Global Funding Retirement Challenge: First Order Impacts

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Nobel Laureate in Economic Sciences in 1997

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Global Pension Programme

"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."

Reality Check: Only Four Ways to Improve the Probability of a Good Retirement

1. **Save More for Retirement**
   Lower lifetime consumption level

2. **Work Longer Before Retiring**
   More saving and shorter retirement period to fund

3. **Take More Investment Risk**
   Prepare "Plan B" for the consequences if that risk is realized

4. **Improve Income Benefits From Accumulated Retirement Assets**
   Annuities and equity-extraction from the house improve benefits without changing saving behavior

Six Feasible Components of an Integrated Approach to Funding Retirement

1. **Pillar 0/I Social Security/DB employer pension plan**

   Highest expected return for risk; cost efficient

2. **Pillar II DC**

   Make it as easy to use as DB – with a comprehensive default offering

   Include robust-design tool for engaged members to tailor income outcomes (without requiring financial knowledge/literacy)

   Provide a smooth transition from accumulation to pay-down phase, customized at retirement

3. **Pillar III provide for uncovered workers and expand opportunity for personal saving for retirement**

   Creation of a new "pension bond" (aka SeLFIES) for purchase by either those not covered by any pension plan or those who want to supplement their benefits beyond their pension plan; requires no financial knowledge and low cost to use

3

Six Feasible Components of an Integrated Approach to Funding Retirement (continued)

4. ## Provide more benefits from assets at retirement

   Efficient deployment of those assets to enhance benefits without increasing risk

   Reverse mortgage (home pension) and annuities can do so materially, without changing people saving behavior

5. ## Work longer, in a systematically organized, retirement-friendly structure

   Contract-employees and organized public and private-sector specialized jobs designed to use the comparative advantages of seniors, with minimal new training required

   To provide both needed cash flow and smoothly taper the work experience

6. ## Restructure the retirement system as a broader lifecycle crisis-coverage system

   For personal and systemic crisis throughout the lifecycle as well as retirement funding

   An organized conduit to get financial resources to individuals quickly and efficiently during crisis

Pillar II DC: Key Retirement Income Principle

Most individuals have no way to relate an account balance to a retirement standard of living

$1,000,000
Account Balance

Pillar II DC: Key Retirement Income Principle

Most individuals DO understand a stream of income in terms of current purchasing power in assessing a standard of living in retirement

$55,000
Real Income
70% salary replacement rate

YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
YEAR 11	YEAR 12	YEAR 13	YEAR 14	YEAR 15
YEAR 16	YEAR 17	YEAR 18	YEAR 19	YEAR 20
YEAR 21	YEAR 22	YEAR 23	YEAR 24	YEAR(S) 25...

Pillar II DC: 2019 U.S. SECURE Act & Mexico CONSAR Pension Reform Require: Show Retirement Income Payout from DC Plan Balance

Current market bond yields should be used to calculate future annual payout in current 2020 $

Legend: ●— Balance ●— Annuity

LOSS ≠ RISK

MXN$1,830

MXN$400,000

MXN$1,040

MXN$950

MXN$150,000

MXN$698

MXN$353

MXN$80,000

MXN$30,000

MXN$140,000

| 30 Years | 40 Years | 50 Years | 50 Years | 60 Years |

1% Rate Increase

To learn more, read Commentary: 5 Ways to Make the SECURE Act Meet Participants' Needs, *Pensions & Investments,* 21 August 2020 https://www.pionline.com/industry-voices/commentary-5-ways-make-secure-act-meet-participants-needs

The cost of the retirement liability is the present value of 25 equal, inflation-indexed payments starting at age 60. Payments are discounted using the Mexican real yield curve. Udibonos yields were sourced from Bloomberg on 08/31/2020. Example illustrates a 50-year old plan participant with a balance of 150,000 pesos, could purchase an inflation protected annuity for 25 years representing MXN$949 monthly pesos

Wealth Goal vs Retirement Income Goal

The correct risk-free assets is critical given the goal
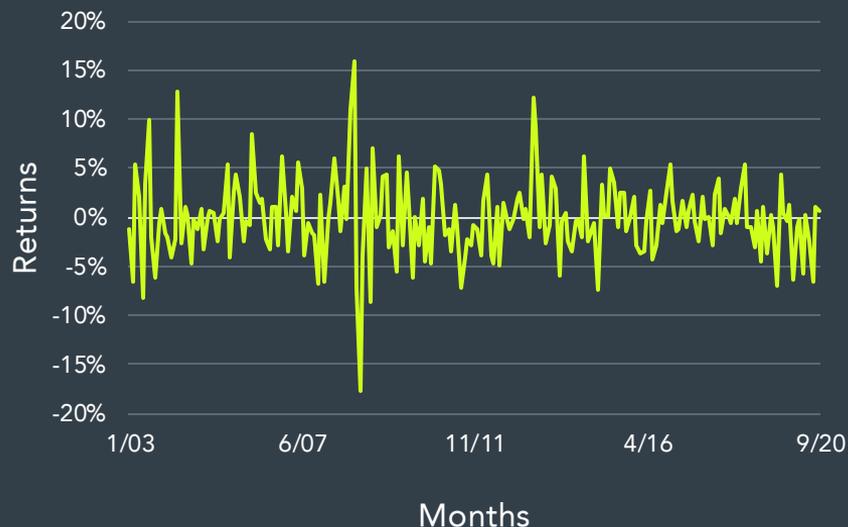
3-Month US T-BILL
(USD)

The volatility of US T-bills is **minimum risk** when looking at it as an **asset value**

3-month US T-BILL
(Funded-ratio Units)

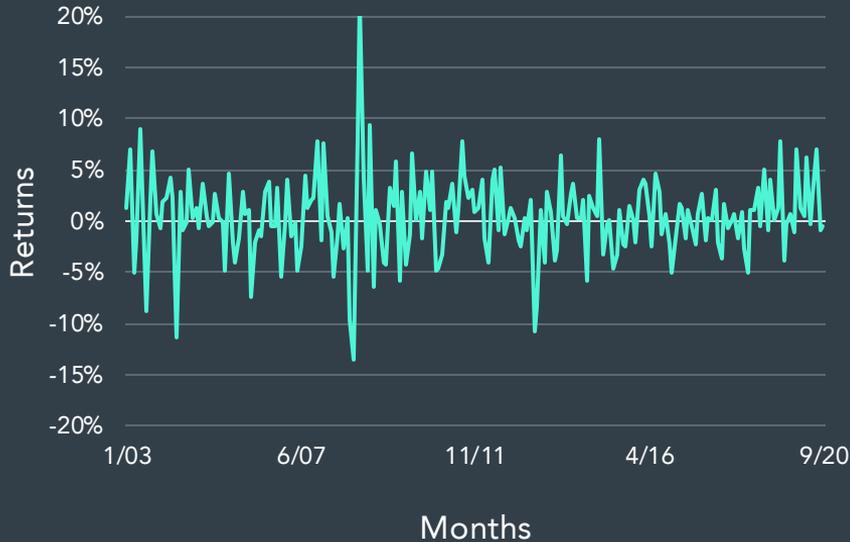But it is **high risk** measured in **retirement income** (funded-ratio units)

Income returns are calculated as the month-over-month percent difference of 25 years of $1 cash flows, deferred for 10 years when currently holding 3-month T-bills. Computed using the U.S. TIPS yield curve.

Retirement Income Goal Needs Different Risk Measure

Using the correct risk free asset is critical

Life Income Hedge Asset
(USD)

Life Income Hedge Asset
(Funded-ratio Units)

The volatility of life-income hedge price is **high risk** when measured in terms of **asset value**

The volatility of life-income hedge price is **minimum risk** when measured in terms of **income**

Asset value returns are calculated as the month-over-month percent difference in the current cost of 25 years of future $1 cash flows, deferred for 10 years. Current cost computed by discounting future cash flows using the U.S. TIPS yield curve.
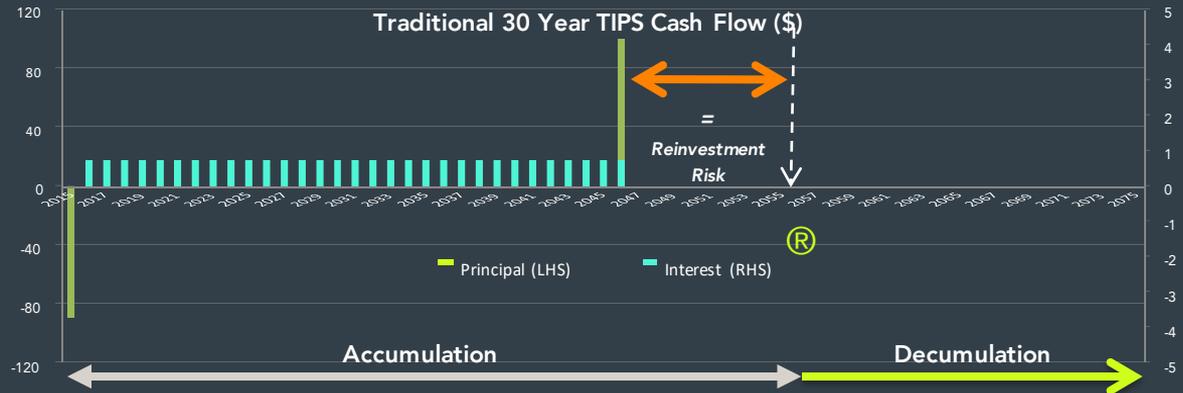
Pillar III (Uncovered Workers): SeLFIES

Cash Flows of 2058 SeLFIES

Match Pension Payouts –
No Additional
Decisions/Transactions and No
Reinvestment Risk
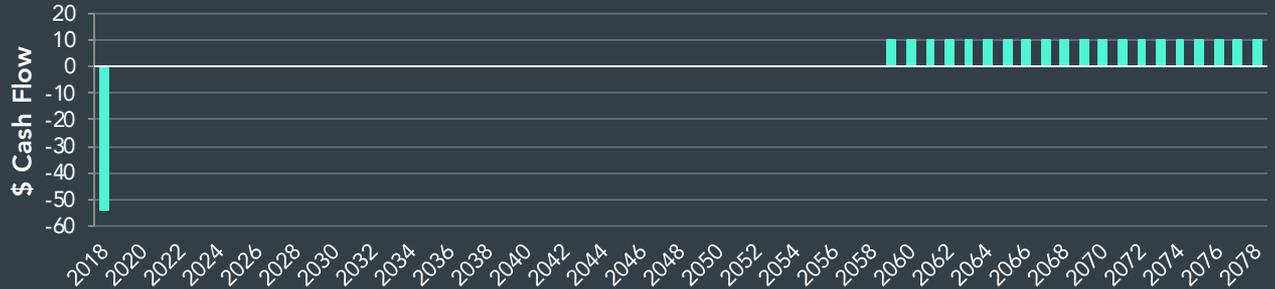
Cash Flows of 30-Year TIPS

61 Additional Decisions/
Transactions and Considerable
Reinvestment Risk

To learn more, read: A Six-
Component Integrated Approach to
Addressing the Retirement Funding
Challenge
with Arun Muralidhar, Journal of Investment
Management, Vol. 18, No.4 (2020), pp. 1-27.

Key Instruments to Maximize Retirement Income Benefits from Retiree's Assets—Life Annuity and Reverse Mortgage

Immediate and Deferred Annuities

Larger payout for same assets as long as you live… the "mortality dividend"

"Tail" insurance on longevity, payouts deferred to > age 85

In return, you give up assets at death when they are no longer needed

Reverse mortgage can provide funding for retirement late in the lifecycle

House is principal source of personal saving and typically largest asset at retirement

Both a pre-paid specialized annuity and a general retirement funding asset

No repayments while retiree is living in house; non-recourse to retiree or estate

Obvious choice for those with no bequest motive; can work well with beneficiaries if explained properly

Both annuity and reverse-mortgage markets will require innovations in designs and market distribution for high efficiency and effectiveness

How the Annuity and Reverse Mortgage Can Achieve a Good Retirement:

(50th Percentile Income Example Age 65)

$50,000 Income | Retirement Goal $36,000 (72% replace) | $165,000 DC Assets | $300,000 house
Inflation-protected bond interest rate = 1.50% and life annuity inflation-protected rate = 5.40%

Security $18,978 + bond interest DC $2,475 = **$21,453 benefit (60% of goal)**

Social Security $18,978 + Annuity purchase DC $8,910 = **$27,888 benefit (77% of goal)**

Reverse mortgage principal = $162,000 (54%) Annuity income purchase = **$162,000 x 0.054 = $8,748**

Social Security $18,978 + Annuity purchase DC+RM $17,658 = **$36,636 benefit (100%)**

Benefit: Social Security 52%   Annuity DC 24%   Annuity Reverse Mortgage 24%

Apply a Smooth Transition to Post-Accumulation, Flexible Spend-Down Strategies Customized to Fit Individual Needs

1	2	3	4
Guaranteed Income for life	**Conservative draw-down (minimum-risk income)**	**Desired income growth goal**	**Longevity insurance**
Life annuity	Not guaranteed	Targeted increase in income starts at specified future date in retirement	Deferred life annuity—purchase at retirement and payments start at age 85
Social Security	No longevity protection	Invest in risk asset	
DB employer pension	Provides liquidity		
	Room for non-spouse bequests		

Appendix

Speaker Profile

Robert C. Merton is the School of Management Distinguished Professor of Finance at the MIT Sloan School of Management and John and Natty McArthur University Professor Emeritus at Harvard University. He was the George Fisher Baker Professor of Business Administration (1988–98) and the John and Natty McArthur University Professor (1998–2010) at Harvard Business School. After receiving a Ph.D. in Economics from MIT in 1970, Merton served on the finance faculty of MIT's Sloan School of Management until 1988 at which time he was J.C. Penney Professor of Management. He is currently Resident Scientist at Dimensional Fund Advisors, where he is the creator of Target Retirement Solution, a global integrated retirement-funding solution system

Merton received the Alfred Nobel Memorial Prize in Economic Sciences in 1997 for a new method to determine the value of derivatives. He is past president of the American Finance Association, a member of the National Academy of Sciences, and a Fellow of the American Academy of Arts and Sciences.

Merton has also been recognized for translating finance science into practice. He received the inaugural Financial Engineer of the Year Award from the International Association for Quantitative Finance (formerly International Association of Financial Engineers), which also elected him a Senior Fellow. He received the 2011 CME Group Melamed-Arditti Innovation Award, and the 2013 WFE Award for Excellence from World Federation of Exchanges. A Distinguished Fellow of the Institute for Quantitative Research in Finance ('Q Group') and a Fellow of the Financial Management Association, Merton received the Nicholas Molodovsky Award from the CFA Institute. He is a member of the Halls of Fame of the Fixed Income Analyst Society, Risk, and Derivative Strategy magazines. Merton received Risk's Lifetime Achievement Award for contributions to the field of risk management and the 2014 Lifetime Achievement Award from the Financial Intermediation Research Society. He received the 2017 Finance Diamond Prize from Fundación de Investigación, IMEF.

Merton's research focuses on finance theory, including lifecycle and retirement finance, optimal portfolio selection, capital asset pricing, pricing of derivative securities, credit risk, loan guarantees, financial innovation, the dynamics of institutional change, and improving the methods of measuring and managing macro-financial risk. Merton received a B.S. in Engineering Mathematics from Columbia University, a M.S. in Applied Mathematics from California Institute of Technology and a Ph.D. in Economics from Massachusetts Institute of Technology and holds honorary degrees from nineteen universities. http://robertcmerton.com/

Global Challenges to DC Retirement Funding

| Employee's Responsibility	Product Designer's Responsibility
Difficultly in determining what is a desirable and realistic retirement goal Don't know how much to save and have limited investment knowledge Difficulty deciding between solutions – guarantees vs liquidity	Well-designed default solution which takes into account employee differences without requiring either information-providing or decisions by the employee—make DC as easy to use as DB/SS Products based on what employees already know instead of requiring them to become finance-educated in order to use the products
Retirement Income Uncertainty Need an income goal and risk management of that goal	**Increasing Longevity** Savings need to last longer

Risk & Return: Wealth Goal vs Income Goal

Measuring the risk/return trade-off correctly– What is the risk-free asset?

US Dollars

Funded-Ratio Income Units
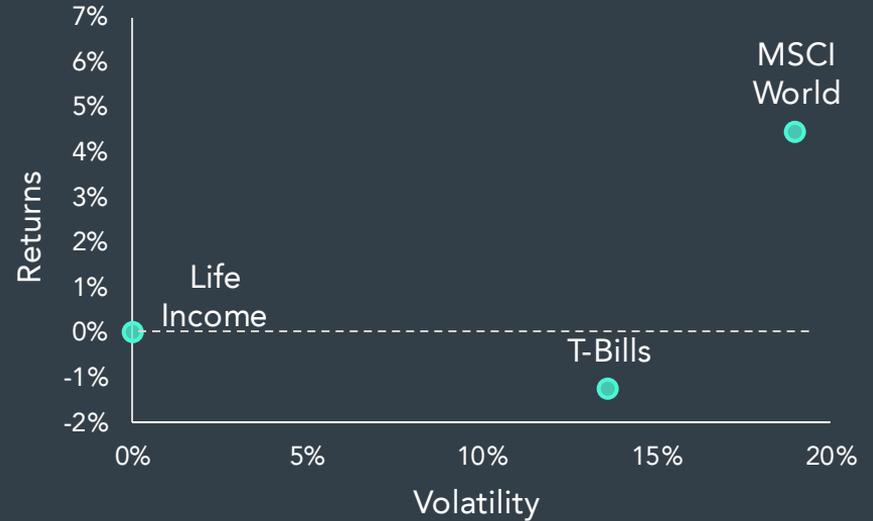
"If one measures risk incorrectly, one cannot possibly manage risk correctly"

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How the Annuity and Reverse Mortgage Can Achieve a Good Retirement:

(25th Percentile Income Example Age 65)

$26,000 Income | Retirement Goal $21,320 (82% replace) | $30,000 DC assets | $150,000 house.
Inflation-protected bond interest rate = 1.50% and life annuity inflation-protected rate = 5.40%

Social Security $15,340 + bond interest DC $450 = **$15,790 benefit (74% of goal)**

Social Security $15,340 + Annuity purchase DC $1,620 = **$16,960 benefit (80% of goal)**

Reverse mortgage principal = $81,300 (54%) Annuity income purchase = **$81,300 x 0.054 = $4,390**

Social Security $15,340 + Annuity purchase DC+RM $6,010 = **$21,350 benefit (100%)**

Benefit: Social Security 71%   Annuity DC 8%   Annuity Reverse Mortgage 21%

How the Annuity and Reverse Mortgage Can Achieve a Good Retirement: Case 3

(75th Percentile Income Example Age 65)

$87,000 Income | Retirement Goal $53,980 (62% replace) | $229,000 DC Assets | $500,000 house
Inflation-protected bond interest rate = 1.50% and life annuity inflation-protected rate = 5.40%

Social Security $26,933 + bond interest DC $3,435 = **$30,368 benefit (56% of goal)**

Social Security $26,933 + Annuity purchase DC $12,366 = **$39,299 benefit (73% of goal)**

Reverse mortgage principal = $271,000 (54%) Annuity income purchase= **$271,000x0.054 = $14,634**

Social Security $26,933 + Annuity purchase DC+RM $27,000 = **$53,933 benefit (100%)**

Benefit: Social Security 50%   Annuity DC 23%   Annuity Reverse Mortgage 27%