ARC CENTRE OF EXCELLENCE IN POPULATION AGEING RESEARCH

The demand for longevity, critical illness insurance and long-term care insurance in the COVID-19 pandemic

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Outline

1. Introduction
2. The hypothetical survey
3. Results
4. Conclusion

1 – Outline

1 – Background

Rapid population ageing & growing awareness of health risks due to COVID-19
Developing countries: basic public insurance $\rightarrow$ catastrophic medical expenditure

- Government - public insurance system not adequate, how to expand?
- Individuals - retirement risks (longevity, medical, aged care), how to manage them?

Challenging task!

- Future survival probabilities, health cost risks (incl. aged care), economic environment
- Societal changes: family values, growing female labour force participation, migration, etc.

Role of retirement insurance?

1 – Annuity puzzle

Theory - Annuities are part of an optimal portfolio
Practice - Voluntary annuitisation rates are low

Many explanations (e.g., Benartzi et al., 2011) - three key reasons

- **Precautionary savings** due to uncertain health-related expenditures (e.g., Koijen et al., 2016; Pang and Warshawsky, 2010; Peijnenburg et al., 2017)
- **Stochastic mortality and correlated health costs** (Laitner et al., 2018; Reichling and Smetters, 2015)
- **Adverse selection** (e.g., Braun et al., 2019; Finkelstein and Poterba, 2004)

Remarks

- Better to consider a *portfolio* of retirement insurance products - health risks matter!
- Limited research considering longevity and health-contingent insurance simultaneously

1 – Our questions

Demand for retirement insurance

1. What are the stated preferences for a portfolio of longevity and health-contingent insurance products?
2. Does access to health-contingent insurance release precautionary savings for the purchase of life annuities?
3. What are the determinants of the stated preferences for the retirement portfolio allocation? How does experience with COVID-19 influence insurance demand?

1 – Our paper

An online hypothetical survey with annuity, critical illness insurance (CII), and long-term care insurance (LTCI) in a less-well developed retirement system (urban China)

- A simplified two-stage process for allocation of (hypothetical) retirement wealth
- Comprehensive covariates, including experience with COVID-19

Main contributions

- The first hypothetical survey to include critical illness insurance in a retirement portfolio
  - Existing studies only consider a life annuity, critical illness insurance, and/or long-term care insurance (Brown et al., 2019; Wang et al., 2021; Wu et al., 2017; Ying et al., 2007).
- Provide empirical evidence for designing bundled longevity and health-contingent insurance products to increase annuity demand
- Provide insights for the design of retirement insurance products

2 – Outline

1. Introduction
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2 – Survey overview

Sample screening (1)
Age 45 - 69, not retired, no history of critical illness, can perform 3+ activities of daily livings (ADLs)

Background information and financial products (2)
Risks and costs in retirement; products (annuity, critical illness insurance (CII), long-term care insurance (LTCI)), and a savings account

Embedded task (3)

Preference of retirement portfolio

- Stage 1: Choice of annuitisation in nine tasks with different cover levels of CII and LTCI

	Task 1	Task 2	Task 3	Task 4	Task 5	Task 6	Task 7	Task 8	Task 9
CII cover	0%	50%	100%	0%	0%	50%	100%	50%	100%
LTCI cover	0%	0%	0%	50%	100%	50%	50%	100%	100%

- Stage 2: Rank the nine portfolios from Stage 1 (each time, see three of the nine portfolios, then indicate the most and the least preferred portfolios, following a balanced incomplete design)

Covariate collection (4)
Questions on retirement planning, health, preferences, personality traits, financial competence; experiences with and attitude of COVID-19; demographics and socio-economics

2 – Embedded task: Stage 1 process

- Stage 1: Choice of annuitisation in nine tasks with different cover levels of CII and LTCI

	Task 1	Task 2	Task 3	Task 4	Task 5	Task 6	Task 7	Task 8	Task 9
CII cover	0%	50%	100%	0%	0%	50%	100%	50%	100%
LTCI cover	0%	0%	0%	50%	100%	50%	50%	100%	100%

Participants

- Complete the above nine annuitisation tasks, *from Task 1 to Task 9*
- At the end of Stage 1, have nine retirement portfolios with different levels of cover for health-related risks, and longevity risk

Annuitisation data

- Analysed with a linear mixed model with random individual intercepts (Model 1)
- Treatment variable: cover of CII and LTCI from the nine tasks (ref.: Task 1)

Next *TWO* pages: An example screenshot of Task 1

2 – Embedded task: Stage 1 example screenshot

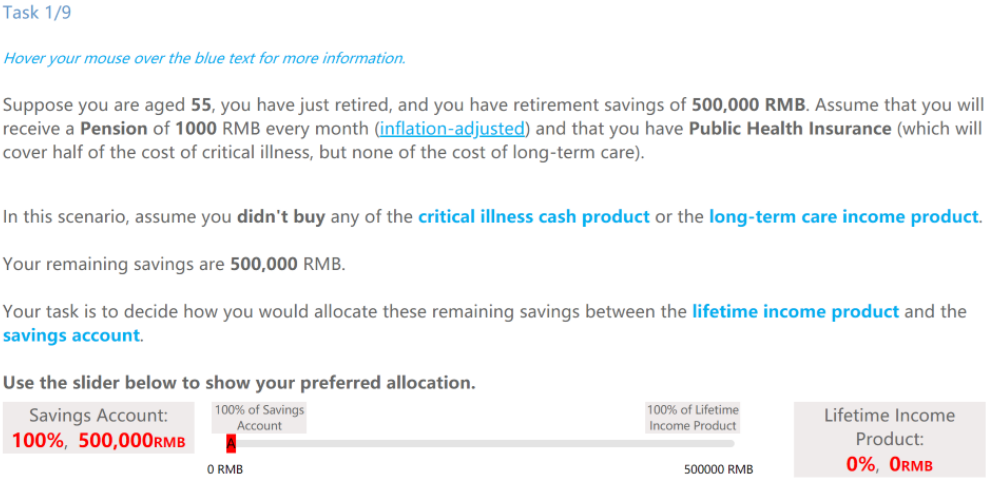

Figure 1: Example screenshot (*upper part*) of an allocation task, Stage 1

2 – Embedded task: Stage 1 example screenshot

The output table below summarises the outcome of your allocation to the three retirement financial products and the savings account.

	Product allocation: Task 1	
Critical illness cash product One-off payment if **critically ill**	0 RMB	You need to withdraw from your savings account to cover the cost if critically ill.
Long-term care income product Monthly income when needing **long-term care**	0 RMB	You need to withdraw from your savings account to cover the cost if needing long-term care.
Lifetime income product Monthly income for the rest of your life	**0** RMB	
Savings account Remaining retirement savings	**500,000** RMB	

Your Pension will also provide a monthly income of 1000 RMB, and Public Health Insurance will cover half of the medical expenditures for critical illness. You do not have any insurance for long-term care.

Figure 2: Example screenshot (*lower part*) of an allocation task, Stage 1

2 – Embedded task: Stage 2 process

- Stage 2: Rank the nine portfolios from Stage 1 (each time, see three of the nine portfolios, then indicate the most and the least preferred portfolios, following a balanced incomplete design)

Participants

- Complete twelve Best-Worst (B-W) tasks, in a randomised order
- At the end of Stage 2, have ranked their nine retirement portfolios

Ranking data

- Analysed with a multinomial logit model with std errors clustered at individual level (Model 2)

Next page: An example screenshot of one Best-Worst task

2 – Embedded task: Stage 2 example screenshot

Choice set 2/12

Of the three retirement product allocations below, which one do you prefer MOST, and which one do you prefer LEAST?

Hover your mouse over the blue text for more information.

	Product allocation A	Product allocation B	Product allocation C
Critical illness cash product One-off payment if **critically ill**	75,000	75,000	150,000
Long-term care income product Monthly income when needing **long-term care**	0	1500	3000
Lifetime income product Monthly income for the rest of your life	624	764	1164
Savings account Remaining retirement savings	280,713	216,609	36,642

	A	B	C
MOST preferred	○	○	○
LEAST preferred	○	○	○

Figure 3: Example screenshot of a Best-Worst task, Stage 2

2 – Pricing

Insurance products:

- Life annuity: industry mortality curve
- Critical illness insurance: industry incidence and mortality curves
- Long-term care insurance: estimated from the China Health and Retirement Longitudinal Study (CHARLS)

Price discounts

- 10% discount when any two products are chosen
- 15% discount when all three products are chosen

Interest rate: 3.5%; Inflation: 2%; Loading: 15%

3 – Outline

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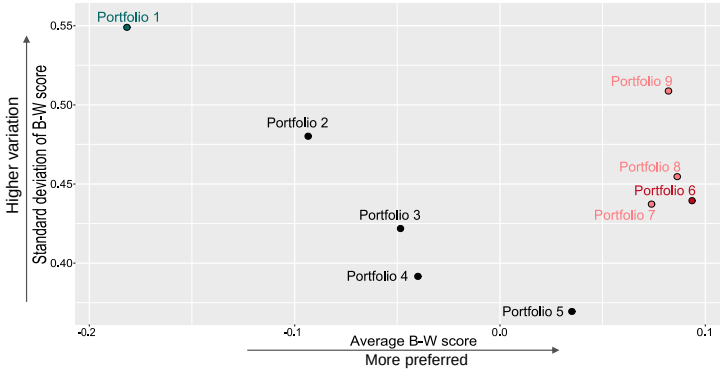
3 – Stated preferences for retirement insurance (Best-Worst tasks)

Portfolio ID	CI, LTC Cover	Monthly annuity
6	50%, 50%	711
8	50%, 100%	652
9	100%, 100%	590
7	100%, 50%	651
5	0%, 100%	666
4	0%, 50%	718
3	100%, 0%	657
2	50%, 0%	665
1	0%, 0%	665

20% of disposable income in urban China



- More preferred: Portfolio 6 to 9
- Least preferred: Portfolio 1
- Higher variation: Portfolio 1, Portfolio 9

3 – Access to health-contingent insurance and annuity demand (Model 1)

Treatment variable: Cover for CI and LTC costs (ref.: 0%)	Dependent variable: Monthly annuity (CNY)
50% CII	44.8*** (9.5)
100% CII	-8.2 (9.5)
50% LTCI	52.8*** (9.5)
100% LTCI	0.9 (9.5)
50% CII + 50% LTCI	45.3*** (9.5)
100% CII + 50% LTCI	-14.4 (9.5)
50% CII + 100% LTCI	-13.1 (9.5)
100% CII + 100% LTCI	-75.5*** (9.5)
Omitted control variables	
No. of observations	9,000
	***p<0.01

- Access to half CII, LTCI, or both increases monthly annuity demand by CNY 45 (1.2% of disposable urban income)
- Access to full CII and LTCI decreases monthly annuity demand by CNY 75 (2.1% of disposable urban income)

3 – Factors affecting retirement insurance (Model 1 and Model 2)

	Demographic and socio-economic factors	Personality traits	Health experience	Retirement planning & Intergenera-tion aspects	Product under-standing	Financial capabilities	COVID-19
Annuity	Wealth, Income, Age, Education, Female, State-employer	Conscien-tiousness, Risk tolerance (financial)	Unhealthy BMI, Family with illness, Provided care	Intended spending, Live in the same house with children, Bequest motives	Product under-standing	Financial and numerical skills	Mental health, Purchased COVID-19 insurance, Worry own income
CII, LTCI	Wealth, Income	Conscien-tiousness, Risk tolerance (financial), Prefer to spend more in bad health state	Provided care	Intended spending, Bequest motives	Product under-standing	Financial and numerical skills, Familiar with financial products, Subjective financial literacy, Have stocks	Mental health, Purchased COVID-19 insurance, COVID-19 risky behaviours

Note:
Positive / negative effects from Model 1 & Model 2

4 – Outline

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4 – Conclusion

We conducted an online hypothetical survey to study the preferences for retirement portfolio in China after the COVID-19 outbreak

- Retirement insurance: a life annuity, critical illness insurance, long-term care insurance
- Key covariates related to retirement planning, and COVID-19 experience

Key findings:

- Most preferred retirement insurance: half critical illness insurance + half long-term care insurance + a monthly annuity of 19.6% of disposable urban income.
- Access to health-contingent insurance can release the precautionary savings to purchase annuity, and the effect depends on the cover of the health insurance.
- Retirement portfolio highly depends on individual factors and COVID-19 experience. Their effects can be opposite by health-contingent insurance and life annuity.

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4 – Model 1

$$\text{Annuity}_{i,t} = \alpha_0 + \beta_t \text{Task}_t + \mathbf{X}_i \kappa + \lambda_i + \epsilon_{i,t}, \tag{1}$$

- $\text{Annuity}_{i,t}$: the amount of monthly annuity income chosen by individual i in each choice task t
- Task_t $(t = 1...9)$: dummy coded treatment variables for the nine choice tasks
- β_t: coefficient
- $\mathbf{X}_i$: vectors of individual covariates
- κ: coefficient vector
- λ_i: individual random intercept

4 – Model 2

The value or utility of portfolio t for individual i:

$$V_{i,t} = \alpha_t + \mathbf{X}_i \kappa_\mathbf{t} + \epsilon_{i,t} \tag{2}$$

The probability of choosing Portfolio A, among Portfolios A, B, and C in a given B-W task:

$$\text{Prob}(\text{Choice}_i = \text{Portfolio}_A) = \frac{e^{V_{i,A}}}{e^{V_{i,A}} + e^{V_{i,B}} + e^{V_{i,C}}} \tag{3}$$

- $\mathbf{X}_i$: vector of individual covariates
- $\kappa_\mathbf{t}$: portfolio-specific coefficient vector of the individual covariates

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