

Bill Sharpe on retirement income planning

Robert Huebscher | Advisor Perspectives | 28 October 2014

William F. Sharpe is the STANCO 25 professor of finance emeritus at Stanford University's Graduate School of Business. He joined the Stanford faculty in 1970, having previously taught at the University of Washington and the University of California at Irvine.

Sharpe was, of course, one of the originators of the capital asset pricing model and also developed the Sharpe ratio for investment-performance analysis, the binomial method for the valuation of options, the gradient method for asset-allocation optimisation and the returns-based style analysis for evaluating the style and performance of investment funds. Along with Harry Markowitz and Merton Miller, he was awarded the 1990 Nobel Prize in economics.

I spoke with Dr Sharpe on 7 October in San Francisco, in connection with the Tiburon CEO Executive Summit.

At the CFA Institute's annual conference in May, you said that retirement income planning is the most complex problem you've analysed in your career. Why is that?

WS: The simple way in which most people have characterised the accumulation phase is to say: You're going to invest, maybe you have a glide path, but the thing you're going to produce is the probability distribution of the value at retirement. You can draw it on a flat piece of paper. It's a probability of distribution of one outcome.

When you are talking about retirement-income strategies, you're discussing probability distributions of what your income will be next year and every year thereafter. You've got 40 or 50 dimensions, even if you only do annual joint-probability distributions. To think about what one of those problems looks like boggles the mind. To compare an outcome with another two, three, four or 10 outcomes to decide which one you like best is a nasty, nasty problem.

The question is how you cut into that. There are ways, but they involve – at the very least – coming up with 50 or maybe 100 coefficients for preferences and risk aversion vis-à-vis income at age 81, opposed to 82, etc.

Then you add in consideration of whether you are alive along with your partner, or just one of you, or if it goes to the kids and the charities after we die. Right there, you're already up to 100, 200 parameters that you've got to somehow or other nail down before you can think about finding an optimum strategy.

The dimensionality is overwhelming, and the behavioral issues are, of course, very difficult.

What is the appropriate role and value of annuities in a retirement portfolio? If possible, address the three major types of annuities: single-premium immediate annuities (SPIAs), deferred-income annuities (DIAs) and variable annuities (VAs) with riders.

WS: First, you can create an annuity based on almost any strategy, of which you've mentioned three. The big issue is to insure against living a long time.

If you attach no utility (to be semi-formal) to leaving money to your heirs, then why wouldn't you buy an annuity? Especially if you could buy it with any kind of crazy investment strategy that you might want. However, there are serious behavioral issues if you characterise an annuity as betting with the life insurance company as to how long you're going to live. You might argue, "What if I die next year? Then, I've lost the bet. The kids don't get anything. The charities don't get anything." People will likely react differently depending upon how you frame the trade-offs.

But as a practical matter, if you have sufficiently low savings and income, you may have no choice but to buy an annuity. In such a case, you can't afford to spend in a way that will almost certainly leave something to your estate.

Another aspect is important. We tend to only look at the savings piece and ask, "Why do so few people annuitise when given the choice?" But this neglects the fact that most people already have an annuity. Those in public service likely have a defined-benefit (DB) plan. Others generally have some form of social security. And, for most such people, it is worth more than their total savings. If you discount those payments, taking into account life expectancy and the fact that it is indexed for inflation, you get values often in the high hundreds of thousands, and sometimes above \$1 million.

The question is therefore: Why don't retirees annuitise more than say 80% or 90% of what they've got? You might conclude that is not so inexplicable. I'm not arguing against voluntary annuitisation; just saying you need to look at it in the context of other retirement benefits. If you examine the assets of the many ordinary people, you find that the most valuable is their social security at retirement. The next largest value is their home equity, and their savings is the smallest. Of course, home equity is not annuitised unless you annuitise it directly or indirectly, perhaps through a reverse mortgage.

Let's switch to the accumulation phase. Yesterday was actually the 20th anniversary of the publication of Bill Bengen's original article on the 4% rule. Along with Jason Scott and John Watson, you co-authored a 2008 paper, "The 4% Rule - At What Price?" What is the appropriate way for a retiree to think about risk in his or her portfolio? In that paper, you quantified the cost of funding surpluses and having to adjust spending for underfunding. Is that the right way to think about risk?

WS: In principle, you can think of the problem as structuring assets to cover liabilities. The liabilities then would be whatever you might need to fund your retirement.

My belief is that the main justification for the typical glide path used in the accumulation phase comes from taking human capital into account. The idea is that when you're young, most of your capital is human capital. As you go through your working career the mix changes, and at the end it's almost all financial capital with little or no to human capital. And most people's human capital is more bond-like than stock-like. That's the real justification for the glide path, although you can make arguments that lessen the effect.

For example, you could worry about the possibility that if a retiree makes it to 65, he or she could be in bad health, then worry about how to hedge against that. You might then want to buy long-term care insurance while you're accumulating funds in order to hedge against a bad-health outcome. Depending upon what's happening with your kids and their careers, if you think you have some obligation to help them if things go bad, you might want to hedge against that. If you're working in the tech industry, your human capital has more equity-like risk, so you might want to adjust the glide path and possibly also underweight tech stocks in your portfolio. There are a lot of possible aspects of this sort, but some of them may be second order.

In that paper, you were critical of target-date funds (TDFs) with glide paths that reduced equity exposure over time. What is your recommendation now on the use of TDFs in retirement planning?

Let me focus on the argument for glide paths in the decumulation phase. A key issue is what some people in the industry call sequence of returns risks. However, since this term is used in different ways, let me focus on the phenomenon that we academics call path dependency.

Given what I regard as plausible assumptions about market-equilibrium pricing, it's not cost-efficient to have a strategy in which the amount you get, say, 10 years after you've invested depends not only on how the market as a whole did over that period, but also on how it got there. In short, the amount of money you have after 10 years may well depend on how the market did over the period, but the path the market took to get where it got shouldn't matter. You can, in principle, get the same *ex ante* probability distribution of income 10 years hence with a strategy that doesn't have any path dependency risk, but it will cost you less.

If you're considering income 20 years hence, the inefficiency for a target-date strategy could be as much as 8% to 10%. And that percentage of your investment is money you could have used otherwise.

Of course, adopting a strategy with path dependency may not be the most horrible thing you could have done. You could have put all your money in mediocre or bad hedge funds with

expenses at 2-and-20.

How much willingness should a retiree have to adjust their spending in response to market returns? If they don't have much flexibility, what should they do?

The extreme case is the 4% rule or, more generally, the x% rule in which there are no such adjustments. Two things are self evident and shouldn't require much discussion. What you spend should depend upon (1) how much you've got and (2) how long you think you might live, or the range of possible lengths of life. The 4% rule is fine on both fronts on day one. For example - you've got \$1 million and you're 65. Spend \$40,000. This may be just fine.

After the initial year, however, what you spend with this rule has nothing to do with how much you have, or for that matter, how long you expect to live. Most importantly, it doesn't depend how much you have at the moment. Any rational person would say, "What you spend ought to depend upon how much money you have." Isn't that self evident?

A rule that doesn't do that after year one doesn't make any sense. And this should be the end of the discussion. But we see such an approach advocated in many places. For example, endowments don't determine what they spend in a year based on what they've got at the beginning of that year. More likely, they use an average of the values of their endowments over the previous, say, five years. Their spending depends upon what they used to have.

One possible argument for such approaches is that markets tend to mean revert. You might assume that if you just lost 40% of your savings, the markets are going to feel really sorry for you and work very hard to go up more than they would otherwise. If you believe there are predictable cycles and you can count on them, then that might justify some degree of neglect of the current value of your assets.

Personally, I don't believe that it makes sense to assume that there is sufficient mean reversion in the markets to just say, "I'm going to spend that \$40,000 increased for inflation, and it matters not whether I have \$200,000 or \$3 million left."

Do you believe in some degree of mean reversion?

Not enough to assume there is mean reversion when adopting a retirement income strategy.

There is a theoretical argument for mean reversion. I made it in a paper many years ago and found a bit of empirical support for the assumption that when the market falls and everybody becomes poorer, the average investor may become more risk-averse, so premiums may increase. I showed that if this were the case, those whose risk aversion falls less than that of the average investor should take on relatively more equity risk when markets fall.

But there are two problems with this argument. One is the empirical data are very weak. Second, the data assume that everybody has a relatively short horizon, say one year. If there

are investors who have a longer horizon and others who have a shorter one, then you could get a very complex equilibrium. And I have no notion what that might look like.

So I believe that it's not a good idea to assume that the expected return is a function of what happened recently. And, even if it is, if you are average in terms of how your risk aversion moves with your wealth, then you should continue to hold whatever you held.

Many practitioners make extensive use of simulation, as does your own firm, Financial Engines. My impression, however, is that it is less commonly used in the academic-finance world as a tool for resolving theoretical questions. Instead, the academic finance world seeks to develop closed-form mathematical formulas, usually in the form of multiple regression equations. One clear difference between the two is that the simulation approach has an explicit time dimension, while multiple regressions are usually single-period models. Do you think the attention to multiple regressions in academic finance is justified, or should more attention be paid to the time dimension, especially through the analytical medium of simulation?

Let me try to parse that into two separate but related issues. It's certainly true that the tradition in finance and economics is to use mathematical models, whether you're doing a theoretical model or an empirical study. Empirical studies using multiple regression or some sort of statistical analysis of data are pretty much standard. And some of those models are very sophisticated.

For modeling future probabilities, there are certainly closed-form models. If you have the mathematical aptitude to do a closed-form model that can capture enough of the reality, then by all means that would be the best approach, because others can check the equations and the inputs and outputs are much clearer.

For studying retirement income strategies, I use Monte Carlo methods. I focus on what I call scenario matrices. Others may have the mathematics to deal with the 50-dimensional probability distributions that we encounter in many retirement-income problems, but I certainly don't. Of course, I use mathematics in the process, but rather than dealing with very complex multi-period probability distributions, I find it easier to write a program and that generates 100,000 or more multi-year scenarios, assuming that the actual scenario is going to be one of them – but you don't in advance know which one.

I don't think it's a matter of mathematics or simulation. Some people can do a better job with a certain class of forward-looking problems using sophisticated mathematical models, and others with simulation. If you do use mathematical models, you should show the equations and the derivations. Then people can check whether your derivations were mathematically correct. If you use simulation, then you should publish the program you wrote that generated the results so people can sort through that if they want, although this may take more effort.

We're seeing a shift in a lot of areas, not only in economics and finance, towards more simulations. In the empirical realm, we're seeing a lot more what we would call (pejoratively) data mining, often using big data which can have great risks. So can simulation. But, when I use it, I try to make clear what I did and, in some cases, I'll write down the program or make it available.

A new theory may be forming in the finance world that claims to integrate factor risk with efficient-market theory. This has arisen with respect to the value factor. The theory seems to be that as the valuation of an asset changes (where valuation means the ratio of price-to-earnings or price-to-book-value) its risk also varies – with risk increasing when its valuation goes down and decreasing when it goes up – and therefore, its expected return also varies with the risk. Do you believe this approach has the potential to modify the efficient market model, as well as your own models, in a meaningful way? Or do you think that it represents a fundamental violation of those models?

It's the first I've heard it spelled out that way, because I'm not current on some of the literature. But let me try to respond.

It's certainly true that if you have a levered company and the value of the company falls, that even if the risk of the company is the same, the risk of the equity will be greater because the leverage has increased. So that's a story that's perfectly plausible.

But there's idiosyncratic risk and there's market-related risk, and you have to parse that out. If everybody – or even if a substantial number of people – know that somehow or other a value-tilted portfolio will be better for everybody than a market portfolio, then that's not consistent with equilibrium, because everybody with any brains would prefer a value-tilted portfolio.

Nothing changes the laws of arithmetic. The net return on the average dollar (or euro, yen, etc) invested in a portfolios tilted away from the index, whether they are based on factors or stock-picking or whatever, will underperform the net return the average dollar invested in a low-cost index fund for that market. That is just arithmetic, as I argued in a paper many years ago.

If there's a particular tilt that is just a better thing to do all the time, then the people with whom they trade should eventually wake up and say at the very least, "We'll get index funds, because we're getting beaten by index funds all the time after costs." And some of them and some of the index fund people will say, "Well, that looks pretty good" and try to adopt the winning approach, causing prices to adjust until its benefit goes away.

One of the speakers today said there was a claim that environmental, social and governance-based investing (ESG) or socially responsible investing (SRI) could be costless, without

sacrificing return. But aren't investors limiting their investable universe? They are making some sacrifice in terms of diversification. Can those two views be reconciled?

Blake Grossman [the former CEO of Barclays Global Investors] and I had lunch last week and recalled that when he was a student in the 1980s, he and I wrote a paper on South African investment. We performed an empirical study to test the hypothesis that if the average investor really hated holding stocks of companies doing business in apartheid South Africa and if so, one would expect an equilibrium in which you would get a premium for holding such stocks, because they are so distasteful to the average investor. In such an equilibrium, if your distaste is equal to that of the average investor, you should hold the overall market index. But if you don't hate them quite as much as the average investor, you should tilt towards them, earning a premium. Conversely, if you divest and don't hold such stocks, you will do worse. We did a lot of empirical studies. There had been some studies previously, but they didn't control for other factors very well, so we used more sophisticated approaches.

We found South Africa-related stocks had outperformed somewhat before 1975 but underperformed slightly thereafter, possibly due to some re-pricing. But we concluded that absent any changes in sentiment, if there were a net distaste for South African stocks, one should expect that avoiding such stocks could injure your overall risk-return profile and that you would then decide of if you wanted to bear that cost. I can't speak for Blake, but I thought I would avoid such cost if apartheid was to continue, but fortunately it did not at the time.

The argument can be applied as well to socially responsible investing. If you state it in terms of divesting from coal producers, then it's identical to the South African discussion. If you put it in terms of overweighting socially responsible companies, then you just flip it, so you might expect lower returns on stocks that the average investor considers more desirable due to socially responsible practices.

The question is, are there enough people in the market who feel strongly enough that such aspects to have a significant effect on expected returns relative to risk? If so, there will be a cost for being socially responsible. But this is at base an empirical issue.

Are there any particular publications that you like to read, particularly with respect to your focus and research now in the retirement phase?

What I really like to read is literary fiction, opera news, sports news and the *New York Times*. But I don't spend as much time as I'd like on such things.

I try to follow Wade Pfau's material. I look at trade publications rather cursorily. I do try to get some sense of what's going on in the advisory industry. I like Kerry Pechter's *Retirement Income Journal*. Many times I don't understand what he's talking about, because he sometimes uses inside-industry terminology. Overall, I try to get some sense of what's going on, but my research deals with most issues at a rather abstract level.

I'm threatening to write an academic book to complement my retirement income blog that will be so technical that possibly nobody but I will read it.

I'll read it.

My condolences. Who knows if and when it will be done. I wrote the preface last week. We'll see about the rest.



Robert Huebscher is the Founder and CEO of Advisor Perspectives. Bob founded Advisor Perspectives in 2007, following a 25-year career in the financial services and information technology industry. This article is abridged and reproduced with permission from [Advisor Perspectives](#).
