ARC CENTRE OF EXCELLENCE IN POPULATION AGEING RESEARCH

Long-term care financing using home equity release: Evidence from an experimental study




Hazel Bateman[1], Hanming Fang[2], Katja Hanewald[1] and Tin Long Ho[1]

[1] UNSW Sydney and CEPAR

[2] University of Pennsylvania, ShanghaiTech University and CEPAR

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Motivation

- Rapid population ageing
- Increased need for long-term care

- Limited public funding
- Long-term care insurance (LTCI) is expensive
- Household savings “locked up” in housing

- Individuals want to “age in place” and receive care at home

Our study

- An **experimental online survey** to assess:

  The potential demand for new financial products that allow individuals to **access their housing wealth to buy LTCI**

- Research questions:
  1. Do individuals **buy more LTCI** when they can access housing wealth?
  2. What is the **preferred product design** (loan vs. partial sale)?
  3. How do **personal characteristics** impact stated product preferences?
     - Rational vs. behavioral factors

Financial Products

- Three *"Long-Term Care Income Products"*
  - Monthly income when policyholder/spouse need LTC
  - Differ in how the single premium is funded

1. **Product S:** Premium paid from **savings account**
2. **Product R:** Premium paid using **reverse mortgage loan**
   - No interest/principal repayments while borrower lives in home
   - No-negative-equity guarantee
   - Guaranteed right to stay in the home
3. **Product H:** Premium paid using **home reversion**
   - Partial sale of the home
   - Lease-for-life agreement

Previous Research

- Alai, D. H., Chen, H., Cho, D., **Hanewald, K.**, & Sherris, M. (2014). Developing equity release markets: Risk analysis for reverse mortgages and home reversions. *North American Actuarial Journal*, *18*(1), 217-241.
  - Cash flows and risk profiles for RMs and HR

- **Hanewald, K.**, Post, T., & Sherris, M. (2016). Portfolio choice in retirement—what is the optimal home equity release product?. *Journal of Risk and Insurance*, *83*(2), 421-446.
  - Optimal portfolio choice with annuities, LTCI, RMs and HR

- **Hanewald, K., Bateman, H., Fang, H.**, & Wu, S. (2020). Is there a demand for reverse mortgages in China? Evidence from two online surveys. *Journal of Economic Behavior & Organization*, *169*, 19-37.
  - Homeowners aged 45-65 are interested in flexible, well-explained RMs
  - Would use extra funds for a more comfortable retirement and to pay for better medical treatments and **aged care services**
  - Children aged 20-49 would recommend RMs to their parents

More Previous Research

- Papers suggesting to combine LTCI and RMs:
  - E.g., Benejam (1987), Jacobs and Weissert (1987)
- Pricing of combined LTCI-RM products:
  - Xiao (2011), Andews and Oberoi (2015), Mayhew et al. (2017)
- Life-cycle models including housing wealth and LTCI:
  - E.g., Davidoff (2009), Shao et al. (2018), Fehr and Hofmann (2020)
- Empirical research on LTCI demand:
  - See summary articles by: Eling and Ghavibazoo (2019), Lambregts and Schuts (2020)

Outline

1. Introduction

2. Methodology

3. Results

4. Conclusion

Methodology

- Experimental online survey fielded in China:
  - Programmed and fielded by dataSpring
  - Commercial web panel
  - Fixed participation fee + bonus amount based on product knowledge quiz

- Representative sample of 1,200 Chinese
  - Quotas: aged 45-64; 50% Tier I/II cities; urban hukou where the participants live; homeowner; 50% male/female; education quotas; no ADL limitations

- Validation of the survey design:
  - Focus group testing
  - Testing of English and Chinese test link

Why China?

- Rapid population aging in China
  - “Getting old before getting rich”
  - > 30 million elderly will require long-term care (LTC) services by 2030 (Li and Otani, 2018)

- Ongoing policy reforms:
  - LTCI pilot programs (e.g., Zhu and Österle, 2020)
  - Reverse mortgage pilot program (see Hanewald et al., 2020)

- Housing wealth ≈ 80% of urban household wealth (Xie and Jin, 2015)

Summary of the survey design

I. Introduction

- Screening questions (sort participants into 8 wealth groups)
- Facts about health states and long-term care
- Hypothetical situation (vignette)

II. Choice tasks

- Introduce Product S → choose LTCI with S
- Introduce Product R → choose LTCI with S and R
- Introduce Product H → choose LTCI with S and H (randomize order)
- Choose preferred scenario
- Product knowledge quiz

III. Covariate collection

Product description

Long-term Care Income Product R

Hover your mouse over the blue text for more information.

We would like to introduce you to Long-term Care Income Product R.

You buy Long-term Care Income Product R by **borrowing against your home**. When you and/or your spouse need long-term care, you receive a regular monthly income.

Please read the product description carefully as your product understanding will be tested in a quiz.

The first column lists the product properties. The second column explains these properties for Long-term Care Income Product R.

	Long-term Care Income Product R
Who offers this product?	A state-owned bank.
Product properties when you are alive	
How much do you need to pay at the start of the contract?	No payments required.
Is your home used as a collateral?	Yes.
Can you continue to live in your home?	Yes. You and your spouse have a guaranteed right to live in your home while at least one of you is non-disabled.
Do you retain the full legal right of your home	Yes. For example, you can rent out your home.
How much long-term care income can you buy at most?	Depends on: Your **age**, your **spouse's age**, your **gender**, the **amount you wish to pay** at the start of the contract and the value of your home at the start of the contract
How is the home value assessed?	The value of your home is assessed by an **independent, authorized appraiser**.

Numerical example

Case study for Long-term Care Income Product R

Hover your mouse over the blue text for more information.

Please read the following case study which illustrates how Long-term Care Income Product R works.

Mr. Wang is aged 60 and Mrs. Wang is aged 55 in 2019. They have an adult daughter. They live in their own apartment in Beijing which is worth RMB 5,000,000 and have RMB 750,000 in their savings account. They decide to buy Long-term Care Income Product R to cover their future long-term care needs.

- They choose to **borrow RMB 600,000 against their apartment** to buy long-term care income with Long-term Care Income Product R. The amount becomes a debt which accumulates interest at the fixed interest rate of 5.8% p.a
- If one or both are disabled, they will receive a **monthly income** according to the following table:

Both non-disabled/deceased	1 non-disabled/deceased, 1 disabled	Both disabled
RMB 0/month	**RMB 10,542**/month	**RMB 21,085** /month

(randomize amount)

- They do **not have to repay anything** while **at least one of them** still **lives at home**.
- The couple **fully own their apartment**, including all growth in its value, if any.

This contract will **terminate** when **both** Mr. and Mrs. Wang **pass away**.

Assume that Mr. Wang remains **non-disabled** and **passes away in 2044**. In the **same** year, Mrs. Wang becomes **disabled** and **permanently moves** into a **residential nursing home**. The **outstanding debt** amount in **2044** accumulated from the **initial loan** is **RMB 2,456,000**. Below are **three** possible **scenarios** in 2044:

- Scenario A: The product provider **sells the home at the highest possible market price** of **RMB 10,000,000**. The sale proceeds are used to **repay** the debt. Mrs. Wang **receives the remaining RMB 7,544,000**. She will receive a long-term care income of **RMB 10,542**/month **until she passes away**.
- Scenario B: The product provider **sells the home at the highest possible market price** of only **RMB 1,000,000**. All sale proceeds **are used to repay** the debt. Mrs. Wang will **receive nothing from the sale**, but she is **not required to make an extra payment**. The difference is a loss to the product provider. Mrs. Wang will receive a long-term care income of **RMB 10,542**/month **until she passes away**.
- Scenario C: Their daughter decides to **repay the debt herself** and **keep** their property. Mrs. Wang will receive a long-term care income of **RMB 10,542**/month **until she passes away**.

Choice Task

Task 2 of 4: Long-term Care Income Product R

Hover your mouse over the blue text for more information.

In this choice task, assume, you have **RMB 750,000** in your savings account and your home is worth **RMB 5,000,000**. You can use the money in your savings account to purchase long-term care income with Long-term Care Income Product S. You can also borrow against your home to purchase long-term care income with Long-term Care Income Product R.

Use the two sliders below to indicate your choices. You can buy long-term care income with your savings (Long-term Care Income Product S) and/or borrow against your home (Long-term Care Income Product R). The outcomes of your choice are summarised in the table below.

The decisions you have to make are:

Would you like to buy long-term care income? And if you do

MRa. How much of your savings do you want to use to buy long-term care income with Long-term Care Income Product S?

You can position the slider anywhere on the line, but you need to move it at least once before you can continue. **If you DON'T want to buy Long Term Care Product S place the slider at RMB 0.**

MRb. How much do you want to borrow against your home to buy long-term care income with Long-term Care Income Product R?

You can position the slider anywhere on the line, but you need to move it at least once before you can continue. **If you DON'T want to buy Long Term Care Product R place the slider at RMB 0.**

	Outcome
Regular income when you and your spouse are non-disabled	**RMB 0** per month
Regular income when one spouse is disabled, and the other spouse is non-disabled or deceased	**RMB 0** per month This would cover **0.00%** of the cost of **formal care in a residential nursing home** for **one person** or **compensate** your **family/friends** who take care of you.
Regular income when both spouses are disabled	**RMB 0** per month This would cover **0.00%** of the cost of **formal care in a residential nursing home** for **you and your spouse** or **compensate your family/friends** who take care of you.
Total payment for long-term care income	**RMB 0**
Payment for long-term care income from your savings account	**RMB 0**
Payment for long-term care income from Long-term Care Income Product R	**RMB 0** loan with annual interest rate 5.80% p.a.
Remaining money in your savings account	**RMB 0**
Your remaining housing wealth	**RMB 0**
Your remaining total wealth	**RMB 0**
Additional features:	You receive the monthly income for as long as you/your spouse are disabled

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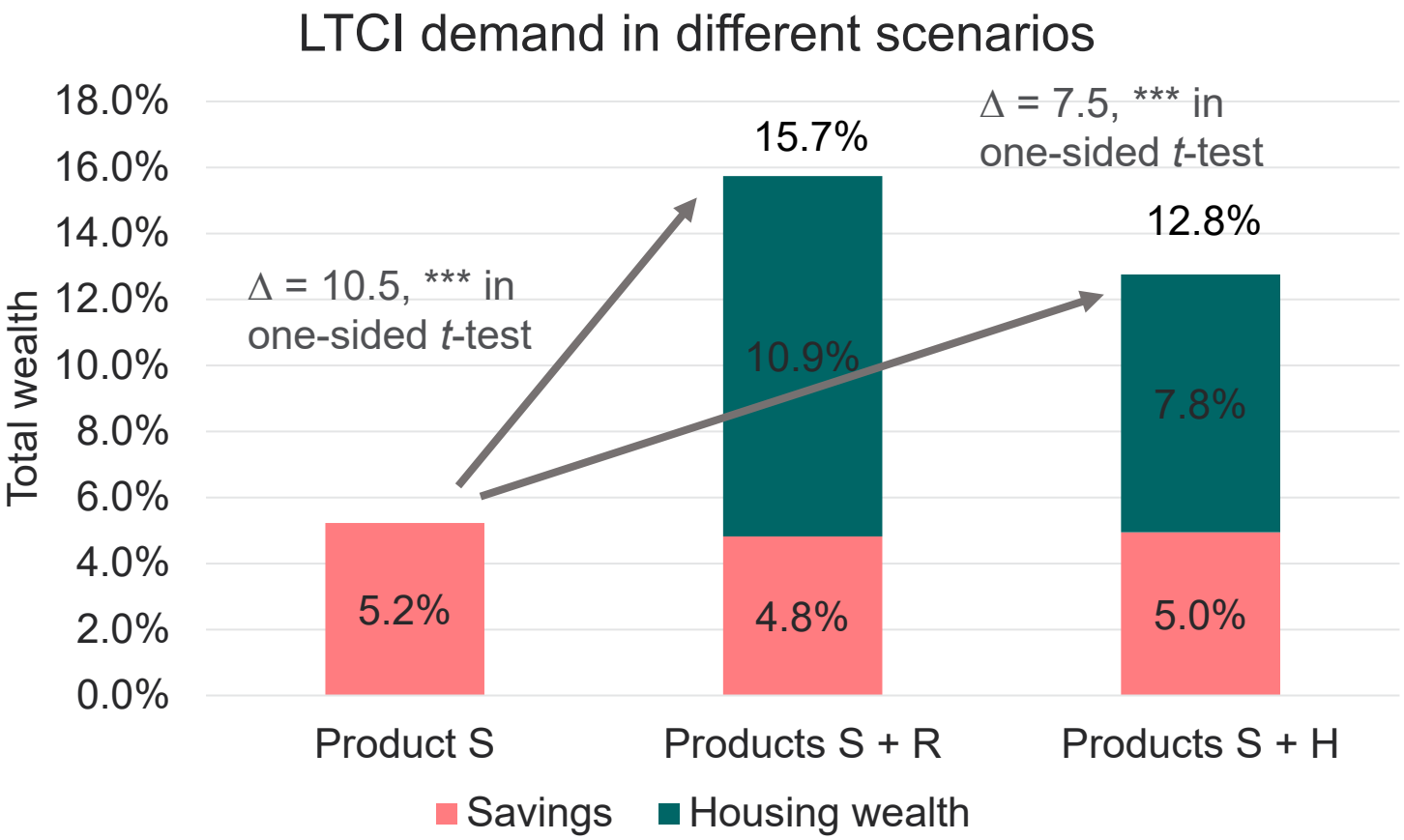
Descriptive statistics

- Sample size: 1,200
- Average completion time: 19 minutes (median); 33 minutes (mean)
- Subjective understanding:

	Completely or mostly clear	Generally clear	Completely or mostly confusing
Product S	83%	16%	1%
Product R	81%	17%	2%
Product H	80%	18%	2%
Whole survey	86%	14%	0%

Descriptive statistics



Factors explaining ΔLTCI demand (1)

	Scenario			
	Products S+R		Products S+H	
Household economic/financials				
Household savings	0.037		-0.010	*
Household debt	0.011	*	0.012	**
Household income	-0.010	+	-0.006	
Social insurance	-0.026		-0.042	**
Property value	0.015	**	0.011	**
Mortgage amount	-0.009		-0.011	+
Demographic factors				
Age	-0.003		-0.002	
Retired	0.019	*	0.023	*
Female	-0.010	+	-0.008	+
Married	0.014		0.023	+
1+ child	0.023		-0.022	
Daughter	-0.011	*	-0.009	*
Child same HH	-0.002		0.003	
College above	-0.003		-0.001	
Tier 1 city	-0.012	*	-0.011	**
Health				
Health	0.002		0.000	
Life expectancy	-0.012	*	-0.009	*
Smoker	-0.010	+	-0.007	+

Factors explaining ΔLTCI demand (2)

	Scenario			
	Products S+R		Products S+H	
Personality and expectations				
Financial literacy and numeracy	0.003		0.004	
Awareness of financial products	-0.005		-0.001	
Awareness long-term care insurance	0.007		0.006	+
Awareness RM	-0.008		-0.004	
House price expectations	0.015	**	0.009	*
Trust in banks	0.000		0.001	
Trust in insurer	0.008	***	0.005	***
Thought of long-term care	0.017	***	0.012	**
Intended bequest	-0.021	***	-0.016	***
Product and survey understanding				
Subjective Product Understanding	0.017	**	0.014	***
Product quiz	-0.012	*	-0.006	
Survey clarity	-0.010		-0.002	
Passed IMC	0.000		-0.004	
Survey time	0.002		0.006	
Treatments				
Version R	-0.012	*	-0.007	+
High premium in example	0.009	+	0.006	+
Model information				
Intercept	0.063		0.081	**
N	1,200		1,200	
R^2	0.113		0.115	

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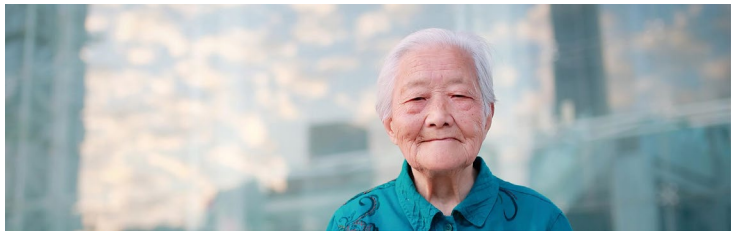
Conclusion

- First study to assess the potential demand for LTCI when individuals can release housing wealth
- Main results:
  - When home equity release is available to purchase LTCI:
    - **Higher demand for LTCI**
    - **Less savings used for LTCI**
  - LTCI-Reverse mortgage preferred over LTCI-Home reversion



Conclusion

- Factors explaining the change in LTCI demand:
  - Rational factors: Household debt (+), property value (+), retired (+), daughter (-), Tier 1 city (-)
  - Behavioural factors: House price expectations (+), trust in insurers (+), thought of LTC before (+), subj. product understanding (+), subj. life expectancy (-), intended bequest (-), product order (-)

- First experimental evidence for the potential demand for combined LTCI-home equity release products
  - Informs further theoretical studies
  - Informs the development of such products

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Thank you!

Contact: k.hanewald@unsw.edu.au

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Extra slides

Information provided

Facts about health states and long-term care

Hover your mouse over the blue text for more information.

As people get older, they are more likely to need help with **activities of daily living** such as bathing or dressing.

In this survey, we refer to an older person as **disabled** if they need help **permanently** with **three or more** of the following six activities of daily living: bathing, dressing, toileting, transferring, continence, or feeding. We refer to this help as **long-term care**.

We refer to older persons as **non-disabled** if they only need help with **two or less** of the six activities of daily living.

On average,
3 out of 10 men aged 60 will eventually become disabled and will need long-term care as they get older, while
4 out of 10 women aged 55 will eventually become disabled and will need long-term care as they get older.

There are two types of long-term care:
Informal care: long-term care provided by the family and/or friends.
Formal care: long-term care provided by professional caring personnel. Formal care in a basic **residential nursing home** costs about RMB **11,500** per month in today's prices.
When you are disabled, you can receive formal care, informal care or a combination of the two.

Long-term care income refers to the regular monthly income you can receive when you and/or your spouse are disabled and need long-term care.

You can click ">>" to continue after 20 seconds.

18%

<< Prev Next >>

The hypothetical situation

Long-term care income choice tasks

In each of the choice tasks you will be asked you to choose how much long-term care income you would like to buy. Ignoring your own financial circumstances, we want you to imagine that:

- you are aged 60,
- you are married and your spouse is aged 55,
- you are about to retire,
- you own your own home in the city you live in, which is currently worth **RMB 5,000,000**
- you have **RMB 750,000** in your savings account,
- you have no other assets.

21%

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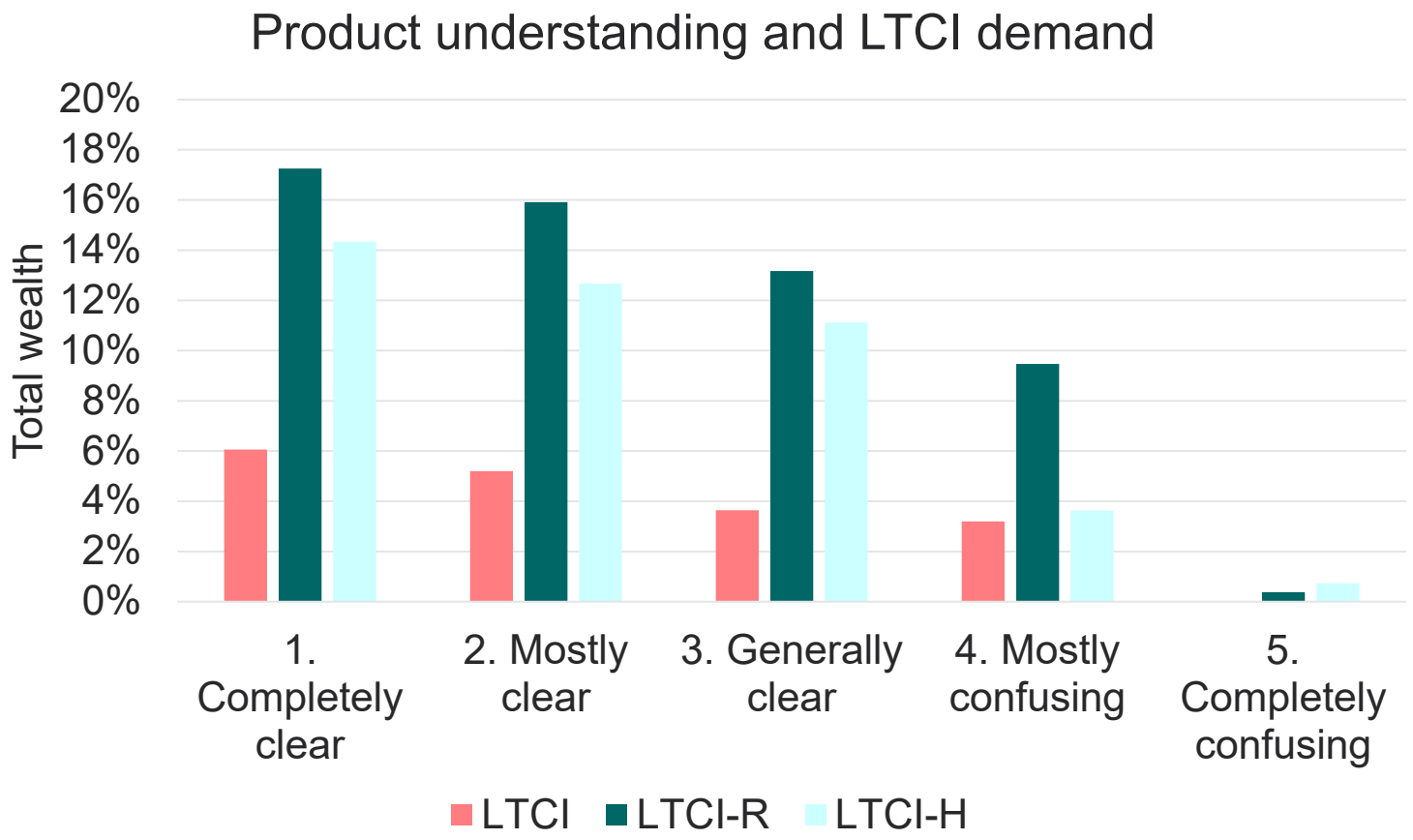
Descriptive statistics



Descriptive statistics

Scenario	LTCI	LTCI & LTCI-R	LTCI & LTCI-H
LTCI - "Long-term care income product S" - LTCI premium paid from savings	✓	✓	✓
LTCI-reverse mortgage (LTCI-R) - "Long-term care income product R" - Premium paid with reverse mortgage		✓	
LTCI-home reversion (LTCI-H) - "Long-term care income product H" - Premium paid from partial home sale			✓
Preferred scenario (% participants)	**41%**	**38%**	**21%**

Factors explaining LTCI demand (1)

	Scenario		
	Product S	Products S+R	Products S+H
Household economic/financials			
Household savings	0.037 ***	0.031 ***	0.027 ***
Household debt	0.013 ***	0.023 ***	0.025 ***
Household income	-0.003	-0.013 *	-0.010 +
Social insurance	-0.002	-0.028	-0.044 *
Property value	-0.018 ***	-0.003	-0.007
Mortgage amount	0.000	-0.009	-0.011
Demographic factors			
Age	-0.001	-0.004	-0.002
Retired	0.005	0.023 *	0.017 *
Female	0.003	-0.007	-0.005
Married	0.004	0.018	0.028 +
1+ child	-0.002	0.022	-0.023
Daughter	-0.001	-0.013 *	-0.010 *
Child same HH	0.007 **	0.005	0.010 *
College above	0.005 +	0.002	0.004
Tier 1 city	-0.002	-0.014 *	-0.012 *
Health			
Health	0.000	0.002	0.000
Life expectancy	-0.002	-0.015 *	-0.012 *
Smoker	0.002	-0.008	-0.006

p-value	Significance
0.1-1	
0.05-0.1	+
0.01-0.05	*
0.001-0.1	**
<0.001	***

Factors explaining LTCI demand (2)

	Scenario		
	Product S	Product S+R	Products S+H
Personality and expectations			
Financial literacy and numeracy	0.007 **	0.010	0.011 *
Awareness of financial products	-0.004	-0.009	-0.005
Awareness long-term care insurance	-0.001	0.006	0.007
Awareness RM	-0.001	-0.009	-0.004
House price expectations	0.002	0.017 **	0.011 *
Trust in banks	0.000	0.000	0.001
Trust in insurer	0.001	0.009 ***	0.006 ***
Thought of long-term care	0.009 ***	0.027 ***	0.021 ***
Intended bequest	-0.005 *	-0.027 ***	-0.021 ***
Product and survey understanding			
Subjective Product Understanding	0.012 ***	0.029 ***	0.026 ***
Product quiz	-0.001	-0.013 *	-0.006
Survey clarity	0.001	-0.009	-0.001
Passed IMC	0.000	0.000	-0.004
Survey time	-0.005 +	-0.003	0.001
Treatments			
Version R	-0.004 +	-0.016 **	-0.011 *
High premium in example	0.001	0.010 +	0.008 +
Model information			
Intercept	0.037	0.064	0.083 *
N	1,200	1,200	1,200
R^2	0.197	0.136	0.146