Eugene Fama, Robert R. McCormick Distinguished Service Professor of Finance at the University of Chicago Booth School of Business, is generally regarded the father of modern finance. Along with Ken French of Dartmouth, his research has expanded upon the capital asset pricing model to identify the value and small-capitalization contributions to risk.

Dan Richards spoke with him on May 1, the day before his guest talk at the CFA Institute annual meeting.

Videos of this interview are available here.

I'd like to begin with a paper that you and Ken French published in 2010 in the Journal of Finance relating to the long-term performance of active mutual funds. What interested you in this topic?

It's an old topic, but we wanted to add a perspective on the overall performance of individual funds, in particular to what extent is performance due to luck rather than skill. So that is the title of the paper, “Luck versus Skill.”

We looked at US stocks, and the timeframe was 1982 to when the paper was published. Basically 1982 was the earliest period in which you have mutual fund data that is free of what we call survivor bias. In other words, dead funds are included in the data from then on. That's very important because a lot of funds die.

What were your high-level conclusions for that 30-year time period?

First, if you look the industry as a whole, and you take a dollar invested in active mutual funds in proportion to their net asset values – bang, right on the market. So, in aggregate, they are holding the market portfolio. Their portfolio looks just like the market portfolio. It is correlated 99%-plus with the market portfolio, but their returns are under the market portfolio returns by almost exactly the average expense fees of the funds.

That's actually a theorem that applies to active investing in general. Active investing has to be a zero-sum game before fees and expenses. Now the mutual fund industry is not all
active investors. But when you add up all active investors it is just arithmetic that says they have to add up to zero.

After fees and expenses, the industry as a whole loses to the market by the amount of fees and expenses.

Now suppose we look at individual funds, and we identify funds that have skill and funds that don’t. Now, the implications of that simple statement we started with, what Bill Sharpe calls the arithmetic of active management, is that everything has to add up to zero. The implications of that are – and this is a little counterintuitive – if there are real winners, not just lucky winners, there have to be real losers. The winners beat the losers.

And could you tell me more about how you conducted this study?

The trick is to form a population of returns that looks just like the actual population, except that you constructed it so that there is no performance, and you know in advance that all of the outcomes are due to chance. Then you do what is called a bootstrap simulation and construct returns for each fund. You compare the distribution of generated returns to the actual distribution, the cross-section of returns. We are looking at funds for their entire lifetimes, not five years or three years of performance.

What we found was if you give the funds back all their fees and expenses, you subtract their benchmarks out and then their returns are basically symmetric about zero. The right tail is a little bit fat and the left tail is a little bit fat, in that there are more winners then you would expect purely by chance, but there are also more losers than you would expect purely by chance, and they balance one another.

So what percentage of active funds would be in that category that would appear to demonstrate skill?

About 15%, before fees.

How about after fees?

After fees, about 3%. The most extreme 3% do about as well as you would expect if they had just enough information to cover their costs. But that means going forward you expect them to do about as well as a low-cost passive fund of the same type.

Part of that is difficult for people to swallow. We are looking at funds over their entire lifetime. So these are funds that have done consistently extremely well. Books have been written about their managers. But that is the whole extreme tail, and yet going forward you expect them to be only about as good as a passive fund.
What does that mean? They have had extraordinary returns over their lifetime, but that is why they were selected to begin with.

You have to take into account that you sorted all the funds and picked out the winners. When you do that, 3% is what you expect on a purely chance basis. We have 3% of funds that do about as well as you would expect if they could just cover their costs, but no better.

A couple of years ago, Lubos Pastor at Chicago and Rob Stambaugh of Wharton authored a paper that suggested that stocks, over the long term, may be riskier than the conventional view of, for example Jeremy Siegel, best known for his book, *Stocks for the Long Run*, which demonstrates that over a long period of time, stocks very predictably outperform other asset classes. Who is right?

What Pastor and Stambaugh are bringing in is that you can't just look at the historical returns. You have to take into account that the average return you estimate from past data has a lot of uncertainty as a prediction of the future average return. If you take into account that uncertainty, then the distribution of possible future outcomes gets much wider, because it takes a very long period of time to get even a reasonably good estimate of the expected returns differentiated from the historical average.

People have a misconception that over the long run stocks will do better than, say, Treasury Bills. That can't be true, because that would create an arbitrage opportunity for a long-term investor. It has to be true that over any period of time you look at, there is some possibility that less risky assets do better than more risky assets.

**Otherwise there is no equity risk premium – the notion that you get a premium for the greater risk in stocks.**

It is true that the probability of getting a positive return goes up the longer the holding period. Now people are misled about that, though. They think 10 years is a long period. It isn't. You are talking investment lifetimes before you can be confident that the expected return is greater than zero.

It's a little bit disturbing. When I talk to advisors, I always emphasize that the big message they have to get to their clients is how risky investing is and how risky different asset classes are.

You are associated with a lot of research that suggests that markets are efficient over time and that it is very difficult – perhaps impossible – for a manager to outperform consistently over a long period of time. The most common counterargument to that is Warren Buffett and his remarkable success since the early 1960s, a 50-year period. Does that contradict your notion that it is impossible for active managers to outperform?
He is a businessperson. He is not an investor *per se*. He buys whole businesses, and I would imagine helps to run them.

But I would like to do the same sort of test that we did on mutual funds. If I take the whole cross-section of entrepreneurs, will the distribution look much different than I would expect by chance? That is a much more difficult thing to do for a cross-section of businesses than it is for a cross-section of mutual funds, because you have good data on mutual funds and you have very limited data on the many thousands of businesses that are out there.

But, because there have been so many thousands of businesses, you expect that the winners on a chance basis will look incredibly good. Now, I don't know if Warren Buffett is lucky or just skilled, but I would like to do the test. And I can't do the test just on him. I have to do the test on everybody to figure out whether he is unusual or not.

**One of the pieces of research that you are best known for, that is one of the most influential and important contributions to finance, relates to work that you and Ken French did years ago on the three-factor model. It suggested that the traditional view that the only thing that predicted future returns was beta or volatility was too narrow. What led you to that research?**

This was back in 1980, when we first started working on this. And the situation at that point was the CAPM was still one factor. Sensitivity to market volatility was the only thing that was really a measure of risk that you needed to know to describe average returns.

That was the dominant paradigm.

But papers had been accumulating showing that if you sorted stocks on market cap, the model seemed to have some problems. If you sorted them on earnings-price ratio, the model seemed have some problems. If you sorted them on leverage, the model seemed to have some problems.

We wrote a paper in 1982 that said, “Okay, let's put all these things together. There are many problems here.” You can slough them off one at a time and say the model is working okay. When you put them all together it basically said this model is not working.

The next year we put a paper out that said you need at least two more risk factors to describe how average returns differ from one another. We added a size factor, basically small-stock returns minus big-stock returns, and what came to be known as the value-growth factor, which is the difference between high book-to-market and low book-to-market returns.

This model says there are three dimensions of risk or exposure to the market. Every asset pricing model says exposure to the market counts. The original CAPM was the one that said that's the only thing that counts.
We are basically saying at least two more sensitivities are important in describing how average returns differ from one another. That caught the attention of academics and practitioners, much to my surprise. I didn't think the original paper would be published, because as far as I could tell there was nothing new in it.

Some of that work became the foundation of Dimensional Fund Advisors, whose president, David Booth, wrote a fairly large check to put his name on the business school here at the University of Chicago. DFA is one of the best-known firms that has taken that academic research and commercialized it in its offerings.

Its approach is based entirely on this three-factor model. Ken French and I are involved in their product development and maintenance.

The impact of size and the fact that smaller stocks outperform shouldn't have been a surprise. If you look at the Morningstar Ibbotson data going back to 1926, I believe it shows a performance premium of 3% per annum over that period of time.

From 1926 to 1963, the data only include NYSE small or value stocks, because they are way below the median NYSE market-cap. In order to be listed on the NYSE originally, the listing requirement was basically right at the median. So everybody below the median had fallen in value. It basically means they were small-value stocks.

You've got a blurring of the line between size and value. That's basically what we tried to disentangle in our 1993 paper. If you look at size or value alone, the effect was not so big. The CAPM has a little problem with that, but not a big one. It’s value that's a big problem because the CAPM thinks that value stocks are less risky than growth stocks.

You developed this insight that there are three factors, not just one, that determined stock performance. If you take the view that the market is perfectly efficient, is there a possibility that, going forward, that insight will be reflected in market valuations so that the return premium will disappear over time?

It all comes down to: Do you think it is risk or not? So do you think small stocks are riskier than big stocks? Do you think value stocks are riskier than growth stocks? Or to turn it around, is saying risk requires higher expected returns the same as saying risk requires a higher cost-of-capital?

To me it makes a lot of sense that small stocks and value stocks are riskier and as a consequence have higher cost-of-capital and higher expected returns. It is like saying because we now know that over long periods of time stocks have higher average returns than bonds, do we expect that to go away in the future? You don't if that is a premium for bearing risk.
I understand how smaller stocks would intuitively seem to be more risky. There are less well capitalized and more vulnerable to financing issues. But value stocks—some would say they should have a higher margin of safety, so they should be less risky rather than more.

That's not the way it works. If you look at the economic characteristics, value stocks tend to be in some difficulty. Their fundamentals look good relative to their market values, but they look awful relative to book values. These are basically companies that are reorganizing a bit, getting things back in order. On the other hand, growth stocks tend to be highly profitable and expanding. So it makes sense that the troubled firms have higher cost-of-capital.

One of the things that you are closely associated with that's come under a little bit of scrutiny and perhaps criticism in light of what has happened with the global financial crisis is the efficient market hypothesis. Perhaps we could start with a quick definition of the efficient market hypothesis?

The simple statement that prices reflect all available information. That is an efficient market.

The corollary to that would be that markets are rational at given points of time. Let's talk about the tech bubble, when you had stocks that had no revenue or sales traded at 100-times earnings. How is that phenomenon consistent with the efficient market hypothesis?

Let's go back to that point in time and ask what was going on. That's when the Internet was getting big play and everybody thought the Internet was going to revolutionize business. Of course it did, but it didn't revolutionize in a way that made Internet companies all that profitable. That was the so-called Internet bubble.

I hate the word bubble because bubbles are things people see with 20/20 hindsight. I don't think they are forward-looking things that people see. But in any case, what was going on was that people were thinking there was going to be some enormous winners out of this process. But who would be able to identify them in advance? So there was a lot of buying of anything in sight that looked like it might have a shot at it.

I did a calculation at that time that said in order to justify the valuation of Internet-related stocks, what would have to happen is that something like 1.5 of them would have to come out of that process to make those valuations worthwhile. Now we did get Google out of it, but that was not clear at that time.
And perhaps Facebook is on its way.

Those fellows weren't even born at that time. It didn't work out the way it was projected. People thought that there was lots of money to be made on the Internet. It turned out the Internet was a very competitive environment.

So your conclusion is that the market valuations were sound at a macro level if you took all of those tech valuations together.

It made sense looking forward. It didn't make any sense looking backwards. So that is always true. Prices are always wrong after the fact, because before the fact you are betting on things that are uncertain; after the fact, you know the facts.

But come back to your notion that you hate the phrase "bubble." What is associated with the notion of a bubble is that people get wrapped up in their emotional response and they lose any kind of rational approach. House prices were the most recent example.

The classic definition of a bubble is something with a predictable ending. It is something that a smart investor should be able to make money on.

But it is come to have the meaning that people think that any big swings and prices are bubbles. So that has destroyed the value of the term. I hate when people say bubble. I don't know if they mean bubble the way you defined it, or if they mean bubble in the classic sense of something with a predictable ending, or they just mean they are talking about a price going up.

Everybody talks about the bubbles that ended in the financial crisis. Can you really think about a world in which all asset markets were subject to bubbles at the same time? That is a tough concept for an economist to swallow. Maybe a stock, maybe a segment, maybe a particular asset, but now you're talking about all assets, because basically all assets were very high. That's a tough one to swallow.

After the fact, we had a huge recession. Prices of all assets crumbled. That is what typically happens with a big recession. It gets called a bubble, but I don't know if it satisfies what people would classically call a bubble.