

# An Alternative Approach to Understanding Risk

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Investors today have access to more data and tools than ever, yet many still experience anxiety when it comes to investing. For both professional and private investors alike, much of this anxiety may stem from a misunderstanding of risk and reward. Without a firm grasp of the risk of an investment, it can be difficult, if not impossible, to set appropriate expectations for the investor in terms of return and potential loss. Thus, the first step to a better understanding of these concepts is finding the appropriate way to measure this risk, which, in turn, may help set more realistic expectations up front.

## WHY WE NEED TO LOOK AT RISK DIFFERENTLY

The key to gaining a more accurate understanding of risk is by recognizing the strengths and weaknesses of popular metrics. An extension of this involves educating clients on the types of risks in their portfolios and what those risks could mean to them in terms of real loss. Many professionals and novice investors try to simplify the exercise so that the risk analysis is more easily understood by all. While this may be well intended, sometimes we need to dig deeper into our toolbox and make certain we are providing a more informative picture to our clients.

Interestingly, if you ask investors what risk they assume when buying stocks, they will likely respond, “losing money.” However, modern portfolio theorists do not define risk as a likelihood of loss, but as volatility, which is determined using statistical measures of variance such as standard deviation and beta. Standard deviation is a measure of absolute volatility that shows how much an investment’s return varies from its average return over time, while beta is a measure of relative volatility that indicates the price variance of an investment compared to the market as a whole. The higher the standard deviation or beta, the higher the risk, according to the theory.

However, instead of thinking of risk in terms of market volatility, or depending on popular terms such as “risk-adjusted returns,” trustees and advisors should focus on aligning the risk metrics they use with the composition of their clients’ portfolios, particularly for those portfolios containing less liquid asset classes.



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For example, in 2008, several distressed credit strategies lost as much as, and possibly more than, the broad equity markets. The risk of a sharp decline was not apparent when using volatility-based metrics, given the backward-looking view of these measures.

What we present here is an alternative set of tools not often used in mainstream portfolio management. Instead of using volatility as a way to measure risk, we present drawdown-based metrics. Drawdown measures the peak-to-trough decline in a specific investment's price and also the time period between peaks. By discussing risk in terms of actual price declines and loss of value, these metrics capture the investor experience more accurately than volatility-based measures. We also focus on the nuances of less liquid and non-normal return distributions of asset classes that may extend beyond those in the traditional 60/40 stock and bond portfolio. If metrics such as these had been more broadly utilized in 2008, investors may have been more aware of the inherent risks in their portfolios, prior to the huge market decline that eventually took place.

### **THE CURRENT MAINSTREAM APPROACH**

Although many investors seem to find reassurance in being told their investments have superior risk-adjusted returns, the comfort with the term could be misplaced, as the math may be correct but misleading. The Sharpe Ratio, a common measurement tool when assessing risk and return, assumes normality. It fails to account for all four moments of a return distribution: mean return, standard deviation, skew and kurtosis. Generally, all four of these should be accounted for, especially when considering assets that are non-normally distributed. Most investment statistics only incorporate volatility into their risk calculations. Not including skew and kurtosis, which delineate the frequency and depth of significant drops in the market, means that the likelihood and severity of loss are not accounted for in the risk assessment, especially with less liquid assets. These sharp market declines, such as what occurred during the financial crisis of 2008, are exactly what investors are trying to avoid.

#### **The Limitations of the Sharpe Ratio**

The Sharpe Ratio is broken down into three components: asset return, risk-free return and standard deviation of return. The goal of the ratio is to identify how much additional return you are receiving for the additional volatility of holding the risky asset over a risk-free asset; the higher the ratio, the better.

The pitfalls of using the Sharpe Ratio are most apparent when considering less efficient or less liquid asset classes, such as securities in the hedge fund universe, as it:

- Assumes return normality, whereas hedge fund strategies are rarely normally distributed
- Fails to capture all moments of a return distribution, namely the most important ones, skew and kurtosis
- Does not account for illiquidity or the lack of liquid markets for many securities in the hedge fund universe

For example, to view a fund-of-funds hedge fund (FoF) with the same assumptions or metrics as a portfolio comprised mainly of large cap asset classes may be misleading and inappropriate. The illiquidity and lack of daily pricing gives the illusion that the FoF hedge fund is less risky due to an artificially low volatility score, which, in turn, delivers a misleading (high) Sharpe Ratio (as the risk factor is driven by volatility in the denominator). Instead, metrics that account for the nuances of hedge funds, and less liquid sub-asset classes within the equity and fixed income asset classes, should communicate meaningful and useful information that investors and clients can understand and utilize in making better diversification and risk tolerance decisions.

Other common risk measurement metrics such as the Treynor Ratio, Information Ratio and Sortino Ratio are very similar to the Sharpe Ratio in how they are calculated, and thus, they suffer from many of the same shortcomings.

#### The Two Sides to Volatility

It is important to note that the aforementioned metrics are predicated on the belief that broad risk is measured by volatility. As we noted earlier, volatility is determined based on standard deviation and beta; the higher the standard deviation or beta, the higher the risk. However, this view presents limitations, especially when considering the correlation between volatility and risk. In a rising market, for example, high volatility can boost the return potential of an investment.

To illustrate the drawbacks to using volatility as a determination of risk, consider the example shown in Exhibit 1. Over a three-month period, Stock A generates a return of 32.8%, with a standard deviation of five. In that same period, Stock B suffers a loss of 38.6%. However, because Stock B consistently declined by 15% each month, its standard deviation is zero. Were we to assess the risk of these stocks based on their recent volatility, those metrics would indicate that Stock B was less risky than Stock A, even though their relative performance tells a different story.

**Exhibit 1. The Limits of Volatility as a Determination of Risk**



Volatility is essentially a double-edged sword, and does not measure what an investor intuitively perceives or experiences as risk. When measuring managers or portfolios, the Sharpe Ratio or volatility-based metrics may not be optimal when trying to account for illiquid, non-normally distributed strategies.

#### AN ALTERNATIVE APPROACH

Drawdown-based risk metrics illustrate the client risk experience in a more meaningful manner than a volatility-based measure. Clients feel the pain of loss, or drawdown, but perhaps cannot relate as easily to standard deviation, beta or variance. These metrics account for the frequency, depth, duration and recovery time of loss, which are aspects of risk that all investors can appreciate. Further, the incorporation of all moments of a return distribution and non-dependency of normality make these metrics more comprehensive. An extension of that same concept is to incorporate investment capture, which seeks to set relative target return ranges during rising and falling market scenarios.

By using these more comprehensive measures, clients will have a better understanding of the potential loss they may be facing and can more effectively manage their expectations regarding return.

### Investment Capture

Investment capture is an outcome-based approach that incorporates both risk and reward into the same metric. Discussing investment capture is an opportunity for advisors to set realistic expectations with clients, while also enlisting them to take ownership of the risk they are seeking relative to their desired return. It can be used as a strategy in building an entire portfolio, or assessing an individual manager or asset class. The target range is determined by looking at the up-market capture and down-market capture together. For example, for every 10% return of an index, the client may want his or her portfolio to reflect a 6–8% gain; and inversely, for every 10% loss of the index, the client may be willing to accept a loss of 5–7% in the portfolio. Thus, the client's expectations are appropriately managed, in that he or she cannot expect to reap a certain percentage of the gains without accepting the possibility of a relative degree of loss. It should be noted that this range of return does not lock in guaranteed values—a manager or portfolio could still experience losses (or gains) outside of this range. However, by looking at these values as thresholds, and incorporating the potential for loss while setting targets for gains, the client is better prepared for what to expect out of the investment.

Once investment capture is determined, drawdown-based metrics such as the Zephyr Pain Index, Calmar Ratio, Omega Ratio and Conditional Value at Risk (CVaR) may be used to better illustrate risk in portfolios or individual strategies on an ongoing basis—especially for those that are less liquid or non-normally distributed.

### Pain Index

The Pain Index, a metric devised by Zephyr Associates, is made up of the frequency, depth and duration of drawdowns a manager or portfolio experiences. The deeper, longer and more frequent the losses, the greater the pain. The smaller the Pain Index, the better. A zero would be best, indicating the manager never lost money.

### Omega Ratio

The Omega Ratio is a relative measure of the likelihood of achieving a given return. It doesn't assume a normal distribution of returns and accounts for all moments in a distribution. As clients broadly think in terms of returns, and not always risk relative to returns, this can be a compelling metric that thoughtfully incorporates outcome-based analysis. While the Omega Ratio is less intuitive than the Pain Index, it is appealing to monitor the risk characteristics relative to a desired return level.

### Calmar Ratio

The Calmar Ratio is a comparison of the average annual compounded rate of return and the maximum drawdown of an investments strategy. The higher the Calmar Ratio, the better the investment performed on a risk-adjusted basis over the specified time period.

### Conditional Value at Risk

The CVaR provides a more practically relevant estimate of downside risk for a manager. CVaR calculates losses one may experience under the worst case scenarios. It provides an estimate of a loss and its associated likelihood. More importantly, CVaR is explicitly designed to measure tail loss; therefore, it is the most practically useful risk metric for an investor interested in minimizing declines in portfolio values at stress points while maximizing returns.

All four of the metrics presented here offer a different perspective on drawdown, and can be used in conjunction with investment capture to monitor risk in a portfolio or individual manager.

## **CONCLUSION**

Utilizing these alternative, more comprehensive measures to assess portfolio risk is only part of the task. In order to best serve our clients in managing their investments and portfolios, we need to ensure that their expectations for return are aligned with the loss they are willing to accept. Relying on investment capture as a means of representing this risk/reward balance, and then incorporating the drawdown-based metrics outlined here, is one effective way of setting realistic expectations.

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Bruce Stewart is a managing director for BNY Mellon Wealth Management. In this role, he has national responsibility for institutional investment strategy activity for the Family Office Division.

Prior to joining the firm in 2014 with nearly 25 years of experience, Bruce was the Director of U.S. Investments at Citibank Global Markets. Prior to that, he was Co-Head of Investments at Toronto Dominion Bank, Co-Founder and Chief Investment Officer for a Boston Multi-Family Family Office.

Bruce has authored numerous white papers including: “Manager Selection Methodology,” “Classic Portfolio Theory vs. Modern Portfolio Theory” and “Outcome-Based Investing in a Post-MPT Environment.” He is a frequent presenter at national investment conferences and has been an exam writer for the CIMA<sup>®</sup> designation.

Bruce received his bachelor’s degree from the School of Technology at Purdue University. He received the Investment Strategist & Alternative Investment Certificates from the University of Pennsylvania’s Wharton School, holds both the CAIA<sup>®</sup> and CIMA<sup>®</sup> designations and is a regular member of the CFA<sup>®</sup> Institute.

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