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Risk infuses everything we do so it goes almost without saying (but I'll say it anyway) that risk and retirement are highly intertwined topics. If we define what retirement researchers and practitioners do as illuminating and improving lifetime financial security, then risk is at its heart. How can we improve the chances of good outcomes while accounting for, or more hopefully controlling for, the risk of poor outcomes?

With respect to investments, mortality, and retirement income, we are in the debt, of course, of those who came before us. Peter Bernstein went so far as to tell us that “The revolutionary idea that defines the boundary between modern times and past is the mastery of risk: the notion that the future is more than a whim of the gods and that men and women are not just passive before nature.” The writings of Markowitz, Merton–Black–Scholes, and actuarial science, among many others, on risk essentially transformed and even created industries, while teaching us that financial security cannot not be achieved without managing risk.

The good news is that our thinking has progressed. The twin notions that return cannot be understood without risk and that risk can be defined as volatility, were fundamental insights that made it possible to create solutions that responded to expressions of investment needs. Among many other insights, we could also point out the legacy of seeing risk, not as a discrete phenomenon, but as operating in continuous time. Standing on these giant shoulders, others have investigated the implications of partial volatility, long-term risk, multiperiod risk, downside risk, tail risk, event risk, passage risk, loss, and even rational versus nonrational risk perception, to name just a few efforts to evaluate risk in the way that people really experience it. Tool development—experiments, computing power, databases and models, such as dynamic programming—has also enabled improvements in theory and in practice.

Why remind us of this legacy? The answer is that in reading the first of the articles in this issue of *The Journal of Retirement*—“What Investment Risk Means to You, Illustrated: *Strategic Asset Allocation, the Budget Constraint, and the Volatility of Spending during Retirement*” (Waring and Siegel)—I began by seeing it as a simple review of what we know about risk in relation to retirement. But then, as the authors peeled back successive layers, they went deeper into the problem to get at some of the compromises we often make when we concoct retirement allocations and solutions. They point out the dangers of traditional, but commonly used approaches to incorporating risk into these solutions.

As just one example, they light upon the “4% rule,” which as we know says that taking a retirement income each year equal to about four percent of a person’s initial wealth has a good chance of being able

to sustain itself to a ripe old age. It should surprise no one that this rule is sometimes helpful, but imperfect. Even with the original assumptions about retirement age, length of retirement, asset allocation, and returns (for example, in today's environment, return assumptions may need to be modified downward), there is a non-trivial chance of running out of money before age 95. And if we account for lengthening lifespans and tail risk, especially in the first few years of retirement, the rule gets dicier. But the authors don't stop there. They show that by locking in a dollar income amount, the 4% rule actually increases risk in comparison to other, more dynamic withdrawal strategies, including the authors' own annually recalculated virtual annuity (ARVA) approach, which each year in retirement essentially starts over again with an income recalibration that takes into account remaining assets and life expectancy.

Too often, in evaluating options and developing solutions, we leave out risk or, for sake of ease, use rules of thumb or simplistic definitions. Waring and Siegel advance our understanding and the practical use of risk in service of retirement solutions by keeping it simple, but also by being unafraid to take us deeper. We hope to encourage further work along these lines and in other areas central to the field.

Brett Hammond
Editor