
A Hydrologist's View of Cash Flows in Retirement

By Kerry Pechter Thu, Jul 7, 2016

John Walton, a professor at the University of Texas at El Paso, has combined his knowledge of water with his personal curiosity about retirement income to create a "framework" for comparing safe withdrawal rates from a balanced portfolio.

Calculations of “safe withdrawal rates” from retirement portfolios often feel like exercises in false precision. Their assumptions are, well, assumptions. Historical performance, the basis for testing withdrawal rates, has limited value. And clients don't necessarily follow the financial diets that advisors cook up for them.

Yet an advisor arguably must take a position on withdrawal rates, if only to answer the retiree's inevitable question: “How much can I afford to spend every year?” While the traditional answer—4% of savings, adjusted for inflation—still serves as a starting point, advisors and academics keep trying to improve on it.

Writing in this week's issue of [Advisor Perspectives](#), John Walton (below right), a hydrologist and chemical engineer at the University of Texas at El Paso, shares the history of his personal search for a withdrawal rate that can deliver what he and everybody else naturally wants: the most income with the least risk of running out of money.

Three broad classes

Walton compares three broad classes of withdrawal rates: *constant rate* methods (e.g., variations on the 4% rule), *mortality methods* (which use life expectancy as a guide to spending), and *mortgage methods*, which “increase withdrawal rates over time based on a maximum lifetime rather than expected lifetime.” He divides each class into sub-classes, and tests their effectiveness in good, bad and median markets.



The best withdrawal methods, he finds, are the constant-rate and mortgage methods. The

mortality-based methods, for reasons described below, are in his opinion inferior. Both the constant rate and the mortgage rate can be improved by “tilting,” Walton says. By that he means tweaking the withdrawal rate up or down in response to portfolio returns. (Walton also discussed tilting in a May 17, 2016 Advisor Perspectives [column](#).)

ISO the optimal withdrawal rate

Walton compares nine different withdrawal methods:

- Four versions of the constant rate (4%) method, using four different degrees of tilt—zero tilt, which means spending 4% of current account balance each year; +1, which means spending 4% of the original principal every year; -1/3 tilt (slightly favoring higher income over capital preservation); +1/3 tilt (slightly favoring capital preservation over higher income).
- Three mortality-based methods: (1/the number of years of remaining life expectancy plus seven years); the IRS Required Minimum Distribution withdrawal rates; or an average of expected and maximum longevity.
- Two “mortgage methods;” one is based on tilting the withdrawal rate back each year toward the payout from a fixed-term annuity based on a maximum life expectancy. In the other, the rising withdrawal rate is “analogous to the fraction of a mortgage payment going to principal.”

Walton uses Monte Carlo simulations to approximate the likely performance of each withdrawal method. He uses a single female life expectancy as a compromise between single male and couple's life expectancies. As the investment, he assumes an 80%/20% stock/bond portfolio.

And the winners are...

Walton dismissed three of the methods—constant dollar amount, the IRS/RMD percentage, and the 1/life expectancy-plus-seven-years method—as too risky for the average person. He also disqualified the three mortality-based methods on the grounds that they shifted spending toward the later ages, when most people actually tend to spend less, and because they suffer from “the subtle error of applying concepts that work only for groups to the isolated individual.”

The most successful methods in Walton's study, as far as achieving the best balance between income and final capital under moderate market conditions, were the two mortgage-based methods and the two constant rate methods with a modest (plus or minus 1/3) tilt. “They eliminate sequence-of-returns risk and minimize longevity risk,” Walton

writes. Sequence risk, of course, refers to the losses associated with having to sell depressed assets for income during a downturn; longevity risk refers to the risk of running uncomfortably low on savings during one's lifetime.

"Tilting" without windmills

The concept and calculation of tilt seems to be the Walton's main contribution to withdrawal rate science. As noted above, the tilt factor can range from minus one (-1), which means spending exactly 4% of the original savings each year, to zero (which means withdrawing exactly 4% of the account balance each year) to infinity, which means using the portfolio return as the withdrawal rate.

The appropriate tilt is calculated "by taking a ratio of current capital divided by the capital that would keep the client on track and then raising the ratio by an exponent. A positive exponent preserves capital at the expense of income stability, and a negative exponent preserves income at the expense of capital," Walton writes.

The tilt, in short, defines the degree of income volatility that the retiree is willing to accept. A tilt factor can be applied to any of the three withdrawal methods—constant rate, mortality, and mortgage. All of Walton's calculations are based on real dollars, so inflation is considered implicitly.

Add a SPIA?

Choosing the best withdrawal rate method is never easy, Walton concedes, because different clients have different risk tolerances, different personal goals and legacy ambitions, different tolerances for income fluctuations, and different tendencies toward longer or shorter lifespans.

Walton notes in the article that annuities are preferable to bonds in a retirement portfolio, and promises to explore the benefits of adding an annuity to the income strategy in a future article. That article, he writes, "will illustrate how different amounts of tilt and single premium immediate annuity (SPIA) can be used to place clients anywhere desired along the capital preservation versus income stability continuum."

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