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William F. Sharpe, PhD, is the STANCO 25 Professor of Finance, Emeritus, at Stanford University's Graduate School of Business. He won the 1990 Nobel Memorial Prize in Economic Sciences, along with Harry Markowitz and Merton Miller, for developing models to assist with investment decision-making. Their early work established financial economics as a separate field of study.



William F. Sharpe, PhD

Sharpe is well known for developing the capital asset pricing model (CAPM) in the 1960s. The CAPM describes the relationship between systematic risk and expected returns; it states that taking on more risk is necessary to earn a higher return. He is also known for creating the Sharpe ratio, a figure used to measure the risk-to-reward ratio of an investment. Sharpe has authored numerous articles for professional journals as well as eight books, including Portfolio Theory and Capital Markets (1970; 2000), Asset Allocation Tools (1987), Investments (1999), Fundamentals of Investments (2000), and Investors and Markets: Portfolio Choice, Asset Prices and Investment Advice (2006). His eighth and most recent book is an e-book, Retirement Income Analysis with Scenario Matrices (2019).

In May 2022, Robert Powell, CFP®, RMA®, editor-in-chief of the Retirement Management Journal; Margaret M. Towle, PhD, CAIA®, CAP®, CIMA®, CPWA®, FSA®, RICP®, principal, Yakima River Partners; and Stephen Horan, PhD, CFP®, CIPM, CAIA®, senior strategic advisor, Investments & Wealth Institute, and associate professor of finance, University of North Carolina, spoke with Sharpe about risks in retirement, portfolio construction, and his legacy of thought leadership.

Stephen Horan: You've called retirement planning "the hardest problem in finance." Why is that?

William Sharpe: That's possibly a bit of hyperbole. But it seems to me you have all the usual financial problems plus mortality, or to put it more pleasantly, longevity. Moreover, there are usually at least two, if not more, entities and interested parties. It's not at all clear just whose utility you are maximizing, or put it in the usual terms.

Margaret Towle: Hyperbole or not, it remains a difficult problem. The transition from DB [defined benefit] plans to DC [defined contribution] plans has posed numerous problems

for individuals. In DC plans, individuals establish goals, accumulating assets to achieve these goals. However, during the decumulation phase, participants receive a lump-sum distribution, which may or may not satisfy the goal of sufficient retirement income to meet their needs. What are your thoughts about these gaps in DC retirement coverage?

William Sharpe: When I first started looking at issues in finance, there were virtually no DC plans. In addition to the public sector, which still has DB, most plans available in the private sector were also DB plans. The move to defined contribution plans in the private sector was a major change. One could ask, "Why did they do it?" Probably because it was much easier for employees who wanted to change jobs. DB plans were still convenient in the public sector, where fewer people change jobs. An employee might move to another organization within a public entity, but moves to other entities are relatively rare. Moreover, at that time considerable swaths of the private employment world didn't have retirement plans.

In many cases, DC replaced nothing. We entered a new era in the private sector with DC plans—which put huge amounts of responsibility on the individual worker to make decisions in both the accumulation and the decumulation phases. In the public sector, it's still predominantly you go to work, you get your salary, you get your benefit. When you retire you receive typically an initial fixed benefit with perhaps some sort of cost-of-living allowance. When you die, your spouse might get a reduced benefit. Then, you or your spouse dies, it's over. It's much simpler than having a DC plan and managing the decumulation phase. But this does raise the question: Why do we have DB predominantly in the public sector and DC almost exclusively in the private sector?

Here's an argument for having DB in the public sector. Many years ago, I had a PhD student who did a fascinating thesis on indentured servants coming to the United States in colonial times. He found a substantial database about indentured servants in the Philadelphia area. It showed that a typical contract provided by the employer of the indentured servant was: "John Smith will work for me for seven years. During the seven years, I will provide specified clothing. On the completion of the seven years, I will provide a payment of X dollars." In some respects, this was similar to a DB pension plan. He found a

very common difference in the contract terms between what you got paid while you were working and what you got paid at completion. Those who seemed more likely to run away before completing their contractual term were paid less during their term and more at the end of that term.

In the public sector, a retirement plan of the DB variety gives the employee an incentive to stay working in the public sector and to be honest while working. So, it is an end-loaded contract. In private enterprise, especially with the current amount of job mobility, that incentive is pretty much gone, and a DC plan is more suitable.

Margaret Towle: And DB plans are disappearing, as you mentioned.

William Sharpe: Yes, almost everywhere in the private sector. There are a few moves toward DC plans in the public sector, but not large ones. By and large, public sector employees rely on a DB plan for much of their retirement income.

DC PROS AND CONS

Robert Powell: Would you regard the current 401(k) system, given its problems, i.e., coverage issues and lack of savings, as a success or a failure? Or are there parts of it that are a success and parts of it that are a failure?

William Sharpe: I would say it's a challenge. There are a great many issues. Private sector employees have Social Security, which is a DB plan. For many lower-income earners, Social Security provides the majority of their retirement savings. And DC plans may be fine for many higher-income earners who will have other assets for their retirement. The question is, how can we make it better for those in the middle? At the very least we need to build in various kinds of nudges to get people to contribute more money. In many cases it may be desirable for employers to contribute more as well. I think moves in these directions are all well-intentioned, but the 401(k) system certainly can be improved.

Margaret Towle: I agree. Reforming the retirement system in the United States will require an integrated approach, essentially considering retirement assets as one component of the retirement security equation. When comparing retirement systems, some countries assume a larger role in providing non-retirement benefits, including health care. In the United States, we approach retirement piecemeal. For example, Medicare healthcare coverage does not cover all expenses, often requiring retirees to pay for supplemental health insurance if they want full coverage. Thus, as it pertains to the retirement situation in the United States, an overhaul is in order.

William Sharpe: Yes. And, to an extent, every individual is a special case. If you're in the gig economy, you face a quite

different situation than if you work for a traditional employer. There's the big question of the role of personal responsibility versus having a nanny employer. But even with a DC plan, the employer has responsibility for the investment vehicles, for the matching amounts, for the default position when a worker assumes employment, and so on. The employer can do a lot to help, over and above that which is mandatory.

Robert Powell: The DOL [Department of Labor] just issued that rule around disclosing the income of your assets in a 401(k) plan.¹ That's always been one of the chief complaints, that plan participants weren't able to determine what their assets would produce, in terms of income. Do you think that's a step in the right direction?

William Sharpe: I don't know the details of the rules so I can't contribute much. Certainly, at Financial Engines, a company that I helped found, that was a key thing we tried to do.² We helped employees of our client companies see the implications of contributing their percentages of payroll and how they were investing their funds on the range of possible real incomes that they might have in retirement. Anything you can do to provide that personalized information to the employee is probably a very good thing.

Robert Powell: With Social Security, you can check your monthly benefit statement and you're told what, in dollars, your monthly benefit will be. But you don't know the net present value of that benefit.

William Sharpe: Nor does anyone else unless you're very sick.

Stephen Horan: When we're talking about DC plans, we know the present value, but we don't know the income. When we're talking about DB or Social Security, we know the income promised to an individual, but we don't know its present value. We've got to solve for one or the other. If we can only have one, what's the better way to do it?

William Sharpe: We should talk at some point about the valuation of some DB plans. You have a pretty good notion about what a DC plan is worth today—you have the valuation of the holdings. But what it's going to produce in the future is, at best, a probability distribution.

There's not a single number unless you assume you annuitize tomorrow and get an estimate based on current quotations. I think you have to be careful trying to estimate the range of possible retirement incomes you could have if you contribute X versus Y. But you should do something. You can't give an ironclad single numeric answer unless you have a plan that allows you to put your DC plan balance into a deferred payout annuity right now. We haven't seen anything quite like that yet.

THE POSSIBLE ROLE OF ANNUITIES

Stephen Horan: Revisiting longevity as a key challenge, should annuities of some sort play a role in investors' retirement-income plans? And if so, would you go immediate versus deferred, versus something else?

William Sharpe: Well, I'm a proponent of payout annuities. We can use the term "annuity" here as long as we don't mean accumulation vehicles. You can, in principle, make a deal today when you're age 45. "This money goes to insurance company X, which will pay me an annuity beginning at age 65," or whatever, although I don't think instruments such as these exist in any significant number. You can't say with assurance to the 45-year-old, "Your current accumulation will buy you this much per year after you retire." You especially can't say it in terms of purchasing power, since there are few if any such real annuities.

I think your point is that you have to help employees understand the relationship between what goes into that plan monthly and the range of things that they might have available to live on after retirement. To do this you have to assume you're going to buy a payout annuity because, otherwise, you have to deal with a whole range of possible mortalities in terms of understanding what a non-annuitized corpus will bring. It's a terrible problem and you start envying the public employee who can say, "If I quit tomorrow, I want to know how much I'm going to get after retirement age, and if I get a raise, I want to know how much more I'll get then." The question is whether, as a society, we should try to have more plans of this sort or leave the current DC plans in place and try to improve them and provide at least a little more useful information about retirement incomes. In my time at Financial Engines, we didn't say, "You will have X." We said something like, "Here's the range that you might have, and if you put in this much more, that range could go up by roughly this amount."

Robert Powell: We've made some progress concerning DC plans, at least. You can invest in a QLAC [qualified longevity annuity contract]. Earlier this year, lawmakers re-introduced the Lifetime Income for Employees Act of 2022, a bill that would amend the DOL's current default investment safe harbor regulations to allow, but not require, a retirement plan's default investment to include a limited investment in a non-liquid annuity component that provides a guaranteed return on investment.

William Sharpe: Yes, that certainly is in the works. I know the industry has been preparing products and it'll be interesting to see if an employee will be able to, in effect, make a DB plan out of at least part of a DC plan.

Margaret Towle: We're talking about adjustments to the current system, whether that's a DB plan or a DC plan. Recognizing that we cannot fully explore social justice issues in this interview, I want to raise the challenges of obtaining

retirement security for single women and Black workers. Single women and Blacks face a retirement crisis exponentially larger than other workers, due to long-standing wealth and income disparities. Are there effective retirement solutions for these groups?

William Sharpe: Assuming they're employed in the private sector, they will have some Social Security, but probably not a large amount if they are not earning much or their income is irregular, etc. I think the answer is to find a way to give more wealth to those people. And that's, in some ways, separate from issues of retirement versus non-retirement income. I would think that for those who are employed, you can do it through Social Security. You could make the benefits for low-income people richer. We could discuss the viability of Social Security as well, but again, I think you have to differentiate between those who don't have a job and those who do—who could be helped by making Social Security even more progressive.

For lower-income people, the Social Security benefit is a greater proportion of their salary and contributions. That's a lever with which you can effect some changes. An alternative is just pure and simple welfare payments. For those who are retired and can't pay for their food, you can provide help directly. But your point is well taken. Somehow, we need to think of the whole process and not just one piece of it. And a DC plan is particularly ill-designed to deal with some of these problems.

RISKS IN RETIREMENT

Robert Powell: Bill, I want to go back to the risks that people face in retirement. You talked about longevity risk, but the other big risk is inflation or loss of purchasing power. And it seems like the instruments that you would use to manage longevity risk are different from the instruments that you would use to manage inflation risk. How would you square up those two competing risks?

William Sharpe: My impression is that in the private sector inflation-adjusted annuities have gone the way of the dodo. It is very hard to find one that has full inflation protection. In part, this may be because there aren't enough TIPS [Treasury Inflation-Protected Securities] in the world, which there probably aren't. And that may be a serious problem. Most DB plans do have inflation protection, maybe not 100 percent, but substantial in most cases. For those with DC plans it is very hard to find a full inflation-adjusted annuity—a very serious problem. I think this accounts at least in part for the lack of people choosing annuities, because the idea of a fixed-dollar payment for 20 years or 30 years isn't very appealing.

Robert Powell: It seems like we tell people that they should think about spending a 3-percent inflation-adjusted amount, but it seems like spending declines over the course of retirement, in which case that rule of thumb would be wrong.

William Sharpe: For most retirees, real spending does decline over time. As someone who has been retired for some while, I can list some reasons why this is the case. The idea of on the spur of the moment flying off to Paris for the weekend doesn't appeal as much. Of course, all sorts of behavior have been affected by the pandemic, but I believe there were some pre-pandemic studies showing declines in spending in dollar terms in periods of relatively low inflation. Taking a broader view, it is important to remember that many retirees nowadays have DC plans, Social Security, and real estate. We like to believe that owner-occupied real estate hedges against inflation. Moreover, it can be turned into income with a reverse mortgage. Social Security is explicitly inflation-adjusted. Supplemental medical plans may or may not adjust for inflation.

Given a modest decrease in real consumption spending, many retirees may be fine, but probably not if inflation becomes out of control.

"... the real problem is that nobody wants to confront the issue of mortality. You don't want to think about it, you don't want to see estimates of when it might occur."

Stephen Horan: What are your recommendations for spending rules? When it comes to real spending, are individuals able to get their minds wrapped around it? I find it difficult even for professionals to compare a yield on TIPS with a yield on a nominal paying security. The reflex is, "Oh, TIPS are yielding nothing."

William Sharpe: Or less than nothing. For some years, real TIPS rates have been negative. As we speak, only one TIPS real rate is still negative, but they are all very low.

Stephen Horan: So, it just seems there's some conversation or translation that needs to take place in the discussion of real versus nominal that people don't reflexively make.

William Sharpe: I couldn't agree more. Real versus nominal rates are hard to internalize. We are not used to 8.5 percent per year inflation. I've lived through 8.5-percent inflation and worse, but a lot of people have not, at least not when they were old enough to be thinking about finance.

At this point, I've got to talk about "the graph no one wants to see." When working on my e-book, *Retirement Income Analysis* [Sharpe 2019], the first output I produced with the software was a little bar graph chart. I'd say to a friend or

relative, "Tell me how old you are and what sex, tell me how old your partner is and what sex, and then I will show you for each of the future years a bar for the probability that you'll both be alive. On top of that for each year will be a bar that shows the probability that only you will be alive, on top of that, a bar for the probability that only your partner, and above that, the space for the probability that neither one of you will be alive." I would then say to my friend or relative, "Let me show you such a graph for you." The answer was, in almost every case, "I do not want to see it."

I asked my friends in the private wealth business, "With a new client, how do you deal with the mortality issue?" They said: "Oh, it's simple. We just assume they'll both live to be 100." This is, of course, in the interest of the advisor who would prefer that the client doesn't spend too much because he or she is charging a fee that is a percentage of the remaining corpus of the account.

That said, the real problem is that nobody wants to confront the issue of mortality. You don't want to think about it, you don't want to see estimates of when it might occur. And of course, people don't process probabilities well. You're happy to think about being alive and you do not want to think about being dead. One just comes up against a wall right there. Perhaps you have had different experiences with ordinary mortals, but I haven't. I don't know why people don't want to buy annuities. Maybe it's just because they don't want to think about mortality or longevity.

I would think that real annuities would appeal, but we know that outside of the public sector they have almost disappeared. Perhaps it is because real estate and Social Security already provide inflation hedges. Reverse mortgages are pretty sensible now, although these are typically relevant for fairly well-off people. I hear from some friends in the industry that there are plans to allow some employees to use at least a portion of their 401(k) plan assets in the 10 years or 20 years before retirement to buy some sort of an option on a post-retirement payment annuity.

BEHAVIORAL FINANCE IN RETIREMENT

Margaret Towle: You seem to be touching on important aspects of behavioral finance. For example, financial advisors working with young people now use the tools of artificial intelligence to mimic aging of a person from an image.

William Sharpe: You may know the work of Hal Hirschfeld.³ I remember when he first introduced himself to me at Stanford. He said, "Here's a picture of your future self." I thought, "Oh, man, I'd better save more for that poor old fellow." I think that approach is very useful. Having become old myself, I understand why nobody really wants to think about being dead. Of course, what we want is for them to think about being alive for

a long time, but it seems as though we are having limited success with that.

It will be interesting to see how the recent attempts to bring annuities into the 401(k) world one way or the other will work out. Unfortunately, many of these annuities may not be inflation-adjusted. After experiencing a bout of inflation, people are not likely to want to commit to fixed-dollar incomes.

Robert Powell: In a previous interview with the *RMJ*, Robert Merton said something that is still stuck in my head, which is that annuities and reverse mortgages will be the two things that help middle America with retirement security.⁴

William Sharpe: Well, just one quick question for you. My impression is, after a bad start, that reverse mortgages are pretty civilized now.

Robert Powell: They're pretty civilized now.

William Sharpe: I mean, think about it. It's inflation-adjusted. You obviously can't pool longevity risk, but you sort of can with your kids. If I die early, my children get the money. If I live for a long time, I'm going to be in a shack in their backyard, which may not be ideal. But I think we have to recognize such a plan as a way to pool longevity risk.

Robert Powell: Reverse mortgages are still little-used compared to what their use could be or should be. Lots of research has looked at them as ways to mitigate sequence-of-returns risk, for instance.

William Sharpe: The software used for my e-book computes the inefficiency of time-dependent asset mixes. But the problem with that is that you don't have binding contracts with the kids.

Stephen Horan: But there's some incentive alignment around that.

William Sharpe: There is. People probably need to have that conversation with their kids at some point, but hopefully, would not have to live in their kids' backyards.

Robert Powell: Bill, your good friend, Zvi Bodie, is sometimes fond of accusing the financial planning world of relying on junk science, and he insists that they should begin to incorporate the principles of life-cycle saving and investing into their practices.⁵ Any thoughts about whether that would help?

William Sharpe: As usual, I agree with Zvi. My guess is that if you happen to see an advisor while you're accumulating assets, they'll happily talk about the joys of retirement. It's all happiness. But once you're retired, if you have a lot of money, they'll

tell you, "Look, let's assume you're going to live to 100 and spend accordingly." That's fine for the wealthy, but most people can't afford to do that. In this world, and especially with concerns about pandemics, it must be very difficult to sell someone a payout annuity. Try telling someone to scrimp and consume a very small amount so there'll be enough left to reach 110. In an ideal world, Social Security might provide more income for at least a section of the population, but with the problems we already have with the funding of Social Security, that's not likely to happen.

SOLUTIONS FROM AROUND THE GLOBE

William Sharpe: Have any of you looked in depth at retirement funding in other countries? Do you have a sense that some other country or countries have it right? Perhaps a more generous social system?

Margaret Towle: The Netherlands seems to have gotten it right. The retirement system fused academic theory with pragmatic solutions to create a successful model for other countries to replicate. Essential elements include diversity of funding sources, robust cost measurements, and fairness in distributing benefits. Overall, compared to the retirement system in the United States, European countries approach retirement in a more comprehensive manner, thus providing beneficiaries with a broader social net.

William Sharpe: I believe that the Swedish social security plan has some private options for investment. In Italy, the benefits of their social plan are high enough for many people to retire reasonably comfortably just on that plan. I think the United States wandered into focusing on DC plans in the private sector without a lot of thought being given to the pluses and minuses, how it might relate to Social Security, what the contribution rates might be, and what the tax treatment should be. I've been around long enough to see the earth-shaking shift in the private sector from DB to DC. Originally, 401(k) and 403(b) plans were not intended to provide a person's entire savings program, but they sort of wound up in that space. It might be a good idea for us to at least think about a new grand design.

Stephen Horan: But how would you characterize the state of affairs? Some have described it as a crisis. Andrew Biggs has said it's not a crisis for those in the upper-income quintile or those in the lowest-income quintile.⁶ But, as you said a second ago, for those in the middle maybe it is a crisis.

William Sharpe: Many would be delighted to have the financial situations enjoyed by the middle class. This subject raises the issue of the distribution of wealth. But it is true that many people in the low-income brackets, between social programs and what little they may accumulate, will be able after retirement to maintain something close to their prior standard of living. And there is little reason for the general population to care about

those who already receive the highest incomes. It does indeed seem to be predominantly a problem for the middle class.

It would be interesting to think about a graph where you have some measure of adequacy relative to pre-retirement life. But thinking of that graph, and the extent to which the system is good for middle-income people or the lower income or the higher income, it would be interesting to see what that curve looks like in different countries. I believe that relative to their lifetimes, low-income Italians are especially well-off. But it would be interesting to see how a ratio measure of post-retirement standard of living divided by pre-retirement standard of living varies from country to country.

Stephen Horan: It's been said that what we need is a national retirement policy, like the bipartisan Commission on Retirement Security and Personal Savings sought to achieve but never really did.⁷

William Sharpe: Nobody could accuse us of having such a policy. But I suspect that Scandinavian countries may well have such policies.

Stephen Horan: You could retire at 110 percent of your pre-retirement income in some Scandinavian countries.

William Sharpe: We have some friends from Sweden who have been retired for 20 years now. They spend the winters in Italy and return to Sweden in the summers. They are straight-out working class, and they just did financially what folks said they should do.

They didn't do anything out of the ordinary, and they've lived very well while working and while retired. That's an example. However, it is a sample of one—not a particularly good empirical study.

THE OPPORTUNITY FOR ADVISORS

Robert Powell: Given what we've talked about so far, is there a missed opportunity? What should advisors be doing? How can they have a positive effect on the families they serve?

William Sharpe: Of course, it depends on who they're advising, what age, and what income level. Probably, most of their clients don't have grave financial problems. But to the extent that such a client wants advice for their children or grandchildren who are not as privileged—max out your 401(k) once you have your basic necessities should be a good place to start for most people.

Moreover, think about retirement and longevity—if you get in that mindset, perhaps the rest will follow.

Margaret Towle: Recent research on the topic suggests that one size does not fit all, at least as it pertains to using a behavioral finance approach to enhance one's understanding of retirement risks and challenges. For example, research suggests that women perceive risk differently than men. We need to understand this better. Nudges are useful, and most certainly systematically instituting nudges will benefit all.

William Sharpe: I'm assuming a good advisor uses or invents good behavioral approaches. That should be a large part of the process of educating, understanding, and trying to determine the clients' preferences. I would hope that's very much part of a traditional practice. I would also certainly like to think every single one of them has read Daniel Kahneman's book [2011].

Behavioral research can and should help. But there are problems. I remember studies that showed many surgeons could not correctly answer simple questions about probabilities. I would want my surgeon to know something about probabilities.

Robert Powell: In Andrew Lo's recent book [Lo and Foerster 2021], you're quoted as saying that the perfect portfolio would be a combination of TIPS and all the tradable bonds and stocks in the world. It just seems on paper so easy.

William Sharpe: Yes, but there's a caveat. To the extent that you consume in the United States things that are somehow specific to the United States, you might want to tilt away a little bit from a global portfolio toward one at least slightly tilted toward the United States, in order to hedge some of your costs. Plus, there are issues concerning wars abroad, problems with international supply chains, and so on. I am a believer in and practitioner of global diversification, but perhaps not completely for everyone. An American might well want to tilt a portfolio toward the United States, but I believe that it's hard to beat the markets and that diversification is a free benefit. It doesn't cost anything extra to diversify, and you get risk reduction—so what's not to like?

I find that a lot of people are resistant to holding stocks and bonds in market proportions because the resulting portfolio would include significant investment in bonds. The statement that you quoted suggested using a world bond/stock portfolio for a risky asset, then combining that risky portfolio with the best instrument you can find for a riskless asset, which for an American is preferably TIPS, and then mixing the risky and the riskless assets. But there are arguments for more-than-market proportions of equities and less-than-market proportions of bonds in the risky portfolio. I believe in very broad diversification, low cost, and holding the combination or spending it as needed when you're retired. Boring, really boring.

Robert Powell: You're not leaving much room for an advisor to help someone there.

William Sharpe: Well, the advisor can help you understand the trade-offs and try to give you a sense of the magnitudes. The advisor can tell you about inflation, give you a sense of the history of inflation, and give you estimates of the risks involved and the expected returns as best one can predict. I think an advisor can do a lot. But if your advisor wants to pick underpriced stocks, then I would suggest that you get a different advisor.

I've been retired for quite a while. As you know, there are three kinds of boards and committees: those that pay you, those that don't pay you, and then those where you pay them. They have good investment advisors but typically have policy statements such as: "Our policy is 60-percent stocks and our band is no more than 70 percent and no less than 50 percent. When we get out of the band, we will buy and sell to move back into the band." I'm sure that you know the approach.

I try to explain to the other committee members that not everybody can have policies of that type. If you're going to sell something or buy something, you need to ask yourself, "Why did the person on the other side take the trade?" I'm used to really intelligent people making what I regard as first-principle errors by failing to think about the nature of the greater marketplace. It is hard to convince them otherwise.

TRENDS IN INVESTING

Margaret Towle: The DOL has expressed serious concerns about the prudence of a fiduciary allowing the use of cryptocurrencies, as well as other digital assets such as tokens, as part of a DC pension plan. Conversely, we are observing a growing desire among other investors, such as philanthropists, to invest in digital assets. What are your thoughts regarding the use of cryptocurrencies as a part of retirement portfolios?

William Sharpe: I think the idea of cryptocurrency as an investment is insane. I just don't get it.

When you buy a share of General Motors you are getting the gains from a company that builds cars. But to the extent cryptocurrency is a medium of exchange, we don't advise having a drawer full of bills, do we? Why would you expect to make money from something that doesn't, as far as I know, produce anything? It doesn't take raw materials and turn them into cars, or books, or whatever. Investing in cryptocurrency just doesn't compute for me. If you want to gamble, it's a lot more fun in Las Vegas. Just sitting around and watching quotes for bitcoin—that's not very entertaining for me.

Robert Powell: What about ESG [environmental, social, and governance] investing?

William Sharpe: One of the charities I have worked with has an ESG fund for donors who want to put their money in a donor-advised charitable fund. Many years ago, Blake Grossman and I did a paper about South Africa-free investment, which was based on negative views of their apartheid policy [Grossman and Sharpe 1986]. I would say that if people don't want to have money invested in firms that do negative things it is, of course, their right.

You would think that if a fair number of people dislike such a firm but a fair number of people do not, that markets would reach an equilibrium where there would be higher risk-adjusted returns for the firm that does the bad things than for firms that do the good things. That would be a perfectly sensible equilibrium. Prices would adjust to reach such an equilibrium.

If people want to have their money invested only in firms that do things that they're happy with, fine—as long as they understand that it might cost them a little and reduce their diversification.

Margaret Towle: Many investors in the ESG space have moved on from negative screening, echoing your sentiments around reduced diversification. More recently, the discussion has shifted away from negative screening to incorporating robust screens for non-financial factors, such as how you treat your employees. These investors justify the expansion of criteria to include nonfinancial measures of the change in potential drivers of return and risk. For example, today the composition of major market indexes consists of companies with assets that are largely intangible, such as intellectual capital. Many ESG investors assert that using ESG measures provides a better way to get a complete picture of return drivers and areas of potential nonfinancial risk such as reputation risk.

William Sharpe: I take your point. Very often the argument is that you should buy the companies run by good people, let's call it, and you'll do better financially. That may well be, and that could be true for a period of time, but one would presume that in time the opposite could prevail.

After we published our article, South Africa-free stocks did better because people were favoring them. That could certainly happen with ESG stocks, but it would not be a long-term equilibrium. Ultimately, if there's something noxious about holding shares in a company, then you would expect that it would have to give a higher return relative to risk for enough investors to be willing to hold it. The transition to such an equilibrium might, of course, be very advantageous for somebody who holds ESG funds. The only fund I've watched is the one we use, and thus far it has slightly underperformed the more broadly diversified funds that we hold.

Margaret Towle: Do you think that investors incorporate negative economic externalities in their assessment of companies?

William Sharpe: We built a portfolio of S&P minus South Africa-related companies, trying to keep the portfolios similar in as many respects as we could. There was a period when, as people put more money into these virtuous companies, they actually outperformed the non-virtuous companies. However, long-term equilibrium would presumably be the converse. To be sure, it is difficult to sort it all out. At the moment you have to pay higher fees for the funds of ESG firms than for those holding broad market portfolios, so that's an additional hurdle for the virtuous investor. There is nothing wrong with investing in virtue, but in equilibrium it may cost you something.

After they all think about this for a while I say: "Okay, it's been a year. The market has done 5 percent. Before cost, what have you index managers on the left earned?"

LEGACY OF FINANCIAL ENGINES

Robert Powell: I'm curious that Financial Engines is today considered one of the largest RIAs [registered investment advisory firms] in the United States.

William Sharpe: I believe that it's the largest independent such firm, but I haven't seen the data in detail.

Robert Powell: With the merger with Edelman, it's now the largest, I believe. Talk a bit about your involvement with the company and the legacy that you've created there, but also the impact that you've had on the growth and prominence of index investing in general.

William Sharpe: After Financial Engines went public in 2010, I sold my shares and fully retired from the company. I keep in touch with some of my friends who are still there, but we don't talk about the company in any detail. I do believe that some of the technology that we built is still chugging along, updated of course, based on a multifactor model, equilibrium assumptions, and holdings-based performance analyses. They're still using some of the things you would expect to find in a firm that I helped found, such as returns-based style analysis, market risk-return trade-offs, and so on, but I don't know any of the details.

Robert Powell: What about the impact that you've had on the growth and prominence of index investing?

William Sharpe: Well, I like to think that my work had something to do with the creation and the spread of indexing in the

early days. That said, there are probably thousands of index funds that I would not endorse because their indexes are narrow and their expenses exorbitant.

I'd be happy to not take credit for having any influence over those funds, but I do think that the broad-based, market-valued, low-expense index funds have been a big plus for the investment community, including people saving for retirement in 401(k) plans. Would such funds have been created anyway? Probably, almost certainly. But with my work on the capital asset pricing model, I at least gave an early academic argument for creating them.

Another argument that I like to make for audiences of people with little investment experience is one I made in a little page-and-a-half piece called "The Arithmetic of Active Management."⁸

To start, I would divide the audience into two groups. Those on the left would be index fund managers and those on the right would do security analysis, learn details about companies, analyze market moves, and so on. Then I tell them that the people on the left are boring—all they know is where to look up information about how many shares of each stock are outstanding, etc. Also, they are not going to get paid much because a robot or computer could do that sort of work. I would say that people on the right are going to be smart, great to talk to at cocktail parties, etc., etc.

After they all think about this for a while I say: "Okay, it's been a year. The market has done 5 percent. Before cost, what have you index managers on the left earned?" When they think about it, they conclude that every one of them got 5 percent before cost. Now I ask, "What about the managers on the right?" They figure that some of them got great results—much more than 5 percent. And some probably less. The returns would undoubtedly differ.

Then I ask: "If the market returned 5 percent, what was the before-cost return on the average dollar invested on the right?" I usually get some puzzled looks as many of them think: "Wait a minute, this must be a trick question. Let me think carefully." Then, bit by bit, they conclude: "Well, it must be 5 percent."

Then we talk about after costs and conclude that the after-cost return on the average dollar invested on the right must be less than that on the average dollar invested with the index managers on the left. That is usually a startling conclusion. Many of them haven't thought about that.

My short paper, "The Arithmetic of Active Management," may well be the most important practical contribution that I made. I find this a bit depressing because I spent most of my research time with complex formulas, computer programs, and all the rest. But this analysis is very convincing.

Stephen Horan: Very powerful.

William Sharpe: One of my friends who preceded me on the podium at a conference years ago said, “Well, Bill should get another Nobel Prize for that.” My response was: “A Nobel Prize for something that obvious? Give me a break.”

Stephen Horan: Yes, humble rules of arithmetic and investing.

RETIREMENT IN PRACTICE

Stephen Horan: Why did you retire when you chose to? What drove your decision to say now is the time?

William Sharpe: I don’t know that I’ve ever tried to answer that question for myself. First of all, I could never have retired away from a major university until the electronic era. With the internet and computers, I found I didn’t need to be near Stanford or another major university. I figured that I could continue doing much of what I had done before except teaching. I’d already taken a couple of years off to start a consulting firm and then gone back. I guess that I was ready to concentrate on writing and research.

For a while, I did a little consulting for large pension funds but then gave that up. Initially, I did talks here and there and tried to keep in pretty close contact with the industry and with academics. I wrote two books—one of which was published as a traditional book and the other which includes software as part of the book remains an e-book on my website. Few seem to have read it.

Robert Powell: I have.

William Sharpe: Have you? But I suspect that you didn’t read the programs.

Robert Powell: I didn’t read the programs.

William Sharpe: My friend who retired from the private wealth company—the one who told me, “Assume they’re both going to be a 100”—said: “Oh, it’s easy to read. You just skip all the programming stuff.” It is now available online at <https://rismat.stanford.edu/>.

As you know, I’m not a child. The calendar fills up and I try to stay in contact with both academics and practitioners. And I try to learn more.

Robert Powell: Thank you, Bill. It’s been an incredible pleasure and honor.

William Sharpe: This has been a delight, and I thank you for your interest, your time, and for indulging me. ●

ENDNOTES

1. See <https://www.federalregister.gov/documents/2020/09/18/2020-17476/pension-benefit-statements-lifetime-income-illustrations>.
2. Sharpe helped found Financial Engines in 1996. The firm introduced one of the first digital fintech retirement platforms to give working people access to advanced portfolio management strategies. In 2018, Financial Engines combined with Edelman Financial Services, now Edelman Financial Engines, merging dedicated human relationships with patented financial technology to give individual investors access to advanced portfolio management and personalized financial strategies.
3. Hal Hershfield, PhD, is an associate professor of marketing, behavioral decision-making, and psychology at the University of California, Los Angeles. His research, which sits at the intersection of psychology and economics, examines the ways that people consider their future selves and how feelings of connection to these distant selves can impact financial decision-making over time.
4. See Merton (2020).
5. Zvi Bodie, PhD, is Professor Emeritus at Boston University, where he taught from 1972 to 2013. He also served on the finance faculty at Harvard Business School (1992–1994) and MIT Sloan School of Management (2008–2009). He has published widely on pension finance and investment strategy and is best known for applying modern financial theory to life-cycle saving and investing.
6. Andrew G. Biggs is a senior fellow at the American Enterprise Institute, where he studies Social Security reform, state and local government pensions, and public sector pay and benefits. Previously, he was the principal deputy commissioner of the Social Security Administration (SSA), where he oversaw SSA’s policy research efforts.
7. The Commission on Retirement Security and Personal Savings was launched in 2014 to examine the U.S. retirement system and offer public policy recommendations that could facilitate increased savings and improve the financial security of Americans in retirement. See <https://bipartisanpolicy.org/commission-on-retirement-security-and-personal-savings/>.
8. See <https://web.stanford.edu/~wfsarpe/art/active/active.htm>.

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