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Finance Fallacy: Stocks in the Long Run

Financial advice is often loaded with misconceptions and misinformation. In the latest edition of Finance Fallacy, Paul Solman and Boston University professor Zvi Bodie debunk the belief that investing in stocks is the safest, smartest route to financial security over the long run.



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What are the best saving and investing products for you? The answer depends on when you will need the money, your goals and if you will be able to sleep at night if you purchase a risky investment where you could lose your principal.

For instance, if you are saving for retirement, and you have 35 years before you retire, you may want to consider riskier investment products, knowing that if you stick to only the "savings" products or to less risky investment products, your money will grow too slowly...or given inflation or taxes, you may lose the purchasing power of your money. A frequent mistake people make is putting money they will not need for a very long time in investments that pay a low amount of interest.

[-Securities and Exchange Commission's Roadmap to Saving and Investing](#)

How we think about risk

PAUL SOLMAN: Welcome to our second Financial Fallacy and again, professor of finance at Boston University School of Management and MIT, Zvi Bodie.

ZVI BODIE: Pleased to be here again.

PAUL SOLMAN: Excellent. So, the financial fallacy this time is what, Professor Bodie?

ZVI BODIE: It's the mistaken belief that although stocks are risky in the short run, they're safe in the long run.

PAUL SOLMAN: Now for our listeners, I should point out that this not exactly a new insight of yours. I believe I have heard you debate this... How many years ago was it when you debated Jeremy Siegel with Paul Samuelson, the Nobel Laureate, moderating? Fifteen years ago?

ZVI BODIE: Oh yeah, at least.

PAUL SOLMAN: Right. And so... And you've actually been working on this issue since the '70s, right?

ZVI BODIE: That's right. Yeah. But of course Paul Samuelson pointed out this fallacy back in the mid-60s and I learned about it from him.

PAUL SOLMAN: And the fallacy is that on average, of course, stocks are a good bet, right? Because over the long run, the average is that you'll do better with stocks - "better" in the sense of a better return on your investment -- than you will with virtually any other class of asset.

ZVI BODIE: Right. That's... You just committed the fallacy!

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Zvi Bodie
Boston University

“ We often make the mistake of thinking of risk as the probability of losing money. But if we just look at the probability without taking account of the severity, then we're going to get completely the wrong idea. ”

PAUL SOLMAN: I was just doing it to please you!

ZVI BODIE: Right. Right. A lot of people believe and, loosely speaking, I guess, it's all right to say this, that if you say that the average or the expected rate of return on stocks is, let's say 8 percent or 9 percent, they think another way of saying that is that, in the long run, that's what you're actually going to earn.

Except that's not correct! OK? All that it means to say... What it means to say that 9 percent is the average or the mean or the expected rate of return is that there is some probability distribution of outcomes in any period and that the mean of that probability distribution, the average value, is 9 percent or 8 percent. But in the long run you could wind up earning a hell of a lot less than that because there's a lot of variance around that mean.

PAUL SOLMAN: The way this became clear to me... You've been explaining this to me for a very long time, and when it became clear to me finally was when I thought of one of those displays that they have like in the Museum of Science in Boston where you've got the distribution. So that's the famous bell curve with this big hump in the middle and then it gets lower and lower as you go out on the tails – so called – in the distribution, the two sides of the distribution.

And what you pointed out to me is for the longer the period of time you're looking at, the longer those tails get. So if you're thinking of one of those tails as really horrible outcome, and the other as really exceptionally, unusually, unexpectedly good, and the mean being that hump in the middle – what you'd usually get – well, then the really horrible outcomes become even more horrible the longer you actually invest more.

ZVI BODIE: Exactly right. And a good way to see that, just saying the same thing over again is: Suppose in any period in a year you can earn 30 percent on the upside or you can lose 20 percent on the downside – just those two possibilities. Then the worst that can happen to you in one year is you lose 20 percent.

Now if you go out two years and you have those two same possibilities in each year, now the worst possible outcome is you're losing 40 percent. In three years, you could lose another 20 percent. So by the time you're looking at 10 years, you could be down to virtually nothing. Now, the probability of that happening is quite low, but it can happen!

PAUL SOLMAN: Right. And so it all depends on what you mean by "safe." If what you mean by safe is: "Hey, nothing bad is going to happen to me," which is what we usually mean by safe, then stocks in the long run are not necessarily safe, and that's your whole point.

ZVI BODIE: Yeah. My point is that we often make the mistake, particularly when we talk about stocks, of thinking of risk as the probability of losing money. But if we just look at the probability without taking account of the severity – how bad it can be – then we're going to get completely the wrong idea.

Testing investment options

PAUL SOLMAN: Now right now up on the [Securities and Exchange Commission Web site](#), which we already attacked in our [first financial fallacy](#) when they failed to make the accurate distinction between savings and investment, here they say: "What are the best savings and investing products for you? The answer depends on what you will need, when you will need the money," sorry, "your goals and if you'll be able to sleep at night, if you purchase a risky investment where you could lose your principal." So far, so good, yes?

ZVI BODIE: Uh huh.

PAUL SOLMAN: "For instance if you were saving for retirement and you have 35 years before you retire, you may want to consider riskier investment products knowing that if you stick to only the savings products, or to less risky investment products" – which is actually all the savings, that's what they think they mean by savings products here, right, so that's the other fallacy – "but your money will grow too slowly, or given inflation or taxes you may lose the purchasing power of your money," professor Bodie. "A frequent mistake that people make is putting money they will not need for a very long time in investments that pay a low amount of interest."

ZVI BODIE: Right.

PAUL SOLMAN: And behind this is the premise that stocks in the long run are better for you?

ZVI BODIE: Exactly. That as long as you have a long time horizon, you're going to do better with stocks.

PAUL SOLMAN: Now we've got a picture here and what's this picture of?

ZVI BODIE: I have a diagram, which is designed to illustrate what happens to a person saving over their whole lifetime, a 70-year horizon. So they save... Let's say they're age 25 when they start contributing to their retirement program, their retirement plan, and they're going to contribute 100 – whatever 100 is...

PAUL SOLMAN: \$100, \$100,000 or whatever.

ZVI BODIE: Kopeks every year.

PAUL SOLMAN: Kopecks.

ZVI BODIE: Every year for 40 years, and then they're going to draw it down to live on from age 65 over 30 years to age 95.

PAUL SOLMAN: Which is the whole point of saving for retirement.

ZVI BODIE: Precisely. And what I do is I take the actual history of returns on the stock market, a broad S&P 500 type of portfolio, very well-diversified portfolio.

PAUL SOLMAN: Five hundred biggest companies, roughly speaking.

ZVI BODIE: Right. And what I do is I say: Let's suppose we invested the way the investment advisers tell us to in these target-date funds, which means when I'm age 25, I put 90 percent of my money into stocks and 10 percent into 'safer' assets - say, cash and bonds. And then every year the closer I get to retirement, I reduce the fraction invested in stocks by 1 percent and increase the fraction in the safer assets, so that when I reach age 65, I've got 50 percent in stocks and 50 percent in bonds, let's call it.

PAUL SOLMAN: And this is a standard algorithm? This is what a target-date fund typically does?

ZVI BODIE: Right. Typically that is... This is the average target-date fund, which is now the default option in many retirement savings plans, 401(k)-type plans. And then I say: All right, now let me convert that into lifetime income over the next 30 years. And I convert it using a real interest rate of 2 percent, by which I mean, we're assuming you can earn 2 percent more than inflation. I choose that rate because that is the rate that you could actually earn for sure right now investing in Treasury Inflation Protected, U.S. Treasury Inflation Protected Bonds. And...

PAUL SOLMAN: These are so-called TIPS. We've talked about them before and we'll talk about them again, but they are bonds you buy, just like Treasury bonds, they are Treasury bonds. They have different maturity dates and they pay you when you redeem them, they pay you the accumulated interest net of inflation from the period you bought them.

ZVI BODIE: Well, they... Well...

PAUL SOLMAN: Yeah, it's tricky but...

ZVI BODIE: Well, they compensate you for inflation, whatever it is, whatever inflation turns out to be. So they're risk free in that sense - no inflation risk. And so what I do is I say: Suppose I took no risk at all, which is what I do, as you know, and put everything into TIPS and earn 2 percent more than inflation over the whole 70 years – the accumulation period of 40 years and then draw it down over 30 years. So, if I put in 100 every year for 40 years, I will be able to take out 280, 2.8 times as much each year fully adjusted for inflation over the next 30.

PAUL SOLMAN: That's if you are only taking it out for 30 years.

ZVI BODIE: Correct.

PAUL SOLMAN: Put in for 40, take out for 30. You get a 2 percent



Paul Solman
NewsHour with Jim Lehrer

“ You have a program that generates these histories, picking them at random from the stock returns of the past. And I remember one [where] the stock market starts going down just when you retire and goes down so far you take out virtually everything. ”

real rate of return, that is net of inflation, and you wind up being able to take out almost three times as much money per year as you put in?

ZVI BODIE: You got it. And that supplements your social security income, and it's just like social security income in that it's U.S. government guaranteed, and it's inflation protected. So that's my benchmark.

And then I say: All right, I'm going to compare how I would have done if I had followed a target-date fund strategy for the 40 years that I'm putting in the money, and also when I'm taking out the money in a variable annuity account, which means it goes up or down depending on whether the target-date portfolio does better or worse than 2 percent.

PAUL SOLMAN: And is that still a 50 percent?

ZVI BODIE: That stays at 50 percent equities.

PAUL SOLMAN: So. It seems so obvious though! I mean, I'm starting out today, I'm looking ahead 70 years and I say: Well, over 70 years, for goodness sake, the stock market has in the past, has certainly gotten 8-9 percent a year. Average it out so there might be another depression, we may be in one right now, but you know what the heck! I'll weather that storm. If you look back over history, the Depression is like just a drop from the secular trend – so called – that is the general upward line of having invested in the economy as a whole or in stocks.

ZVI BODIE: Well, that's right, and in fact if you use the 70 years – that period since the Depression to now, OK, or 'til 2005 is where it stops - indeed, over that period, you would have done much better with a target-day fund strategy.

PAUL SOLMAN: Better than...?

ZVI BODIE: Than 2 percent all TIPS safe strategy. But...

PAUL SOLMAN: Which is a technical matter – you couldn't have done because they didn't start offering those until the '90s.

ZVI BODIE: That is true. Right. But now we've got them.

PAUL SOLMAN: Right.

ZVI BODIE: And so I ask the question: Well, why don't I generate alternative 70-year histories?

PAUL SOLMAN: Right.

ZVI BODIE: Using the same rates of return that were earned on stocks and bonds in the past and a random, randomization of those rates of return.

PAUL SOLMAN: So random - so 1940, 1977, 1933, 1979... Just picking them at random.

ZVI BODIE: Right. Just picking them out. And I can get the same rate of return more than once because I keep returning them to the...

PAUL SOLMAN: I see. So each one, each time you might get 1933 a second time, or something like that.

ZVI BODIE: Right.

PAUL SOLMAN: And what are you trying to do here? Just so we understand.

ZVI BODIE: This is called Monte Carlo simulation and it's standard practice in trying to figure out how much risk there is in any particular investment strategy, to randomize the rate of return.

PAUL SOLMAN: So we're not stuck with the past 70 years, we're just taking annual returns from the entire history of the stock market, putting them together and saying: Hey this is a possibility. Here's another possibility, another 70 years worth of returns.

ZVI BODIE: Right. But we are relying on history in the sense that we think the probability distribution of returns, the histogram of annual rates of return...

PAUL SOLMAN: That's that famous bell curve?

ZVI BODIE: Right. Is going to be the same as it was in the past. So it has the same average, it has the same standard deviation, has all the same statistical properties.

PAUL SOLMAN: Got it.

ZVI BODIE: And we sample randomly from it. And we generate alternative 70-year histories. And any one of these is equally likely going into the future. So if we generate 100 of these histories, each one of them has a probability of 1 percent of occurring.

In this diagram I show you four alternative histories. One is the benchmark one that's safe, that's risk-free.

PAUL SOLMAN: 2 percent a year.

ZVI BODIE: 2 percent a year and that generates 280 per year in income.

PAUL SOLMAN: Almost three times what you put in.

ZVI BODIE: Then I showed the historical one that actually occurred over the last 70 years and during that 30-year history, you would have had much more income in each year than 280. So that outperformed the safe benchmark, and that's what everybody is looking at and they're saying: Gee, you know, stocks look great! Because there's this long run history.

PAUL SOLMAN: Right.

ZVI BODIE: But, of course, that's just one of many histories that are possible going forward. And so I give you two other runs, randomly generated. Two other alternative histories, one of which is even better than the historical one, but one of them is disastrous. Okay? It has... Basically that's the one where you're eating dog food at age 80.

PAUL SOLMAN: Now I've seen you do this in class and in fact you just... You have a computer program that generates these histories, picking them at random from all the stock returns of the past. And I remember one where you get out forty years... I'll never forget it actually. It pops up on the screen, it's random, so it's happening in real time and there's one: Uh oh! That one, the stock market starts going down just when you retire and goes down so far in that first 10 years that, given the amount you're supposed to take out every year in order not to eat dog food, you've taken out virtually everything by the end of the 10 years and even though in that particular run the stock market then soared...

So there was just this 10 year period out of 70 where it went down just like the Great Depression or something, but that happened to be the 10 years that knocked you out of the game!

ZVI BODIE: Right. You've got it. And that of course is the whole point. Is that that's what's going to happen when you and I retire. That's Murphy's Law of Monte Carlo simulation.

PAUL SOLMAN: Well it's not... For anybody who retired a year and a half ago...

ZVI BODIE: Yeah. Or back in 1974, for example -- the last time we had a disastrous run of stock market returns. So the point...

PAUL SOLMAN: There the market didn't return until...

ZVI BODIE: Oh, until 15 years later.

PAUL SOLMAN: Right. So, that 10 years could literally wipe you out even if you were utterly prudent with respect to saving.

ZVI BODIE: Right. Now my point is that no matter how low the probability of that occurring may seem to be, it could happen and we insure against things like that all the time. I mean, how likely is it that your house is going to burn down? Really very unlikely -- much less than a 5 percent probability. Yet you pay good money to insure against it because of the severity of that happening -- and that's what is missing in the standard story that we hear about stocks not being risky in the long run.

Safety nets during downturns

PAUL SOLMAN: So, it seems so obvious that this is the case. I mean once you make the argument I can't imagine anybody listening who doesn't think: Well, I see what he means. Particularly now. They didn't used to listen to you, Zvi! But these days I guess you're getting a warmer reception!

ZVI BODIE: Yes, it occurs periodically that they start listening!

PAUL SOLMAN: This story somehow plays once the stock market starts going down. But if it's so obvious, then how come there has been such assiduous, diligent resistance - intractable, I would say -- resistance to this message?

ZVI BODIE: Well, essentially there are two explanations, I think. One is: Probability is hard to understand, statistics are hard to understand. You know there was a famous book that we studied in high school -- I know I did -- called "How to Lie with Statistics."

PAUL SOLMAN: Well, I remember 'Lies, damned lies and statistics' -- I think that's a Mark Twain [line](#).

ZVI BODIE: So, it's easy for even well-meaning people just to misunderstand it, but it's even easier if you're trying to sell investment products to somebody who understands it just as badly as you do. So, there are an awful lot of people who are making their living by selling mutual funds, stock funds, and so forth, and it's much more profitable to manage stocks than to manage TIPS. There's nothing to manage with TIPS!

PAUL SOLMAN: And therefore no commissions.

ZVI BODIE: Right. And so, you know, what you're getting is a marketing pitch.

PAUL SOLMAN: Well, but of course, isn't there a third reason which is: I, the typical investor, want to believe in the marketing pitch. I mean, I'm programmed to hope for the best. We've talked to Dan Arieli about this. You know, there's an innate optimism built in to us and it clouds our judgment and certainly if I'm thinking: Hey wait a second I'm going to have to forgo stuff now because I'm going to get a lower rate of return; as opposed to: Hey, it's the average, everyone else is doing it. Isn't there a natural predisposition to believe the story?

ZVI BODIE: You're absolutely right but... But it is exploited by the marketing.

So, typically what happens is this: You sit down with an adviser, or you sit down at a computer program, and it's going to help you plan for retirement. So, it starts off with you giving a target level of income. You know you're lost once you start that way because where you really want to start is: What am I doing now, and how much will I be able to afford in retirement? Right? And how do I protect that? And when is a sensible time for me to plan on retiring, if ever! That's what I would call rational, realistic planning.

But that's not what is done by these planners. What is done is: Where would like to be when you retire? So, you set this level of retirement income, which in many cases is just totally unrealistic given your current savings rate and your planned retirement age. And then, you know, so the program shows: Oh my god! The person is saying I can't save that much, I'll never retire. Not to worry! Just increase the fraction in equities and magically you're there. And then, of course, once they've hooked you in that way, now they flip the meaning of safe and risky, because what they then say is: You can't afford not to invest in equities.

PAUL SOLMAN: Right because you'll...

ZVI BODIE: You'll never reach your target unless you do!

PAUL SOLMAN: Great. So here's a letter from a viewer saying: "Conventional wisdom has always been to invest in stocks long term for retirement." So, this person hasn't ever heard you talk or hasn't believed you anyway.

"The problem is: What if you reach retirement during a bear market?" Ah! Because your insight is now coming to bear fruit. "Your nest egg is depleted and your only choice is to wait it out. Based on the past 20 years or so, does it make more sense to invest in bonds which may return less long term but provide a safety net in case of a downturn?



Zvi Bodie
Boston University

“ This is a very well-known phenomenon that people just assume that somehow [the market has] got to come back. I mean it's the same thing at the gambling tables. ”

The target-based retirement funds sound good, but it seems like the same problems concerning market timing exist for them as well. What do you think?" We know what you think but the point is that people are now beginning to wake up to this reality after having believed, as this person apparently did – we don't know the name here – but believed the conventional wisdom all these years.

ZVI BODIE: Yes. Well, of course, what you now hear from the advisers and from all the marketing materials on the Internet and elsewhere, is now would be the worst possible time to get out of the market; in fact, maybe should you even be increasing your investment.

PAUL SOLMAN: Oh absolutely! On the NewsHour, financial planners, advisers say that when asked quite consistently, and have ever since the market started crashing.

ZVI BODIE: Right. And it, for those of us who teach economics, that's called 'the sunk cost fallacy.' In other words, you may have had twice as much money at the beginning of 2008, but you don't anymore, and somehow you think that you're going to bounce back because you were once there. But all of the evidence we have about stock returns indicate that it's essentially a random law, that the odds of doing well or doing badly, the probability distribution you're facing today is essentially the same as the one you faced a year ago.

PAUL SOLMAN: So it's always starting from scratch? What I remember from the Carter administration used to call 'zero-based budgeting,' which is only... It's also called in economics 'marginal thinking,' which means: Start from now. What's the cost of the next thing you're going to buy vs. the benefit.

ZVI BODIE: And not thinking about where you were, and thinking: If only I hold on, it'll come back.

PAUL SOLMAN: Because that is a sunk-cost in a sense it's sunk, it's done, you've lost that money. You're trying to figure out what's going to happen from today forward because that's all that matters.

ZVI BODIE: Right. And this is a very well-known phenomenon that people just assume that somehow it's got to come back. I mean it's the same thing at the gambling tables.

PAUL SOLMAN: You're due! You're due!

ZVI BODIE: Right.

PAUL SOLMAN: I remember one of the smartest kids in high school when we were playing poker once, and he said he's going to stick with the hand because he's due. Because he got bad hands for...

ZVI BODIE: Right.

PAUL SOLMAN: And I couldn't believe it. He went on to clerk for a Supreme Court judge, but the guy just... He felt in his bones and I tried to talk him out of it and went: Oh, what the hell...

ZVI BODIE: Well, you know, one of your good friends has said: We're all fooled by randomness. Right?

PAUL SOLMAN: Uh huh.

ZVI BODIE: And it's true. It's just hard for the human brain to accept the fact that certain things are random!

PAUL SOLMAN: Right and this is Nassim Taleb and a book I would highly recommend, his "Black Swan" book as well.

OK. So, stocks are not safe for the long run – not in the sense that people generally mean or understand the phrase, stocks are not safe in the long run. Not to say you could save... In a sense they're safe, but in the way most people mean it they're not, they're now jolted by it, and yet the SEC and others still are influenced by the conventional wisdom enough or...

ZVI BODIE: Or by the industry...

PAUL SOLMAN: Or by the industry to promulgate them.

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ZVI BODIE: Yeah.

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