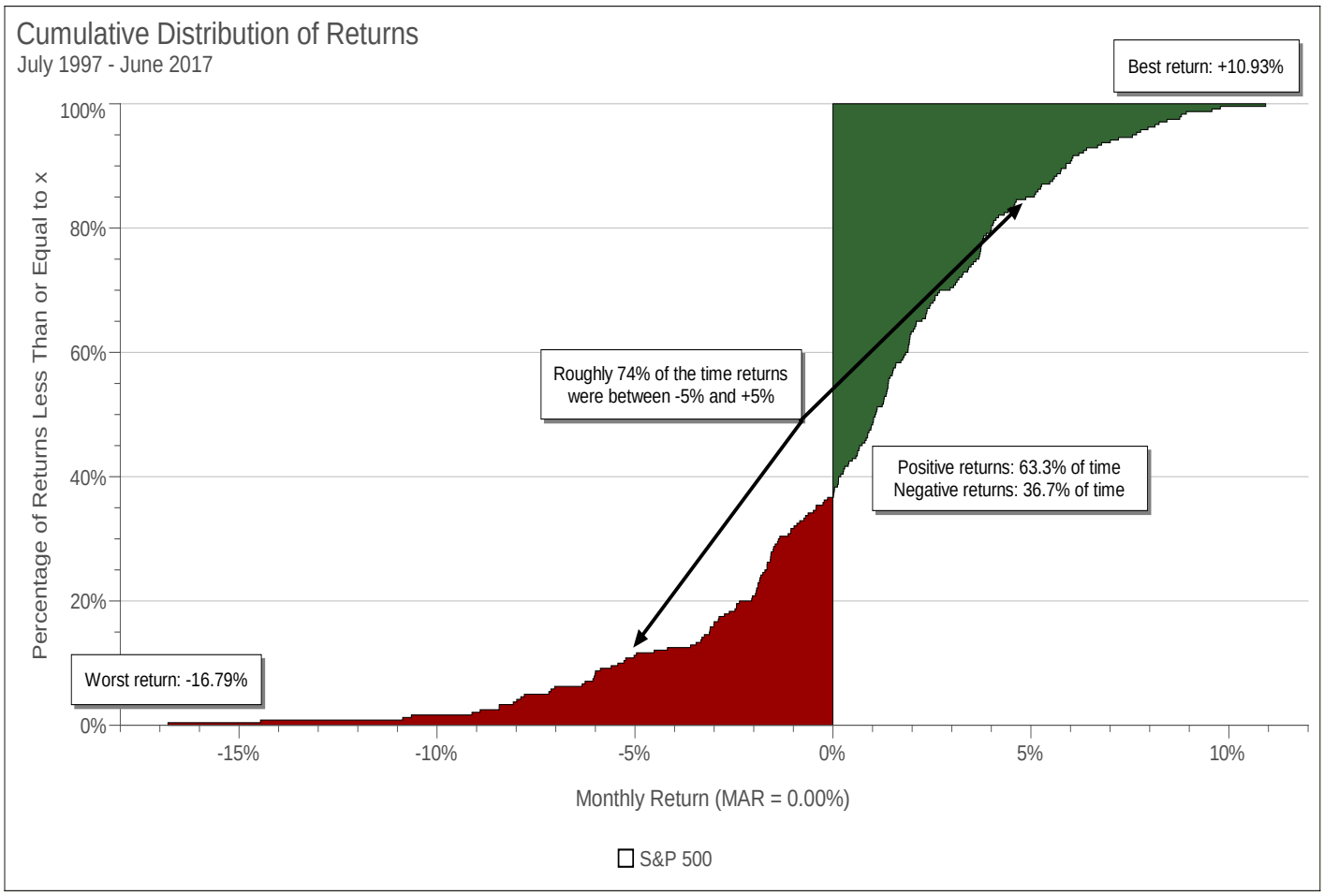
Omega Ratio

Risk Metrics Series



Source: Zephyr StyleADVISOR

Marc Odo | April 26, 2018 | Swan Blog

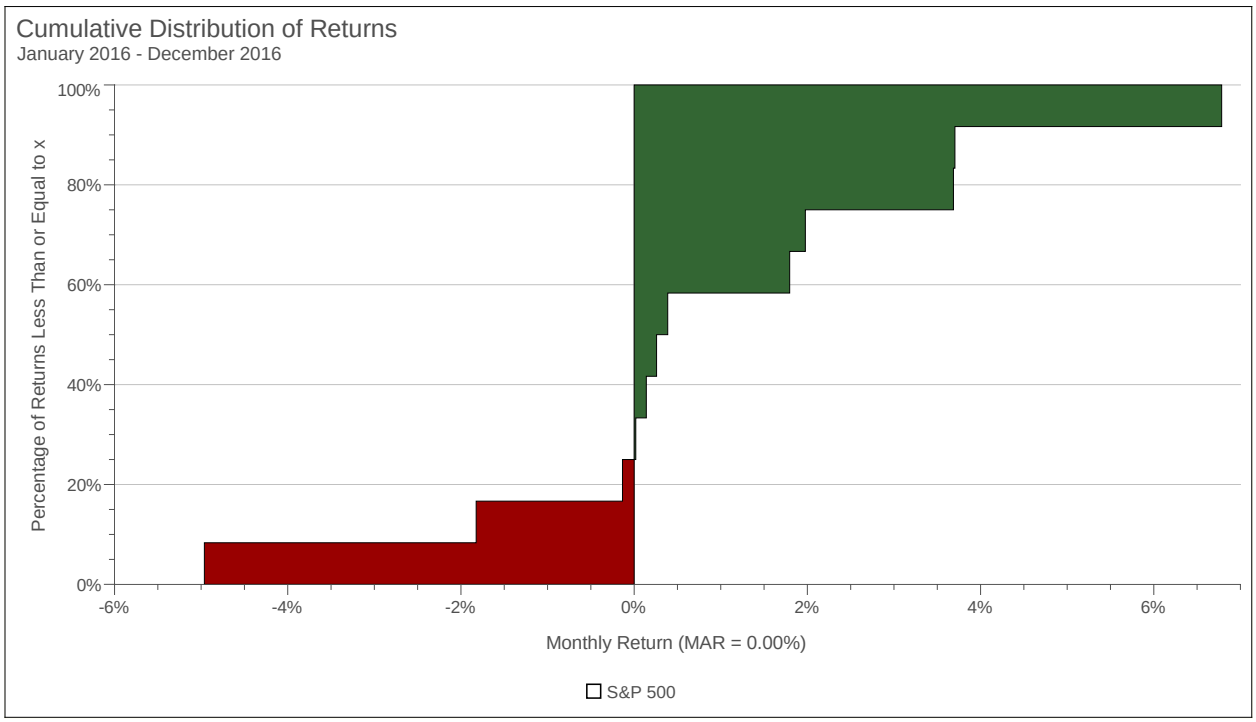
On the StatMAP, the omega risk metric is a useful risk/return trade-off measurement for tail risk.

Put simply, Omega is the ratio of an investment's gains relative to its losses. It gives you an idea of whether an investment's return will be met or exceeded.

Keating and Shadwick developed omega and named their metric after the last letter in the Greek alphabet: omega. The idea was that omega would be the last metric anyone would ever need. While I don't think there is an end-all, be-all risk metric, omega does offer unique insight into how outlier events impact an investment's return distribution.

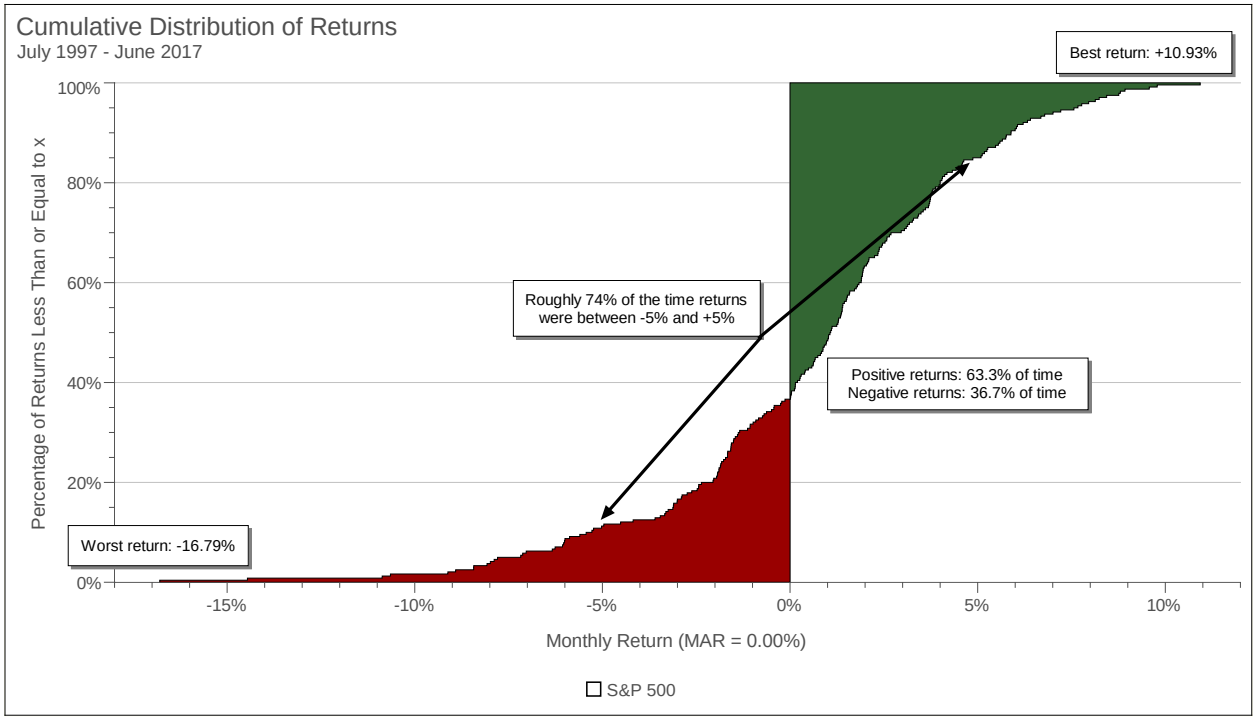
Calculating Omega

To think about this visually, let's first look at the distribution of returns for the S&P 500 for 2016. In the graph below, we see a distribution of the 12 monthly returns sorted from worst to first. The worst return in 2016 was -4.96%, the best was 6.78%. Three months were negative, one was very close to zero, and eight months were positive.



Source: Zephyr StyleADVISOR

This graph might not be too interesting if one only looks at a single year. It's chunky and doesn't seem to tell you too much. However, if you were to expand the time horizon to something larger like 20 years, the picture becomes much more informative.



Source: Zephyr StyleADVISOR

The worst one-month return over the last 20 years was -16.79% and the best was 10.93%. Returns were positive (green area) 63.3% of the time whereas returns were negative (red area) 36.7% of the time. Roughly 74% of the returns fell somewhere between -5% and +5%. This graph gives us an excellent idea of what the overall distribution of returns looks like.

Omega is derived from this graph. The green area, the gains, represents the count and scale of monthly returns that fall above a minimum accepted return (MAR), in this case set to 0%. Ideally, this green area would be quite large. The red area, on the other hand, represents the count and scale of observations that fall below the MAR, the losses. One would hope this area to be as small as possible. Omega is calculated by dividing the good, green area by the bad, red area[1].

Evaluating Omega

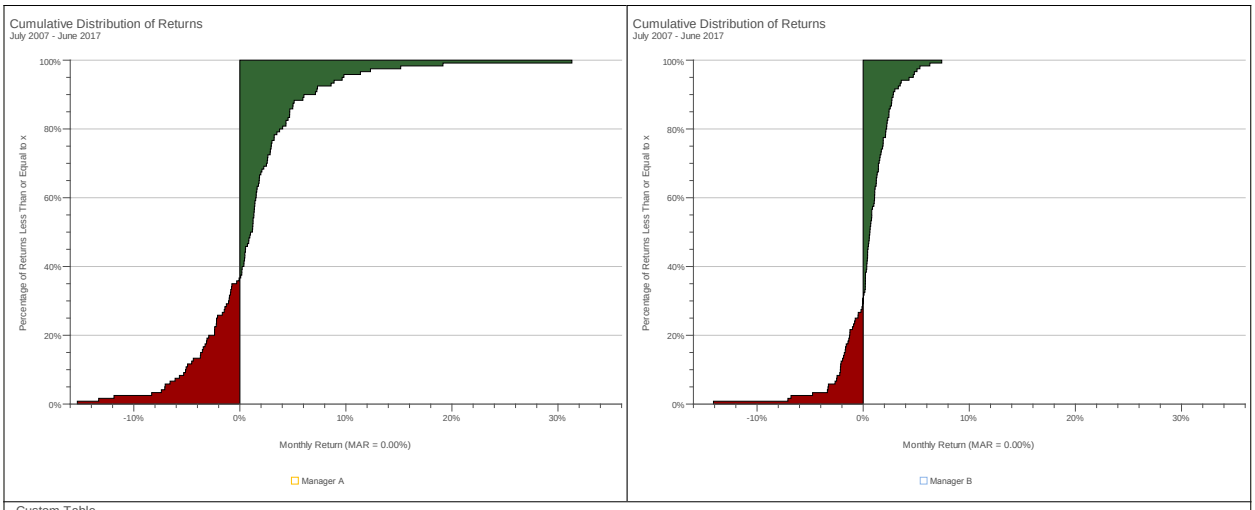
What should be apparent by looking at the omega graph is the impact of outlier events on the calculation of omega. If there are numerous observations well below (or above) the MAR, they will equate to large amounts of real estate. Conversely, if most of the monthly observations fall somewhere close to the MAR, they won't generate a lot of area to be measured. Therefore, omega is an excellent metric for determining the impact of extreme, outlier events.

Since omega is a ratio with a "good" number in the numerator and a "bad" measure in the denominator, an analyst would hope to see large omega numbers. And just like the pain index or pain ratio, there is not an absolute value that one can use as a reference point to determine whether an omega is good or bad. The omega would need to be compared against that of a benchmark or a group of peers.

[1] Omega was developed by Con Keating and William Shadwick in 2002. http://www.isda.org/c_and_a/pdf/GammaPub.pdf

Upside Omega and Downside Omega

If there is one drawback to omega, it is that it rolls the "good" (the green area) together with the "bad" (the red area) to form a single number. But what if one only wants to analyze the downside risk or upside potential in isolation? Omega doesn't account for that. After all, it's possible that a manager has a very small green area and a very small red area while a different manager has very large green and red areas, but at the end of the day the omegas are roughly the same. This situation is displayed in the chart below.



Custom Table
July 2007 - June 2017: Summary Statistics

	Omega (MAR = 0.00%)	Upside Omega (MAR= 0.00%)	Downside Omega (MAR= 0.00%)
Manager A	1.67	2.41%	1.44%
Manager B	1.67	1.15%	0.69%

Source: Zephyr StyleADVISOR

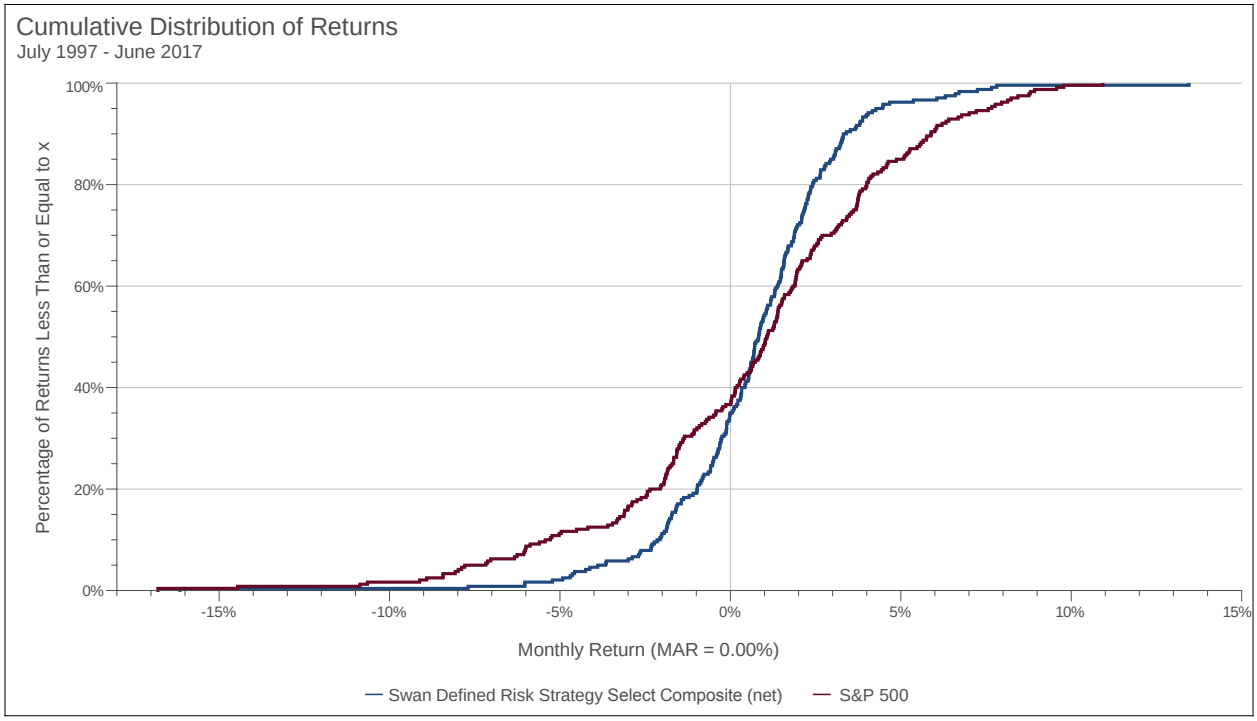
One refinement to the concept of omega is to simply look at the two halves independently and not roll them up into a single ratio[2]. This is called upside omega and downside omega. Obviously, one hopes upside omega is large, signifying 1) many observations above the MAR, 2) extreme observations above the MAR, or 3) both. Conversely, one hopes downside omega is small for the same reasons.

Omega and the Defined Risk Strategy

Omega can help advisors understand how well an investment strategy or alternative approach mitigates tail risk. Advisors will want to compare the omega ratios of a few funds to properly assess this.

Using the Defined Risk Strategy (DRS) as an example, the DRS Select Composite has historically done a good job mitigating losses. However, there is a cost to this: The price of protecting on the downside is to give up some of the returns on the upside. The graph below illustrates this trade-off.

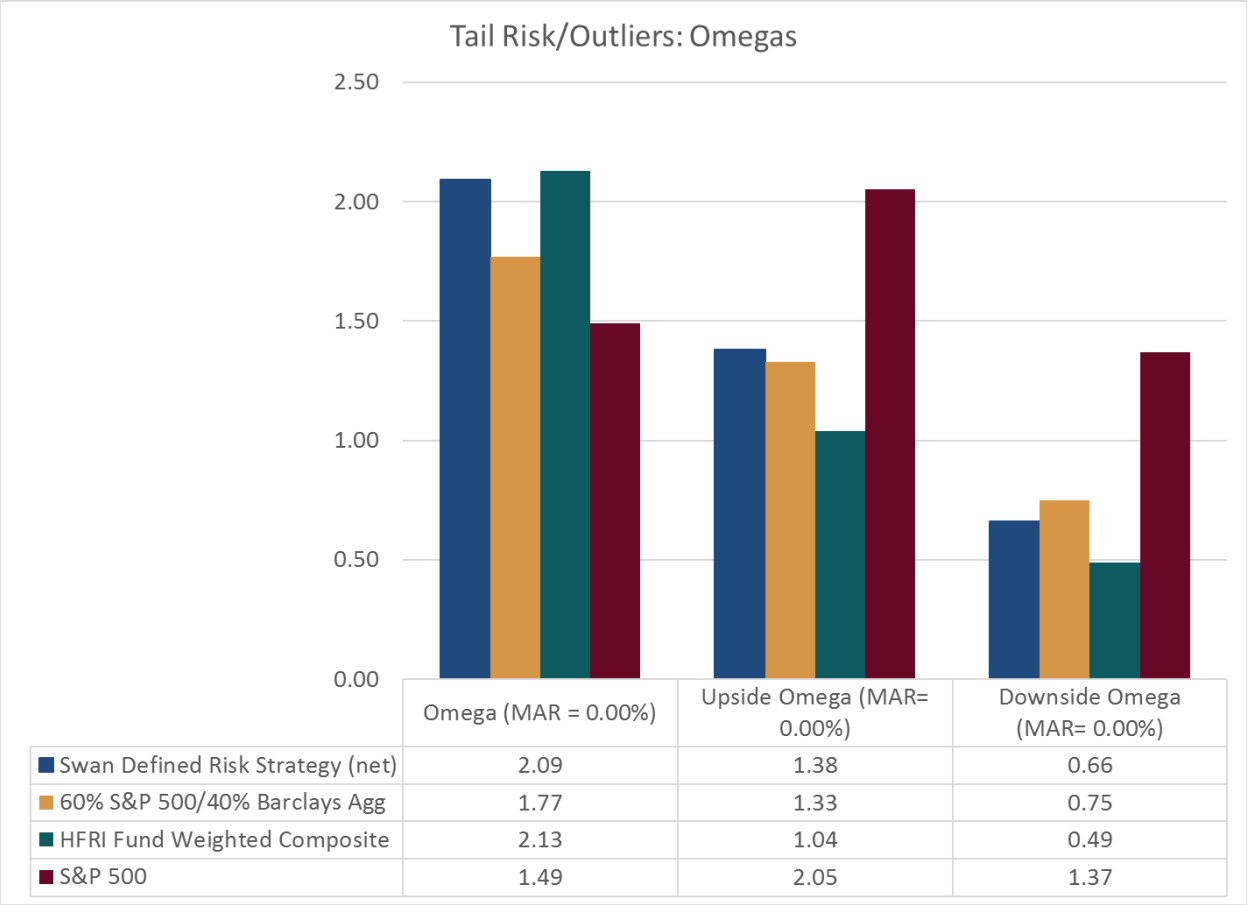
[2] Breaking out omega into its separate components was not part of the original Keating and Shadwick paper. It was an enhancement brought about by Zephyr Associates.



Source: Zephyr StyleADVISOR. The S&P 500 Index is an unmanaged index and cannot be invested into directly. Past performance is no guarantee of future results. DRS results are from the DRS Select Composite, net of all fees, from July 7, 1997 to June 30, 2017.

The S-graph for the DRS Select Composite is narrower than the S-graph for the S&P 500. The area encapsulated by the count and scale of returns less than 0% (i.e., the downside omega) is smaller than that of the S&P 500—a good thing. However, the trade-off is the upside omega area, representing the count and scale of returns greater than 0%, which is less than that of the S&P 500.

It has always been Swan's philosophy that protecting against losses is more important than capturing all of the upside gains. The graphs below illustrate how the DRS Select Composite's history reflects this bias between the months of July 7, 1997 and June 30, 2017.



	Omega (MAR = 0.00%)	Upside Omega (MAR= 0.00%)	Downside Omega (MAR= 0.00%)
Swan Defined Risk Strategy (net)	2.09	1.38	0.66
60% S&P 500/40% Barclays Agg	1.77	1.33	0.75
HFRI Fund Weighted Composite	2.13	1.04	0.49
S&P 500	1.49	2.05	1.37

Source: Zephyr StyleADVISOR, Swan Global Investments. The Barclays U.S. Aggregate Bond Index and the S&P 500 Index are unmanaged indices and cannot be invested into directly. DRS results are from the DRS Select Composite, net of all fees, from July 7, 1997 to June 30, 2017. Past performance is no guarantee of future results. Structures mentioned may not be available within your Broker/Dealer.

You can quantify this trade-off by dividing the upside omega by the downside omega to get the overall omega ratio. For the DRS, the omega is 2.09, whereas the omega for the S&P 500 is 1.49. As stated earlier, one would hope to have larger omega numbers; this means the ratio between the good and bad areas of the distribution is skewed more to the positive with the DRS.

The omega ratio for the DRS is slightly less than that of the hedge fund index, 2.09 versus 2.13. The DRS has more upside omega (1.38 vs 1.04) but also more downside area (0.66 vs 0.49). At the end of the day, the trade-off between upside and downside is roughly equal between the two.

While omega won't be the one and only risk metric to evaluate investments with, omega provides insight into how outlier events affect the distribution of a given investment—an important attribute for those who want to protect investment portfolios from major market events. Advisors can use this metric when comparing funds' historical avoiding or minimizing the impact of "black swan" events.

About the Author:

Marc Odo, CFA®, CAIA®, CIPM®, CFP®, Director of Investor Solutions, is responsible for helping clients and prospects gain a detailed understanding of Swan's Defined Risk Strategy, including how it fits into an overall investment strategy. Formerly, Marc was the Director of Research for 11 years at Zephyr Associates.

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