

Mental Accounting, Annuities, and Retirement Asset Allocation

Limitations of Annuity and Reverse Mortgages Innovation

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Background and Motivation

As populations age rapidly worldwide—especially in East Asia—many retirees face the dilemma of "growing old before getting rich."

Traditional pension systems struggle with low annuitization rates and high lump-sum withdrawals.

Our study applies Richard Thaler's mental accounting theory to explain these puzzling behaviors.

22%

China

Actively contribute to personal annuities despite six years of policy support

92.9%

South Korea

Corporate pension participants took lump sums in 2022

Research Questions



1

Mental Classification

Do individuals mentally classify different retirement financial products—such as public pensions, fixed deposits, provident funds, and real estate—into distinct psychological accounts?

2

Effects on Behavior

How do these mental accounts affect both retirement anxiety and the likelihood of early asset liquidation under high-return temptations?

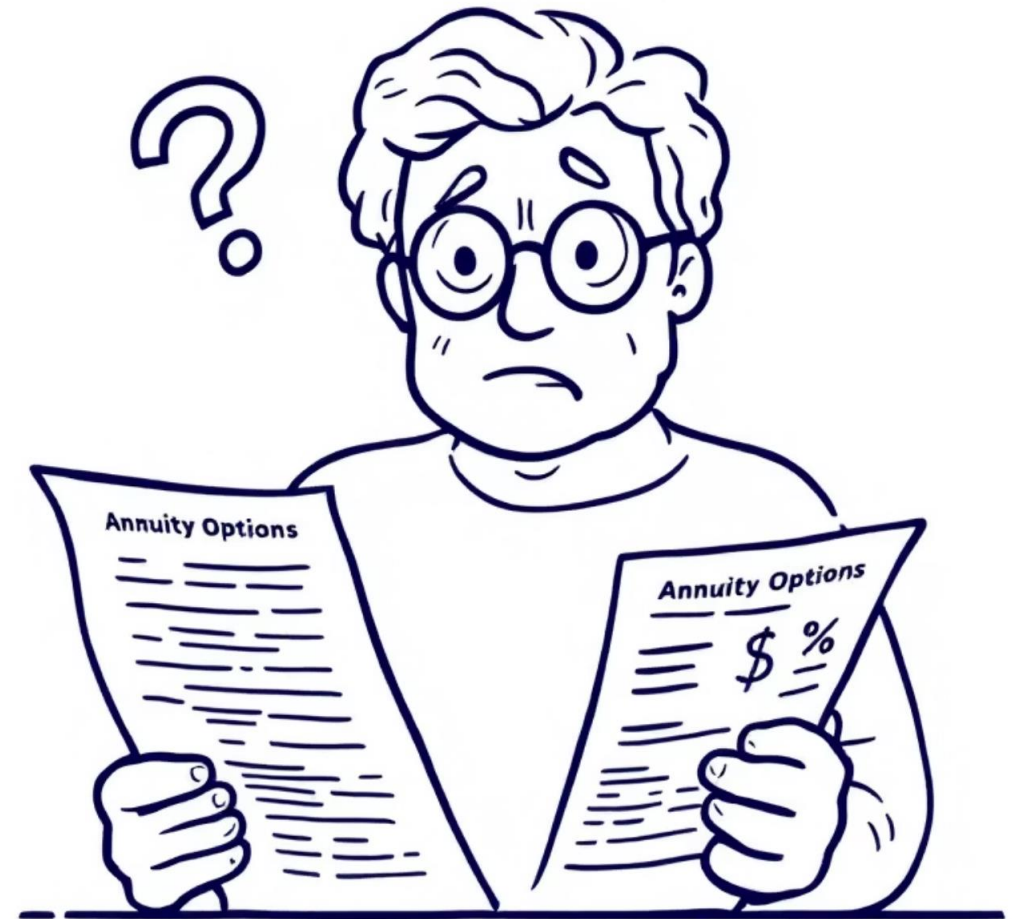
Answering these questions will reveal how product framing and cultural factors shape retirement decisions.

Theoretical Background: Annuity Puzzle

Franco Modigliani coined the term 'annuity puzzle' in 1986 to describe why consumers avoid annuities despite their theoretical benefit for lifetime income smoothing.

Studies by Buetler & Teppa (2005) and Benartzi et al. (2011) show retirees fear uncertain future returns and value liquidity.

Mental accounting suggests they partition funds so that pension accounts feel expendable under tempting returns, reinforcing this avoidance.



Theoretical Background: Reverse Mortgages

Purpose

Reverse mortgages aim to unlock housing wealth for retirees

Cultural Barrier

In many Asian cultures, real estate is viewed as an inheritance legacy

Market Reality

Only 214 reverse mortgage deals in China over ten years

Traditional product designs assess current market value but fail to overcome homeowners' strong emotional resistance to selling or encumbering their property.





Theoretical Background: Mental Accounting

Thaler's mental accounting theory posits that people create separate psychological 'envelopes' for money based on its intended use.

Real Estate

Often occupies an "inheritance envelope" making it psychologically rigid

Pension Savings

May reside in a "liquidity envelope" more prone to early withdrawal when faced with higher returns elsewhere

Survey Design and Data Collection

Methodology

- Structured survey (Sept 2024–Jan 2025)
- 500 Koreans aged 18–45 with economics/finance backgrounds
- Quota sampling by age and gender
- Post-stratification weighting for representativeness

Questionnaire Content

- Product purchase willingness (5-point Likert scale)
- Retirement concern level
- Binary choice on early withdrawal (15% return scenario)
- Triggers (savings depletion fear, health access concerns)

Questionnaire Module	Data Variable(s)	Measurement Method	Description
Willingness to purchase retirement products	pension_willing, fixeddep_willing, provident_willing, estate_willing	5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree)	Assesses the level of interest in contributing to various retirement financial products
Retirement mental accounting (concern level)	retire_concern	5-point Likert scale	Measures overall concern about financial security in retirement
Early withdrawal under high-return scenario	liquidate_decision	Binary (0 = No, 1 = Yes)	Indicates whether individuals would break mental accounts for higher returns
Triggers and motives for withdrawal	savings_runout, pension_insuff, burden_children, life_meaning, health_access, econ_security, housing_good, family_support	Binary (0/1)	Captures different stressors and psychological triggers linked to early withdrawal behavior



Analytical Framework

Stage 1

Models retirement concern as a function of product purchase willingness to capture mental account formation

Stage 2

Models early withdrawal decisions based on retirement concern , product preference, and eight stressor variables

Control variables include gender, age, income quintile, and financial literacy

Main Regression Analysis Results

1. Purchase Willingness → Retirement Concern & High-Yield Liquidation Tendency

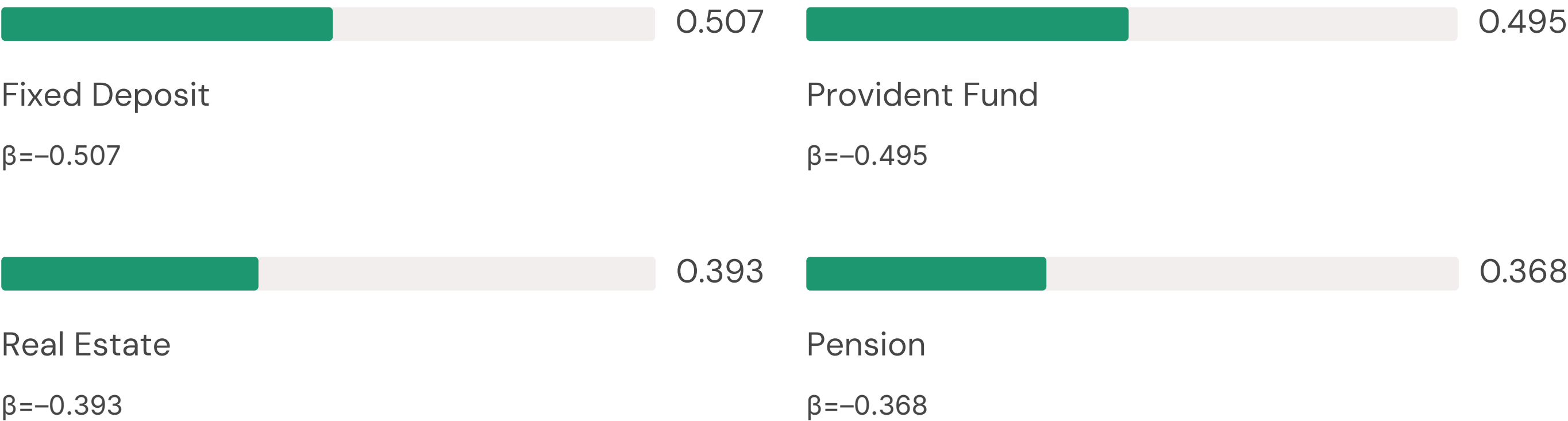
Asset Category	β_R	S.E.	P-Value	β_L	S.E.	P-Value	OR
Pension	−0.368	0.124	0.003	0.323	0.110	0.003	1.381
Fixed Deposit	−0.507	0.125	0.000	0.236	0.112	0.036	1.266
Provident Fund	−0.495	0.122	0.000	0.269	0.109	0.014	1.309
Real Estate	−0.393	0.128	0.002	−0.296	0.115	0.010	0.743

2. Retirement Concerns → Early Pension Withdrawal

Retirement Concern Variable	β	S.E.	P-Value	OR
Fear of savings depletion	0.891	0.273	0.001	2.437
Perception of insufficient pension	0.550	0.267	0.039	1.733
Becoming a burden to children	0.060	0.264	0.819	1.062
Loss of life purpose	1.241	0.286	0.000	3.461
Poor health (medical access)	0.757	0.274	0.006	2.132
Economic instability (income risk)	1.026	0.272	0.000	2.791
Poor housing conditions	1.269	0.280	0.000	3.557
Lack of family support	0.775	0.269	0.004	2.170

Key Finding 1: Product Preference → Retirement Concern

Higher willingness to purchase each product significantly reduces retirement anxiety (all $p < 0.01$)



This indicates respondents view fixed deposits as most psychologically reassuring, while pensions provide comparatively less immediate comfort.

Key Finding 2: Product Preference → Liquidation Tendency

More Likely to Liquidate

Pensions (OR=1.381)

Fixed Deposits (OR=1.266)

Provident Funds (OR=1.309)

Less Likely to Liquidate

✔ Real Estate (OR=0.743, $p=0.010$)

Forms the most rigid mental account
against high-yield temptations



Key Finding 3: Stressors Trigger Early Withdrawal

3.56

Poor Housing

Highest odds ratio for early withdrawal

3.46

Loss of Purpose

Second highest trigger for liquidation

2.79

Economic Instability

Third most significant stressor

Notably, "becoming a burden to children" was not significant ($p=0.819$), suggesting limited behavioral impact of social concerns.

Behavioral Gaps in Retirement Finance



1

Present Bias

High personal discount rates lead to overweighting immediate needs over future security

2

Information Asymmetry

Product complexity deters trust in pensions and reverse mortgages

3

Macroeconomic Volatility

Reduces confidence in long-term financial commitments

Addressing these gaps requires combining behavioral insights with product redesign

Policy Implication 1: Pension System Reform



Recommended Reforms:

- Integrate annuitized products with enhanced liquidity and transparency
- Implement automatic enrollment systems
- Create simplified disclosures
- Apply behavioral nudges (e.g., framing pension contributions as "forced savings")

Policy Implication 2: Real Estate-Backed Credit Innovation

AI-Driven Credit Scoring

Personalized risk assessment based on property value and retirement needs

Controlled Spending Caps

Limits tied directly to retirement needs while preserving inheritance value

Tiered Credit Limits

Based on asset value and life-cycle stage



Policy Implication 3: Cross-Sector Collaboration

Financial Institutions
Develop innovative products

Public Education
Improve financial literacy

Housing Regulators
Enable flexible equity access

Pension Authorities
Reform withdrawal policies



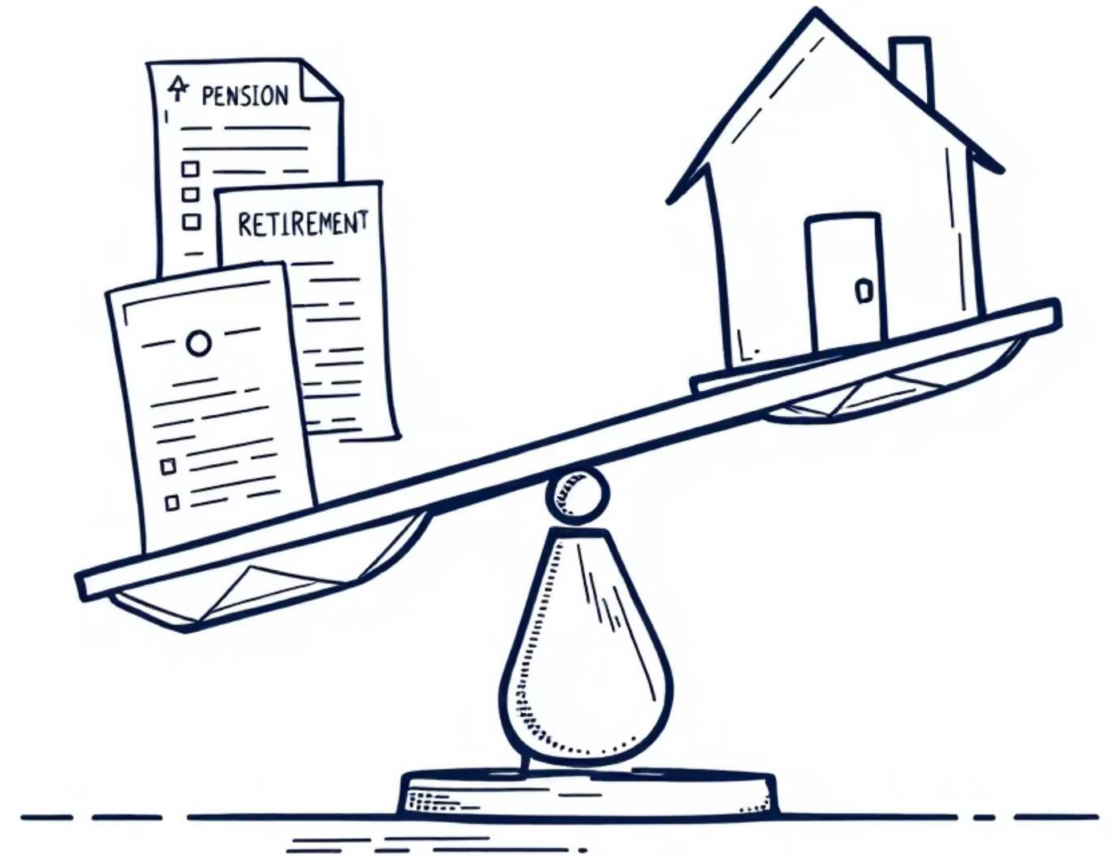
Implement pilot programs with continuous monitoring and leverage big data for dynamic risk management

Conclusion

Mental accounting is critical in explaining retirement asset choices and liquidation behaviors

Real estate emerges as a psychologically resilient asset, while pensions and savings remain vulnerable to high-return temptations

Future product innovation must respect these behavioral tendencies to enhance retirement security



Limitations and Future Research

Sample Limitations

Sample: financially literate, age 18–45 only—will expand to diverse groups to assess financial literacy effects on annuity puzzle.

Measurement Issues

Proxy measures for mental accounting used—will apply simulation distance models to include more influencing variables beyond simple logit limits.

External Factors

External economic factors (e.g., interest rates) underrepresented—future studies to use simulation models for broader macroeconomic integration.