Various studies on the policy implications of demographic change in national and Community policies

Lot.1: Implications of demographic change in enlarged EU on patterns of saving and consumption and in related consumer's behaviour

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Contents

5. Estimating Private Consumption Profiles♦

In this chapter we provide an empirical analysis on consumption for selected European countries. The aim of this study is twofold. First, we investigate the existence of a consumption drop at retirement and we evaluate whether its magnitude is compatible with the life-cycle theory of consumption (i.e. we explore the existence of a "retirement-consumption puzzle"). Second, we estimate a life-cycle profile of consumption of the individual. Thus, this part of the study provides a crucial input for the simulation model. The estimated life-time consumption profiles, together with occupational status and demographic projections will, in fact, allow us (in the next chapters) to evaluate the effects of ageing on consumption patterns.

We exploit information from SHARE (Survey of Health, Ageing and Retirement in Europe) data. This is a multidisciplinary and cross-national data base of micro data on health, socio-economic status and social and family networks of some 22 000 Continental European individuals over the age of 50. Eleven countries have contributed micro data to the 2004 SHARE baseline study. Data collected include economic variables, social support variables, together with health and psychological variables.

Although – as we will see shortly – the characteristics of SHARE pose important limits in several dimensions of our analysis, this is the only dataset which contains information on consumption for several countries, and we use it to facilitate cross-countries comparisons.[33] Among the countries considered in the cluster analysis described in chapter 3, this dataset covers Germany, Spain, Italy, and France. Consequently, we limit our analysis to these four countries.

Households surveyed in SHARE are those with head aged 50 or older. Within household, every member over the age 50 is eligible for participation in the questionnaire. Spouses are equally eligible if they are younger than 50. The interview starts with a cover screen which collects information on gender and age of each of the household members. This cover screen is then used to determine the individuals in the

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♦ This Chapter was edited by Michele Belloni (belloni@cerp.unito.it).

[33] The other dataset available for European cross-countries comparisons, the European Community Household Panel (ECHP), does not provide information on consumption.

household who are eligible for participation in the questionnaire. The questionnaire includes 20 modules. Some modules concern the household rather than the individual and so they are only answered by the designated financial, family, or household respondent. The modules on family consumption, housing situation and household income are answered by the household respondent, being this the person most capable of answering questions on those topics. Since the main variable of our study is consumption, we take the person designated household respondent as the household head throughout our analysis. Other information as demographics and networks, health, employment and pensions, assets, activities and expectations are collected at individual level.

Four items of consumption are surveyed: food at home, food outside the home, telephone expenditure and all goods and services. The last one includes the previous three plus all the other expenditures but excludes durables as well as payments for the house (such as rent, repairs, and mortgage reimbursements). It represents therefore a measure of non-durable consumption, which is what we need for our analysis. For each item, the average monthly amount spent is asked (in a normal month, i.e. a month where no exceptional expenditures occurred).

So far, only the 2004 wave of the data is available, and therefore we are forced to carry out our analysis on a single cross-section. While the availability of a panel data would have permitted to disentangle age effects on consumption from time and cohort effects, a cross-section does not. This data limitation requires particular caution when interpreting the results, especially the shape of the life-time consumption profiles. In fact, it can be potentially a mixture between age, cohort and time effects, and external checks or/and additional assumptions are needed in the interpretation. A relatively minor bias presumably affects the evaluation of the retirement-consumption puzzle, given the more restricted range of cohorts – those around retirement age – involved.

Generally, empirical studies on consumption use an underlying model of household behavior, meaning a model where decisions to consume are taken collectively within the family. These studies attribute the household consumption to the household decision maker and explain it with his/her characteristics. In practice, the characteristics of the family are described and summarized by the characteristics of its head. The analysis of consumption dip at retirement can be performed within the household consumption framework because it affects only 50 years-old and older heads. Given that we do not

have information on young households (whose head is younger than 50), it is instead impossible to estimate directly a life-cycle profile within this framework. As we will describe later on, in order to solve this problem, we use an *ad hoc* methodology which, starting from consumption at the household level splits it between the members of the household. An immediate consequence of this data limitation is however that two almost separate empirical studies are needed in order to achieve the twofold aim of this study as presented in the beginning of this chapter.

The chapter proceeds as follows. In section 6.1 we first briefly describe the data preparation and the sample selection and then we provide a descriptive analysis of the data. In section 5.2 we investigate the retirement-consumption drop by means of an econometric analysis based on household consumption data. In section 5.3 we apply the methodology to attribute consumption to the single members of the household, and we estimate a life-cycle profile of consumption. Section 5.4 concludes and links results to the projection model.

5.1 Data preparation and descriptive analysis

Based on a preliminary data inspection we:

- trim consumption at its 1st and 99th percentiles;
- group households with at least 6 components into an unique size class (due to a low frequency of observations);
- exclude households when the reference person is younger than 50 (due to a low frequency of observations);
- build the following age brackets: [50,54]=50, [55,59]=55, …, [75,79]=75,[80,104]=80.

In table 1 we show average consumption by age and country for each of the four consumption variables available in the dataset: food at home, food outside the home, telephone expenditure and total non-durable consumption. In the same table we also show the share of each of the three specific types of consumption with respect to total non-durable consumption. Food at home represents by far the most important component of total non-durable consumption, taking a share between 39 and 62 percent (it is in general lower in Germany than in the other countries). This share does

not decrease with the age of the head (particularly in France, it steadily increases), on the opposite to what happens for food outside the home.[34] Telephone bill tends to keep constant with the age of the head. If the household income reduces while its head ages (see later), then we can assert that food at home is a necessity, telephone expenditure is a neutral good, and food outside the home is a luxury good.[35]

The last column of table 1 shows that total non-durable consumption heavily decreases with age. On average, the oldest heads, those older than 80, consume roughly 60 percent of the value of a head aged 50. The reduction is more pronounced in Spain, and less in Germany.

A part of this decline can be easily explained by looking at the household size. In table 2 we show the average household size by head's age for the different countries. Italian and Spanish households have on average more members. A part of the cross-countries differences can be explained in terms of differences in the age at which children leave the house. In fact, it is widely known (OECD, 2000) that in Italy and in Spain children live with their parents until later ages.

Apart from the cross-country differences, table 2 shows an important result for understanding the consumption drop: household size tends to fall as the head ages. This may happen for several reasons, like children leave parents' house or parents may more likely die. A first way to correct for household size is to look at consumption per equivalent-adults. We measure the number of equivalent-adults in a household as the number of adults plus 0.5 times the number of children below age 18, and we report corrected consumption in table 4.

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[34] In the literature on consumption, food outside the home is often seen as a work-related expenditure. Its often observed reduction at retirement is thus considered one of the possible explanations of the consumption "puzzle" at retirement (Banks, Blundell and Tanner, 1998).

[35] An interesting analysis would be to look at how consumption changes at retirement not only in terms of amount, but also in terms of composition. We leave this study to future research, and in the rest of the study we will focus on total non-durable consumption.

Table 1 – Total non-durable consumption and broad commodities by age and country: average and share on total non-durable consumption

		Food at home		Food outside the home		Telephone exp.		Total non-durable
Country	**Age**	**€**	%	**€**	%	**€**	%	**€**
Germany	[50, 54]	450.68	0.41	89.42	0.08	69.16	0.06	1107.98
	[55, 59]	441.18	0.41	95.99	0.09	63.29	0.06	1077.79
	[60, 64]	389.73	0.39	75.48	0.08	47.99	0.05	995.23
	[65, 69]	393.61	0.42	67.01	0.07	43.23	0.05	947.17
	[70, 74]	371.63	0.42	61.35	0.07	44.76	0.05	888.09
	[75, 79]	315.41	0.39	42.06	0.05	34.82	0.04	806.84
	>=80	278.14	0.40	37.26	0.05	36.45	0.05	699.22
Spain	[50, 54]	554.76	0.51	88.01	0.08	62.36	0.06	1098.11
	[55, 59]	511.76	0.50	64.88	0.06	53.23	0.05	1022.76
	[60, 64]	445.49	0.53	38.99	0.05	44.04	0.05	836.03
	[65, 69]	431.51	0.56	39.31	0.05	43.43	0.06	774.65
	[70, 74]	363.27	0.62	23.80	0.04	36.51	0.06	587.54
	[75, 79]	346.92	0.61	18.09	0.03	31.45	0.06	565.20
	>=80	385.41	0.63	17.01	0.03	32.69	0.05	612.17
Italy	[50, 54]	633.92	0.49	93.47	0.07	97.69	0.08	1285.19
	[55, 59]	556.67	0.47	69.95	0.06	82.36	0.07	1181.64
	[60, 64]	594.47	0.57	64.24	0.06	97.08	0.09	1044.13
	[65, 69]	469.35	0.49	53.51	0.06	76.33	0.08	958.05
	[70, 74]	453.22	0.50	27.11	0.03	75.48	0.08	902.12
	[75, 79]	423.98	0.55	31.89	0.04	62.44	0.08	770.37
	>=80	402.02	0.52	30.61	0.04	50.82	0.07	769.14
France	[50, 54]	554.75	0.40	122.77	0.09	90.16	0.06	1392.72
	[55, 59]	522.76	0.43	86.37	0.07	79.03	0.06	1227.19
	[60, 64]	509.22	0.41	65.76	0.05	77.77	0.06	1230.71
	[65, 69]	441.21	0.42	66.96	0.06	92.38	0.09	1055.22
	[70, 74]	505.56	0.52	39.33	0.04	73.69	0.08	966.20
	[75, 79]	526.29	0.53	50.89	0.05	55.21	0.06	998.35
	>=80	453.11	0.58	42.88	0.05	59.00	0.08	783.17

Notes: age of the household head, values in euro, 2004.

Source: Our computation on SHARE data

Table 2 – Average household size by age and country

Age	Germany	Spain	Italy	France
[50, 54]	2.39	3.25	3.22	2.58
[55, 59]	2.18	3.17	2.82	2.17
[60, 64]	1.96	2.62	2.54	1.98
[65, 69]	1.86	2.41	2.25	1.75
[70, 74]	1.75	2.08	2.08	1.71
[75, 79]	1.69	2.04	2.05	1.62
>=80	1.39	2.09	1.85	1.38

Notes: age of the household head, values in euro, 2004.

Source: Our computation on SHARE data

Equivalent-adults correction, however, can be too severe in presence of economies of scale in household consumption. Economies of scale are in effect apparent in table 3, where average consumption increases with household size, but less than proportionally. One of the (many) way to take into account of economies of scale is to use the "OECD-modified" equivalence scale (Haagenars *et.al*, 1994), largely used for comparison purposes in poverty analysis (e.g. Atkinson, Rainwater and Smeeding, 1995). This scale assigns a value of 1 to the household head, of 0.5 to each additional adult member and of 0.3 to each child.

Table 3 – Average total non-durable consumption by household size and country

Hh size	Germany	Spain	Italy	France
1	665.24	500.61	616.85	879.62
2	1022.15	700.68	1026.27	1154.39
3	1226.37	905.69	1101.75	1493.16
4	1432.40	1070.88	1364.39	1678.56
5	1334.21	1425.15	1270.53	1531.45
>=6	1100.00	1344.75	1239.47	1265.33

Notes: values in euro, 2004.

Source: Our computation on SHARE data

In table 4, we therefore show average OECD-scale-corrected household (non-durable) consumption by age, and we compare it with both total (non-durable) consumption (the value reported in the SHARE data) and (non-durable) per equivalent-adults consumption. These results, together with averages by single age (instead of 5-years age brackets), are also presented in graph 1. We can see how the consumption profile is much flatter, once a correction for household size is taken into account. The profiles of

per equivalent-adults and OECD-scale-corrected consumption are almost parallel, the latter being slightly higher (due to the economies of scale).

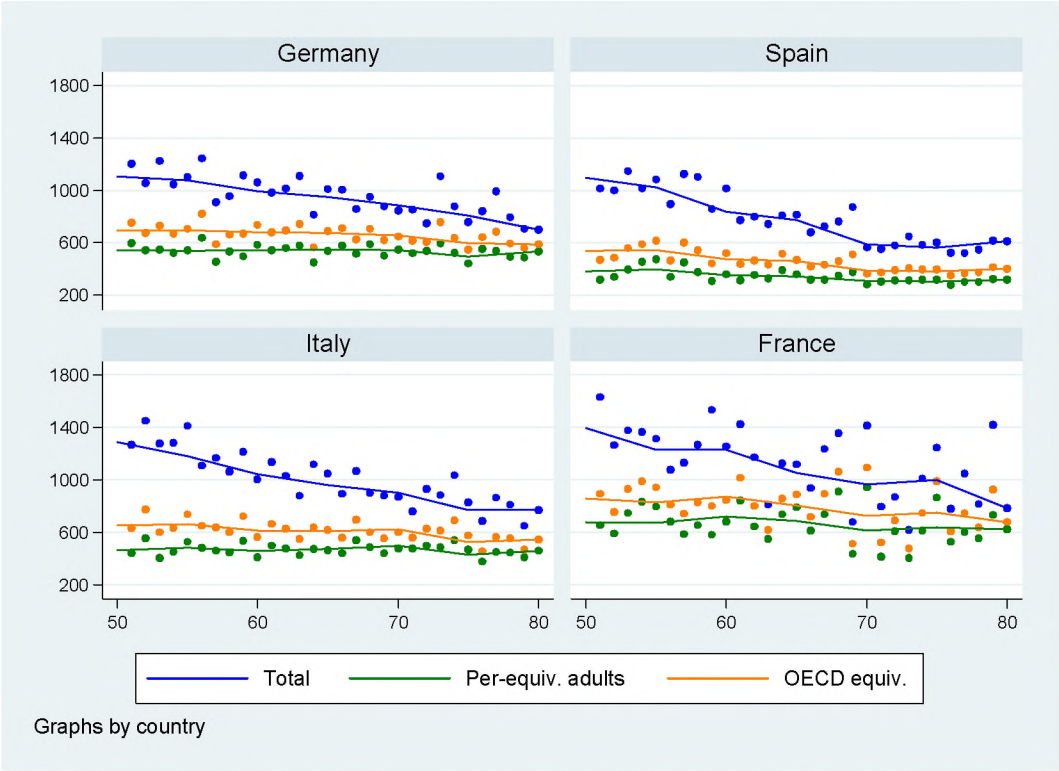
Table 4 - Average non-durable consumption by age and country: different measures

Country	Age	Total	Per-equiv. adults	OECD-modified
Germany	[50, 54]	1107.98	546.20	696.48
	[55, 59]	1077.79	538.11	696.31
	[60, 64]	995.23	541.88	682.94
	[65, 69]	947.17	547.48	675.76
	[70, 74]	888.09	545.89	656.07
	[75, 79]	806.84	496.42	596.84
	>=80	699.22	532.42	587.02
Spain	[50, 54]	1098.11	382.74	538.9
	[55, 59]	1022.76	397.40	542.55
	[60, 64]	836.03	351.58	477.4
	[65, 69]	774.65	345.86	460.91
	[70, 74]	587.54	308.80	389.29
	[75, 79]	565.20	305.72	380.53
	>=80	612.17	319.27	400.99
Italy	[50, 54]	1285.19	461.03	651.57
	[55, 59]	1181.64	482.16	661.36
	[60, 64]	1044.13	456.08	610.96
	[65, 69]	958.05	471.07	607.13
	[70, 74]	902.12	497.88	621.53
	[75, 79]	770.37	427.45	524.38
	>=80	769.14	457.78	546.8
France	[50, 54]	1392.72	675.76	859.33
	[55, 59]	1227.19	671.59	828.56
	[60, 64]	1230.71	723.01	872.52
	[65, 69]	1055.22	684.95	802.51
	[70, 74]	966.20	613.18	726.06
	[75, 79]	998.35	635.57	751.21
	>=80	783.17	621.36	674.94

Notes: age of the household head, values in euro, 2004.

Source: Our computation on SHARE data

Graph 1 - Average non-durable consumption by age and country: different measures



Notes: Age variable is the age of the household head. Values are presented in Euro, 2004. Lines connect 5-years age brackets averages (values in table 4), dots represents single age averages.

Source: Our computation on SHARE data.

We finally disaggregate consumption according to the job status of the head. We distinguish four job statuses: retired, job, unemployed and out of the labor force.[36] Results are reported in table 5. As expected, consumption is on average lower for retired than for workers. This occurs at every age and for every country. Furthermore, consumption for retired tends to decrease with the age of the head while changes in consumption for workers are different across countries: it clearly decreases only in France, while in the other countries either there is no clear trend or it even increases (Germany).[37] Unemployment heads are very few and thus we leave this group out of our analysis, as explained later.

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[36] We recode the variable in SHARE as follows: employed or self-employed (including working for family business) are here designated by "job" and permanently sick or disabled and home maker are grouped into a category labelled "out of the labor force". Retired individuals are not included in this last category since we have the specific category "retired".

[37] From the literature on retirement (see e.g. Belloni, Borella and Fornero 2002, for an application to Italy) it is known how workers who stay longer in the labor market have a higher

Table 5 – OECD-modified non-durable consumption: averages and frequencies by age, job status and country

		Retired		Job		Unemployed		Out of labor force	
Country	**Age**	Consumption	Freq.	Consumption	Freq.	Consumption	Freq.	Consumption	Freq.
Germany	[50, 54]	772.50	4	1199.03	273	697.91	45	996.55	38
	[55, 59]	1039.77	13	1192.54	173	798.21	33	844.29	48
	[60, 64]	969.66	188	1188.70	78	1002.27	24	813.60	56
	[65, 69]	945.38	318	1212.50	20	250.00	2	818.33	20
	[70, 74]	892.65	177	1800.00	3		0	572.73	12
	[75, 79]	837.36	173	625.00	3		0	549.06	16
	>=80	710.39	127		0		0	585.46	15
	Total	894.40	1,000	1196.14	550	788.53	104	803.72	205
Spain	[50, 54]	875.00	8	1150.21	149	974.44	19	1055.59	84
	[55, 59]	865.51	18	1097.26	116	934.62	17	964.87	82
	[60, 64]	889.57	63	1058.88	53	898.35	19	650.14	93
	[65, 69]	784.49	144	820.00	10	550.00	1	756.45	85
	[70, 74]	612.38	130		0		0	552.25	88
	[75, 79]	598.39	109		0		0	492.99	50
	>=80	654.11	101		0		0	558.80	78
	Total	703.01	573	1108.63	328	928.82	56	734.46	560
Italy	[50, 54]	1047.73	16	1437.40	128	702.50	10	1108.79	66
	[55, 59]	1409.54	86	1096.03	123	816.67	9	1120.69	99
	[60, 64]	1048.57	213	1261.43	34	627.50	7	952.46	67
	[65, 69]	985.49	218	1468.75	13	500.00	2	781.67	57
	[70, 74]	866.09	188	5000.00	2		0	955.95	42
	[75, 79]	727.44	104	1725.00	4		0	761.52	26
	>=80	801.73	85		0		0	633.33	24
	Total	971.26	910	1302.58	304	716.52	28	968.59	381
France	[50, 54]	1127.83	8	1480.11	162	1574.55	15	869.70	25
	[55, 59]	1142.08	30	1241.06	107	1457.83	14	1172.83	31
	[60, 64]	1300.95	90	1039.49	20	1067.24	12	1042.86	11
	[65, 69]	1026.51	134		1		0	1600.60	6
	[70, 74]	1010.42	130		0		0	376.67	10
	[75, 79]	970.42	92		0		0	1339.00	13
	>=80	784.45	101		0		0	775.50	21
	Total	1035.00	585	1365.18	290	1394.35	41	1007.21	117

Notes: age of the household head, values in euro, 2004.

Source: Our computation on SHARE data

wealth. Perhaps there is therefore a selection effect, being the relatively richer those still at work at older ages. Comparisons here are however difficult because of the low frequency of observations for retired at age 50-55 and for workers starting from age 60-65.

Out of labor force heads are instead very numerous. We can also see how their average consumption is quite similar to the average consumption of retired. Frequently, income of these households comes from another breadwinner (often a pensioner) and dissaving is not the only way to finance consumption. In the econometric section we will show how we deal with this data problem.

5.2 Econometric analysis on household data: is there a consumption drop at retirement?

In this section we quantify the consumption drop at retirement, following the econometric approach in Miniaci, Monfardini and Weber (2003). In few words, we perform a regression analysis that aims to explain consumption with characteristics of both the household and the respective head. We consider several specifications, and for each of them we provide a separate estimation for each of our four countries. Results are presented in four separate tables, one for each country (table 6 for Germany, 7 for Spain, 8 for Italy, and 9 for France).

A preliminary task, before starting the econometric analysis, was to recover the information on consumption of the households whose respondent declares to be out of the labor force. We observe many cases like this in the data (around 20 percent of the observations). Even if the focus of this study is on workers *versus* retired, we exploit the presence in many of these households of a "breadwinner". We define the breadwinner as the household head or, whenever the household head is out of labor force, as his/her partner if this is a worker or retired. If the partner meets this requirement we include the household in the sample even if the reported head is out of the labor force. In the other cases, e.g. when reported household head and respective partner are both out of labor force, or whenever the household has a single component who is neither worker nor retired, we leave the observation out of the sample. As already mentioned households whose head is unemployed are too few and therefore are also left out of the sample. So, more precisely than before, with the regression analysis presented in this section we will explain consumption with characteristics of both the household and the respective breadwinner. Throughout the section we will use the term household head with the meaning of household breadwinner.

We then consider the following model:

$$\ln(c_h) = \alpha + \sum_{a=2}^{7} \beta_a age\_a_h + \delta \ln(eq\_ad_h) + \varepsilon_h \qquad (6.1)$$

where $ln(c_h)$ is the logarithm of total non-durable consumption, h is the household index, age_a are dummy variables equal to one if the age of the head is within age bracket $\_a$ and zero otherwise ($\_a=1$ if age is in [50,54], $\_a==2$ in [55,59], .. , $\_a==7$ in [80,104]), $ln(eq\_ad_h)$ is the logarithm of the number of equivalent-adults in the household (as defined in the previous section) and ε_h is an $i.i.d\ (0,\sigma^2)$ error term. α, β_a and δ are parameters to be estimated. β_a indicates the relative difference in consumption of age group $\_a$ with respect to those individuals aged 50-54. δ represents the elasticity of consumption with respect to the household size as measured by the number of equivalent-adults. The model – as well as the other models which follow - is estimated by OLS.

Results for specification (6.1) are shown in column 2 of each country-table (tables 6 to 9). In every country, consumption progressively decreases with the age of the head. The reduction is however less pronounced in Germany than in other countries. In this country, consumption at age 75-79 (age group 6), for example, is 23 percent lower than at age 50-54. The corresponding values for Spain, Italy and France are 42.5, 39.6 and 29.8 respectively. Parameter estimates are almost always statistically significant, except for the youngest age groups – it seems that there is no important difference in consumption between ages 50-54 and 55-59. The estimate of δ is statistically significant and considerably less than one in every country. This result confirms the existence of economies of scale, already mentioned and illustrated in table 3. For example in Germany δ is estimated to be 0.52, meaning that when the number of equivalent adults of the household doubles, household consumption increases by around 50 percent. Economies of scale are even stronger in the other countries.

We then provide a first estimate of the consumption drop at retirement, adding to the model a dummy for head retired:

$$\ln(c_h) = \alpha + \sum_{a=2}^{7} \beta_a age\_a_h + \delta \ln(eq\_ad_h) + \phi ret_h + \varepsilon_h \qquad (6.2)$$

where *ret* is equal to one if the head is retired and aged between 50 and 69, and zero otherwise. Starting from age 70 there are in fact very few workers in the sample. We hence impose that, from that age on, the consumption profile by age is the same for workers and retired.

Results for this specification provide a clear evidence of a consumption drop at retirement only in Germany. For every country, ϕ is estimated to be negative, but, except for Germany, those estimates are too imprecise. In particular, in Germany consumption is 16.8 percent lower for a retired than for a worker. In Spain, the coefficient estimate is around -7 percent, and for the other countries is very small.

It can be the case that the previous specification for the effect of being retired is too inflexible - we imposed that being retired has an effect on consumption that is constant across all the age groups – and is responsible for the insignificance previously reported. Therefore, we propose an alternative and more flexible specification, which allows the differences between consumption of workers and retired to vary with age:

$$\ln(c_h) = \alpha + \sum_{a=2}^{7} \beta_a age\_a_h + \delta \ln(eq\_ad_h) + \sum_{a=1}^{4} \phi_a age\_a\_ret_h + \varepsilon_h \qquad (6.3)$$

where *age_a_ret* = *age_a* * *ret* (*a*=1, 2, 3 and 4 in age groups [50,54], [55,59], [60,64] and [65,69], respectively) and ϕ_a measures the difference of consumption between workers and retired within age group *_a*.

Results for this specification provide additional information for Germany. They indicate that the gap in consumption between workers and retired in this country is very large at younger ages but it decreases afterwards up to disappear completely. In particular, retired consume 48 percent less than workers in the first age bracket (50-54), 20.4 percent less in the third one (60-64), and almost the same in the last one (65-69). With respect to a 50-54 years-old worker, a 55-59 years-old retired consumes 14 percent less (-0.148+0.008), a 60-64 years-old retired (as well as a 65-69 years-old retired) consumes 13 percent less (-0.204+0.074 and 0.039-0.167). Results for the other countries do not provide any important additional information when compared to those previously presented.[38] So, even this more flexible specification for the effect of being retired on

[38] This specification provide however some additional evidence for Spain, for the age2_retired coefficient. With a level of confidence of 90 percent, in the age bracket 55-59, Spanish retirees consume on average

consumption indicates that the gap between consumption of workers and retired is important in Germany but not in the other countries.

In order to better interpret results of the previous specification, in the specification that follow, we include some demographic and social characteristics of the head. The model then becomes:

$$\ln(c_h) = \alpha + \sum_{a=2}^{7} \beta_a age\_a_h + \delta \ln(eq\_ad_h) + \sum_{a=1}^{4} \phi_a age\_a\_ret_h + \varphi X_h + \varepsilon_h \qquad (6.4)$$

where X is a matrix of controls, which includes only a dummy for female head, two dummies for marital status, and three dummies for education. These three groups of controls in matrix X will be added to the regression progressively. Results are presented in columns 4, 5 and 6 of each country-table. Three categories of marital status are considered: married (omitted category), in partnership, single. The four categories of education attainment are: none or primary education (omitted category), lower-secondary education, upper-secondary education, college or more advanced education.[39]

As shown in columns 4, 5, 6, a household where head is female has a lower consumption in Germany. This negative and significant effect is found in all three specifications and it decreases as we add controls for marital status and education. When these are all included, we still find that households with a female as head consume around 6 percent less than the others. For France we find the same negative effect for female, but its significance vanishes when marital status and education are controlled for. Moreover, the head being female has basically no effect in Italy, while it has a positive effect in Spain (around 10 percent).

Meaningful results are obtained for marital status. The effect of this variable is however very different across countries. Living with a partner, instead of living with the spouse, means a dramatically lower consumption in Germany (-18 percent) and in Spain (-16.5 percent). It instead means no difference in consumption in France, and a remarkably

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20.7 percent less than workers. In general, in order to find significant results, we will try - especially for the youngest ages, where the number of retired is particularly low - more parsimonious specifications.

[39] We exploit the "isced-97 coding of education" variable, which is present in SHARE between the "generated" variables (variables created subsequently and not directly asked into the questionnaire). We regroup the categories of that variable as follows: "none" and "code 1" are "none or primary", "code 2" is "lower-secondary", "code 3" and "code 4" are "upper-secondary", "code 5" and "code 6" are "college or more advanced", "still in school" and "others" are dropped.

higher consumption in Italy (+34 percent). Living single has a similar negative effect on consumption.

Results for education are unambiguous and of quite high precision. Education is found to affect positively consumption, in Spain, Italy and France. Surprisingly that is not the case in Germany.[40] With an exception for upper-secondary education in France, consumption grows monotonically with education.

A broad conclusion of these three last specifications is that controlling for those extra characteristics hardly affects the results for consumption drop at retirement obtained before with specification (6.3).

Finally, in the two last specifications, we control for the economic and financial characteristics of the household.

The model is given by:

$$\ln(c_h) = \alpha + \sum_{a=2}^{7} \beta_a age\_a_h + \delta \ln(eq\_ad_h) + \sum_{a=1}^{4} \phi_a age\_a\_ret_h + \varphi X_h + \gamma Z_h + \varepsilon_h \qquad (6.5)$$

where Z includes total net financial wealth and current household income.[41] These two variables are added progressively and respective results are presented in columns 7 and 8 of each country-table. As expected, both of the variables have a positive effect on household consumption, and estimates are always highly significant. Controlling for them tend to reduce the effect on consumption of being retired (from -48 to -30 percent in the first age bracket for Germany), and reduces the precision of the estimates (also for Germany coefficients for retired variables become not significant at 95 percent confidence level). Additional specifications for these variables (e.g. quartiles, or polynomials) and alternative measures of wealth are however needed in order to draw richer conclusions.

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[40] In the literature on consumption and income education it is often seen as a proxy for permanent income, which - according to many versions of the life-cycle model - determines the level of consumption over the life-cycle.

[41] "Net financial wealth" is equal to gross financial assets minus financial liabilities. The former includes the sum of the values of bank accounts, government and corporate bonds, stocks, mutual funds, individual retirement accounts, contractual savings for housing and life insurance policies owned by the household. "Net financial wealth" is one of the many (generated) variables in SHARE providing a measure of household wealth. Others measures, for example, include real assets and risky financial wealth. See Christelis, Jappelli and Padula (2005) for additional information. "Gross annual household income" is the sum of gross annual income of each household member (from employment, self-employment, pension, private regular transfers, long term care) plus capital assets income (from bank accounts, bonds, stocks or shares and mutual funds), rent payments received and imputed rents. It is a generated variable, see Brugiavini *et.al.* (2005) for additional information.

Table 6 – log consumption: parameter estimates. Germany

Dep: log(consumption)	Models							
	(6.1)	**(6.2)**	**(6.3)**	**(6.4)**	**(6.4)**	**(6.4)**	**(6.5)**	**(6.5)**
age2	0.002	0.012	0.008	-0.006	-0.021	-0.025	-0.036	-0.016
	(0.054)	(0.054)	(0.055)	(0.055)	(0.055)	(0.053)	(0.054)	(0.052)
age3	-0.063	0.052	0.074	0.047	0.039	0.043	0.019	0.023
	(0.049)	(0.064)	(0.069)	(0.069)	(0.069)	(0.067)	(0.067)	(0.066)
age4	-0.131 *	0.024	-0.167	-0.220*	-0.249*	-0.210*	-0.229*	-0.167
	(0.047)	(0.073)	(0.112)	(0.112)	(0.112)	(0.109)	(0.109)	(0.108)
age5	-0.156*	-0.160*	-0.163*	-0.169*	-0.197*	-0.110*	-0.095	-0.023
	(0.057)	(0.056)	(0.056)	(0.056)	(0.057)	(0.057)	(0.057)	(0.055)
age6	-0.228*	-0.232*	-0.236*	-0.249*	-0.276*	-0.204*	-0.181*	-0.120*
	(0.057)	(0.057)	(0.057)	(0.057)	(0.058)	(0.057)	(0.057)	(0.055)
age7	-0.240*	-0.245*	-0.248*	-0.237*	-0.251*	-0.169*	-0.158*	-0.096
	(0.066)	(0.066)	(0.066)	(0.065)	(0.065)	(0.064)	(0.064)	(0.063)
ln(eq_adults)	0.520*	0.515*	0.518*	0.479*	0.318*	0.319*	0.295*	0.339*
	(0.040)	(0.040)	(0.040)	(0.041)	(0.071)	(0.069)	(0.069)	(0.069)
retired		-0.168*	---	---	---	---	---	---
		(0.060)	---	---	---	---	---	---
age1_retired			-0.482*	-0.479*	-0.457*	-0.416*	-0.359	-0.301
			(0.218)	(0.216)	(0.216)	(0.210)	(0.207)	(0.200)
age2_retired			-0.148	-0.138	-0.138	-0.102	-0.035	-0.009
			(0.143)	(0.143)	(0.142)	(0.139)	(0.141)	(0.136)
age3_retired			-0.204*	-0.180*	-0.205*	-0.169*	-0.130	-0.064
			(0.071)	(0.071)	(0.071)	(0.069)	(0.069)	(0.068)
age4_retired			0.039	0.083	0.078	0.084	0.125	0.126
			(0.111)	(0.111)	(0.110)	(0.107)	(0.108)	(0.107)
female				-0.140*	-0.126*	-0.062*	-0.051*	-0.030*
				(0.030)	(0.031)	(0.031)	(0.031)	(0.030)
liv_partner					-0.196*	-0.180*	-0.134	-0.083
					(0.085)	(0.083)	(0.084)	(0.081)
liv_single					-0.173*	-0.152*	-0.134*	-0.027
					(0.061)	(0.059)	(0.059)	(0.059)
educ2						-0.120	-0.146	-0.124
						(0.188)	(0.186)	(0.180)
educ3						0.072	0.045	0.020
						(0.186)	(0.184)	(0.177)
educ4						0.318	0.254	0.196
						(0.187)	(0.186)	(0.179)
hh fin_wealth							1.351*	0.832*
							(0.241)	(0.239)
hh income								0.157*
								(0.017)
_cons	6.521*	6.527*	6.529*	6.623*	6.786*	6.594*	6.564*	5.277*
	(0.045)	(0.045)	(0.045)	(0.049)	(0.074)	(0.202)	(0.200)	(0.233)

Notes: OLS estimates, * = significant at 5 percent, standard errors in parenthesis, reference person is age1, worker, male, married and living with the spouse, educ1. See text for an explanation of the variables, values in euro, 2004.

Source: our computation on SHARE data.

Table 7 – log consumption: parameter estimates. Spain

Dep: log(consumption)	Models							
	(6.1)	(6.2)	(6.3)	(6.4)	(6.4)	(6.4)	(6.5)	(6.5)
age2	-0.023	-0.017	-0.002	0.003	0.002	0.023	0.037	0.004
	(0.059)	(0.059)	(0.061)	(0.061)	(0.060)	(0.058)	(0.058)	(0.056)
age3	-0.089	-0.054	-0.063	-0.053	-0.070	0.000	-0.019	-0.072
	(0.060)	(0.068)	(0.074)	(0.074)	(0.074)	(0.072)	(0.072)	(0.070)
age4	-0.270*	-0.204*	-0.289*	-0.273*	-0.298*	-0.214	-0.197	-0.288*
	(0.057)	(0.081)	(0.118)	(0.119)	(0.118)	(0.115)	(0.117)	(0.114)
age5	-0.363*	-0.366*	-0.366*	-0.342*	-0.358*	-0.233*	-0.227*	-0.229*
	(0.059)	(0.059)	(0.060)	(0.061)	(0.061)	(0.062)	(0.062)	(0.059)
age6	-0.425*	-0.428*	-0.427*	-0.406*	-0.425*	-0.302*	-0.268*	-0.271*
	(0.064)	(0.064)	(0.065)	(0.065)	(0.065)	(0.066)	(0.066)	(0.064)
age7	-0.423*	-0.426*	-0.425*	-0.413*	-0.416*	-0.295*	-0.267*	-0.268*
	(0.065)	(0.065)	(0.066)	(0.066)	(0.065)	(0.066)	(0.066)	(0.063)
l_eqadults	0.408*	0.409*	0.410*	0.422*	0.340*	0.353*	0.361*	0.302*
	(0.039)	(0.039)	(0.039)	(0.040)	(0.047)	(0.045)	(0.045)	(0.044)
retired		-0.074	---	---	---	---	---	---
		(0.064)	---	---	---	---	---	---
age1_retired			-0.064	-0.058	-0.062	0.025	0.051	-0.075
			(0.175)	(0.175)	(0.174)	(0.168)	(0.178)	(0.169)
age2_retired			-0.207	-0.191	-0.203	-0.157	-0.142	-0.126
			(0.120)	(0.121)	(0.120)	(0.116)	(0.115)	(0.115)
age3_retired			-0.049	-0.041	-0.035	-0.023	0.004	0.061
			(0.083)	(0.083)	(0.083)	(0.080)	(0.080)	(0.077)
age4_retired			0.022	0.022	0.031	0.051	0.048	0.126
			(0.118)	(0.118)	(0.117)	(0.113)	(0.115)	(0.112)
female				0.070	0.106*	0.107*	0.111*	0.135*
				(0.038)	(0.039)	(0.038)	(0.038)	(0.037)
liv_partner					-0.159*	-0.165*	-0.168*	-0.220*
					(0.073)	(0.071)	(0.071)	(0.068)
liv_single					-0.163*	-0.175*	-0.171*	-0.166*
					(0.050)	(0.049)	(0.049)	(0.047)
educ2						0.061	0.046	0.038
						(0.043)	(0.043)	(0.041)
educ3						0.247*	0.225*	0.127*
						(0.058)	(0.059)	(0.057)
educ4						0.432*	0.397*	0.297*
						(0.057)	(0.060)	(0.060)
hh fin_wealth							1.256*	0.888*
							(0.310)	(0.302)
hh income								0.140*
								(0.018)
_cons	6.451*	6.454*	6.452*	6.409*	6.523*	6.359*	6.324*	5.379*
	(0.056)	(0.056)	(0.057)	(0.061)	(0.069)	(0.073)	(0.073)	(0.143)

Notes: OLS estimates, * = significant at 5 percent, standard errors in parenthesis, reference person is age1, worker, male, married and living with the spouse, educ1. See text for an explanation of the variables, values in euro, 2004.

Source: our computation on SHARE data.

Table 8 – log consumption: parameter estimates. Italy

Dep: log(consumption)	Models							
	(6.1)	(6.2)	(6.3)	(6.4)	(6.4)	(6.4)	(6.5)	(6.5)
age2	-0.127	-0.122	-0.184*	-0.180*	-0.173*	-0.137	-0.142*	-0.158*
	(0.067)	(0.070)	(0.075)	(0.075)	(0.075)	(0.073)	(0.073)	(0.072)
age3	-0.136*	-0.124	-0.075	-0.068	-0.062	0.057	0.023	-0.036
	(0.065)	(0.079)	(0.101)	(0.102)	(0.102)	(0.099)	(0.100)	(0.101)
age4	-0.229*	-0.215*	-0.069	-0.059	-0.049	0.019	0.002	-0.041
	(0.067)	(0.085)	(0.144)	(0.145)	(0.145)	(0.140)	(0.140)	(0.139)
age5	-0.300*	-0.301*	-0.314*	-0.311*	-0.306*	-0.076	-0.087	-0.111
	(0.070)	(0.070)	(0.071)	(0.072)	(0.072)	(0.072)	(0.072)	(0.071)
age6	-0.396*	-0.398*	-0.410*	-0.408*	-0.404*	-0.196*	-0.206*	-0.210*
	(0.082)	(0.082)	(0.083)	(0.083)	(0.083)	(0.082)	(0.082)	(0.081)
age7	-0.397*	-0.399*	-0.412*	-0.410*	-0.401*	-0.142	-0.150	-0.149
	(0.088)	(0.088)	(0.089)	(0.089)	(0.089)	(0.089)	(0.089)	(0.088)
l_eqadults	0.431*	0.431*	0.430*	0.436*	0.392*	0.416*	0.421*	0.355*
	(0.043)	(0.043)	(0.043)	(0.044)	(0.052)	(0.050)	(0.050)	(0.050)
retired		-0.016	---	---	---	---	---	---
		(0.060)	---	---	---	---	---	---
age1_retired			-0.157	-0.149	-0.129	-0.030	-0.045	-0.082
			(0.162)	(0.162)	(0.162)	(0.156)	(0.160)	(0.162)
age2_retired			0.110	0.112	0.112	0.231*	0.223*	0.206*
			(0.079)	(0.079)	(0.079)	(0.077)	(0.077)	(0.076)
age3_retired			-0.098	-0.104	-0.109	-0.094	-0.087	-0.058
			(0.094)	(0.095)	(0.095)	(0.091)	(0.092)	(0.094)
age4_retired			-0.190	-0.198	-0.205	-0.093	-0.087	-0.070
			(0.140)	(0.140)	(0.140)	(0.135)	(0.135)	(0.134)
female				0.025	0.043	0.050	0.049	0.040
				(0.038)	(0.039)	(0.037)	(0.037)	(0.037)
liv_partner					0.321	0.342*	0.274	0.344*
					(0.169)	(0.162)	(0.169)	(0.165)
liv_single					-0.080	-0.069	-0.064	-0.066
					(0.053)	(0.051)	(0.051)	(0.050)
educ2						0.215*	0.201*	0.172*
						(0.046)	(0.047)	(0.046)
educ3						0.413*	0.384*	0.305*
						(0.048)	(0.049)	(0.049)
educ4						0.551*	0.491*	0.402*
						(0.077)	(0.078)	(0.079)
hh fin_wealth							1.615*	1.277*
							(0.406)	(0.410)
hh income								0.144*
								(0.021)
_cons	6.603*	6.604*	6.617*	6.600*	6.640*	6.312*	6.303*	5.327*
	(0.068)	(0.068)	(0.069)	(0.074)	(0.082)	(0.085)	(0.085)	(0.168)

Notes: OLS estimates, * = significant at 5 percent, standard errors in parenthesis, reference person is age1, worker, male, married and living with the spouse, educ1. See text for an explanation of the variables, values in euro, 2004.

Source: our computation on SHARE data

Table 9 – log consumption: parameter estimates. France

Dep: log(consumption)	Models							
	(6.1)	(6.2)	(6.3)	(6.4)	(6.4)	(6.4)	(6.5)	(6.5)
age2	-0.080	-0.079	-0.087	-0.066	-0.081	-0.082	-0.082	-0.066
	(0.094)	(0.097)	(0.102)	(0.102)	(0.102)	(0.098)	(0.100)	(0.101)
age3	0.039	0.041	-0.037	-0.010	-0.028	0.002	0.020	0.019
	(0.100)	(0.137)	(0.180)	(0.180)	(0.179)	(0.174)	(0.173)	(0.178)
age4	-0.155	-0.152	-0.121	-0.142	-0.201	-0.320	-0.285	-0.248
	(0.099)	(0.150)	(0.546)	(0.544)	(0.542)	(0.526)	(0.520)	(0.521)
age5	-0.282*	-0.282*	-0.289*	-0.295*	-0.322*	-0.216*	-0.190	-0.192
	(0.103)	(0.103)	(0.104)	(0.104)	(0.104)	(0.104)	(0.104)	(0.105)
age6	-0.298*	-0.298*	-0.306*	-0.316*	-0.347*	-0.230*	-0.213	-0.208
	(0.114)	(0.114)	(0.115)	(0.114)	(0.114)	(0.114)	(0.116)	(0.116)
age7	-0.408*	-0.408*	-0.415*	-0.412*	-0.416*	-0.300*	-0.295*	-0.291*
	(0.117)	(0.118)	(0.118)	(0.118)	(0.118)	(0.118)	(0.120)	(0.120)
l_eqadults	0.421*	0.421*	0.423*	0.365*	0.140	0.162	0.153	0.160
	(0.072)	(0.072)	(0.073)	(0.076)	(0.114)	(0.110)	(0.112)	(0.112)
retired		-0.003	---	---	---	---	---	---
		(0.118)	---	---	---	---	---	---
age1_retired			-0.174	-0.224	-0.209	-0.239	-0.225	-0.248
			(0.279)	(0.279)	(0.278)	(0.273)	(0.270)	(0.271)
age2_retired			-0.003	-0.027	-0.057	0.028	0.031	0.021
			(0.152)	(0.152)	(0.152)	(0.148)	(0.146)	(0.147)
age3_retired			0.088	0.054	0.037	0.055	0.049	0.064
			(0.189)	(0.189)	(0.188)	(0.182)	(0.180)	(0.186)
age4_retired			-0.044	-0.018	0.002	0.216	0.200	0.174
			(0.548)	(0.546)	(0.544)	(0.528)	(0.522)	(0.523)
female				-0.147*	-0.109	-0.081	-0.038	-0.033
				(0.062)	(0.063)	(0.062)	(0.062)	(0.063)
liv_partner					-0.112	-0.057	-0.018	-0.040
					(0.174)	(0.169)	(0.171)	(0.172)
liv_single					-0.266*	-0.246*	-0.268*	-0.221*
					(0.099)	(0.096)	(0.098)	(0.102)
educ2						0.265*	0.220*	0.193
						(0.111)	(0.111)	(0.112)
educ3						0.153*	0.155*	0.129
						(0.027)	(0.025)	(0.066)
educ4						0.537*	0.489*	0.448*
						(0.000)	(0.000)	(0.000)
hh fin_wealth							1.346*	1.204*
							(0.542)	(0.546)
hh income								0.073*
								(0.037)
_cons	6.679*	6.679*	6.686*	6.781*	7.014*	6.755*	6.698*	6.119*
	(0.084)	(0.084)	(0.085)	(0.094)	(0.127)	(0.136)	(0.139)	(0.334)

Notes: OLS estimates, * = significant at 5 percent, standard errors in parenthesis, reference person is age1, worker, male, married and living with the spouse, educ1. See text for an explanation of the variables, values in euro, 2004.
Source: our computation on SHARE data.

5.3 From household to individual data: estimating individual life-cycle consumption profiles

In this section, we estimate a life-cycle profile of consumption for each country. As already noted, profiles of consumption over the life-cycle could not be directly provided within the econometric analysis of the previous section, which was based on older-than-50 household heads. Due to data limits, we are therefore forced to provide a separate analysis for this aim, and to replace the household consumption framework with the individual consumption framework.[42]

We use the method proposed by Deaton and Paxson (2000). The main assumption behind it is that households are just "veils" for the individuals, who save and consume according to their life-time wealth. It is certainly a bold assumption, but it was needed to obtain individual data, which are necessary to run the projection model. According to such an assumption, being part of a household does not change the individual consumption choices, but make them difficult to observe for the statistician. Other remarkable assumptions are that neither economies of scale, nor issues of endogenous household formation are considered. The econometric technique that Deaton and Paxson propose proceeds in two subsequent steps (iterated to obtain a convergence in the estimation), which disentangle age from cohort effects. Given that we work on a single cross-section, we cannot disentangle those two effects. We estimate the following version of the Deaton and Paxson model:

$$c_h = \sum_a \beta_a n_{ah} + \upsilon_h \qquad (6.6)$$

where c is the household (total non-durable) consumption, h is the household index, a is an age bracket (a = [0,19], [20,34], [35,54], [55,59], [60,64],…, [75,79], [80,104]), n_{ah} is the number of individuals aged a in the household, and υ is an *i.i.d* $(0,\sigma^2)$ error term. β_a

[42] The development of individual models of consumption (see e.g. Browning, 1995) is mainly related to the issue of cohabitation. The household model of consumption can be misleading if there is more than one earner in the family, and their demographic characteristics (especially cohort) differ substantially. This is typically the case of grown children living at home. Cohabitation raises also the issue of endogenous household formation, i.e. children decisions to stay or to leave depends on income, wealth or consumption of the household.

are the parameters of interest to be estimated. They give the mean consumption of an individual in age bracket *a*. The model is estimated by OLS.

Results with narrower age brackets were extremely imprecise, especially for ages between 20 and 45. The dataset is very unbalanced toward old households, because there are no heads younger than 50. Consequently, there are few children who are still at home in the data, especially above age 30 (with the partial exception of Italy and Spain, statistics not reported). Thus, we were forced to build broader intervals at those ages. Results are shown in table 10 and in graph 2.

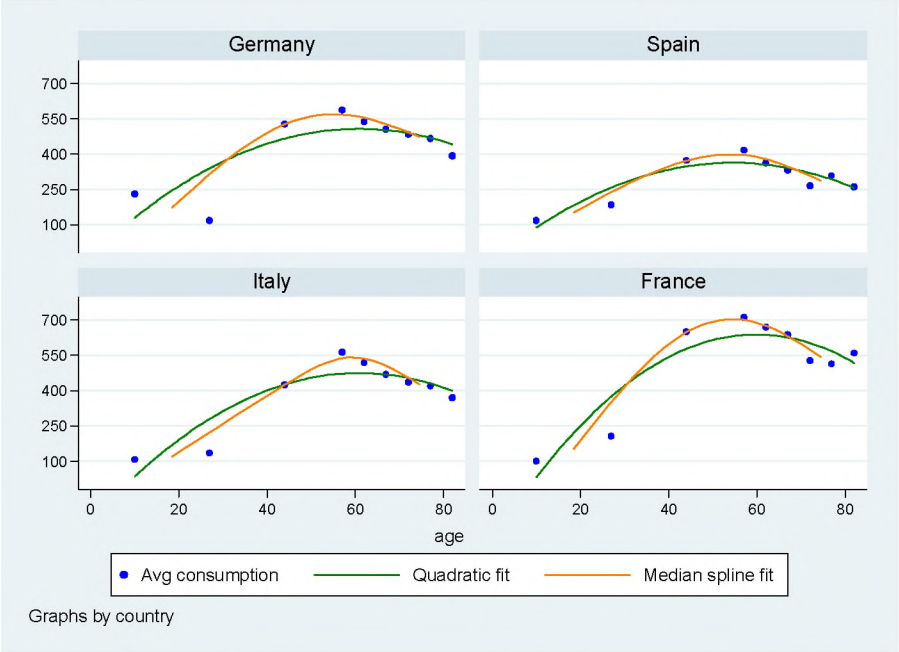
In order to provide an average consumption at each age, we first attribute the estimated coefficients for each interval to the respective median age. We then use those points to fit a quadratic function and a cubic spline. The resulting profiles for each country are shown in graph 2.

Table 6.10 – model (6.6) : parameter estimates by country

Dep: total consumption	**Country**			
	Germany	**Spain**	**Italy**	**France**
Nb of members aged:				
[0,19]	230.208*	118.525*	108.621	101.871
	(45.891)	(37.838)	(65.568)	(75.504)
[20, 34]	118.680*	186.001*	136.021*	208.154*
	(37.181)	(21.353)	(34.960)	(78.978)
[35, 54]	526.668*	371.309*	425.464*	648.564*
	(21.230)	(21.863)	(37.351)	(51.093)
[55, 59]	586.887*	415.862*	564.268*	713.039*
	(25.806)	(27.457)	(38.606)	(58.494)
[60, 64]	538.538*	362.763*	519.274*	669.439*
	(21.354)	(26.295)	(36.463)	(73.124)
[65, 69]	505.756*	332.722*	468.803*	638.153*
	(22.014)	(27.147)	(38.139)	(78.403)
[70, 74]	482.118*	266.281*	437.366*	528.305*
	(30.714)	(27.409)	(42.264)	(77.732)
[75, 79]	466.358*	306.665*	419.014*	513.595*
	(31.341)	(32.222)	(58.079)	(94.747)
>=80	393.152*	260.940*	370.069*	559.315*
	(37.266)	(27.942)	(56.366)	(97.654)

Notes: OLS estimates of model (6.6), * = significant at 1 percent, standard errors in parenthesis, values in euro, 2004.
Source: our computation on SHARE data

Graph 2 - life-cycle profiles of consumption by country: estimated averages and fitted functions



Notes: values in euro, 2004; blue dots represent estimated coefficients (i.e. the estimated average consumption in each age bracket, see table 10), attributed to the median age of each interval, the green and the orange lines represent a quadratic and a median spline fit of the blue dots respectively.

Source: our computation on SHARE data

5.4 Conclusions

As a conclusion we may state that there is no a clear cut evidence of a drop in consumption after retirement, and that the observed drop is most likely to be a question of age and habits much more than a question of being retired[43].

As for the age-consumption profiles, caution must be applied in using them, because, due to data limitations, we have not been able to disentangle age and cohort effects; as will be explained below in some detail, cohort effects might be at least partially responsible of the concavity of age-consumption profiles, thus they cannot be dismissed in the simulation approach, and a proxy for them will be introduced .

The next step of our analysis is to apply age-consumption profiles to devise the effects of an ageing society on consumption and savings.

[43] Germany is an exception; however the evidence of a dip of consumption after retirement for that country is limited to relatively young retirees, and disappears at more typical retirement ages.