



Use retirement planning tools at your own risk

Most consider probability of an income shortfall but not how big or small it might be

By [Robert Powell](#), MarketWatch

Nov. 5, 2009 BOSTON (MarketWatch) -- **When it comes to retirement planning, it's important to measure risk. But it's just as important not to mismeasure it. Unfortunately, that's what most Americans and financial-services firms do today. They tend to focus on the probability of risk and less, if at all, on the magnitude of the risk. The net result is that many retirees and retirement savers now have investment portfolios that are far too aggressive.**

Or so says Richard Fullmer of Russell Investments, author of a just-published white paper "*Mismeasurement of Risk in Financial Planning.*"

To get a sense of why that's so requires a brief history lesson. For many years, Americans used something called deterministic models to calculate whether their portfolio would last their lifetime, according to Fullmer. With that model, you plugged in a desired rate of return on your portfolio along with some projected rate of inflation and -- voila -- you learned how long your portfolio would last. But there are a few problems with that model, according to Fullmer.

'Target' retirement funds in SEC's crosshairs

After some target-date funds lost as much as 40% in the market crash, federal regulators are considering new rules governing these retirement products to make sure they serve savers better. But those rules are unlikely to help, says Ron Surz, president of Target Date Solutions. MarketWatch's Andrea Coombes reports.

First, it's quite possible that you don't know what rates of return or inflation are reasonable to assume. Second, Fullmer said, given "the inherent nature of the capital markets," even if you choose reasonable values, the future could turn out quite differently. And third, the success or failure of the financial plan is subject to something Fullmer calls "path dependency." "Even if the capital markets did deliver the assumed average rate of return over the planning period, the plan could still fail if the returns came about unevenly rather than smoothly," he wrote.

And, boy, didn't we learn that the hard way in 2008.

Say hello to probability

Enter Monte Carlo simulations. To address shortcomings with deterministic models, firms in the financial-services industry started to use probabilistic models, and most typically they used a

technique called Monte Carlo simulation. A Monte Carlo simulation "projects out numerous (hundreds or thousands) potential paths that could unfold over time for variables such as portfolio returns and inflation," Fullmer wrote. "Dividing the number of paths under which the plan fails by the total number of paths simulated gives the probability of failure." This was a significant improvement that could address all three of the problems with deterministic models.

Now, simulation models are wonderful tools if used properly. "Unfortunately, that is not always the case," Fullmer wrote. Consider: You use such models to figure out a suitable savings rate, retirement date, spending budget, investment strategy, and so on. But doing so typically requires "an understanding of an investor's risk tolerance as well as the risk of ruin inherent in an investor's financial plan."

Most tools don't do that, however. Most financial-planning tools define risk as the probability that the plan may fail -- in other words that you will run out of money, Fullmer wrote. "The conventional guidance is that investors should plan using a low -- 5% to 10% -- probability of failure, although the suitable probability threshold for any particular individual will depend on his or her risk tolerance," he wrote.

"The problem with this definition and treatment is that the probability of failure is not a complete measure of risk. Just as not measuring risk can be dangerous, so too can mismeasuring it."

To Fullmer, risk is really the probability of an event occurring and the magnitude of the consequences of it occurring. An event with a high probability and a low magnitude may have the same exposure to risk as an event with low probability and high magnitude. Consider his example: Let's say the fine for a speeding ticket is \$100 when the driver's speed is less than 15 miles per hour over the speeding limit and \$1,000 when the driver's speed is more than 15 miles over the limit. Now say you are driving on a road where the posted speed limit is 50 miles per hour. "Clearly, the risk to you of driving 67 miles per hour on this road is much greater than the risk of driving 63 miles an hour," he wrote. "This is true even if the probability of getting caught is exactly the same."

What does this have to do with the topic of financial planning? Simply this: "Models that measure only the probability of failure ignore one side of the risk equation completely."

Fullmer isn't suggesting that Monte Carlo be scrapped. Simulation models actually lend themselves very well to proper risk measurement but only if they measure both the probability of failure and the magnitude of the failure cases that occur. Right now, however, the models use this calculation: The magnitude is the total amount of desired spending and bequeathing (how much money is left to heirs and others after you die) that does not occur because the portfolio ran out of money -- often referred to as "shortfall." In other words, the existing tools use this model: Shortfall risk equals probability of shortfall.

A better risk measure, however, would be this: Shortfall risk equals probability of shortfall times the magnitude of shortfall. To be fair, probability statistics may be good enough as a quick check on whether a particular spending plan is reasonable, Fullmer wrote. But they are "inadequate when comes to actual decision making."

In fact, by focusing solely on the "probability component of risk," he says you may wind up with a portfolio that's too aggressive, that is too heavily weighted in stocks. That's a direct result of ignoring the *magnitude* of the failure.

Said Fullmer: "Getting the risk measure correct is vitally important."

How does one go about doing that? Unfortunately, that's no easy task. Most planning tools today don't boast about whether they measure risk completely. Instead, Fullmer says you have to approach these tools with a "buyer beware" frame of mind. If you use a Monte Carlo simulation tool and it tells you that you have a 90% chance of success and then recommends a portfolio, beware. If on the other hand, the tool suggests that you have a 20% chance of failure, that you would run out of money in year 10, and then presents a portfolio that minimizes the severity of it not working, well, that tool might be worth using.

To be sure, the next generation of financial-planning and retirement-income tools might incorporate magnitude into the risk equation. For now, however, consider yourself warned: Use these tools at your own risk.

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