# Long-Term Care Insurance: Knowledge Barriers, Risk Perception and Adverse Selection

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# Motivation

- Rapid population aging represents a challenge for financing and providing long-term care (LTC).

- Near retirement, probability of ever needing LTC in nursing home in range [35%,50%] (U.S.)
- The annual cost of a private nursing home ranges between 40,000$ and 60,000$ in Canada.

- ... yet, few people hold a private LTC insurance:
  - In the US, only 10.8% of those 60 years and older hold a private insurance policy
  - LTC spending covered by private insurance is less than 2% in 2011 (OECD, 2011)

# Why so low take-up?

**Demand Side:**

- Importance of family support (Van Houtven and Norton, 2004; Bonsang, 2009),
- Crowdout from social insurance (Pauly, 1990; Brown and Finkelstein, 2008),
- Misperceptions (Zhou-Richter et al., 2010; Finkelstein and McGarry, 2006),
- Bequest motives (Lockwood, 2014),
- Housing as substitute for insurance (Davidoff, 2010)
- Lack of financial knowledge (Lusardi and Mitchell, 2014, Lusardi et al. 2017) and of true LTC costs as well as institutional settings in case of dependency

# Why so low take-up? (2)

**Supply Side:**

- Loading factors (Brown and Finkelstein, 2009),
- Adverse selection and moral hazard (Sloan and Norton, 1997),
- Rationing of access: average waiting time of 10 months in Quebec,

# This Paper (1)

- We partnered with *Asking Canadians*, an online panel, to ask 2000 Canadians (Ontario and Quebec) between the age of 50 and 70 about long-term care and insurance
- We match them in COMPAS, a health microsimulation model which can predict lifetime exposure to mortality, disability, nursing home and formal care
  $\rightarrow$ estimate actual risks and compare them with risk perceptions
- Questionnaire asks about current take-up, knowledge of long-term care, expectations, preferences and socio-economic and health characteristics
  $\rightarrow$ infer reasons for low take-up rates

# This Paper (2)

- Build a stated-preference experiment: we present each respondent with 5 different products varying in terms of LTC benefit, premium and a term life insurance benefit if they die prior to age 85 $\rightarrow$ infer demand for LTCI and whether there exists adverse or advantagous selection in a market for long-term care insurance.
- Methodology adapted from Einav et al. (2010),
- We estimate welfare loss associated with asymmetric information and price elasticity of demand

# The survey

**Introductory text:**

*We are going to show you some simple insurance policies and ask you to rate those. You can assume that if you were to have two or more limitations in activities of daily living, the insurance company offering you this product would pay the benefits no matter what the circumstances. Once you receive benefits, you do not pay any premiums.*

*Each product has three attributes: a) a monthly premium you have to pay; b) a monthly benefit if you have 2 or more limitations in activities of daily living, starting 3 months after your limitations have been verified; and c) a payout to your survivors if you die before age 85. Assume that if you are healthy and you stop paying premiums for 3 consecutive months, the contract is cancelled and you lose coverage. The premium cannot increase once you have purchased the product. Finally, the benefits are adjusted for inflation (indexed).*

# The survey (2)

| While healthy | Once you have at least 2 ADL | When you die |
|---|---|---|
| You pay $\pi$ | You receive $b_{ltc}$ | Your survivors receive $b_{life}$ |

What are the chances, 0% meaning no chance and 100% for sure, that you would purchase the policy if it were offered to you by a trusted insurance company?

# The survey (3)

- 5 scenarios $(\pi, b_{LTC}, b_{life})$ are presented to each respondent.
- **Benefits** are drawn independently as follow:
  - Monthly LTCI benefit $b_{ltc}$ from the distribution $[2000, 1/3; 3000, 1/3; 4000, 1/3]$.
  - Life insurance benefit $b_{life}$ from the distribution $[0, 3/5; 10000, 1/5, 25000, 1/5]$
- **Premiums** are age-gender actuarial premium $\pi_h$ + a price adjustment factor $\tau$ which is randomized

$$\tau = [0.6, 1/5; 0.8, 1/5; 1.0, 1/5; 1.2, 1/5; 1.4, 1/5].$$

$\rightarrow$ The premium is given by $\pi = \tau\pi_h$.

# Descriptive evidence (1)

We match agents from our panel in COMPAS, a health microsimulation model which can predict lifetime exposure to mortality, disability, nursing home and formal care in Canada. Compute deviation between subjective risk and objective risk (from COMPAS)

- Overestimation of survival probability (+10%) survival
- Underestimation probability 1+ years with ADL (-10%)
- Overestimation probability ever enter nursing home (+9%) nursing homes

Large heterogeneity in misperceptions

# Descriptive evidence (2)

## Take-up, knowledge and awareness of LTCI

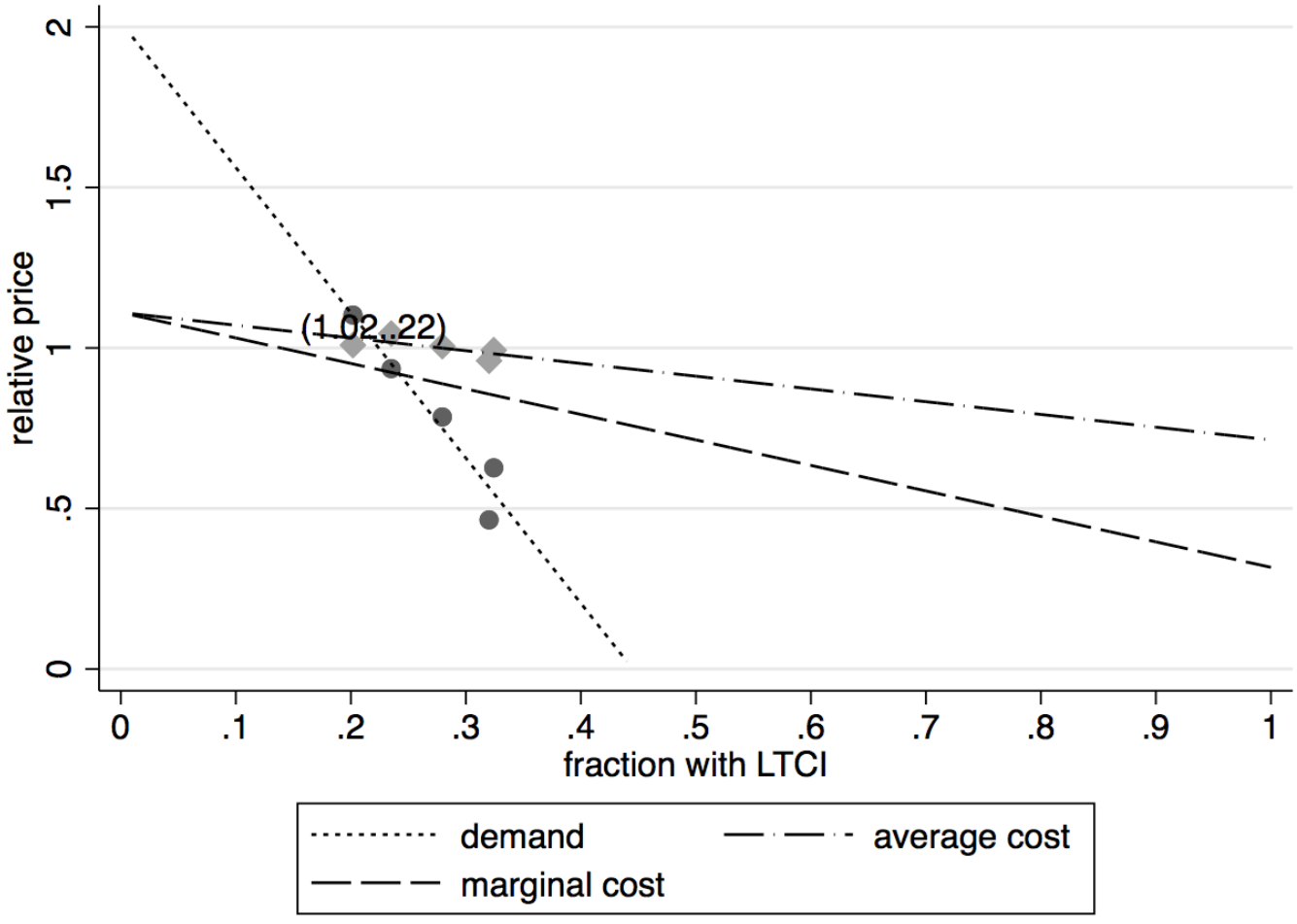
| **No LTCI** | | **LTCI** | |
|---|---|---|---|
| **Fraction (%)** | 88.2 | **Fraction (%)** | 11.8 |
| **Knowledge of LTCI (%)** | | **Knowledge of LTCI (%)** | |
| *A lot* | 7.2 | *A lot* | 29.3 |
| *A little* | 52.9 | *A little* | 65 |
| *None at all* | 39.9 | *None at all* | 5.7 |
| **Why don't you have LTCI? (%)** | | **How did you come to purchase LTCI? (%)** | |
| *Never offered one* | 43.6 | *Offered* | 53 |
| *Not yet made decision* | 7.7 | *Searched myself* | 9.6 |
| *Used to have one* | 0.6 | *Other* | 37.4 |
| *Too expensive* | 19.3 | | |
| *Doesn't cover my needs* | 2.2 | **LTC policy** | |
| *Don't need such a policy* | 14.4 | *Premium* | $ 125 |
| *Don't know what it is* | 8.2 | *Benefit* | $ 2,415 |
| *Other* | 4.1 | | |
| **Do you have life insurance? (%)** | | **Do you have life insurance? (%)** | |
| *Yes* | 67.4 | *Yes* | 75 |
| *No* | 31.8 | *No* | 22.2 |
| *Don't know* | 0.77 | *Don't know* | 2.8 |

Table: Holding of Long-Term Care and Life Insurance

# Overview Methodology

- Simulate market equilibrium using experiment : Market
- Use response to changes in prices to estimate demand
- Use both demand at given prices and costs from microsimulation to estimate average cost curve
- Find equilibrium price and fraction insured assuming market competition

# Results (2): Benchmark Case




(a) $b_{ltc} = 2000$

Figure: Predicted Equilibrium for Contract without Life Insurance Benefits

# Results (4): Awareness Constraint

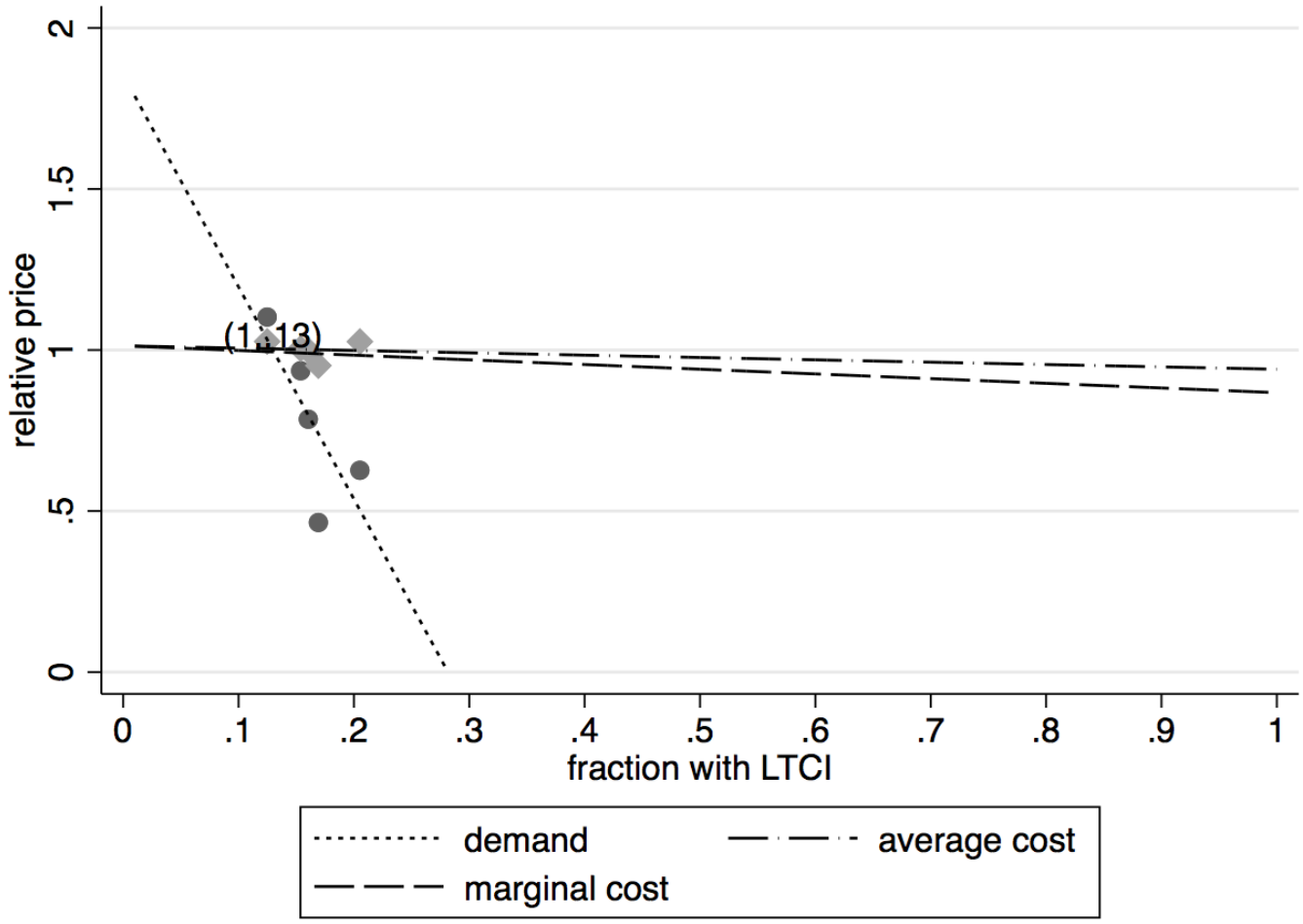



Figure: Predicted Equilibrium for Contract with 2,000$ Monthly LTC benefit with Awareness Constraint

# Demand Factors

- We regress

$$\overline{q}_i = x_i\beta + \epsilon_i \tag{1}$$

  where $\overline{q}_i$ is the average of the choice probability over the 5 scenarios of respondent $i$, $x_i$ denotes a set of variables measured in the survey, $\epsilon_i$ is an error term.
- We then construct counterfactual choice probabilities, zero-ing out some variables
- We can then recompute equilibrium in the market using $\tilde{q}^k_{i,j}$ and compare it to equilibrium using $q_{i,j}$.

# Demand Factors (3)

- Misperceptions:
  - deviation between subjective and objective expectations for survival, disability and nursing homes $(+)$
  - indicator variable about whether respondents not to know the answer $(-$, significant only for disability risk)
- Knowledge of the institutions (not significant except for subjective waiting times: $+10$ months leads to an increase of 1.7 %point in demand)
- Little general knowledge about LTCI (-)

Table 5

# Demand Factors (4) - Counterfactual analysis

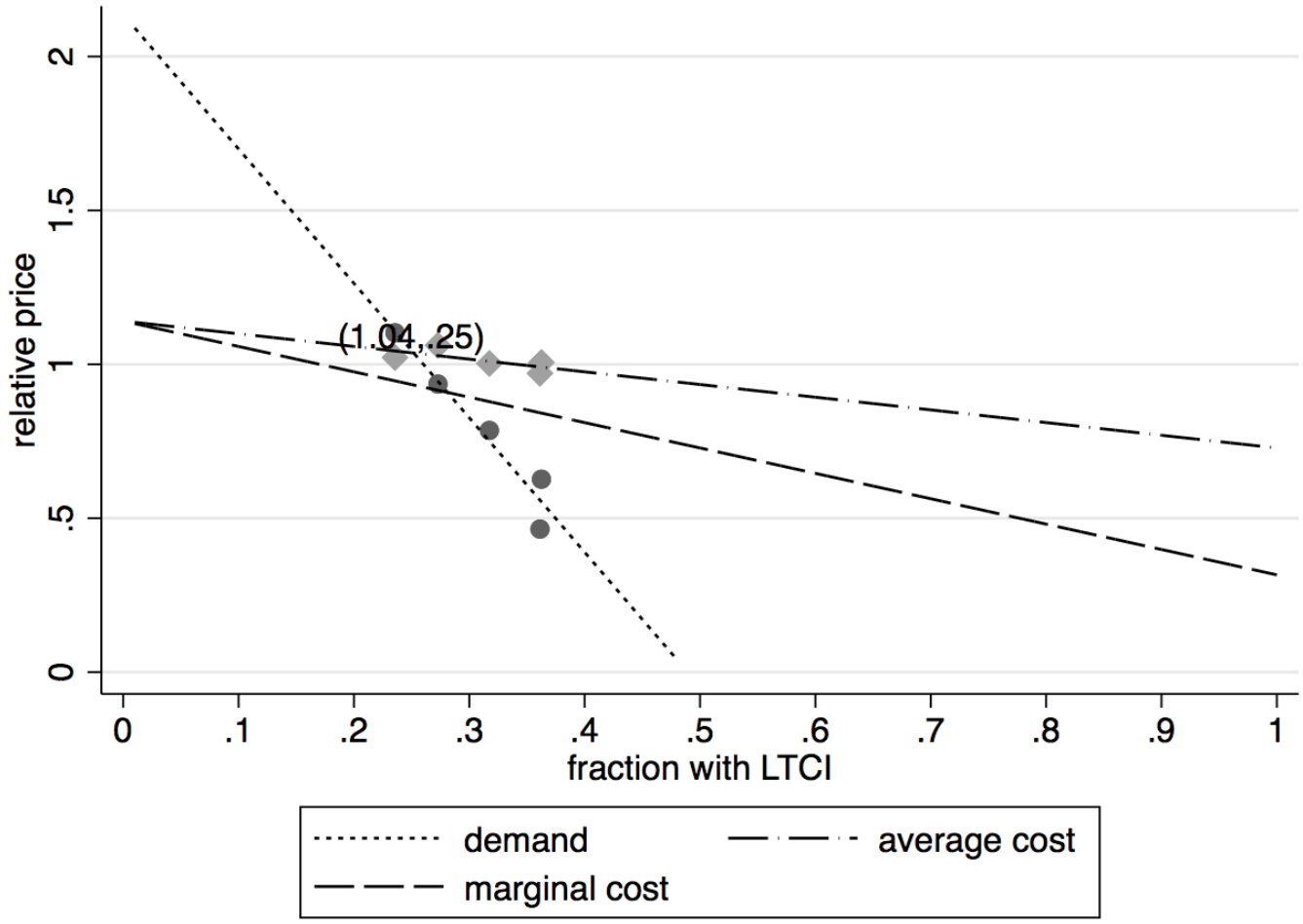



Figure: Predicted Equilibrium for Contract with 2,000$ Monthly LTC benefit without Misperception and Knowledge Barriers

# Welfare Change

| | Welfare Loss (% of consumer surplus) | | |
|---|---|---|---|
| Contracts | Awareness | Knowledge | Adverse Selection |
| (2,0) | 49.3 | 27.7 | 0.9 |
| (2,10) | 63.9 | 34.6 | 0.6 |
| (2,25) | 71.1 | 47.4 | 2.1 |
| (3,0) | 49.0 | 44.2 | 0.1 |
| (3,10) | 63.3 | 22.6 | 0.0 |
| (3,25) | 18.0 | 39.2 | 0.1 |
| (4,0) | 3.5 | 66.3 | 2.5 |
| (4,10) | 55.9 | 46.4 | 0.2 |
| (4,25) | 30.2 | 81.8 | 1.5 |

# Conclusions

- In the baseline scenario, we predict 22% take-up if everyone offered.
- Adverse selection does not appear to explain low take-up, in part because of inelastic demand.
- A host of demand factors explain little of the heterogeneity in choice probabilities.
- *Supply and informational constraints are key:* low take-up is simply due to the fact that the elderly are not aware of those products.
  40% have never been offered such insurance (and have limited knowledge). Welfare effects suggest not lack of interest.

# COMPAS Premiums

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## Comparison of Premiums

| Age | | Female | Male |
|---|---|---|---|
| 50-54 | Model | 139 | 119 |
| | Data | 130 | 97 |
| 55-59 | Model | 183 | 155 |
| | Data | 175 | 123 |
| 60-64 | Model | 220 | 194 |
| | Data | 238 | 174 |
| 65-69 | Model | 291 | 263 |
| | Data | 352 | 262 |

Table: Monthly Premium from data (CAA Quebec) and Actuarial Premium from modelling (COMPAS microsimulation model): Monthly premiums from CAA with a 2% inflation guarantee. Sample average for 2000$ and 3000$ per month benefit.

# Mortality Risk Projections by Age Group:

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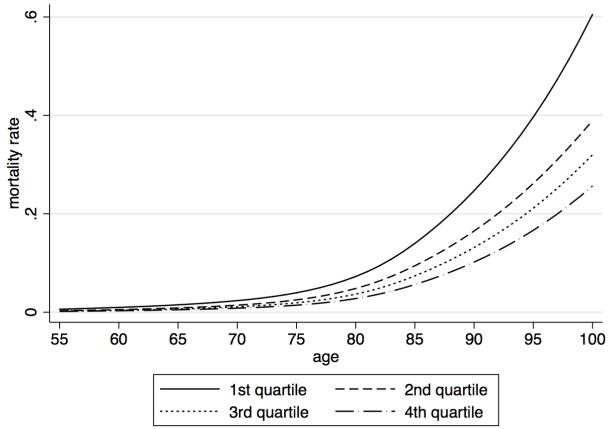
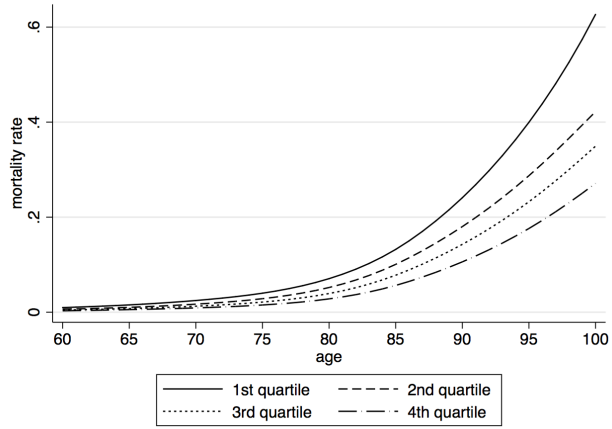
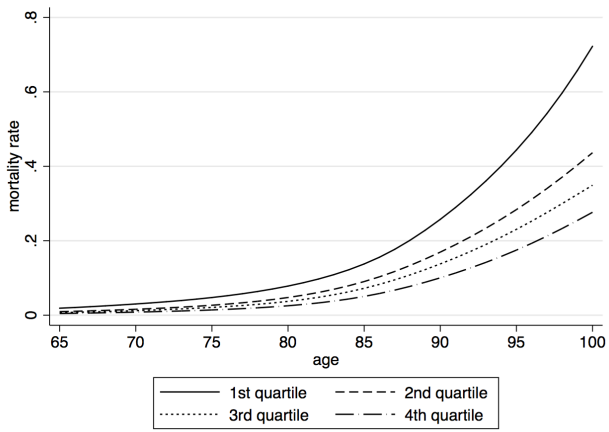


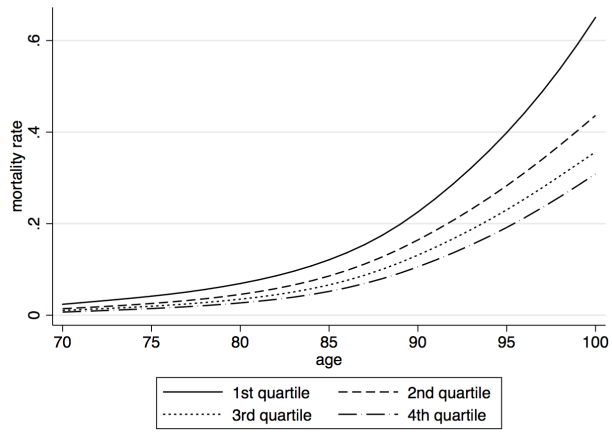

(a) Age 50-54




(b) Age 55-59




(c) Age 60-64




(d) Age 65-69

# Disability Risk Projections by Age Group

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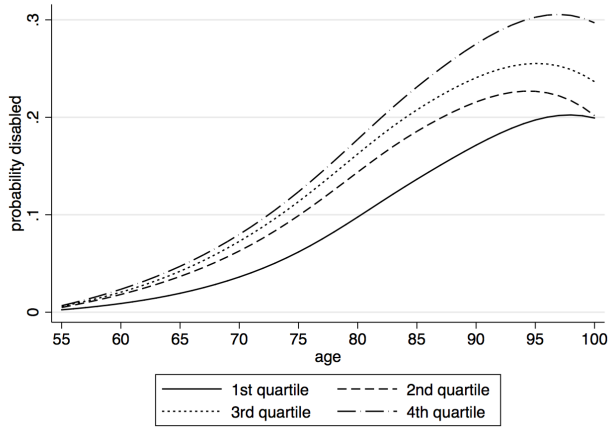
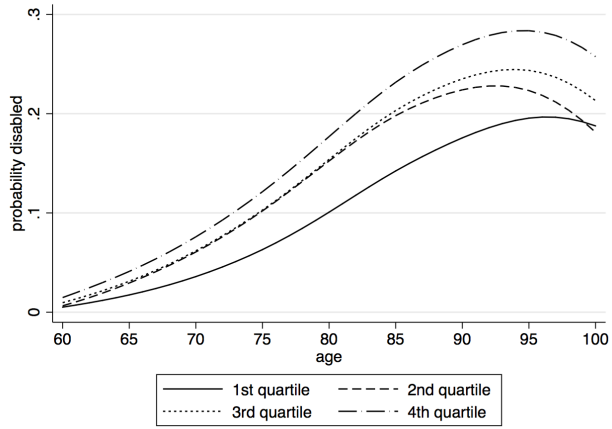
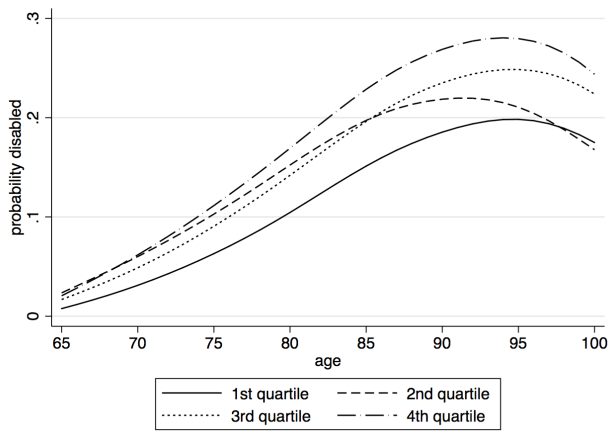


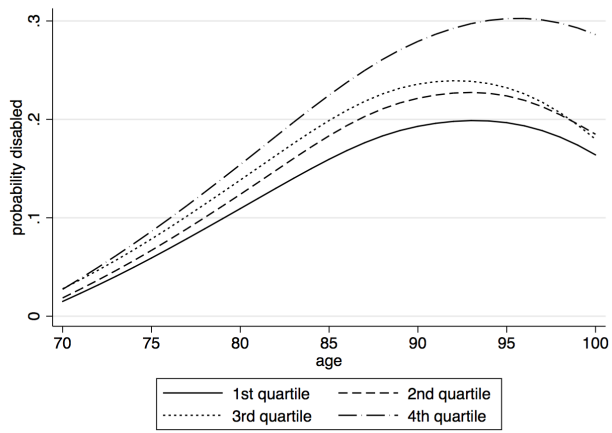

(e) Age 50-54




(f) Age 55-59




(g) Age 60-64




(h) Age 65-69

# Probability of Ever Being Disabled or Enter a Nursing Home

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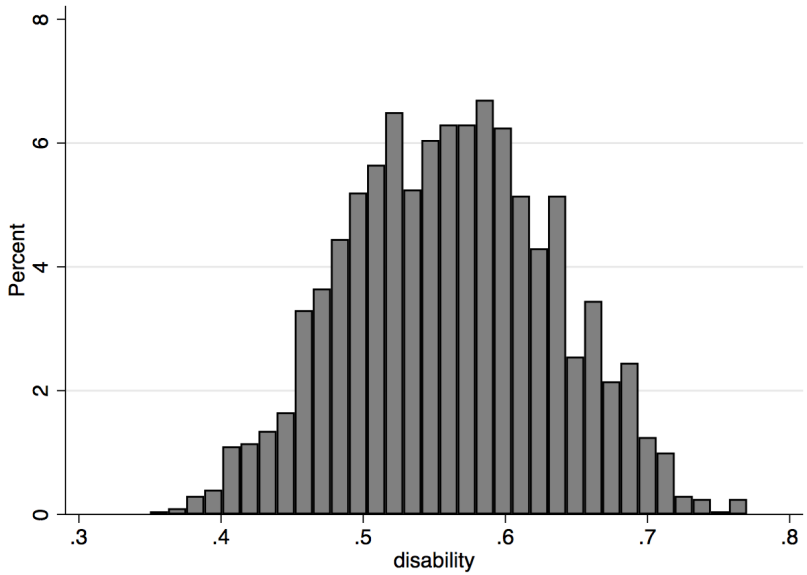
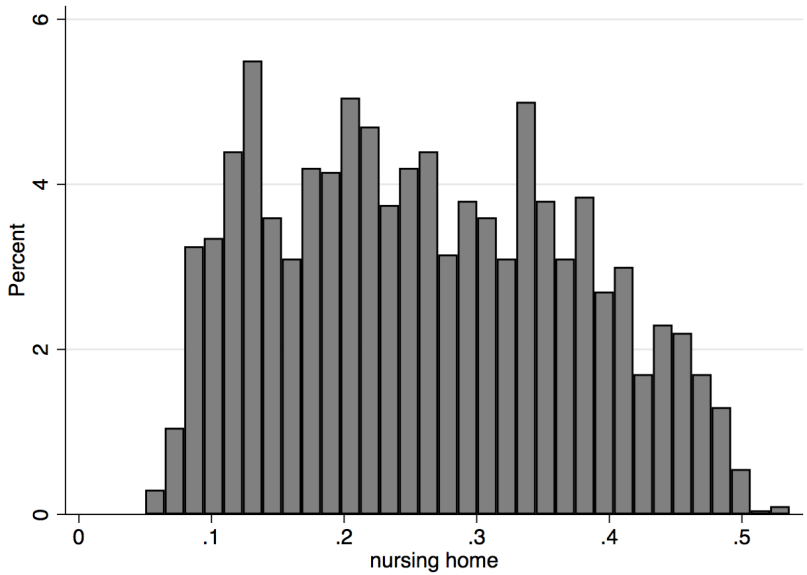



(i) Lifetime Disability




(j) Lifetime Nursing Home

# Expected Present Value of Cost to Respondents

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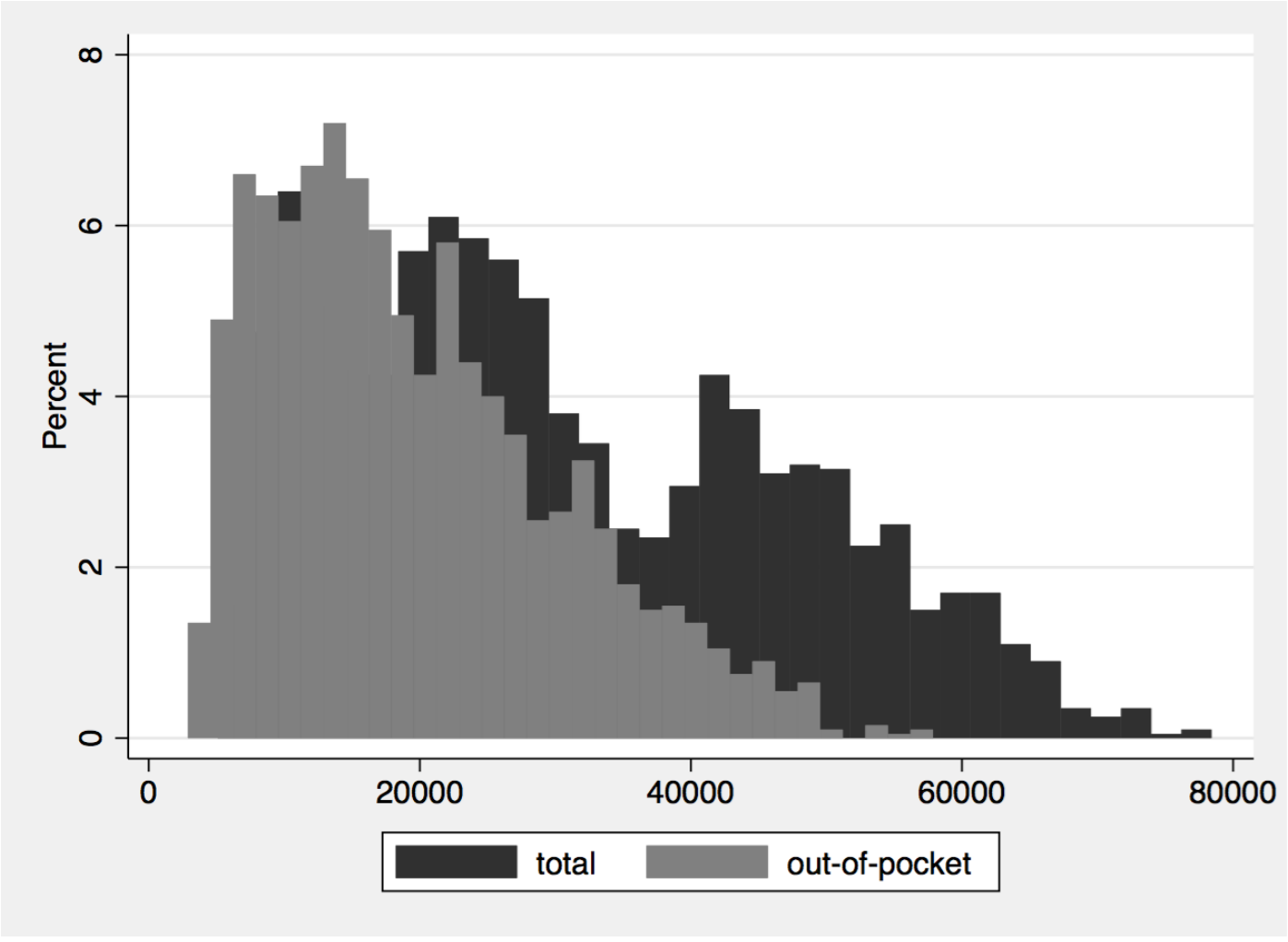

# Einav et al. (2010) - Adverse Selection

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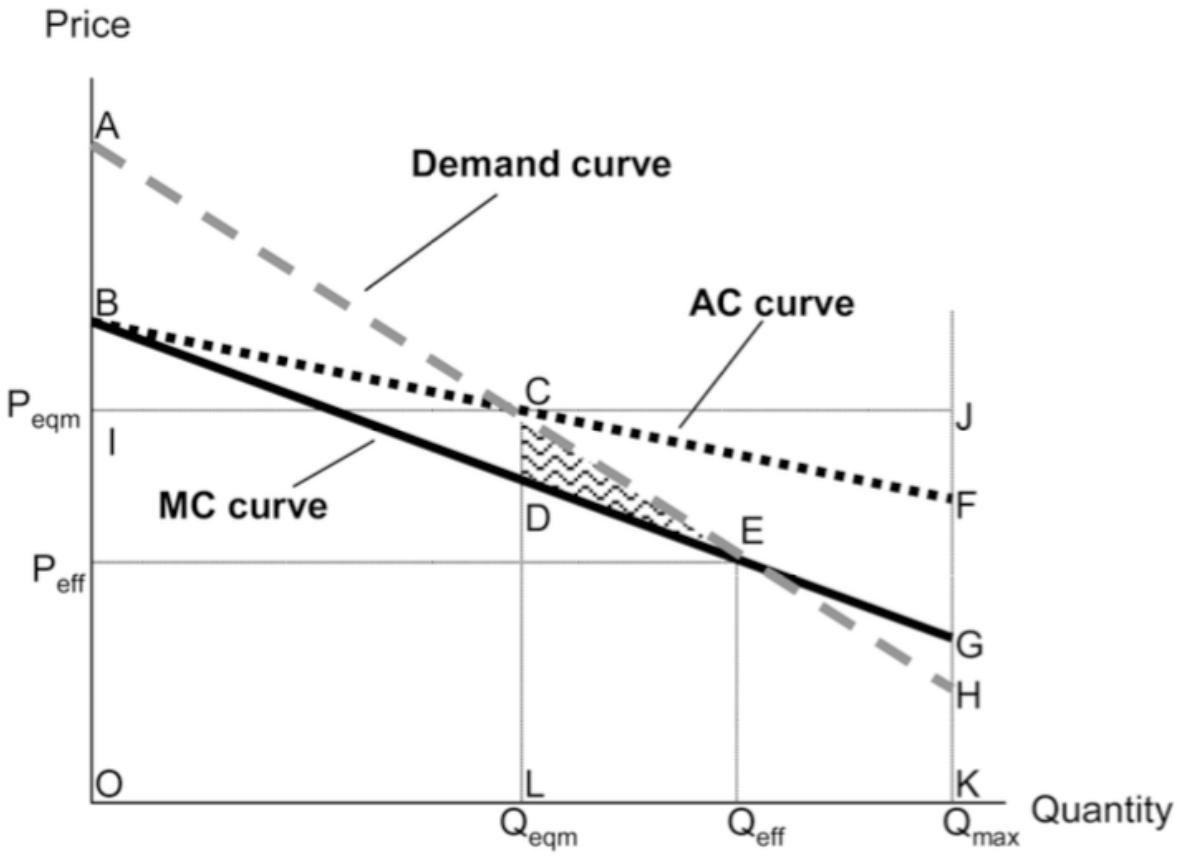
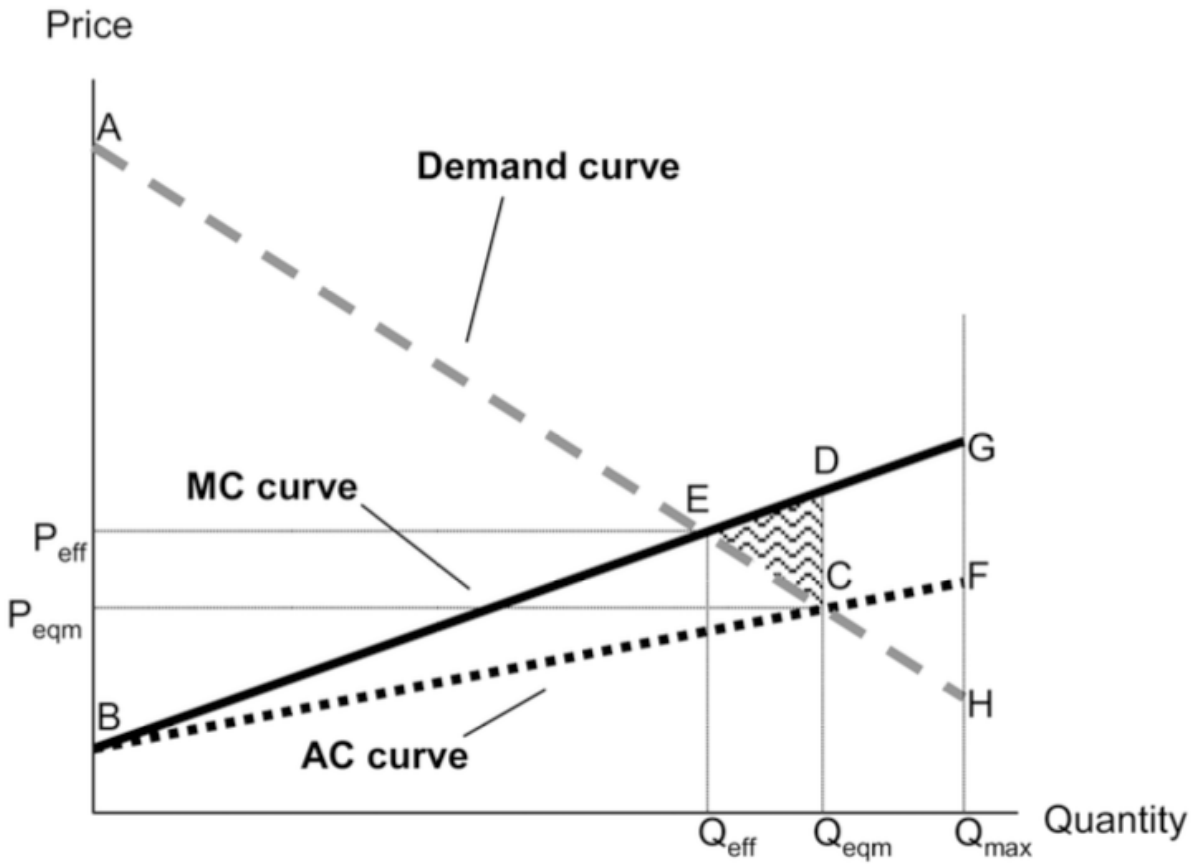



$\rightarrow$ under-insurance

# Einav et al. (2010) - Propitious Selection




$\rightarrow$ over-insurance

# Correlation between Survival and Disability Risk

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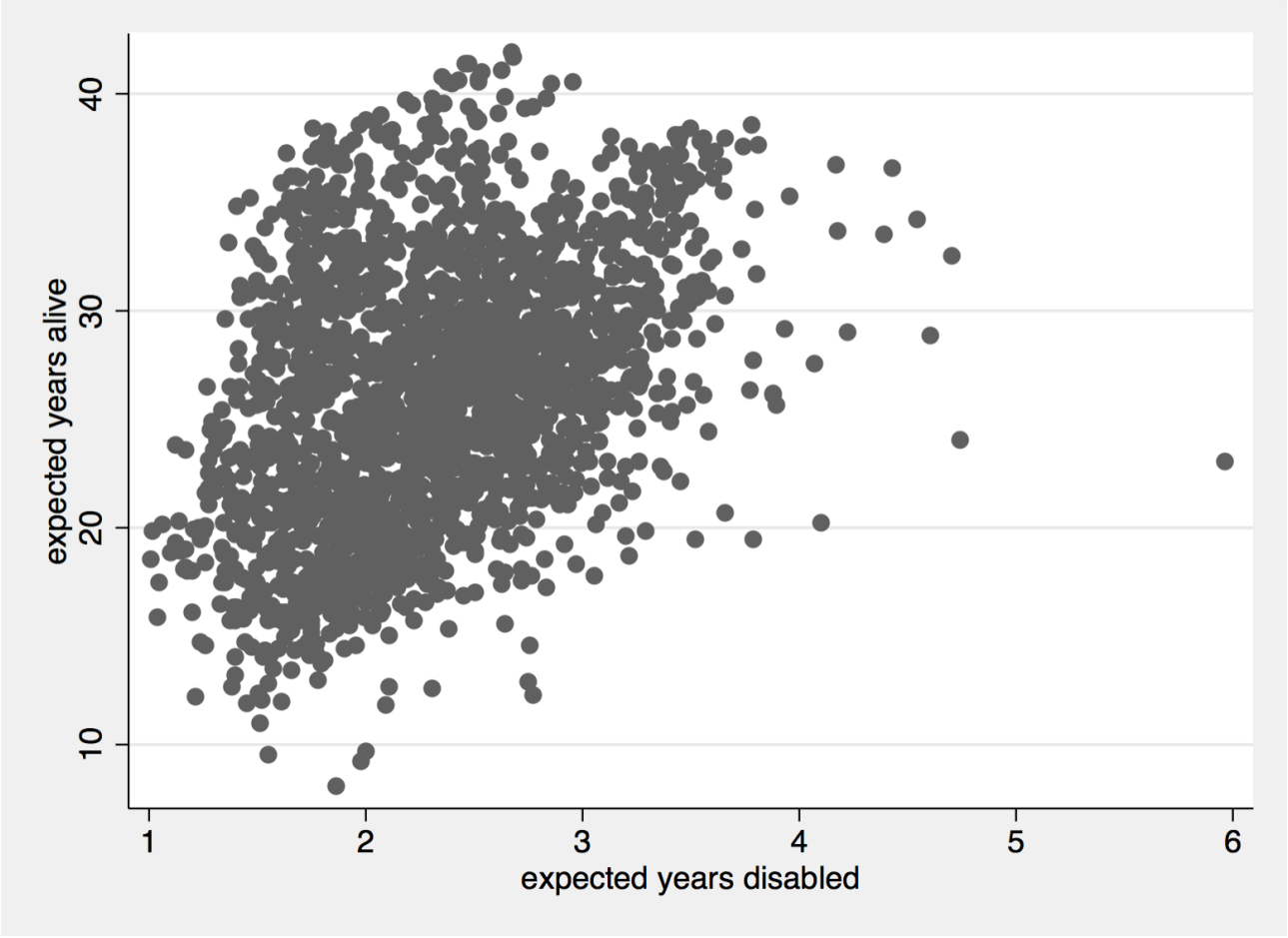


→ Positive rather than negative correlation

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| | (1) q | (2) q | (3) q |
|---|---|---|---|
| own home | -0.0411** | -0.0400** | -0.0383* |
| | (-2.68) | (-2.63) | (-2.56) |
| bequest | 0.0474*** | 0.0442** | 0.0403** |
| | (3.46) | (3.28) | (2.98) |
| risk loving | 0.0332* | 0.0299* | 0.0283* |
| | (2.28) | (2.08) | (1.98) |
| family | 0.0293* | 0.0208 | 0.0212 |
| | (2.54) | (1.78) | (1.81) |
| prefers formal | 0.0395*** | 0.0315** | 0.0264* |
| | (3.53) | (2.75) | (2.29) |
| bias survival | | 0.0461* | 0.0480* |
| | | (2.16) | (2.27) |
| dnk survival | | -0.0160 | -0.0164 |
| | | (-0.91) | (-0.93) |
| bias adl | | 0.0570* | 0.0530* |
| | | (2.36) | (2.21) |
| dnk adl | | -0.0321* | -0.0306* |
| | | (-2.09) | (-2.02) |
| pr family provides care | | 0.0526** | 0.0466* |
| | | (2.81) | (2.48) |
| dnk family | | 0.00333 | 0.000438 |
| | | (0.18) | (0.02) |
| bias nursing home | | 0.0865*** | 0.0918*** |
| | | (3.46) | (3.69) |
| dnk nursing home | | 0.00199 | 0.00568 |
| | | (0.12) | (0.36) |
| financial knowledge | | | -0.0290* |
| | | | (-2.54) |
| knows means-testing | | | 0.0142 |
| | | | (0.94) |
| monthly cost nursing home | | | -0.00344 |
| | | | (-0.81) |
| dnk cost | | | -0.00785 |
| | | | (-0.44) |
| nursing home free | | | -0.00184 |
| | | | (-0.09) |
| wait time | | | 0.00178* |
| | | | (2.08) |
| dnk wait time | | | 0.0140 |
| | | | (0.87) |
| dnk LTCI | | | -0.0537*** |
| | | | (-4.63) |
| knows lapsing risk | | | 0.0305 |
| | | | (1.08) |
| $R^2$ | 0.066 | 0.098 | 0.114 |

$t$ statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

# Survival

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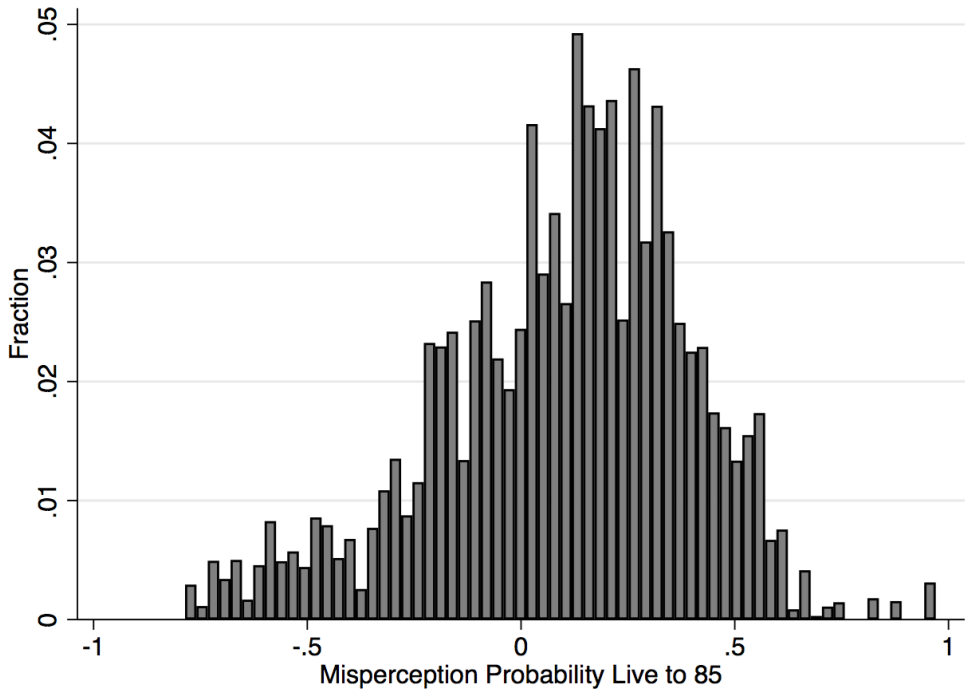

# Disability

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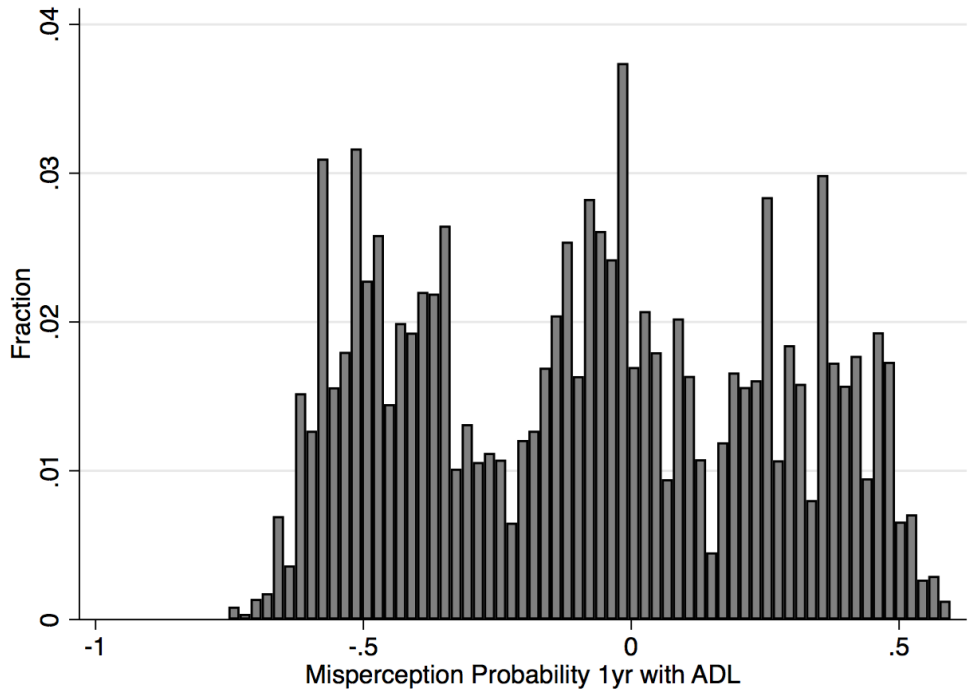

# Nusring Homes

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