Investing for Retirement: SPIAs, TIPS, Stocks and the 4% Rule

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Relying only on stocks and bonds to fund a decumulation strategy may no longer be feasible, given today's low interest rate environment and the prospect of muted returns from the equities market. Investors should instead consider using single-premium immediate annuities (SPIAs) to fund at least a portion of retirement needs.

The potential role of SPIAs has begun to get attention as numerous recent articles and blog posts have questioned the viability of the 4% rule for retirement withdrawals. For two contrasting views, Bill Bengen's article, "How Much is Enough," in the May *Financial Advisor* supports continued use of the 4% rule, perhaps with some investment strategy tweaks, while a blog post by Wade Pfau last month shows how failure rates could rise with lower future investment returns.

This article is certainly not the first research on full or partial use of annuities. A classic study was a 2001 paper by Ameriks, Veres, and Warshawsky, "Making Retirement Income Last a Lifetime," in the *Journal of Financial Planning*. (Note: the linked article is available only to members of the Financial Planning Association.) Moshe Milevsky and Peng Chen have also done work in this area in the past few years, including in chapters of two books by Milevsky – "Are You a Stock or a Bond?" and "Pensionize Your Nest Egg," which he co-authored with Alexandra Macqueen.

This article will examine the issues raised in these earlier studies, in light of the current investment environment. Before projecting outcomes for various SPIA strategies, I'll first propose a specific downside risk measure to use in the analysis, and also discuss how TIPS, which have been touted as a safe retirement investment, may come up short compared to SPIAs.

A better downside risk measure

Evaluating investment strategies for retirement involves balancing upside prospects – projected bequest values or the possibility of increased spending – against the downside risk of depleting savings while still alive. The most popular downside-risk measure is the probability of running out of money. Monte Carlo simulations are typically used to estimate the percentage of failures, given various retirement durations. However, this measure gives an incomplete picture of risk, because it doesn't address the magnitude of failure. For example, living to age 95 and running out of money at 75 is much worse than running out of money at 94½.

For this article I will use a different measure, which takes into account both the probability and magnitude of failure, which I will take a moment to explain briefly. To get my measure,

I ran Monte Carlo simulations and allowed both investment performance and longevity to be variable. For those cases in which savings run out before death, I calculated the equivalent of a "negative bequest" – the amount of outside funds from relatives, charities, or the government that would be necessary to continue withdrawals at the target level until death. For example, if an individual is withdrawing a level $20,000 per year, and runs out of money 5 years before death, the negative bequest is $100,000.

For a whole set of Monte Carlo simulations, I have calculated the average negative bequest among those cases where the portfolio fails. I then multiply the failure percentage by the average negative bequest to produce a measure that combines the likelihood of failure and the average magnitude. Going back to the example, a 20% chance of losing an average of $100,000 would be equivalent to a 10% chance of losing an average of $200,000. In the analysis that follows, I'll use this combined risk measure, but I will also show its components – probability of failure and average negative bequest in the event of failure – because the probability of failure is the more familiar risk measure for most planners.

TIPS versus SPIAs as "safe" investments

For most clients, the risk of running out of money weighs more heavily than being able to leave a bequest, so there is naturally an attraction to investments that protect the downside. TIPS have been touted as such an investment, but, unfortunately, with current low interest rates, the protection they offer has been eroded.

If we consider the classic 4% inflation-adjusted withdrawal rate, and assume TIPS yield their long-term historical average of 2.5%, an all-TIPS portfolio would last 40 years. However, current TIPS real yields are negative out to 16-year maturities, so a TIPS portfolio matching the duration of a retirement income stream would likely have a zero or slightly negative yield. At a zero yield, a TIPS portfolio would support 4% withdrawals for only 25 years. The life expectancy for a healthy 65-year-old male is about 20 years, and for a female it's about 22 years. For a couple, the expectation is that it will take about 30 years for both spouses to die. (All of these life expectancies are based on estimates I derived from Society of Actuaries data). Since about half the individuals or couples will outlive their life expectancies, TIPS are not currently well suited to supporting 4% inflation-adjusted withdrawals.

SPIAs offer a means to overcome the lack of longevity protection that TIPS currently provide. This is possible because of mortality pooling, where those who live to less than life expectancy subsidize those who live longer. For example, a 65-year-old female can currently buy an inflation-adjusted SPIA with a 4.31% payout rate, based on rates provided by Income Solutions.® For couples, the payout rate for 100% continuance to the survivor falls just short of 4%, but if payments are reduced by one-third at the first death, the payout rate is 4.08%. So even though TIPS no longer support a 4% withdrawal rate, SPIAs are worth considering as an alternative. There are negatives to consider, such as giving up

control of funds, but the upside is an inflation-adjusted stream of income that will last for life.

SPIAs and the 4% rule

Now I'll turn to the more general topic of funding retirement with various mixes of SPIAs, TIPS, and stocks, and I'll focus specifically on the viability of the 4% rule. The hypothetical client for this analysis will be a 65-year-old female with a life expectancy of 22 years. I'll assume that she has savings of $500,000 that she wishes to put toward withdrawals of $20,000 per year that will increase with inflation.

For investments, I've assumed that TIPS earn a zero percent rate, reflecting current market rates, with zero standard deviation achieved using laddering. For stocks, I've assumed a real rate of 4.8% (arithmetic) with 20% standard deviation. The 4.8% equity premium was also cited in Wade Pfau's May 26, 2012 blog posting, "Reality Check on Retirement Planning Assumptions," and it is based on the experience reported by Dimson, Marsh and Staunton for 19 developed countries between 1900 and 2010. This equity premium assumption is slightly lower than the average forecast from a group of investment experts assembled by the CFA Institute late last year and reported on by Laurence Siegel in the February 7, 2012 Advisor Perspectives article, "Jeremy Siegel, Rob Arnott, and Other Experts Forecast Equity Returns." However, there seems to be general agreement among experts that future returns will be lower than past returns.

The stock standard deviation is based on Ibbotson data for large company stocks from 1926-2011. I've deducted .15% from these returns for estimated investment expenses. The SPIA payout rate is assumed to be 4.31%, based on a quote from Income Solutions® as of May 31 for a 65-year-old female.

This chart shows outcomes for various investment and SPIA mixes, produced using Monte Carlo simulations for investment returns and variable mortality as well. The column labeled “SPIA Percent” refers to the portion of withdrawals that come from SPIA income. For example, if the individual is withdrawing an inflation-adjusted $20,000 per year (4% of the initial $500,000) and the SPIA Percent is 50%, this means that $10,000 of the $20,000 is coming from an inflation-adjusted SPIA, and the other half is withdrawals coming from the initial $500,000, reduced by the amount of funds used to purchase the SPIA. The stock and bond percentages refer to the allocation of the non-SPIA funds, which we assume to be rebalanced regularly to maintain the allocation percentages.

Comparison of Investment Strategies to Support Retirement Withdrawals
4% Inflation-Adjusted Withdrawal Rate, $500,000 Initial Investment

Strategy Number	Stock Percent	Bond Percent	SPIA Percent	Failure Probability	Average Loss if Failure	Loss times Probability (LxP)	Expected Bequest
1	100%	0%	0%	24%	$172,150	$41,700	$646,100
2	100%	0%	25%	23%	$130,050	$30,350	$476,150
3	100%	0%	50%	23%	$83,800	$19,050	$359,800
4	100%	0%	75%	17%	$39,300	$6,500	$219,950
5	100%	0%	100%	0%	$0	$0	$104,300
6	65%	35%	0%	19%	$137,850	$26,600	$335,950
6A	*65%*	*35%*	*0%*	*5%*	*$123,450*	*$6,173*	*$1,145,850*
7	35%	65%	0%	23%	$110,000	$26,150	$169,700
8	0%	100%	0%	43%	$115,900	$49,850	$52,100

There might be an immediate attraction to Strategy #6A, but, unfortunately, I don't view this one as currently feasible. It is based on historical performance, and I've included it to show the dramatic difference that my current assumptions make. For historical returns, Strategy #6A is based on Ibbotson data for 1926-2011, and assumed a 65% stock allocation, which is roughly in line with Bengen's recommendations in his original studies on the 4% rule.

Turning to the strategies based on current assumptions, the “Loss times Probability” column (LxP) provides a key performance measure, because it combines the failure probabilities and average losses in the event of failure. Note that, as we move from Strategy #1 to #5, the LxP measure decreases, meaning risk decreases as more of the portfolio is annuitized. If clients wish to consider partial or full annuitization, they will need to weigh bequest motivation versus the potential impact of running out of money. Strategies #1 to #5 also shows how failure probabilities alone can be misleading – these probabilities remain almost level until reaching 75% SPIAs, even though risks are reduced.

Strategy #5 involves spending $464,000 on an SPIA that pays an inflation-adjusted $20,000 per year (4.31% payout rate) and having $36,000 left over to invest. The SPIA fully provides for the baseline income need, so the probability of failure is zero.

This chart also shows how stock/SPIA mixes dominate stock/bond mixes when it comes to their performance. For example, Strategy #3 produces a higher expected bequest at a lower LxP than any of the stock/bond mixes in Strategies #6, #7, and #8. The SPIA can be thought of as a "turbo-charged" bond for retirement. If clients can overcome annuity

reluctance, they can improve financial outcomes by substituting SPIAs for bonds. Beside the investment allocations shown, I could also have examined mixes with all three types of investments. However, informal testing showed that such combinations do not perform as well as the mixes shown.

Strategy #8 shows how poorly an all-TIPS allocation performs, especially given my use of variable mortality. At a 4% withdrawal rate, an all-TIPS portfolio will last about 25 years. If I had used a fixed 22-year life expectancy, this strategy would have shown 100% success. However, using variable mortality shows the more realistic expectation that the strategy will fail more than 40% of the time.

Conclusion

Based on historical returns, retirees could have funded retirement with regular stock and bond investments, which would have supported taking 4% inflation-adjusted withdrawals. However, when we update the return data to consider the current interest rate environment and incorporate lower future stock returns, a bleaker picture emerges. To make the 4% rule work prospectively, it may be necessary to include products like SPIAs that provide longevity guarantees.