

# ***SeLFIES*— A Globally Applicable Bond Innovation to Improve Retirement Funding and Support Other Policy Objectives**

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# Global Challenge of Funding Retirement

Why current retirement funding systems may not be adequate or sustainable: Korea as a Case Study

- National Pension Service (NPS) fund may be on unsustainable long-term path
  - Buffer fund is expected to diminish from 2040 and could be depleted by 2060
  - Increasing the contribution rate from current 9% to correct this may be difficult
  - Cutting benefits may also be difficult and at a 40% maximum replacement ratio which is already inadequate to provide a full retirement funding, may not work
  - Increasing general tax rates to provide government subsidy is not a long-run fix
  - Trying to increase return by taking more investment risk, requires a “safety net” funding plan in case the risk is realized
- About 51% of population is in NPS, which means that 49% is not covered
- Private pensions: 17% of population have a retirement pension and 24% have a personal voluntary one. However those so covered have large overlap with NPS and so a material part of population is “uncovered” by either a public or private plan
- Conclusion: more of the population will become responsible for funding a larger proportion of their retirement through personal saving and Defined-Contribution plans
- *SeLFIES* is a proposed innovation to enable people to do so and improve retirement outcomes

# What is a Goal for a “Good” Retirement?

“An inflation-protected income for life that allows you to sustain the *standard of living* you enjoyed in the *latter* part of your working life.”

- Standard of living is measured by *income*, and not by *wealth*.
- Standard-of-living risk is measured by income risk and not wealth risk.

*Reality everywhere*: Individuals will have to take greater responsibility for funding their own retirement in the future than in the past.

SeLFIES are a bond innovation to help address this challenge.

# What are SeLFIES?

## Standard-of-Living indexed, Forward-starting, Income-only Securities

- SeLFIES are bonds with payouts designed to create a pension-like pattern desired by individuals for their retirement
- There is a deferral of payouts until a specified future start date (anticipated retirement date) and from that date on there are annual level payouts with indexing, until a specified maturity date, the “payout period”.
- Like a pension, there is no principal or “balloon” payment at the maturity date.
- The payouts are indexed to aggregate per capita consumption, so that the holder is hedged against both consumption inflation and standard-of-living-change risks until payouts begin, and indexed to consumption inflation only, thereafter.
- SeLFIES are government bonds with the same credit standing as other full-faith-and-credit bond issues.

# What are SeLFIES?

## Standard-of-Living indexed, Forward-starting, Income-only Securities (continued)

- SeLFIES are issued as a series with different annual starting dates. The length of the payout period (from the payout starting date to maturity) is the same for all SeLFIES. The payout period is set a bit longer than life expectancy at standard retirement age.
- SeLFIES are sold at auction and traded in a secondary market in standard-size denominations as with other government bonds.
- SeLFIES are also issued (or redeemed) in small denominations directly to consumers, based on prices from the auction and large-denomination secondary markets.
- Provisions for “aggregators” purchase of small denomination units to be pooled for exchange for standard denomination SeLFIES would support close correspondence between market and direct issue prices.
- Robust design to work in any country with a bond market.

# E.G. SeLFIES – Standard-of-Living indexed, Forward-starting, Income-only Securities

## 28-Year Old Planning to Retire at Age 65 (2058) with Goal of \$50,000 Retirement Income

- Each 2058 SeLFIES has the following:
  - Starts paying periodic level-payout of \$10/year in 2058 for a fixed period of 20 years, with no principal or “balloon” payout at its maturity in 2078
  - Payout amounts indexed to per-capita consumption until 2058
  - Protects the holder against both inflation and standard-of-living changes until 2058
  - Payout amounts indexed to inflation only, from 2058 to 2078. [“fixed” standard of living]
- Super simple to figure out what you need to own to meet your goal  
Goal =  $\$50,000 / \$10 =$  need to own 5,000 bonds
- Super simple to figure out how close you are to your goal  
Where am I? Own 3,000 bonds = \$30,000. You are 60% to your goal
- Addresses the challenge of a lack of financial literacy for savers to take responsibility for their own retirement outcomes

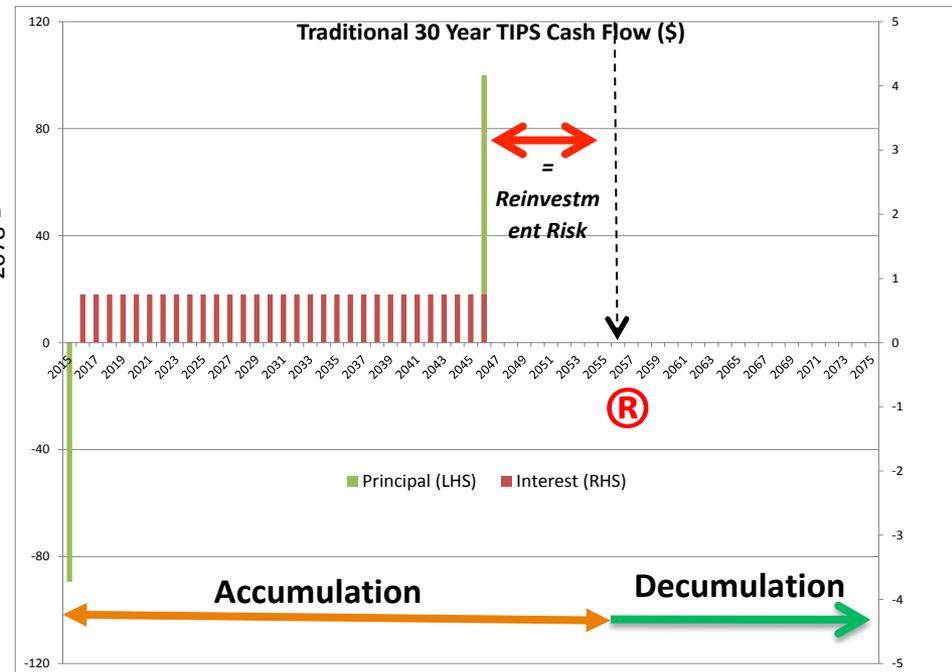
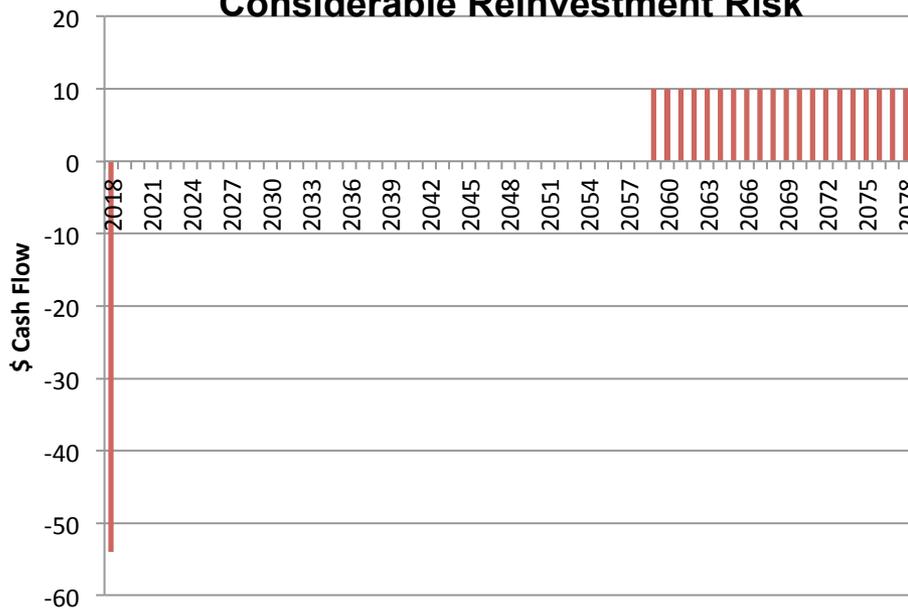
# Why Do SeLFIES Have a Payout Time Pattern Different from Traditional Bonds with Periodic Coupon Payments and a Principal “Balloon” Payment at Maturity?

## Cash Flows of 2058 SeLFIES

Match Pension Payouts –  
No Additional Decisions/Transactions and  
No Reinvestment Risk

## Cash Flows of 30-Year TIPS

61 Additional Decisions/Transactions and  
Considerable Reinvestment Risk



# Why Index Cash Payouts to Consumption Per Capita Instead of Just to Inflation (CPI) ?

Goal for retirement is referenced to sustaining the standard of living experienced in the *latter* part of work life just before retirement –

## Average Compound Growth Rates: Korea

Time Period	<u>Consumption per Capita*</u>	<u>Inflation (CPI)**</u>	<u>Standard of Living (SoL)</u>	<u>Goal Short-Fall CPI Only / (CPI &amp; SoL)</u>
2007-2017	3.7%	2.3%	1.4%	0.87 10 Years
1997-2017	5.0%	2.2%	2.7%	0.64 20 years
1987-2017	8.4%	3.9%	4.3%	0.28 30 years
1965-2017	13.6%	7.4%	5.8%	0.04 53 years

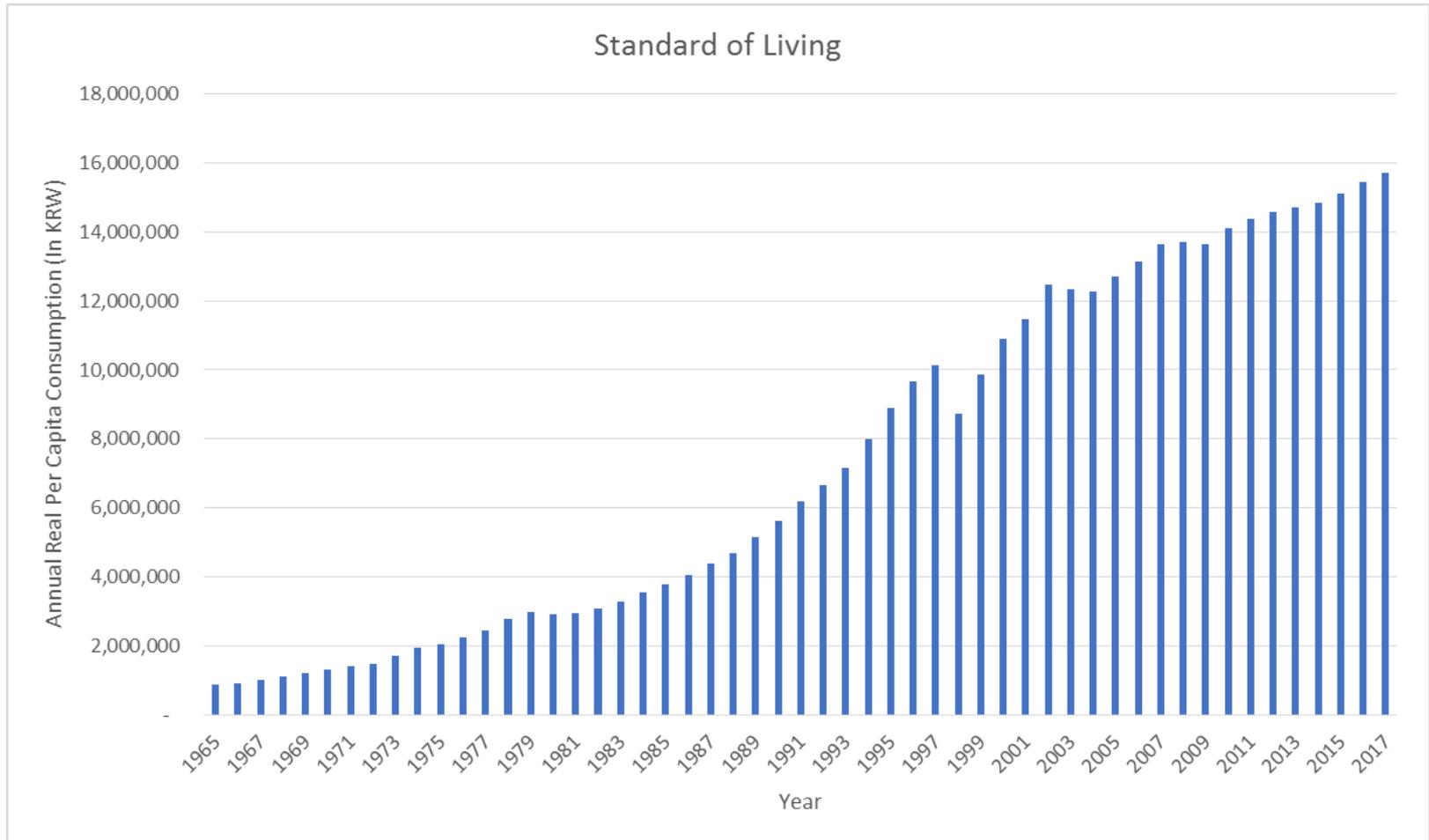
\*Covers both inflation (CPI) and standard of living (SoL)

\*\*Covers inflation (CPI) only

Source: Statistics Korea, Bank of Korea Economic Statistics System

# Standard of Living Growth in Korea 1965-2017

## Annual Inflation-adjusted per Capita Consumption



# Using SeLFIES & Addressing Longevity Risk in Retirement -- Determination of Optimum Maturity for SeLFIES

- SeLFIES are bonds with a pre-specified number of payments [aka fixed maturity], and so cannot provide “contingent” protection against longevity risk of “outliving” your assets, with guaranteed lifetime income, as pensions and life annuities do.
- If the maturity of SeLFIES were set longer than it is feasible for any human to live, then it could provide lifetime income protection but at an inefficiently high cost, since for certain there will always be “unused” payments left at death, which are “wasted”, making that solution materially suboptimal.
- In a frictionless world, if the SeLFIES maturity were set equal to life expectancy, conditional on reaching retirement-age, then competitive insurance companies should be willing to exchange 1-1 a life annuity with the same payments for the SeLFIES, which is the ideal statistical hedge for the insurance company to hold.

## SeLFIES & Addressing Longevity Risk in Retirement -- Determination of Optimum Maturity for SeLFIES (cont.)

- With frictions, the maturity of the SeLFIES should be set longer to cover the expected costs, so that the 1-1 exchange would take place. For example, If conditional life expectancy at age 65 is 85 or 20 years, then choose the SeLFIES maturity to be 22 years at the start of payments, to achieve a 1-1 exchange, by providing the insurance company with two years of additional SeLFIES payments as “compensation” for expenses and profit.
- The exchange of identical promised payments minimizes complexity, transactions costs and addresses effectively, well-known cognitive dysfunctions of consumers. The shortest maturity for SeLFIES which supports 1-1 exchange as the market price is the optimum maturity.
- The SeLFIES owner can wait to decide whether to do the exchange or not until retirement, when they know their actual health, finances and commitment needs.

# Who Will be the Users of SeLFIES?

## Individual Retail and Institutional Investors

- Individuals who are uncovered by any public or private pension plan and must accumulate assets for retirement through personal saving
- Individuals who are covered by a pension plan but the plan benefits are inadequate to provide for a good retirement and they must accumulate additional assets for retirement through personal saving
- Individuals who are covered by a pension plan but at least part of the plan requires their personal decision-making and responsibility as to what to invest the plan assets in, as in a defined-contribution (DC) plan
- Institutional investors such as pension funds and insurance companies who have pension and annuity benefit liabilities, and want to hedge them effectively and at low cost
- General institutional and retail investors who would want an efficient and low-cost core “best-diversified” portfolio, according to finance theory [Consumption Capital Asset Pricing Model, Breeden 1979]

# Why Government Should be the Issuer of SeLFIES?

- SeLFIES will have no credit risk and so made very simple for buyers because do not worry about risk of default and all the associated disclosures
- Reliable supplier—to be successful most be prepared to issue bonds in good and bad times and have the capacity to provide large volume on regular basis
- Governments with VAT are “natural” issuers because the bond payments can be hedged by VAT revenues, since VAT is a tax on consumption
- Issuing SeLFIES ensures more domestic holding of government debt, a material benefit, especially for emerging market countries
- A security issued by government to improve financial market “completion” similar to 2007 issuing of JGB 40-year “ultra longs” or 1997 issuing of US Treasury inflation-indexed bonds “TIPS,” could also reduce debt funding cost
- Governments doing infrastructure financing improve maturity-matching of funding for infrastructure investments which reduces re-financing risk and issuing costs; can also be used to manage government tax-revenue risk

## Addressing Multiple Market Needs and Policy Objectives with a Single Bond Innovation: Retirement Income, Funding Infrastructure, and Improving Investors' Core Diversification... all by Issuing SELFIES

- Principle: match the “best” issuers with the “best” holders and improve to maximize scale and minimize cost
- Retirement funding improvements for individuals and institutions; improve maturity-matching of funding for infrastructure investments to reduce re-financing risk and issuing costs; control government tax-revenue risk
- Pattern of delayed payouts for many years and then level payouts match infrastructure cash inflow pattern and provides a precise match to cash flow needs of retirees, so no further transactions are needed by either issuer or buyer
- Finance science predicts that an asset which is perfectly correlated with aggregate consumption would be an ideal diversification asset for all investors

# APPENDIX: Scientific Papers Underlying SeLFIES Concept

- Merton, R. C. and Muralidhar, A. 2020a. “A Six-Component Integrated Approach to Addressing the Retirement Funding Challenge,” *Journal of Investment Management*, Vol. 18, No.4, December 2020
- Merton, R. C. and Muralidhar, A. (2020b). “SeLFIES: A New Pension Bond and Currency for Retirement,” *Journal of Financial Transformation* **51** (May–June 2020), 1–12.
- Merton, R. C., Muralidhar, A., and Pinto-Ferreira, R. (2019). “SeLFIES for Portugal: An Innovative Pan European Retirement Solution,” In *The Future of Pension Plans in the EU Internal Market*, ed. Nazare Costa Cabral and Nuno Cunha Rodrigues, SpringerLink, pp. 161–178.
- Muralidhar, A., K. Ohashi, and S. Shin. 2016. The Most Basic Missing Instrument in Financial Markets: The Case for Bonds for Financial Security, *Journal of Investment Consulting*, Vol. 16, No. 2, p. 34-47, 2016

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- Muralidhar, A., K. Ohashi, and S. Shin. 2014a. The Relative Asset Pricing Model: Implications for Asset Allocation, Rebalancing, and Asset Pricing. *Journal of Financial Perspectives* ( <https://www.gfsi.ey.com/the-journal-of-financial-perspectives.php> ) March 2014
- Muralidhar, A., K. Ohashi, and S. Shin. 2014b. The Relative Asset Pricing Model: Toward a Unified Theory of Asset Pricing, *Journal of Investment Consulting*, Vol. 15, No. 1, 51-66, 2014
- Merton, Robert C. "On Consumption-Indexed Public Pension Plans." In *Financial Aspects of the U.S. Pension System*, edited by Zvi Bodie and John B. Shoven. Chicago: University of Chicago Press, 1983. Reprinted as Chapter 18 in Robert C. Merton, *Continuous-Time Finance*, Wiley-Blackwell, 1990, revised edition 1992.