Foreword by BARRY RITHOLTZ

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How to Make a Fortune in Bull, Bear, and Black Swan Markets

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WILEY
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Michael: Outline your example that goes into American football and let people slowly come into your thinking.

Campbell: There are plenty of sports examples here. And football is one of them, where a team could have many wins in a row or a quarterback many passes in a row. And the issue: Is that due to skill, is it luck or is it a combination? It's also the case that a quarterback could appear to do quite poorly and not [make] that many passes. That doesn't necessarily mean that quarterback lacks skill, it could just be bad luck.

It's the same thing with investment managers where you can outperform the market many, many years in a row. It's not clear that's a result of skill or a result of just good luck. It is a vexing problem in finance: How do we separate the skill from the luck?

Michael: As you were talking about beating the market for many years in a row, I thought of someone. I'm quite fond of him. He's liked some of my work and I've had a chance to meet him several times.
times. He had a fantastic run at Legg Mason, and that’s Bill Miller. I think he beat the S&P for 14 years in a row. But then, at the end of the 14-year stretch there was a pretty significant drawdown in the ’08 crisis. So as you make this point about skill versus luck, there’s no doubt, it’s not an easy subject.

Campbell: No, it can be a combination, that’s the thing. It’s really interesting if you group the best-performing hedge funds or mutual funds and then hold those for the next period and just keep on doing that. You just buy the winners, like the extreme winners. You just have that as a strategy. Then what you find is that portfolio does poorly. Some at the very top probably were blessed with good luck.

That doesn’t mean they’re unskilled; it could still be skill, but they were skilled plus the luck that got them up there, and this is the way that I usually like to explain it. Suppose that you just like grab a whole bunch of dice, like a large number, let’s say 36 dice. And you drop them on the table, and then you go pick out all of the ones that show six, and let’s say there’s about seven of them. You take all the other dice away off the table, then you drop the ones that all have six and you’re going to get a combination of one, two, three.

It’s going to average about three, and think of that as the people that did really well. The sixes are the people that were at the very top that did the best. Then when you threw those dice again, it’s just natural that you’re not going to get seven sixes from those dice. A lot of this has to do with regression to the mean and luck.

Michael: I was thinking of two traders. One very famous, one not so famous but just as successful, Jim Simons at Renaissance Technologies. He’s had math formulas named after him. He will come out loudly and clearly, and always say, “Hey, I’m a very lucky guy.” That’s not taking away from his skill. I could think of the most famous U.S.A. investor, the wealthiest U.S.A. investor, he says, “Look, I won the Ovarian Lottery.” That’s Warren Buffett.

The notion of survivorship bias starts to become an interesting topic because if we look at a particular trading strategy or particular traders, and not to take anything away from Warren Buffett, but there’s not a lot of other Warren Buffettts.
Campbell: That’s true. Jim Simons, Warren Buffett are probably . . .

Michael: They’re up there [as stars].

Campbell: They are up there and they are saying, “I was lucky.” Really, that’s a hard one to believe. I know Jim Simons and I don’t know Warren Buffett. They do very different things. From what I know of Simons’s operations, there’s a lot of skill there, but as you say, again, it can be a combination of having skill and good luck.

Michael: You’ve got to have a strategy that puts you in a position to benefit when the unexpected happens. If one has a strategy that can operate like that . . . that starts to be skill-like.

Campbell: Definitely. Again, it might not always work . . .

Michael: Process versus outcome. You can have a great process and it doesn’t necessarily mean that outcome’s going to be beautiful every time.

Campbell: You mentioned survivorship bias. There is a kind of reverse type of bias and that is that some very skilled investment managers drop out because they’ve had bad luck. That’s kind of a reverse survivorship bias.

This is really important. This idea doesn’t just apply to investment managers. Let me discuss, just for a minute, another research paper I have that does a psychometric survey of CEOs. What my paper finds is that CEOs are hugely more tolerant of risk than the lay population. Like by a factor of 10. It’s extraordinary.

You can think of a scenario where these people that are very tolerant of risk enter a firm as a junior employee. They take a lot of risk and some of them, they get lucky, it turns out. Others don’t get lucky and they drop out of the firm. Then these people that are taking a lot of risk with enough luck will rise to the top and be the CEO, whereas the person that’s risk averse never takes that extra bit of risk and never experiences the good luck and is stuck in the middle.

This explains why CEOs happen to be very tolerant of risk. The interplay of that plus luck goes a long way to explain the psychometric qualities of CEOs.

*Mean reversion works almost all the time, and then it stops and you are kind of out of business.*

Jerry Parker
Michael: I can think of two heads of investment banks who until the fall of 2008, for the vast population out there that understood what they did, they were Prince Charmings. Nothing could go wrong for them and that’s Alan Greenberg at Bear Stearns and Richard Fuld at Lehman Brothers. These were guys that would fit right into the outline you were describing. But then on the back side of an entire career of taking more risk, waking up one day and the dice come up different.

Campbell: Exactly, and of course risk is two-sided, so there’s an upside and a downside and this was an obvious negative realization. It’s really hard because they were on a roll, so to speak. This could be bad luck or it could be lack of skill.

Michael: I often see people say, “Survivorship bias, they’re the lucky ones left, what about all the other guys that failed?” The implication being that everyone that failed was as skilled and had the same technique or same strategy as those winners. I don’t necessarily see that evidence. Sometimes we just assume they were equal but they’re not necessarily equal or taking the same steps or strategies. Just another facet of this.

Campbell: Yes, totally agree. It could be a much different strategy, but in the end that’s what they choose. You could think of every investor having a slightly different strategy. Some of them might be chasing real risk premia, some of them think they’re chasing real risk premia but it turns out that it’s not. Others are chasing mispricing in the market that might be fleeting. Indeed, it might turn the other way, that once you start buying, all of a sudden instead of something undervalued, it’s overvalued.

There’s a myriad of different strategies out there and some of them will turn out because they should turn out. Like capturing a long-term risk premia and some of them will turn out just by luck.

Michael: Was it random?

Campbell: That’s correct. We don’t do a very good job at questioning the performance and saying, “Was this due to luck or was it due to skill?” We look at these investment manager stars and think they’ve got a huge amount of skill and we don’t consider the other side. How much of that is luck?
As I said, goes both ways. And you know how often this happens, where you hire an investment manager? You look at the track record, it's a wonderful track record, you're comfortable with the track record. You invest with the manager and then they have like one or two years of subpar performance and then you fire them. As soon as you fire them, the next year they do great.

Well, what's the story there? It's a simple story like I mentioned with the dice. You have a couple of years of bad luck. Indeed, in the track record there's probably a couple of years like that, too, but you tend to ignore that. You fire the person at exactly the wrong time and you pay the price. Investors just don't do a very good job of attempting to weigh the balance of luck and skill.

Michael: One of the reasons many people get confused is we want to think in terms of a nice normal distribution, because it works great for weights and heights and all this kind of stuff. Everything's just normally distributed . . .

But in the real world of asset management in trading and investing, there's something called skew.

Campbell: This is an important component of my own research. There's a path-breaking paper published in 1952 by Harry Markowitz on how to optimize a portfolio. That paper led to a Nobel Prize for him in 1990. And what this paper does is it says what we want is a portfolio with the best possible target return but the lowest volatility for that level of target return.

Essentially this is the optimal tradeoff of an expected return and risk, and I'd like to put “risk” in quotations because in this path-breaking paper there's a footnote that's buried at the end of the paper that says, “This only is appropriate if the asset returns are normal and investors have no preference for skew.”

Let me explain what that actually means. If the asset returns are so-called normally distributed, then there's no unusual tail behavior. That means there's no severe downside, there's no severe upside. The upside and the downside are exactly symmetric. With the usual measure of volatility, that's exactly what happens.

For example, you could have a stock that is going up dramatically. Maybe it goes up like 300, 400 percent and it's got a high
level of volatility. You can have another stock that goes down dramatically, maybe goes down 95 percent, and it's got the exact same level of volatility. Volatility doesn't tell you anything about the direction. It's measuring the surprise in an absolute sense. Volatility is symmetric. It treats the upside and the downside the same.

Skew, on the other hand, tells us the balance between the upside and the downside. You could have two portfolios that have the same target return, the same volatility, but they've got a different skew. One has got an abnormally high probability of a severe downside, the other has got an abnormally high probability of severe upside. For any investor it's obvious which one to choose. You choose the one that has got more upside than downside.

I've been on a campaign for many years to try to change the way that we think of risk, to change the way that we actually do asset management or portfolio management. Take this asymmetry between the upside and the downside, and recognize that it is rare that any asset return is so-called normally distributed. Actually make that part of the portfolio management exercise and, equally as important, make it part of the risk management exercise.

I am tired of hearing about these 20-standard-deviation events, like what happened to Swiss franc. And there's many other examples during the financial crisis, the Russian crisis, etc. Twenty-standard-deviation events? It's not 20 standard deviations. It's only 20 if you believe naïvely these asset returns are normally distributed. They're not, so don't even tell me this. It doesn't make any sense.

Michael: I've had Harry Markowitz on my show. He was surprised at how the industry took his work, and he wasn't part of what happened, but they took his work and ran with it and that was essentially how modern finance got built off of his work. That's a fair synopsis, isn't it?

Campbell: Yes. That 1952 paper is an amazing paper. I've only mentioned one thing that he foresaw. I think that this was a simple framework he proposed. It works under special assumptions.
He was the one that recognized what those assumptions were, but then you're right, the industry goes with something and doesn't think about when is it appropriate to apply and when isn't it. When I teach finance at Duke University, as one of the main lessons for my students, we've got these models. But all these models are wrong, that's why they're called a model—you're simplifying reality.

And the issue of applying your skill is knowing when to apply a simplified framework and when not to. In certain situations, it's fine, other situations no. Harry is really the father of modern finance and that paper is just an incredible piece of work given that he saw not just the usefulness of his simplified framework, but he saw basically how to take it to the next level and to incorporate this idea of skew.

**Michael:** Your paper evaluating trading strategies caught my eye for one thing in particular . . . I assumed that I knew the advisor you were talking about, which was AHL—which is a managed futures trading [trend following] operation owned by Man out of London.

**Campbell:** It's a managed futures house that manages about $15 billion. At AHL they look at strategies all the time. They think very deeply about luck versus skill. There is a strategy that showed accumulative profit from 2004 through 2014. It's a graph and it's basically going straight up. It's an extraordinary strategy where it's got one year that has a very small negative return in 2004. It knocks the ball out of the park during the financial crisis. It's got about a 15 percent annualized return, 15 percent volatility, so the so-called Sharpe ratio of 1—extremely consistent. We're looking at this strategy and you can see people's head nodding, "Yes, this is the sort of thing we want to put some capital on." And then the very next slide is really surprising.

It adds to this graph the other 199 purely random strategies. All of a sudden this graph that was just one line going straight up is added to 199 things that basically are centered around zero. The exercise was to simulate 200 random strategies with a target return of zero, so every single one has no skill, and is purely generated numbers with 15 percent volatility.

*I actually went into the business thinking I could automate everything and that a machine would do it all.*

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Blair Hull
You see the very top one, the very best one is the one that was shown first, and then you see at the bottom there's like a terrible one that earns 15 percent negative and everything in between. The idea is that by pure random chance, and that's what the random number generator is doing, by random chance you're going to see strategies that look great. You need to be careful if you're doing internal research. What you don't want is your researchers sifting through hundreds of strategies and picking off the top one, because when you put money on that top one in real time, it's going to do poorly.

Michael: This was AHL presenting, correct?

Campbell: They are leading edge in terms of thinking about luck versus skill. This was part of an exercise on how to avoid overfitting of back tests. That's why that exhibit is there, because it is a great example that you could easily be fooled by random strategies.

Michael: What is your perspective, your thoughts about the work of Nassim Taleb?

Campbell: That it fits in really well with my work on skewness. He talks about so-called black swan events and again, these events that are negative 20-standard-deviation events. It doesn't make any sense unless it's a normal distribution. Because within a normal distribution, the probability of something like that happening is like one event in the life of the universe, which doesn't make any sense.

He's talking about these things that you don't necessarily see in historical data, but then they happen. You could think of it as an extreme negative skew type of event. That works in pretty well because his view of the world, as my view of the world, is that it's not symmetrically distributed, it's not normally distributed, and I think that's important.

Michael: Many managed futures trading strategies obviously are trend following in nature and they're predicated on not knowing what's going to happen next. A lot of their risk premia come from the hedgers out there. People make arguments about where their source of profits come from . . .

There's a thinking, a long-standing thinking that goes behind this particular strategy, and you're making the point that, if you just
sit down at your computer, and you really have not even philo-
sopherically thought through what the strategy is, and then you only
want to trust some random systems that come up, you can wake up
in trouble.

Even if initially all your investors are sold on the idea of
15 percent returns and 15 percent volatility and that sounds
great, and you raise $1 billion, but if there’s not a sound
economic thinking behind the strategy, we all know what’s going
to happen.

Campbell: That’s correct. This is the way that it should work.
I do know from direct experience, this is the way that it
does work at a firm like Man AHL, and maybe it’s no surprise
they’ve done so well with this. Basically a researcher would
come up with an idea, but without looking at the data. They
come up with an economic framework and then they actually
pitch that framework in a seminar. I’ll call it that—an academic
seminar.

They will get feedback and then the senior people will actually
decide whether the economic idea makes enough sense that you
actually go to the data. Let’s say it does make sense, then the firm
will give the researcher what’s known as a random partition of the
history of the data. They will give bits and pieces of the history to
the researcher. The researcher will then test the economic idea,
and this is the so-called in-sample testing, and then there’ll be
another seminar.

The results will be presented, and then a decision will be made
whether to give the rest of the data to test it in a so-called out-of-
sample test. It might be killed or it might go ahead to the out-of-
sample. Let’s say it actually goes to the other sample and let’s say it
does well, then there’s a further stage where it will be invested in,
but only invested with internal money.

It’s multiple stages that you actually have to go through until it
gets to the client, because you really don’t want to put anything
to client trading that might be a result of luck, because you don’t
want to disappoint your clients. All the incentives are running
in the right direction to do the best possible thing for your
client.
Michael: I was giving a presentation in Singapore, and I was speaking about the managed futures trading strategy of trend following. And at the end of the presentation this young lady raised her hand and she had this look that said she probably had been at Duke in one of your classes and was really was bright. She had that look that said, “Oh man, I’m in trouble. She’s going to kill me. She’s going to obliterate me. I’m dead.”

She raises her hand and she immediately shot herself in the foot and I want you to explain why. She immediately said, “Okay, can you tell me about the Sharpe ratio of these strategies.” I wanted to do a Vulcan mind meld and just say, “Hold on, don’t just immediately assume the Sharpe ratio is the be-all end-all. Let’s at least pick apart the pros and cons of the Sharpe ratio.” But you could just see the indoctrination as she asked the question.

Campbell: Yes, incredibly naive. But, this is the way it is in the industry on both sides, buy side, sell side, that people will look at an investment, look at the Sharpe ratio, which is the expected excess return usually over some benchmark divided by the volatility. They’re only considering the volatility risk, and let me tell you the type of trouble that gets you into. If you do the Sharpe ratios of different investment styles or maybe even hedge fund returns, you’ll see a wide variation in the average Sharpe ratios. You’ll see gigantic Sharpe ratios for things like convertible arbitrage but more modest Sharpe ratios for things like managed futures [trend following]. The reason is very clear once you expand the way you think about risk.

Managed futures has got positive skew and it’s almost by construction, because when things are going up you’re buying. That’s the same as replicating a long call option. When things are going down you’re selling. That’s like replicating a long put option. Effectively, you can think of managed futures as something with a long straddle-like performance which has got positive skew. They do really well in market meltdowns and they do well when the market’s going up sharply.

That is something that is rewarded by investors. They actually like that. It provides a hedge. Whereas these other Sharpe ratios, very high Sharpe ratio strategies, they get a severe negative skew. For them you need to have extra return on average because investors really don’t like that severe downside.
You cannot compare two strategies based upon a Sharpe ratio if they have different skew properties. The Sharpe ratio does not take that into account. Indeed, it’s very similar to what we were talking about earlier with the simple market, with its framework where you look at expected target return divided by volatility. Volatility is not a sufficient metric for risk; it is part of the story, it’s not the entire story. If you make the mistake of just looking at volatility, then it’s going to lead to a portfolio that will disappoint you.

Michael: Thinking back to that example with the young lady, I don’t know if it was “I didn’t want to listen” or “I don’t understand” or “I’ve already got my mind made up.” The indoctrination strikes me.

Campbell: Well, it’s complicated because this sort of discussion is not even in the textbooks in finance. It’s kind of surprising. So you can go through a top program [and not learn this].

Michael: That is the truest statement. Anyone reading right now that doubts you, I want them to go find where you’re wrong.

Campbell: Yes, it’s one of the reasons I don’t use a textbook for what I teach. I teach out of my own notes and my own research articles. But this is something that you have to point a lot of fingers here, including pointing fingers at my own colleagues. I just don’t think that we do a good job of explaining risk to our students. I think in my class, there’s about three classes [where] we just sit down and think about what risk actually is.

Michael: You’re making a fantastic point there. Put aside all the jargon and get people to conceptually wrap their arms around the idea of what skew is, and even getting rid of the word “skew,” so to speak, and getting people to sit down and look at it all . . . a freshman in high school with no math training, if properly explained what’s going on, could understand.

Campbell: Yes, I agree. Let me give the other insight from Markowitz’s article that is relevant for this discussion. And that is that his framework assumes that you exactly know all of the inputs, you exactly know the volatilities, you exactly know correlations between assets, and you exactly know the target return. There’s no uncertainty in any events, whereas in the practice of management there is uncertainty. So another dimension of risk is that you think the correlation is, let’s say 0.5, but you’re not sure, maybe it’s 0.2, maybe it’s 0.7, but it’s certainly not exactly 0.5.

A delusion is something that people believe in despite a total lack of evidence.

Richard Dawkins
The same for the volatility. You think it’s 15 but you’re uncertain. Maybe it’s 12, maybe it’s 17. This is another dimension of risk. Most people think, “Risk is just the volatility.” Another way of thinking about risk is, “What if you don’t know what the volatility is?” Even deeper, what if you don’t know the distribution? It’s not normal, we kind of know that, but what is it? Or the skew. We don’t know what that downside tail actually is. We can maybe estimate it but we’re not sure. All of this is risk, and it’s rarely taken into account at this level that there’s a difference between risk and uncertainty. People usually group those together and it shows they really haven’t thought it through.

**Michael:** It would be a long story to get to the point as to why many of them have developed a faulty foundation, but the fact is that so many decision makers in charge of other people’s money think that somehow or another there is a perfect prediction for tomorrow and that estimates are a bad thing, when estimates are basically all we’ve got.

It’s really crazy that we’ve got to a position where so many people that think the world of investment management is supposed to be perfection. It’s an insane notion.

**Campbell:** And unfortunately, the actual investors reinforce this, because they will judge the manager based upon the past quarter or the past year, and that leads to a different type of behavior on the part of the manager. I would much prefer, as I said earlier, take a look at the track record, you’re comfortable with it, fine. And what I actually recommend is that the investment managers educate the client as to what could happen.

One way of doing that is really simple. Let’s say I’ve got a 20-year track record, what I can do is to create with the real data from those 20 years an alternative history by kind of randomly sampling years and put them together. And then keep on doing that. Then it gives you a way to look at what things could look like given the track record.

Then when it actually happens, maybe you’ve got two years in a row of substandard performance, you can look at the history and say, “That’s not unusual. That happens 25 percent of the time, given the track record.” If you believe the actual track record and you actually analyze it in this way of creating alternative histories,
then it really helps avoid the mistake of firing a skilled manager because they've had bad luck.

**Michael:** If I see 1 percent a month every month every year, I'm either thinking it's Bernié Madoff Junior or another Long-Term Capital Management. You can't make money every month. Maybe there's somebody with a high-frequency shop that's got some advantage that no one else has, but it just doesn't work that way.

**Campbell:** Yes, this is a great example. You've got somebody that is basically in a S&P 500 portfolio, but on top of the S&P 500 they're writing out-of-the-money put options and out-of-the-money call options. If there's not that much volatility you're collecting a premium. Month after month given that premium that you're collecting, they'd beat the market. One percent here, 2 percent, 1 percent, 2 percent. It keeps on going. It is foolish to think that is beating the market or alpha or whatever you want to call it. That's called taking risk, because if the market goes severely down, then you've got these put options you have to pay off. It magnifies the downside of holding the S&P 500 and on top of that it cuts off the upside because if the market goes up substantially you need to pay out for the call options.

All that does is to take a portfolio, the S&P 500, and tilt it towards negative skew, and that's the reason that you see a return pattern like this. People are getting a little extra return because at some point there's going to be a severe downside. That is important to take into account.

**Michael:** It's cliche, but that free lunch isn't always so free.

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*Too many people simply give up too easily. You have to keep the desire to forge ahead, and you have to be able to take the bruises of unsucccess. Success is just one long street fight.*

—Milton Berle