

# State-Dependent Preferences and Probability Misperceptions in Long-Term Care Insurance

Philippe De Donder (TSE, CNRS)

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# Introduction

- Long Term Care: care for people needing daily living support (for activities such as bathing, dressing, eating, getting in and out of bed, toileting, and continence) over a prolonged period of time.
- So-called “LTC insurance puzzle”: why do we see so little (private) LTC insurance? Compare with health insurance...
- Many reasons: Demand side (informal help by family, lack of knowledge of products,...), Supply side (crowding out of public programs, adverse selection,...). See TSE Note n°3 (2009)
- Here: focus on behavioral aspects:
  - Misperceptions of LTC risks,
  - State-Dependent Preferences

## I. Misperception of LTC risks

Simple idea: if agents under-estimate their risk, this decreases their willingness to pay for LTC insurance.

Results based on two papers:

- Boyer M., De Donder Ph., Fluet C., Leroux M.-L. and P.-C. Michaud, “Long Term Care Risk Misperceptions”, *The Geneva Papers on Risk and Insurance – Issues and Practice*, 2019, 44 (2), 183-215.
- Boyer M., De Donder Ph., Fluet C., Leroux M.-L. and P.-C. Michaud, “Long-term Care Insurance : Information Frictions and Selection”, *American Economic Journal: Economic Policy*, 2020, 12(3), 134-69.

## Two risk dimensions: longevity & disability at old age

- There is evidence of misperceptions of longevity (under-estimation of survival probability at 70, but over-estimation above 70).
- There is much less evidence on disability at old age. Costa-Font & Costa-Font (2011): “aggregate optimism bias”: the probability of being disabled at 80 is 48% for others but only 20% for respondents themselves.

## Our contribution

We provide evidence for Canada with

- 1 measure for longevity (probability to live to 80) + 2 measures for LTC (probability dependency + probability needing formal care).
- We construct “objective” measures of 3 dimensions and compare them with subjective measures (whole distribution)
- We relate the 3 dimensions
- We link them with the demand for LTCI.

## Survey

- We ran an online panel survey in late 2016 with 2000 Canadians (Ontario+Québec) aged 50 to 70.
- We asked them several questions about their socio-economic characteristics, reasons for having purchased (or not) LTCI as well as their preferences regarding the type of LTC they would prefer to receive.
- We also asked them questions about their subjective assessment of three different risks.
- The last section of the survey consisted in a stated preferences experiment.

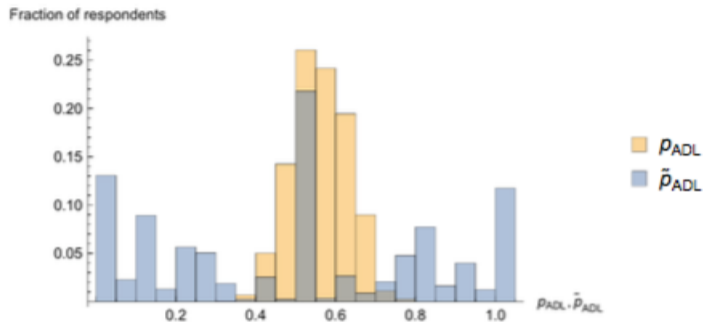
- We then matched respondents with a health microsimulation model (called COMPAS) devised to estimate personalized lifetime exposure to the risk of disability, nursing home entry and longevity.
- We study the individual determinants of these misperceptions and how they impact intentions to buy LTCI as well as the actual demand for LTCI

## Results (i) : Misperceptions

- First, misperceptions are quite small on average : 4.5% for longevity vs 9% for LTC.
- Survey respondents are on average optimistic for ADL and for their survival probability, and pessimistic for their need of a nursing home.
- Second, there is a lot more heterogeneity in subjective estimates of risks than in the objective estimates, with many more people estimating that they have either a low or a high risk than is the case with COMPAS.
- Third, there is little correlation at the individual level between subjective and objective measures of risk, except for survival, suggesting that survey participants are better informed about their survival probability than about their LTC risks.

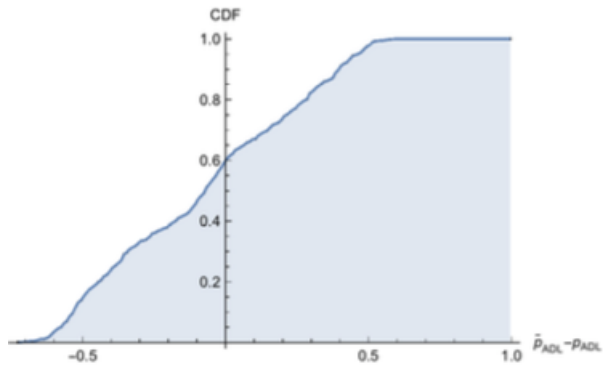


	mean
$\tilde{p}_{ADL}$	47.77
$p_{ADL}$	55.80
$\tilde{p}_{ADL} - p_{ADL}$	-8.03
$\tilde{p}_{NH}$	35.41
$p_{NH}$	26.35
$\tilde{p}_{NH} - p_{NH}$	9.06
$\tilde{\pi}$	67.73
$\pi$	63.22
$\tilde{\pi} - \pi$	4.51

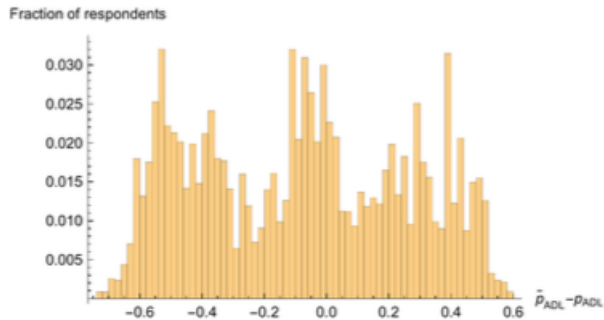


(b) Histogram

Figure 2: CDF and Histogram of objective and subjective probabilities of needing help with ADLs

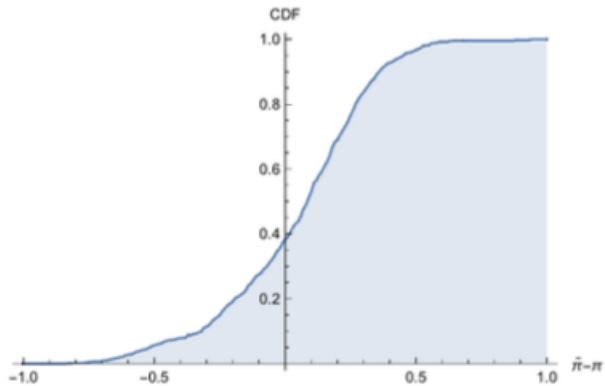


(a) CDF

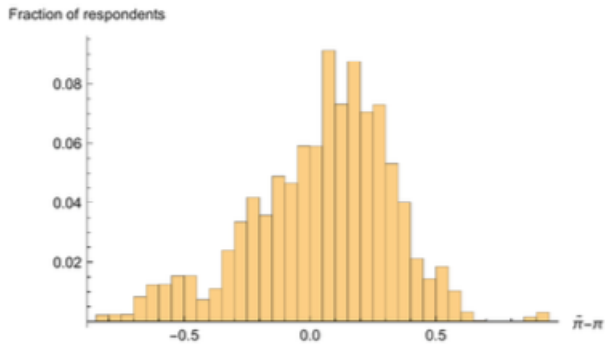


(b) Histogram

Figure 3: CDF and Histogram of  $(\tilde{p}_{ADL} - p_{ADL})$



(a) CDF

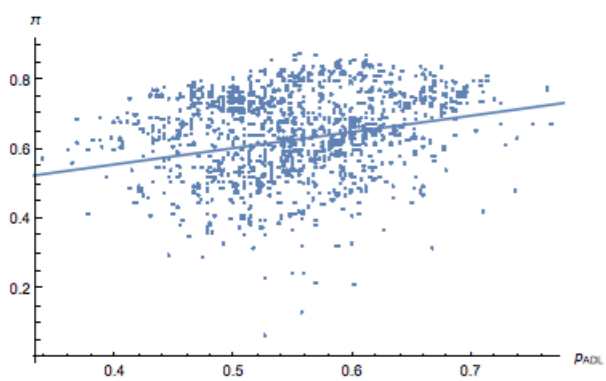


(b) Histogram

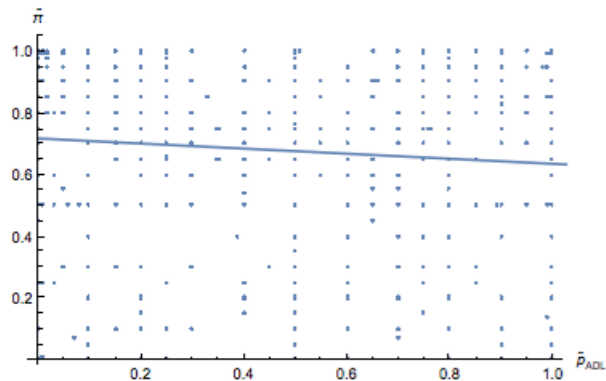
Figure 8: CDF and Histogram of  $\tilde{\pi} - \pi$

## Results (ii) : Cross-correlations

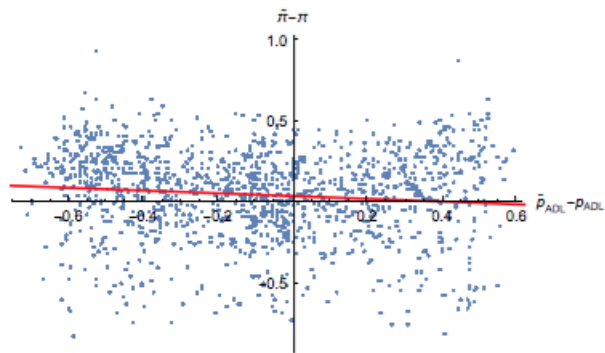
- First, we find a (slightly) positive correlation between objective measures of LTC and longevity risks consistent with LTC risks increasing with age, but a (slightly) negative correlation between those two subjective measures, consistent with the hypothesis that the current subjective health status of the respondent drives his/her answers on both dimensions.
- The correlation between misperceptions in the two dimensions (longevity and LTC) is (slightly) negative, with 38% of respondents being optimistic on both dimensions.



(a)  $\pi$  and  $p_{ADL}$



(b)  $\tilde{\pi}$  and  $\tilde{p}_{ADL}$



(c)  $\tilde{p}_{ADL} - p_{ADL}$  and  $\tilde{\pi} - \pi$

Figure 9: Relationship between Survival and ADL risks

	$\tilde{\pi} - \pi > 0$	$\tilde{\pi} - \pi < 0$
$\tilde{p}_{ADL} - p_{ADL} > 0$	24%	15%
$\tilde{p}_{ADL} - p_{ADL} < 0$	38%	23%

Table 3: Fraction of individuals in each quadrant (Total number of respondents= 1255).

- Looking then at correlates of misperceptions, we find that women and residents of the province of Québec are more optimistic regarding ADL and nursing home risk, while more educated respondents are more pessimistic regarding nursing home risk. There is rarely a consistent pattern across all three risks in terms of determinants, which highlights the importance of looking at all three risks separately. This holds as well for determinants of the probability of knowing these risks.



### **Results (iii): Links with LTCI purchases (intentions)**

- We find that misperceptions are significantly and positively correlated with intentions to buy LTCI, but that these effects cannot explain why take-up of LTCI is low at the aggregate level, for two reasons.
- First, the coefficients are quite small (for instance, a 10 percentage point increase in misperception of ADL risk increases demand by 0.9 percentage point).
- Second, not all misperceptions bias demand downward, with subjects on average over-estimating their need for nursing home and their longevity. Correcting misperceptions on the three dimensions simultaneously would increase LTCI take-up by at most one percentage point.
- This is confirmed in the (much more sophisticated) AEJ paper.

## II : State-Dependent Preferences

- Most of (theoretical) literature represents advent of LTC as a monetary shock, not affecting preferences.
- Consequence: higher marginal utility and need to insure against LTC risk.
- But health economics literature has long suggested that preferences change when dependency strikes.
- With ML Leroux (UQAM),<sup>1</sup> we focus on the change in preferences as well as on the change in the composition of the consumption basket resulting from a change in the health status.

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<sup>1</sup>“Long Term Care Insurance and State Dependent Preferences”. TSE Working Paper 2019-1061

## The model

- We develop a theoretical model where we assume state-dependent preferences and, where we distinguish daily-life consumption from LTC expenditures (including its health services component).
- This model enables us to determine the demand for LTCI and how this demand is affected by both the state-dependency of preferences and the variation in the composition of the consumption bundle (between daily-life consumption and health expenditures).
- Main assumption: marginal utility of daily life consumption (traveling, attending cultural events, going to restaurants, undertaking physical activities, etc.). decreases when dependent.

## The results

- We obtain that agents always buy less than full LTCI, with some agents preferring not to buy any insurance at all.
- Moreover, we obtain that the transfer received from the insurer at equilibrium covers only a fraction of the LTC expenses. This can be related to LTCI contracts observed worldwide.
- We study how the demand for insurance varies with income. We then show that, although marginal utilities of consumption (or ex post income) are equalized across states when agents buy insurance, the marginal utilities of ex ante income are not.
- This allows us to generate the following testable implications of our model (who should exhibit higher marginal utility of ex ante income).

- With B. Achou (HEC Montréal), Franca Glenzer (HEC Montréal), Minjoon Lee (Carleton U) and ML Leroux (UQAM), we currently complement this theoretical approach by an econometrical analysis, based on an online survey, to assess whether and how preferences differ when dependent. Plus impact of COVID (perceptions) on care type choice (home care vs nursing homes) and on preferences for the introduction of a social program.