

Understanding Uncertainty and Common Risk Management Challenges

By Yuval D. Bar-Or, PhD

Many professionals and academicians talk about financial risk. Yet risk and uncertainty remain misunderstood by most people, including many professionals. Why is this? The answer is that risk and uncertainty are nuanced concepts involving numerous forces interacting in nonlinear fashion to yield multiple potential outcomes. Add our human biases and natural preference to KISS (keep it simple ...) and the true meaning of risk and the challenges inherent to estimating risk are often obscured, ignored, or grossly oversimplified.

This article aims to put the science of risk center stage by critically examining some commonly used risk measures and highlighting other issues that make risk management challenging. The objective is to help you recognize that attaining a better understanding of risk will make you a more sophisticated, credible, and successful advisor.

What is Risk?

In our context, risk is the presence of multiple potential outcomes, where at least one is bad. That is, at least one results in a financial loss. For example, purchasing a financial security is clearly a risky undertaking. It requires an upfront investment, and in many of the potential outcomes some or all of the original investment may be lost. (Risk isn't restricted to a possibility of financial losses. "Bad" outcomes may include physical injury and reputational damage, among others.)

Some Common Measures of Risk

We must measure risk in order to be able to do something intelligent about it. (That, of

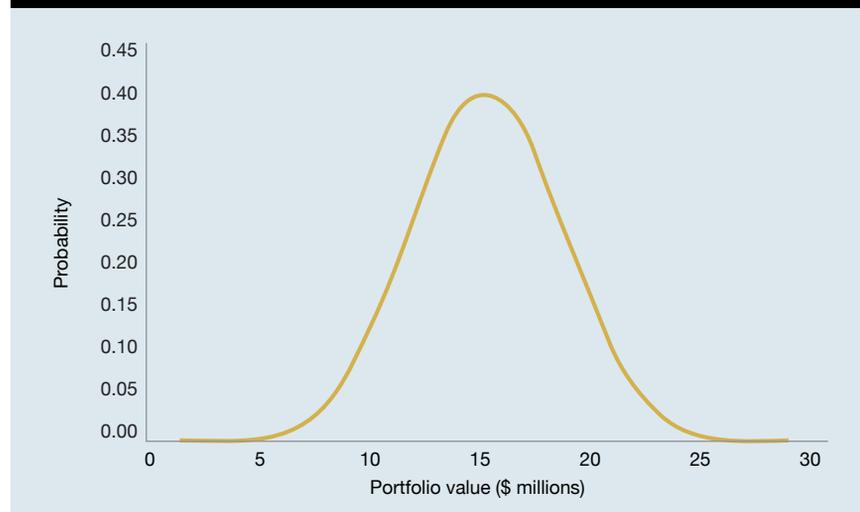
course, presumes that we have good measures of risk and we understand them properly—more about that later.) In this article we focus our attention on three commonly utilized measures of risk: agency ratings, sigma, and beta. Agency ratings are commonly used credit risk measures that aim to capture the default probability (and loss given default) of debt instruments. Sigma is a measure of total variability, often approximated by the standard deviation of historical outcomes (returns, earnings, etc.). Beta measures the covariance between a given security's returns and those of a single (assumed to be highly influential) market factor. In practice, that market factor is often a broad stock index such as the S&P 500.

Common Measures Are Often Flawed or Misunderstood

Let's examine each of these popular risk measures, beginning with agency ratings.

Agency ratings often are described as "through-the-cycle" measures, i.e., estimates of a corporate borrower's average credit risk over a period that is long enough to contain business cycle effects. These are often contrasted with "point-in-time" measures that seek to estimate the probability of default over a specified time horizon, typically a single year. Corporations issuing debt prefer to have stable ratings because this makes raising money easier. Rating agencies cater to these clients by giving them averaged-out, through-the-cycle ratings. But such averages have a tendency to obscure the possibility that a firm may default in the very near term. That is, it may not survive the early part of a cyclical downturn. Some studies have shown that securities with the same rating may exhibit very different point-in-time risks. That is, among firms rated BBB, some may exhibit AA-like (very low) risk and others B-like (very high) risk.

Figure 1: The Normal Distribution



Here's one implication. Consider a bond portfolio manager who is allowed to invest in only investment-grade holdings. Seeking the highest returns possible, she buys the highest-yielding bonds in the investment-grade universe. This means she is creating a portfolio packed with bonds exhibiting the highest "point-in-time" risks. It also suggests that her portfolio will be riskier than its intended investment-grade mandate.

Next, let's consider sigma, a measure of total risk. Sigma is often estimated by calculating standard deviation. Standard deviations are most easily understood when an underlying distribution is normal (see figure 1).

But the standard deviation measure can be very misleading when we are faced with asymmetric, skewed, nonnormal distributions. Consider fixed-income portfolios held by banks, insurance companies, and asset management firms. These portfolios exhibit asymmetric distributions with one long fat tail reflecting significant risk of loss (see figure 2).

Any report you examine can be highly misleading if it lists only the sigma measure and omits the full distribution. That is, you don't know whether the underlying picture looks like figure 1 or figure 2. Note that figure 2 reflects much higher probability of deep losses (the left side of the distribution) than figure 1. This means that extreme 3- or 4-sigma (so-called black swan) events are much more likely to occur in practice. Clearly, you need to know whether you are recommending a higher-risk investment to clients, but the sigma measure alone doesn't tell the whole story.

Furthermore, standard deviation calculations are backward-looking in the sense that they use historical data reflecting past outcomes. Changes in micro- and macro-economic forces can make historical data less representative. For example, if a firm opts to move into a more volatile set of business activities, its total variability measure, sigma, should increase, but calculations of sigma using older data may not reflect the change properly. Enron exemplified this by migrating into increasingly

Figure 2: Fat-Tailed Skewed Distribution

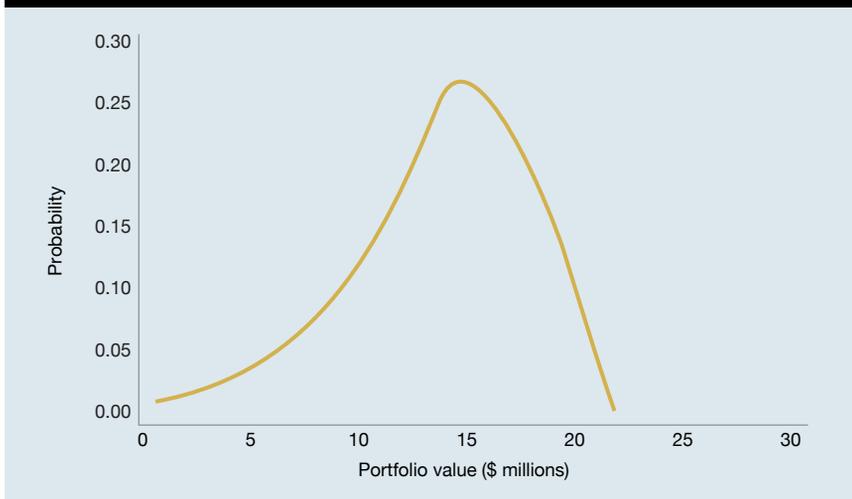
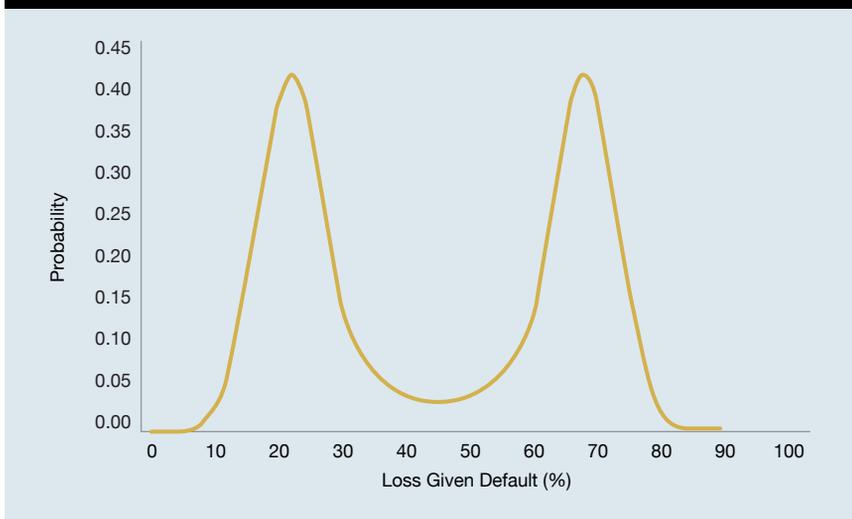


Figure 3: The Bi-Modal Distribution



riskier activities (of course, Enron's troubles went far deeper than this).

Some underlying distributions are very far from the ideal normal distribution. Figure 3 reflects the severity of losses in the event of default on some fixed-income instruments. Note that this is a bimodal distribution (losses tend to be high or low, but not medium-sized). The standard deviation measure can be calculated and reported, but that single measure neglects very important information regarding the underlying distribution.

The bottom line is that without seeing the full distribution, the sigma measure alone

is insufficient to give decision makers such as chief executive officers, investors, and financial advisors a complete understanding of the true risks.

Finally, consider beta and a simple question: Do you really believe the entire world's systematic complexity can be conveniently and precisely reduced to a single source, i.e., the one we call the market factor? Numerous studies suggest the answers are not favorable to beta fans.

Despite the clear deficiencies in all three aforementioned risk measures, they continue to be widely used. Why?

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The somewhat sad answer is that they are easy to calculate and therefore readily available.

That is an unsatisfying answer when relying on a flawed or misunderstood measure of risk may lead to flawed conclusions, flawed advice, and financial losses for clients.

More Risk Management Challenges

It would be nice if the issues highlighted above represented the biggest problems we face as risk managers, but there are many other issues to contend with, such as the following:

Retail investing pays far too much attention to returns rather than risk. Mention of risk is often restricted to a single line of small print (e.g., “past performance is not a guarantee of future performance”) or a single number or symbol such as those we’ve encountered earlier (sigma, beta, BBB). Example: I recently attended a meeting of 50 advisors being briefed on new annuity products. Everyone got excited about the promised returns. The session lasted an hour. No one ever asked about the risks.

Humans are not very good at quantifying risks. In recent decades the field of psychology has documented many biases in the way we perceive and mentally process probabilities and severities of potentially dangerous outcomes. Space limitations prohibit detailed treatment of these very important decision-making deficiencies, so I’ll simply list a few of the documented biases here: overconfidence, value attribution, the illusion of control, loss aversion, etc.

The concept of risk tolerance underlies all retail financial planning activities. The idea seems great on paper, but can we really understand the complexities of a human’s risk tolerance using a 10-question ques-

tionnaire? Does risk tolerance vary over time? Is it possible that the answers to the questionnaire may vary depending on the environment and recent experiences? The answers to these questions suggest that typical questionnaires are insufficient to accurately identify an individual’s risk tolerance. This in turn means that basing advice solely on questionnaire results may not serve clients well.

Correlation

Much of what we’ve already covered applies to individual securities or investments. Let’s introduce the portfolio context now and the concept of correlation. When it comes to portfolios and to overall nest-egg management, correlation and diversification are crucial. Lower correlation allows for greater diversification, which in turn means lower risk.

A typical nondiversified fixed-income portfolio’s value distribution looks like figure 2. Dedicated efforts to increase diversification can reduce the fat tail and make the distribution look more like figure 1. Are you recommending that your clients invest in figure 1 or figure 2 portfolios?

Many risk-management problems have to do with the incentive to fudge correlation measures. Example: Portfolio managers’ compensation increasingly is based on returns achieved versus risk taken. Assuming low correlation measures or pretending these are low may make illiquid portfolios appear low risk on paper, when in reality managers may be making riskier (more correlated) bets. The higher risk makes higher returns more likely but also increases the probability of larger losses.

The Law of One Number

Can a single measure fully describe the distributions in figures 1, 2, or 3? Can a single

measure fully describe the uncertainty involved in a situation as simple as rolling a six-sided die? The obvious answer is no. No single measure can capture the true essence of risk—not beta, not sigma, not a rating, and not any other single number or label. Why? Because risk is by definition the existence of multiple outcomes. Whenever we resort to reporting risk using a single label, we are throwing away potentially crucial information.

The Law of One Number says that risk can’t be measured using a single number or label. A corollary is that if you insist on measuring risk using a single number, you (and your clients) will suffer the consequences: Clients will lose money, and you will lose clients.

Better Ways to Think and Talk about Risk

1. Risk is never a single number or symbol—it’s a distribution or a picture relating all possible outcomes to their probabilities of occurrence. You should use pictures and graphs to show and discuss those potential outcomes. Have open conversations with clients regarding the probabilities of those outcomes. This will reduce misunderstandings.
2. Look to the future rather than to the past. Extend the discussion to include simulations of client portfolio values under a sequence of potential future scenarios. Always balance out discussions of favorable outcomes with potentially unfavorable ones.
3. Consider a client with assets in several accounts: 401(k), individual retirement account, 529 college plan, variable annuity, and indexed universal life. Do you view the presence of so many accounts as evidence of diversification? Often, the underlying investments are highly concentrated in the same family of stocks and/or bonds (e.g., large-cap domestic stock funds). Because these accounts are investing in the same securities, the diversification benefit is limited, i.e., correlation remains high and risk is high.
4. The presence of risk means there will be losses. This is unavoidable. Proactively prepare clients for the certainty that where there is uncertainty, there will be

some inevitable losses in the future. The objective is not to scare the client, it's to establish a stable relationship based on realistic expectations. The aforementioned simulations help to get this message across and the resulting discussions can more reliably reveal clients' true underlying risk tolerance.

To be an effective risk manager for your clients, pay attention to the following:

Be aware. Being aware that the risk is lurking will give you a different mindset than being oblivious. You will be more alert and in a better position to provide proactive advice.

Stop clients from acting on emotionally driven, hasty decisions. Remind your client that she may be affected by a psychological bias (or several). If you have the luxury of time, suggest she defer the decision by a day or two.

Seek a second opinion. Ask others (colleagues, mentors) for their opinions. Find people who will tell it like it is, not those who will tell you what they think you want to hear.

Quantify the risk. Think in terms of probabilities of bad outcomes and severity in those cases where the bad outcomes are realized. Considering these two dimensions allows your remedies to be more surgical, i.e., more focused and precise.

See the big picture. Neither risk nor return can be examined in isolation. The only

correct approach is to always discuss risk and return simultaneously.

Consider alternatives. What can the client do when faced with risk? He can retain it, mitigate some or all of it (hedge or transfer), or walk away from it and not take the risk to begin with.

Take action. A decision has not been made until some action has been taken. Deciding to move client holdings from risky securities to safer bonds means nothing unless you actually execute the trades.

Accountability

When dealing with risky investments, you can give the best investment advice (under the circumstances prevailing at the time) and still end up in a situation where the client loses money. In reaction to the loss, the client may be inclined to hold you accountable and fire you.

Doing your job means that when inevitable losses are manifested, their frequency and severity are lower than if you hadn't been involved. It's not easy to explain this to a client after the fact. When a loss inevitably occurs, the client may not realize that you deserve credit for making the loss smaller than it otherwise might have been. Proactively educating the client helps. Share simulations and establish realistic expectations ahead of time.

Another aspect of accountability has to do with your organization's philosophical attitude toward risk taking. Make sure you

understand your organization's positions and abide by them. If you are in a managerial role, take the time to carefully formulate the risk philosophy and communicate it clearly to others, with clear examples and limits on the types of risks that are or are not acceptable.

Go on Offense

Risk management is often viewed as a defensive function. But once you develop risk management expertise you can use your risk assessment superiority to gain an advantage.

By having scientifically rigorous discussions with your clients, you will (1) understand them better, (2) be in position to provide better advice, and (3) increase your credibility. Because most advisors don't do this well, you will have created an advantage over others. Over time, you can develop a loyal customer base that is fully aware of the value you add and happy to sing your praises to other prospects. ●

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