Long-Term Care Needs: Implications for Savings, Welfare, and Public Policy

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Introduction

- Contrary to the predictions of a standard life-cycle model, many elderly dissave slowly during retirement.

  Huggett (JME 1996)

- Long-term care (LTC) needs: defined as demand of assistance to perform basic tasks of everyday life.

- To what extent LTC needs affects the dissaving decisions of the old?

Motivation

Cross-Country Evidence

- LTC needs are potentially very important since:
  - Publicly insured to a lower extent than medical expenses.
  - Expensive when paid out-of-pocket.

- I investigate differences in the dissaving behavior of individuals based on variation on public provision of LTC across countries.

- I use micro data from the Health and Retirement Study (HRS) and the Survey of Health, Aging, and Retirement in Europe (SHARE).

- Median wealth regression by country on age polynomial, gender, and education dummies.

$$\text{Dissaving} = 1 - \frac{\text{Median Assets}_{age=85}}{\text{Median Assets}_{age=70}}$$

Motivation

Cross-Country Evidence

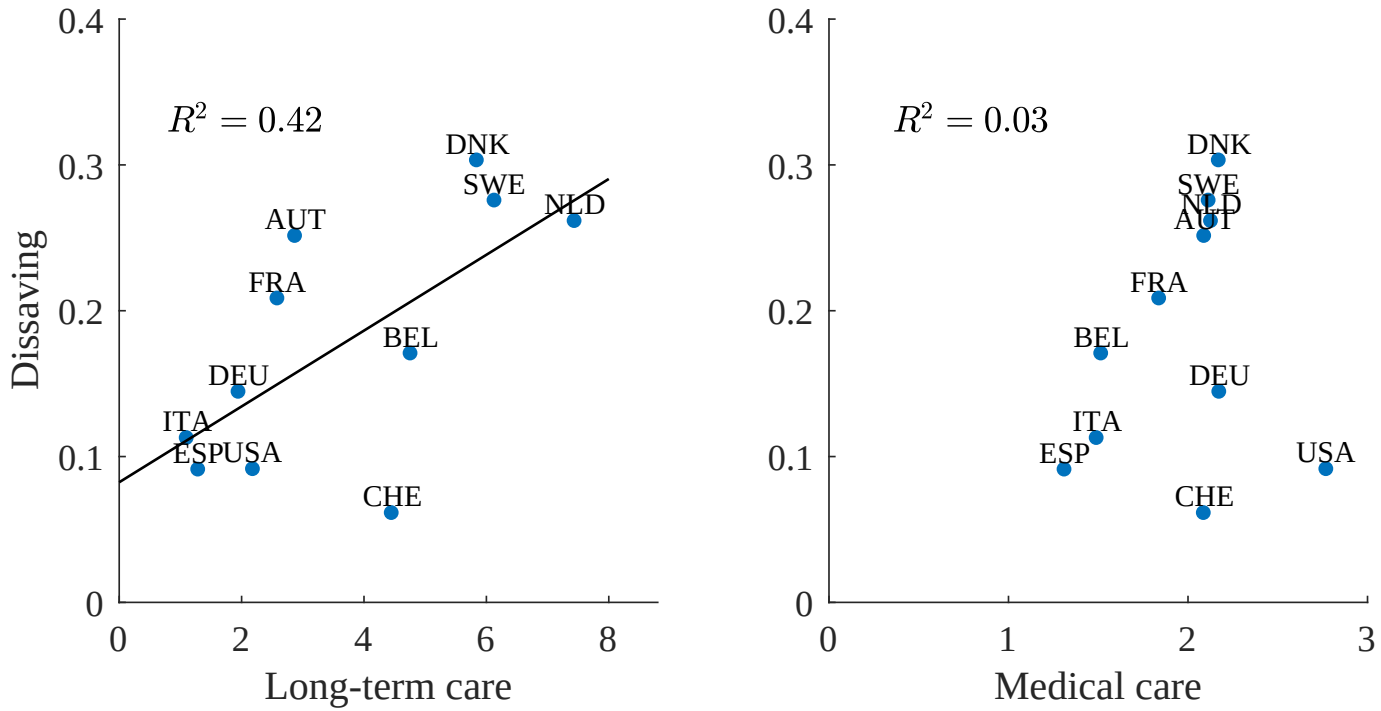

Figure 1: Dissaving and public expenditure across countries: long-term care (left panel) and medical care (right panel).

This Paper

- The goal of this paper:
  1. Analyze to what extent LTC needs drives the savings decision of individuals late in life.
  2. Compare its relative importance over medical expenses and bequest motives.
  3. Evaluate the effect of public provision of LTC on dissaving differences across countries.

Related Literature

- Savings in retirement:
  - Health related expenses (medical + nursing homes).
    De Nardi, French, and Jones (JPE 2010); Dobrescu (JHR 2015)
  - LTC expenses.
    Ameriks et al. (WP); Kopecky and Koreshkova (AEJma 2014); Lockwood (WP); Imrohoroglu and Zhao (WP)
- This paper:
  - Include LTC need heterogeneity.
  - LTC expenses are endogenous.

Related Literature

- Family care arrangements.

  Barczyk and Kredler (RES 2017); Ko (WP); Mommaerts (WP)

  Imrohoroglu and Zhao (WP)

- This paper:
  - Take IC as given from the data.
  - Make bequest motive vary with IC.

Outline

1. Introduction
2. Related Literature
3. LTC Needs and LTC Expenditure Choices
4. Model
5. Counterfactuals
6. Policy Experiments
7. Conclusions

LTC Needs

- In order to analyze LTC expenditure choices, I need first to identify individual's LTC needs.
- The HRS contains panel information on reported difficulty with 12 different activities of daily living and instrumental activities of daily living (I-ADLs) (0/1 dummy variables).
  - walking across the room, eating, taking medication, etc.
- In my companion paper, my co-authors and I reduce the dimensionality of the data from 2^{12} states into only 4 **latent** health states.
- We exploit the panel dimension (past, present and future information) by estimating states and transitions jointly.

LTC Needs

- The data is well represented by 4 different health groups.
  - The healthy: no difficulties with I-ADLs.
  - The physically frail: limitations mainly with physical activities.
  - The mentally frail: limitations mainly with cognitive activities.
  - The impaired: limitations with both cognitive and non-cognitive.

LTC Needs

Table 1: Expected duration of each health state at age 70 by permanent income quartile.

Permanent income quartile	Life Expectancy	=	Healthy	+	Physically frail	+	Mentally frail	+	Impaired
					Males				
Bottom	10.0		6.4		1.9		0.9		0.8
Top	13.9		11.3		1.4		0.6		0.5
					Females				
Bottom	13.4		7.7		3.2		1.2		1.3
Top	17.0		12.6		2.3		1.0		1.1

Notes: Permanent income quartiles computed from average non-investment income.

- Females and the poor face the largest LTC risk.

LTC Choices

- Using HRS helpers files, I document LTC choices for the elderly singles based on previously defined LTC needs.
- I classify care as depending on the identity of the caregiver:
  - Informal if the caregiver is a relative or a friend.
  - Formal if she is an employee of an institution, a paid helper, or a professional.
- I document that individuals adjust their consumption of FC.
  - As health deteriorates, individuals consume more FC.
  - Richer individuals consume more FC.
  - Access to IC lowers the demand of FC.

LTC Choices

Formal Care Hours by Permanent Income Quartile

Table 2: Formal care hours per day by permanent income quartile

	Physically frail	Mentally frail	Impaired
All	0.7	1.0	2.8

LTC Choices

Formal Care Hours by Permanent Income Quartile

Table 2: Formal care hours per day by permanent income quartile

	Physically frail	Mentally frail	Impaired
All	0.7	1.0	2.8
Bottom	0.8	1.0	2.3
Second	0.6	0.9	2.9
Third	0.5	1.2	2.7
Top	0.9	1.3	3.5

LTC Choices

Formal Care and Access to Informal Care

- Individuals adjust their consumption of FC depending on their access to IC.
- In order to summarize the large heterogeneity in IC hours, I assume that there are only three types of families in the population.
- For each health status, I split the distribution of IC hours in three equally likely groups:
  - Individuals belonging to *close families* belong to the top tercile of IC hours distribution.
  - Individuals belonging to *distant families* belong to the middle tercile of IC hours distribution.
  - Individuals *on their own* belong to the bottom tercile of IC hours distribution.

LTC Choices

Formal Care and Access to Informal Care

Table 3: Formal care hours per day by family type.

Family	Physically frail	Mentally frail	Impaired
All	0.7	1.0	2.8

LTC Choices

Formal Care and Access to Informal Care

Table 3: Formal care hours per day by family type.

Family	Physically frail	Mentally frail	Impaired
All	0.7	1.0	2.8
On your own	1.4	2.0	4.9
Distant	0.3	0.9	3.4
Close	0.3	0.5	1.7

Model

Model

- Single agents start their life at age $a = 70$.
- Health status defined as:
  - $h = 1$: Healthy.
  - $h = 2$: Physically frail.
  - $h = 3$: Mentally frail.
  - $h = 4$: Impaired.
  - $h = D$: Dead.
- Stochastic and persistent medical expenses.
- Constant stream of income $b(PI, s)$.
- Choices:
  - Save at an safe interest rate r.
  - LTC and regular consumption
  - Access a means-tested government program.

Model

- Following previous section, I define three different types of families.
  - $F = 0$: On your own.
  - $F = 1$: distant family
  - $F = 2$: close family.
- Each type of family differs in the amount of IC hours provided which also vary by health status: $l_{IC}(h, F)$.

Model

Preferences

- Following De Nardi, French and Jones (2010), agents derive utility from:

$$u(c, l_{FC}; h, F) = \frac{c^{1-\sigma}}{1-\sigma} + \mu(h)^{\nu} \frac{\left[l_{FC} + \omega \cdot l_{IC}(h, F)\right]^{1-\nu}}{1-\nu}$$

- When dying individuals derive utility from leaving bequests:

$$\phi(k; F) = \lambda(F)^{\sigma} \frac{(k+\delta)^{1-\sigma}}{1-\sigma}$$

Model

Government Insurance

- Agents always have the option of using a government program (G).
  - Enjoy $\underline{c}$, consumption floor independent from their LTC needs.
  - Furthermore, if the agent is in need of LTC, Medicaid provides $\underline{I}(h)$ hours of formal care for free.
  - Consumer's wealth is set to zero ($k' = 0$).

Model

Problem

$$V_a(k,h,\zeta,\xi,s,PI,F) = \max_{k',c,l_{FC},G} \Big\{ u(c,l_{FC};h,F) + \beta(1-\pi_{h'=D,h,a,s,PI})E_a[V_{a+2}(k',h',\zeta',\xi',s,PI,F)] + \beta\pi_{h'=D,h,a,s,PI}\phi(k';F) \Big\}$$

s.t

$$k' = (1-G)\Big[(1+r)k + b(PI,s) - m - c - p_{FC}.l_{FC}\Big]$$

$$G = 1 \Leftrightarrow \begin{cases} c = \underline{c} \\ l_{FC} = \underline{l}(h) \end{cases}$$

Estimation Procedure

- Standard two-step strategy:
  1. Estimate parameters identified out of the model.
  2. Estimate parameters with method of simulated moments.
     - 12 parameters to estimate and 273 moment conditions.
     - Simulated individuals are endowed with a value of the state variables observed in the 1998 HRS data: assets, gender, PI, and age.
     - Each simulated person inherits her entire mortality history realized in the HRS and simulate her decisions from 1998 to 2014.

Estimated Preference Parameters

General		*Family dependent*	
β : discount factor	0.97 (0.01)	$\lambda(F=0)$: On your own	0.06 (0.36)
σ : RRA, consumption	4.24 (0.10)	$\lambda(F=1)$: Distant	0.62 (0.07)
ν : RRA, care hours	3.03 (0.07)	$\lambda(F=2)$: Close	0.83 (0.06)
δ : bequest curvature $\times 10^3$	13.2 (1.75)		
$\underline{c}$: consumption floor $\times 10^3$	10.9 (0.10)	*Health dependent*	
ω : IC-FC equivalence	0.87 (0.12)	$\mu(h=2)$: Physically frail	1.01 (0.11)
		$\mu(h=3)$: Mentally frail	2.71 (0.27)
		$\mu(h=4)$: Impaired	6.55 (0.63)

Targeted Moments

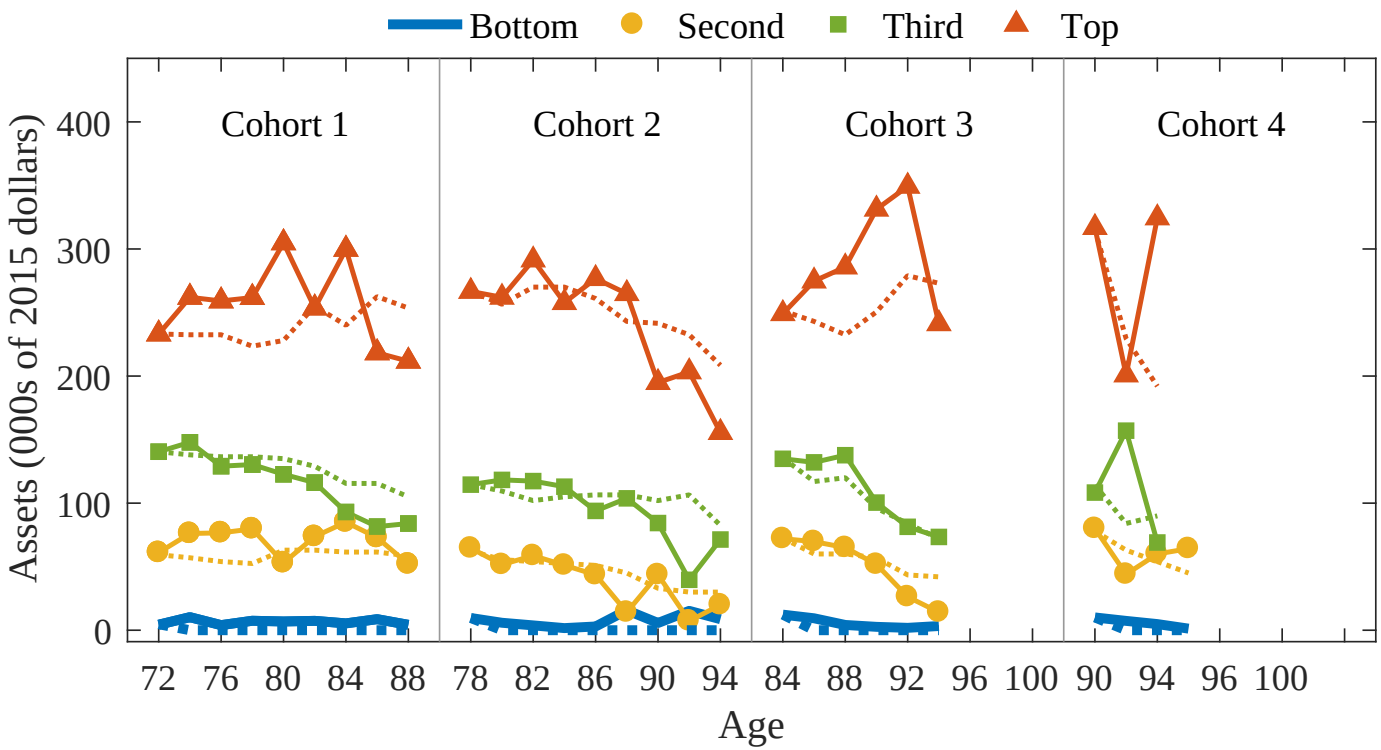

Figure 2: Median Net Worth by Permanent Income Quartile. Solid (data), dotted (model)

Targeted Moments

Table 4: Model fit: formal care hours by permanent income quartile

	Physically frail	Mentally frail	Impaired
Bottom	0.8	1.0	2.3
	[0.6]	[1.0]	[2.5]
Second	0.6	0.9	2.9
	[0.3]	[0.8]	[2.3]
Third	0.5	1.2	2.7
	[0.4]	[1.1]	[3.0]
Top	0.9	1.3	3.5
	[0.9]	[2.1]	[4.5]

Notes: Table reports data and simulated formal care consumption. Simulated statistics are given in brackets.

Targeted Moments

Table 5: Model fit: formal care hours by family type

	Physically frail	Mentally frail	Impaired
On your own	1.4	2.1	4.9
	[0.9]	[1.7]	[3.7]
Distant	0.3	0.9	3.5
	[0.5]	[1.2]	[3.3]
Close	0.3	0.5	1.7
	[0.2]	[0.5]	[1.4]

Notes: Table reports data and simulated formal care consumption. Simulated statistics are given in brackets.

Untargeted Moments

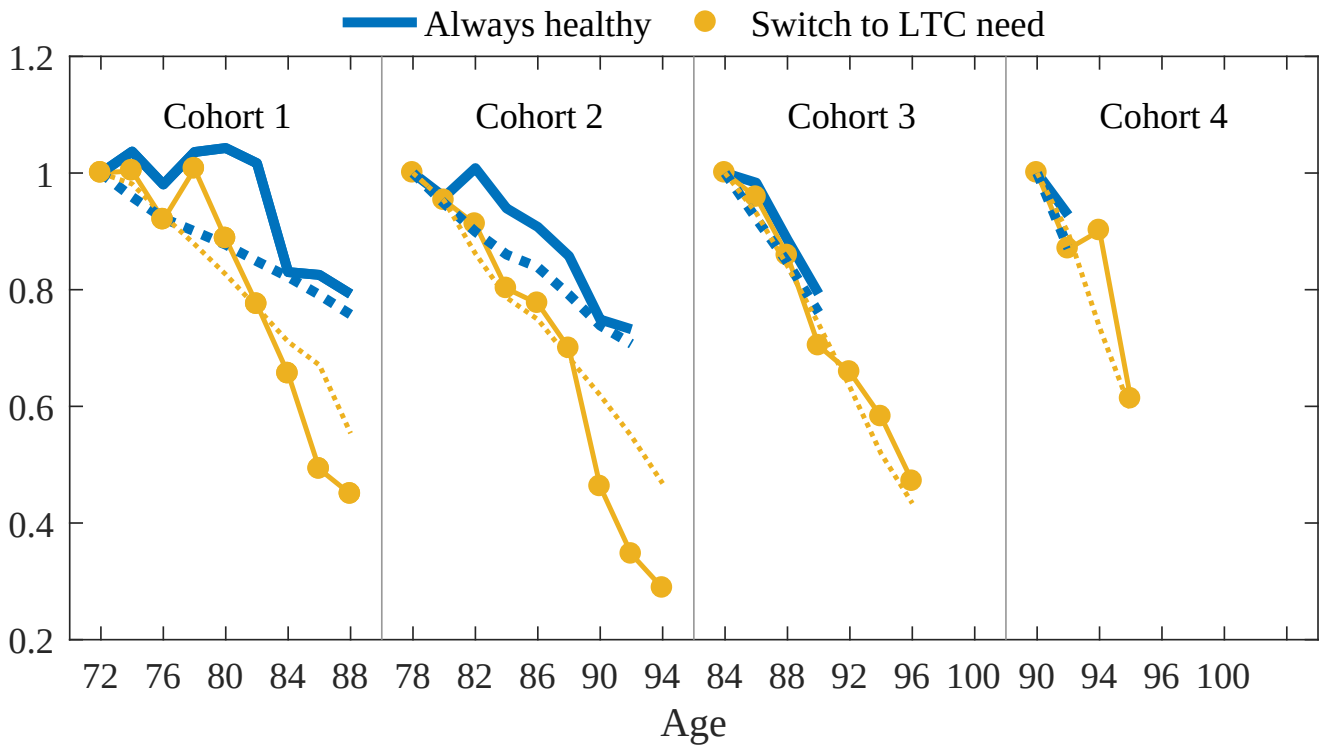

Figure 3: Median net worth by health status.
Solid (data), dotted (model)

Counterfactuals

How much do individuals save for LTC?

- I determine the importance of LTC on the asset accumulation profile:
  - Simulate the benchmark model for individuals aged 70-75 in 1998: cohort 1.
  - Compare it to a model where agents do not derive utility from consuming care: $\mu(h) = 0 \Leftrightarrow$ Agents always fit but same LE and medical risk as in benchmark.
  - I then recompute the optimal savings decisions, simulate the model, and compare the resulting asset accumulation profile to the asset profile generated by the baseline model.

How much do individuals save for LTC?

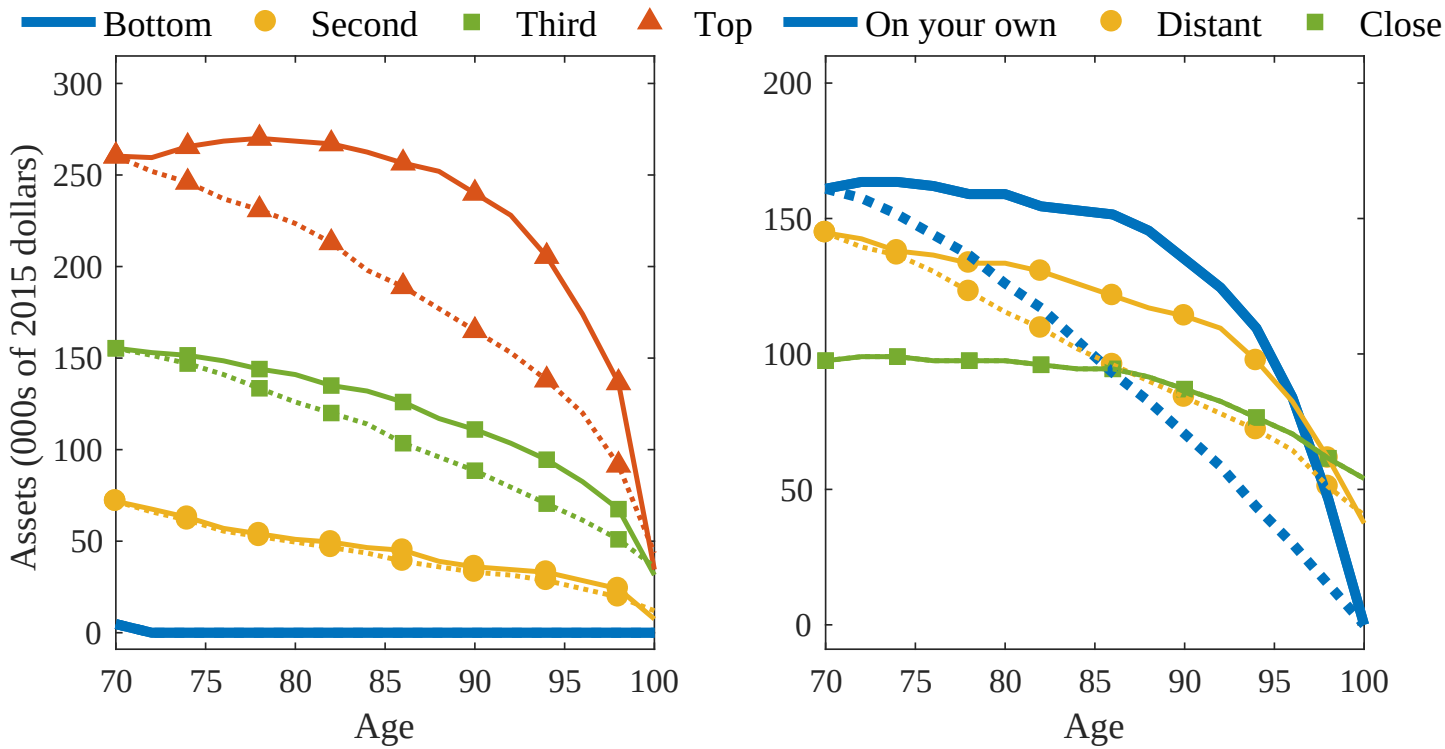

Figure 4: Model simulation by permanent income quartile (left panel) and family type (right panel): benchmark (solid) and model with no utility from care (dotted).

How much do individuals save for LTC?

- Individuals in the simulation in the top PI quartile dissave much faster than in the benchmark economy.
  - By age 90, individuals in the simulation hold around 1/3 less assets.
- LTC is therefore a crucial driver of savings for the elderly rich.
- Individuals savings pattern in the bottom quartiles of PI are unaffected by LTC.
- Individuals receiving little IC from relatives are the ones accumulating the most precautionary savings.

Are medical expenditures an important driver of savings?

- Medical expenses play little role at explaining the dissaving puzzle.
  - By age 90, individuals in the top PI hold 13% less assets in the simulation than in the benchmark model.
- In line with the data, health states in which medical expenditures are high turn-out to be short-lived due to higher mortality.
- This result suggests that Medicare provides good level of insurance against medical shocks.

Bequests

- Bequests are estimated to be luxury good.
- Individuals in close families derive much higher utility from leaving bequests.
- Bequest motives matter little for the rich (8% lower wealth at age 90 for this group).

Policy Experiment

On the Efficiency of Current Public LTC expenses

- Small subsidies to FC reduce the incentive of over-consuming to become Medicaid eligible.
  - Reduce government transfers to the poor.
- It is possible to find a subsidy that keeps total government transfers constant.

Table 6: The cost and benefits of subsidizing the price of formal care by 4.5% at age 70.

Permanent income quartile	Government transfers	Δ Government transfers	Equivalent variation
Bottom	37.5	-1.3	3.0
Second	15.0	0.1	1.0
Third	13.0	0.4	1.4
Top	11.4	0.7	1.8
Average	18.0	0.0	1.8

Cross-Country Variation in Dissaving Rates

- I want to investigate to which extent differences in the provision of public LTC are able to explain the cross-country variation in dissaving rates.
  - In order to reproduce eligibility criteria in European countries, I make government LTC universal: remove asset test.
  - I change hours of care provided by the government so that I match aggregate expenditures in LTC country by country.

Cross-Country Variation in Dissaving Rates

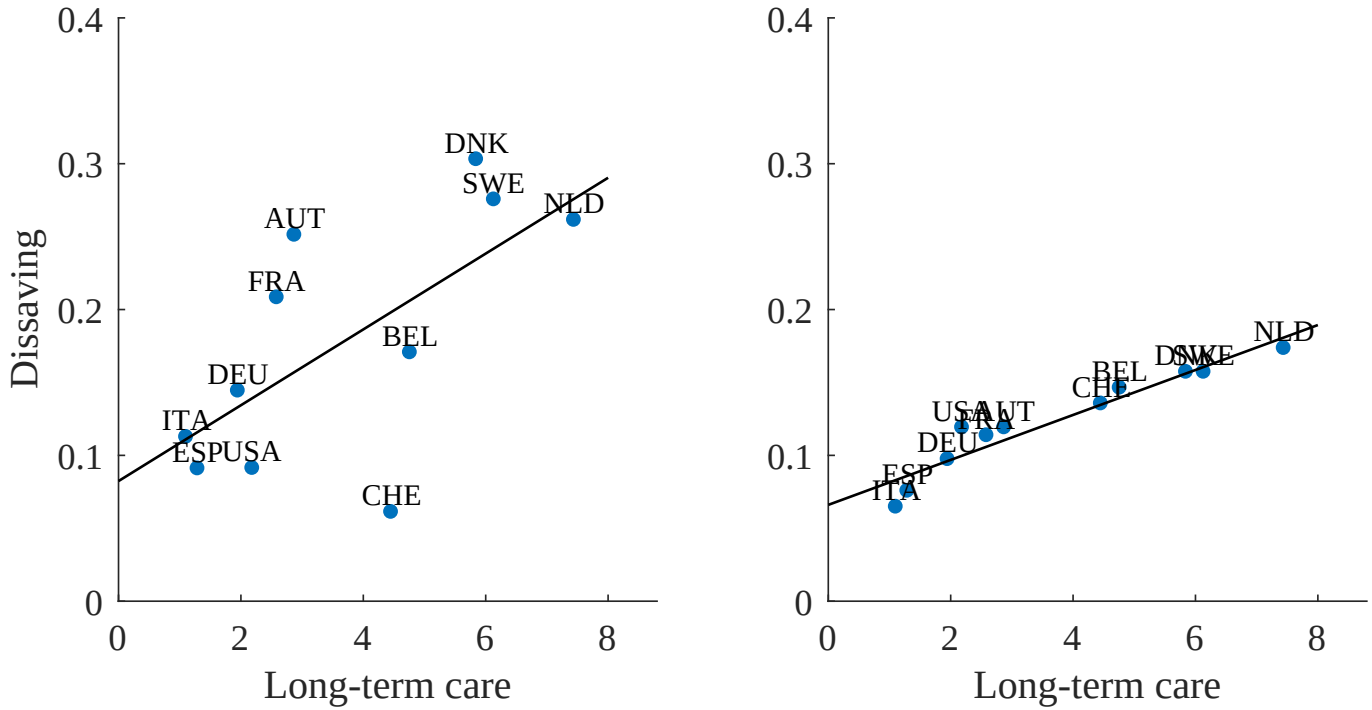

Figure 5: Dissaving and public provision of long-term care across countries: data (left panel) and model (right panel)

Cross-Country Variation in Dissaving Rates

- I compute the semi-elasticity of dissaving (from age 70 to 85) w.r.t. public spending in LTC:
  - Data: the dissaving rate from age 70 to 85 increases 2.6 p.p per $1,000 spent in LTC.
  - Model: 1.5 p.p. per $1,000 spent in LTC.
- Based on the model's prediction, around 40% of the variation in dissaving rates across countries can be explained by differences in the provision of LTC by the public sector.

Conclusions

- I estimate a model of savings for retired single individuals with heterogeneous LTC needs and where LTC expenses are endogenous.
- LTC is a key driver of savings for the elderly rich.
- Bequests and medical expenditures play a minor role at explaining the dissaving puzzle for the rich.
- The model stresses the role of public LTC coverage for explaining differences in the dissaving pattern across countries.