Handout for Class #14

Asset Management, Lifecycle Investing, and Retirement Finance

Robert C. Merton

15.467

Class #14

Wednesday, April 7, 2021

Lecture

Meeting the Challenges of Funding Retirement: A Next-Generation Solution, Part I Overview

Prof. Robert C. Merton

TA: Zaki Dernaoui zaki@mit.edu

15.467 Asset Management, Lifecycle Investing and Retirement Finance

IV. Retirement Finance: Design of Plans and Development of Tools and Products

2:30pm Wed., April 7, 2021 Online

TOPIC

Class 14: Meeting the Challenges of Funding Retirement: A Next-Generation Solution, Part I Overview

MATERIALS

Required Reading:

“A Six-Component Integrated Approach to Addressing the Retirement Funding Challenge,” R.C. Merton and A. Muralidhar, *Journal of Investment Management*, Vol. 18, No.4, December 2020, pp. 28-48.

“Glossary of Terms for Pension Plans,” R.C. Merton.

“Commentary: 5 Ways to Make the SECURE Act Meet Participants’ Needs,” R.C. Merton, *Pensions & Investments*, August 21, 2020.

“The SECURE Act’s changes”, T. Adams and C.A. Lafond, *Journal of Accountancy*, July 1, 2020.

“If You’re Over 50, Chances Are the Decision to Leave a Job Won’t be Yours,” P. Gosselin, *ProPublica*, January 4, 2019.

Optional Reading

"Saving Woes Stretch Retirement Outlook," ING International Survey | Savings, thinkforward, Ipsos, & ING, February 2019, pp. 6-12.

"Pensions: An Urgent Call," Gabriel Plata, Inter-American Development Bank, January 2019.

"Funding Retirement: Next Generation Design," R.C. Merton, *JASSA: The Finsia Journal of Applied Finance*, Issue 4, 2012.

"BlackRock: DC Participants Most Concerned About Monthly Income in Retirement," Meaghan Kilroy, *Pensions & Investments*, March 6, 2018.

"The Fundamental Problem with Retirement Funds," P. Cairns, *Moneyweb*, April 3, 2018. (South Africa)

"Alexander Forbes Clarity,” Alexander Forbes Group Holdings Limited. (South Africa, browse)

"QSuper's Permanent Revolution," David Rowley, *top1000funds.com*, May 9, 2014.

"Redefining DC Plans for the Future: Top 10 Updates to Our DC Vocabulary for 2018," WillisTowerWatson, 2017.

Background References

"Mercer Suggests Top Priorities for DC Plan Sponsors in 2018," R. Moore , *Administration | PlanSponsor.com*, December 18, 2017.

"It's the Income, Stupid," J. Greenwood, *Money Marketing,* August 17, 2013.

"California on Verge of Creating Retirement Plan for Private-Sector Workers," K. Pender, *San Francisco Chronicle*, March 9, 2018.

"Nobel Prize Winner to Pension Funds: Simplify!" P. Cairns, *Moneyweb*, July 24, 2015. (South Africa)

When will you retire? Reality may not match expectations

Nobody can predict the future. At the same time, people typically focus on the now, making future retirement an abstract concept.

Some may retire later than they expect, with fewer years left in which to support themselves. Others may retire earlier, before they've saved enough. Reasons might include poor health, age discrimination or a weak labour market.

In our study, the mean expected age of retirement in Europe is 63.4.

According to Prudential's "Planning your Retirement: Expect the Unexpected" 2018 report, just 23% of early retirees in the USA chose to do this; 46% were forced to retire due to health problems. Retiring just five years early can reduce retirement income by 36%, the Prudential report says.

ING Poland economist Karol Pogorzelski notes a pattern to the chart's camel-like humps, with single dromedary-type humps reflecting a single retirement age for both sexes. Twin (Bactrian camel) humps are countries with different retirement ages for men and women.

The more ambiguous or multiple-hump pattern reflects countries in transition from this situation to a single official age of retirement.

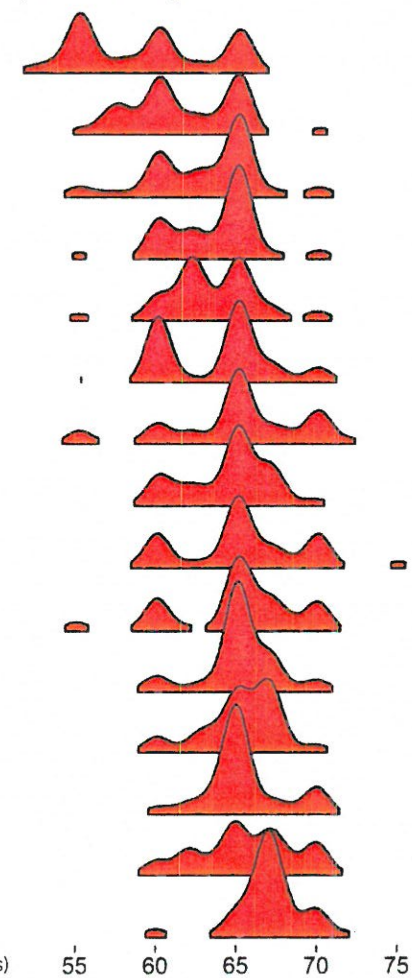
"Like the three humps in Turkey, UK, Germany and Italy. One reason is because the retirement age is becoming unisex in some places; the other is when many retire early," he says. "The general lesson would be that people's expectations about their retirement are adapting to the regulatory possibilities."

The question

At what age do you expect to retire?

Orange area denotes individual replies around expected retirement age. These were averaged and compared with the average actual (real) ages at retirement reported in OECD Pensions at a Glance 2017 statistics.

Expected retirement age; orange area = all individual answers; peaks = most frequent (ING)



	Average expected age at retirement (ING)	Years from actual average age of retirement (OECD)
Turkey	57.6	-8.6
Luxembourg	61.3	0.3
Romania	62.2	-1
Austria	63.1	1.8
France	63.1	3
Poland	63.4	2.1
USA	64.2	-1.8
Belgium	64.2	3.7
Australia	64.4	0.1
United Kingdom	64.7	0.8
Spain	64.8	2.4
Germany	65	1.8
Czech Republic	65.5	3.8
Italy	66.1	4.4
Netherlands	66.9	4

Many fear they won't be able to afford to retire

As the chart shows, 61% of Europeans who have not yet retired worry about having enough money in retirement. The shares are highest in Spain, France, and Poland.

In our full dataset, those who say they are "uncomfortable" (80%) or "very uncomfortable" (86%) with the amount they have in savings today are the most likely to agree with the statement.

Women are also more likely to agree (66%) that they worry about this than men (56%).

Across the age brackets, shares are relatively low at age 18-24 (57%), peaking around age 25-34 (64%) and tapering off to 45% by age 65+.

We also explore attitudes towards the role any long-term assets might have in funding retirement.

In Europe, 35% of those with long-term assets reply "I do not consider these part of (funding) my retirement" while 27% say simply "I do not have these".

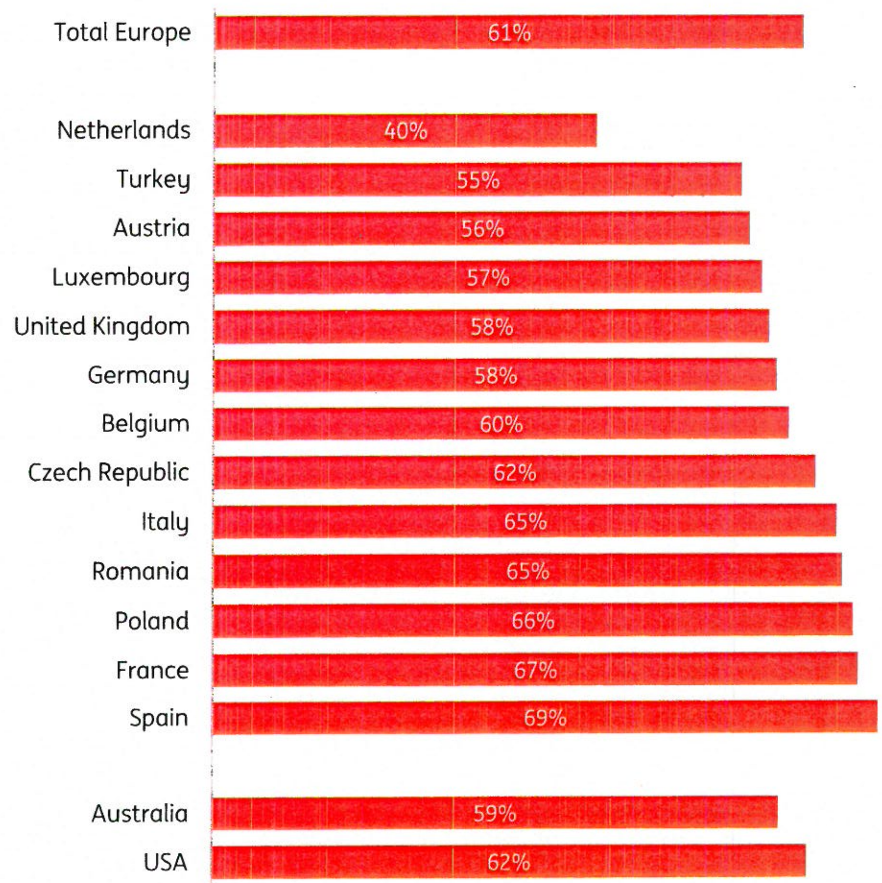
Will many pass on an inheritance?

Of Europeans who have not yet retired, 38% tell us they expect to pass on an inheritance, with the shares highest in Poland (61%) and Luxembourg (56%). Males (42%) are more likely to say this than females (34%) as well as those who say they're "very comfortable" (57%) or "comfortable" (51%) with the amount they've saved.

The question

"I worry about whether I will have enough money in retirement."

Shares of the not yet retired who reply "agree" or "strongly agree". Other possible answers were "neither agree nor disagree", "disagree", "strongly disagree" or "I don't know".



Sample size: 11,948

Will you enjoy the same living standard once retired?

Nearly two in five not-yet-retired Europeans don't expect to enjoy the same standard of living when they retire that they have today.

The already-retired in our survey are a small sub-group. But half of the people in this group confirm they don't have the same standard of living they did when working.

For most who say this, the assumption is that their living standards have declined. Some may have seen their living standards rise.

France shows the largest gap between expectations of those not-yet-retired and the experience of current retirees.

Our full data set shows that unretired European males (30%) are more likely to express optimism about their eventual standard of living in retirement than females (23%).

Across the not-yet-retired age brackets, expectations of achieving a roughly similar lifestyle as a pensioner are highest among the 65+ bracket (39%).

This group is nearest to the retirement age and presumably better able to accurately analyse their likely situation, are already adjusting, or have this front of mind.

Among younger age brackets (31% of 18-24s; 28% of 25-34s; 26% of 35-44s; 22% of 45-54s) decreasing shares of Europeans expect to have the same standard of living once retired. However, the share rises again around age 55-64 (25%), hitting 39% among the 65+ group.

The question

"In retirement I enjoy the same standard of living I had when working / expect to enjoy the same living standard as today"

Shares who "disagree" or "strongly disagree" per country. Other possible answers are "strongly agree", "agree", "neither agree nor disagree", and "I don't know".

Sample size: 2,747 (Retired) 11,948 (Not yet retired)

What is a Good Retirement Goal?

"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 Components of a Sustainable Integrated Approach to Funding Retirement

1. Pillar 0/I Social Security/defined-benefit(DB) employer pension plan

   Highest expected return for risk; cost efficient

2. Pillar II defined-contribution (DC) employer pension plan

   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

Six Components of a Sustainable Integrated Approach to Funding Retirement (continued)

4. **Provide more benefits from assets available 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 employment 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

Key DC Design Principles to Achieve a Good Retirement

1. Set **replacement income** as the goal for retirement
2. Address risks relevant to the goal: **income shortfall**, not return volatility
3. Deliver an asset allocation strategy to manage **retirement income risk**
4. Make efficient use of all **dedicated retirement assets**
5. Offer **personalization** based on one's retirement account characteristics
6. Take account of changes in both **market and personal** circumstances
7. **Be effective** even for those who are **completely unengaged**
8. Supply **only meaningful information** and offer **actionable choices** to improve outlook
9. Offer **robust, scalable and low cost** investment strategies
10. Offer **seamless transition** and **payout flexibility at retirement**

Pillar II DC: Key Retirement Income Principle

DC Plans Today Display Only Account Balance-- Most individuals have **no way** to relate a current 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

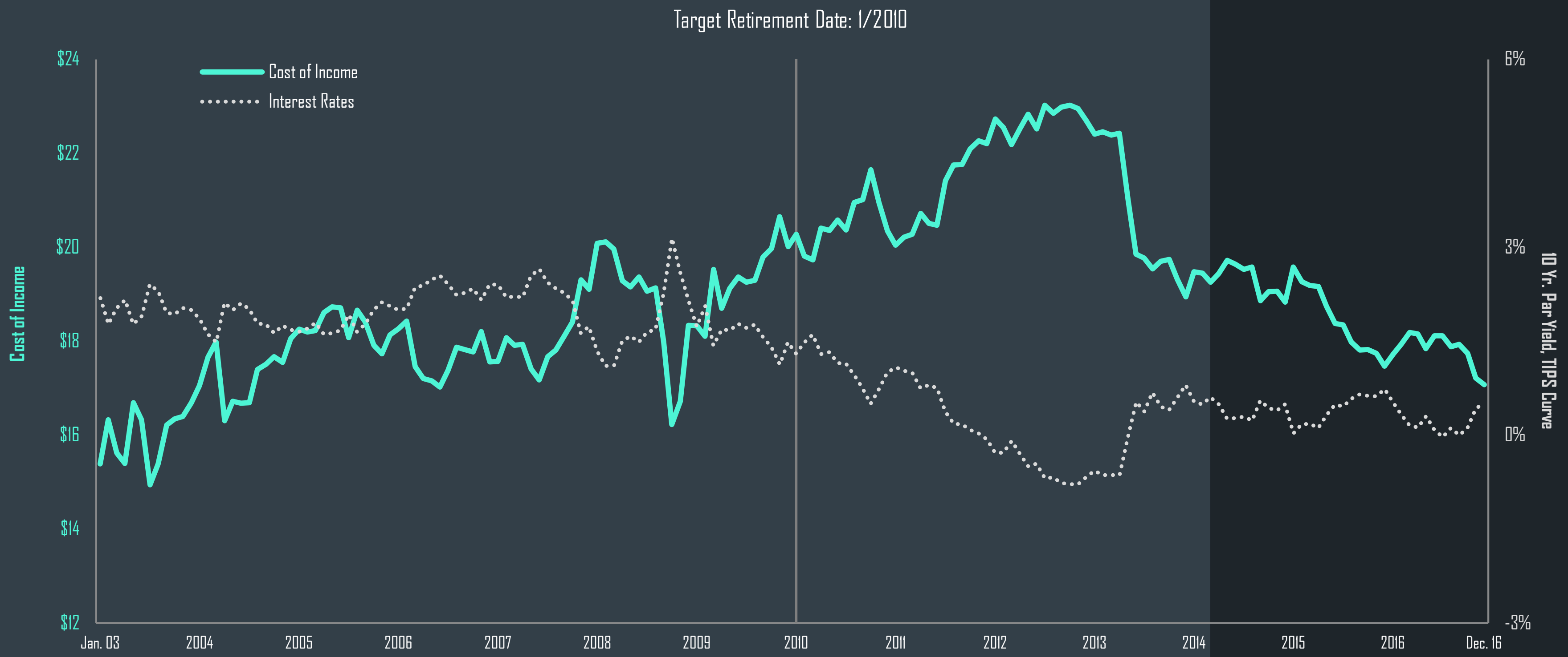
$55,000
Real Income

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…

From Wealth to Income—Income Risk is Material

S&P STRIDE: The cost of Income Overtime



Cost of Income data from S&P Dow Jones Indices. See "S&P STRIDE Index Series Description and Disclosures" and "S&P Stride Index Series Hypothetical Performance Disclosure" in Appendix. Interest rates represented by the 10-year par yield published by the Federal Reserve System, statistical release H15.

Retirement Income vs Wealth Accumulation Risk

Age now	Decline in Retirement Income (Funded Ratio) Between Highest Rate and Lowest Rate Dec 2003-Oct 2020
65	**-38%**
60	**-50%**
55	**-59%**
50	**-67%**

Large impact from interest rate changes

US TIPS 10-year rates ranged between -1.1% to 3.1%
(Dec 2003-Oct 2020)

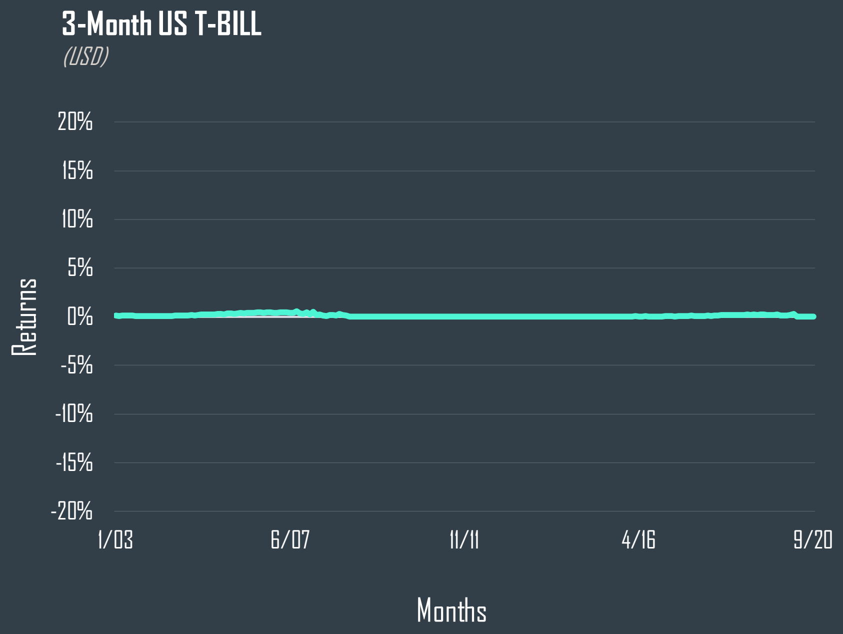
Lower rates raises the cost of life income benefit

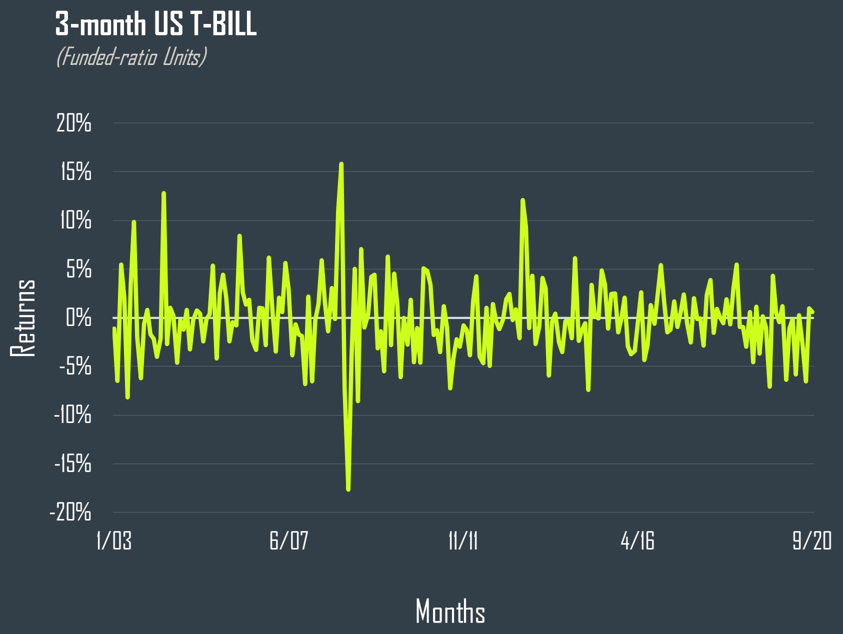
As cost rises, the funded ratio falls

To estimate the decline in retirement income we first compute the cost of income based on the maximum and minimum 10-year US TIPS rates over the Dec 2003 to October 2020 time period. Cost of income is calculated by assuming 25 years of $1 cash flows per year from age 65 (retirement age) to 90, discounted to present value by the 10-year US TIPS rate. Based on the computed cost of income, we estimate how much retirement income $1 today can provide ($1 over the estimated cost of income). The decline in retirement income is the percentage change in retirement income between the estimate based on the maximum and minimum 10-year US TIPS rate.

Wealth Goal vs Retirement Income Goal

The correct risk-free asset is critical, given the goal. **If you do not measure risk correctly, you cannot manage risk correctly**





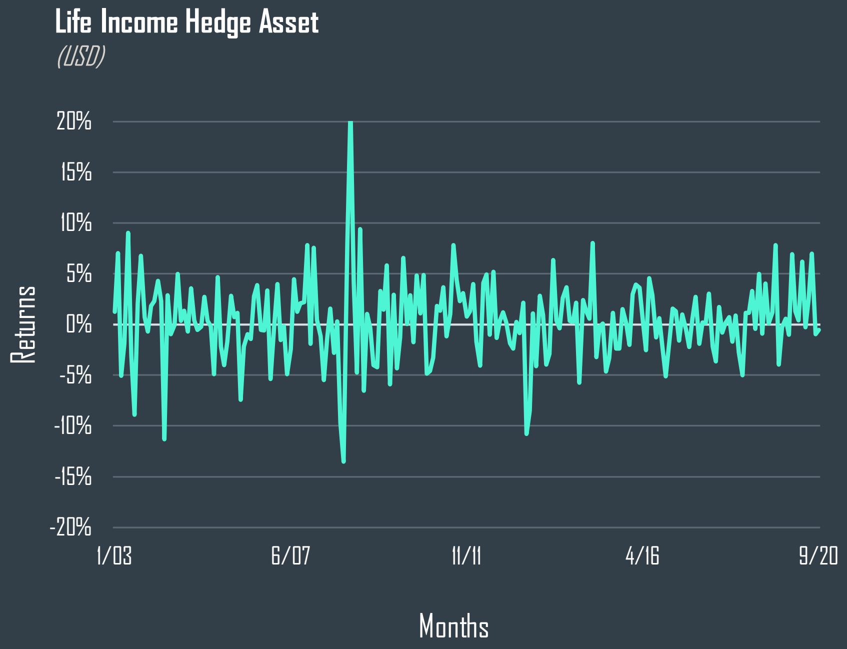
The volatility of US T-bills is **minimum risk** when looking at it as an **asset value**

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

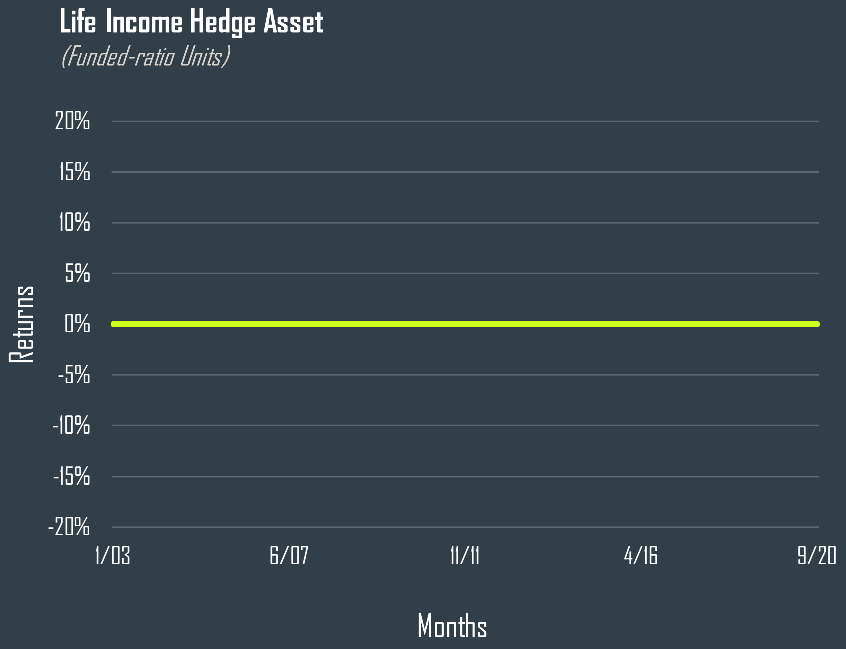
Income returns are calculated as the month-over-month percent difference of 25 years of $1 cash flows, deferred for 10 years when currently holding 3-month T-bills. Computed using the U.S. TIPS yield curve.

Retirement Income Goal Needs Different Risk Measure

Using the correct risk free asset is critical. **If you do not measure risk correctly, you cannot manage risk correctly**



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



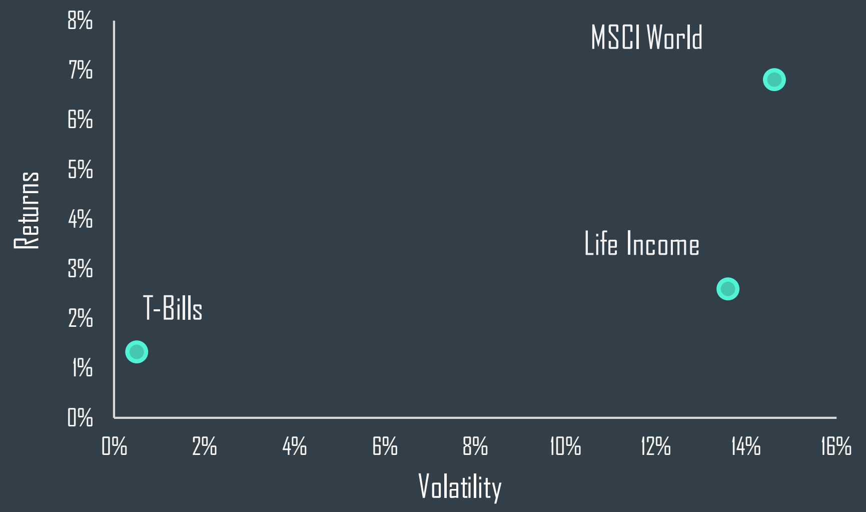
The volatility of life-income hedge price is **minimum risk** when measured in terms of **income**

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.

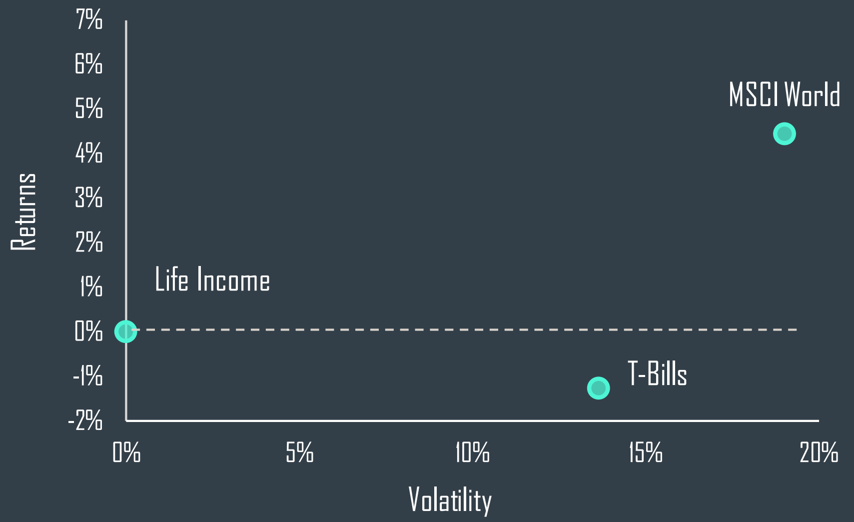
Risk & Return: Wealth Goal vs Income Goal

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"

Average returns/standard deviation are the annualized equally weighted monthly returns/standard deviation from 1/2003 to 9/2020.

Pillar II DC: Good News for Participants--2019 U.S. SECURE Act Requirement to Show Retirement Income from DC Plan Balance -- 5 Ways to Make the 2019 SECURE Act Meet Participant's Needs

1. Account balances should be converted into monthly income estimates.

2. Participants should know how much of their pre-retirement income will be replaced in retirement.

3. Current market bond yields should be used to calculate annual payouts.

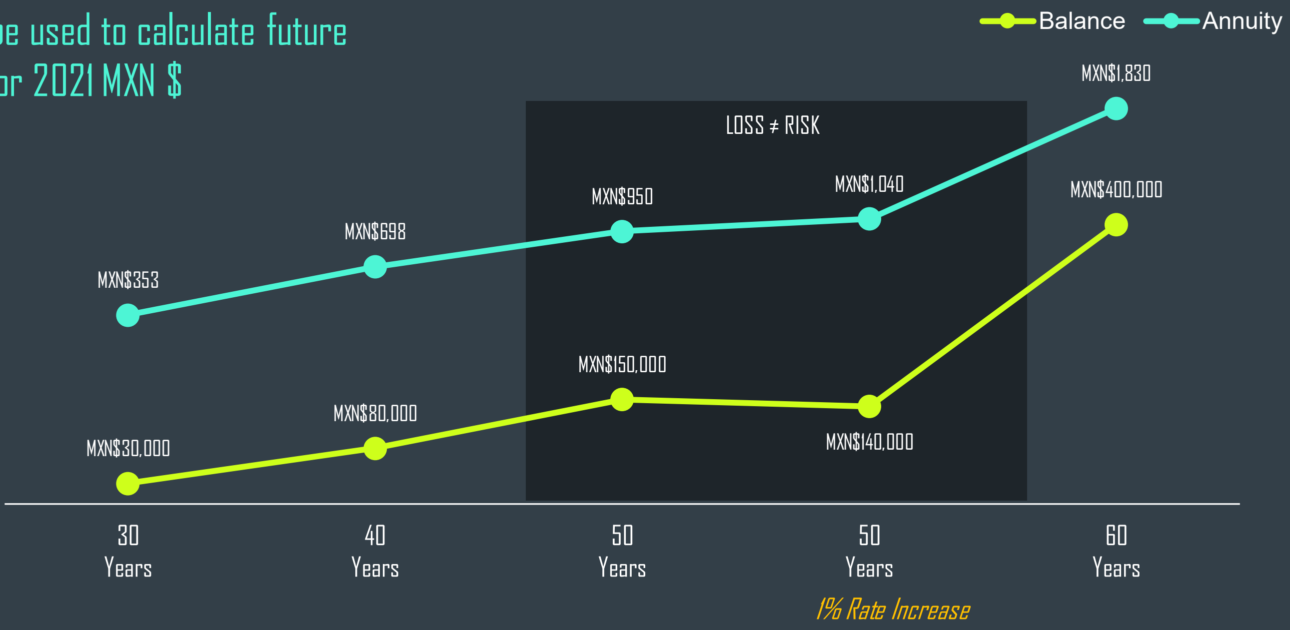
4. Future income numbers should be presented in current 2020 prices.

5. To account for uncertainty, plan participants should be provided with a range of potential outcomes

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

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

Current market bond yields should be used to calculate future annual payout in current 2021 US $ or 2021 MXN $



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

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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 material innovations in designs and market distribution for high efficiency and effectiveness improvements

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

50th Percentile US Income Example Age 65 US government guaranteed HECM reverse mortgage

$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%

Social 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 Social Security DB employer pension	Provides liquidity & non-spousal bequest No longevity Protection Not guaranteed	Targeted increase in income starting at specified future date in retirement Reason to Invest in risk asset	Deferred life annuity—purchase at retirement and payments start at age 85— "tail risk" longevity insurance