The Nobel Laureate and Stanford professor discusses longevity risk, the inefficiencies of the four-per-cent rule, and the importance of a lockbox strategy.

Thought Leader Interview:

William Sharpe

by **Karen Christensen**

There are lots of mixed messages out there for financial services consumers. In your view, what are the key steps to financial security?

The first thing I would suggest is that people get good, realistic forecasts of where they're likely to end up in retirement if they continue to do what they are currently doing. And by realistic, I mean taking into account not only how good it could be, but the bad and the ugly, so that they have some realistic view of their future if they continue to do what they're doing. Having done that, they can begin to ask the hard questions: "Should I save more?" (very often, the answer is yes.); "Should I take a different amount of risk?"; "Am I diversified sufficiently?", etc.

Second, people need to invest their savings in efficient and low-cost ways, and choose investments that are consistent with their circumstances, their other assets and their tolerance for risk. At retirement time, decisions need to be made concerning the funds that have been saved: should you buy annuities? If so, what types, and how much money should be annuitized? If funds remain, how should they be invested and spent over your retirement years? These are all difficult decisions, and they must be made as thoughtfully as possible.

You have devoted much of your career to the study of market risk. Do today's investors focus enough on the downside?

Unfortunately, many investment decisions are being made by individuals who are ill-prepared to make them. To say to someone, 'here are 8,000 mutual funds' – or even 'here are 10 – do what's right', is not very helpful. The software and some of the human advice people are getting often seems to ignore risk. These are bookkeeping schemes in which you earn nine per cent every year like clockwork, and you die right on schedule; there's no uncertainty at all. Making a decision as to 'stocks vs. bonds vs. cash' and about how much to save, without acknowledging uncertainty – let alone trying to estimate it – seems to me the height of folly.

As average life expectancy continues to increase, so does 'longevity risk'. How is this impacting investment planning?

Living longer entails the need to either save more, work longer, or do both. It would be nice if there were some simple way to earn more on investments, but once the inefficiencies have been wrung out of an investment program, there is no way to accommodate increased longevity without incurring the pain of consuming less, working longer, or both.

One of the most popular retirement strategies involves annually spending a fixed amount equal to four per cent of initial wealth and rebalancing the remainder to a 40/60 per cent mix of bonds and stocks. What do you think of this approach?

My colleagues and I have addressed the 'four per cent rule', and we believe it is inefficient to couple a desired fixed-spending process with a variable and uncertain investment strategy. As typically implemented, it runs the risk of running out of money within the intended period and the risk of having money left over after the period ends. It is possible to obtain the same outcomes with the same probabilities at a lower cost. In recent research we estimated that in a typical setting, such an approach may be equivalent to throwing away 10 to 20 per cent of one's retirement savings. For all of these reasons, we believe that this widely-advocated 'rule of thumb' is not a good approach. The problem with traditional retirement security strategies is that they are split into two parts: an investment strategy and a spending policy. These really need to be integrated.

ILLUSTRATION BY COLIN BERGH

Some investments have higher expected returns than others, and by and large, they're the ones that do the worst in bad times.

In a recent paper ("Efficient Retirement Financial Strategies"), you highlight the importance of creating a 'lockbox strategy'. Please explain this term.

The approach is designed for someone who has just retired and has decided to devote a given amount of savings to spending in future years. The idea is to assess the individual's preferences for various amounts of consumption in each future year, his or her risk tolerance vis-à-vis spending at various times in the future, current wealth and other sources of income, and then determine an overall plan. Part of this plan involves allocating current funds to a series of 'lockboxes', each of which is designed to provide spending in a given future year. Thus one might put, say, $20,000 in a lockbox for the year 2020. The box would also include instructions for the management of the money from the present to the terminal year. Different boxes could well have different investment management strategies, as well as different amounts of initial funding.

In the paper I show that in a so-called 'complete' financial market, any spending and investment strategy can be implemented with a lockbox approach. Of course the notion of a 'complete market' is just a convenient assumption often made by economists; real financial markets do not fit this ideal. Nonetheless, investment outcomes that people might actually wish to achieve could well be obtained with existing financial instruments. Alternatively, if there were sufficient demand for a particular set of outcomes, the financial services industry would undoubtedly create appropriate instruments. Some current approaches to retirement investment and spending can be implemented now with the lockbox approach.

An important consideration that makes lockboxes attractive is the fact that in our later years, our ability to make optimal decisions may be diminished; so in a sense, the lockbox approach allows an individual to make decisions for his or her 'elder self.' This does not mean that lockboxes cannot be opened prematurely to obtain additional funds, nor that all the money in a lockbox must be spent in its designated year. But there are many advantages associated with the intentions reflected in a lockbox strategy. Moreover, it is more likely to provide efficient investment outcomes than some rules of thumb that treat all of your savings as a single portfolio.

You have said that investments with higher expected returns tend to be those that do the worst in bad times. Why is this?

Some investments do have higher expected returns than others, and by and large, they're the ones that do the worst in bad times. This is the standard result of asset pricing theory, be it the Capital Asset Pricing Model or the more general approach utilizing pricing kernels. The fundamental idea is that goods that are scarce command higher prices than those that are plentiful. If this were not the case, people would want more of the former than the latter, which is infeasible. In future states of the world where markets are bad, there is less money, and hence people will pay more for a promise to receive $1 in a down market than for a promise to receive $1 in an up market. This leads directly to higher expected returns for investments that are expected to do worse in bad times – that is, provide fewer of the expensive dollars and more of the cheap ones. In this context, 'bad times' refers to situations in which a broadly-diversified portfolio of financial securities of all types does badly. For example, one might want to think about the 'World Market Portfolio', including all traded bonds and stocks around the globe.

You have noted that a gulf exists between economists' approach to retirement strategies and the 'rules of thumb' used by financial advisors. How can the average investor navigate this gulf?

The average investor should definitely get advice from a person or organization that listens to what the economists are saying.

Do you believe that Behavioural Finance is making a positive contribution to the discipline of Financial Economics?

It is making – and will continue to make – a significant contribution, but it is important to differentiate between two things: asset pricing and portfolio choice. There are asset prices – risk and return and all that – and there are the portfolios people hold. In his book *The Wisdom of Crowds*, **James Suroweicki** sensibly refers to a lot of behavioural work and efficient markets work. The basic argument is that if we have enough people, even though they may be ill-informed and irrational coming to market, it is entirely possible that the prices of assets, thereby true risks and returns, are what you would get if they were all rational and well-informed. **Bob Merton** and **Zvi Brodie** have made the same point that capital markets can give you results that are consistent with these almost-silly models in which everyone knows everything and everybody is perfectly rational; and that those models can be good in terms of prices, risk and returns and all the rest. Even though people's portfolios are widely divergent from the market, I think where behavioural research can really help – and I have been a fan of it since the 1970s, long before it became popular – is in helping us to understand what people do and why.

Do you use behavioural research at your firm?

Yes, we spend a lot of time using it to help people make sensible portfolio decisions. But I remain skeptical about using it to try to 'beat the market.'

You received the Nobel Prize for your Capital Asset Pricing Model (CAPM). Please describe it.

The basis of the CAPM is that an individual investor can choose exposure to risk through a combination of lending-borrowing and a suitably composed (optimal) portfolio of risky securities. Every investment carries two distinct risks: the first, the risk of being in the market – known as systematic risk or 'beta risk,' cannot be diversified away. The second type – unsystematic risk – is specific to a company's fortunes. Since this uncertainty can be mitigated through appropriate diversification, a portfolio's expected return hinges solely on its beta – its relationship to the overall market. CAPM was the first efficient capital market theory. It concluded that only one type of risk would be rewarded with higher expected return – the risk of doing badly in bad times. Such risk was stated in terms of a 'beta' value. For example, a security or portfolio with a beta of 0.5 would be expected to fall half as much as the world market portfolio in a bear market (for example, five per cent if the market fell 10 per cent.) A security or portfolio with a beta of 1.5 would be expected to fall 1.5 times as much (15 per cent if the market fell 10 per cent). The higher an asset's beta (bad news) the greater its expected return (good news). In a CAPM world, only beta risk is rewarded.

How has CAPM evolved since you created it in the 1960s?

Asset pricing has evolved significantly. People – myself and others – went on to what I call 'extended' capital asset pricing models, in which expected return is a function of beta, taxes, liquidity, dividend yield and other things people might care about. Much of the current theory and practice can be traced more directly to the state/preference work of **Arrow** and **Debreu** than to the mean/variance approach of **Harry Markowitz** and the Capital Asset Pricing Model. However, the two are related, and the latter can be considered a special case of the former. I discuss these issues in my latest book. The fundamental idea remains that there's no reason to expect reward just for bearing risk. Otherwise, everyone would head for Las Vegas. If there is reward for risk, it's got to be special: there must be some economics behind it, or the world is even crazier than we think.

Can you explain the Sharpe Ratio in layman's terms?

It attempts to answer the following question: If you want a single number to summarize the desirability of an overall investment strategy, what would it be? My answer many years ago was a ratio that I called the 'Reward-to-Variability Ratio' and others called the Sharpe Ratio. The numerator is the expected return over and above a riskless rate of interest; the denominator is the standard deviation of that difference. Thus higher expected return leads to a better ratio, as does lower risk. The basis for the measure is the assumption that the investor can lever a portfolio up or down to obtain the most desirable level of risk and expected return, so that a portfolio with a higher Sharpe Ratio will dominate one with a lower ratio at every possible level of risk.

Of course, we have computers now, so we don't need to rely on a 'single number' to rate alternative strategies. Moreover, for components of an overall portfolio we need other approaches. One, often called the Information Ratio, is equivalent to a Sharpe Ratio in which a benchmark portfolio is used instead of a riskless asset when computing the expected value and standard deviation. It is also the case that when a measure such as the Sharpe Ratio is used with *ex-post* realized results, the value is at best an approximation of what one might expect in the future, and the latter is what matters when making investment decisions.

In November of 2007, your firm [Financial Engines] announced that it had reached $15 billion in assets under management – over double what you started the year with ($6 billion.) How did you achieve such remarkable growth?

We began directly managing individuals' 401(k) accounts relatively recently. As the number of plan sponsors choosing us as the provider of managed accounts has increased, the number of employees who can use our services has increased. Moreover, as we 'roll out' our services to employees within a plan, the number choosing to have us manage their assets increases. Since we are far from a steady state in this area, our assets under management have increased substantially.

You believe that the principles of good investing can be summarized in four verbs: Diversify, Economize, Personalize and Contextualize. Please explain.

First, Diversify, Diversify, Diversify: one should hold many types of assets in order to minimize the impact on the portfolio of any single type of risk. The closer you come to holding the entire market portfolio, the higher your expected return for the risk you take. Second, Economize: money should only be spent on things like investment management fees and trading costs when there is reason to believe that the reward will be great enough to offset the cost. Third, Personalize: when investing, take into account your circumstances and the things that make your situation unique, especially the risks you face outside the financial markets. As an extreme example, imagine that all you eat is chocolate. In that case, you'd want to invest more in the stock of candy makers so that if they raise prices, your food will cost more but your stock will go up. Lastly, Contextualize: have a well considered view of the manner in which asset prices are determined in capital markets and the resultant trade-offs of risks and expected returns. Remember, if you bet that market prices are wrong (by investing heavily in a single stock or sector), you have to be able to justify why you are right and the market isn't. Asset prices are not determined by someone from Mars. Not yet, anyway. ***R***

William Sharpe is the Stanco 25 Professor of Finance, Emeritus at Stanford University's Graduate School of Business, where he has taught since 1970. The founder of Financial Engines Inc., he received the Nobel Prize in Economic Sciences in 1990. His latest book is *Investors and Markets: Portfolio Choices, Asset Prices, and Investment Advice* (Princeton University Press, 2006).