Available SPAR Statistics

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This page lists the risk and return statistics and calculations available in SPAR.

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Note The "All Periods" option available for some SPAR statistics (e.g., Annualized Standard Deviation All Periods), is used to calculate annualized values for periods that are less than one year.

A

Adjusted Beta

The adjusted beta reflects that over time, the beta of all stocks regress towards the beta of the market, which is defined as one. The adjusted beta is calculated as the Adjustment Factor percentage multiplied by the raw beta, plus one minus the Adjustment Factor multiplied by the beta of the market.

*Adjusted Beta = (Adj Factor * Raw Beta) + ((1 - Adj Factor) * 1.0)*

Adjusted R-Squared

Adjusted R-squared is used in conjunction with style benchmarks in style analysis. It adjusts for the number of component series used to build the style benchmark. The adjusted R-squared will always be less than or equal to R-squared.

*Adjusted R-Squared = [1 - [(# of Returns - 1) / (# of Returns - # of Style Components)] * Variance(Excess Return of Manager Series over Benchmark Series) / Variance(Manager Series)] * 100*

Alpha

The standard intercept. Alpha is a risk (beta-adjusted) return measurement. If two managers had the same return, but one had a lower beta, that manager would have a higher alpha.

$$\alpha = \frac{1}{n}\sum_{i=1}^{n} x_i - \beta \frac{1}{n}\sum_{i=1}^{n} y_i$$

where:
α = Alpha
ß = Beta
x_i = Portfolio return for period i
y_i = Benchmark return for period i

Alpha T-Stat

A value, determined from sample information, used to determine whether or not to reject the null hypothesis. This value has to be greater than the critical value in order to be statistically significant.

$$\frac{alpha\ (\alpha)}{std\ error\ of\ alpha\ (\alpha)}$$

Annualized Alpha

Measures the fund's value added relative to a benchmark. It is the Y intercept of the regression line.

$$\left(\left(\left(1 + \frac{\alpha}{100}\right)^{frequency\ period}\right) - 1\right) * 100$$

where:
α = Alpha
frequency period = varies (e.g., "12" for months in the year or "4" for quarters)

Annualized Standard Deviation

A statistical measure of the degree to which an individual value in a probability distribution tends to vary from the mean of the distribution. This value is annualized by multiplying the population standard deviation by the square root of the frequency annual periods (260 for daily frequency, 12 for monthly frequency, 4 for quarterly frequency). The greater degree of dispersion, the greater degree of risk.

Note When you select an annualized statistic, instead of using the default period you can specify the number of days to use in the calculation within the Dates tab.

For periods greater than one year:

$$portfolio\ standard\ deviation\ (population) * \sqrt{frequency\ annual\ periods}$$

For periods less than one year:

$$portfolio\ standard\ deviation\ (population)$$

Annualized Standard Deviation (Sample)

A statistical measure of the degree to which an individual value in a probability distribution tends to vary from the mean of the distribution. This value is annualized by multiplying the sample standard deviation by the square root of the annual number of the frequency (260 for daily frequency, 12 for monthly frequency, 4 for quarterly frequency). The greater degree of dispersion, the greater degree of risk.

Note When you select an annualized statistic, instead of using the default period you can specify the number of days to use in the calculation within the Dates tab.

For periods greater than one year:

$$portfolio\ standard\ deviation\ (sample) * \sqrt{frequency\ annual\ periods}$$

For periods less than 1 year:

$$portfolio\ standard\ deviation\ (sample)$$

Asset-Weighted Standard Deviation

Asset-weighted measure of the consistency of performance of the components of a composite.

$$\sqrt{\frac{\sum W_i R_i^{\,2}}{\sum W_i} - \left(\frac{\sum W_i R_i}{\sum W_i}\right)^2}$$

where:
W_i = weight of the i^{th} portfolio at the beginning of the period
R_i = annual return of the portfolio

Appraisal Ratio

The ratio used to measure the quality of a fund's investment picking ability. The Appraisal Ratio compares the fund's alpha to the portfolio's unsystematic risk.

$$Appraisal\ Ratio = \frac{Fund\ Alpha}{Non\text{-}Systematic\ Risk}$$

Average Return

The mean of the entire return series over a given time period.

$$\frac{1}{n}\sum_{i=1}^{n} r_i$$

where:
r_i = Portfolio return for period i

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B

Batting Average

The number of periods that the portfolio outperforms (or matches) the benchmark divided by the total number of periods.

Note This statistic is available through the consolidated SPAR statistic Observations.

Best/Worst Return

The highest/lowest absolute return over a given time period.

$$Max(r_1, \ , r_n)$$

where:

r_i = Portfolio return for period i

--OR--

$$Min(r_1, \ , r_n)$$

where:

r_i = Portfolio return for period i

Beta

The systematic risk of a portfolio. The beta of a portfolio is its sensitivity to a benchmark. A portfolio with a beta of 1 is as risky as the benchmark and would therefore provide expected returns equal to those of the market during both up and down periods. A portfolio with a beta of 2 would move approximately twice as much as the benchmark.

$$\beta = \frac{n\sum_{i=1}^{n} x_i y_i - \sum_{i=1}^{n} x_i \sum_{i=1}^{n} y_i}{n\sum_{i=1}^{n} y_i^2 - \sum_{i=1}^{n} (y_i)^2}$$

where:
x_i = Portfolio return for period i
y_i = Benchmark return for period i

Beta T-Stat

A value, determined from sample information, used to determine whether or not to reject the null hypothesis. T-Stat = Beta Coefficient divided by Standard Error of the Beta Coefficient. This value must be greater than the critical value in order to be statistically significant.

$$\frac{beta\ (\beta)}{std\ error\ of\ beta\ (\beta)}$$

Bias Ratio

The bias ratio measures how far the returns from a portfolio are from an unbiased distribution.

$$\frac{\mathrm{Count}(r_i | r_i \in [0, +\sigma])}{1 + \mathrm{Count}(r_i | r_i \in [-\sigma, 0))}$$

where:
[0,+s] = The closed interval from zero to +1 standard deviation of returns (including zero and +s)
[-s,0) = The half open interval from -1 standard deviation of returns to zero (including -s and excluding zero)
r_i = Return in month i, 1 = i = n, and n = number of monthly returns

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C

Calmar Ratio

Calmar Ratio = Compounded Annual Return / Maximum Drawdown (using the absolute value)

Capture

Upside/Downside capture explains how well a portfolio performs in time periods where the benchmark's returns are greater/less than zero.

$$\frac{\substack{\textit{Cumulative return of the portfolio} \\ \textit{in the period where the corresponding} \\ \textit{benchmark return is greater or less than zero}}}{\substack{\textit{Cumulative return of the benchmark} \\ \textit{in periods where the return is greater or less than zero}}}$$

Capture Ratio

This is the ratio of upside capture to downside capture.

Capture Ratio = Upside Capture / Downside Capture

Consecutive Observations

Counts the largest set of consecutive return value occurrences based on the criteria chosen within the statistic options.

Correlation

The linear relationship between two return series. Correlation shows the strength of the relationship between two return series. The higher the correlation, the more similar the returns.

$$\rho_{xy} = \frac{Cov(X,Y)}{\sigma_x \sigma_y}$$

where:
Cov(x,y) = Covariance between portfolio returns and benchmark returns
s_x = Standard deviation of portfolio returns
s_y = Standard deviation of benchmark returns

Covariance

The covariance function returns the covariance between two float arrays.

$$Cov(X,Y) = \frac{\sum_{i=1}^{n} (X_i - \bar{X})(Y_i - \bar{Y})}{n-1}$$

where:
n = Sample size
X_i = The ith value of X
X¯ = The mean of all X values
Y_i = The ith value of Y
? = The mean value of all Y values

Custom Field

Use this statistic to display (non-return) data from $$Performance.ofdb. For more information, see Using SPAR Custom Fields Data.

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D

D-Statistic

The D-statistic is the sum of the absolute value of the negative returns divided by the sum of the absolute value of all returns. The statistic value can be any rational number between 0 and 1. A low D-statistic, combined with a high Hurst, indicates the presence of positive return persistence.

Downmarket Return

Portfolio return only looking at periods where the benchmark had negative returns.

The Annualized Downmarket Return uses all periods as the basis for annualization. The Subperiod statistic only uses the actual number of periods where the benchmark had negative returns for annualization.

Drawdown Index

This is commonly known as the mean value of drawdowns over a given analysis period.

$$abs\left(\frac{\int_{t_1}^{t_2} D(x)dx}{(t_2 - t_1)}\right)$$

where:
abs = Absolute value
t_1 and t_2 = Time period one and two

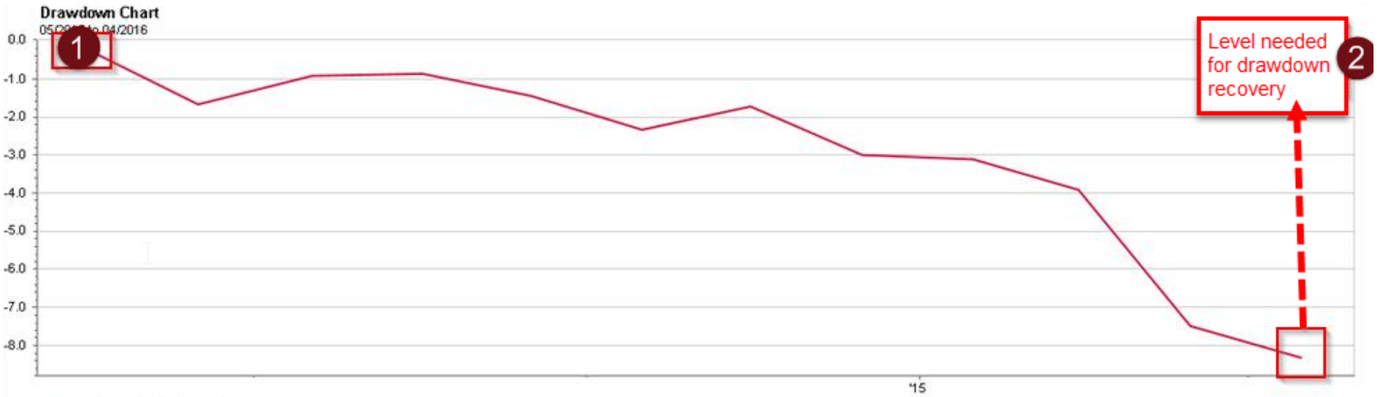
Drawdown Ratio

The risk/ratio that uses the drawdown index as its measure of risk.

(Annualized Portfolio Return - Annualized Risk Free Rate Return) / Drawdown Index

Drawdown Recovery Period

The the amount of time it takes the portfolio to make up the losses (or recover) from the max drawdown (i.e., the largest loss). The easiest way to prove out the drawdown recovery period is to use the Drawdown Chart.



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E

Error

The sum of the squares of the difference between the observed and expected value.

$$\frac{\sum_{i=1}^{n} (y_i - \alpha - \beta x_i)^2}{n-2}$$

where:
y_i = Portfolio return for period i
x_i = Benchmark return for period i
a = Alpha
ß = Beta

Equal-Weighted Standard Deviation

Equal-weighted measure of the consistency of performance of the components of a composite.

$$\sqrt{\frac{\sum R_i^2}{n} - \left(\frac{\sum R_i}{n}\right)^2}$$

where:
R_i = annual return for portfolio i
n = number of portfolios in the composite

Excess Return Over Market Risk

The ratio of excess return (relative to the benchmark) divided by by the standard deviation of the benchmark's return.

Excess Standard Deviation

The excess of the fund's standard deviation relative to the benchmark's standard deviation.

Excess Variance

The sum of the squares of the deviation from the mean. Variance measures the dispersion of the distribution.

$$\frac{n\sum_{i=1}^{n} r_i^2 - (\sum_{i=1}^{n} r_i)^2}{n^2}$$

where:
r_i = Portfolio return for period i

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G

Gain to Loss Ratio

Absolute value of the ratio of average positive returns to average negative returns.

Growth of X

The growth of a specified initial fund value based on observed returns over the specified period.

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H

High Water Mark

The % gain the fund needs to reach the high water mark of the cumulative return series.
$1/(1 + u) - 1$

Hurst

The Hurst exponent (H) is a statistical measure used to classify time series. H = 0.5 indicates a random series while H > 0.5 indicates a trend-reinforcing series. A larger H value is indicative of a stronger trend. The calculation uses rescaled range analysis to estimate the value of the Hurst exponent.

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I

Information Ratio

A measure of consistency in excess return. The annualized excess return over a benchmark divided by the annualized standard deviation (population) of excess return.

$$\frac{ann\ portfolio\ return - ann\ benchmark\ return}{tracking\ error}$$

where:
Tracking Error = Population standard deviation of portfolio excess returns

Information Ratio T-Stat

The value of the information ratio multiplied by the square root of the periods per year (based on frequency).

Investment Multiple (TVPI)

Shows the total value of a fund as a percentage of its cost basis; also called the Total Value Multiple.

Investment Multiple = Total Value / Paid-In Capital

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J

Jarque-Bera

Jarque-Bera is a test of the normality of a returns distribution.

$$JB = \frac{n}{6}\left(S^2 + \frac{1}{4}K^2\right)$$

$$S = \frac{\hat{\mu}_3}{\hat{\sigma}^3} = \frac{\frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})^3}{\left(\frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})^2\right)^{3/2}}$$

$$K = \frac{\hat{\mu}_4}{\hat{\sigma}^4} - 3 = \frac{\frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})^4}{\left(\frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})^2\right)^2} - 3$$

where:
n = Number of observations
S = Skewness
K = Excess Kurtos

Jensen Alpha

A risk-adjusted performance measure that is the excess return of a portfolio over and above that predicted by the CAPM, given the portfolio's beta and the average market return. Jensen Alpha measures the value added of an active strategy.

$$\alpha_J = ann\ port\ ret - \left[ann\ risk\ free\ rate\ ret + \beta\left(ann\ bench\ ret - ann\ risk\ free\ rate\ ret\right)\right]$$

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K

K-Ratio

A risk-reward ratio that takes the sequence of observed returns into account.

$$\frac{\begin{array}{c}Slope\ of\ best\ fit\ regression\ line\\ upon\ cumulative\ return\ line\end{array}}{Standard\ error\ of\ best\ fit\ line}$$

Kelly Criterion

The Kelly Criterion calculation is commonly used in gambling scenarios to determine the optimal amount of money to bet in order to maximize long-term capital growth. Many people also use the calculation as a general money management system for investing and portfolio sizing.

$$Kelly\ \% = W - [(1 - W) / R]$$

where:
W = The win probability that any given trade you make will return a positive amount
R = The win/loss ratio where the total positive trade amount is divided by the total negative trade amount

The output is the Kelly percentage

Kurtosis

Kurtosis is the level of "peakedness" or flatness of a distribution relative to the normal distribution. Higher kurtosis indicates a relatively peaked distribution; negative kurtosis indicates a relatively flat distribution.

$$\left\{\frac{n(n+1)}{(n-1)(n-2)(n-3)}\sum\left(\frac{x_j - t}{s}\right)^4\right\} - \frac{3(n-1)^2}{(n-2)(n-3)}$$

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L

Longest Drawdown

Returns the length of the period during which the longest drawdown length occurred. Longest Drawdown and Maximum Drawdown use the same basic underlying calculation, with Longest returning the greatest number of periods in the drawdown and Maximum showing the most negative value. The units returned are dependent on the frequency (e.g., if you select a monthly frequency, the drawdown period will be reported in months).

Note Drawdown does not reset whenever there's a positive return. It only resets once the cumulative return is 0%.

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M

Market Value

Total value of fund or portfolio.

Martin Ratio

The ratio of the fund's excess returns compared to the risk free rate by the Ulcer Index.

Maximum Drawdown

A fund's largest loss from a peak to a trough in a certain time period. In other words, the maximum loss from any point during the period. Maximum Drawdown and Longest Drawdown use the same basic underlying calculation, with Maximum showing the most negative value in the drawdown and Longest returning the greatest number of periods.

Note Drawdown does not reset whenever there's a positive return. It only resets once the cumulative return is 0%.

Maximum Gain

A fund's largest gain from a trough to a peak in a certain time period. In other words, the maximum gain from any point during the period.

Median Return

The median of the entire return series over a given time period.

Modified Information Ratio

A measure of consistency in excess return. The annualized excess return over a benchmark divided by the annualized standard deviation (population) of excess return.

$$\frac{(Investment\ Return - Benchmark\ Return)}{Tracking\ Error^{(ER/absER)}}$$

where:
ER = Excess Return = (Investment Return - Benchmark Return)

Modified Sharpe Ratio

A risk-adjusted measure that measures reward per unit of risk. The higher the Sharpe Ratio, the better. The numerator is the difference between the portfolio's annualized return and the annualized return of a risk-free instrument. The denominator is the portfolio's annualized standard deviation (population).

$$\frac{(Investment\ Return - Risk\text{-}Free\ Rate\ of\ Return)}{Standard\ Deviation^{(ER/absER)}}$$

where:
ER = Excess Return = (Investment Return - Risk-Free Rate of Return)

Modified Sortino Ratio

The Sortino Ratio is similar to the Sharpe Ratio except the Sortino Ratio uses annualized downside deviation for the denominator, whereas Sharpe uses annualized standard deviation. The numerator is the difference between the portfolio's annualized return and the Minimum Acceptable Return (MAR). The denominator is the portfolio's annualized downside deviation.

$$\frac{investment\ return - MAR}{downside\ deviation^{(ER/absER)}}$$

where:
ER = Excess Return = (Investment Return - MAR)
Downside Deviation = $\left[\sqrt{\frac{1}{n}\sum_{i=1}^{n}(r_i)^2}\right] * \sqrt{frequency\ annual\ period}$
r_i = Portfolio return for period i less than 0

Modified Treynor Ratio

Measures reward per unit of beta risk. The numerator of this ratio is the difference between the portfolio annualized return and the annualized return of the risk-free instrument (T-Bills). The denominator is the portfolio's beta.

$$\frac{investment\ return - risk\text{-}free\ rate\ of\ return}{beta^{(ER/absER)}}$$

where:
ER = Excess Return = (Investment Return - Risk-Free Rate of Return)

M-Squared

M-squared is a performance measurement using return per unit of total risk as measured by the standard deviation. The investment portfolio's standard deviation (a measure of how spread out its returns are) is adjusted to reflect the standard deviation of the market benchmark portfolio. The return premiums of the adjusted investment portfolio and the market index portfolio are then compared.

M-squared is named after its developers, Leah Modigliani and Franco Modigliani.

$$m^2 = \left[\left(\frac{r - r_f}{\sigma r}\right) * \sigma \overline{r}\right] + r_f$$

where:
r = Annualized portfolio return
$\overline{r}$ = Annualized index return
r_f = Annualized risk free return
sr = Annualized standard deviation of portfolio return
s$\overline{r}$ = Annualized standard deviation of index return

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N

Number of Portfolios

Total number of portfolios in a composite at the end of a report period.

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O

Observations

Counts the set of return value occurrences based on the criteria selected within the statistic options.

Omega

For any return level (r), the number is the probability-weighted ratio of gains to losses, relative to the threshold (r).

$$\Omega(r) = \frac{\int_r^b (1 - F(x))dx}{\int_a^r F(x)dx}$$

where:
(a, b) = Interval of returns
F = Cumulative distribution of returns
r = Return level

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P

Percent Gain

The number of positive periods divided by the number of positive periods for the benchmark.

Paid-in Capital

Paid-in capital is the cumulative amount of capital that has been drawn down from a private equity fund.

PIC Multiple

The percentage of a private equity fund's committed capital that has actually been drawn down.

PIC Multiple= Paid-In Capital / Committed Capital

Predicted R-Squared

Predicted R-squared indicates how well the regression model predicts responses for new observations, whereas R-squared indicates how well the model fits your data.

Profit Loss Ratio

This value represents the ratio of positive returns to negative returns for a certain period.

$$\left(\frac{sum\ of\ positive\ returns\ for\ Period\ i}{sum\ of\ negative\ returns\ for\ Period\ i}\right) * -1$$

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R

Realization (DPI) Multiple

The realization multiple gives a potential private equity investor insight into how much of the fund's return has been realized (i.e., paid out to investors); also called Distributions Multiple.

Realization Multiple = Cumulative Distributions / Paid-In Capital

Return

The gain or loss of the portfolio over the specified period.

R-Squared

R-squared is the correlation squared. It is used in style analysis to determine how much information about a return series the style benchmark has been able to capture. The higher the R-squared, the better the benchmark. Thus, if you are looking at the R-squared statistic for a fund versus two different benchmarks, the benchmark with the higher statistic does a better job explaining the return of the fund in question.

$$r = \frac{n(\sum_{i=1}^{n} x_i y_i) - \sum_{i=1}^{n} x_i \sum_{i=1}^{n} y_i}{\sqrt{\left[n\sum_{i=1}^{n} x_i^2 - (\sum_{i=1}^{n} x_i)^2\right]\left[n\sum_{i=1}^{n} y_i^2 - (\sum_{i=1}^{n} y_i)^2\right]}}$$

where:
x_i = Portfolio return for period i
y_i = Benchmark return for period i

Residual Multiple (RVPI)

The RVPI multiple provides a measurement of how much of a private equity fund's return is unrealized and dependent on the market value of its investments.

RVPI Multiple= Residual Value / Paid-In Capital

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S

Semi-Standard Deviation

A characterization of the upside/downside risk of a distribution. The semi-variance of the return above/below the mean or target is calculated. The semi-standard deviation is the square root of the semi-variance. The semi-standard deviation is always lower than the total standard deviation of the distribution.

Semi-Tracking Error

Tracking error is the active risk of the portfolio. The semi–tracking error is the upside/downside annualized standard deviation of the returns between the portfolio and the benchmark. In other words, it is calculated by creating a new return series of the excess returns and then calculating the standard deviation of the positive/negative returns.

annualized standard deviation(x_1 - y_1,,,,,x_n - y_n)

where:
x_i = Portfolio return for period i
y_i = Benchmark return for period i
x_i - y_i = 0 for upside OR x_i - y_i less than 0 for downside

Semi-Variance

The sum of the squares of the deviation above/below the mean or target. It measures the dispersion of the distribution.

Sharpe Ratio

A risk-adjusted measure that measures reward per unit of risk. The higher the Sharpe Ratio, the better. The numerator is the difference between the portfolio's annualized return and the annualized return of a risk-free instrument. The denominator is the portfolio's annualized standard deviation (population).

$$\frac{ann\ portfolio\ return - ann\ risk\ free\ rate\ return}{annualized\ standard\ deviation\ portfolio\,(population)}$$

Skewness

Skewness characterizes how far in either direction a distribution's tail extends. Positive skewness indicates the tail extends to the right, in the positive direction. Negative skewness indicates the tail extends to the left, in the negative direction.

$$\left(\frac{n}{(n-1)(n-2)}\right)\sum\left(\frac{x_j - t}{s}\right)^3$$

Sortino Ratio

The Sortino Ratio is similar to the Sharpe Ratio except the Sortino Ratio uses annualized downside deviation for the denominator, whereas Sharpe uses annualized standard deviation. The numerator is the difference between the portfolio's annualized return and the Minimum Acceptable Return (MAR). The denominator is the portfolio's annualized downside deviation.

$$\frac{annualized\ portfolio\ return - MAR}{annualized\ downside\ deviation}$$

where:

Downside Deviation = $\left[\sqrt{\frac{1}{n}\sum_{i=1}^{n}(r_i)^2}\right] * \sqrt{frequency\ annual\ period}$

r_i = Portfolio return for period i less than 0

Standard Deviation

A statistical measure of the degree to which an individual portfolio return tends to vary from the mean, based on the entire population. The greater degree of dispersion, the greater degree of risk.

$$\sqrt{\frac{n\sum_{i=1}^{n} r_i^2 - (\sum_{i=1}^{n} r_i)^2}{n^2}}$$ where:

r_i = Portfolio return for period i

Sterling Ratio

A measure of the risk-adjusted return of a portfolio.

Sterling Ratio = Annualized 3-Year Return / Absolute Value (3-Year Average of Yearly Maximum Drawdown - Threshold Percentage)

Stock Selection

This measures the effect of stock selection in a fund.

$$Stock\ Selection = 1 - (R\text{-}Squared)$$

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T

Total Firm Assets

Total assets under management for a defined firm.

Total Value

The total fair value of a private equity fund.

Total Value = (Residual or Composite) Market Value + Cumulative Distributions

Tracking Error

The active risk of the portfolio. It determines the standard deviation of the excess returns between the portfolio and the benchmark. It is calculated by creating a new return series of the excess returns and then calculating the population standard deviation of that return series. Similar to other statistics, Tracking Error includes a variety of options that you can select that will impact the calculation. For example, selecting the "Annualize" option for Tracking Error uses the following calculation:

For periods greater than one year:

$$\sqrt{\frac{n\sum_{i=1}^{n} e_i^2 - (\sum_{i=1}^{n} e_i)^2}{n^2}} * \sqrt{frequency\ annual\ periods}$$

For periods less than 1 year:

$$\sqrt{\frac{n\sum_{i=1}^{n} e_i^2 - (\sum_{i=1}^{n} e_i)^2}{n^2}}$$

where:

e_i = Portfolio Return

$_i$ - Benchmark Return$_i$

Treynor Ratio

Measures reward per unit of beta risk. The numerator of this ratio is the difference between the portfolio annualized return and the annualized return of the risk free instrument (T-Bills). The denominator is the portfolio's beta.

$$\frac{annualized\ portfolio\ return - annualized\ risk\ free\ return}{Beta_{port}}$$

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U

Ulcer Index

The Ulcer Index measures the riskiness of investments by factoring in the depth and duration of drawdowns from recent peaks. A large value indicates a riskier fund.

Upmarket Return

Portfolio return only looking at periods where the benchmark had positive returns.

The Annualized Upmarket Return uses all periods as the basis for annualization. The Subperiod statistic only uses the actual number of periods where the benchmark had positive returns for annualization.

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V

Value at Risk (VaR)

Value at Risk (VaR) is a ranked return statistic. An array of returns is sorted from greatest to least, and the resulting list is divided into 100 buckets (similar to percentiles, with the "1" bucket corresponding to the highest returns). The one-day VaR over a given confidence interval is the worst return from the confidence interval's corresponding bucket. So, for instance, the one-day VaR with 66% confidence is the worst return from the "66" bucket. To determine VaR over higher time frames, multiply the one-day VaR of the desired confidence interval by the square root of the days desired.

Variance

The sum of the squares of the deviation from the mean. Variance measures the dispersion of the distribution.

$$\frac{n\sum_{i=1}^{n} r_i^2 - \left(\sum_{i=1}^{n} r_i\right)^2}{n^2}$$

where:
r_i = Portfolio return for period i

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