unexpected and, if so, it is likely associated with a wealth shock determining sizeable effects on consumption. Permanent income, the main determinant of current consumption, is negatively affected by earlier retirement, as retirement coincides with a flow of pensions which are lower than labor incomes. In addition to that, unexpected retirement is also associated to a replacement rate lower than expected, further exacerbating the income drop when retired. This leads to an estimation of the consumption drop at retirement that mixes up for some individuals the effects of the unexpected income shock consequent to retirement with all the other potential explanations for the reduction in consumption at retirement, namely: preferences, non separability between consumption and leisure, etc...

As discussed in section 2, we extensively deal with the unexpected retirement by using information on the expected age of retirement. In particular, at each time t we observe both whether and individual is retiring and whether an individual expected to retire. At time t, an individual is defined to expect to retire if in the previous wave he reported so. Interacting these two dichotomous variables we obtain four dummy variables to cover the four possible cases: (i) in period t an individual is not retired and did not expect to be retired; (ii) in period t an individual is not retired but expected to be retired; (iii) in period t an individual is retired but did not expected to be retired, and (iv) in period t an individual is retired and expected to retire. Case (iii) is what we label “retired when not expected”, while case (iv) is what we label “retired when expected”. Actually, in our sample, about 68 per cent of the individuals who retire correctly predict retirement. Case (i) is our base case and we exclude the corresponding dummy variable from the regressions.

As reported in table 4, our base case specification (column 1) shows that households who were expecting retirement reduced their consumption, by about 4 per cent, while households who unexpectedly retire, on average, did not change their consumption pattern. Such a finding is in clear contrast with the idea that unexpected early retirement is associated with a drop in wealth and, as a consequence, in consumption. In order to explore what characteristics may drive this result, we break our results according to the educational level of the head of the households and the availability of a second pillar pension. As reported in column 2, consumption drops at retirement, only when it is expected, and only for low educated individuals; on average for this group consumption drops by about 5 per cent.

When we consider second pillar coverage, we find we find again a drop of about 5 per cent for households with no second pillar pension who retirement when expected. The coefficient of the dummy “retired when unexpected” is instead lower in absolute value and not significantly different from zero. Individuals with a second pillar coverage distinguish themselves from the rest of the sample as they exhibit a sizeable increase in their consumption levels of about 11 per cent when retirement is expected. When retirement is unexpected the positive coefficient is even higher, but

the standard error is also very high, indicating there is great variability of behaviour within this group.

Table 4 - OLS by alternative specifications disentangling expected and unexpected retirement

		(1) b/se	(2) b/se	(3) b/se	(4) b/se
	retired when expected	-0.0374**			
		(0.0171)			
	retired when not expected	-0.0198			
		(0.0291)			
high educated	retired when expected		-0.0169		
			(0.0290)		
	retired when not expected		-0.0270		
			(0.0486)		
low educated	retired when expected		-0.0476**		
			(0.0206)		
	retired when not expected		-0.0180		
			(0.0350)		
without II° pillar	retired when expected			-0.0507***	
				(0.0175)	
	retired when not expected			-0.0334	
				(0.0302)	
with II° pillar	retired when expected			0.1134**	
				(0.0515)	
	retired when not expected			0.1497	
				(0.0920)	
wealth at retirement below the median	retired when expected				-0.0461*
					(0.0237)
	retired when not expected				-0.0895**
					(0.0433)
wealth at retirement abow the median	retired when expected				-0.0270
					(0.0218)
	retired when not expected				0.0526
					(0.0350)
not retired when expected		0.0277*	0.0275*	0.0272*	0.0283*
		(0.0159)	(0.0160)	(0.0160)	(0.0159)
R-squared		0.041	0.041	0.043	0.043
N		5667	5667	5667	5667

Note: ***1% significance level; **5% significance level; *10% significance level.
Clustered standard errors. Standard errors in parentheses.

We finally break down our sample of retiring individuals according to whether their wealth at retirement is above or below the median, and (column 4) we find evidence of a consumption drop at retirement significantly different from zero only for low wealth individuals. For them, the consumption drop is equal to about 4.6 per cent if retirement was expected, while it almost doubles when retirement was unexpected (although the two numbers are not statistically different one from

the other, especially due to the relatively high standard error for the "expected retirement" group). Wealthier households do not react to retirement, in neither the expected or unexpected case.

In all the specifications shown in table 4, for individuals expecting retirement that we do not observe to retire - that are about 10 per cent of our sample - we do observe an increase in consumption that can be due to the fact that if they do not retire they unexpectedly have more income and can consequently increase consumption.

Concluding, it is only when we distinguish among wealth levels that we are able to isolate a negative effect of unexpected retirement on consumption: while below the median individuals who retire when expected experience a (moderate) consumption drop at retirement, indicating that some consumption drop for this group of the population is planned, when retirement comes unexpectedly early low wealth households react by lowering their consumption even more, probably due to a low buffer to face negative shocks.

5. Conclusions

In this paper we exploit the panel dimension of the Bank of Italy data set to estimate the size of the consumption drop at retirement in Italy. We also use information on the expected age of retirement to distinguish between expected and unexpected retirement and this permits to disentangle the effects of negative wealth shocks at retirement from the estimates of the consumption drop.

Our results show that on average the non-durable consumption drop at retirement in Italy is about 4 per cent. This finding is in line with previous research on Italian data (Miniaci, Monfardini and Weber, 2010; Battistin, Brugiavini, Rettore and Weber, 2009). Further investigation reveals that the reduction in non-durable consumption at retirement only persists among low educated (heads of) households and households where the head has no second pillar coverage. Most importantly, we find significant differences when we distinguish households according to their accumulated wealth at retirement: the average consumption drop for households with wealth below the median is about 7%, while it is zero for households who accumulated wealth above the median.

We also make use of information on the expected age of retirement to test the hypothesis that the observed consumption drop is caused by individuals who retire involuntary early. We find that the average 4 per cent drop in consumption at retirement is indeed present also when individuals retire when they expect to do so. This result is driven, as before, by households with relatively little wealth (below the median): in this group, we find that the consumption drop is about 9% if the head did not expect to retire, while the magnitude of the drop shrinks by half when retirement was expected to happen.

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