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A Smart Way to Develop Retirement Income Strategies

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How can actuaries apply their expertise and methods to help workers retire in a world where traditional defined benefit (DB) pension plans are mostly a thing of the past? I've been pondering this question throughout my encore career as a retirement educator and researcher, following a 30-year career as a consulting actuary working in the private sector.

I believe the techniques actuaries use to help large DB plans devise funding and investment strategies could also be used to develop viable retirement income strategies that could be implemented in individual retirement accounts and 401(k) plans. I've had the opportunity to test my belief on a recent collaboration between the Stanford Center on Longevity (SCL) and the Society of Actuaries (SOA). The research team included myself; another actuary, Joe Tomlinson, FSA; and retirement researcher Wade Pfau, Ph.D.

This project applies modern portfolio theory to the retirement, or decumulation, phase to help sort out the many retirement planning tradeoffs necessary to navigate the diverse landscape of retirement income solutions.

For details on how older workers and employers can use the strategy outlined in this essay, see these accompanying pieces:

- “Smart Decisions Older Workers Can Make for Retirement”
- “Smart Steps Employers Can Take to Help Older Workers Transition into Retirement”

The full report¹ contains details on the analyses and conclusions in this group of essays; other results, graphs and tables that present our analyses; and details on our assumptions and methods.

Let's first look at these tradeoffs and landscape, then we'll summarize our analyses and their results.

Retirement Planning Involves Tradeoffs

Choosing a specific solution that will help workers generate retirement income requires them to make informed tradeoffs between potentially competing goals:

- Maximizing lifetime income
- Providing access to savings (liquidity)
- Planning for bequests
- Minimizing implementation complexity and costs
- Minimizing income taxes
- Protecting against common risks, such as
 - Longevity
 - Inflation
 - Investment volatility
 - Death of their spouse
 - Cognitive decline and mistakes
 - Fraud
 - Political/regulatory issues (changes in laws or regulations on retirement plans or Social Security, or the taxation of these benefits)

It should surprise no one that the average American worker isn't adequately trained to make informed decisions regarding retirement income strategies that effectively balance these goals. And while there's no perfect retirement income generator (RIG) that meets all these goals, one comes close, as we'll see.

The Retirement Income Landscape

There are many viable retirement income generators, each with their own advantages and disadvantages:

- Social Security
- Pensions
- Investing savings and using a systematic withdrawal plan (SWP) to generate a retirement paycheck
- A guaranteed lifetime annuity from an insurance company (think of this as akin to a personal pension)

1 Wade Pfau, Joe Tomlinson and Steve Vernon, *Optimizing Retirement Income by Integrating Retirement Plans, IRAs, and Home Equity: A Framework for Evaluating Retirement Income Decisions* (Stanford, CA: Stanford Center on Longevity/Society of Actuaries, November 2017), <http://longevity.stanford.edu/2017/11/29/optimizing-retirement-income-by-integrating-retirement-plans-iras-and-home-equity-a-framework-for-evaluating-retirement-income-decisions/>.

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- Working
- Real estate rental income or income from a business
- A reverse mortgage

It's important to realize that each of these RIGs produces a different amount of retirement income. In addition, the advantages and disadvantages of some RIGs tend to complement others, which is one reason retirees should diversify their sources of retirement income to satisfy their unique goals and circumstances.

A Systematic Comparison of Retirement Income Strategies

Many analyses of retirement strategies contain significant limitations. For example, they might:

- Analyze only a few retirement income strategies, perhaps limiting the analysis to solutions their financial institution offers
- Analyze solutions to deploy retirement savings in isolation, without considering how the solution interacts with valuable Social Security benefits
- Not address the various goals that might be important to older workers and the tradeoffs these workers face

To address these limitations, the SCL/SOA project examined 292 retirement income strategies, including various combinations of:

- Starting Social Security at age 65
- Starting Social Security at age 70
- Single premium immediate annuities (SPIA)
- Systematic withdrawal plans, including the IRS required minimum distribution (RMD)
- Guaranteed lifetime withdrawal benefits (GLWB)
- Fixed index annuities (FIA)
- SPIA/SWP combinations
- FIA/SWP combinations
- Tenure payment from a reverse mortgage

For three hypothetical retirees, we prepared the following analyses:

- Stochastic forecasts of income and accessible wealth (liquidity) throughout retirement for each retirement solution
- An efficient frontier that compares the tradeoff between expected amount of income and liquidity for the solutions we analyzed

- Patterns of income during the retirement period to determine if income is expected to keep up with inflation and to estimate the potential volatility

Stochastic forecasts and efficient frontiers are analytical techniques that many large pension plans use to devise funding and investment strategies.

Our economic assumptions reflect the low-interest environment prevalent in 2017. We compared high-performing and low-performing solutions to illustrate the impact of net investment performance and institutional vs. retail pricing on retirement outcomes. For the cost of annuities, we used actual annuity purchase rates prevalent at the beginning of 2017.

Figure 1 shows one example from our efficient frontier analyses for a hypothetical 65-year-old single female with \$250,000 in retirement savings. Each symbol represents a retirement income strategy for our subject.

Figure 1 Retirement Income Frontier



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We used these efficient frontier analyses to narrow the number of solutions—from 292 to 21—that we examined in more detail, as discussed next.

The Retirement Income Dashboard

To help retirees and their advisers make informed tradeoffs regarding the potentially competing goals described previously, we developed eight metrics to help retirees and planners compare different retirement income solutions:

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1. Average annual real retirement income expected during retirement
2. Increase or decrease in real income expected during retirement (inflation protection)
3. Average accessible wealth expected throughout retirement (liquidity)
4. Rate that wealth is spent down
5. Average bequest expected upon death
6. Downside volatility (the estimated magnitude of potential future reductions in income)
7. Probability of shortfall relative to a specified minimum threshold of income
8. Magnitude of shortfall

We used these metrics to prepare detailed comparisons of the 21 retirement income solutions. For these solutions, we created a dashboard to compare the results of our analyses. Figure 2 shows one dashboard example from our report for a married couple, each age 65, with \$400,000 in retirement savings.

Social Security is Close to the Perfect Retirement Income Generator

Our analyses demonstrate that Social Security meets more retirement planning goals than any other RIG:

- It helps maximize the amount of expected retirement income through a thoughtful optimization strategy
- It helps minimize taxes by excluding part or all of income from taxation
- It protects against most common risks, such as
 - Longevity
 - Inflation
 - Investment volatility
 - Death of a spouse through the survivor's benefit
 - Cognitive decline and mistakes
 - Fraud
- It's simple to implement and there are no transaction costs

As such, it makes sense for workers to maximize the value of this important benefit, usually by delaying the start of benefits for the primary wage-earner. The optimal strategy for a married couple often depends on their specific circumstances, so it may be desirable to use commonly available software or consult a financial adviser who specializes in Social Security optimization.

Many reputable researchers have confirmed the general advantages of delaying Social Security.² These studies typically scrutinize Social Security benefits in isolation without considering income from other sources. By using a total retirement portfolio approach, including income generated by savings, our analyses amplify the importance of these researchers' findings.

Our analyses show that for many middle-income retirees (those with between \$100,000 and \$1 million in savings), Social Security benefits will represent one-half to two-thirds of total retirement income if workers start Social Security at age 65, and from three-fourths to more than 85% of total retirement income if they optimize Social Security by delaying until age 70.

As a result, for many middle-income retirees, the total retirement income portfolio reflects the desirable features of Social Security. In other words, if Social Security benefits represent 80% of the total retirement income portfolio, then at least 80% of the total portfolio will enjoy Social Security's advantages. In this case, *Social Security may be the only annuity income that many middle-income retirees will need*, given Social Security's dominance of their total retirement income portfolio.

Figure 3 provides an example of our analyses showing the portion of total retirement income represented by Social Security for the 65-year-old married couple with \$400,000 in savings for various retirement income solutions. For various retirement income solutions, Social Security (the nongray portion of each graph) delivers 60% to 86% of the total retirement income.

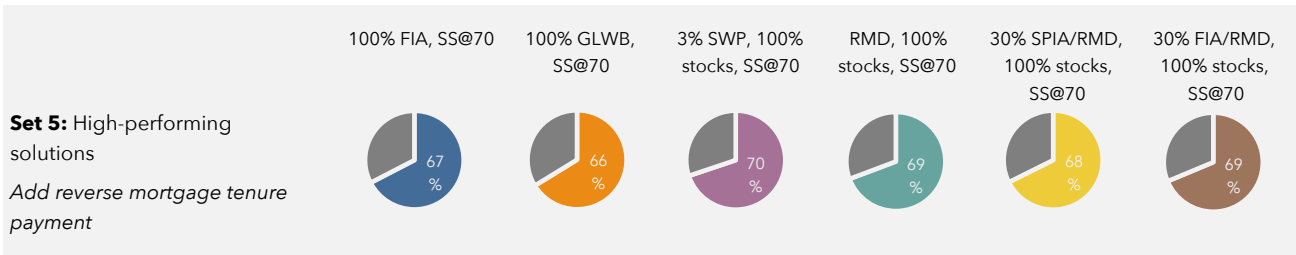
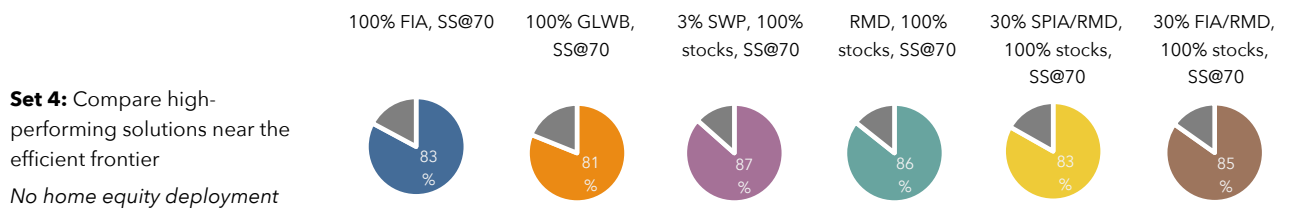
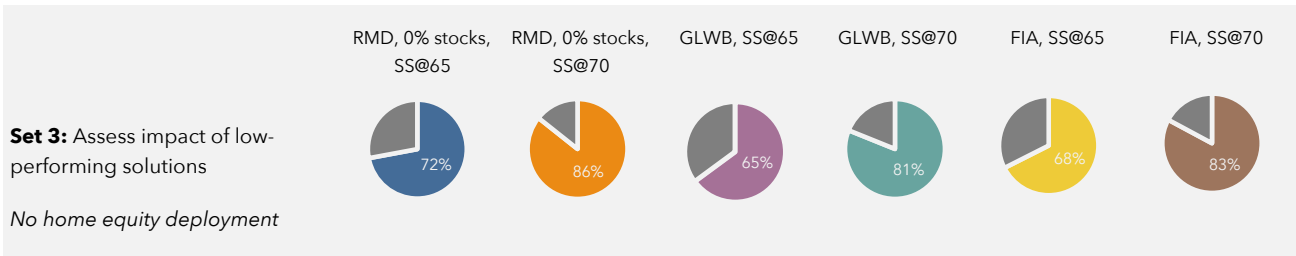
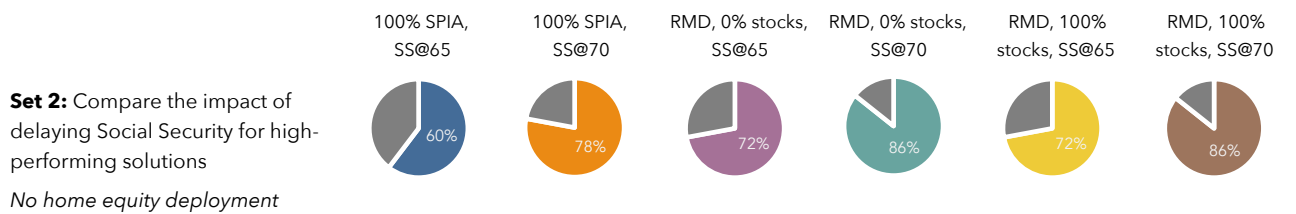
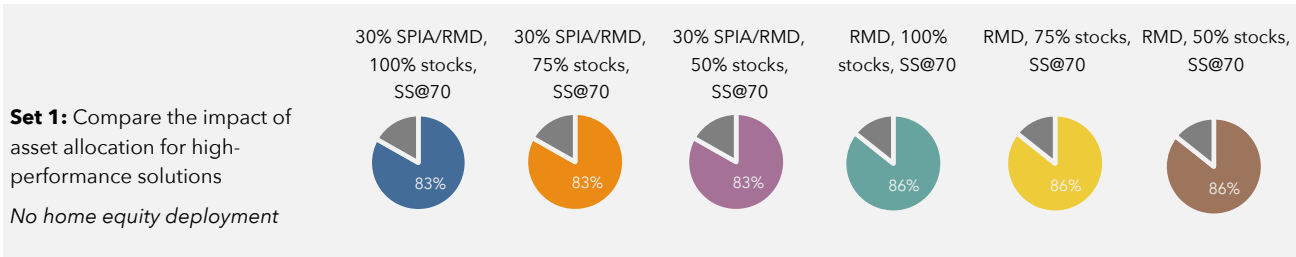
2 Wade Pfau, *When Should You Claim Social Security* (McLean, VA: Retirement Researcher, 2015); William F. Sharpe, *Retirement Income Scenario Matrices* (Stanford, CA: Stanford University, 2017), <https://web.stanford.edu/~wfsarpe/RISMAT/>; John Shoven and Sita Slavov, "The Decision to Delay Social Security Benefits: Theory and Evidence," National Bureau of Economic Research working paper no. 17866 (February 2012), <http://www.nber.org/papers/w17866>; James Mahaney, "Innovative Strategies to Help Maximize Social Security Benefits," Prudential research, updated 2017 edition, <http://research.prudential.com/documents/rp/InnovativeSocialSecurityNov2012.pdf?doc=innovativestrategies1112&bu=ret&ref=PDF&cid=MEP>; Laurence J. Kotlikoff, Phillip Moeller and Paul Selman, *Get What's Yours: The Secrets to Maxing Out Your Social Security* (New York, NY: Simon & Schuster, 2016).

Figure 2 Retirement Income Dashboard: No Deployment of Home Equity



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Figure 3 Retirement Income Dashboard: Percent of Initial Retirement Income Provided by Social Security



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Pessimists might point out that Social Security is subject to political risk; our leaders can change the amount of benefits paid to current retirees or older workers, possibly making significant reductions. When deciding on a Social Security claiming strategy, older workers must weigh this risk against Social Security's other desirable features.

Introducing the Spend Safely in Retirement Strategy

Our analyses identified a straightforward strategy that produces a reasonable tradeoff among various goals for middle-income retirees. This strategy delays Social Security until age 70 for the primary wage-earner and uses the IRS required minimum distribution to calculate income from savings. We call this the “Spend Safely in Retirement Strategy.”

The best way for an older worker to implement this strategy is to work just enough to pay for living expenses until age 70 to enable delaying Social Security benefits. To make this method work, retirees may also need to significantly reduce their living expenses.

If a worker isn't willing or able to delay retirement, the next best way to implement the Spend Safely in Retirement Strategy is to use a portion of savings to enable delaying Social Security benefits as long as possible but no later than age 70. They would then invest their remaining savings and use the RMD to calculate the lifetime retirement income generated by their savings. While analyzing this latter approach, we assumed the worker retires at age 65 but uses a portion of savings to enable delaying Social Security until age 70.

With remaining savings (after optimizing Social Security), we assumed retirees would use the RMD to calculate retirement income, starting at age 65. The IRS rules dictate the minimum withdrawal starting at age 70 1/2; at that age, the account balance in taxable retirement accounts (such as traditional IRAs and 401(k) accounts) is divided by the participant's life expectancy to determine the minimum required withdrawal amount for the coming year. The RMD requires this amount be withdrawn from the account and included in taxable income for the year. Between ages 65 and 70, we assumed the retiree would withdraw 3.5% of the portfolio value at the beginning of each year.

The purpose of the RMD is for the federal government to capture taxable income from retirement accounts. It wasn't devised as a spend-down strategy, although our analyses show that it happens to meet common retirement planning goals. The RMD life expectancy tables can be translated into a series of withdrawal percentages, which are shown in the Appendix.

For married couples, the optimal strategy for claiming Social Security for the spouse who isn't the primary wage earner typically depends on individual circumstances. Often, the optimal strategy for this spouse calls for starting benefits somewhere between their full retirement age (FRA) and age 70. For our analyses of the 65-year-old married couple, we assumed the spouse who isn't the primary wage earner would start Social Security at age 66, their FRA.

The primary disadvantage of using savings to enable delaying Social Security benefits is that it can substantially reduce the amount of remaining assets and liquidity throughout retirement. This disadvantage must be weighed against the potential for permanently increased, guaranteed retirement income from a delay strategy.

Advantages of the Strategy

Our analyses show the Spend Safely in Retirement Strategy has many key advantages:

- It produces higher average total retirement income throughout retirement compared to most solutions we analyzed.
- The RMD portion automatically adjusts the withdrawal amounts to recognize investment gains or losses. Withdrawals are increased after years with favorable returns, and vice versa.
- It provides a lifetime income, no matter how long the participant lives. The RMD portion automatically adjusts the withdrawal each year for remaining life expectancy.
- It projects total income that increases moderately in real terms, while many other solutions aren't projected to keep up with inflation. The strategy produced projected real income increases of up to 10% during the retirement period.
- It produces a moderate level of accessible wealth for flexibility and the ability to make future changes as well as a higher accessible wealth compared

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to strategies that use annuities. It provides less accessible wealth than strategies that maximize flexibility, such as SWPs with low withdrawal rates and/or strategies that don't use savings to enable the delay of Social Security benefits.

- It provides a moderate level of bequests, for the same reasons.
- It produces low measures of downside volatility, with potential future annual reductions in spending typically well under 3%, which is hopefully a manageable amount.

The Spend Safely in Retirement Strategy has another significant advantage: It can be readily implemented from virtually any IRA or 401(k) plan without purchasing an annuity, something many retirees are reluctant to do and many 401(k) plans don't want to offer. Many administrators can calculate the RMD and automatically pay it according to the frequency elected by the retiree.

Several analysts have studied the RMD as a drawdown strategy and have concluded it's a viable way to produce a stream of lifetime retirement income.³ These studies typically analyzed the RMD solution in isolation, without considering the value of Social Security benefits. Once again, by using a total retirement portfolio approach that includes Social Security income, our analyses amplify the importance of the analyses prepared by these researchers.

This project has given me a chance to apply my actuarial skills and expertise in new ways to help workers, employers and society at large.

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Appendix Withdrawal Percentages Under the IRS Required Minimum Distribution

Age	Distribution Period in Years	Minimum Payout Rate ¹
70	27.4	3.65%
71	26.5	3.77%
72	25.6	3.91%
73	24.7	4.05%
74	23.8	4.20%
75	22.9	4.37%
76	22.0	4.55%
77	21.2	4.72%
78	20.3	4.93%
79	19.5	5.13%
80	18.7	5.35%
81	17.9	5.59%
82	17.1	5.85%
83	16.3	6.13%
84	15.5	6.45%
85	14.8	6.76%
86	14.1	7.09%
87	13.4	7.46%
88	12.7	7.87%
89	12.0	8.33%
90	11.4	8.77%

1 Calculated from instructions at <https://www.irs.gov/retirement-plans/plan-participant-employee/retirement-topics-required-minimum-distributions-rmds> using data from

Notes:

The RMD table continues beyond age 90.

Use the account holder's age on their birthday during the calendar year.

If the account holder is married and their spouse is more than 10 years younger, a different table with payout rates that are lower than these rates applies.

3 Joe Tomlinson, "Coping with Sequence Risk: How Variable Withdrawal and Annuitization Improve Retirement Outcomes," *Advisor Perspectives*, Sept. 25, 2017, <https://www.advisorperspectives.com/articles/2017/09/25/coping-with-sequence-risk-how-variable-withdrawal-and-annuitization-improve-retirement-outcomes>; Wade Pfau, "Retirement Spending and Required Minimum Distributions," *Retirement Researcher*, Nov. 22, 2016, <https://retirementresearcher.com/retirement-spending-required-minimum-distributions/>; Wei Sun and Anthony Webb, "Can Retirees Base Wealth Withdrawals on the IRS' Required Minimum Distribution," Center for Retirement Research at Boston College issue brief no. 12-19 (October 2012), http://crr.bc.edu/wp-content/uploads/2012/10/IB_12-19-508.pdf; David Blanchett, Maciej Kowara and Peng Chen, "Optimal Withdrawal Strategy for Retirement Income Portfolios," *Morningstar Investment Management research paper*, May 22, 2012, <https://corporate.morningstar.com/US/documents/ResearchPapers/OptimalWithdrawalStrategyRetirementIncomePortfolios.pdf>.