

Quick Guide to Risk Metrics

Fundamental Investing

This quick reference guide defines some of the most commonly used investment performance terms. Refer to it as needed and feel free to share it as applicable.

Alpha

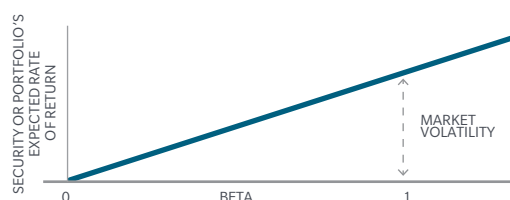
Measures a portfolio's risk-adjusted performance against that of its benchmark

- A positive alpha indicates relative outperformance.
- A negative alpha indicates relative underperformance.

Beta

Measures the volatility of a security or portfolio to that of the market movements

- A beta less than 1.0 indicates likely lower volatility than the market.
- A beta greater than 1.0 indicates likely higher volatility than the market.



Capture ratio

Measures the percentage of benchmark return captured by a portfolio manager during a specified period

- Upside capture: A ratio greater than one indicates that the portfolio outperforms in up markets.
- Downside capture: A ratio less than one, even negative, indicates that the portfolio outperforms in down markets.

$$\text{Capture ratio} = \frac{\text{Portfolio return}}{\text{Benchmark return}} \times 100$$

Correlation

Measures how a portfolio's asset classes move in relation to each other in response to market events

- Correlation ranges from +1 to -1. The closer two assets are to a +1 correlation, the more likely they are to move in the same direction.
- A negative correlation indicates two assets moving in opposite directions.
- Low or negative correlation among assets within a portfolio may help reduce overall portfolio volatility.

Government securities				
-0.14	High yield			
-0.23	0.69	Value stocks		
-0.06	0.68	0.76	REITs	
0.33	0.73	0.59	0.53	Emerging market debt

Information ratio

Measures the consistency of a portfolio manager's performance versus the benchmark

- A higher, positive information ratio indicates the manager has beaten the benchmark without taking excessive risks.

$$\text{Information ratio} = \frac{\text{Excess return}}{\text{Tracking error}}$$

Fundamental Investing

R² (R-squared)

That part of a portfolio's volatility that can be explained by movements in its benchmark or market

- An R² of 100% shows that all movements of a portfolio are completely explained by movements in the benchmark or market.
- A low R² indicates that little of the portfolio's movement can be explained by benchmark or market movements.

Sharpe ratio

Measures the reward-to-risk efficiency of a portfolio

- The higher the Sharpe ratio, the better the portfolio's historical risk-adjusted performance.

Sharpe ratio

=

Portfolio's return – Risk-free rate*

Portfolio's standard deviation

* Defined as 3-month T-bill or appropriate market-specific asset for non-USD portfolios

Standard deviation

A common statistical measure of portfolio volatility

- Standard deviation measures how much a portfolio's total return varies from its mean or average.
- The more a portfolio's returns fluctuate from month to month, the higher its standard deviation and the greater its volatility.

Tracking error

Measures the volatility of a portfolio's excess return versus its benchmark

- An actively managed portfolio typically has a high tracking error.
- An index fund is expected to have a tracking error close to zero.

Hypothetical examples are for illustrative purposes only and do not represent any MFS investment product.

The views expressed are those of the author(s) and are subject to change at any time. These views are for informational purposes only and should not be relied upon as a recommendation to purchase any security or as a solicitation or investment advice. No forecasts can be guaranteed.

Unless otherwise indicated, logos and product and service names are trademarks of MFS® and its affiliates and may be registered in certain countries.

Distributed by: **U.S.** - MFS Investment Management; **Latin America** - MFS International Ltd.

Please note that in Europe and Asia Pacific, this document is intended for distribution to investment professionals and institutional clients only. In Canada, this document is intended for institutional use only.

Note to Canadian readers: Issued in Canada by MFS Investment Management Canada Limited. No securities commission or similar regulatory authority in Canada has reviewed this communication. **Note to UK and Switzerland readers:** Issued in the UK and Switzerland by MFS International (U.K.) Limited ("MIL UK"), a private limited company registered in England and Wales with the company number 03062718, and authorised and regulated in the conduct of investment business by the UK Financial Conduct Authority. MIL UK, an indirect subsidiary of MFS®, has its registered office at One Carter Lane, London, EC4V 5ER. **Note to Europe (ex UK and Switzerland) readers:** Issued in Europe by MFS Investment Management (Lux) S.à r.l. (MFS Lux) – authorized under Luxembourg law as a management company for Funds domiciled in Luxembourg and which both provide products and investment services to institutional investors and is registered office is at S.à r.l. 4 Rue Albert Borschette, Luxembourg L-1246. Tel: 352 2826 12800. This material shall not be circulated or distributed to any person other than to professional investors (as permitted by local regulations) and should not be relied upon or distributed to persons where such reliance or distribution would be contrary to local regulation; **Singapore** - MFS International Singapore Pte. Ltd. (CRN 201228809M); **Australia/New Zealand** - MFS International Australia Pty Ltd ("MFS Australia") holds an Australian financial services licence number 485343. MFS Australia is regulated by the Australian Securities and Investments Commission.; **Hong Kong** - MFS International (Hong Kong) Limited ("MIL HK"), a private limited company licensed and regulated by the Hong Kong Securities and Futures Commission (the "SFC"). MIL HK is approved to engage in dealing in securities and asset management regulated activities and may provide certain investment services to "professional investors" as defined in the Securities and Futures Ordinance ("SFO"); **For Professional Investors in China** – MFS Financial Management Consulting (Shanghai) Co., Ltd. 2801-12, 28th Floor, 100 Century Avenue, Shanghai World Financial Center, Shanghai Pilot Free Trade Zone, 200120, China, a Chinese limited liability company registered to provide financial management consulting services.; **Japan** - MFS Investment Management K.K., is registered as a Financial Instruments Business Operator, Kanto Local Finance Bureau (FIBO) No.312, a member of the Investment Trust Association, Japan and the Japan Investment Advisers Association. As fees to be borne by investors vary depending upon circumstances such as products, services, investment period and market conditions, the total amount nor the calculation methods cannot be disclosed in advance. All investments involve risks, including market fluctuation and investors may lose the principal amount invested. Investors should obtain and read the prospectus and/or document set forth in Article 37-3 of Financial Instruments and Exchange Act carefully before making the investments.