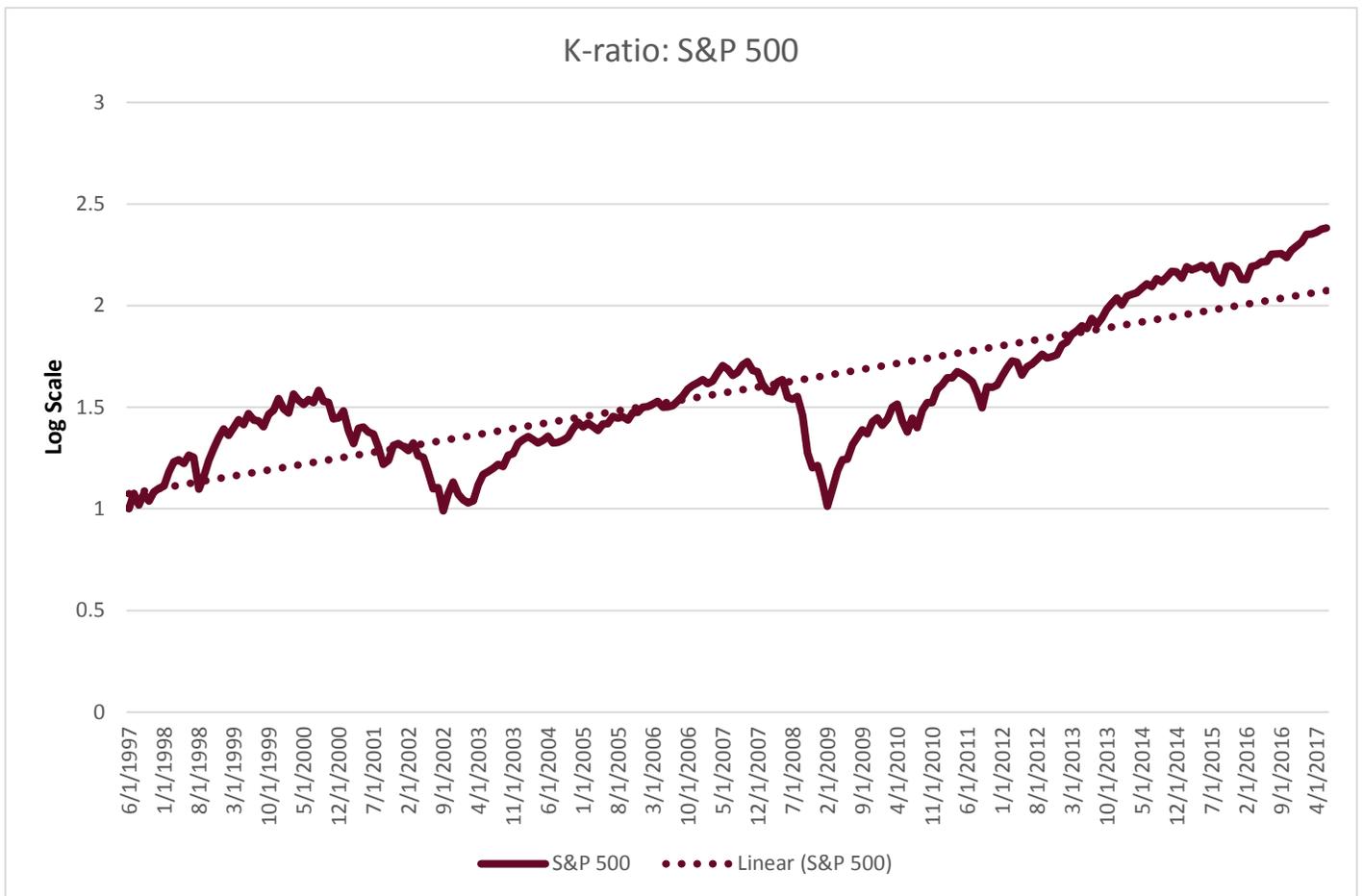


Zephyr K-Ratio

Risk Metrics Series



Source: Zephyr StyleADVISOR, Swan Global Investments

The objective of this ongoing educational series of blog posts is to sort through, explain, and organize all of the various performance metrics that are available to the financial analyst, but most investors really want just two things:

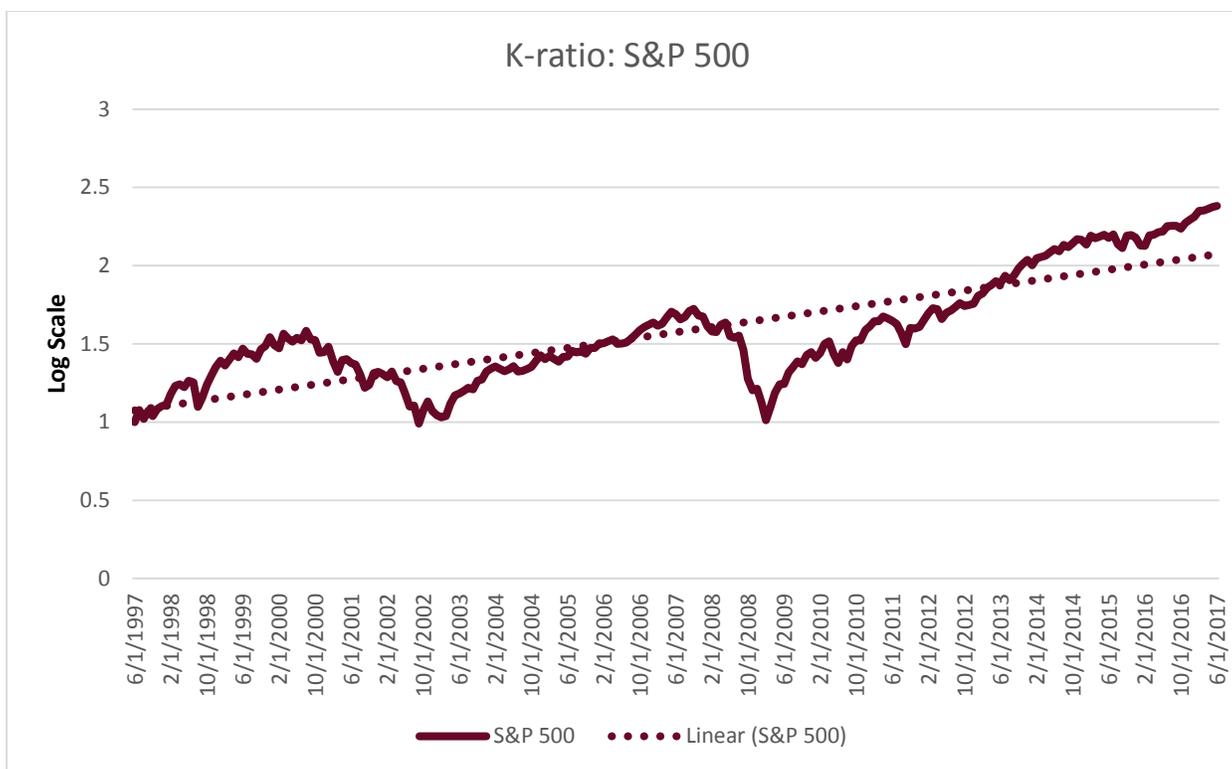
1. They want their wealth to appreciate at a rapid rate
2. They do not want to deviate from that path of wealth appreciation

Luckily, there's a ratio for that: Zephyr K-Ratio¹. This ratio measures the consistency of wealth creation over time.

The Steeper the Slope, The Faster the Climb

Let's begin with an illustration to help understand this new metric.

Below we see a cumulative return graph for the S&P 500 over the last 20 years². Superimposed over the actual data is a straight, best-fit line.



Source: Zephyr StyleADVISOR, Swan Global Investments

The slope of the line is the return measure, so the steeper the slope of that line, the better. A steeper slope indicates a more rapid pace of wealth appreciation.

Obviously in real life the path of wealth appreciation is not a straight line. There are many ups and downs along the way. However, a straight line of wealth appreciation can be thought of as an ideal. If an investment offered a consistent rate of

¹ The K-ratio was first proposed by Lars Kestner in 1996. The Zephyr K-ratio is a variation of the K-ratio that removes an element of the formula that incorporates the number of data points used in the calculation. http://www.styleadvisor.com/sites/default/files/article/zephyr_concepts_zephyr_k_ratio_pdf_41672.pdf

² Because this is a cumulative return graph, it takes into account the compounding of wealth. In order to superimpose a best-fit line over a compounding series, the graph must first be converted to a log scale.

wealth appreciation with no deviations on a month-to-month or year-to-year basis, it would likely find an enthusiastic pool of investors.

Calculating & Evaluating the Zephyr K-Ratio

The K-ratio is the slope of the best-fit line that measures capital appreciation divided by the standard error of the mean, which it uses as its measure of risk.

The standard error of the mean is subtly but importantly different than the standard deviation used in most performance and risk statistics. While standard deviation measures how much individual observations of data tend to be dispersed from the mean value, standard error of the mean is a test of the mean itself—it is a way to indicate how precise or accurate a mean value is.

Using the standard error of the mean as a measure of risk allows us to see just how closely an actual return pattern matches that idealized straight line. The smaller the standard error of the mean, the closer the actual return series is to the idealized straight line. Conversely, a large standard error of the mean indicates that the actual path the investment takes meanders far and wide off the straight line.

With this ratio, the larger the number the better, and a comparison to peers is necessary to determine whether a number is “good” or “bad.”

K-Ratio Addresses a Standard Deviation Flaw

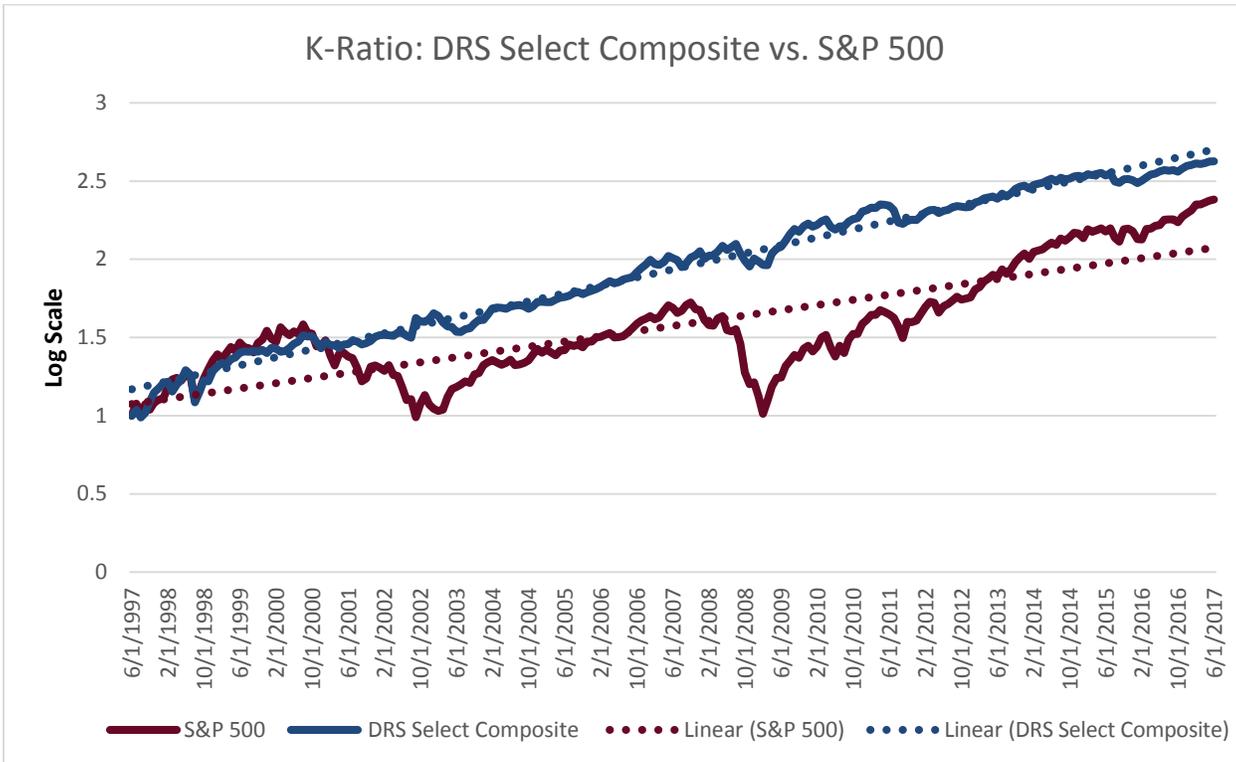
As an added benefit, the K-ratio addresses one of the long-standing complaints regarding the use of standard deviation as a risk measure: it does not and cannot take into account the timing of bad returns. If there are a dozen very bad monthly returns over the span of ten years, standard deviation cannot tell whether those bad months were randomly scattered throughout a decade or if they were all clustered in a small period of time. Anyone who remembers the dark days of late 2008/early 2009 can recall that some of the worst months in memory were tightly clustered within a few quarters.

The standard error of the mean and the K-ratio remedy this. A financial crisis pushes the investment from the idealized straight line, so you can clearly see where that cluster of bad months happened.

The Zephyr K-Ratio in Action: A Comparison

For the K-ratio to have meaning, it must be compared to other investments' K-Ratios. Using the Defined Risk Strategy (DRS) as an example, we compare the K-Ratio for the DRS Select Composite to the S&P 500.

The DRS Select Composite looks strong when analyzed in terms of consistency of wealth creation in contrast to the S&P 500. First of all, the slope of the best-fit line is steeper than that of the S&P 500, meaning the DRS Select Composite does a better job of creating wealth.



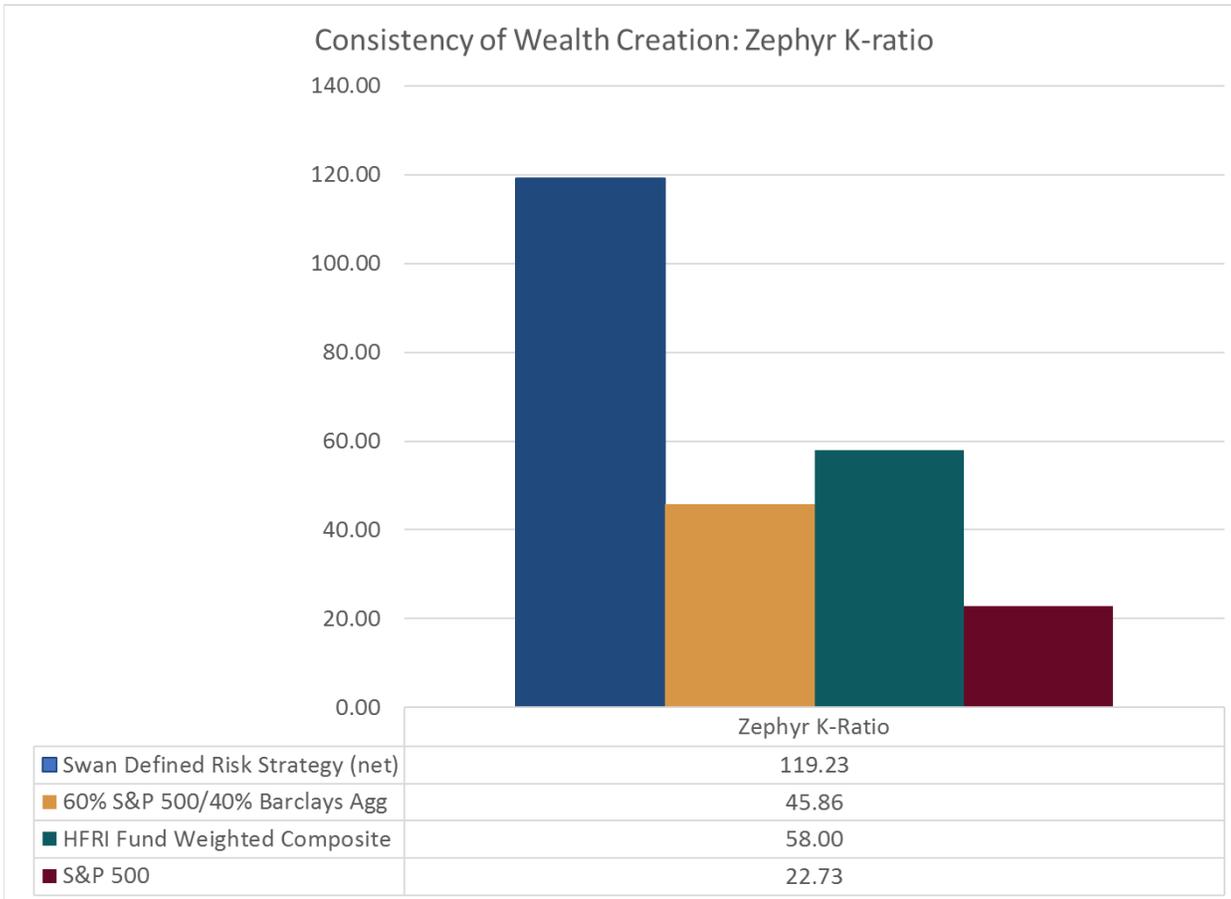
Source: Zephyr StyleADVISOR, Swan Global Investments. All S&P 500 data based on historical performance of the S&P Total Return Index. All historical performance of the Swan DRS Select Composite is net of fees. Prior performance is not a guarantee of future results.

Secondly, and more importantly, the actual data line tends to hug the idealized best-fit line much more closely than the S&P 500 fits its ideal line. This is the consistency part of the equation.

A strong return metric divided by a smaller risk metric will certainly lead to better overall ratios. That is what we see with the K-ratio metric—the DRS winning on both the wealth creation and consistency fronts.

Defined Risk Strategy: Smooth & Consistent Wealth Creation

The DRS was devised with this goal in mind: to provide a nice, smooth, constant rate of wealth creation. The K-ratio illustrates how well the strategy was able to achieve that goal.



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.

The DRS Select Composite's K-ratio is 119.23, much better than the S&P 500's 22.73. The S&P 500's K-ratio shows that the two big bear markets in 2000-02 and 2007-09 had a big impact on an investor's path of wealth creation. The balanced 60/40 mix and the hedge fund index did better than the S&P 500 with K-ratios of 45.86 and 58.00, respectively, but are well short of the DRS Select Composite's K-ratio of 119.23.

An investment made solely in a S&P 500 product would have been knocked severely off course by those crises. Of course, anyone who had been through those periods remembers those events, but the K-ratio allows us to quantify the impact of those events on one's wealth creation.

About the Author:



Marc Odo CFA®, CAIA®, CIPM®, CFP®, Director of Investment 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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All Swan products utilize the Defined Risk Strategy ("DRS"), but may vary by asset class, regulatory offering type, etc. Accordingly, all Swan DRS product offerings will have different performance results due to offering differences and comparing results among the Swan products and composites may be of limited use. All data used herein, including the statistical information, verification and performance reports are available upon request. The S&P 500 Index is a market cap weighted index of 500 widely held stocks often used as a proxy for the overall U.S. equity market. The 60/40 benchmark is a blended composite, weighted 60% in the aforementioned S&P 500 Index and 40% in the Barclays US Aggregate Bond Index to represent balanced portfolios. The Barclays US Aggregate Bond Index is a broad-based flagship benchmark that measures the investment grade, US dollar-denominated, fixed-rate taxable bond market. The index includes Treasuries, government-related and corporate securities, MBS (agency fixed-rate and hybrid ARM pass-throughs), ABS and CMBS (agency and non-agency). HFRI Fund Weighted Composite Index: The HFRI Fund Weighted Composite Index is a global, equal-weighted index of over 2,000 single-manager funds that report to HFR Database. Constituent funds report monthly net of all fees performance in US Dollar and have a minimum of \$50 Million under management or a twelve (12) month track record of active performance. The HFRI Fund Weighted Composite Index does not include Funds of Hedge Funds.

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