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Online Complement C1 – Additional Details on the Methodology

The estimation of the probability of dying uses the observed mortality in SHARE between Waves 1 and 2, 2 and 3, and 4 and 5. The logit models for the probability of becoming dependent and the probability of recovery use observed transitions between Waves 1 and 2, and Waves 4 and 5 of SHARE (Wave 3 questionnaire – SHARELIFE – provides no information on ADLs). To simplify the analysis, we do not take into account where the disability takes place (at home or in institution). If we do not consider accommodation costs and day-to-day living costs (meals, laundry, etc.) in nursing homes, we can assume that the cost of long-term care is the same at home and in institution. Tables C1-1 and C1-2 provide details on observed mortality and disability and on baseline transition probabilities in the sample.

Table C1-1
Observed Mortality between Waves 1-2, Waves 2-3, and Waves 4-5

Initial status	Final status			
	Alive	Deceased	Missing information	Total
< 2 ADLs (non-dependent)	**27,587** (0.779)	**1,129** (0.032)	6,711 (0.189)	35,427
2+ ADLs (dependent)	**1,906** (0.591)	**581** (0.180)	738 (0.229)	3,225
Alive (disability status unknown)	77 (0.347)	8 (0.036)	137 (0.617)	222
Total	29,570 (0.761)	1,718 (0.044)	7,586 (0.195)	38,874

Figures without parentheses represent the number of observations. Percentages in line are reported in parentheses. Figures in bold correspond to the observations used to estimate the transition model. Individuals aged 65 and over in the initial wave.
Source: SHARE, waves 1 to 5.

Table C1-2
Observed Disability Status Transitions between Waves 1-2 and Waves 4-5

Initial disability status	Final disability status					
	Non-dependent	Dependent	Alive (disability status unknown)	Deceased	Missing information	Total
< 2 ADLs (non-dependent)	**16,783** (0.668)	**1,020** (0.041)	1,336 (0.053)	812 (0.032)	5,176 (0.206)	25,127
2+ ADLs (dependent)	**272** (0.116)	**976** (0.418)	118 (0.051)	378 (0.162)	591 (0.253)	2,335
Alive (disability status unknown)	0 (0.000)	0 (0.000)	58 (0.320)	5 (0.028)	118 (0.652)	181
Total	17,055 (0.618)	1,996 (0.072)	1,512 (0.054)	1,195 (0.043)	5,885 (0.213)	27,643

Figures without parentheses represent the number of observations. Percentages in line are reported in parentheses. Figures in bold correspond to the observations used to estimate the transition model. Individuals aged 65 and over in the initial wave.
Source: SHARE, waves 1, 2, 4, 5.

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Table C1-3
Hours of Care Needed for Different Activities of Daily Living (Per Week)

SHARE activities of daily living	Assumptions used in this paper	Pampalon *et al.* (1991)	Austrian assessment of needs (Carrino & Orso, 2014)	German assessment of needs (Carrino & Orso, 2014)
Bathing/showering	4	4	6.25	6.53
Dressing	4.67	4.67	5	Unspecified
Using the toilet (+ transfers)	7	7	Unspecified	4.67
Eating	14	14	7.5	5.95
Getting in/out of bed	4.67	4.67	3.75	0.47
Walking across a room	3.5	3.5		Unspecified
Shopping for groceries	1.63	3.25	2.5	Unspecified
Preparing hot meal	3.5	7	7.5	Unspecified
Doing work around the house or garden	6	12	7.5	Unspecified

Note: We divide by 2 Pampalon *et al.*'s hours of care needed for shopping, preparing meals and doing work around the house and garden. Compared to 1991, more ready-made meals and household appliances are cheaply available, reducing such time costs. We also wanted to limit the overestimation of LTC costs.
Sources: Carrino & Orso (2014), Pampalon *et al.* (1991).

Table C1-4
Stylized Analysis of the Ability to Pay for LTC

Income I	$I < C$		Inability to pay for LTC
	$I \geq C$		Ability to pay for LTC without any restriction
Income I and financial assets F	$I - f \geq C$		Ability to pay for LTC without any restriction
	$I - f < C \text{ and } F > 0$ $D = \dfrac{F}{C - (I - f)}$		Ability to pay for D years of LTC
Income I, financial assets F and real-estate (RE) other than the main residence	$I - f - r \geq C$		Ability to pay for LTC without any restriction
	$I - f - r < C \text{ and } F + RE > 0$ $D = \dfrac{F + RE}{C - (I - f - r)}$		Ability to pay for D years of LTC
Income I, financial assets F, real estate (RE) and lump-sum reverse mortgage payments L	$I - f - r \geq C$		Ability to pay for LTC without any restriction
	$I - f - r < C \text{ and } F + RE + L > 0$ $D = \dfrac{F + RE + L}{C - (I - f - r)}$		Ability to pay for D years of LTC

Note: To simplify the analysis, we do not subtract from income the repayment of financial debts ($F < 0$). It avoids having to make assumptions about debt repayments and concerns only few individuals (957 individuals in the sample of 65+ in wave 5 have financial debts).

Table C1-5
Sample Selection for the Analysis of Ability to Pay (Tenth Simulation)

Situation in 2013 (wave 5)		At least one period of disability (10th simulation)	No partner/spouse when they are dependent (10th simulation)
No partner/spouse	7,466	4,243	4,243
Couple (partner/spouse interviewed)	12,440	6,284	2,365 who become dependent after the death of their partner/spouse
Couple (partner/spouse not interviewed)	3,863	1,596	Date of death of the partner/spouse unknown
Total	23,769	12,123	**6,608**

Note: The figure in bold corresponds to the observations used to study ability to pay (in the tenth simulation). Individuals aged 65 and over in wave 5.
Source: SHARE; authors' microsimulation.

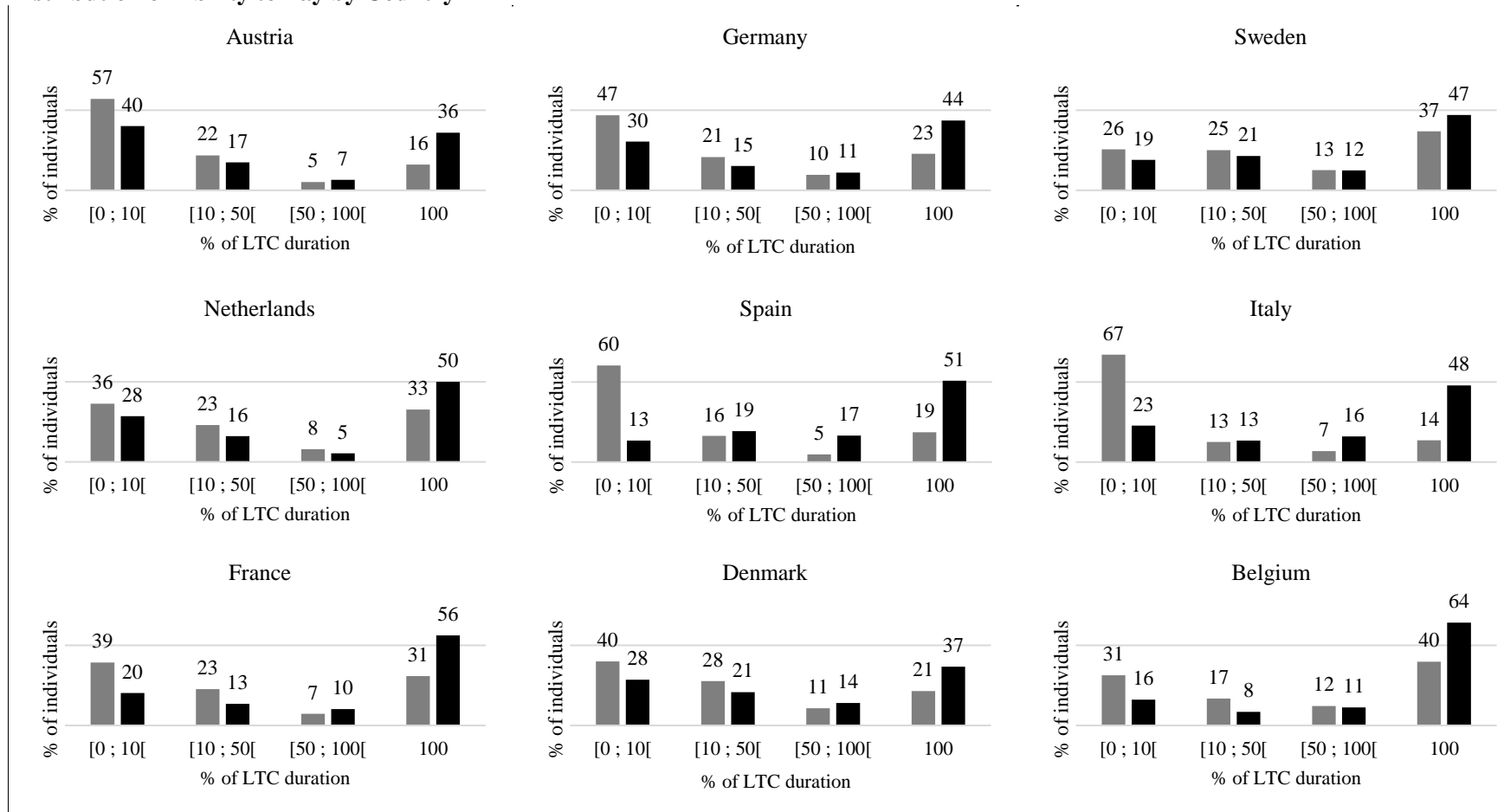**Private Financing of Long-Term Care: Income, Savings and Reverse Mortgages***
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Online Complement C2 – LTC Duration that Dependent Individuals are Able to Finance at the Country Level

Figure C2-I
Distribution of Ability to Pay by Country

The distribution presented here corresponds to the tenth simulation. Weighted distributions. In grey: no RM. In black: lump-sum RM. Individuals aged 65 and over in wave 5 and who have no partner when they are dependent (6,608 individuals).
Source: SHARE, microsimulation.

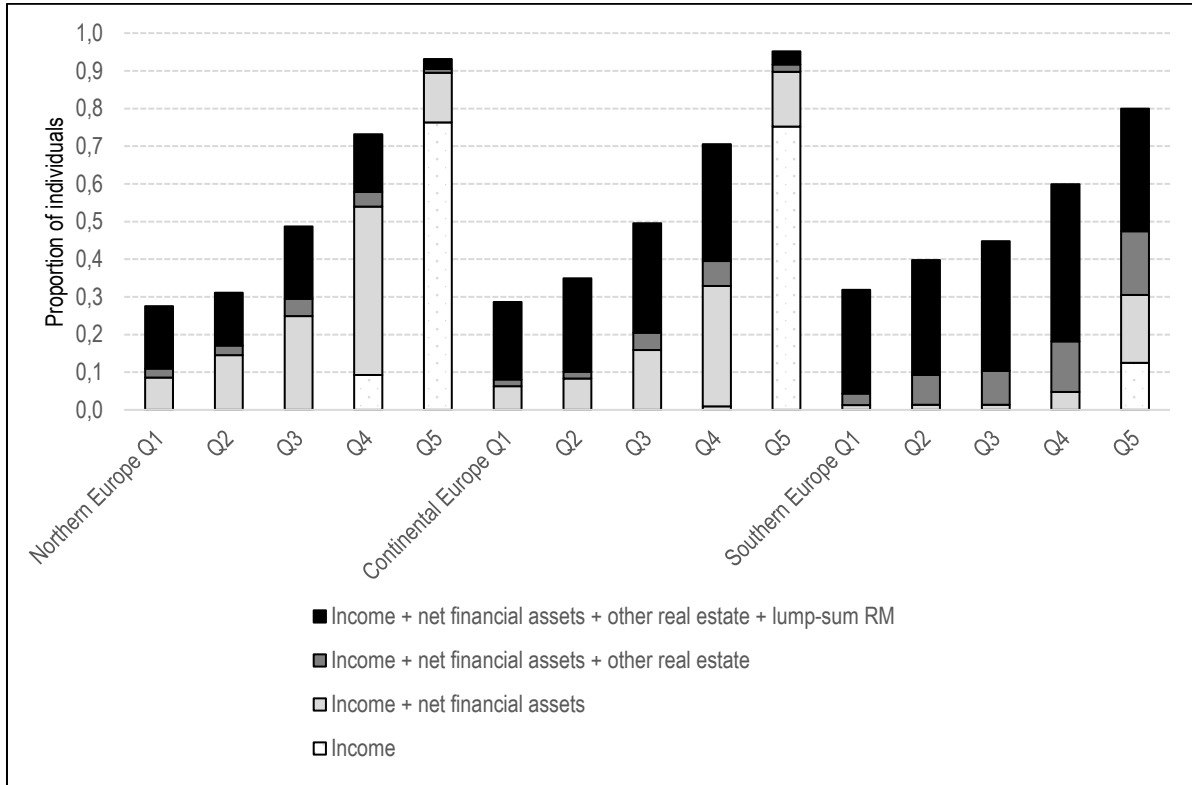**Private Financing of Long-Term Care: Income, Savings and Reverse Mortgages***
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Online Complement C3 – Analysis by Income Quintile and Country Groups

Figure C3-I

Proportion of Dependent Individuals Who Are Able to Pay for their LTC Needs, by Income Quintile

Northern Europe: Sweden, the Netherlands and Denmark. Continental Europe: Austria, Germany, France and Belgium. Southern Europe: Spain and Italy. Individuals aged 65 and over in wave 5 and who have no partner when they become dependent.
Source: SHARE; authors' microsimulation.

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Online Complement C4 – Sensitivity Tests

This Online complement tests the sensitivity of the results to changes in the interest rate (4% instead of 8%) and in life tables (20% lower life expectancy than in the Human Mortality Database) used to compute reverse mortgages. It also simulates the effect of a change in the growth rate of housing prices (+/-5% per year instead of 0%).

Table C4-1

Effects of a Change in RM Parameters (Interest Rate, Remaining Life Expectancy and Evolution of Housing Prices) on the Distribution of the Lump-Sum Amount that Dependent Individuals Can Receive

(In %)

	Distribution of home equity	Distribution of lump-sum amount (baseline)	Lump-sum amount (m: 4%)	Lump-sum amount (e: -20%)	Lump-sum amount (g: 5%)	Lump-sum amount (g: -5%)
P10	57,989	32,902	44,055	37,560	47,970	21,187
P25	100,171	61,500	81,132	69,157	87,352	42,361
P50	170,000	103,991	131,531	114,070	138,241	75,914
P75	270,000	173,763	215,046	190,673	226,412	130,147
P90	400,000	264,556	323,583	282,602	344,173	202,803
Mean	221,888	141,191	175,111	153,940	186,922	107,134
Number of observations: 4,179						

Note: The distribution corresponds to the tenth simulation. Weighted distribution. Homeowners aged 65 and over in wave 5 and who have no partner when they are dependent.
Source: SHARE; authors' microsimulation.

Table C4-1 above summarizes the lump-sum amounts that dependent individuals receive for different levels of interest rates, life expectancy and housing prices. The mean lump-sum payment is €141,191 in the baseline scenario, €175,111 if the interest rate decreases to 4% and 153,940 euros if the life expectancy is 20% lower. If housing prices decrease, the lump-sum payment is lower (€107,134), while it is higher (€186,922) if housing prices increase.

The ability to pay remains stable when RM parameters are changed (Table C4-2). In the baseline scenario, 49% of individuals can pay for their periods of LTC needs. This proportion is equal to 53% if we use a 4% interest rate, and to 50% if we use a 20% lower life expectancy. It ranges between 45% and 54% depending on the evolution of housing prices. This stability is explained by our assumption that individuals take out reverse mortgages when they become dependent. The lump-sum payment was already computed based on short life expectancies, and changing the parameters makes little difference when compared to the annual LTC cost.

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Table C4-2
Effects of a Change in RM Parameters on Ability to Pay

	Lump-sum RM (baseline)	Lump-sum RM (m: 4%)	Lump-sum RM (e: - 20%)	Lump-sum RM (g: 5%)	Lump-sum RM (g: - 5%)
Total	0.489	0.525	0.503	0.537	0.447
	(0.005)	(0.007)	(0.007)	(0.006)	(0.007)
Austria	0.380	0.400	0.389	0.406	0.351
	(0.013)	(0.013)	(0.013)	(0.014)	(0.011)
Germany	0.425	0.444	0.433	0.451	0.401
	(0.012)	(0.012)	(0.011)	(0.012)	(0.010)
Sweden	0.476	0.487	0.481	0.496	0.460
	(0.019)	(0.021)	(0.021)	(0.020)	(0.019)
Netherlands	0.483	0.496	0.488	0.501	0.462
	(0.018)	(0.016)	(0.015)	(0.015)	(0.021)
Spain	0.504	0.555	0.525	0.573	0.452
	(0.013)	(0.016)	(0.011)	(0.019)	(0.016)
Italy	0.481	0.534	0.502	0.554	0.419
	(0.016)	(0.019)	(0.018)	(0.020)	(0.016)
France	0.576	0.611	0.589	0.622	0.532
	(0.022)	(0.017)	(0.019)	(0.016)	(0.025)
Denmark	0.383	0.406	0.391	0.411	0.358
	(0.018)	(0.018)	(0.018)	(0.016)	(0.020)
Belgium	0.657	0.680	0.666	0.687	0.625
	(0.015)	(0.015)	(0.013)	(0.016)	(0.012)
Number of observations: between 6,542 and 6,746 depending on the simulation					

Note: The figures correspond to the mean of the (weighted) ability to pay across ten replications of simulations. Standard deviations between the means of the ten replications are in parentheses. Individuals aged 65 and over in wave 5 and who have no partner when they are dependent.
Source: SHARE; authors' microsimulation.

Online Complement C5 – The Role of Informal Care and Public LTC Coverage

Informal Care

To simplify the simulation, we do not take into account the diversity of care arrangements in Europe. We simply assume that the LTC cost borne by dependent individuals is 25% or 50% lower when they had children in Wave 5. This corresponds to the case where children provide informal care or purchase formal services.

In the baseline scenario, by construction, the ability to pay for LTC needs is nearly the same, whether one has children or not (Table C5-1). When we assume that the LTC cost is lower for individuals with children, it increases their ability to pay. When the LTC cost is 25% lower, the proportion of individuals with children who can pay for LTC is 57%, compared to 51% for individuals without children. If the LTC cost was 50% lower, 68% of individuals who have children could totally finance their periods of disability.

Table C5
Effect of Informal Care on Ability to Pay

		Adjusted household income	+ Net financial assets	+ Other real estate	+ Lump-sum RM
Baseline scenario	Total	0.062 (0.003)	0.164 (0.006)	0.222 (0.004)	0.489 (0.005)
	No children	0.069 (0.008)	0.192 (0.008)	0.241 (0.016)	0.505 (0.020)
	At least one child	0.060 (0.003)	0.159 (0.008)	0.218 (0.005)	0.485 (0.006)
LTC cost -25%	At least one child	0.113 (0.004)	0.237 (0.003)	0.291 (0.002)	0.569 (0.007)
LTC cost -50%	At least one child	0.230 (0.006)	0.370 (0.006)	0.417 (0.006)	0.678 (0.007)
Number of observations: between 6,542 and 6,746 depending on the simulation				

Note: The figures correspond to the mean of the (weighted) ability to pay across ten replications of simulations. Standard deviations between the means of the ten replications are in parentheses. Individuals aged 65 and over in wave 5 and who have no partner when they are dependent.
Source: SHARE; authors' microsimulation.

Public LTC Coverage

To simulate the effect of public LTC coverage on social inequalities, we mimic a simple income-tested system and assume that 80% of the LTC cost is publicly covered for dependent individuals in the bottom income quintile, 60% for the 2nd quintile, 40% for the 3rd quintile, 10% for the 4th quintile and 5% for the 5th quintile (we do not consider the issue of financing a public LTC insurance system).

While only 6% of individuals can pay for their LTC needs out of their income in the baseline scenario, this proportion more than doubles (13%) when adding public LTC coverage (Table C5-2). Similarly, the proportion of individuals who can pay for LTC with income and financial assets increases from 16% to 32%. If we add all housing assets, 67% of dependent individuals can totally finance their LTC expenses with public coverage, as compared to 49% in the baseline scenario. In addition, since we have assumed that co-payments increase with income, public LTC coverage reduces social inequalities.

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Table C5-2
Effect of Public LTC Coverage on Ability to Pay

		Adjusted household income	+ Net financial assets	+ Other real estate	+ Lump-sum RM
Baseline scenario	Total	0.062 (0.003)	0.164 (0.006)	0.222 (0.004)	0.489 (0.005)
	Q1	0.000 (0.000)	0.046 (0.006)	0.069 (0.007)	0.298 (0.011)
	Q2	0.000 (0.000)	0.060 (0.010)	0.103 (0.010)	0.365 (0.022)
	Q3	0.000 (0.000)	0.101 (0.011)	0.166 (0.009)	0.475 (0.015)
	Q4	0.009 (0.002)	0.212 (0.026)	0.307 (0.024)	0.658 (0.026)
	Q5	0.445 (0.016)	0.606 (0.015)	0.699 (0.022)	0.877 (0.014)
Public LTC coverage	Total	0.132 (0.003)	0.324 (0.009)	0.381 (0.007)	0.671 (0.009)
	Q1	0.114 (0.008)	0.270 (0.012)	0.300 (0.011)	0.596 (0.016)
	Q2	0.078 (0.004)	0.293 (0.017)	0.337 (0.017)	0.640 (0.017)
	Q3	0.052 (0.004)	0.261 (0.014)	0.325 (0.013)	0.638 (0.019)
	Q4	0.042 (0.007)	0.277 (0.028)	0.367 (0.025)	0.698 (0.026)
	Q5	0.493 (0.019)	0.636 (0.018)	0.717 (0.023)	0.886 (0.012)
Number of observations: between 6,542 and 6,746 depending on the simulation					

Note: The figures correspond to the mean of the (weighted) ability to pay across ten replications of simulations. Standard deviations between the means of the ten replications are in parentheses. Individuals aged 65 and over in wave 5 and who have no partner when they are dependent.
Source: SHARE; authors' microsimulation.